2001

ski-doo

Skandic LT/WT/SWT/WT LC
Touring Cargo 380/500
Touring Fan 380/500
Formula Deluxe Fan 380/500
MX Z Fan 380/440/500
Summit Fan 500

Volume 1

Shop Manual

484 200 022

2001
Shop Manual

VOLUME 1

SKANDIC LT/WT/SWT/WT LC
TOURING CARGO 380/500
TOURING FAN 380/500
FORMULA DELUXE FAN 380/500
MX Z FAN 380/440/500
SUMMIT FAN 500

BOMBARDIER
RECREATIONAL PRODUCTS

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SAFETY NOTICE

This manual has been prepared as a guide to correctly service and repair some 2001 Ski-Doo snowmobiles. See model list below.

This edition was primarily published to be used by snowmobile mechanic technicians who are already familiar with all service procedures relating to Bombardier made snowmobiles. Mechanic technicians should intent to continuous training courses given by Bombardier Training Dept.

Please note that the instructions will apply only if proper hand tools and special service tools are used.

This *Shop Manual* uses technical terms which may be slightly different from the ones used in the *Parts Catalog*.

It is understood that this manual may be translated into another language. In the event of any discrepancy, the English version shall prevail.

The content depicts parts and/or procedures applicable to the particular product at time of writing. *Service* and *Warranty Bulletins* may be published to update the content of this manual. Make sure to read and understand these.

In addition, the sole purpose of the illustrations throughout the manual, is to assist identification of the general configuration of the parts. They are not to be interpreted as technical drawings or exact replicas of the parts.

The use of Bombardier parts is most strongly recommended when considering replacement of any component. Dealer and/or distributor assistance should be sought in case of doubt.

The engines and the corresponding components identified in this document should not be utilized on product(s) other than those mentioned in this document.

Torque wrench tightening specifications must be strictly adhered to. Locking devices (ex.: locking tab, self-locking fasteners, etc.) must be installed or replaced with new ones. If the efficiency of a locking device is impaired, it must be renewed.

This manual emphasizes particular information denoted by the wording and symbols:

⚠ WARNING

Identifies an instruction which, if not followed, could cause serious personal injury including possibility of death.

CAUTION: Denotes an instruction which, if not followed, could severely damage vehicle components.

NOTE: Indicates supplementary information needed to fully complete an instruction.

Although the mere reading of such information does not eliminate the hazard, your understanding of the information will promote its correct use. Always use common shop safety practice.

Bombardier Inc. disclaims liability for all damages and/or injuries resulting from the improper use of the contents. We strongly recommend that any services be carried out and/or verified by a highly skilled professional mechanic. It is understood that certain modifications may render use of the vehicle illegal under existing federal, provincial and state regulations.

WHAT'S NEW

INTRODUCTION

- Procedure to change self-locking fasteners.

OIL INJECTION SYSTEM 04-06

- Different pump adjustments according to pump identification.

REWIND STARTER 04-09

- New type of lubricant is used on all moving parts.

INTRODUCTION

This *Shop Manual Volume 1* covers the following Bombardier made 2001 snowmobiles:

MODELS	MODEL NUMBER
SKANDIC* LT (Canada)	1816
SKANDIC* LT (U.S.)	1817
SKANDIC* WT (Canada)	1814
SKANDIC* WT (U.S.)	1815
SKANDIC* SWT (Canada)	1812
SKANDIC* SWT (U.S.)	1813
SKANDIC* WT LC (Canada)	1810
SKANDIC* WT LC (U.S.)	1811
TOURING* FAN 380 (Canada)	1807
TOURING* FAN 380 (U.S.)	1808
TOURING* CARGO 380 (Canada)	1854
TOURING* CARGO 380 (Europe)	1809
TOURING* FAN 500 (Canada)	1804
TOURING* FAN 500 (U.S.)	1805
TOURING* CARGO 500 (Canada)	1852
TOURING* CARGO 500 (Europe)	1806
FORMULA* DELUXE FAN 380 (Canada)	1784
FORMULA* DELUXE FAN 380(U.S.)	1785
FORMULA* DELUXE FAN 500 (Canada)	1782
FORMULA* DELUXE FAN 500 (U.S.)	1783
MX Z FAN 380 (Canada)	1721
MX Z FAN 380 (U.S.)	1722
MX Z FAN 380 (EUROPE)	1835
MX Z FAN 440 (Canada)	1821
MX Z FAN 440 (U.S.)	1822
MX Z FAN 500 (Canada)	1719
MX Z FAN 500 (U.S.)	1720
SUMMIT FAN 500 (Canada)	1762
SUMMIT FAN 500 (U.S.)	1763

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Touring CARGO 380/500
Touring FAN 380/500
Formula Deluxe FAN 380/500
MX Z FAN 380/440/500

These are S-series models.

TYPICAL — S-SERIES

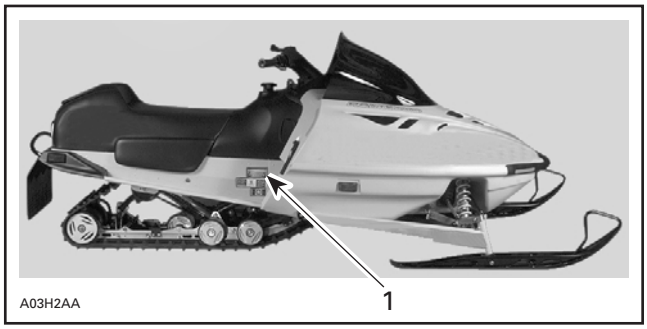
Skandic LT
Skandic WT
Skandic SWT
Skandic WT LC

These are Skandic Series models.

TYPICAL — SKANDIC SERIES

VEHICLE IDENTIFICATION NUMBER

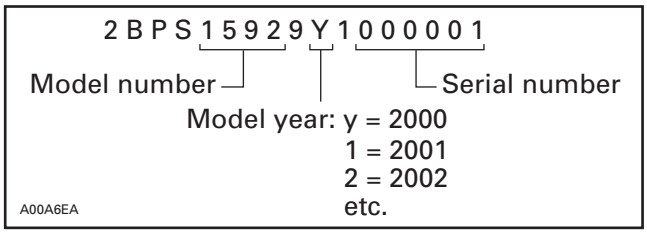
Vehicle Identification Number Location



TYPICAL

1. *Vehicle identification number*

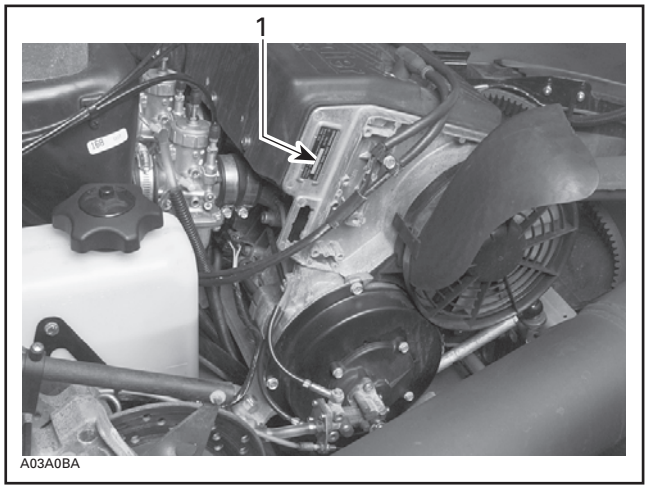
Vehicle Identification Number Meaning



ENGINE SERIAL NUMBER

Engine Serial Number Location

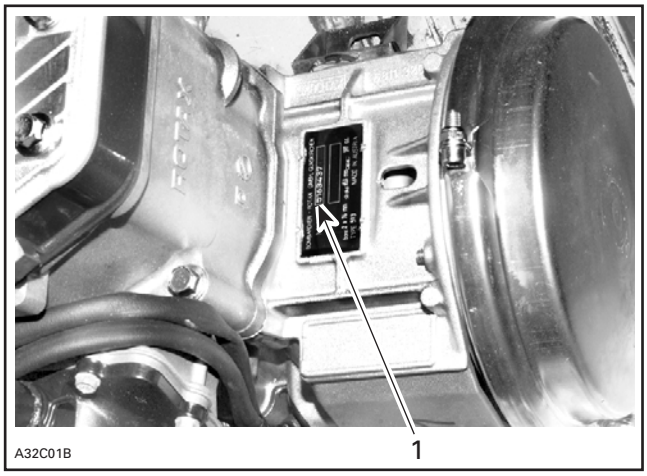
Fan-Cooled Engines



TYPICAL — FAN-COOLED ENGINES

1. *Engine serial number*

Liquid-Cooled Engines



TYPICAL — LIQUID-COOLED ENGINES

1. *Engine serial number*

LIST OF ABBREVIATIONS USED IN THIS MANUAL

A	ampere
amp	ampere
A•h	ampere-hour
AC	alternate current
ACM	acceleration and control modulator
ARM	advance ride management
BDC	bottom dead center
BTDC	before top dead denter
°C	degree Celsius
cc	cubic centimeter
CDI	capacitor discharge ignition
CTR	center
cm	centimeter
cm^2	square centimeter
cm^3	cubic centimeter
DC	direct current
DPM	digital performance management
DSA	direct shock action
°F	degree Fahrenheit
FC	fan cooled
fl. oz	fluid ounce
ft	foot
GRD	ground
H.A.C.	high altitude compensator
hal.	halogen
HI	high
imp. oz	imperial ounce
in	inch
in^2	square inch
in^3	cubic inch
k	kilo (thousand)
kg	kilogram
km/h	kilometer per hour
kPa	Kilopascal
L	liter
lb	pound
lbf	pound (force)
lbf/in^2	pound per square inch
LH	left hand
LO	low
LT	long track
m	meter
MAG	magneto
Max.	maximum
Min.	minimum
mL	milliliter
mm	millimeter
MPEM	multi-purpose electronic module
MPH	mile per hour
N	newton
N.A.	not applicable
no.	number
00.0	continuity
0.L	overload (open circuit)
O.D.	outside diameter
OPT	optional
oz	ounce
P/N	part number
PSI	pound per square inch
PTO	power take off
R	rectangular
RH	right hand
RAVE	rotax adjustable variable exhaust
RPM	revolution per minute
RMS	root mean square
RRIM	reinforced reaction injection molding
Sp. Gr.	specific gravity
ST	semi-trapezoidal
TDC	top dead center
TRA	total range adjustable
U.S. oz	ounce (United States)
V	volt
Vac	volt (alternative current)

INTRODUCTION

ARRANGEMENT OF THE MANUAL

The manual is divided into 11 major sections:

01 SERVICE TOOLS AND SERVICE PRODUCTS
02 LUBRICATION AND MAINTENANCE
03 TROUBLESHOOTING
04 ENGINE
05 TRANSMISSION
06 ELECTRICAL
07 REAR SUSPENSION
08 STEERING/FRONT SUSPENSION
09 BODY/FRAME
10 TECHNICAL DATA
11 WIRING DIAGRAMS

Each section is divided in various subsections, and again, each subsection has one or more division.

This *Shop Manual* uses technical terms wich may be slightly different from the ones in the parts catalog.

TYPICAL PAGE

Page heading indicates section and subsection detailed.

Subsection title indicates beginning of the subsection.

Italic subtitle above exploded view indicate pertaining models.

Exploded view assists you in identifying parts and related positions.

Drop represents a liquid product to be applied to a surface. In this case Loctite 271 to screw threads.

Bold face number indicates special procedure concerning this part.

Illustration number for publishing process.

Dotted box contains parts of a particular model in this case the short track models only.

Tightening torque nearby fastener. In this case, nut must be torqued to 4 N•m or 35 lbf•**in**.

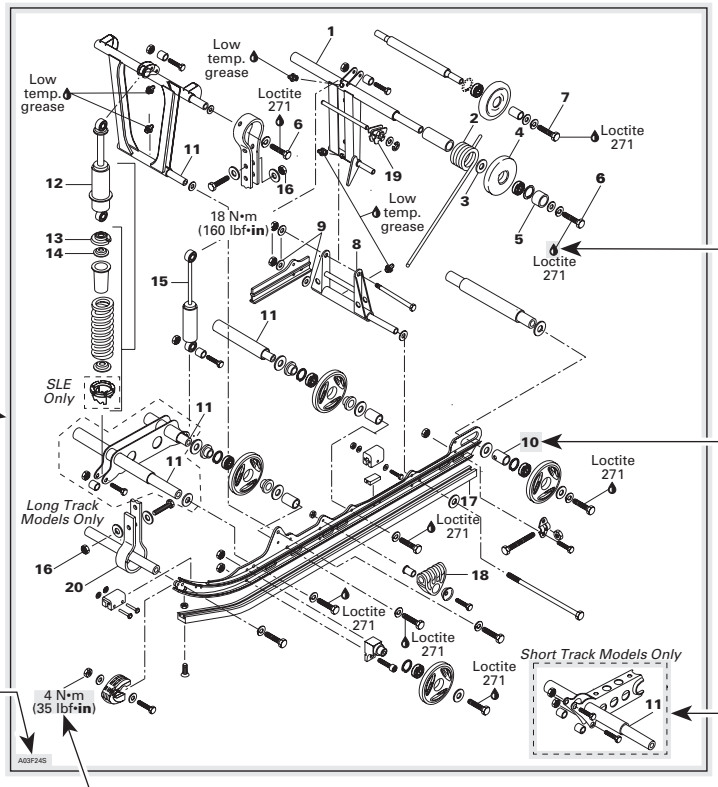
Page numbering system:
07: REAR SUSPENSION section
01: SUSPENSION SC-10 SPORT, TOURING AND MOUNTAIN subsection
1: First page of this subsection

CAUTION: Pay attention to torque specifications. Some of these are in lbf•**in** instead of lbf•ft. Use appropriate torque wrench.

Section 07 REAR SUSPENSION
Subsection 01 (SUPENSION SC-10 SPORT, TOURING AND MOUNTAIN)

SUSPENSION SC-10 SPORT, TOURING AND MOUNTAIN

Grand Touring 500/580, Formula 500/583 and Summit 500

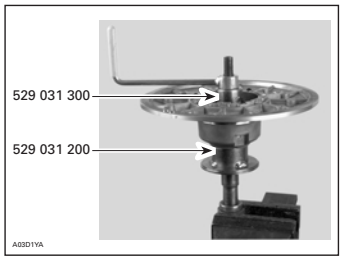


07-01-1

A01A28S

TYPICAL PAGE

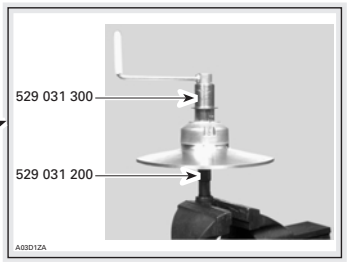
Turn puller handle and sliding half at once to extract the bushing.



IMPORTANT: Large bushing retaining screws and washers must be removed before small bushing installation.

Coat bushing outside diameter with Loctite 609 (P/N 413 703 100).

Install bushing as following photo.



ASSEMBLY

Came Slider Shoe

When replacing slider shoes **no. 4**, always install a new set (3 shoes) to maintain equal pressure on the cam.

Assemble driven pulley components by reversing the disassembly procedure.

Cam

Coat cam **no. 18** interior with anti-seize lubricant.

INSTALLATION

Countershaft

CAUTION: Always apply anti-seize lubricant (P/N 413 701 000) on the countershaft before final pulley installation.

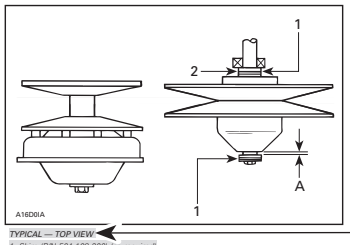
A-Series and B-Series Only

Should installation procedure be required, refer to BRAKE 05-05 then look for **Brake Disc and Countershaft Bearing Adjustment**.

Reinstall the pulley on the countershaft by reversing the removal procedure.

All Models

Check end play of driven pulley on countershaft by pushing pulley towards outer housing so that the inner shims (P/N 504 108 200) contact it. Measure end play at the mounting screw end between shim(s) and puley. See illustration.



TYPICAL — TOP VIEW.
1. Shim (P/N 504 108 200) (as required)
2. Contact
A. 0 to 1 mm (0 to 3/64 in)

Torque retaining screw **no. 13** to 25 N•m (18 lbf•ft).

ADJUSTMENT

Refer to PULLEY DISTANCE AND ALIGNMENT 05-04 to adjust pulley distance. Adjust drive belt height between pulley halves to obtain specified belt deflection.

Title indicates main procedure to be carried-out.

Italic bold face type setting indicates a particular procedure concerning a model.

Italic bold face setting in this case indicates that particular procedure for A and B-Series is finished, so from this point, all models are concerned.

"TYPICAL" caption indicates a general view which does not represent full detail. "TOP VIEW" caption helps you in understanding illustration.

Call-outs for above illustration.

Illustration always follows text to which it pertains.

Reference to look up a certain section and subsection. In this case it concerns pulleys adjustment.

Subtitle indicates a particular procedure for the named part.

Bold face number following part name refers to exploded view at beginning of subsection.

A01A2BS

GENERAL INFORMATION

The information and component/system descriptions contained in this manual are correct at time of publication. Bombardier Inc. however, maintains a policy of continuous improvement of its products without imposing upon itself any obligation to install them on products previously manufactured.

Due to late changes, it may have some differences between the manufactured product and the description and/or specifications in this document.

Bombardier Inc. reserves the right at any time to discontinue or change specifications, designs, features, models or equipment without incurring obligation.

USEFUL PUBLICATIONS

Refer to *Parts Catalogs* to order the right parts.

PARTS CATALOG	
MODELS	P/N
Skandic LT	484 400 153
Skandic WT/SWT/WT LC	484 400 093
Touring FAN 380/500 Touring CARGO 380/500	484 400 103
Formula DLX FAN 380 MX Z FAN 380	484 400 253
Formula DLX FAN 500 MX Z FAN 440/500	484 400 114
SUMMIT FAN 500	484 400 243

Use *Specification Booklet* to find rapidly the right specs.

1997-2001 SPECIFICATION BOOKLET (P/N 484 300 198).

ILLUSTRATIONS AND PROCEDURES

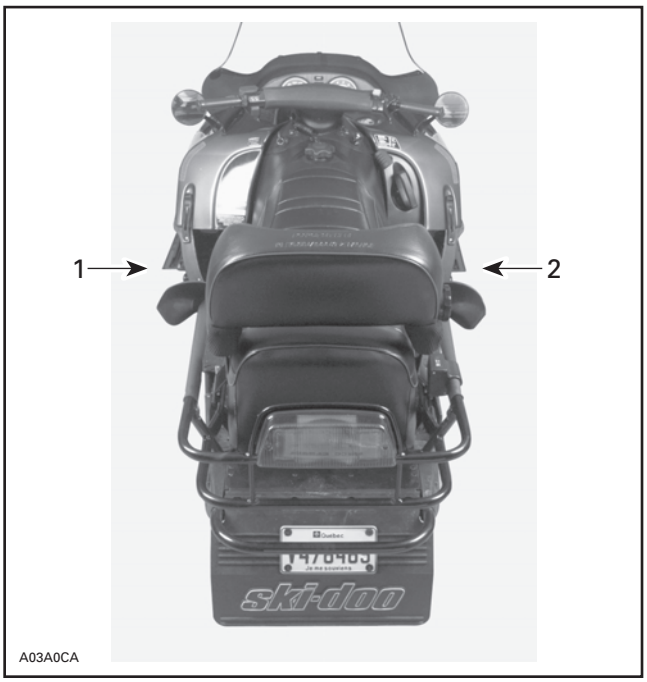
Illustrations and photos show the typical construction of the different assemblies and, in all cases, may not reproduce the full detail or exact shape of the parts shown. However, they represent parts which have the same or a similar function.

CAUTION: Most components of those vehicles are built with parts dimensioned in the metric system. Most fasteners are metric and must not be replaced by customary fasteners or vice versa. Mismatched or incorrect fasteners could cause damage to the vehicle or possible personal injury.

As many of the procedures in this manual are interrelated, we suggest, that before undertaking any task, you read and thoroughly understand the entire section or subsection in which the procedure is contained.

A number of procedures throughout the book require the use of special tools. Before commencing any procedure, be sure that you have on hand all the tools required, or approved equivalents.

The use of RIGHT and LEFT indications in the text, always refers to driving position (when sitting on vehicle).



TYPICAL

1. *Left*
2. *Right*

SELF-LOCKING FASTENERS PROCEDURE

The following describes the most common application procedures when working with self-locking fasteners.

Use a metal brush or a screwtap to clean the hole properly then use a solvent (Methyl-Chloride), let act during 30 minutes and wipe off. The solvent utilization is to ensure the adhesive works properly.

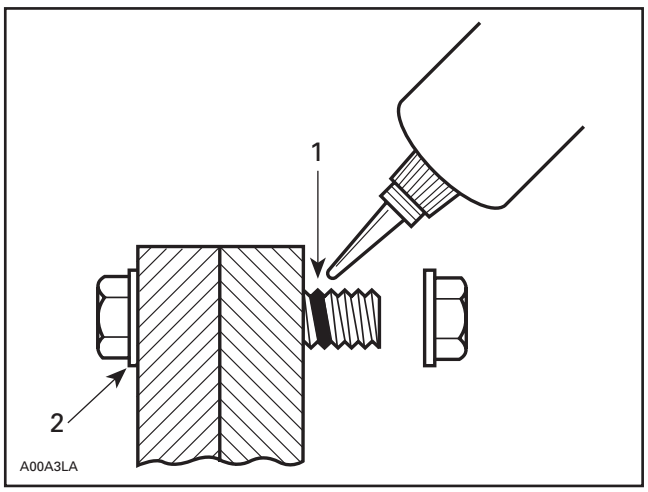
LOCTITE APPLICATION PROCEDURE

The following describes the most common application procedures when working with Loctite products.

NOTE: Always use proper strength Loctite product as recommended in this *Shop Manual*.

THREADLOCKER

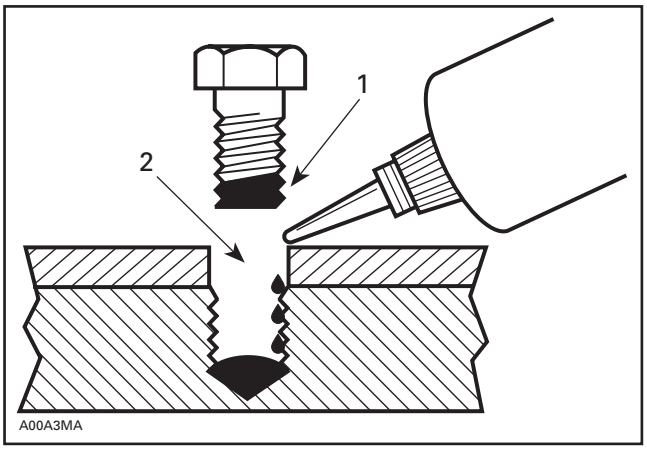
Uncovered Holes (bolts and nuts)



1. Apply here
2. Do not apply

1. Clean threads (bolt and nut) with solvent.
2. Apply Loctite Primer N (P/N 293 800 041) on threads and allow to dry.
3. Choose proper strength Loctite threadlocker.
4. Fit bolt in the hole.
5. Apply a few drops of threadlocker at proposed tightened nut engagement area.
6. Position nut and tighten as required.

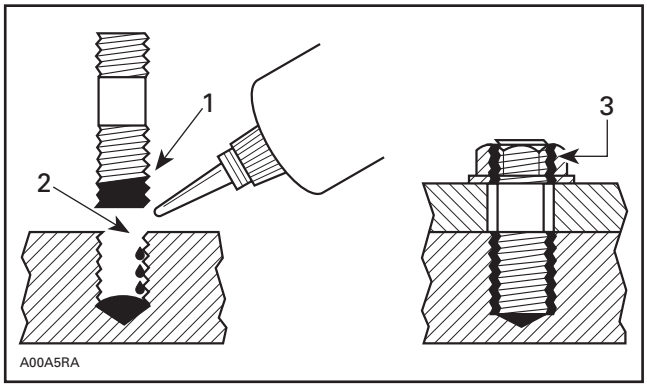
Blind Holes



1. On threads
2. On threads and at the bottom of hole

1. Clean threads (bolt and hole) with solvent.
2. Apply Loctite Primer N (P/N 293 800 041) on threads (bolt and nut) and allow to dry for 30 seconds.
3. Choose proper strength Loctite threadlocker.
4. Apply several drops along the threaded hole and at the bottom of the hole.
5. Apply several drops on bolt threads.
6. Tighten as required.

Stud in Blind Holes

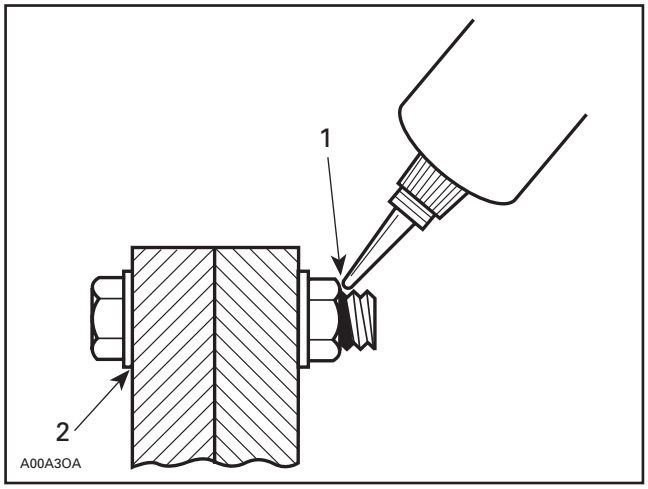


1. On threads
2. On threads and in the hole
3. Onto nut threads

1. Clean threads (stud and hole) with solvent.
2. Apply Loctite Primer N (P/N 293 800 041) on threads and allow to dry.
3. Put several drops of proper strength Loctite threadlocker on female threads and in hole.
4. Apply several drops of proper strength Loctite on stud threads.

5. Install stud.
6. Install cover, etc.
7. Apply drops of proper strength Loctite on uncovered threads.
8. Tighten nuts as required.

Preassembled Parts

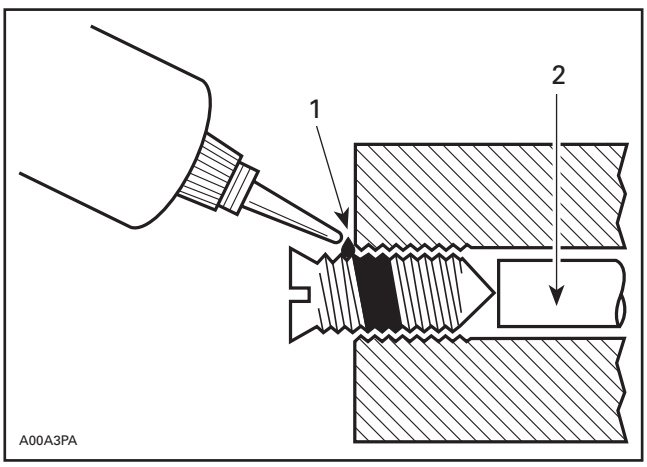


1. Apply here
2. Do not apply

1. Clean bolts and nuts with solvent.
2. Assemble components.
3. Tighten nuts.
4. Apply drops of proper strength Loctite on bolt/nut contact surfaces.
5. Avoid touching metal with tip of flask.

NOTE: For preventive maintenance on existing equipment, retighten nuts and apply proper strength Loctite on bolt/nut contact surfaces.

Adjusting Screw



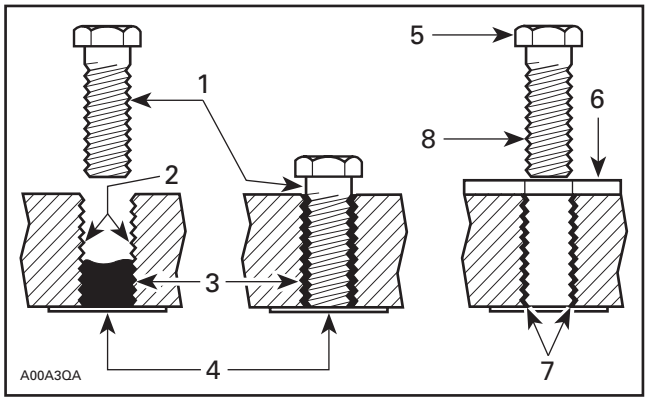
1. Apply here
2. Plunger

1. Adjust screw to proper setting.
2. Apply drops of proper strength Loctite threadlocker on screw/body contact surfaces.
3. Avoid touching metal with tip of flask.

NOTE: If it is difficult to readjust, heat screw with a soldering iron (232°C (450°F)).

STRIPPED THREAD REPAIR

Stripped Threads



1. Release agent
2. Stripped threads
3. Form-A-Thread
4. Tape
5. Cleaned bolt
6. Plate
7. New threads
8. Threadlocker

Standard Thread Repair

1. Follow instructions on Loctite FORM-A-THREAD (P/N 413 708 600) package.
2. If a plate is used to align bolt:
   a. Apply release agent on mating surfaces.
   b. Put waxed paper or similar film on the surfaces.
3. Twist bolt when inserting it to improve thread conformation.

NOTE: NOT intended for engine stud repairs.

Repair of Small Holes/Fine Threads

Option 1: Enlarge damaged hole, then follow **Standard Thread Repair** procedure.

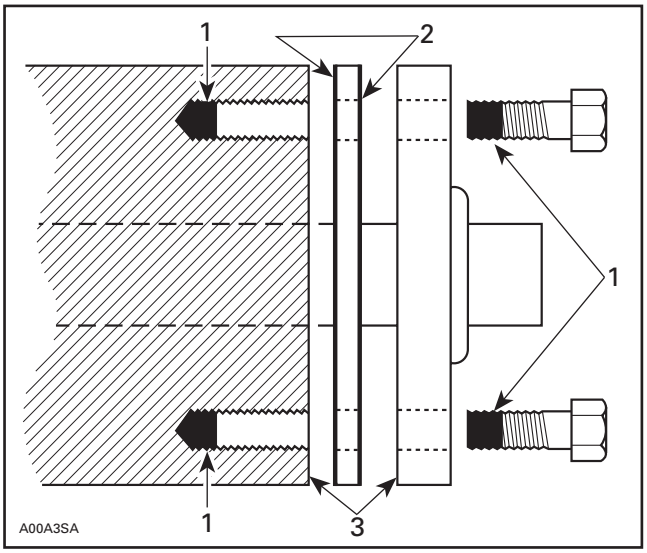
Option 2: Apply FORM-A-THREAD on the screw and insert in damaged hole.

Permanent Stud Installation (light duty)

1. Use a stud or thread on desired length.
2. DO NOT apply release agent on stud.
3. Do a Standard Thread Repair.
4. Allow to cure for 30 minutes.
5. Assemble.

GASKET COMPOUND

All Parts



1. Proper strength Loctite
2. Loctite Primer N (P/N 413 708 100) and Gasket Eliminator 515 (P/N 413 702 700) on both sides of gasket
3. Loctite Primer N only

1. Remove old gasket and other contaminants with Loctite Chisel remover (P/N 413 708 500). Use a mechanical mean if necessary.

NOTE: Avoid grinding.

2. Clean both mating surfaces with solvent.
3. Spray Loctite Primer N on both mating surfaces and on both sides of gasket. Allow to dry 1 or 2 minutes.
4. Apply GASKET ELIMINATOR 515 (P/N 413 702 700) on both sides of gasket, using a clean applicator.
5. Place gasket on mating surfaces and assemble immediately.

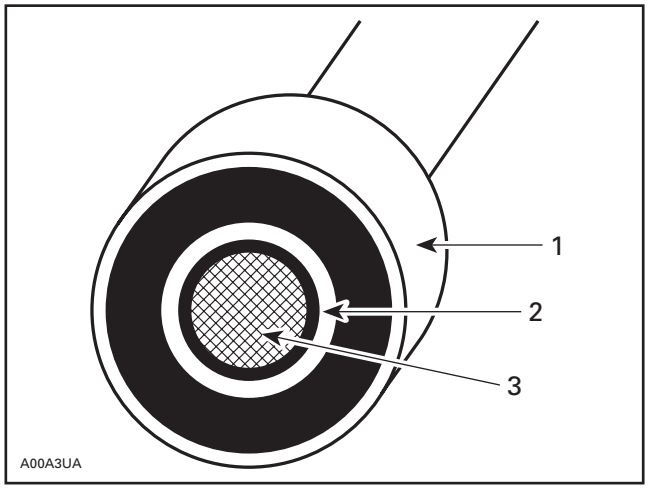
NOTE: If the cover is bolted to blind holes (above), apply proper strength Loctite in the hole and on threads. Tighten.

If holes are sunken, apply proper strength Loctite on bolt threads.

6. Tighten as usual.

MOUNTING ON SHAFT

Mounting with a Press



1. Bearing
2. Proper strength Loctite
3. Shaft

Standard

1. Clean shaft external part and element internal part.
2. Apply a strip of proper strength Loctite on shaft circumference at insert or engagement point.

NOTE: Retaining compound is always forced out when applied on shaft.

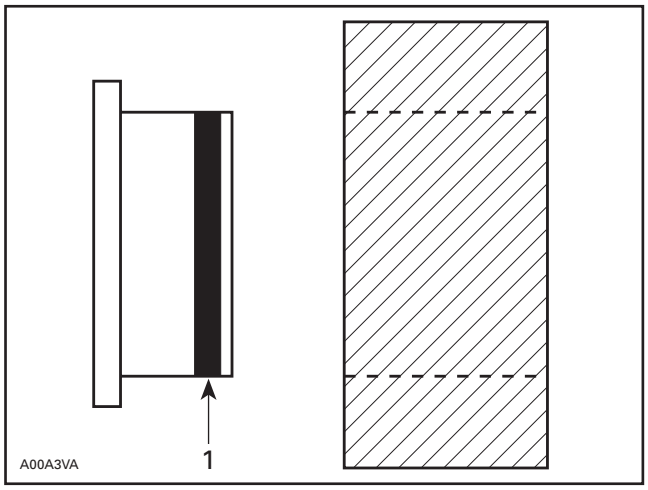
3. DO NOT use anti-seize Loctite or any similar product.
4. No curing period is required.

Mounting in Tandem

1. Apply retaining compound on internal element bore.
2. Continue to assemble as shown above.

CASE-IN COMPONENTS

Metallic Gaskets



1. Proper strength Loctite

1. Clean inner housing diameter and outer gasket diameter.
2. Spray housing and gasket with Loctite Primer N (P/N 293 800 041).
3. Apply a strip of proper strength Loctite on leading edge of outer metallic gasket diameter.

NOTE: Any Loctite product can be used here. A low strength liquid is recommended as normal strength and gap are required.

4. Install according to standard procedure.
5. Wipe off surplus.
6. Allow it to cure for 30 minutes.

NOTE: Normally used on worn-out housings to prevent leaking or sliding.

It is generally not necessary to remove gasket compound applied on outer gasket diameter.

TIGHTENING TORQUES

Tighten fasteners to torque mentioned in exploded views and text. When they are not specified refer to following table. All torques apply to 8.8 grade fasteners. Bold face size (e.g. **M4**) indicates nominal value (mean value).

N•m	FASTENER SIZE (8.8 GRADE)	Lbf•**in**
2	**M4**	18
3	M4	27
4	**M5**	35
8	M6	71
9	M6	80
10	**M6**	89
11	**M6**	97
12	**M6**	106

N•m	FASTENER SIZE (8.8 GRADE)	Lbf•ft
21	M8	15
22	M8	16
23	**M8**	17
24	M8	18
25	M8	18
43	M10	32
44	M10	32
45	M10	33
46	M10	34
47	M10	35
48	**M10**	35
49	M10	36
50	M10	37
51	M10	38
52	M10	38
53	M10	39
76	M12	56
77	M12	57
78	M12	58
79	M12	58
80	**M12**	59
81	M12	60
82	M12	60
83	M12	61
84	M12	62
121	M14	89
122	M14	90
123	M14	91
124	M14	91
125	M14	92
126	M14	93
127	M14	94
128	M14	94
129	M14	95
130	M14	96
131	M14	97
132	M14	97
133	M14	98
134	M14	99
135	**M14**	100
136	M14	100
137	M14	101
138	M14	102
139	M14	103
140	M14	103
141	M14	104
142	M14	105
143	M14	105
144	M14	106
145	M14	107
146	M14	108
147	M14	108
148	M14	109
149	M14	110
150	M14	111

TIGHTENING TORQUES FOR 8.8 GRADE BOLTS AND NUTS

We would be pleased if you could communicate to Bombardier any suggestions you may have concerning our publications.

Bombardier SERVICE PUBLICATIONS REPORT

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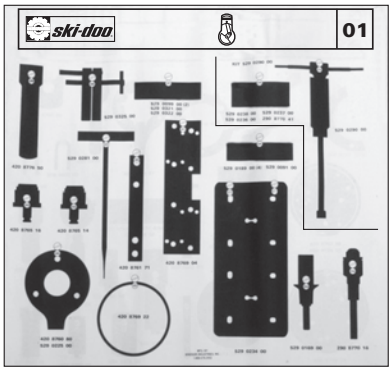
SERVICE TOOLS

This is a list of tools to properly service Ski-Doo snowmobiles. The list includes both the mandatory tools included in a kit (P/N 861 743 700) and the optional tools that are ordered separately. The list of Service Products, both mandatory and optional, are not part of any kit and must all be ordered separately. If you need to replace or add to your tool inventory these items can be ordered through the regular parts channel.

Following mention points out new tool and product:

WORKSHOP — MANDATORY SERVICE TOOLS

Tool board
(P/N 529 034 000)

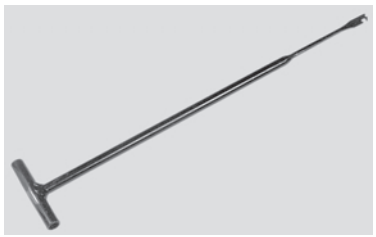


A00A3X4

APPLICATION
All models.

ENGINE — MANDATORY SERVICE TOOLS

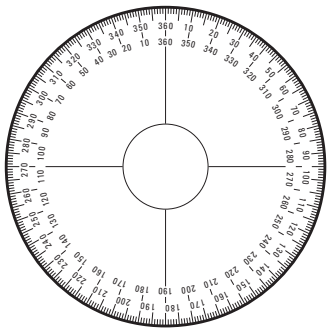
Exhaust spring installer/remover
(P/N 529 035 400)



A01B584

APPLICATION
CK3 series.

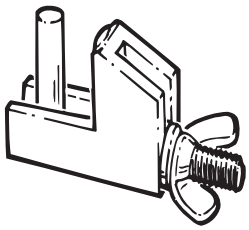
Degree wheel
(P/N 529 035 607)



A00B514

APPLICATION
All rotary valve engines.
NOTE: This tool replaces degree wheel (P/N 295 000 007).

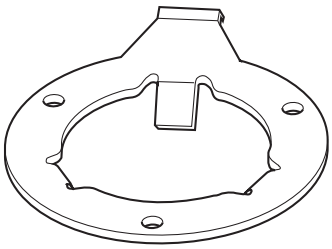
Hose pincher (2)
(P/N 295 000 076)



A01B2I4

APPLICATION
All vehicles.
NOTE: Only the P/N has been changed. This hose pincher is identical to the P/N 529 009 900.

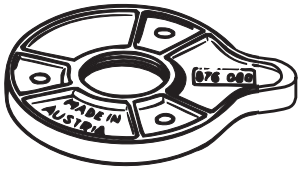
Fan holder
(P/N 420 876 357)



A00C0Q4

APPLICATION
377, 443 and 503 engines.

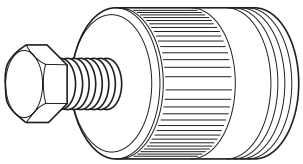
Magneto puller ring
(P/N 420 876 080)



A00C1R4

APPLICATION
All engines except 247.

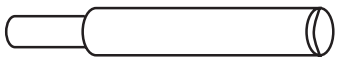
Magneto puller
(P/N 529 035 547)



A00C1A4

APPLICATION
All engines except 247.
NOTE: The previous extractor (P/N 529 022 500) can be upgraded by replacing the screw with the new one (P/N 529 035 549).

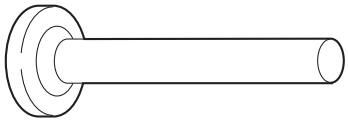
Aligning pin (4)
(P/N 529 018 900)



A00A1D4

APPLICATION
467, 494 and 582 engines.

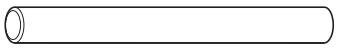
Pusher
(washer behind the impeller)
(P/N 529 020 700)



A00C3H4

APPLICATION
Rotary valve engines.

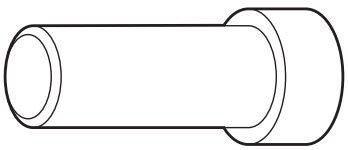
Rotary valve shaft pusher
(P/N 420 876 612)



A00C0F4

APPLICATION
Rotary valve engines with a 10 mm impeller shaft.

Rotary valve seal pusher
(valve side)
(P/N 420 876 607)



A00C0Y4

APPLICATION
Rotary valve engines.

ENGINE (continued) — MANDATORY SERVICE TOOLS

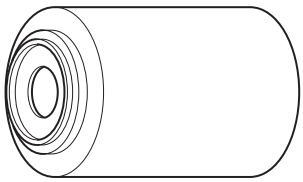
Rotary valve shaft seal pusher (inner, water pump side)
(P/N 420 876 512)

A00C374

APPLICATION

Rotary valve engines, 1991 and newer with a 10 mm impeller shaft.

Rotary valve shaft seal pusher (outer, water pump side)
(P/N 420 877 050)

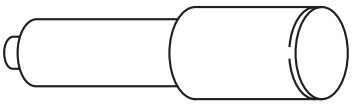


A00C0X4

APPLICATION

Rotary valve engines.

Bearing pusher (rotary valve)
(P/N 420 876 500)

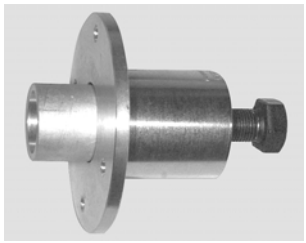


A00B2J4

APPLICATION

Rotary valve engines.

Ceramic seal pusher
(P/N 420 877 820)

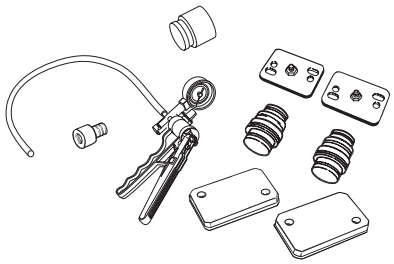


A00B524

APPLICATION

494 and 670 engines with ceramic seal on water pump side.

Engine leak tester kit
(P/N 861 749 100)

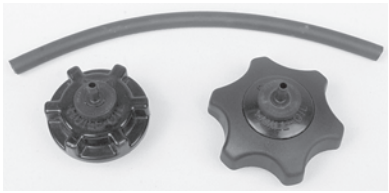


A01B2D5

APPLICATION

All engines.

Fuel and oil system leak tester kit
(P/N 529 033 100)



A01B5E4

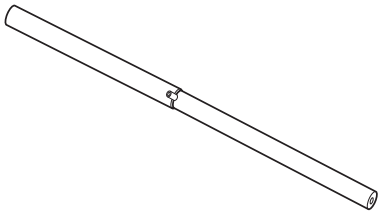
APPLICATION

All models.

Choke plunger tool
A) (P/N 529 032 100)

NEW

B) (P/N 529 035 602)



A01C5D4

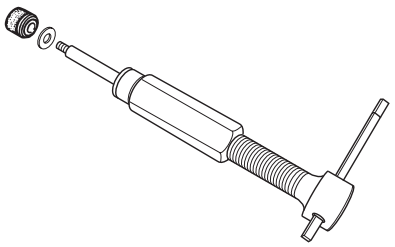
APPLICATION

A) All models equipped with chokes except ZX series (small end for 34 mm carburetor and big end for 38 mm carburetor).

B) ZX series.

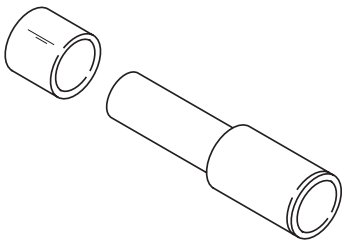
ENGINE (continued) — MANDATORY SERVICE TOOLS

1) Piston pin puller
(P/N 529 035 503)



A02B094

2) Sleeve kit 18 mm
(P/N 529 035 541)
3) Sleeve kit 20 mm
(P/N 529 035 542)



A01B5A4

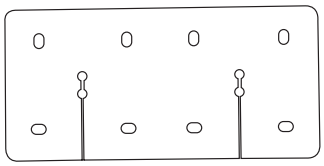
NOTE: 18 mm sleeve kit contains 1 shouldered sleeve and 3 sleeves. 20 mm sleeve kit contains 1 shouldered sleeve and 2 sleeves.

APPLICATION

1) All engines.
2) 277, 443, 503 and 809 engine.
3) 593, 670 and 693 engines.

NOTE: The previous piston pin puller (P/N 529 029 000) can be upgraded by adding protector (P/N 529 035 513) and replacing the expansion sleeve with appropriate sleeve kit.

Rubber pad
(P/N 529 023 400)

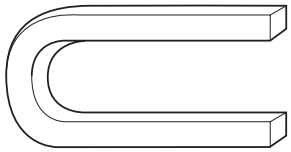


A01B4C4

APPLICATION

All cageless bearing engines.

Rotary valve circlip tool
A) (P/N 529 029 100)
B) (P/N 529 020 800)

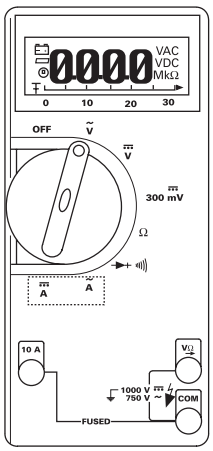


A00C3I4

APPLICATION

A) 1994 and on rotary valve engines.
B) Up to 1993 rotary valve engines.

Multimeter
(P/N 529 022 000)

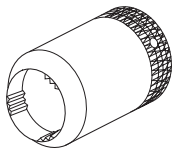


F01B1O4

APPLICATION

All models.

Choke/DESS nut tool
(P/N 529 034 600)



A01B554

APPLICATION

All models equipped with a choke and/or a DESS.

NOTE: This tool replaces choke nut tool (P/N 529 032 200).

ENGINE (continued) — MANDATORY SERVICE TOOLS

9-volt adaptor
(P/N 529 035 675)

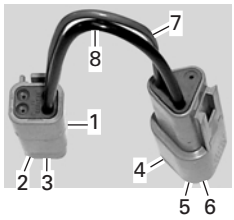
NEW

A00B5G4

APPLICATION
All models equipped with a DESS.

Homemade adaptor

NEW



A00B5J4

Required parts:

1) Female housing (P/N 515 175 245)
2) Female terminal (2) (P/N 409 015 100)
3) Female lock (P/N 515 175 246)
4) Male housing (P/N 409 207 000)
5) Male terminal (2) (P/N 278 000 631)
6) Male lock (P/N 409 207 600)
7) RED wire in position 1 (4-wire connector) and B (3-wire connector)
8) BLACK wire in position 2 (4-wire connector) and C (3-wire connector)

APPLICATION
2001 Mach Z TECH PLUS.

1-2) Programmer kit
(P/N 529 035 718)
2) Communication cables
(P/N 529 001 052)

NEW

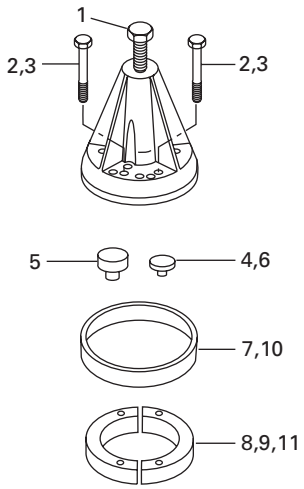
A01B5B5

APPLICATION
All models equipped with a DESS.

ENGINE (continued) — RECOMMENDED SERVICE TOOLS

The following tools are highly recommended to optimize your basic tool kit and reduce repair time.

1-2) Crankshaft bearing puller with screw
(P/N 420 877 635)



A01B547

APPLICATION
All engines.

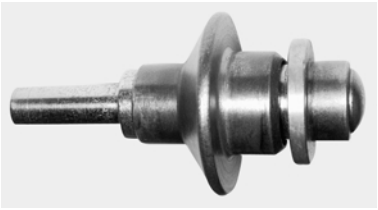
1) Screw M16 x 1.5 x 150	(P/N 420 940 755)
2) Screw M8 x 40 (4)	(P/N 420 840 681)
3) Screw M8 x 70 (4)	(P/N 420 841 201)
4) Crankshaft protector 247 engine.	(P/N 420 976 890)
5) Crankshaft protector PTO All engines except 247.	(P/N 420 876 552)
6) Crankshaft protector MAG All engines except 247.	(P/N 420 876 557)
7) Puller ring Use with half rings (P/N 420 977 475 or 420 276 025).	(P/N 420 977 490)
8) Half ring (2) For 72 mm O.D. bearings.	(P/N 420 977 475)
9) Half ring (2) For 62 mm O.D. bearings.	(P/N 420 276 025)
10) Puller ring For half rings (P/N 420 977 479).	(P/N 420 977 494)
11) Half ring For 80 mm O.D. bearings.	(P/N 420 977 479)

ENGINE (continued) — RECOMMENDED SERVICE TOOLS

Piston circlip installer

A) (P/N 529 035 561) 18 mm

B) (P/N 529 035 562) 20 mm



A00B4Y4

APPLICATION

A) All engines except 593, 670 and 693.

NOTE: This tool replaces circlip installer (P/N 529 016 900).

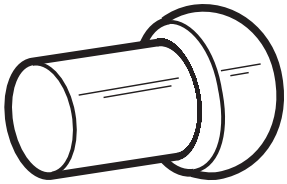
B) 593, 670 and 693 engines.

NOTE: This tool replaces circlip installer (P/N 290 877 016).

Piston pin/connecting rod bearing centering tool

(P/N 529 009 100)

NOTE: New diameter is 9.65 mm (0.380 in).



A01B1R4

APPLICATION

All engines except cageless and 670 engines.

Ring compressor

A) (P/N 420 876 090) (62 mm)

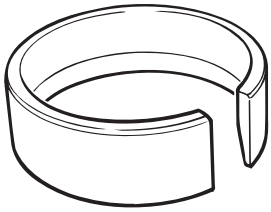
B) (P/N 420 876 974) (69.5 mm)

C) (P/N 420 876 970) (72 mm)

D) (P/N 420 876 972) (76 mm)

E) (P/N 420 876 975) (67.5 mm)

F) (P/N 529 030 800) (78 mm)



A01B1T4

APPLICATION

A) 377 engine.

B) 467 and 494 engines.

C) 503, 253 and 536 engines.

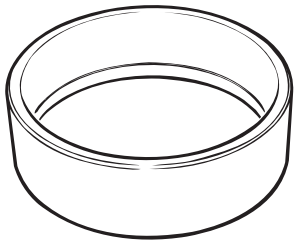
D) 582, 583 and 643 engines.

E) 443 and 447 engines.

F) 670 engine.

Magneto coil centering ring

(P/N 420 876 922)



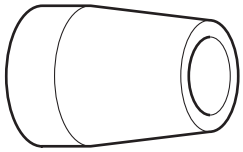
A01B1V4

APPLICATION

All engines with Nippondenso CDI (160 W).

Seal protector sleeve

(P/N 420 276 900) (MAG)



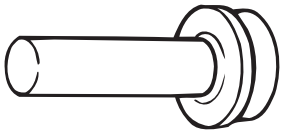
A00C0D4

APPLICATION

247 engine.

Polyamid ring pusher

(P/N 420 276 930)



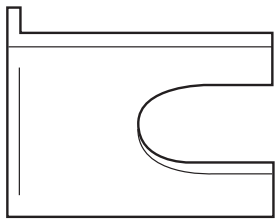
A00C0Z4

APPLICATION

247 engine.

Crankshaft feeler gauge

(P/N 420 876 620)



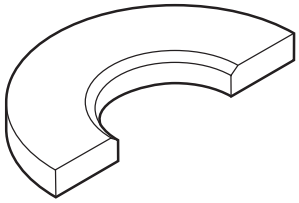
A00C114

APPLICATION

377, 443, 447 and 503 engines.

ENGINE (continued) — RECOMMENDED SERVICE TOOLS

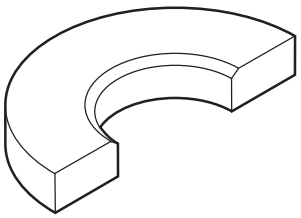
Crankshaft distance gauge
(5.7 mm)
(P/N 420 876 822)



A00C294

APPLICATION
377, 443 and 447 engines.

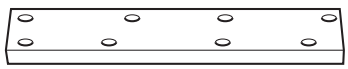
Crankshaft distance gauge
(12.7 mm)
(P/N 420 876 824)



A00C3A4

APPLICATION
503 engine.

Cylinder aligning tool
A) (P/N 420 876 904)
(on exhaust side)
B) (P/N 420 876 171)
(on intake side)



A00B084

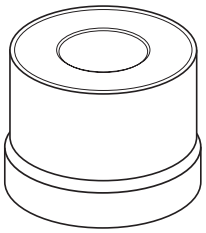
APPLICATION
A) 2-cylinder liquid cooled engines.
B) 2-cylinder fan cooled engines.

Driver tool
(P/N 529 035 521)

A00B4O4

APPLICATION
Mini Z.

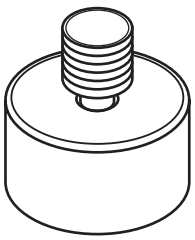
Attachment
(P/N 529 035 522)



A00B4P4

APPLICATION
Mini Z.

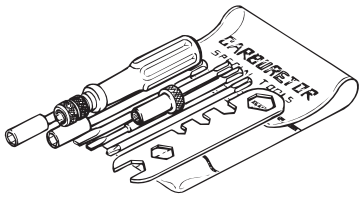
Pilot 22 mm
(P/N 529 035 523)



A00B4Q4

APPLICATION
Mini Z.

Carburetor tool kit
(P/N 404 112 000)



A00B2F4

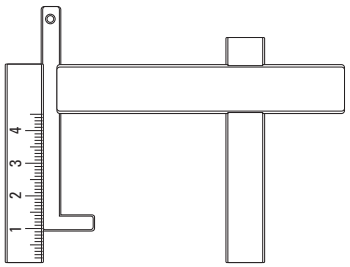
APPLICATION
All models.

Adaptor
(P/N 529 033 800)
(TYPICAL)

A00B4H4

APPLICATION
1997 and 1998 Grand Touring SE
1998 Summit x 670.

Float level gauge
(P/N 529 035 520)

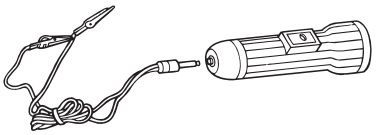


A00B4N4

APPLICATION
All models.

ENGINE (continued) — RECOMMENDED SERVICE TOOLS

Circuit tester
(continuity light)
(P/N 414 012 200)



A00C214

APPLICATION
All vehicles.

Stroboscopic timing light
(P/N 529 031 900)

A00B4F4

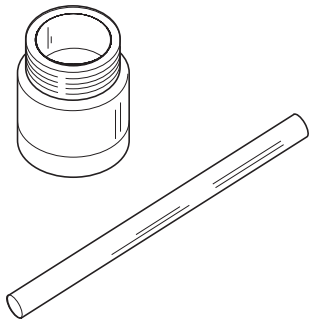
APPLICATION
All engines.

Bypass wires
(P/N 529 033 300)

A00I094

APPLICATION
360 W magneto
(Grand Touring 700/SE).

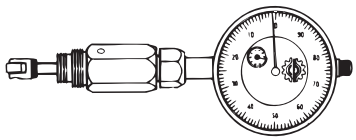
RAVE movement indicator
(P/N 861 725 800)



A18B014

APPLICATION
All RAVE equipped engines.

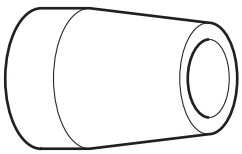
Dial indicator
(TDC gauge)
(P/N 414 104 700)



A00B4E4

APPLICATION
All engines.

Seal protector sleeve
A) (P/N 420 876 980)
B) (P/N 420 876 490)



A00C0D4

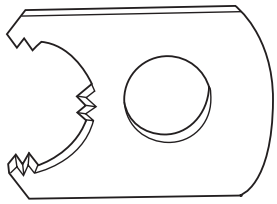
APPLICATION
A) Rotary valve engines with 10 mm shaft.
B) Rotary valve engines with 12 mm shaft.

Magneto puller
(P/N 420 976 235)

F01B294

APPLICATION
247 engine.

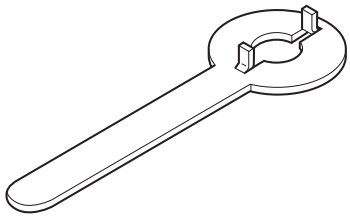
Injection pump gear holder
(P/N 420 876 695)



A00B314

APPLICATION
253, 377, 447 and 503 engines.

Injection pump gear holder
(P/N 420 277 905)

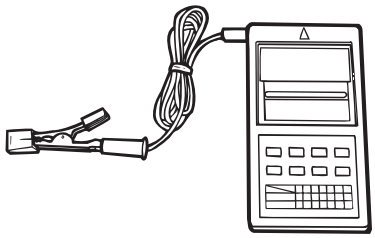


A00C164

APPLICATION
All liquid cooled engines.

ENGINE (continued) — RECOMMENDED SERVICE TOOLS

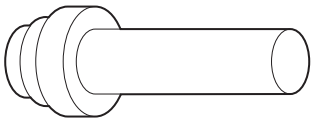
Digital/induction type tachometer
(P/N 529 014 500)



F01B1G4

APPLICATION
All engines.

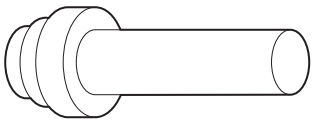
MAG seal pusher
(P/N 420 277 875)



A00C0V4

APPLICATION
277 engine.

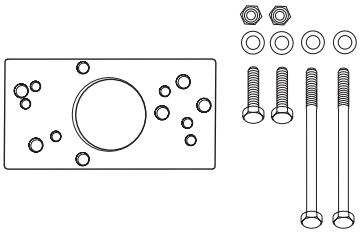
PTO seal pusher
(P/N 420 876 660)



A00C0V4

APPLICATION
277 engine.

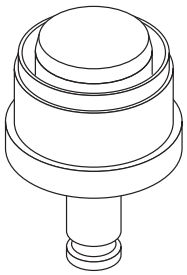
Base puller plate kit
(P/N 529 024 900)



A05C0M4

APPLICATION
277 engine.

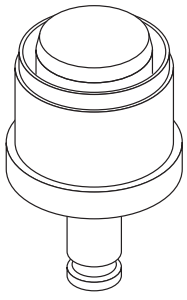
Insertion jig
(magneto side seal)
(P/N 420 876 516)



A00C3T4

APPLICATION
779 engine.

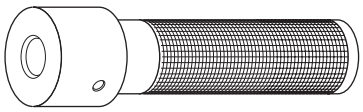
Insertion jig
(magneto seal)
(P/N 420 876 514)



A00C3U4

APPLICATION
454, 494, 599, 670, 699 and 809 engines.

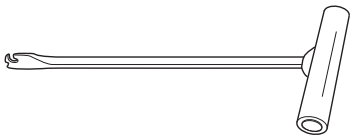
Handle for insertion jig
(P/N 420 877 650)



A00C3V4

APPLICATION
454, 494, 599, 670, 699, 779 and 809 engines.

Exhaust spring installer/remover
(P/N 529 035 559)

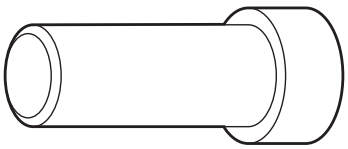


A00C3S4

APPLICATION
All models except CK3 series.

NOTE: This tool replaces exhaust spring installer/remover (P/N 529 028 100).

Rotary valve seal and
shaft pusher
(P/N 420 876 605)



A00C0Y4

APPLICATION
Rotary valve engines 1990 models and older.

NGINE (continued) — RECOMMENDED SERVICE TOOLS

Seal pusher (rotary valve)
(P/N 420 876 510)

A00C374

APPLICATION

All rotary valve shaft seals with a 12 mm I.D.

Rotary valve shaft pusher
(P/N 420 876 610)

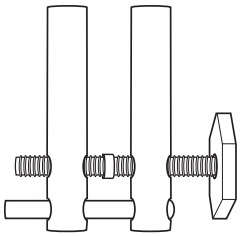
A00C0F4

APPLICATION

All rotary valve engines with 12 mm shaft.

Large hose pincher
(P/N 529 032 500)

(TYPICAL)



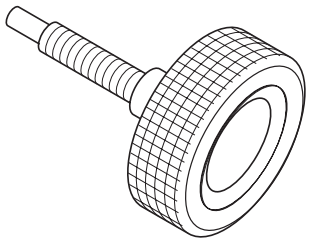
F01B234

APPLICATION

All vehicles.

TRANSMISSION — MANDATORY SERVICE TOOLS

Driven pulley opening tool
(P/N 529 017 200)



A00A1A4

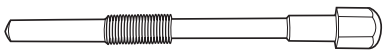
APPLICATION
All non-RER models.

Clutch holder
(P/N 529 006 400)

A01B154

APPLICATION
All TRA drive pulleys.

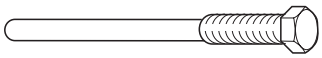
TRA drive pulley puller
(P/N 529 022 400)



A06B014

APPLICATION
TRA drive pulley for the 454, 494, 599, 670, 699, 779 and 809 engines.

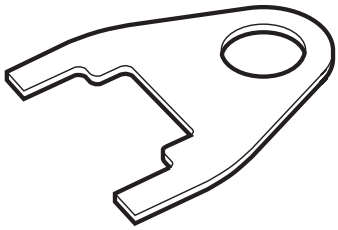
TRA drive pulley puller
(P/N 529 007 900) (25 mm)



A18B044

APPLICATION
TRA drive pulley for 443, 467, 503, 536 and 537 engines.

Forks (3)
(P/N 529 005 500)

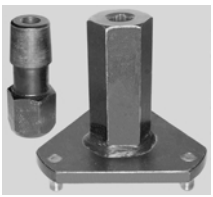


A16B014

APPLICATION
All vehicles equipped with a TRA drive pulley.

Tool kit
(P/N 529 025 400)

NEW



A00B5N4

APPLICATION
Comet® 102C drive pulley.

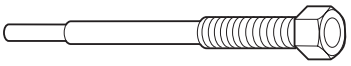
Drive pulley puller
(P/N 529 025 000)

NEW

A00B5M4

APPLICATION
Comet® 102C drive pulley.

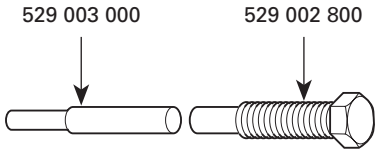
Drive pulley puller
(P/N 529 002 100)
(standard threads)



A00C084

APPLICATION
Square shaft, standard (SAE) threads.

Drive pulley puller
(P/N 860 414 200)
(square shaft metric)
Consists of:



A00C095

APPLICATION
Square shaft, metric threads drive pulley.

TRANSMISSION (continued) — MANDATORY SERVICE TOOLS

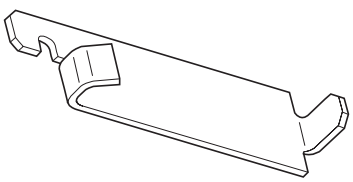
Transmission alignment bar
A) (P/N 529 026 900)
B) (P/N 529 030 000)
C) (P/N 529 035 586)
D) (P/N 529 026 700)
E) (P/N 529 035 530)
F) (P/N 529 031 000)
G) (P/N 529 035 527)
H) (P/N 529 035 572)
I) (P/N 529 035 594)

A01B4D4

APPLICATION
A) Tundra II LT/R.
B) S-Series with Bombardier Lite.
C) S-Series with Bombardier Lite and RER.
D) F-Series, S-Series and ZX series with TRA.
E) S-Series with TRA and RER.
F) Skandic WT LC/SWT.
G) CK3 series except 1998 Mach Z series.
H) 1998 Mach Z series.
I) CK3 series with RER.

Spring scale hook (long)
A) (P/N 529 006 500)
B) (P/N 529 030 900)
C) (P/N 529 035 557)

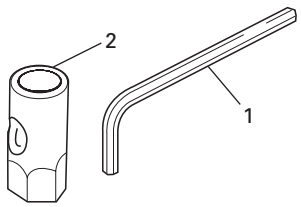
(TYPICAL)



A00B4A4

APPLICATION
A) Tundra II LT.
B) F-Series and S-Series (1995 and newer).
C) CK3 without RER.

Drive belt tension adjuster tool
(P/N 529 008 700)

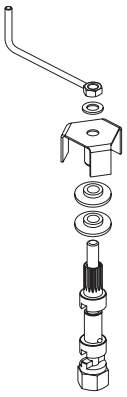


A15B044

Parts included:
1) Hexagonal wrench (P/N 420 876 730).
2) Socket wrench (P/N 529 015 000).

APPLICATION
All vehicles except Élan, Tundra II and Skandic WT.

Pulley spring compressor
(P/N 529 035 524)

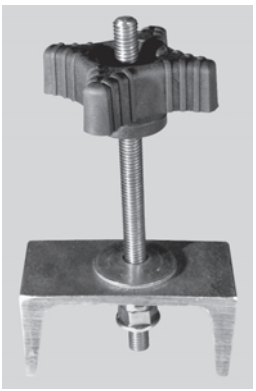


A02D1P4

APPLICATION
All models.

NOTE: This tool has Acme threads and replaces spring compressor (P/N 529 018 600).

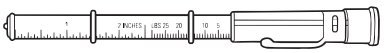
Driven pulley spring compressor
(P/N 529 035 300)



A05B034

APPLICATION
Tundra R.

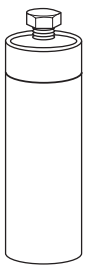
Tension tester
(P/N 414 348 200)



A00C074

APPLICATION
All models.

Countershaft bearing installer
(P/N 529 030 200)

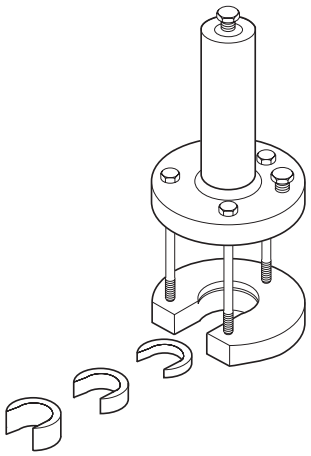


A00A194

APPLICATION
S-Series and F-Series.

TRANSMISSION (continued) — MANDATORY SERVICE TOOLS

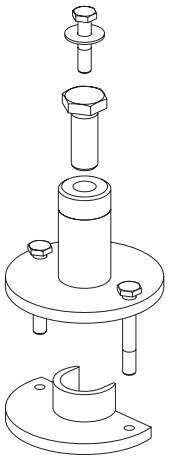
Countershaft bearing remover
(P/N 529 030 100)



A00A274

APPLICATION
S-Series and F-Series.

Countershaft bearing remover/installer
(P/N 529 035 554)

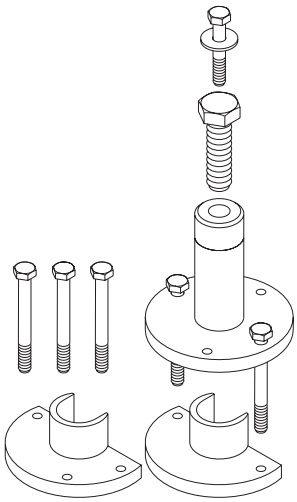


A01B5C4

APPLICATION
CK3 Series.

Countershaft bearing remover/installer
(P/N 529 035 699)

NEW

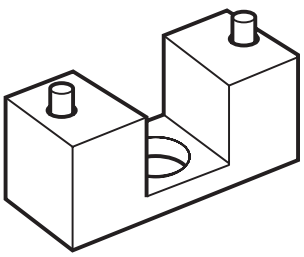


A00B5K4

APPLICATION
ZX and CK3 Series.

NOTE: This tool replaces CK3 series countershaft bearing remover/installer (P/N 529 035 554).

Spring cover tool
(P/N 529 027 300)



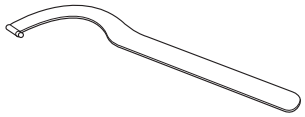
A01B4M4

APPLICATION
Bombardier Lite drive pulley.

TRANSMISSION (continued) — RECOMMENDED SERVICE TOOLS

The following tools are highly recommended to optimize your basic tool kit and reduce repair time.

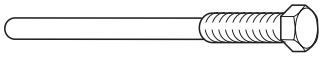
Clutch holder
(P/N 529 027 600)



A02B034

APPLICATION
Bombardier Lite drive pulley.

Drive pulley puller
(P/N 529 031 400)



A18B044

APPLICATION
Bombardier Lite drive pulley, except Élan.

Driven pulley opening tool
(P/N 529 035 501)

A03D2P4

APPLICATION
S and CK3 series with RER.

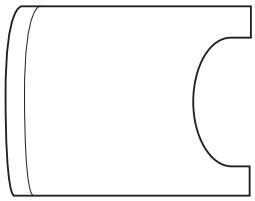
NOTE: This tool replaces driven pulley opening tool (P/N 529 019 500).

Driven pulley opening tool
(P/N 529 034 200)

A05B044

APPLICATION
Tundra R.

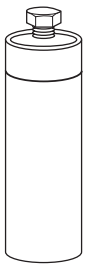
Alignment tool
(P/N 420 476 010)



A00C1D4

APPLICATION
Skandic WT and Alpine II gearbox.

Countershaft bearing installer
(P/N 529 018 800)

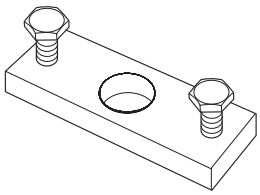


A00A194

APPLICATION
PRS chassis.

TRANSMISSION (continued) — RECOMMENDED SERVICE TOOLS

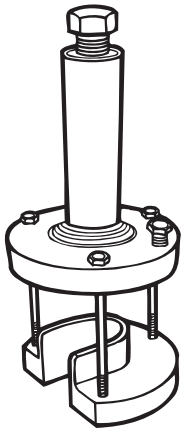
Cam pusher
(P/N 529 012 900)



A18B064

APPLICATION
Tundra II LT.

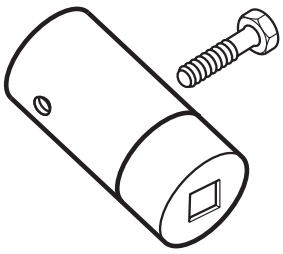
Countershaft bearing remover
(P/N 529 018 700)



A00A164

APPLICATION
PRS chassis.

Drive pulley puller
(P/N 529 023 100)



A00C3J4

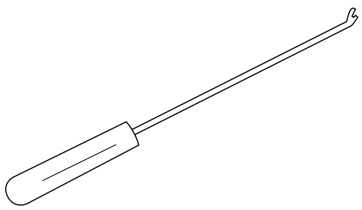
APPLICATION
Élan.

Transmission ball mounting pin
(P/N 420 476 020)

A00C1C4

APPLICATION
Alpine II 3-speed gearbox.

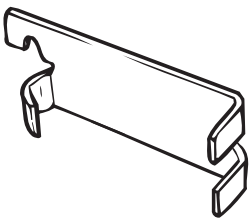
Transmission adjuster
(P/N 529 028 500)



A00D0X4

APPLICATION
F-Series equipped with "twist shifter" reverse transmission.

Spring scale hook (long)
(P/N 529 015 200)



A01B514

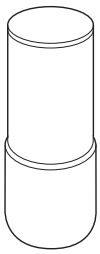
APPLICATION
1994 models and older except Alpine II.

Alignment bar
A) (P/N 529 025 600)
B) (P/N 529 028 200)
C) (P/N 529 028 300)
D) (P/N 529 026 800)
E) (P/N 529 031 000)

A01B4D4

APPLICATION
A) PRS chassis.
B) Alpine II.
C) Élan.
D) Safari L.
E) Skandic WT 1996.

Burnishing bar
(P/N 529 026 402)

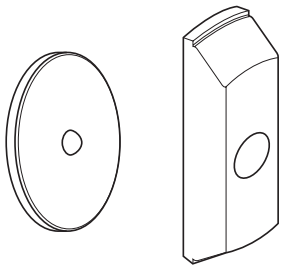


A00B464

APPLICATION
Tundra II LT, Safari L and Skandic.

TRANSMISSION (continued) — RECOMMENDED SERVICE TOOLS

Large bushing extractor
(P/N 529 031 100)



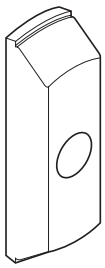
A00B4I4

APPLICATION

All models except Tundra/R, Skandic WT/SWT/WT LC and S-Series with RER.

NOTE: Use this tool only with former puller (P/N 529 018 600) that has regular threads.

Large bushing extractor
(P/N 529 035 575)



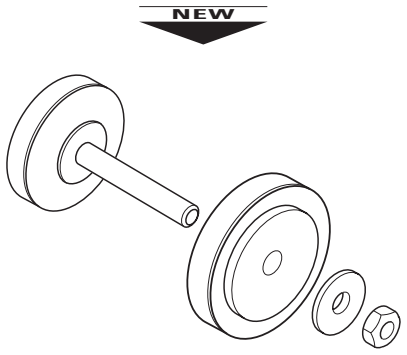
A02D1Q4

APPLICATION

S-Series with RER.

NOTE: Use this tool only with new puller (P/N 529 035 524) that has Acme threads and support plate included with extractor (P/N 529 031 100).

Chaincase seal pusher
(P/N 529 035 584)



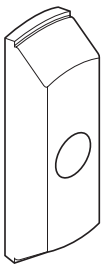
A00B504

APPLICATION

S, F, CK3 and ZX Series.

NOTE: This tool replaces chaincase upper seal pusher (P/N 529 032 300).

Large bushing extractor
(P/N 529 035 576)



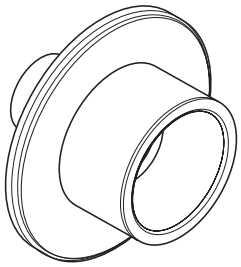
A02D1Q4

APPLICATION

All models except Tundra/R, Skandic WT/SWT/WT LC and S-Series with RER.

NOTE: Use this tool only with new puller (P/N 529 035 524) that has Acme threads and support plate included with extractor (P/N 529 031 100).

Large bushing installer and small bushing extractor
(P/N 529 031 200)



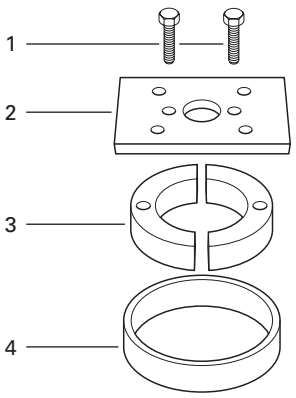
A00B4J4

APPLICATION

All models except Tundra/R, Skandic WT/SWT/WT LC and S-Series with RER.

3-speed transmission bearing extractor

1) Screw M8 x 25 (2) (P/N 207 182 544)
2) Plate
3) Half ring (2) (P/N 420 876 330)
4) Ring (P/N 420 977 480)



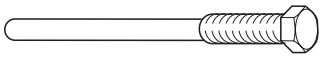
A00C1B4

APPLICATION

Alpine II 3-speed transmission.

TRANSMISSION (continued) — RECOMMENDED SERVICE TOOLS

TRA drive pulley puller (27 mm)
(P/N 529 010 100)

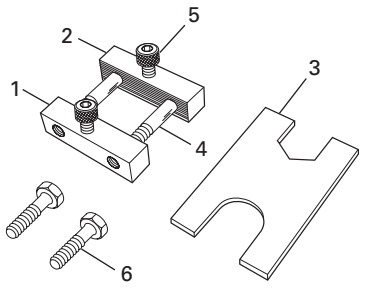


A18B044

APPLICATION

TRA drive pulley (27 mm) shaft except 454, 670 and 779 engines.

Drive axle sprocket adjuster
(P/N 861 725 700)



A01B2O4

Parts included in the kit:

1) Block with threads
   (P/N 529 010 700)
2) Block without threads
   (P/N 529 010 800)
3) Plate
   (P/N 529 010 600)
4) Bolt M10 (2)
   (P/N 222 007 565)
5) Allen screw M8 (2)
   (P/N 222 983 065)
6) Screw M8 (2)
   (P/N 222 082 565)

NOTE: When the tool is to be used between tunnel and sprocket use screws M8.

APPLICATION

All vehicles except Élan.

Transmission adjuster
(P/N 529 030 300)

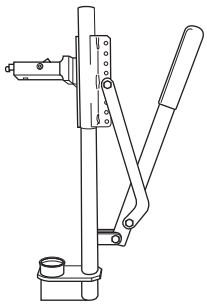
A03D1T4

APPLICATION

Vehicles equipped with "push-pull shifter" reverse transmission.

SUSPENSION — MANDATORY SERVICE TOOLS

Shock spring removal kit
(P/N 529 035 504)
Replacement clevis pin:
(P/N 414 528 400)



A01B4O4

APPLICATION

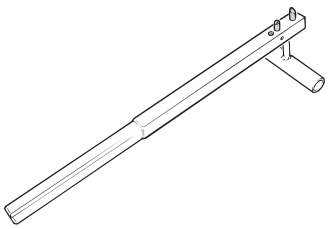
All suspensions with coil spring.

NOTE: The previous shock spring removal kit (P/N 529 027 100) can be upgraded by replacing the stopper with a wider stopper (P/N 529 035 551).

SUSPENSION (continued) — RECOMMENDED SERVICE TOOLS

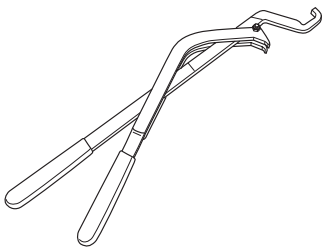
A) Track cleat remover
(P/N 529 008 200)
Pins
(P/N 529 008 204)

NOTE: Pins can be rotated 180° depending on whether the tool is used by a left-hander or right-hander.



A01B1J4

B) Track cleat remover
(P/N 529 028 700)



A01F224

APPLICATION

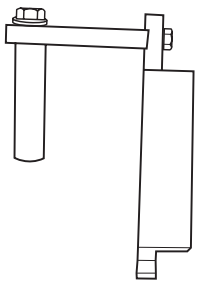
A) 1993 and older.

B) 1994 and newer except Élan and Tundra II.

Camber angle tool
(P/N 529 021 600)

NOTE: Angle finder with a magnetic base must be used.

Suggestion: K-D tool no. 2968

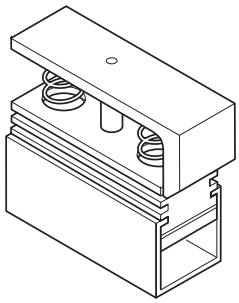


A06B024

APPLICATION

All DSA front suspensions.

Track tension gauge
(P/N 529 021 500)



A00B3X4

APPLICATION

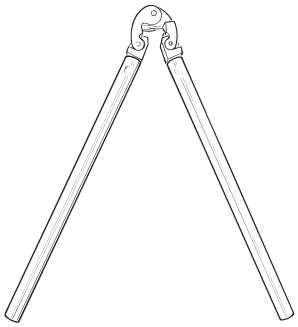
All models except Élan.

Track cleat installer

A) (P/N 529 008 500)
Narrow

B) (P/N 529 028 800)
Narrow

C) (P/N 529 007 700)
Wide



A01B1M4

APPLICATION

A) 1993 and older.

B) 1994 and newer.

C) 1992 and older with wide cleat opening.

Dome guide
(P/N 529 026 500

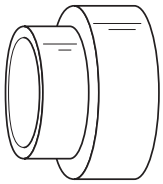
A06F1B4

APPLICATION

T/A shocks.

SUSPENSION (continued) — RECOMMENDED SERVICE TOOLS

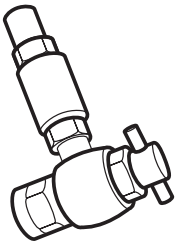
Piston guide
A) (P/N 529 026 600)
B) (P/N 529 035 608)



A06F1C4

APPLICATION
A) Most T/A shocks.
B) C-46 T/A shocks.

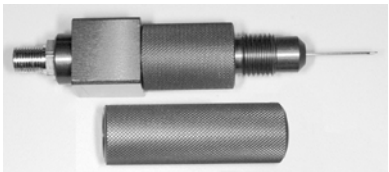
Gas shock valve tool
(P/N 529 035 570)



A02F134

APPLICATION
1999 and older T/A shocks.

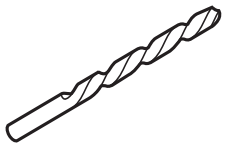
Tool for shock
(P/N 529 035 614)



A00B5I4

APPLICATION
2000 and up T/A shocks.

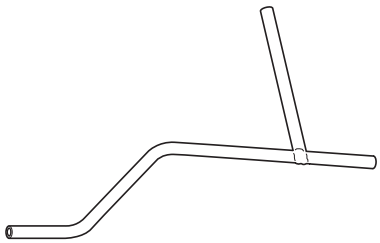
Drill bit
(P/N 529 031 800)



A01B564

APPLICATION
All 3/16 inch rivets.

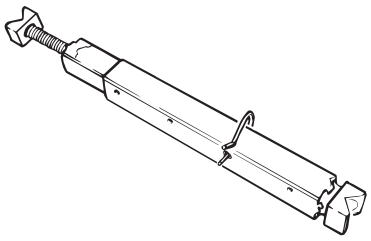
Spring installer (bar)
(P/N 529 005 000)



A00C1I4

APPLICATION
Tundra II LT, Scout and all SC-10 suspensions.

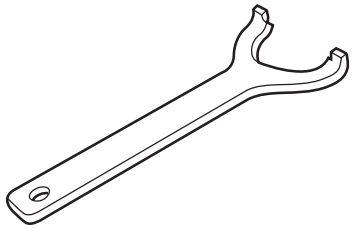
Drive axle holder
(P/N 529 007 200)



A01B1E4

APPLICATION
All models.

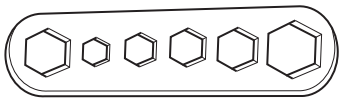
Kayaba shock adjustment tool
(P/N 529 035 582)



A00A1K4

APPLICATION
C-7 suspension.

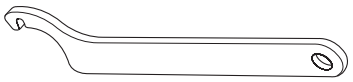
Hexagonal wrench
(P/N 529 014 700)



A19B024

APPLICATION
All SC-10 suspensions, Safari and Skandic prior to 1995.

Suspension adjustment wrench
(P/N 529 017 100)



A15B094

APPLICATION
1992 and old Formula C-7.

Suspension adjustment wrench
(P/N 529 032 900)

A02F114

APPLICATION
ARM and SC 10 II suspensions.

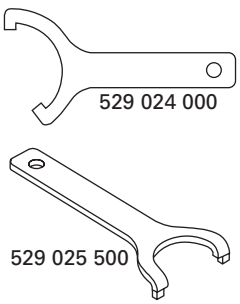
SUSPENSION (continued) — RECOMMENDED SERVICE TOOLS

Suspension adjustment wrench
(P/N 529 034 100)

A02F124

APPLICATION
CK3 series.

Adjustment wrench
(P/N 861 743 900)
Consists of:



A00B4B4

APPLICATION
1998 and older models with T/A shock.

Adjustment wrench
(P/N 520 000 126)

A00B5H4

APPLICATION
SC 10 II (coupling blocks).

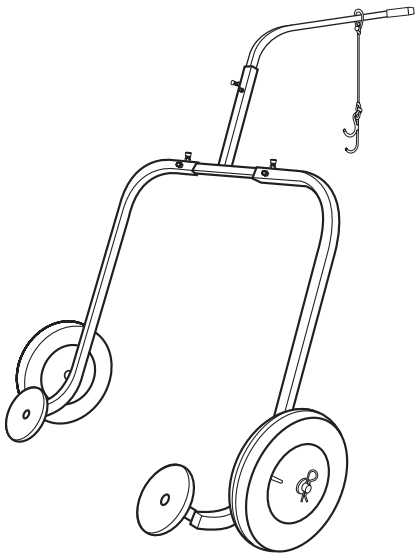
VEHICLES — RECOMMENDED SERVICE TOOLS

Protective mat
(P/N 529 030 600)

A01B45W

APPLICATION
All vehicles.

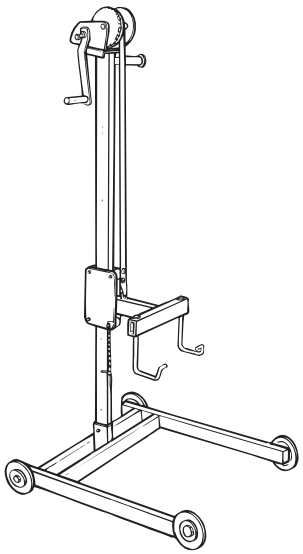
Dolly
(P/N 529 029 900)



A00B4CJ

APPLICATION
All models.

Snowmobile jack
(P/N 529 020 000)



A01A1JJ

APPLICATION
All models.

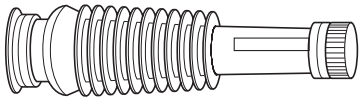
VEHICLES (continued) — RECOMMENDED SERVICE TOOLS

Template for hood drilling
(P/N 529 034 400)

A02H154

APPLICATION
S-Series.
NOTE: To drill new hood prior to install meters.

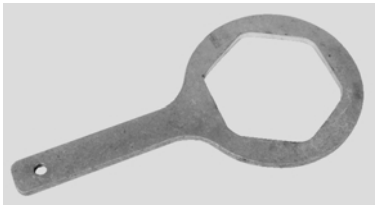
Flexible spout for oil container
(P/N 414 837 300)



F04B044

APPLICATION
All models.

Adjustment wrench
(P/N 529 035 603)



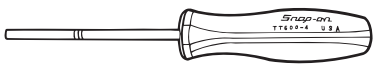
A32B044

APPLICATION
To remove and install fuel tank nut on ZX series.

Terminal (Packard) remover
Not sold by Bombardier

Snap-on
TT 600-4

NEW



F01B1J4

APPLICATION
Models with Packard connectors.

Crimping tool
(P/N 295 100 164)

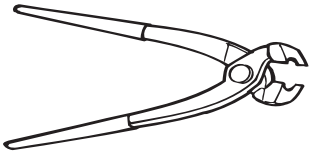
NEW

F00B0E4

APPLICATION
Models with AMP connectors.

Hose clamp pliers
(P/N 295 000 070)

NEW



F01D174

APPLICATION
Some models.

SERVICE PRODUCTS

MANDATORY SERVICE PRODUCTS

Retaining compound
(P/N 413 703 100)
Loctite® RC/609:
Retaining compound (10 mL) (green)

A00B2S4

APPLICATION

Used for retaining bushings, bearings in slightly worn housing or on shaft.

Sealing compound
(P/N 420 297 906)

A00B564

APPLICATION

To seal crankcase on all ZX series engines.

NOTE: This product replaces the larger tube (P/N 420 297 905).

Paste gasket
(P/N 413 702 700)
Loctite® 515:
Gasket eliminator (50 mL)

A00B2T4

APPLICATION

Crankcase halves and gearbox mating surfaces.

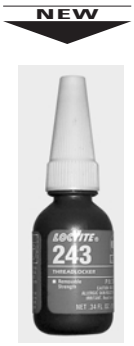
Paste gasket
(P/N 293 800 038)
Loctite® 518:
Gasket eliminator (50 mL)

F01B124

APPLICATION

Crankcase halves and gearbox mating surfaces.

Medium-strength threadlocker
(P/N 293 800 060)
Loctite® 243:
Threadlocker (10 mL)
(blue, medium strength)



F00A0O4

APPLICATION

Flywheel nut, crankcase studs, etc.

NOTE: This product replaces Loctite 242 (P/N 293 800 015).

High strength threadlocker
(P/N 293 800 005)
Loctite® 271:
Threadlocker (10 mL)
(red, high strength)

A00B2U4

APPLICATION

Fasteners and studs up to 25 mm (1 in) diameter.

MANDATORY SERVICE PRODUCTS (continued)

Gasket/paint remover
(P/N 413 708 500)
Loctite® Chisel
510 g (18 oz)

A00B574

APPLICATION

Clean mating surfaces of cylinders and crankcase. Remove carbon in combustion chambers.

Loctite® primer
(P/N 293 800 041)
Primer N
128 g (5 oz)

A00B3N4

APPLICATION

To prepare mating surfaces before applying paste gasket, retaining compound or threadlockers.

NOTE: Only the P/N has been changed. This product is identical to the P/N 413 708 100.

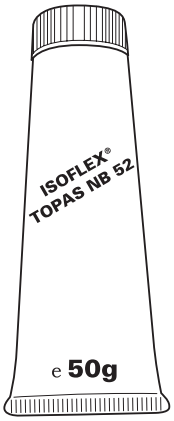
Molykote PG 54
(P/N 420 899 763)
(10 g)

A00B5F4

APPLICATION

Lubricate pawl and pawl lock of rewind starter.

Grease Isoflex
(P/N 293 550 021)
(50 g)



A00B554

APPLICATION

To lubricate some bearings on 3-cylinder, 453, 493, 593 and 693 engines.

Petamo grease
(P/N 420 899 271)

A00B584

APPLICATION

To lubricate lip of all ZX series engine crankshaft seals.

RECOMMENDED SERVICE PRODUCTS

Premix oil
(P/N 413 803 100)
(12 x 500 mL)

A00B5L4

APPLICATION
All pre-mix models.

Injection oil
(P/N 413 802 900)
(12 x 1 liter)
(P/N 413 803 000)
(3 x 4 liter)
(P/N 413 803 200)
(205 liter)

F01B2H4

APPLICATION
All engines.

BOMBARDIER-ROTAX Formula XP-S synthetic injection oil
(P/N 413 710 500)
(12 x 1 liter)
(P/N 413 711 000)
(3 x 4 liter)
(P/N 413 710 700)
(205 liter)

F01B354

APPLICATION
All engines.

Premixed coolant - 52°C (- 62°F)
(P/N 413 711 802)
(16 x 1 L)

A00B5E4

APPLICATION
All liquid cooled models.

Storage oil
(P/N 413 711 600)
(350 g spray can) (12 x 350 g)

A02B054

APPLICATION
All models.

NOTE: Only the P/N has been changed. This product is identical to the P/N 496 014 100.

Fuel stabilizer
(P/N 413 408 600)
(12 x 8 oz)

A00B3V4

APPLICATION
All models.

RECOMMENDED SERVICE PRODUCTS (continued)

Chaincase oil
(P/N 413 801 900)
(16 x 250 mL)

A00B2R4

APPLICATION

Chaincase lubricant on all fan-cooled models except Skandic WT series.

Synthetic chaincase oil
(P/N 413 803 300)
(12 x 355 mL)

A01B4Q4

APPLICATION

Chaincase lubricant on all liquid-cooled models and Skandic WT series.

Grease LMZ no. 1
(P/N 413 707 500)
(400 g)

A00B1Y4

APPLICATION

Mainly used between regulators or rectifiers and frame to transfer the heat build-up and to assure a good ground.

Synthetic grease
(400 g)
(P/N 413 711 500)

A01B574

APPLICATION

For front and rear suspension components and drive axle bearing.

Super Lube (grease)
(P/N 293 550 014)

A00B474

APPLICATION

Exhaust tail pipe grommet.

BOMBARDIER LUBE
(P/N 293 600 016)
(12 x 14 oz)

A00B4W4

APPLICATION

Steering ball joints on all models.

Shock oil
(P/N 413 711 806)
(32 oz)

(TYPICAL)

A06F0P4

APPLICATION

T/A shocks.

RECOMMENDED SERVICE PRODUCTS (continued)

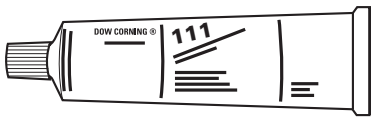
Anti-seize lubricant
(P/N 293 800 070)
Loctite anti-seize lubricant 236 mL (8 oz)

A00B594

APPLICATION

Mounting surfaces of driven pulley and brake disc on countershaft.

Molykote 111
(P/N 413 707 000)

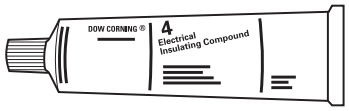


A00B3W4

APPLICATION

Crankshaft seals on all engines except ZX series ones.

Silicone dielectric grease
(P/N 293 550 004)
(3 oz)



A00B1X4

APPLICATION

On all electric connections. High tension coil and spark plug connections. Connector housings, etc.

NOTE: Only the P/N has been changed. This product is identical to the P/N 413 701 700.

Parts cleaner
(P/N 413 711 809)
(320 g)

A00B4X4

APPLICATION

Engine crankcase joining surfaces, pulleys and any greasy surfaces.

Bombardier cleaner
(P/N 293 110 001)
(400 g)
(P/N 293 110 002)
(4 L)

F01B2J4

APPLICATION

All models.

Plastic & vinyl cleaner
(P/N 413 711 200)
(6 x 1 L)

A00B4V4

APPLICATION

Hood, bottom pan and seat.

RECOMMENDED SERVICE PRODUCTS (continued)

High temperature threadlocker
(P/N 413 711 400)
Loctite 648 (green) (5 mL)

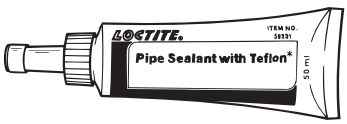
A00B3D4

APPLICATION

To fasten oil injection nozzle to crankcase.

NOTE: Only the P/N has been changed. This product is identical to the P/N 420 899 788.

Pipe sealant
(P/N 293 800 018)
Loctite 592 (50 mL)



A00B2W4

APPLICATION

Engine plugs and senders.

NOTE: Only the P/N has been changed. This product is identical to the P/N 413 702 300.

Clear silicone
(P/N 293 800 033)

F01B1S4

APPLICATION

All models to seal bottom pan.

High temperature RTV sealant
(P/N 413 710 300)
Ultra Copper
(80 mL)

A00B5A4

APPLICATION

All models.

General purpose instant adhesive
(P/N 293 800 021)
Loctite 495 (3 g)

A00B2V4

APPLICATION

Rubber to metal bonding and most hard plastic.

NOTE: Only the P/N has been changed. This product is identical to the P/N 413 703 200.

Gel instant adhesive
(P/N 413 708 300)
Loctite 454-40
20 g (.70 oz)

A00B3O4

APPLICATION

Isolating foam and rubber strip.

RECOMMENDED SERVICE PRODUCTS (continued)

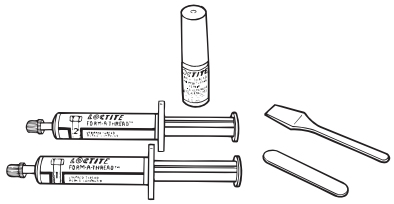
Tough adhesive
(P/N 413 408 300)
Loctite Black Max
3 mL (.10 oz)

A00B3P4

APPLICATION

Shifter boot or grip.

Stripped threads repair kit
(P/N 413 708 600)
Form-A-thread 81668

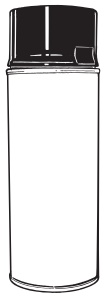


A00A1J4

APPLICATION

Repair damaged threads of grade 5 (SAE) or 8.8 (metric) maximum. Do not use in applications where temperatures will exceed 149°C (300°F) or on critical assemblies.

Paint for frame touch-up
(P/N 413 401 000)
Black semi-gloss
(spray can)

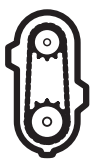


A00B3H4

APPLICATION

All models with a black frame.

PERIODIC MAINTENANCE CHART

SYSTEM	PART/TASK	10-HOUR OR 500 km (300 mi) INSPECTION (to be performed by dealer)	WEEKLY OR EVERY 240 km (150 mi)	MONTHLY OR EVERY 800 km (500 mi)	ONCE A YEAR OR EVERY 3200 km (2000 mi)	STORAGE (to be performed by dealer)	PRE-SEASON PREPARATION (to be performed by dealer)	REFER TO
	Rewind Starter Lubrication and Rope Condition					✔	✔	Subsection 04-09
	Engine Head Nuts or Screws	✔			✔	✔		Appropriate section: See Top End
	Engine Mount Nuts	✔			✔	✔		Appropriate section: See ENGINE REMOVAL
	Exhaust System	✔		✔		✔		Appropriate section: See ENGINE REMOVAL
	Engine Lubrication					✔	✔	This section no. 1
	Cooling System Condition	✔			✔		✔	Subsections 04-07 and 04-08
	Coolant Replacement (except fan cooled)					✔		Subsection 04-08
	Condition of Seals					✔	✔	Subsections 04-02 and 04-03
	Injection Oil Filter Condition			✔				Subsection 04-06
	Injection Oil Filter Replacement					✔		Subsection 04-06
	Oil Injection Pump Adjustment	✔			✔		✔	Subsection 04-06
	Fuel Stabilizer					✔		This section no. 2
	Fuel Filter Replacement						✔	This section no. 3
	Fuel Lines and Connections	✔				✔	✔	Subsection 04-11
	Carburetor Adjustment	✔			✔		✔	Subsection 04-10
	Throttle Cable Inspection	✔			✔	✔	✔	Subsection 04-11
	Air Filter Cleaning			✔			✔	This section no. 4
	Drive Belt Condition	✔	✔				✔	Subsection 05-02
	Condition of Drive and Driven Pulleys	✔		✔		✔		Subsections 05-03 and 05-04
	Cleaning of Drive and Driven Pulleys						✔	Subsections 05-03 and 05-04
	Retorquing of Drive Pulley Screw	✔						Subsection 05-03
	Driven Pulley Preload	✔			✔	✔		Subsection 05-04
	Brake Fluid Level	✔	✔				✔	Subsection 05-06
	Brake Fluid Change (once a year)					✔		Subsection 05-06
	Brake Condition	✔	✔			✔	✔	Subsection 05-06
	Brake Adjustment			✔		✔		Subsection 05-06
	Drive Chain Tension	✔		✔		✔		Subsections 05-07 and 05-08
	Countershaft Lubrication	✔		✔		✔		Subsection 05-06
	Chaincase/Gearbox Oil Level	✔		✔			✔	Subsections 05-07 and 05-08
	Gearbox Oil Change (Skandic WT/SWT/WT LC only)	✔			✔	✔		Subsection 05-08
	Chaincase/Gearbox Oil Change	✔				✔		Subsections 05-07 and 05-08
	Lubrication of Drive Axle End Bearing**	✔		✔		✔		Subsection 07-04

SYSTEM	PART/TASK	10-HOUR OR 500 km (300 mi) INSPECTION (to be performed by dealer)	WEEKLY OR EVERY 240 km (150 mi)	MONTHLY OR EVERY 800 km (500 mi)	ONCE A YEAR OR EVERY 3200 km (2000 mi)	STORAGE (to be performed by dealer)	PRE-SEASON PREPARATION (to be performed by dealer)	REFER TO
	Handlebar Bolts. Retorque to 26 N•m (19 lbf•ft)	✔				✔		Subsection 08-02
	Steering and Front Suspension Mechanism Lubrication**	✔		✔		✔		Subsections 08-02 and 08-03
	Steering and Front Suspension Mechanism Condition	✔		✔		✔		Subsections 08-02 and 08-03
	Wear and Condition of Skis and Runners	✔	✔			✔		Subsection 08-03
	Steering and Ski Leg Camber Adjustment	✔		✔		✔		Subsection 08-02
	Suspension Adjustments	AS REQUIRED						Section 07: See appropriate subsection and *Operator's Guide*
	Suspension Lubrication**				✔	✔		Section 07: See appropriate subsection
	Suspension Condition	✔		✔		✔		Section 07: See appropriate subsection
	Suspension Stopper Strap Condition				✔	✔		Section 07: See appropriate subsection
	Track Condition	✔		✔		✔		Subsection 07-05
	Track Tension and Alignment	✔	AS REQUIRED					Subsection 07-05
	Spark Plugs*	✔		✔			✔	Subsection 06-03
	Engine Timing	✔					✔	Subsection 06-02
	Battery Condition	✔		✔		✔	✔	Subsection 06-04
	Headlight Beam Aiming				✔		✔	Subsection 09-02
	Wiring Harnesses, Cables and Lines	✔		✔		✔		Subsection 09-02
	Operation of Lighting System (HI/LO beam, brake light, etc.) Test Operation of Emergency Cut-Out Switch and Tether Cut-Out Switch	✔	✔			✔		*Operator's Guide*
	Rags in Air Intake and Exhaust System					✔	✔	This section no. 5
	Engine Compartment	✔		✔		✔		This section no. 6
	Vehicle Cleaning and Protection	✔		✔		✔		This section no. 7

* Before installing new spark plugs at pre-season preparation, it is suggested to burn excess storage oil by starting the engine with the old spark plugs. Only perform this operation in a well-ventilated area.

**Lubricate whenever the vehicle is used in wet conditions (wet snow, rain, puddles).

NO. 1 ENGINE LUBRICATION

At Storage

Engine internal parts must be lubricated to protect them from possible rust formation during the storage period.

Proceed as follows:

Start the engine and allow it to run at idle speed until the engine reaches its operating temperature.

⚠ WARNING

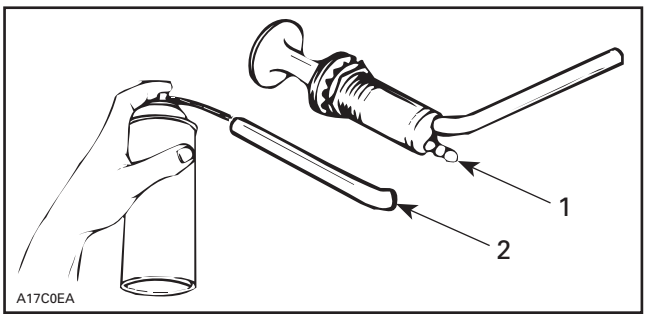
Ensure the track is free of all particles which could be thrown out while it is rotating. Keep hands, tools, feet and clothing clear of track. Ensure no one is standing in close proximity to the vehicle.

Stop the engine.

Models with a Primer

To prevent fuel from draining, primer button should be pushed all the way in.

Disconnect the outlet primer hose from the primer valve (straight coupling).



1. Straight coupling
2. To intake manifold

Insert storage oil (P/N 496 014 100) nozzle into primer outlet hose.

Models with a Choke

Remove air silencers to spray storage oil into each carburetor bore.

All Models

Restart engine and run at idle speed.

Inject storage oil until the engine stalls or until a sufficient quantity of oil has entered the engine (approximately half a can).

With the engine stopped, remove the spark plug and spray storage oil (P/N 496 014 100) into each cylinder.

Crank slowly 2 or 3 revolutions to lubricate cylinders.

Reinstall the spark plugs and the outlet primer hose or air silencers.

⚠ WARNING

This procedure must only be performed in a well-ventilated area. Do not run engine during storage period.

At Pre-Season Preparation

Add 500 mL (17 U.S. oz) of recommended injection oil to the first full filled fuel tank.

NO. 2 FUEL STABILIZER

With the new fuel additives, it is critical to use the fuel stabilizer (P/N 413 408 600) (250 mL) to prevent fuel deterioration, gum formation and fuel system components corrosion. Follow manufacturer's instructions for proper use.

Pour fuel stabilizer in fuel tank prior to starting engine for internal parts lubrication so that stabilizer flows everywhere in fuel system.

After engine starting, use primer several times so that stabilizer flows inside it.

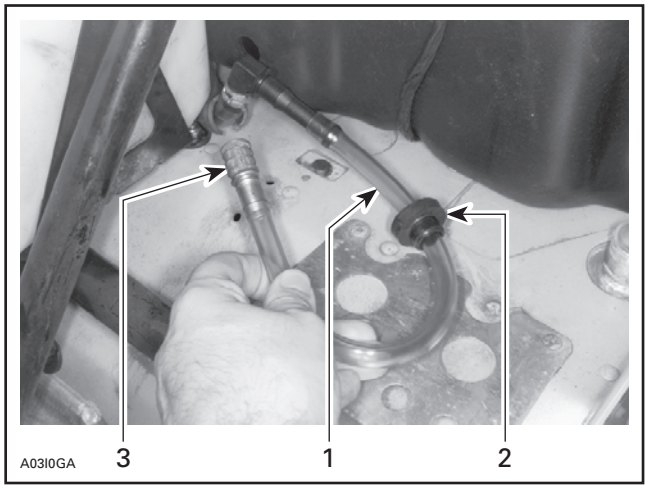
Do not drain fuel system.

CAUTION: Fuel stabilizer should be added prior to engine lubrication to ensure carburetor(s) protection against varnish deposit.

NO. 3 FUEL FILTER REPLACEMENT

Drain fuel tank.

Remove fuel line grommet from fuel tank and pull out inlet fuel line from tank.



TYPICAL

1. *Inlet fuel line*
2. *Position of grommet when installing*
3. *Fuel filter*

Replace fuel filter. To facilitate the fuel line installation, slide grommet on fuel line about 50 mm (2 in) away from elbow then install grommet on fuel tank and push elbow through grommet.

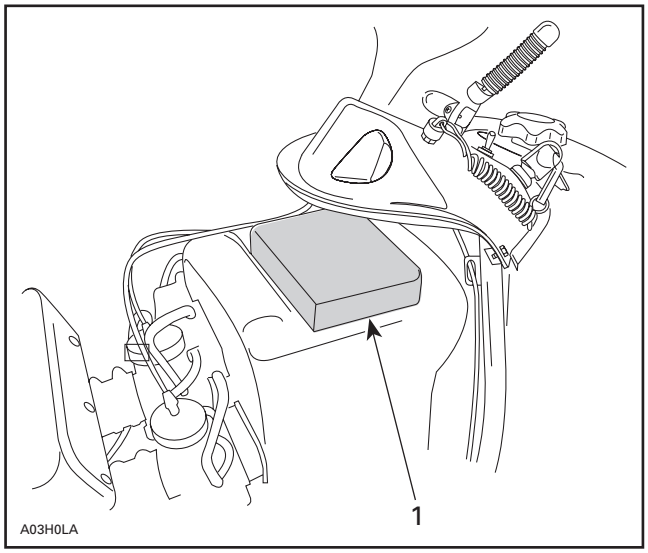
NO. 4 AIR FILTER CLEANING

Check that the air box is clean and dry then properly reinstall the filter.

CAUTION: These snowmobiles have been calibrated with the filter installed. Operating the snowmobile without it may cause engine damage.

S-Series

Lift hood and remove air filter from air intake silencer.



TYPICAL

1. *Filter*

To clean the filter, shake the snow out of it then, dry it out.

NO. 5 RAGS IN AIR INTAKE AND EXHAUST SYSTEM

At storage preparation, block air intake hole and exhaust system hole using clean rags.

Remove those rags at pre-season preparation.

NO. 6 ENGINE COMPARTMENT

Keep clean of grass, twigs, cloth, etc. These are combustible under certain conditions.

NO. 7 VEHICLE CLEANING AND PROTECTION

Remove any dirt or rust.

To clean the entire vehicle, use only flannel clothes or Kimtowels® wipers no. 58-380 from Kimberly-Clark.

CAUTION: It is necessary to use flannel cloths or Kimtowels wipers on windshield and hood to avoid damaging further surfaces to clean.

To clean the entire vehicle, including metallic parts with a **thick** coat of grease, use Endust® imported by Bristol Myers, available at hardware stores or supermarkets.

For bottom pan cleaning, use Bombardier Cleaner (P/N 293 110 001 (spray can 400 g) and 293 110 002 (4 L)).

CAUTION: Do not use Bombardier Cleaner on decals or vinyl.

To clean the entire vehicle, including metallic parts with a **thin** coat of grease, use Simple Green® from Sunshine Makers Inc., available at hardware stores or at automotive parts retailer.

For vinyl and plastic parts, use Vinyl & Plastic Cleaner (P/N 413 711 200 (6 x 1 L)).

To remove scratches on windshield or hood: Start with "Slip Streamer Motorcycle Windshield Heavy Duty Scratch, Remover". Finish with "Slip Streamer Motorcycle Cleaner and Polish".

NOTE: The latest product may be use alone if only light scratches are noticeable.

CAUTION: Never clean plastic parts or hood with strong detergent, degreasing agent, paint thinner, acetone, products containing chlorine, etc.

Inspect the hood and repair any damage.

Touch up all metal spots where paint has been scratched off. Spray all metal parts including shock chromed rods with BOMBARDIER LUBE (P/N 293 600 016).

Remove drive belt and spray BOMBARDIER LUBE (P/N 293 600 016) on drive and driven pulley sheaves.

Wax the hood and the painted portion of the frame for better protection.

NOTE: Apply wax on glossy finish only. Protect the vehicle with a cover to prevent dust accumulation during storage.

CAUTION: The snowmobile has to be stored in a cool and dry place and covered with an opaque tarpaulin. This will prevent sun rays and grime from affecting plastic components and vehicle finish.

Lift rear of vehicle until track is clear of the ground. Install on a snowmobile mechanical stand.

NOTE: Do not release track tension.

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ENGINE

The following chart is provided to help in diagnosing the probable source of troubles. It should be used as a guideline. Some causes or corrections may not apply to a specific model.

SYMPTOM	**ENGINE BACKFIRES.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check spark plugs.** a. Carbon accumulation caused by defective spark plug(s). *Clean carbon accumulation and replace spark plugs.*
	2. Check ignition timing. a. Timing is too advanced. *Set timing according to specifications (refer to TECHNICAL DATA).*
	3. Check carburetor. a. Fuel passages obstruted. Clean carburetor and install new filter(s). b. Fuel level too low. Adjust float level according to specifications.
	4. Check cooling system. a. Loose fan belt. *Adjust or replace fan belt (refer to TECHNICAL DATA).* b. Low antifreeze level. *Adjust antifreeze level. Then check clamps or hoses.* c. Defective tank cap. *Replace cap.* d. Air in system. *Bleed system.*

SYMPTOM	**ENGINE SUDDENLY TURNS OFF AT HIGH RPM AND/OR WITH LIGHT LOAD.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check that all ground wires are well connected.**

SYMPTOM	ENGINE SUDDENLY TURNS OFF.
CONDITION	NORMAL USE.
Test/Inspection	**1. Perform engine leak test. Refer to ENGINE LEAK VERIFICATION FLOW CHART. Check possible piston seizure.** a. Damaged gasket and/or seal. *Replace defective parts.*
	2. "Four-corner" seizure of piston(s). a. Accelerating too fast when engine is cold. Piston expands faster than cylinder. *Replace piston(s). Ask driver to refer to warm-up procedure in* Operator's Guide.
	3. Piston(s) seizure on exhaust side (color on piston dome is correct). a. Kinked fuel tank vent tube. *Relocate fuel tank vent tube.* b. Leaks at fuel line connections or damaged fuel lines. *Replace defective lines.* c. Fuel does not flow through carburetor(s) (foreign particles in needle area and/or varnish formation in carburetor(s)). *Clean carburetor(s) and install new filter(s).* d. Spark plug heat range is too warm. *Install spark plugs with appropriate heat range (refer to TECHNICAL DATA).* e. Improper ignition timing. *Adjust according to specifications (refer to TECHNICAL DATA).* f. Restriction in exhaust system. *Replace.* g. Compression ratio is too high. *Install genuine parts.* h. Carburetor calibration is too lean. *Adjust according to specifications (refer to TECHNICAL DATA).* i. Reed valve improperly adjusted or damaged. *Adjust according to specifications (refer to 593 ENGINE TYPE) and/or install Bombardier's recommended reed valve.* j. Poor oil quality. *Use BOMBARDIER injection oil.* k. Leaks at air intake silencer. *Replace air intake silencer grommets.*
	4. Melted and/or perforated piston dome; melted section at ring end gap. a. When piston reaches TDC, mixture is ignited by heated areas in combustion chamber. This situation is due to an incomplete combustion of a poor oil quality. *Clean residue accumulation in combustion chamber and replace piston(s). Use BOMBARDIER injection oil.* b. Spark plug heat range is too high. *Install recommended spark plugs (refer to TECHNICAL DATA).* c. Ignition timing is too advanced. *Adjust according to specifications (refer to TECHNICAL DATA).* d. Inadequate fuel quality. *Use appropriate fuel.* e. Carburetion is too lean. *Adjust according to specifications (refer to TECHNICAL DATA).*

	5. Seized piston all around the circumference (dry surface). a. Lack of oil, damaged oil line or defective injection pump. *Replace defective part(s).*
	6. Grooves on intake side of piston only. a. Oil film eliminated by water (snow infiltration in engine). *Replace piston(s) and check if intake system leaks.*
	7. Piston color is dark due to seizure on intake and exhaust sides. a. Broken or loose fan belt. *Replace fan belt or adjust its tension (refer to TECHNICAL DATA).* b. Cooling system leaks and lowers coolant level. *Tighten clamps or replace defective parts. Add antifreeze in cooling system until appropriate level is reached.* c. Accumulation of foreign particles in needle and/or main jet area. *Clean carburetor(s).*
	8. Cracked or broken piston(s). a. Cracked or broken piston(s) due to excessive piston/cylinder clearance or engine overreving. *Replace piston(s). Check piston/cylinder clearance (refer to TECHNICAL DATA). Adjust drive pulley according to specifications (refer to TECHNICAL DATA) and/or clean pulley sheaves if they are contaminated with greasy particles.*

SYMPTOM	**PISTON RING AND CYLINDER SURFACES ARE GROOVED.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check oil quality.** a. Poor oil quality. *Use BOMBARDIER injection oil.*
	2. Check injection pump and its hoses. a. Inadequate injection pump adjustment and/or defective hoses. *Adjust pump according to specifications (refer to ENGINE) and/or replace hoses.*

SYMPTOM	ENGINE DOES NOT OFFER MAXIMUM POWER AND/OR DOES NOT REACH MAXIMUM OPERATING RPM.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check spark plug condition.** a. Fouled spark plugs. *Replace.*
	2. Check if there is water in fuel. a. There is water in fuel. *Drain fuel system, then fill it with appropriate fuel.*
	3. Check items listed in ENGINE RUNS OUT OF FUEL (refer to fuel and oil systems subsection).
	4. Check carburetor adjustments and cleanliness. a. Inadequate carburetor adjustments or dirt accumulation. *Adjust according to specifications (refer to TECHNICAL DATA) or clean.*
	5. Check drive belt. a. Worn belt. *Replace belt if width is 3 mm (1/8") less than nominal dimension (refer to TECHNICAL DATA).*
	6. Check track adjustment. a. Too much tension and/or improper alignment. *Align track and adjust its tension to specifications (refer to TECHNICAL DATA).*
	7. Check drive pulley. a. Improper calibration screw adjustments (TRA pulley) and/or worn bushing(s). *Adjust according to specifications (refer to TECHNICAL DATA) and/or replace bushing(s).*
	8. Check driven pulley. a. Worn bushing and/or spring tension. *Replace spring and/or adjust its tension according to specifications (refer to TECHNICAL DATA).*
	9. Check exhaust system. a. Restriction. *Replace.*
	10. Check ignition timing. a. Decrease in power due to retarded ignition. *Adjust according to specifications (refer to TECHNICAL DATA).*
	11. Check engine compression. a. Worn piston(s) and ring(s). *Replace (refer to TECHNICAL DATA for specifications).*
	12. Check engine cooling system. a. Engine overheats. Improper fan belt tension. *Adjust fan belt (refer to TECHNICAL DATA).* b. Antifreeze level is low, cap fails to pressurize system or air circulates through lines. *Adjust level, replace cap or bleed cooling system.*
	13. Check reed valve. a. Improper tightness and/or opening. Replace or adjust. Refer to proper ENGINE subsection.

SYMPTOM	ENGINE DETONATION AT MAXIMUM RPM.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check which type of fuel is used.** a. Octane number is too low and/or alcohol level is too high. *Use recommended fuel type.*
	2. Check spark plug type. a. Improper spark plug heat range. *Install recommended spark plugs (refer to TECHNICAL DATA).*
	3. Check exhaust system. a. Too much restriction. *Replace.*
	4. Check ignition timing. a. Timing is too advanced. *Adjust according to specifications (refer to TECHNICAL DATA).*
	5. Check carburetion. a. Fouled and/or improper carburetor components. *Clean or replace according to specifications (refer to TECHNICAL DATA).*
	6. Check compression ratio and combustion chamber volume. a. Compression ratio is too high. *Install genuine parts.*

SYMPTOM	ENGINE TURNS OVER BUT FAILS TO START.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check switches.** a. Ignition switch, emergency cut-out switch or tether switch is in the OFF position. *Place all switches in the RUN or ON position. If it still does not work, connect DESS switch BK/GN and BK/WH wires together (harness side).*
	2. Check fuel valve. a. Fully open fuel valve.
	3. Check fuel level. a. Mixture not rich enough to start cold engine. *Check fuel tank level and use primer.*
	4. Check spark plug. a. Defective spark plug (no spark). *Replace spark plugs.*
	5. Check amount of fuel on spark plug. a. Flooded engine (spark plug wet when removed). *Do not overprime or overchoke. Remove wet spark plugs, turn ignition switch to OFF and crank engine several times. Install clean dry spark plugs. Start engine following usual starting procedure.*
	6. Check fuel lines. a. No fuel to the engine (spark plugs dry when removed). *Check fuel tank level; turn fuel valve on if applicable; check fuel filter, replace if clogged; check condition of fuel and impulse lines and their connections.*
	7. Check engine compression. a. Insufficient engine compression. *Replace defective part(s) (ex.: piston(s), ring(s), etc.).*

SYMPTOM	**IRREGULAR ENGINE IDLE.**
CONDITION	NORMAL USE AFTER ENGINE WARM UP.
Test/Inspection	**1. Check choke.** a. Choke plunger may be partially opened. *Readjust.*
	2. Check carburetor adapter. a. Air enters through a crack. *Replace.*
	3. Check air screw position. a. Inadequate fuel/air mixture. *Adjust according to specifications (refer to TECHNICAL DATA).*
	4. Check ignition system trigger coil air gap. a. Air gap is too large. *Adjust according to specifications (refer to TECHNICAL DATA).*
	5. Check dimension of pilot jet. a. Inadequate fuel/air mixture. *Adjust according to specifications (refer to TECHNICAL DATA).*
	6. Check reed valve. a. Improper tightness and/or opening. *Replace or adjust. Refer to proper ENGINE subsection.*
	7. Perform engine leak test. a. Leaking gaskets allow air to enter in engine. *Replace defective parts.*

SYMPTOM	HIGH ENGINE OPERATING TEMPERATURE.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check temperature gauge sensor.** a. False reading. *Check terminal connections. If problem still persists, replace sensor.*
	2. Check fan belt. a. Belt slides because it is too loose. *Adjust according to specifications (refer to TECHNICAL DATA).*
	3. Verify antifreeze level and check if there is air infiltration in the system or if there are leaks in gasket areas. a. Low antifreeze level or air in system. *Add antifreeze until recommended level is reached, bleed system and/or tighten clamps at fitting.*
	4. Check if antifreeze flows through system properly. a. Foreign particles and/or broken coolant pump impeller. *Clean cooling system and/or replace coolant pump impeller.*
	5. Check thermostat. a. Thermostat reacts slowly or not at all. *Replace.*
	6. Check antifreeze concentration. a. Antifreeze concentration is too high. *Adjust concentration according to Bombardier's recommendations.*
	7. Check tank cap. a. Cap does not hold pressure. *Replace.*
	8. Check carburetion. a. Improperly adjusted or inadequate carburetor components. *Adjust according to specifications (refer to TECHNICAL DATA) or replace inadequate component(s).*
	9. Check cylinder head gaskets. a. Worn gaskets. *Replace.*
	10. Check ignition timing. a. Ignition timing is too advanced. *Adjust according to specifications (refer to TECHNICAL DATA).*
	11. Check if there are leaks at air intake silencer and/or engine crankcase. a. Leak(s). *Repair or replace.*
	12. Check condition and heat range of spark plugs. a. Melted spark plug tip or inadequate heat range. *Replace.*

SYMPTOM	ENGINE EQUIPPED WITH RAVE VALVE DOES NOT REACH ITS FULL OPERATING RPM (500 TO 1000 RPM SLOWER).
CONDITION	NORMAL USE.
Test/Inspection	**1. Check RAVE valve pistons.** a. Valve piston(s) is (are) too far out. *Screw valve piston(s) to bottom.*
	2. Check RAVE valve stems. a. Bent RAVE valve stem(s). *Replace.*
	3. Check RAVE valves. a. Jammed valve(s). *Clean.*
	4. Check tension of RAVE springs. a. Inadequate spring tension. *Replace.*
	5. Check RAVE pressure holes. a. Clogged holes. *Clean.*
	6. Check clamps or sleeves. a. Damaged clamp(s) or sleeve(s). *Replace.*
	7. Check exhaust tightness. a. Exhaust system is leaking leading to a too low back pressure. *Replaces parts and reseal.*

SYMPTOM	ENGINE EQUIPPED WITH RAVE. ENGINE HESITATES AT MID-SPEED AND REACHES MAXIMUM PERFORMANCE ONLY AFTER A WHILE.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check RAVE valve spring(s).** a. Spring tension is too weak or spring(s) is (are) broken. *Replace.*
	2. Check RAVE valve cover red adjustment screws. a. Adjustment screw(s) is (are) too loose. *Adjust according to ASSEMBLY PROCEDURE in appropriate ENGINE subsections.*
	3. Check RAVE valve movement (RAVE movement indicator P/N 861 725 800). a. Valve(s) is (are) stuck in open position. *Clean.*

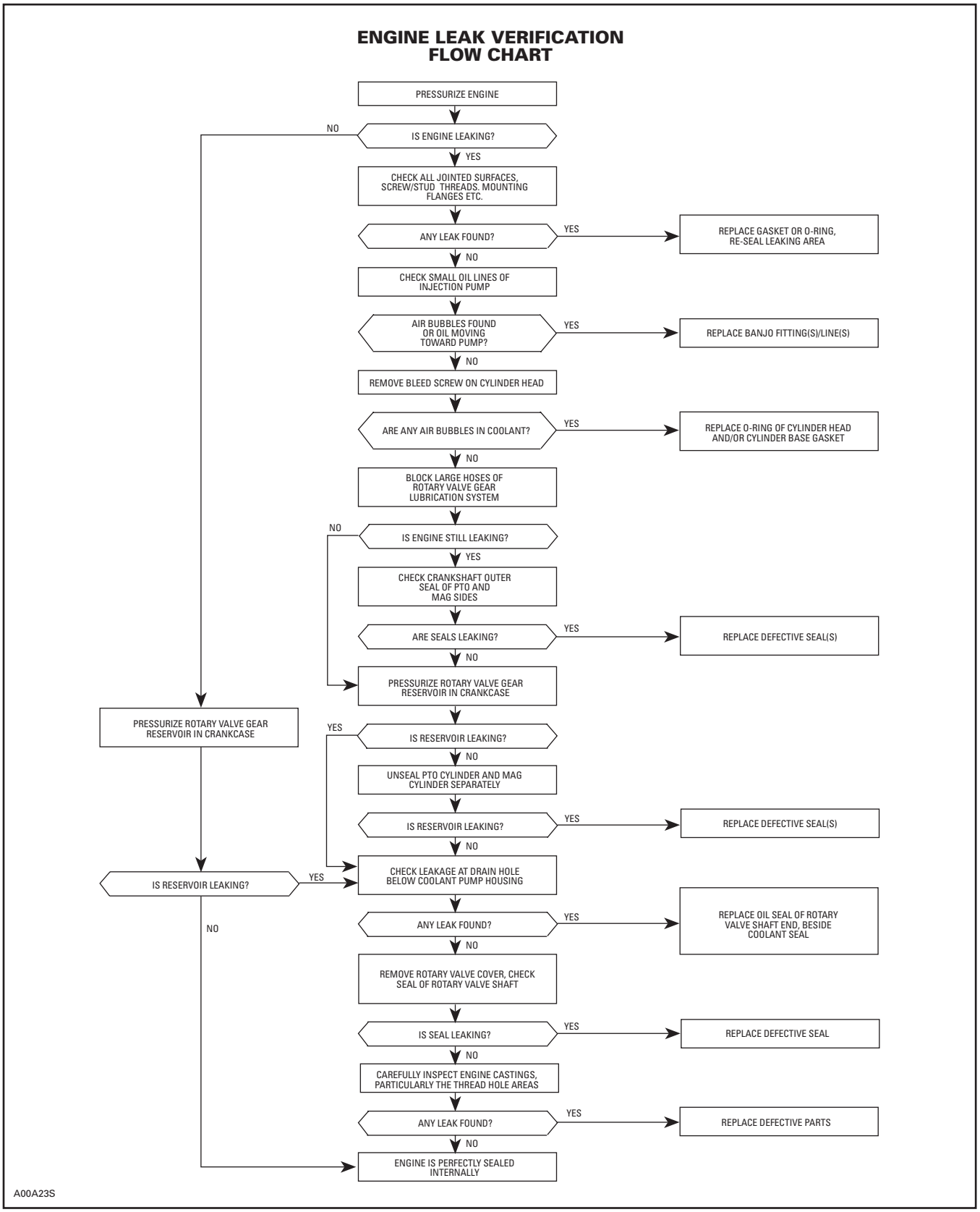
SYMPTOM	REWIND STARTER ROPE DOES NOT REWIND.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check rewind spring.** a. Broken spring. *Replace spring.*

SYMPTOM	REWIND STARTER PAWL DOES NOT ENGAGE.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check stopper spring.** a. Broken stopper spring. *Replace.*
	2. Check pawl and pawl lock. a. Pawl and pawl lock have stuck together because of heat. *Replace.*
	3. Check pawl and rope sheave. a. Pawl and rope sheave have stuck together because of heat. *Replace.*

SYMPTOM	ENGINE PINGING.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check fuel lines.** a. Bent fuel lines (preventing fuel from flowing through). *Relocate or replace fuel lines.*
	2. Check if carburetor(s) is (are) clean. a. Dirt prevents fuel from flowing through. *Clean.*
	3. Check ignition timing. a. Timing is too advanced. *Adjust according to specifications (refer to TECHNICAL DATA).*
	4. Check compression ratio. a. Compression ratio is too high. *Replace inadequate part(s) to obtain manufacturer's recommended compression ratio or use a higher grade fuel.*

SYMPTOM	ENGINE GENERATES A LOT OF VIBRATIONS.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check engine supports and stopper.** a. Loose and/or broken supports or interference between support(s) and chassis. *Retighten to specification (refer to TECHNICAL DATA) or replace.*
	2. Check drive pulley (refer to: vibrations coming from drive pulley).
	3. Check carburetor synchronization. a. Throttle slide heights are adjusted differently and/or throttle slide openings are unsynchronized. *Adjust throttle slide heights and throttle cable.*

ENGINE LEAK VERIFICATION FLOW CHART



FUEL AND OIL SYSTEMS

The following chart is provided to help in diagnosing the probable source of troubles. It should be used as a guideline. Some causes or corrections may not apply to a specific model.

SYMPTOM	**HIGH FUEL CONSUMPTION OR RICH MIXTURE.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check fuel tank.** a. Perforated fuel tank. *Replace fuel tank.*
	2. Check fuel pump reservoir and carburetor fittings. a. Leaking fittings. *Replace defective part.*
	3. Check choke adjustment. a. Fuel flows through choke circuit while engine runs. *Readjust choke.*
	4. Check float height in carburetor(s). a. Fuel level is too high in float bowl(s). *Adjust according to specifications (refer to TECHNICAL DATA).*
	5. Check needle valve. a. Foreign particles prevent needle valve(s) from closing and/or worn seating area. *Clean or replace needle valve(s), then clean seating area.*

SYMPTOM	**FUEL LEAKS IN ENGINE BASE WHEN ENGINE IS STOPPED.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check items 3, 4 and 5 of HIGH FUEL CONSUMPTION.**
	2. Check fuel pump diaphragm. a. Cracked diaphragm. *Replace.*

SYMPTOM	ENGINE LACKS POWER OR STALLS AT HIGH RPM.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check fuel tank vent hose.** a. Kinked or clogged hose. *Relocate or replace.*
	2. Check fuel filter. a. Clogged filter. *Replace.*
	3. Check fuel lines. a. Kinked or clogged lines. *Relocate or replace.*
	4. Check fuel pump flow. a. Dried diaphragm. *Replace.*
	5. Check if carburetor(s) is (are) clean. a. Varnish. *Clean.*

SYMPTOM	HIGH INJECTION OIL CONSUMPTION.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check oil injection pump adjustment.** a. Oil injection pump adjusted too rich. *Adjust.*
	2. Check injection pump identification. a. Wrong pump installed. *Replace with the appropriate pump. Refer to OIL INJECTION SYSTEM.*
	3. Check injection oil lines and their fitting. a. Leaking lines and/or cover. *Replace defective part(s).*
	4. Check injection pump cover gasket. a. Worn gasket. *Replace.*

SYMPTOM	ENGINE RUNS OUT OF FUEL (OR LEAN MIXTURE).
CONDITION	NORMAL USE.
Test/Inspection	**1. Check fuel filter ball located in fuel tank. Ball must move freely.** a. Corrosion due to oxidation at installation. *Replace fuel filter.*
	2. Check if lines are perforated or kinked and make sure they do not leak at fittings. a. Lines are too big for their fittings or are improperly routed. *Replace or properly relocate lines.*
	3. Check fuel pump outlet flow. a. Dirt clogging fuel pump lines or torn membrane. *Clean or replace fuel pump.*
	4. Check carburetor needle valve(s). a. Dirt (varnish, foreign particle) clogging fuel line inlets. *Clean.*
	5. Check main jet. a. Dirt (varnish, foreign particle) accumulation at main jet. *Clean.*
	6. Check float height in carburetor bowl(s). a. Running out of fuel at high speed because float height is too low. *Adjust float height according to specifications.*

TRANSMISSION AND BRAKE SYSTEMS

The following charts are provided to help in diagnosing the probable source of troubles. It should be used as a guideline. Some causes or corrections may not apply to a specific model.

TRANSMISSION

SYMPTOM	THE SNOWMOBILE ACCELERATES SLOWLY, ESPECIALLY WHEN IT IS STOPPED.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check drive belt condition.** a. Belt is too narrow (drive belt engagement is higher in drive pulley). *Replace belt if width is less than specified in DRIVE BELT.*
	2. Check distance between pulleys and/or drive belt deflection. a. Distance is too small between pulleys or deflection is too high (drive belt engagement is higher in drive pulley). *Adjust distance between pulleys and/or drive belt deflection according to specifications (refer to TECHNICAL DATA).*
	3. Check driven pulley sliding half play. a. Jammed sliding half. *Replace.*
	4. Check spring tension of driven pulley sliding half. a. Sliding half rotation is accelerated when spring tension is too weak. *Adjust according to specifications (refer to TECHNICAL DATA).*
	5. Refer to VIBRATIONS ORIGINATING FROM DRIVEN PULLEY and check items listed.
	6. Check drive pulley spring tension. a. Spring tension is too weak. *Replace.*

SYMPTOM	ENGINE MAXIMUM RPM IS TOO HIGH AND TOP SPEED IS NOT REACHED.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check items 1, 2 and 3 of THE SNOWMOBILE ACCELERATES SLOWLY, ESPECIALLY WHEN IT IS STOPPED.**
	2. Check driven pulley spring tension. a. Spring tension is too stiff. *Adjust according to specifications (refer to TECHNICAL DATA).*
	3. Check position of the calibration screws. (TRA drive pulley) a. Selected numbers are too high. *Adjust according to specifications (refer to TECHNICAL DATA).*
	4. Refer to VIBRATIONS ORIGINATING FROM DRIVEN PULLEY and check items listed.

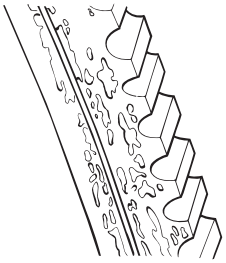
SYMPTOM	LOOSENESS IS FELT IN DRIVE SYSTEM WHEN ACCELERATING/DECELERATING.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check drive chain tension.** a. Drive chain is too loose. *Adjust.*
	2. Check radial play of driven pulley. a. Worn key, keyway or splines. *Replace.*

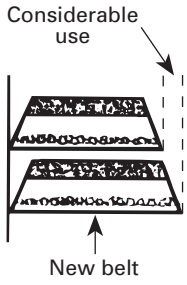
SYMPTOM	VIBRATIONS ORIGINATING FROM DRIVE PULLEY.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check drive belt.** a. Belt width is uneven at many places. *Replace.*
	2. Check tightening torque of drive pulley screw. a. Moving governor cup. *Retighten screw.*
	3. Spring cover screws. a. Spring cover moves and restrains sliding half movement. *Retighten screws.*
	4. Check spring cover (TRA TYPE) and/or outer half bushings. a. Excessive gap between bushings and inner half shaft, thus restraining sliding half movements. *Replace bushing(s).*
	5. Check sliding half slider shoes. a. Worn slider shoes. *Replace.*

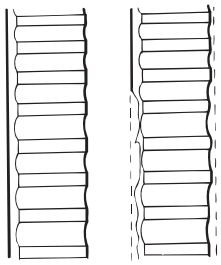
SYMPTOM	VIBRATIONS ORIGINATING FROM DRIVEN PULLEY.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check sliding half play.** a. Sliding half runout. *Replace sliding half bushing.*
	2. Check sliding half and fixed half straightness. a. Sliding half/fixed half runout. *Replace.*
	3. Check cam slider shoes. a. One or two slider shoes out of three are broken. *Replace.*

SYMPTOM	PULLEYS DO NOT DOWN SHIFT PROPERLY.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check driven pulley spring tension.** a. Spring tension is too weak. *Adjust according to specifications (refer to TECHNICAL DATA).*
	2. Refer to VIBRATIONS COMING FROM DRIVEN PULLEY and check items listed.
	3. Check drive pulley bushings (cleanliness, wear, etc.). a. Bushings stick to fixed half pulley shaft. *Clean or replace.*
	4. Check driven pulley spring tension. a. Spring tension is too weak. *Replace.*

SYMPTOM	UNEVEN BELT WEAR ON ONE SIDE ONLY.
CONDITION	NORMAL USE.
Test/Inspection A00D09Y	**1. Check tightening torque of engine mount bolts.** a. Loose engine mount. *Tighten engine mount nuts/bolts equally.*
	2. Check pulley alignment. a. Pulley misalignment. *Align pulleys.*
	3. Check drive belt contact area on pulleys. a. Rough or scratched pulley surfaces. *Repair or replace pulley half.*
	4. Check driven pulley sliding half play. a. Driven pulley bushing worn. *Replace bushing.*

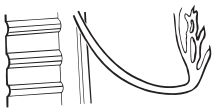
SYMPTOM	BELT GLAZED EXCESSIVELY OR HAVING BAKED APPEARANCE.
CONDITION	NORMAL USE.
Test/Inspection  A00D0AY	**1. Check if drive pulley bushings are worn.** a. Insufficient pressure on belt sides. *Replace bushing.* **2. Check condition of drive pulley fixed half shaft.** a. Rusted drive or driven pulley shafts. *Clean shaft with fine steel wool.* **3. Check if pulley halves are clean.** a. Oil on pulley surfaces. *Clean pulley halves.* **4. Check pulley calibration.** a. Improper pulley calibration. *Calibrate according to specifications.*

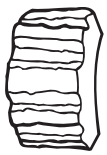
SYMPTOM	BELT WORN EXCESSIVELY IN TOP WIDTH.
CONDITION	NORMAL USE.
Test/Inspection  A00D0BY	**1. Check drive pulley.** a. Excessive slippage due to irregular outward actuation movement of drive pulley. *Carry out drive pulley inspection.* **2. Check drive belt identification number.** a. Improper belt angle. (wrong type of belt). *Replace belt with an appropriate drive belt.* **3. Check drive belt width.** a. Considerable use. *Replace belt if width is less than specified specified in DRIVE BELT.*

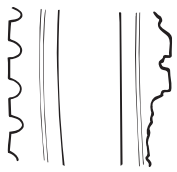
SYMPTOM	BELT WORN NARROW IN ONE SECTION.
CONDITION	NORMAL USE.
Test/Inspection  A00D0CY	**1. Check if parking brake is released.** a. Parking brake is engaged. *Release parking brake.*
	2. Check track tension/alignment. a. Frozen or too tight track. *Liberate track from ice or check track tension and alignment.*
	3. Check drive pulley. a. Drive pulley not functioning properly. *Repair or replace drive pulley.*
	4. Check idle speed. a. Engine idle speed too high. *Adjust according to specifications.*
	5. Check drive belt length. a. Incorrect belt length. *Replace belt with an appropriate drive belt (refer to TECHNICAL DATA).*
	6. Check distance between pulleys. a. Incorrect pulley distance. *Readjust according to specifications.*
	7. Check belt deflection. a. Deflection is too small. *Adjust according to specifications.*

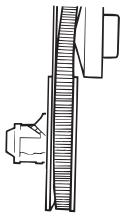
SYMPTOM	BELT SIDES WORN CONCAVE.
CONDITION	NORMAL USE.
Test/Inspection A00D0DY	**1. Check pulley half surfaces.** a. Rough or scratched pulley half surfaces. *Repair or replace.*
	2. Check drive belt identification number. a. Unspecified type of belt. *Replace belt with an appropriate drive belt (refer to TECHNICAL DATA).*

SYMPTOM	**BELT DISINTEGRATION.**
CONDITION	NORMAL USE.
Test/Inspection A00DOEY	**1. Check drive belt identification number.** a. Excessive belt speed. *Using unspecified type of belt. Replace belt with proper type of belt (refer to TECHNICAL DATA).* **2. Check if pulley halves are clean.** a. Oil on pulley surfaces. *Clean pulley surfaces with fine emery cloth and wipe clean using Parts Cleaner (P/N 413 711 809) and a cloth.*

SYMPTOM	**BELT EDGE CORD BREAKAGE.**
CONDITION	NORMAL USE.
Test/Inspection  A00DOFY	**1. Check pulley alignment.** a. Pulley misalignment. *Align pulley according to specifications (refer to TECHNICAL DATA).*

SYMPTOM	**FLEX CRACKS BETWEEN COGS.**
CONDITION	NORMAL USE.
Test/Inspection  A00D0GY	**1. Check drive belt condition.** a. Considerable use, belt wearing out. *Replace.*

SYMPTOM	**SHEARED COGS, COMPRESSION SECTION FRACTURED OR TORN.**
CONDITION	NORMAL USE.
Test/Inspection  A00D0HY	**1. Check drive belt rotational direction.** a. Improper belt installation. *Replace.* **2. Check if drive belt rubs against components.** a. Belt rubbing on stationary object. *Relocate components.* **3. Check drive pulley.** a. Violent engagement of drive pulley. *Check drive pulley engagement speed, drive pulley bushings and components.*

SYMPTOM	**BELT "FLIP-OVER" AT HIGH SPEED.**
CONDITION	NORMAL USE.
Test/Inspection  A00D0IY	**1. Check pulley alignment.** a. Pulley misalignment. *Align pulley according to specifications (refer to TECHNICAL DATA).*
	2. Check drive belt identification number. a. Using unspecified type of belt. *Replace belt with an appropriate drive belt.*

BRAKE SYSTEM

MECHANICAL BRAKE

SYMPTOM	BRAKE DOES NOT ADJUST AUTOMATICALLY.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check ratchet wheel spring.** a. Broken ratchet wheel spring tab. *Replace.*
	2. Check mobile pad stud. a. Stud rotates in pad. *Replace.*

SYMPTOM	BRAKE HANDLE DOES NOT RETURN COMPLETELY.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check brake return spring.** a. Broken return spring. *Replace.*
	2. Check if brake cable moves freely in its housing. a. Brake cable movement is limited due to oxidation or dirt accumulation. *Replace.*
	3. Check distance between brake lever and caliper. a. Distance is too wide. *Adjust according to specifications (refer to TRANSMISSION).*

HYDRAULIC BRAKE

SYMPTOM	SPONGY BRAKE CONDITION.
CONDITION	NORMAL USE.
Test/Inspection	**1. Faulty brake fluid.** *Replace brake fluid and bleed system. If problem still occurs, replace master cylinder.*

SYMPTOM	BRAKE FLUID LEAKING.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check for loosen hose connectors.** *Replace copper washers and retighten.*
	2. Check for damaged hose, master cylinder and caliper. *Replace part(s) and check for proper mounting.*

MECHANICAL AND HYDRAULIC BRAKES

SYMPTOM	BRAKE SYSTEM IS NOISY.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check brake pad thickness.** a. Pads are worn up to wear warner. *Replace.*

ELECTRICAL SYSTEM

The following chart is provided to help in diagnosing the probable source of troubles. It should be used as a guideline. Some causes or corrections may not apply to a specific model.

SYMPTOM	**STARTER DOES NOT TURN.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check 30 A fuse located near battery.** a. Burnt fuse. *Check wiring condition and replace 30 A fuse.*
	2. Check continuity of starter switch contact points. a. Poor contact of starter switch contact points. *Repair or replace switch.*
	3. Check continuity between starter switch and solenoid. a. Open circuit between starter switch and solenoid switch. *Repair.*

SYMPTOM	STARTER TURNS; BUT DOES NOT CRANK THE ENGINE.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check engine.** a. Engine seized. *Rebuild engine.*
	2. Check wire connection. a. Inadequate connection (too much resistance). *Clean and reconnect.*
	3. Check battery charge. a. Weak battery. *Recharge battery and verify recharge system and wires.*
	4. Check battery capacity. a. Shorted battery cell(s). *Replace.*
	5. Check solenoid switch contact disc. a. Burnt or poor contact of solenoid switch contact disc. *Replace solenoid switch.*
	6. Check continuity of solenoid switch pull-in winding. a. Open circuit of solenoid switch pull-in winding. *Replace solenoid switch.*
	7. Check continuity of solenoid switch hold-in winding. a. Open circuit of solenoid switch hold-in winding. *Replace solenoid switch.*
	8. Check brushes. a. Poor contact of brushes or worn. *Replace brushes.*
	9. Check commutator. a. Burnt commutator. *Turn commutator on a lathe. Respect outer diameter wear limit.* *Refer to ELECTRIC STARTER.*
	10. Check height of commutator mica. a. Commutator mica too high. *Undercut mica.*
	11. Check field coil resistance. a. Shorted field coil. *Repair or replace yoke.*
	12. Check armature resistance. a. Shorted armature. *Repair or replace armature.*
	13. Check tension of brush springs. a. Weak brush spring tension. *Replace springs.*
	14. Check yoke assembly magnets. a. Weak magnets. *Replace yoke assembly.*
	15. Check if bushings are worn. a. Worn bushings. *Replace bushings.*

SYMPTOM	STARTER TURNS, BUT OVERRUNNING CLUTCH PINION DOES NOT MESH WITH RING GEAR.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check clutch pinion gear.** a. Worn clutch pinion gear. *Replace clutch.*
	2. Check clutch. a. Defective clutch. *Replace clutch.*
	3. Check brackets. a. Worn or broken brackets. *Replace brackets.*
	4. Check movement of clutch on splines. a. Poor movement of clutch on splines. *Clean and correct.*
	5. Check clutch bushing. a. Worn clutch bushing. *Replace clutch.*
	6. Check starter bushings. a. Worn starter bushing(s). *Replace bushing(s).*
	7. Check ring gear. a. Worn ring gear. *Replace ring gear.*

SYMPTOM	ELECTRIC STARTER KEEPS TURNING WHEN ENGINE IS STARTED.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check clutch.** a. Jammed clutch pinion gear. *Replace or clean.*
	2. Check movement of clutch on splines. a. Clutch is stuck on splines. *Clean.*
	3. Check starter brackets. a. Broken bracket(s). *Replace bracket(s).*
	4. Check ignition switch. a. Ignition switch does not return to its ON position or is short-circuited. *Adjust retaining screw or replace switch.*
	5. Check solenoid. a. Shorted solenoid switch winding(s). *Replace solenoid switch.*
	6. Check solenoid switch contacts. a. Melted solenoid switch contacts. *Replace solenoid switch.*
	7. Check starter switch. a. Starter switch returns poorly. *Replace ignition switch.*

SYMPTOM	NOISE OCCURENCE WHEN STARTING ENGINE.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check if ring gear is well-mounted to drive pulley inner half.** a. Loose and/or broken bolts. *Retighten bolts using thread locker or replace ring gear and drive pulley inner half.*

SYMPTOM	REGULATOR BLACK WIRE IS MELTED (HARNESS SIDE).
CONDITION	NORMAL USE.
Test/Inspection	**1. Check that big ground wire at battery is well connected to chassis.** a. Corroded and/or loose connection(s). *Clean and/or retighten.*

SYMPTOM	OPTIONAL ELECTRIC STARTER DOES NOT WORK WHEN TURNING IGNITION SWITCH.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check connection of BLACK wire (solenoid ground) in 3-wire housing coming from magneto (white housing).** a. Corroded and/or loose connection(s). *Clean and/or retighten.*

SYMPTOM	ELECTRIC STARTER SOMETIMES DOES NOT WORK WHEN TURNING IGNITION SWITCH.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check battery cables and starter wires.** a. Corroded and/or loose connection(s). *Clean and/or retighten.*
	2. Check fuse. a. Oxidized or burnt fuse. *Clean or replace.*
	3. Check wiring harness connections. a. Oxidized connections. *Clean or replace defective terminals.*
	4. Check ignition switch. a. Defective contacts in ignition switch. *Replace.*
	5. Check solenoid of electric starter. a. Shorted solenoid wiring harness or eroded contact washer. *Replace.*

SYMPTOM	ENGINE DOES NOT START — NO SPARK AT SPARK PLUG.
CONDITION	AT ENGINE CRANKING.
Test/Inspection	**1. Verify spark plug condition.** a. Defective, improperly set, worn-out, fouled. *Identify source of problem and correct. Replace spark plugs.*
	2. Verify spark plug cap resistance with an ohmmeter. a. Defective part. *Replace cap.*
	3. Verify if problem originated from electrical system wiring harness and/or accessories and/or ignition cut-out switches by unplugging the 3-wire connectors between the magneto/generator and the vehicle wiring harness. Check condition of connectors. a. Heating, rotating or sharp part in contact with harness. Improper harness routing. Defective switch(es). Corroded connector terminals. *Replace or repair damaged wires. Reroute where necessary. Replace defective switch(es). Clean terminals and apply silicone dielectric grease.*
	4. Verify trigger coil resistance with an ohmmeter and connector condition. a. Defective coil. Corroded connector terminals. *Replace defective coil. Clean terminals and apply silicone dielectric grease.*
	5. Verify condition of ignition coil. a. Mechanically damaged part. Vibration problem. Electrically damaged part. *Tighten mounting screws. Replace ignition coil.*
	6. Verify condition of ignition generator coils. a. Mechanically damaged part. Vibration problem. Electrically damaged part. *Tighten mounting screws. Replace coils.*
	7. Verify MPEM. a. Mechanically damaged part. Vibration problem. Electrically damaged part. *Tighten mounting screws. Replace MPEM, retest and verify ignition timing.*

SYMPTOM	CDI MODULE DOES NOT WORK.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check that high tension coil wires do not touch any metal parts.** a. Short circuit. *Isolate and reroute wires.*

SYMPTOM	ENGINE STALLS.
CONDITION	AT LOW SPEED.
Test/Inspection	**1. Verify items 4, 5 and 6 above.**

SYMPTOM	**IRREGULAR ENGINE SPEED.**
CONDITION	AT HIGH SPEED.
Test/Inspection	**1. Verify items 4, 5 and 6 above.**
CONDITION	AT LOW SPEED.
Test/Inspection	**1. Verify items 4 and 5 above and trigger coil/flywheel protrusion air gap.** a. Air gap too large. *Readjust air gap.*

SYMPTOM	**ENGINE IS MISFIRING — ERRATIC SPARK AT SPARK PLUG.**
CONDITION	RIDING ON WET SNOW.
Test/Inspection	**1. Verify if spark plug wires and/or spark plug cap seals are sealing out moisture.** a. Defective wires and/or seals. *Replace defective part.*
	2. Verify if ignition system wiring harness connectors are in good condition and/or are sealing out moisture. a. Loose connectors, corroded terminals or defective parts. *Clean terminals and apply silicone dielectric grease. Replace defective parts.*
CONDITION	NORMAL USE.
Test/Inspection	**1. Verify misfiring by observing flash of stroboscopic timing light; unplug connectors between magneto/generator and vehicle wiring harness to isolate problem. Check condition of connectors.** a. Defective spark plug(s) and/or cable(s)/cap(s). Defective electrical system wiring harness and/or accessories and/ignition cut-out switches. Condition of connector terminals. *Replace defective parts and/or repair damaged wires. Replace defective switch(es). Clean terminals and apply silicone dielectric grease.*
CONDITION	RIDING IN DEEP AND THICK SNOW.
Test/Inspection	**1. Perform all verifications outlined under ENGINE DOES NOT START — NO SPARK AT SPARK PLUG.**
	2. Verify spark plugs. Proceed with spark plug analysis in order to identify source of problem. a. Defective and/or worn spark plug(s) and/or cable(s) and/or cap(s). *Replace defective part(s). Proceed with ignition system testing procedures. Perform engine analysis.*

SYMPTOM	FOULED (BLACK) SPARK PLUG TIP.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check carburetor(s).** a. Carburetion is too rich. *Adjust according to specifications (refer to TECHNICAL DATA).*
	2. Check injection oil consumption. a. Injection pump flow is too high. *Adjust according to specifications or replace.*
	3. Check oil quality. a. Poor oil quality that creates deposits. *Use BOMBARDIER injection oil.*
	4. Check engine compression. a. Leaking piston ring(s). *Replace.*

SYMPTOM	SPARK PLUG TIP(S) IS (ARE) LIGHT GREY.
CONDITION	NORMAL USE.
Test/Inspection	**1. Refer to ENGINE SLOWS DOWN OR STOPS AT HIGH RPM and check items listed.**
	2. Check spark plug heat range. a. Spark plug heat range is too high. *Replace by Bombardier's recommended spark plug (refer to TECHNICAL DATA).*
	3. Check if air intake silencer leaks. a. Air surplus coming from opening(s) located between halves. *Seal.*
	4. Check carburetor adapter collars. a. Loose collar(s). *Tighten.*
	5. Check carburetor adapter(s). a. Cracked or deformed adapter(s). *Replace.*

SYMPTOM	**RER (ROTAX ELECTRONIC REVERSE) DOES NOT WORK.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check idle speed.** a. Wrong idle speed. *Adjust according to specification (refer to TECHNICAL DATA).*
	2. Check spark plug. a. Faulty spark plug. *Replace.*
	3. Check drive belt deflection. a. Wrong deflection. *Adjust according to specification (refer to TECHNICAL DATA).*
	4. Check carburetor synchronization and air screw adjustment. a. Wrong adjustment. *Adjust according to specification (refer to TECHNICAL DATA) and read carburetor subsection.*
	5. Check electrical connections. a. Bad electrical connections or damaged wires. *Clean or replace.*
	6. Check MPEM. a. Faulty MPEM. *Replace.*
CONDITION	AT HIGH ALTITUDE.
Test/Inspection	**1. Check high altitude cap continuity.** a. Broken jumper inside high altitude cap. *Replace high altitude cap.*

SYMPTOM	**HEADLAMP NOT LIGHTING.**
CONDITION	WHITE BULB.
Test/Inspection	**1. Check bulb.** a. Gas leak. *Replace bulb.*
CONDITION	BROKEN ELEMENT.
Test/Inspection	**1. Check for loose headlamp housing and bulb socket.** a. Vibration problem. *Tighten headlamp mounting screws. Lock bulb in socket. Replace bulb.*
CONDITION	MELTED FILAMENT (ENDS OF ELEMENT HOLDER) AND BLACK BULB.
Test/Inspection	**1. Check voltage at headlamp at different speeds. It must not be above 15 Vac.** NOTE: If quartz halogen bulb is involved, ensure that proper voltage regulator is installed. a. Excessive voltage in lighting circuit. *Replace voltage regulator and ensure proper grounding. Retest.*

SYMPTOM	HEADLAMP DIMING.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check voltage at headlamp at different speeds. It must not be below 11 Vac.** a. Insufficient voltage in lighting circuit. *Replace voltage regulator and retest.*
	2. Visually inspect wiring harness for damaged and/or melted wires and/or bad wire terminal crimping and/or connections. a. Heating, rotating or sharp part in contact with harness. Improper harness routing. *Repair/replace damaged wires and/or terminals. Reroute harness where necessary.*
	3. Verify if there is an interconnection between AC and DC current. a. Faulty installation of optional equipment. *Find optional equipment connected directly to DC ground (BK wire or chassis) or to any DC hot wire (RD, RD/BL). Disconnect and reconnect to AC current (YL and YL/BK wires).*
	4. Verify if optional electric accessories are overloading the magneto/generator. a. Excessive electrical load to magneto/generator. *Reduce the electrical load by removing excess accessories. Reconnect as recommended by manufacturer.*
	5. Hot Grips brand: Verify if they were connected in parallel by mistake. a. Excessive electrical load to magneto/generator. *Reconnect as recommended by manufacturer.*
	6. Bombardier heating grips: Verify if the return wires of the elements were grounded to the chassis by mistake. a. Faulty installation of optional equipment. *Reconnect as recommended by manufacturer.*
	7. Verify if heating grips installation overloads the magneto/generator capacity. a. Excessive electrical load to magneto/generator. *Reduce the electrical load by removing accessories.*

SYMPTOM	FALSE FUEL AND/OR TEMPERATURE GAUGE READINGS.
CONDITION	NORMAL USE.
Test/Inspection	**1. Verify if gauge was connected on DC current by mistake (in case of optional installation).** a. Faulty installation of optional equipment. *Find optional wires connected directly to DC ground (BK wire to chassis) or to any DC hot wire (RD, RD/BL). Disconnect and reconnect to AC current (YL and YL/BK wires).*
	2. Verify sender unit for resistance variation when moving float arm. a. Defective or damage part. *Replace sender unit.*
	3. Verify sender unit for free movement and/or correct arm position. a. Defective or damaged part. *Correct or replace sender unit.*
	4. Verify sender unit/gauge wiring harness condition. a. Heating, rotating or sharp part in contact with harness. Improper harness routing. *Replace or repair damaged wires. Reroute where necessary.*

SYMPTOM	WITH ENGINE IDLING NO ELECTRICAL ACCESSORIES WORK.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check idle speed.** a. Too low idle speed. *Readjust to specifications.*
	2. Verify regulator. a. Faulty regulator. *Replace.*

SYMPTOM	BRAKE LIGHT REMAINS ON.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check if bulb is properly installed.** a. Bulb is not installed correctly (contact elements are reversed). *Install bulb correctly.*
	2. Check brake switch. a. Switch contact remains closed. *On mechanical brake if brake switich is in good condition, adjust brake cable or brake switch. On hydraulic brake, replace brake switch.*

SYMPTOM	REAR LIGHT BULB FLASHES.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check bulb tightness in housing.** a. Looseness at bulb contact elements. *Install bulb correctly.*
	2. Check if rear light is properly connected. a. Connector housing is partially connected. *Install connector housing properly.*
	3. Check continuity of wires. a. Corroded terminals and/or broken wires. *Replace terminal(s) or crimp defective wires.*

SYMPTOM	TACHOMETER DOES NOT WORK.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check continuity of wires.** a. Corroded terminals and/or broken wires. *Replace terminal(s) or crimp defective wires.*

SYMPTOM	HIGH BEAM PILOT LAMP LIGHTS UP WHEN LOW BEAM IS SELECTED.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check proper connections.** a. YELLOW wire connected to pilot lamp. Mixed-up connections with heating element pilot lamps. *Reconnect a YELLOW/BLACK wire to pilot lamp. YELLOW wires are connected to heating element pilot lamps.*

SUSPENSION AND TRACK

The following chart is provided to help in diagnosing the probable source of troubles. It should be used as a guideline. Some causes or corrections may not apply to a specific model.

SYMPTOM	**SUSPENSION IS TOO LOW.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check condition of spring.** a. Spring is weakened or broken. *Replace spring.*
	2. Check preload of spring. a. Low spring preload. *Increase preload to the recommended position.*

SYMPTOM	**REAR SUSPENSION BOTTOMS OUT.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check rear spring preload or rear arm spring preload.** a. Spring tension is too low. *Increase rear arm spring preload.*

SYMPTOM	**SLIDER SHOES WEAR OUT PREMATURELY.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check track tension.** a. Pressure is too great on slider shoes. *Adjust according to specifications (refer to TECHNICAL DATA).* *Replace defective parts.*

SYMPTOM	**TRACK CLEATS BECOME BLUE.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check track tension.** a. Pressure is too great on cleats. *Adjust according to specifications (refer to TECHNICAL DATA).*
	2. Check slider shoes and/or suspension retaining screws. a. Worn slider shoes or lost retaining screws. *Replace defective parts and/or tighten loose screws.*

SYMPTOM	NOISE OR VIBRATIONS ORIGINATING FROM THE TRACK.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check slide suspension retaining bolts.** a. Missing bolt(s) allowing movement of certain components which in turn interfere with track rotation. *Replace missing bolt(s).*
	2. Check condition of idler wheel(s). a. Idler wheel rubber is damaged. *Replace.*
	3. Check guide cleats. a. Top portion of guide cleat(s) is bent. *Replace.*
	4. Check sprockets. a. One or various teeth of drive shaft sprockets are broken. *Replace sprocket(s).*
	5. Check track rods and/or internal traction teeth. a. One or various track rods and/or teeth are broken. *Replace track.*

SYMPTOM	DERAILING TRACK.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check track tension.** a. Track is too loose. *Adjust.*
	2. Check if track and slider shoes are properly aligned. a. Improper alignment. *Adjust.*
	3. Check for proper suspension fastening. a. Loose or lost retaining screws. *Install new screws and tighten to recommended torque.*

SYMPTOM	**REAR SUSPENSION IS TOO STIFF.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check track tension.** a. Track is too tight. *Adjust.*
	2. Check if axles are properly lubricated. a. Improper lubrication and/or contaminated grease (sticky oil sludge). *Clean and/or lubricate.*
	3. Check rear spring preload. a. Too much preload. *Adjust to recommended position.*

SYMPTOM	**WHEN HANDLEBAR IS TURNED, SNOWMOBILE UNDERSTEERS.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check ski runner condition.** a. Worn ski runners. *Replace.*
	2. Check tension of ski spring adjustment cams. a. Insufficient ski pressure on the ground. *Increase spring preload.*
	3. Check if front arm stopper strap is too long. a. Insufficient ski pressure on the ground. *Shorten stopper strap.*
	4. Check front arm spring tension. a. Insufficient ski pressure on the ground. *Loosen spring tension.*
	5. On Skandic WT series only, check distance between shackle and stopper. a. Insufficient ski pressure on the ground. *Install horse shoe washer(s) as described in* Operator's Guide.

SYMPTOM	HANDLEBAR IS DIFFICULT TO TURN.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check position of ski spring adjustment cams.** a. More pressure on the ground when cam increases spring preload. *Reduce ski spring preload.*
	2. Check position of stopper strap. a. More weight when stopper strap is short. *Lengthen front arm stopper strap.*
	3. Check position of front arm shock adjustment cam(s). a. When spring tension is weak, more weight is transferred to the skis. *Increase spring preload.*
	4. Check condition of ball joints. a. Corrosion restrains movement. *Lubricate or replace.*
	5. Check swing arm camber. a. Too much ski leg inclination. *Adjust camber to specifications.*
	6. Check for proper lubrication. a. Components need lubrication. *Lubricate. Refer to LUBRICATION AND MAINTENANCE.*

SYMPTOM	THE SNOWMOBILE IS UNSTABLE (IT MOVES FROM LEFT TO RIGHT AND VICE VERSA).
CONDITION	NORMAL USE.
Test/Inspection	**1. Check ski runner condition.** a. Worn or bent ski runners. *Replace ski runners.*
	2. Check ski alignment. a. Improper ski alignment. *Align skis in order to obtain proper toe-out (opening) (to adjust, refer to STEERING SYSTEM).*
	3. Check if bushings are too loose in steering system. a. Bushings are too loose. *Replace.*
	4. Check ski pressure. NOTE: If all parts are in good condition and the customer still complains about an unstable snowmobile, consider the installation of optional Proactive Control System.

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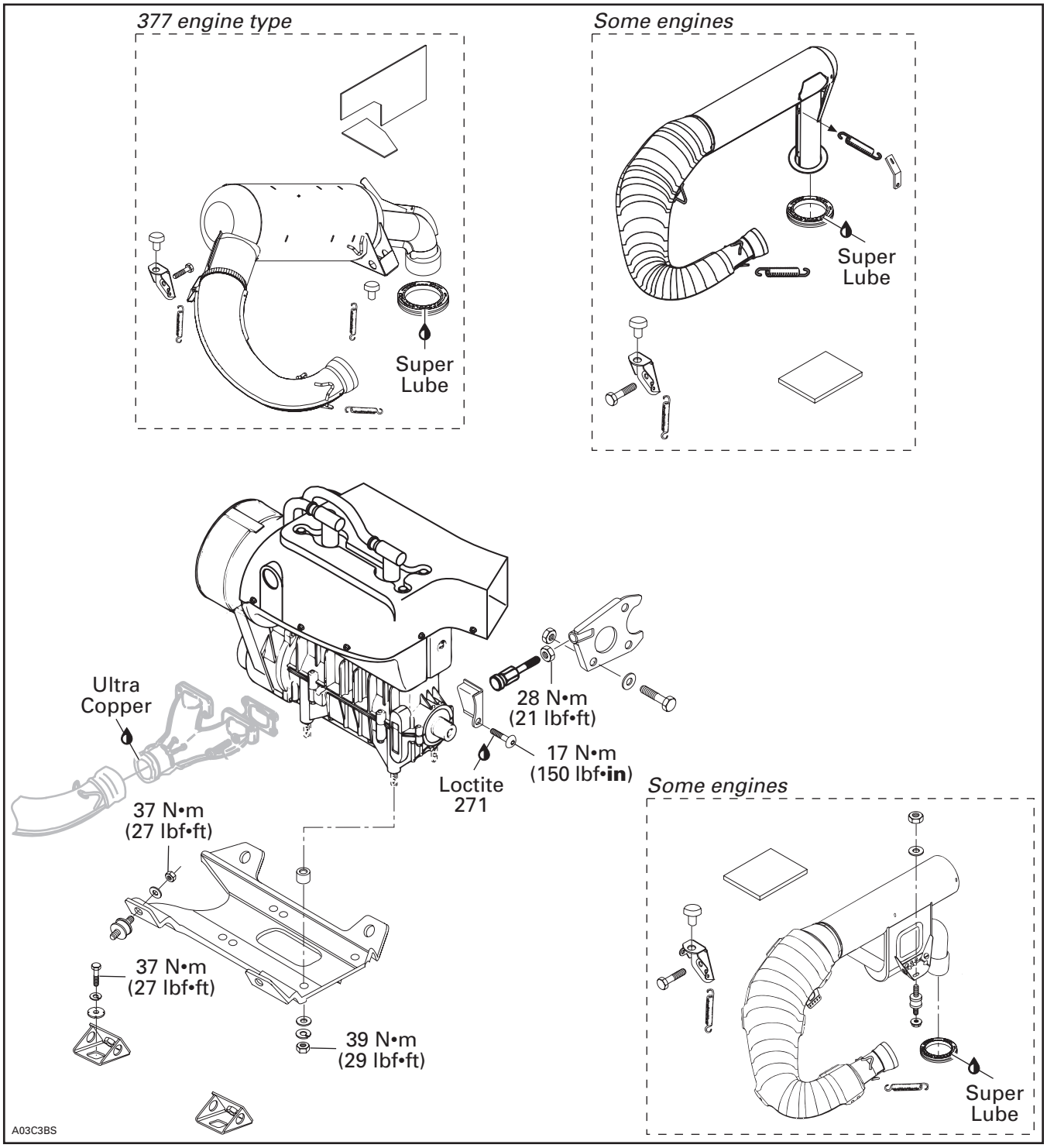
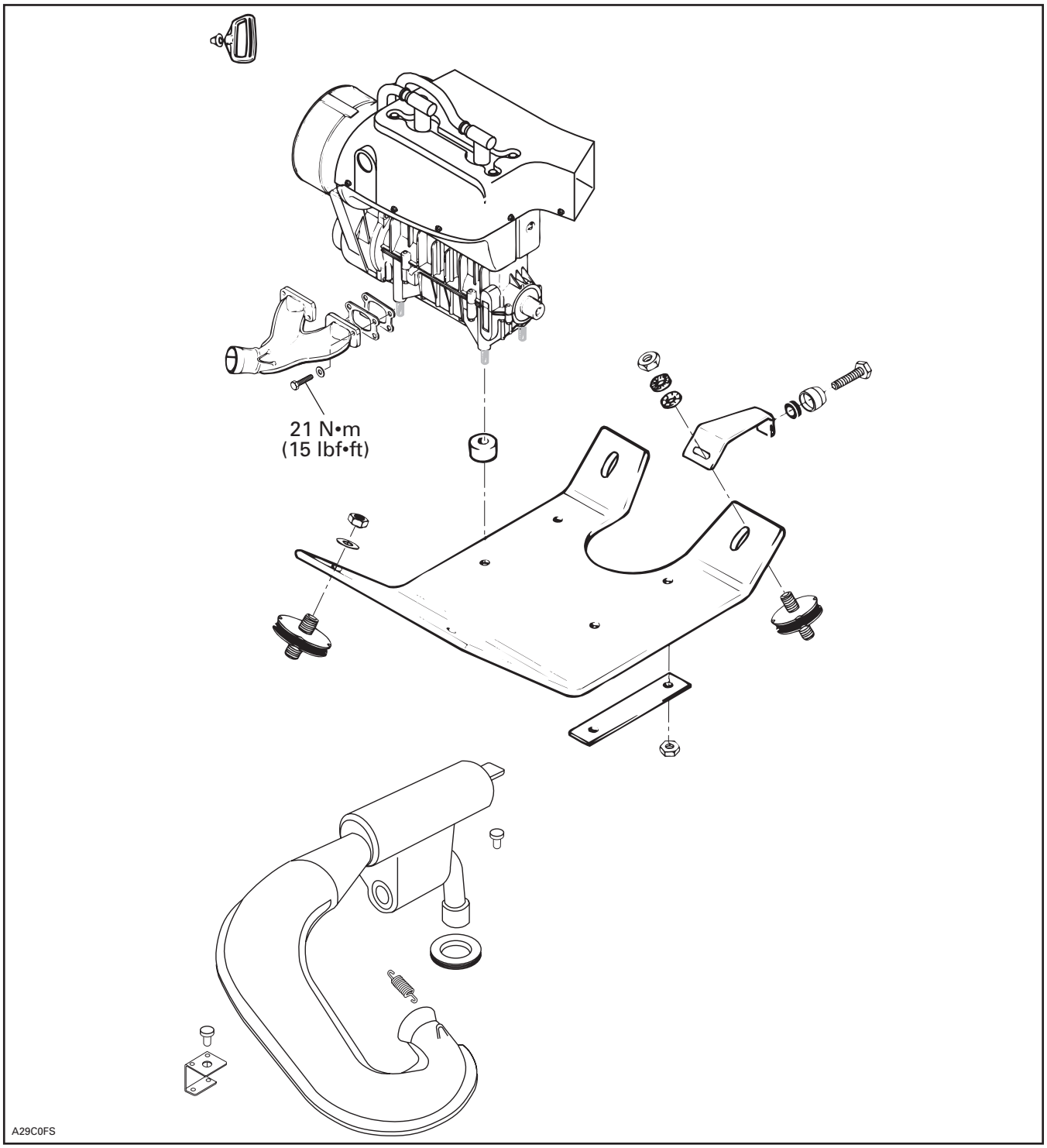
377, 443 AND 503 ENGINE TYPES

ENGINE REMOVAL AND INSTALLATION

S-Series 377, 443 and 503 Engine Types



Skandic LT 443 Engine Type and Skandic WT/SWT 503 Engine Type



ENGINE REMOVAL AND INSTALLATION

Disconnect or remove the following:

⚠ WARNING

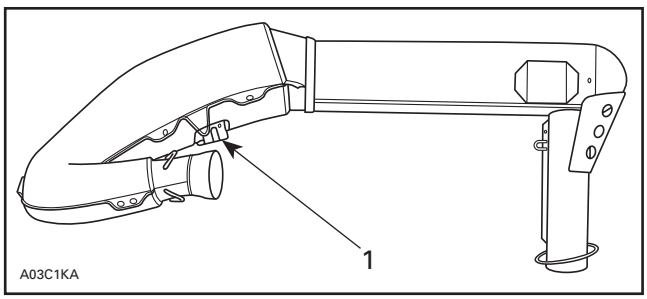
Before disconnecting any electrical wire in starter system always first disconnect the BLACK negative battery cable (on electric starting models).

- negative cable from battery (on electric starting models)
- guard
- drive belt
- drive pulley using appropriate puller, refer to DRIVE PULLEY
- air silencer and carburetors
- impulse line from engine crankcase
- electrical connector housings
- exhaust pipe
- oil pump inlet line and plug it
- oil pump cable
- rewind cable: tie a knot near rewind housing and remove starting grip.

TUNED PIPE IDENTIFICATION

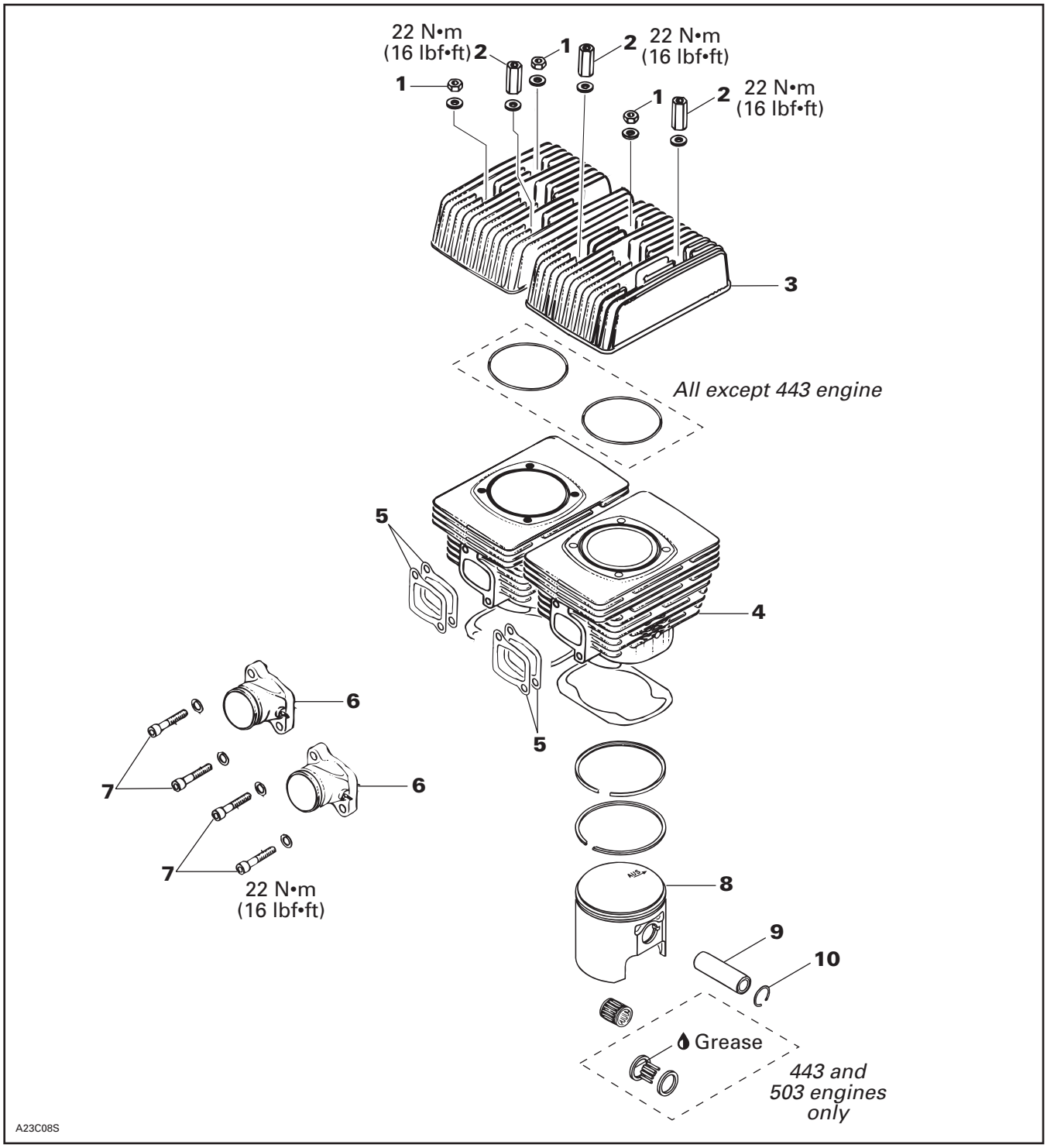
This part is identified on welded support.

Second number sequence of P/N is stamped on part.



1. Identification: 0467 for 514 046 700

TOP END



PARTS FLAT RATE

NOTE: The following procedures can be done without removing the engine from chassis.

CLEANING

Discard all gaskets. Use Gasket Remover (P/N 413 708 500) to clean mating surfaces.

Clean all metal components in a non-ferrous metal cleaner.

Scrape off carbon formation from cylinder exhaust port, cylinder head and piston dome using a wooden spatula.

NOTE: The letters "AUS" and arrow on the piston dome must be visible after cleaning.

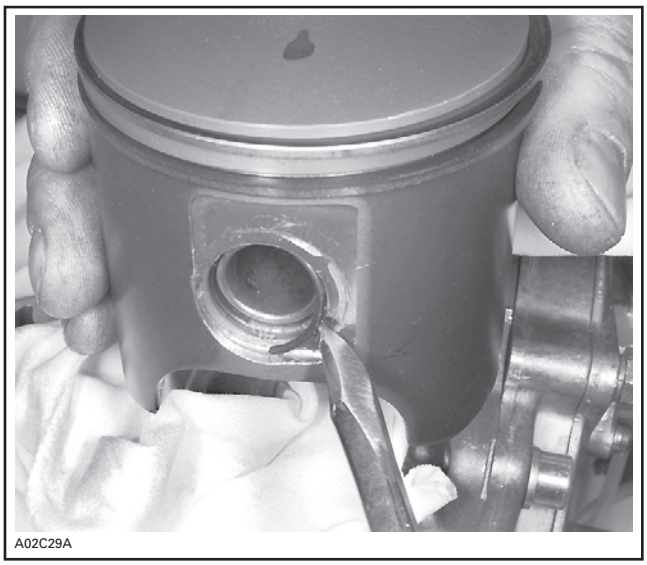
Clean the piston ring grooves with a groove cleaner tool, or with a piece of broken ring.

DISASSEMBLY

Remove top fan cowl, intake sockets and lower fan cowl.

Remove cylinder heads.

Place a clean cloth or rubber pad (P/N 529 023 400) over crankcase to prevent circlips **no. 10** from falling into crankcase. Then with a pointed tool inserted in piston notch, remove both circlips from piston **no. 8**.



TYPICAL

377 Engine

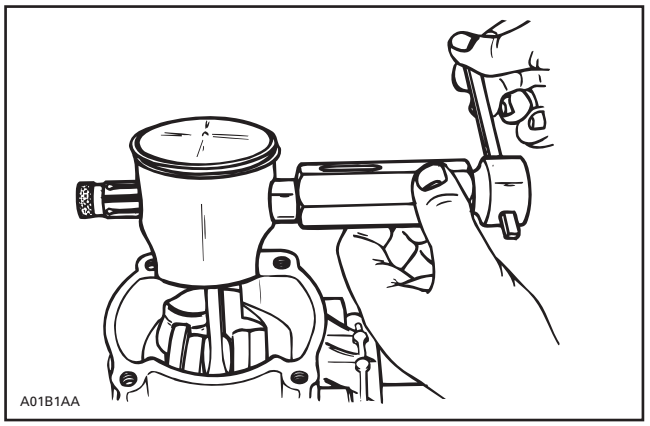
To remove piston pin **no. 9**, use piston pin puller (P/N 529 035 503).

Fully screw puller handle.

Insert puller end into piston pin.

Screw (LH threads) extracting nut.

Hold puller firmly and rotate puller handle counterclockwise to pull piston pin.



TYPICAL

NOTE: The PTO cylinder or fan housing have to be removed to give access to MAG piston pin with the puller.

443 and 503 Engines

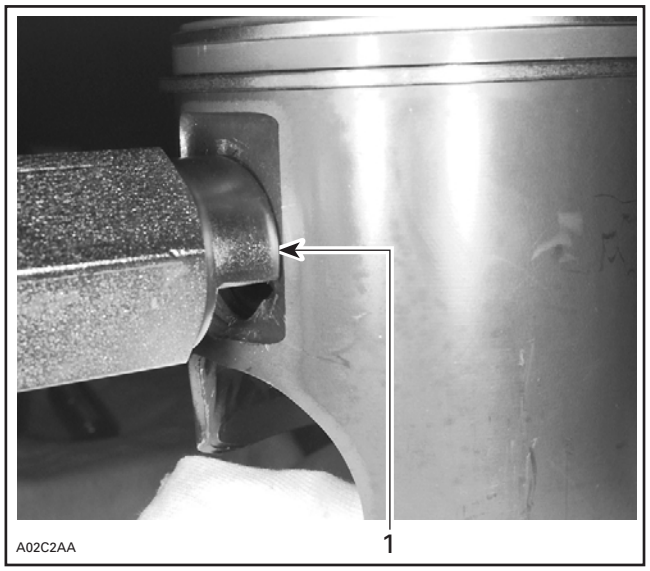
On these engines, piston pin needle bearing is mounted without a cage.

Use piston pin puller (P/N 529 035 503) along with 18 mm sleeve kit (P/N 529 035 541) and locating sleeve (P/N 529 023 800).

NOTE: The locating sleeve is the same that contains new cageless bearing.

Place a clean cloth or rubber pad (P/N 529 023 400) over crankcase to prevent circlips **no. 10** from falling into crankcase. Then with a pointed tool inserted in piston notch, remove both circlips from piston **no. 8**.

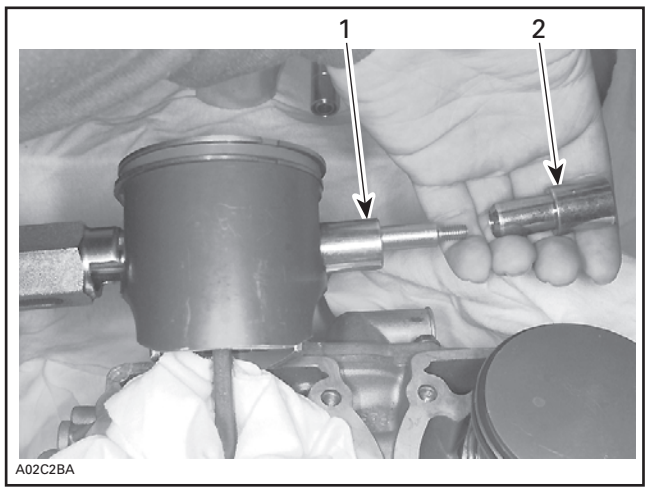
Insert piston pin puller (P/N 529 035 503) making sure it sits squarely against piston.



TYPICAL

1. Properly seated all around

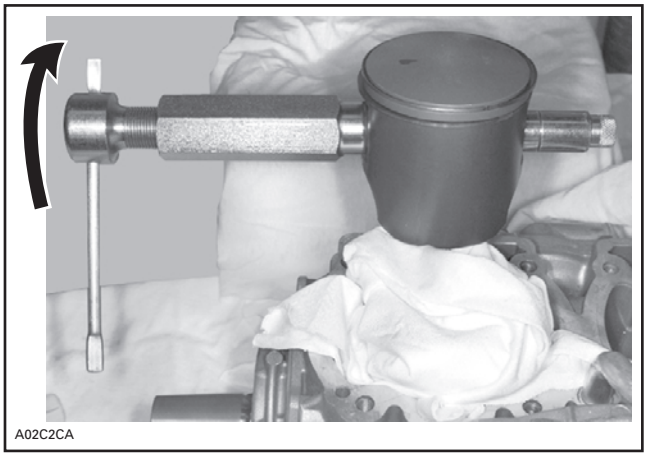
Install sleeve then shouldered sleeve over puller rod.



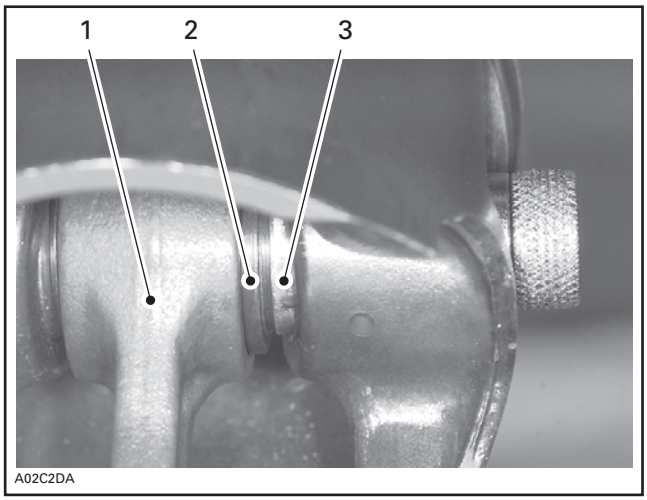
TYPICAL — INSTALLATION OF SLEEVE KIT

1. Sleeve
2. Shouldered sleeve

Pull out piston pin **no. 10** by unscrewing puller until shouldered sleeve end is flush with thrust washer of piston pin bearing.



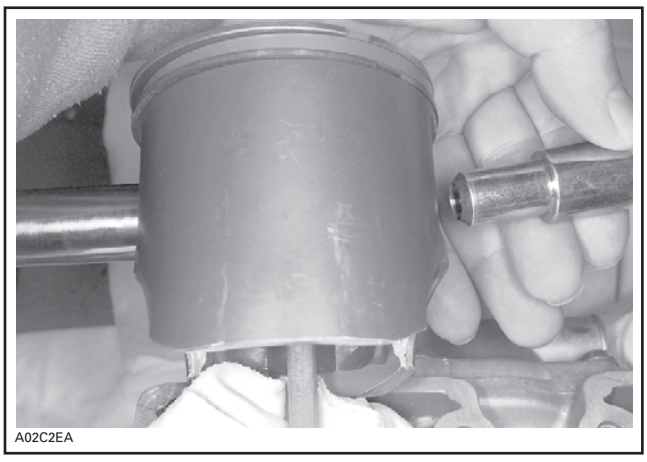
TYPICAL — PISTON PIN EXTRACTION



TYPICAL

1. Sleeve inside bearing
2. Thrust washer
3. Shouldered sleeve end

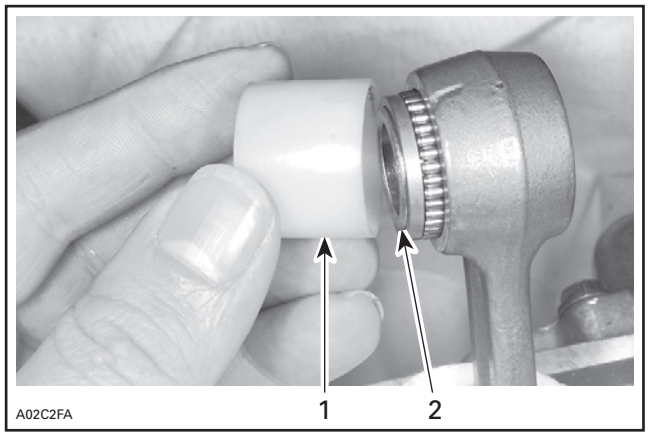
Remove puller. Pull out shouldered sleeve carefully.



TYPICAL

Remove piston from connecting rod.

Install locating sleeve. Then push needle bearings along with thrust washers and sleeve.



TYPICAL

1. *Locating sleeve*
2. *Sleeve*

NOTE: 0.25 and 0.5 mm oversized piston and rings are available if necessary.

Use a locking tie to fasten all needles and thrust washers along with locating sleeve.

INSPECTION

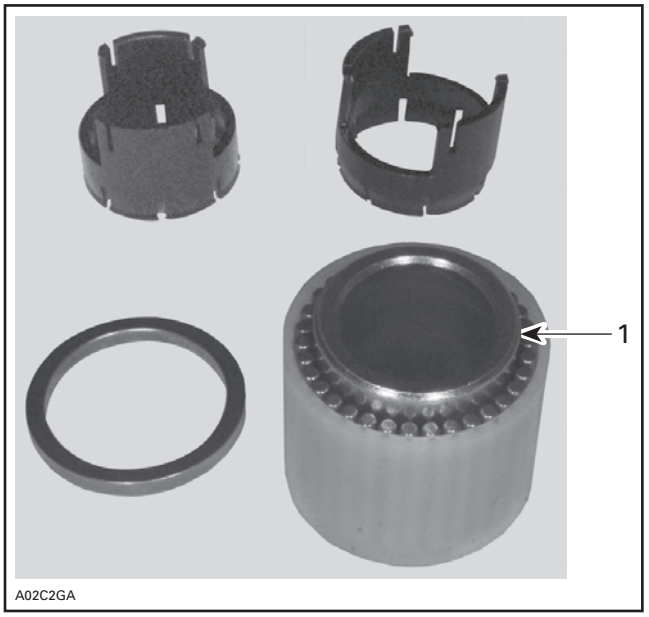
Refer to ENGINE DIMENSIONS MEASUREMENT.

ASSEMBLY

443 and 503 Engines

When reinstalling original needle bearings, make sure that 31 needles are inserted between sleeve and locating sleeve.

When installing a new cageless bearing, replace half plastic cages by sleeve.

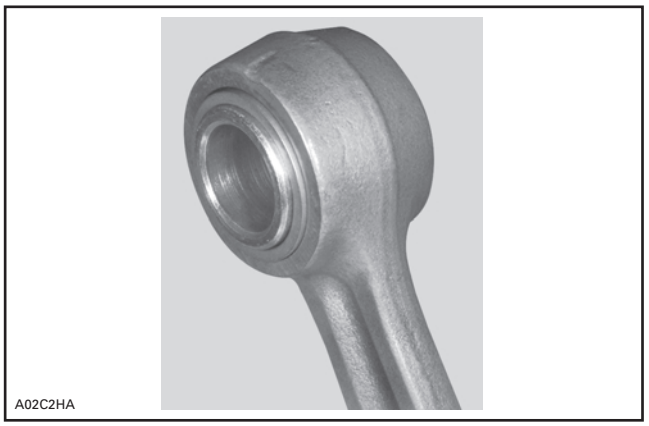


TYPICAL

1. *Sleeve*

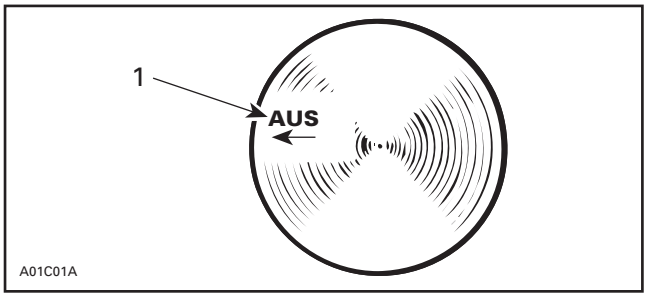
Grease thrust washers and install them on each end of needles.

Insert cageless bearing into connecting rod.



TYPICAL — CAGELESS BEARING AND SLEEVE INSTALLED

Mount piston over connecting rod with the letters "AUS" (over an arrow on the piston dome) facing in the direction of exhaust port.

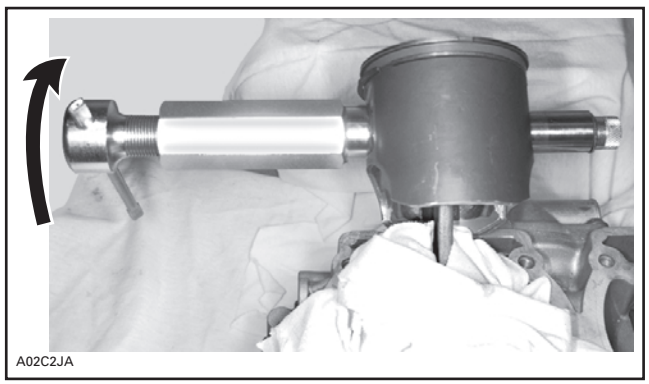


1. Exhaust

Install shouldered sleeve.

TYPICAL — SHOULDERED SLEEVE INSTALLATION

Install piston pin puller and turn handle until piston pin is correctly positioned in piston.

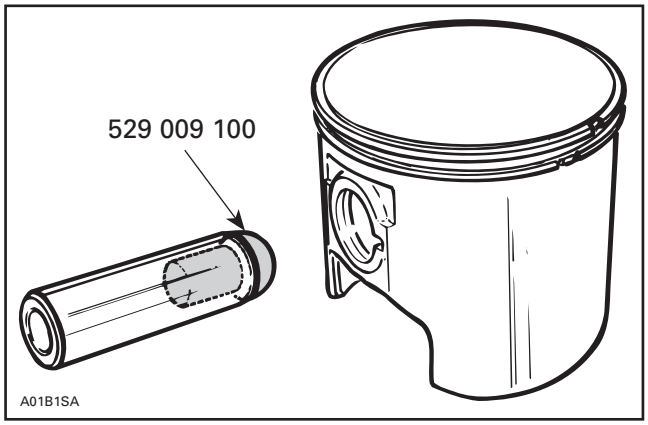


TYPICAL

– Remove piston pin puller and sleeve kit.

377 Engine

To center the piston pin with the connecting rod bearing, use centering tool (P/N 529 009 100).



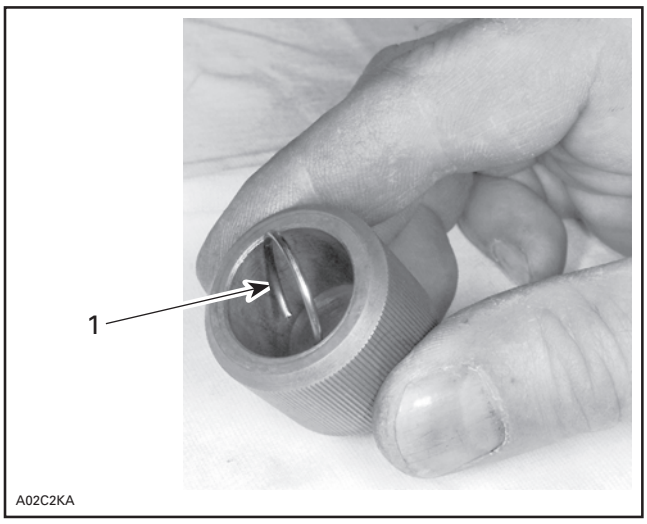
NOTE: The circlip on the opposite side can be installed before pin installation, the tool will easily go out.

Use piston pin puller (P/N 529 035 503) to install a piston pin that cannot be installed as described above.

All Models

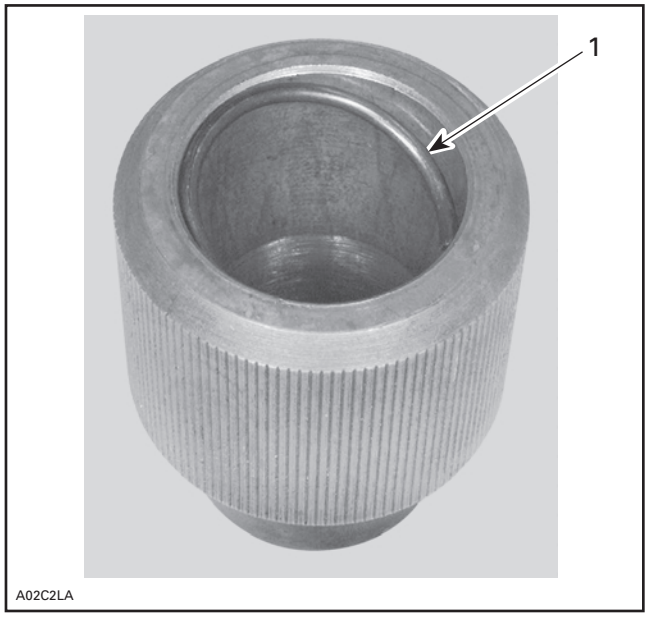
To minimize the effect of acceleration forces on circlip, install each circlip so the circlip break is at 6 o'clock as illustrated. Use piston circlip installer (P/N 529 035 561).

Insert circlip in tool at an angle.



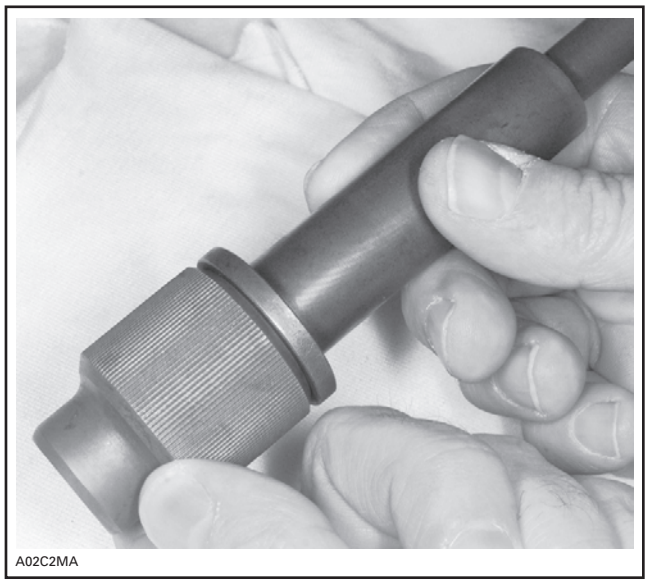
1. Circlip

Square it up using a finger.

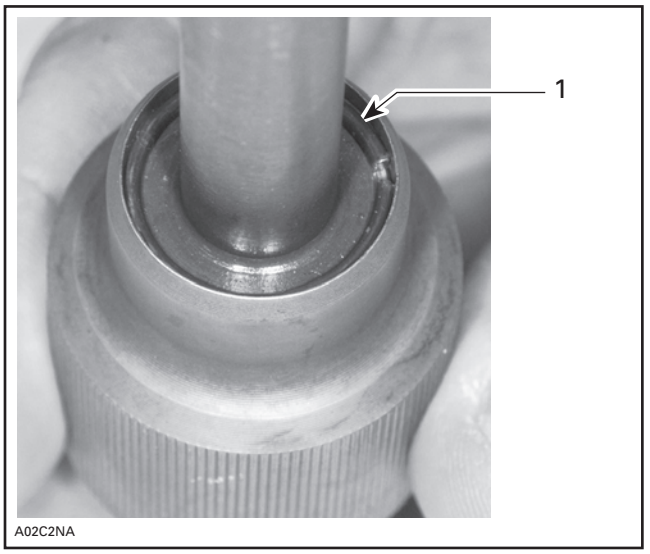


1. Circlip

Continue to square it up using round end of circlip installer.

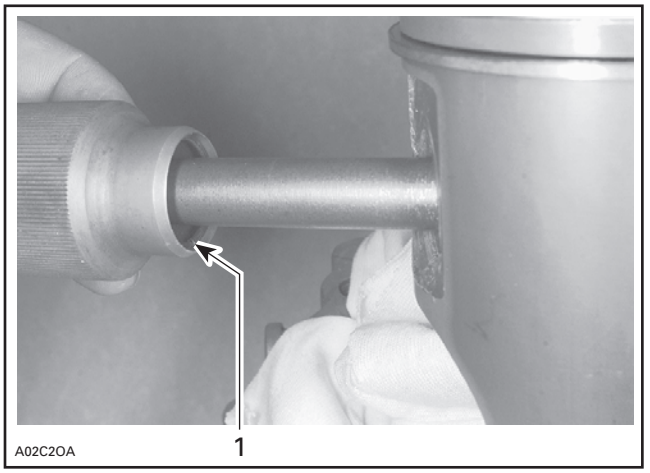


Using square end of tool, push circlip in until it rests in groove.



1. Circlip in groove

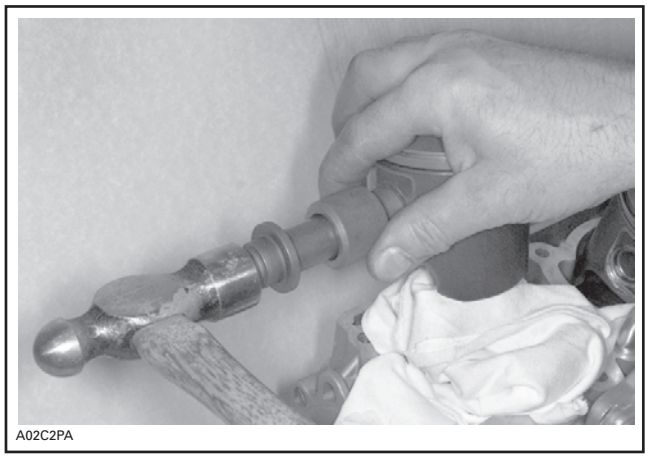
Mount tool in piston making sure that circlip break is facing down.



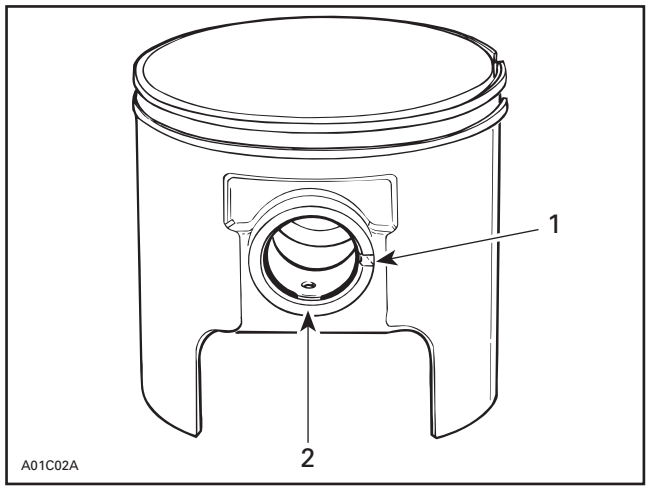
TYPICAL

1. Circlip break facing down

Hold tool firmly against piston then strike on round end of tool. Circlip will move from tool groove to piston groove.



TYPICAL



1. *Piston notch*
2. *Circlip break at 6 o'clock*

CAUTION: Circlips must not move freely in the groove after installation. If so, replace them.

NOTE: Be sure to restore the chamfer around all cylinder sleeve port openings.

Before inserting piston in cylinder no. 4, lubricate the cylinder with new injection oil or equivalent.

Install proper ring compressor on piston assembly.

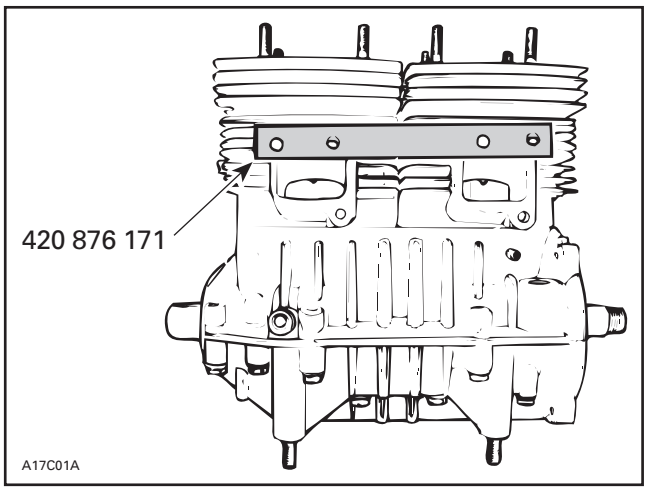
ENGINE TYPE	RING COMPRESSOR P/N
377 and 443	420 876 090
503	420 876 970

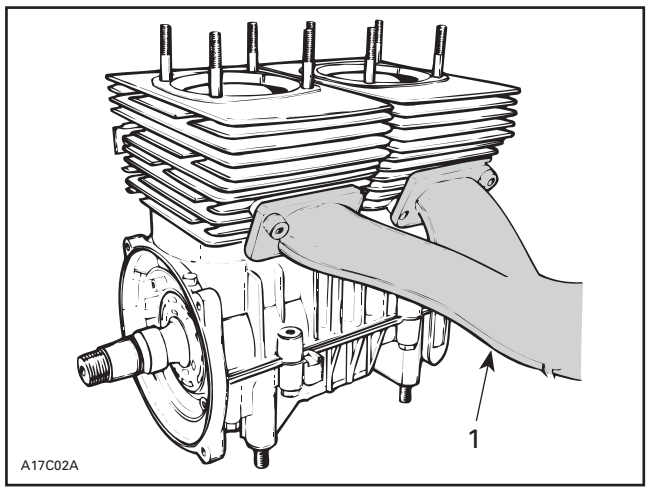
NOTE: The ring compressor will not fit on over size pistons.

Check flatness of intake sockets no. 6. Refer to ENGINE DIMENSION MEASUREMENT and look for Checking Surface Flatness.

At cylinder no. 4 and/or cylinder head no. 3 installation, use aligning tool or exhaust manifold itself to ensure sealing of intake manifold and exhaust before tightening cylinder head nuts.

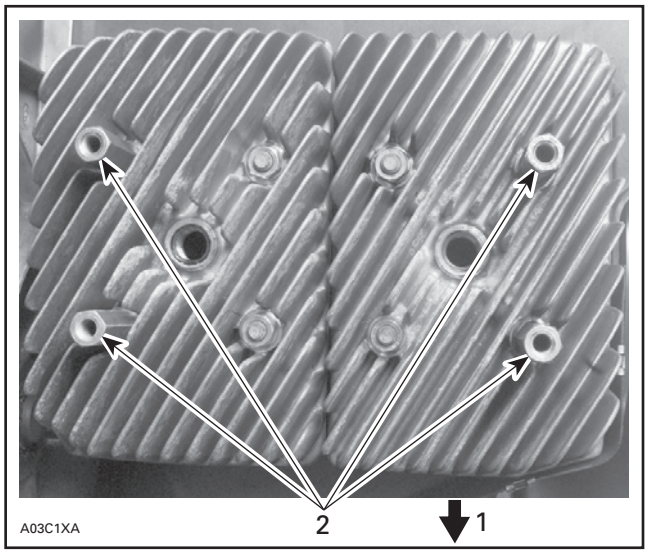
ENGINE TYPE	ALIGNING TOOL P/N
377, 443 and 503	420 876 171





1. *Or use exhaust manifold to align cylinders*

Position distance nuts **no. 2** as illustrated.



1. Exhaust
2. Distance nuts

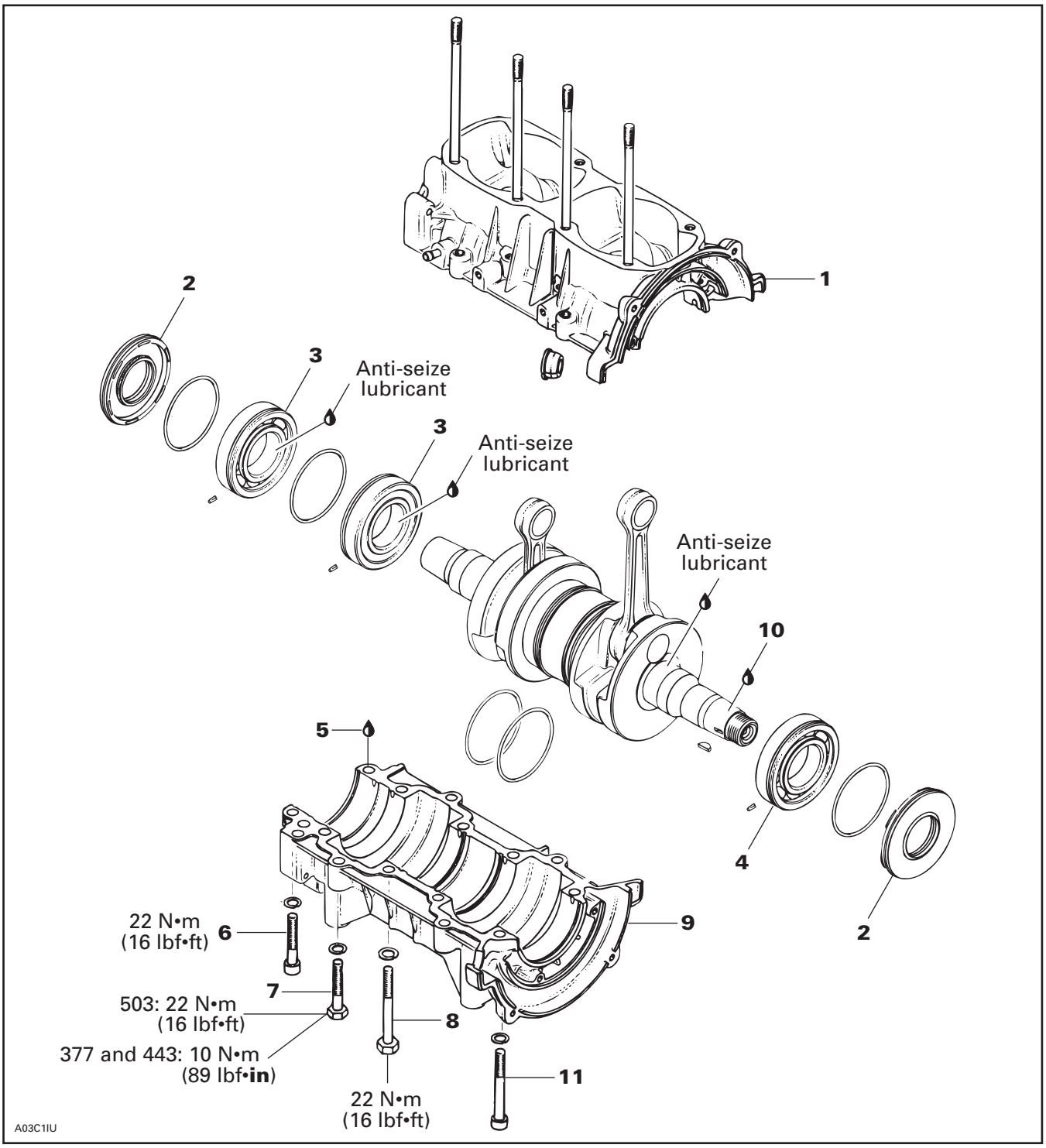
Cross torque cylinder head nuts **nos. 1** and **2** to 22 N•m (16 lbf•ft); torque each cylinder head individually.

Install armature plate, fan housing and then air deflector.

Install a gasket on each side of the air deflector.

Torque intake socket bolts to 22 N•m (16 lbf•ft).

BOTTOM END


1
2
3
Anti-seize lubricant
3
Anti-seize lubricant
Anti-seize lubricant
10
5
4
2
9
22 N•m (16 lbf•ft)
6
7
503: 22 N•m (16 lbf•ft)
377 and 443: 10 N•m (89 lbf•in)
8
11
22 N•m (16 lbf•ft)
A03C1IU

NOTE: Engine must be removed from chassis to perform the following procedures.

Remove engine from chassis.

Remove fan guard, rewind starter, starting pulley, trigger coil wire from 4-connector housing, magneto flywheel then fan housing.

Remove stator plate.

CLEANING

Discard all seals, gaskets and O-rings.

Clean all metal components in a non-ferrous metal cleaner. Use gasket remover (P/N 413 708 500) accordingly.

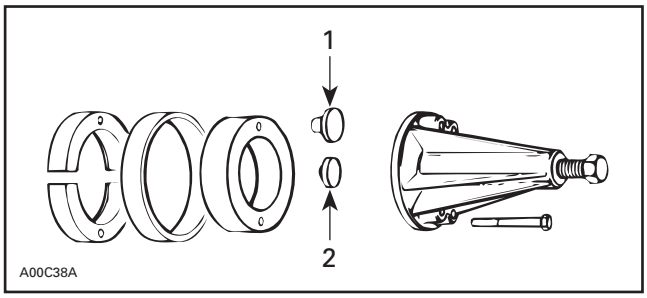
Remove all trace of Loctite 243 from crankshaft taper.

Remove old sealant from crankcase mating surfaces with Bombardier gasket remover (P/N 413 708 500).

CAUTION: Never use a sharp object to scrape away old sealant as score marks incurred are detrimental to crankcase sealing.

DISASSEMBLY

To remove bearings **nos. 3** and **4** from crankshaft, use a protective cap and a special puller, as illustrated.



1. PTO side
2. MAG side

INSPECTION

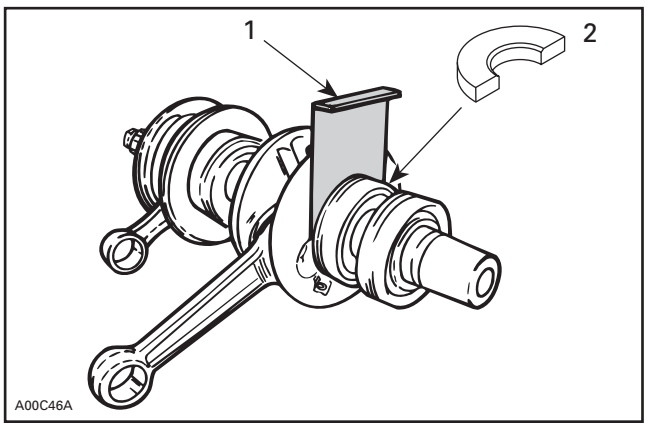
Refer to ENGINE DIMENSIONS MEASUREMENT.

ASSEMBLY

Smear anti-seize lubricant (P/N 413 701 000) on part of crankshaft where bearing fits.

To check proper clearance between bearing **no. 3** and counterweight, use feeler gauge (P/N 420 876 620).

Mount second bearing with distance gauge (P/N 420 876 822) for 377 and 443 and (P/N 420 876 824) for 503 for proper positioning.



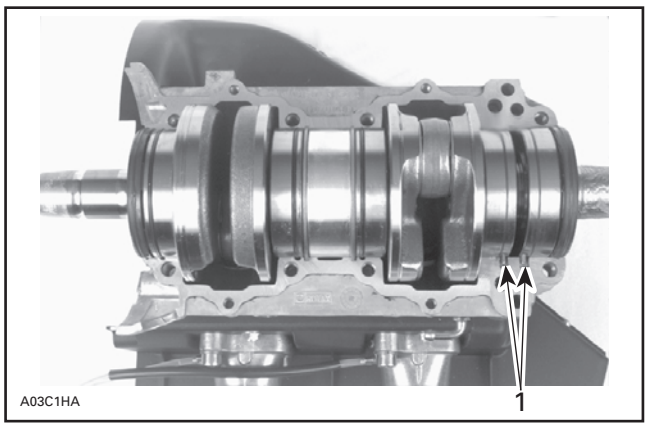
1. Feeler gauge
2. Distance gauge

Prior to installation, place bearings into an oil container filled with oil heated to 75°C (167°F).

This will expand bearings and ease installation. Install bearings with groove as per exploded view.

Bearings are pressed on crankshaft until they rest against radius. These radius maintain the gap needed for bearings lubrication.

When installing crankshaft, position drive pins **no. 10** as illustrated.

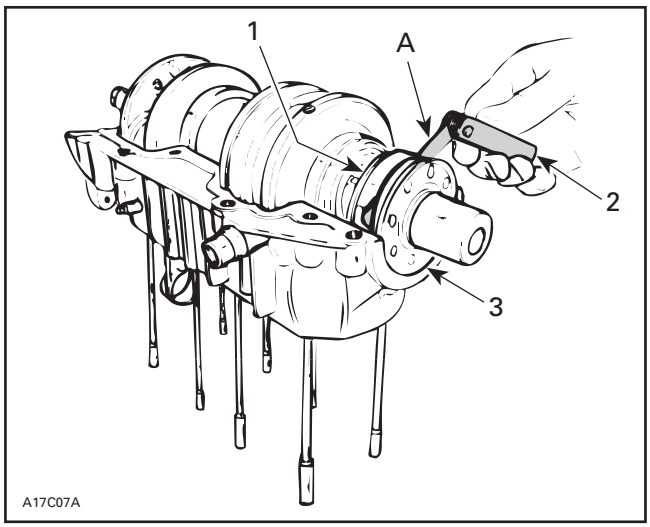


TYPICAL
1. Drive pins

At seal **no. 2** assembly, apply a light coat of lithium grease on seal lip.

For bearing lubrication purpose, a gap of 1.0 mm (.040 in) must be maintained between seals and bearings.

When installing plain oil seals (seal without locating ring or without spacing legs), ensure to maintain 1.0 mm (.040 in) gap.



1. Bearing
2. Feeler gauge
3. Plain oil seal
A. 1 mm (.040 in)

Crankcase halves **nos. 1** and **9** are factory matched and therefore, are not interchangeable as single halves.

Prior to joining of crankcase halves, spray some new injection oil (or equivalent) on all moving parts of the crankshaft. Spray Primer N (P/N 413 708 100) on one of mating surfaces. Let it dry for 10 to 20 minutes.

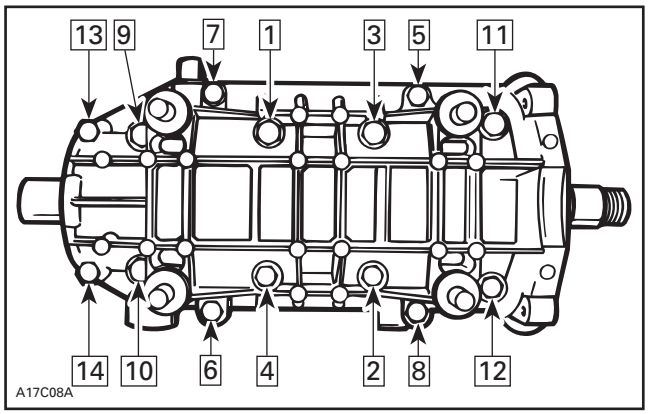
Apply paste gasket (P/N 413 702 700) **no. 5** on the other mating surface.

NOTE: Primer N allows Loctite 515 to fully cure on aluminum surfaces. It increases filling capacity and reduce curing time.

Position the crankcase halves together and tighten bolts by hand then install and tighten armature plate on magneto side to correctly align the crankcase halves.

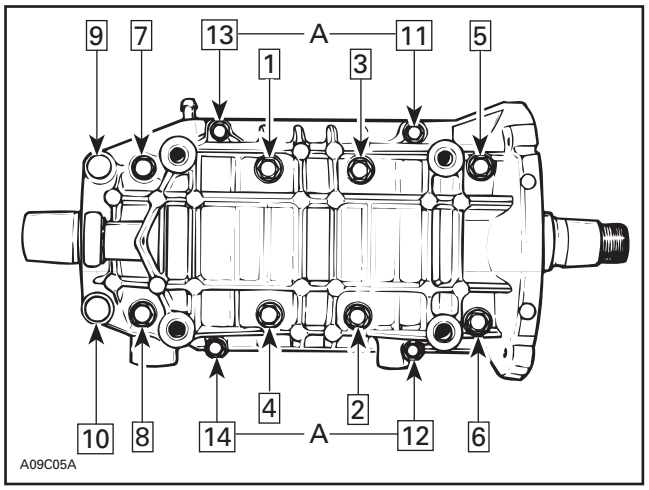
503 Engine Type

Torque screws **nos. 6, 7, 8** and **11** to 10 N•m (89 lbf•**in**) then to 22 N•m (16 lbf•ft) following illustrated sequence.



377 and 443 Engines

Torque screws to proper torque in the following sequence.



*A. 10 N•m (89 lbf•**in**)*
All the other screws are torqued to 21 N•m (15 lbf•ft)

All Engines

To install magneto, refer to CDI MAGNETO.

593 ENGINE TYPE

Skandic WT LC

REMOVAL FROM VEHICLE

Open hood.

Remove tuned pipe and muffler.

Drain engine coolant.

Remove or unplug the following then lift off engine from engine compartment.

NOTE: Use of a hoist is recommended.

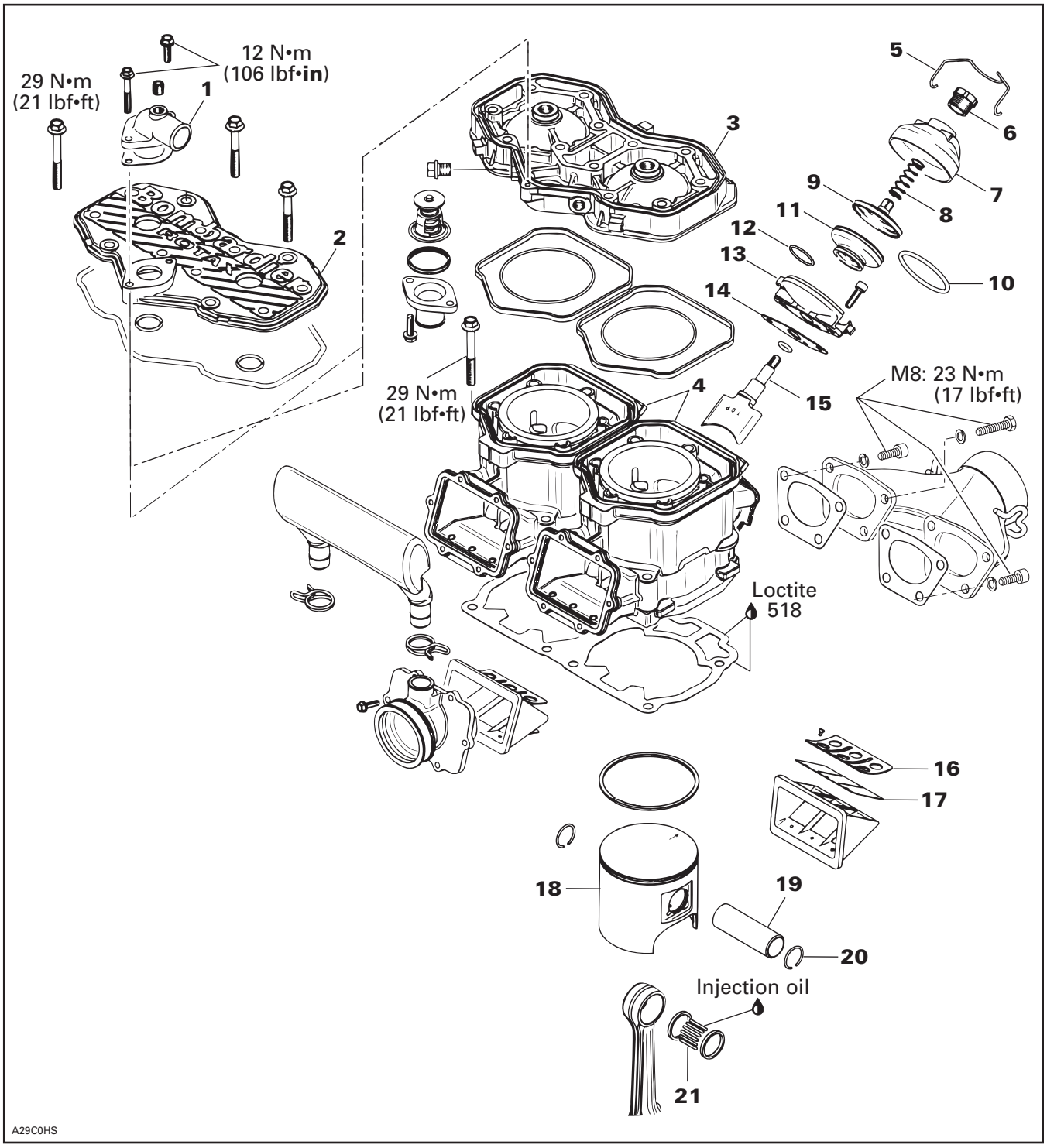
– guard
– air silencer
– drive belt
– rewind starter handle
– drive pulley (not necessary if engine has not to be disassemble)
– hood
– carburetors
– impulse hose and electrical connectors
– oil injection inlet line at oil injection pump, install hose pincher
– oil pump cable
– coolant hoses between cylinder head and radiator
– coolant by-pass hose
– coolant hose at front of coolant reservoir
– engine support screws
– engine stopper (left rear of engine).

INSTALLATION ON VEHICLE

To install engine on vehicle, reverse removal procedure. However, pay attention, to all appropriate component/system reinstallation procedures described throughout this *Shop Manual* and to the following:

– After throttle cable installation, check carburetor maximum throttle opening and oil injection pump adjustment.
– Check pulley alignment and drive belt tension.
– Seal exhaust ball joints with Ultra Copper (P/N 413 710 300).

TOP END


29 N•m
(21 lbf•ft)
12 N•m
(106 lbf•in)
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
29 N•m
(21 lbf•ft)
M8: 23 N•m
(17 lbf•ft)
Loctite
518
16
17
18
19
20
Injection oil
21
A29C0HS

COMPONENT REMOVAL

Most engine components can be removed with engine on vehicle such as:

– cylinder head
– piston(s)
– cylinder(s)
– rewind starter
– oil pump
– water pump
– magneto flywheel
– RAVE valve(s)
– reed valve(s).

CLEANING

Discard all gaskets and O-rings.

Clean all metal components in a non-ferrous metal cleaner.

Scrape off carbon formation from cylinder exhaust port cylinder head and piston dome using a wooden spatula.

NOTE: The letters "AUS" (over an arrow on the piston dome) must be visible after cleaning.

Clean the piston ring groove with a groove cleaner tool or with a piece of broken ring.

DISASSEMBLY

RAVE System

NOTE: RAVE stands for Rotax Adjustable Variable Exhaust.

Remove spring clip **no. 5**, cover **no. 7** and spring **no. 8**.

Remove spring **no. 10**.

Unscrew valve piston **no. 9**.

Remove bellows **no. 11** and spring **no. 12**.

Remove cylindrical screws. Remove valve housing **no. 13**.

Pull out exhaust valve **no. 15**.

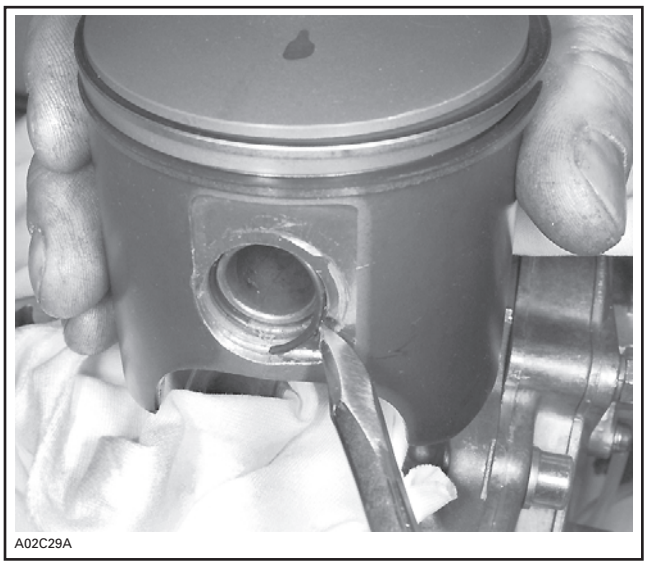
RAVE VALVE PARTIALLY REMOVED

2, Cylinder

Remove spark plugs, coolant outlet **no. 30**. Unscrew cylinder head cover **no. 2** then cylinder head **no. 3**.

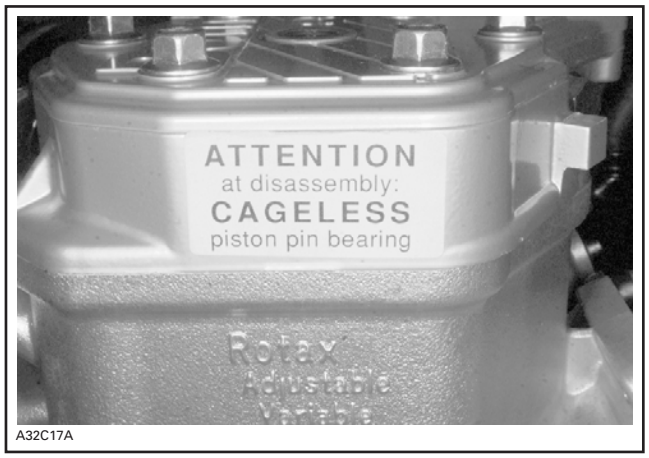
18, Piston

Place a clean cloth or rubber pad (P/N 529 023 400) over crankcase. then with a pointed tool inserted in piston notch, remove both circlips **no. 20** from piston **no. 18**.



TYPICAL

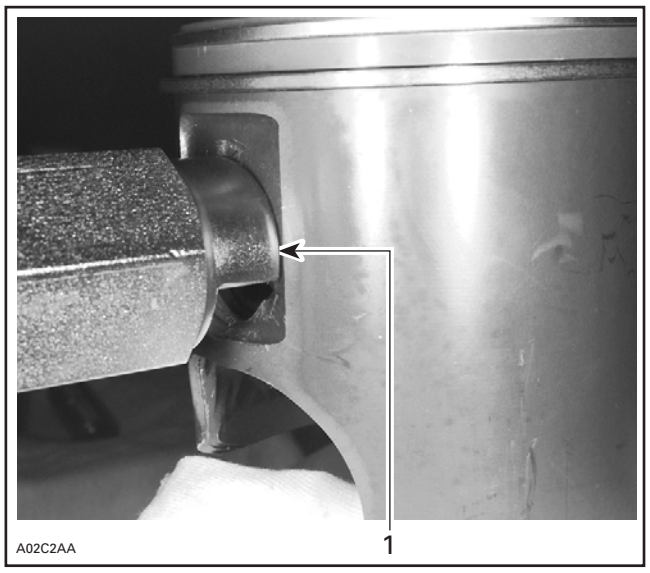
This engine is equipped with cageless piston pin bearings.



Use piston pin puller (P/N 529 035 503) along with 20 mm sleeve kit (P/N 529 035 542) and locating sleeve.

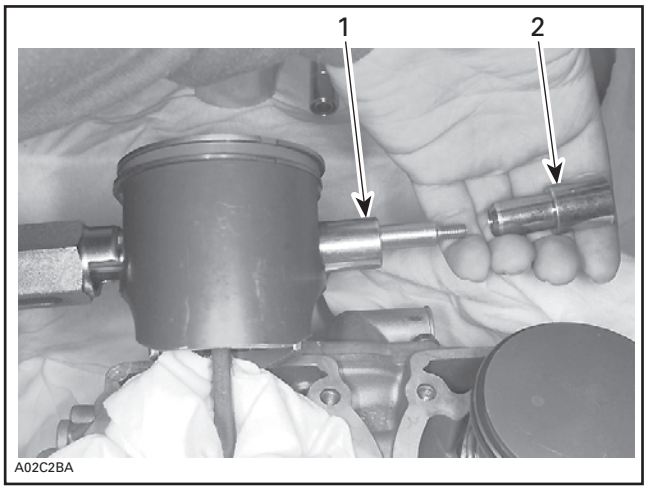
NOTE: The locating sleeve is the same that contains new cageless bearing.

Insert piston pin puller (P/N 529 035 503) making sure it sits squarely against piston.



TYPICAL
1. Properly seated all around

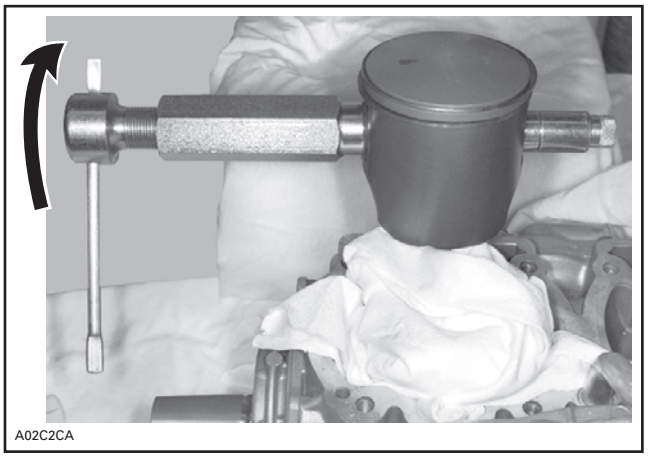
Install sleeve then shouldered sleeve over puller rod.



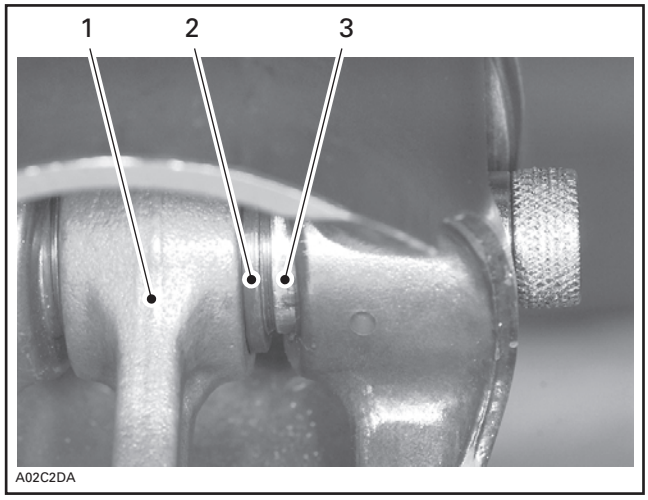
TYPICAL — INSTALLATION OF SLEEVE KIT
1. Sleeve
2. Shouldered sleeve

Screw (LH threads) extracting nut.

Pull out piston pin **no. 19** by unscrewing puller until shouldered sleeve end is flush with thrust washer of piston pin bearing.



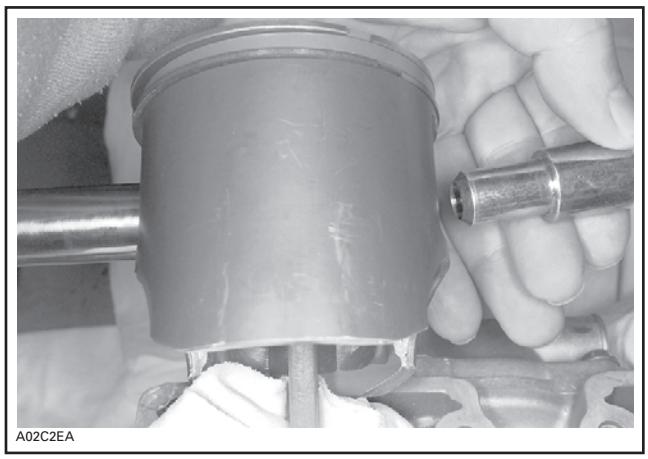
TYPICAL — PISTON PIN EXTRACTION



TYPICAL

1. *Sleeve inside bearing*
2. *Thrust washer*
3. *Shouldered sleeve end*

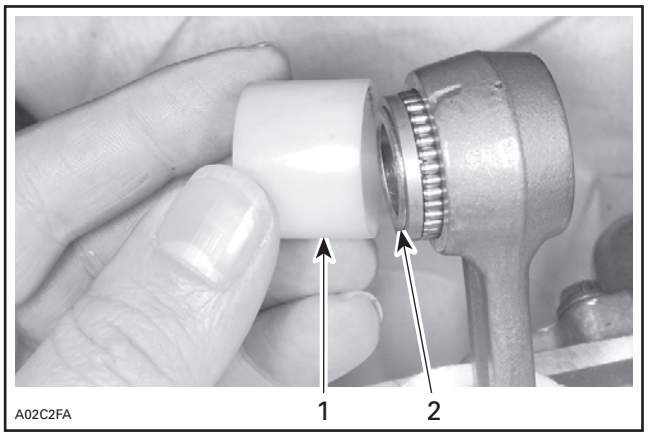
Remove puller. Pull out shouldered sleeve carefully.



TYPICAL

Remove piston from connecting rod.

Install locating sleeve. Then push needle bearings along with thrust washers and sleeve.



TYPICAL

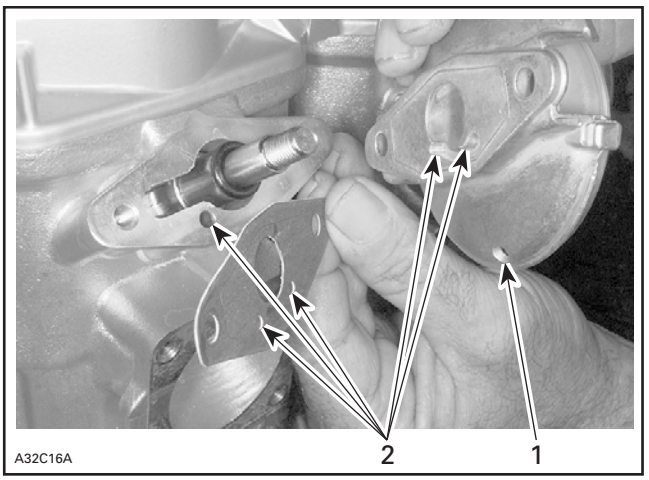
1. *Locating sleeve*
2. *Sleeve*

INSPECTION

NOTE: Refer to LEAK TEST AND ENGINE DIMENSIONS MEASUREMENT.

RAVE System

Check valve rod housing and cylinder for clogged passages.



1. *Draining hole*
2. *Passages*

NOTE: Oil dripping from draining hole indicates a loosen spring or damaged bellows.

11, Bellows

Check for cracked, dried or perforated bellows.

8, Spring

Engine type	Spring P/N	Wire dia. mm (in)	Free length mm (in)	Preload in N (lbf) at compressed length of 14 mm (.551 in)
593	420 239 944	0.9 (.031)	48.5 (1.91)	15.9 (3.56)

ASSEMBLY

RAVE System

Install RAVE valve with its mention top as illustrated in the removal photo. Tighten red cap **no. 6** screw to bottom.

4,18, Cylinder and Piston

Be sure to restore the chamfer around all cylinder sleeve port openings.

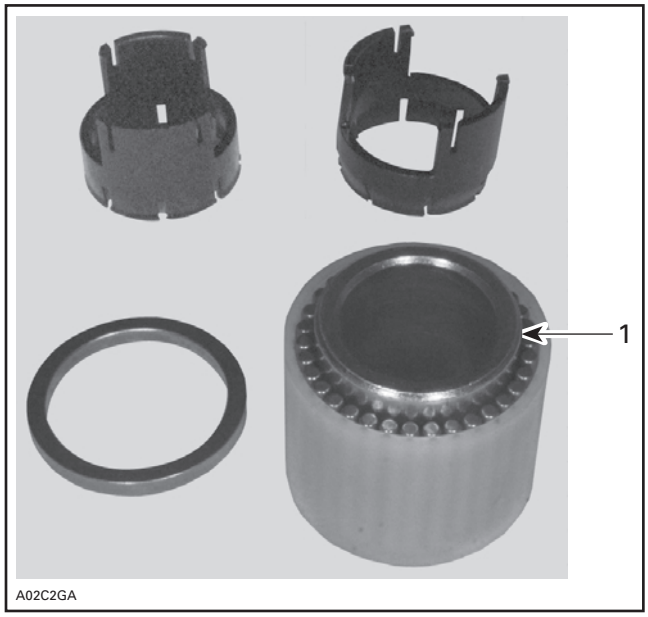
Before inserting piston in cylinder, lubricate the cylinder with new injection oil or equivalent.

2,3,4, Cylinder Head Cover, Cylinder Head and Cylinder

Check flatness of part sealing surfaces. Refer to LEAK TEST AND ENGINE DIMENSION MEASUREMENT and look for **Checking Surface Flatness**.

When installing a new cageless bearing, replace half plastic cages by sleeve.

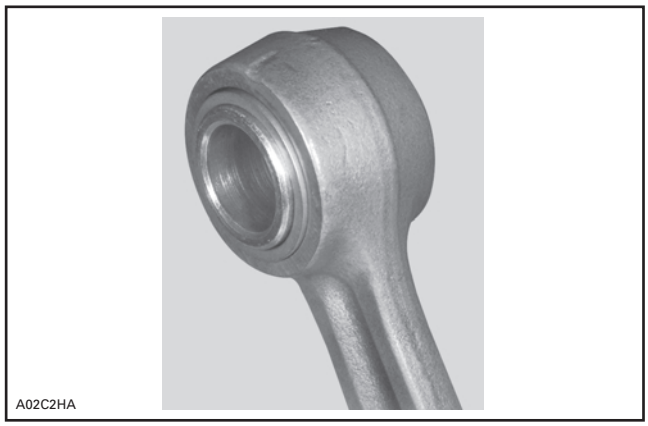
NOTE: 593 engine cageless bearings have 28 needles.



TYPICAL
1. Sleeve

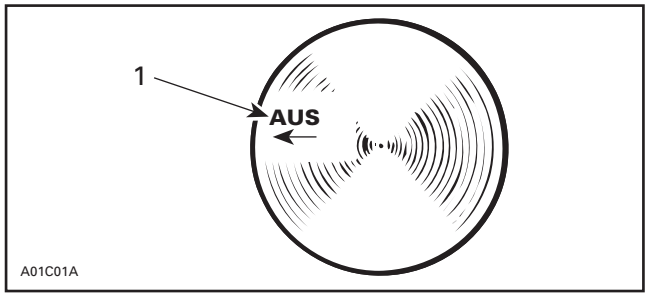
Grease thrust washers and install them on each end of needles.

Insert cageless bearing into connecting rod.



TYPICAL — CAGELESS BEARING AND SLEEVE INSTALLED

At assembly, place the pistons over the connecting rods with the letters **"AUS"** (over an arrow on the piston dome) facing in direction of the exhaust port.

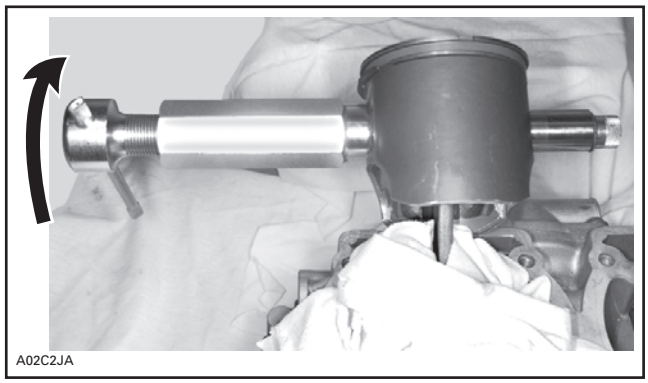


1. Exhaust

Install shouldered sleeve.

TYPICAL — SHOULDERED SLEEVE INSTALLATION

Install piston pin puller and turn handle until piston pin is correctly positioned in piston.



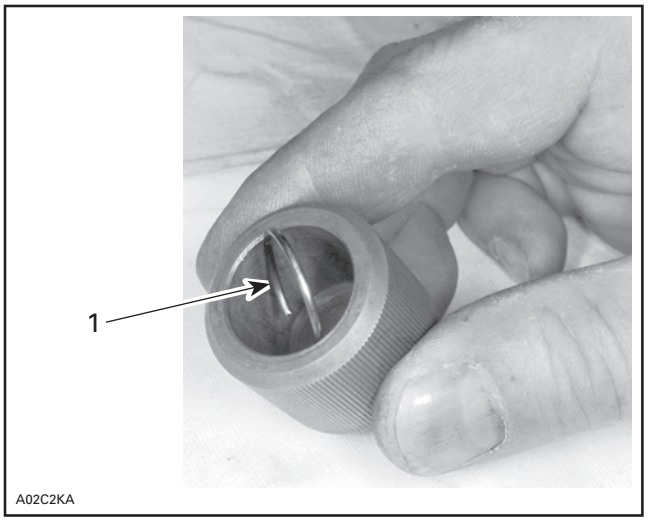
TYPICAL

CAUTION: Always install new circlips.

To minimize the effect of acceleration forces on circlip, install each circlip so the circlip break is at 6 o'clock as illustrated. Use appropriate piston circlip installer.

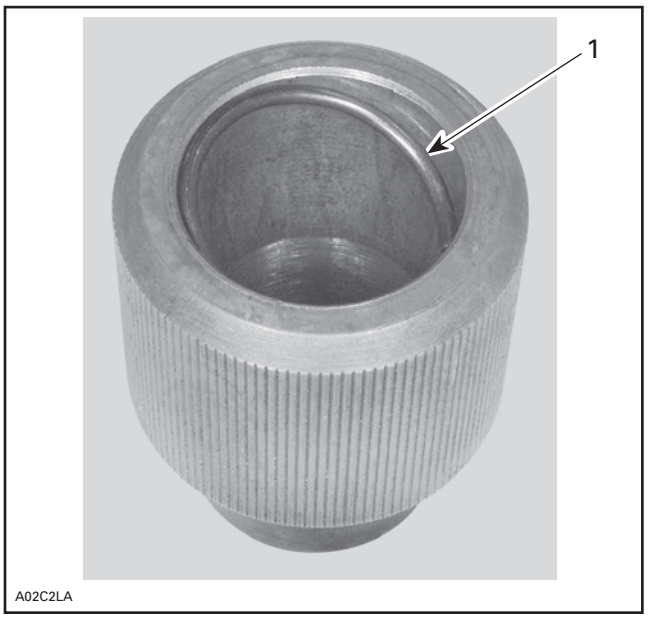
ENGINE TYPE	PISTON CIRCLIP INSTALLER (P/N)
593	529 035 562

Insert circlip in tool at an angle.



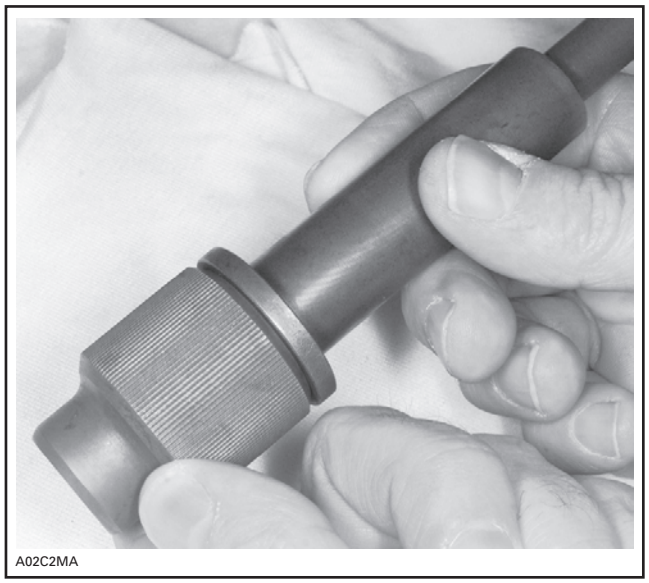
TYPICAL
1. Circlip

Square it up using a finger.



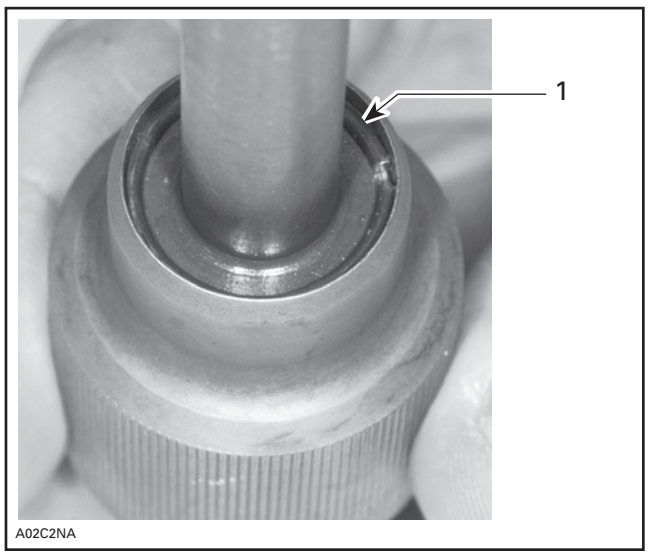
TYPICAL
1. Circlip

Continue to square it up using round end of circlip installer.


A02C2MA

TYPICAL

Using square end of tool, push circlip in until it rests in groove.

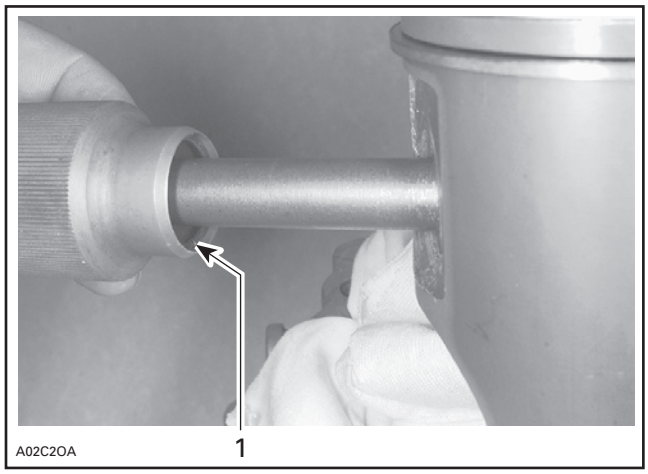


A02C2NA

TYPICAL

1. Circlip in groove

Mount tool in piston making sure that circlip break is facing down.

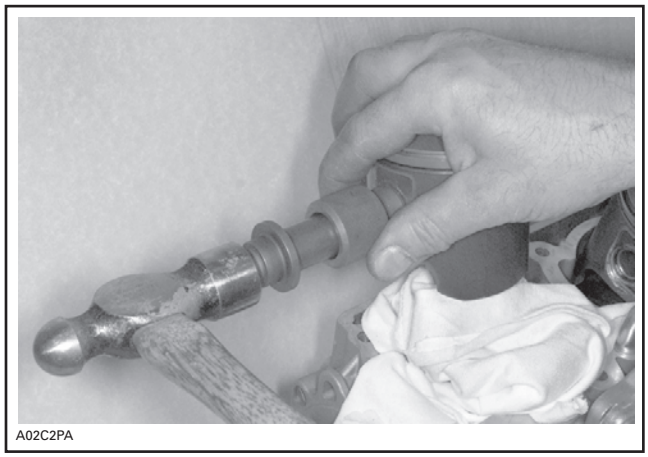


A02C2OA

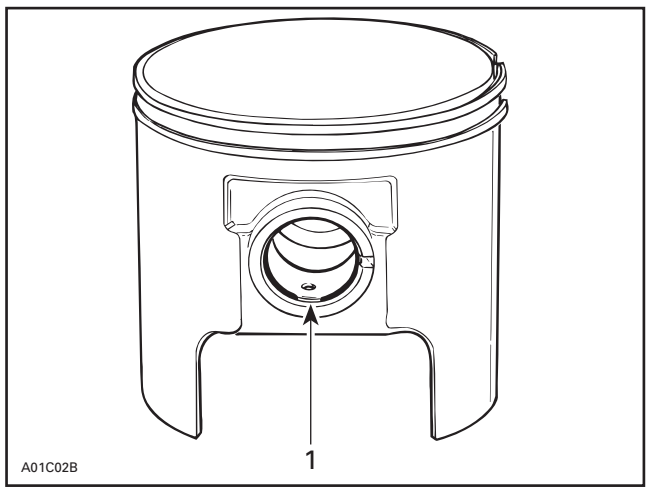
TYPICAL

1. Circlip break facing down

Hold tool firmly against piston then strike on round end of tool. Circlip will move from tool groove to piston groove.


A02C2PA

TYPICAL



TYPICAL

1. Circlip break

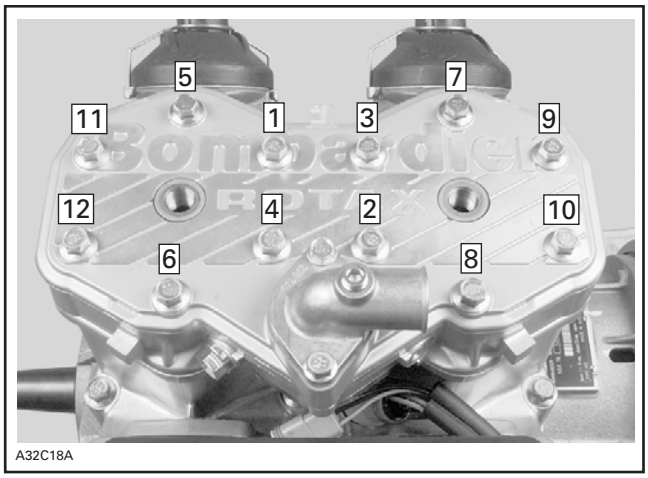
CAUTION: Circlips must not move freely after installation; if so, replace them.

Coat both sides of a new cylinder gasket with Loctite 518 then, install it on crankcase.

Loosely install cylinders.

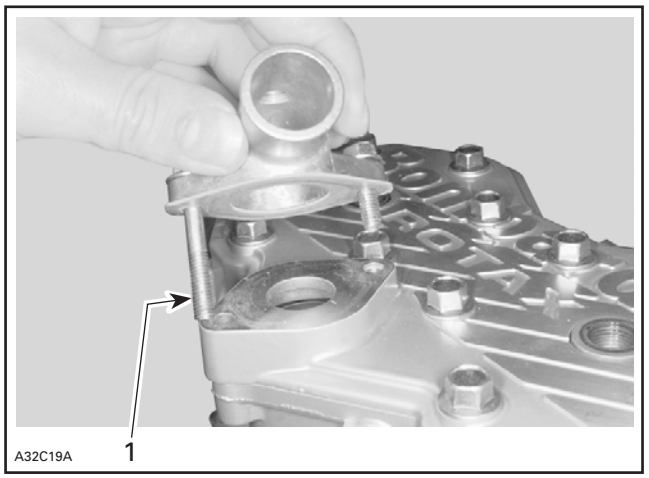
Install exhaust manifold then, tighten cylinder retaining screws to 29 N•m (21 lbf•ft) in a criss-cross sequence.

At assembly, torque cylinder head screws to 29 N•m (21 lbf•ft) in the following illustrated sequence.



TYPICAL

Install outlet socket and tighten screws to 12 N•m (106 lbf•**in**). Note position of longer screw.



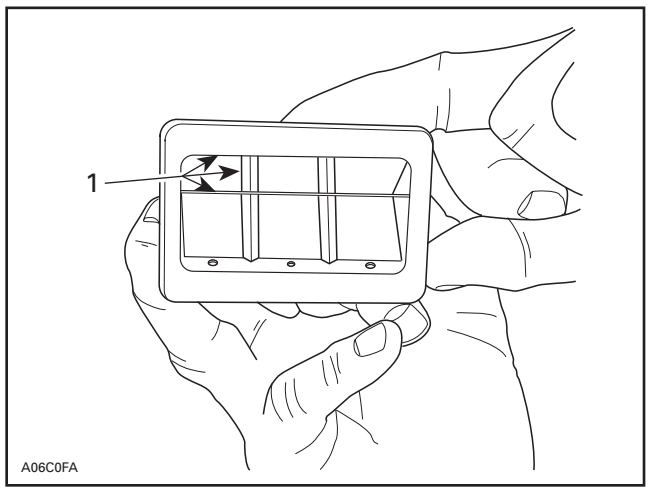
1. Longer screw

17, Reed Valve

Blades have a curved shape. Install with their curve facing reed block.

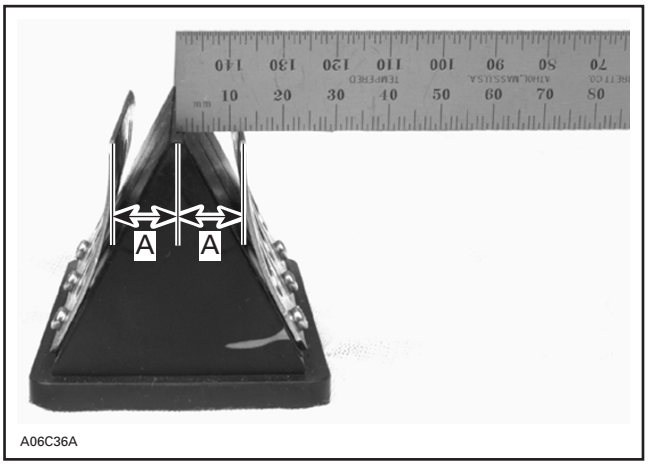
With blade stopper **no. 16** removed, check reed valve for proper tightness. There must be no play between blade and valve body when exerting a finger pressure on blade at blade stopper location.

In case of a play, turn blade upside down and recheck. If there is still a play, replace blade and/or valve body.



1. No play

Check distance from blade stopper outer edge and distance from center of reed valve block.

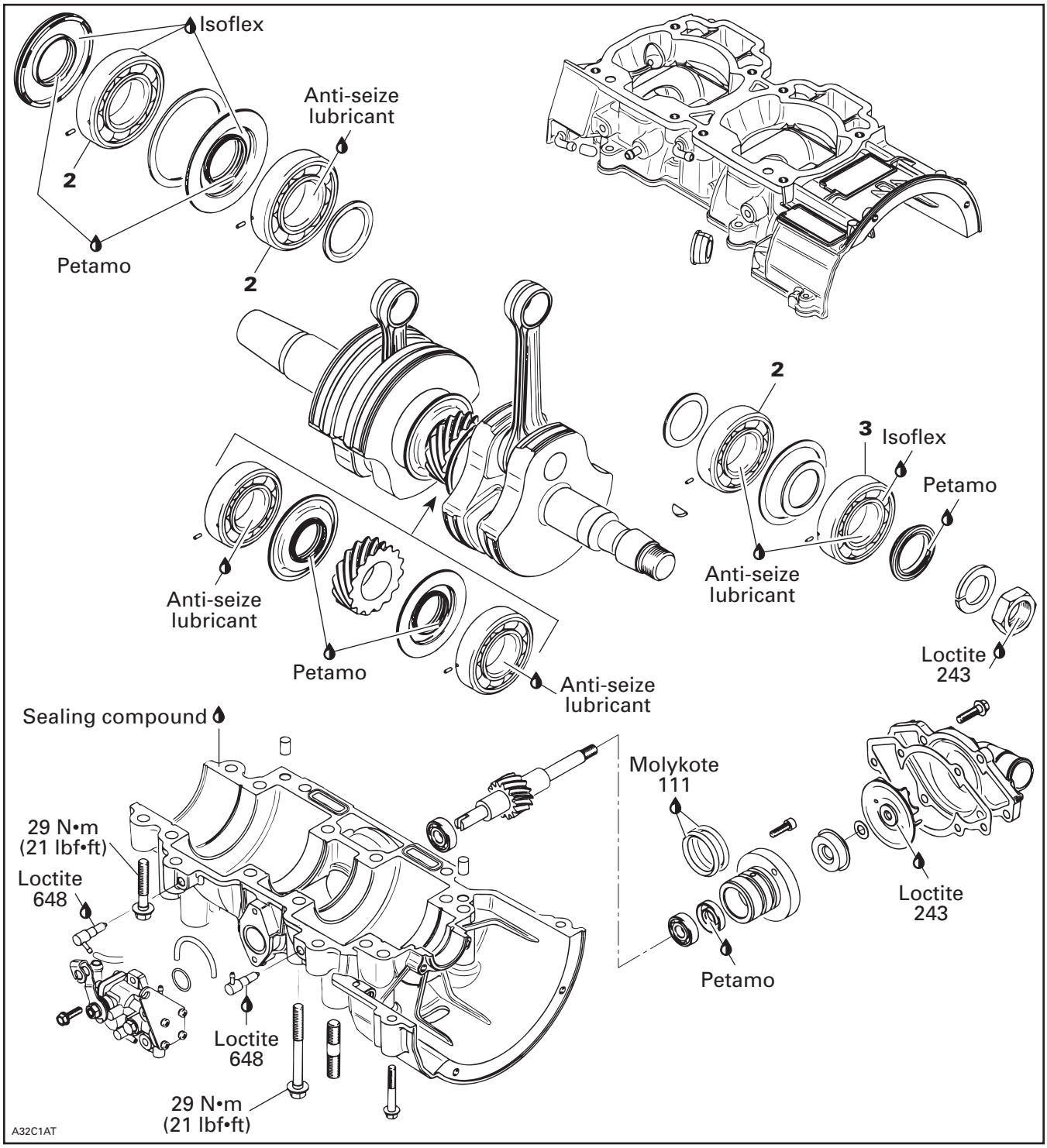


TYPICAL
A. 17.0 - 0, + 0.75 mm (.669 - 0, + .030 in)

Bent blade stopper as required to obtain the proper distance.

Blade stoppers may slightly interfere with cylinder during installation. Adjusted distance will be reduced automatically upon installation.

BOTTOM END


Isoflex
Anti-seize lubricant
2
Petamo
2
2
3
Isoflex
Petamo
Anti-seize lubricant
Anti-seize lubricant
Petamo
Anti-seize lubricant
Loctite 243
Sealing compound
29 N•m (21 lbf•ft)
Loctite 648
Loctite 648
29 N•m (21 lbf•ft)
Molykote 111
Petamo
Loctite 243
A32C1AT

NOTE: Engine must be removed from chassis to perform the following procedures.

CLEANING

Discard all oil seals, gaskets, O-rings and sealing rings.

Clean all metal components in a non-ferrous metal cleaner. Use Gasket remover (P/N 413 708 500) accordingly.

Remove old paste gasket from crankcase mating surfaces with Gasket remover (P/N 413 708 500).

CAUTION: Never use a sharp object to scrape away old sealant as score marks incurred are detrimental to crankcase sealing.

DISASSEMBLY

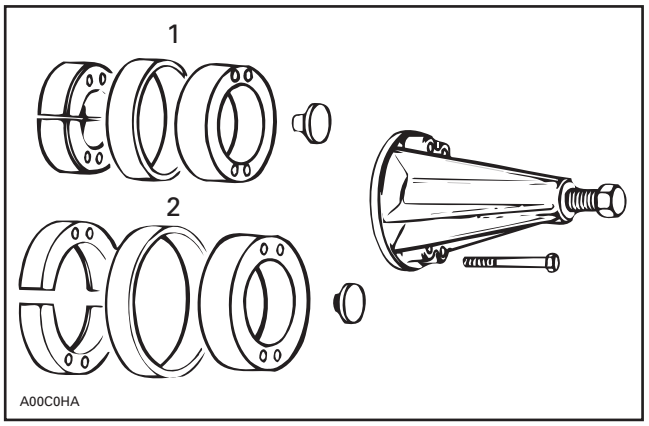
General

To remove drive pulley, refer to DRIVE PULLEY.

To remove magneto, refer to CDI SYSTEM.

2,3, Crankshaft Bearing

To remove bearings from crankshaft, use a protective cap and special puller, as illustrated.



1. *PTO side*
2. *MAG side*

INSPECTION

NOTE: Refer to LEAK TEST AND ENGINE DIMENSIONS MEASUREMENT.

ASSEMBLY

Coat lip of all seals with Petamo grease (P/N 420 899 271).

2, Crankshaft Bearing

Smear anti-seize lubricant (P/N 413 701 000) on part of crankshaft where bearing fits.

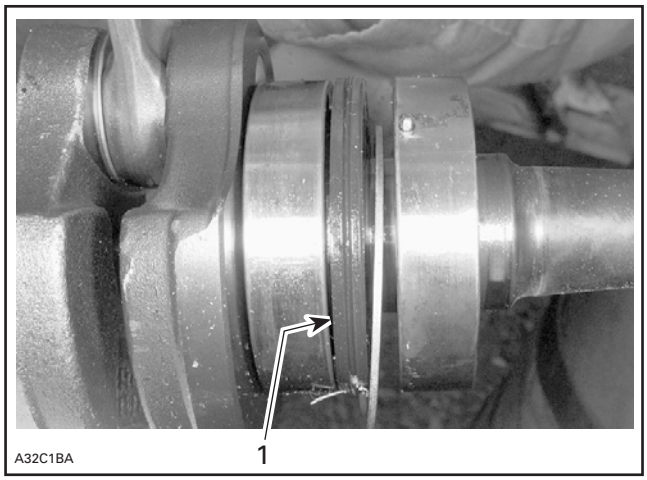
Prior to installation, place bearings into an oil container filled with injection oil previously heated to 75°C (167°F). This will expand bearing and ease installation.

Some bearings must be lubricated with Isoflex grease (P/N 293 550 021).

CAUTION: Use only the recommended Isoflex grease. Make sure not to push Isoflex grease between outside bearing race and half crankcase.

NOTE: The 50 g tube corresponds to 50 cc of grease.

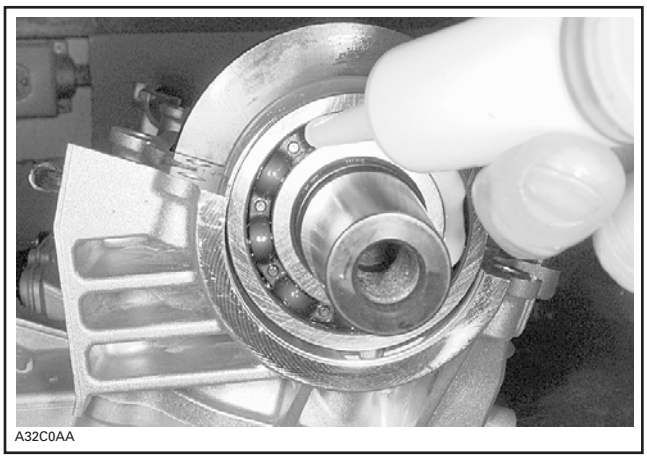
Fill PTO side inner seal with Isoflex grease.



1. *PTO side inner seal filled with Isoflex grease*

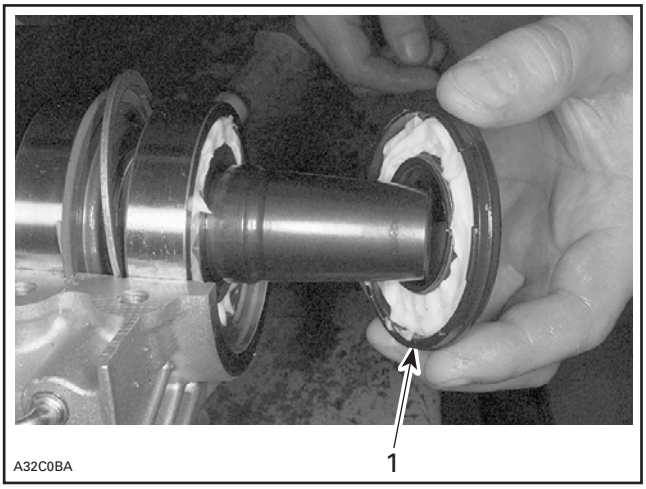
Put 35 to 40 mL of grease in a syringe.

With the syringe, fill the outer ball bearing with grease.



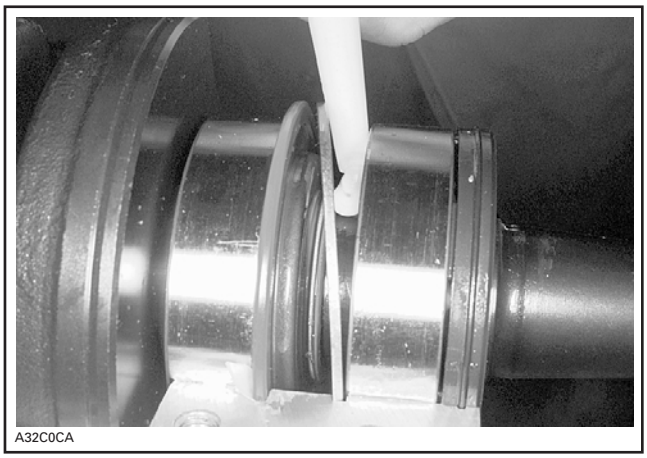
BALLS COATED WITH A SEAM OF GREASE

Coat inner side of seal and set it in place.



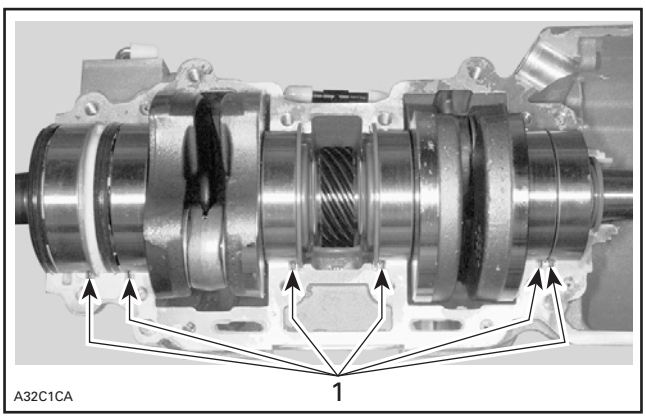
1. Fill with grease and set in place

Use the remaining grease to coat the inner side of the ball bearing.



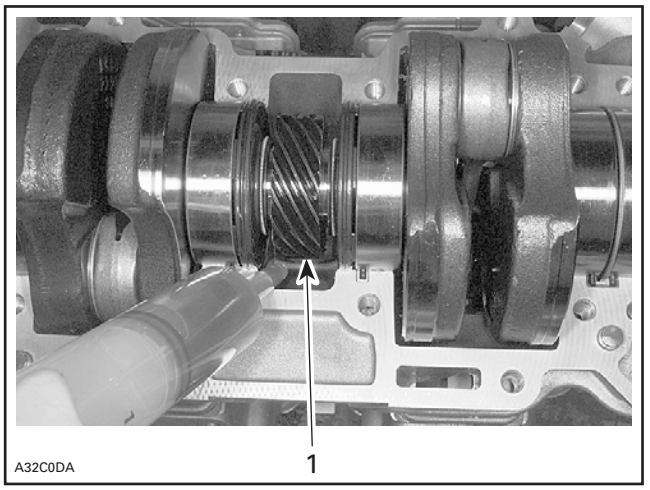
Apply 20 mL of grease to MAG side outer bearing.

At crankshaft installation, position drive pins as illustrated.



1. Position pins

Drop 50 mL (2 U.S. oz) of injection oil in the pan under central gear to lubricate pump gearing as per photo.



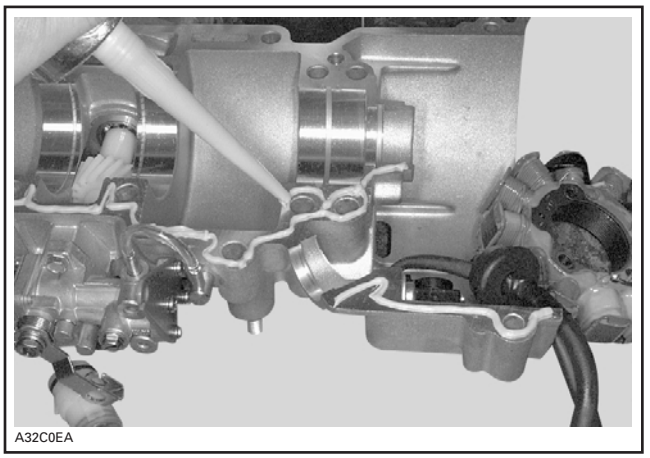
1. Oil bath

Crankcase Assembly

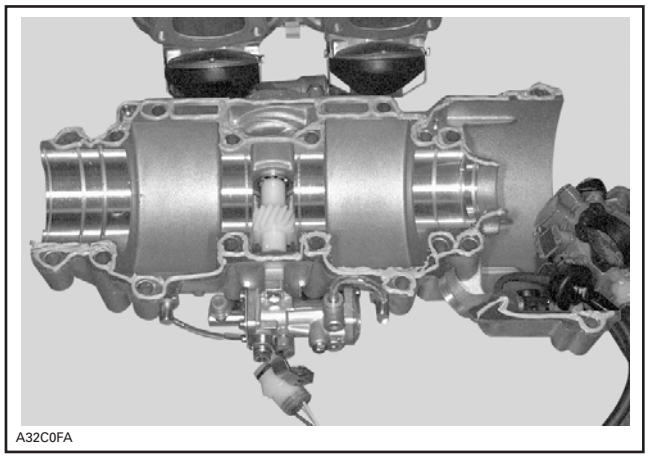
IMPORTANT: The total assembly sequence, including sealing compound spreading, screwing and torquing of bolts according to the proper sequence must be performed within 10 minutes.

Before screwing both parts of crankcase, seal it with a sealing compound (P/N 420 297 905). Make sure surfaces are clean and degreased before applying sealing compound.

Spread a seam of 1.2 mm (1/16 in) maximum in diameter on surface of lower crankcase half.



As far as possible, sealing compound must be applied in one run to avoid any risks of leaking through the crankcase.

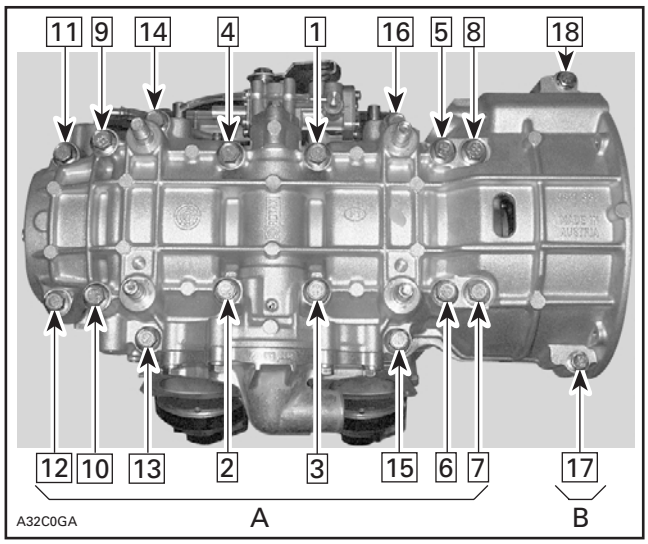


SEAMING COMPLETED — CONTACT SURFACES COVERED AND SCREW HOLES SURROUNDED

Screw the 4 central bolts to squeeze compound between crankcase halves before it starts to dry.

NOTE: Sealing compound spreading plus screwing of engine central four bolts must be performed within 2 minutes to ensure a good sealing and avoid linking.

Screw all crankcase bolts in place in the following sequence and to the appropriate torque through a two steps torquing: first, screw bolts up to 60% of the final torque (18 N•m (13.5 lbf•ft) for most of the bolts), then, tighten to the required torque (i.e. 29 N•m (21 lbf•ft)).



A. Torque bolts 1 through 16 to 29 N•m (21 lbf•ft)
*B. Torque bolts 17 and 18 to 9 N•m (80 lbf•**in**)*

LEAK TEST AND ENGINE DIMENSION MEASUREMENT

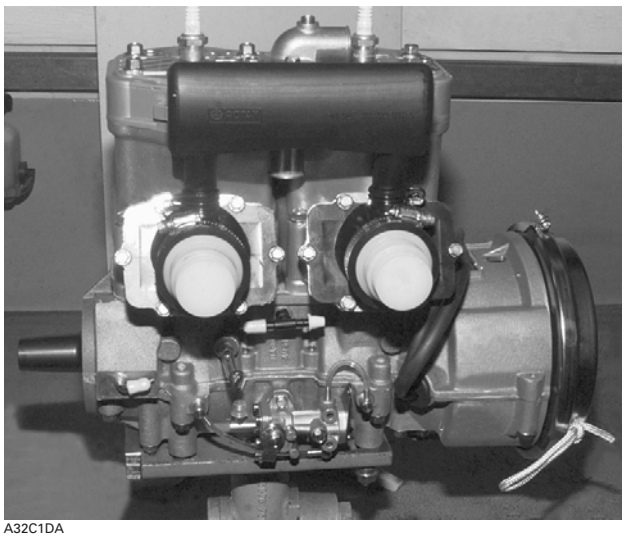
LEAK TEST

The following gives verification procedures for liquid cooled engines though it also applies to fan cooled engines. For FC engines, do not consider information pertaining to coolant system and pump shaft oil gear reservoir.

On FC twin-cylinder engines, each cylinder cannot be verified individually due to leakage from one cylinder to the other through labyrinth sleeve in center of crankshaft.

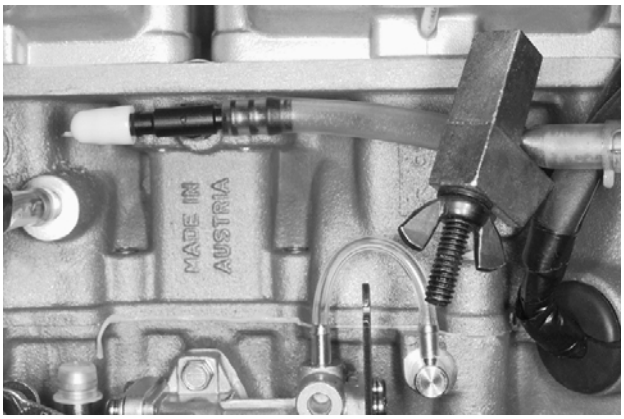
PREPARATION

1. Remove tuned pipe.
2. Install plug over exhaust manifold.
3. Remove carburetors.
4. Insert plugs in intake rubber boots. Tighten with clamps already there.



A32C1DA

5. Using a hose pincher (P/N 295 000 076), block impulse hose.
6. Using hose pinchers (P/N 295 000 076), block pump shaft oil hose and lubrication nipple on PTO side.

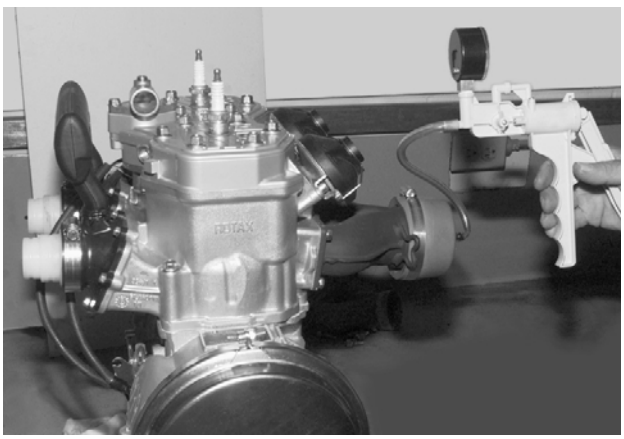


A32C1EA

7. Install air pump on exhaust plug.

NOTE: If necessary, lubricate air pump piston with mild soap.

CAUTION: Using hydrocarbon lubricant (such as engine oil) will damage rubber seal of pump piston.



A32C1FA

8. Activate pump and pressurize engine to 34 kPa (5 PSI). Do not exceed this pressure.
9. Engine must stand this pressure during 3 minutes. If pressure drops before 3 minutes, check tester kit by spraying a soapy solution on pump cylinder, all plugs and fittings.
   – If tester kit is leaking, bubbles will indicate where leak comes from.
   – If tester kit is not leaking, check engine as per following procedure.

PROCEDURE

NOTE: A flow chart has been prepared as a visual reference. See last page of this chapter.

Using flow chart and following text, pressurize area to be tested and spray soapy solution at the indicated location.

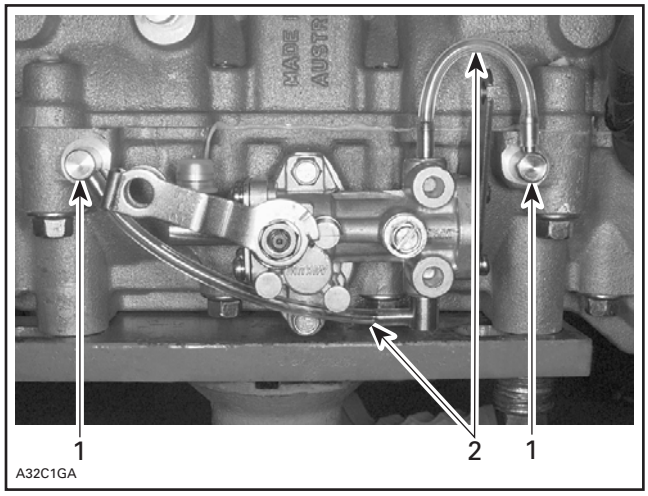
**TEST PRESSURE: 34 KPA (5 PSI)
FOR 3 MINUTES**

– If there is a leak at the tested location, it is recommended to continue testing next items before overhauling engine. There is a possibility of more than one leak.
– If there is no leak at the tested location, continue pumping to maintain pressure and continue with next items until leak is found.

Engine

Check the following:

1. All jointed surfaces and screw/stud threads of engine:
   – spark plug base, insulator
   – cylinder head
   – RAVE valve bellows, piston and housing
   – cylinder
   – crankcase halves (joint)
   – oil injection pump mounting flange (O-ring, seal)
   – coolant pump housing
   – bleed screws/plugs.
2. Small injection oil lines coming from pump.



1. Injection nipples
2. Small injection oil lines

Check for air bubbles or oil column going toward pump. It indicates defective check valve in injection nipples.

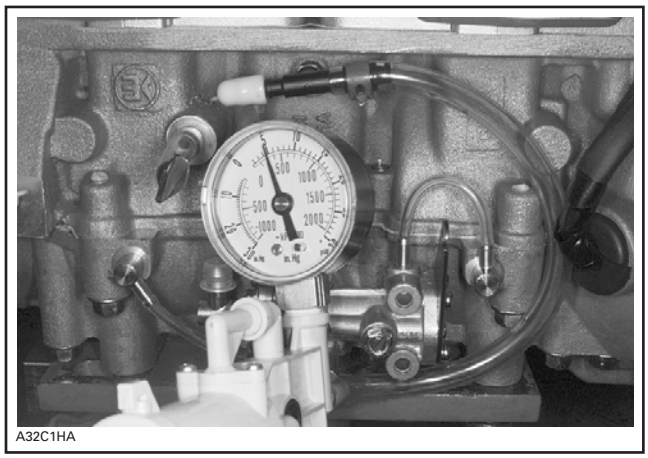
3. Remove cooling system cap.

Check for air bubbles in antifreeze. It indicates defective cylinder head O-ring or cylinder base gasket.

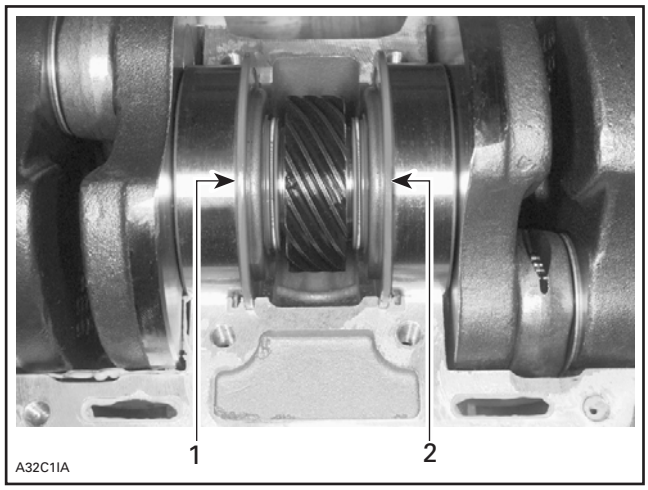
4. Remove drive pulley then check crankshaft outer seal.
5. Remove rewind starter and magneto system then check crankshaft outer seal.
6. Check pump shaft gear oil reservoir.

Pump Shaft Oil Gear Reservoir

Install air pump on adapter and pressurize as before.



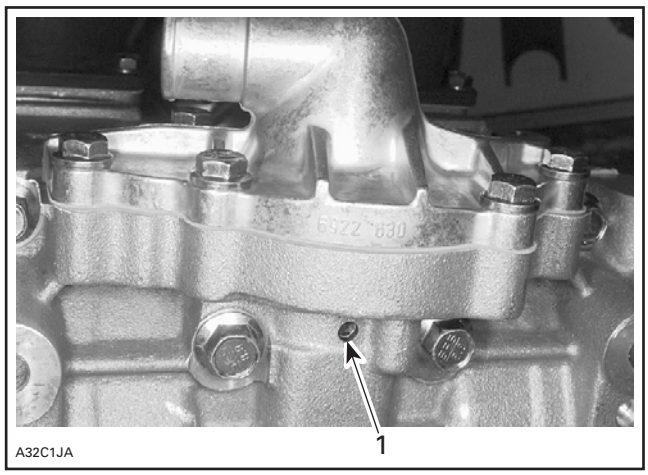
If pressure drops, it indicates a defective crankshaft inner seal.



CRANKSHAFT INSTALLED IN UPPER HALF CRANKCASE

1. *Crankshaft inner seal on PTO side*
2. *Crankshaft inner seal on MAG side*

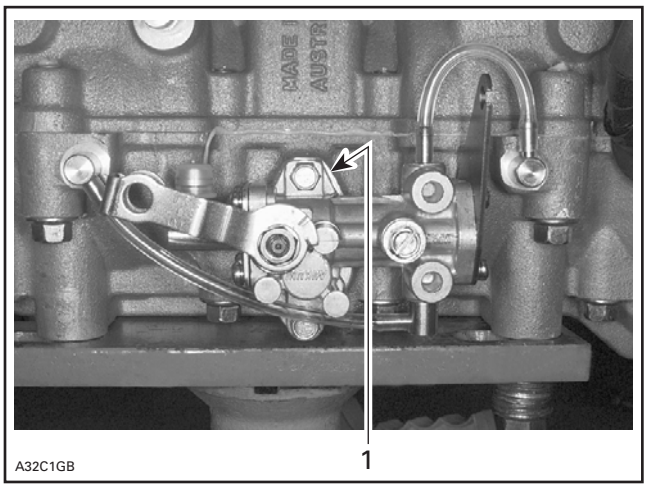
1. Check drain hole below coolant pump housing with soapy water.



1. *Drain hole*

If there is a leak, it indicates defective seal of pump shaft (oil seal beside coolant ceramic seal).

2. Leaks can be also on oil pump side. Check mounting area for leaks.



1. *Check mounting area*

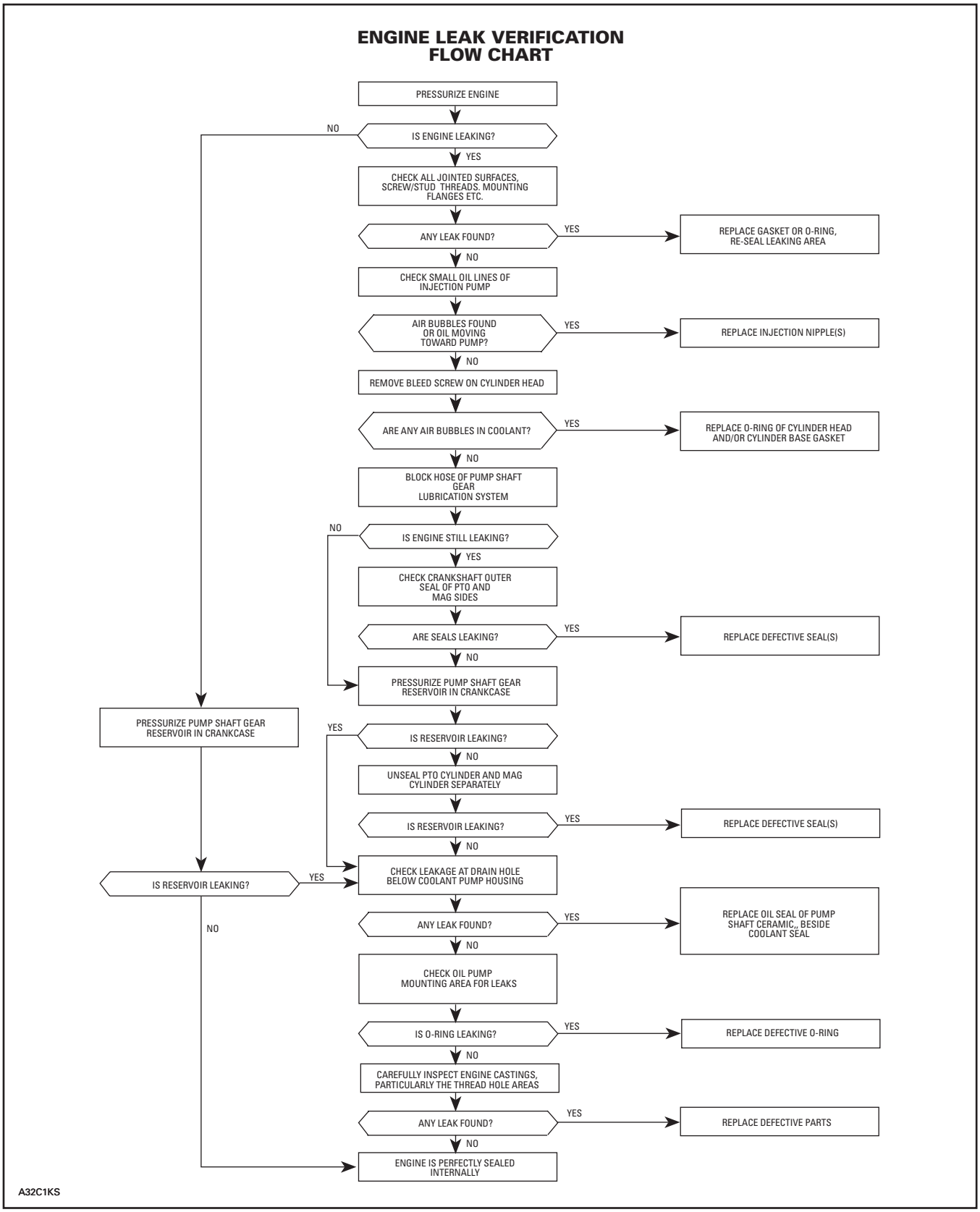
3. If leak still persists, it indicates a defective casting somewhere in engine.

   Disassemble engine and carefully check for defects in castings. Pay attention to tapped holes which may go through engine sealed area and thus lead to leakage.

FINALIZING REASSEMBLY

After reassembling engine, always recheck for leakage.

ENGINE LEAK VERIFICATION FLOW CHART



ENGINE DIMENSION MEASUREMENT

This section covers all engine types.

CYLINDER HEAD WARPAGE

ENGINE TYPE	MAXIMUM
All	0.05 mm (.002 in) per 50 mm (2 in) of surface
	0.5 mm (.020 in) for total length of cylinder head

Check gasketed surface of the cylinder head with a straightedge and a feeler gauge.

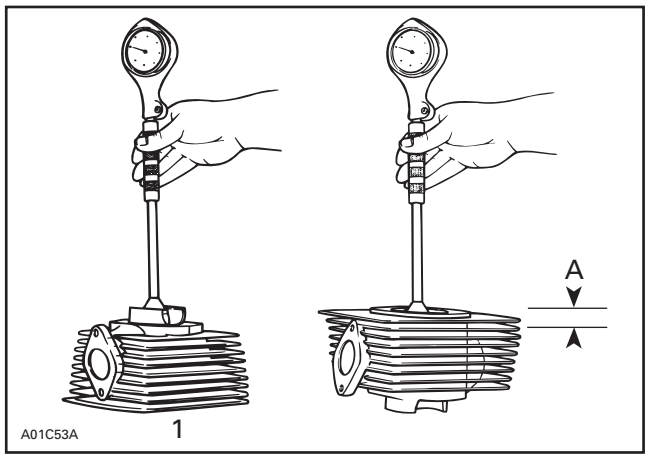
CYLINDER TAPER

ENGINE TYPE	MAXIMUM
All	0.10 mm (.004 in)

Compare cylinder diameter 16 mm (5/8 in) from top of cylinder to just below its intake port area.

On rotary valve engines, measure just below auxiliary transfer port, facing exhaust port. If the difference exceeds the specified dimension the cylinder should be rebored and honed or should be replaced.

NOTE: Be sure to restore the chamfer around all cylinder sleeve port openings.



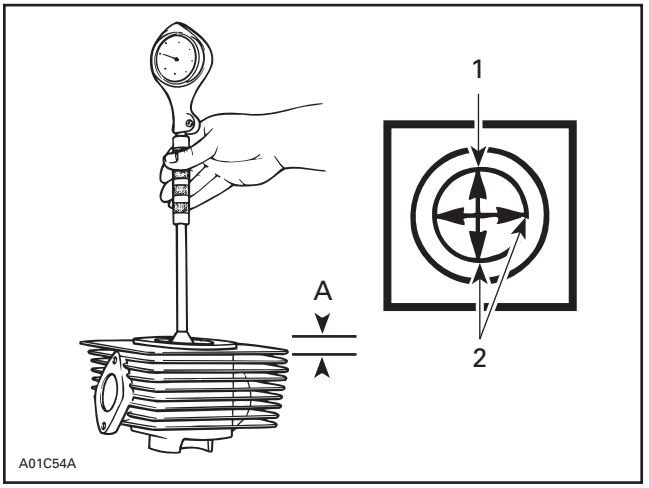
1. Below the intake port
A. 16 mm (5/8 in) from top

CYLINDER OUT OF ROUND

ENGINE TYPE	MAXIMUM
All	0.08 mm (.003 in)

Measuring 16 mm (5/8 in) from top of cylinder with a cylinder gauge, check if the cylinder out of round is more than the specified dimension. If larger, cylinder should be rebored and honed or should be replaced.

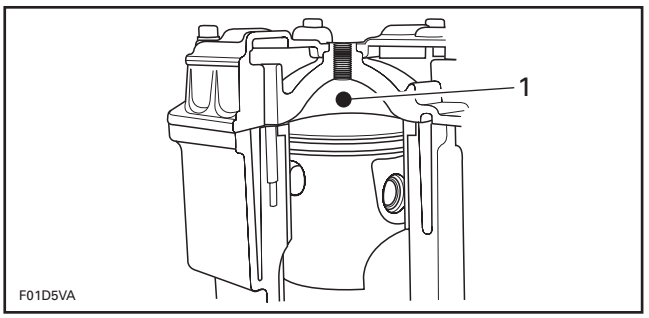
NOTE: Be sure to restore the chamfer around all cylinder sleeve port openings.



1. Piston pin position
2. Measures to be compared
A. 16 mm (5/8 in)

COMBUSTION CHAMBER VOLUME MEASUREMENT

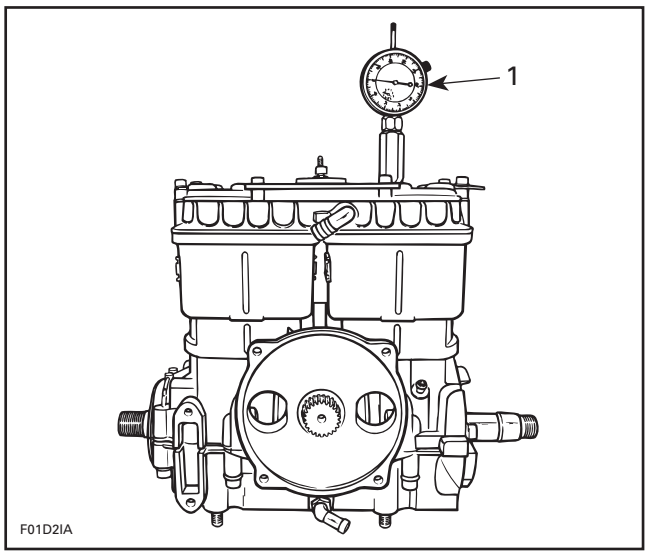
The combustion chamber volume is the region in the cylinder head above the piston at Top Dead Center. It is measured with the cylinder head installed on the engine.



1. Combustion chamber

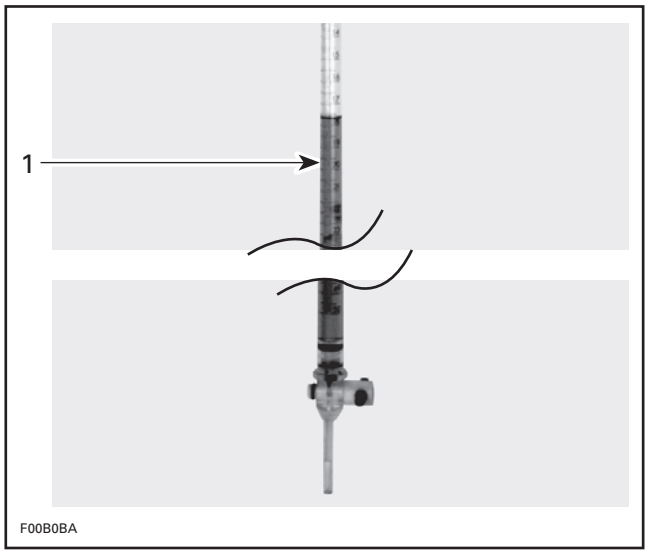
NOTE: When checking the combustion chamber volume, engine must be cold, piston must be free of carbon deposit and cylinder head must be leveled.

1. Remove both spark plugs and bring one piston to Top Dead Center a using a TDC gauge.



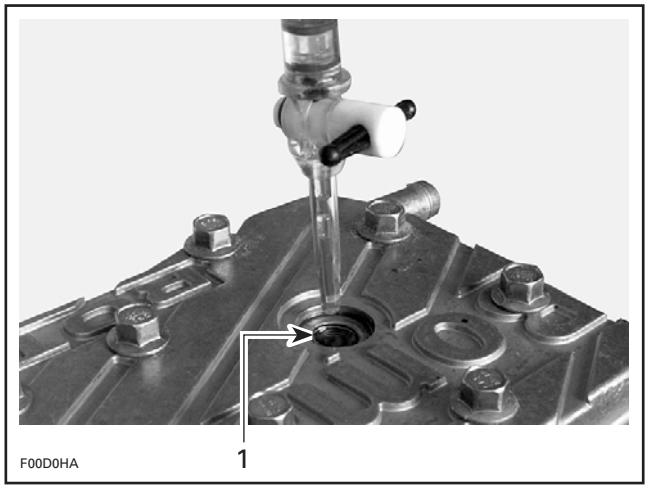
1. Bring piston to TDC

2. Obtain a graduated burette (capacity 0-50 cc) and fill with an equal part (50/50) of gasoline and injection oil.



1. Graduated burette (0-50 cc)

3. Open burette valve to fill its tip. Add liquid in burette until level reaches 0 cc.
4. Inject the burette content through the spark plug hole until liquid touches the top spark plug hole.



1. Top of spark plug hole

NOTE: The liquid level in cylinder must not drop for a few seconds after filling. If so, there is a leak between piston and cylinder. The recorded volume would be false.

5. Let burette stand upward for about 10 minutes, until liquid level is stabilized.
6. Read the burette scale to obtain the quantity of liquid injected in the combustion chamber.

NOTE: When the combustion chamber is filled to top of spark plug hole, it includes an amount of 2.25 cc corresponding to the spark plug tip.

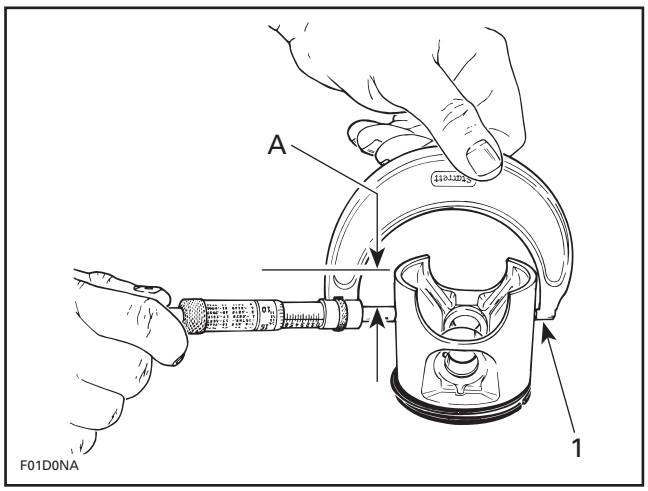
7. Repeat the procedure for the other cylinder.

ENGINE TYPE	COMBUSTION CHAMBER VOLUME (CC) (UP TO TOP THREAD OF SPARK PLUG HOLE)
377	20.3 ± 0.8
443	24.0 ± 1.0
503	27.5 ± 1.2
593	29.9 ± 1.2

Install a thicker or thinner cylinder/crankcase gasket (refer to *Parts Catalogs*) in order to obtain the specified combustion chamber volume.

USED PISTON MEASUREMENT

Using a micrometer, measure piston at A perpendicularly (90°) to piston pin.



1. Measuring perpendicularly (90°) to piston pin axis
A. See table below

ENGINE TYPE	DIMENSION A mm (in)
377 and 443	20.8 (.819)
503	18.0 (.709)
593	25.57 (1.004)

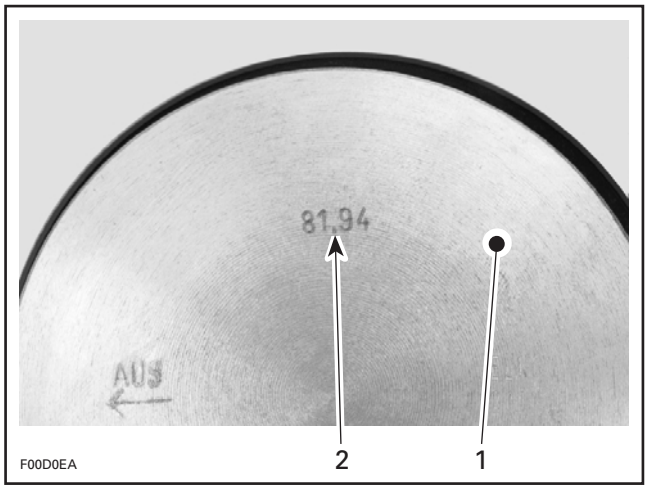
The measured dimension should be the same as the one scribed on piston dome. If not, install a new piston.

CYLINDER/PISTON CLEARANCE

Used and New Pistons

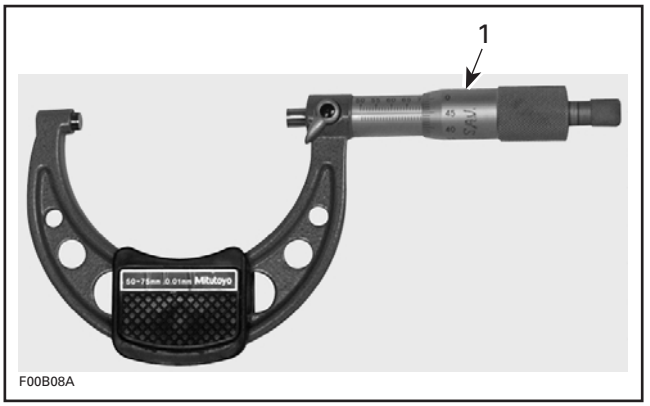
NOTE: Make sure used piston is not worn. See USED PISTON MEASUREMENT above.

Take the measurement on the piston dome.



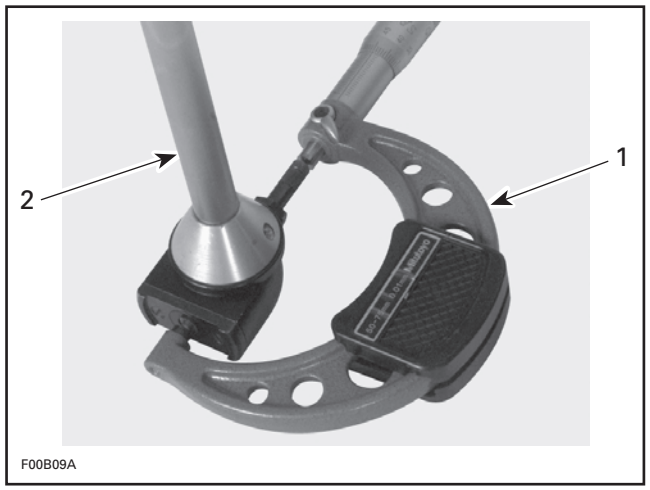
1. Piston dome
2. Piston measurement

Adjust and lock a micrometer to the specified value on the piston dome.

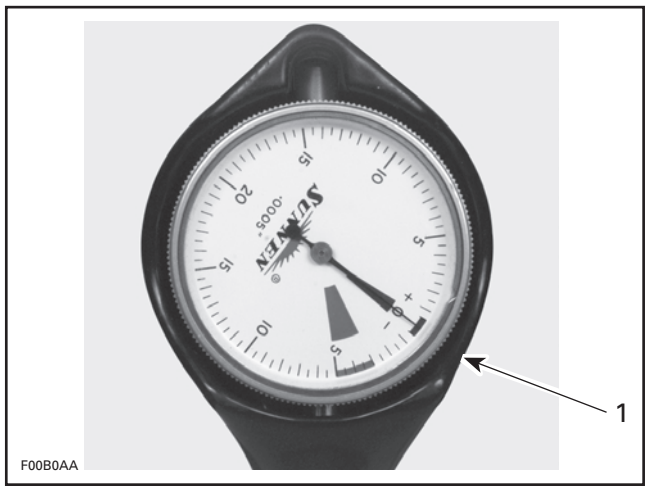


1. Micrometer set to the piston dimension

With the micrometer set to the piston dimension, adjust a cylinder bore gauge to the micrometer dimension and set the indicator to 0.

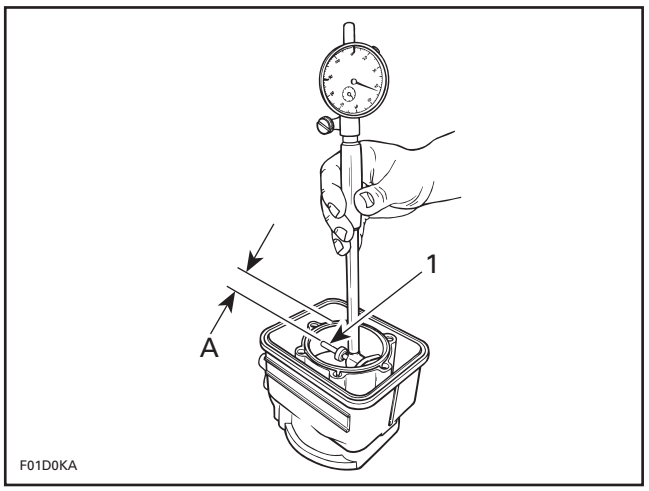


1. Use the micrometer to set the cylinder bore gauge
2. Dial bore gauge



1. Indicator set to 0 (zero)

Position the dial bore gauge at 16 mm (5/8 in) below cylinder top edge.



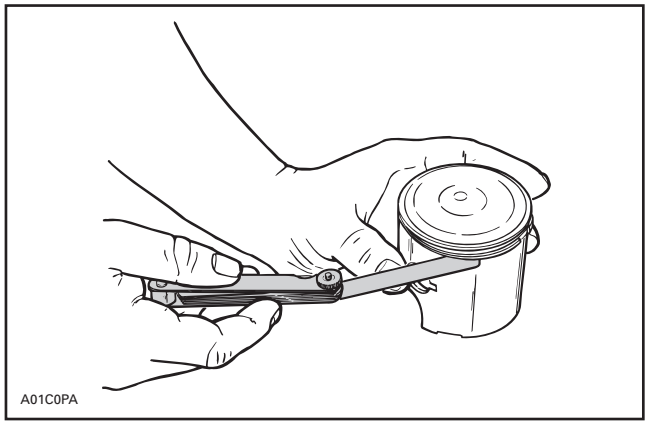
1. Measuring perpendicularly (90°) to piston pin axis
A. 16 mm (5/8 in)

Read the measurement on the cylinder bore gauge. The result is the exact piston/cylinder wall clearance. If clearance exceeds specified tolerance, replace cylinder or rebore. Refer to TECHNICAL DATA.

NOTE: Make sure the cylinder bore gauge indicator is set exactly at the same position as with the micrometer, otherwise the reading will be false.

RING/PISTON GROOVE CLEARANCE

Using a feeler gauge check clearance between rectangular ring and groove. Replace piston if clearance exceeds specified tolerance. Refer to TECHNICAL DATA.

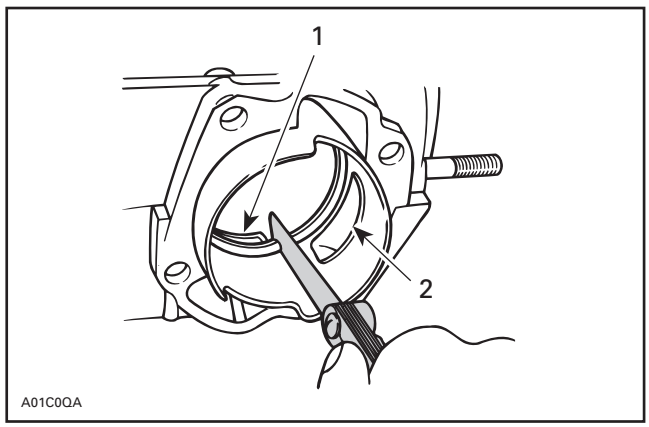


RING END GAP

Position ring half-way between transfer ports and intake port. On rotary valve engines, position ring just below transfer ports.

NOTE: In order to correctly position the ring in the cylinder, use piston as a pusher.

Using a feeler gauge, check ring end gap. Replace ring if gap exceeds specified tolerance. Refer to TECHNICAL DATA.



1. Transfer port
2. Intake port

CRANKSHAFT DEFLECTION

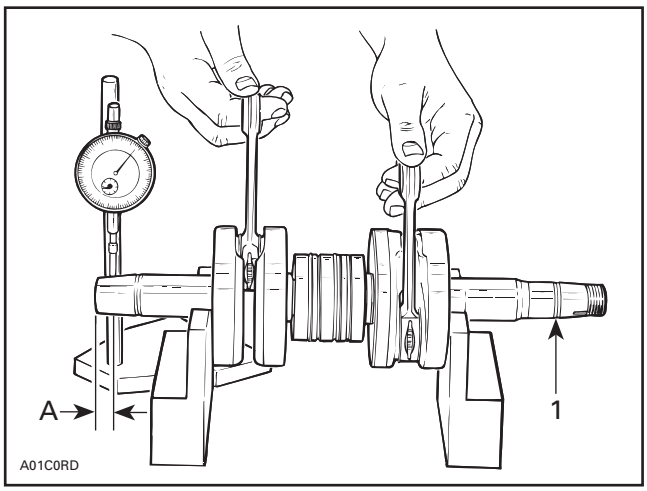
Crankshaft deflection is measured with a dial indicator.

Measuring (in engine)

First, check deflection with crankshaft in engine. If deflection exceeds the specified tolerance, recheck deflection using V-shaped blocks to determine the defective part(s). See below.

Measuring (on bench)

Once engine is disassembled, check crankshaft deflection on V-shaped blocks. If deflection exceeds the specified tolerance, it can be worn bearings or a bent crankshaft. Remove crankshaft bearings and check deflection again on V-shaped blocks to determine the defective part(s). See measurement A in following illustration.



TYPICAL

1. Measure at mid point between the key and the first thread
A. 3 mm (1/8 in)

Crankshaft Deflection on PTO Side

ENGINE TYPE	MAXIMUM ON PTO SIDE mm (in)
377, 443 and 503 on S-Series	0.06 (.0024)
443 on Skandic LT	0.08 (.0031)
503 on Skandic WT/SWT	0.06 (.0024)
593	0.08 (.0031)

Crankshaft Deflection on MAG Side

ENGINE TYPE	MAXIMUM ON MAG SIDE mm (in)
377, 443 and 503 on S-Series	0.03 (.0012)
443 on Skandic LT	0.06 (.0024)
503 on Skandic WT/SWT	0.03 (.0012)
593	0.06 (.0024)

Crankshaft Deflection in Center of Crankshaft

ENGINE TYPE	MAXIMUM IN CENTER OF CRANKSHAFT
377, 443 and 503 on S-Series	0.08 (.0031)
443 on Skandic LT	0.03 (.0012)
503 on Skandic WT/SWT	0.08 (.0031)
593	0.05 (.002)

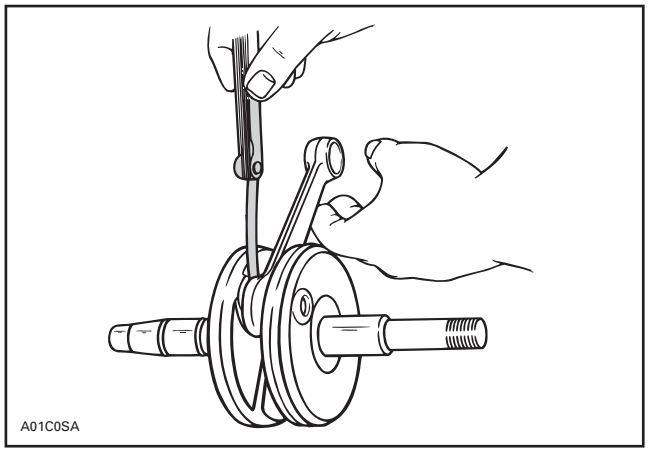
NOTE: Crankshaft deflection cannot be correctly measured between centers of a lathe.

If the deflection exceeds the specified tolerance, crankshaft should be repaired or replaced.

CONNECTING ROD BIG END AXIAL PLAY

ENGINE TYPE	NEW PARTS MIN. - MAX.	WEAR LIMIT
377, 443 and 503	0.20 - 0.53 mm (.008 - .021 in)	1.0 mm (.039 in)
593	0.39 - 0.74 mm (.015 - .029 in)	1.20 mm (.047 in)

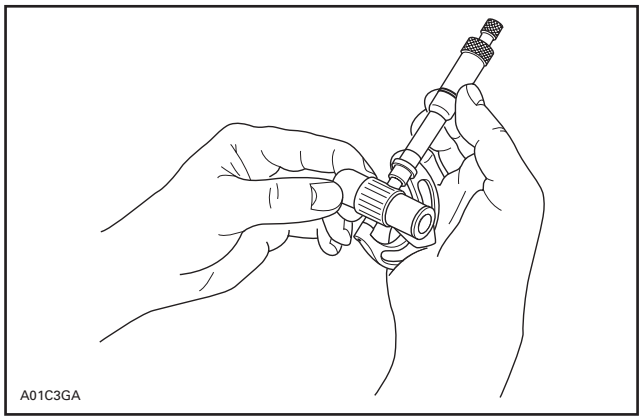
Using a feeler gauge, measure distance between thrust washer and crankshaft counterweight. If the distance exceeds specified tolerance, repair or replace the crankshaft.

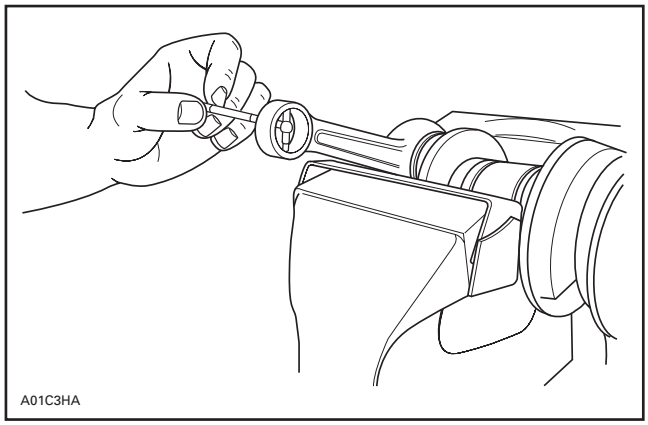


TYPICAL

CONNECTING ROD/PISTON PIN CLEARANCE

Measure piston pin with its needle bearing. Compare to inside diameter of connecting rod.





ENGINE TYPE	NEW PARTS MIN. - MAX.	WEAR LIMIT
All	0.003 - 0.012 mm (.0001 - .0005 in)	0.015 mm (.0006 in)

CONNECTING ROD/CRANKPIN CLEARANCE

ENGINE TYPE	NEW PARTS MIN. - MAX.	WEAR LIMIT
377, 443 and 503	0.020 - 0.033 mm (.0008 - .0013 in)	0.05 mm (.0020 in)
593	0.038 - 0.050 mm (.0015 - .0020 in)	0.06 mm (.0024 in)

CRANKSHAFT END-PLAY

All Engine Types

End-play is not adjustable but it should be between 0.10 - 0.30 mm (.004 - .012 in).

CHECKING SURFACE FLATNESS

Intake manifold, intake manifold cover can be checked for perfectly mating surfaces.

Lay part on a surface plate (marble, mirror or thick glass plate).

Holding down one end of part, try pushing down the other end.

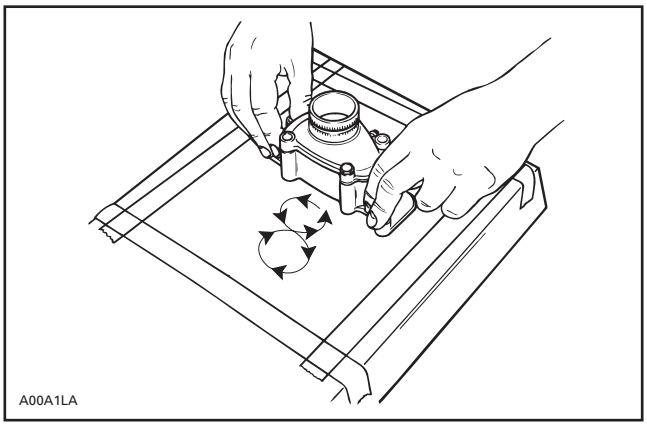
If any play is felt, part must be rectified.

RECTIFYING SURFACES

Stick a fine sand paper sheet on the surface plate then lightly oil the sand paper.

Rub part mating surface on sand paper using 8-figure movements.

Sand until mating surface is perfectly straight.



CHECKING CRANKSHAFT ALIGNMENT

Install a degree wheel (P/N 414 352 900) on crankshaft end.

Remove both spark plugs.

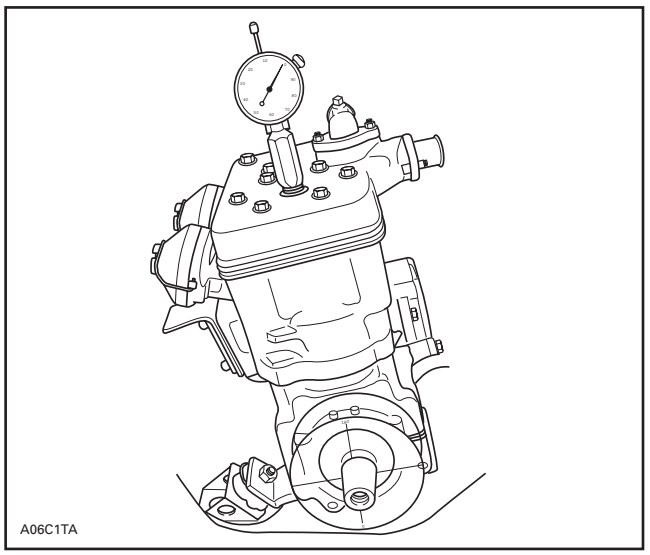
Install a TDC gauge (P/N 414 104 700) in spark plug hole on MAG side.

Bring MAG piston at top dead center.

Rotate degree wheel (not crankshaft) so that 360° mark aligns with center of crankcase. Scribe a mark on crankcase.

Remove TDC gauge and install it on PTO side cylinder.

Bring PTO piston to top dead center. Degree wheel must rotate with crankshaft.



TYPICAL

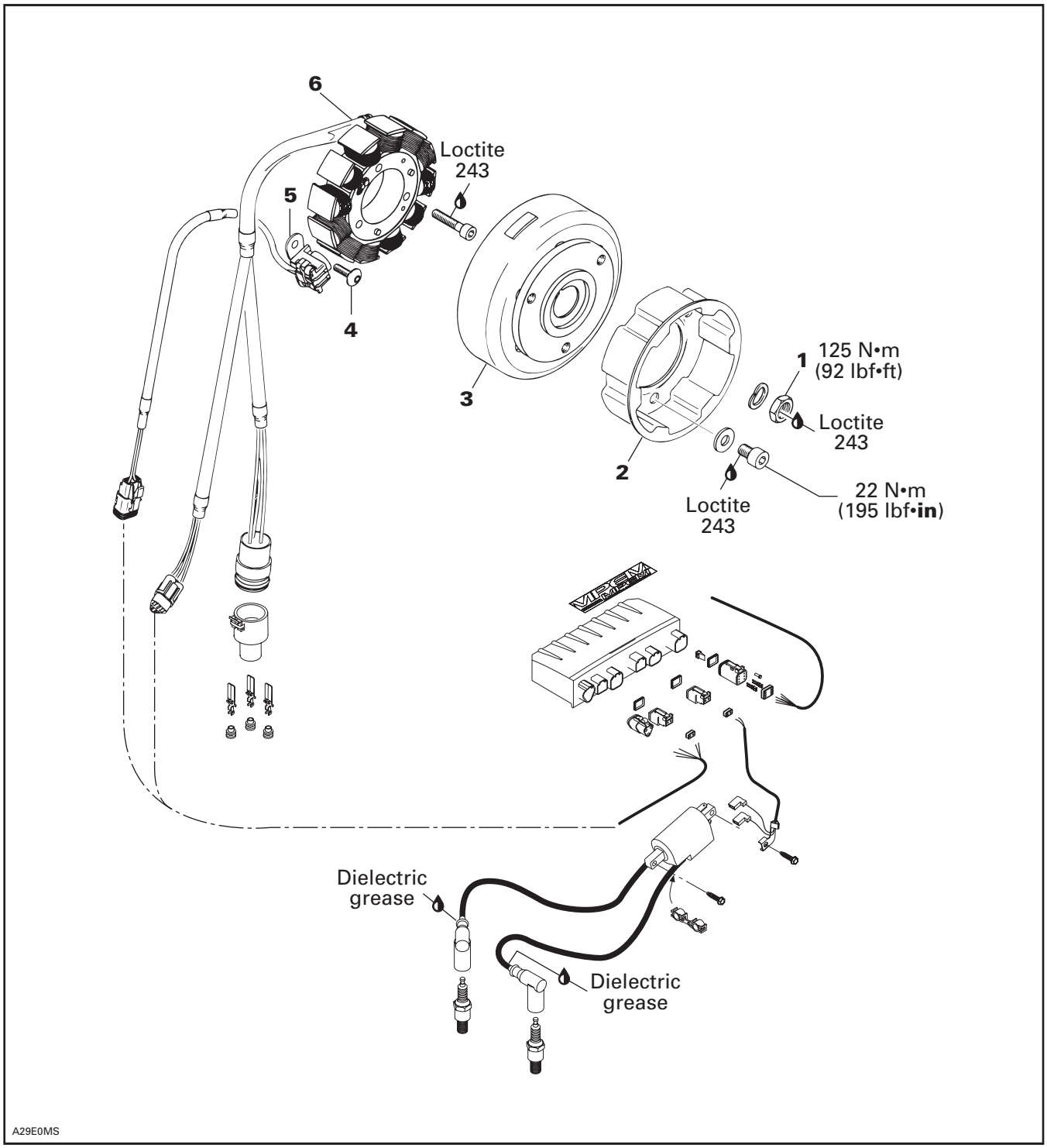
Interval between cylinders must be 180° ± 0.5.

Any other reading indicates a misaligned (twisted) crankshaft.

CDI SYSTEM

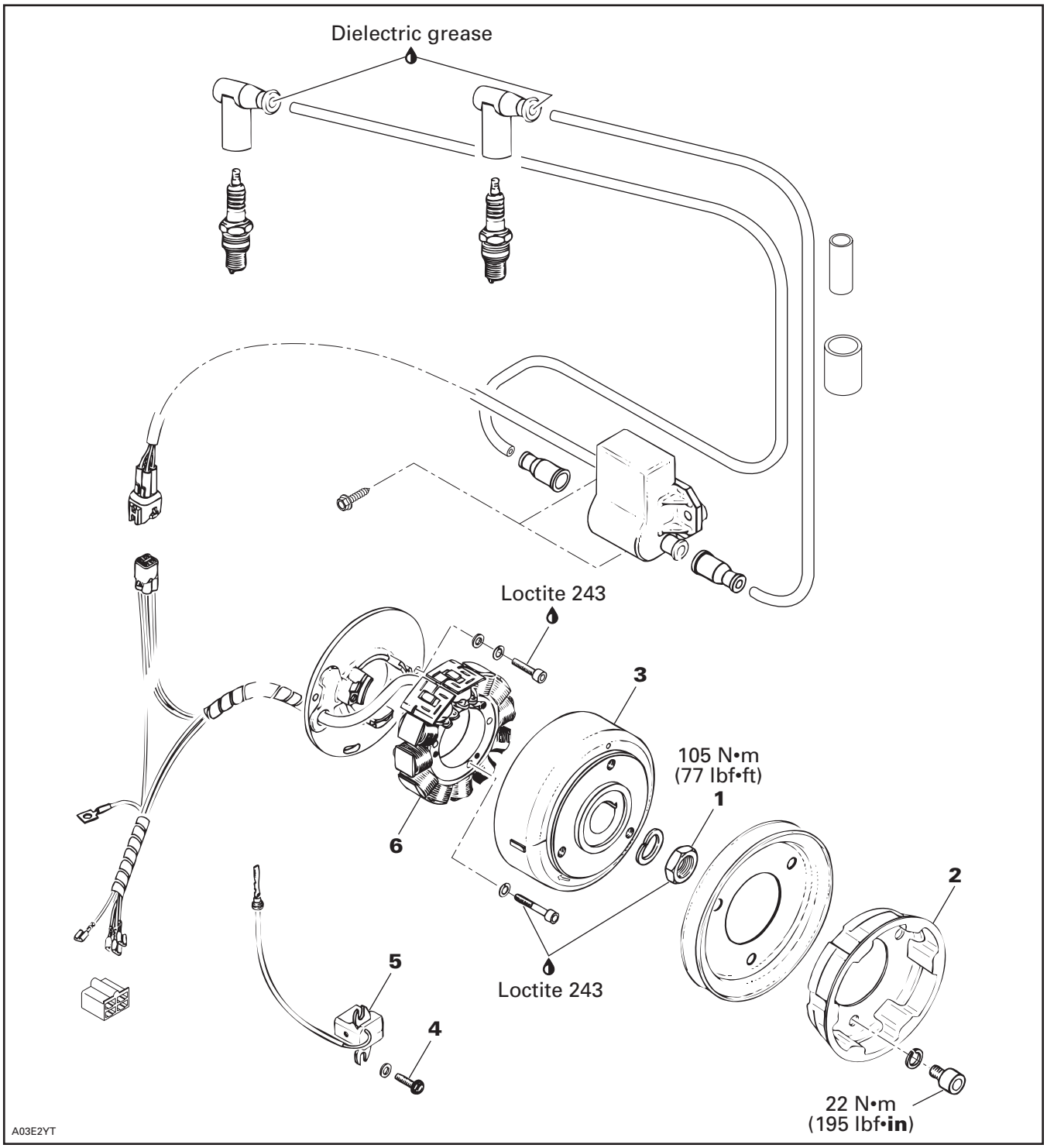
NIPPONDENSO TRIGGER COIL IGNITION SYSTEM

290 W on Skandic WT LC



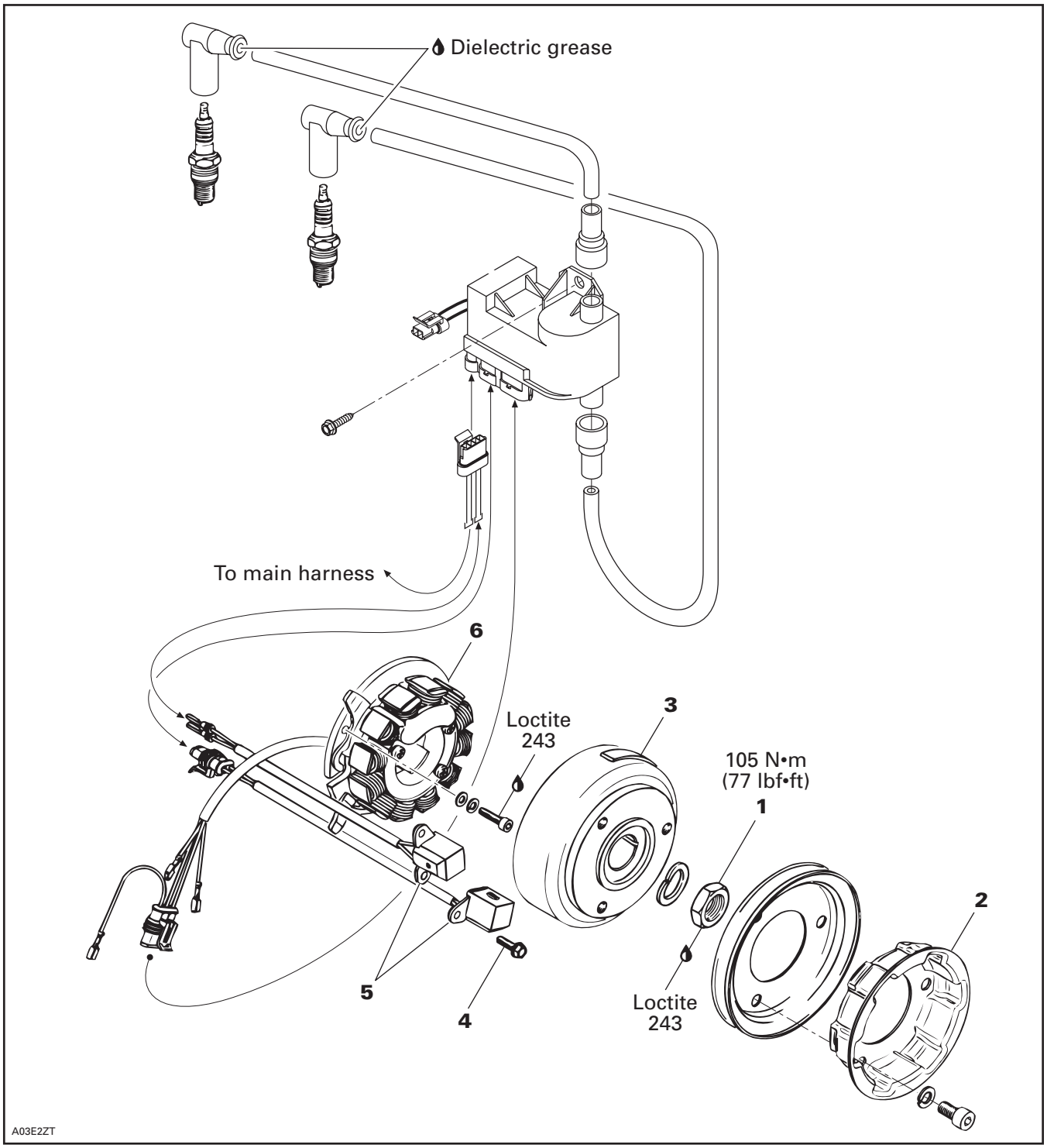
DUCATI IGNITION SYSTEM

Skandic WT/SWT



RER IGNITION SYSTEM

S-Series and Skandic LT



NOTE: The following procedures can be done without removing the engine from chassis. To facilitate magneto removal, hold drive pulley with tool (P/N 529 027 600).

CDI means Capacitor Discharge System.

CLEANING

Clean all metal components in a non-ferrous metal cleaner.

CAUTION: Clean stator and magneto using only a clean cloth.

DISASSEMBLY

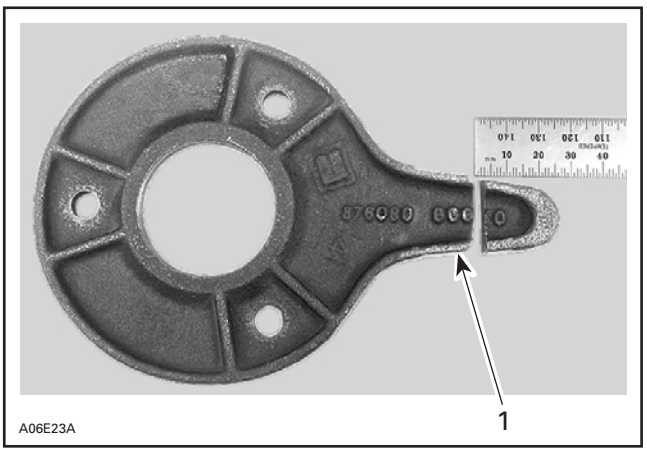
3, Magneto Flywheel

To gain access to magneto assembly, remove the following parts as needed on different engines:

– tuned pipe and muffler
– rewind starter
– starting pulley **no. 2**.

To remove magneto flywheel retaining nut **no. 1**:

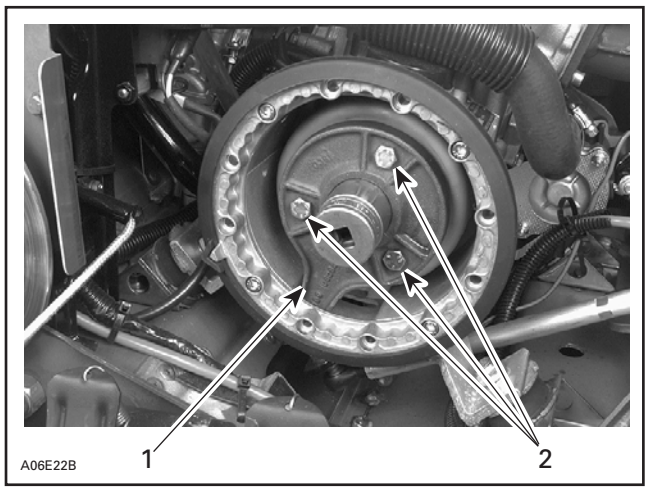
– Use magneto puller ring (P/N 420 876 080). Former puller has to be modified as shown.



1. Cut by 25 mm (1 in)

– Install puller with its tab in magneto housing opening.

CAUTION: Use only M8 x 20 mm screws to bolt puller to magneto.

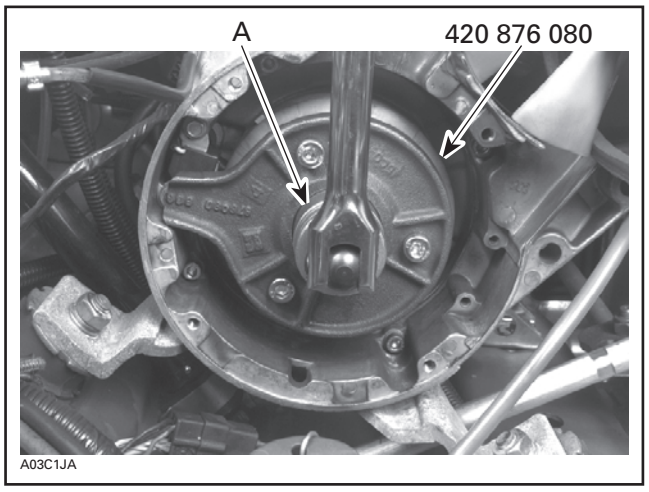


TYPICAL

1. Tab in magneto housing opening
2. M8 x 20 mm screws

– Remove magneto flywheel nut, using a 30 mm socket machined to 40 mm (1.580 in) outside diameter by 16 mm (5/8 in) long.

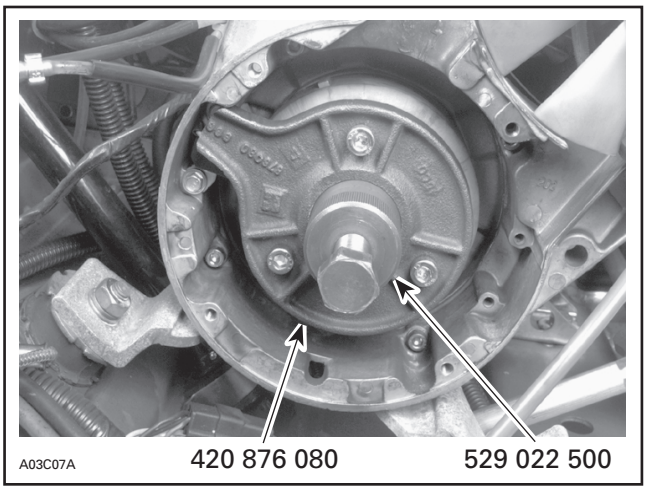
NOTE: To correctly remove a threadlocked fastener it is first necessary to tap on the fastener to break threadlocker bond. This will eliminate the possibility of thread breakage.



TYPICAL

A. 30 mm socket

To remove magneto flywheel, install the puller (P/N 529 022 500).



TYPICAL

– Tighten puller bolt and at the same time, tap on bolt head using a hammer to release magneto flywheel from its taper.

5, Trigger Coil

Magneto and stator **no. 6** must be removed before trigger coil removal.

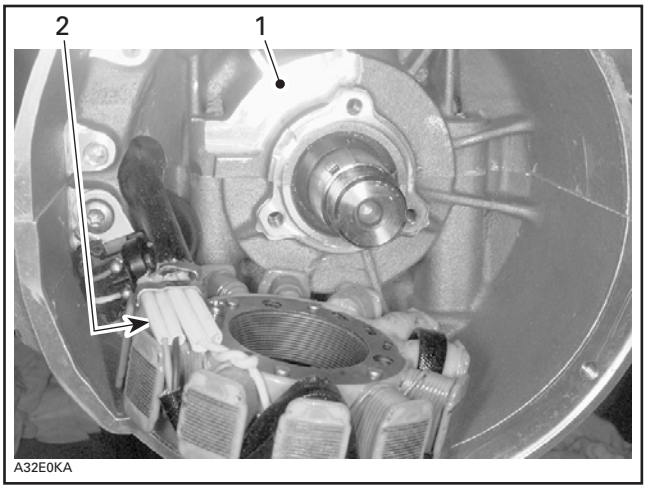
To replace trigger coil:

– Disconnect trigger coil connector housing.
– Remove grommet from crankcase where trigger coil wire exits magneto housing.
– Remove retaining screws **no. 4**.
– Remove trigger coil and carefully pull wires.
– Install new trigger coil and other parts removed.

ASSEMBLY

6, Stator

Make sure to position stator in a way that its wire protectors are over recess of crankcase.



1. Crankcase recess
2. Wire protectors

3, Magneto Flywheel

Clean crankshaft extension (taper) and apply Loctite 243 (blue) on taper, then position Woodruff key, flywheel and lock washer on crankshaft.

Clean nut threads and apply Loctite 243 (blue) then tighten nut to 105 N•m (77 lbf•ft) for fan-cooled engines and to 125 N•m (92 lbf•ft) for 593 engine.

At reassembly coat all electric connections except Deutsch housings (waterproof gray housing) with silicone dielectric grease (P/N 293 550 004) to prevent corrosion or moisture penetration.

CAUTION: Do not use silicone "sealant", this product will corrode contacts. Do not apply silicone dielectric grease on any Deutsch (gray) housing otherwise housing seal will be damaged.

Ignition Timing

Check as described in IGNITION TIMING.

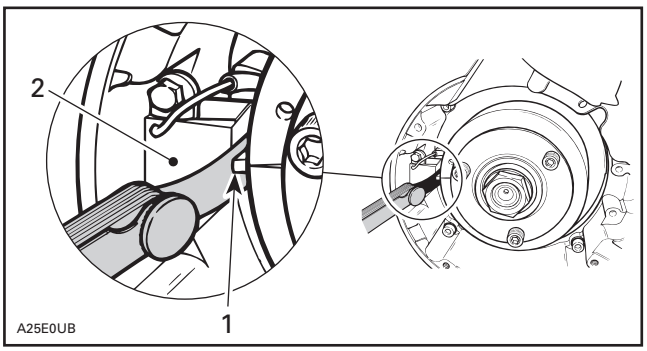
ADJUSTMENT

Skandic WT/SWT Only

Whenever the trigger coil or the magneto flywheel is removed or replaced, the air-gap between the trigger coil and the flywheel protrusion must be checked and adjusted. The purpose of this adjustment is to obtain the minimum clearance between these parts — without touching at any RPM — so that the trigger coil produces its proper electrical output. Ignition timing must also be checked. Refer to IGNITION SYSTEM.

Proceed as follows:

1. Rotate flywheel so that one protrusion aligns with trigger coil.
2. Using a feeler gauge of 0.45 mm (.018 in) to 0.55 mm (.022 in) thick, check air-gap between center pole of trigger coil and flywheel protrusion.
3. If necessary, adjust by slackening retaining screws and moving trigger coil toward or away of protrusion.
4. Retighten screws and recheck air-gap.



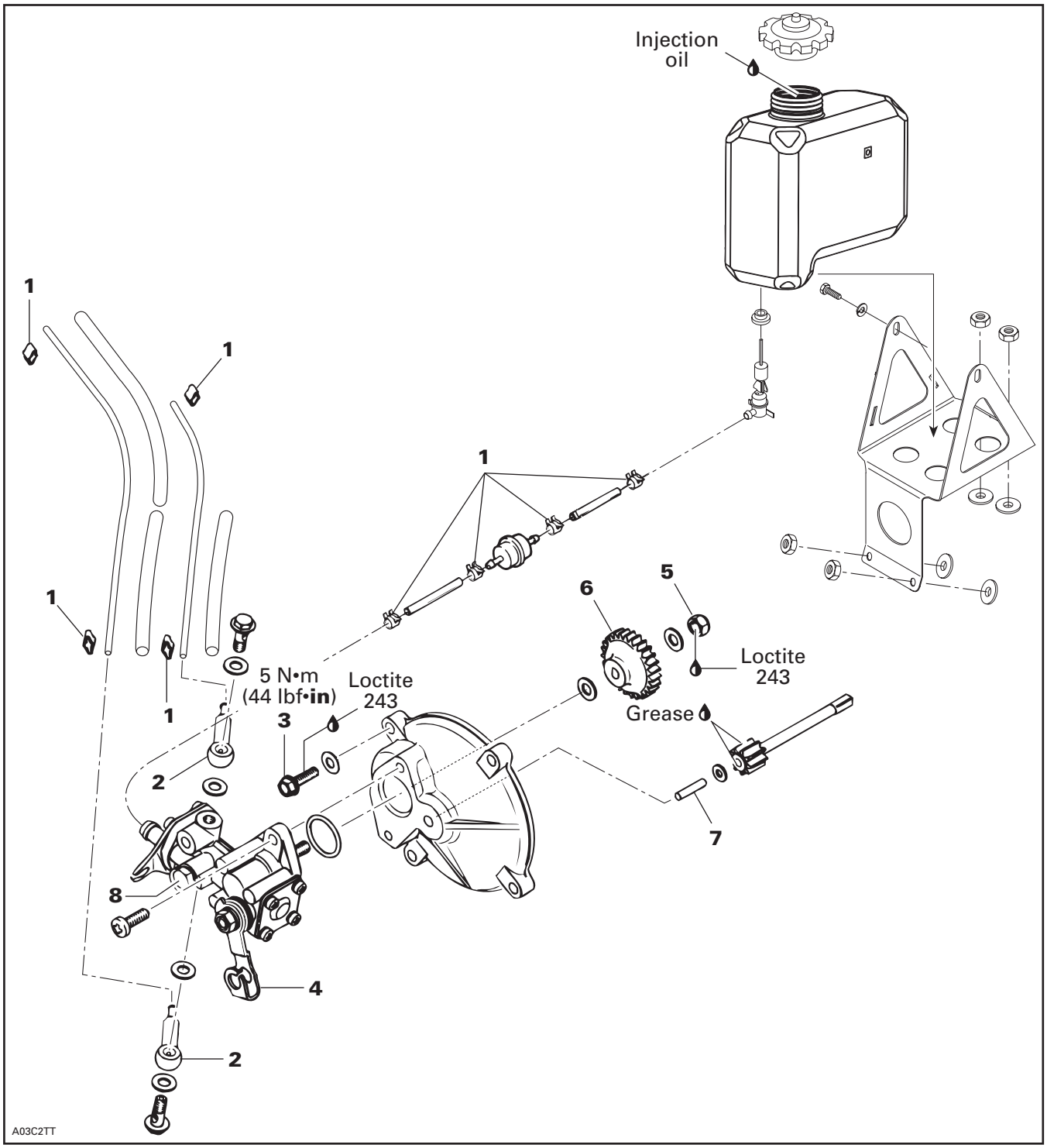
ADJUSTING TRIGGER COIL AIR-GAP

1. Flywheel protrusion
2. Trigger coil

OIL INJECTION SYSTEM

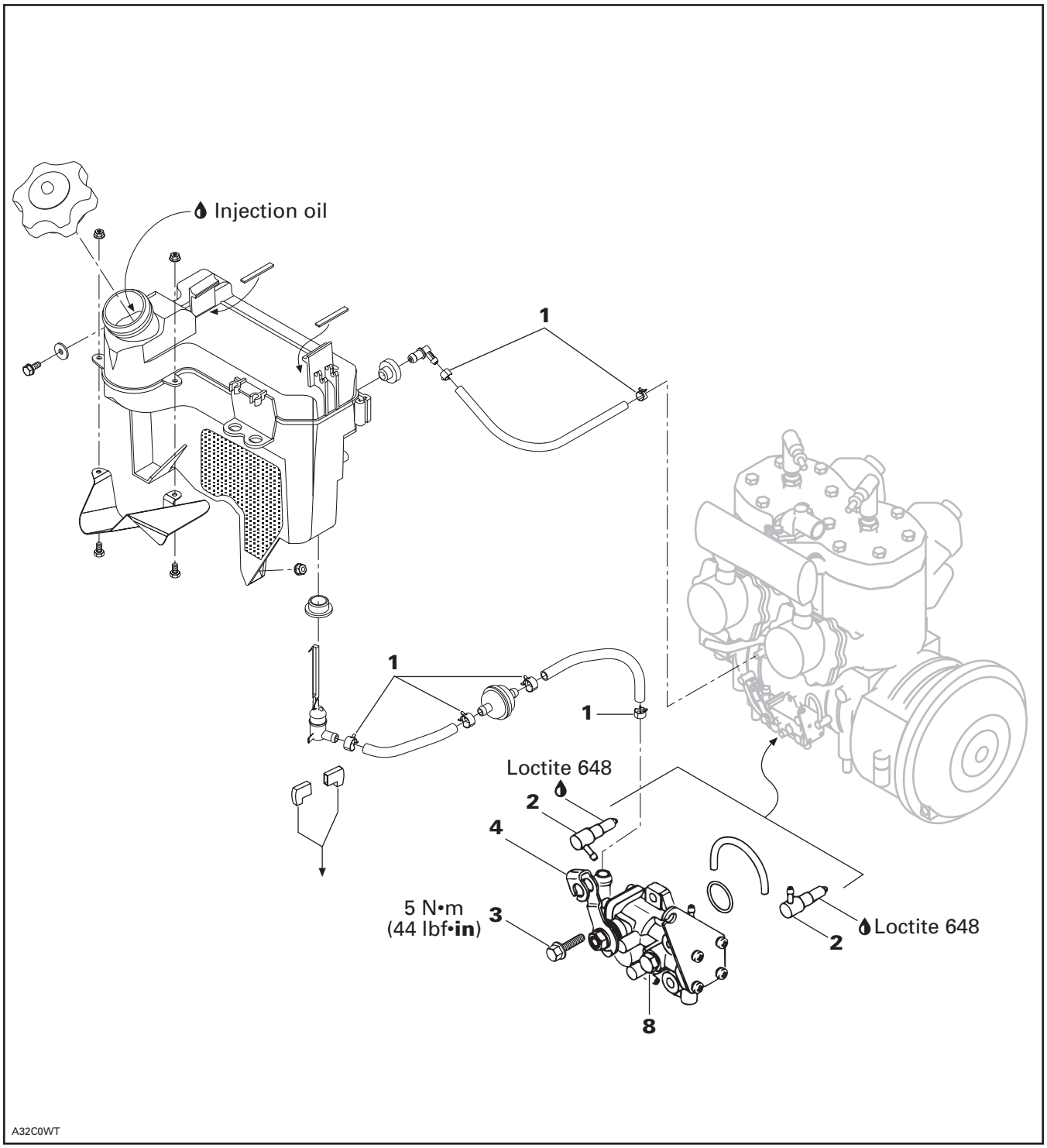
OIL INJECTION PUMP

377, 443 and 503 Engines on S-Series and Skandic LT/WT/SWT



TYPICAL

593 Engine on Skandic WT LC



TYPICAL

⚠ WARNING

Wipe off any oil spills. Oil is highly flammable.

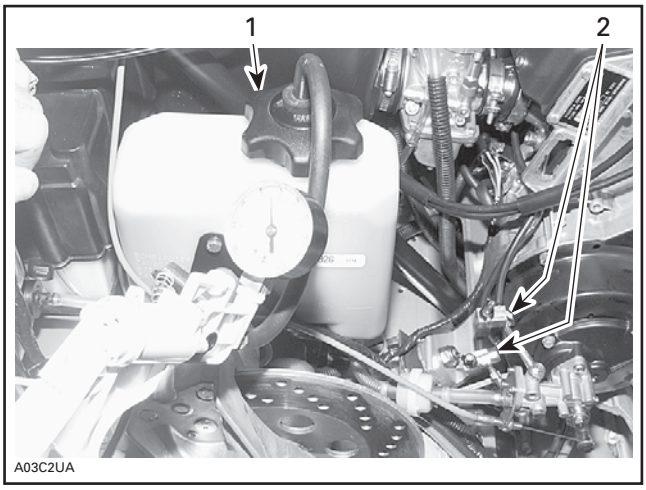
OIL SYSTEM LEAK TEST

All Models

The following test will indicate any leak from oil reservoir to the banjo fitting(s).

Install on oil reservoir special cap of leak testing kit (P/N 529 033 100).

Install hose pinchers (P/N 295 000 076) on outlet hoses.



TYPICAL

1. *Special cap on reservoir*
2. *Hose pinchers on outlet hoses*

Connect pump of leak testing kit to special cap.

Pressurize oil system to 21 kPa (3 PSI). That pressure must not drop during 3 minutes.

If pressure drops, locate leak(s) and repair/replace leaking component(s). To ease locating leak(s) spray soapy water on components, bubbles will indicate leak location(s).

OIL PUMP IDENTIFICATION

All Models

4, Pump Lever

Different engines need different pumps. See identification on lever no. 4.

CAUTION: Always mount proper pump on engine.

ENGINE TYPE	OIL PUMP IDENTIFICATION
377 (S-Series)	L13
443 (S-Series)	E8
443 (Skandic LT)	L13
503 (S-Series)	E8
503 (Skandic WT/SWT)	E6
593 (Skandic WT LC)	L7

NOTE: The following procedures can be done without removing the engine from chassis.

CLEANING

Clean all metal components in a non-ferrous metal cleaner.

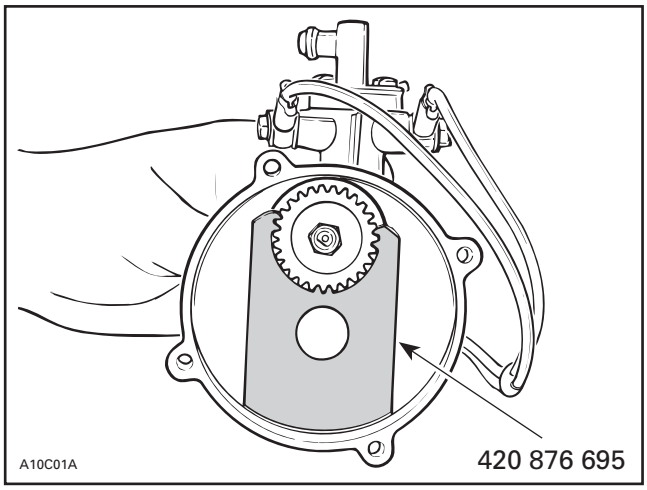
DISASSEMBLY

NOTE: Some oil pump components are not available as single parts.

5,6, Gear Retaining Nut and Oil Pump Gear

To remove gear retaining nut, first extract the needle roller with pliers then lock gear in place using one of the following gear holder.

ENGINE TYPE	TOOL P/N
377/443/503	420 876 695



ASSEMBLY

1, Spring Clip

Always check for spring clips tightness.

6, Oil Pump Gear

At gear assembly, apply a light coat of Molykote 111 (P/N 413 707 000) on gear teeth.

7, Needle Roller (fan cooled engine only)

The needle roller must be engaged as deep as possible in the pump mounting flange.

3, Screw

Torque to 5 N•m (44 lbf•**in**).

Cable plastic elbow must be fastened and fully inserted.

Make sure cable barrel is well seated in oil pump lever.

Secure barrel with plastic washer and circlip.

Install cable lock washer on lever side.

Verify cable and oil pump lever operation.

ADJUSTMENT

All Models

Prior to adjusting the pump, make sure all carburetor adjustments are completed.

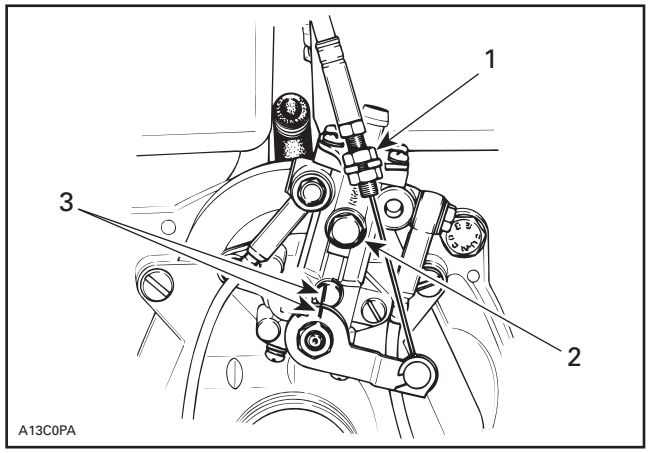
Pumps Identified E6, E8 and L13

Eliminate the throttle cable free-play by pressing the throttle lever until a light resistance is felt, then hold in place.

The mark on the pump casting and on the lever must align. Width of lever mark is the tolerance.

Loosen the adjuster nut and adjust accordingly.

Retighten the adjuster nut.



TYPICAL — S-SERIES AND SKANDIC WT/SWT

1. *Adjuster nut*
2. *Bleeder screw*
3. *Marks*

CAUTION: Proper oil injection pump adjustment is very important. Any delay in the opening of the pump can result in serious engine damage.

Pump Identified L7

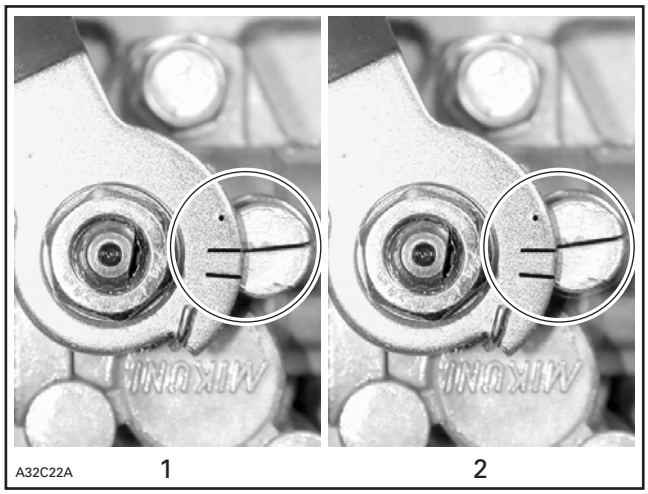
Do not touch throttle lever. The cable free-play has not to be eliminated on this model.

Because the oil pump is mounted low on engine, it is very difficult to avoid parallax problem and set a good adjustment.

Parallax Problem

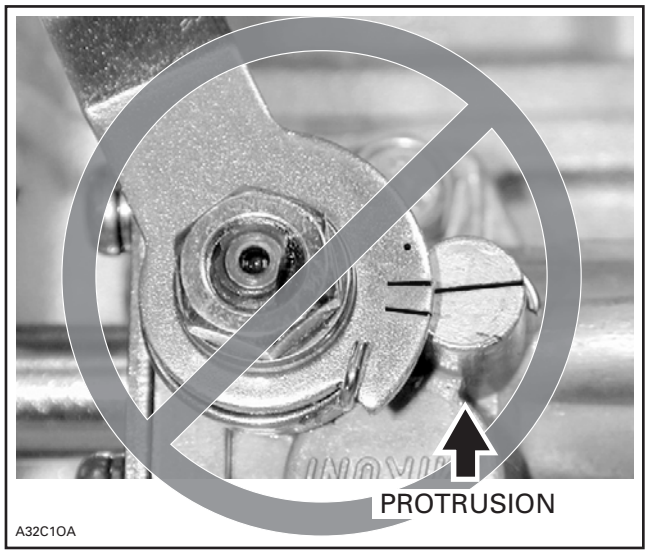
When adjusting pump lever, since the mechanic can not view the pump perpendicularly, the adjustment will not be accurate. Following photos show three different views of the same properly adjusted pump.

VIEW TOO HIGH — ADJUSTMENT SEEMS TO BE TOO RICH WHEN TOP OF BODY'S PROTRUSION CAN BE SEEN



VIEW STRAIGHT AHEAD — BODY'S PROTRUSION LOOKS LIKE A CIRCLE, MARK ON PUMP ALIGN WITH SECOND MARK ON LEVER (MARK ON DOT SIDE)

1. *Minimum setting*
2. *Maximum setting*



VIEW TOO LOW — ADJUSTMENT SEEMS TO BE TOO LEAN WHEN BOTTOM OF BODY'S PROTRUSION CAN BE SEEN

To avoid a bad adjustment, follow below procedure.

Procedure for Oil Pump Adjustment

Ensure carburetors are synchronized according to the technical specifications.

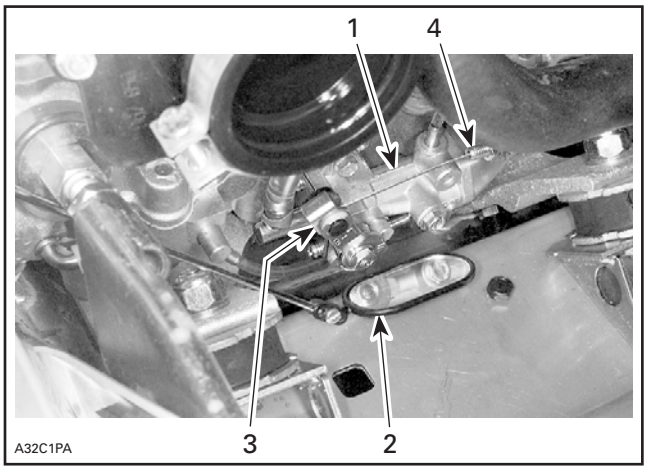
Remove air box. Carburetors may also be removed to improve visibility and ease adjustment of oil pump cable.

NOTE: Place carburetors on top of intake boots to keep cable routing near original location.

Use a small round or oblong mirror to see the marks.

The second mark on pump lever must be aligned or up to 1 mm (.039 in) below pump casting mark. If not, loosen the adjuster nut and adjust accordingly.

Retighten the adjuster nut.

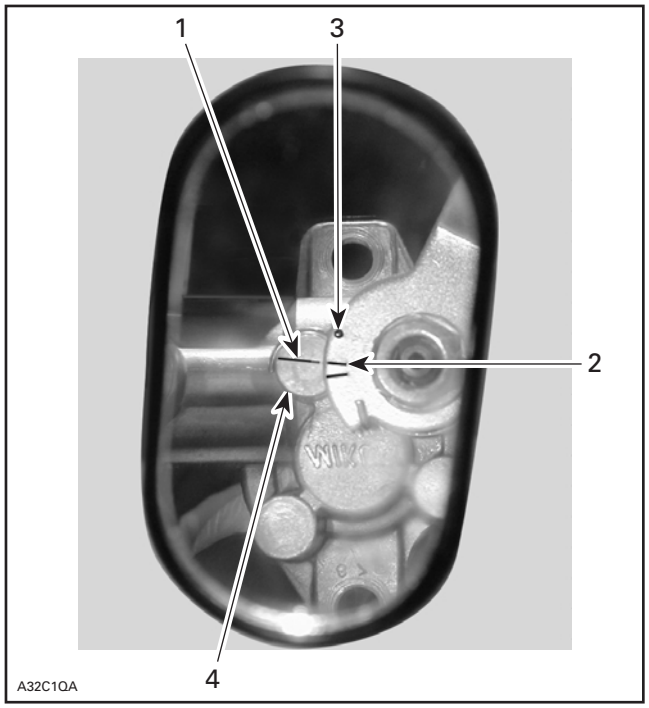


VIEW WITH AIR BOX, CARBURETORS AND FUEL PUMP REMOVED

1. *Oil pump*
2. *Mirror*
3. *Lever*
4. *Adjustment screw*

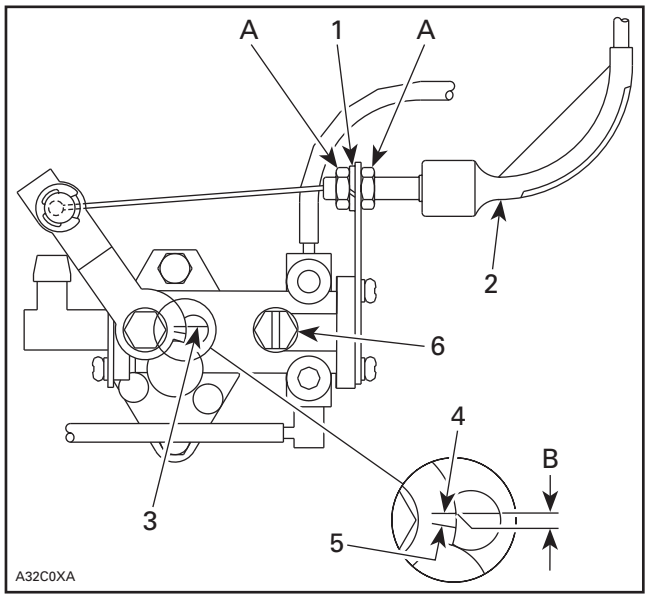
Make sure that view in mirror is straight ahead, without parallax problem.

Protrusion with fixed mark on pump must look like a full circle. See next photo.



VIEW FROM MIRROR SHOULD LOOK LIKE THIS

1. *Mark on pump casting*
2. *Second mark on lever*
3. *Dot*
4. *Pump protrusion as a circle, not a cylinder*



1. *Lock washer*
2. *Plastic elbow fastened and fully inserted*
3. *Pump casting mark*
4. *Second mark aligned or below*
5. *First mark*
6. *Bleeder screw*

A. *5 N•m (44 lbf•**in**)*
B. *0 to 1 mm (0 to .039 in)*

CAUTION: Proper oil injection pump adjustment is very important. Any delay in the opening of the pump can result in serious engine damage.

BLEEDING

Bleed main oil line (between tank and pump) by loosening the bleeder screw until air has escaped from the line. Add injection oil as required.

Reinstall all parts.

Bleed the small oil line between pump and engine by running engine at idle while holding the pump lever in fully open position.

NOTE: Make a J hook out of mechanical wire to lift the lever.

⚠ WARNING

Ensure not to operate carburetor throttle mechanism. Secure the rear of the vehicle on a stand.

CHECKING OPERATION

Oil Pump

On Vehicle

NOTE: Main oil line must be full of oil. See bleeding procedure above.

Lift rear of vehicle and support with a mechanical stand. Unplug small oil lines from pump. Start engine and stop it as soon as it fires.

Check that oil in small oil lines has been sucked up (this will be indicated by a clear section of small oil lines). Repeat the procedure until this condition is attained.

Reconnect small oil lines, start engine and run at idle while holding the pump lever in fully open position. Oil columns must advance into small oil lines.

If not, remove pump assembly and check the pump gear and drive shaft (if applicable) for defects, replace as necessary. Test pump as describes below.

NOTE: Through normal use, oil level must not drop in small tubes. If oil drops, verify check valve operation in injection nozzle. Replace as necessary.

Test Bench

Connect a hose filled with injection oil to main line fitting. Insert other hose end in an injection oil container. Using a clockwise rotating drill rotate pump shaft. Oil must drip from outer fittings while holding lever in a fully open position. If not replace pump.

2, Check Valve

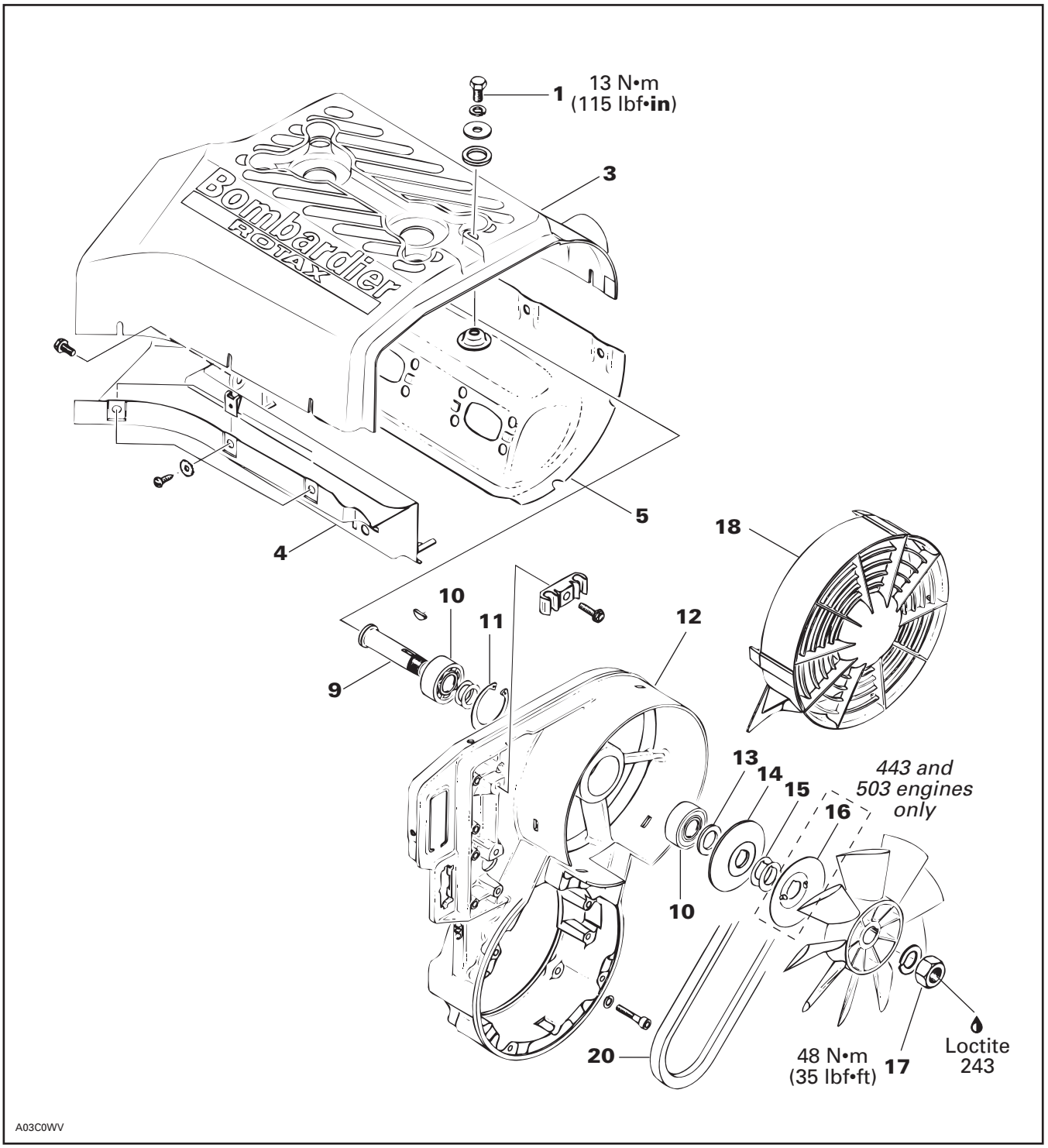
Check valve is part (built-in) of injection nozzle.

To verify this check valve, proceed the same as for checking pump operation on vehicle. First unplug oil line from injection nozzle. After restarting the engine, check that a clear section in small oil line is present. Reconnect oil line.

Run engine at idle. Oil column must advance. If the check valve is faulty, oil column will go back and forth. Replace if so.

AXIAL FAN COOLING SYSTEM

377, 443 and 503 Engines



NOTE: The following procedures can be done without removing engine from chassis.

REMOVAL

NOTE: To facilitate further disassembly, fan nut may be removed before removing fan housing.

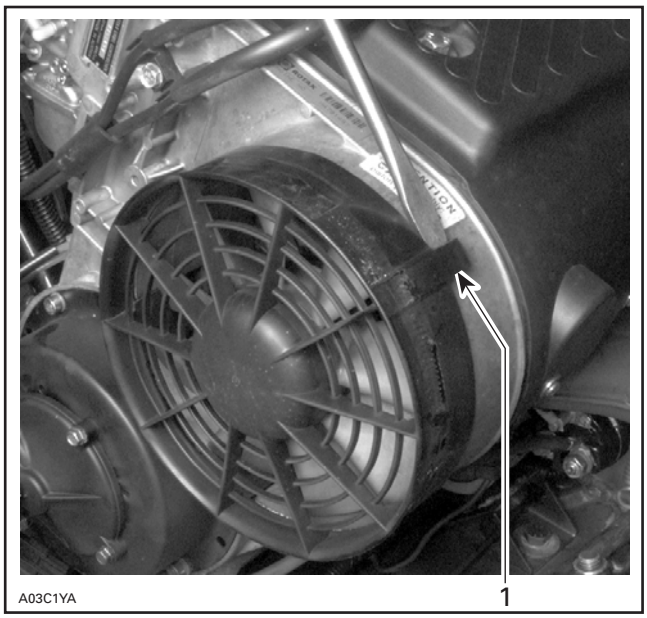
Remove rewind starter, starting pulley, trigger coil wire from 4-connector housing then fan housing ass'y.

CLEANING

Clean all metal components in a non-ferrous metal cleaner.

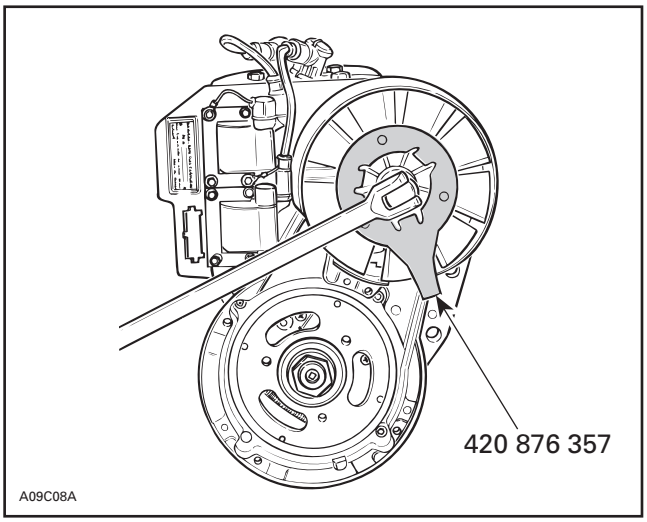
DISASSEMBLY AND ASSEMBLY

Using a flat screwdriver, lift fan protector tabs as shown in the following photo, then remove fan protector.



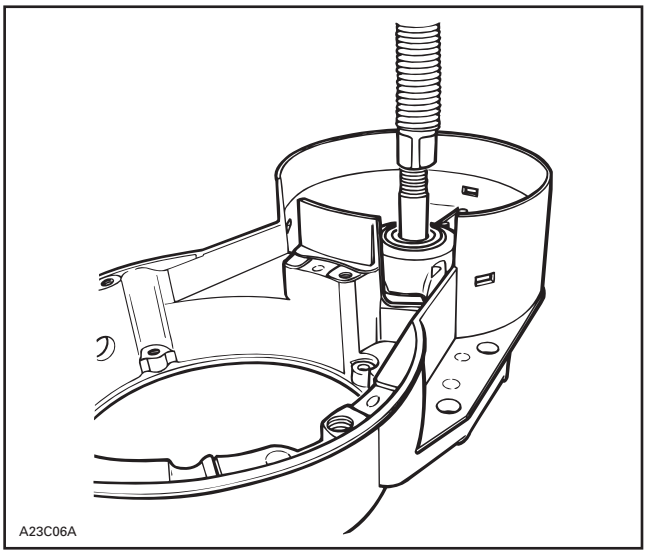
1. Lift tab and remove fan protector

To remove or install fan pulley retaining nut **no. 17**, lock fan pulley with special holder wrench (P/N 420 876 357). At assembly, torque nut to 48 N•m (35 lbf•ft).

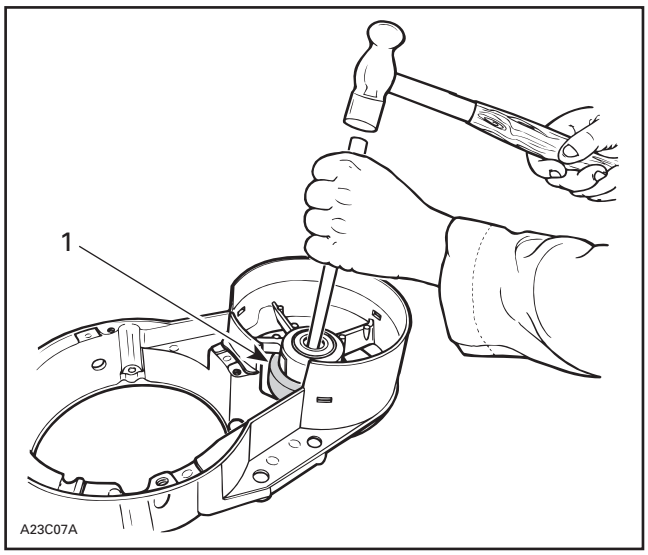


TYPICAL

Using a press, drive the fan shaft **no. 9** out.



Support fan housing **no. 12** with a ring. With a punch, working all around bearing **no. 10** inner race, drive bearing out of fan housing. Keep shims for installation.



1. Ring supporting fan housing

Remove circlip **no. 11** then remaining bearing.

To install, press one bearing in place then install circlip and shims. Press the other bearing from opposite side until it is flush with housing. Press fan shaft from engine side of fan housing. Check for free rolling action.

INSTALLATION

At assembly, apply a light coat of Loctite 243 (blue) on screw **no. 1** threads.

A gasket must be placed on both sides (inner and outer) of intake and exhaust holes of cylinder cowl **nos. 4** and **5**.

Reinstall fan protector **no. 18** properly.

⚠ WARNING

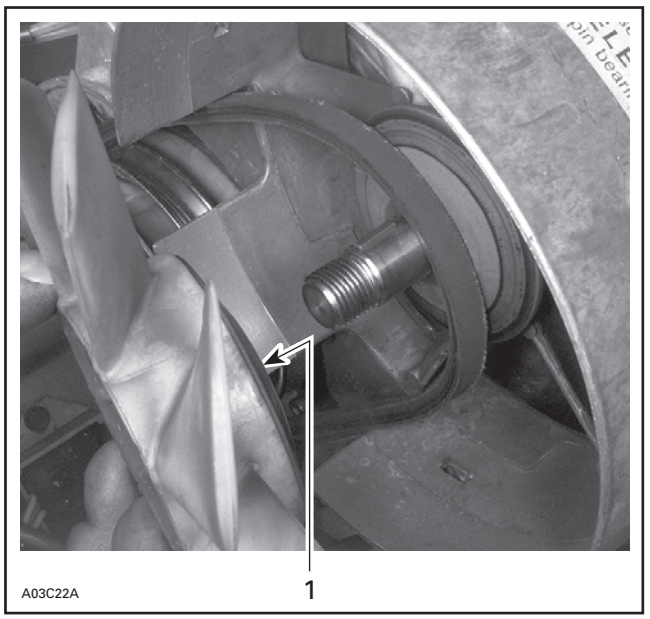
Always reinstall fan protector after servicing.

FAN BELT REPLACEMENT AND DEFLECTION ADJUSTMENT

Remove muffler, rewind starter and on so equipped models connecting flange. Following procedure described above.

Using fan holder tool (P/N 420 876 357), remove fan nut.

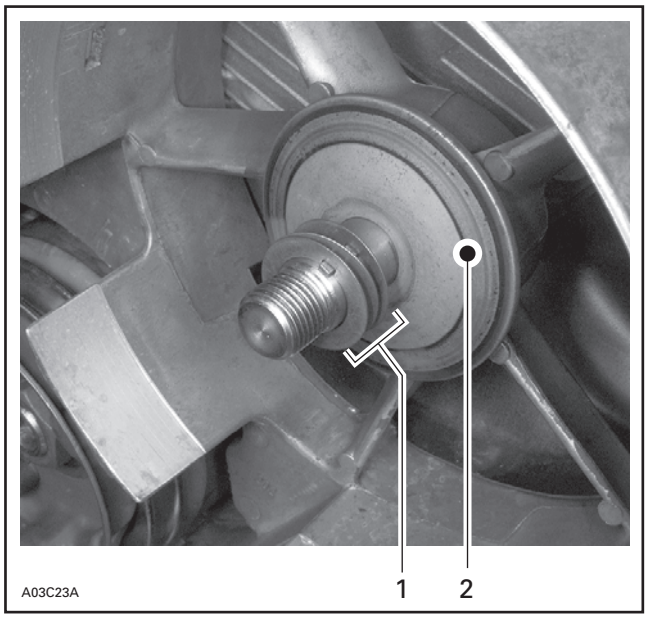
Remove fan with pulley half.



1. Remove fan with pulley half

Remove fan belt.

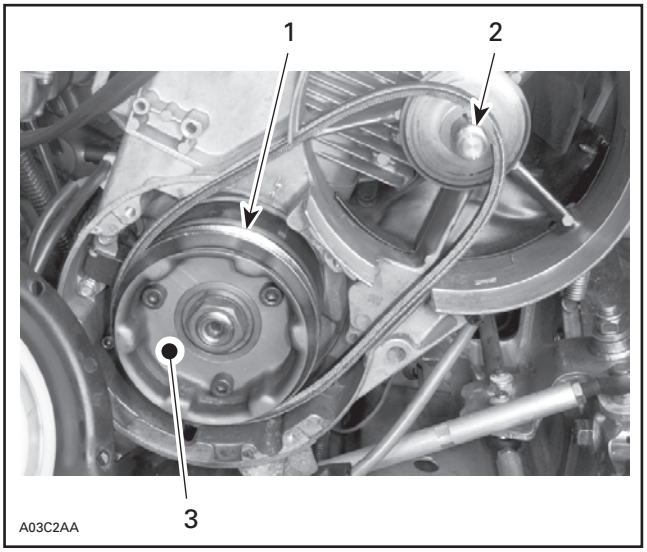
Leave shims and second half pulley in place. Refer to the following photo.



1. Keep shims
2. Leave second half pulley in place

Reassembly

Install fan belt on bottom pulley first then position onto fan shaft, as shown in the next photo.



FAN BELT PROPERLY INSTALLED ON BOTTOM PULLEY AND FAN SHAFT

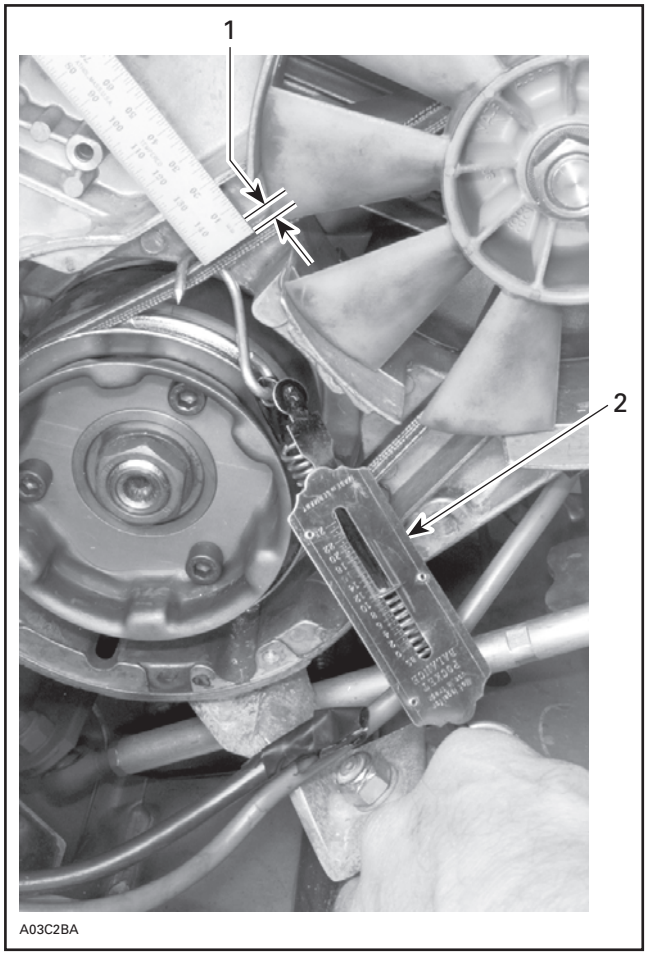
1. *Bottom pulley*
2. *Fan shaft*
3. *Starting pulley*

Reinstall fan assembly on fan shaft. Temporarily tighten fan nut.

CAUTION: When reinstalling fan assembly, ensure that key is properly positioned into fan shaft keyway.

Fan Belt Deflection Adjustment

Check fan belt deflection using a ruler and a fish scale positioned midway between pulleys as per following photo.



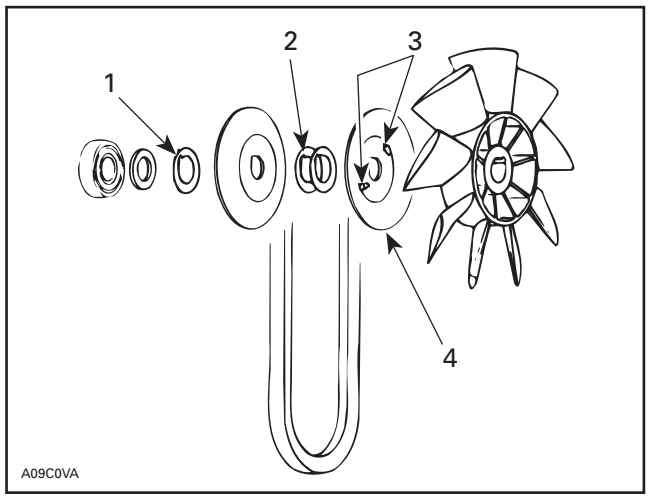
TYPICAL

1. *Measure deflection here*
2. *Fish scale*

Belt deflection must be according to the following specifications:

ENGINE TYPE	BELT DEFLECTION	FORCE APPLIED
377	8.5 mm (11/32 in)	5 kg (11 lb)
443 and 503	9.5 mm (3/8 in)	

To adjust deflection tension, add or remove shim(s) **no. 15** between pulley halves **nos. 14** and **16**. Install excess shim(s) between distance sleeve **no. 13** and half pulley **no. 14** (housing side).



1. *Unused shim(s) here*
2. *Adjust here*
3. *Positioning noses*
4. *Some engines only*

Some engines have a separate metal pulley half instead of using back of fan as pulley half. On first mentioned engines, select pulley halves so that the one with 2 positioning noses will be on fan side. Ensure to insert these noses into fan notches.

Once fan belt is properly adjusted, torque fan nut to 48 N•m (35 lbf•ft) using fan holder tool (P/N 420 876 357), as shown in the following photo.

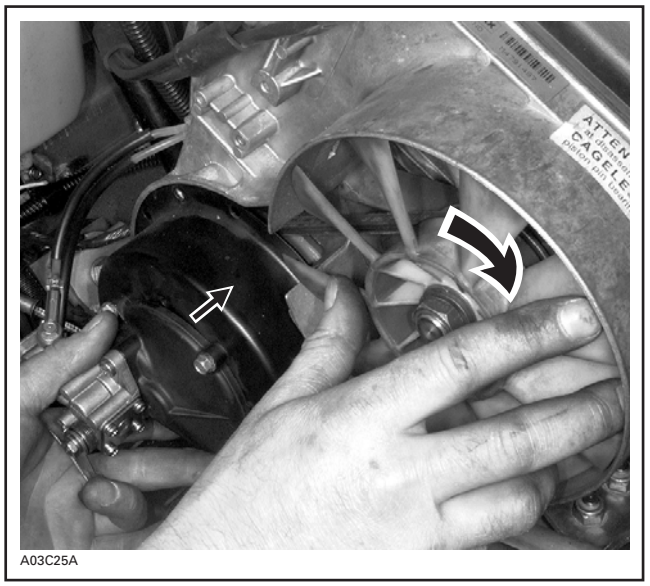
NOTE: Apply Loctite 243 (blue) on fan nut threads.

TORQUE FAN NUT USING FAN HOLDER TOOL

Finalizing Reassembly

Reinstall rewind starter.

CAUTION: When installing rewind starter, ensure that oil pump shaft is properly positioned. Do not force shaft insertion. Turn fan until oil pump shaft slides in place, as shown in the following photo.



TURN FAN TO SLIDE OIL PUMP SHAFT IN PLACE

Secure rewind starter with original screws.

Reinstall fan protector **no. 18** properly.

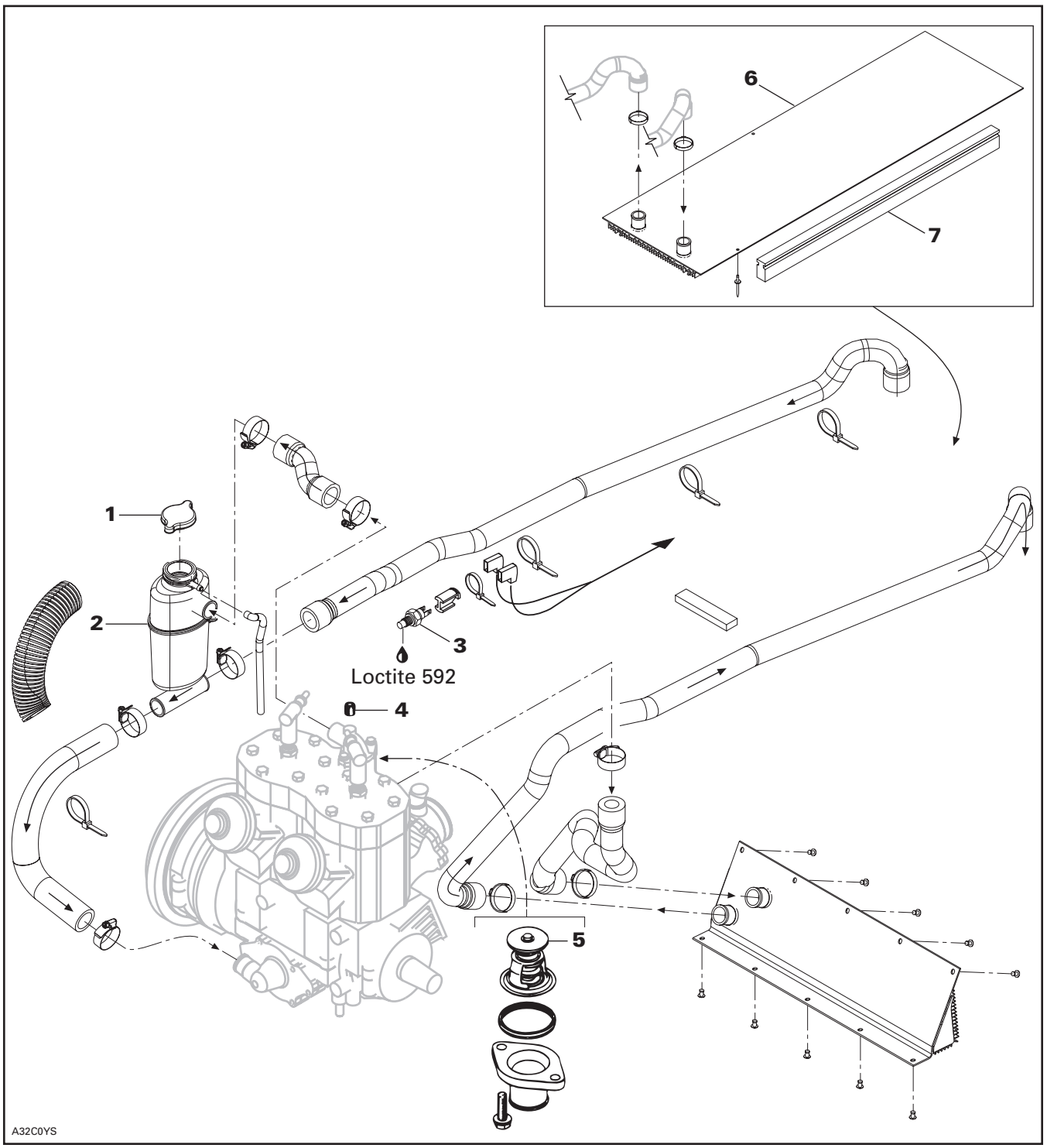
⚠ WARNING

Always reinstall fan protector after servicing.

Reinstall muffler.

LIQUID COOLING SYSTEM

593 Engine



TYPICAL

INSPECTION

Check general condition of hoses and clamp tightness.

DRAINING THE SYSTEM

⚠ WARNING

Never drain or refill the cooling system when engine is hot.

To drain the cooling system, siphon the coolant mixture from the coolant tank. Disconnect hose at water pump.

DISASSEMBLY AND ASSEMBLY

3,4, Sender and Plug

Apply Loctite 592 (P/N 413 702 300) thread sealant on sender and plug to avoid leaks.

1, Pressure Cap

Check if the cap pressurizes the system. If not, install a new 90 kPa (13 PSI) cap (do not exceed this pressure).

6,7, Radiator and Radiator Protector

Insert radiator protector into radiator C-rail and crimp C-rail at rear end. Refer to FRAME for radiator removal.

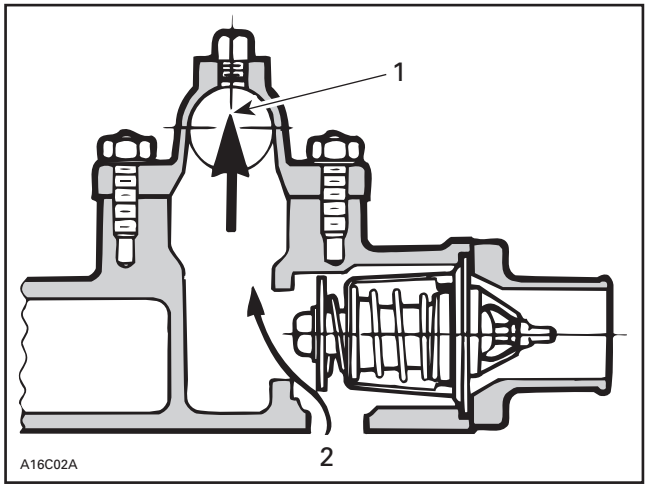
5, Thermostat

To check thermostat, put in water and heat water. Thermostat should start to open when water temperature reaches the following degree. It will be almost fully open at 50°C (122°F).

ENGINE	TEMPERATURE
593	42°C (108°F)

Thermostat is a double action type.

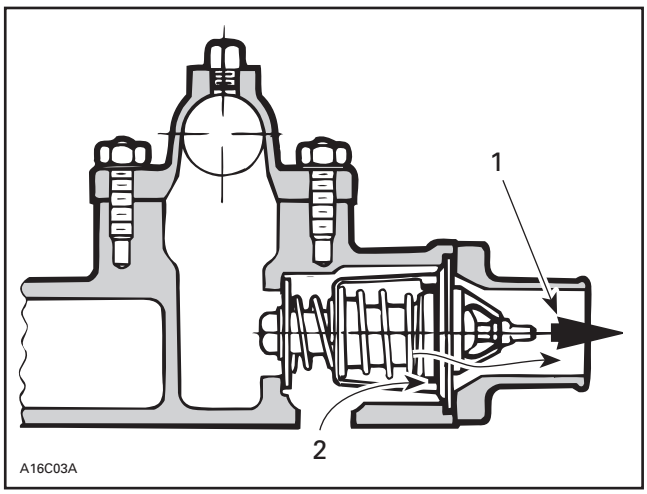
a. Its function is to give faster warm up of the engine by controlling a circuit; water pump — engine — coolant tank. This is done by bypassing the radiator circuit.



TYPICAL — CLOSED THERMOSTAT, COLD ENGINE

1. To reservoir
2. From cylinders

b. When the liquid is warmed enough, the thermostat opens progressively the circuit, water pump — engine — radiators — coolant tank to keep the liquid at the desired temperature. (See the diagram of the exploded view).



TYPICAL — OPEN THERMOSTAT, WARM ENGINE

1. To radiators
2. From cylinders

These 2 functions have the advantage of preventing a massive entry of cold water into the engine.

COOLING SYSTEM REFILLING PROCEDURE

Recommended Coolant

Use Premixed coolant - 52°C (- 62°F) (P/N 413 711 802) (16 x 1L). Do not reinstall pressure cap.

CAUTION: To prevent rust formation or freezing condition, always replenish the system with recommended premixed coolant.

System Capacity

Refer to TECHNICAL DATA.

Refilling Procedure

Lift front of vehicle until the tunnel is horizontal. With engine cold, refill coolant tank no. 2 up to cold level line. Wait a few minutes then refill to line. Start engine. Refill up to line while engine is idling until all air bubbles have escaped from system (about 4 to 5 minutes). Install pressure cap.

To make sure coolant flows through radiators, touch them by hand. They must feel warm.

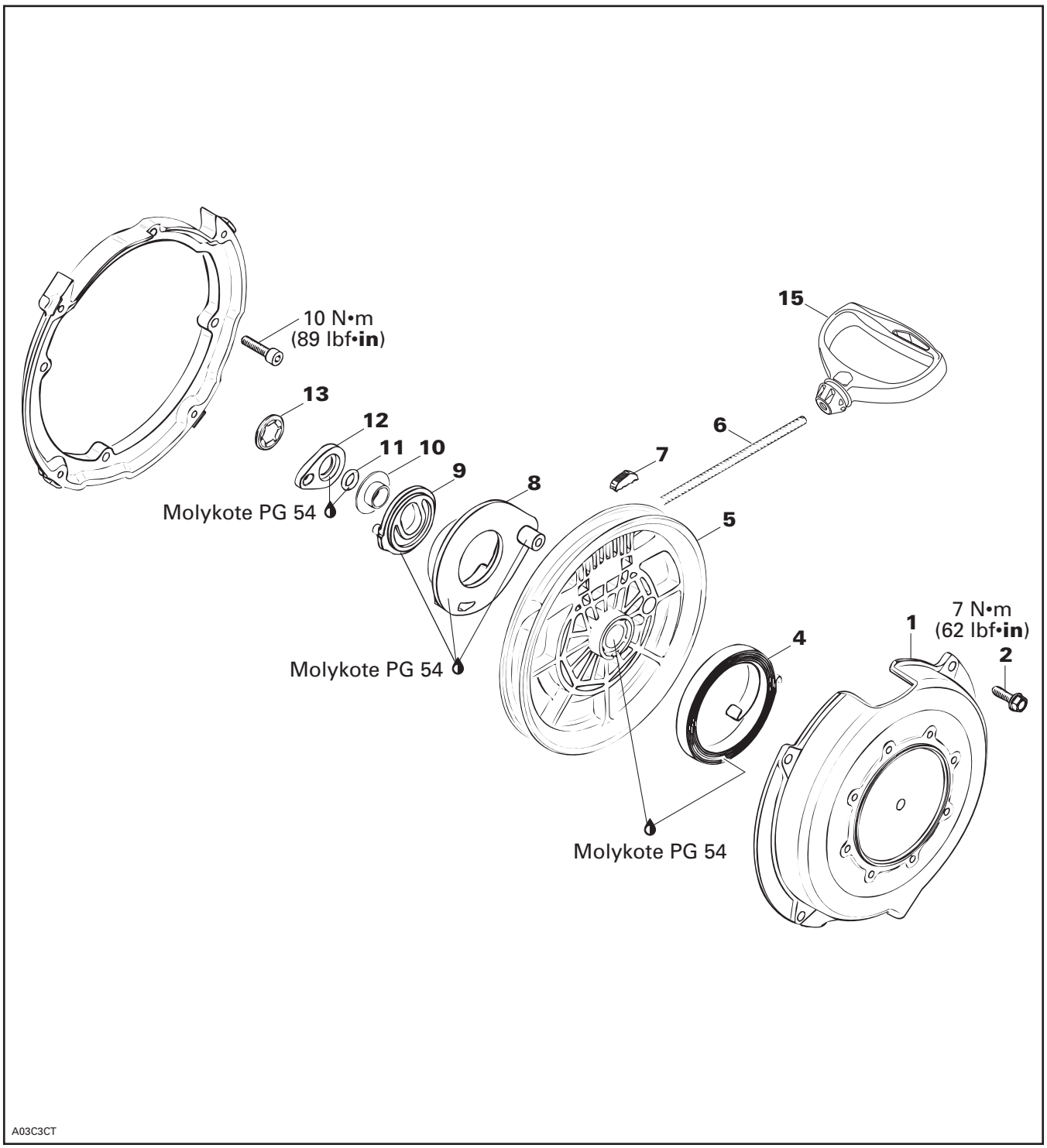
Put back front of vehicle on the ground.

When engine has completely cooled down, recheck coolant level in coolant tank and refill up to line.

Check coolant concentration (freezing point) with proper tester.

REWIND STARTER

Plastic Rewind Starter on All Models



INSPECTION

NOTE: Due to dust accumulation, rewind starter must be periodically cleaned, inspected and relubricated.

CAUTION: It is of the utmost importance that the rewind starter spring be lubricated periodically using specific lubricant. Otherwise, rewind starter component life will be shortened and/or rewind starter will not operate properly under very cold temperatures.

Check if rope **no. 6** is fraying, replace if so.

When pulling starter grip, mechanism must engage within 30 cm (1 ft) of rope pulled. If not, disassemble rewind starter, clean and check for damaged plastic parts. Replace as required, lubricate, reassemble and recheck. Always replace O-ring **no. 11** every time rewind starter is disassemble.

When releasing starter grip, it must return to its stopper and stay against it. If not, check for proper spring preload or damages. Readjust or replace as required.

When pulling starter grip 10 times in a row, it must return freely. If not, check for damaged parts or lack of lubrication. Replace parts or lubricate accordingly.

REMOVAL

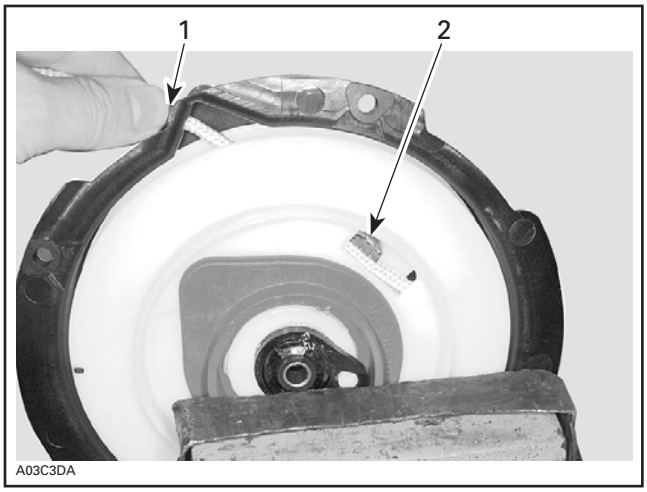
Using a small screwdriver, extract rope knot from starter grip **no. 15**. Cut rope close to knot. Tie a knot near starter.

Remove screws **no. 2** securing rewind starter **no. 1** to engine then remove rewind starter.

Remove pump from rewind starter cover.

ROPE REPLACEMENT

Completely pull out rope. Hold rewind starter in a vise.



1. Rope exit hole
2. Key to be removed

With a long thin pin punch inserted through rope exit hole, push key **no. 7**. Remove key and rope. Install a new rope and lock it using key **no. 7**.

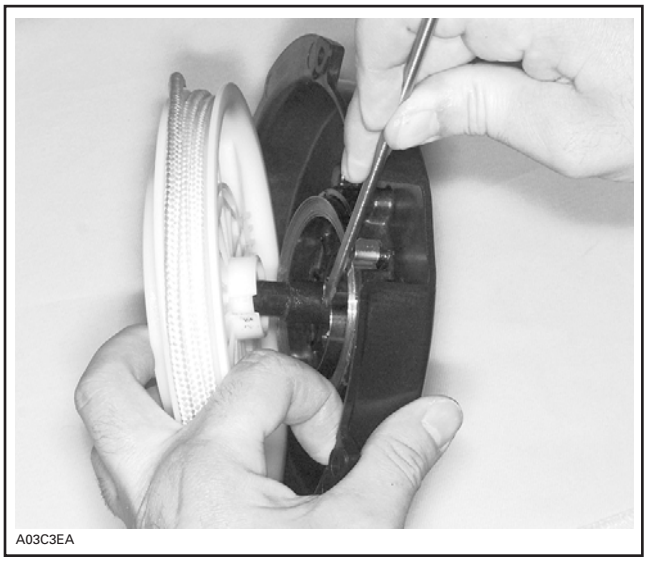
NOTE: When rope is completely pulled out, spring preload is 4-1/2 turns.

DISASSEMBLY

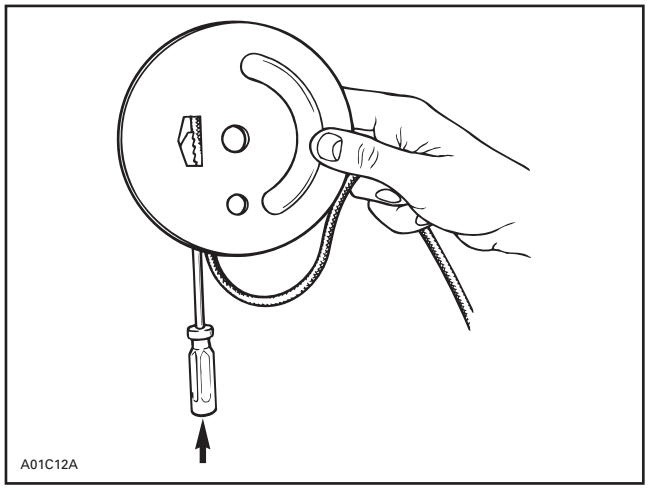
Undo knot previously tied at removal. Let sheave get free to release spring preload.

Cut push nut **no. 13** and discard. Remove locking element **no. 12**, O-ring **no. 11**, step collar **no. 10**, pawl lock **no. 9** and pawl **no. 8**.

Remove sheave **no. 5** from starter housing **no. 1**. Hold spring with a screwdriver.



– Disengage key **no. 7** and pull out rope **no. 6**.



GENTLY TAP ON KEY

ASSEMBLY

At assembly, position spring **no. 4** outer end into spring guide notch then wind the spring counterclockwise into guide.

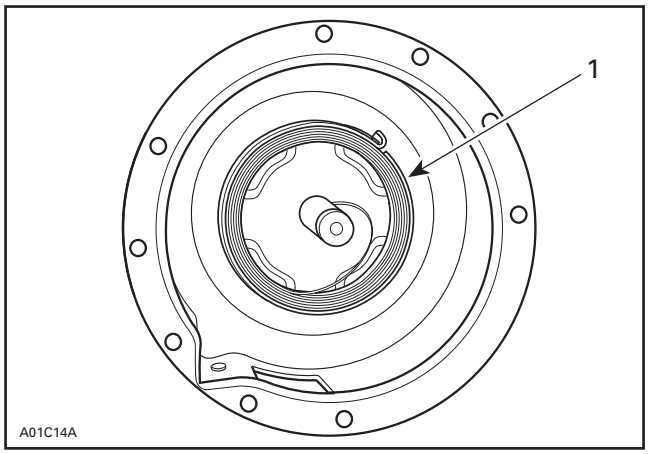
⚠ WARNING

Since the spring is tightly wound inside the guide it may fly out when rewind is handled. Always handle with care.

1. Outer end into guide notch

CAUTION: **It is of the utmost importance that the rewind starter spring be lubricated periodically using specific lubricant. Otherwise, rewind starter component life will be shortened and/or rewind starter will not operate properly under very cold temperatures.**

Lubricate spring assembly with Molykote PG 54 (P/N 420 899 763).

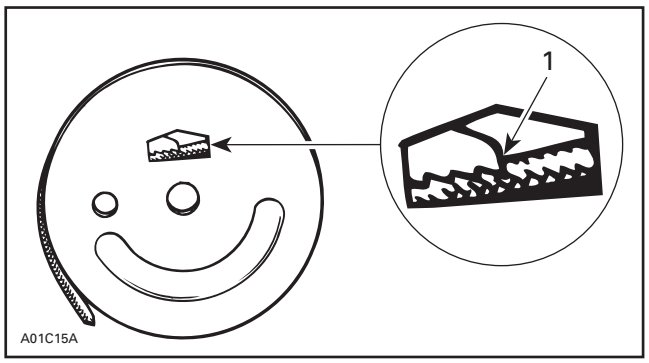


TYPICAL

1. Grease inside spring guide

CAUTION: **The use of standard multi-purpose grease could result in rewind starter malfunction.**

To install rope **no. 6**, insert rope into sheave **no. 5** orifice and lock it with the key **no. 7** as illustrated.



1. Push to lock

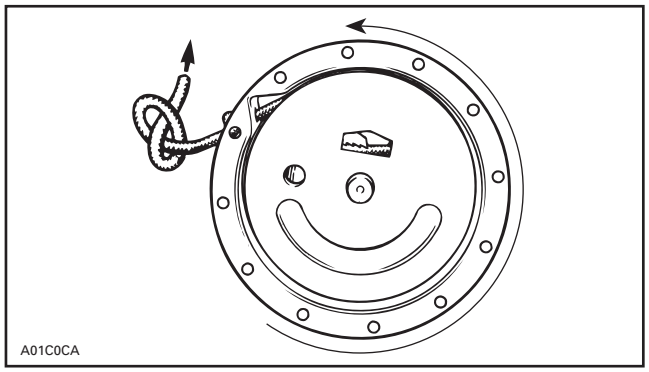
Lubricate housing post with silicone compound grease. Install sheave.

To adjust rope tension:

Wind rope on sheave and place rope sheave into starter housing making sure that the sheave hub notch engages in the rewind spring hook.

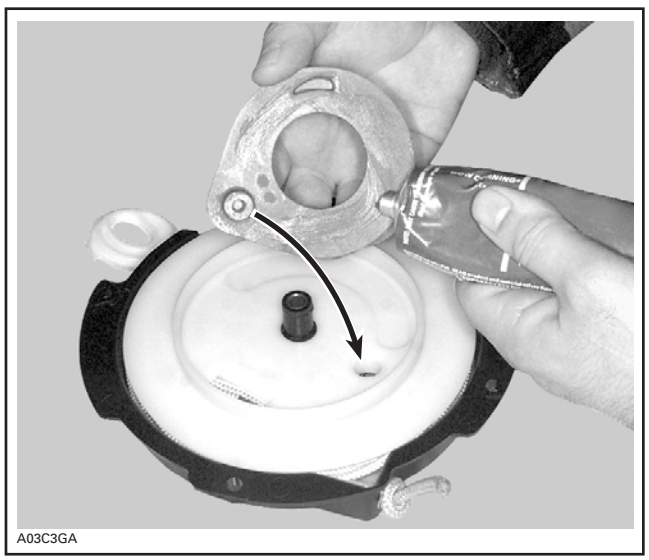
Rotate the sheave counterclockwise until rope end is accessible through rope exit hole. This will give 1/2 turn of preload.

Pull the rope out of the starter housing and temporarily make a knot to hold it.

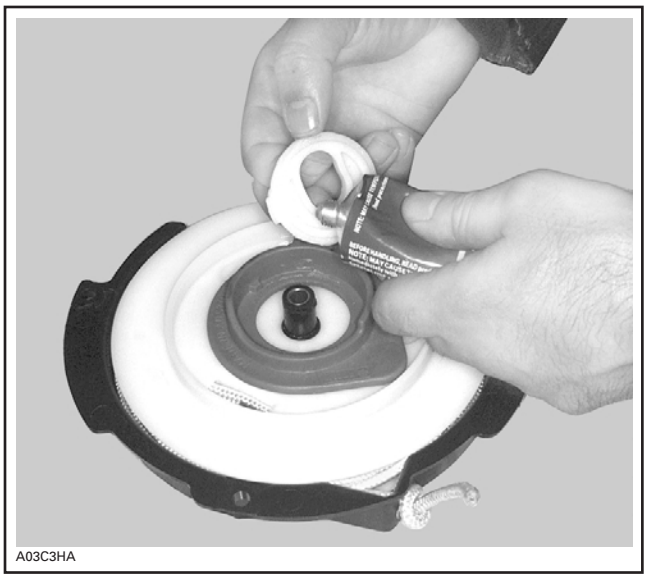


TYPICAL

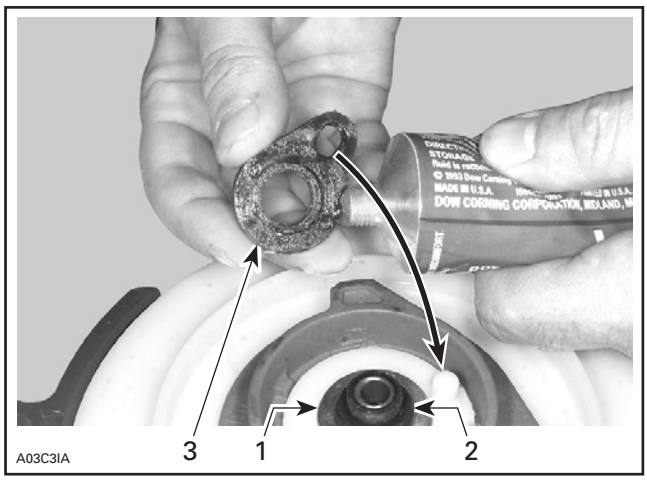
Lubricate pawl **no. 8** with Molykote PG 54 (P/N 420 899 763) then install over rope sheave.



Lubricate pawl lock **no. 9** with Molykote PG 54 (P/N 420 899 763). Install over pawl.



Install step collar **no. 10** with its sleeve first. Lubricate a new O-ring **no. 11** and locking element **no. 9** with Molykote PG 54 (P/N 420 899 763). Install over pawl lock.



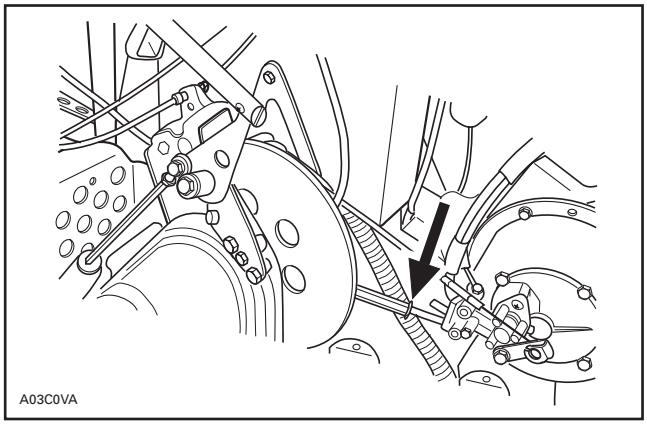
1. *Step collar*
2. *O-ring*
3. *Locking element*

Position a new push nut **no. 13**.

INSTALLATION

Reinstall oil pump on rewind starter assembly.

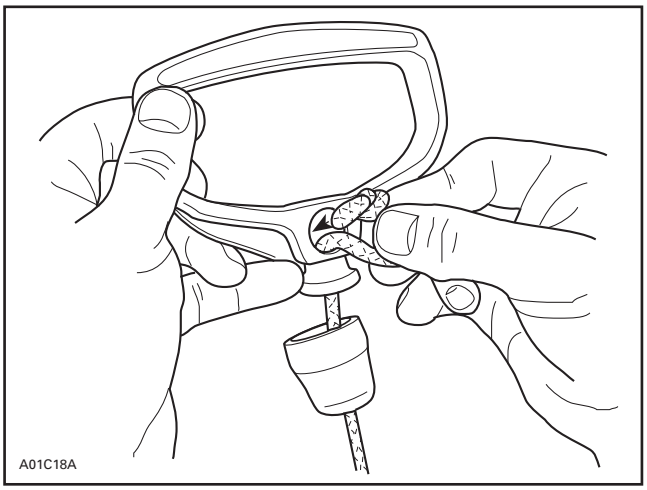
Thread starter rope no. 6 through rope guide when applicable.



TYPICAL

Reinstall rewind starter assembly on engine.

Prior to installing starter grip no. 15 on new rope, it is first necessary to fuse the rope end with a lit match. Pass rope through starter grip and tie a knot in the rope end. Fuse the knot with a lit match then insert rope end down and pull the starter grip over the knot.

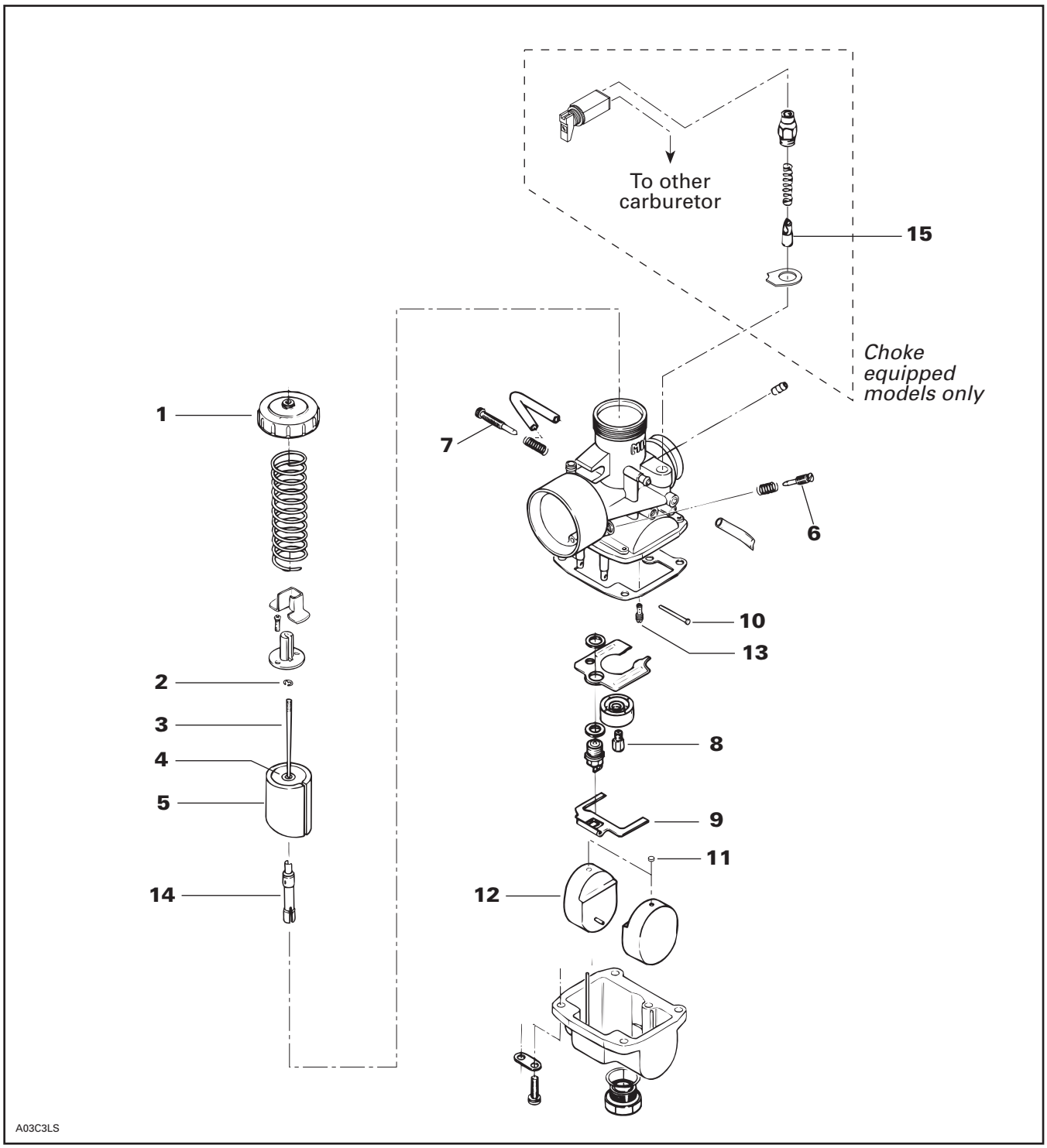


TYPICAL

CARBURETOR AND FUEL PUMP

CARBURETOR

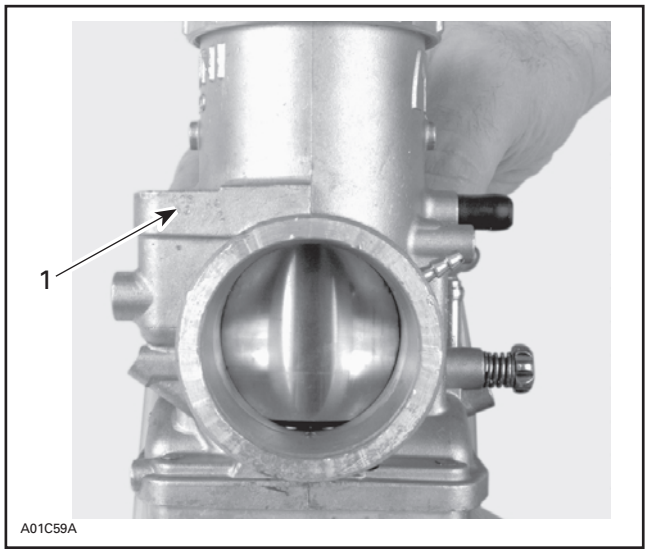
All Models



TYPICAL

IDENTIFICATION

All carburetors are identified on their body.

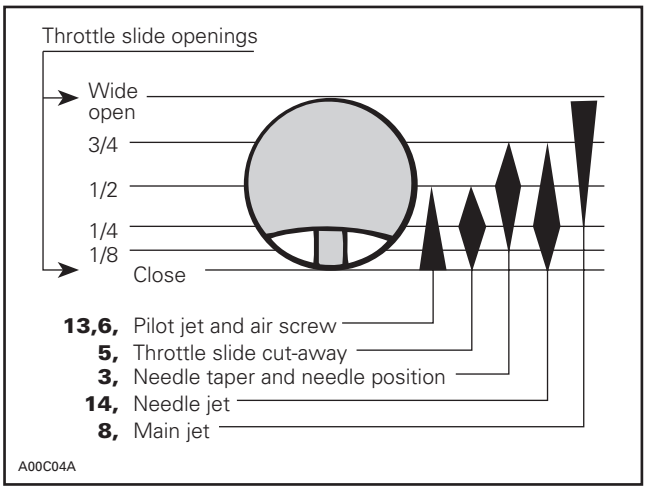


1. Identification: 34-482

CARBURETOR CIRCUIT OPERATION VERSUS THROTTLE OPENING

The following illustration shows the part of the carburetor which begins and stops to function at different throttle slide openings.

Note that the wider part of symbol corresponds to the opening mostly affected. For instance, throttle slide cut-away begins to function at closed position but it is most effective at 1/4 opening and decreases up to 1/2 opening.



VIEW FROM AIR INTAKE OPENING

NOTE: For proper calibration refer to TECHNICAL DATA and to SPARK PLUG.

NOTE: For high altitude regions, a Service Bulletin will give information about calibration according to altitude and temperature.

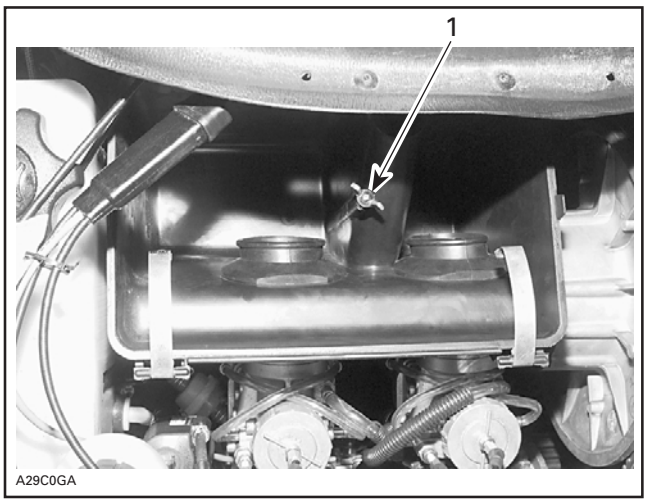
REMOVAL

Skandic LT/WT/SWT

Remove air silencer.

Skandic WT LC

Remove air silencer cover. Unscrew through bolt then, remove air silencer.



1. Through bolt

S-Series

Remove air silencer. Refer to BATTERY.

All Models

Disconnect fuel inlet line.

Disconnect primer line from carburetor on some models.

Disconnect choke cable on some models.

Unscrew carburetor cover **no. 1** then pull out throttle slide **no. 5** from carburetor.

⚠ WARNING

Exercise care when handling throttle slide. Scratches incurred may cause throttle slide to stick open in operation.

Disconnect throttle cable from throttle slide.

Untighten rubber flange clamps then remove carburetor from engine.

CLEANING AND INSPECTION

The entire carburetor should be cleaned with a general solvent and dried with compressed air before disassembly.

CAUTION: Heavy duty carburetor cleaner may be harmful to the float material and to the rubber parts, O-rings, etc. Therefore, it is recommended to remove those parts prior to cleaning.

Carburetor body and jets should be cleaned in a carburetor cleaner following manufacturer's instructions.

⚠ WARNING

Solvent with a low flash point such as gasoline, naphtha, benzol, etc., should not be used as they are flammable and explosive.

Check inlet needle tip condition. If worn, the inlet needle and seat must be replaced as a matched set.

NOTE: Install needle valve for snowmobile carburetor only. It is designed to operate with a fuel pump system.

Check throttle slide **no. 5** for wear. Replace as necessary.

Check that idle speed screw **no. 7** is straight. Replace as necessary.

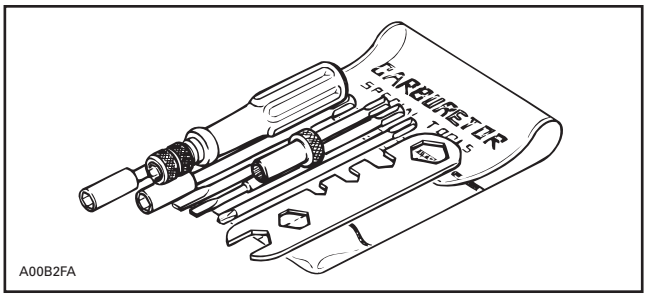
Check for fuel soaked into float **no. 12**; replace as necessary.

Check float **no. 12** for cracks or other damages affecting free movement; replace as necessary.

Inspect throttle cable and housing for any damages. Replace as necessary.

DISASSEMBLY AND ASSEMBLY

NOTE: To ease the carburetor disassembly and assembly procedures it is recommended to use carburetor tool kit (P/N 404 112 000).

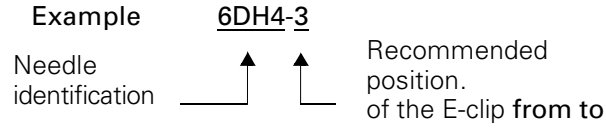


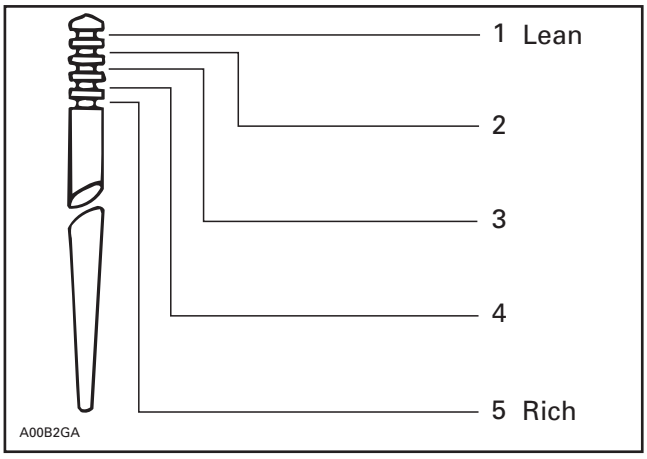
2,3, E-Clip and Needle

Remove screws from needle retaining plate to withdraw the needle.

The position of the needle in the throttle slide is adjustable by means of an E-clip inserted into 1 of 5 grooves located on the upper part of the needle. Position 1 (at top) is the leanest, 5 (at bottom) the richest.

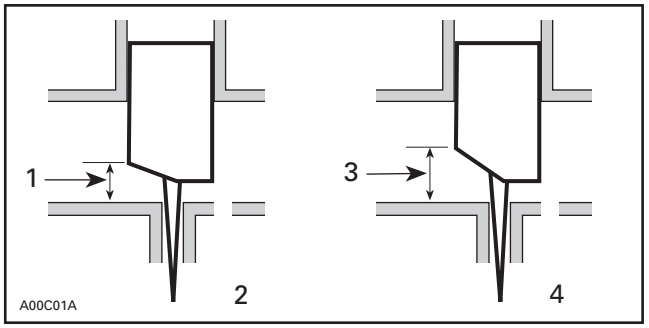
NOTE: The last digit of the needle identification number gives the recommended position of the E-clip **from the top** of the needle.





CLIP POSITIONS

The size of the throttle slide cut-away affects the fuel mixture between 1/8 to 1/2 throttle opening.



1. *Low cut-away low*
2. *Rich mixture*
3. *High cut-away high*
4. *Lean mixture*

8, Main Jet

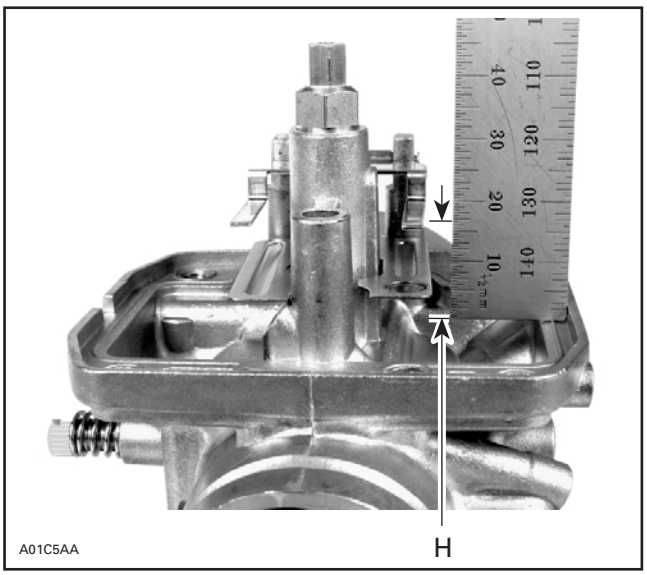
The main jet installed in the carburetor has been selected for a temperature of - 20°C (0°F) at sea level. Different jetting can be installed to suit temperature and/or altitude changes. Always check spark plug tip and/or piston dome color to find out correct jetting.

CARBURETOR FLOAT LEVEL ADJUSTMENT

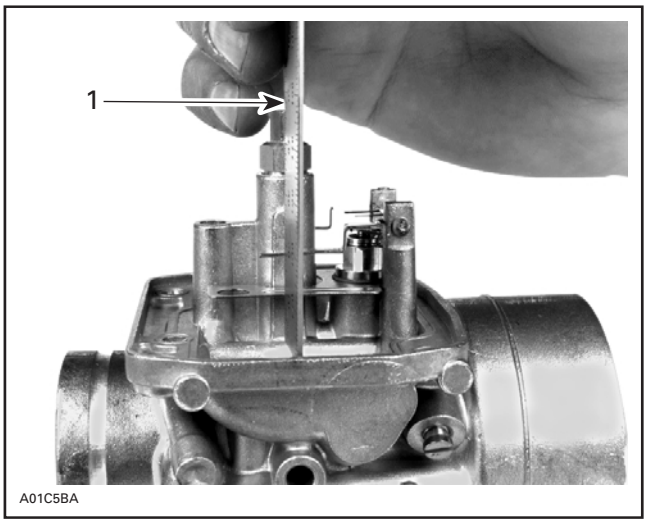
9,10, Float Arm and Float Arm Pin

Correct fuel level in float chamber is vital toward maximum engine efficiency. To check for correct float level proceed as follows:

– Make sure that float arm is symmetrical — not distorted.
– Remove float bowl and gasket from carburetor.
– With carburetor chamber upside-down on a level surface, measure height H between bowl seat and **top** edge of float arm. Keep ruler perfectly vertical and in line with main jet hole.



TYPICAL
H: Float height

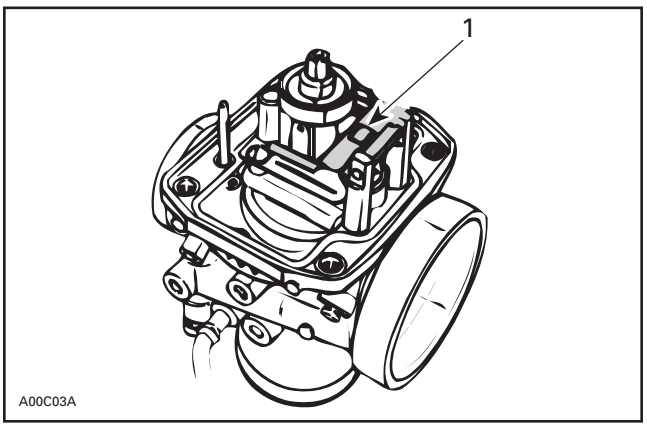


1. Ruler vertical and in line with main jet

CARBURETOR MODEL	FLOAT HEIGHT H ± 1 mm	(± .040 in)
Skandic LT/WT/SWT Formula DLX FAN 380/500 Touring FAN 380/500 MX Z FAN 380/440/500 Summit FAN 500 Skandic LT/WT/SWT	23.9	(.941)
Skandic WT LC	18.1	(.713)

To Adjust Height H

– Bend the contact tab of float arm until the specified height is reached.

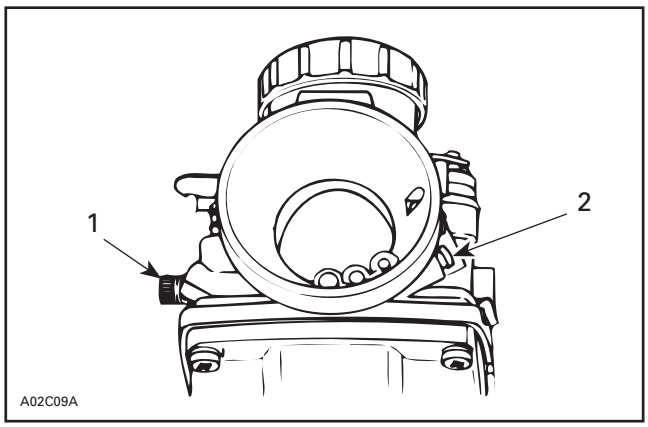


1. Contact tab

CARBURETOR ADJUSTMENTS

Adjustments should be performed following this sequence:

– air screw adjustment
– throttle slide height (preliminary idle speed adjustment)
– throttle cable adjustment
– carburetor synchronization (dual carburetor models)
– final idle speed adjustment (engine running)
– oil pump and carburetor synchronization.



1. Idle speed screw
2. Air screw

6, Air Screw

Completely close the **air screw** (until a slight seating resistance is felt) then back off as specified.

Turning screw in clockwise enrichners mixture and conversely, turning it out counterclockwise leans mixture.

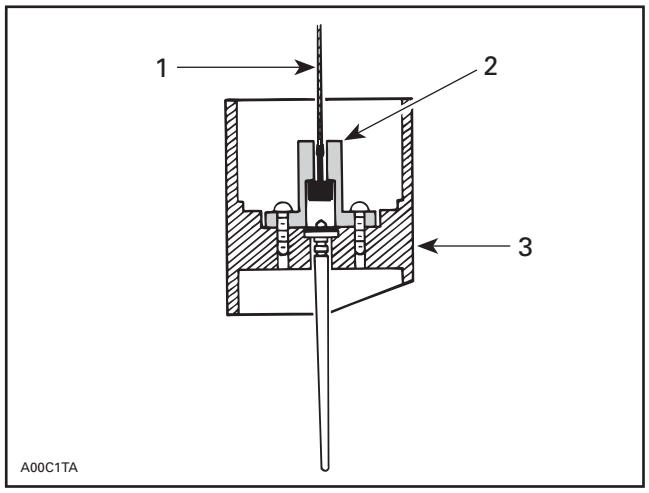
Refer to TECHNICAL DATA for the specifications.

7, Idle Speed Screw

Throttle Slide Opening (preliminary idle speed adjustment)

Hook throttle cable into the needle retainer plate.

NOTE: Do not obstruct hole in throttle slide when installing needle retaining plate. This is important to allow air escaping through and thus allowing a quick response.

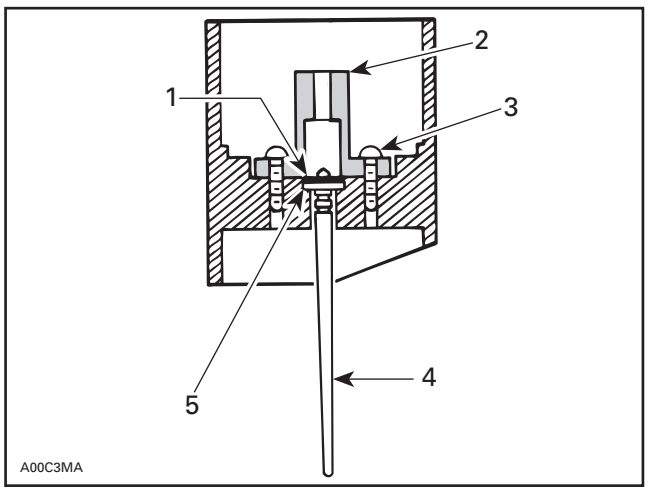


CENTER POST TYPE

1. Throttle cable
2. Needle retaining plate
3. Throttle slide

Make sure the nylon packing **no. 4** is installed on all applicable throttle slides.

CAUTION: Serious engine damage can occur if this notice is disregarded.



CENTER POST TYPE

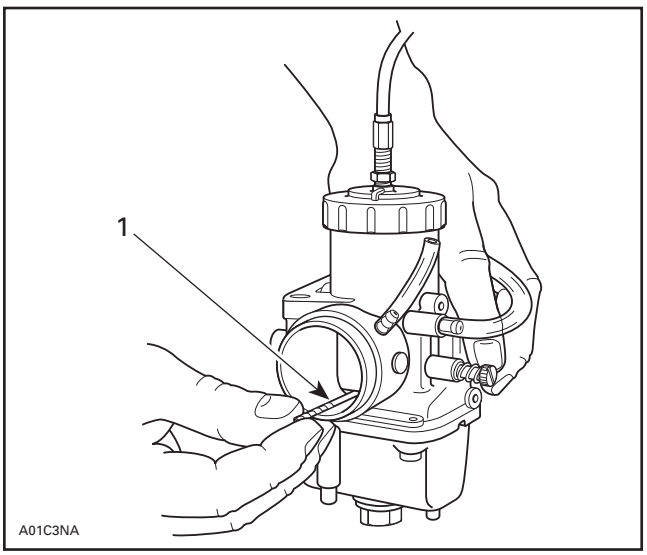
1. E-clip
2. Needle retaining plate
3. Screw
4. Needle
5. Nylon packing

Adjust throttle slide height (see following table) by turning idle speed screw **no. 7**. Throttle slide height is measured on **outlet** side of carburetor (engine side).

NOTE: Make sure that throttle cable does not hold throttle slide. Loosen cable adjuster accordingly. Throttle cable adjustment will be done during adjustment of throttle-slide-to-cover free play.

Final idle speed adjustment (engine running at idle speed) should be within 1/2 turn of idle speed screw from preliminary adjustment.

MODELS	THROTTLE SLIDE HEIGHT mm (in)
Skandic LT/WT/SWT/WT LC, Formula DLX FAN 500, Touring FAN 500 MX Z FAN 440/500 Summit FAN 500	1.5 (.059)
Touring FAN 380 Formula DLX FAN 380 MX Z FAN 380	1.3 (.051)



TYPICAL
1. Drill bit used as gauge for throttle slide height

INSTALLATION

CAUTION: Never allow throttle slide(s) to snap shut.

Prior to install carburetor, adjust air screw and preliminary idle speed as described above.

To install carburetor on engine, inverse removal procedure.

However, pay attention to the following:

On applicable models, make sure to align tab of carburetor and air intake silencer (if applicable) with notch of adaptor(s). On applicable models, install adaptor with UP mark facing up.

CAUTION: The rubber flange must be checked for cracks and/or damage. At assembly, the flange must be perfectly matched with the air intake manifold or severe engine damage will occur.

Install clamps in a way that their tightening bolts are staggered — not aligned.

Throttle Cable Adjustment

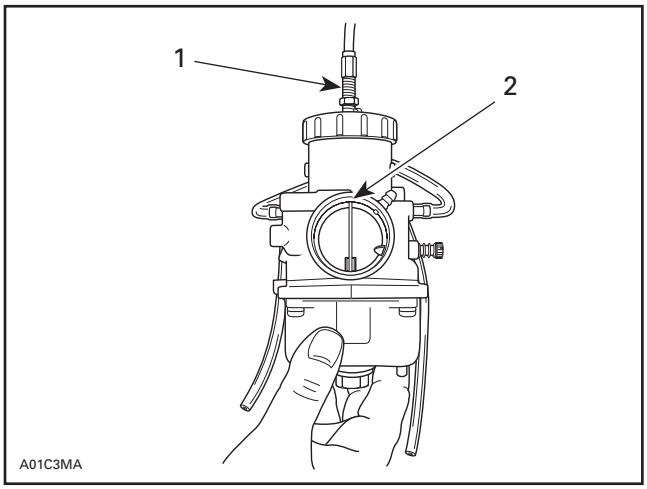
⚠ WARNING

Ensure the engine is turned OFF, prior to performing the throttle cable adjustment.

For maximum performance, correct cable adjustment is critical.

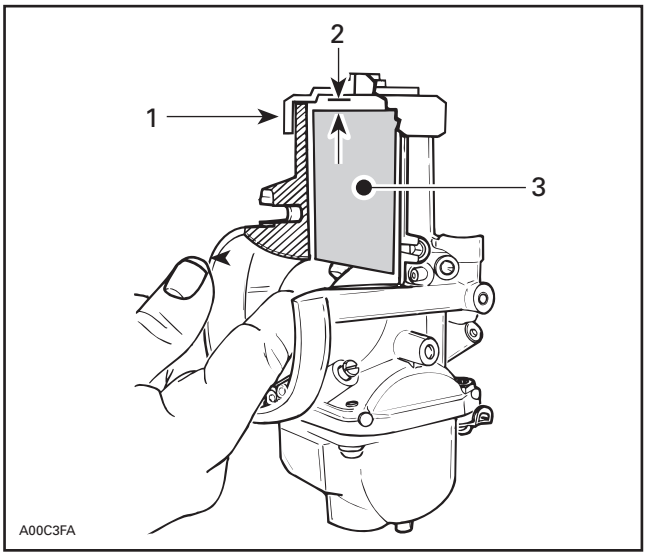
At full opening throttle slide must be flush or 1.0 mm (.040 in) lower than the top of carburetor **outlet** bore (engine side).

First loosen adjuster nut then turn throttle cable adjuster accordingly.



FULL OPENING (THROTTLE LEVER AGAINST HANDLE GRIP)
1. Throttle cable adjuster
2. Throttle slide flush or 1.0 mm (.040 in) lower than carburetor outlet bore (engine side)

Check that **with the throttle lever fully depressed**, there is a free play between the carburetor cover and top of throttle slide.



FULL OPENING (THROTTLE LEVER AGAINST HANDLE GRIP)

1. *Cover*
2. *Free play*
3. *Throttle slide*

⚠ WARNING

This gap is very important. If the throttle slide rests against the carburetor cover at full throttle opening, this will create too much strain and may damage the throttle cable or other components in throttle mechanism.

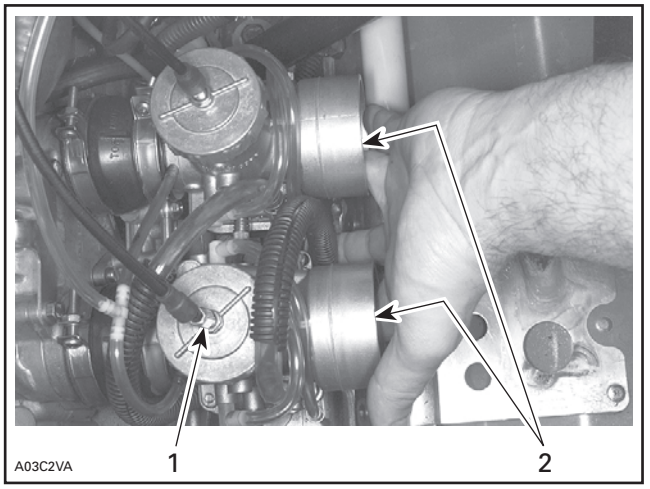
Carburetor Synchronization

Dual Carburetor Models Only

When depressing throttle lever, both carburetor slides must start to open at the same time.

Unlock cable adjustment lock nut on one carburetor.

Screw or unscrew cable adjuster until both carburetor slides start to open at same time. Cable play will be identical on both carburetors. Retighten jam nut.



TYPICAL

1. *Screw or unscrew adjuster*
2. *Check that both slides start to open at the same time*

Check throttle slide position at wide open throttle. Throttle slide must be flush or 1 mm (.040 in) lower than carburetor **outlet** bore. At that same position, check that throttle slide does not contact carburetor cover. Turn cable adjuster and recheck synchronization.

CAUTION: If the throttle slide rests against the carburetor cover at full throttle opening, this will create too much strain and may damage the throttle cable or other components in throttle mechanism.

CAUTION: On dual carburetor models, make sure both carburetors start to operate simultaneously. Beside do not interchange carburetors, the jetting may be different on each side. A red dot is printed on one carburetor and on the engine. Match the carburetor and the engine dots when applicable.

CAUTION: The oil injection pump adjustment must be checked each time carburetor is adjusted. Refer to OIL INJECTION SYSTEM.

IDLE SPEED FINAL ADJUSTMENT

7, Idle Speed Screw

CAUTION: Before starting engine for the final idle adjustment, make sure that oil pump is adjusted. The oil injection pump adjustment must be checked each time carburetor is adjusted. Refer to OIL INJECTION SYSTEM.

Start engine and allow it to warm then adjust idle speed to specifications by turning **idle speed** screw clockwise to increase engine speed or counterclockwise to decrease it.

NOTE: On twin-carburetor models: Turn adjustment screw the same amount to keep carburetors synchronized.

Refer to TECHNICAL DATA for the specifications.

CAUTION: Do not attempt to set the idle speed by using the air screw. Severe engine damage can occur.

CHOKE

S-Series and Skandic LT/WT/SWT/WT LC

Choke Plunger Adjustment

Set choke lever to fully open position.

CHOKE LEVER — FULLY OPEN POSITION

S-Series Models and Skandic LT/WT/SWT

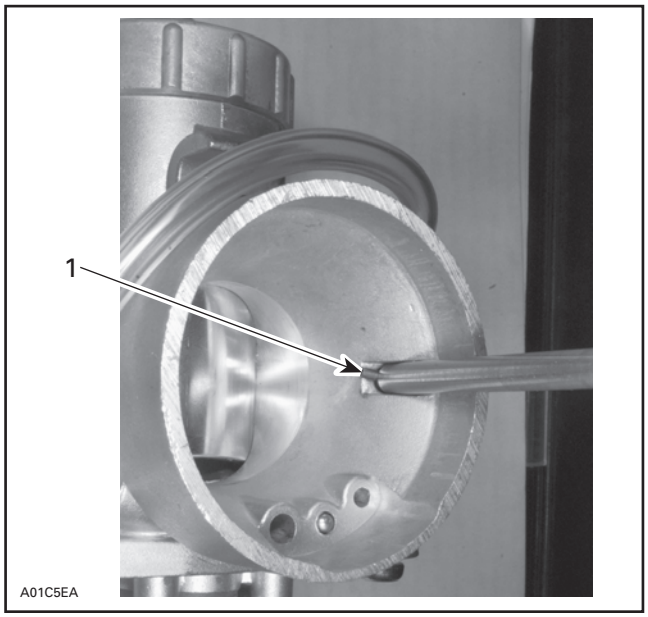
Use small diameter (for VM 30, VM 32 and VM 34 carburetors) of choke plunger tool (P/N 529 032 100).

Skandic WT/LC

Use big diameter (for VM 38) of choke plunger tool (P/N 529 032 100).

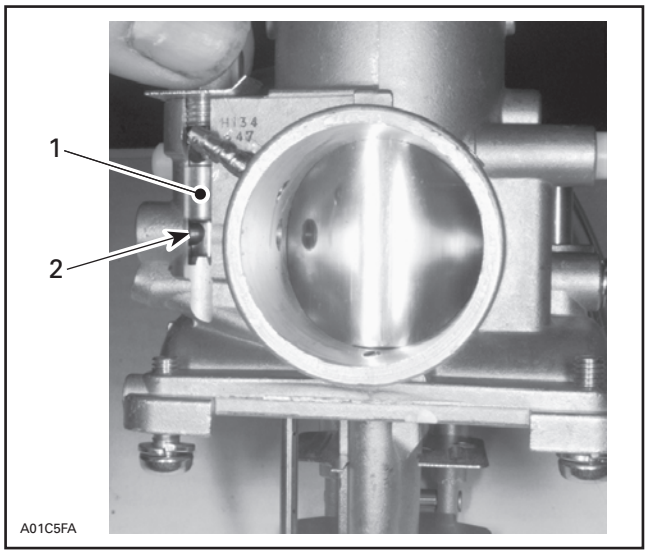
All Models

Insert proper diameter of choke plunger tool into choke air inlet of each carburetor. Tool stopper may not lean against recess wall. Though it must be within 1 mm (.040 in) of recess wall.



AIR SILENCER SIDE SHOWN

1. *Tool stopper within 1 mm (.040 in) of recess wall*



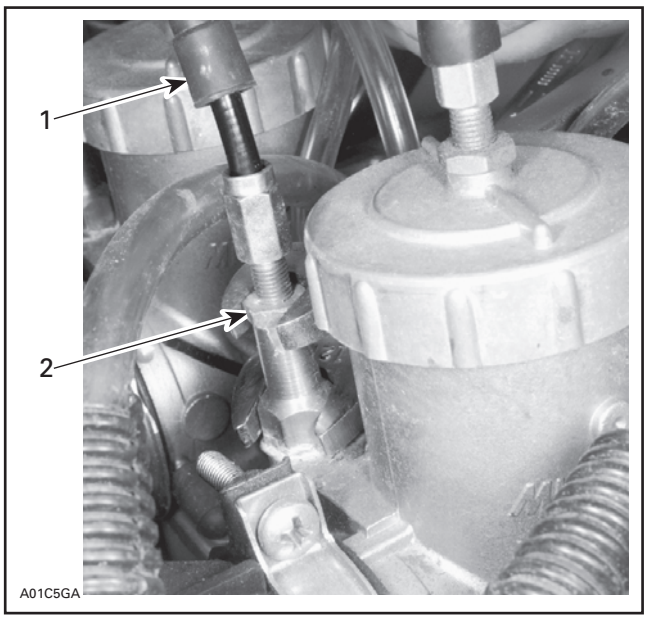
CUT-AWAY (ENGINE SIDE SHOWN)

1. *Choke plunger*
2. *Tool properly seated under choke plunger*

If tool tip does not seat under choke plunger **no. 15**, adjust as follows:

Make sure choke lever is at fully open position.

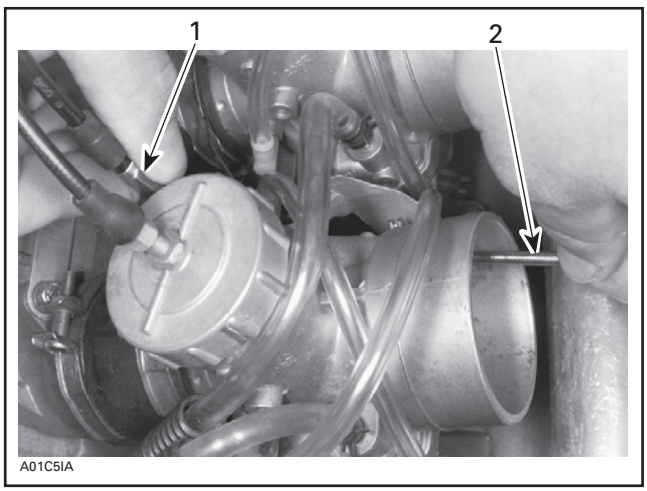
Lift up protector cap and loosen choke cable lock nut, as shown in the next photo.



1. Lift up protector cap
2. Loosen lock nut

Turn choke cable adjustment nut by hand until tool properly seats under choke plunger.

NOTE: A light pressure should be needed to position tool under plunger.

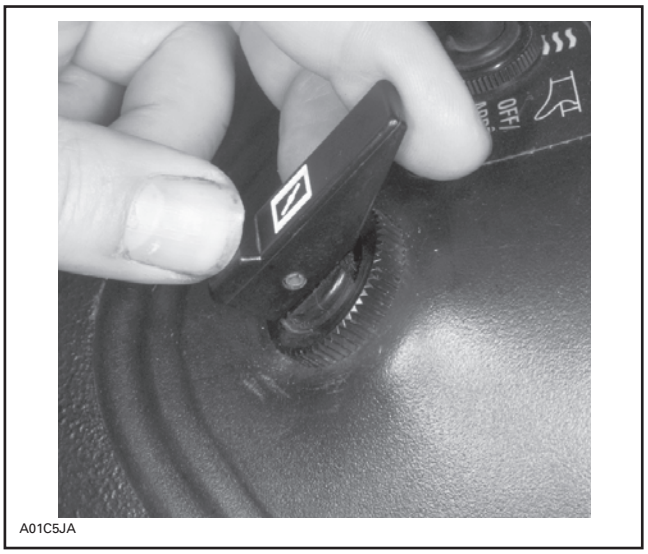


1. Choke cable adjustment nut
2. Choke plunger tool

Tighten choke cable lock nut and reinstall protector cap.

Set choke lever to close and open positions and ensure that tool properly seats under plunger **only** when lever is set to fully open position.

Set choke lever to close position and, by pulling and pushing choke lever, make sure there is no tension on cable (free play).

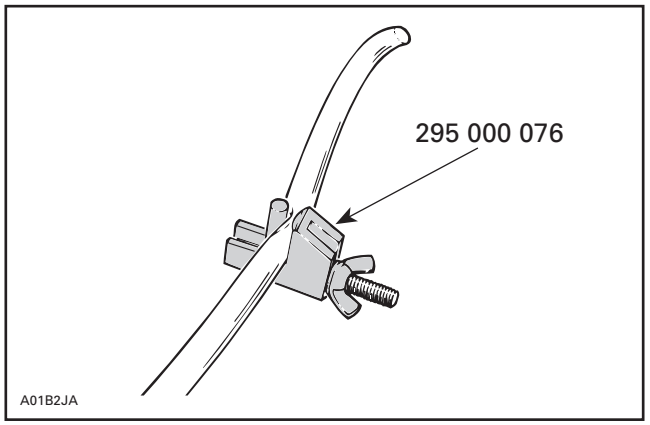


CHOKE LEVER — CLOSED POSITION

FUEL PUMP

REMOVAL

Install a hose pincer (P/N 295 000 076) on fuel supply line close to pump inlet.



Disconnect fuel outlet line(s).

Disconnect impulse line.

Remove screws securing fuel pump.

PUMP VERIFICATION

Check fuel pump valves operation as follows:

Connect a clean plastic tubing to the inlet nipple and alternately apply pressure and vacuum with pump of leak test kit. The inlet valve should release with pressure and hold under vacuum.

Repeat the same procedure at the outlet nipple. This time the outlet valve should hold with pressure and release under vacuum.

NOTE: On model fitted with 2 outlets, plug 1 outlet with finger while checking outlet valve.

Check impulse diaphragm and gasket on high-supply fuel pump with twin outlets as follows:

Connect a clean plastic tubing to the impulse nipple and plug vent hole on top cover. Either apply pressure or vacuum. The diaphragm/gasket must not leak.

CLEANING AND INSPECTION

The entire pump should be cleaned with general purpose solvent before disassembly.

Fuel pump components should be cleaned in general purpose solvent and dried with compressed air.

⚠ WARNING

Solvent with a low flash point such as gasoline, naphtha, benzol, etc., should not be used as each is flammable and explosive.

Inspect diaphragm. The pumping area should be free of holes, tears or imperfections. Replace as needed.

High-supply pump with twin outlets: Thoroughly clean filter on top cover. Replace pump if too dirty.

INSTALLATION

To install, inverse removal procedure.

⚠ WARNING

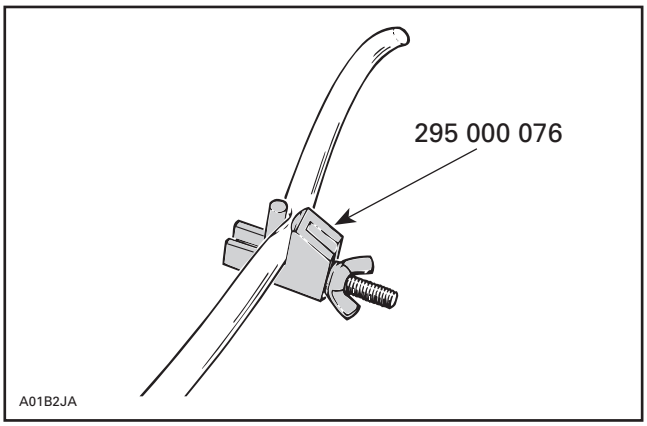
Pressure test to ensure there is no leak in fuel system.

FUEL TANK AND THROTTLE CABLE

Fuel Tank Lines

⚠ WARNING

When draining a fuel tank or whenever a fuel line is disconnected, obstruct line with a hose pincher (P/N 295 000 076) or equivalent device. Fuel is flammable and explosive under certain conditions. Ensure work area is well ventilated. Do not smoke or allow open flames or sparks in the vicinity.



Impulse/Fuel Lines Spring Clips

All Models

Always reposition spring clips after any repair to prevent possible leaks.

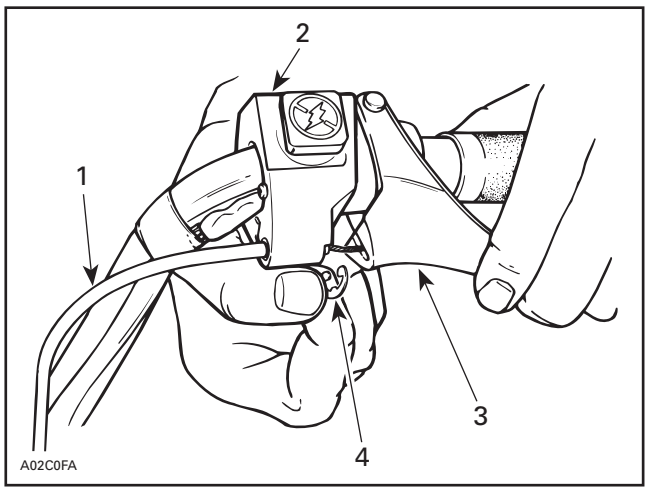
Throttle Cable Circlip at Handlebar

All Models

Put silicone grease (P/N 413 701 700) around cable barrel. Locate circlip as per illustration.

⚠ WARNING

If this procedure is disregarded, throttle might be half-open at normally closed position and the engine will speed up when starting.



TYPICAL

1. *Throttle cable housing*
2. *Throttle handle housing*
3. *Throttle handle*
4. *Circlip*

Adjust throttle cable as specified in CARBURETOR AND FUEL PUMP.

Throttle Cable Routing

CAUTION: Check that throttle cable is routed away from sharp edges, hot or vibrating parts. When turning steering while engine is running, idle speed must not vary.

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DRIVE BELT

MODEL	PART NUMBER	WIDTH (NEW) ± 0.25 mm (.010 in)	MINIMUM WIDTH (WEAR LIMIT)
S-Series Skandic LT/WT/SWT/WT LC	415 060 600	34.70 mm (1.366 in)	32.30 mm (1.272 in)

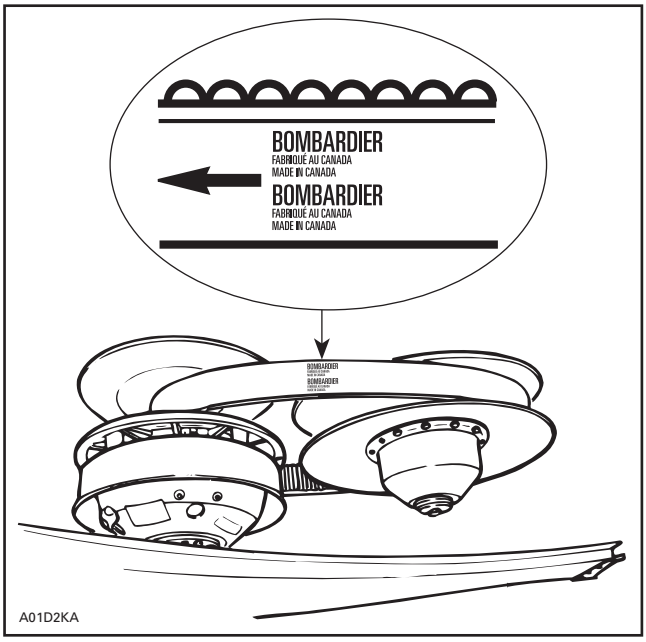
INSPECTION

Inspect belt for cracks, fraying or abnormal wear (uneven wear, wear on one side, missing cogs, cracked fabric). If abnormal wear is noted, probable cause could be pulley misalignment, excessive RPM with frozen track, fast starts without warm-up period, burred or rusty sheave, oil on belt or distorted spare belt.

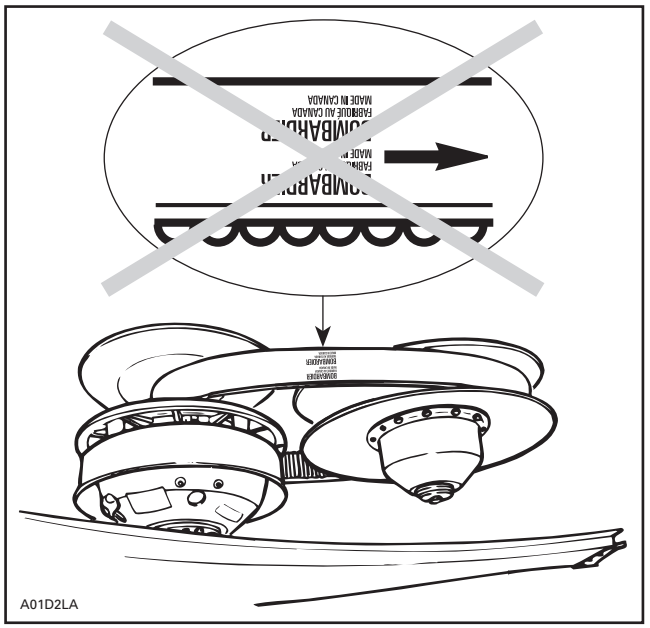
Check the drive belt width. Replace the drive belt if width is less than the minimum width recommended (see table above).

ROTATION DIRECTION

The maximum drive belt life span is obtained when the drive belt is installed as shown. This will ensure that correct direction of rotation is respected.



CORRECT



INCORRECT

NOTE: For used drive belt, mark and reinstall in the same position.

DRIVE BELT DEFLECTION MEASUREMENT

NOTE: The drive belt deflection measurement must be performed each time a new drive belt is installed.

NOTE: To obtain an accurate drive belt deflection measurement, it is suggested to allow a break-in period of 50 km (30 mi).

Before checking the belt deflection, ensure vehicle has the proper belt (Refer to the application chart).

Adjust pulley distance and alignment. Refer to PULLEY DISTANCE AND ALIGNMENT.

To obtain maximum vehicle performance, the belt tension must be adjusted according to specifications shown in the accompanying chart.

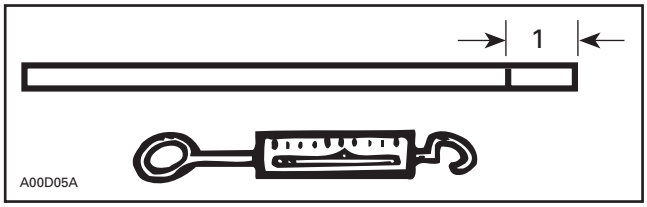
MODEL	DEFLECTION mm (in)	FORCE kg (lb)	HEIGHT† OVER DRIVEN PULLEY
All models	32 ± 5 (1-1/4 ± 13/64)	11.3 (25)	0 - 1.5 mm (0 - 1/16 in)

† FOR REFERENCE ONLY

To Check Tension

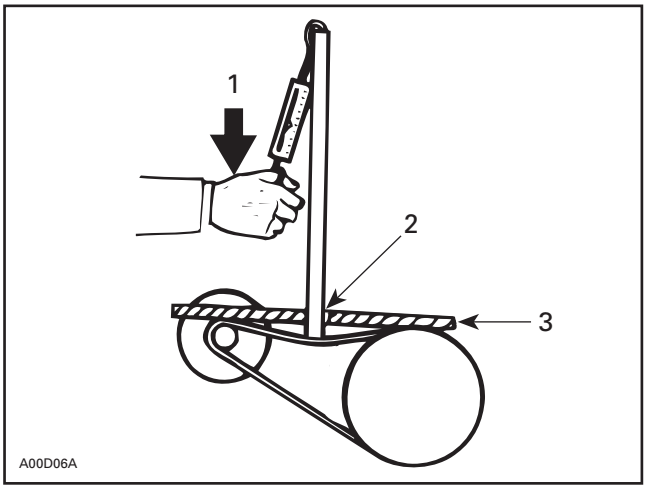
Position a reference rule on drive belt.

Wooden Stick and Spring Scale Method



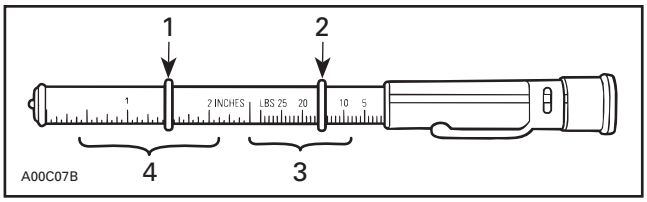
1. Mark specified deflection

Using spring scale and stick, apply specified force on drive belt halfway between pulleys as shown.



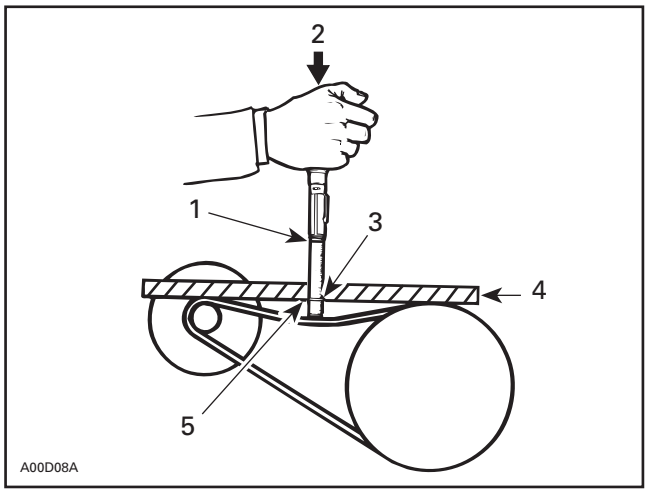
1. Force
2. Read deflection here
3. Reference rule

Or use the belt tension tester (P/N 414 348 200).



1. Lower O-ring
2. Upper O-ring
3. Force (read down)
4. Deflection (read up)

1. Slide lower O-ring of tester to specified deflection.
2. Slide upper O-ring of tester until reaching mark 0 (zero).
3. Apply pressure until lower O-ring is flush with edge of rule and read force on the upper scale at top edge of O-ring.



1. Upper O-ring — force
2. Force applied
3. Lower O-ring — deflection
4. Reference rule
5. Deflection

DEFLECTION ADJUSTMENT

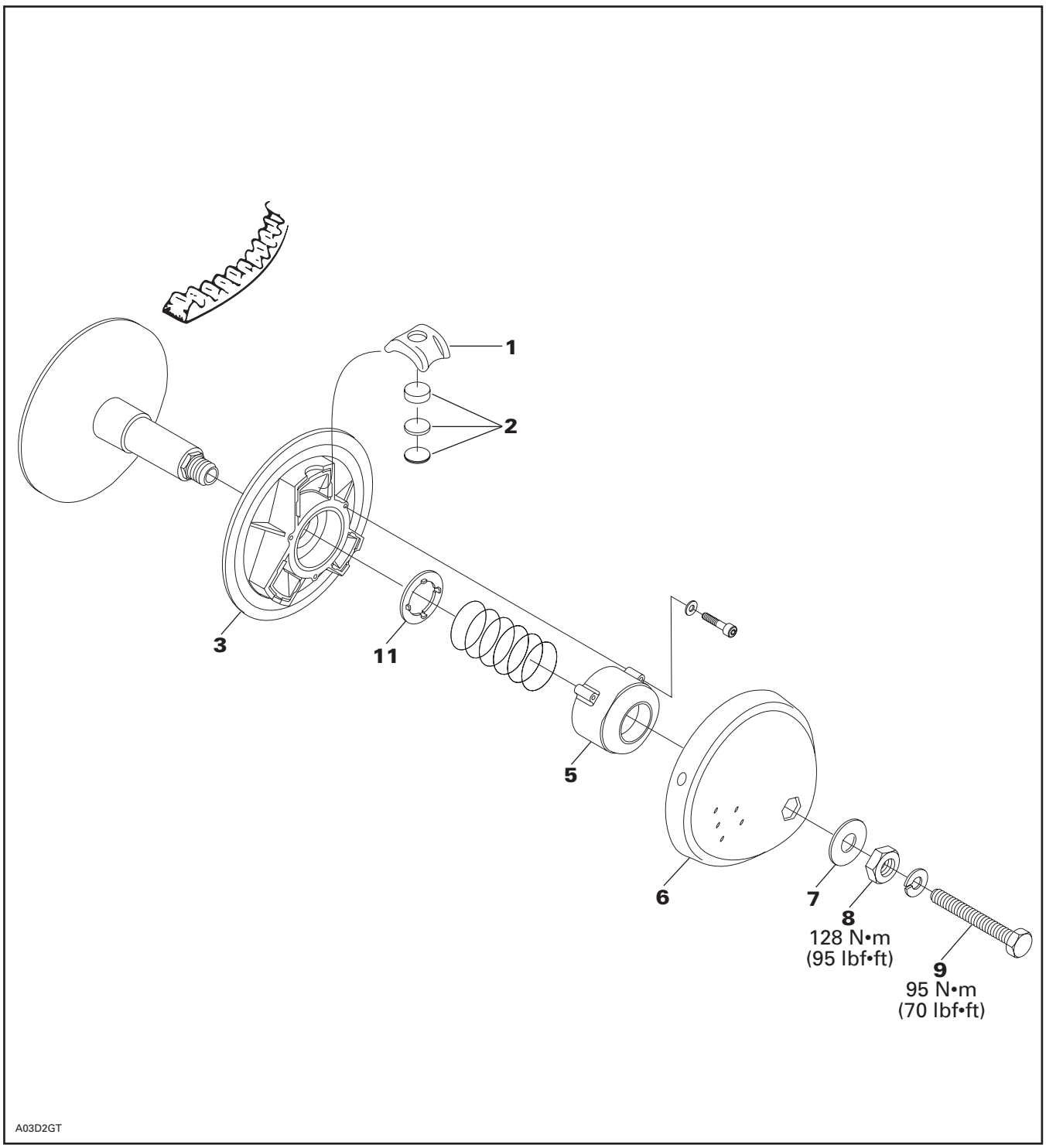
Vary pulley distance — within tolerances — to obtain proper drive belt deflection.

DRIVE PULLEY

BOMBARDIER LITE

NOTE: This is a lubrication free drive pulley.

377 Engine S-Series



GENERAL

Some drive pulley components (return spring, calibration disk) can be changed to improve vehicle performance in high altitude regions. A Service Bulletin will give information about calibration according to altitude.

CAUTION: Such modifications should only be performed by experience mechanics since they can greatly affect vehicle performance.

⚠ WARNING

Any drive pulley repairs must be performed by an authorized Bombardier snowmobile dealer, or other such qualified person. Sub-component installation and assembly tolerances require strict adherence to procedures detailed.

REMOVAL

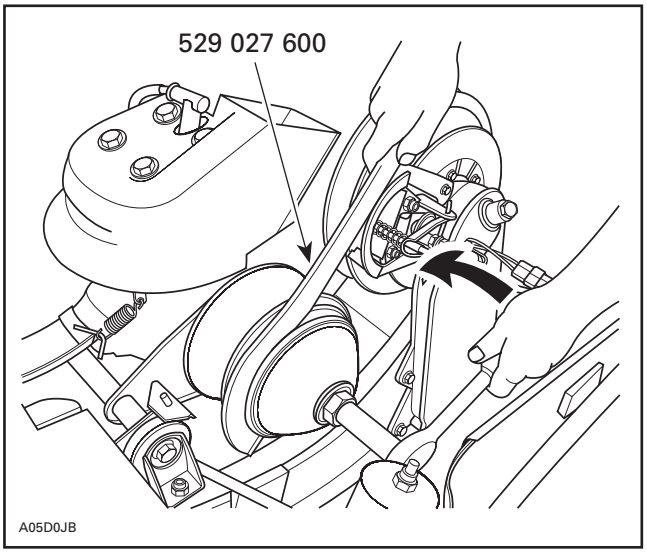
NOTE: If disassembling drive pulley, first straighten tab washer no. 7 then untighten nut no. 8.

⚠ WARNING

Never use an impact wrench to remove or install the drive pulley.

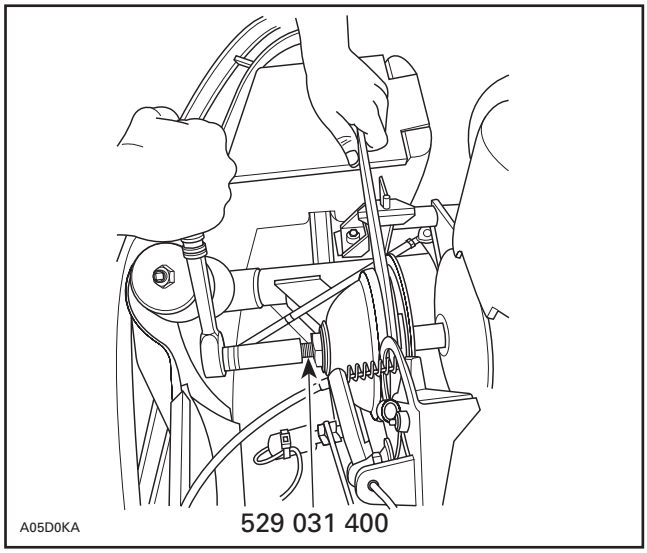
Use holder (P/N 529 027 600).

Remove retaining screw no. 9.



TYPICAL

Insert drive pulley puller (P/N 529 031 400) then remove drive pulley.

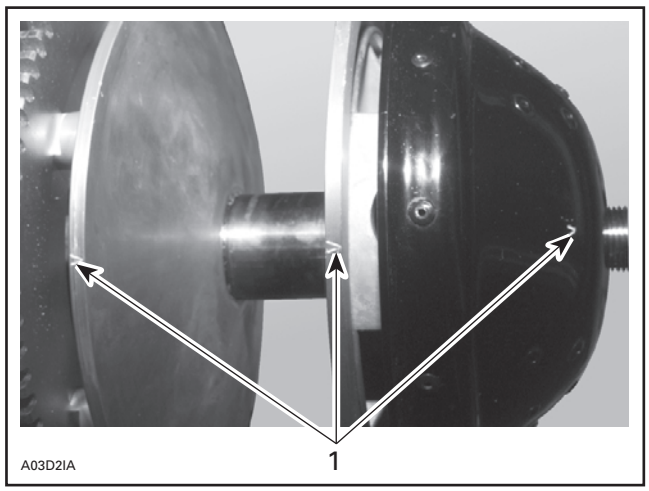


TYPICAL

DISASSEMBLY

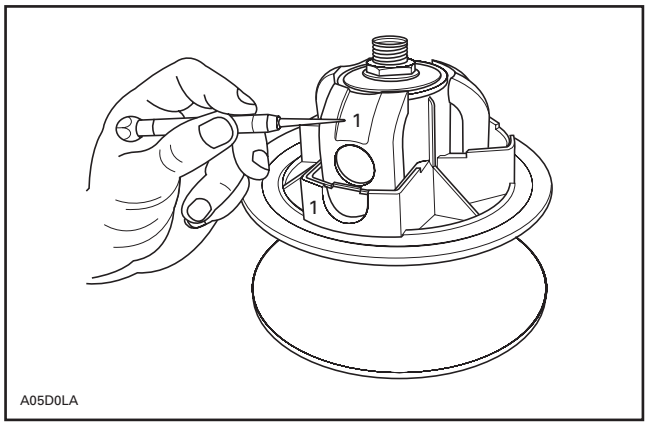
Unscrew nut. Remove tab washer.

Check for alignment marks for proper indexing at reassembly.



1. Alignment marks

Identify blocks **no. 1** and their respective positive positions for reassembly.

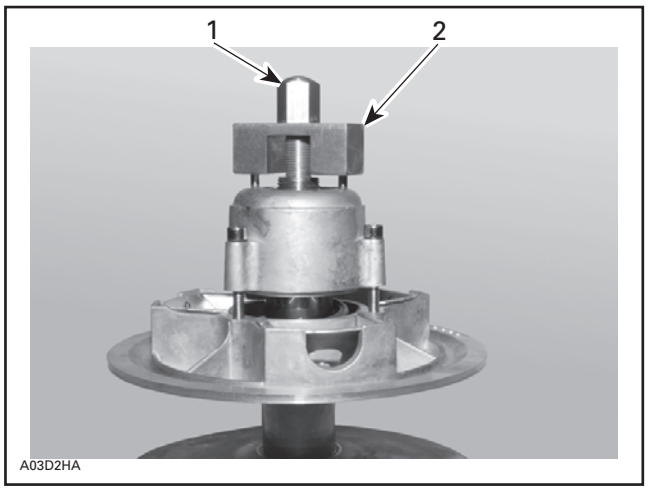


1. Identify

2, Cap, Washer and Disk

These are calibration parts. Refer to TECHNICAL DATA.

Install spring cover tool (P/N 529 027 300) with puller (P/N 529 031 400) on spring cover.



1. Puller tool
2. Spring cover tool

Screw puller (hand tight) to hold spring cover and remove screws holding spring cover.

Slowly unscrew puller to release spring pressure.

Remove spring cover **no. 5**, spring and washer **no. 11**.

CLEANING

Clean pulley faces and shaft with fine steel wool and clean dry cloth. Clean sliding half bushing with clean dry cloth.

INSPECTION

Check sliding half for excessive lateral play and fixed half shaft for scratches. Replace as required.

ASSEMBLY

Install circlip **no. 11** then washer **no. 10**.

Make sure to install blocks at their original position and with their curved end toward governor cup. See following illustration.

Tighten nut **no. 8** to 128 N•m (95 lbf•ft).

INSTALLATION

Torque screw to 90 to 100 N•m (66 to 74 lbf•ft).

Install drive belt and belt guard.

Raise and block the rear of the vehicle and support it with a mechanical stand.

⚠ WARNING

Ensure that the track is free of particles which could be thrown out while track is rotating. Keep hands, tools, feet and clothing clear of track. Ensure nobody is standing near the vehicle.

Accelerate the vehicle at low speed (maximum 30 km/h (20 MPH)) and apply the brake, repeat 5 times.

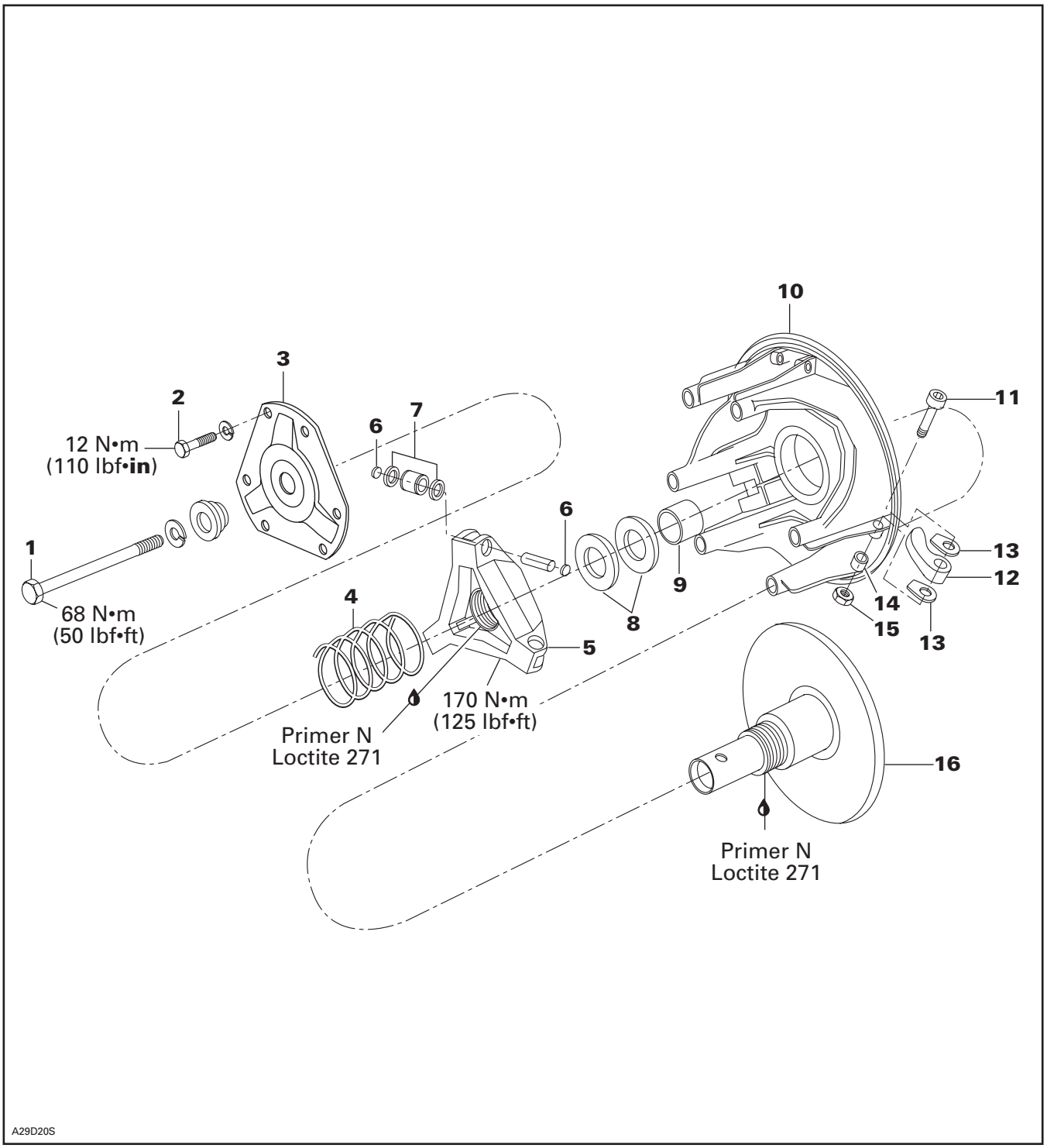
Recheck the torque of 90 to 100 N•m (66 to 74 lbf•ft).

⚠ WARNING

After 10 hours of operation the transmission system of the vehicle must be inspected to ensure the retaining screw is properly torqued.

COMET® 102C

377 Engine Skandic LT



GENERAL

Some drive pulley components can be changed to improve vehicle performance in high altitude regions. A Service Bulletin will give information about calibration according to altitude.

CAUTION: Such modifications should only be performed by experience mechanics since they can greatly affect vehicle performance.

⚠ WARNING

Any drive pulley repairs must be performed by an authorized Bombardier snowmobile dealer, or other such qualified person. Sub-component installation and assembly tolerances require strict adherence to procedures detailed.

MAINTENANCE

Cam Arm Pivot Nut

At first 10-hour (500 km) cam arm pivot nuts **no. 15** have to be retighten.

To do so, loosen one turn all cover screws **no. 2**.

Retighten to 5.6 N•m (50 lbf•**in**) maximum all three pivot nuts **no. 15**. Make sure cam arms **no. 12** can still move on their pivot bolts **no. 11**.

Retighten cover screws **no. 2** to 12 N•m (110 lbf•**in**). Proceed with one screw per tower in a criss-cross sequence then, remaining three screws.

Cam Arm Bushing

Cam arm bushings **no. 14** have to be replaced every 3000 km (2000 mi).

With drive pulley still installed on crankshaft, remove one cam arm **no. 12** at a time. Install parts included in Cam Arm Kit. Proceed with remaining cam arms.

Loosen one turn all cover screws **no. 2**.

Retighten to 5.6 N•m (50 lbf•**in**) maximum all three pivot nuts **no. 15**. Make sure cam arms **no. 12** can still move on their pivot bolts **no. 11**.

Retighten cover screws **no. 2** to 12 N•m (110 lbf•**in**). Proceed with one screw per tower in a criss-cross sequence then, remaining three screws.

REMOVAL

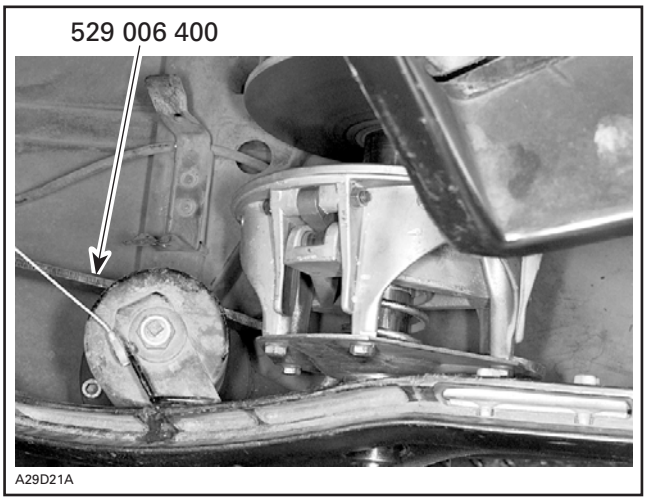
⚠ WARNING

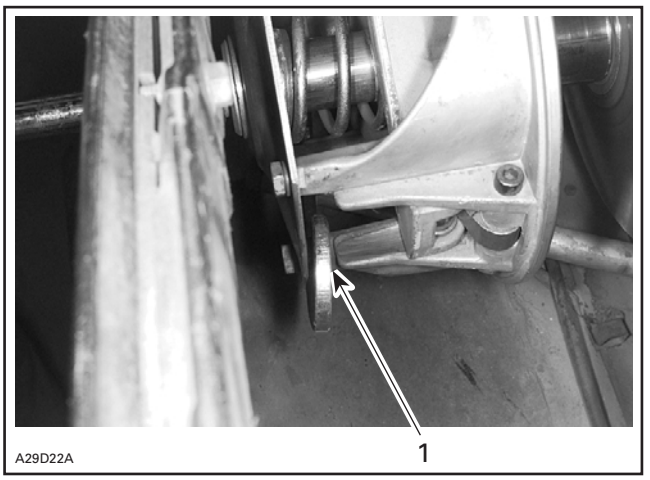
Never use an impact wrench to remove or install the drive pulley.

Unfasten center and rear bottom pan attachments on left hand side. Remove belt guard.

Open driven pulley using driven pulley opening tool (P/N 529 017 200). Remove drive belt.

Use holder (P/N 529 006 400). Make sure holder hook is positioned on top of tower.



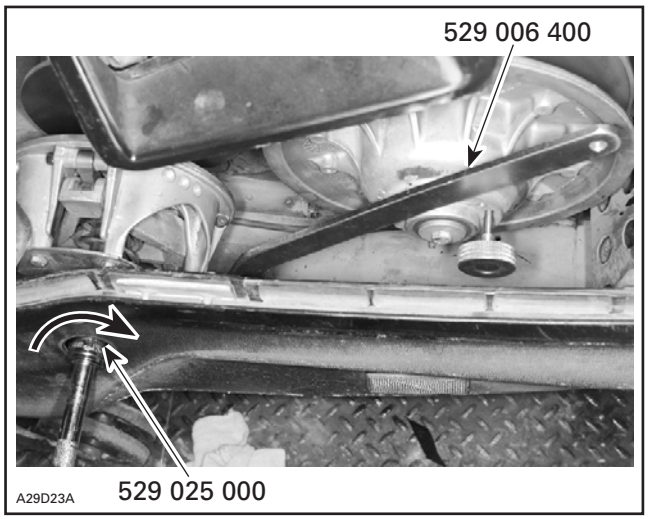


1. Holder hook on top of tower

Remove retaining screw **no. 1**.

Install holder (P/N 529 006 400) in a way to limit pulley clockwise rotation.

Insert drive pulley puller (P/N 529 025 000) then turn puller clockwise to free drive pulley from crankshaft taper.



Remove driven pulley to make room for drive pulley removal.

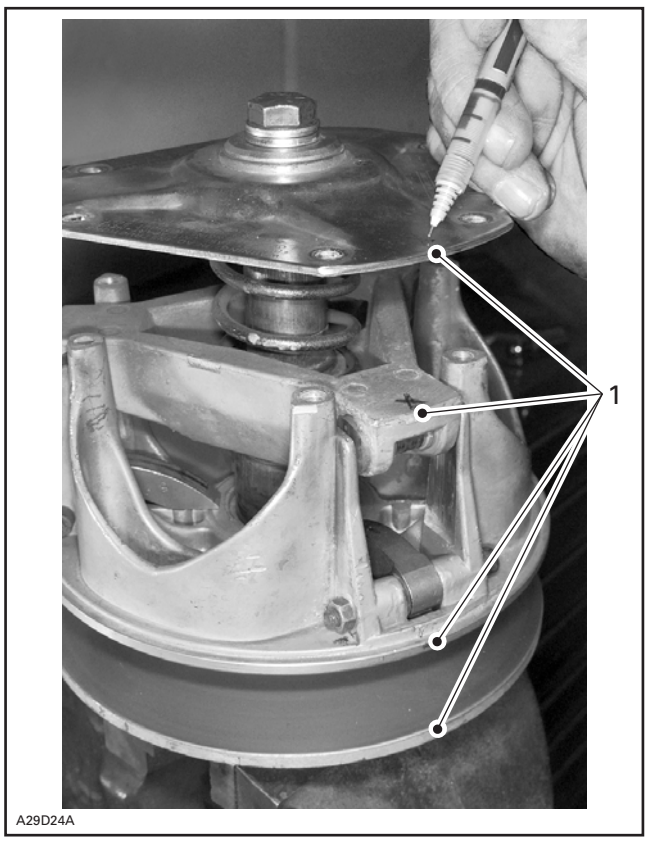
Remove drive pulley.

DISASSEMBLY

Mount retainer from tool kit (P/N 529 025 400) in a vise.

Install drive pulley over retainer then, fasten retaing screw **no. 1** and torque to 68 N•m (50 lbf•ft). Now drive pulley is locked on retainer.

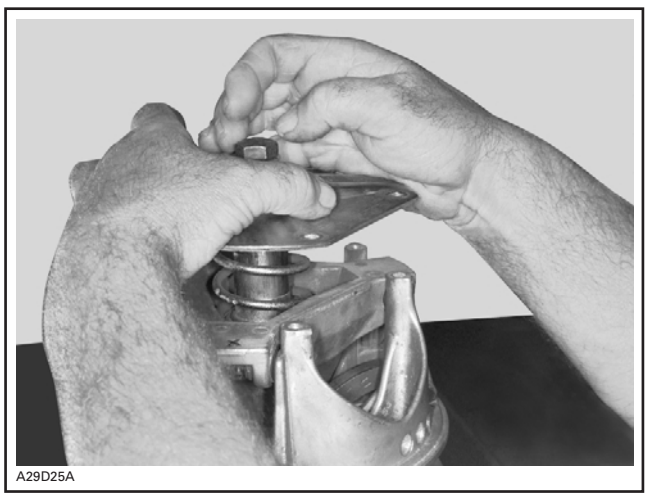
Scribe pen marks on fixed half **no. 16**, sliding half **no. 10**, spider **no. 5** and cover **no. 3** for proper indexing at reassembly.



1. Scribe marks

Remove cover screws **no. 2**.

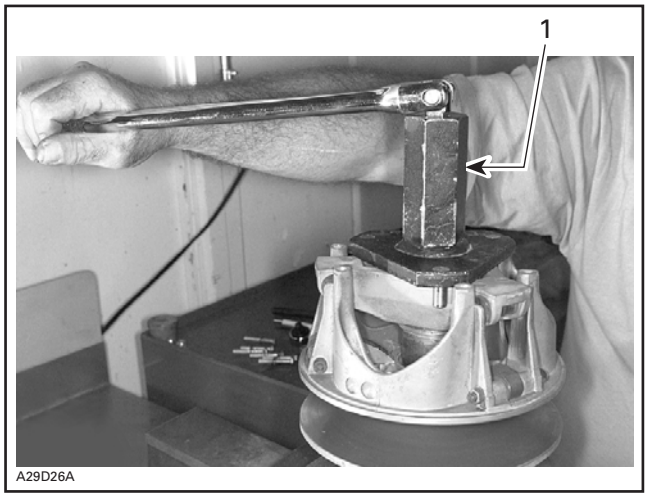
Hold cover **no. 3** by hand then, unscrew retaining screw **no. 1**.



Remove cover **no. 3**.

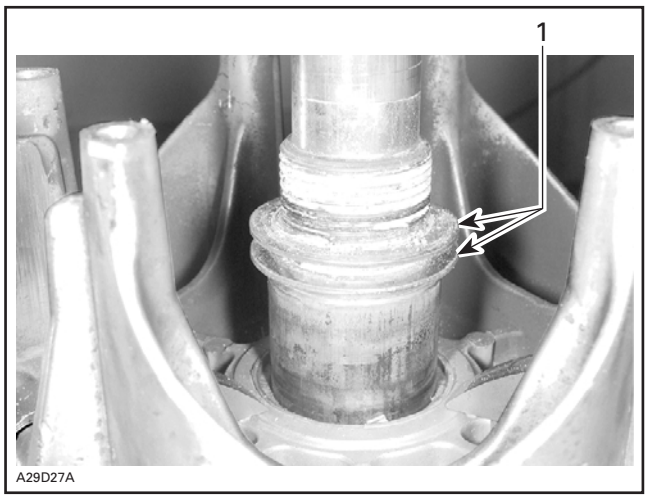
Heat spider **no. 5** to melt threadlocker.

Install spider wrench from tool kit (P/N 529 025 400) then, unscrew spider **no. 5**.



1. Spider wrench

Note shim **no. 8** quantity.



1. Shims

Remove cam arms **no. 12**.

CLEANING

Clean pulley faces and shaft with fine steel wool and clean dry cloth. Clean sliding half bushing **no. 9** and cover bushing with clean dry cloth.

Thoroughly clean spider threads and fixed half post threads.

INSPECTION

Check sliding half for excessive lateral play and fixed half post for scratches. Replace as required.

Check cover bushing interior. Replace cover if bushing is completely bronze instead of the original teflon coating.

Check that spider thrust buttons **no. 6** for proper sliding action. Replace as required.

Check rollers **no. 7** for free action. Replace as required.

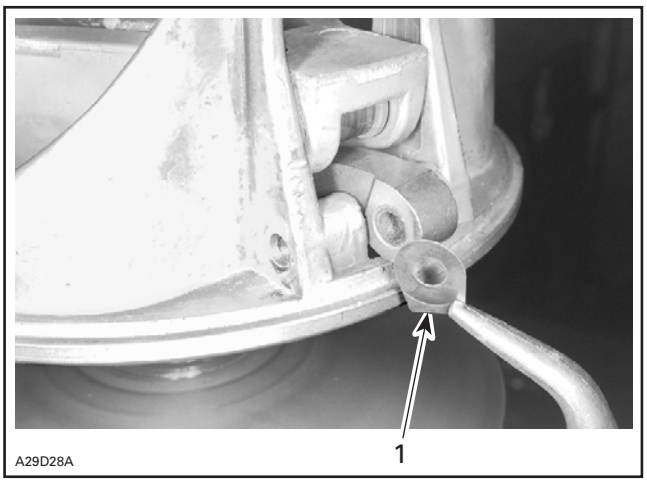
ASSEMBLY

Install shims **no. 8** on fixed half post.

Apply Primer N (P/N 293 800 041) to both post and spider threads, allow to dry for 10 minutes. Apply Loctite 271 (P/N 293 800 005) to threads.

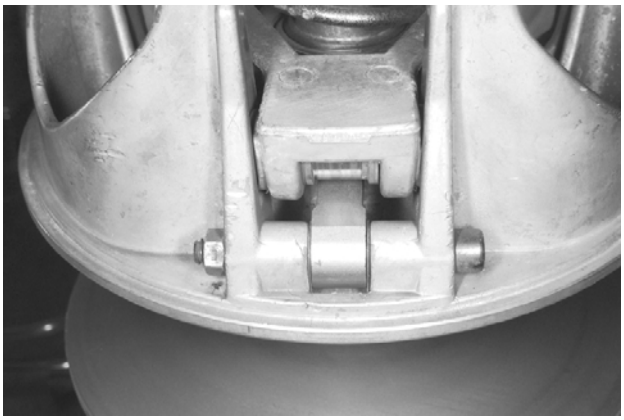
Using spider wrench from tool kit (P/N 529 025 400) torque spider **no. 5** to 170 N•m (125 lbf•ft).

With square end facing sliding half install a washer **no. 13** on each side of cam arm **no. 12**.



1. Square end facing sliding half

Tighten to 5.6 N•m (50 lbf•**in**) maximum all three pivot nuts **no. 15**. Make sure cam arms **no. 12** can still move on their pivot bolts **no. 11**.


A29D29A

Install spring **no. 4**, cover **no. 3**.

Tighten cover screws **no. 2** to 12 N•m (110 lbf•**in**). Proceed with one screw per tower in a criss-cross sequence then, remaining three screws.

Use puller (P/N 529 025 000) to unlock drive pulley from retainer.

A29D2AA

INSTALLATION

Install drive pulley on crankshaft.

Torque retaining screw to 68 N•m (50 lbf•ft).

Reinstall driven pulley, drive belt and belt guard. Refasten bottom pan center and rear attachments on left hand side.

Raise and block the rear of the vehicle and support it with a mechanical stand.

⚠ WARNING

Ensure that the track is free of particles which could be thrown out while track is rotating. Keep hands, tools, feet and clothing clear of track. Ensure nobody is standing near the vehicle.

Accelerate the vehicle at low speed (maximum 30 km/h (20 MPH)) and apply the brake, repeat 5 times.

Recheck the torque of 68 N•m (50 lbf•ft).

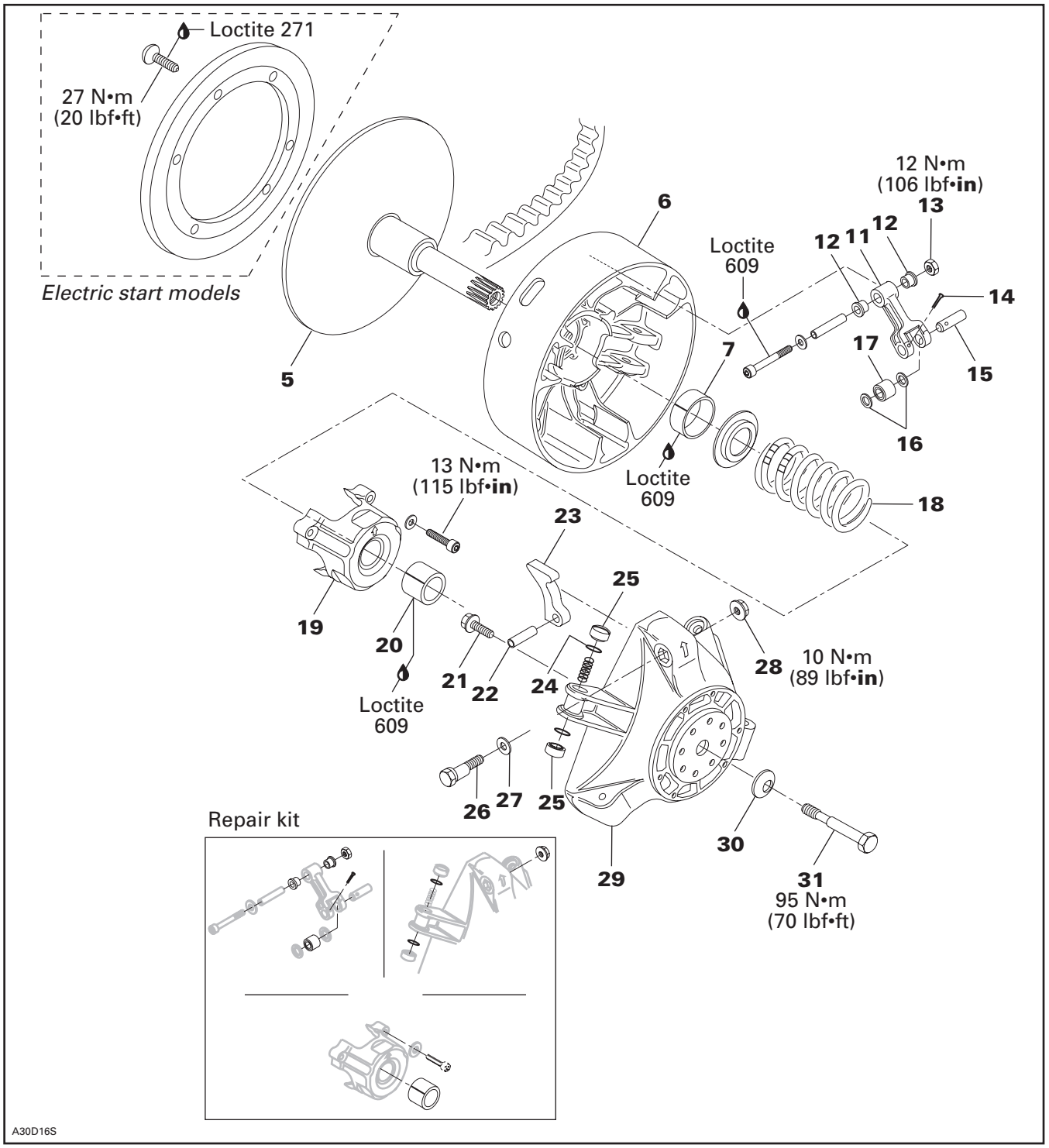
⚠ WARNING

After 10 hours of operation the transmission system of the vehicle must be inspected to ensure the retaining screw is properly torqued.

TRA

Touring Fan 500, Formula Deluxe Fan 500, MX Z Fan 440/500, Summit Fan 500 and Skandic WT/SWT/WT LC

NOTE: This is a lubrication free drive pulley.



GENERAL

Some drive pulley components (return spring, ramp) can be changed to improve vehicle performance in high altitude regions. A Service Bulletin will give information about calibration according to altitude.

CAUTION: Such modifications should only be performed by experienced mechanics since they can greatly affect vehicle performance. Verify spring specifications before installation. Do not only refer to the spring color code.

NOTE: TRA drive pulley stands for Total Range Adjustable drive pulley.

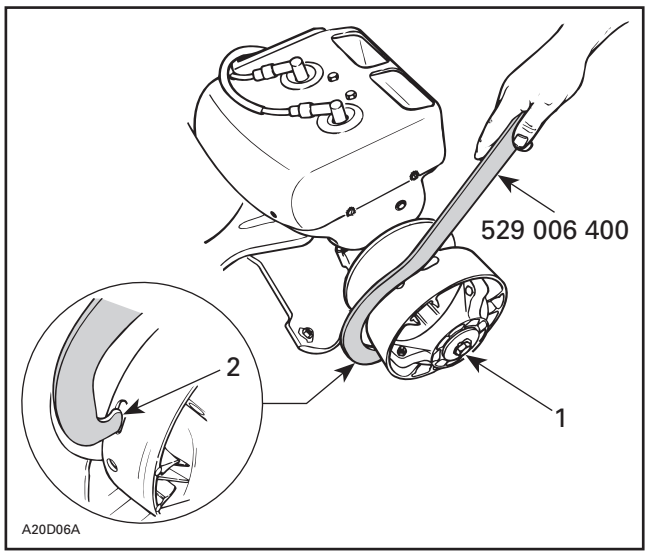
⚠ WARNING

Any drive pulley repairs must be performed by an authorized Bombardier snowmobile dealer, or other such qualified person. Sub-component installation and assembly tolerances require strict adherence to procedures detailed.

REMOVAL

30,31, Conical Spring Washer and Screw

Use holder (P/N 529 006 400).



TYPICAL

1. *Retaining screw*
2. *Insert in any slot*

⚠ WARNING

Never use any type of impact wrench at drive pulley removal and installation.

Remove retaining screw.

To remove drive pulley ass'y and/or fixed half from engine, use puller (P/N 529 022 400).

CAUTION: These pulleys have metric threads. Do not use imperial threads puller. Always tighten puller by hand to ensure that the drive pulley has the same type of threads (metric vs imperial) prior to fully tightening.

To Remove Drive Pulley Ass'y:

Retain drive pulley with clutch holder.

Install puller in pulley shaft then tighten.

DISASSEMBLY

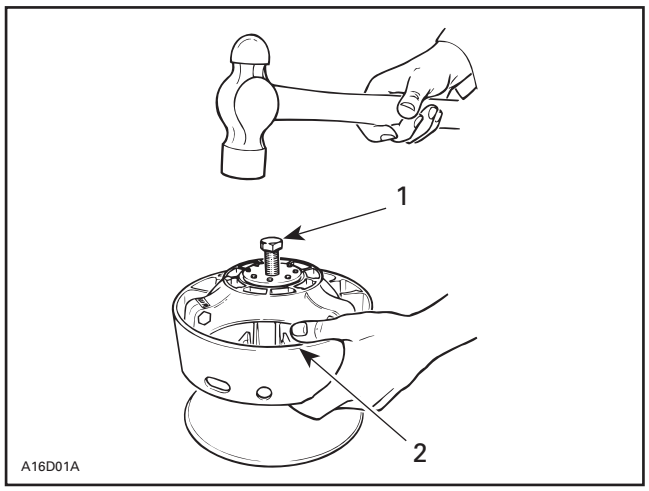
1,2, Screw and Ring Gear

CAUTION: Retaining screws must be heated before disassembly. Do not exceed 150°C (300°F).

5,6, Fixed and Sliding Half

CAUTION: Do not tap on governor cup.

Screw puller into fixed half shaft about 13 mm (1/2 in). Raise drive pulley and hold it by the sliding half while knocking on puller head to disengage fixed half.



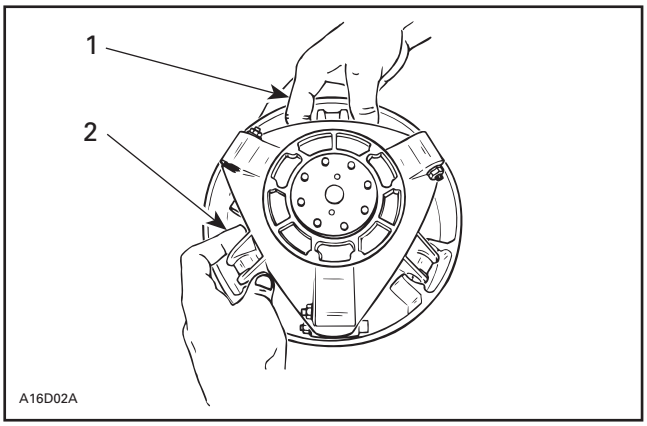
1. *Puller*
2. *Holding sliding half*

NOTE: No components marking is required before disassembling this drive pulley since it has factory mark and arrows as indexing reference.

25,29, Slider Shoe and Governor Cup

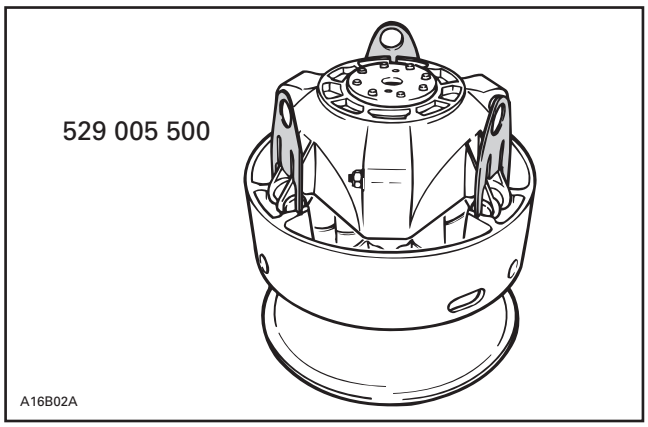
Carefully lift governor cup until slider shoes come at their highest position into guides.

Hold a slider shoe set then carefully lift its housing and remove slider shoes. Proceed the same way for other housings lifting one at a time.



1. *Hold slider shoes*
2. *Lift one housing at a time*

NOTE: To ease disassembly, forks (P/N 529 005 500) should be used to hold slider shoes prior to removing governor cup.



19, Spring Cover Ass'y

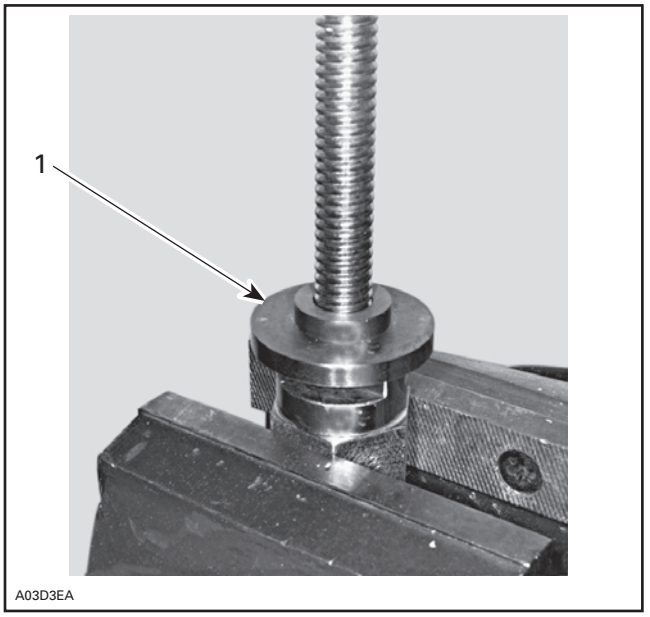
It is pushed by clutch spring pressure.

⚠ WARNING

Clutch spring is very strong. Never attempt to remove spring cover without the recommended tools.

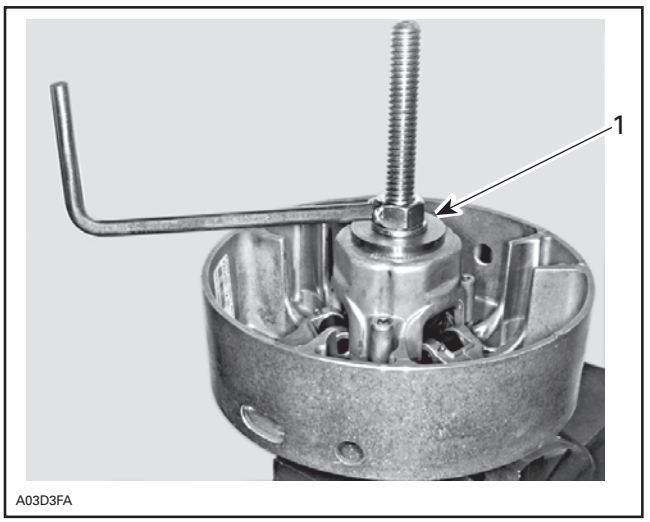
Use spring compressor (P/N 529 035 524).

Install support guide.



1. *Support guide*

Install sliding half then a second support guide. These support guides will prevent bushing damages.



1. *Support guide*

Remove 3 Allen screws retaining spring cover then unscrew compressor.

CLEANING

5,6, Fixed and Sliding Half

Clean pulley faces and shaft with fine steel wool and dry cloth.

5, Fixed Half and Crankshaft End

Parts must be at room temperature before cleaning.

Using a paper towel with cleaning solvent, clean crankshaft tapered end and the taper inside the fixed half of the drive pulley, crankshaft threads and retaining screw threads.

⚠ WARNING

This procedure must be performed in a well-ventilated area.

CAUTION: Avoid contact between cleaner and crankshaft seal because damage may occur.

Remove all hardened oil deposits that have baked on crankshaft and pulley tapered surfaces with coarse or medium steel wool and/or sand paper no. 600.

CAUTION: Do not use any other type of abrasive.

Reclean mounting surfaces with paper towel and cleaning solvent.

Wipe off the mounting surfaces with a clean, dry paper towel.

CAUTION: Mounting surfaces must be free of any oil, cleaner or towel residue.

7,20, Bushing

Only use petrol base cleaner when cleaning bushings.

CAUTION: Do not use acetone to clean bushing.

INSPECTION

Drive pulley should be inspected annually.

16,17, Thrust Washer and Roller

Check roller for roundness of external diameter. Check thrust washer for thickness wear. Replace as required.

CAUTION: Ensure rollers are in good condition. Replace as required.

9,12, Fitting Bolt Ass'y and Flanged Bushing

Check for wear, replace as required.

24,25, O-Ring and Slider Shoe

Check if O-rings are cracked, cut or crushed. Replace as required.

Check slider shoes for wear. Replace if groove is not apparent on top.

5,29, Fixed Half and Governor Cup

Inspect splines and free play between both parts. Maximum free play is 0.5 mm (.020 in) measured at calibration screw radius. Replace if required.

7,20, Sliding Half and Spring Cover Bushing

Visually inspect coating. Replace if worn.

Sliding Half Bushing Replacement

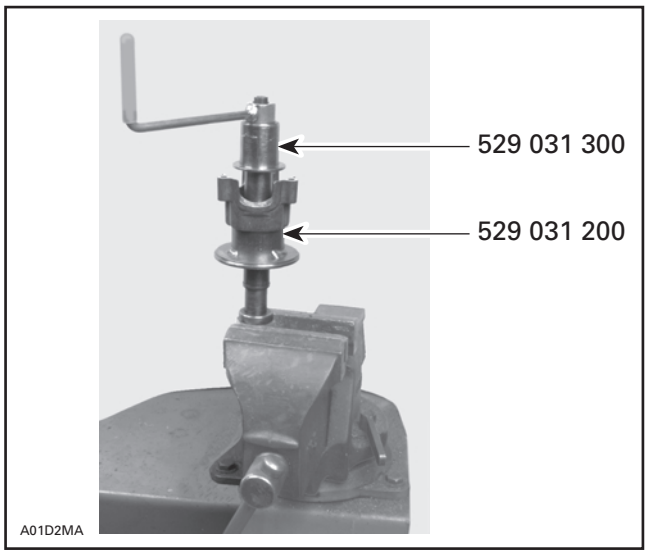
This bushing is not replacable. If worn out, replace sliding half ass'y.

Spring Cover Bushing Replacement

Under normal use there is no need to replace this bushing.

Mount compressor (P/N 529 035 524) in a vise.

Use tools (P/N 529 031 300 and 529 031 200) to remove old bushing.



CAUTION: Bushing must be bonded with retaining compound.

Apply retaining compound Loctite 609 outside of bushing then press it down to counterbore from outside end.

CAUTION: Insert bushing from sliding half side (inner side) of spring cover.

ASSEMBLY

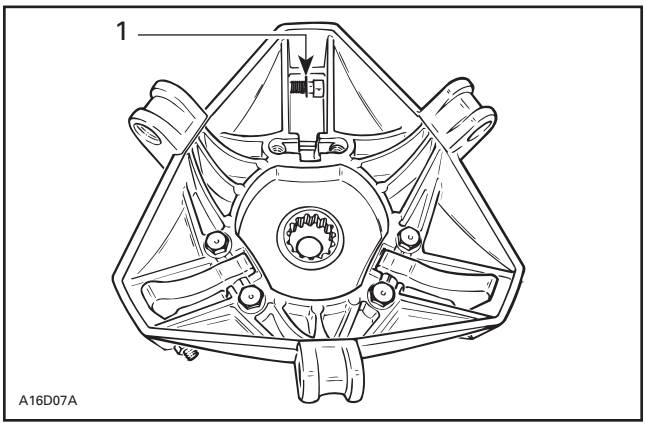
NOTE: This drive pulley is lubrication free. **Do not lubricate** any component.

1,2,3, Screw, Ring Gear and Loctite 271

Apply Loctite 271 (P/N 413 702 900) on threads and then torque to 27 N•m (20 lbf•ft).

26,27,28, Calibration Screw, Washer and Locking Nut

When installing calibration screw, make sure to install washer as shown.



1. Washer

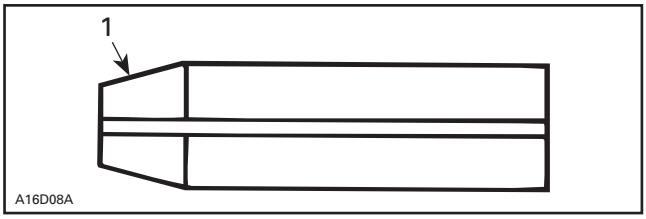
Torque locking nut to 10 N•m (89 lbf•**in**).

15, Pin

Always use the same type of pin as originally installed when servicing. Different types have different weights for calibration purpose. Refer to TECHNICAL DATA.

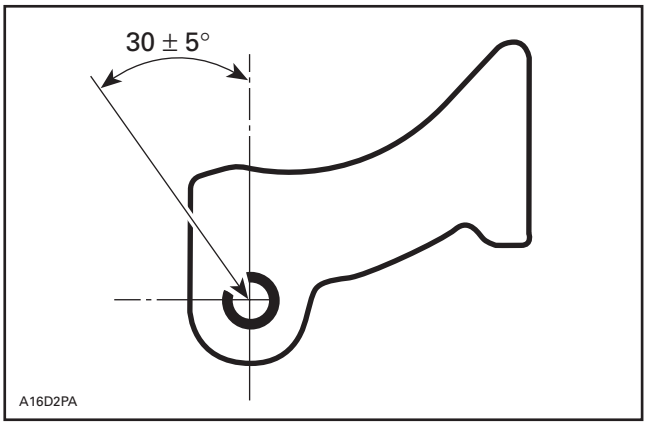
21,22,23, Screw, Dowel Tube and Ramp

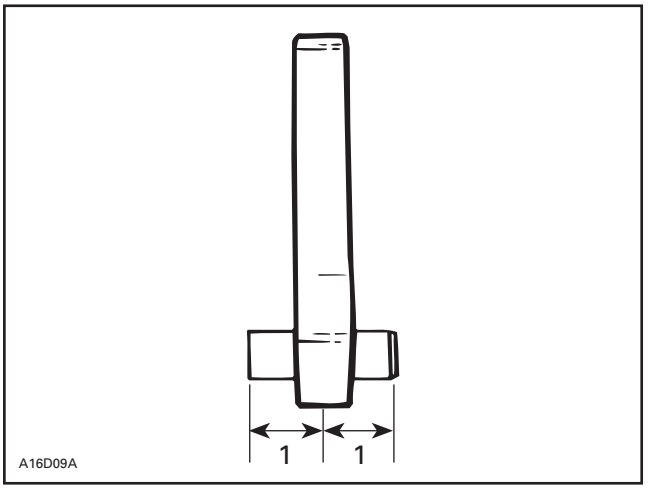
Insert dowel tube from chamfered side. Make sure ramp is centered on dowel tube.



1. Chamfered side

Position dowel tube split at the illustrated angle.





1. Equal distance

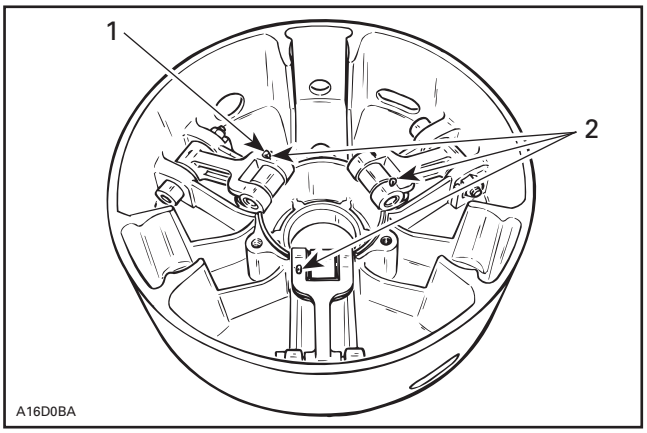
Torque screws to 10 N•m (89 lbf•**in**).

9,11,13,14, Screw, Lever Ass'y, Nut and Cotter Pin

Always install lever assemblies so that cotter pins are on the shown side. Besides install cotter pin head on top when lever is sat at bottom of sliding half. Bend cotter pin ends to sit perfectly against lever.

⚠ WARNING

Whenever replacing centrifugal levers, always replace all 3 at the same time. Otherwise, drive pulley misbalancing will occur because of levers difference.



1. Head on top
2. All on the same side

CAUTION: Lever assemblies must be installed so that cotter pins are on the same side.

Torque nuts to 12 N•m (106 lbf•**in**).

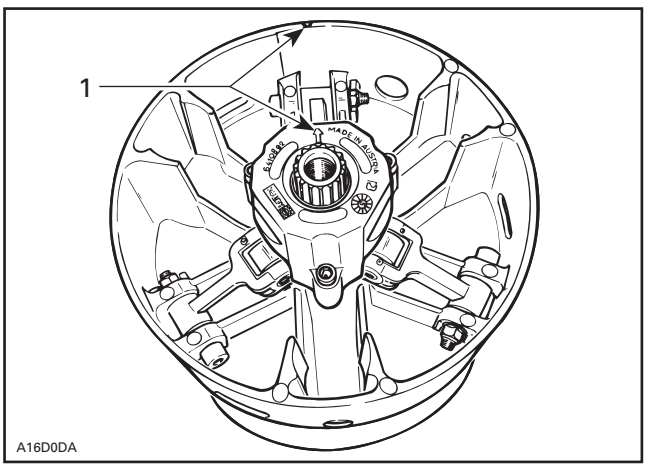
CAUTION: Lever ass'y and rollers must move easily after installation.

5,6,18,19, Fixed Half, Sliding Half, Spring, Spring Cover and Screw

To install spring cover, use spring compressor (P/N 529 035 524).

Assemble fixed and sliding halves. Note that fixed halves have different cone angle. Match cone angle with crankshaft.

Lift sliding half against spring cover and align spring cover arrow with sliding half mark.

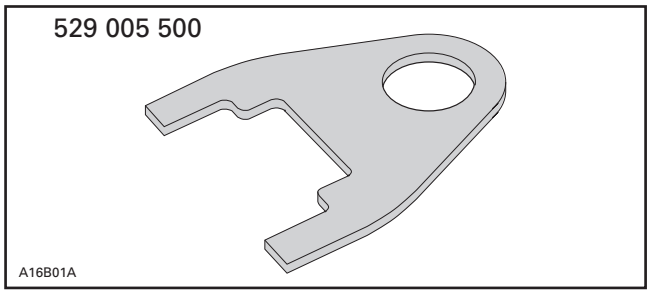


1. Align

Install and torque screws to 13 N•m (115 lbf•**in**).

6,25,29, Sliding Half, Slider Shoe and Governor Cup

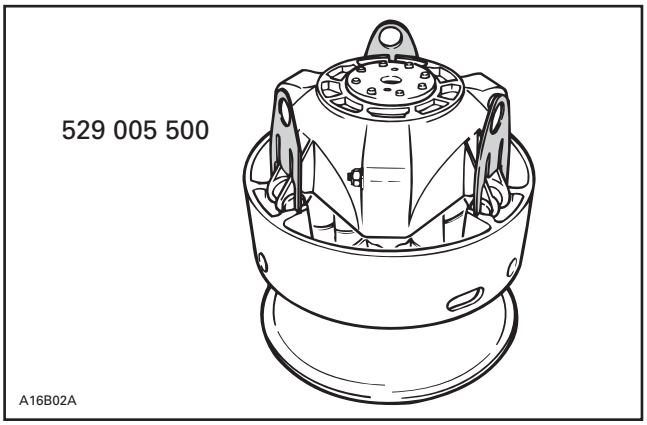
To install governor cup, use following tool:



Insert spring and slider shoes into governor cup so that groove in each slider shoe is vertical to properly slide in guides.

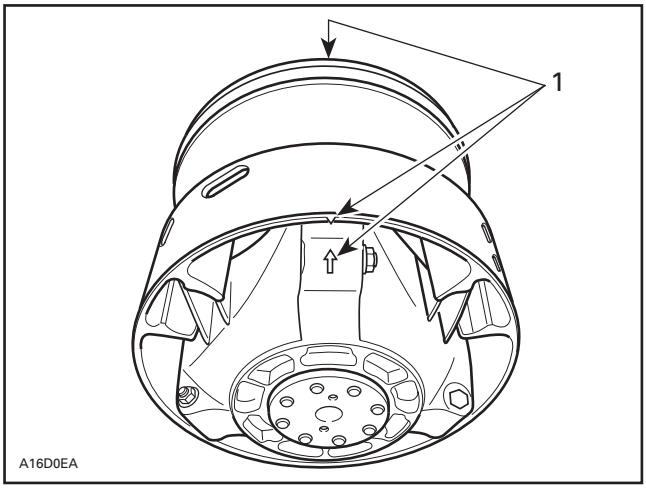
CAUTION: Make sure O-rings are installed on slider shoes and their grooves are positioned vertically.

Install fork (P/N 529 005 500) into slider shoe grooves to maintain them for governor cup installation. Proceed on 3 set of slider shoes.



Make sure to align governor cup arrow with sliding half and fixed half mark.

NOTE: If fixed half has no mark, align governor cup mark with segment no. 1 of inner half. Segments are identified on engine side.



1. Align

Carefully slide governor cup into sliding half. Align mark of governor cup with mark of fixed half.

Remove forks and push governor cup so that its splines engage with fixed half shaft splines.

CAUTION: Make sure splines of both parts are fully engaged.

INSTALLATION

⚠ WARNING

Do not apply anti-seize or any lubricant on crankshaft and drive pulley tapers.

⚠ WARNING

Never use any type of impact wrench at drive pulley removal and installation.

Clean mounting surfaces as described in CLEANING above.

Drive Pulley Ass'y

The installation procedure must be strictly adhered to as follows.

Install drive pulley on crankshaft extension.

Install conical washer with its concave side towards drive pulley then install screw.

⚠ WARNING

Never substitute conical washer and/or screw with jobber ones. Always use Bombardier genuine parts for this particular case.

Use holder. See removal procedure.

Torque screw to 90 to 100 N•m (66 to 74 lbf•ft).

Install drive belt and guard.

Raise and block the rear of the vehicle and support it with a mechanical stand.

⚠ WARNING

Ensure that the track is free of particles which could be thrown out while track is rotating. Keep hands, tools, feet and clothing clear of track. Ensure nobody is standing near the vehicle.

Accelerate the vehicle at low speed (maximum 30 km/h (20 MPH) and apply the brake, repeat 5 times.

Recheck the torque of 90 to 100 N•m (66 to 74 lbf•ft).

⚠ WARNING

After 10 hours of operation the transmission system of the vehicle must be inspected to ensure the retaining screw is properly torqued.

DRIVE PULLEY ADJUSTMENT

The drive pulley is factory calibrated to transmit maximum engine power at a predefined RPM. Factors such as ambient temperature, altitude or surface condition may vary this critical engine RPM thus affecting snowmobile efficiency.

This adjustable drive pulley allows setting maximum engine RPM in the vehicle to maintain maximum power.

Calibration screws should be adjusted so that actual maximum engine RPM in vehicle matches with the maximum horsepower RPM given in TECHNICAL DATA.

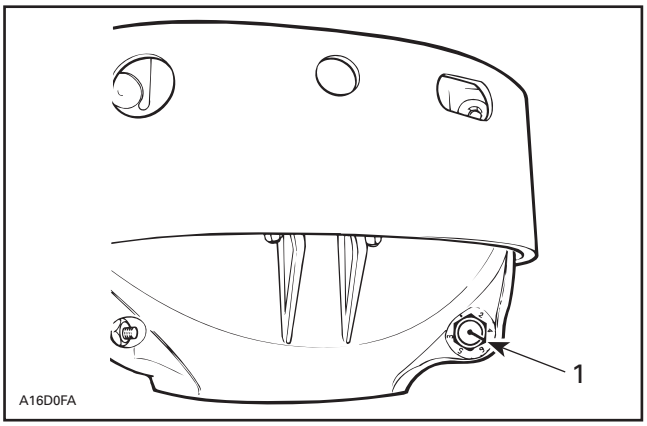
NOTE: Use precision digital tachometer for engine RPM adjustment.

NOTE: The adjustment has an effect on high RPM only.

To adjust, modify ramp end position by turning calibration screws.

26,28,29, Calibration Screw, Locking Nut and Governor Cup

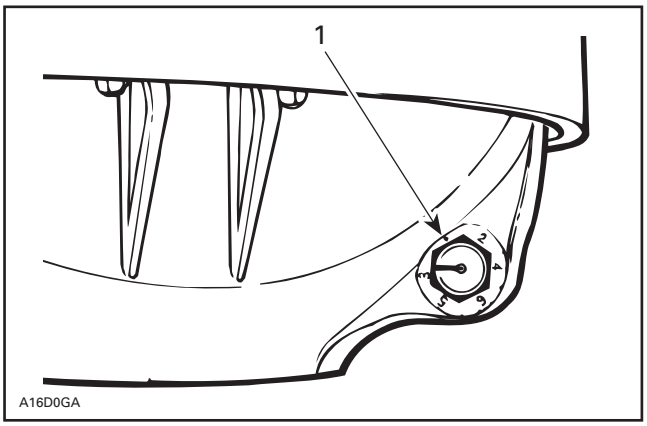
Calibration screw has a notch on top of its head.



1. Notch

Governor cup has 6 positions numbered 2 to 6. Note that in position 1 there is no stamped number (due to its location on casting).

See TECHNICAL DATA for original setting.



1. Position 1 (not numbered)

Each number modifies maximum engine RPM by about 200 RPM.

Lower numbers decrease engine RPM in steps of 200 RPM and higher numbers increase it in steps of 200 RPM.

Example:

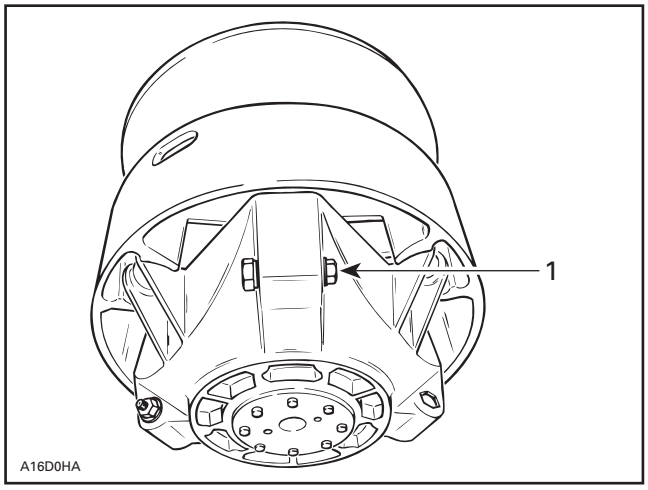
Calibration screw is set at position 3 and is changed to position 5. So maximum engine RPM is increased by about 400 RPM.

To Adjust:

Just loosen locking nut enough to pull calibration screw **partially** out and adjust to desired position. Do not completely remove the locking nut. Torque locking nuts to 10 N•m (89 lbf•**in**).

CAUTION: Do not completely remove calibration screw otherwise its inside washer will fall off.

CAUTION: Always adjust all 3 calibration screws and make sure they are all set at the same number.

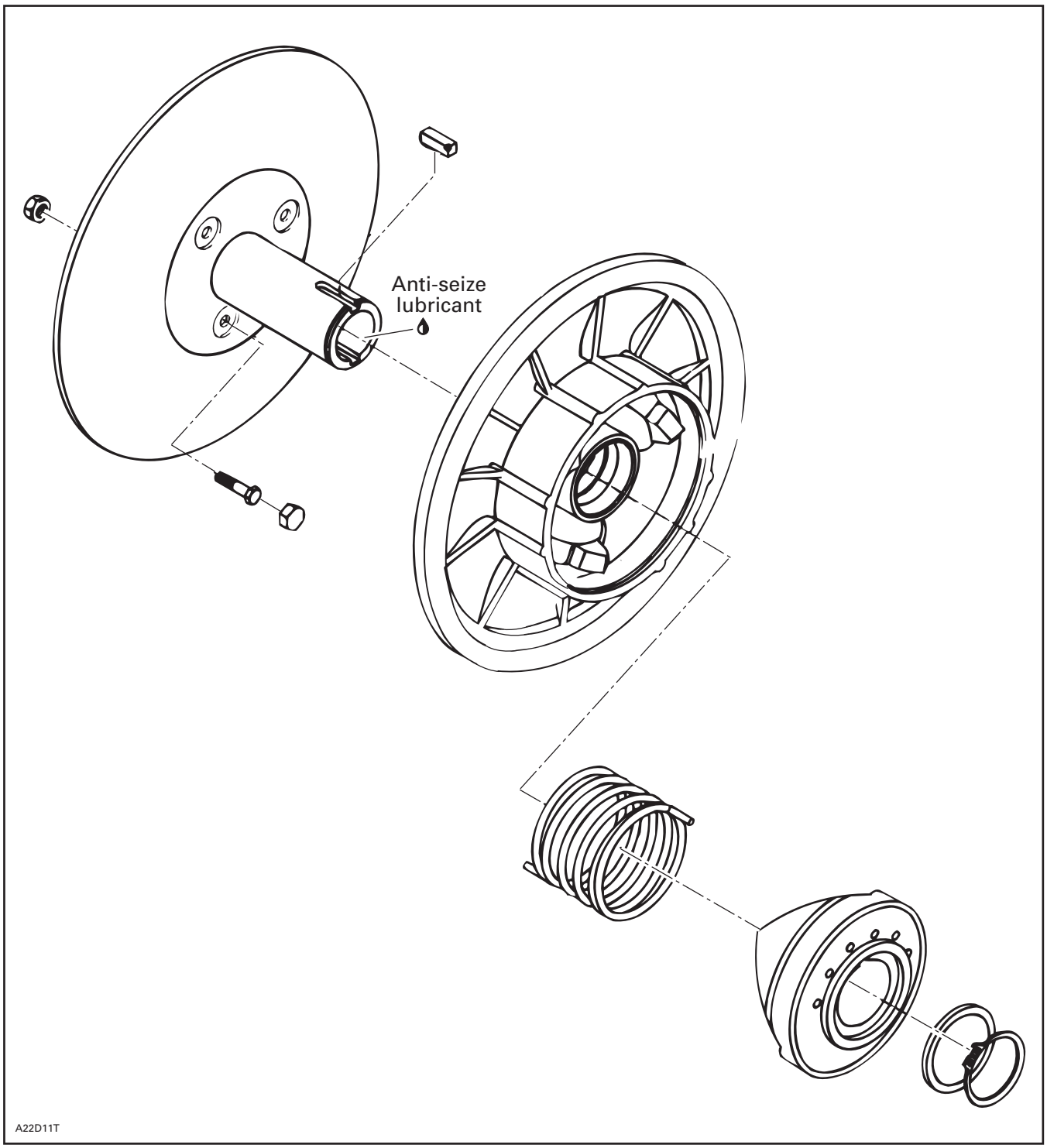


1. Loosen just enough to permit rotating of calibration screw

DRIVEN PULLEY

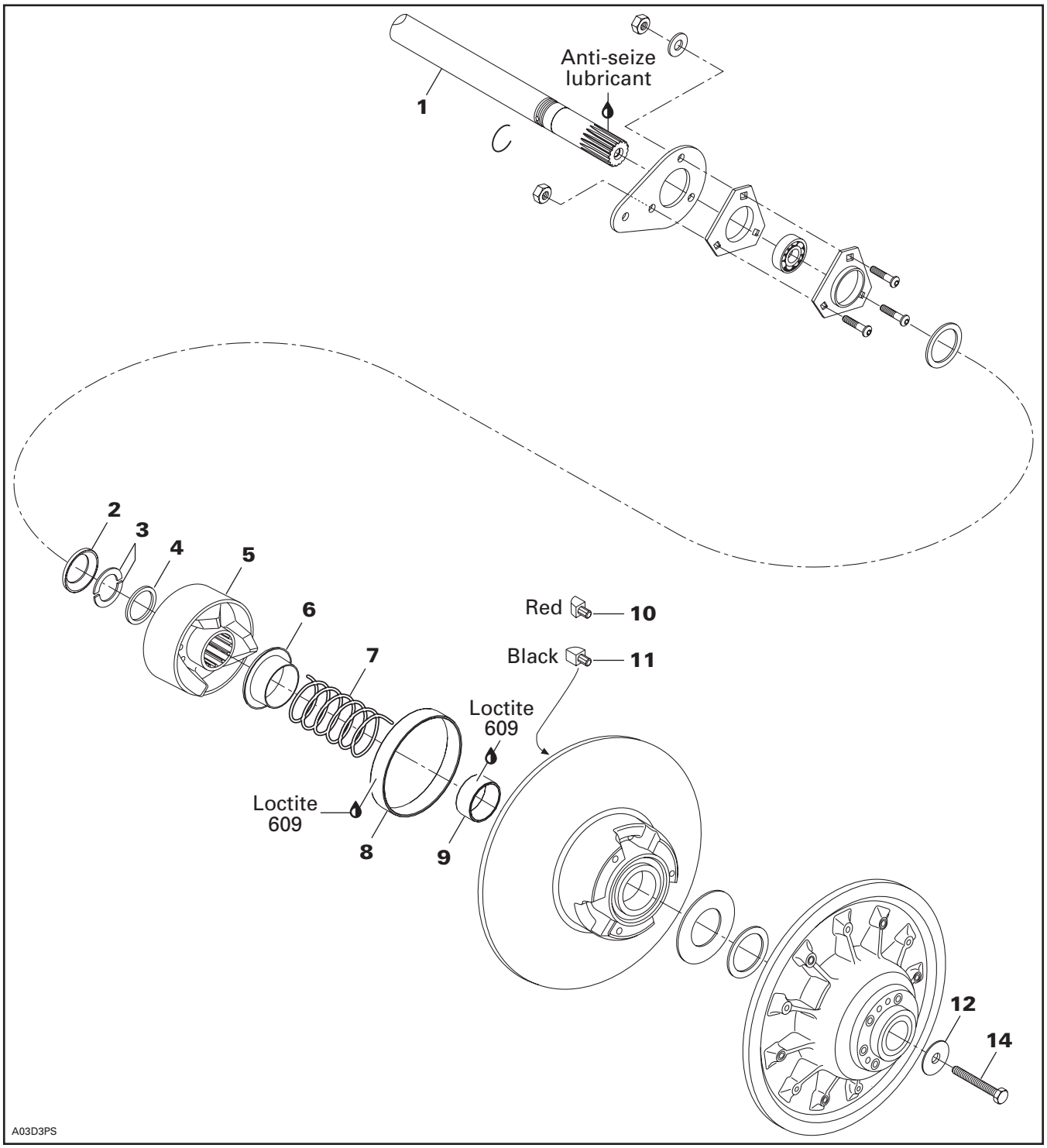
THRUSTBUSHING

Skandic WT/SWT/WT LC



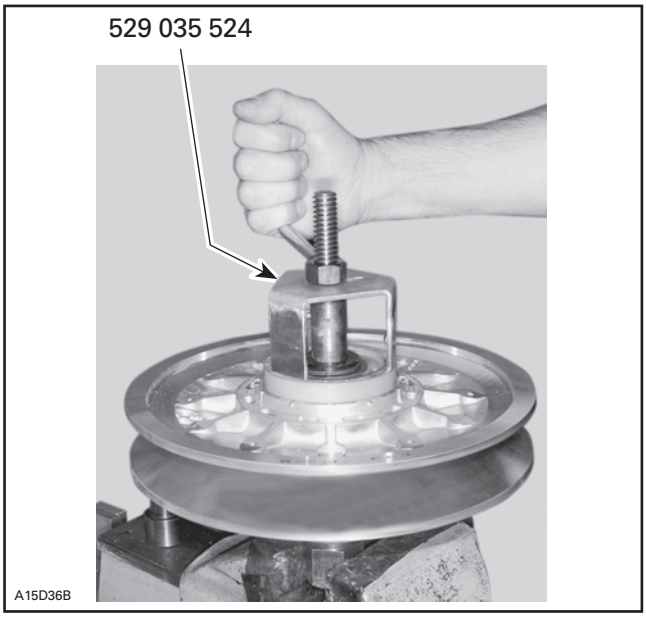
LPV27

S-Series and Skandic LT



DISASSEMBLY

Use spring compressor (P/N 529 035 524).



TYPICAL

Remove half keys **no. 3** and spacer **no. 4** to disassemble the outer cam and the 2 pulley halves.

⚠ WARNING

Driven pulley cam is spring loaded, use above mentioned tool.

INSPECTION

Replace bushing(s) if worn more than specified.

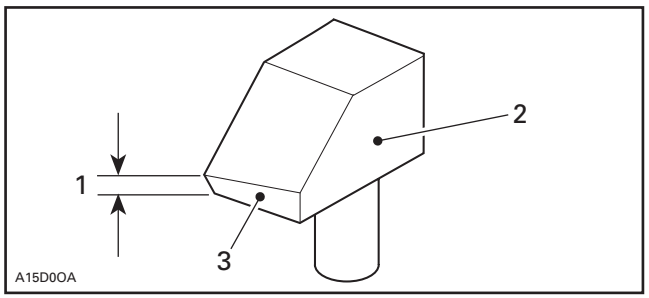
DRIVEN PULLEY BUSHING WEAR LIMIT mm (in)	
Small bushing	38.30 (1.508)
Large bushing	108.2 (4.260)

10,11, Slider Shoe

Black slider shoe = forward

Red slider shoe = reverse

Check cam slider shoes for wear. Replace when inside edge of cam slider shoe slope base is worn to 1 mm (.039 in) or less.



1. *Measure thickness of slope base here*
2. *Sliding pulley side*
3. *Slope base*

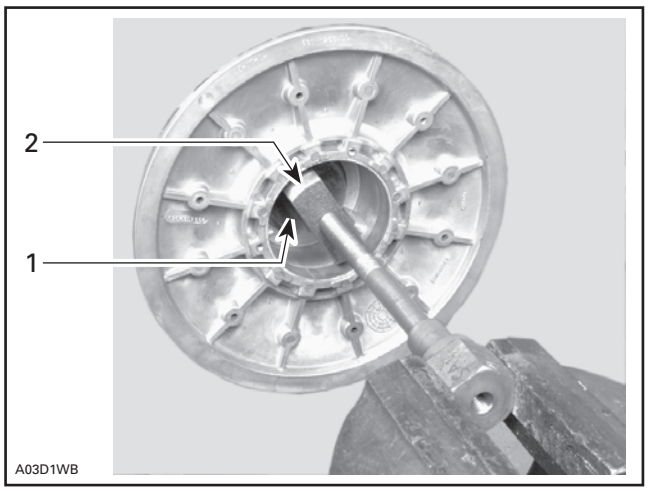
Bushing Replacement

Large Bushing

Remove Allen screws if applicable. Heat to break Loctite bond.

Install support plate included in tool (P/N 529 031 100) inside sliding half.

Place extractor (P/N 529 035 575) below bushing.



TYPICAL

1. *Support plate*
2. *Extractor*

Mount screw head of new puller (P/N 529 035 524) in a vise.

Turn pulley half by hand to extract old bushing.

Before bushing installation, file sliding half bore to remove burrs from crimping areas.

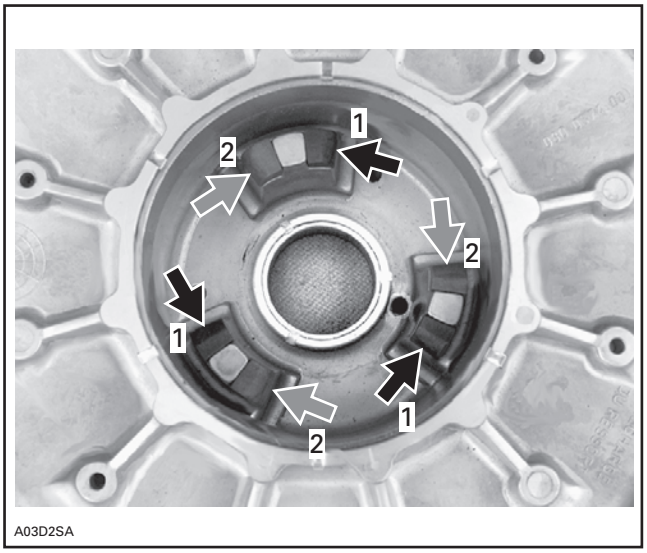
Coat bushing outside diameter with Loctite 609 (P/N 413 703 100). Place new bushing on sliding half and slightly tap to engage squarely the bushing in the sliding.

ASSEMBLY

10,11, Cam Slider Shoe

When replacing slider shoes, always install a new set (3 shoes) to maintain equal pressure on the cam.

Install slider shoes as per following photo. Red slider shoes are being used for reverse and black ones for forward.



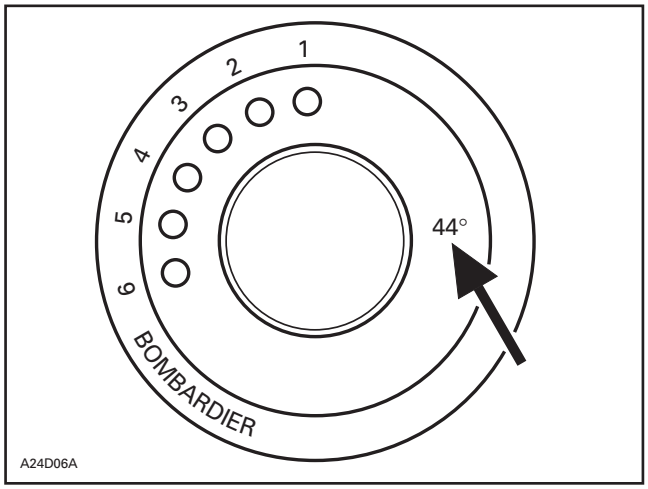
1. BLACK slider shoe
2. RED slider shoe

Assemble driven pulley components by reversing the disassembly procedure.

5,6,7, Cam, Guard and Spring

Make sure to install proper cam. Refer to TECHNICAL DATA.

Cam angle is identified on cam.

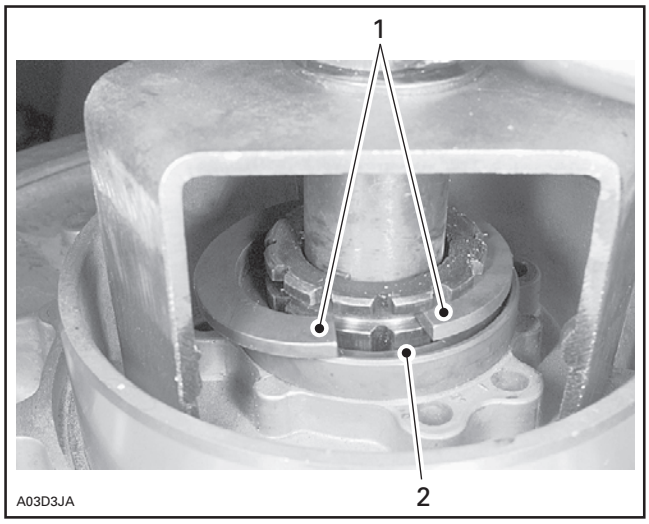


Position guard **no. 6** in cam **no. 5** then insert spring in adjusting hole **no. 3** (mid-hole) into outer cam.

Compress outer cam using spring compressor (P/N 529 035 524).

Install spacer **no. 4** then secure outer cam with half keys **no. 3**, as shown in the next photo.

CAUTION: Ensure that half keys are properly inserted into shaft groove and that spacer recess is facing half keys.



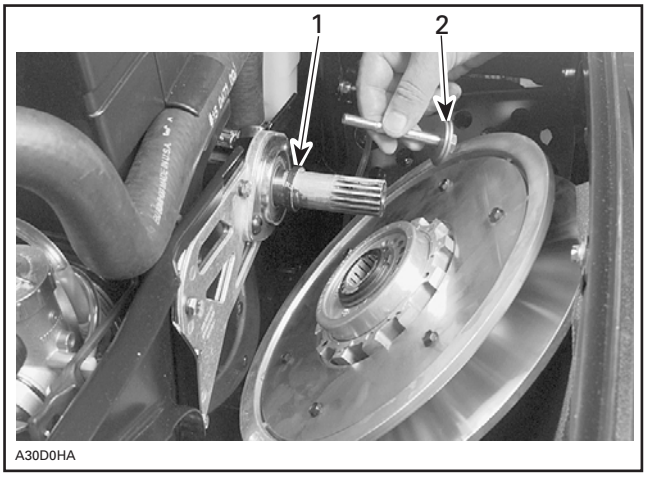
1. Half keys inserted into shaft groove
2. Spacer recess facing half keys

INSTALLATION

1, Countershaft

CAUTION: Always apply anti-seize lubricant (P/N 413 701 000) on the countershaft before final pulley installation.

Make sure that spacer no. 2 is on countershaft before installing driven pulley. Note also that washer shoulder is facing driven pulley.



TYPICAL

1. *Spacer*
2. *Shoulder on this side*

Should installation procedure be required, refer to BRAKE then look for Brake Disc and Countershaft Bearing Adjustment.

Reinstall the pulley on the countershaft by reversing the removal procedure.

14, Pulley Retaining Screw

Torque to 25 N•m (18 lbf•ft).

ADJUSTMENT

Pulley Alignment and Drive Belt Deflection

Refer to PULLEY DISTANCE AND ALIGNMENT and DRIVE BELT to perform adjustments.

CAUTION: Drive belt and pulley adjustments must always be checked whenever pulleys have been removed, replaced or disassembled.

PULLEY DISTANCE AND ALIGNMENT

GENERAL

The pulley distance we will refer to in this section, is the space separating the drive and driven pulley outside diameters (Z measurement).

This basic distance is provided as an assembly guide and indicates the dimensions between which satisfactory belt deflection will be obtained.

Both pulley distance adjustment and pulley alignment must be carried out to ensure the highest efficiency of the transmission system. Furthermore, optimum drive belt operation and minimal wear will be obtained only with proper pulley alignment.

CAUTION: Before checking pulley adjustment, the rear suspension must be mounted on the vehicle and track tension/alignment must be done. Always check pulley adjustment after suspension is adjusted.

⚠ WARNING

Failure to correctly perform pulley alignment may cause the vehicle to creep forward at idle.

All pulley alignment specifications refer to:

X = Distance between straight bar and drive pulley fixed half edge, **measured between pulleys**.

Y = Distance between straight bar and drive pulley fixed half edge, **measured at the end of straight bar**.

Z = Distance between outside diameter of pulleys.

GENERAL PROCEDURE

Remove guard.

S-Series and Skandic LT

Use driven pulley opening tool (P/N 529 035 501).

All Models

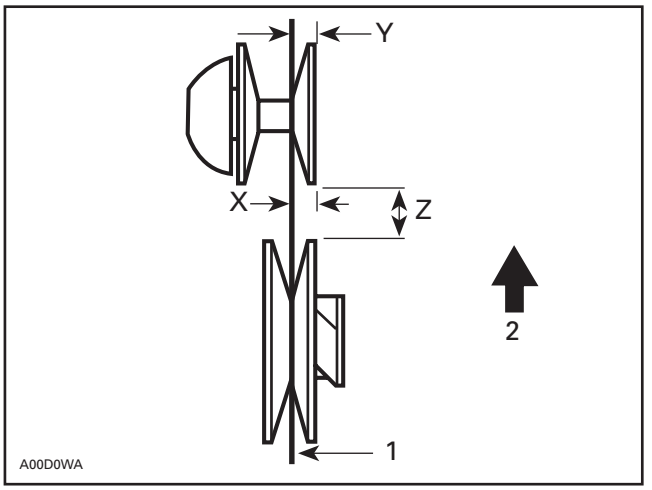
Remove drive belt.

Insert a straight bar 9.5 mm (.375 in) square, 48 cm (19 in) long or the proper alignment template into the opened driven pulley.

Measuring Procedure

Using Straight Bar:

Always measure distances X and Y from the farther straight bar side (including its thickness to the fixed half edge).



1. Straight bar
2. Front of vehicle

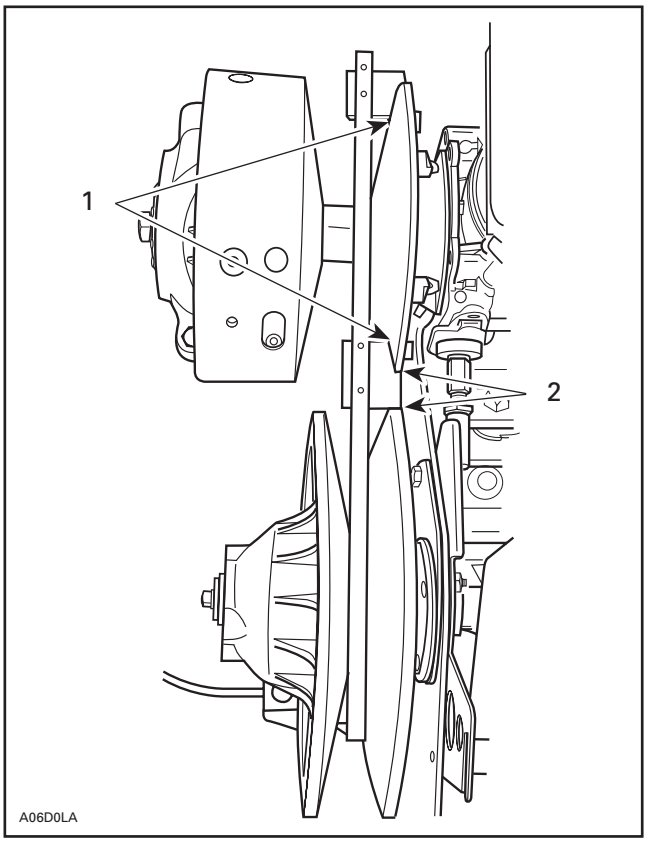
The distance Y **must** exceed distance X to compensate for the twist due to the engine torque.

Nominal Value Procedure and Quick Alignment and Distance Check

Alignment template tabs must fully contact fixed half of drive pulley.

Pulley distance is correct when tab contacts both pulley halves.

Refer to chart below for proper alignment template.



TYPICAL
1. *Contact (alignment)*
2. *Contact (distance)*

Drive Belt Deflection

NOTE: When pulley distance and alignment are adjusted to specifications, refer to DRIVE BELT to adjust drive belt deflection.

CAUTION: This section deals mainly with adjustment procedures. For complete assembly requirements, refer to the proper ENGINE or TRANSMISSION installation section.

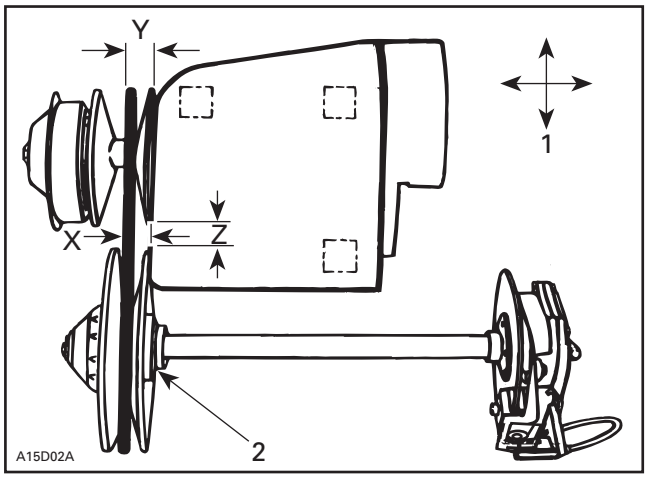
PULLEY ALIGNMENT AND DISTANCE SPECIFICATIONS CHART

MODEL	PULLEY DISTANCE	OFFSET		ALIGNMENT TEMPLATE ①
	Z	X	Y-X	
	± 0.50 mm (.020 in)	± 0.50 mm (.020 in)	± 0.5 mm (.020 in)	P/N
Touring Fan 380, Formula DLX 380, MX Z Fan 380	26.0 (1.024)	33.4 (1.315)	1.0 (.039)	529 035 586
Touring Fan 500, Formula DLX Fan 500, MX Z Fan 440/500	17.0 (.669)	35.5 (1.398)	1.0 (.039)	529 035 530
Skandic LT	34.2 ± 0.75 (1.346 ± .030)	37.0 ± 0.75 (1.457 ± .030)	0.75 to 2.25 (.030 to .086)	
Skandic WT/SWT/WT LC	32.3 ± 0.75 (1.272 ± .030)	35.0 ± 0.75 (1.380 ± .030)	0.75 to 2.25 (.030 to .086)	529 035 545

① Alignment templates have been made according to pulley alignment nominal values. However, they do not take into account allowed tolerances for alignment specifications. They are used as GO/NO GO gauges for quick alignment and pulley distance check and as templates to reach alignment nominal values.

Pulley Distance Adjustment Method

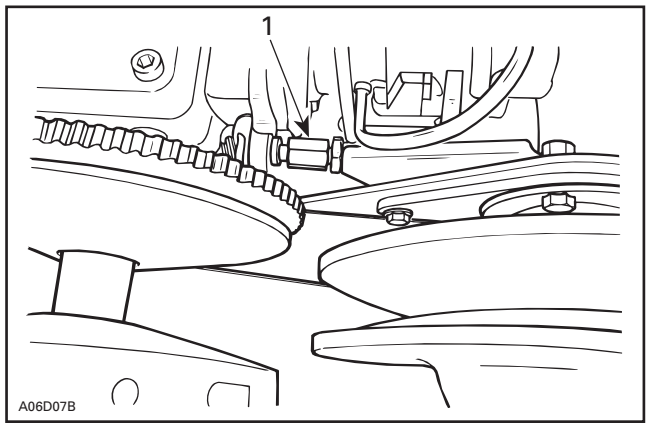
S-Series



TYPICAL

1. *Engine movement*
2. *Contact*

NOTE: Prior to performing pulley adjustment, loosen torque rod nut to allow engine movement. Engine supports have tendency to stick to frame, work engine loose prior to aligning.



1. *Loosen*

Engine Movement

The engine support has slotted mounting holes. Move engine to obtain specified distance between pulleys.

Pulley Alignment Method

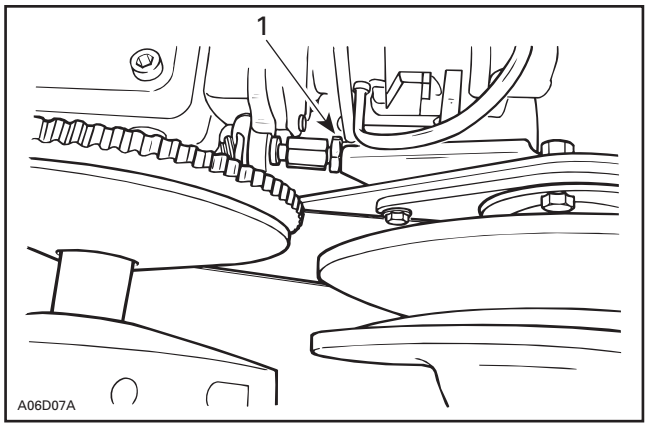
Driven Pulley Movement

When engine slotted mounting holes do not allow to set proper pulley offset X, adjust with shims (P/N 504 108 200) between pulley and countershaft bearing support (pulley pushed toward brake disc).

Engine Movement

Loosen the 4 bolts retaining engine support to the frame. Position engine to obtain the specified alignment.

NOTE: After alignment, adjust torque rod so it slightly contacts stopper plate. Do not over tighten, it will disalign pulleys.

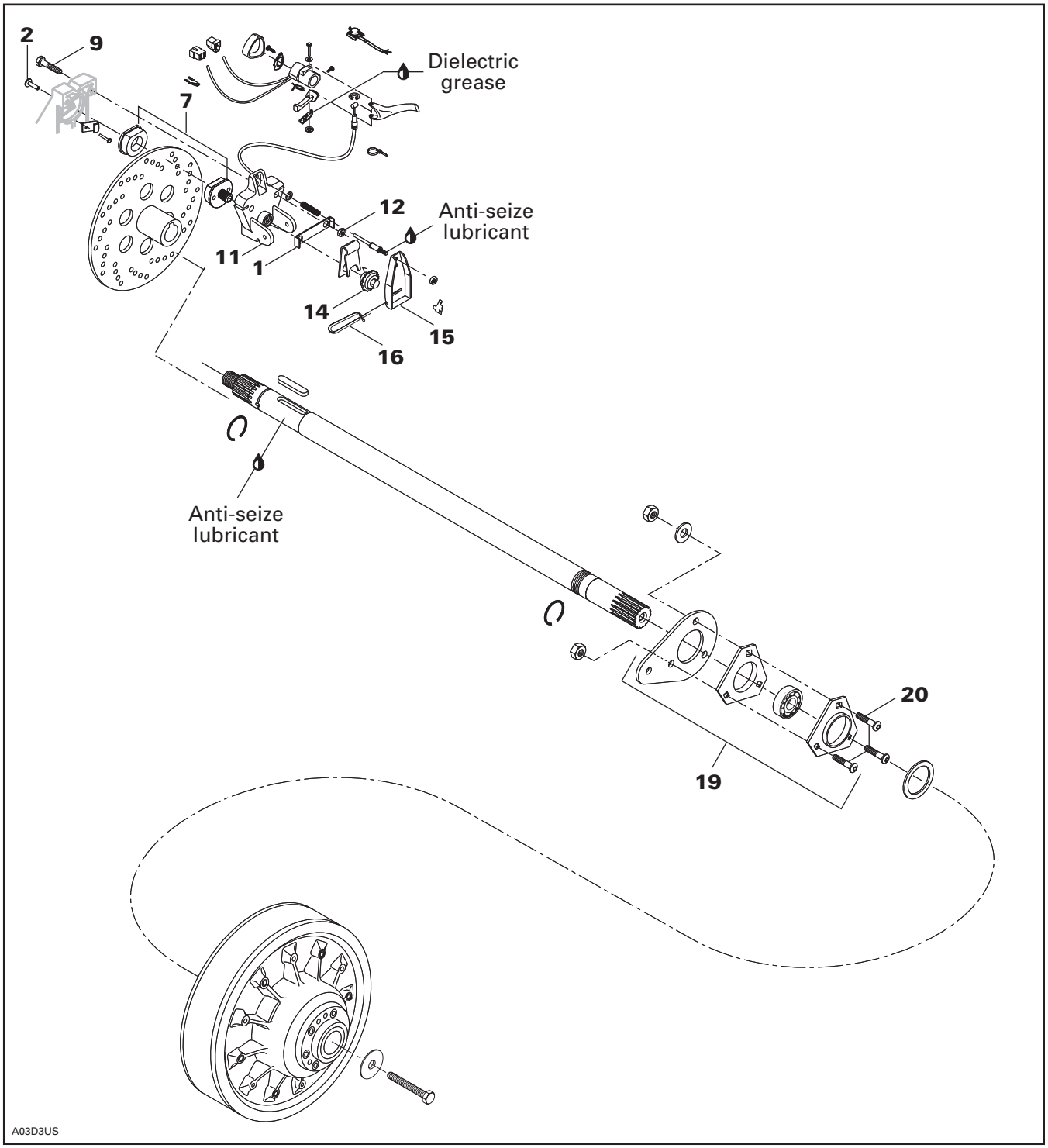


1. *Retighten*

BRAKE

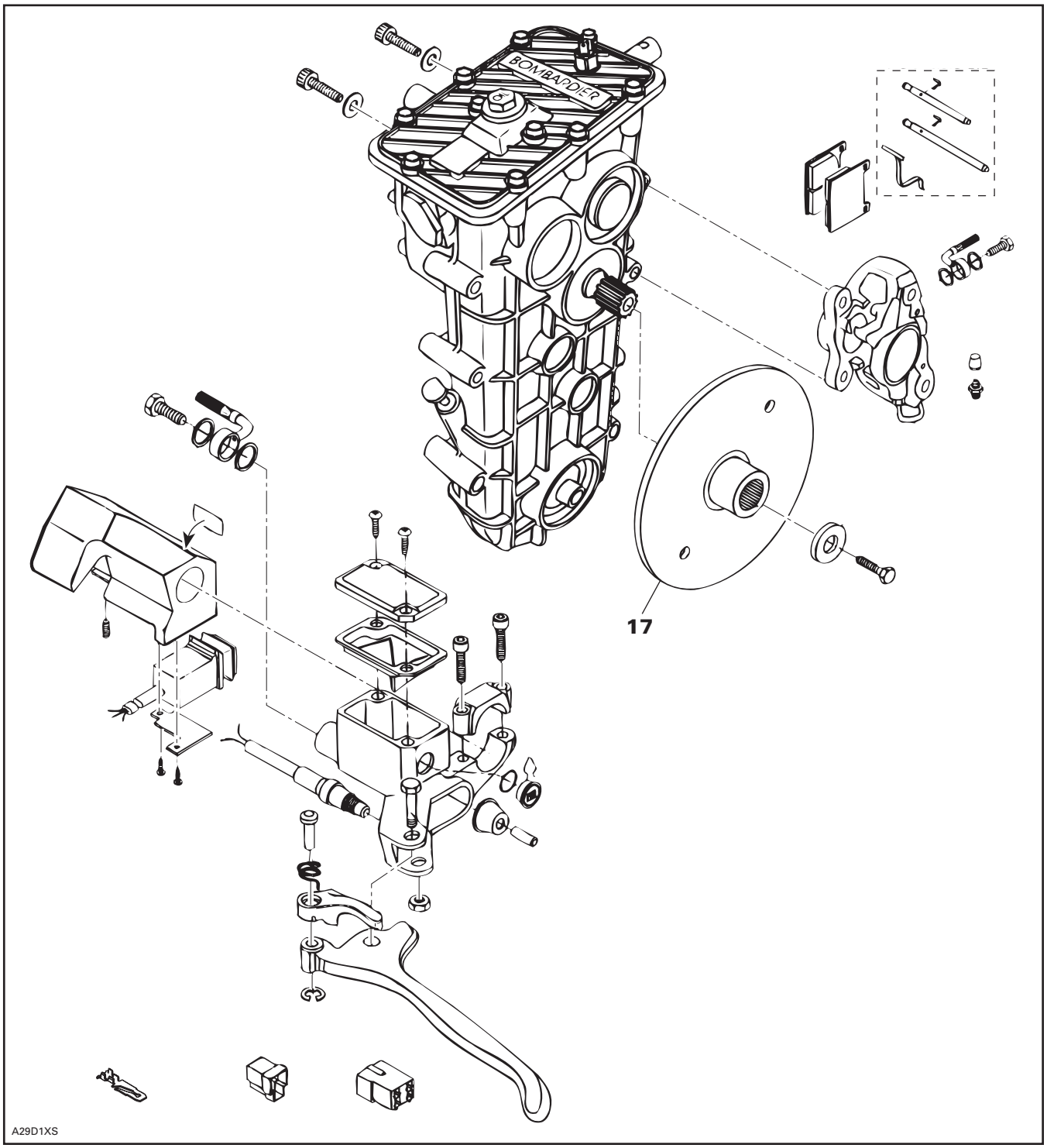
MECHANICAL BRAKE

Formula DLX 380, Touring Fan 380, MX Z Fan 380 and Skandic LT

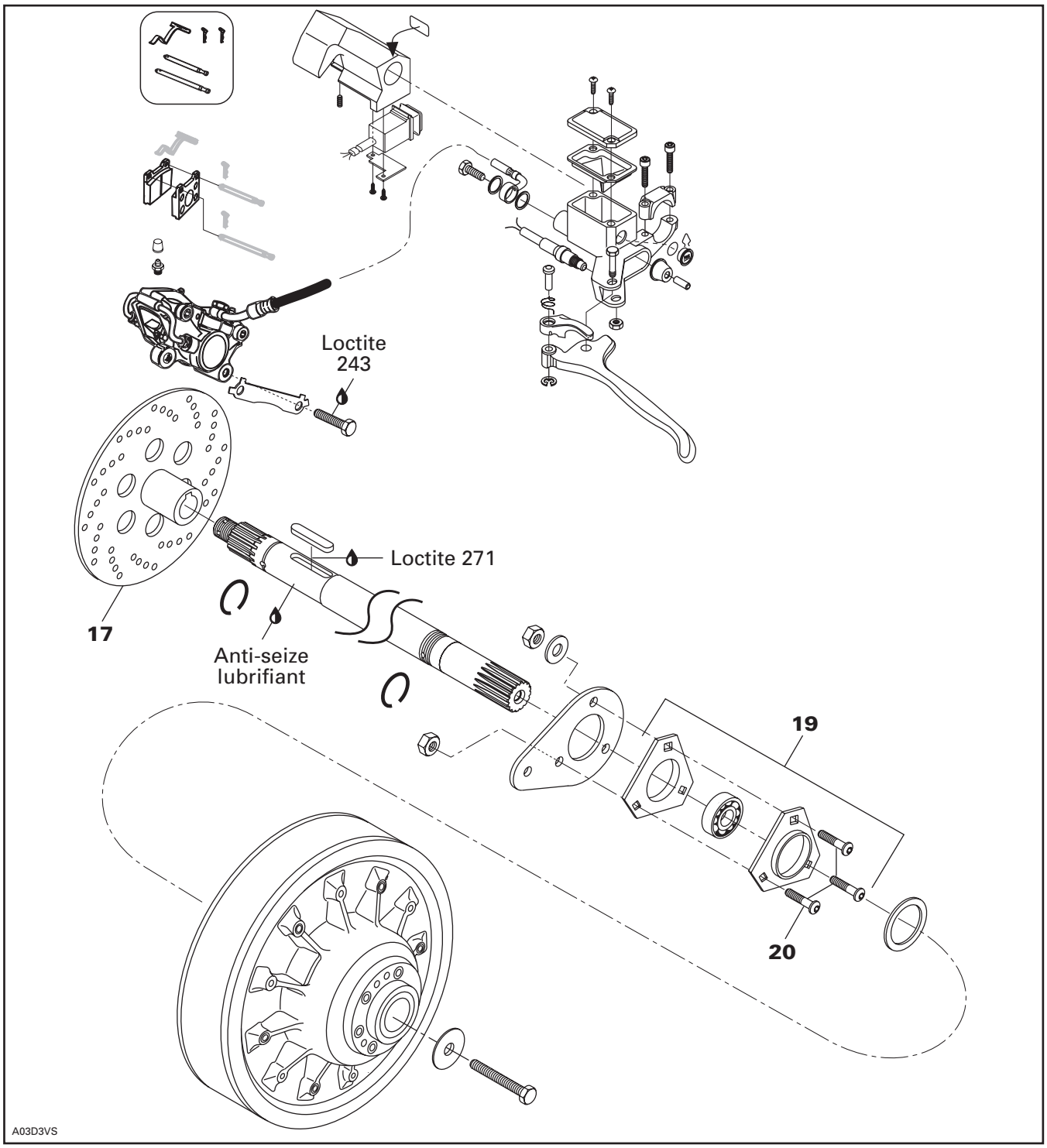


HYDRAULIC BRAKE

Skandic WT/SWT/WT LC



Formula DLX Fan 500, Touring Fan 440/500 and Summit Fan 500



REMOVAL

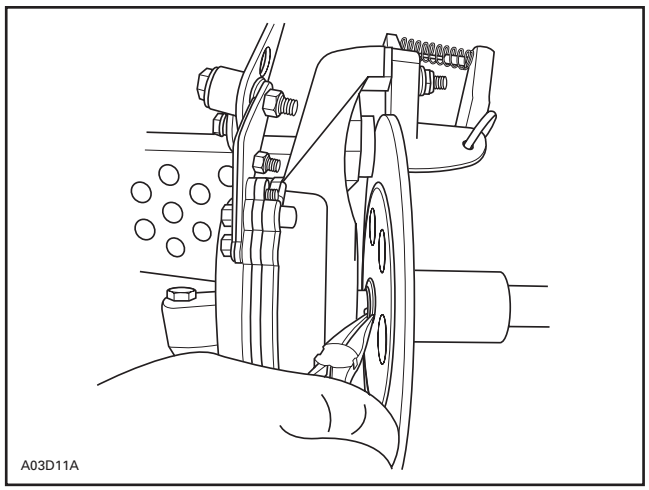
Brake Disc Removal

Skandic WT/SWT/WT LC

– Remove caliper by unscrewing M10 Allen screws.
– Unbolt disc.

S-Series and Skandic LT

– Remove caliper.
– Remove guard, belt and driven pulley.
– Remove air silencer.
– Unbolt bearing support **no. 19** from chassis.
– Open chaincase and remove upper sprocket.
– Pull countershaft assembly toward driven pulley side to gain access to clip **no. 25**.
– Remove clip **no. 25** on countershaft.



– Pull countershaft toward driven pulley side to free from chaincase and disc.
– Remove disc.

Countershaft Removal

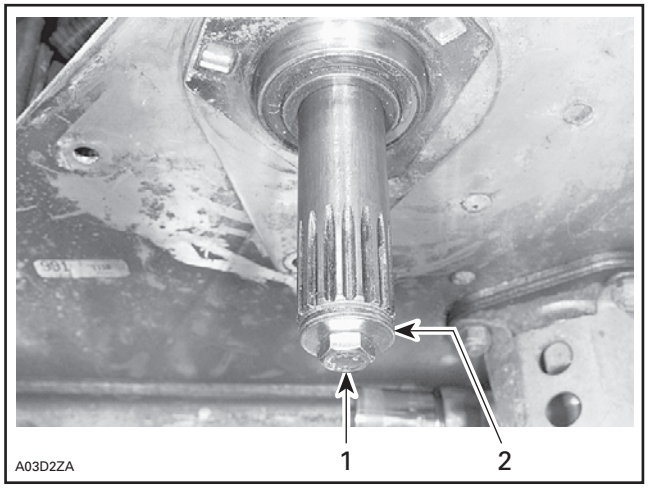
S-Series and Skandic LT with Mechanical Brake

Proceed the same as for brake disc removal.

Countershaft Bearing Removal

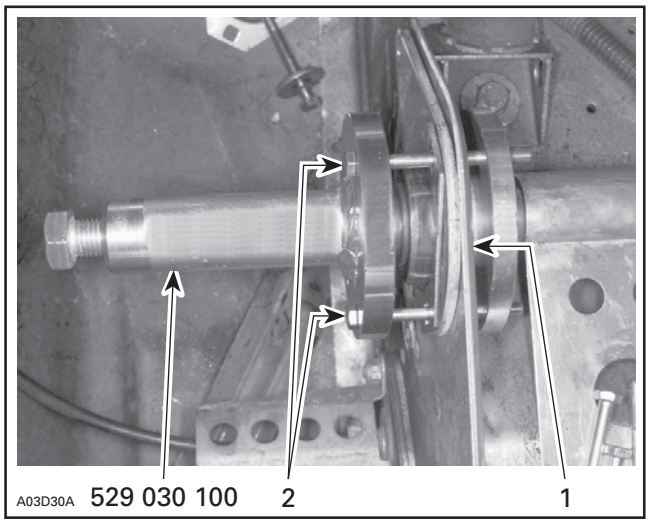
S-Series

Unbolt bearing support and triangular support. Install screw from remover (P/N 529 030 100) and some flat washers of 3 mm (1/8 in) total thickness.



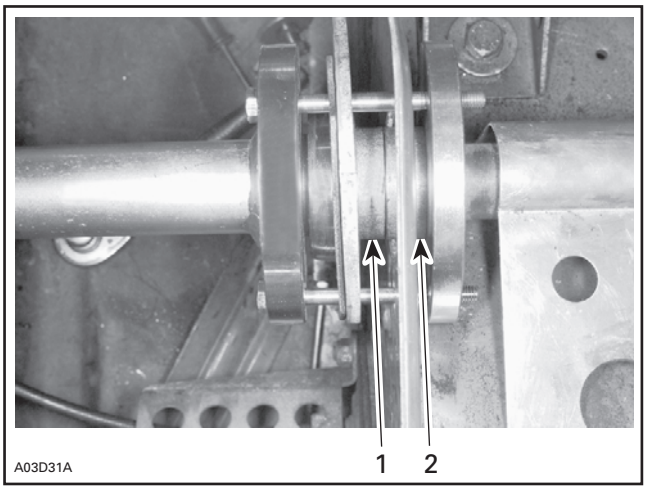
1. Screw from tool
2. Washers use as a 3 mm (1/8 in) spacer

Install remover (P/N 529 030 100) on countershaft and medium thickness spacer. Use M6 x 70 mm screws instead of screws supplied with remover.



1. Medium thickness spacer
2. M6 x 70 mm screws

Add the thin spacer to complete bearing removal.



1. *Thin spacer*
2. *Medium thickness spacer*

DISASSEMBLY

7,15,16,23, Brake Pad, Brake Lever, Pin and Screw

All Models with Mechanical Brake

Pull pin out of caliper and remove lever.

Fixed pad is riveted to chaincase on these models. Caliper must be split to remove moving pad. To removed fixed pad, drill out its rivet then pry disc in order to free fixed pad.

All Models with Hydraulic Brake

Only brake pads are available as spare parts. If caliper or master cylinder are damaged, replace each of them as an assembly.

CLEANING

Clean all metal components in a general purpose solvent. Thoroughly dry all components before assembling.

CAUTION: Do not clean brake pads in solvent. Soiled brake pads must be replaced by new ones.

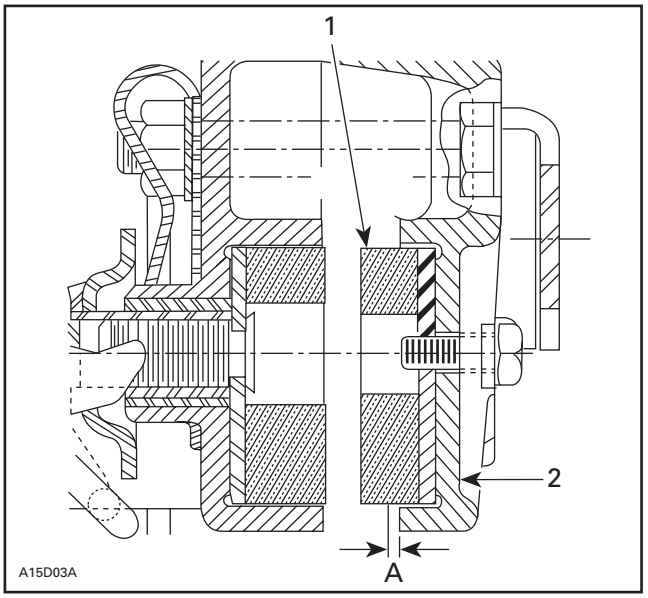
INSPECTION

7, Brake Pad

Models with Mechanical Brake

Brake pads must be replaced when **fixed** pad projects only 1 mm (1/32 in) from caliper.

CAUTION: Brake pads must always be replaced in pairs.



TYPICAL

1. *Fixed pad*
2. *Inner caliper*

A. 1 mm (1/32 in) minimum

Models with Hydraulic Brake

Brake pads must be replaced when lining is 1 mm (1/32 in) thick.

CAUTION: Brake pads must always be replaced in pairs.

Brake Disc

All Models

Check for scoring, cracking or heat discoloration, replace as required.

CAUTION: Brake disc should never be machined.

ASSEMBLY

14, Ratchet Wheel

Apply synthetic grease (P/N 413 711 500) on threads and spring seat prior to installing. Fully tighten then back off one turn.

16, Pin

Install so that it can only be removed upward. Lock it in the caliper casting notch.

INSTALLATION

To install brake, reverse removal procedure paying attention to the following.

⚠ WARNING

Avoid getting oil on brake pads. Do not lubricate or apply antirust or antifreeze solution in brake cable.

17, Brake Disc

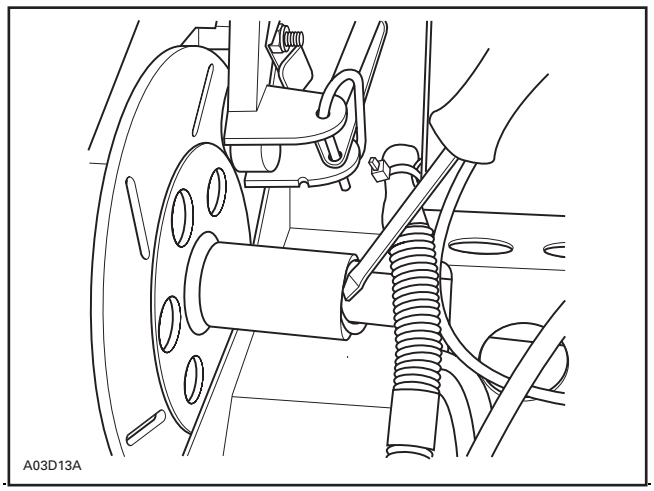
S-Series and Skandic LT

The brake disc must be floating on countershaft for efficient operation of brake.

Apply anti-seize lubricant (P/N 413 701 000) on shaft and check that disc slides freely.

The disc hub exceeds the disc more from one side than from the other. Install disc with the longer exceeding portion toward driven pulley.

Push O-rings inside disc hub.

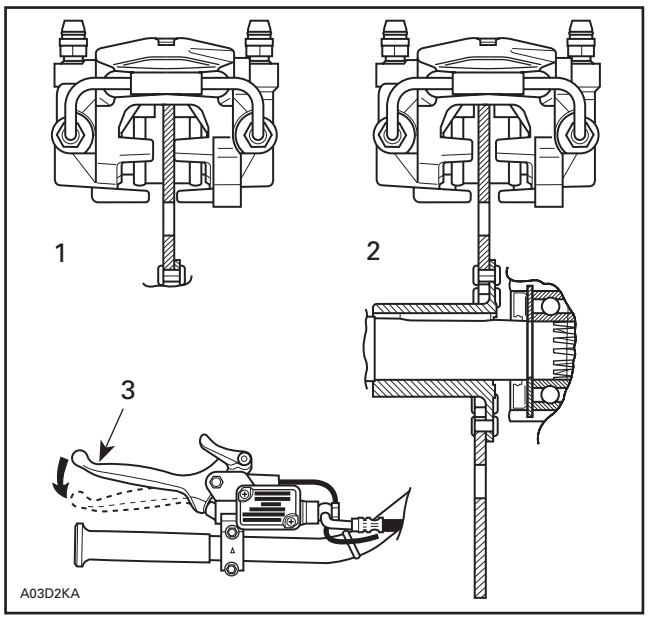


7, Brake Pad

Models with Hydraulic Brake

After brake pads installation, brake disc must be centered in caliper. Apply brake then check for proper brake disc positioning.

Push on appropriate caliper piston in order to move pad inward allowing proper brake disc positioning.



1. Brake disc not centered
2. Brake disc centered
3. Apply brake before checking

Apply brake then recheck.

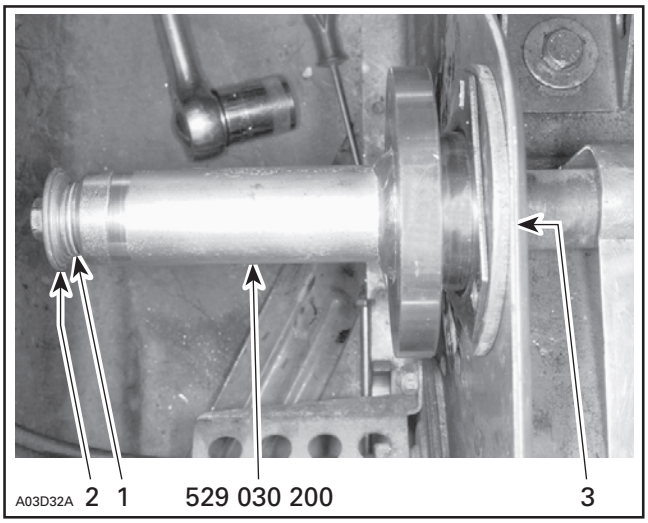
Countershaft Bearing Adjustment

S-Series

Insert countershaft (with brake disc) from chaincase side through countershaft support (driven pulley side), then insert into chaincase.

Install countershaft bearing **no. 19** using proper tool.

To install bearing on countershaft, use remover (P/N 529 030 100) and some flat washers of 3 mm (1/8 in) total thickness. Using original retaining screw and shouldered washer tighten until bearing rests against circlip.



1. *Washers use as a 3 mm (1/8 in) spacer*
2. *Original retaining screw and shouldered washer*
3. *Bearing against circlip*

Ensure that countershaft is properly aligned, then tighten 3 retaining screws.

NOTE: A misaligned countershaft will result in difficulty to center the bearing in its support.

Refer to DRIVE AXLE then look Chaincase Perpendicularity Adjustment.

Torque castellated nut of upper sprocket to 53 N•m (39 lbf•ft).

Close chaincase referring to CHAINCASE.

1,11,12, Locking Tab, Outer Caliper and Nut

S-Series and Skandic LT

Install caliper retaining bolts.

Assemble outer caliper. Install locking tab then nuts. Torque nuts to 24 N•m (18 lbf•ft). Bend locking tab over a flat of each nut.

5,12, Brake Cable and Nut

Insert brake cable into upper hole in brake lever and caliper. Install nut and tighten until a few threads exceed.

⚠ WARNING

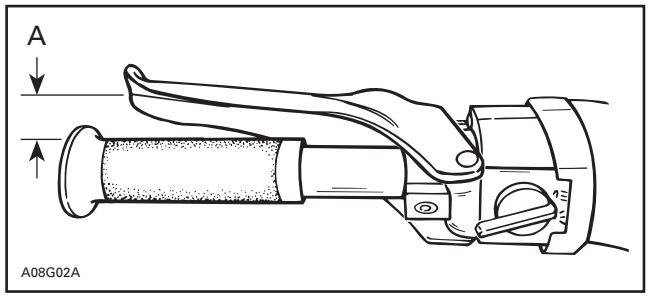
At least 3 threads must exceed the elastic stop nut.

ADJUSTMENT

Brake

Models with Mechanical Brake

Fully depress brake handle several times to obtain 13 mm (1/2 in) between brake handle and handlebar grip when brake is fully applied.



A. 13 mm (1/2 in)

Should this adjustment be unattainable, retighten nut no. 12 as needed.

Models with Hydraulic Brake

Change brake fluid once a year.

Bleed brake system as follows:

Keep sufficient DOT 4 brake fluid in reservoir at all times.

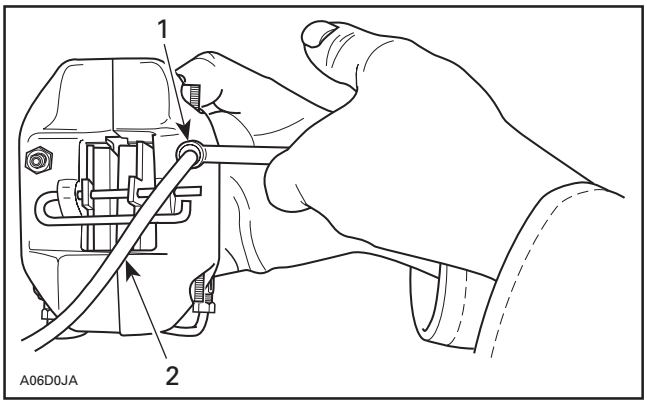
CAUTION: Use only DOT 4 brake fluid.

Install a hose on left side bleeder. Route this hose to a container.

Pump a few times brake lever and while holding brake lever depressed, open bleeder and check for air to escape.

Repeat with the same bleeder until no air appears in hose.

Proceed the same way with the right side bleeder.



TYPICAL

1. *Open bleeder*
2. *Clear hose to catch used brake fluid*

Brake Light

Models with Mechanical Brake

Brake light should light up before brake pads touch brake disc. To adjust, unscrew nut no. 12 until brake light goes on.

⚠ WARNING

At least one full thread must exceed the elastic stop nut.

Check brake adjustment as described above.

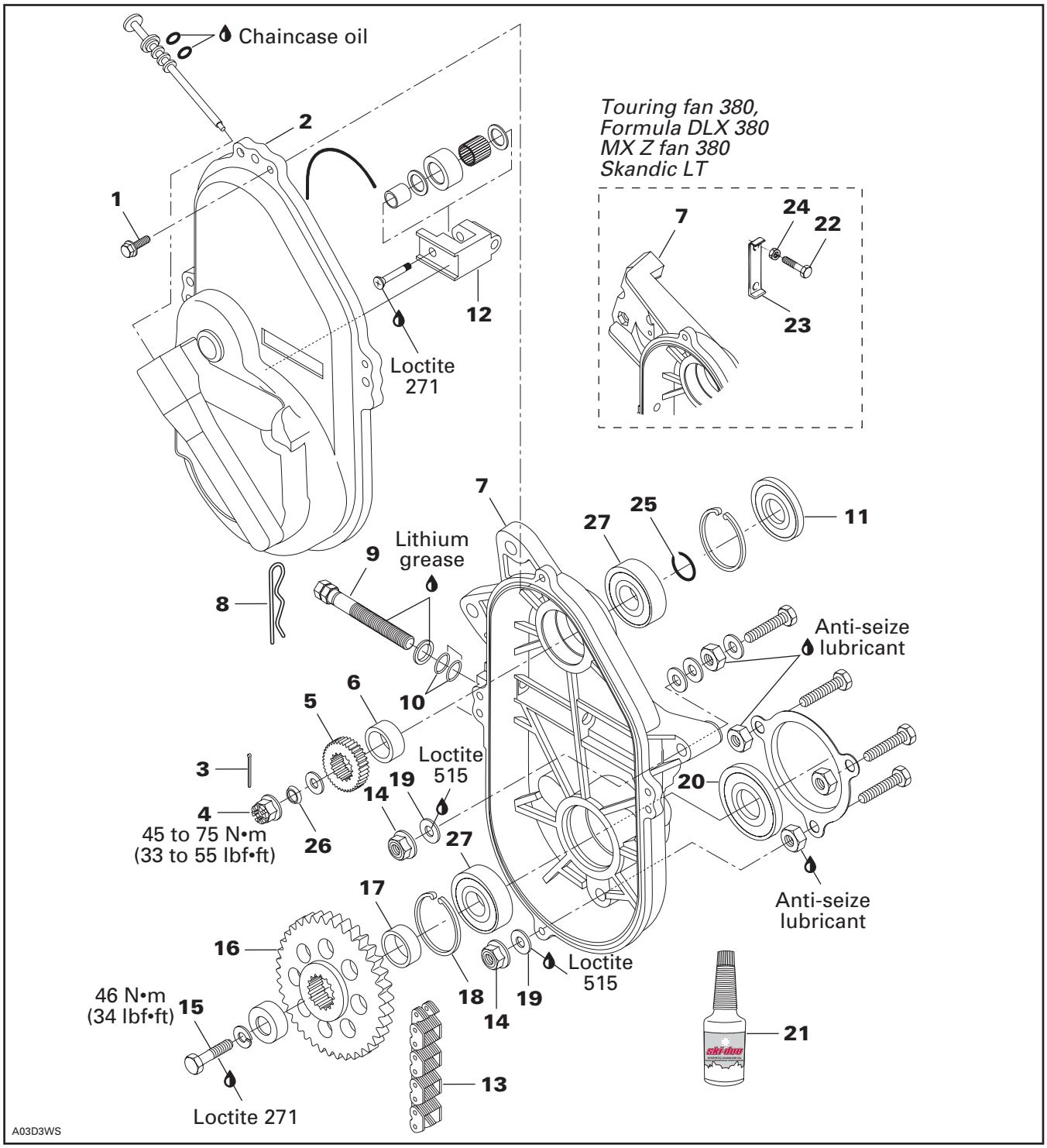
NOTE: If brake light adjustment is unattainable while respecting brake adjustment, ratchet wheel may be too far out. If so, tighten ratchet wheel.

Models with Hydraulic Brake

There is no adjustment on these models. Check that switch is securely installed.

CHAINCASE

S-Series and Skandic LT



REMOVAL

To remove chaincase proceed as follows.

Remove tuned pipe and muffler.

⚠ WARNING

Never remove exhaust components when engine is hot.

Remove hair pin **no. 8**. Release drive chain tension by unscrewing tensioner adjustment screw.

Drain oil by removing chaincase cover **no. 2**.

Apply brakes.

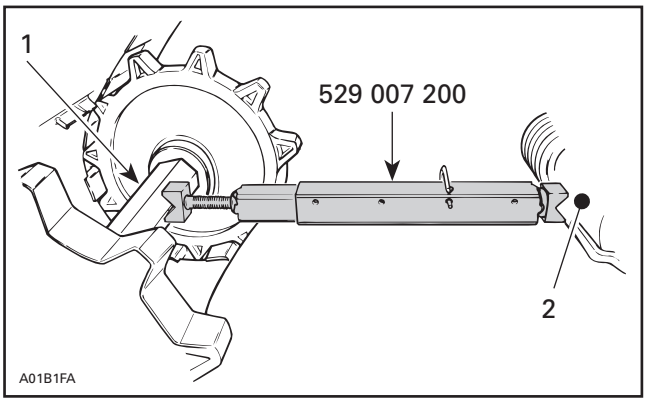
Remove cotter pin **no. 3**, nut **no. 4**, washer **no. 26** retaining upper sprocket **no. 5** and screw **no. 15** retaining lower sprocket **no. 16**. Pull sprockets and drive chain simultaneously. Remove shims **nos. 6** and **17**.

NOTE: Should countershaft removal be required, refer to BRAKE then look for **Brake Disc**.

Remove 5 nuts **no. 14**. Three nuts are behind the lower sprocket.

Unfold locking tab **no. 23**, then remove caliper retaining screws **no. 22**.

Release track tension, use drive axle holder (P/N 529 007 200).



TYPICAL

1. *Drive axle*
2. *Suspension cross shaft*

Pry out drive axle oil seal **no. 20** from chaincase.

Pull chaincase from drive axle and countershaft.

Using 2 prybars inserted between chaincase **no. 7** and frame, pry complete assembly from vehicle.

INSPECTION

Visually inspect the chain for cracked, damaged or missing links. Check for worn or defective bearings, sprockets and chain tensioner components.

⚠ WARNING

If chain deflection is greater than 38 mm (1.5 in) (without chain tensioner), replace chain and check condition of sprockets.

GEAR RATIO MODIFICATION

For particular applications, the number of teeth of the sprockets can be increased or decreased on lower and upper sprockets.

Refer to TECHNICAL DATA for gear ratios.

CAUTION: Gear ratio modifications should only be performed by experienced mechanics since they can greatly affect vehicle performance.

NOTE: For high altitude regions, a Service Bulletin will give information about calibration according to altitude.

INSTALLATION

Reverse removal procedure and pay attention to the following. Replace oil seals, gaskets and O-rings.

Sealed side of bearing **no. 27** must face chaincase cover.

11, Oil Seal

Clean chaincase bore with cleaning solvent then apply Loctite 609 to oil seal mounting surface (outside).

Using an appropriate pusher, press the oil seal into chaincase hub. Oil seal must fit flush with the chaincase edge.

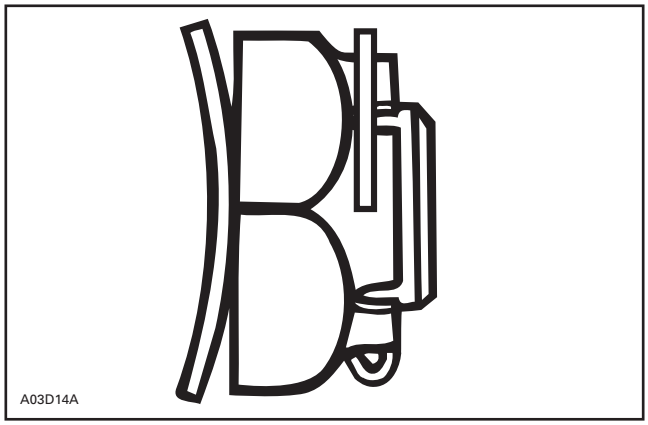
NOTE: Should installation procedure for countershaft be required, refer to BRAKE then look for **Brake Disc and Countershaft Bearing Adjustment**.

5,16, Sprockets

Position the sprockets with the writing facing the chaincase cover.

26, Conical Spring Washer

Install washer with its concave side towards drive pulley.



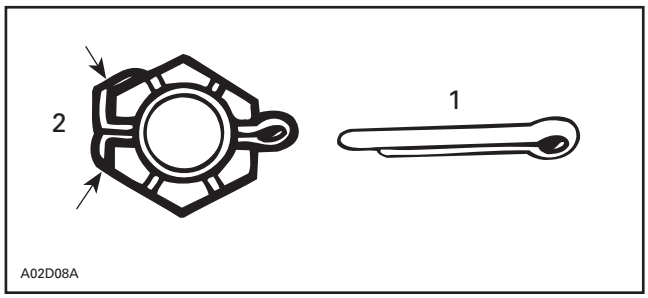
4, Upper Sprocket Castellated Nut

Torque to 45 to 90 N•m (33 to 66 lbf•ft).

Install new cotter pin in the position shown.

CAUTION: When removing a cotter pin always replace with a new one.

CAUTION: Cotter pin will rub on chaincase cover if installed otherwise.



1. New
2. Fold cotter pin over castellated nut flats only

18, Circlip

CAUTION: It is of the utmost importance to install the circlip otherwise damage to the chaincase components may occur.

DRIVE CHAIN ADJUSTMENT

NOTE: Brake disc key must be in good condition before checking chain free play.

10, O-Ring

Replace both O-rings **no. 10** on tensioner adjustment screw. Fully tighten tensioner adjustment screw **by hand**, then back off only far enough for hair pin to engage in locking hole.

This initial adjustment should provide 3 - 5 mm (1/8 - 13/64 in) free-play when measured at the outer circumference of the brake disc.

CAUTION: Free-play must not exceed 5 mm (13/64 in), readjust if necessary.

⚠ WARNING

If the specified free-play is not reached with the tensioner screw fully tightened, replace chain and check the condition of sprockets.

21, Chaincase Oil

S-Series Models

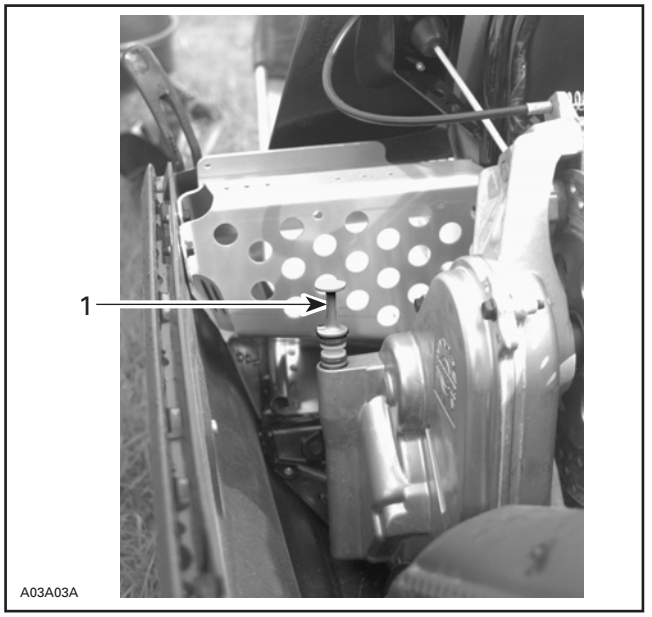
Pour 250 mL (8.5 fl. oz) of mineral chaincase oil (P/N 413 801 900) into chaincase.

Skandic LT

Pour 375 mL (12.7 fl. oz) of synthetic chaincase oil (P/N 413 803 300) into chaincase.

All Models

Check oil level with the dipstick then add if required. Remove metal particles from magnet.



TYPICAL
1. Dipstick

NOTE: Chaincase must be in its proper position when checking oil level.

ADJUSTMENT

Pulley Alignment

Refer to PULLEY DISTANCE AND ALIGNMENT.

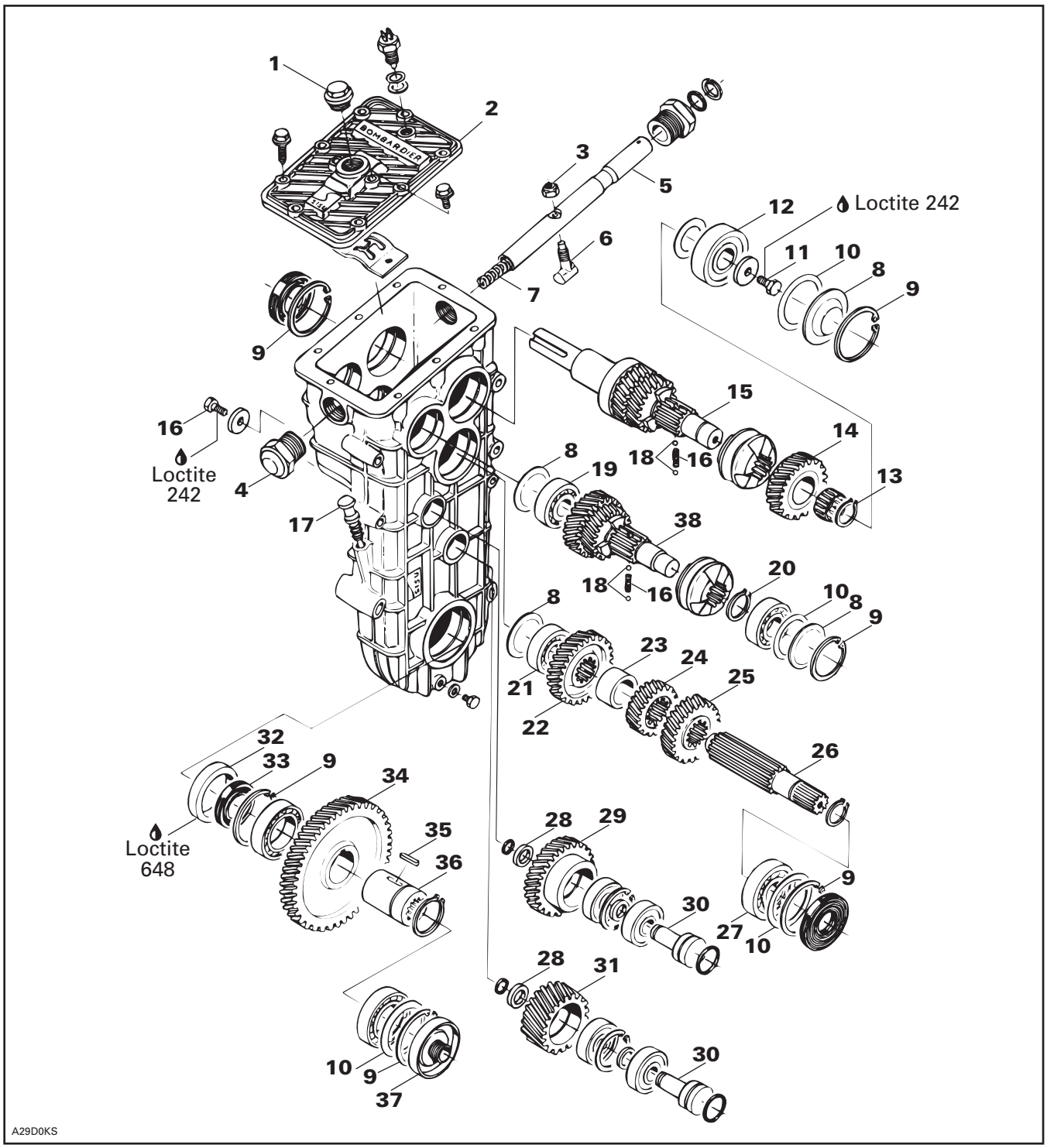
Track Tension and Alignment

Refer to TRACK.

GEARBOX

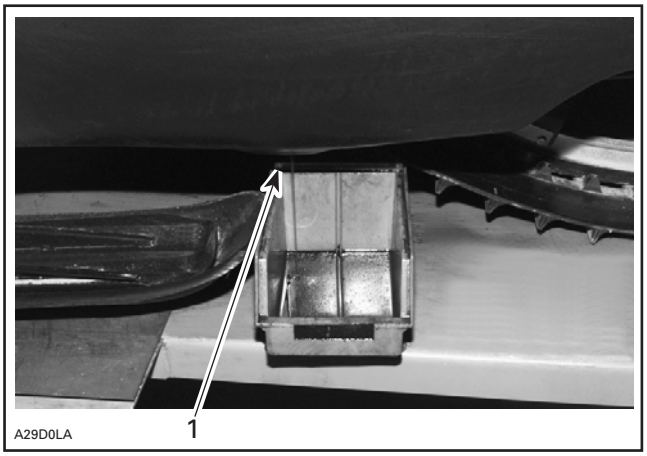
3-SPEED GEARBOX

Skandic WT/SWT/WT LC



REMOVAL

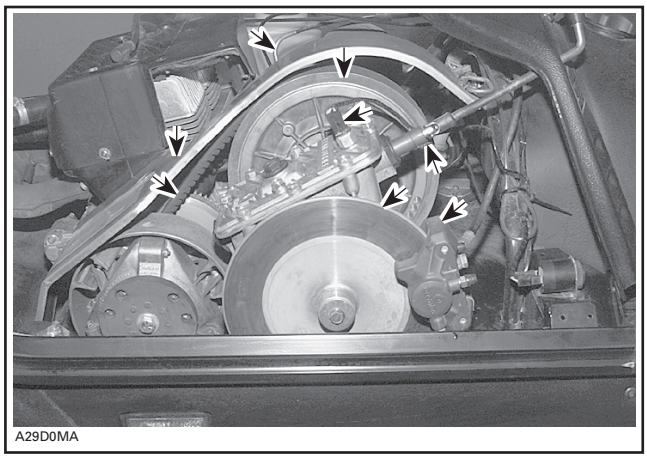
Drain gearbox oil.



1. Bottom pan drain hole nearby gearbox drain plug

Remove belt guard, drive belt. Remove air silencer, carburetor(s) then, driven pulley.

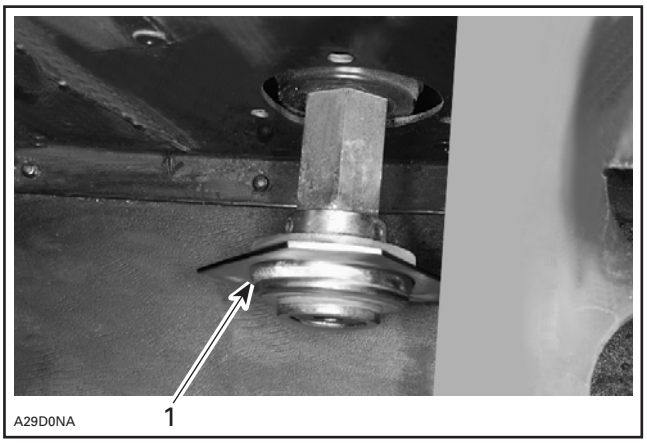
Remove brake caliper, brake disc. Unfasten shifting rod and unplug reverse switch.



Remove rear suspension.

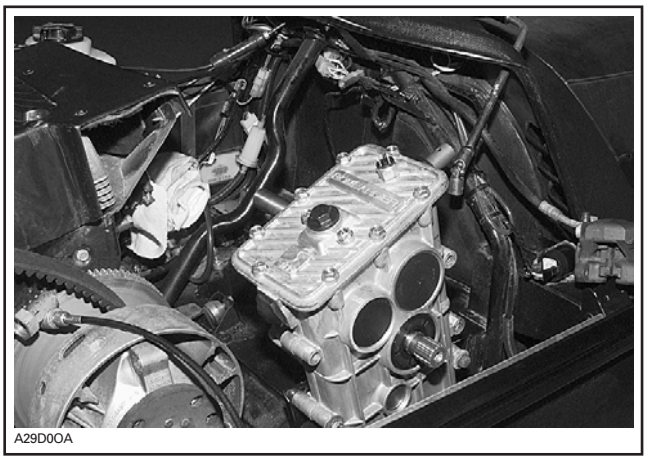
Remove angle drive and square pin from bottom of gearbox.

Remove muffler. Unbolt RH end bearing then pull drive axle toward right side.



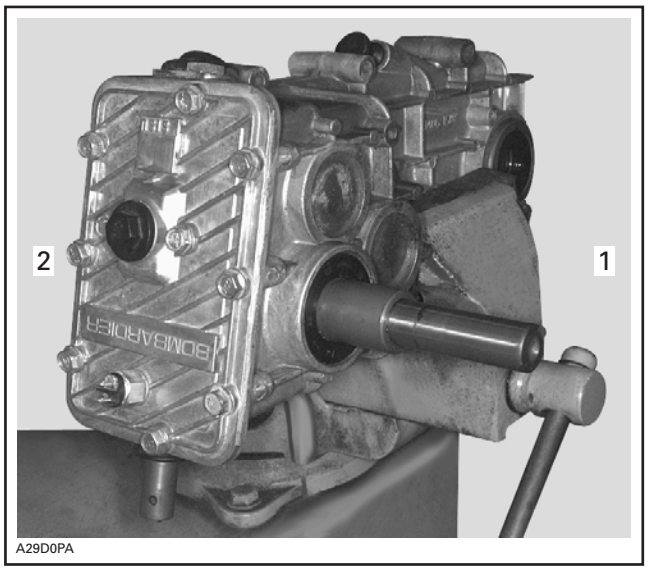
1. RH end bearing

Unbolt gearbox from chassis.



DISASSEMBLY

For the following procedure, right hand side refers to driven pulley side and left hand side to brake disc side.



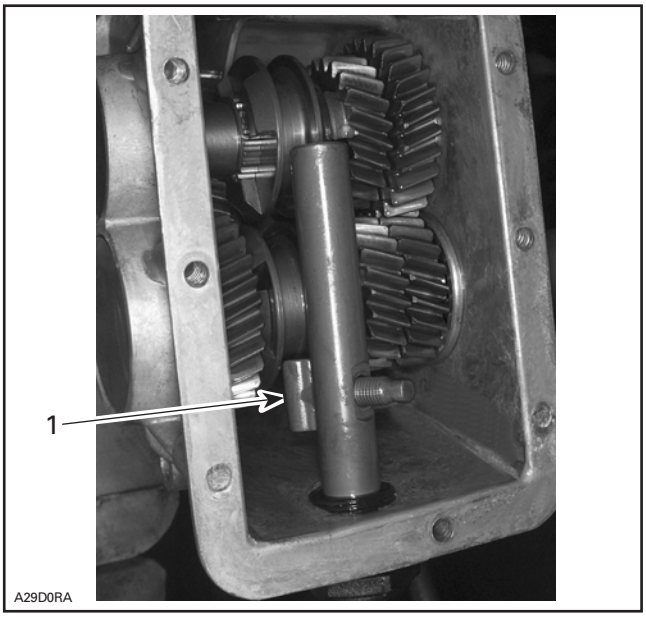
1. *RH side driven pulley side*
2. *LH side brake disc side*

Remove dipstick **no. 17**. Unfasten cover **no. 2** from gearbox housing.

Remove nut **no. 3** retaining pin **no. 6**.

1. *Cover*
2. *Nut*

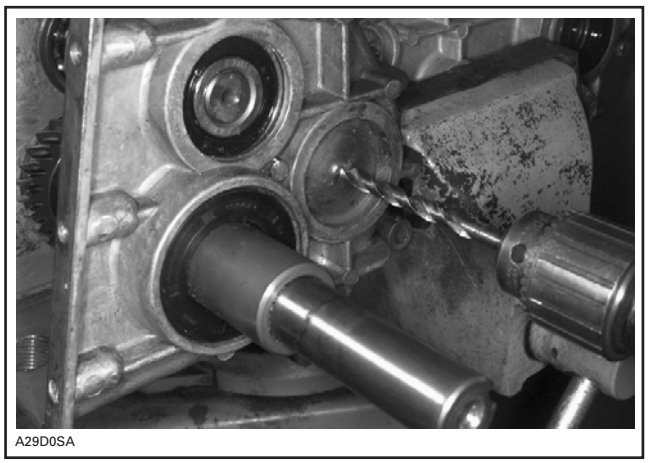
Unfasten sleeve nut **no. 4**, remove spring **no. 7** then, partially pull shaft **no. 5** and remove pin **no. 6**.



1. *Pin*

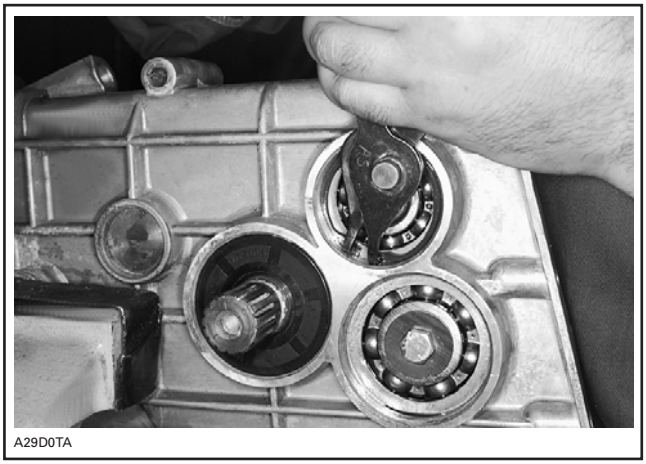
Completely remove shaft **no. 5**.

Drill a 10 mm (3/8 in) dia. hole through all plugs **no. 8**.



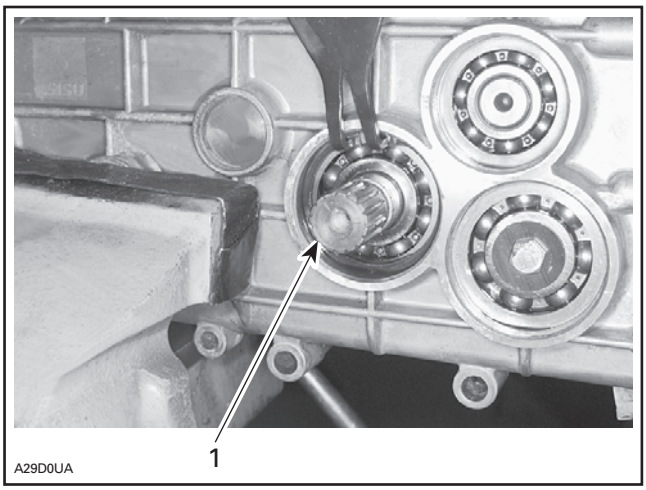
Remove all plugs **no. 8** from gearbox.

Remove all circlips **no. 9**.


A29D0TA

IMPORTANT: Note all shims quantity and location.

Remove brake shaft oil seal then, circlip.

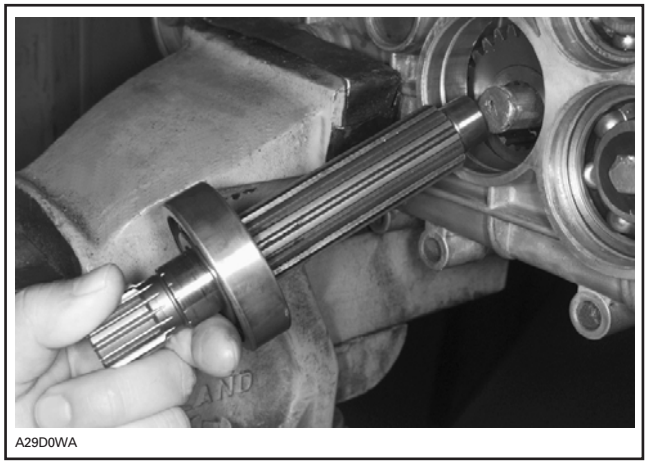


A29D0UA

1. Brake shaft

Proceeding from right side, drive brake shaft out of gearbox housing.

A29D0VA


A29D0WA

Remove sleeve **no. 23**.

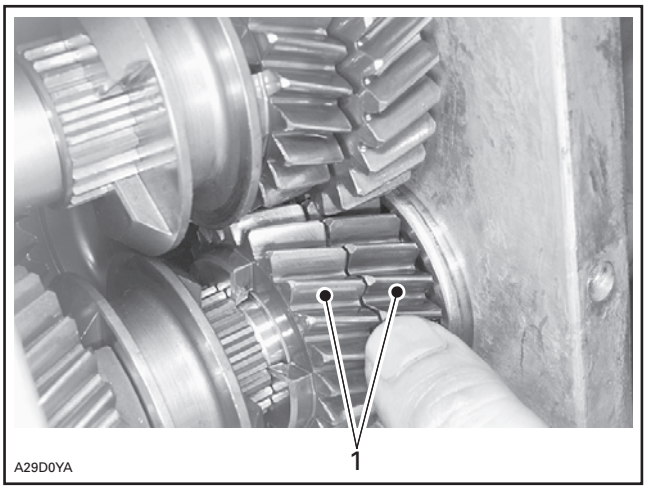
NOTE: Brake shaft gears remain in gearbox housing.

Remove bearing **no. 27** from brake shaft **no. 26** using a press.

A29D0XA

Drive reverse shaft **no. 38** out until its LH side bearing is free.

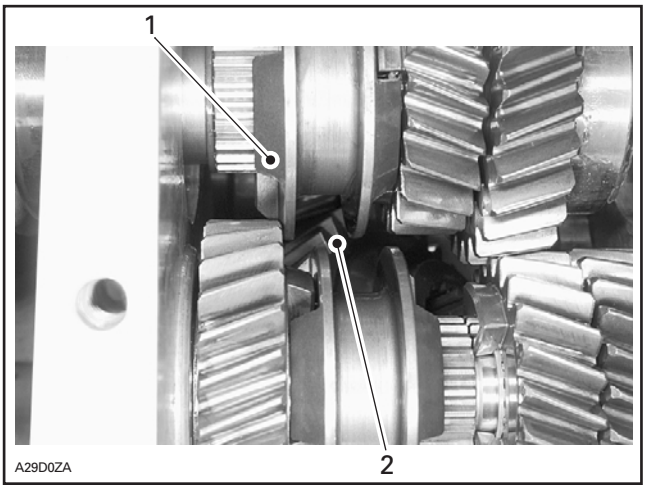
Make sure gears mesh.



1. These gears must mesh as reverse shaft is driven out

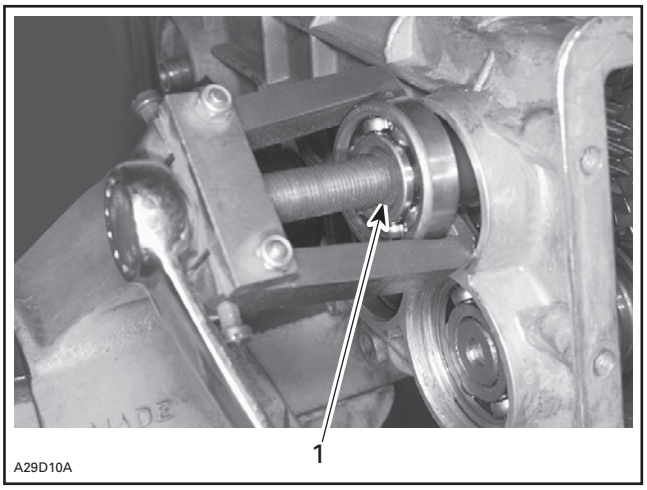
Shift in reverse gear.

Turn reverse shaft so its sliding sleeve dog will not touch the RH gear of driven pulley shaft **no. 15**. This will allow the driven pulley shaft to be pushed out enough for bearing removal.



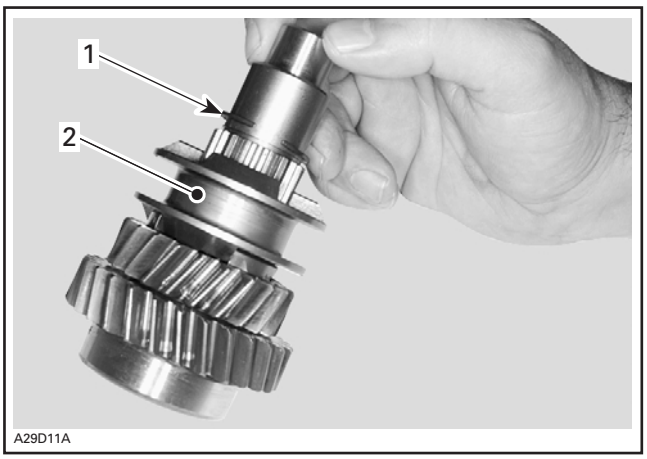
1. Sleeve dog not touching right gear
2. Brake shaft gears are still in gearbox

Use a puller to extract LH reverse shaft bearing.



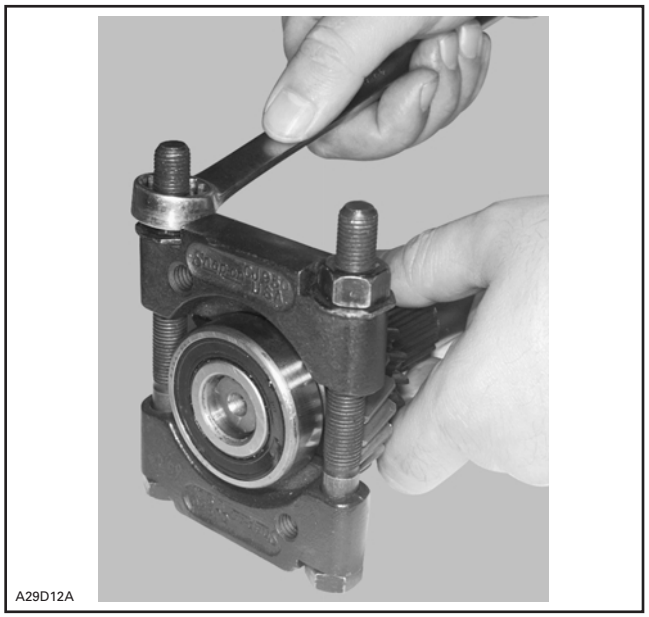
1. Extract reverse shaft LH side bearing

To remove sliding sleeve from reverse shaft, first remove circlip.



1. Circlip
2. Sliding sleeve

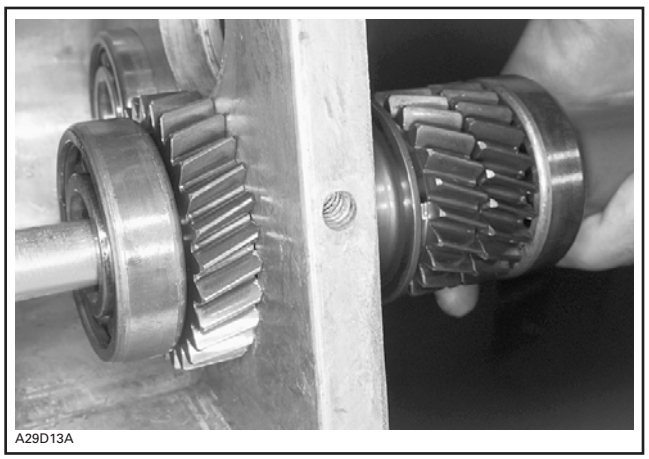
Use a puller to extract bearing **no. 19**.



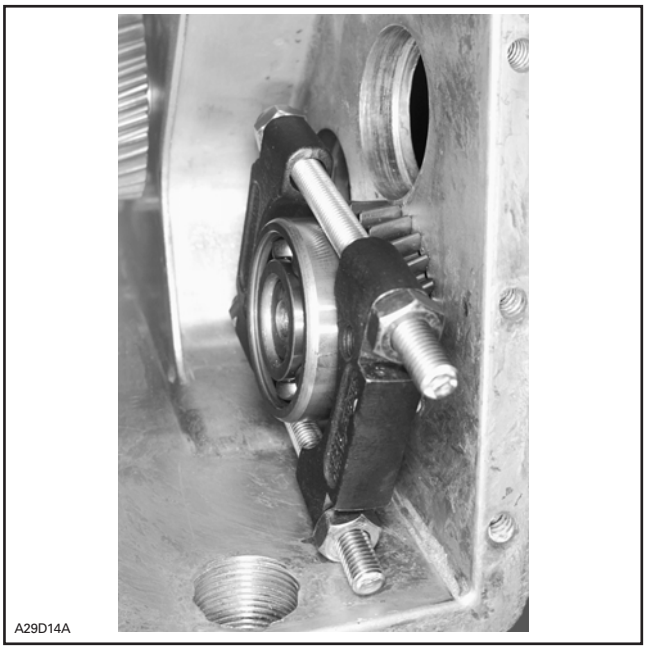
Remove brake shaft gears.

Unbolt driven pulley shaft screw **no. 11** and remove washer.

Push driven pulley shaft **no. 15** out of gearbox until its LH gear **no. 14** is against gearbox inner wall.

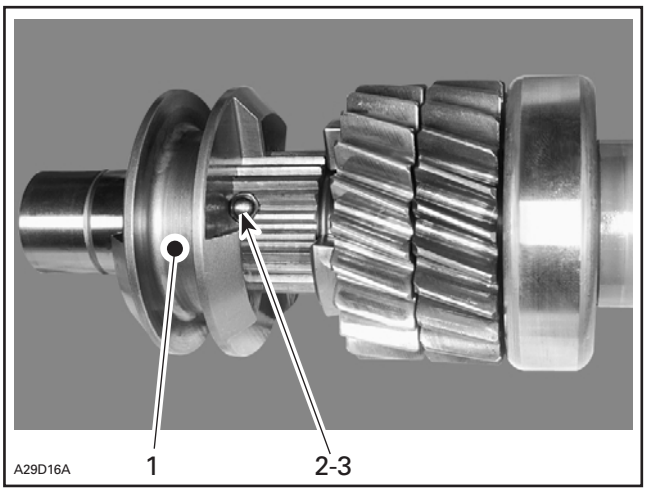


Use a puller to extract bearing **no. 12**.

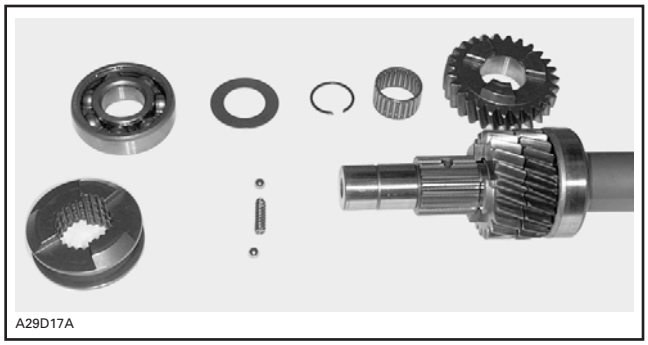


Remove circlip then, gear **no. 14**. Now driven pulley shaft can be pulled out from gearbox.

Remove sliding sleeve taking care not to lose balls **no. 18** and spring **no. 16**.



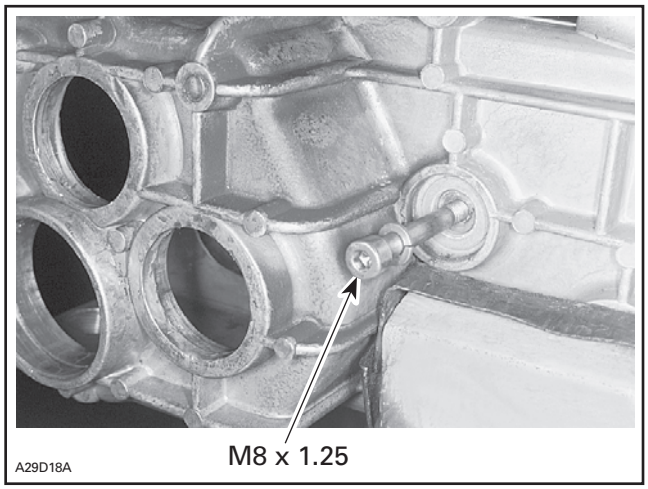
1. *Sliding sleeve*
2. *Spring*
3. *Balls*


A29D17A

DRIVEN PULLEY SHAFT COMPONENTS

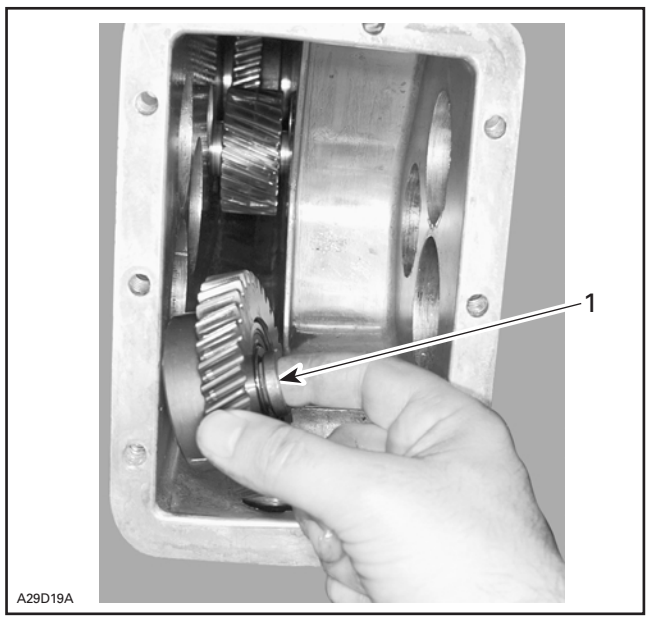
Remove screws **no. 16** from intermediate shafts **no. 30**.

Fasten a long M8 x 1.25 screw in axle end then drive it out, beginning with top one.



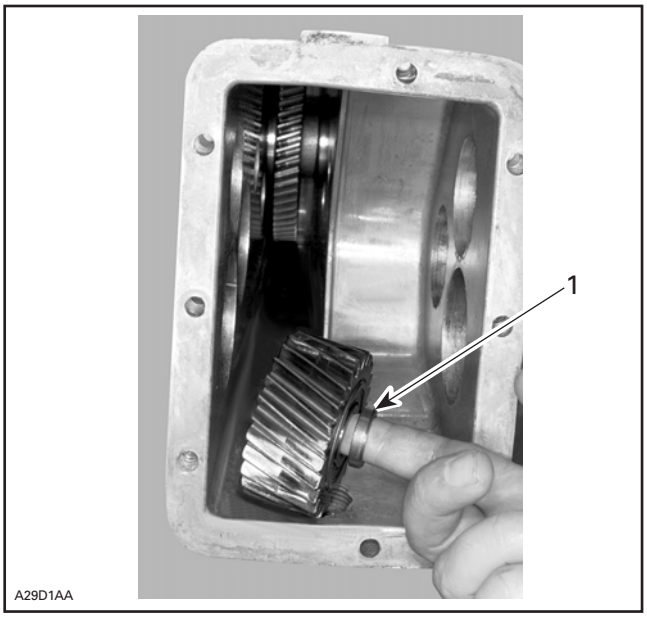
A29D18A

Remove intermediate gears and spacers.



A29D19A

1. Spacer

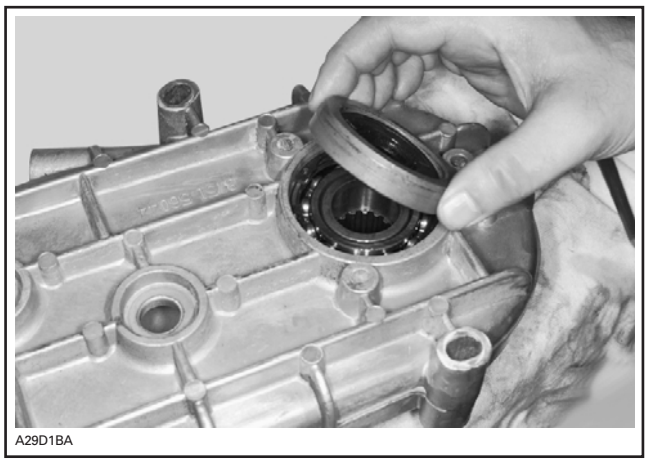


A29D1AA

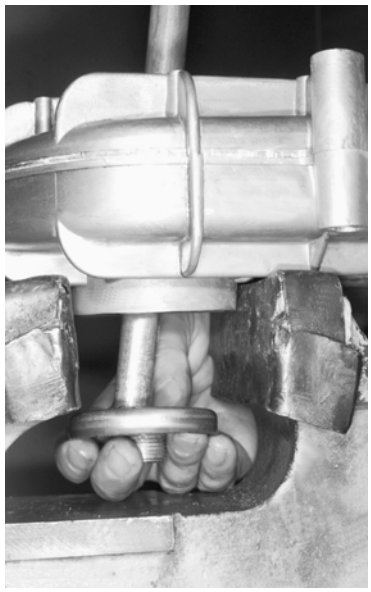
1. Spacer

Do not disassemble bearings of intermediate gears needlessly.

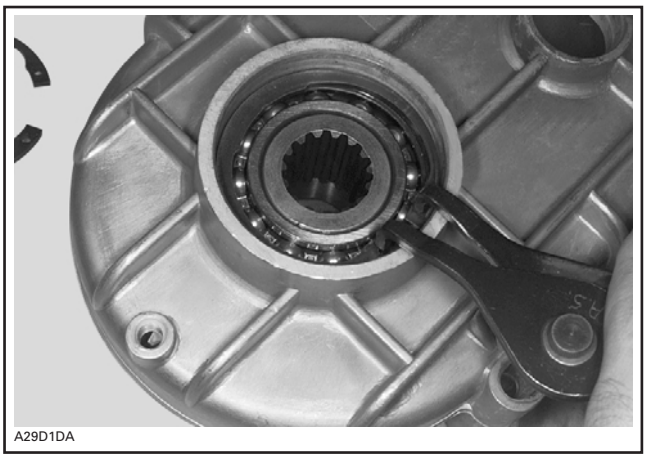
Pry out bottom seal **no. 33** from gearbox housing. Remove sleeve **no. 32** then, circlip **no. 9**.


A29D1BA

Drive out plug **no. 37**.

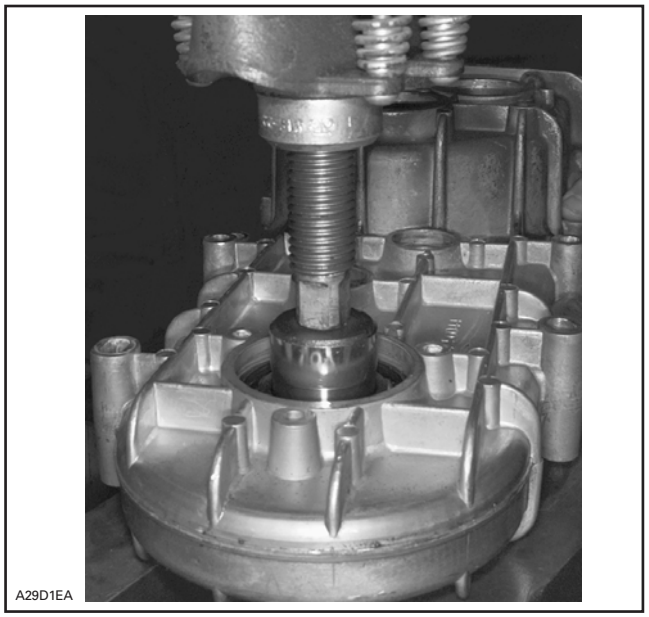

A29D1CA

Remove circlip **no. 9** from LH side.


A29D1DA

Using a press, drive out lower shaft **no. 36** from RH side.

CAUTION: Do not push against inner bearing race.


A29D1EA

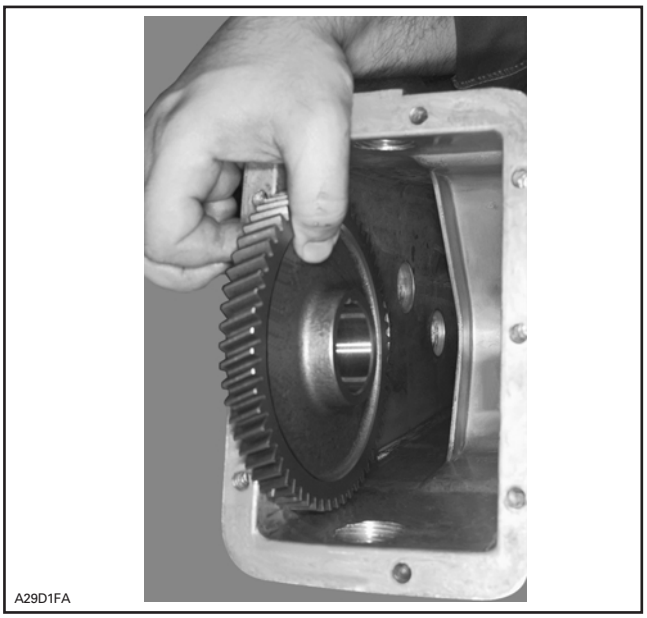
INSPECTION

Check bearing condition. There must be no discoloration, missing rollers or balls, broken cages, etc.

Check sprocket teeth.

ASSEMBLY

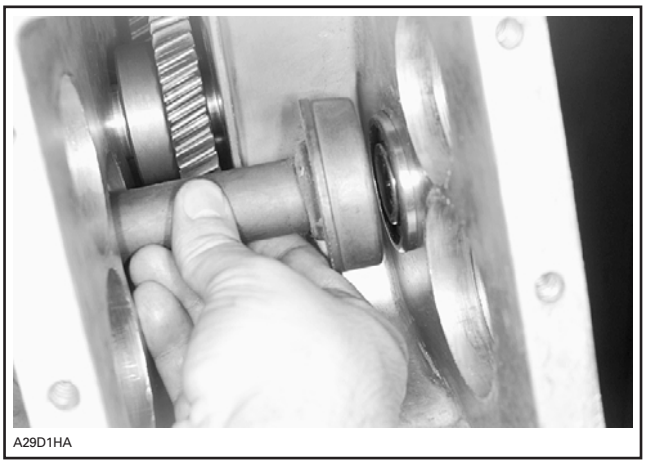
Install lower gear **no. 34** with its shoulder facing RH side.


A29D1FA

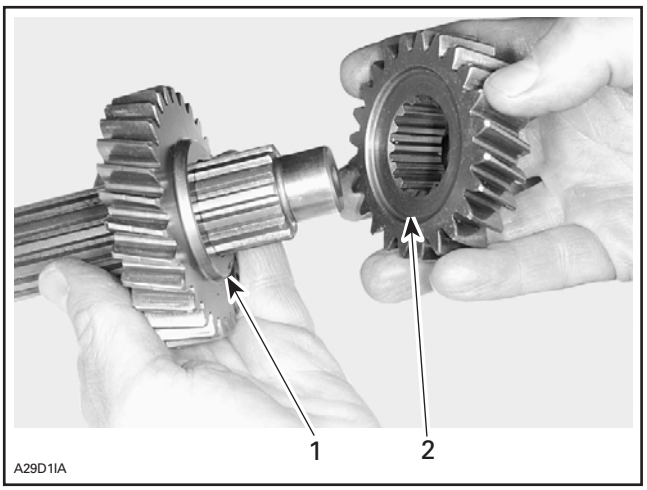
Install lower shaft **no. 36** with its hollow side (no splines) on RH side. Align key with lower gear **no. 34** keyway.

Install intermediate gears **no. 29** with their shoulder towards LH side. Position spacers **no. 28** as illustrated in removal procedure. Beveled side of spacers goes against gearbox wall.

Install RH side bearing of brake and reverse shafts.

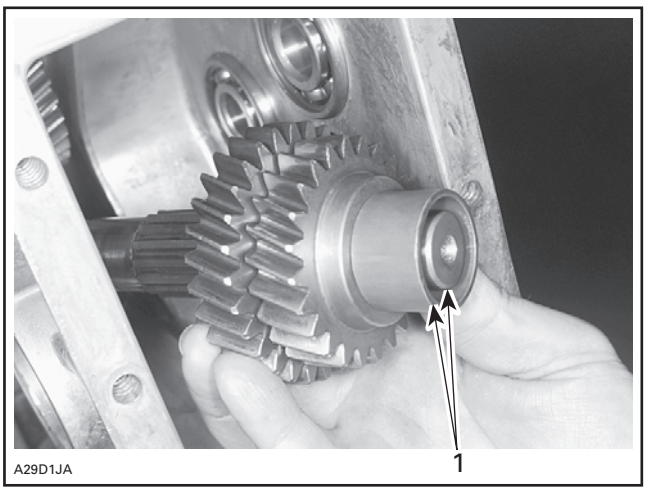


Partially assemble brake shaft gears **nos. 24** and **25** with shoulder facing recess.



1. Shoulder
2. Recess

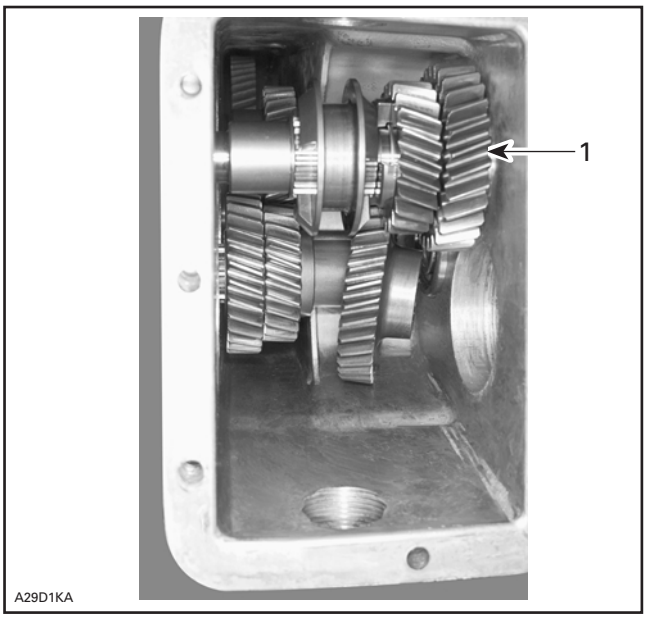
Install sleeve **no. 23** on brake shaft **no. 26** then, slide gears and sleeve until end of sleeve is flush with shaft end.



1. Flush

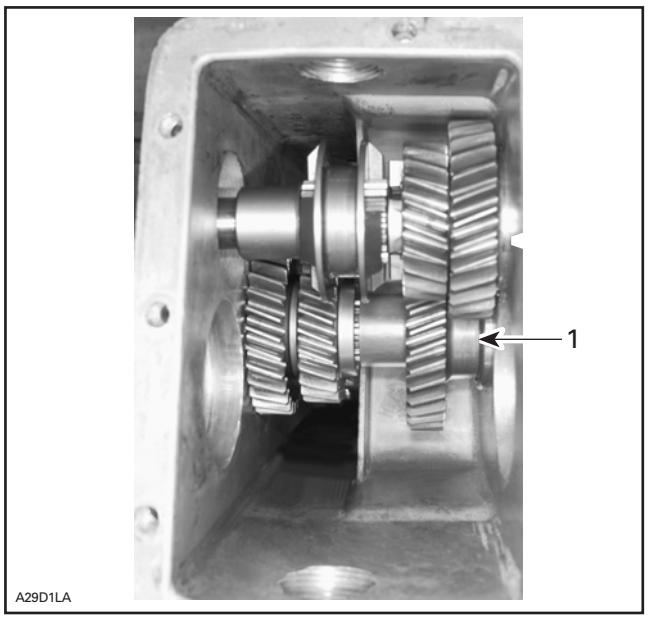
Install brake shaft **no. 26** into gearbox then, loosely install gear **no. 22** with its shoulder facing bearing **no. 21**. Do not push brake shaft into bearing **no. 21** at this time.

Install reverse shaft ass'y **no. 38** into its RH side bearing **no. 19**.



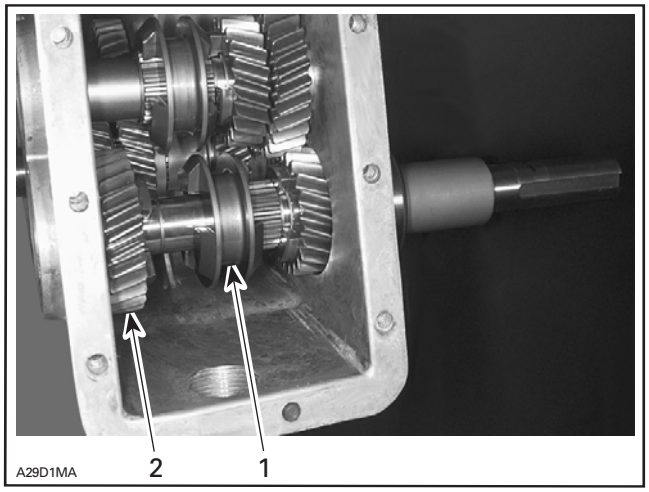
1. Reverse shaft installed in its RH bearing

Position gear **no. 22** against bearing RH side bearing **no. 19** then, finalize brake shaft **no. 26** insertion.



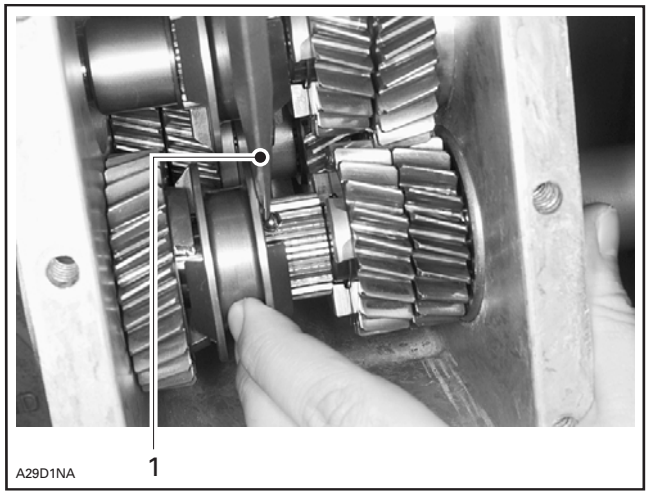
1. Finalizing brake shaft insertion

Install driven pulley shaft **no. 15** with the sliding sleeve loosely inserted. Gear **no. 14** must be at its place.



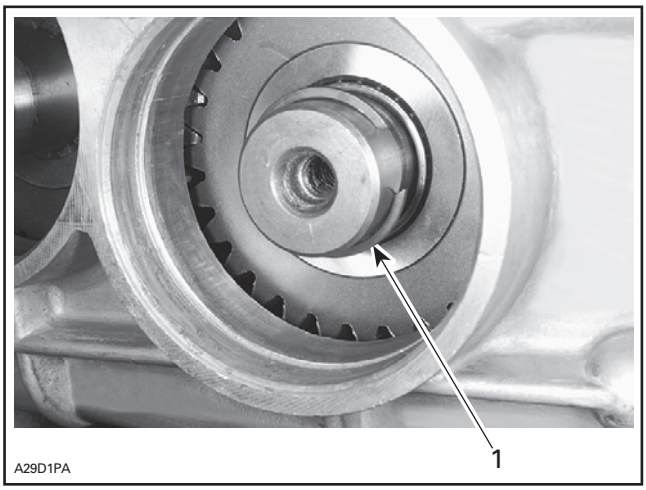
1. Sliding sleeve loosely inserted
*2. Gear **no. 14** in place*

Install balls **no. 18** and spring **no. 16** into driven pulley shaft.



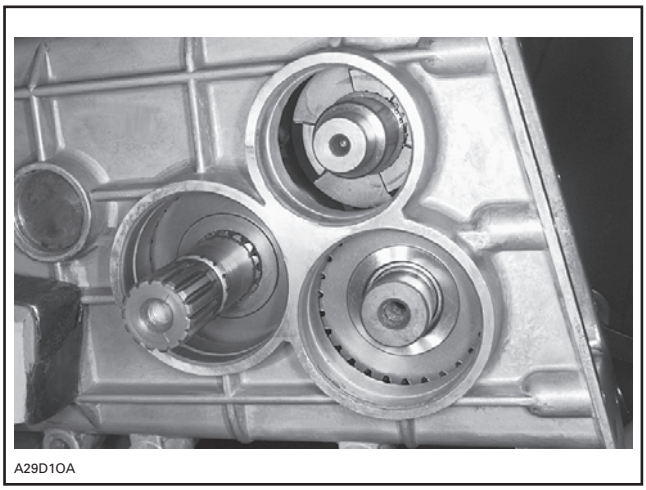
1. Push on ball with a screwdriver then move sliding sleeve to the right

Finalize driven pulley shaft insertion. Make sure that gears mesh during insertion. Install circlip **no. 20**.



1. Circlip

Install LH side bearings **nos. 12, 19** and **21**, shims **no. 8**, circlip **no. 9** then, plugs **no. 8**.



READY TO INSTALL BEARINGS, SHIMS, CIRCLIPS AND PLUGS

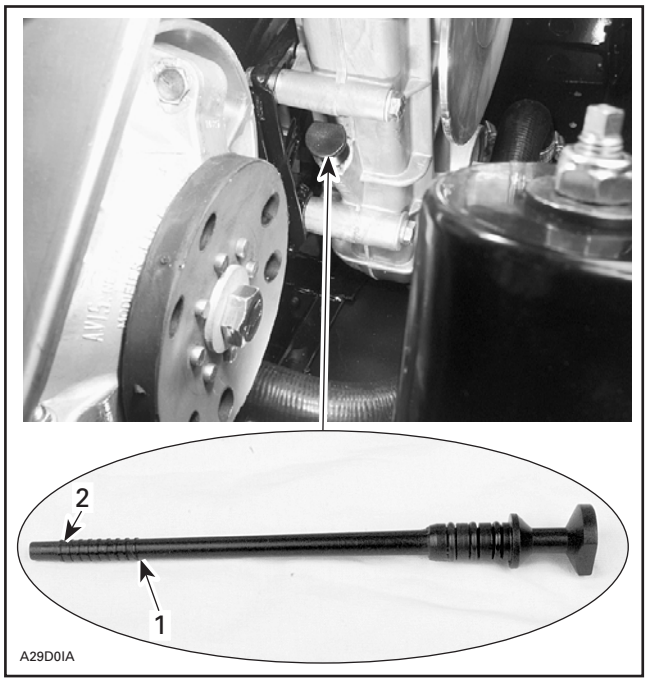
INSTALLATION

Reverse removal procedure. Check pulley alignment.

OIL LEVEL

To check, pull dipstick. Oil should reach level mark.

NOTE: After first outing, oil level will decrease as the upper oil cavity fills with oil. Recheck oil level and refill as required.



1. Full level mark
2. Lower level mark

To fill, remove filler plug from top of transmission. Refill as required using Bombardier synthetic chaincase oil (P/N 413 802 800 — 12 x 250 mL).

DRIVE CHAIN

SILENT CHAIN

There are 2 types of silent chains. One is 11-plates wide and the other is 13-plates wide (stronger). Do not interchange sprockets. Fit chain on sprockets to make sure that you are using the right ones according to width. Refer to TECHNICAL DATA.

NOTE: No work (separation, lengthening) can be done on a silent chain.

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IGNITION TIMING

TWIN CYLINDER RER CDI SYSTEM

S-Series and Skandic LT

If for any reason, ignition timing accuracy is suspected, it can be verified as follows.

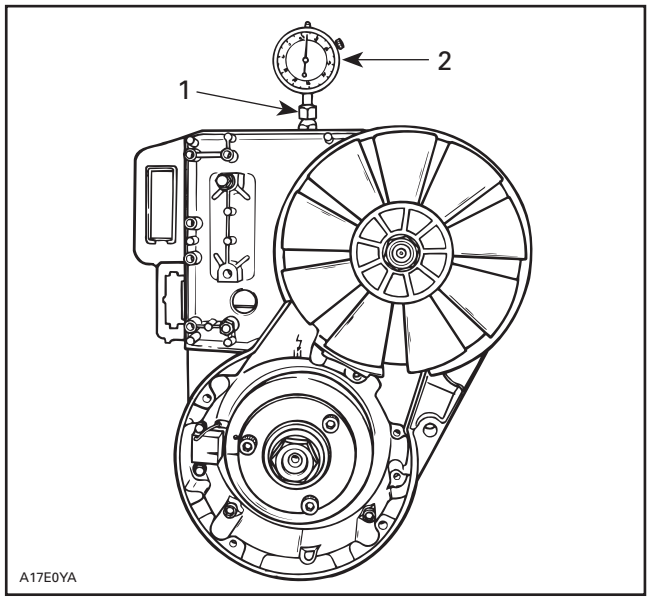
Verifying Magneto Flywheel Timing Mark Position

Prior to checking the timing, it may be necessary to verify the position of the timing mark on the magneto flywheel, for the following reasons:

1. To detect a missing or broken magneto flywheel Woodruff key which would allow a change of timing to occur, with eventual break down of the engine.
2. To correctly locate and mark a timing mark on a new service magneto flywheel.
3. To verify the correct location of the factory timing mark.
4. To detect a wrong magneto flywheel corresponding to a different engine type.

To verify the position of the timing mark on the magneto flywheel, proceed as follows:

1. Clean the area around the spark plugs, and remove them.
2. Remove the rewind starter from the engine.
3. Install the TDC gauge in the spark plug hole, (magneto/generator side) and adjust as follows:
   a. Position the magneto flywheel at approximately TDC.



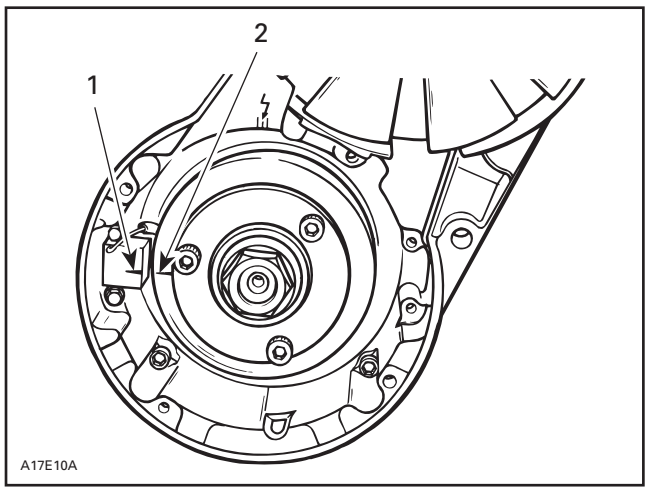
TYPICAL — INSTALLATION OF TDC GAUGE
1. Gauge on MAG side cylinder
2. Adaptor lock nut

   b. Assemble the gauge to the adaptor and tighten the roller lock nut. Do not tighten the adaptor lock nut.
   c. Screw the adaptor into the spark plug hole and tighten to prevent movement in the plug hole.
   d. Position the dial face toward the magneto/generator. Move the gauge down until the needle just begins to move, then move down a further 5 or 6 mm (approximately 1/4 in). Tighten adaptor lock nut by hand.
4. Locate the piston TDC position as follows:
   a. Slowly rotate the magneto flywheel back and forth across TDC while observing the needle. Note that the needle stops moving only as the piston is changing direction.
   b. Rotate the dial face so that "0" is in line with the needle when it stops moving.
   c. Again, slowly rotate the magneto flywheel back and forth across TDC and adjust the dial face to "0", until the needle always stops exactly at "0" before changing direction.
   d. "0" now indicates exact TDC.

5. Verify the position of the timing mark on the magneto flywheel as follows:

NOTE: When checking timing, certain procedures require that the magneto flywheel be turned in a clockwise direction, viewed facing the magneto/generator. If it is necessary to turn back (counterclockwise) for any reason, rotate the magneto flywheel at least one-quarter turn counterclockwise, and then rotate it clockwise. The last magneto flywheel movement when making a critical check must always be in a clockwise direction, to ensure that the slack in engine moving parts is taken-up.

   a. Rotate the magneto flywheel counterclockwise, one-quarter turn then carefully rotate it clockwise until the needle indicates the specified measurement. Refer to TECHNICAL DATA.
   b. Verify that the magneto flywheel mark perfectly aligns with the mark on the trigger coil, refer to illustration.
   c. If the marks do not align, check magneto flywheel and trigger coil part numbers and check Woodruff key condition. If all parts are the appropriate ones and if Woodruff key is in good condition, continue the procedure.

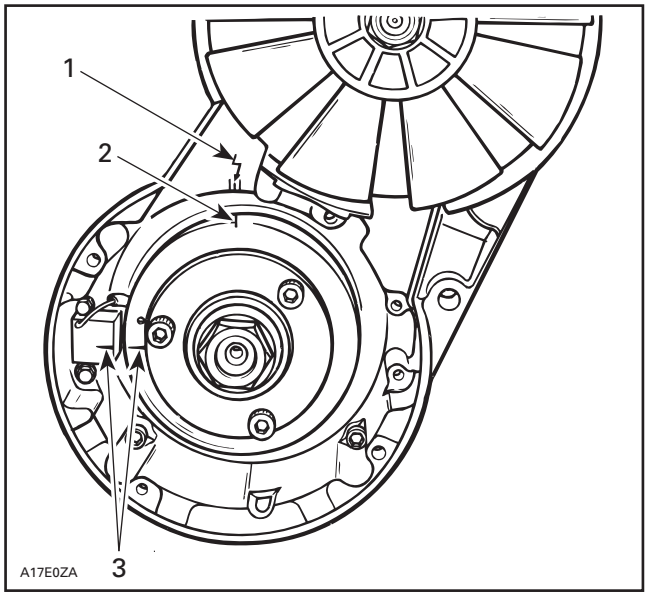


TYPICAL

1. *Trigger coil mark*
2. *Magneto flywheel mark*

NOTE: These marks cannot be used to check dynamic (with engine running) ignition timing with a timing light: a new mark must be scribed on magneto flywheel for this purpose.

6. Scribe a new mark on magneto flywheel as follows.
   a. Remove the fan cover from the engine.
   b. Maintain magneto flywheel so that previous marks remain aligned.
   c. Scribe or punch a mark on magneto flywheel so that it perfectly aligns with the arrow on crankcase, refer to illustration. This new timing mark should be used for future timing checks (dynamic timing).
   d. Reinstall rewind starter.
   e. Check the timing with a timing light.

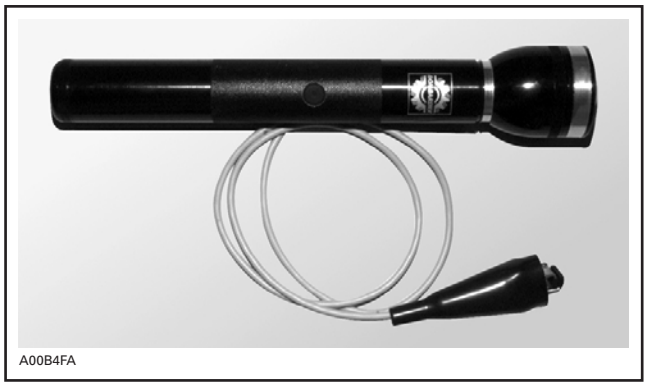


TYPICAL

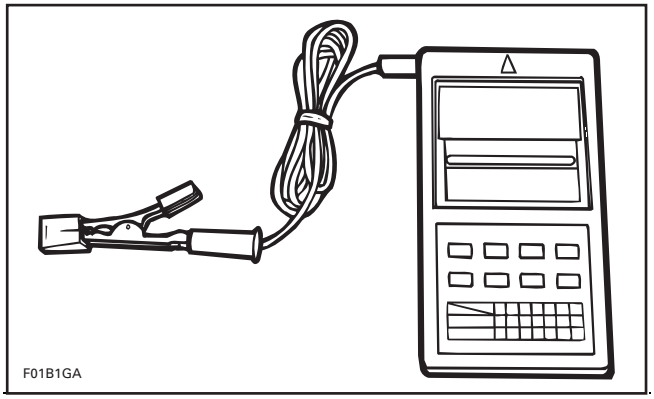
1. *Crankcase arrow*
2. *Scribe a mark here*
3. *Maintain verified timing marks aligned (static timing)*

Checking Ignition Timing

Use timing light (P/N 529 031 900) and digital induction type tachometer (P/N 529 014 500).



TIMING LIGHT (P/N 529 031 900)



TACHOMETER (P/N 529 014 500)

To check the ignition timing, refer to illustration and proceed as follows:

⚠ WARNING

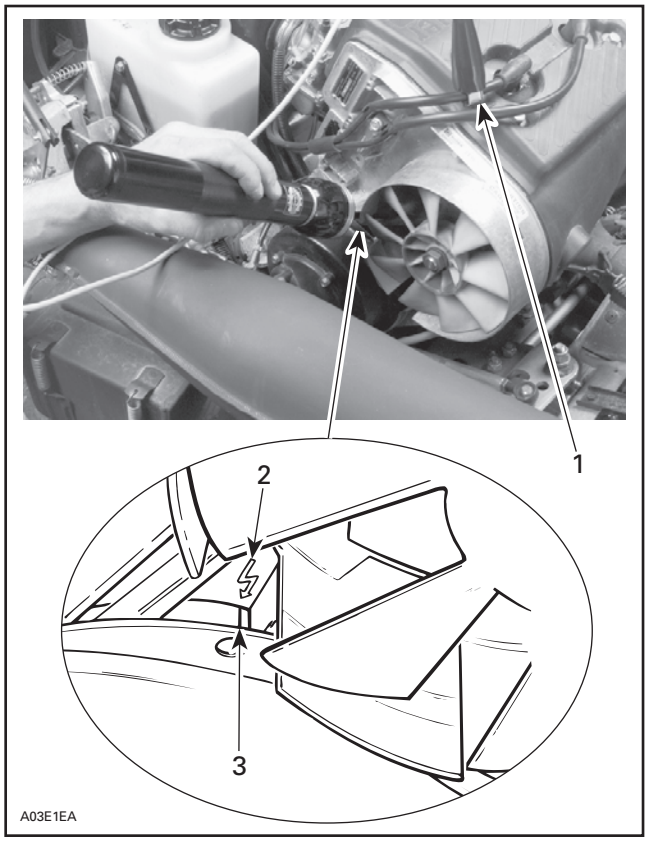
Place ski tips against a wall, raise rear of vehicle on a stand, so that track does not contact the ground. Do not allow anyone in front of or behind the vehicle while engine is running. Keep clear of track and do not wear loose clothing which can get caught in moving parts.

1. Connect the timing light pick-up to a spark plug cable.

NOTE: To avoid an incorrect reading due to parallax, view the magneto flywheel and the crankcase timing marks in a straight line.

2. Connect tachometer wire to spark plug wire or aim tachometer toward spark plug wire without using any connection wire.
3. Start the engine and raise the engine speed at least to 3500 RPM (3000 to 4000 RPM) while observing the timing marks, refer to illustration. The magneto flywheel mark scribed previously and the crankcase arrow should be perfectly aligned. If the marks do not align, a faulty trigger coil (check proper grounding of coil), a faulty flywheel, a faulty Woodruff key, a misaligned (twisted) crankshaft or a faulty CDI module could be the cause: substitute one part at a time and recheck timing marks (check connectors condition prior to substituting any part).

NOTE: Ignition timing may be verified when engine speed is anywhere within 3000 - 4000 RPM.



S-SERIES

1. Timing light pick-up on MAG side
2. Crankcase arrow
3. Magneto flywheel mark

4. Install parts which were removed.

DUCATI CDI SYSTEM

503 Engine Types on Skandic WT/SWT

Proper ignition timing is determined by trigger coil position.

If for any reason, ignition timing accuracy is suspected, it can be checked as follows.

Verifying Magneto Flywheel Timing Mark Position

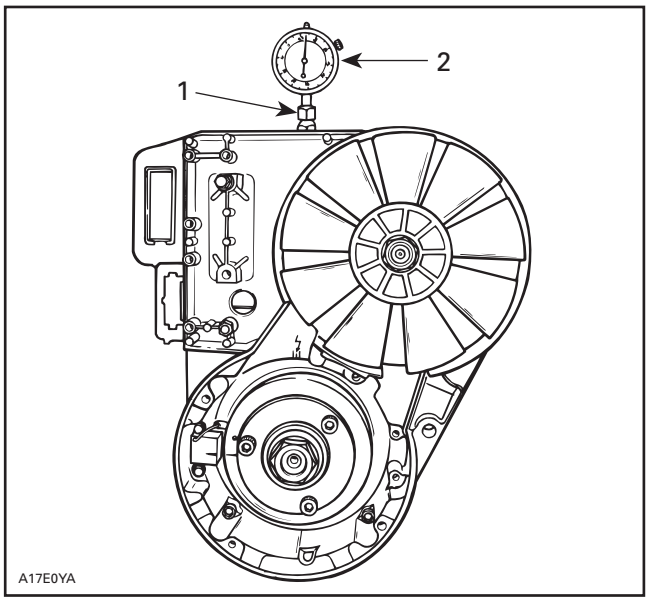
Prior to checking the timing, it may be necessary to verify the position of the timing mark on the magneto flywheel, for the following reasons:

1. To detect a missing or broken magneto flywheel Woodruff key which would allow a change of timing to occur, with eventual break down of the engine.

2. To correctly locate and mark a timing mark on a new service magneto flywheel.
3. To verify the correct location of the factory timing mark.
4. To detect a wrong magneto flywheel.

To verify the position of the timing mark on the magneto flywheel, proceed as follows:

1. Clean the area around the spark plugs, and remove them.
2. Remove the rewind starter from the engine.
3. Install the TDC gauge in the spark plug hole, (magneto/generator side) and adjust as follows:
   a. Position the magneto flywheel at approximately TDC.

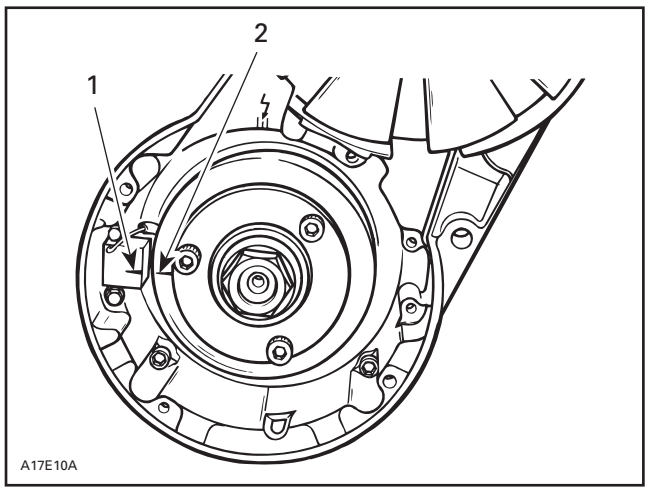


INSTALLATION OF TDC GAUGE
1. Adapter lock nut
2. Gauge on MAG side cylinder

   b. Assemble the gauge to the adapter and tighten the roller lock nut. Do not tighten the adapter lock nut.
   c. Screw the adapter into the spark plug hole and tighten to prevent movement in the plug hole.
   d. Position the dial face toward the magneto/generator. Move the gauge down until the needle just begins to move, then move down a further 5 or 6 mm (approximately 1/4 in). Tighten adapter lock nut by hand.
4. Locate the piston TDC position as follows:
   a. Slowly rotate the magneto flywheel back and forth across TDC while observing the needle. Note that the needle stops moving only as the piston is changing direction.
   b. Rotate the dial face so that 0 (zero) is in line with the needle when it stops moving.
   c. Again, slowly rotate the magneto flywheel back and forth across TDC and adjust the dial face to 0 (zero), until the needle always stops exactly at 0 (zero) before changing direction.
   d. 0 (zero) now indicates exact TDC.
5. Verify the position of the timing mark on the magneto flywheel as follows:

NOTE: When checking timing, certain procedures require that the magneto flywheel be turned in a clockwise direction, viewed facing the magneto/generator. If it is necessary to turn back (counterclockwise) for any reason, rotate the magneto flywheel at least 1/4 turn counterclockwise, and then rotate it clockwise. The last magneto flywheel movement when making a critical check must always be in a clockwise direction, to ensure that the slack in engine moving parts is taken-up.

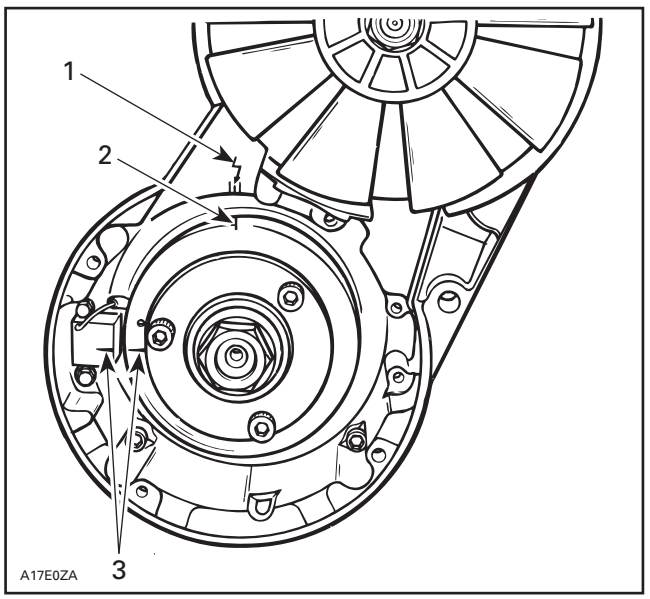
   a. Rotate the magneto flywheel 1/4 turn counterclockwise, 1/4 turn then carefully rotate it clockwise until the needle indicates the specified measurement. Refer to TECHNICAL DATA.
   b. Verify that the magneto flywheel mark perfectly aligns with the mark on the trigger coil, refer to illustration.
   c. If the marks do not align, check magneto flywheel and trigger coil part numbers and check Woodruff key condition. If all parts are the appropriate ones and if Woodruff key is in good condition, continue the procedure.



1. Trigger coil mark
2. Magneto flywheel mark

NOTE: These marks cannot be used to check dynamic (with engine running) ignition timing with a timing light: a new mark must be scribed on magneto flywheel for this purpose.

6. Scribe a new mark on magneto flywheel as follows:
   a. Remove the fan cover from the engine.
   b. Maintain magneto flywheel so that previous marks remain aligned.
   c. Scribe or punch a mark on magneto flywheel so that it aligns perfectly with the arrow on crankcase, refer to illustration. This new timing mark should be used for future timing checks (dynamic timing).
   d. Reinstall rewind starter.
   e. Check the timing with a timing light (P/N 529 031 900).



1. Crankcase arrow
2. Scribe a mark here
3. Maintain verified timing marks aligned (static timing)

Checking Ignition Timing

Use timing light (P/N 529 031 900).

To check the ignition timing, refer to illustration and proceed as follows:

NOTE: Engine should be cold when checking timing. Do not idle engine for more than 20 seconds and make checks quickly.

⚠ WARNING

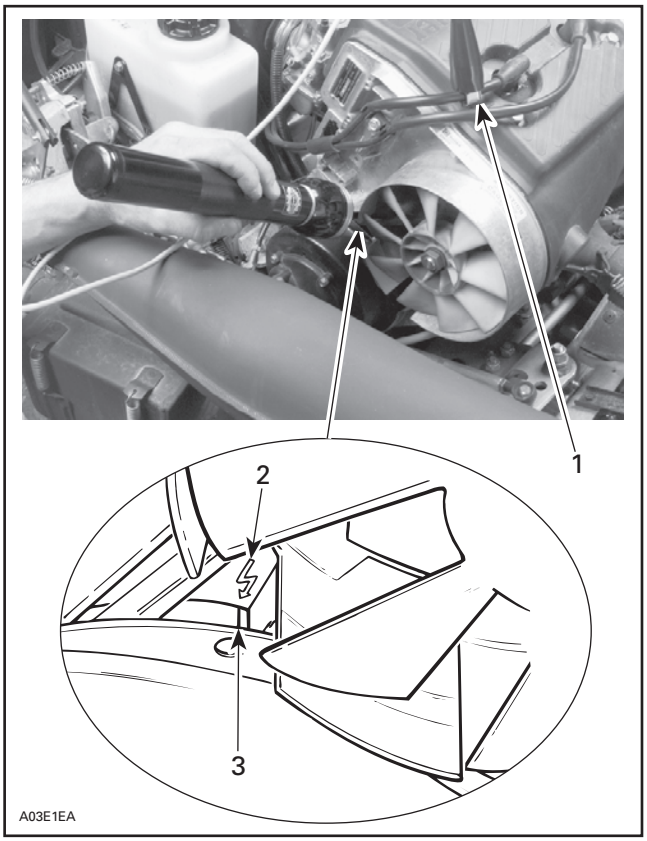
Place ski tips against a wall, raise rear of vehicle on a stand, so that track does not contact the ground. Do not allow anyone in front of or behind the vehicle while engine is running. Keep clear of track and do not wear loose clothing which can get caught in moving parts.

1. Connect the timing light pick-up to a spark plug cable and the power connections to the battery.

NOTE: To avoid an incorrect reading due to parallax, view the magneto flywheel and the crankcase timing marks in a straight line.

2. Start the engine and raise the engine speed to **6000** RPM while observing the timing marks, refer to illustration. The magneto flywheel mark scribed previously and the crankcase arrow should be perfectly aligned. If the marks do not align, move trigger coil accordingly.

NOTE: Ignition timing have to be verified when engine speed is 6000 RPM.



CHECKING IGNITION TIMING

1. *Timing light pick-up on MAG side*
2. *Crankcase arrow*
3. *Magneto flywheel mark*

3. Install parts which were removed.

SPARK PLUGS

NGK SPARK PLUG

All Models

NGK SPARK PLUG NUMBERING SYSTEM

Bombardier uses NGK brand spark plugs on all its snowmobile models.

The heat range identification system is:

Low number → hot plug

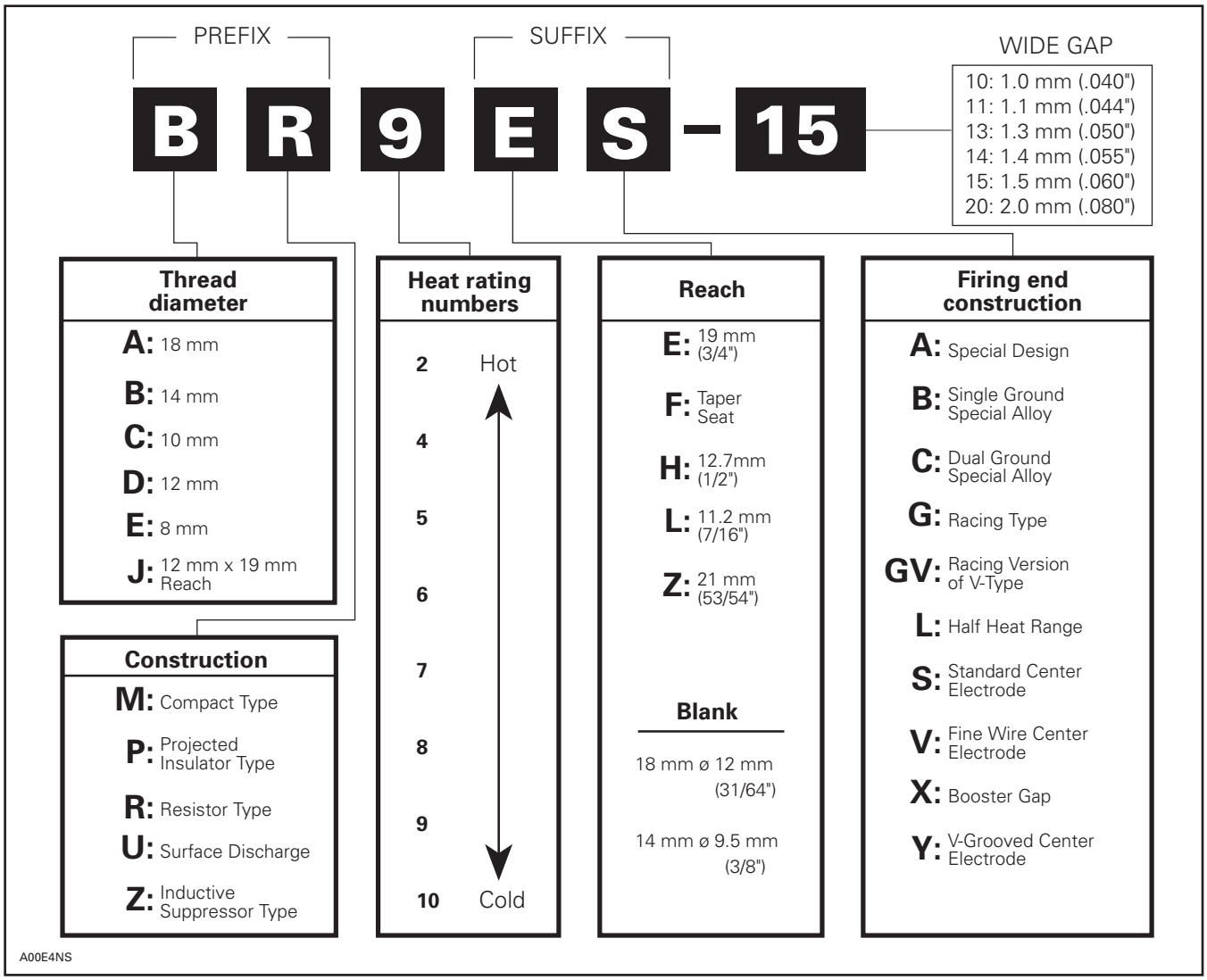
High number → cold plug

REFERENCE CHART

NGK spark plugs used on Bombardier snowmobiles are covered in this manual:

– BR9ES.

DESIGN SYMBOLS USED IN NGK SPARK PLUGS



CROSSCUTS AND GAP STYLES OF SPARK PLUGS

Standard Type | Projected Insulator Type | Taper Seat Type | V-Type | Surface Discharge Type

A01E1PS

DISASSEMBLY

First unscrew the spark plug 1 turn.

Clean the spark plug and cylinder head with pressurized air, then completely unscrew.

⚠ WARNING

Whenever using compressed air, always wear protective eye wear.

HEAT RANGE

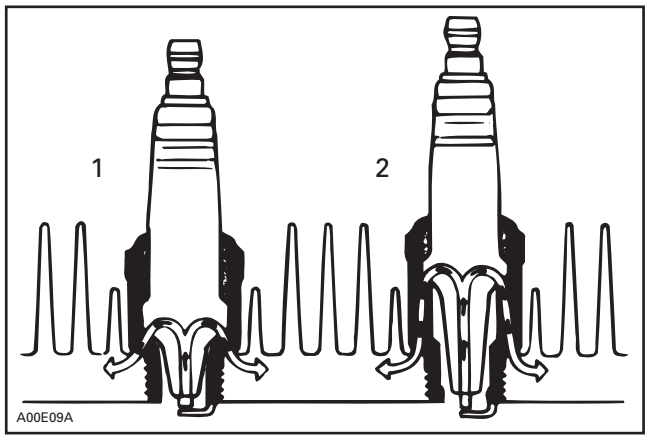
The proper operating temperature or heat range of the spark plugs is determined by the spark plug ability to dissipate the heat generated by combustion.

The longer the heat path between the electrode tip to the plug shell, the hotter the spark plug operating temperature will be — and inversely, the shorter the heat path, the colder the operating temperature will be.

A **cold** type plug has a relatively short insulator nose and transfers heat very rapidly into the cylinder head.

Such a plug is used in heavy duty or continuous high speed operation to avoid overheating.

The **hot** type plug has a longer insulator nose and transfers heat more slowly away from its firing end. It runs hotter and burns off combustion deposits which might tend to foul the plug during prolonged idle or low speed operation.



1. Cold
2. Hot

CAUTION: Severe engine damage might occur if a wrong heat range plug is used.

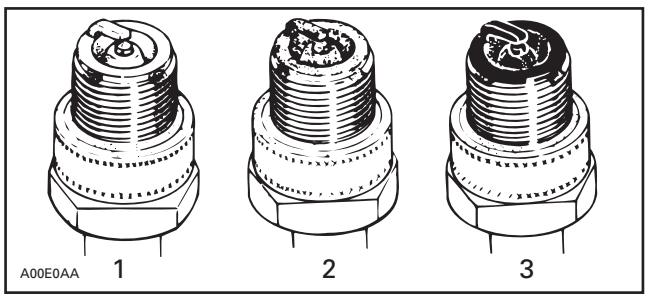
A **too hot** plug will result in overheating and pre-ignition, etc.

A **too cold** plug will result in fouling (shorting the spark plug) or may create carbon build up which can heat up red-hot and cause pre-ignition or detonation.

FOULING

Fouling of the spark plug is indicated by irregular running of the engine, decreased engine speed due to misfiring, reduced performance, and increased fuel consumption. This is due to a loss of compression. Other possible causes are: prolonged idling, or running on a too rich mixture due to a faulty carburetor adjustment or incorrect fuel and/or fuel mixing. The plug face of a fouled spark plug has either a dry coating of soot or an oily, glossy coating given by an excess either of oil or of oil with soot. Such coatings form a conductive connection between the center electrode and ground.

SPARK PLUG ANALYSIS



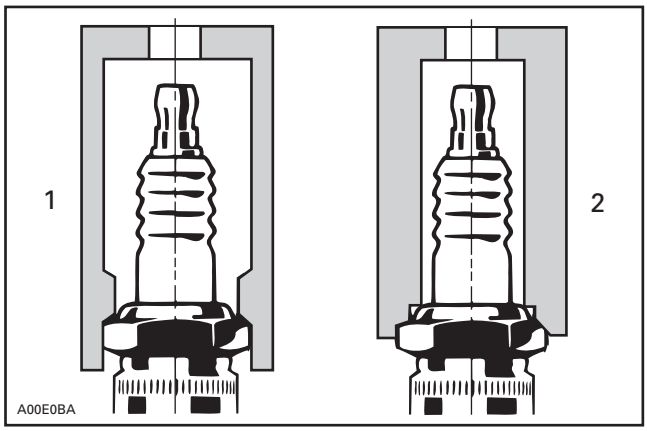
1. Overheated (light grey)
2. Normal (brownish)
3. Fouled (black)

The plug electrode and piston dome reveal the condition of the engine, operating condition, method of driving and fuel mixture. For this reason it is advisable to inspect the spark plug at regular intervals, examining the plug electrode and the piston dome.

SPARK PLUG INSTALLATION

Prior to installation make sure that contact surfaces of the cylinder head and spark plug are free of grime.

1. Using a wire feeler gauge, set electrode gap according to TECHNICAL DATA.
2. Apply anti-seize lubricant (P/N 413 701 000) over the spark plug threads to prevent possible seizure.
3. Hand screw spark plug into cylinder head and tighten with a torque wrench and a proper socket.



1. Proper socket
2. Improper socket

SPARK PLUG TIGHTENING TORQUE

MODELS	SPARK PLUGS	TORQUE N•m (lbf•ft)
All models	NGK	27 (20)

BATTERY

REMOVAL

All Models

⚠ WARNING

Battery BLACK negative cable must always be disconnected first and connected last.

⚠ WARNING

Never charge or boost battery while installed on vehicle.

S-Series

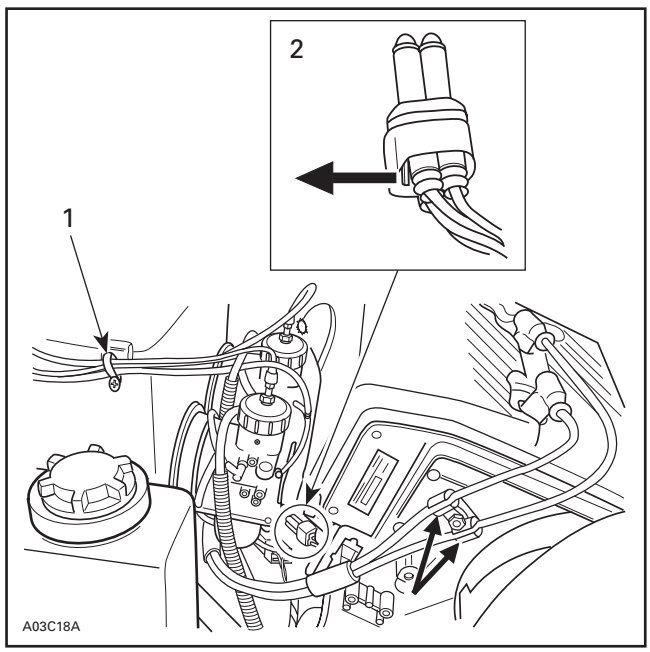
Remove belt guard.

Unfasten spark plug cables from fan housing. Unplug spark plug caps.

Remove throttle cable attachment from air silencer.

Unplug CDI box harness connector.

Loosen collar on carburetor adaptors. Remove air silencer. CDI box will come along with.



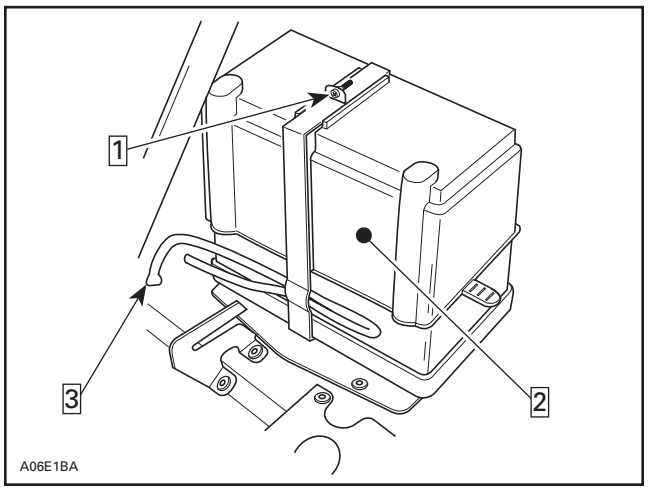
1. Attachment
2. CDI box harness connector

S-Series

Unfasten retaining strips.

Open strips and lift battery protective boot.

Remove vent tube.



Step 1: Unfasten and open
Step 2: Lift protective boot
Step 3: Remove vent tube

All Models

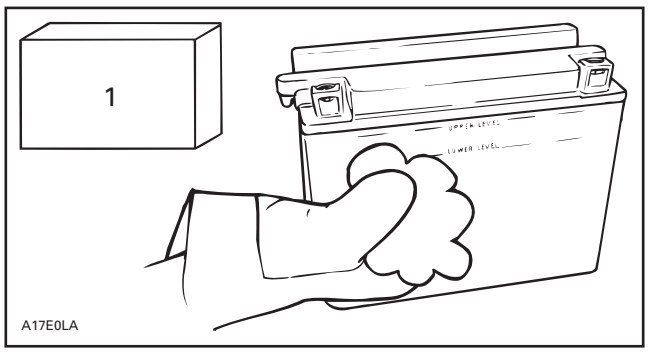
Withdraw battery from vehicle being careful not lean it so that electrolyte flows out of vent tube.

CAUTION: Should any electrolyte spillage occur, immediately wash off with a solution of baking soda and water to prevent damage to vehicle components.

CLEANING

Clean the battery, battery casing, vent tube, caps, cables and battery posts using a solution of baking soda and water.

CAUTION: Do not allow cleaning solution to enter battery interior since it will destroy the electrolyte.



1. Baking soda

Remove corrosion from battery cable terminals and battery posts using a firm wire brush.

INSPECTION

Visually inspect battery casing for cracks or other possible damage. If casting is damaged, replace battery and thoroughly clean battery tray and close area with water and baking soda.

⚠ WARNING

Should the battery casing be damaged, wear a suitable pair of non-absorbent gloves when removing the battery by hand.

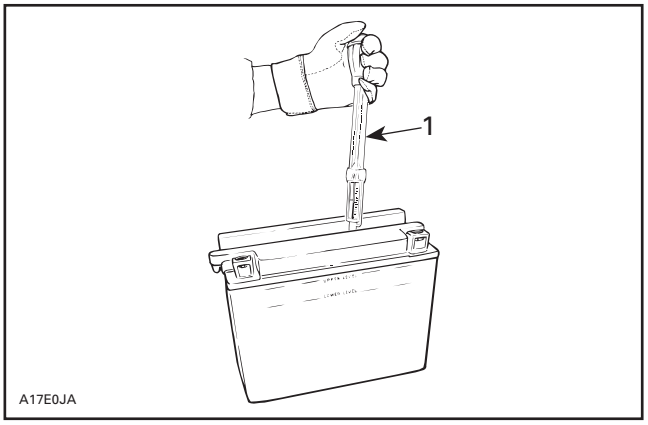
Inspect battery posts for security of mounting.

Inspect for cracked or damaged battery caps, replace defective caps.

⚠ WARNING

Battery caps do not have vent holes. Make sure that vent tube is not obstructed.

HYDROMETER TEST



1. Specific gravity 1.260

A hydrometer measures the charge of a battery in terms of specific gravity of the electrolyte. Most hydrometers give a true reading at 27°C (80°F).

In order to obtain correct readings, adjust the initial reading by **adding** .004 points to the hydrometer readings for each 5.5°C (10°F) **above 27°C (80°F)** and by **subtracting** .004 point for every 5.5°C (10°F) **below 27°C (80°F)**.

This chart will be useful to find the correct reading.

ELECTROLYTE TEMPERATURE		OPERATION TO PERFORM		
°C	°F			
38 32	100 90	add	.008 .004	to the reading
27	**80**	**correct reading**		
21 16 10 4 - 1 - 7 - 12 - 18 - 23 - 29 - 34 - 40	70 60 50 40 30 20 10 0 - 10 - 20 - 30 - 40	subtract	.004 .008 .012 .016 .020 .024 .028 .032 .036 .040 .044 .048	from the reading

EXAMPLE NO. 1
Temperature below 27°C (80°F):
Hydrometer Reading: 1.250
Electrolyte temperature: - 7°C (20°F)
Subtract .024 Sp. Gr.
Corrected Sp. Gr. is 1.226

EXAMPLE NO. 2
Temperature above 27°C (80°F):
Hydrometer Reading: 1.235
Electrolyte temperature: 38°C (100°F)
Add .008 Sp. Gr.
Corrected Sp. Gr. is 1.243

CAUTION: Do not install a partially charged battery on a snowmobile since the casing might crack at freezing temperature. The following chart shows the freezing point of the electrolyte in relation to the charge of the battery.

TEMPERATURE CORRECTED SPECIFIC GRAVITY	BATTERY CHARGE	FREEZING POINT OF ELECTROLYTE
1.260	Fully charged	- 59°C (- 74°F)
1.230	3/4 charged	- 40°C (- 40°F)
1.200	1/2 charged	- 27°C (- 16°F)
1.170	1/4 charged	- 18°C (0°F)
1.110	Discharged	- 7°C (+ 19°F)

BATTERY STORAGE

Disconnect and remove battery from the vehicle.

Check electrolyte level in each cell, add distilled water up to upper level line.

CAUTION: Do not overfill.

The battery must always be stored in fully charged condition. If required, charge until specific gravity of 1.260 is obtained.

CAUTION: Battery electrolyte temperature must not exceed 50°C (122°F). The casing should not feel hot.

Clean battery terminals and cable connections using a wire brush. Apply a light coat of dielectric grease (P/N 293 550 004) or petroleum jelly on terminals.

Clean battery casing and caps using a solution of baking soda and water. Do not allow cleaning solution to enter battery, otherwise it will destroy the electrolyte. Rinse battery with clear water and dry well using a clean cloth.

Store battery on a wooden shelf in a cool dry place. Such conditions reduce self-discharging and keep fluid evaporation to a minimum.

During the storage period, recheck electrolyte level and specific gravity readings at least every 40 days. As necessary, keep the battery at its upper level line and near full charge as possible (trickle charge).

ACTIVATION OF NEW BATTERY

⚠ WARNING

Never charge or boost battery while installed on vehicle.

CAUTION: Prior to charging the battery, always remove it from the vehicle to prevent electrolyte spillage.

A new battery is factory fresh dry charged. For storage purposes, it is fitted with a temporary sealing tube.

Do not remove the sealing tube or loosen battery caps unless activation is desired.

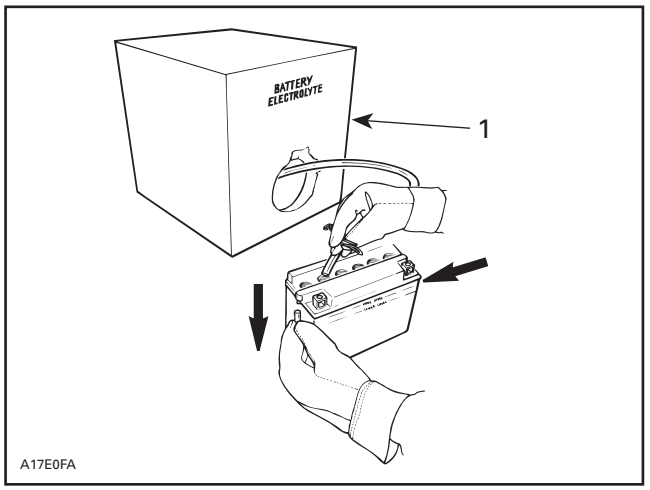
In case of accidental premature removal of caps or sealing tube, battery should be given a full charge.

Perform the following operations anytime a new battery is to be installed.

1. Remove the sealing tube from the vent elbow. Install vent tube, included in the battery kit, to battery elbow.

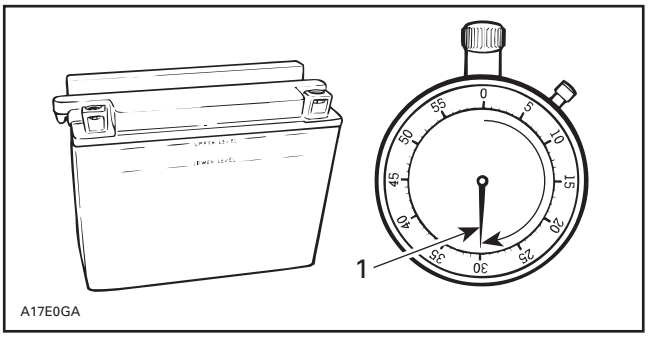
⚠ WARNING

Failure to remove the sealing tube could result in an explosion.



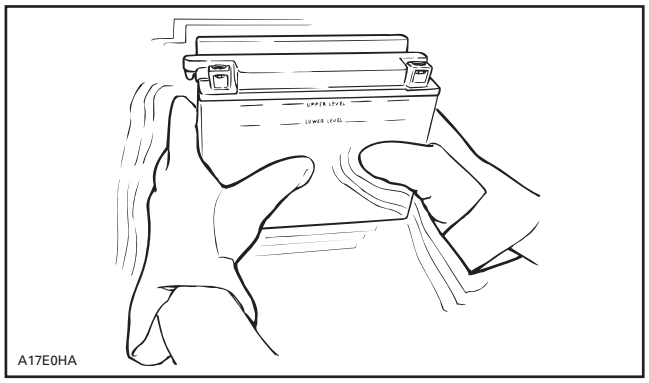
1. Battery electrolyte

2. Remove caps and fill battery to UPPER LEVEL line with electrolyte (specific gravity: 1.260 at 20°C (68°F)).
3. Allow the battery to stand for 30 minutes MINIMUM so that electrolyte soaks through battery cells.

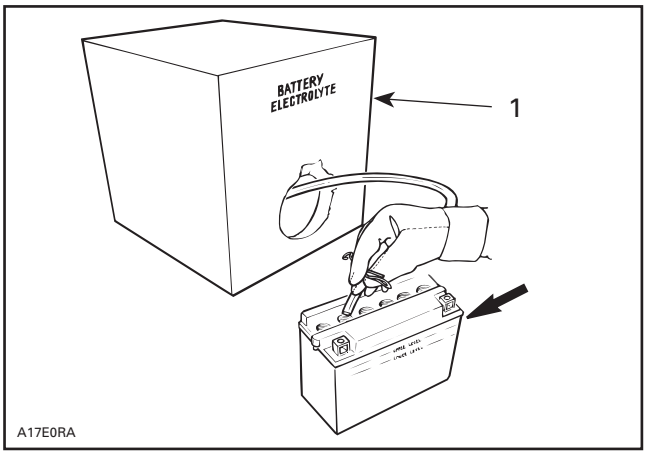


1. 30 minutes

4. Allow gas bubbles to escape by lightly shaking battery by hand.

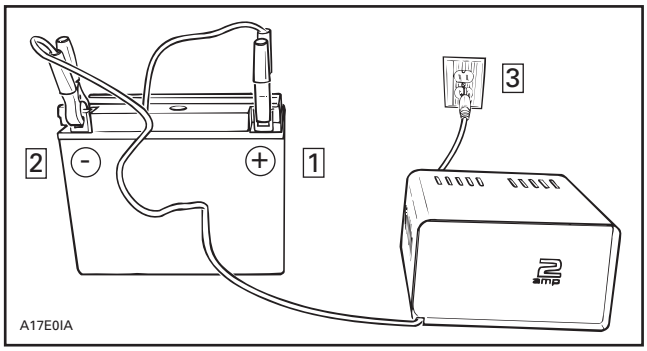


5. Readjust the electrolyte level to the UPPER LEVEL line.



1. Battery electrolyte

6. Connect a 2 A battery charger for 10 to 20 hours.

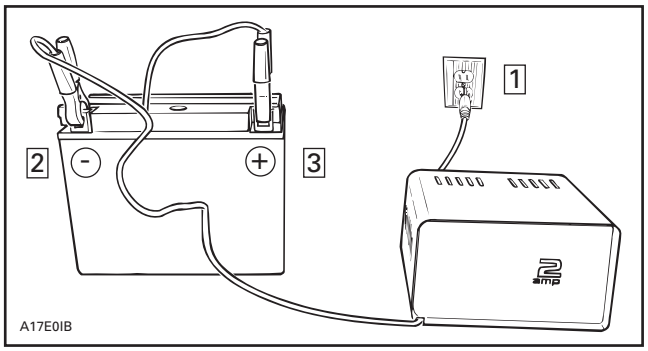


CAUTION: If charging rate raises higher than 2.4 A reduce it immediately. If cell temperature rises higher than 50°C (122°F) (if the casing feels hot) discontinue charging temporarily or reduce the charging rate.

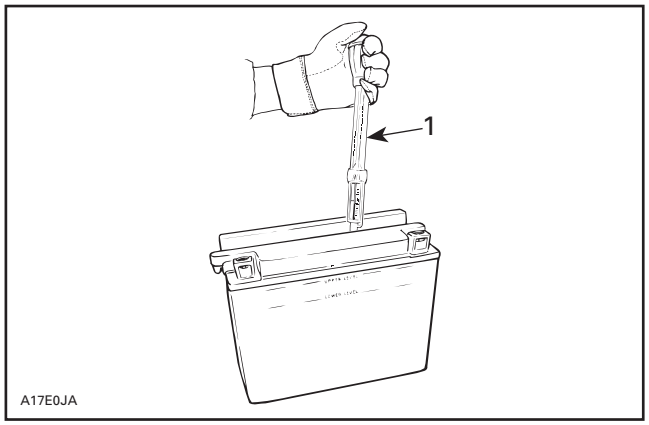
⚠ WARNING

Gases given off by a battery being charged are highly explosive. Always charge in a well ventilated area. Keep battery away from cigarettes or open flames. Always turn battery charger off prior to disconnecting cables. Otherwise a spark will occur and battery might explode.

7. Disconnect battery charger.

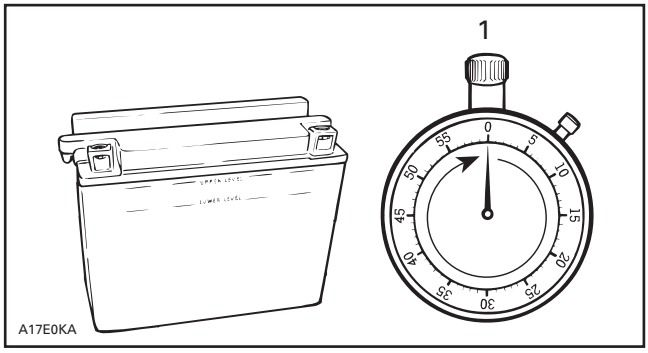


8. Test battery state of charge. Use a hydrometer.



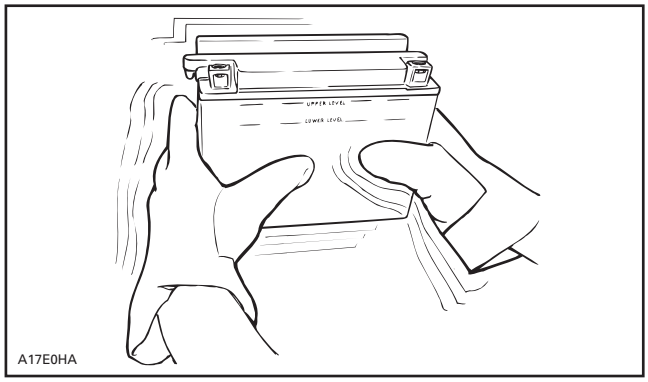
1. Specific gravity 1.260

9. Let battery settle for 1 hour.

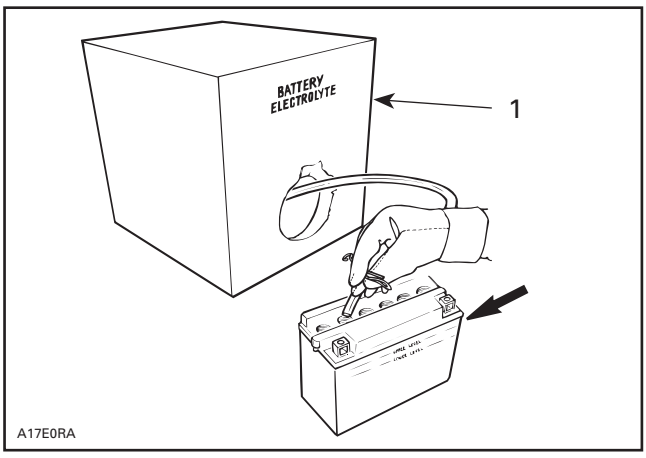


1. 60 minutes

10. Allow gas bubbles to escape by lightly shake battery.

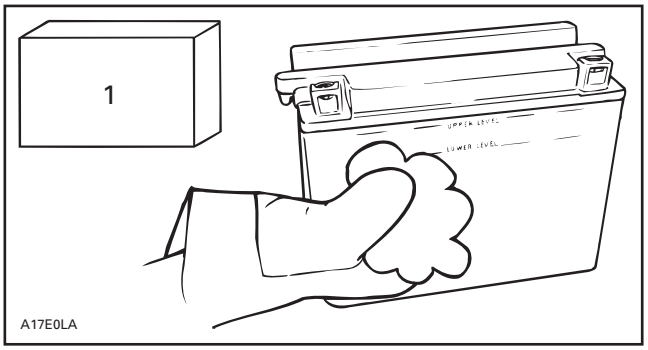


11. Readjust electrolyte level.



1. Battery electrolyte

12. Reinstall caps and clean any electrolyte spillage using a solution of baking soda and water.



1. Baking soda

CAUTION: Do not allow cleaning solution to enter battery interior since it will destroy the electrolyte.

NOTE: It is recommended to verify the battery charge once a month. If necessary, fully charge battery.

SERVICING

Electrolyte Level

Since a battery has been activated (see above), add distilled water to top up electrolyte.

TIPS FOR CHARGING A USED BATTERY

CAUTION: Prior to charging the battery, always remove it from the vehicle to prevent electrolyte spillage.

For best results, battery should be charged when the electrolyte and the plates are at room temperature. A battery that is cold may not accept current for several hours after charging begun.

Do not charge frozen battery. If the battery charge is very low, the battery may freeze. If it is suspected to be frozen, keep it in a heated area for about 2 hours before charging.

⚠ WARNING

Do not place battery near open flame.

Time required to charge a battery will vary depending some factors such as:

– Battery temperature: Charging time is increased as the temperature goes down. The current accepted by a cold battery will remain low. As the battery warms up, it will accept a higher rate of charge.
– State of charge: Because the electrolyte is nearly pure water in a completely discharged battery, it cannot accept current as well as electrolyte. This is the reason the battery will not accept current when the charging cycle first begins. As the battery remains on the charger, the current from the charger causes the electrolytic acid content to rise which makes the electrolyte a better conductor and then, the battery will accept a higher charging rate.
– Type of charger: Battery chargers vary in the amount of voltage and current that they can supply. Therefore, time required for the battery to begin accepting measurable current will also vary.

Charging a Very Flat or Completely Discharged Battery

Unless this procedure is properly followed, a good battery may be needlessly replaced.

– Measure the voltage at the battery posts with an accurate voltmeter. If it is below 10 volts, the battery will accept current at very low rate, in term of milliamperes, because electrolyte is nearly pure water as explained above. It could be some time before the charging rate increases. Such low current flow may not be detectable on some charger ammeters and the battery will seem not to accept any charge.
– Only for this particular case, set the charger to a high rate.

NOTE: Some chargers have a polarity protection feature which prevents charging unless the charger leads are connected to the correct battery terminals. A completely discharged battery may not have enough voltage to activate this circuitry, even though the leads are connected properly. This will make it appear that the battery will not accept a charge. Follow the charger manufacturer's instruction telling how to bypass or override this circuitry so that the charger will turn on and charge a low-voltage battery.

– Since the battery chargers vary in the amount of voltage and current they provide, the time required for the battery to accept measurable charger current might be up to approximately 10 hours or more.
– If the charging current is not up to a measurable amount at the end of about 10 hours, the battery should be replaced.
– If the charging current is measurable before the end or at the end of about 10 hours, the battery is good and charging should be completed in the normal manner as specified in Activation of a new battery.
– It is recommended that any battery recharged by this procedure be load tested prior to returning it to service.

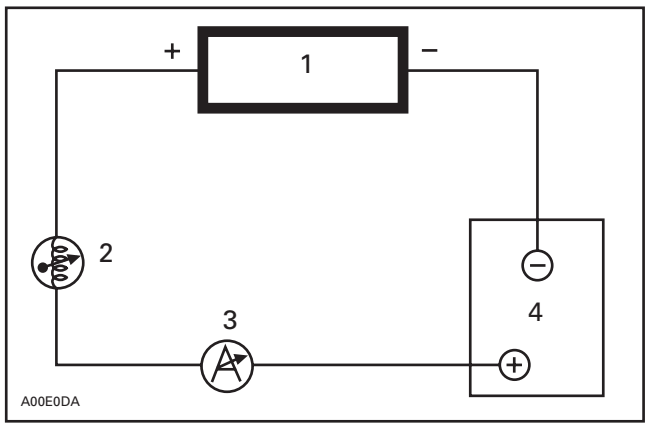
BATTERY CHARGING EQUIPMENT

The battery charger should have an adjustable charging rate. Variable adjustment is preferred, but a unit which can be adjusted in small increments is acceptable.

The battery charger must be equipped with an ammeter capable of accurately measuring current of less than one ampere.

If the present charger is not adjustable to the proper current values, a rheostat can be connected in series with the battery to provide adjustment. 12 ohm, 50 watt rheostat, such as OHMITE — 0314 or MALLORY 50K 12P, are available from electronic parts supply shops and they are suitable for use with most chargers if the peak current is to be held below 2 A.

If you need an accurate ammeter, we recommend the use of: SHURITE — 5202 (0 to 3 A) or — 5203 (0 to 5 A) available from electronic parts supply shops.



1. Charger
2. Rheostat 12 Ω 50 W
3. Ammeter
4. Battery

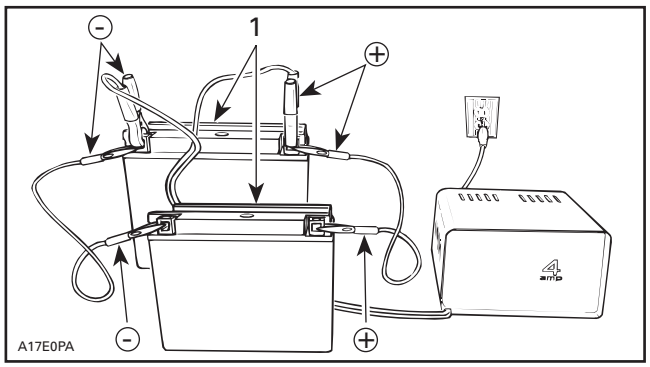
For a service application and a permanent installation, both ammeter and rheostat can be built into a small box adjacent to your charger.

CAUTION: Adequate ventilation MUST be provided to cool the rheostat.

Charging 2 or More Batteries at a Time

Connect all positives together and use a charger with a capacity (rated) equal to: number of batteries to be charged multiply by 2 A.

For example: charging 5 batteries at a time requires a 10 A rated charger (5 × 2 A = 10 A).



TYPICAL
1. Two batteries = 4 A

INSTALLATION OF BATTERY

Ensure vent tube is properly installed on battery elbow.

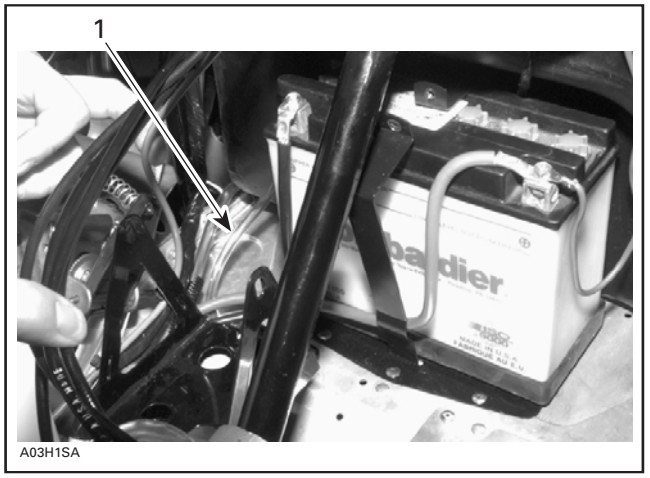
Connect vent tube to vehicle fitting on front frame.

Route RED positive cable behind retaining strip and connect it to positive battery terminal. Connect RED wire (coming from ignition switch).

Connect BLACK negative cable LAST.

CAUTION: Negative battery terminal should always be disconnected FIRST and reconnected LAST.

Apply silicone dielectric grease (P/N 293 550 004) on battery posts and connectors.



BATTERY CONNECTION
1. Vent tube on fitting

Ensure that vent tube is not kinked or blocked then install protective boot over battery.

Close and fasten retaining strips.

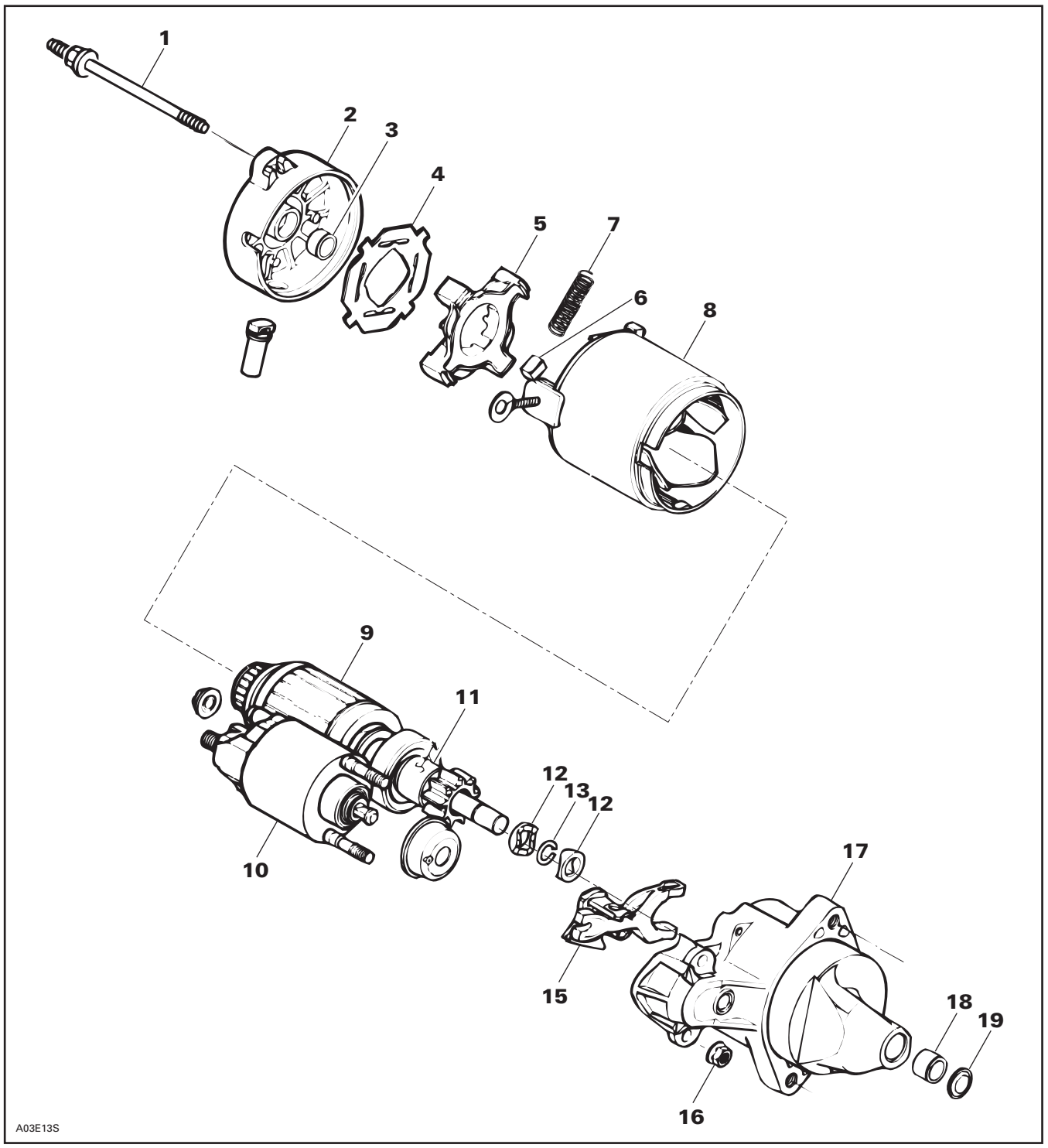
Reinstall air silencer.

Fasten spark plug cables to fan housing.

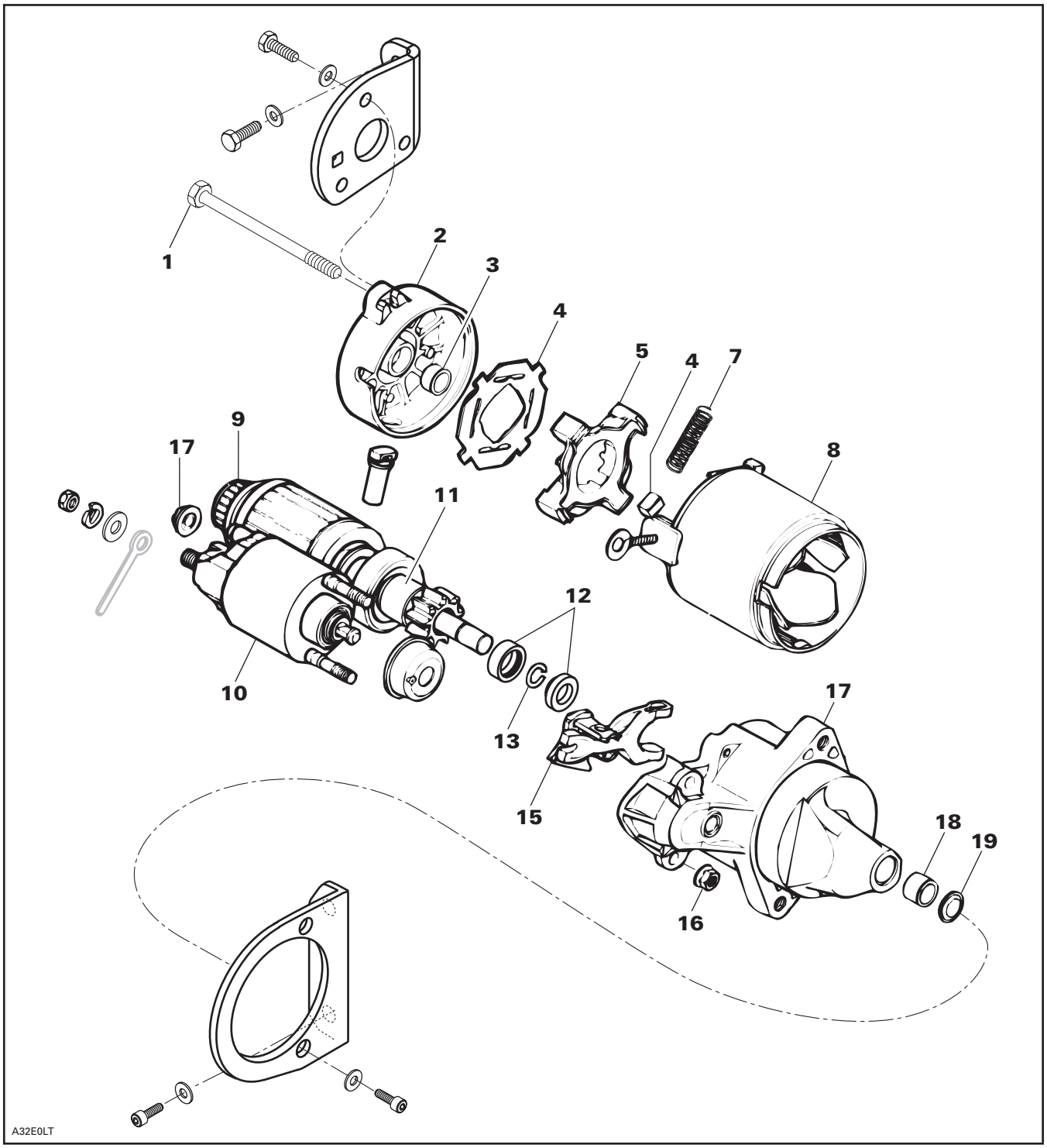
Reinstall throttle cable to air silencer. See removal illustration.

ELECTRIC STARTER

S-Series with Electric Starting and Skandic WT/SWT



Skandic WT LC



REMOVAL

– Disconnect BLACK ground cable from battery.
– Disconnect RED positive cable from battery.

⚠ WARNING

Always disconnect ground cable first and connect last.

– Disconnect RED cable and RED/GREEN wire from starter solenoid switch.
– Remove starter from engine.

DISASSEMBLY

Disconnect bare wire linking starter and solenoid.

Remove nuts **no. 16** then solenoid switch **no. 10** by lifting and pulling to disengage from drive lever **no. 15**.

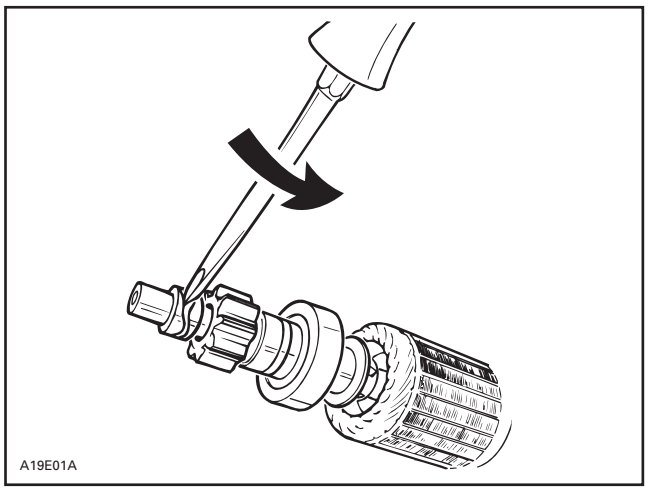
Unscrew starter screws (long) **no. 1** then pull yoke **no. 8** with end frame **no. 2** to separate from drive housing **no. 17**.

Pull armature **no. 9** with drive lever **no. 15**.

Remove insulator **no. 4** then brush springs **no. 7** being careful not to lose them since they will be projected out.

Pull brush holder **no. 5** from yoke **no. 8**.

Insert blade of a small screwdriver between stop collars.



Twist screwdriver to separate stop collars **no. 12** thus giving access to circlip **no. 13**.

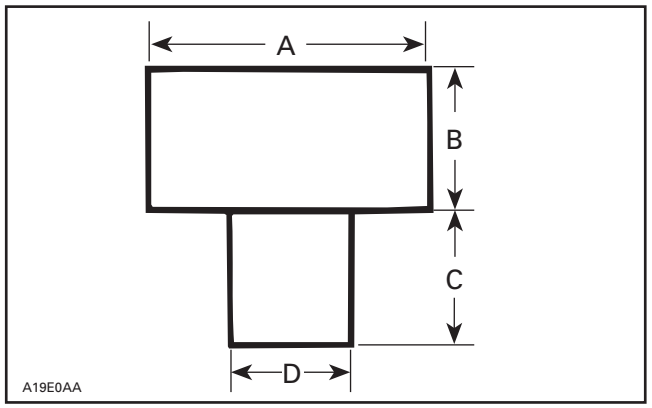
Remove outer collar, circlip then inner collar.

Remove overrunning clutch **no. 11**.

Check the wear on bushing **no. 18** by measuring the amount of radial play between the armature shaft and the bushing.

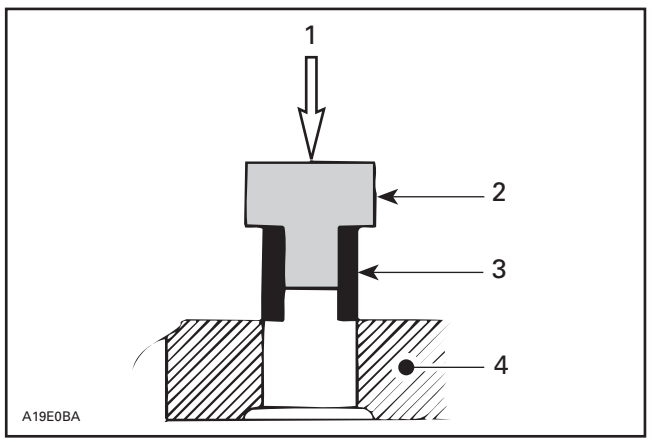
The radial play should not exceed 0.20 mm (.008 in). If greater, replace the bushing. To replace, press out the old one toward bushing cover and press in a new one with a bushing pusher. The correct size of the bushing pusher to use is given on next illustration.

CAUTION: Support drive housing adequately to prevent damage when pressing bushing.



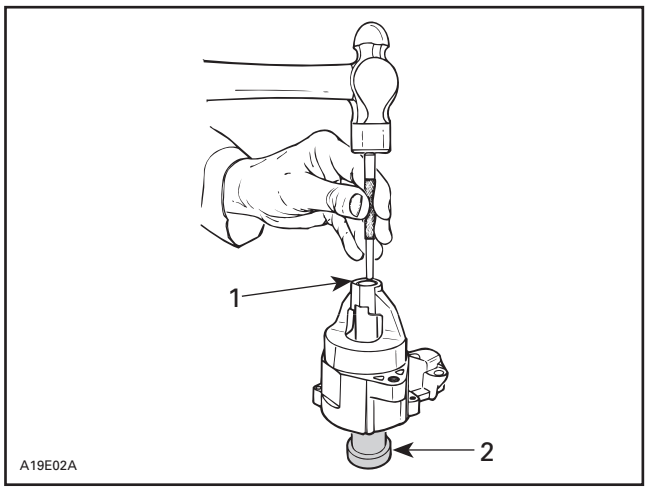
BUSHING PUSHER

A. 16 mm (5/8 in) diameter
B. 13 mm (1/2 in)
C. 11 mm (7/16 in)
D. 11.0 mm (.433 in)



1. Press-in
2. Bushing pusher
3. Bushing
4. Drive housing

Install bushing cover **no. 19** then, using a punch, stake bushing cover in place.



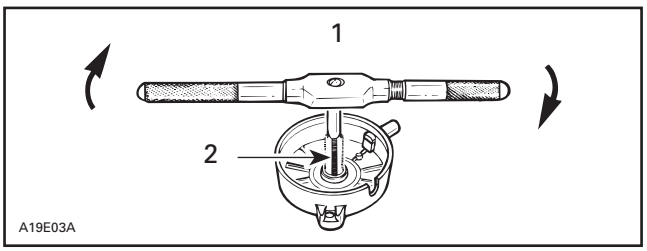
1. Stake bushing cover
2. Support

3, Bushing (end frame)

Check the wear on bushing **no. 3** by measuring the amount of radial play between the armature shaft and the bushing.

The radial play should not exceed 0.20 mm (.008 in). If greater, replace bushing as follows:

Using a 12 mm tap, cut threads into bushing so that the tap contacts the end frame. Continue to rotate tap until the bushing comes free.



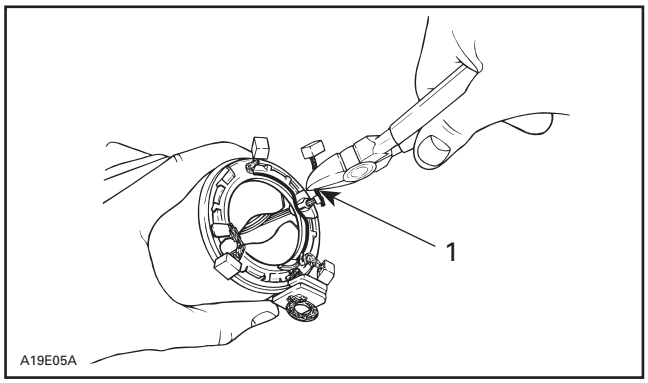
1. Turn until bushing goes out
2. 12 mm tap

To install new bushing, use the same bushing pusher as for drive housing bushing installation.

6, Brush

To replace brush **no. 6**, proceed as follows:

Cut brush wire close to connector at the welded portion.



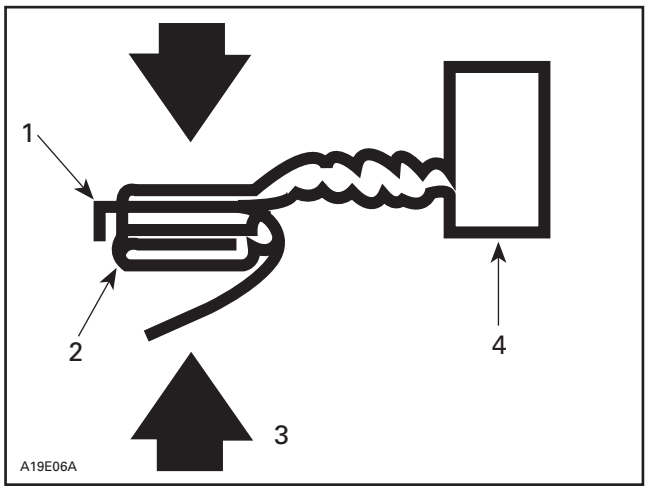
1. Cut close to connector

Remove burrs with a file on the remaining welded portion.

CAUTION: Be careful not to damage plastic portion of yoke.

Place spare brush plate edge against yoke connector edge (welded portion).

Crimp plate over yoke connector with a pair of pliers.



1. Plate edge
2. Yoke connector
3. Crimp
4. Spare brush

Solder the crimped portion.

CAUTION: Do not overheat and quickly perform soldering to prevent solder from flowing to the brush through the wire. Preferably use a heat sink.

CLEANING AND INSPECTION

CLEANING

CAUTION: Armature starter yoke ass'y and drive unit assembly must not be immersed in cleaning solvent.

Clean brushes and holder with a clean cloth soaked in solvent. Brushes must be dried thoroughly with a clean cloth.

Blow brush holder clean using compressed air.

⚠ WARNING

Always wear safety goggles when using compressed air.

Remove dirt, oil or grease from commutator using a clean cloth soaked in suitable solvent. Dry well using a clean, dry cloth.

Clean engine starter gear teeth and drive unit (clutch).

NOTE: Bushings must not be cleaned with grease dissolving agents.

Immerse all metal components in cleaning solution. Dry using a clean, dry cloth.

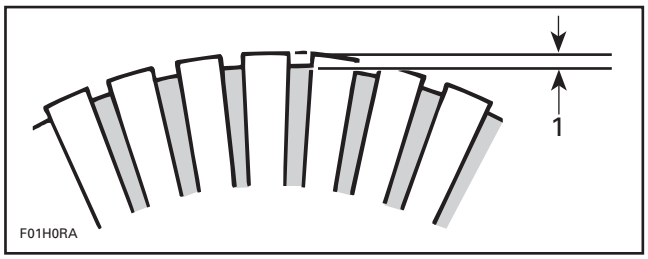
INSPECTION

Armature

NOTE: An ohmmeter may be used for the following testing procedures, except for the one concerning the shorted windings in the armature.

Check the commutator for roughness, burnt or scored surface. If necessary, turn the commutator on a lathe, enough to remove grime only.

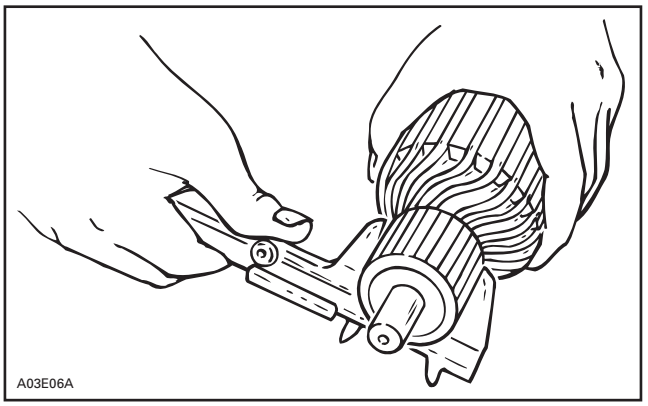
Check the commutator for mica depth. If the depth is less than 0.20 mm (.008 in), undercut the mica. Be sure that no burrs are left and no copper dust remains between the segments after the undercutting operation is completed.



1. Commutator undercut 0.20 mm (.008 in)

Check the commutator out-of-round condition with V Blocks and an indicator. If the commutator out-of-round is more than 0.40 mm (.016 in), the commutator should be turned on a lathe.

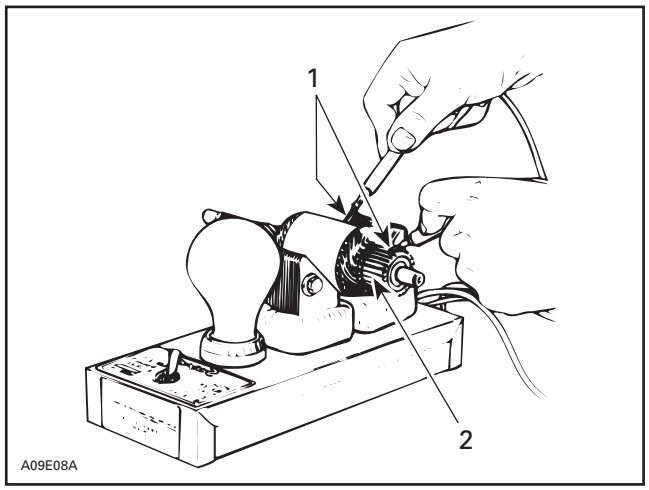
Check commutator outer diameter. If less than specified value, replace.



MODEL	WEAR LIMIT
All	27 mm (1.063 in)

Test for Ground Circuit in the Armature:

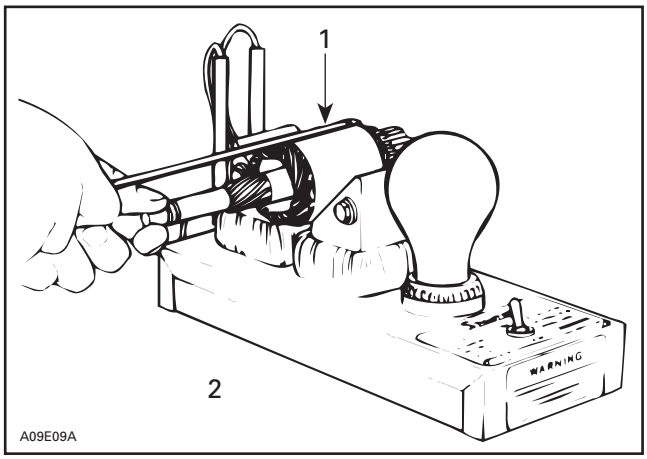
Use growler test probes. Check between armature core and the commutator bars. If growler lamp turns on, bars are grounded. If so, replace armature.



1. Test probes
2. Commutator bars

Test Armature for Shorted Winding:

When the armature is rotated in the growler with a steel strip (hacksaw blade) held above it, the strip will vibrate over that area of the armature which has short circuit. Replace armature if so.



1. Steel strip (hack-saw blade)
2. Growler

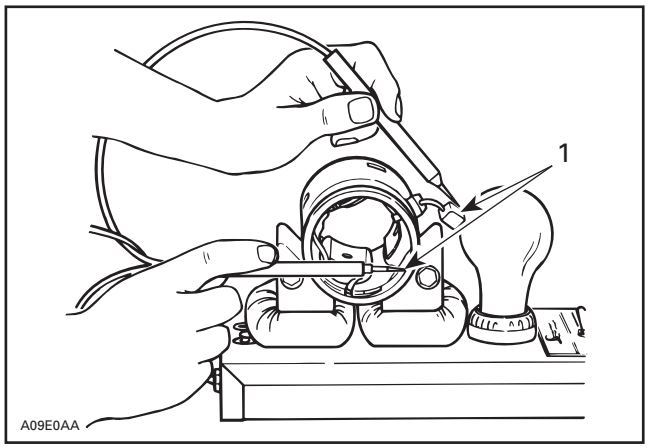
Test the Armature for Open Circuit:

Use growler test probes. Place one test probe on a commutator bar and the other test probe on the neighboring bar. Repeat this operation for all bars, moving one test probe at a time. If the growler lamp does not turn on, the armature circuit between these 2 bars is opened. The armature should be replaced or repaired; open circuits most often occur at the commutator riser where coils are soldered. (Burnt commutator bars are usually an indication of an open-circuit armature coil).

Field Windings and Brushes

Test the Field Winding for Open Circuit:

Use growler test probes. Place one test probe on the negative brush and the other test probe on the yoke. If growler lamp does not turn on, the field winding has an open-circuit. The yoke has to be repaired or replaced.



1. Test probes

Check the dynamic brake winding for open circuit by placing one test probe on the positive brush and the other probe on the negative brush.

If growler lamp does not turn on, the winding circuit is open-circuit and the yoke has to be repaired or replaced.

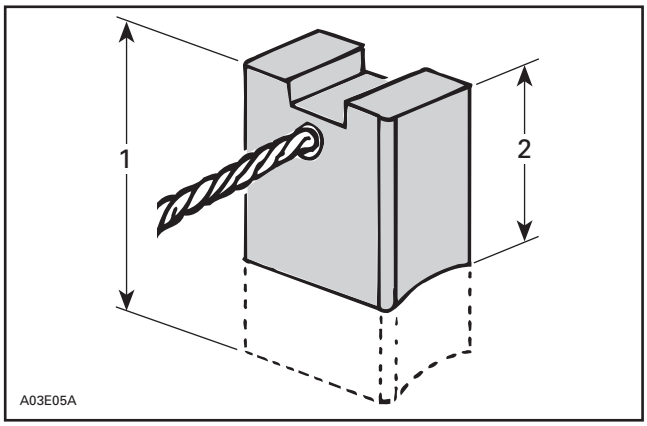
Brush Holder

Check the brush holder for insulation using growler test probes. Place one test probe on the insulated brush holder and the other test probe on the brush holder plate. If the growler lamp turns on, the brush holder has to be repaired or replaced.

Brush Length

Measure brush length. If less than the specified value, replace them.

MODEL	LENGTH	
	NEW	WEAR LIMIT
All	10 mm (.400 in)	6 mm (.236 in)



TYPICAL
1. *New*
2. *Wear limit*

Overrunning Clutch

The pinion of the overrunning clutch should turn smoothly in a clockwise direction, and should not slip in a counterclockwise direction. If defective, replace.

Check the pinion teeth for wear and damage. If defective, replace.

SOLENOID SWITCH

Inspect connections and clean as necessary. Solenoid switch condition can be checked with an ohmmeter. Install test probes on **large** connectors of solenoid when it is activated (+ on RED/GREEN wire and – on solenoid body).

IMPORTANT: No current must be present on large cables when using ohmmeter, otherwise meter could be damaged.

ASSEMBLY

Prior to assembling, coat sliding surfaces and moving parts on armature shaft splines, overrunning clutch, solenoid switch plunger, drive lever and bushings with grease.

Proceed as follows for assembling.

Secure drive housing in a vise.

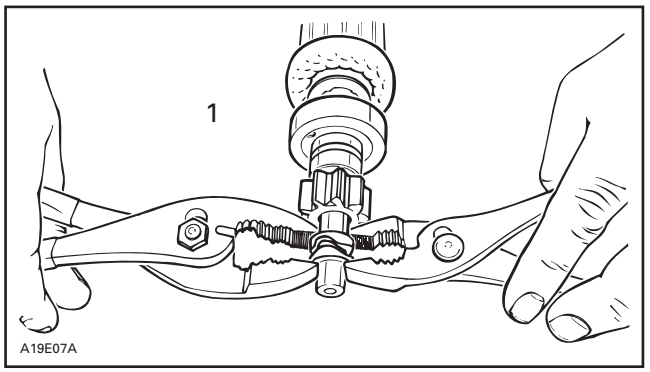
CAUTION: Do not overtighten since housing might be damaged.

Install overrunning clutch onto armature shaft. Insert **inner** collar onto shaft. Install a new circlip.

CAUTION: Always install a new circlip when servicing.

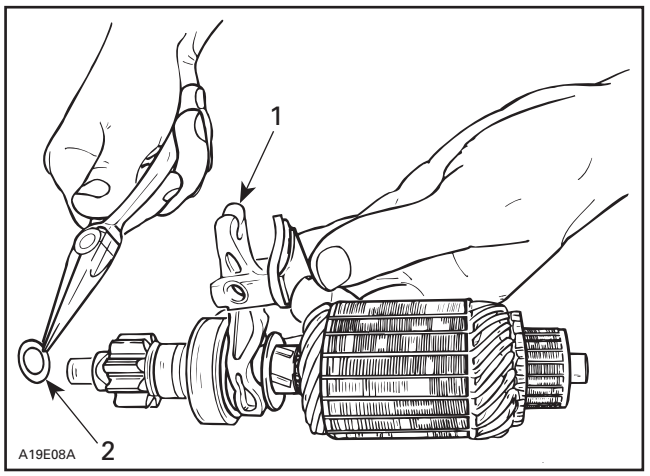
Insert **outer** collar being careful to match protrusions with notches of collars.

Using a pair of pliers on each side of stop collars, squeeze evenly until collars sit over circlip.



1. *Squeeze evenly*

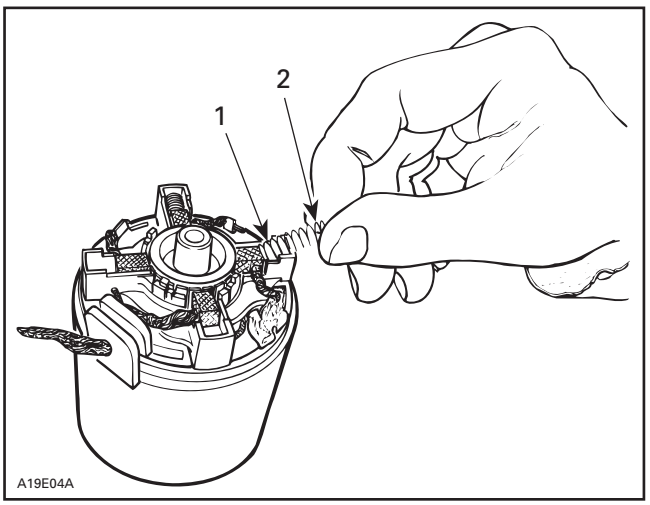
Install thrust washer against outer stop collar. Place drive lever onto overrunning clutch then insert into drive housing.



1. *Install on overrunning clutch*
2. *Install thrust washer*

Slide yoke over armature.

Install brush holder then brushes in their housings. Insert springs as follows: place one end of spring against brush, compress, then push the other end of spring onto its housing. Repeat for remaining springs.



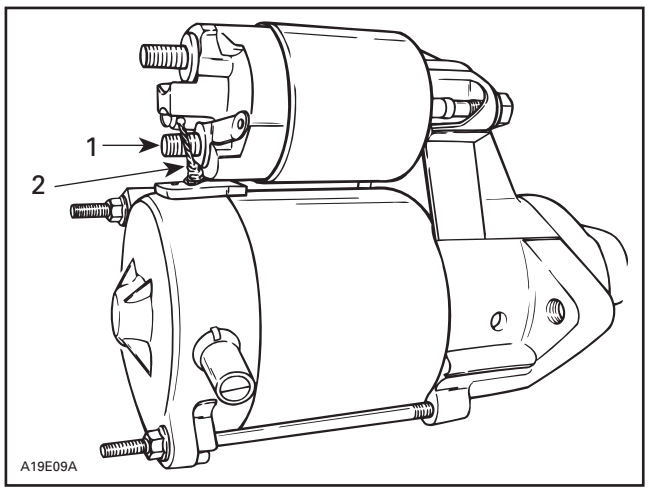
1. This end first
2. Push this end to complete

Secure insulator over brushes and springs. Properly install end frame and tighten screws.

Insert solenoid plunger inside of drive lever fork and secure to drive housing.

Connect starter bare wire to solenoid.

NOTE: Connect this wire on the **shorter** solenoid stud.



1. Shorter stud
2. Bare wire

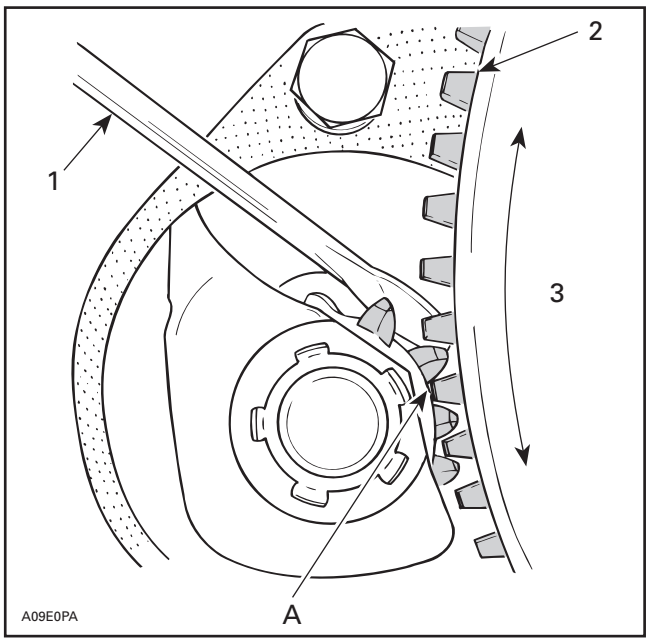
INSTALLATION

Make sure that starter and engine mating surfaces are free of grime. Serious trouble may arise if starter is not properly aligned.

Install starter.

NOTE: Check proper engaging depth of starter pinion teeth to ring gear teeth (see illustration). Install hardened washers (P/N 503 007 900) between engine and starter supports accordingly.

CAUTION: All starter bracket fasteners must be secured with Loctite 271 (P/N 293 800 005).



1. Screwdriver pulling starter pinion
2. Ring gear
3. No excessive backlash
A. 0.5 to 1.5 mm (.020 to .060 in)

Connect the RED battery cable and the RED wire to the large terminal of the solenoid. Connect RED/GREEN wire to small terminal of solenoid.

Connect BLACK cable to battery.

⚠ WARNING

Always disconnect ground cable first and connect last.

TESTING PROCEDURE

GENERAL

The following chart gives the engine types with their implemented system.

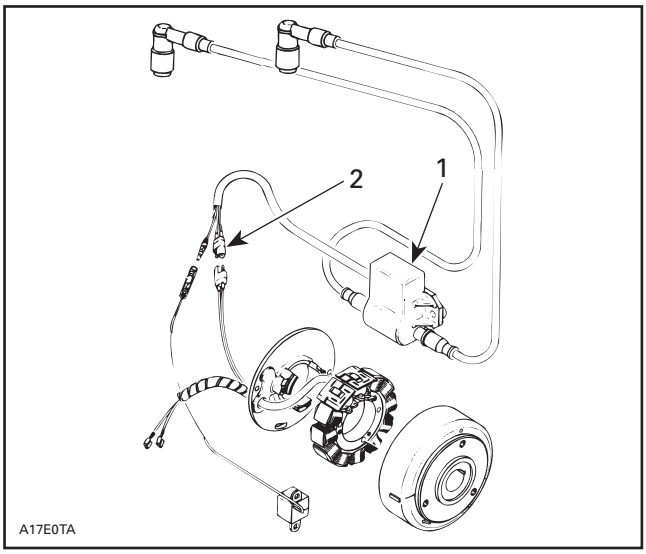
ENGINE TYPE	IGNITION SYSTEM	CHARGING SYSTEM OUTPUT
503 on Skandic WT/SWT	① Ducati trigger coil CDI	240
377, 443 and 503 on Skandic LT and S-Series with RER	② RER dual trigger coil CDI (twin cylinder)	240
593 on Skandic WT LC	③ Nippondenso trigger coil CDI	290

CDI System Identification

①Ducati Trigger Coil CDI

The DUCATI trigger coil CDI system has a combined ignition module/ignition coil which is mounted on air silencer, below carburetors.

Ignition module is connected to the ignition generator coil via a 4-connector housing (GREEN and WHITE wires).



① DUCATI TRIGGER COIL CDI SYSTEM

1. *Combined ignition module/ignition coil mounted on air silencer below carburetors*
2. *4-DA housing (GREEN and WHITE wires)*

②RER Dual Trigger Coil CDI (twin cylinder)

The RER dual trigger coil CDI system has an ignition coil integrated to the MPEM which is mounted on oil reservoir.

MPEM is connected to a single ignition generator coil via a 3-connector housing (BLACK and RED wires).

MPEM is programmed to recognize a signal sent by the switch located on snowmobile console.

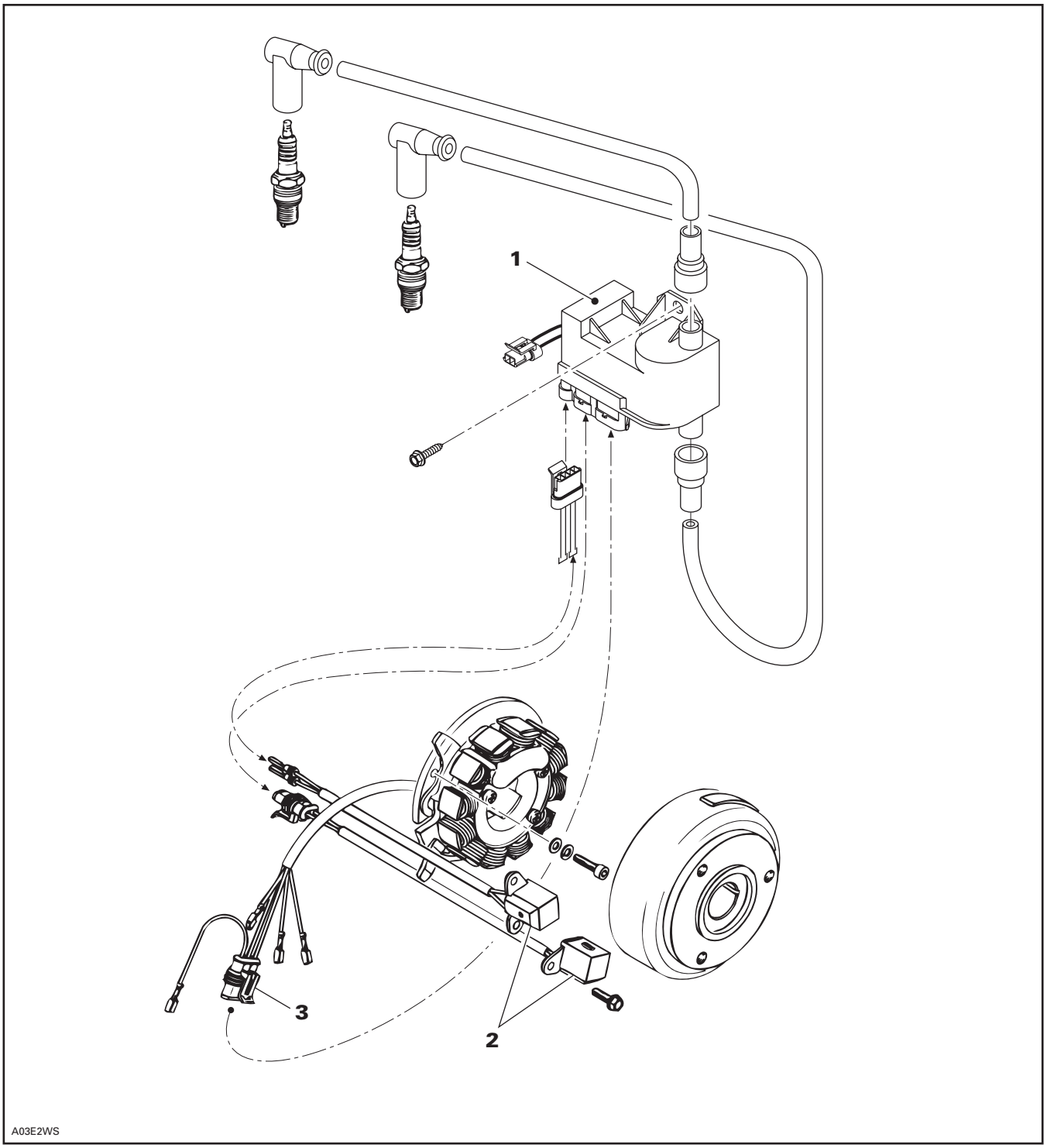
When switch is activated, MPEM cuts off ignition and engine rev drops at approximately 450 RPM.

MPEM fires a spark at a great advance creating a thrust which reverses engine rotation.

Second trigger coil located on crankcase takes over to produce spark in reverse rotation.

A safety device is incorporated to MPEM preventing it from reading any signal coming from reverse switch at following engine revs.

Below 1000 RPM and above 3500 RPM = No reverse signal.



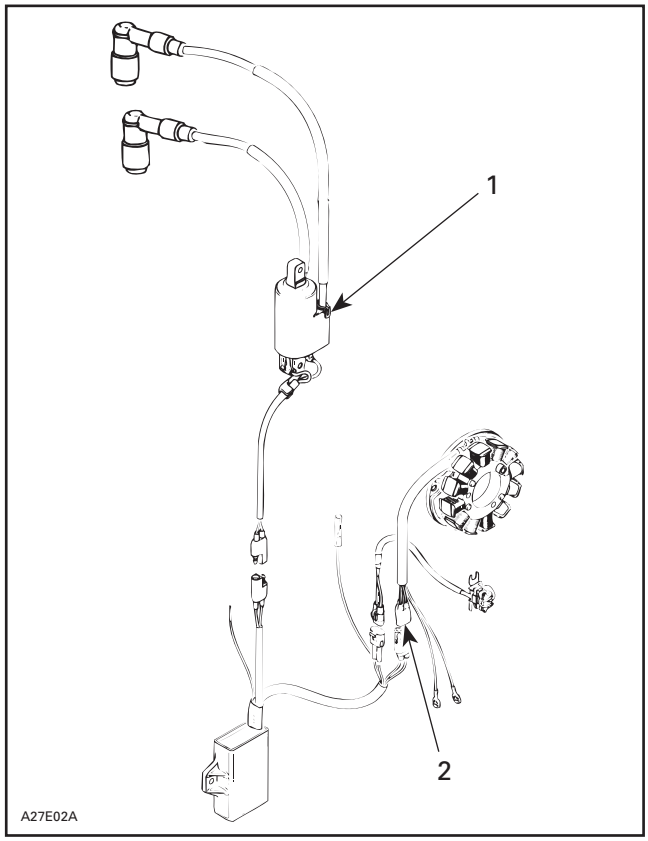
② *RER DUAL TRIGGER COIL CDI SYSTEM (TWIN CYLINDER)*

1. *MPEM*
2. *Trigger coils*
3. *2-05 housing (BLACK and RED wires)*

③Nippondenso

The NIPPONDENSO CDI system has a separate ignition coil which is mounted on the reservoir support.

1. Ignition module is connected to the ignition generator coil via a 3-wire connector (RED, BLACK/RED and BLACK wires).



③ *NIPPONDENSO TRIGGER COIL CDI SYSTEM*

1. Separate ignition coil mounted on reservoir support
2. Three-wire connector (RED, BLACK/RED and BLACK)

DUCATI TRIGGER COIL CDI SYSTEM TESTING

Skandic WT/SWT

IGNITION SYSTEM TESTING SEQUENCE

In case of ignition problems, check the following in the prescribed order until the problem can be solved.

1. Sparking/spark plug condition.
2. Electrical connectors.
3. Ignition switches, tether cord cap and emergency switch.
4. Ignition coil output.
5. Trigger coil output.

LIGHTING SYSTEM TESTING SEQUENCE

1. Electrical connectors.
2. Magneto output (lighting generator coil).

Testing Conditions

Voltage measurements are always taken upon starting the vehicle. Readings taken when the engine is running will be higher than indicated range. Part temperature must be approximately 20°C (68°F) (room temperature), otherwise readings could be distorted.

Analysis of Readings

Voltage Readings

When testing the different magneto components, it is important to take into consideration that readings vary according to the force applied onto the manual starter. It is therefore important to employ enough force upon each trial.

The reading must be 3 times within or above the range indicated in the corresponding table. If the reading is too low, the part is considered to be defective and it must be replaced.

Resistance Readings

Place multimeter selector switch to Ω in order to measure resistance. Readings must be within the indicated range. Otherwise, the part is considered to be defective and must be replaced.

CAUTION: When taking measurements, it is useless to try to start the vehicle since readings would then be distorted.

Intermittent Ignition Problems

It is difficult to make a diagnostic in the case of intermittent ignition problems. Thus, problems occurring only when the engine operating temperature is normal must be checked in similar conditions.

In most cases when problems are caused by temperature or vibrations, these can only be solved by replacing parts. Most problems cannot be detected when the engine is stopped.

Multiple Problems

As a matter of fact, more that one component can be defective. As a result, if the problem remains although a part was replaced, start over the whole verification from the beginning in order to identify the other defective component.

1. SPARKING

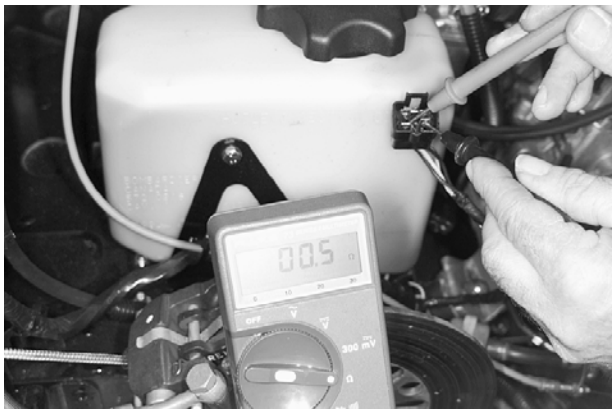
During this operation, it is important to use the snowmobile spark plug and not a new one. Bring the plug in contact with the engine. If no spark is produced, replace the spark plug with a new one and do the test again.

2. ELECTRICAL CONNECTOR TESTING

Make sure that none of the connectors are disconnected.

3. IGNITION SWITCH, TETHER CORD SWITCH AND EMERGENCY SWITCH TESTING

Disconnect connector housing 2-01 from engine, and using a multimeter, check resistance as indicated in IGNITION table.

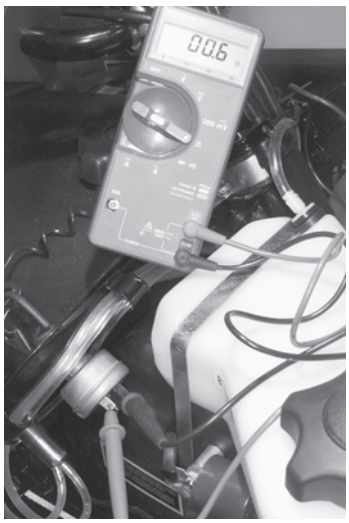

A03E1IA

If readings are acceptable, go on to next step.

If readings are inadequate, individually check each switch as follows.

Ignition Switch (key)

Disconnect switch housing. Using a multimeter, check between **MAG** and **GRD** terminals if the circuit is open (0.L $_{M\Omega}$) in operating position and if the circuit is closed (0 $_{\Omega}$) in off position.


A05E07A

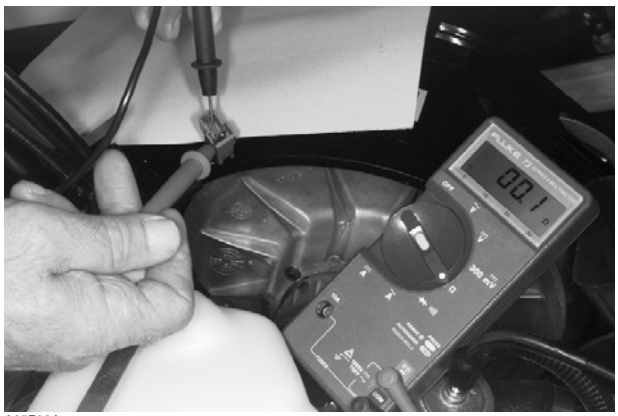
TYPICAL

If readings do not correspond to the above-mentioned indications, replace switch.

If readings are acceptable, check other switches.

Emergency Switch

Unplug switch block connected to main wiring harness. Check using a multimeter. Connect probes to 6-02-C-M and 6-02-D-M terminals. The multimeter should indicate an open circuit (0.L $_{M\Omega}$) in operating position and a closed circuit (0 $_{\Omega}$) in off position.


A05E08A

TYPICAL

If readings do not correspond to the above-mentioned indications, replace switch.

If readings are acceptable, check other switches.

Tether Cord Switch

Unplug switch block connected to main wiring harness. Check using a multimeter by connecting probes to 6-03-B-M and 6-03-A-M wires. The multimeter should indicate an open circuit (0.L $_{M\Omega}$) in operating position and a closed circuit (0 $_{\Omega}$) in off position.

A05E09A

TYPICAL

If readings do not correspond to the above-mentioned indications, replace switch.

If readings are acceptable, check other switches.

If none of these verifications are conclusive, the problem finds its source in the main wiring harness. Proceed as follows:

NOTE: For this next step, no stop switch must be connected to the main wiring harness.

Disconnect all stop switches from the main wiring harness and check the continuity of each wire by connecting probes to the end of wires of the same color. Repeat with all other wires. It is important to mention that all wires of the same color within a given harness are connected together. These wires should therefore have a closed circuit. On the other hand, BLACK and BLACK/YELLOW wires must have an open circuit (0.L $_{M\Omega}$).

Repair or replace if necessary.

4. IGNITION GENERATOR COIL VOLTAGE TESTING

General

When manually starting the engine while the spark plug is installed, the engine will tend to accelerate beyond the compression point. This will result in higher magneto output power.

1. Disconnect the 4-wire housing between the ignition module and the magneto wiring harness (4-02).

2. Connect multimeter probes to GREEN and WHITE wires (female end), then bring selector to Ṽ and scale to 00.0VAC.
3. Activate the manual starter and check values indicated by the multimeter.
4. Repeat operation 3 times.

A03E1JA

5. Compare readings with those appearing in the IGNITION table.

5. TRIGGER COIL VOLTAGE TESTING

1. Disconnect 4-wire housing between the ignition module and the engine (4-02).
2. Connect multimeter probes to RED/WHITE wire (female side) and to the engine, then bring selector switch to Ṽ and scale to 00.0VAC.
3. Activate the manual starter and check values indicated by the multimeter.
4. Repeat operation 3 times.
5. Compare readings with those appearing in the IGNITION table.

CONCLUSION

If none of the above testing operations produced valid results, it is strongly recommended to keep on testing according to the list appearing in the Resistance column of the IGNITION table.

Set the multimeter as indicated.

LIGHTING GENERATOR COIL VOLTAGE TESTING

NOTE: The lighting generator coil is not part of the ignition system. It is a self-contained system used to supply current to the lighting system and to other devices working on alternating current. However, this system can be tested using a multimeter.

1. Disconnect housing from engine (2-01).
2. Connect multimeter wires to YELLOW and YELLOW/BLACK wires (female side), then place selector switch to Ṽ and scale to 0.00VAC.
3. Activate the manual starter and check values indicated by the multimeter.
4. Repeat operation 3 times.

A03E1LA

5. Compare readings with those appearing in the LIGHTING table.

CONCLUSION

If none of the above testing operations produced valid results, it is strongly recommended to keep on testing according to the list appearing in the Resistance column of the LIGHTING table.

Set the multimeter as indicated.

IGNITION SYSTEM TESTING (Skandic WT/SWT)							
PART	TEST TO BE PERFORMED	WIRE COLOR	RESISTANCE Ω		VOLTAGE V		NOTE
			VALUE (OHMS)	MULTIMETER SCALE	VALUE (VOLTS)	MULTIMETER SCALE	
Stop switch	Running insulation	BK and BK/YL	0.L	00.0 MΩ	—	—	All switches must be in run position.
	Continuity in stop position	BK and BK/YL	00.0 - 00.5	00.0 Ω	—	—	At least one stop switch must be operational.
Ignition generator coil	Output	WH and GN	230.0 - 330.0	00.0 Ω	30.0 - 60.0	00.0VAC	All switches must be in run position.
	Ground continuity	WH and engine	00.0 - 00.5	00.0 Ω	—	—	The term "engine" refers to the engine metal parts connected to the magneto housing.
Trigger coil	Continuity	RD/WH and engine	140.0 - 180.0	00.0 Ω	2.0 - 9.0	00.0VAC	
Ignition module and high voltage coil	Secondary winding resistance with caps	—	13.1 K - 18.3 K	00.0 KΩ	**CAUTION:** Do not measure high voltage coil output voltage.		
High voltage coil	Secondary winding resistance with caps	Spark plug cap Spark plug cap	8.90 K - 13.1 K	00.0 KΩ	**CAUTION:** Do not measure high voltage coil output voltage.		
	Secondary winding resistance without caps	BK BK	0.90 K - 1.10 K	00.0 KΩ	**CAUTION:** Do not measure high voltage coil output voltage.		
	Secondary winding voltage	BK engine	—	—	.100 - .250	0.00VAC	The measurement must be taken on the spark plug cable (without the spark plug).
Spark plug cap	Cap resistance	—	4.0 K - 6.0 K	00.0 KΩ	—	—	—

NOTE: Stop switches include the ignition switch, the tether cord switch and the emergency cut-out switch.

It is important to take note that voltage measurements must be taken while starting the vehicle using the manual starter.

Voltages obtained upon starting are proportional to the force applied onto the manual starter. A low voltage is therefore normal under a low cranking force.

Perform testing in the prescribed order and replace any parts not performing according to specifications.

It is important to resume all tests when replacing a component.

If not specified, the probe connecting sequence is not important.

LIGHTING SYSTEM TESTING (Skandic WT/SWT)							
PART	TEST TO BE PERFORMED	WIRE COLOR	RESISTANCE Ω		VOLTAGE V		NOTE
			VALUE (OHMS)	MULTIMETER SCALE	VALUE (VOLTS)	MULTIMETER SCALE	
Lighting generator coil	Power	YL and YL/BK	0.05 - 0.6	00.0 Ω	2.5 - 7.0	00.0 VAC	—
	Insulation	YL and engine	0.L	00.0 MΩ	—	—	—
	Ground continuity	BK engine	00.0 - 00.5	00.0 MΩ	—	—	—

NOTE: Stop switches include the ignition switch, the tether cord switch and the emergency cut-out switch.

It is important to take note that voltage measurements must be taken while starting the vehicle using the manual starter.

Voltages obtained upon starting are proportional to the force applied onto the manual starter. A low voltage is therefore normal under a low cranking force.

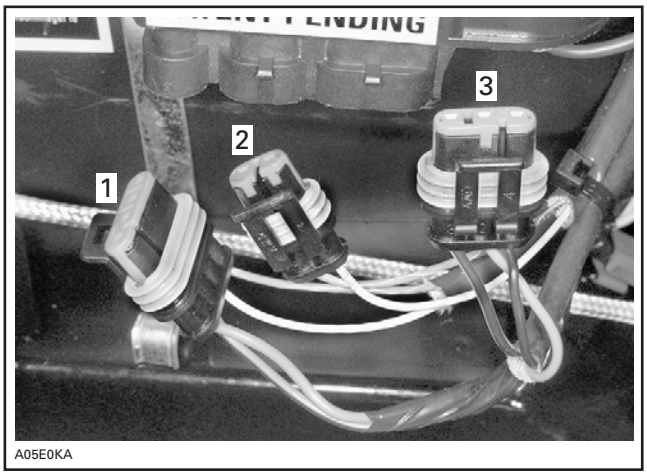
Perform testing in the prescribed order and replace any parts not performing according to specifications.

It is important to resume all tests when replacing a component.

If not specified, the probe connecting sequence is not important.

RER DUAL TRIGGER COIL CDI SYSTEM TESTING

Skandic LT and S-series with RER



MPEM

1. *Reverse switch, reverse indicator and trigger coil*
2. *Trigger coil*
3. *Generator output and cut-off switches*

IGNITION SYSTEM TESTING SEQUENCE

In case of ignition problems, check the following in the prescribed order until the problem can be solved.

1. Sparking/spark plug condition.
2. Electrical connectors.
3. Ignition switches, tether cord cap and emergency switch.
4. Ignition coil output.
5. Trigger coil output.

NOTE: Refer to DUCATI CDI SYSTEM TESTING and appropriate model IGNITION SYSTEM TESTING TABLE at the end of this chapter for complete detailed testing procedure.

LIGHTING SYSTEM TESTING SEQUENCE

1. Electrical connectors.
2. Magneto output (lighting generator coil).

NOTE: Refer to DUCATI CDI SYSTEM TESTING and appropriate model LIGHTING SYSTEM TESTING TABLE at the end of this chapter for complete detailed testing procedure.

Testing Conditions

Voltage measurements are always taken upon starting the vehicle. Readings taken when the engine is running will be higher than indicated range.

Part temperature must be approximately 21°C (70°F) (room temperature), otherwise readings could be distorted.

Analysis of Readings

Voltage Readings

When testing the different magneto components, it is important to take into consideration that readings vary according to the force applied onto the manual starter. It is therefore important to employ enough force upon each trial.

The reading must be 3 times within or above the range indicated in the corresponding table. If the reading is too low, the part is considered to be defective and it must be replaced.

Resistance Readings

Place multimeter selector switch to Ω in order to measure resistance. Readings must be within the indicated range. Otherwise, the part is considered to be defective and must be replaced.

CAUTION: When taking measurements, it is useless to try to start the vehicle since readings would then be distorted.

Intermittent Ignition Problems

It is difficult to make a diagnostic in the case of intermittent ignition problems. Thus, problems occurring only when the engine operating temperature is normal must be checked in similar conditions.

In most cases when problems are caused by temperature or vibrations, these can only be solved by replacing parts. Most problems cannot be detected when the engine is stopped.

Multiple Problems

As a matter of fact, more than one component can be defective. As a result, if the problem remains although a part was replaced, start over the whole verification from the beginning in order to identify the other defective component.

1. SPARKING

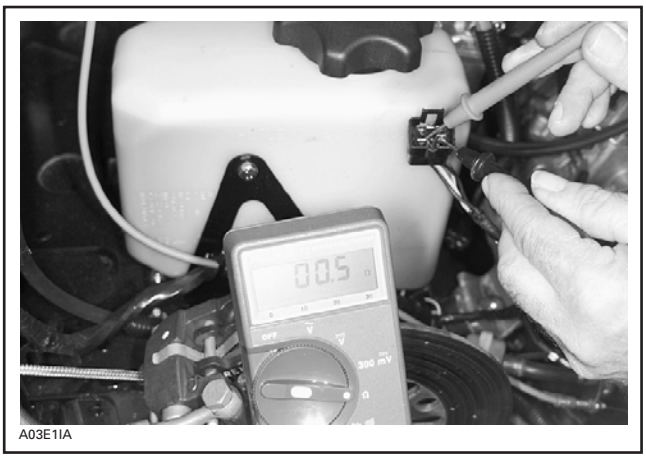
During this operation, it is important to use the snowmobile spark plug and not a new one. Bring the plug in contact with the engine. If no spark is produced, replace the spark plug with a new one and do the test again.

2. ELECTRICAL CONNECTOR TESTING

Make sure that none of the connectors are disconnected.

3. IGNITION SWITCH, TETHER CORD SWITCH AND EMERGENCY SWITCH TESTING

Disconnect connector housing 2-MO from engine, and using a multimeter, check resistance as indicated in IGNITION table.

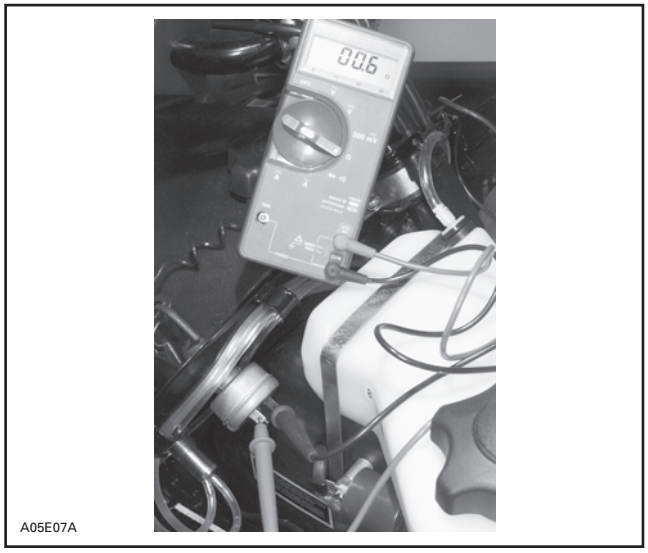

A03E1IA

If readings are acceptable, go on to next step.

If readings are inadequate, individually check each switch as follows.

Ignition Switch (key)

Disconnect switch housing. Using a multimeter, check between **MAG** and **GRD** terminals if the circuit is open (0.L $_{M\Omega}$) in operating position and if the circuit is closed (0 $_{\Omega}$) in off position.


A05E07A

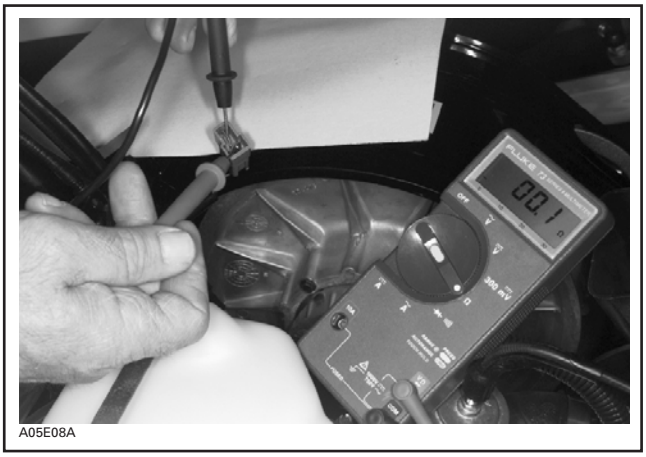
TYPICAL

If readings do not correspond to the above-mentioned indications, replace switch.

If readings are acceptable, check other switches.

Emergency Switch

Unplug switch block connected to main wiring harness. Check using a multimeter. Connect probes to 6-IU-C-M and 6-IU-D-M terminals. The multimeter should indicate an open circuit (0.L $_{M\Omega}$) in operating position and a closed circuit (0 $_{\Omega}$) in off position.


A05E08A

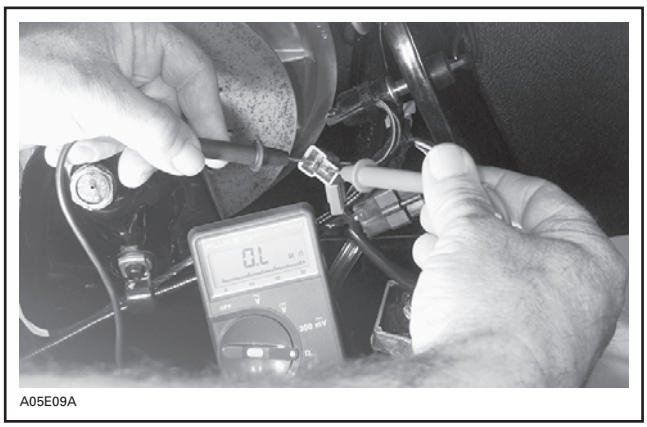
TYPICAL

If readings do not correspond to the above-mentioned indications, replace switch.

If readings are acceptable, check other switches.

Tether Cord Switch

Unplug switch block connected to main wiring harness. Check using a multimeter by connecting probes to 6-BC-B-M and 6-BC-A-M wires. The multimeter should indicate an open circuit (0.L $_{M\Omega}$) in operating position and a closed circuit (0 $_{\Omega}$) in off position.



A05E09A

TYPICAL

If readings do not correspond to the above-mentioned indications, replace switch.

If readings are acceptable, check other switches.

If none of these verifications are conclusive, the problem finds its source in the main wiring harness. Proceed as follows:

NOTE: For this next step, no stop switch must be connected to the main wiring harness.

Disconnect all stop switches from the main wiring harness and check the continuity of each wire by connecting probes to the end of wires of the same color. Repeat with all other wires. It is important to mention that all wires of the same color within a given harness are connected together. These wires should therefore have a closed circuit. On the other hand, BLACK and BLACK/YELLOW wires must have an open circuit (0.L $_{M\Omega}$).

Repair or replace if necessary.

4. IGNITION GENERATOR COIL VOLTAGE TESTING

General

When manually starting the engine while the spark plug is installed, the engine will tend to accelerate beyond the compression point. This will result in higher magneto output power.

1. Disconnect the 3-wire housing between the ignition module and the magneto wiring harness (2-DC).
2. Connect multimeter probes to RED and BLACK wires (female end), then bring selector to $\tilde{V}$ and scale to 00.0^{VAC}.
3. Activate the manual starter and check values indicated by the multimeter.
4. Repeat operation 3 times.

A03E1JA

5. Compare readings with those appearing in the IGNITION table.

5. TRIGGER COIL VOLTAGE TESTING

1. Disconnect 4-wire housing between the ignition module and the engine (2-DA and 2-DB).
2. Connect multimeter probes to BLUE/YELLOW wire and to WHITE/YELLOW wire, then bring selector switch to $\tilde{V}$ and scale to 00.0^{VAC}.
3. Activate the manual starter and check values indicated by the multimeter.
4. Repeat operation 3 times.
5. Compare readings with those appearing in the IGNITION table.

BUZZER TESTING

Using jumper wires, connect battery positive post to buzzer positive tab.

Connect battery negative post to buzzer negative tab. See next photo.

CAUTION: To avoid buzzer damage, ensure that polarity is respected.

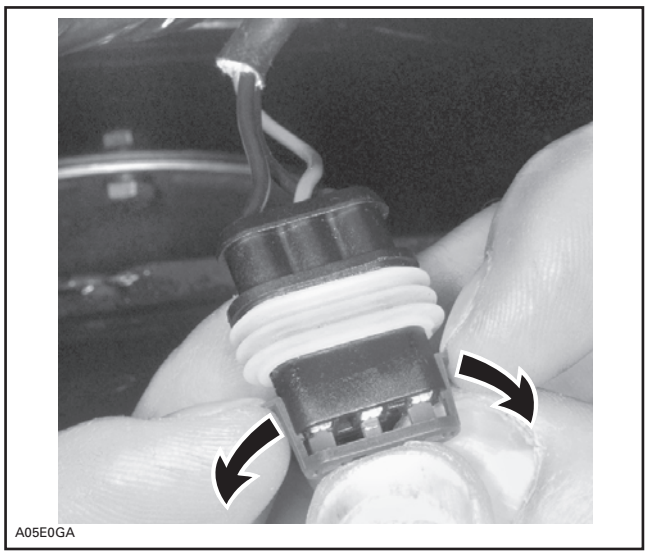
A03E21A

12-VOLT BATTERY PLUGGED TO BUZZER

MPEM CONNECTORS

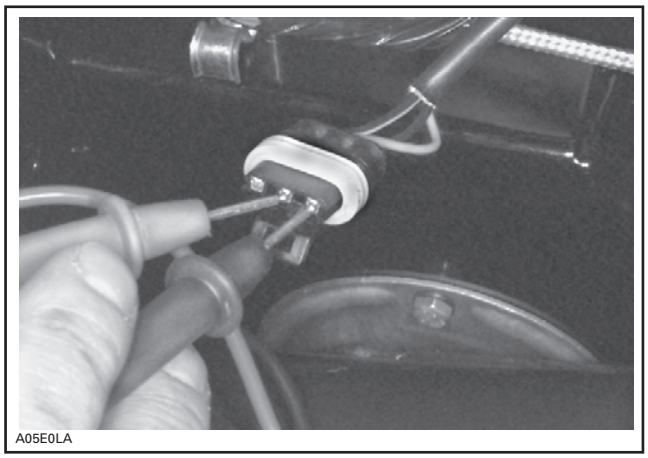
To ease electrical readings on MPEM connectors, connector cap must be removed.

Hold connector in hands then lift both tabs to remove connector cap.


A05E0GA

LIFT TABS TO REMOVE CAP

Insert multimeter probes into connector.


A05E0LA

TEST USING MULTIMETER PROBES

IGNITION SYSTEM TESTING (S-Series and Skandic LT with RER 240 W)							
PART	TEST TO BE PERFORMED	WIRE COLOR	RESISTANCE Ω		VOLTAGE V		NOTE
			VALUE (OHMS)	MULTIMETER SCALE	VALUE (VOLTS)	MULTIMETER SCALE	
Stop switch	Running insulation	BK BK/YL	0.L	00.0 MΩ	—	—	All switches must be in run position.
	Continuity in STOP position	BK BK/YL	00.0 - 00.5	00.0 Ω	—	—	Only one stop switch must be in stop position. Test them one after the other.
Ignition generator coil	Output	RD BK	4.5 - 6.5	00.0 Ω	7.0 - 15.0	00.0VAC	—
	Ground continuity	BK engine	00.0 - 00.5	00.0 Ω	—	—	The term "engine" refers to the engine metal parts connected to the magneto housing.
Front trigger coil	Resistance and output	WH/YL BL/YL	160 -180	00.0 Ω	.150 - .350	.000VAC	—
Rear trigger coil	Resistance and output	WH/YL BL/YL	160 -180	00.0 Ω	.150 - .350	.000VAC	—
MPEM and high voltage coil	Secondary winding resistance with caps	Spark plug cap Spark plug cap	8.90 K - 13.1 K	00.0 KΩ	**CAUTION:** Do not measure high voltage coil output voltage.		
	Secondary winding resistance without caps	BK BK	0.90 K - 1.10 K	00.0 KΩ	**CAUTION:** Do not measure high voltage coil output voltage.		
	Secondary winding voltage	BK engine	—	—	.100 - .250	0.00VAC	The measurement must be taken on the spark plug cable (without the spark plug).
Spark plug cap	Cap resistance	—	4.0 K - 6.0 K	00.0 KΩ	—	—	—

NOTE: Stop switches include the ignition switch, the tether cord switch and the emergency cut-out switch.

It is important to take note that voltage measurements must be taken while starting the vehicle using the manual starter.

Voltages obtained upon starting are proportional to the force applied onto the manual starter. A low voltage is therefore normal under a low cranking force.

Perform testing in the prescribed order and replace any parts not performing according to specifications.

It is important to resume all tests when replacing a component.

If not specified, the probe connecting sequence is not important.

LIGHTING SYSTEM TESTING (S-Series and Skandic LT with RER 240 W)							
PART	TEST TO BE PERFORMED	WIRE COLOR	RESISTANCE Ω		VOLTAGE V		NOTE
			VALUE (OHMS)	MULTIMETER SCALE	VALUE (VOLTS)	MULTIMETER SCALE	
Lighting generator coil	Power	YL YL/BK	00.0 - 00.6	00.0 Ω	3.0 - 7.0	00.0VAC	—
	Insulation	YL engine	0.L	00.0 MΩ	—	—	The term "engine" refers to the engine metal parts connected to the magneto housing.
	Ground continuity	BK engine	00.0 - 00.5	00.0 Ω	—	—	

NOTE: It is important to take note that voltage measurements must be taken while starting the vehicle using the manual starter.

Voltages obtained upon starting are proportional to the force applied onto the manual starter. A low voltage is therefore normal under a low cranking force.

Perform testing in the prescribed order and replace any parts not performing according to specifications.

It is important to resume all tests when replacing a component.

If not specified, the probe connecting sequence is not important.

NIPPONDENSO CDI SYSTEM TESTING

593 on Skandic WT LC

IGNITION SYSTEM TESTING (Skandic WT LC 290 W 2001)							
PART	TEST TO BE PERFORMED	WIRE COLOR	RESISTANCE Ω		VOLTAGE V		NOTE
			VALUE (OHMS)	MULTIMETER SCALE	VALUE (VOLTS)	MULTIMETER SCALE	
Stop switches	Running insulation	BK and BK/YL	0.L	00.0 MΩ	—	—	All switches must be in run position.
	Continuity in stop position	BK and BK/YL	00.0 - 00.5	00.0 Ω	—	—	Only one stop switch must be in stop position. Test one at a time.
	Insulation in stop position	BK/GN and BK/WH	0.L	00.0 MΩ	—	—	Tether cord cap must be off.
	Running continuity	BK/GN and BK/WH	00.0 - 00.5	00.0 Ω	—	—	Tether cord cap must be in place.
Ignition generator coil	Output	RD and BK/RD	11.6 - 21.6	00.0 Ω	15.0 - 30.0	00.0VAC	—
	Coil insulation	RD and BK	0.L	00.0 MΩ	—	—	—
	Ground continuity	BK and engine	00.0 - 00.5	00.0 Ω	—	—	The term "engine" refers to the engine metal parts connected to the magneto housing.
Trigger coil	Resistance and output	WH/YL and BL/YL	190 - 300	00.0 Ω	.200 - .350	.000VAC	—
MPEM	Output voltage	WH/BL and BK	—	—	25.0 - 100.0	00.0VAC	All switches must be in run position.
High voltage coil	Primary winding resistance	WH/BL and BK	00.0 - 00.9	00.0 Ω	—	—	—
	Secondary winding resistance (spark plug cap included)	Spark plug cap Spark plug cap	19.5 K - 26.5 K	00.0 KΩ	**CAUTION:** Do not measure high voltage coil output voltage.		
	Secondary winding resistance (without spark plug cap)	BK and BK	9.6 K - 14.4 K	00.0 KΩ	**CAUTION:** Do not measure high voltage coil output voltage.		
	Secondary winding voltage	BK and engine	—	—	0.1 - 1.4	0.00VAC	The measurement must be taken on the spark plug wire (without the spark plug).
	Insulation	Spark plug cap BK	0.L	00.0 MΩ	—	—	—
Spark plug cap	Cap resistance	—	4.0 K - 6.0 K	00.0 KΩ	—	—	—

NOTE: Stop switches include the ignition switch and the emergency cut-out switch.

It is important to take note that voltage measurements must be taken while starting the vehicle using the manual starter.

Voltages obtained upon starting are proportional to the force applied onto the manual starter. A low voltage is therefore normal under a low cranking force.

Perform testing in the prescribed order and replace any parts not performing according to specifications.

It is important to resume all test when replacing a component.

It not specified, the probe connecting sequence is not important.

LIGHTING SYSTEM TESTING (Skandic WT LC 290 W 2001)							
PART	TEST TO BE PERFORMED	WIRE COLOR	RESISTANCE Ω		VOLTAGE V		NOTE
			VALUE (OHMS)	MULTIMETER SCALE	VALUE (VOLTS)	MULTIMETER SCALE	
Lighting generator coil	Output	YL	00.1 - 00.4	00.0 Ω	0.5 - 2.0	00.0 VAC	—
	Coil insulation	YL and engine	0.L	00.0 MΩ	—	—	The term "engine" refers to the engine metal parts connected to the magneto housing.
	Ground continuity	BK and engine	00.0 - 00.5	00.0 Ω	—	—	

NOTE: Stop switches include the ignition switch and the emergency cut-out switch.

It is important to take note that voltage measurements must be taken while starting the vehicle using the manual starter.

Voltages obtained upon starting are proportional to the force applied onto the manual starter. A low voltage is therefore normal under a low cranking force.

Perform testing in the prescribed order and replace any parts not performing according to specifications.

It is important to resume all test when replacing a component.

It not specified, the probe connecting sequence is not important.

INSPECTION OF AC CIRCUIT ISOLATION

All Electric Start Models

If AC circuit is not isolated from frame, headlamp beam will weaken.

INSPECTION

Disconnect regulator/rectifier.

Connect one digital ohmmeter probe (needle ohmmeter will not offer enough precision) to frame and other probe to one of 2 YELLOW magneto wires.

Measured resistance must be infinite. If such is not the case, it means there is a connection between AC circuit and DC circuit.

Disconnect one accessory at the time to identify the faulty circuit.

INSPECTION OF HEATING ELEMENTS

All Models Except Skandic LT/WT/SWT/WT LC

All measurements must be performed at 21°C (70°F).

Throttle Lever Heating Element

Resistance Measurement

HIGH INTENSITY	YELLOW/BLACK wire BROWN wire	1.96 to 3.64 ohms
LOW INTENSITY	YELLOW/BLACK wire BROWN/YELLOW wire	8.05 to 14.95 ohms

Current Measurement

HIGH INTENSITY	BROWN wire	0.23 A minimum
LOW INTENSITY	BROWN/YELLOW wire	0.13 A minimum

Handlebar Grip Heating Element

Resistance Measurement

HIGH INTENSITY	YELLOW/BLACK wire ORANGE wire	8.73 to ① 10.67 ohms
LOW INTENSITY	YELLOW/BLACK wire ORANGE/VIOLET wire	17.7 to ① 20.7 ohms

Skandic LT/WT/SWT/WT LC

Throttle Lever Heating Element

Resistance Measurement

BLACK WIRE BLACK WIRE	48 ohms

Handlebar Grip Heating Element

Resistance Measurement

BLACK WIRE BLACK WIRE	9.6 ohms ①

① When measuring resistance at terminals the actual value will be half the measurement in table. The reason for that is the elements are connected in parallel. Therefore the total resistance is half the resistance of one element.

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SC-10 SUSPENSIONS (ALL VERSIONS)

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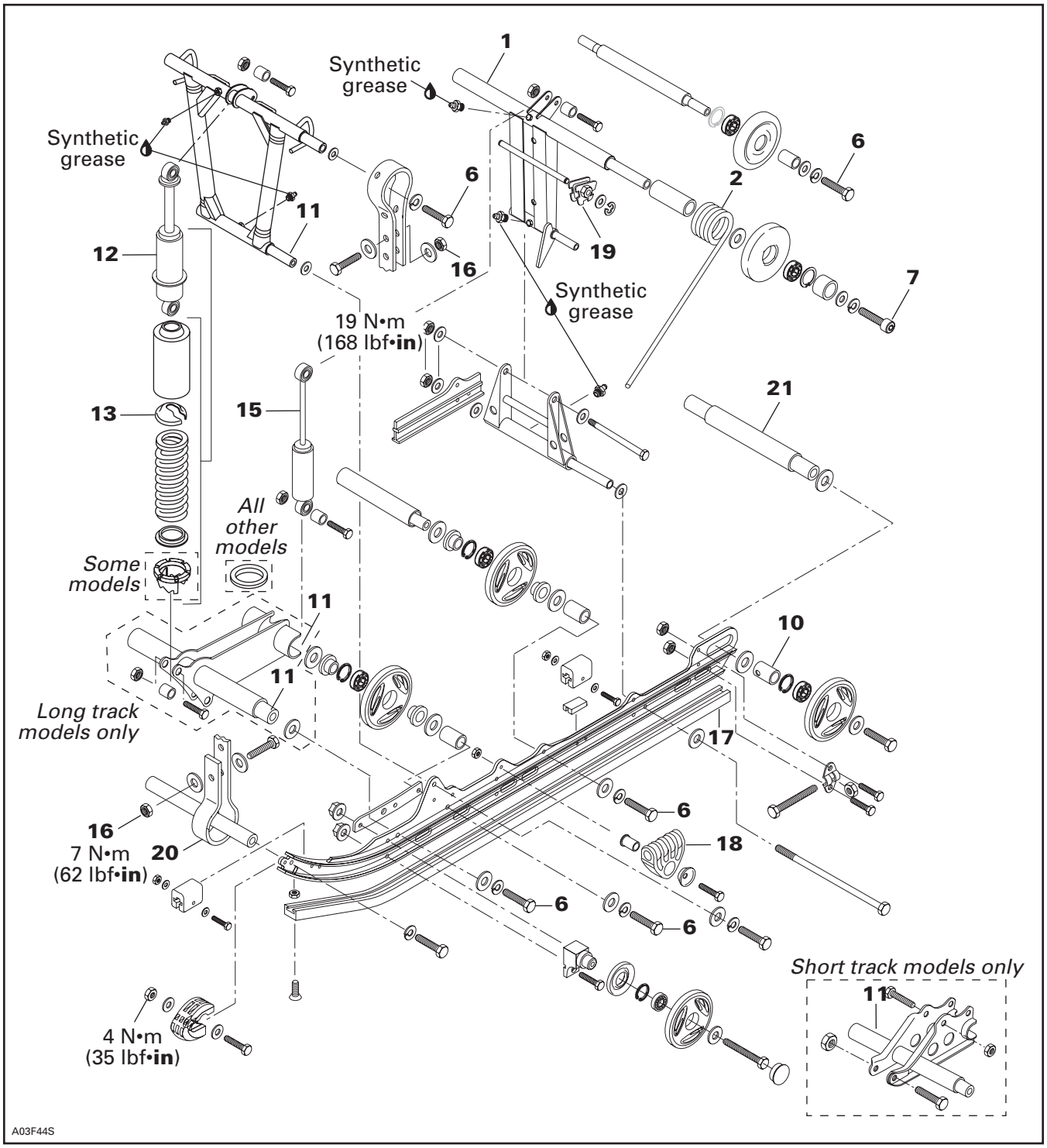
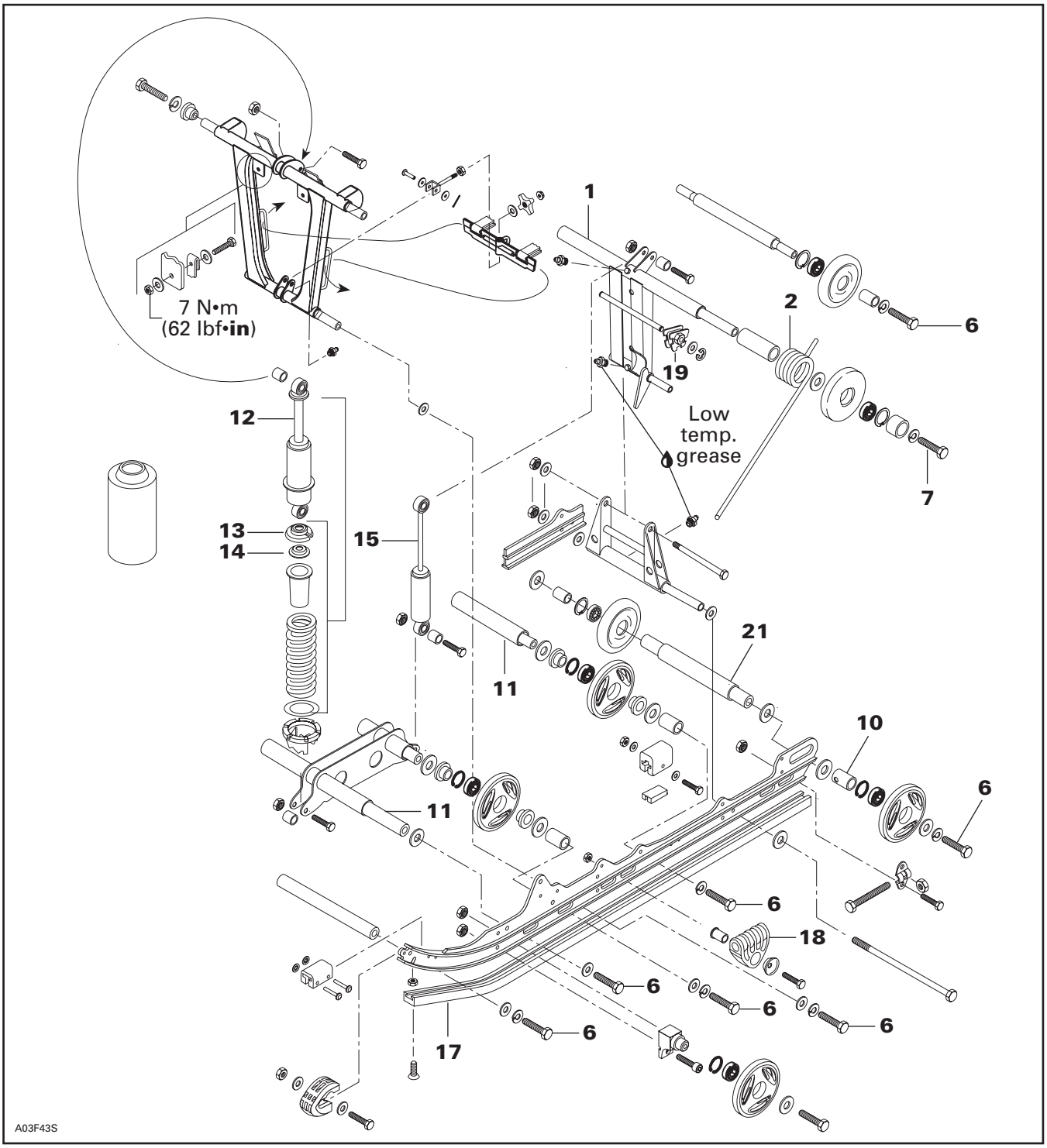
SC-10 Touring on Touring Fan 380/500



SC-10 Mountain on Summit Fan 500



PARTS FLAT RATE

COMPONENT REMOVAL AND INSTALLATION

Lift rear of vehicle and support it off the ground.

21, Rear Axle

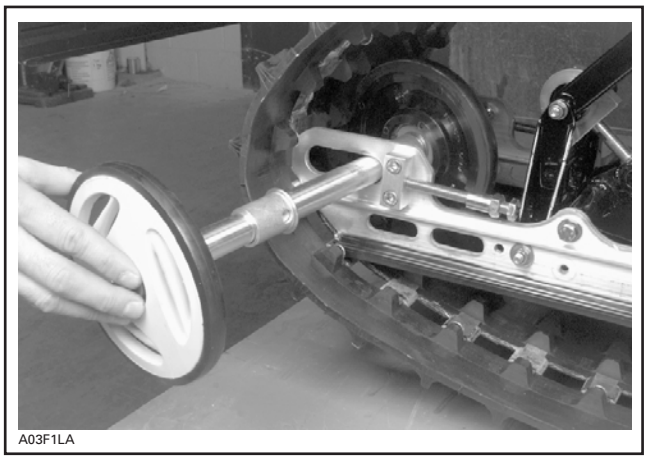
Remove screw on rear axle on side of offset wheel.

Completely loosen track tension.

Pull out rear axle from opposite side of offset inner wheel.

At assembly, align spacer hole with adjusting bolt.

Make sure to reinstall washer on each side of runner.



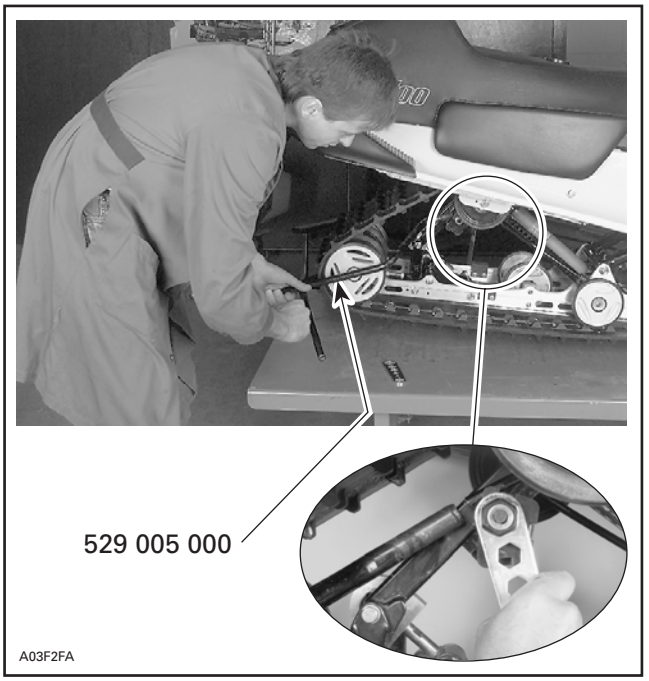
A03F1LA

TYPICAL

15, Rear Shock

Lift rear of vehicle.

Slightly turn adjusting cam to expose spring end. Using spring installer (P/N 529 005 000), remove left spring from adjusting cam.



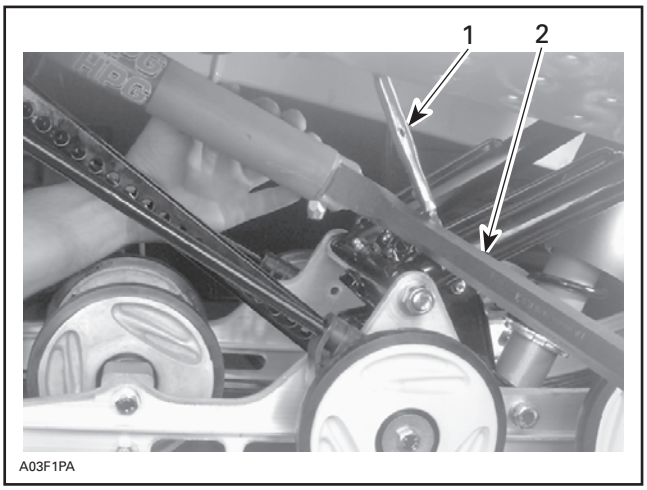
A03F2FA

Remove nut on top end of shock.

Remove nut on bottom end of shock. Pry up shock bottom end to ease removing bolt (gas shock only). See installation illustration below.

Installation is reverse of removal procedure. To easily compress gas shock absorber, use a pry bar and locking pliers as a stopper.

CAUTION: Take care not to damage grease fitting.



A03F1PA

1. *Locking pliers*
2. *Pry bar*

12, Front Shock

All Models

Unfasten one end of stopper strap(s).

Unbolt shock and remove it.

2, Rear Spring

All Models

Remove spring ends from adjusting cams.

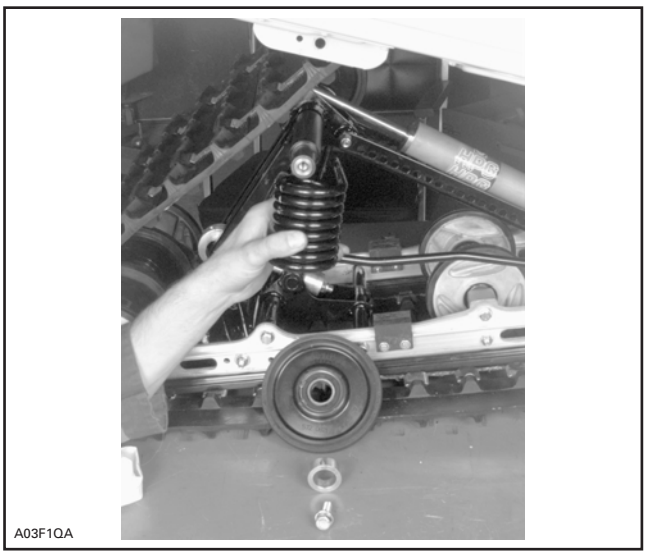
Unbolt rear arm top axle from chassis.

All Liquid Cooled Models

Unscrew set screws from locking ring at each end of top axle.

Remove spacers and top idler wheels.

Remove springs.



TYPICAL

At reassembly, respect THIS SIDE OUT inscription on wheel.

SUSPENSION ASS'Y REMOVAL

19, Cam

Decrease spring preload by turning cams accordingly.

Lift rear of vehicle and support it off the ground.

Loosen track tension.

Remove rear arm top axle screws no. 7 from chassis.

6,7, Self-Locking Screws

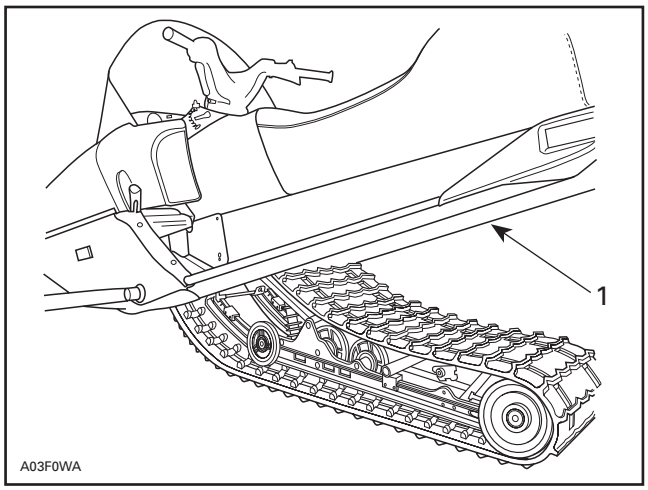
CAUTION: These self-locking screws must always be replaced by new ones everytime they are removed.

NOTE: To prevent axle from turning when unscrewing self-locking screws, proceed as follows:

– Knock on screw head and/or heat to break threadlocker bond.
– Remove one self-locking screw then install a 10 mm shorter non-self-locking one in place.
– Remove the opposite self-locking screw.
– Remove the temporary installed non-self-locking screw.

Unscrew center idler wheel axle from tunnel then remove.

Lift rear of vehicle at least 1 m (3 ft).



1. At least 1 m (3 ft)

Remove both screws no. 6 retaining front arm to tunnel.

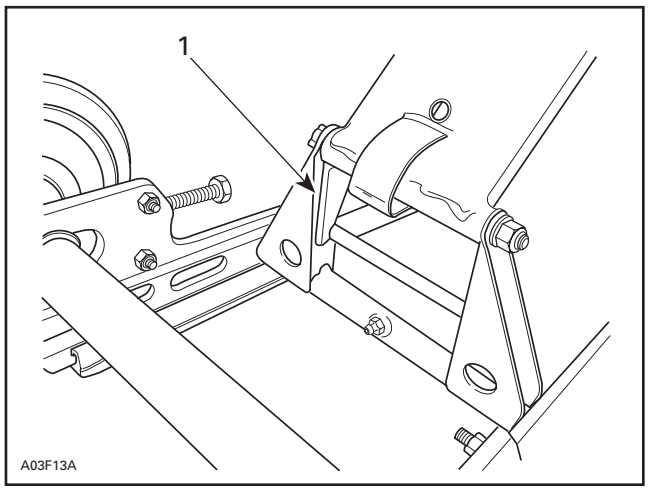
Remove suspension.

DISASSEMBLY AND ASSEMBLY

Inspect track thoroughly before reinstalling suspension. Refer to TRACK.

1, Rear Arm

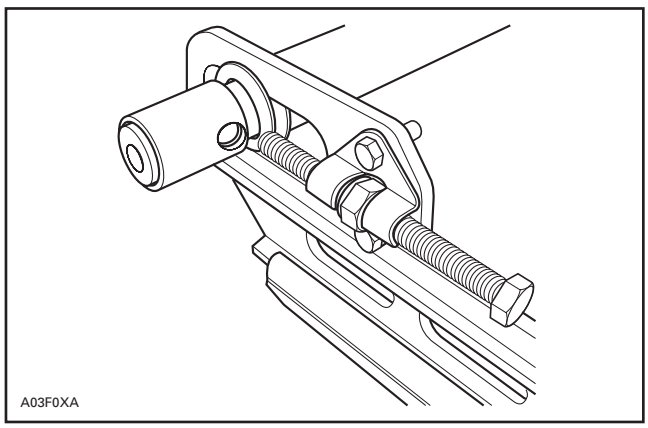
At installation, rear arm stroke limiter must be on rear side.



1. Stroke limiter on rear side

10, Outer Bushing

At installation, hole must face adjustment screw.



11, Axle

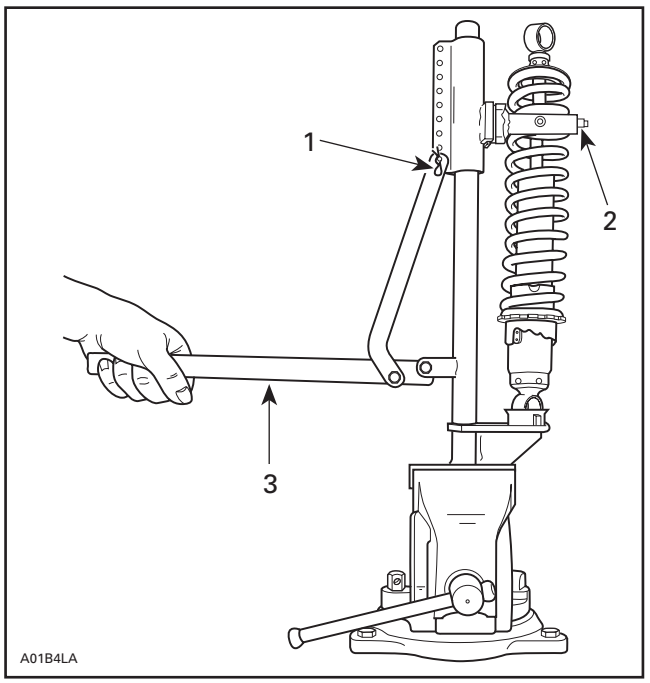
Note position of axles at disassembly. Axles with a paint stripe serve as idler wheel axles. These are more precise than those used as pivot axles. Idler wheel axles can be used as pivot axles but the opposite is not true.

12,13,14, Front Shock, Spring Stopper and Cap

Use shock spring remover (P/N 529 035 504) and put it in a vise. Mount shock in it and turn shock so that spring coils matched spring compressor.

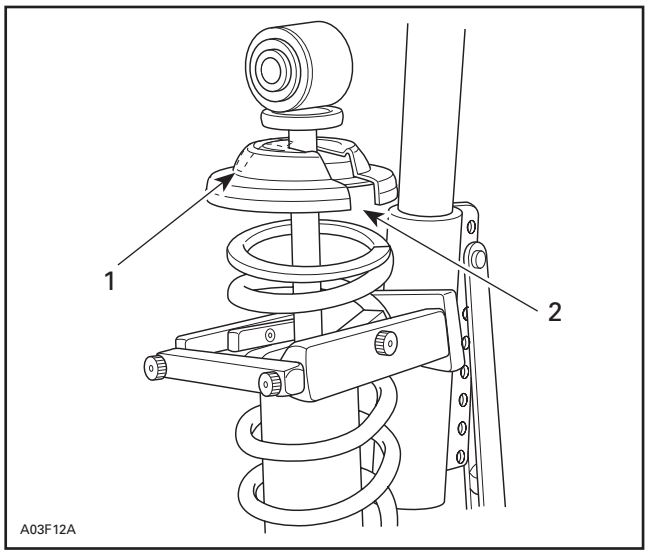
Close and lock bar. Adjust handle horizontal by changing position of clevis pin.

Push down on handle until it locks. Remove spring stopper and cap then release handle.



1. Clevis pin
2. Bar
3. Handle horizontal

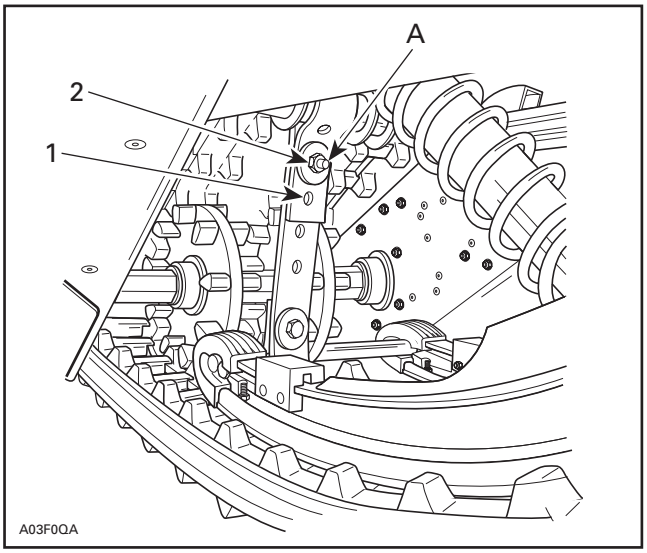
At installation, cap opening must be 180° from spring stopper opening.



1. Cap opening
2. Spring stopper opening

20, Stopper Strap

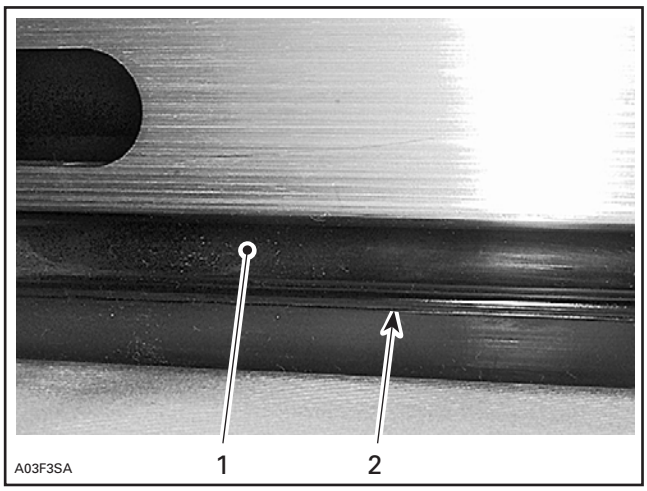
Inspect strap for wear or cracks, bolt and nut for tightness. If loose, inspect hole for deformation. Replace as required. Make sure it is attached through proper hole from the end. Refer to TECHNICAL DATA. Torque nut to 7 N•m (62 lbf•**in**).



1. 1st hole
2. 2nd hole
*A. 7 N•m (62 lbf•**in**)*

17, Slider Shoe

Molding line is the wear limit indicator.



TYPICAL

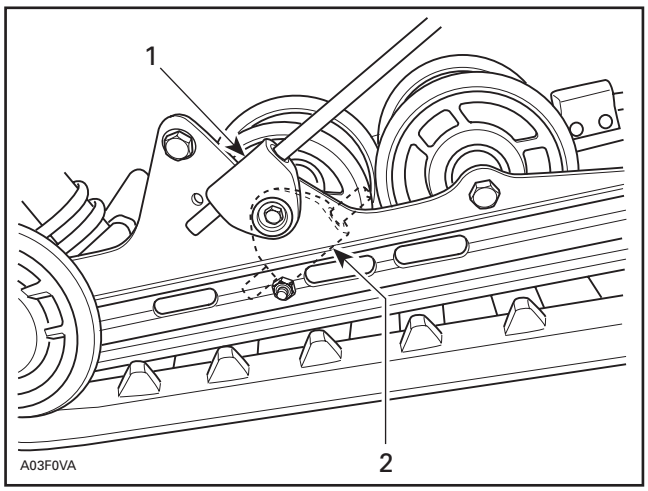
1. Slider shoe
2. Molding line (wear limit indicator)

Replace slider shoes when wear limit is reached.

CAUTION: Slider shoes must always be replaced in pairs.

18, Spring Support

CAUTION: To avoid track damage, spring supports must be mounted upward.



RIGHT SIDE SHOWN

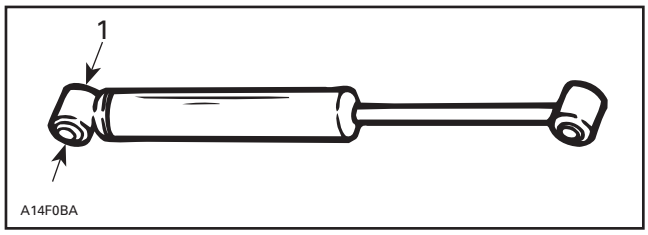
1. Right position: upward
2. Wrong position

SHOCK ABSORBER INSPECTION

All Models Equipped with Hydraulic Shock

NOTE: Hydraulic shocks are black painted.

Secure the shock body end in a vise with its rod upward.



1. Clamp

CAUTION: Do not clamp directly on shock body.

Examine each shock for leaks. Extend and compress the piston several times over its entire stroke. Check that it moves smoothly and with uniform resistance with its rod upward.

Pay attention to the following conditions that will denote a defective shock:

– A skip or a hang back when reversing stroke at mid travel.
– Seizing or binding condition except at extreme end of either stroke.
– Oil leakage.
– A gurgling noise, after completing one full compression and extension stroke.

Renew if any faults are present.

All Models Equipped with Gas Pressurized Shock

NOTE: Gas pressurized shocks are light gray or purple painted, or bare aluminum.

Gas shock can be inspected as follows:

Because of gas pressure, strong resistance is felt when compressing shock. When released, the shock will extend unassisted. Renew as required.

If suspecting an internal gas leak between oil chamber and gas chamber, check shock as follows:

Install shock in a vise clamping on its bottom eyelet with its rod upward.

Let it stand for 5 minutes.

Completely push down the shock rod then release.

Rod must come out at a steady speed. If speed suddenly increases particularly at end of extension, replace shock.

If suspecting a frozen gas shock proceed as follows:

Place shock in a freezer (temperature below 0°C (32°F)) for 4 hours.

Push down on rod and note its resistance, compare to a new shock. If shock is frozen it will be much more difficult to compress than for the new one.

INSTALLATION

Install assembled suspension into track with front portion first.

Insert rear portion of suspension into track.

Bolt front arm, rear arm then center top idler wheel axle.

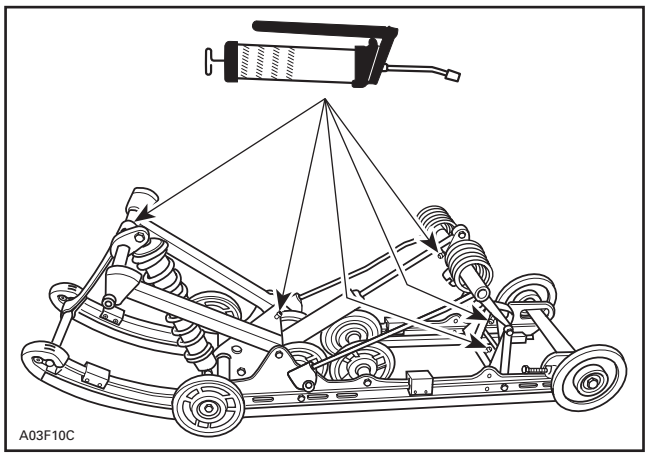
Adjust track tension.

RIDE ADJUSTMENT

Refer to *Operator's Guide*.

LUBRICATION

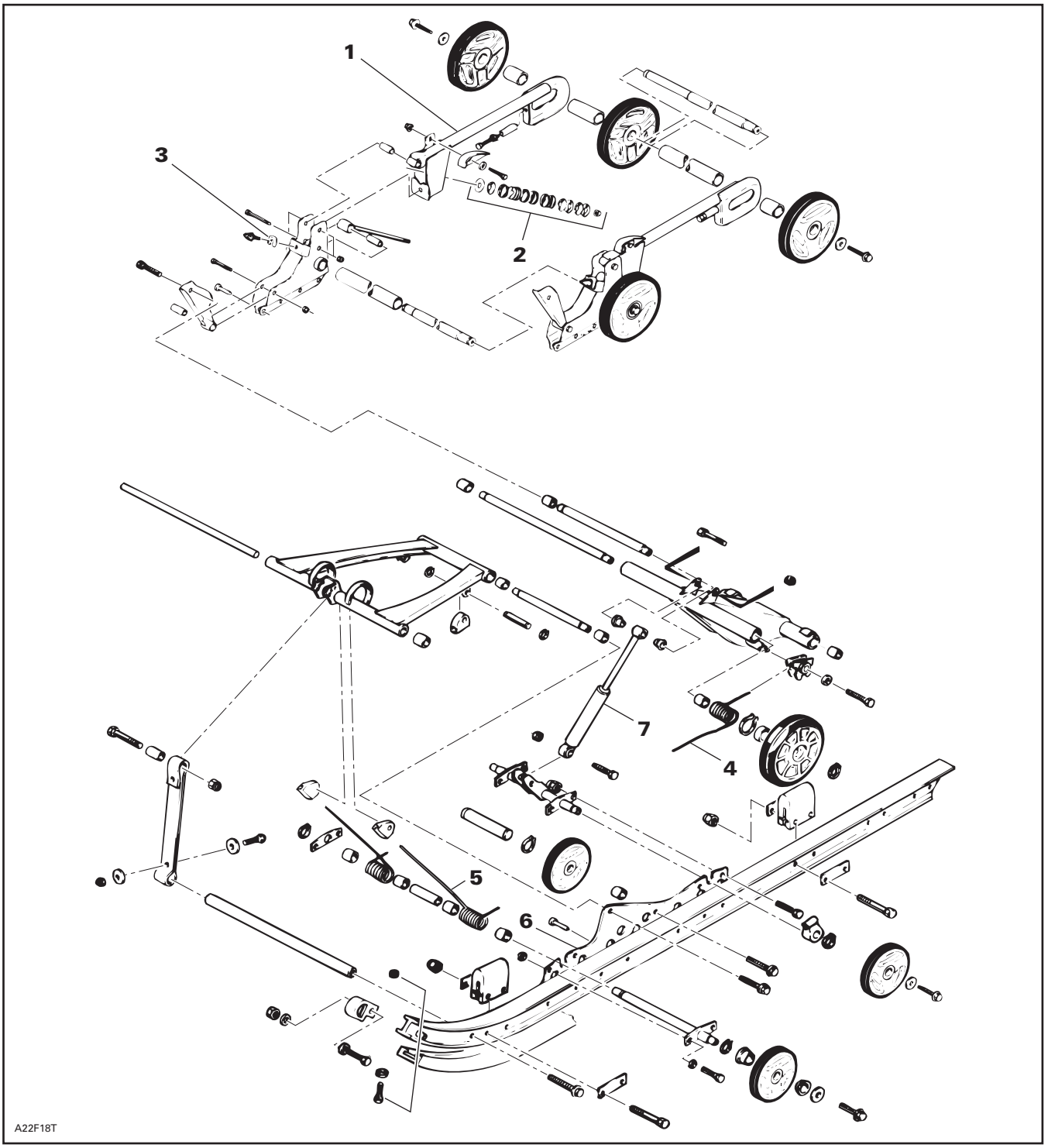
Lubricate front and rear arms at grease fittings using synthetic grease (P/N 413 711 500).



SC-10 SPORT, MOUNTAIN AND TOURING: 5 GREASE FITTINGS

SKANDIC WT SUSPENSION

Skandic LT/WT/SWT/WT LC



TYPICAL

REMOVAL

Release track tension.

Lift rear of vehicle and support it off the ground.

Unbolt front arm then rear arm.

NOTE: To prevent cross shaft from turning when unscrewing screws assembled with threadlocker, proceed as follows:

– Knock on screw head to break threadlocker bond.
– Loosen one screw then retighten.
– Remove the opposite screw.
– Remove the first one.

Remove suspension assembly.

A22F1EA

DISASSEMBLY AND ASSEMBLY

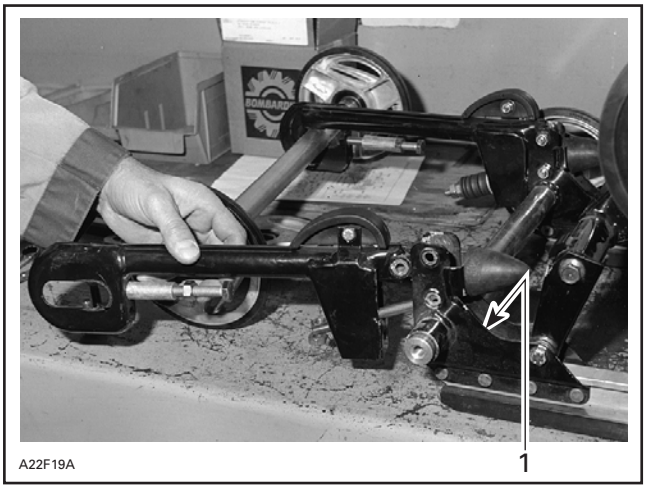
1, Extension

Remove nuts and conical washers from the eye bolt adjuster. Remove bolt retaining eye bolt adjuster to support.

Remove rear idler wheel on appropriate side.

Remove idler wheel from support.

Unbolt extension from its support.

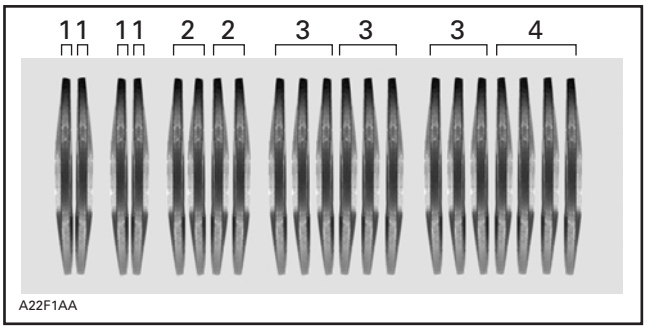


A22F19A

1. Support

2, Conical Washer

At installation, position conical washers as shown.



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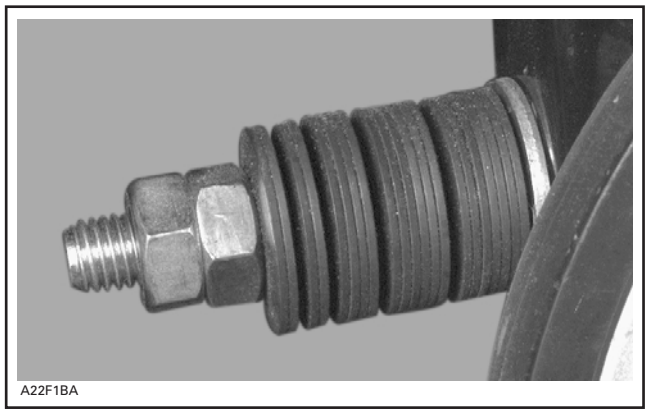
WASHER QUANTITY AND MOUNTING POSITION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Tighten nut 3/4 turn after contacting washers for better deep snow performance. Maximum preload is 3 turns after nut touching washers. This last adjustment is for trail riding with or without a load and for pulling a load.

4, Rear Spring

Remove top idler wheels.

Unscrew one end of shock.

Remove spring.

5, Front Spring

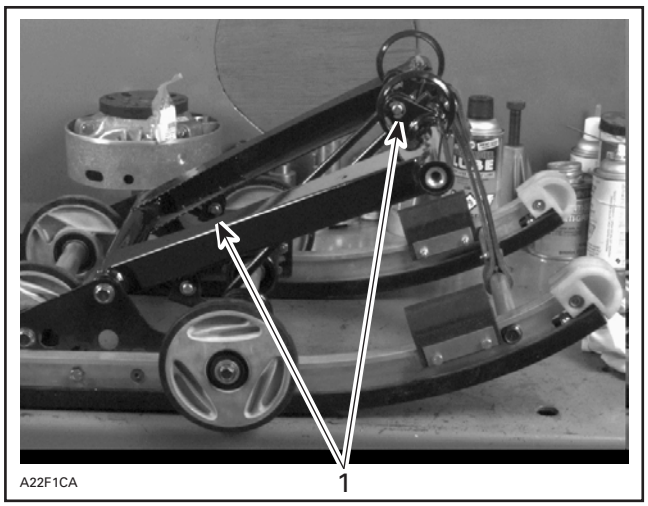
Remove circlips retaining spring support to top and bottom of front arm.

Holding spring end, remove lock pin of top spring support then bottom support lock pin.

Unbolt front idler wheel axle.

Remove idler wheel on side where axle retaining plate is not welded.

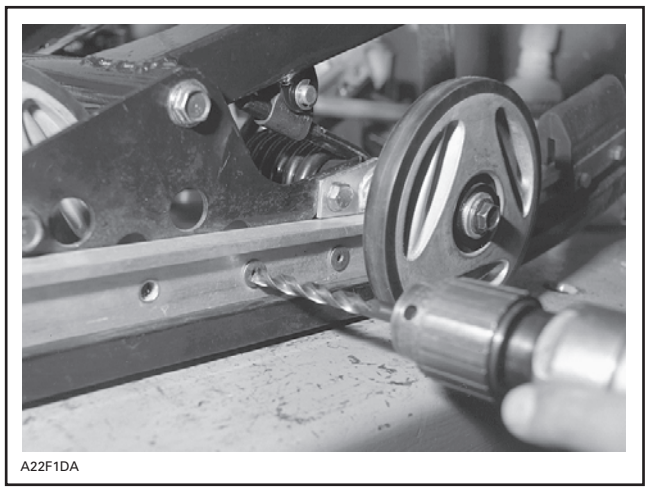
Remove springs.



1. Circlips

6, Support Plate

Drill rivets to remove support plate. Use a 8 mm (21/64 in) drill bit.



Rivets can be substitued by M8 x 20 bolts and nuts.

3, Horse-Shoe Washer

For deep snow riding, do not install washer.

For trail riding with passenger and/or weight, install 1 washer under each rubber stoppers.

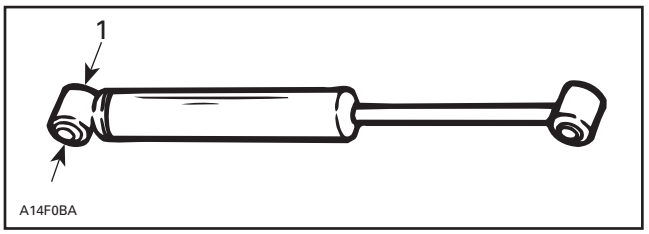
For trail riding with heavy load and/or pulling a load, use 2 washers under each rubber stoppers.

7, Shock

Install shock with its rod upward.

SHOCK ABSORBER SERVICING

Secure the shock body end in a vise.



TYPICAL

1. Clamp

CAUTION: Do not clamp directly on shock body.

Examine each shock for leaks. Extend and compress the piston several times over its entire stroke then check that it moves smoothly and with uniform resistance.

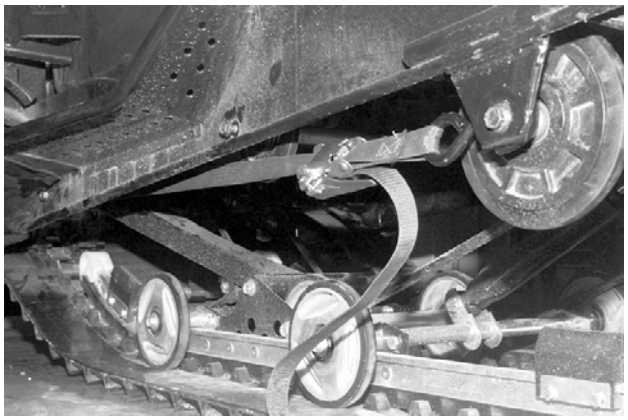
Pay attention to the following conditions that will denote a faulty shock:

– A skip or a hang back when reversing stroke at mid travel.
– Seizing or binding condition except at extreme ends of stroke.
– Oil leakage.
– A gurgling noise, after completing one full compression and extension stroke.

Renew if any fault is present.

INSTALLATION

Use a tie-down between front arm and spring axle to ease installation of front arm screws.



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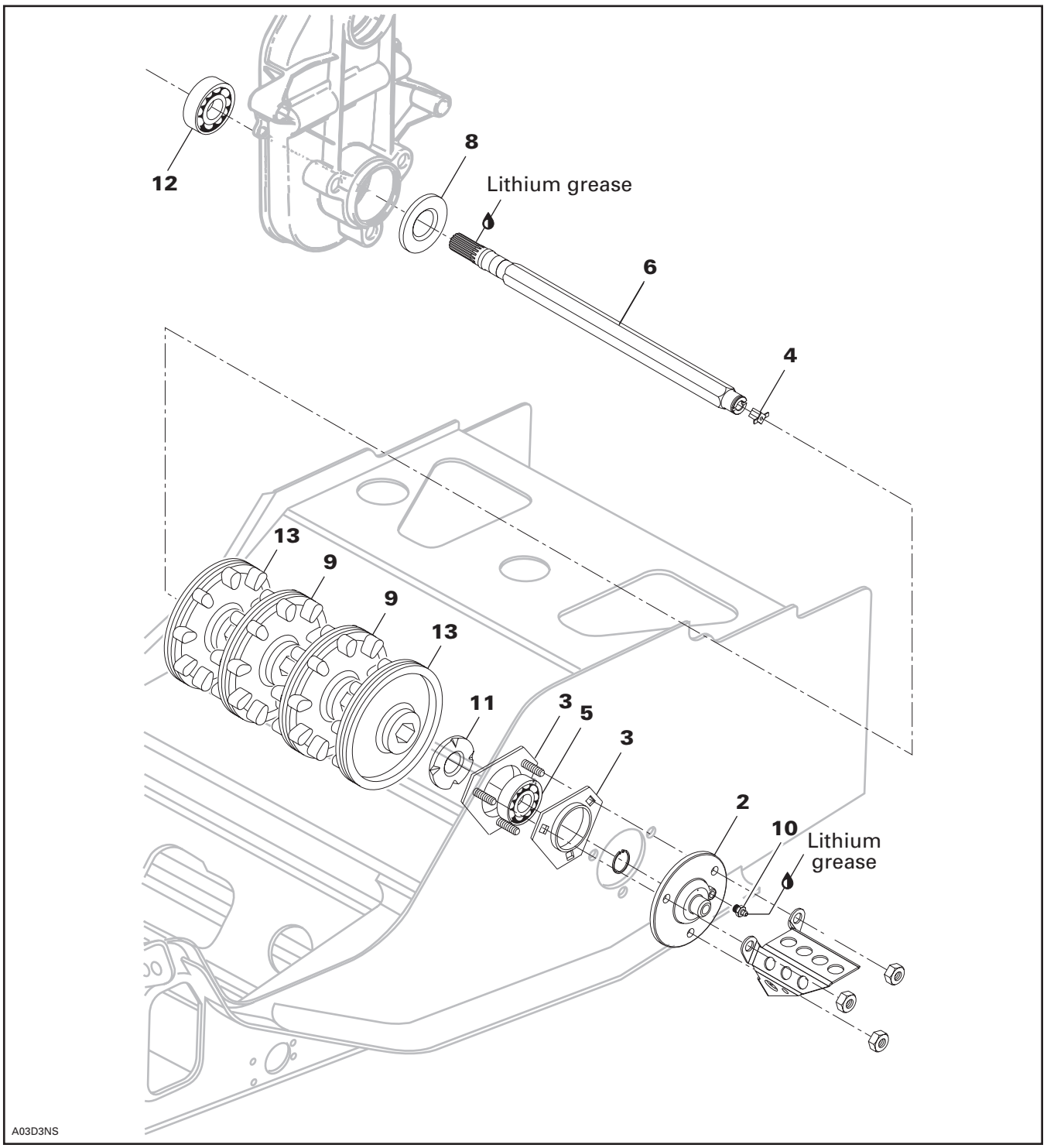
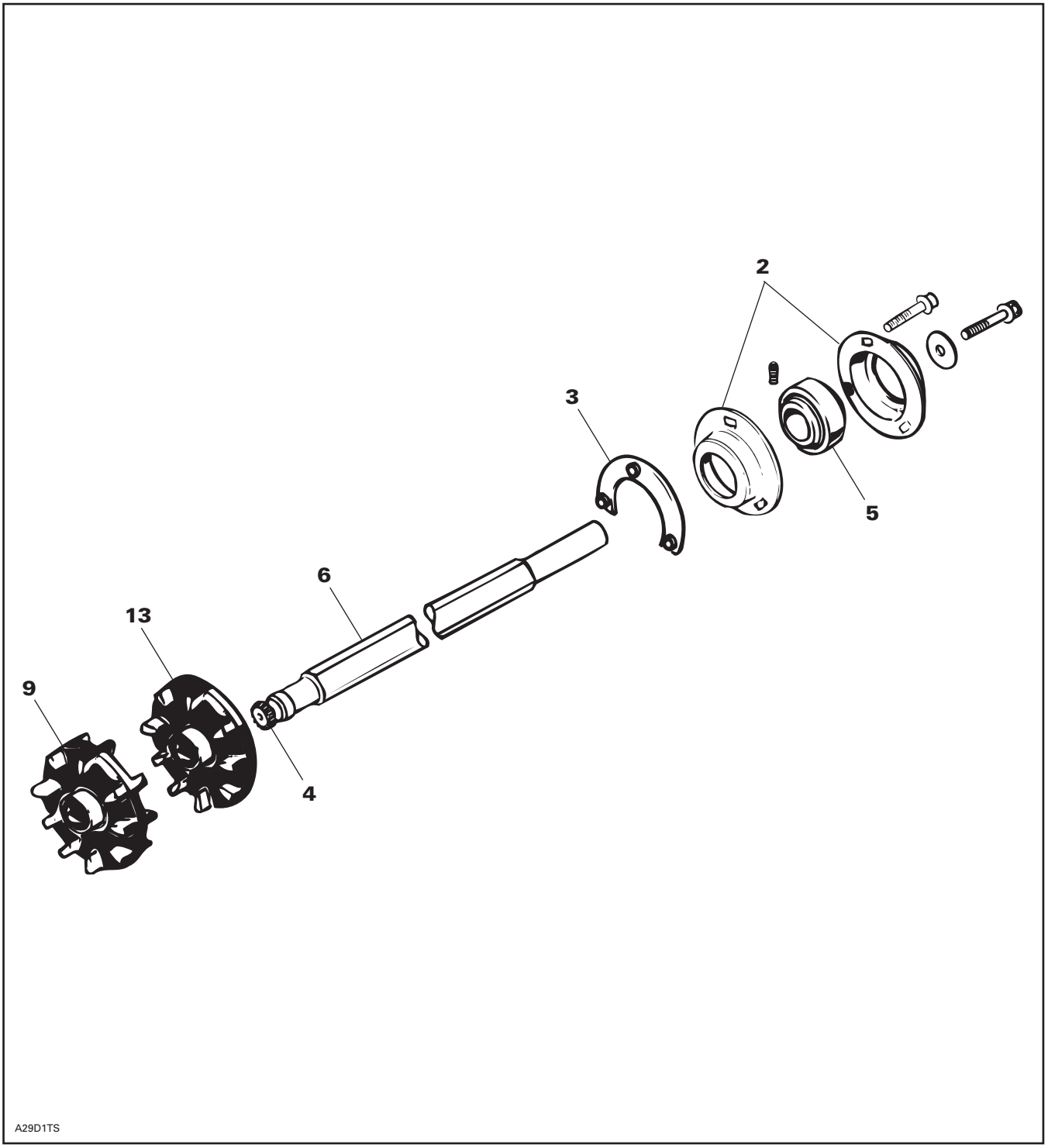
DRIVE AXLE

S-Series and Skandic LT



TYPICAL

Skandic WT/SWT/WT LC



REMOVAL

All Models Except Skandic WT/SWT/WT LC

Drain oil from chaincase or gearbox. Release drive chain tension. Remove chaincase cover.

Raise and block rear of vehicle off the ground.

Remove suspension. Refer to SUSPENSION.

2,8, End Bearing Housing and Seal

Remove speedometer cable, cable protector, and plastic bearing cover. Remove circlip from drive axle.

Remove chain and sprocket then circlip and bearing from drive axle.

Pry oil seals from chaincase and end bearing housing.

6,9,13, Drive Axle and Sprocket

Release drive axle sprocket from track and at the same time, pulling the drive axle towards the end bearing housing side.

Remove drive axle from vehicle.

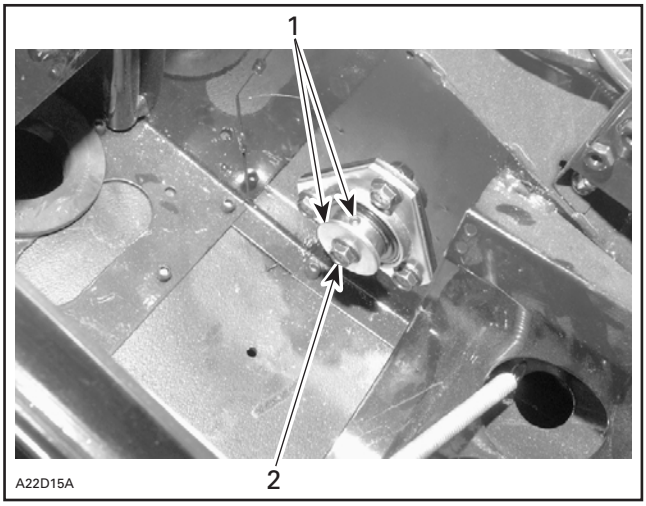
Skandic WT/SWT/WT LC Only

Drain gearbox.

Raise and block rear of vehicle off the ground.

Remove suspension. Refer to SKANDIC WT SUSPENSION.

Remove muffler. Unfasten screw from drive axle end. Loosen both Allen screws from end bearing.



1. Allen screws
2. Screw

Remove 3 screws retaining end bearing then remove inner plate.

Remove drive axle.

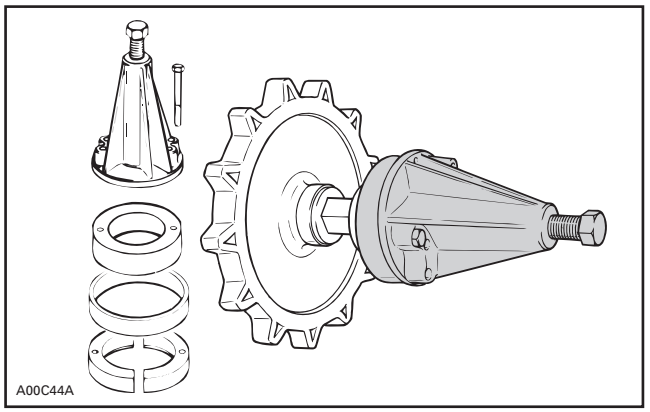
DISASSEMBLY

4, Speedometer Drive Insert

Remove speedometer drive insert.

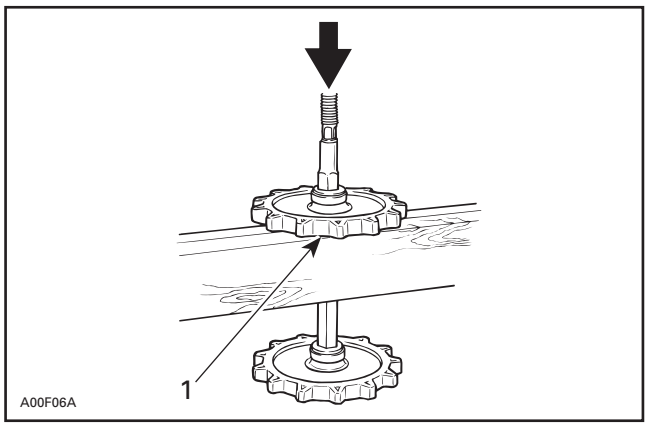
5,12, Bearing

To remove bearings, use puller assembly, ring and half rings as illustrated.



9,13, Sprocket and Half-Sprocket

To remove press fit sprockets, use a press and a suitable support as illustrated.



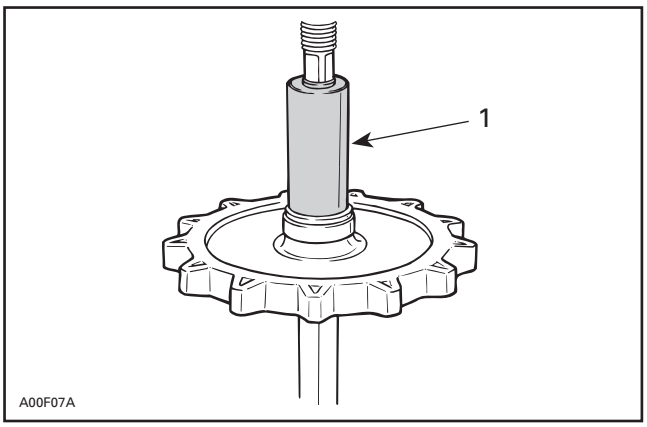
TYPICAL
1. Support sprocket near hub

NOTE: Two different types of sprocket press fit can be found. Ensure to replace ring reinforced sprockets with the same type.

ASSEMBLY

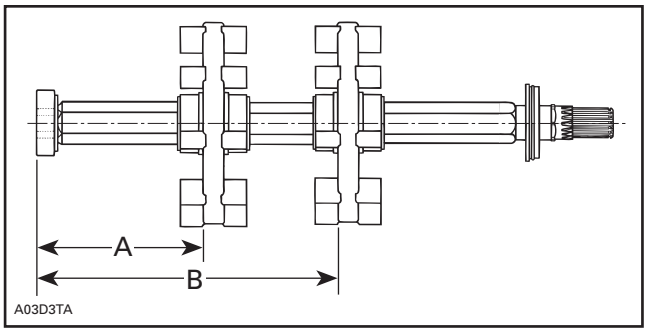
8,9,13, Drive Axle and Sprocket

To assemble press fit sprockets, use a press and a suitable pipe as illustrated. Sprockets must be assembled according to the following dimensions.



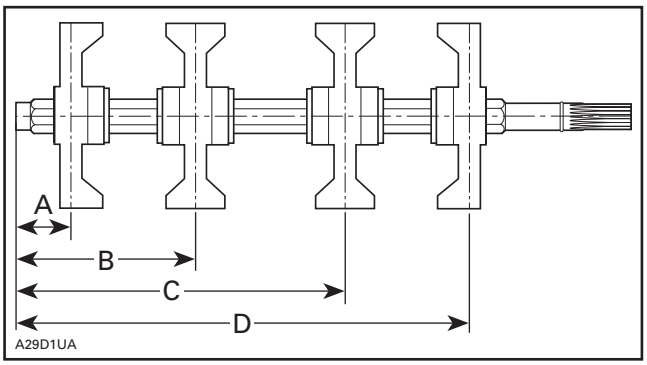
1. Pipe

S-Series



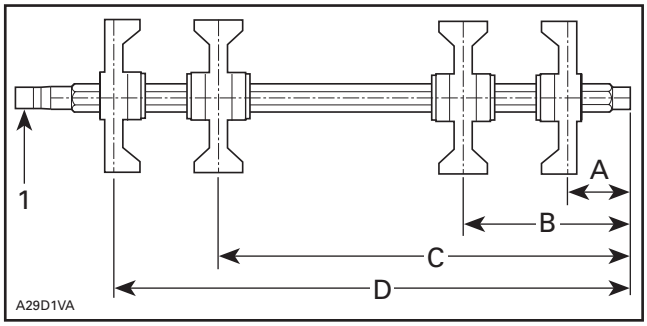
A. 151.2 mm (5.953 in)
B. 274.2 mm (10.795 in)

Skandic LT



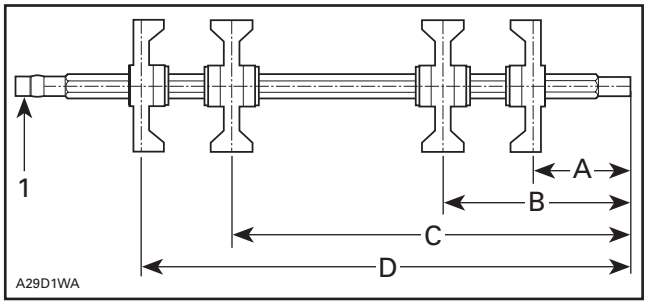
A. 47.0 mm (1.850 in)
B. 148.0 mm (5.827 in)
C. 271.0 mm (10.669 in)
D. 372.0 mm (14.646 in)

Skandic WT/WT LC



1. Gearbox side
A. 55.0 mm (2.165 in)
B. 157.0 mm (6.181 in)
C. 399.0 mm (15.709 in)
D. 501.0 mm (19.724 in)

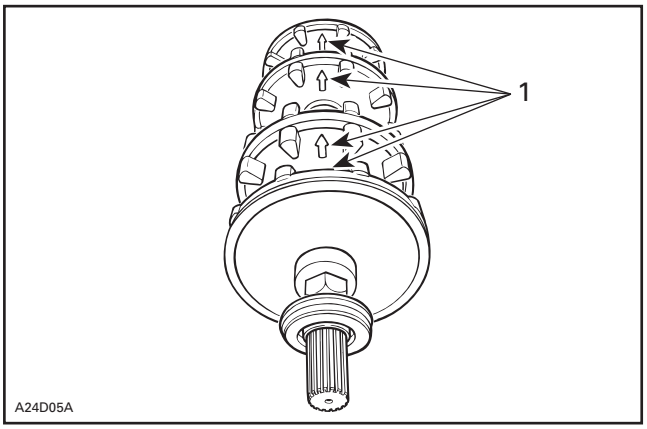
Skandic SWT



1. Gearbox side
A. 105.0 mm (4.016 in)
B. 207.0 mm (8.150 in)
C. 449.0 mm (17.677 in)
D. 551.0 mm (21.693 in)

All Models

Ensure to align indexing marks of each sprocket when assembling.

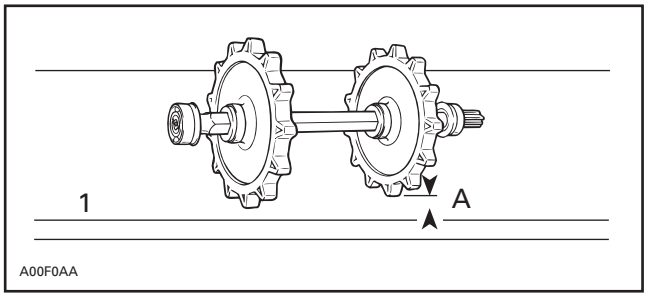


TYPICAL

1. Indexing marks aligned

The maximum desynchronization for the sprockets is 1.5 mm (1/16 in).

To check this tolerance, place axle assembly on a plane surface and measure the gap between sprocket tooth and surface.

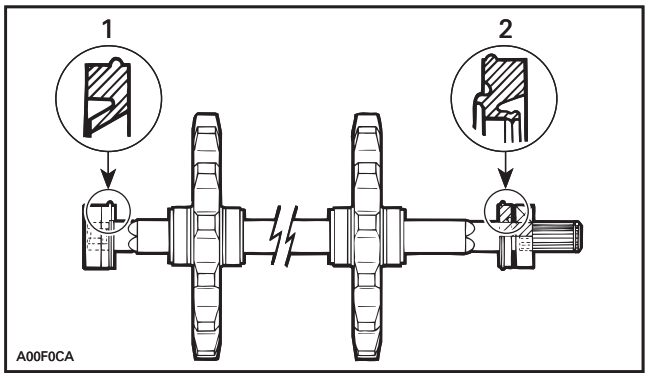


1. Plane surface
A. 1.5 mm (1/16 in) MAXIMUM

CAUTION: The same sprocket must not be pressed twice on the axle. If synchronization is found to be defective, use a new sprocket.

6,8, Drive Axle and Seal

When assembling drive axle, always position a new seal on each end of drive axle (if applicable). Locate seal lip as illustrated.



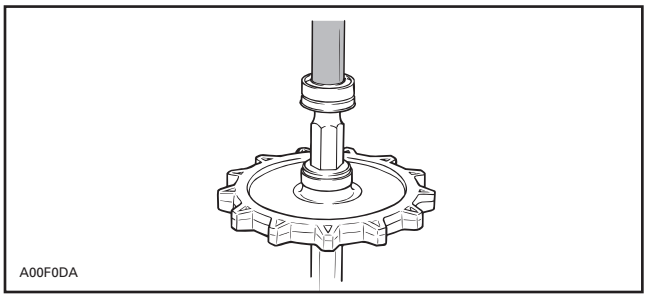
1. Grease seal type
2. Oil seal type

11, Bearing Protector

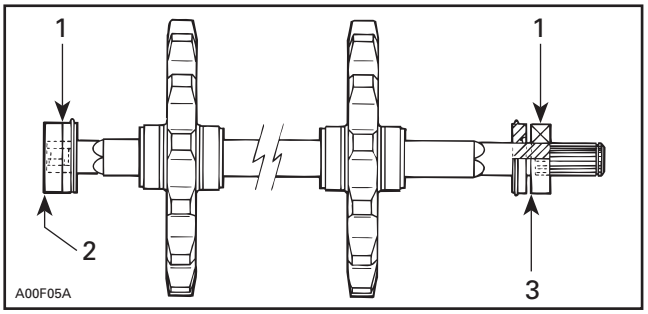
At assembly, flat side of bearing protector must be against bearing.

5,12, Bearing

Always push bearing by inner race.



The bearing on the splined side of axle must be pushed until it is seated on shaft shoulder. The end bearing housing bearing must be flush with end of drive axle. Each bearing must have its shield facing the sprocket.



1. Bearing shield on this side
2. Flush with drive axle
3. Seated on shaft shoulder

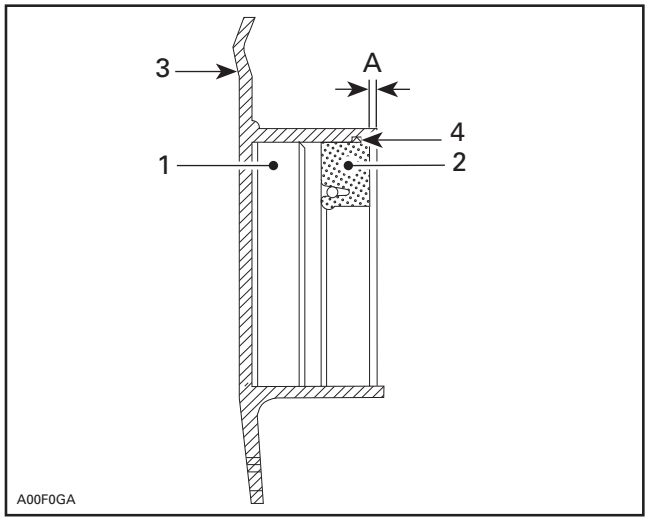
INSTALLATION

4, Speedometer Drive Insert

If the drive axle to be installed is a new part and the vehicle is equipped with a speedometer, a correct size speedometer drive insert must be installed into the axle end. Ensure that insert is flush with end of axle.

Position drive axle assembly into location. Install end bearing housing. Install spacer (if applicable) between bearing and lower chaincase sprocket.

Install chaincase and position seals (if applicable), making sure that a gap of approximately 2 mm (1/16 in) exists between end of bearing housing and each seal.



SIDE VIEW

1. Bearing
2. Seal
3. Housing
4. Seal lip
A. 2 mm (.080 in) approximately

3, Retainer Ring

Make sure that welded nuts are toward inside of tunnel.

Lock drive axle sprocket with a circlip.

Reinstall the chaincase cover.

Refill with chaincase oil. Refer to TECHNICAL DATA.

Install the suspension. Refer to TRACK and adjust track tension and carry out track alignment procedure.

LUBRICATION

15, Grease Fitting

Lubricate end housing bearing with synthetic grease (P/N 513 711 500).

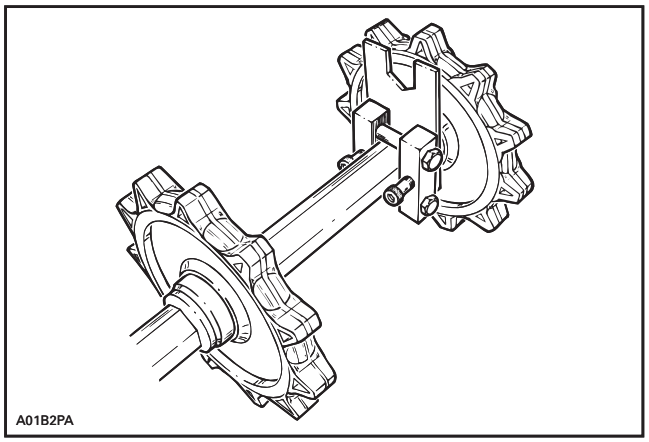
ADJUSTMENT

Sprocket/Track Alignment

CAUTION: Do not tamper with sprocket/track alignment if frame or suspension is damaged.

Sprockets might be repositioned to fit lugs without removing drive axle.

Use drive axle sprocket adjuster kit (P/N 861 725 700).



TYPICAL

TRACK

TRACK TYPE APPLICATION

Refer to TECHNICAL DATA section.

GENERAL

This section gives guidelines for track removal. Some components require more detailed disassembly procedures. In these particular cases, refer to the pertaining section in this manual.

INSPECTION

Visually inspect track for:

– cuts and abnormal wear
– broken rods
– broken or missing track cleats.

If track is damaged or rods are broken, replace track. For damaged or missing cleats, replace by new ones, using cleat remover (P/N 529 028 700). Use small-cleat installer (P/N 529 008 500).

⚠ WARNING

Do not operate a snowmobile with a cut, torn or damaged track.

REMOVAL

S-Series and Skandic LT

Remove the following parts:

– speedometer cable
– muffler
– chaincase cover
– suspension
– drive axle seal
– end bearing housing
– sprockets and chain
– drive axle (toward end bearing housing)
– track.

Skandic WT/SWT/WT LC

Remove the following parts:

– rear suspension
– muffler.

Drain gearbox.

Remove drive axle then track.

INSTALLATION

All Models

Reverse the removal procedure.

NOTE: When installing the track, respect rotation direction indicated by an arrow on track thread.

Check sprocket/track alignment as described in DRIVE AXLE.

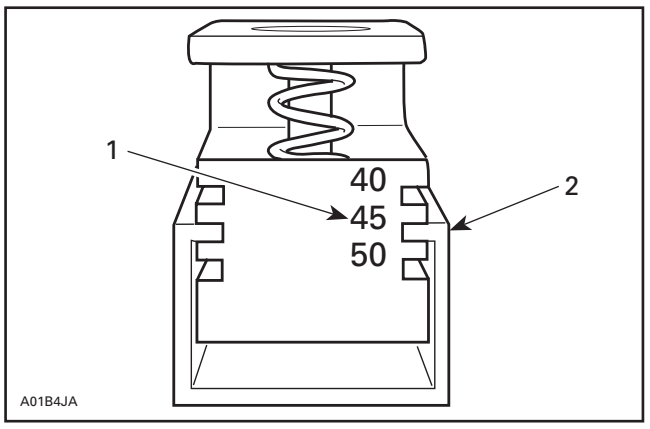
Track Tension and Alignment

Track tension and alignment are inter-related. Do not adjust one without checking the other. Track tension procedure must be carried out prior to track alignment.

Tension

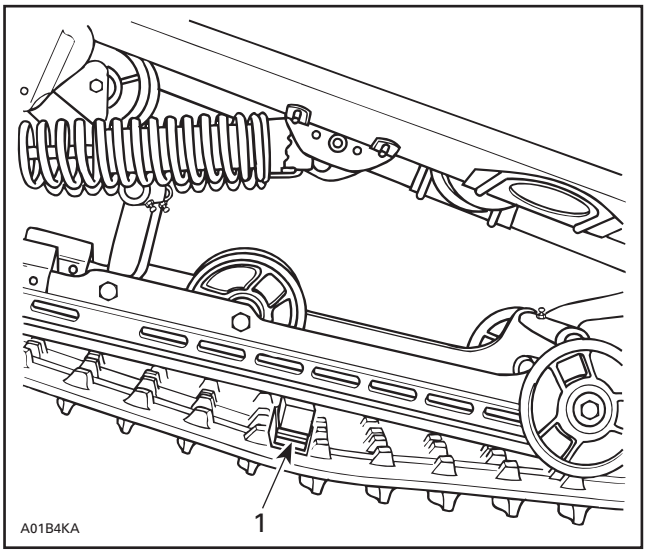
Lift the rear of vehicle and support with a mechanical stand. Allow the slide to extend normally. Check the gap halfway between front and rear idler wheels. Measure between slider shoe and bottom inside of track.

When using the track tension gauge (P/N 529 021 500), slide U-shape extrusion to proper deflection. Refer to TECHNICAL DATA.



1. Example: 45 mm
2. Extrusion

Insert preset gauge between slider shoe and track. Allow gauge to settle by forcing track up and down. Track tension is as specified when edge of gauge reaches line.

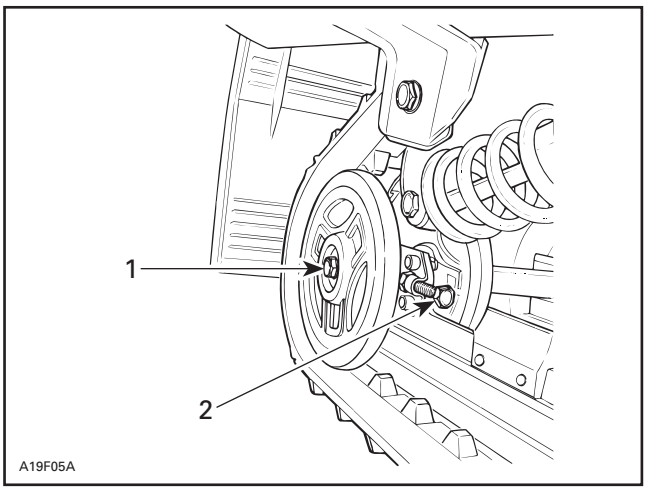


TYPICAL
1. Line

NOTE: Lightly oil track tension gauge center pin to avoid sticking.

CAUTION: Too much tension will result in power loss and excessive stress on suspension components. If too loose, the track will have a tendency to thump.

To adjust, loosen the rear idler wheel retaining screws then loosen or tighten the adjuster bolts located on the inner side of the rear idler wheels.



TYPICAL
1. Retaining screw
2. Adjuster bolt

Alignment

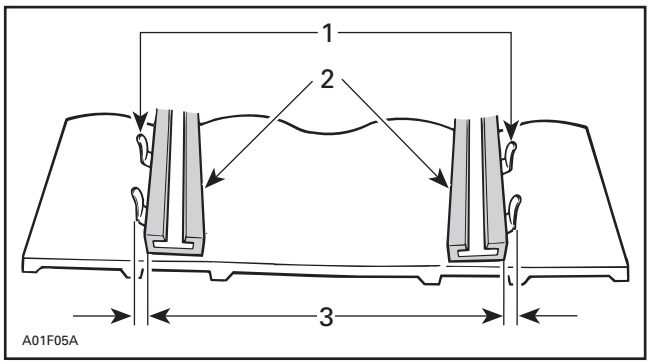
⚠ WARNING

Before checking track tension, ensure that the track is free of all particles which could be thrown out while it is rotating. Keep hands, tools, feet and clothing clear of track. Ensure no one is standing in close proximity to the vehicle.

All Models

With rear of vehicle supported off the ground, start engine and allow the track to rotate **slowly**.

Check that the track is well centered; equal distance on both sides between edges of track guides and slider shoes.

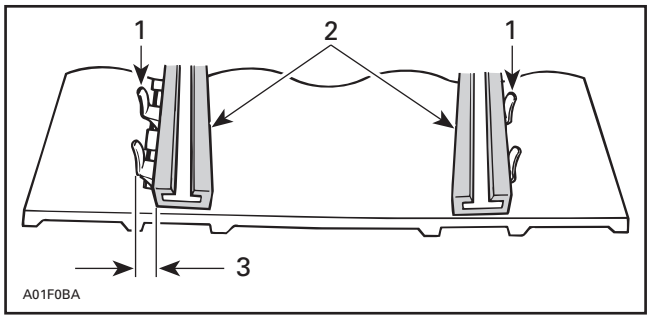


1. Guides
2. Slider shoes
3. Equal distance

⚠ WARNING

Before checking track alignment, ensure that the track is free of all particles which could be thrown out while track is rotating. Keep hands, tools, feet and clothing clear of track.

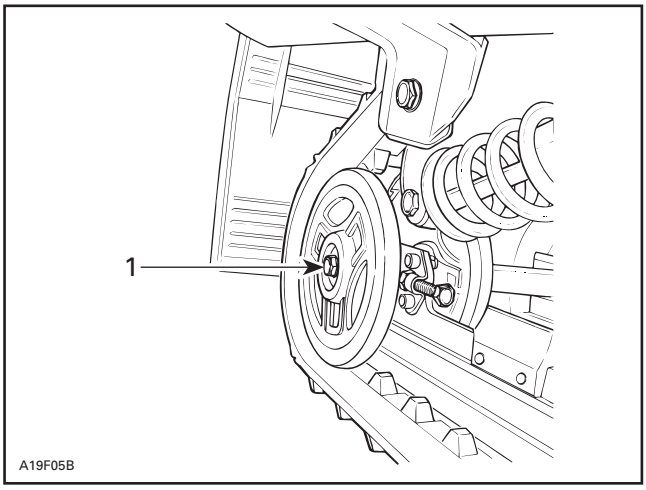
To correct, stop engine then tighten the adjuster bolt on side where guides are farthest to slide. Recheck alignment.



1. Guides
2. Slider shoes
3. Tighten on this side

NOTE: Torque retaining screw to 48 N•m (35 lbf•ft) after adjustment.

Tighten the idler wheel retaining screws.



TYPICAL

1. Retighten

Restart engine, rotate track **slowly** and recheck alignment.

Track Cleat

Removal

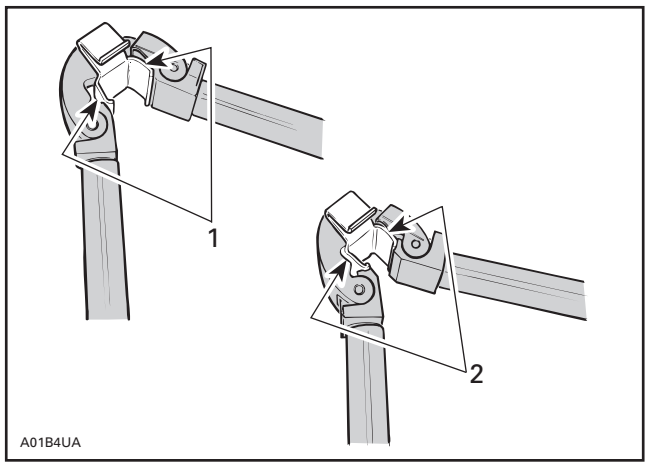
– Raise rear of vehicle off the ground and lift snow guard then rotate track to expose a cleat to be replaced.

– Using track cleat remover (P/N 529 028 700) for all models.

Installation

NOTE: Keep the same pitch between guide cleats.

– Place new cleat in position and using small track cleat installer (P/N 529 028 800) bend cleat then push tabs into rubber.



TYPICAL

1. First step
2. Second step (to push tabs into rubber)

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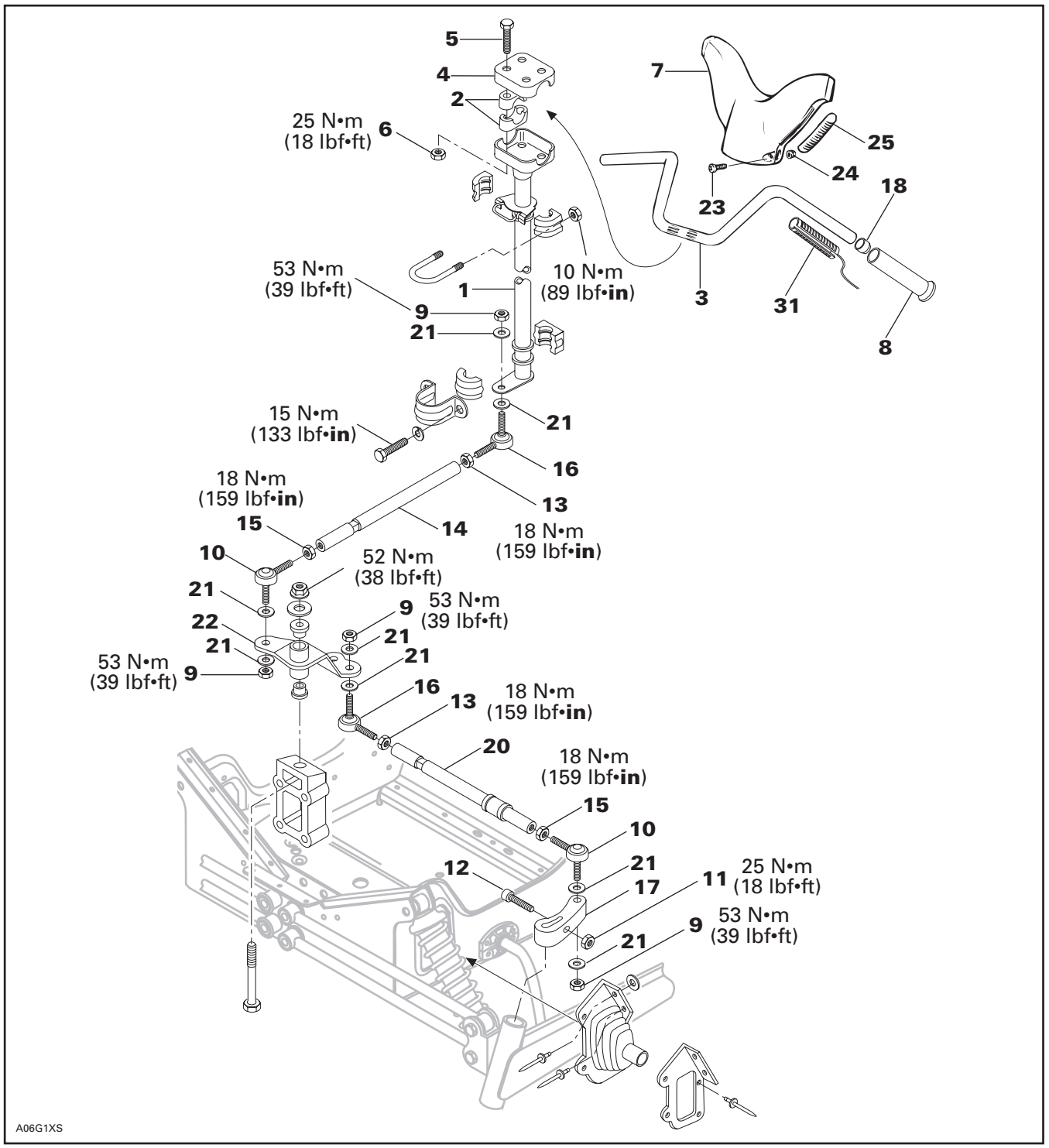
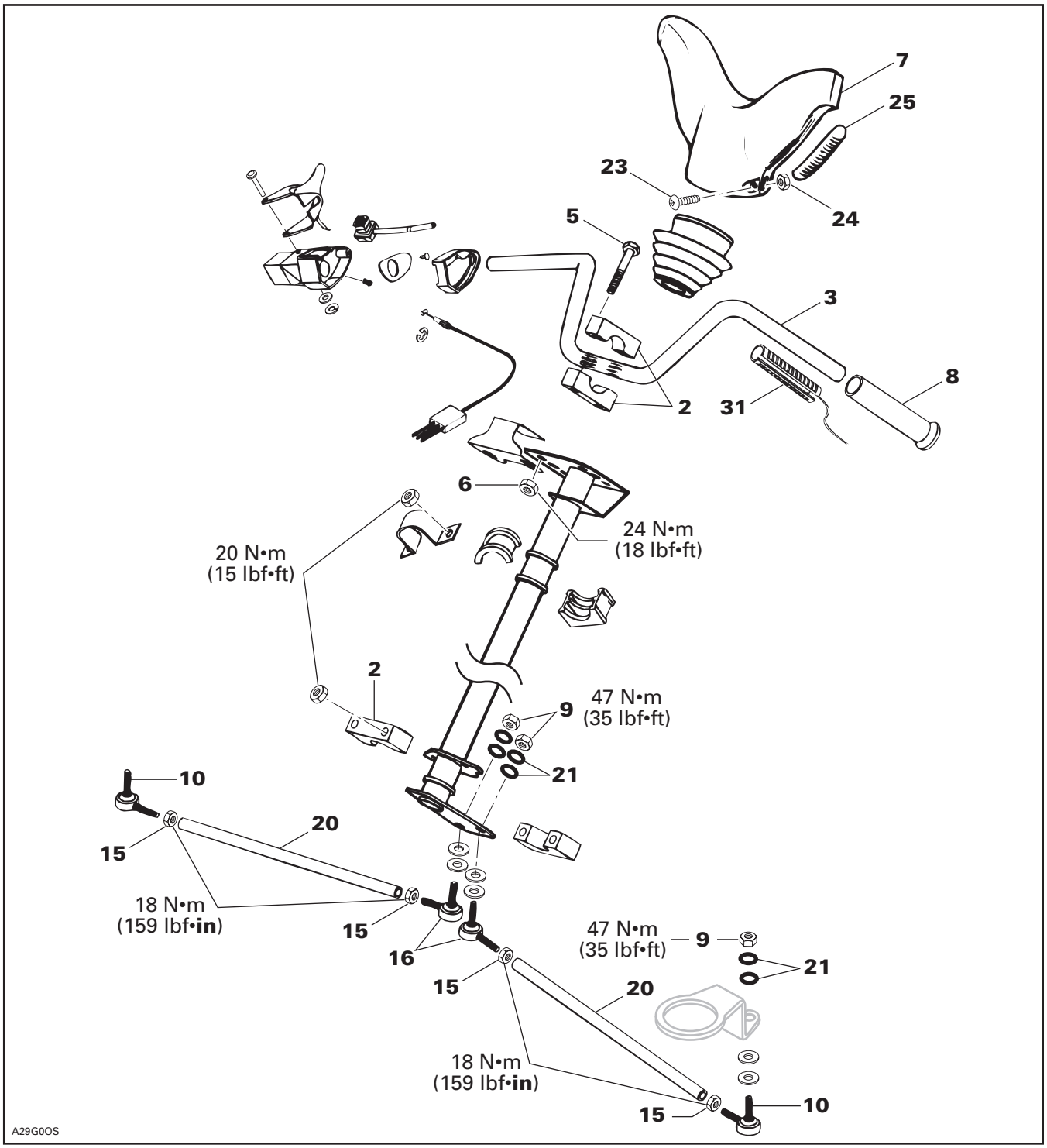
STEERING SYSTEM

S-Series



Skandic WT/SWT/WT LC



TYPICAL

INSPECTION

Check skis and ski runner for wear, replace as necessary. Refer to STEERING SYSTEM.

17, Steering Arm and Ski Leg

Make sure steering arm and ski leg splines interlock without excessive play.

⚠ WARNING

Any parts having worn splines have to be replaced with new ones.

Check the general condition of the steering system components for wear. Replace if necessary.

31, Heating Grip Element

To test heating elements, refer to TESTING PROCEDURE.

10,16, Ball Joint (left hand and right hand threads)

Inspect ball joint ends for wear or looseness, if excessive, replace them.

DISASSEMBLY AND ASSEMBLY

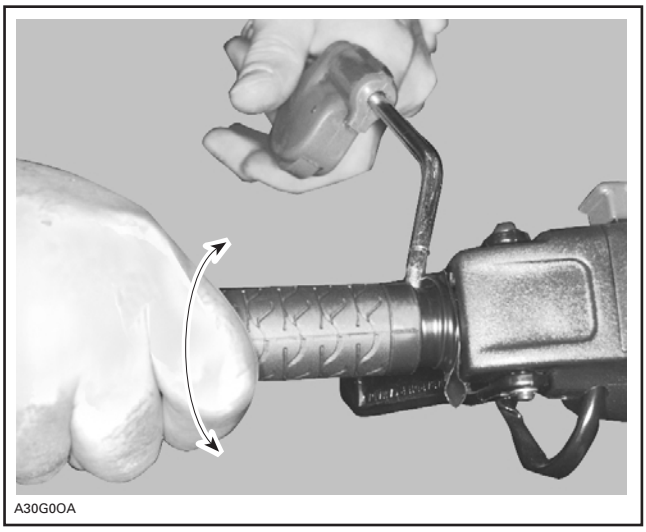
8, Grip

Grips must be carefully removed to prevent damaging the heating elements.

Heat grip with a heat gun.

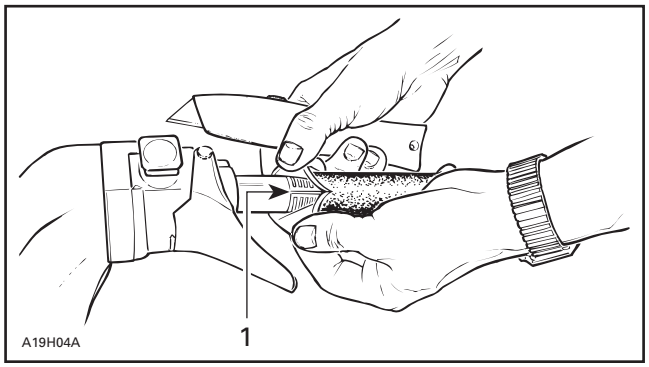
Apply tape to handlebar near the grip to protect paint.

Inject compressed air into the handlebar and twist grip as pulling it out.



The grips might be unremovable as explained above, in this case, carefully proceed as follows to prevent damaging the heating elements.

Start cutting and immediately peel it open to locate the gap in the heating element, as shown.



TYPICAL

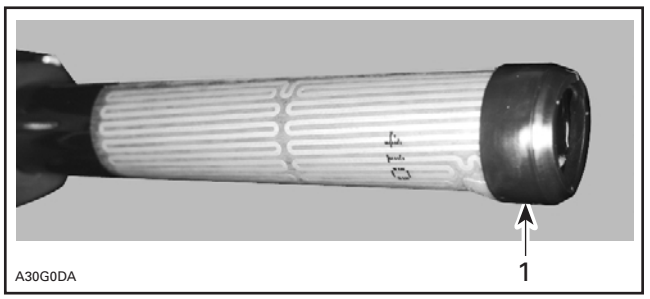
1. Gap in the heating element opposite the wires

Continue cutting along the gap and remove the grip.

If required, slowly peel heating element **no. 31** from handlebar and remove it.

To install, stick the heating element to the handlebar making sure the wires do not interfere with operation of the accelerator or brake handle.

Prior to install grips, position heating element protector **no. 18**.



1. Heating element protector

⚠ WARNING

Never use lubricants (e.g. oil, grease, etc.) to install the handlebar grip. Only use a mix of soap and water. Mix 40 parts of water with one part of dish washing soap (recommended: Ultra Joy, Sunlight or Palmolive).

Heat the grip with a heater gun or a spot light to ease installation. Insert new grip with compressed air.

A30G0NA

1, Steering Column

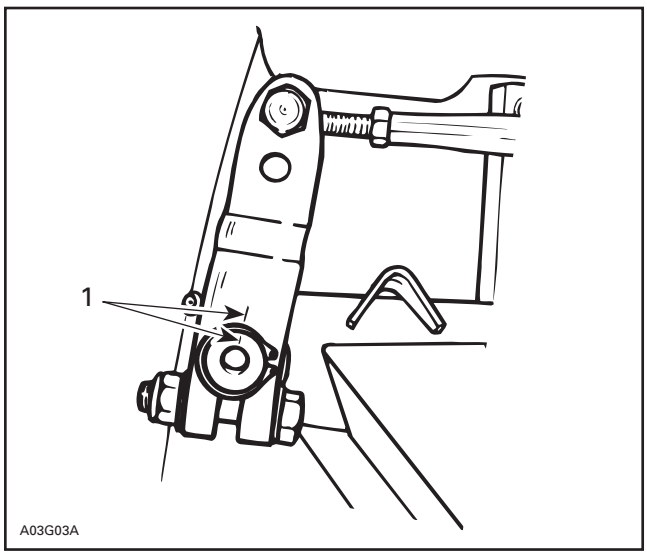
Remove steering pad then handlebar ass'y.

Detach the short tie rod (under the engine) from the steering column.

To gain access to lower U-clamp, remove the air intake silencer and carburetor(s). Remove U-clamps then steering column.

17, Steering Arm

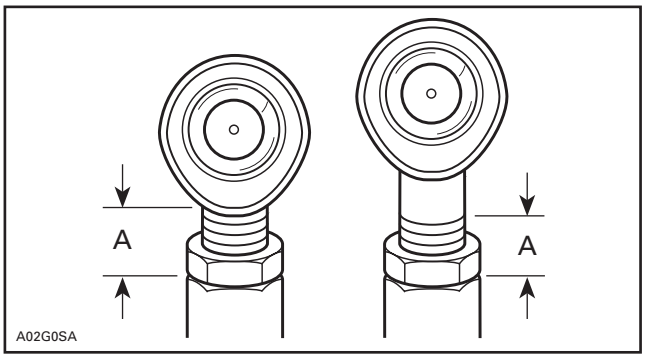
To maintain correct steering geometry for reassembling, punch mark the steering arm and ski leg before disassembly.



TYPICAL
1. Punch marks

10,16, Ball Joint (left hand and right hand threads)

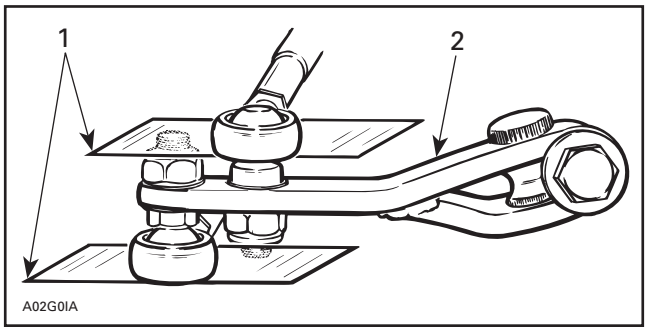
Screw threaded end of the ball joint into the tie rod. The maximum external threaded length not engaged in the tie rod must not exceed 20 mm (25/32 in).



TYPICAL
A. 20 mm (25/32 in) maximum

The ball joint should be restrained when tightening the tie rod end lock nut. Align it so the tie rod end is parallel to the steering arm when assembled on the vehicle, refer to the following illustration.

For proper torque specifications refer to the specific exploded view for the vehicle being serviced.



TYPICAL
1. Parallel with steering arm
2. Steering arm

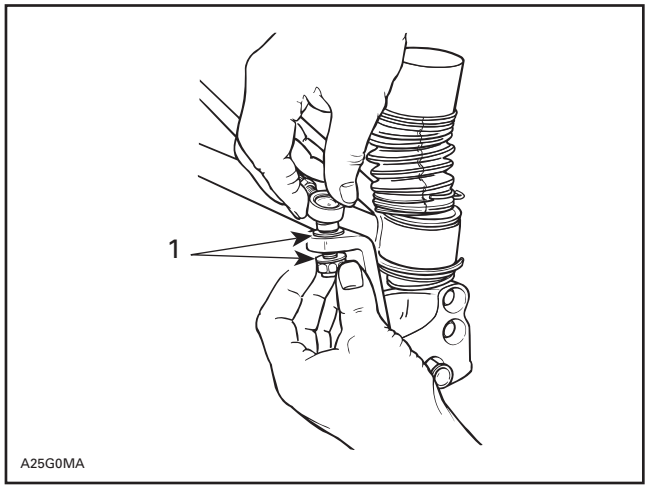
⚠ WARNING

The cut off section of the ball joint must run parallel with the steering arm. When tightening lock nuts, restrain ball joint with appropriate size wrench. The maximum external threaded length not engaged in the tie rod must not exceed 20 mm (25/32 in).

21, Hardened Washer on Ball Joint Stud

S-Series and Skandic LT

Install a hardened washer on each side of the arm.

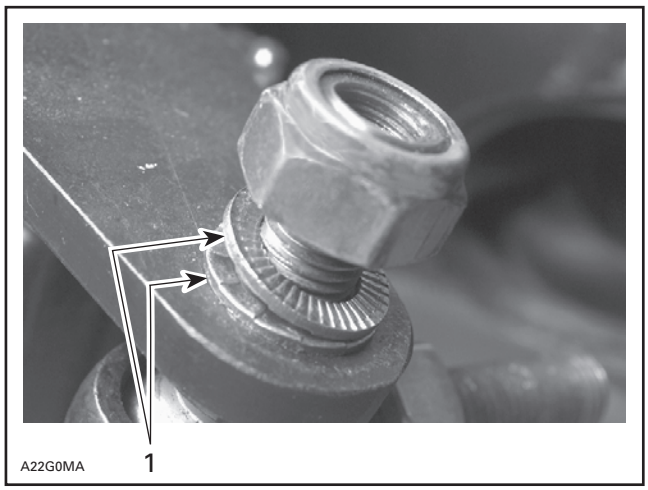


TYPICAL

1. Hardened washers

Skandic WT/SWT/WT LC Only

Install special washers (locking disks) with teeth facing each others.

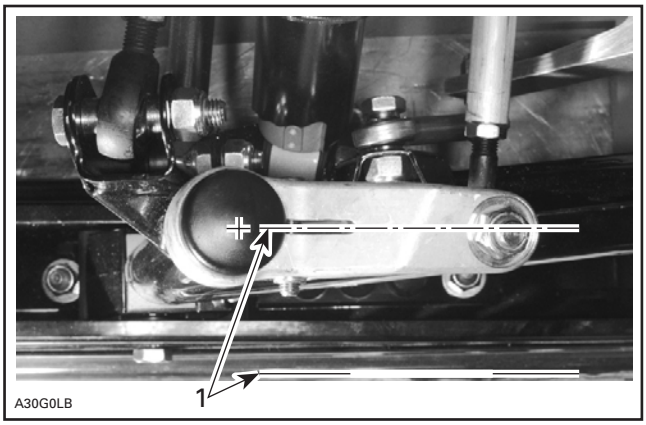


1. Large teeth

S-Series

17, Steering Arm

Steering arm axis (from plastic cap center to a ball center of ball joint) must run parallel to ski.



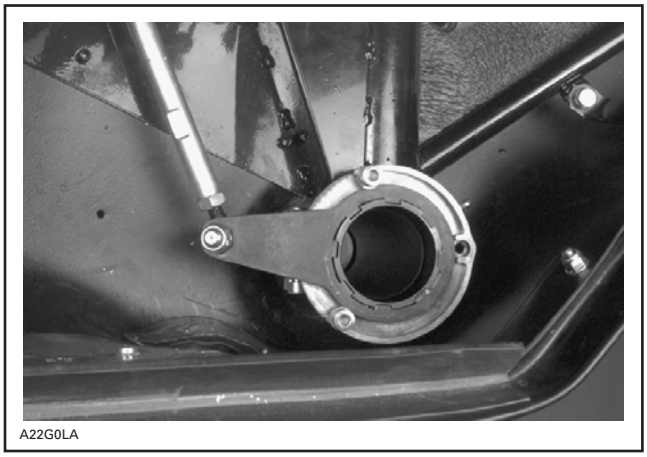
TYPICAL

1. Parallel

Tighten the steering arm nut no. 11 to the torque specified in the exploded view.

Skandic LT/WT/SWT/WT LC Only

Install steering arm at mid-travel position when handlebar and skis are facing straight ahead.



TYPICAL

9,13,15, Ball Joint Nut and Jam Nut

Tighten ball joint, nuts and jam nuts to specified torque (see exploded view).

HANDLEBAR POSITION ADJUSTMENT

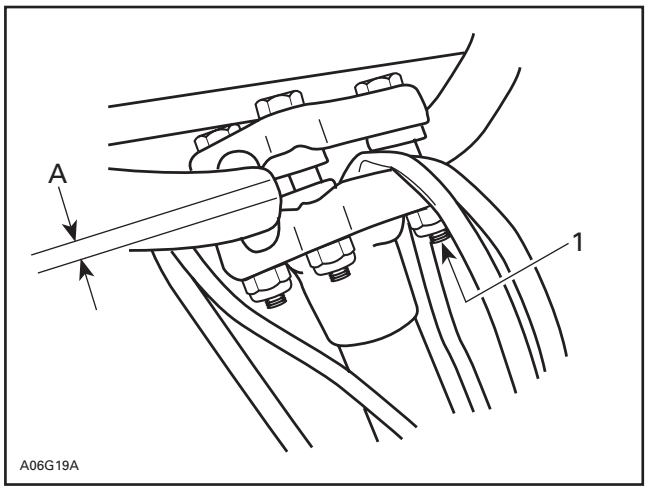
All Models

Remove steering pad. Loosen 4 nuts on steering clamps **no. 2**.

Adjust the steering handlebar to the desired position.

Lock the handlebar in place by tightening the 4 nuts as specified in the illustrations.

CAUTION: Tighten the nuts equally in a criss-cross sequence and ensure there is an equal gap on each side of the clamps **no. 2.**



TYPICAL

1. Torque to 26 N•m (19 lbf•ft)
A. Equal gap all around

⚠ WARNING

Avoid contact between the brake handle and the windshield by NOT adjusting the handlebar too high.

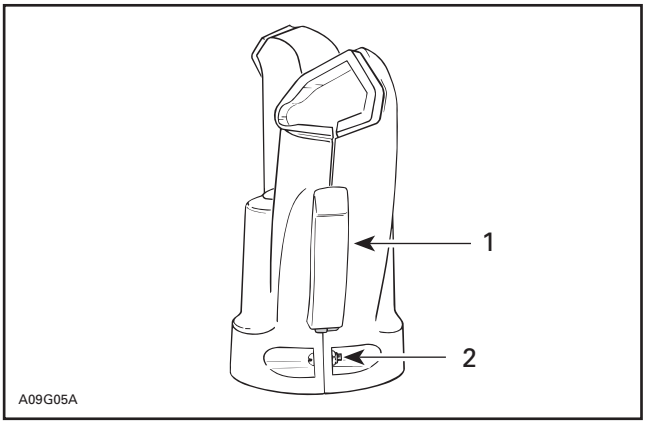
⚠ WARNING

Make sure that the steering pad and all controls are properly fixed to their normal location on the handlebar.

Properly fit the steering pad to the handlebar. Assemble using the 2 rubber attachments, nuts and bolts where applicable.

⚠ WARNING

Make sure that the steering pad and all controls are properly fixed to their normal location on the handlebar.



TYPICAL

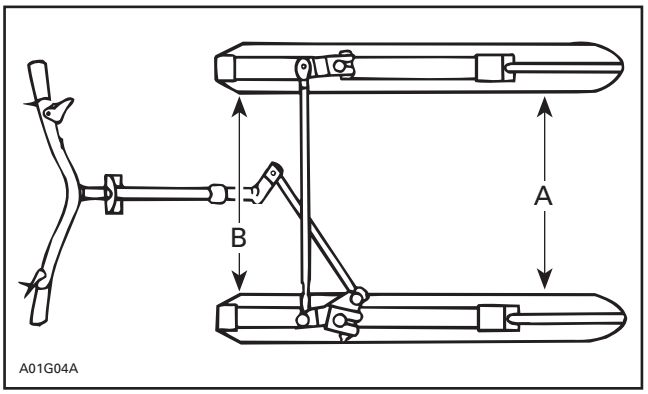
1. Rubber attachment
2. Nut and bolt (where applicable)

STEERING ADJUSTMENT (SKIS)

Definitions

TOE-OUT:

A difference measured between the front edge of the skis **A** and rear edge **B** as viewed from the top. It is adjustable.



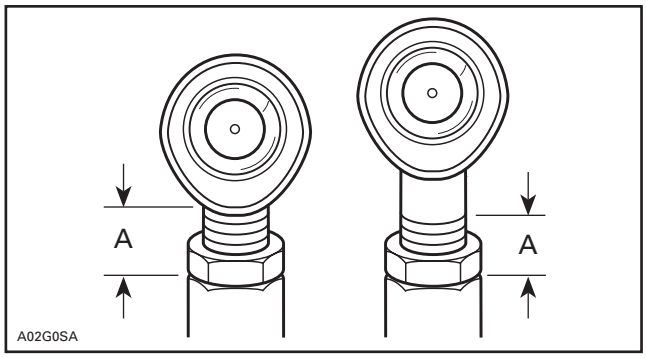
CAMBER:

A specific inward or outward tilt angle of ski leg compared to a vertical line when viewing the vehicle from front. **This angle is not adjustable on any models.**

Adjustments

⚠ WARNING

Maximum ball joint external threaded length not engaged in the tie rod end must not exceed 20 mm (25/32 in). Torque lock nut to 18 N•m (159 lbf•**in**).



A. 20 mm (25/32 in) maximum

S-Series

Adjustments should be performed following this sequence:

– Handlebar/pivot arm centering.

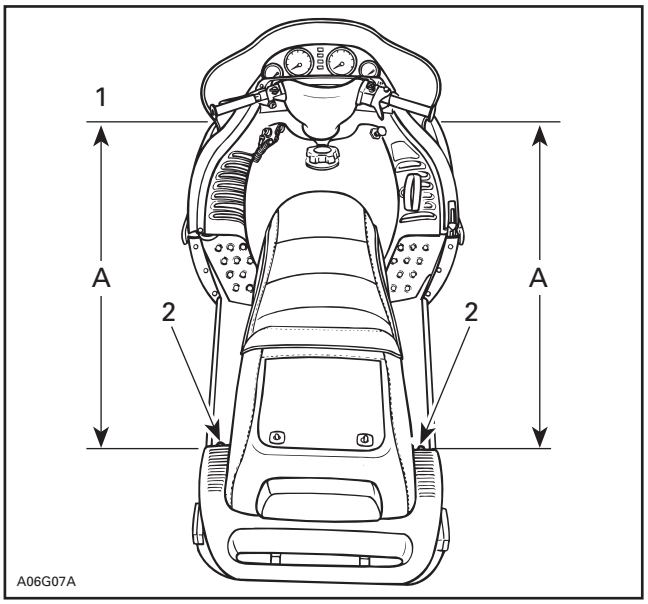
– Toe-out adjustment.

HANDLEBAR/PIVOT ARM CENTERING

13,14,15,22, Jam Nut, Tie Rod and Pivot Arm

Turn handlebar in a way that both grip ends are at equal distance from reference point.

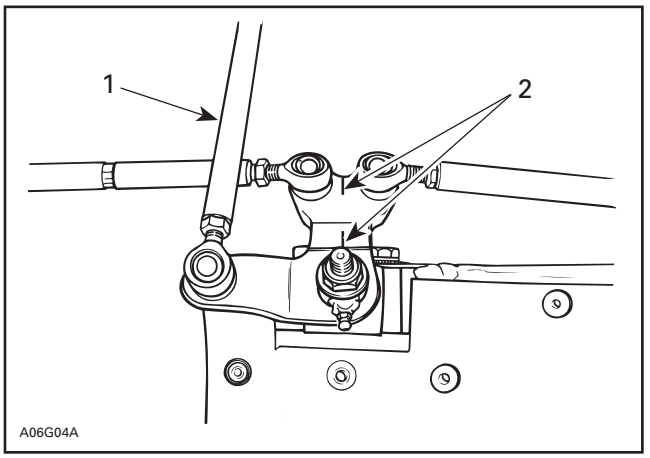
NOTE: The reference point must be the same relative to each side.



TYPICAL

1. Equal distance A on each side
2. Same reference point

With handlebar in that straight-ahead position, the center of the pivot arm must be in line with the end of the bolt. Loosen the jam nuts on tie rod **no. 14** (LH threads on steering column end) and turn tie rod accordingly. Align and retighten the jam nuts to 18 N•m (159 lbf•**in**).



TYPICAL

*1. Tie rod **no. 14***
2. Center of pivot arm in line with bolt end

This adjustment will provide same turning radius for each side.

After this adjustment, skis may not be in straight-ahead position. This situation will be corrected when adjusting toe-out.

⚠ WARNING

Do not attempt to adjust skis straight-ahead position by turning ball joint on tie rod **no. 14**.

TOE-OUT ADJUSTMENT

Make sure that handlebar is horizontal as explained above.

Toe-out adjustment is performed by adjusting length of left and right tie rods no. 20.

Procedure:

– Loosen jam nuts no. 13 and no. 15 of both tie rods no. 20.

⚠ WARNING

Never lengthen tie rod making threaded portion of ball joint exceed 20 mm (25/32 in).

– Close front of skis manually to take all slack from steering mechanism.

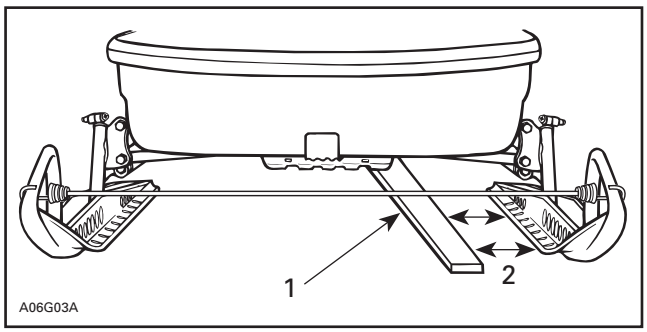
NOTE: A rubber cord must be hooked in front of skis to keep them closed.

Toe-out is 0 mm (0 in) when skis are in a straight-ahead position and the front of vehicle is lifted off the ground.

NOTE: To make sure skis are in a straight-ahead position, place a straight edge against pre-adjusted track and measure the distance between front and rear of skis and straight edge. After the ski toe-out adjustment, rear and front distances must be equal.

To adjust turn tie rods then retorque jam nuts.

To reduce tolerance when measuring, set one ski to proper toe-out then measure from that ski to the opposite ski.



TYPICAL

1. Straight edge
2. Measure here

Skandic LT/WT/SWT/WT LC

Skis should have a toe-out of 10 mm (3/8 in) when they are in a straight-ahead position and the vehicle is resting on the ground.

Proceed the same as S-Series above. Measurements are taken 250 mm (10 in) at front and rear of ski pivot bolt.

NOTE: To make sure skis are in a straight-ahead position, place a straight edge against pre-adjusted track and measure the distance between front and rear of skis and straight edge. Distances should be equal. After the ski toe-out adjustment, distance at front of ski must be 5 mm (3/16 in) more than at rear on both sides for a total toe-out of 10 mm (3/8 in).

LUBRICATION

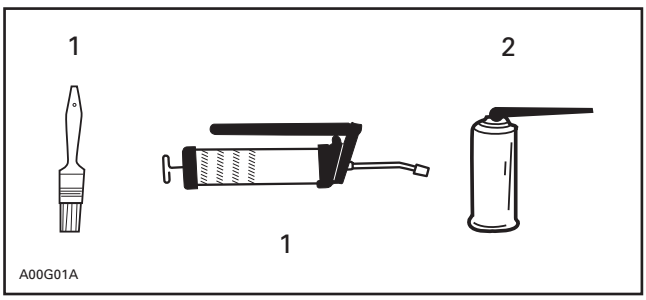
⚠ WARNING

Do not lubricate throttle and/or brake cable nor their housing.

26, Grease Fittings

Only use synthetic grease (P/N 413 711 500).

The following symbols will be used to show what type of lubricant should be used at the suitable locations.



1. Synthetic grease
2. Penetrating lubricant (P/N 293 600 016)

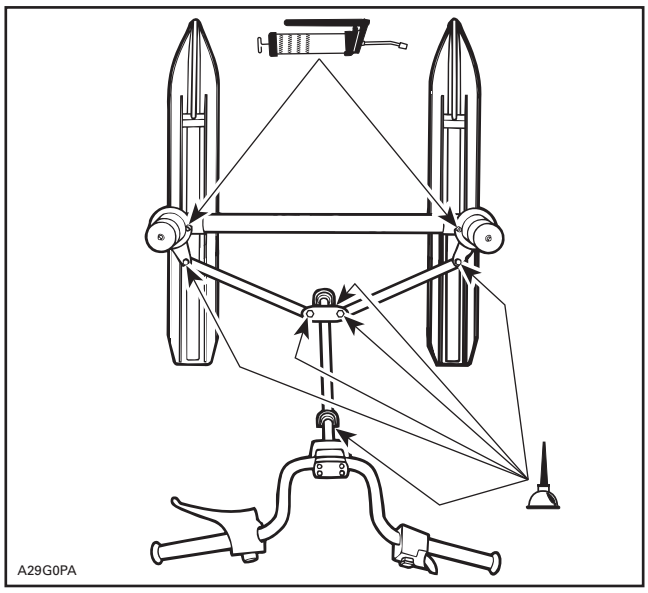
Skandic LT/WT/SWT/WT LC

Lubricate front suspension posts. Pump five strokes of grease gun on each post.

NOTE: There are 2 grease fittings.

Oil ball joints and steering column bushings.

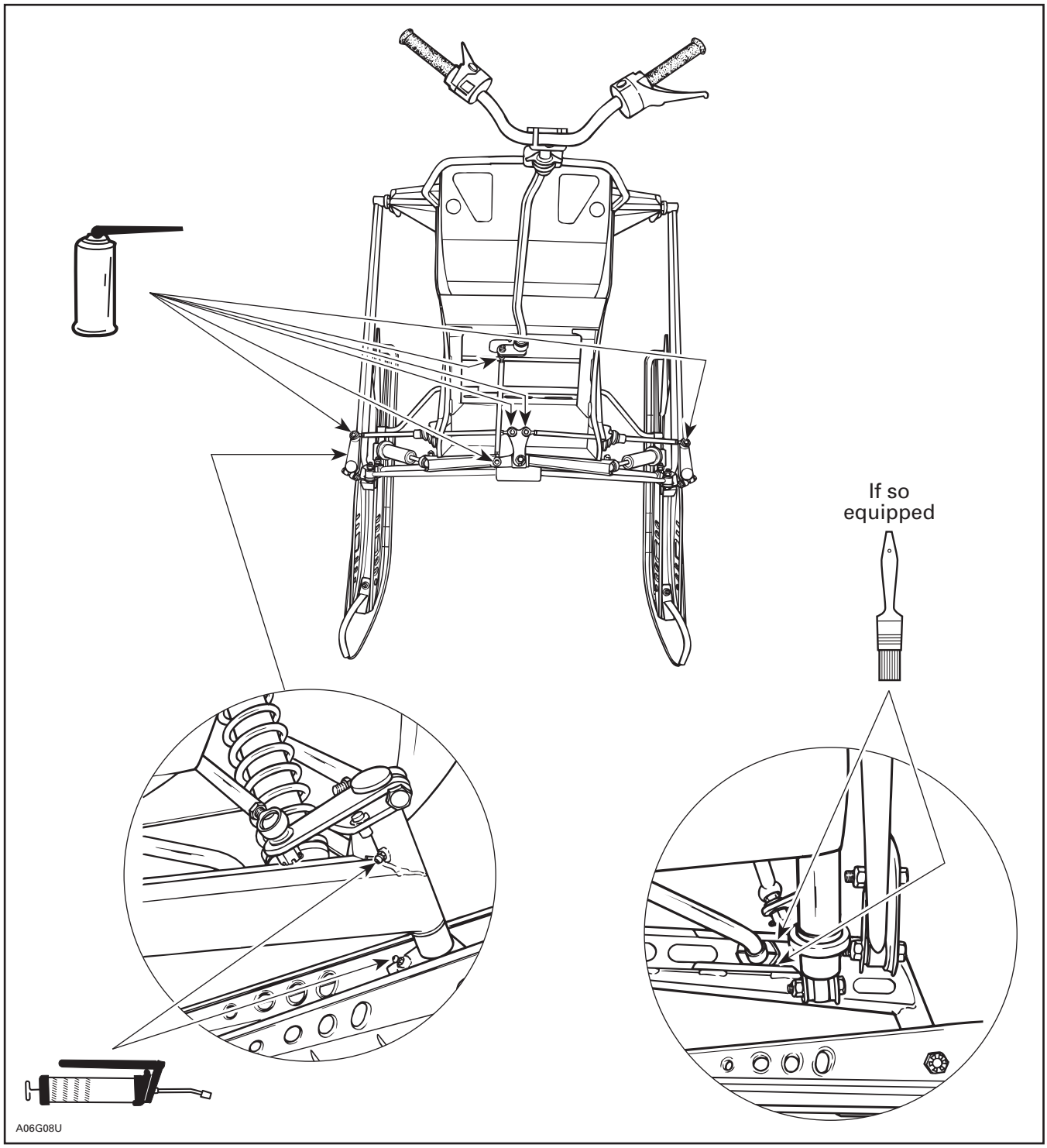
NOTE: There are 6 lubrication points.



S-Series

Lubricate:

– Grease ski legs and ski pivots.
– Coat stabilizer sliders with grease, and oil their ball joints if so equipped.

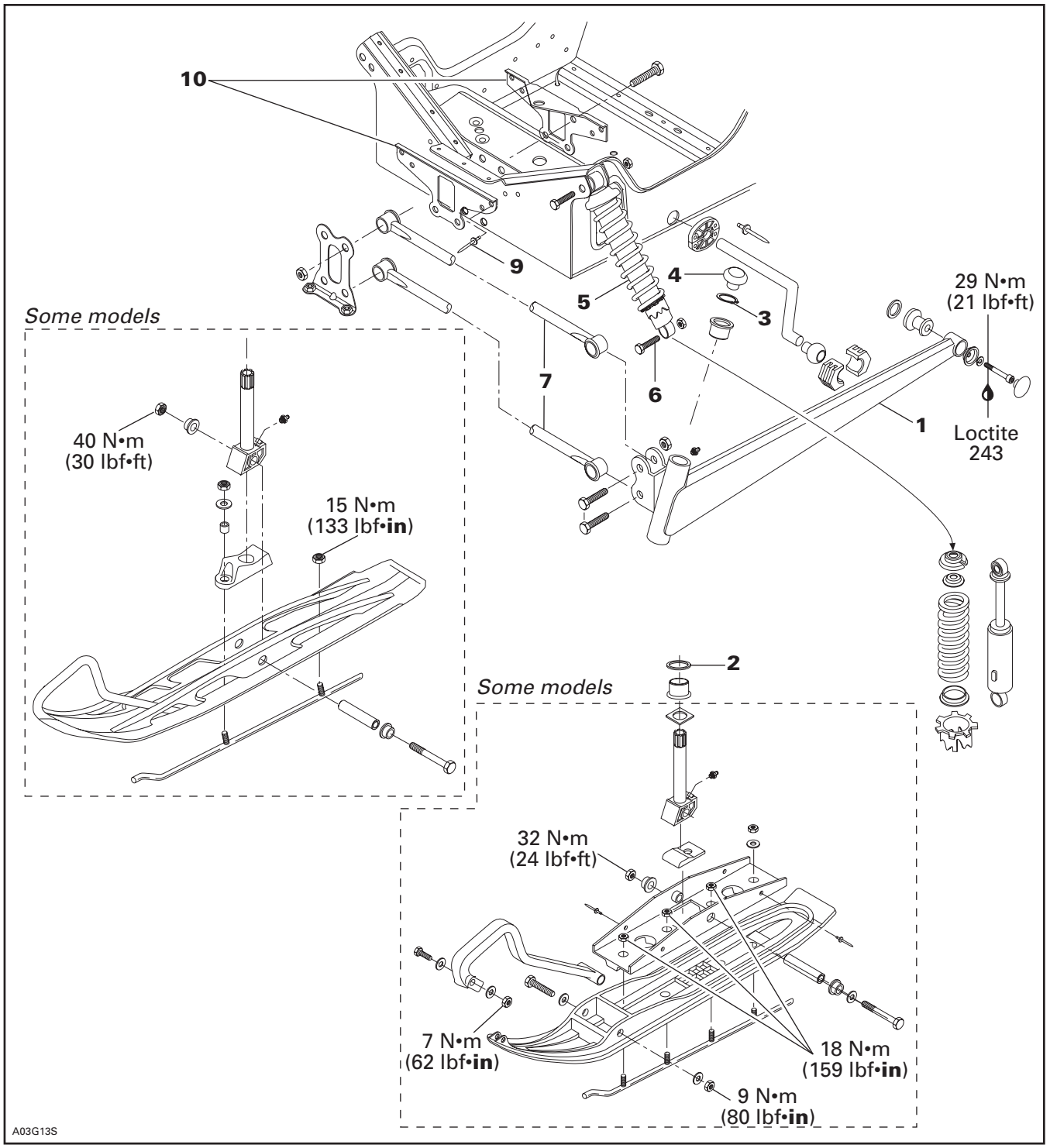


TYPICAL — S-SERIES

PARTS FLAT RATE

SUSPENSION AND SKI SYSTEM

S-Series

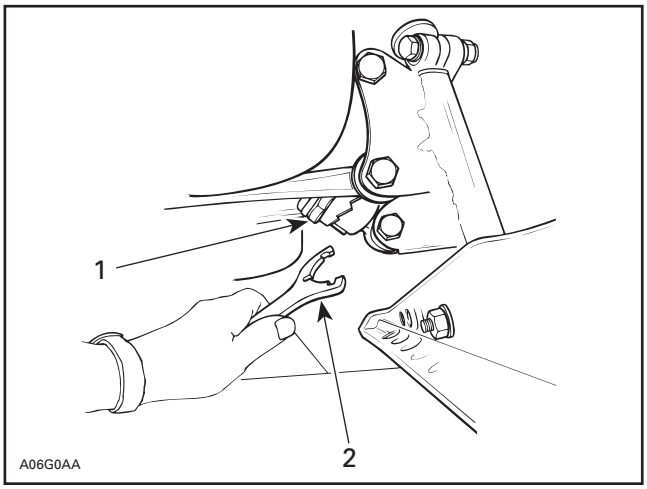


DISASSEMBLY

5, Shock

Lift front of vehicle and support it off the ground.

Reduce spring preload by turning adjusting ring accordingly with the adjustment wrench in vehicle tool box.



1. Shock cam
2. Adjustment wrench

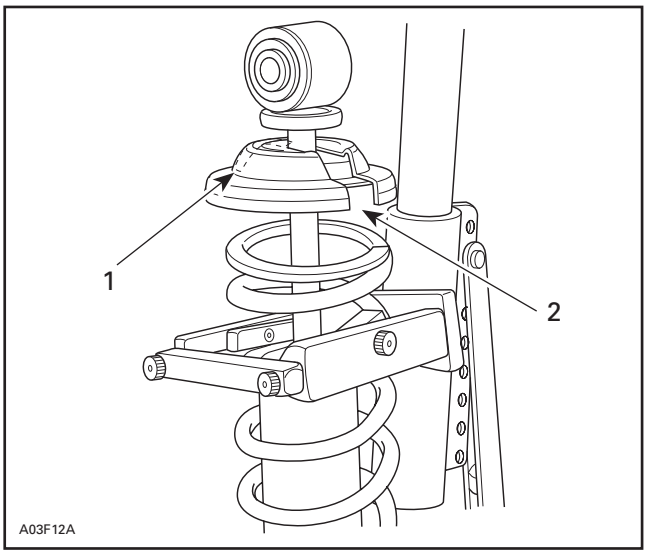
Remove lower bolt then upper bolt of shock.

For shock spring disassembly use shock spring remover (P/N 529 035 504) in a vise. Mount shock in it and turn shock so that spring coils match spring compressor.

Close and lock the bar. Adjust the handle horizontal position by changing the position of the clevis pin.

Push down on the handle until it locks. Remove spring stopper and cap then release handle.

When installing the cap opening must be 180° from the spring stopper opening.



1. Cap opening
2. Spring stopper opening

1, Swing Arm

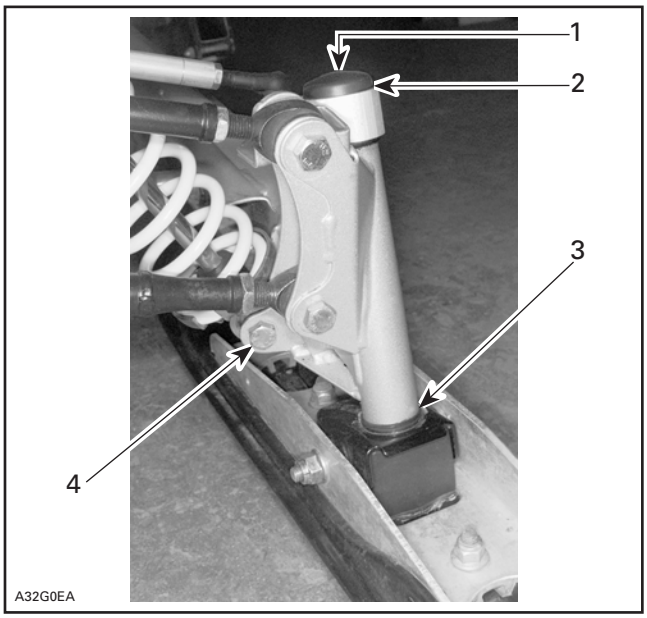
Lift front of vehicle and support it off the ground.

Remove cap, circlip then loosen steering arm bolt and pull up steering arm. Note washer **no. 2** position. Ski leg may fall off from swing arm.

Unbolt lower end of shock from swing arm.

Unbolt both radius rods.

Unbolt swing arm from footrest.



TYPICAL

*1. Cap **no. 4***
*2. Circlip **no. 3***
*3. Washer **no. 2***
*4. Bolt retaining lower end of shock **no. 6***

INSPECTION

Check all rubber cushions for crack and wear. Replace as required.

Check straightness of splines and proper interlocking with steering arm. Replace as required.

Check for straightness of swing arm. Replace as required.

Check for clogged grease fittings. Clean or replace as required.

Check for proper action of sliding blocks in swing arm.

Check skis and runners for wear, replace as necessary.

Check condition of ski stopper. Replace it when deteriorated.

To check condition of shock, refer to SC-10 SUSPENSION then look for **Shock Absorber Inspection**.

INSTALLATION

For assembly, reverse the disassembly procedure. However, pay attention to the following.

Apply synthetic grease (P/N 413 711 500) to ski leg components.

Tighten nuts and screws to proper torque as mentioned in exploded view.

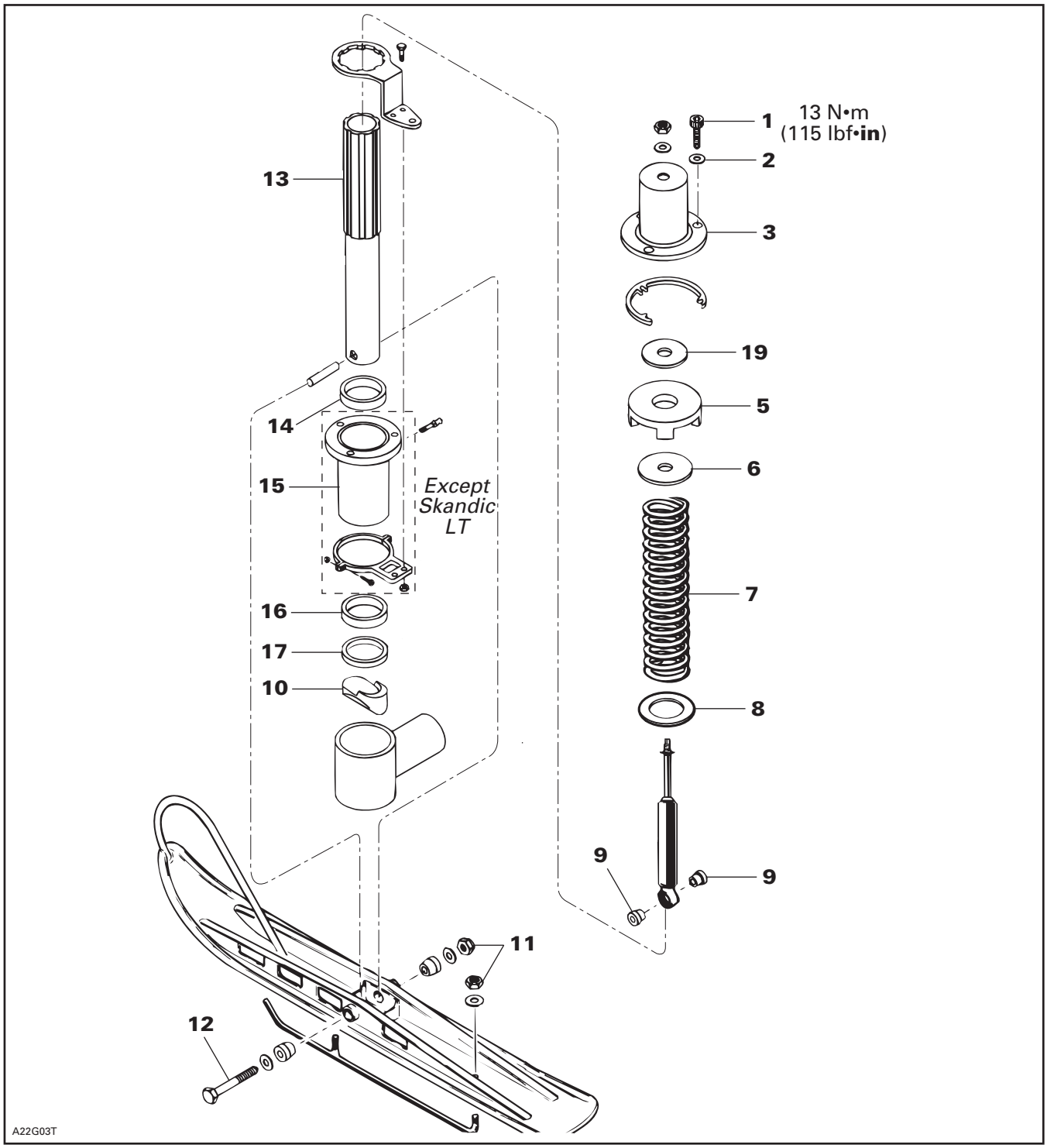
7,8, Upper and Lower Radius Rods

Position radius rods and tie rods horizontally before tightening nuts.

9,10, Rivet and Link Plate

Attach link plate to frame with rivets, if applicable.

Skandic LT/WT/SWT/WT LC



TYPICAL

PARTS FLAT RATE

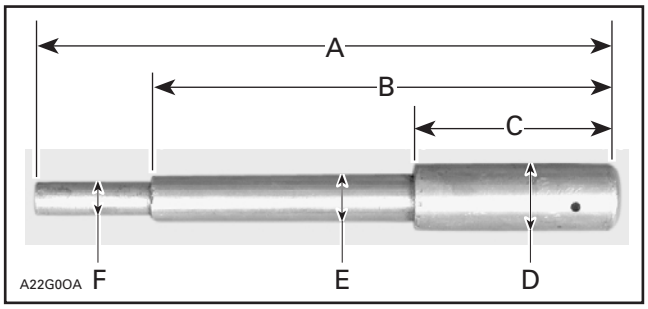
ON-VEHICLE COMPONENT VERIFICATION

8, Shock

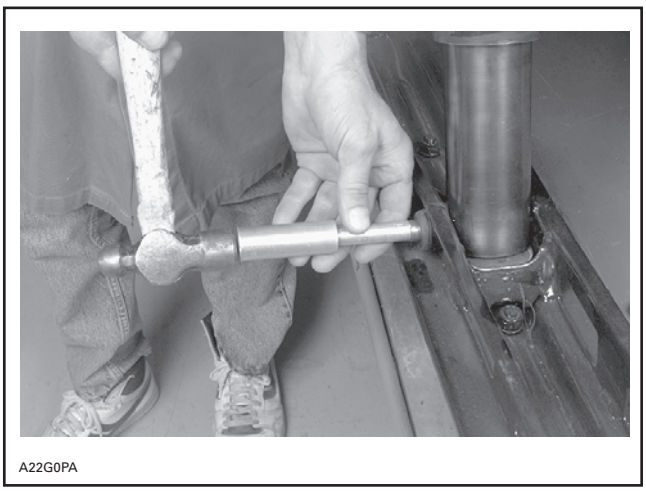
Lift front of vehicle and support off the ground.

Remove ski bolt and nut.

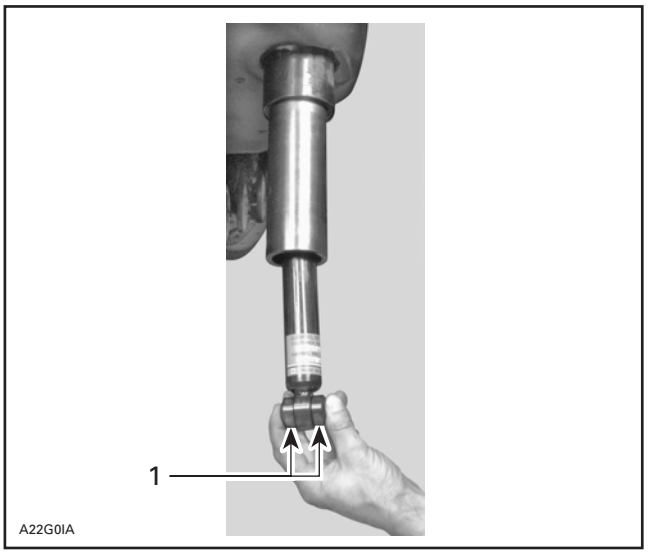
Remove steel bushing from ski using a pusher. See pusher dimensions below.



A. 220 mm (8.66 in)
B. 180 mm (7.09 in)
C. 70 mm (2.75 in)
D. 25 mm (1.0 in)
E. 15 mm (.59 in)
F. 9 mm (.35 in)



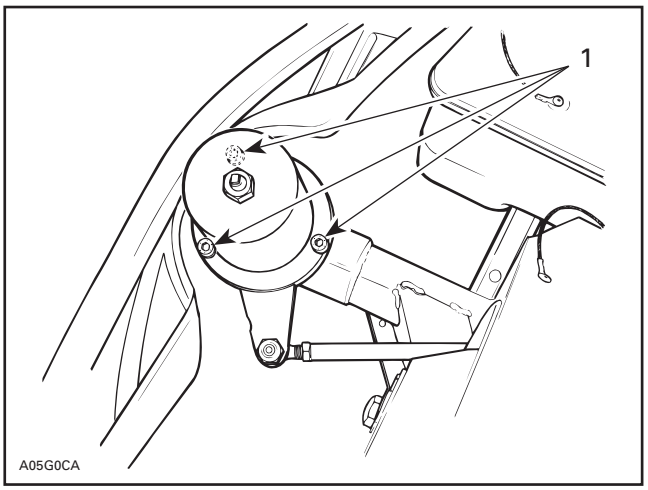
Unfasten rod nut then pull out shock from bottom. Check shock as described below in INSPECTION. At installation, make sure bushings are in place.



1. Bushings

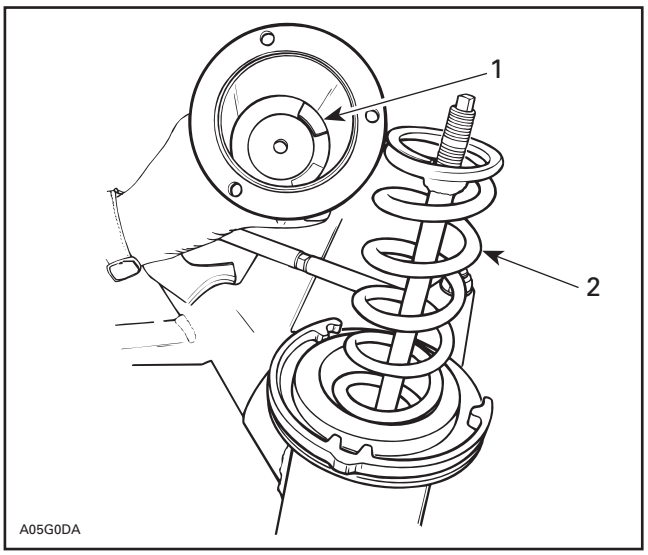
7, Spring

Unscrew shock rod nut then remove washer. Unscrew 3 Allen screws retaining cover **no. 3**, then remove stopper **no. 5**, washers **no. 6**, washer **no. 19**.



1. Allen screws

NOTE: These washers and stopper can be wedged in cover.



1. Washers and stopper wedged in cover
2. Spring

Pull out spring.

DISASSEMBLY

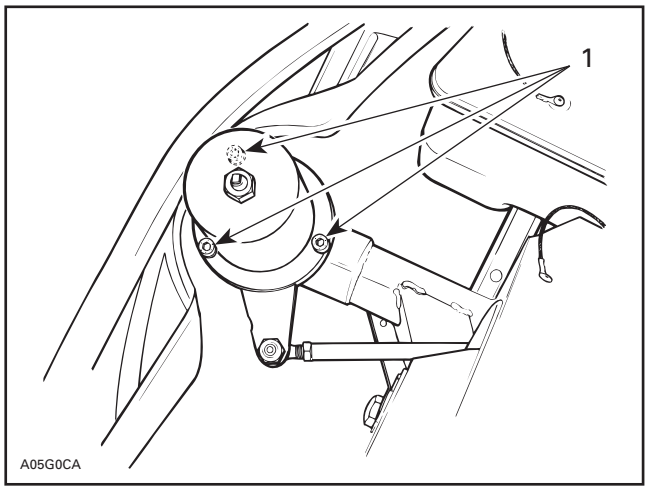
Lift front of vehicle and support off the ground.

1,2,3,5,6,9,11,12, Bolt, Lock Washer, Cover, Stopper, Bushing and Nut

Remove ski bolt, nut, bushings and ski.

Unscrew shock rod nut then remove washer. Shock will fall off the ski leg.

Unscrew 3 Allen screws retaining cover, then remove stopper and washers.

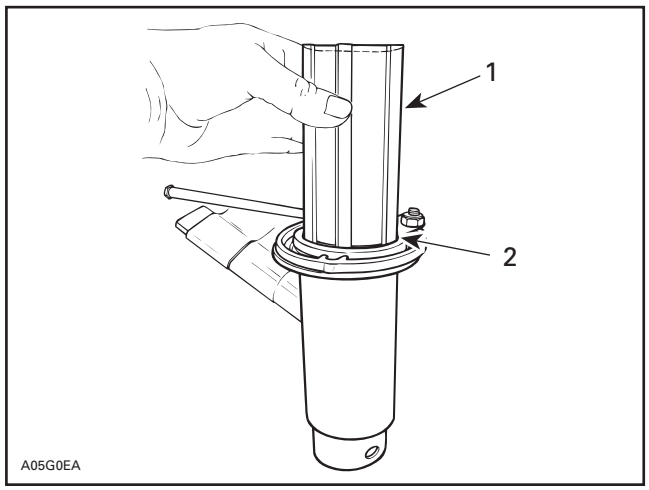


1. Allen screws

NOTE: These washers and stopper can be wedged in cap.

13,14,16,17, Ski Leg, Bushing and Seal

Pull up ski leg. Steering arm will not interfere.



1. Pull up ski leg
2. Steering arm in place

Remove seal. Drive out bushing if worn out.

INSPECTION

All Models

Suspension Free Operation

Remove cover and check for free movement of ski leg by lifting end of ski.

13, Ski Leg

Check straightness of ski leg. Check for scored or scratched surface. Replace as required.

Check that splines on ski leg and steering arm interlock properly with no excessive free play. Renew as necessary.

5, Stopper

Check condition of stopper. Replace it when deteriorated.

Grease Fitting

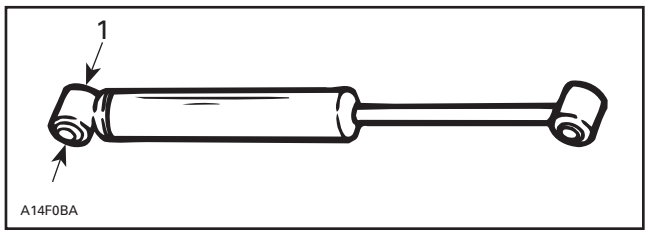
Ensure that grease fittings are not clogged.

10, Ski Stopper

Check stopper for crack or deterioration. Replace as required.

8, Shock Absorber

Secure the shock body end in a vise with its rod upward.



1. Clamp

CAUTION: Do not clamp directly on shock body.

Examine each shock for leaks. Extend and compress the piston several times over its entire stroke with its rod upward. Check that it moves smoothly and with uniform resistance.

Pay attention to the following conditions that will denote a defective shock:

– A skip or a hang back when reversing stroke at mid travel.
– Seizing or binding condition except at extreme end of either stroke.
– Oil leakage.
– A gurgling noise, after completing one full compression and extension stroke.

Renew if any faults are present.

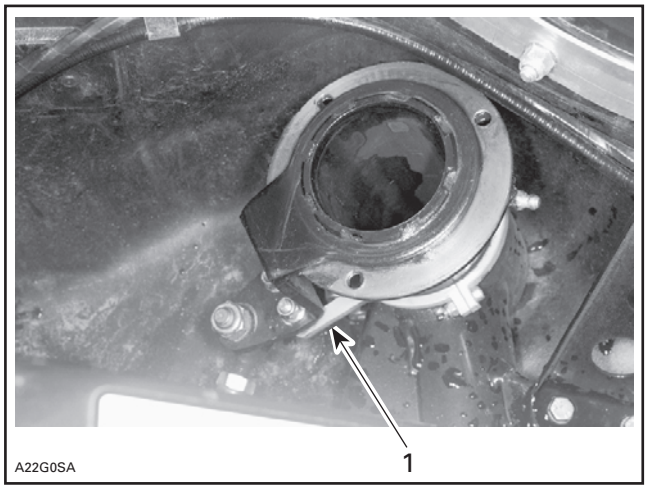
INSTALLATION

For assembly, reverse the disassembly procedure. However, pay attention to the following.

Apply synthetic grease (P/N 413 711 500) as illustrated in exploded view above.

Tighten nuts and screws to proper torque as mentioned in exploded view.

Reinstall steering arm reinforcement when removed.



1. Reinforcement

16,17, Seal

Install seal before reinstalling ski leg.

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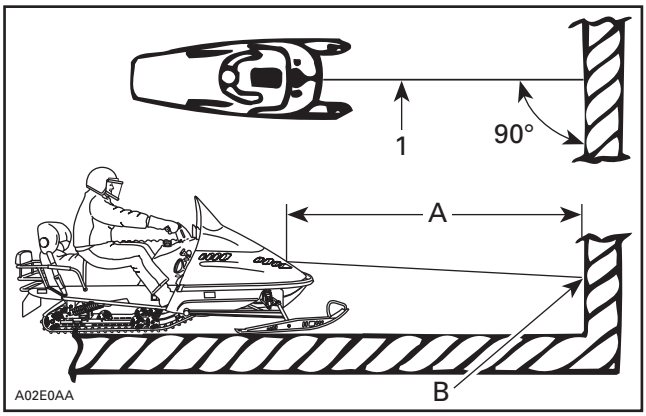
BODY

INSTALLATION AND ADJUSTMENT

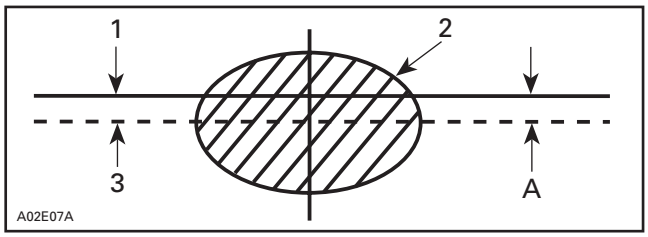
HEADLAMP BEAM AIMING

Beam aiming is correct when center of high beam is 25 mm (1 in) below the headlamp horizontal center line, scribed on a test surface, 381 cm (12 ft 6 in) away.

Measure headlamp center distance from ground. Scribe a line at this height on test surface (wall or screen). Light beam center should be 25 mm (1 in) below scribed line.



1. Headlamp center line
A. 381 cm (12 ft 6 in)
B. 25 mm (1 in) below center line



1. Headlamp horizontal
2. Light beam (high beam) (projected on the wall)
3. Light beam center
A. 25 mm (1 in)

Required Conditions

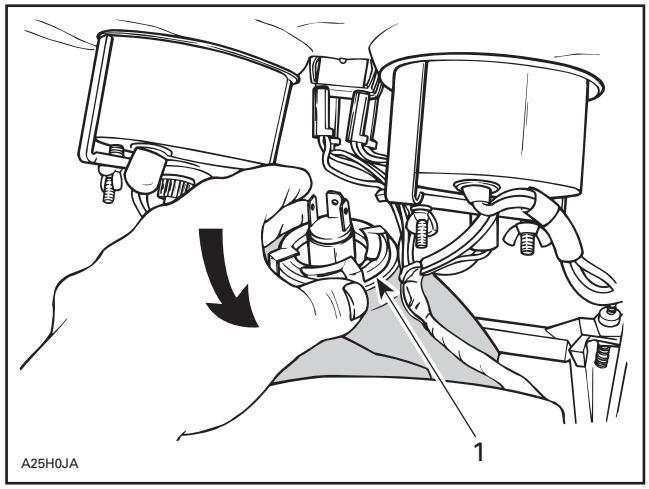
Place the vehicle on a flat surface perpendicular to test surface (wall or screen) and 381 cm (12 ft 6 in) away from it.

Rider or equivalent weight must be on the vehicle.

Select **high** beam.

BULB REPLACEMENT

If headlamp bulb is burnt, tilt cab and unplug the connector from the headlamp. Remove the rubber boot and unfasten the bulb retainer clips or locking ring.



TYPICAL
1. Locking ring

Replace bulb. If the taillight bulb is burnt, expose the bulb by removing red plastic lens. To remove, unscrew the 2 retaining screws. Verify all lights after replacement.

CAUTION: Never touch glass portion of an halogen bulb with bare fingers, as it shortens its operating life. If by mistake glass is touched, clean it with isopropyl alcohol which will not leave a film on the bulb.

DECAL

To remove a decal; heat old decal with a heat gun and peel off slowly.

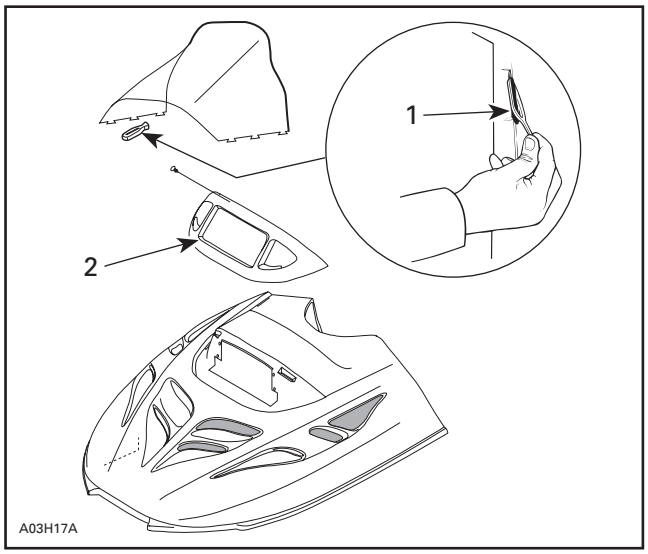
Using isopropyl alcohol, clean the surface and dry thoroughly.

Apply liquid soap to new decal and carefully position the decal. Using a sponge or a squeegee, remove the air bubbles and surplus water working from the center toward the edges. Allow to air dry.

CAUTION: Do not apply isopropyl alcohol or solvent directly on decals.

WINDSHIELD INSTALLATION

Position the windshield on the hood then push it down until the tabs are fully inserted into the hood slots. Lock the windshield tabs in position using latches as shown.



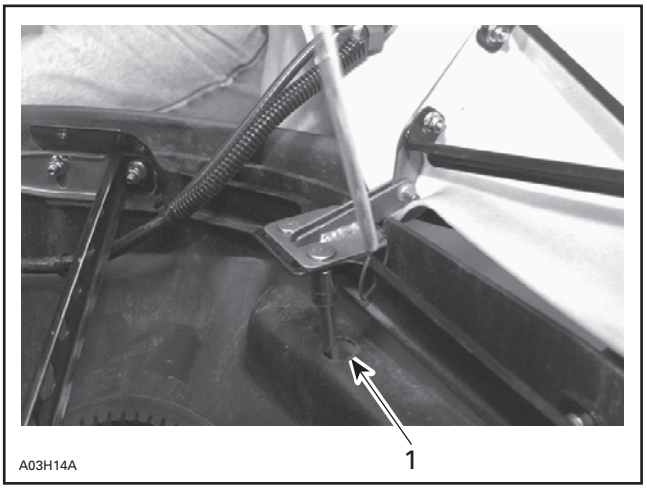
S-SERIES

1. *Latch*
2. *Temporary remove headlamp molding for windshield installation*

HOOD

S-Series

Working from within engine compartment, remove exterior nuts retaining both hinges. Then, close hood and remove interior nuts through the access holes.



1. Access hole

At installation, loosely install nuts, close hood then adjust before tightening interior nuts through access holes.

BELT GUARD

Disassembly and Assembly

NOTE: For additional information (ex.: exploded view) refer to the corresponding *Parts Catalog*.

⚠ WARNING

Engine should be running only with belt guard well-secured in place.

Inspection

All Models

Check belt guard mounting bosses, clips and retainers for wear.

WIRING HARNESS

⚠ WARNING

Ensure all terminals are properly crimped on the wires and that all connector housings are properly fastened. Keep wires away from any rotating, moving, heating and vibrating parts. Use proper fastening devices as required.

CABLES

⚠ WARNING

Before installation, ensure that all cables are in perfect condition. Properly install the cable ends and secure them in place. Pay attention to route them properly, away from any rotating, moving, heating, or vibrating parts.

PIPING

⚠ WARNING

Always ensure that the fuel, vent, primer, impulse, injection oil and rotary valve oil lines are properly fixed to their connectors, that they are not perforated or kinked and that they are properly routed away from any rotating, moving, heating or vibrating parts. Also check for leaks. Replace if required.

NOTE: Refer to proper *Parts Catalog* to find suitable clip part numbers.

PLASTIC MAINTENANCE AND REPAIR

MAINTENANCE

Clean the vehicle thoroughly, removing all dirt and grease accumulation.

To clean use a soft clean cloth and either soapy water or isopropyl alcohol.

To remove grease, oil or glue use isopropyl alcohol.

CAUTION: Do not apply isopropyl alcohol or acetone directly on decals.

CAUTION: The following products must not be used to clean or wax any of the plastic components used on the vehicles:

- gasoline
- brake fluid
- kerosene
- diesel fuel
- lighter fluid
- varsol
- naphtha
- acetone
- strong detergents
- abrasive cleaners
- waxes containing an abrasive or a cleaning agent in their formula.

Apply wax on glossy finish only. Protect the vehicle with a cover to prevent dust accumulation during storage.

CAUTION: If for some reason the snowmobile has to be stored outside it is preferable to cover it with an opaque tarpaulin. This will prevent the sun rays from affecting the plastic components and the vehicle finish.

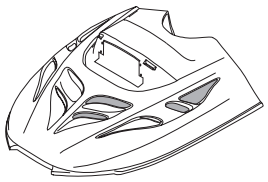
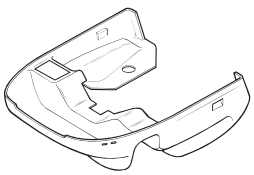
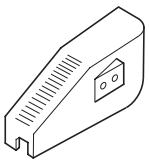
REPAIR

The very first step before repairing plastic materials is to find out exactly which type of material is involved. Refer to following chart.

CAUTION: Consult chart and repair kit instructions carefully, some repair products are not compatible with certain plastics.

⚠ WARNING

Polycarbonate windshields must never be repaired by welding or otherwise.

		IRREPAIRABLE	REPAIRABLE		
PART	**MODEL**	**HIGH DENSITY POLYETHYLENE**	**POLYPROPYLENE**	**R.I.M. URETHANE**	**POLYETHYLENE**
HOOD  A06H194	Skandic LT/WT SWT/ WT LC				
	S-Series				
BOTTOM PAN  A06H1A4	Skandic LT/WT SWT/ WT LC				
	S-Series				
SIDE PANEL AND REAR MOLDING  A06H1B4	S-Series				

MATERIAL REPAIR PROCEDURE

R.I.M. Urethane

R.I.M. urethane is light colored (tan) on the inside with a smooth surface.

⚠ WARNING

Material should be repaired and repainted in a well-ventilated area only.

CAUTION: Clean R.I.M. with isopropyl alcohol or Crest Hi-Solv product. **Never** use cleaners or products that contain **chlorine**.

CAUTION: R.I.M. should never be exposed to temperatures exceeding 93°C (200°F).

NOTE: When working on a R.I.M. surface, never use a grinder or a high revolution tool such as an air or electric buffer. Use of such tools could overheat material and liberate agents in it thus causing a bad adhesion.

REPAIR PROCEDURE FOR R.I.M. URETHANE

Small Scratches

– Sand and scuff area.
– Feather out edges.
– Paint with a matching acrylic auto touch-up paint.

Deep Scratches

– Sand and scuff area.
– Make a V groove using a knife or a rough round file.
– Clean surface with isopropyl alcohol or Crest Hi-Solv stock no. AH-S product.
– Cover with TP-E epoxy mixed in equal quantities.
– Heat the surface with a heater lamp placed at 38 cm (15 in) for a period of 15 minutes.
– Sand the surface using a smooth dry sand paper.
– Use the same product if a final finish is required.
– Clean surface with Crest Hi-Solv product.
– Apply a flexible primer such as Crest Prima Flex stock no. AP-F.
– Wait 10 minutes.
– Repaint (air dry during 72 hours (approximately)).

Large Crack

– Sand and scuff outside and inside area by exceeding it 31.7 mm (1-1/4 in) on each side and 12.7 mm (1/2 in) at each end.
– Make a V groove (appr. 90°) on both sides of hood using a knife or a rough round file.
– Enlarge the crack to 2.4 mm (3/32 in) – 3.2 mm (1/8 in) using a sharp knife.
– Clean outside and inside surface with isopropyl alcohol or Crest Hi-Solv product.
– Repair inside surface first.
– Cover inside area with Crest TP-E epoxy.
– Apply a 50 mm × 30 mm (2 in × 1-1/4 in) patch. If no room for the patch, use tape.
– Cover exterior surface with same product. Damaged area should be slightly higher.
– Heat surface with a heater lamp placed at 38 mm (15 in) for a period of 15 minutes.
– Sand outside surface using a smooth dry sand paper.
– Use same product if a final finish is required.
– Apply a flexible primer.
– Wait 10 minutes.
– Repaint (air dry during 72 hours approximately).

NOTE: Both R.I.M. materials are high static plastics, painting must be done in a dust free area such as a paint booth.

Crest products used in R.I.M. repair procedure are available from following locations:

CREST MAIN OFFICE AND MANUFACTURING PLANT	
CREST INDUSTRIES, INC. 3841 13th Street Wyandotte, Michigan 48192	Phone: 734-283-4100 Toll Free: 1-800-822-4100 Fax: 1-800-344-4461 Fax: 734-283-4461 E-Mail: info@crestauto.com www.crestauto.com

DISTRIBUTOR WAREHOUSE LOCATIONS		
UNITED STATES		CANADA
CREST EAST COAST, INC. P.O. Box 550 1109 Industrial Parkway Brick, New Jersey 08723 Phone: 732-458-9000 Fax: 732-458-5753 CREST PRODUCTS, INC. *Shipping Address:* 125 Production Drive Yorktown, Virginia 23693 Phone: 757-599-6572 Virginia: 1-800-572-5025 Outstate: 1-800-368-5033 Fax: 757-599-6630 *Mailing Address:* P.O. Box 2018 Grafton, Virginia 23692 CREST INDUSTRIES SOUTHEAST, INC. *Shipping Address:* 1400-B Woodstock Rd. Roswell, Georgia 30075 *Mailing Address:* 11530 Bowen Road Roswell, Georgia 30075 Phone: 770-642-7670 Toll Free: 1-800-552-0876 Fax: 770-642-7679	CREST INDUSTRIES, INC. (CREST MID-WEST) 231 Larkin Williams Ind. Court St. Louis, Missouri 63026 Phone: 314-349-4800 Toll Free: 1-800-733-2737 Fax: 314-349-4888 Toll Free Fax: 1-800-776-2737 **CREST MID WEST** **Regional Branch Warehouses** CREST INDUSTRIES, INC. P.O. Box 635 Mountain Home, Arkansas 72653 Phone: 501-491-5583 Toll Free: 1-800-733-2737 CREST INDUSTRIES, INC. 4200 Jackson Street, Unit 9 Denver, Colorado 80216 Phone: 303-320-3900 Toll Free: 1-800-733-2737 Fax: 303-320-6509 REM-CO DISTRIBUTING, INC. 5625 S. Adams Tacoma, Washington 98409 Phone: 253-474-5414 Toll Free: 1-800-735-7224 Fax: 253-474-7339	J2 PRODUCTS A Division of Sawill Ltd. 54 Audia Court, Unit 2A Concord, Ontario, L4K 3N4 *Phone:* Toronto: 416-665-1404 Concord: 905-669-9410 *Fax:* Concord: 905-669-9419 WHEEL-IN AUTOMOTIVE SUPPLY *Shipping Address:* No. 1, 3911A Brandon St. S.E. Calgary, Alberta, T2G 4A7 Phone: 403-287-0775 *Mailing Address:* P.O. Box 40036 929-42nd Avenue S.E. Calgary, Alberta, T2G 5G5

FRAME

FRAME CLEANING

NOTE: For aluminum frames use only aluminum cleaner and follow instructions on container. (Dursol cleaner or equivalent).

Clean frame and tunnel with appropriate cleaners and rinse with high pressure hose.

Touch up all metal spots where paint has been scratched off. Spray all bare metal parts of vehicle with metal protector.

Seat Cleaning

For all models, it is recommended to clean the seat with a solution of **warm soapy water**, using a soft clean cloth.

CAUTION: Avoid use of harsh detergents such as strong soaps, degreasing solvents, abrasive cleaners, paint thinners, etc. that may cause damage to the seat cover.

FRAME WELDING

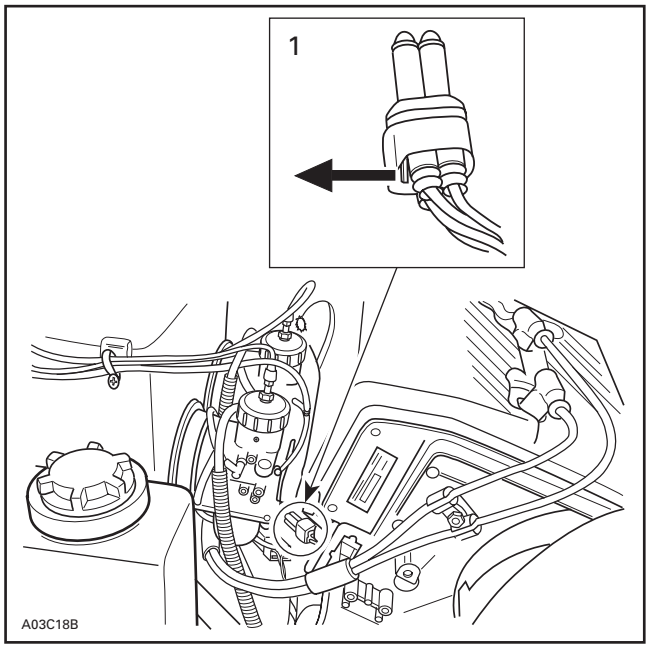
Steel Frame:

– electric welding
– amperage: 70-110 A
– voltage: 20-24 V
– electrode: E-7014 (3/32 in).

Aluminum Frame
(refer to specialized welding shop):

– electric welding: inert gas (argon)
– rod: ER-4043 (3/32 in).

CAUTION: Before performing electrical welding anywhere on the vehicle, unplug the multiple connector at the electronic box. On models equipped with a battery, also unplug the negative cable. This will protect the electronic box and battery against damage caused by flowing current when welding.



TYPICAL

1. Unplug before electrical welding

CAUTION: If welding is to be done near plastic material, it is recommended to either remove the part from the area or to protect it with aluminum foil to prevent damage.

FRAME COMPONENT REPLACEMENT

S-Series

Drilling Procedure

When drilling self-piercing rivets, use Supertanium™ drill bit (P/N 529 031 800), available in a 5 mm (3/16 in) size and shipped in packs of 2.

For proper drilling instructions and to prevent premature wear, follow the procedure below.

Always use a variable speed electric drill.

Partially drill rivet end — not the rivet head.

Maintain a slow to medium speed at all times when drilling. The proper speed is attained when a constant chip is ejected.

NOTE: To increase bit life, use Bombardier synthetic chaincase oil (P/N 413 803 300) as a cutting oil.

CAUTION: High speed drilling will cause excessive heat which may destroy the cutting edge of the bit, therefore avoid using pneumatic drills.

A03H2FA

Remove part riveted.

Punch out rivet head from drilled end.

If rivet is only accessible from head; ground rivet head completely and punch out remaining part of rivet.

TECHNICAL DATA

SI* METRIC INFORMATION GUIDE

BASE UNITS

DESCRIPTION	UNIT	SYMBOL
length	meter	m
mass	kilogram	kg
force	newton	N
liquid	liter	L
temperature	Celsius	°C
pressure	kilopascal	kPa
torque	newton•meter	N•m
speed	kilometer per hour	km/h

PREFIXES

PREFIX	SYMBOL	MEANING	VALUE
kilo	k	one thousand	1 000
centi	c	one hundredth	0.01
milli	m	one thousandth	0.001
micro	µ	one millionth	0.000001

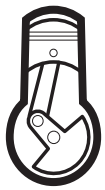
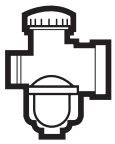
CONVERSION FACTORS

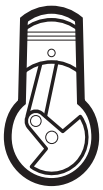
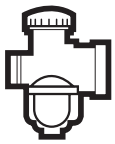
TO CONVERT	TO †	MULTIPLY BY
in	mm	25.4
in	cm	2.54
in^2	cm^2	6.45
in^3	cm^3	16.39
ft	m	0.3
oz	g	28.35
lb	kg	0.45
lbf	N	4.4
lbf•**in**	N•m	0.11
lbf•ft	N•m	1.36
lbf•ft	lbf•**in**	12
PSI (lbf/in^2)	kPa	6.89
imp. oz	U.S. oz	0.96
imp. oz	mL	28.41
imp. gal	U.S. gal	1.2
imp. gal	L	4.55
U.S. oz	mL	29.57
U.S. gal	L	3.79
MPH	km/h	1.61
Fahrenheit	Celsius	(°F - 32) ÷ 1.8
Celsius	Fahrenheit	(°C × 1.8) + 32

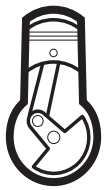
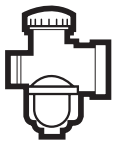
* The international system of units abbreviates SI in all languages.

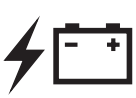
† To obtain the inverse sequence, divide by the given factor. To convert **mm** to **in**, divide by 25.4.

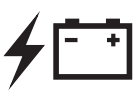
NOTE: Conversion factors are rounded off to 2 decimals for easier use.

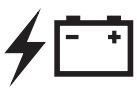
	VEHICLE MODEL			TOURING FAN 380, TOURING CARGO 380 FORMULA DELUXE FAN 380 MX Z FAN 380	TOURING FAN 500, TOURING CARGO 500 FORMULA DELUXE 500 MX Z FAN 500	MX Z FAN 440
	ENGINE TYPE			**377**	**503**	**443**
	Number of Cylinders			2	2	2
	Bore		mm (in)	62.01 (2.441)	72.00 (2.835)	67.5 (2.6575)
	Stroke		mm (in)	61.00 (2.402)	61.00 (2.402)	61.0 (2.402)
	Displacement		cm^3 (in^3)	368.3 (22.48)	496.7 (30.31)	436.6 (26.64)
	Compression Ratio (corrected)			6.7	6.4	6.4
	Maximum Power Engine Speed ①		± 100 RPM	6900	7000	7000
	Piston Ring Type		$1^{st}/2^{nd}$	ST/R	ST/R	ST/R
	Ring End Gap	(new) (wear limit)	mm (in) mm (in)	0.2 (.008) 1.0 (.039)	0.25 (.010) 1.0 (.039)	0.2 (.008) 1.0 (.039)
	Ring/Piston Groove Clearance	(new) (wear limit)	mm (in) mm (in)	0.04 (.0016) 0.2 (.008)	0.04 (.0016) 0.2 (.008)	0.04 (.0016) 0.2 (.0079)
	Piston/Cylinder Wall Clearance	(new) (wear limit)	± 0.016 mm (± .0006 in) mm (in)	0.070 (.0028) 0.2 (.008)	0.080 (.0031) 0.2 (.008)	0.08 (.0031) 0.2 (.008)
	Connecting Rod Big End Axial Play	(new) (wear limit)	mm (in) mm (in)	0.20 (.0079) 1.0 (.0394)	0.2 (.0079) 1.0 (.0394)	0.2 (.0079) 1.0 (.0394)
	Maximum Crankshaft End-Play ②		mm (in)	0.3 (.0118)	0.3 (.0118)	0.3 (.012)
	Maximum Crankshaft Deflection Measured at PTO		mm (in)	0.06 (.0024)	0.06 (.0024)	0.06 (.0024)
	Magneto Generator Output		W	240	240	240
	Ignition Type			CDI	CDI	CDI
	Spark Plug Make and Type			NGK BR9ES	NGK BR9ES	NGK BR9ES
	Spark Plug Gap		± 0.05 mm (± .002 in)	0.45 (.018)	0.45 (.018)	0.45 (.018)
	Ignition Timing BTDC ④ ⑧		mm (in)	2.79 (.110)	2.77 (.109)	2.79 (.110)
	Trigger Coil Air Gap		mm (in)	0.50 – 0.70 (.020 – .028)	0.50 – 0.70 (.020 – .028)	0.50 – 0.70 (.020 – .028)
	Trigger Coil ⑤		Ω	160 – 180	160 – 180	160 – 180
	Generating Coil ⑤		Ω	5.1 – 6.2	5.1 – 6.2	5.1 – 6.2
	Lighting Coil ⑤		Ω	0.17 – 0.21	0.17 – 0.21	0.17 – 0.21
	High Tension Coil ⑤	Primary	Ω	N.A.	N.A.	N.A.
		Secondary	kΩ	0.9 – 1.1	0.9 – 1.1	0.9 – 1.1
	Carburetor Type		PTO/MAG	2 x VM 30-200	VM 34-549/550	VM 34 547/548
	Main Jet		PTO/MAG	140/140	180/170	205/195
	Needle Jet			159 P-0	159 P-0	159 P-0
	Pilot Jet			40	40	35
	Needle Identification — Clip Position			6DP9-3	6DH2-3	6DH2-3
	Slide Cut-Away			2.5	2.5	2.5
	Float Adjustment		± 1 mm (± .040 in)	23.9 (.94)	23.9 (.94)	23.9 (.94)
	Air Screw Adjustment		± 1/16 Turn	1-1/4	1-7/8	1-1/2
	Idle Speed RPM		± 200 RPM	1650	1650	1650
	Gas Type/Pump Octane Number			Unleaded/87	Unleaded/87	Unleaded/87
	Gas/Oil Ratio			Injection	Injection	Injection
	Type			Axial fan	Axial fan	Axial fan
	Axial Fan Belt Adjustment	Deflection	mm (in)	9 – 10 (.35 – .39)	9 – 10 (.35 – .39)	9 – 10 (.35 – .39)
		Force ⑥	kg (lbf)	5 (11)	5 (11)	5 (11)
	Thermostat Opening Temperature		°C (°F)	N.A.	N.A.	N.A.
	Radiator Cap Opening Pressure		kPa (PSI)	N.A.	N.A.	N.A.
	ENGINE COLD N•m (lb•ft)	Drive Pulley Retaining Screw		⑦	⑦	⑦
		Exhaust Manifold Nuts or Bolts		22 (16)	22 (16)	22 (16)
		Magneto Ring Nut		105 (77)	105 (77)	105 (77)
		Crankcase Nuts or Screws	M6 M8	10 (7) 22 (16)	— 22 (16)	10 (7) 22 (16)
		Crankcase/Engine Support Nuts or Screws		40 (29)	40 (29)	40 (29)
		Cylinder Head Nuts		22 (16)	22 (16)	22 (16)
		Crankcase/Cylinder Nuts or Screws		N.A.	N.A.	N.A.
		Axial Fan Shaft Nut		48 (35)	48 (35)	48 (35)

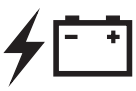
	VEHICLE MODEL			SUMMIT FAN 500	SKANDIC LT
	ENGINE TYPE			**503**	**443**
	Number of Cylinders			2	2
	Bore		mm (in)	72.00 (2.835)	67.5 (2.6575)
	Stroke		mm (in)	61.00 (2.402)	61.0 (2.402)
	Displacement		cm^3 (in^3)	496.7 (30.31)	436.6 (26.64)
	Compression Ratio (corrected)			6.4	6.4
	Maximum Power Engine Speed ①		± 100 RPM	7000	6750
	Piston Ring Type		1st/2nd	ST/R	ST/R
	Ring End Gap	(new) (wear limit)	mm (in) mm (in)	0.25 (.010) 1.0 (.039)	0.2 (.008) 1.0 (.039)
	Ring/Piston Groove Clearance	(new) (wear limit)	mm (in) mm (in)	0.04 (.0016) 0.2 (.008)	0.04 (.0016) 0.2 (.0079)
	Piston/Cylinder Wall Clearance	(new) (wear limit)	± 0.016 mm (± .0006 in) mm (in)	0.080 (.0031) 0.2 (.008)	0.080 (.0031) ⑨ 0.2 (.008)
	Connecting Rod Big End Axial Play	(new) (wear limit)	mm (in) mm (in)	0.2 (.0079) 1.0 (.0394)	0.2 (.0079) 1.0 (.0394)
	Maximum Crankshaft End-Play ②		mm (in)	0.3 (.0118)	0.3 (.012)
	Maximum Crankshaft Deflection Measured at PTO		mm (in)	0.06 (.0024)	0.08 (.0031)
	Magneto Generator Output		W	240	240
	Ignition Type			CDI	CDI
	Spark Plug Make and Type			NGK BR9ES	NGK BR9ES
	Spark Plug Gap		± 0.05 mm (± .002 in)	0.45 (.018)	0.45 (.018)
	Ignition Timing BTDC ④ ⑧		mm (in)	2.77 (.109)	2.79 (.110)
	Trigger Coil Air Gap		mm (in)	0.50 – 0.70 (.020 – .028)	0.45 – 0.55 (.018 – .022)
	Trigger Coil ⑤		Ω	160 – 180	160 – 180
	Generating Coil ⑤		Ω	5.1 – 6.2	5.1 – 6.2
	Lighting Coil ⑤		Ω	0.17 – 0.21	0.17 – 0.21
	High Tension Coil ⑤	Primary	Ω	N.A.	N.A.
		Secondary	kΩ	0.9 – 1.1	0.9 – 1.1
	Carburetor Type		PTO/MAG	VM 34 -565/566	VM 32-19110
	Main Jet		PTO/MAG	200/190	195
	Needle Jet			159 P-2	159 O-6
	Pilot Jet			70	45
	Needle Identification — Clip Position			6DH2-4	6DGH10
	Slide Cut-Away			2.5	2.5
	Float Adjustment		± 1 mm (± .040 in)	23.9 (.94)	23.9 (.94)
	Air Screw Adjustment		± 1/16 Turn	2-1/4	1-1/2
	Idle Speed RPM		± 200 RPM	1650	1650
	Gas Type/Pump Octane Number			Unleaded/87	Unleaded/87
	Gas/Oil Ratio			Injection	Injection
	Type			Axial fan	Axial fan
	Axial Fan Belt Adjustment	Deflection	mm (in)	9 – 10 (.35 – .39)	9 – 10 (.35 – .39)
		Force ⑥	kg (lbf)	5 (11)	5 (11)
	Thermostat Opening Temperature		°C (°F)	N.A.	N.A.
	Radiator Cap Opening Pressure		kPa (PSI)	N.A.	N.A.
	ENGINE COLD N•m (lb•ft)	Drive Pulley Retaining Screw		⑦	⑩
		Exhaust Manifold Nuts or Bolts		22 (16)	22 (16)
		Magneto Ring Nut		105 (77)	105 (77)
		Crankcase Nuts or Screws	M6 M8	— 22 (16)	— 22 (16)
		Crankcase/Engine Support Nuts or Screws		40 (29)	40 (29)
		Cylinder Head Nuts		22 (16)	22 (16)
		Crankcase/Cylinder Nuts or Screws		N.A.	N.A.
		Axial Fan Shaft Nut		48 (35)	48 (35)

	VEHICLE MODEL			SKANDIC WT SKANDIC SWT	SKANDIC WT LC
	ENGINE TYPE			**503**	**593**
	Number of Cylinders			2	2
	Bore		mm (in)	72.0 (2.835)	76.00 (2.992)
	Stroke		mm (in)	61.0 (2.402)	65.8 (2.591)
	Displacement		cm^3 (in^3)	496.7 (30.31)	597.0 (36.43)
	Compression Ratio (corrected)			6.2	6.7
	Maximum Power Engine Speed ①		± 100 RPM	6800	7200
	Piston Ring Type		1st/2nd	ST/R	ST
	Ring End Gap	(new) (wear limit)	mm (in) mm (in)	0.2 (.0079) 1.0 (.039)	0.4 (.016) 1.0 (.039)
	Ring/Piston Groove Clearance	(new) (wear limit)	mm (in) mm (in)	0.04 (.0016) 0.2 (.0079)	0.04 (.0016) 0.2 (.0079)
	Piston/Cylinder Wall Clearance	(new) (wear limit)	± 0.016 mm (± .0006 in) mm (in)	0.9 (.0035) 0.2 (.0079)	0.12 (.0047) 0.2 (.0079)
	Connecting Rod Big End Axial Play	(new) (wear limit)	mm (in) mm (in)	0.2 (.0079) 1.0 (.0394)	0.39 (.0154) 1.2 (.0472)
	Maximum Crankshaft End-Play ②		mm (in)	0.3 (.012)	0.3 (.012)
	Maximum Crankshaft Deflection Measured at PTO		mm (in)	0.06 (.0024)	0.08 (.0031)
	Magneto Generator Output		W	240	290
	Ignition Type			CDI	CDI
	Spark Plug Make and Type			NGK BR9ES	NGK BR9ES
	Spark Plug Gap		± 0.05 mm (± .002 in)	0.45 (.018)	0.45 (.018)
	Ignition Timing BTDC ④ ⑧		mm (in)	1.66 (.065)	3.00 (.118)
	Trigger Coil Air Gap		mm (in)	0.45 – 0.55 (.018 – .021)	0.55 – 1.45 (.022 – .057)
	Trigger Coil ⑤		Ω	140 – 180	190 – 300
	Generating Coil ⑤		Ω	230 – 330	11.6 – 21.6
	Lighting Coil ⑤		Ω	0.23 – 0.28	0.10 – 0.40
	High Tension Coil ⑤	Primary	Ω	N.A.	0.0 – 0.9
		Secondary	kΩ	5.1 – 6.3	9.5 – 16.5
	Carburetor Type		PTO/MAG	2 x VM 34-19084	VM 38-19111/19112
	Main Jet		PTO/MAG	185	330/310
	Needle Jet			159 P-1	480 Q-4
	Pilot Jet			40	40
	Needle Identification — Clip Position			6DH2-3	6FL14-4
	Slide Cut-Away			2.5	2.5
	Float Adjustment		± 1 mm (± .040 in)	23.9 (.937)	18.1 (.710)
	Air Screw Adjustment		± 1/16 Turn	1-1/4	1-1/2
	Idle Speed RPM		± 200 RPM	1650	1900
	Gas Type/Pump Octane Number			Unleaded/87	Unleaded/87
	Gas/Oil Ratio			Injection	Injection
	Type			Axial fan	Liquid
	Axial Fan Belt Adjustment	Deflection	mm (in)	9 – 10 (.35 – .39)	N.A.
		Force ⑥	kg (lbf)	5 (11)	N.A.
	Thermostat Opening Temperature		°C (°F)	N.A.	42 (108)
	Radiator Cap Opening Pressure		kPa (PSI)	N.A.	100 (14.5)
	ENGINE COLD N•m (lb•ft)	Drive Pulley Retaining Screw		⑦	⑦
		Exhaust Manifold Nuts or Bolts		22 (16)	23 (17)
		Magneto Ring Nut		105 (77)	125 (92)
		Crankcase Nuts or Screws	M6 M8	— 22 (16)	9 (6.5) 29 (21)
		Crankcase/Engine Support Nuts or Screws		39 (29)	35 (26)
		Cylinder Head Nuts		22 (16)	29 (21)
		Crankcase/Cylinder Nuts or Screws		N.A.	29 (21)
		Axial Fan Shaft Nut		48 (35)	N.A.

	VEHICLE MODEL				TOURING FAN 380 TOURING CARGO 380	TOURING FAN 500 TOURING CARGO 500	FORMULA DELUXE FAN 380
	ENGINE TYPE				**377**	**503**	**377**
	Chain Drive Ratio				18/44	21/44	18/44
	Chain	Pitch		in	3/8	3/8	3/8
		Type/Links Qty/Plates Qty			Silent/70/11	Silent/72/11	Silent/70/11
	Drive Pulley	Type of Drive Pulley			Bombardier Lite	TRA	Bombardier Lite
		Ramp Identification			N.A.	292X ⑤	N.A.
		Calibration Screw Position or Calibration Part ①			1181 1 x C, 1 x S21	3	1181 1 x C, 1 x S21
		Spring Color			Green/Green	Red/Red	Red/Blue
		Spring Length	± 1.5 mm (± .060 in)		72.0 (2.83)	97.2 (3.83)	96 (3.78)
		Clutch Engagement	± 200 RPM		2500	2900	3500
	Driven Pulley	Type of Driven Pulley			LPV27	LPV27	LPV27
		Spring Preload	± 0.7 kg (± 1.5 lb)		N.A.	N.A.	N.A.
		Cam Angle		degree	47 – 44	47 – 44	47 – 44
	Pulley Distance Z			(+ 0, - 1) mm ((+ 0, - 1/32) in)	26.0 ± 0.5 (1.024 ± .020)	17.0 ± 0.5 (.669 ± .020)	26.0 ± 0.5 (1.024 ± .020)
	Offset	X		mm (in)	33.4 ± 0.5 (1.315 ± .020)	35.5 ± 0.5 (1.398 ± .020)	33.4 ± 0.5 (1.315 ± .020)
		Y – X		MIN. MAX.	+ 1 (+ .039) + 2 (+ .079)	+ 1 (+ .039) + 2 (+ .079)	1.0 – 2.0 (.039 – .079)
	Drive Belt Part Number (P/N)				415 060 600	415 060 600	415 060 600
	Drive Belt Width (new) ②			mm (in)	34.7 (1-3/8)	34.7 (1-3/8)	34.7 (1-3/8)
	Drive Belt Adjustment	Deflection		± 5 mm (± 13/64 in)	32 (1-1/4)	32 (1-1/4)	32 (1-1/4)
		Force ③		kg (lbf)	11.3 (25)	11.3 (25)	11.3 (25)
	Track	Width		cm (in)	38.1 (15)	38.1 (15)	38.1 (15)
		Length		cm (in)	345 (136)	345 (136)	307 (121)
		Profile Height		mm (in)	18.4 (.724)	18.4 (.724)	18.4 (.724)
		Adjustment	Deflection	mm (in)	35 – 40 (1-3/8 – 1-9/16)	35 – 40 (1-3/8 – 1-9/16)	35 – 40 (1-3/8 – 1-9/16)
			Force ④	kg (lbf)	7.3 (16)	7.3 (16)	7.3 (16)
	Suspension Type		Track		SC-10 Touring	SC-10 Touring	SC-10 Sport
			Ski		DSA	DSA	DSA
	Length			cm (in)	294 (115.7)	294 (115.7)	272.5 (107.3)
	Width			cm (in)	120.7 (47.5)	120.7 (47.5)	120.7 (47.5)
	Height			cm (in)	122 (48.0)	122 (48.0)	116.9 (46.0)
	Ski Stance			cm (in)	106.7 (42)	106.7 (42)	106.7 (42)
	Toe-out and Camber			mm (in) degree	0 (0) 0	0 (0) 0	0 (0) 0
	Mass (dry)			kg (lb)	T. FAN 205 (452) T. CARGO 208 (458)	T. FAN 224 (493) T. CARGO 227 (499)	202 (445)
	Ground Contact Area			cm^2 (in^2)	7227 (1120)	7227 (1120)	6503 (1008)
	Ground Contact Pressure			kPa (PSI)	T. FAN 2.84 (.412) T. CARGO 2.82 (.409)	T. FAN 3.04 (.441) T. CARGO 3.08 (.447)	3.05 (.442)
	Frame Material				Aluminum	Aluminum	Aluminum
	Bottom Pan Material				Impact copolymer	Impact copolymer	Impact copolymer
	Hood Material				RRIM polyurethane	RRIM polyurethane	RRIM polyurethane
	Battery			V (A•h)	12 (20)	12 (20)	12 (20)
	Headlight			W	H4 60/55	H4 60/55	H4 60/55
	Taillight and Stoplight			W	8/27	8/27	8/27
	Tachometer and Speedometer Bulb			W	3	3	3
	Fuel and Temperature Gauge Bulb			W	N.A.	N.A.	N.A.
	Fuse	Starter Solenoid		A	30	30	30
		Tachometer		A	N.A.	N.A.	N.A.
	Fuel Tank			L (U.S. gal)	38 (10)	38 (10)	38 (10)
	Chaincase Gearbox			mL (U.S.oz)	250 (8.5)	250 (8.5)	250 (8.5)
	Cooling System ⑦			L (U.S. oz)	N.A.	N.A.	N.A.
	Injection Oil Reservoir			L (U.S. oz)	2.55 (86)	2.55 (86)	2.55 (86)

	VEHICLE MODEL				FORMULA DELUXE FAN 500	MX Z FAN 440	MX Z FAN 380
	ENGINE TYPE				**503**	**443**	**377**
	Chain Drive Ratio				21/44	21/44	18/44
	Chain	Pitch		in	3/8	3/8	3/8
		Type/Links Qty/Plates Qty			Silent 72/11	Silent 72/11	Silent 70/11
	Drive Pulley	Type of Drive Pulley			TRA	TRA	Bombardier Lite
		Ramp Identification			291X ⑤	287 ⑤	N.A.
		Calibration Screw Position or Calibration Part ①			3	3	1181 1 x C, 1 x S21
		Spring Color			Yellow/Red	Green/Violet	Red/Blue
		Spring Length		± 1.5 mm (± .060 in)	121 (4.77)	133.7 (5.26)	96 (3.78)
		Clutch Engagement		± 200 RPM	3300	4500	3500
	Driven Pulley	Type of Driven Pulley			LPV27	LPV27	LPV27
		Spring Preload		± 0.7 kg (± 1.5 lb)	N.A.	N.A.	N.A.
		Cam Angle		degree	47 – 44	47 – 44	47 – 44
	Pulley Distance Z			(+ 0, - 1) mm ((+ 0, - 1/32) in)	17.0 ± 0.5 (.669 ± .020)	16.5 ± 0.5 (.650 ± .020)	26.0 ± 0.5 (1.024 ± .020)
	Offset	X		mm (in)	35.5 ± 0.5 (1.315 ± .020)	35.5 (1.398)	33.4 (1.315)
		Y – X		MIN. MAX.	1.0 – 2.0 (.039 – .079)	1.0 – 2.0 (.039 – .079)	1.0 – 2.0 (.039 – .079)
	Drive Belt Part Number (P/N)				415 060 600	415 060 600	415 060 600
	Drive Belt Width (new) ②			mm (in)	34.7 (1-3/8)	34.7 (1.366)	34.7 (1.366)
	Drive Belt Adjustment		Deflection	± 5 mm (± 13/64 in)	32 (1-1/4)	32 (1-1/4)	32 (1-1/4)
			Force ③	kg (lbf)	11.3 (25)	11.3 (25)	11.3 (25)
	Track	Width		cm (in)	38.1 (15)	38.1 (15.0)	38.1 (15.0)
		Length		cm (in)	307 (121)	307 (121)	307 (121)
		Profile Height		mm (in)	18.4 (.724)	18.4 (.724)	18.4 (.724)
		Adjustment	Deflection	mm (in)	35 – 40 (1-3/8 – 1-9/16)	35 – 40 (1-3/8 – 1-3/4)	35 – 40 (1-3/8 – 1-3/4)
			Force ④	kg (lbf)	7.3 (16)	7.3 (16)	7.3 (16)
	Suspension Type		Track		SC-10 Touring	SC-10 Sport	SC-10 Sport
			Ski		DSA	DSA	DSA
	Length			cm (in)	272.5 (107.3)	272.5 (107.3)	272.5 (107.3)
	Width			cm (in)	120.7 (47.5)	120.7 (47.5)	120.7 (47.5)
	Height			cm (in)	116.9 (46.0)	116.9 (46.0)	116.9 (46.0)
	Ski Stance			cm (in)	106.7 (42)	106.7 (42)	106.7 (42)
	Toe-out and Camber			mm (in) degree	0 (0) 0	0 (0) 0	0 (0) 0
	Mass (dry)			kg (lb)	211 (465)	201 (442)	193 (425)
	Ground Contact Area			cm^2 (in^2)	6503 (1008)	6503 (1008)	6503 (1008)
	Ground Contact Pressure			kPa (PSI)	3.18 (.461)	3.03 (.439)	2.91 (.422)
	Frame Material				Aluminum	Aluminum	Aluminum
	Bottom Pan Material				Impact copolymer	Impact copolymer	Impact copolymer
	Hood Material				RRIM polyurethane	RRIM polyurethane	RRIM polyurethane
	Battery			V (A•h)	12 (20)	N.A.	N.A.
	Headlight			W	H4 60/55	H4 60/55	H4 60/55
	Taillight and Stoplight			W	8/27	8/27	8/27
	Tachometer and Speedometer Bulb			W	3	3	3
	Fuel and Temperature Gauge Bulb			W	N.A.	N.A.	N.A.
	Fuse	Starter Solenoid		A	30	N.A.	N.A.
		Tachometer		A	N.A.	N.A.	N.A.
	Fuel Tank			L (U.S. gal)	38 (10)	38 (10)	38 (10)
	Chaincase Gearbox			mL (U.S.oz)	250 (8.5)	250 (8.5)	250 (8.5)
	Cooling System ⑦			L (U.S. oz)	N.A.	N.A.	N.A.
	Injection Oil Reservoir			L (U.S. oz)	2.55 (86)	2.55 (86)	2.55 (86)

	VEHICLE MODEL				MX Z FAN 500	SUMMIT FAN 500	SKANDIC LT
	ENGINE TYPE				**503**	**503**	**443**
	Chain Drive Ratio				21/44	17/44	17/44
	Chain	Pitch		in	3/8	3/8	3/8
		Type/Links Qty/Plates Qty			Silent 72/11	Silent 70/11	Silent 70/11
	Drive Pulley	Type of Drive Pulley			TRA	TRA	Comet
		Ramp Identification			287 ⑤	227 ⑤	–
		Calibration Screw Position or Calibration Part ①			3	3	–
		Spring Color			Green/Blue	Green/Violet	Silver/Black
		Spring Length		± 1.5 mm (± .060 in)	147.4 (5.80)	133.7 (5.26)	
		Clutch Engagement		± 200 RPM	4500	4500	3000
	Driven Pulley	Type of Driven Pulley			LPV27	LPV27	LPV27
		Spring Preload		± 0.7 kg (± 1.5 lb)	N.A.	N.A.	N.A.
		Cam Angle		degree	47 – 44	47 – 44	40
	Pulley Distance Z			(+ 0, - 1) mm ((+ 0, - 1/32) in)	16.5 ± 0.5 (.650 ± .020)	17.0 ± 0.5 (.669 ± .020)	34.2 ± 0.75 (1.346 ± .030)
	Offset	X		mm (in)	35.5 (1.398)	35.5 (1.398)	35.0 (1.380)
		Y – X		MIN. MAX.	1.0 – 2.0 (.039 – .079)	1.0 – 2.0 (.039 – .079)	0.75 – 2.25 (.030 – .086)
	Drive Belt Part Number (P/N)				415 060 600	417 300 064	414 633 800
	Drive Belt Width (new) ②			mm (in)	34.7 (1.366)	35.1 (1.382)	34.6 (1-3/8)
	Drive Belt Adjustment		Deflection	± 5 mm (± 13/64 in)	32 (1-1/4)	38 (1-1/4)	32 (1-1/4)
			Force ③	kg (lbf)	11.3 (25)	11.5 (25)	11.3 (25)
	Track	Width		cm (in)	38.1 (15.0)	38.1 (15.0)	38.1 (15.0)
		Length		cm (in)	307 (121)	345.5 (136)	396.8 (156.2)
		Profile Height		mm (in)	18.4 (.724)	38.1 (1.5)	25 (1)
		Adjustment	Deflection	mm (in)	30 – 35 (1-3/16 – 1-3/8)	35 – 40 (1-3/8 – 1-3/4)	40 – 50 (1-9/16 – 1-31/32)
			Force ④	kg (lbf)	7.3 (16)	7.3 (16)	7.3 (16)
	Suspension Type		Track		SC-10 Sport	SC-10 Mountain	Skandic WT
			Ski		DSA	DSA	Telescopic strut
	Length			cm (in)	272.5 (107.3)	293.9 (115.7)	302.0 (118.9)
	Width			cm (in)	120.0 (47.2)	120.7 (47.5)	96.0 (37.8)
	Height			cm (in)	116.9 (46.0)	122.0 (48)	129.5 (51)
	Ski Stance			cm (in)	106.7 (42)	106.7 (42)	82 (32.3)
	Toe-out and Camber			mm (in) degree	0 (0) 0	0 (0) 0	5 (3/16) - 2
	Mass (dry)			kg (lb)	202 (445)	205 (450)	212 (467)
	Ground Contact Area			cm^2 (in^2)	6503 (1008)	7227.2 (1120.2)	8811.3 (1365.8)
	Ground Contact Pressure			kPa (PSI)	3.05 (.442)	2.78 (.403)	2.41 (.350)
	Frame Material				Aluminum	Aluminum	Steel
	Bottom Pan Material				Impact copolymer	Impact copolymer	HD polyethylene
	Hood Material				RRIM polyurethane	RRIM polyurethane	RRIM
	Battery			V (A•h)	N.A.	N.A.	N.A.
	Headlight			W	H4 60/55	H4 60/55	H4 60/55
	Taillight and Stoplight			W	8/27	8/27	8/27
	Tachometer and Speedometer Bulb			W	3	3	3
	Fuel and Temperature Gauge Bulb			W	N.A.	N.A.	N.A.
	Fuse	Starter Solenoid		A	N.A.	N.A.	N.A.
		Tachometer		A	N.A.	N.A.	N.A.
	Fuel Tank			L (U.S. gal)	38 (10)	38 (10)	37 (9.8)
	Chaincase Gearbox			mL (U.S.oz)	250 (8.5)	250 (8.5)	250 (8.8)
	Cooling System ⑦			L (U.S. oz)	N.A.	N.A.	N.A.
	Injection Oil Reservoir			L (U.S. oz)	2.55 (86)	2.55 (86)	2.5 (84.5)

	VEHICLE MODEL				SKANDIC WT	SKANDIC SWT	SKANDIC WT LC
	ENGINE TYPE				503	503	593
	Chain Drive Ratio				N.A.	N.A.	N.A.
	Chain	Pitch		in	N.A.	N.A.	N.A.
		Type/Links Qty/Plates Qty			N.A.	N.A.	N.A.
	Drive Pulley	Type of Drive Pulley			TRA	TRA	TRA
		Ramp Identification			290 ⑤	290 ⑤	290 ⑥
		Calibration Screw Position or Calibration Part ①			4	2	4
		Spring Color			Yellow/Orange	Yellow/Orange	Red/Red
		Spring Length		± 1.5 mm (± .060 in)	105.7 (4.16)	105.7 (4.16)	96.3 (3.79)
		Clutch Engagement		± 200 RPM	3000	3000	2900
	Driven Pulley	Type of Driven Pulley			Cam	Cam	Cam
		Spring Preload		± 0.7 kg (± 1.5 lb)	7.0 (15.4)	7.0 (15.4)	7 (15.4)
		Cam Angle		degree	40	40	40
	Pulley Distance Z			(+ 0, - 1) mm ((+ 0, - 1/32) in)	32.3 ± 0.75 (1.346 ± .030)	32.3 ± 0.75 (1.346 ± .030)	± 0.75 (1.346 ± .030)
	Offset	X		mm (in)	35.0 (1.380)	35.0 (1.380)	35.0 (1.380)
		Y – X		MIN. MAX.	0.75 – 2.25 (.030 – .086)	0.75 – 2.25 (.030 – .086)	0.75 – 2.25 (.030 – .086)
	Drive Belt Part Number (P/N)				414 633 800	414 633 800	414 633 800
	Drive Belt Width (new) ②			mm (in)	34.6 (1-3/8)	34.6 (1-3/8)	34.6 (1-3/8)
	Drive Belt Adjustment		Deflection	± 5 mm (± 13/64 in)	32 (1-1/4)	32 (1-1/4)	32 (1-1/4)
			Force ③	kg (lbf)	11.3 (25)	11.3 (25)	11.3 (25)
	Track	Width		cm (in)	50.0 (19.7)	60.0 (23.6)	50.0 (19.7)
		Length		cm (in)	396.8 (156.2)	396.8 (156.2)	396.8 (156.2)
		Profile Height		mm (in)	23.5 (.925)	23.5 (.925)	31.8 (1.250)
		Adjustment	Deflection	mm (in)	40 – 50 (1-9/16 – 1-31/32)	40 – 50 (1-9/16 – 1-31/32)	40 – 50 (1-9/16 – 1-31/32)
			Force ④	kg (lbf)	7.3 (16)	7.3 (16)	7.3 (16)
	Suspension Type		Track		Skandic WT	Skandic WT	Skandic WT
			Ski		Telescopic strut	Telescopic strut	Telescopic strut
	Length			cm (in)	302.0 (118.9)	315.0 (124.0)	315.0 (124.0)
	Width			cm (in)	104.5 (41.1)	110.0 (43.3)	110.0 (43.3)
	Height			cm (in)	122 (48)	133 (52.4)	122 (48)
	Ski Stance			cm (in)	90.0 (35.4)	90.0 (35.4)	90.0 (35.4)
	Toe-out and Camber			mm (in) degree	5 (3/16) - 2	5 (3/16) - 2	5 (3/16) - 2
	Mass (dry)			kg (lb)	260 (573)	277 (611)	281 (620)
	Ground Contact Area			cm^2 (in^2)	10793 (1672.9)	13986 (2167.8)	12335 (1912)
	Ground Contact Pressure			kPa (PSI)	2.41 (.350)	1.98 (.287)	2.28 (.331)
	Frame Material				Steel	Steel	Steel
	Bottom Pan Material				HD polyethylene	HD polyethylene	HD polyethylene
	Hood Material				RRIM	RRIM	RRIM
	Battery			V (A•h)	12 (20)	12 (20)	12 (20)
	Headlight			W	H4 60/55	H4 60/55	H4 60/55
	Taillight and Stoplight			W	8/27	8/27	8/27
	Tachometer and Speedometer Bulb			W	3	3	3
	Fuel and Temperature Gauge Bulb			W	N.A.	N.A.	N.A.
	Fuse	Starter Solenoid		A	15	15	15
		Tachometer		A	N.A.	N.A.	N.A.
	Fuel Tank			L (U.S. gal)	42 (11.1)	42 (11.1)	42 (11.1)
	Chaincase Gearbox			mL (U.S.oz)	400 (13.5)	400 (13.5)	400 (13.5)
	Cooling System ⑦			L (U.S. oz)	N.A.	N.A.	4.5 (152)
	Injection Oil Reservoir			L (U.S. oz)	2.5 (84.5)	2.5 (84.5)	2.5 (84.5)

ENGINE TECHNICAL DATA LEGEND

BTDC: Before Top Dead Center
CDI: Capacitor Discharge Ignition
K: Kilo (x 1000)
MAG: Magneto Side
N.A.: Not Applicable
PTO: Power Take Off Side
R: Rectangular
ST: Semi-Trapezoidal

① The maximum horsepower RPM is applicable on the vehicle. It may be different under certain circumstances and BOMBARDIER INC. reserves the right to modify it without obligation.

② Crankshaft end-play is not adjustable on these models except Tundra R. Specification is given for verification purposes only.

③ Rotary valve to crankcase clearance: 0.27 – 0.48 mm (.011 – .019 in).

④ For all non-RER models timing is verified at 6000 RPM (engine cold) with headlamp turned on.

⑤ All resistance measurements must be performed with parts at room temperature (approx. 20°C (68°F)). Temperature greatly affects resistance measurements.

⑥ Force applied midway between pulleys to obtain specified deflection.

⑦ Drive pulley retaining screw: torque to 90 to 100 N•m (66 to 74 lbf•ft), install drive belt, accelerate the vehicle at low speed (maximum 30 km/h (20 MPH)) and apply the brake; repeat 5 times. Recheck the torque of 90 to 100 N•m (66 to 74 lbf•ft).

⑧ For all RER models timing is verified at 3500 RPM (engine cold) with headlamp turned on.

⑨ Piston/cylinder clearance with new parts on Skandic LT is 0.080 ± 0.0067 mm (.0031 ± .00026 in).

⑩ Tightening torques for Skandic LT Comet drive pulley.
Retaining screw: 60 to 68 N•m (44 to 50 lbf•ft).
Spider: 170 N•m (125 lbf•ft).
Cover screws: 12.5 N•m (110 lbf•**in**).
Pivot bolts and nuts: 5.6 N•m (50 lbf•**in**).

VEHICLE TECHNICAL DATA LEGEND

DSA: Direct Shock Action
RRIM: Reinforced Reaction Injection Molding
TRA: Total Range Adjustable drive pulley
N.A.: Not Applicable

① For Bombardier Lite drive pulleys:
1157 = Red block, push type 38 g (P/N 417 115 700).
1181 = Black block, screw type 39.6 g (P/N 417 118 100).
1143 = Red block, screw type 41.8 g (P/N 417 114 300).
W = Washer 1.8 g (P/N 417 115 800).
C = Cap 1.65 g (P/N 417 114 500).
S3.4 = Weight, screw type 3.4 g (P/N 417 114 400).
S21 = Weight, screw type 21 g (P/N 417 120 400).

② Minimum allowable width may not be less than 3.0 mm (1/8 in) of a new drive belt.

③ Force applied midway between pulleys to obtain specified deflection.

④ Force or downward pull applied to track to obtain specified tension deflection.

⑤ Lever with roller pin (P/N 417 004 309) (hollow).

⑥ Lever with roller pin (P/N 417 004 308) (solid).

⑦ Ethylene-glycol antifreeze for aluminum engines mixed with distilled water (3 parts of antifreeze for 2 parts of distilled water). Bombardier pre-mixed coolant - 52°C (- 62°F) (16 x 1 L) (P/N 413 711 802).

WIRING DIAGRAMS

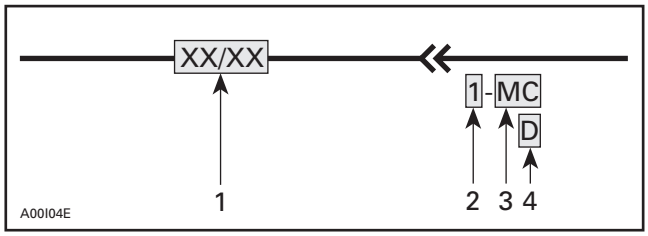
MODEL	WIRING DIAGRAM PAGE	HEADLIGHT (WATT)	TAILLIGHT (WATT)	ELECTRICAL SYSTEM OUTPUT (WATT)
S-Series	Annex 1	60/55 hal.	8/27	240
Skandic LT	Annex 2	60/55 hal.	8/27	240
Skandic WT/SWT	Annex 3	60/55 hal.	8/27	240
Skandic WT LC	Annex 4	60/55 hal.	8/27	220

hal. = halogen

WIRING DIAGRAM LEGEND

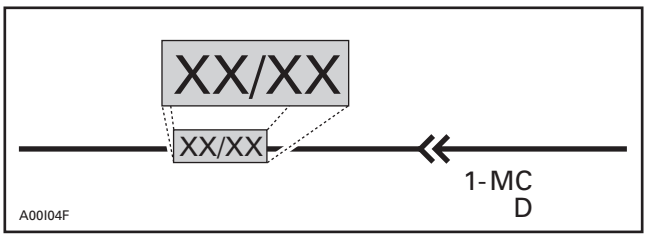
⚠ WARNING

Ensure all terminals are properly crimped on the wires and all connector housings are properly fastened.



1. *Wire colors*
2. *Housing area*
3. *Housing number per area*
4. *Wire connector location in housing*

WIRE COLORS AND CIRCUIT



The first color of a wire is the main color, second color is the stripe.

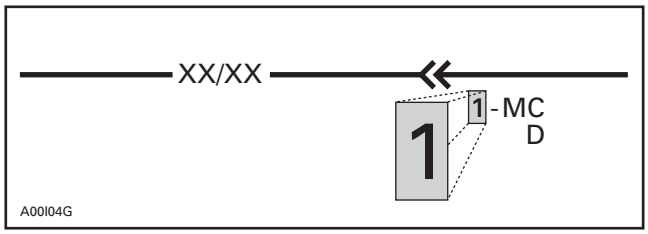
Example: YL/BK is a YELLOW wire with a BLACK stripe.

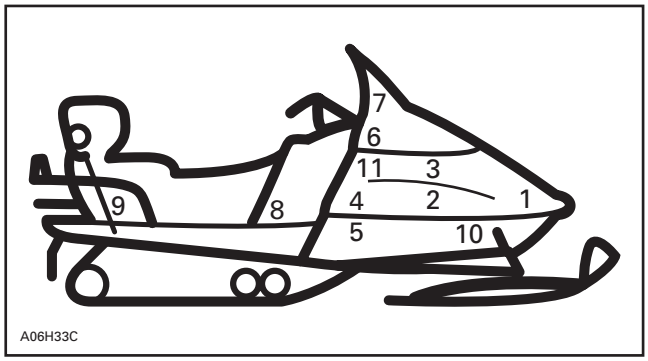
COLOR CODE					
BE	–	BEIGE	OR	–	ORANGE
BK	–	BLACK	RD	–	RED
BL	–	BLUE	VI	–	VIOLET
BR	–	BROWN	WH	–	WHITE
GN	–	GREEN	YL	–	YELLOW
GY	–	GREY			

Following table shows wire colors related to electrical circuits.

WIRE COLOR	ELECTRICAL CIRCUIT	ADDITIONAL INFORMATION
BLACK/YELLOW	ENGINE SHUT OFF – key switch – tether cord switch – emergency switch	Must be grounded to stop engine.
BLACK (small)	Ground for shut off, RER pilot lamp, beeper and beeper switch	
BLACK (big)	Ground for starter (–)	
BEIGE	RER switch	Must be grounded to activate RER.
BEIGE/BLACK	Reverse alarm and pilot lamp	Current returns by BLACK wire.
YELLOW YELLOW/BLACK (S-Series) YELLOW/GREEN (Skandic Series)	12 volts (AC)	If shorted, magneto stops producing electricity.
RED	12 volts (DC) (+) For starter motor	
RED/GREEN	12 volts (DC) (+) For starter solenoid	
RED/BLUE	12 volts (DC) (+) Rectifier output	
GREY	12 volts (AC) High beam	Current returns by YELLOW/BLACK wire connected to headlamp.
VIOLET/GREY	12 volts (AC) Low beam	
WHITE	12 volts (AC) Brake light	Current returns by YELLOW/BLACK wire connected to taillight.
WHITE/RED	12 volts (AC) Low oil level	Current returns by YELLOW/BLACK wire connected to oil level sensor.
BLUE	12 volts (AC) Fuel level indicator	Current returns by YELLOW wire connected to fuel level sensor.
ORANGE	12 volts (AC) Heated grips (max.)	Current returns by YELLOW/BLACK wire connected to heating elements.
ORANGE/VIOLET	12 volts (AC) Heated grips (min.)	
BROWN	12 volts (AC) Heated throttle lever (max.)	
BROWN/YELLOW	12 volts (AC) Heated throttle lever (min.)	
GREEN	12 volts (AC) Temperature gauge	Current returns by YELLOW wire connected to sensor.
VIOLET	12 volts (AC) Engine overheating light	

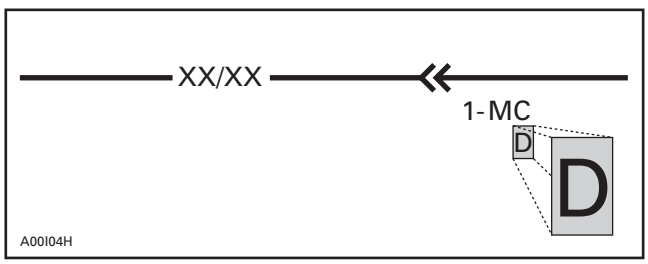
CONNECTOR HOUSING AREA

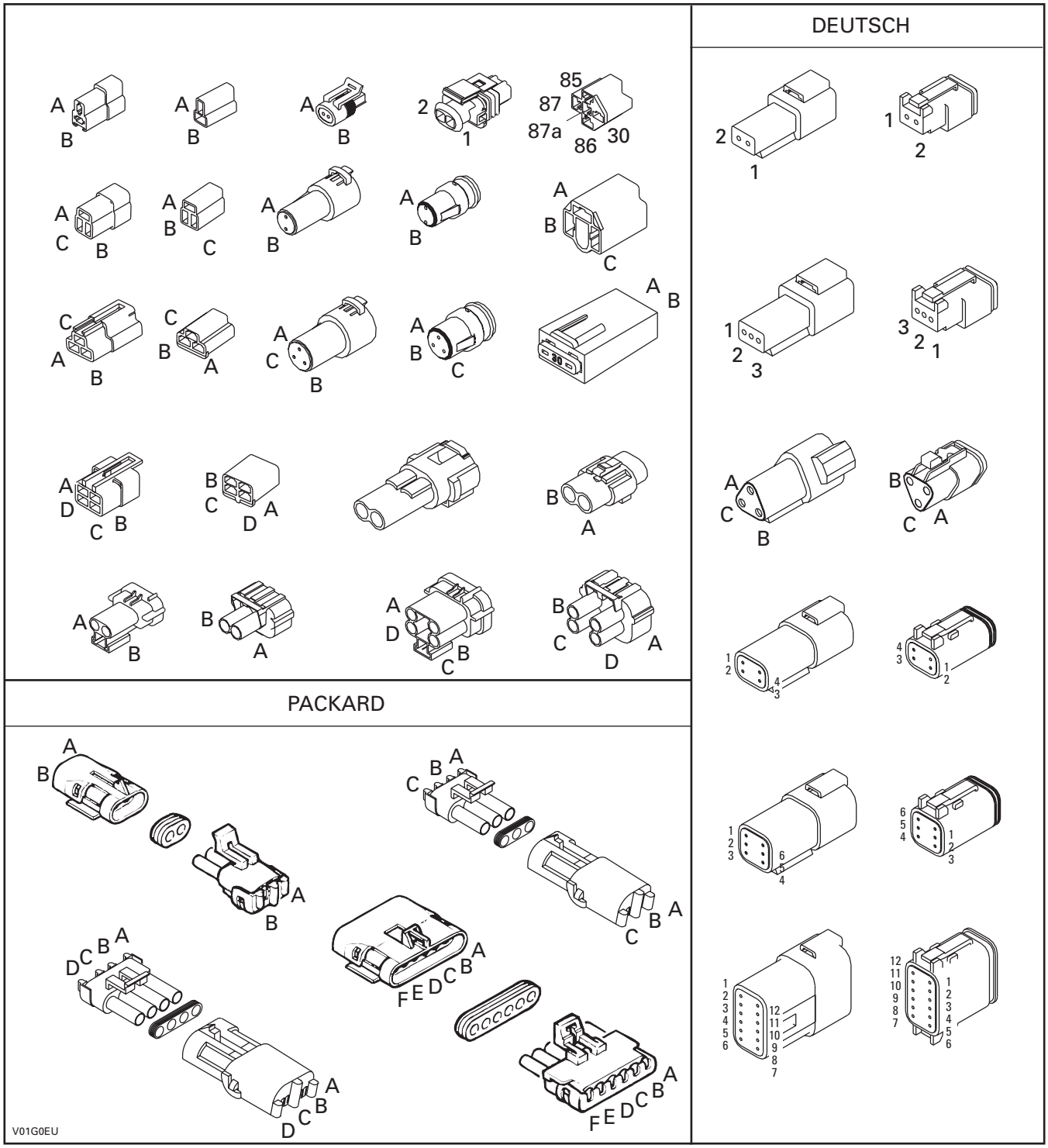




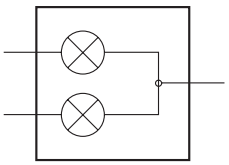
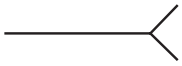
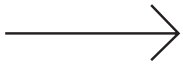
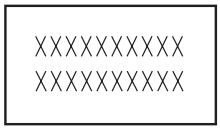
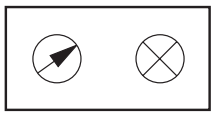
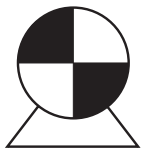
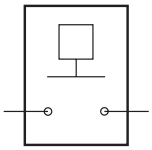
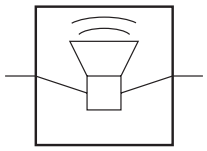
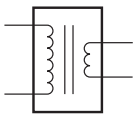
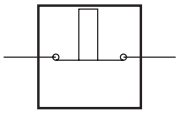
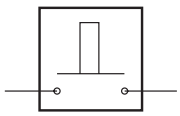
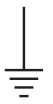
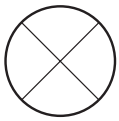
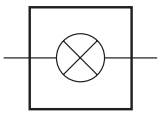
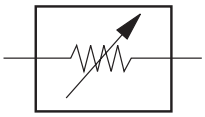
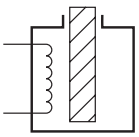
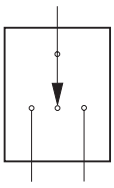
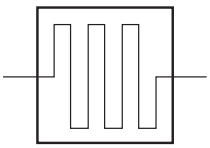
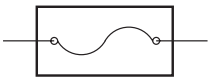
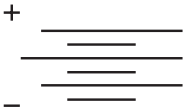
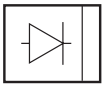
AREA	LOCATION
1	Front of engine compartment
2	Magneto
3	Carburetors
4	Near of intake silencer
5	Near driven pulley
6	Under console
7	Under hood
8	Near fuel tank
9	Rear of seat
10	Under engine
11	On injection oil reservoir

CONNECTOR LOCATION IN HOUSING




DEUTSCH
PACKARD
V01G0EU

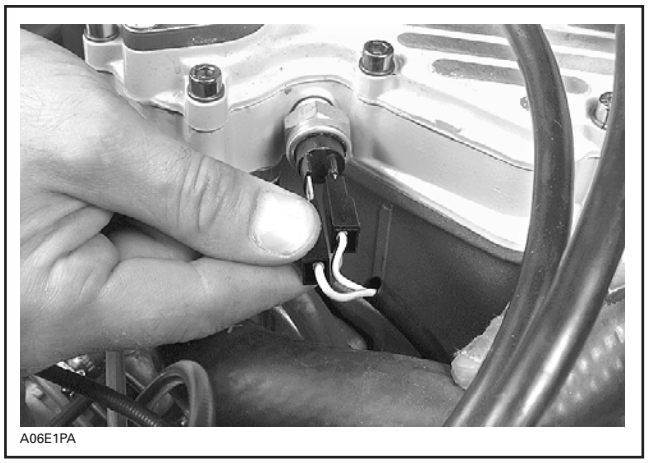
SYMBOLS DESCRIPTION

Beam and tail light 	Female terminal 	Male terminal 	Electronic module 
Meter 	Electric motor 	Low level sensor 	Buzzer 
Ignition coil 	Normally close switch 	Normally open switch 	Male terminal on instrument
Engine ground	Frame ground  Frame	Spark plug	Meter movement
Bulb 	Pilot 	Analog sensor 	Solenoid valve 
Magneto (Delta)	3 position switch 	Heating element 	Fuse 
Trigger coil	Battery 	Diode 	Partially illustrated component

A00E55S

UNPLUGING CONNECTORS

Always unplug connectors by pulling on housing not on wire.

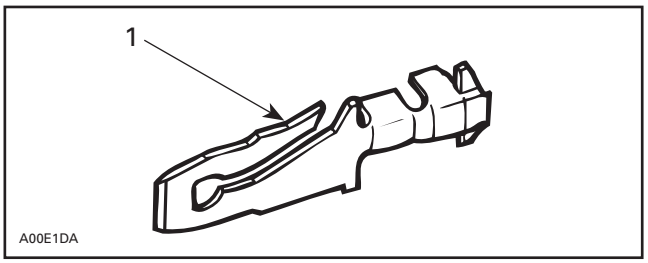

A06E1PA

TYPICAL

TAB AND RECEPTACLE CONNECTORS REMOVAL

Tab Connector

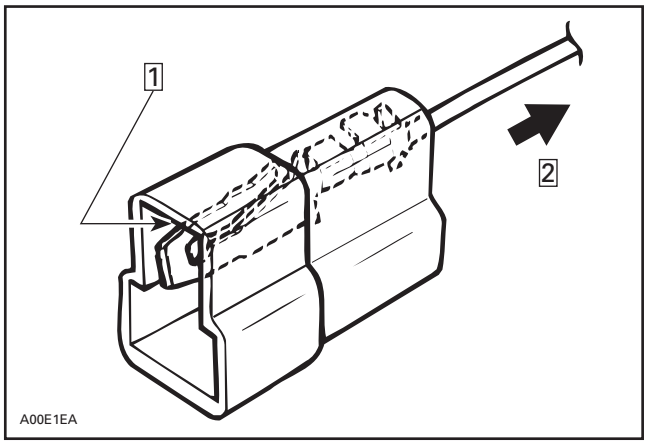
It is locked in its housing by a spring tab on its side. Removal is done by squeezing this tab.



TAB CONNECTOR
1. Locking tab

To remove:

– Insert a screwdriver or Snap-on TT 600-5 from opposite side of wire and pry locking tab.
– While holding locking tab pried, pull connector toward wire side.

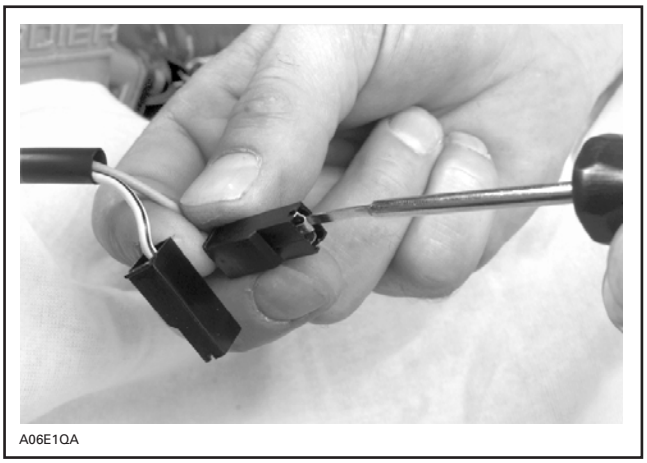


Step 1: Insert screwdriver here
Step 2: Pull this side

Locking Receptacle Connector

To remove:

– Insert tool Snap-on TT 600-5 in access opening then pull housing toward wire side.

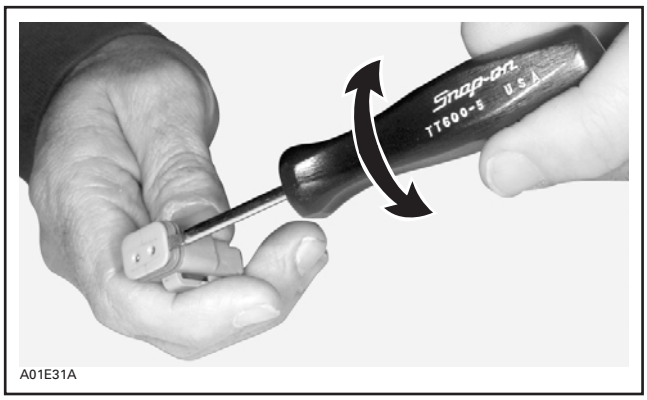

A06E1QA

Waterproof Connector Housing

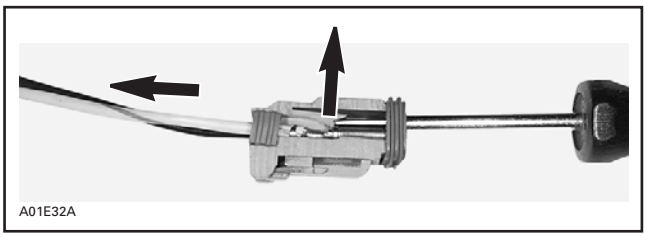
Female Connector Housing

To remove:

– Insert tool Snap-on TT 600-5 under lock and twist to lift it.



– Pry tab to free connector then pull wire out of housing.

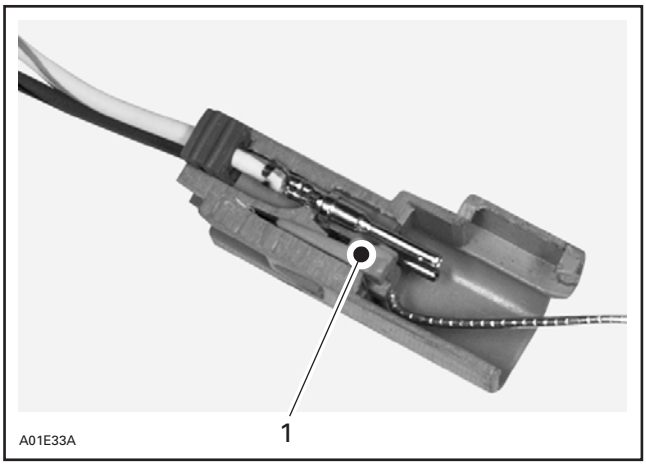


FEMALE CONNECTOR HOUSING — CUT-AWAY

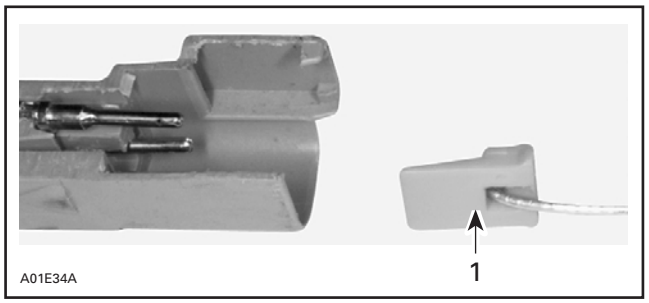
Male Connector Housing

To remove:

– Using a small hook, pull out the lock.

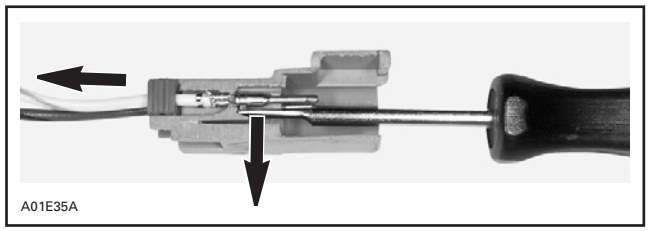


1. Lock



1. Lock

– Pry tab to free connector then pull wire out of housing.

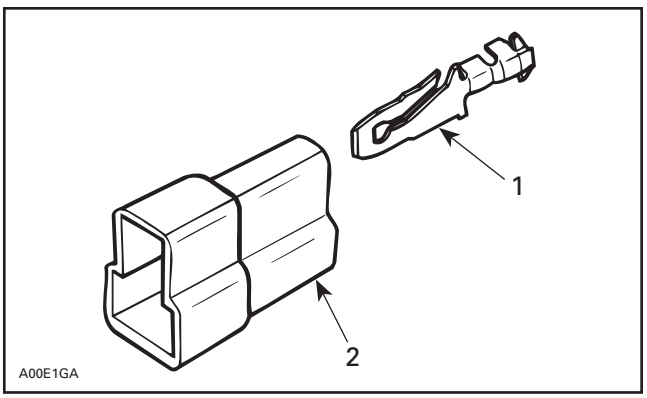


MALE CONNECTOR HOUSING — CUT-AWAY

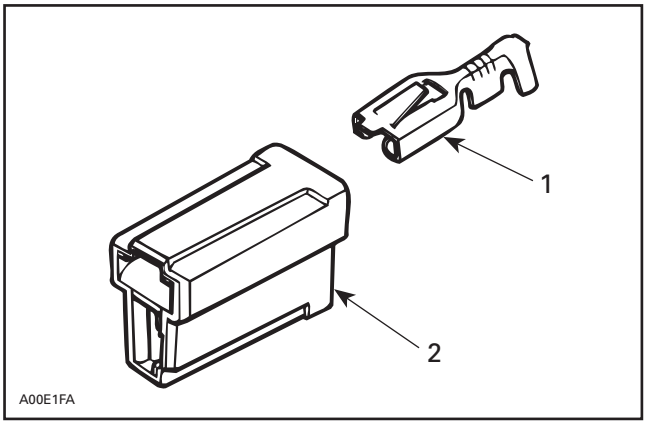
TAB AND RECEPTACLE CONNECTORS INSTALLATION

Prior to installing, make sure locking tab is sufficiently lifted to properly lock.

Insert tab and receptacle connectors in their respective housings as shown in following illustrations. Push sufficiently so that they snap. Try pulling wire to ensure they are properly locked.



1. Tab
2. Housing



TYPICAL

1. *Receptacle*
2. *Housing*

ACCESSORIES INSTALLATION

On all **electric start models**: The direct current (DC) utilizes the snowmobile frame as ground "wire" while all alternating current (AC) consumers (lights, heated grips, fuel gauge, etc.) utilize a separate ground wire.

Never interconnect AC and DC grounds as an AC voltage drop will result. When installing accessories on **any** snowmobile, connect their wires directly to the YELLOW and YELLOW/BLACK lighting coil wires.

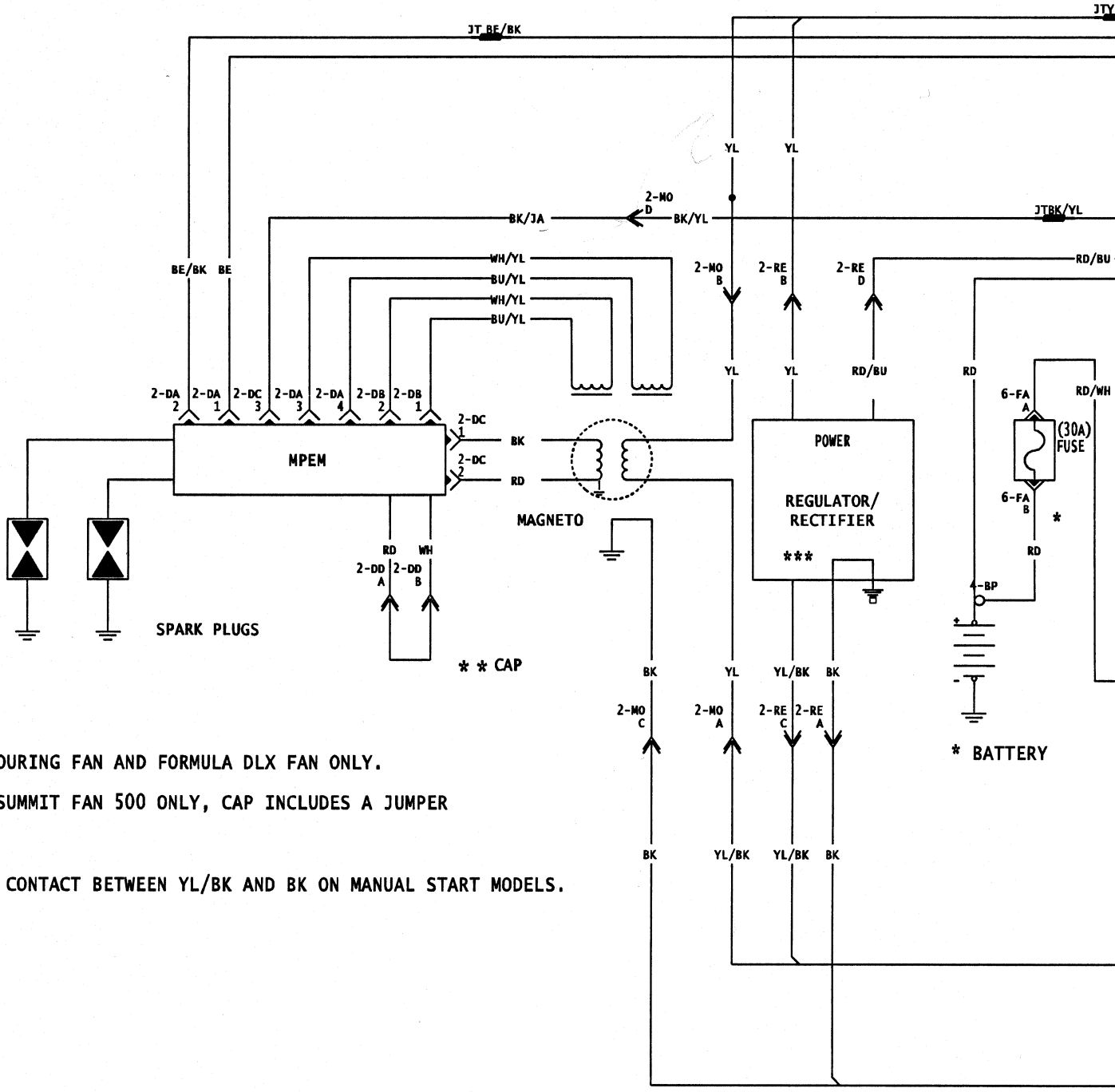
Even if **manual start models** have an AC ground to the chassis (on voltage regulator), all accessories utilize a ground wire isolated from chassis. When an electric starter kit is installed, the voltage regulator and its ground wire are replaced by a voltage rectifier/regulator unit permitting a completely isolated AC circuit.

⚠ WARNING

Never secure electrical wires/cables with fuel lines. Keep wires away from any rotating, moving, heating, vibrating or sharp edge. Use proper fastening devices as required.

ANNEX 1 S-SERIES

2001 TOURING FAN 380/500, FORMULA DLX FAN 380/500, SUMMIT FAN 500,

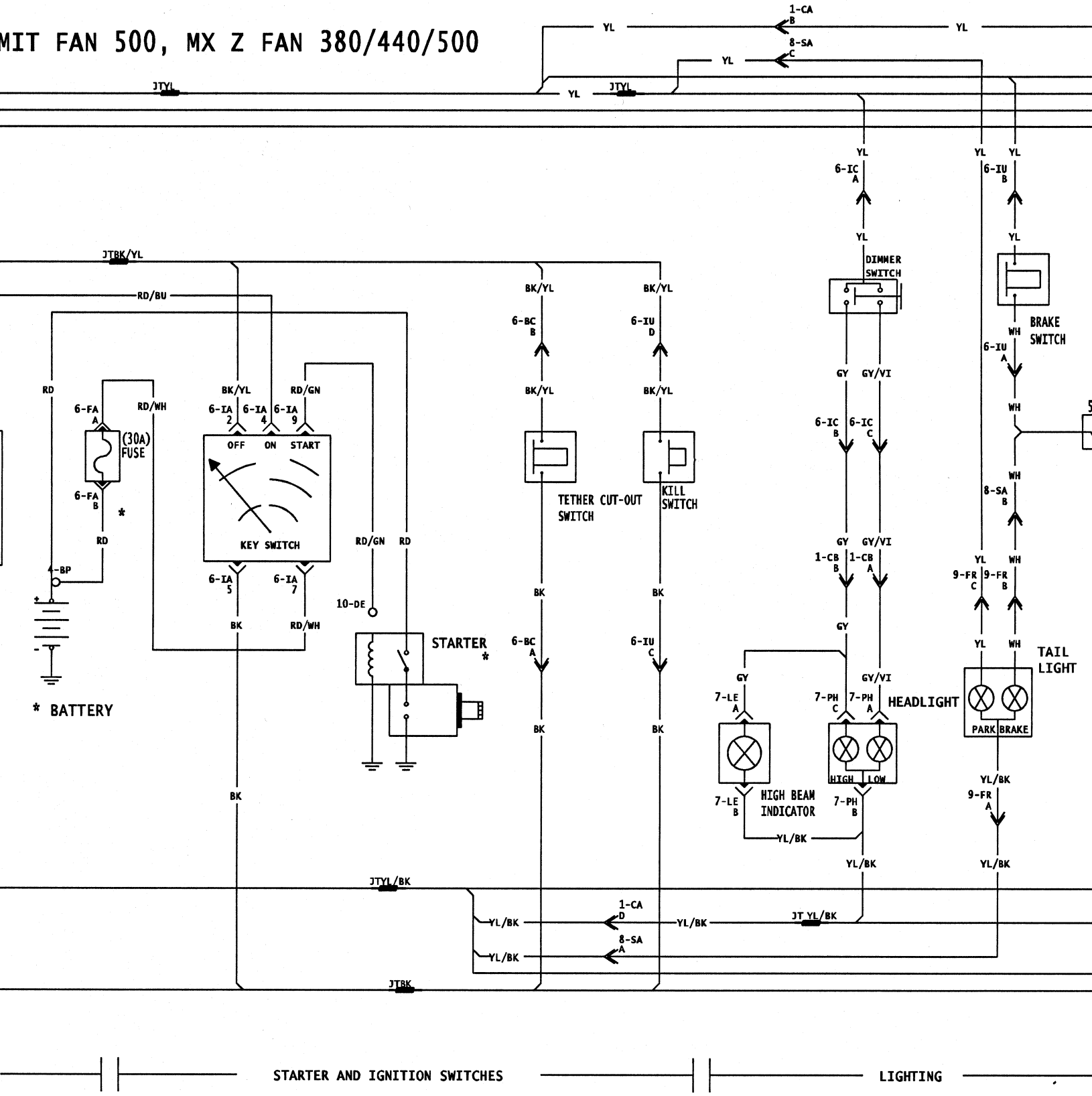


* TOURING FAN AND FORMULA DLX FAN ONLY.

** SUMMIT FAN 500 ONLY, CAP INCLUDES A JUMPER

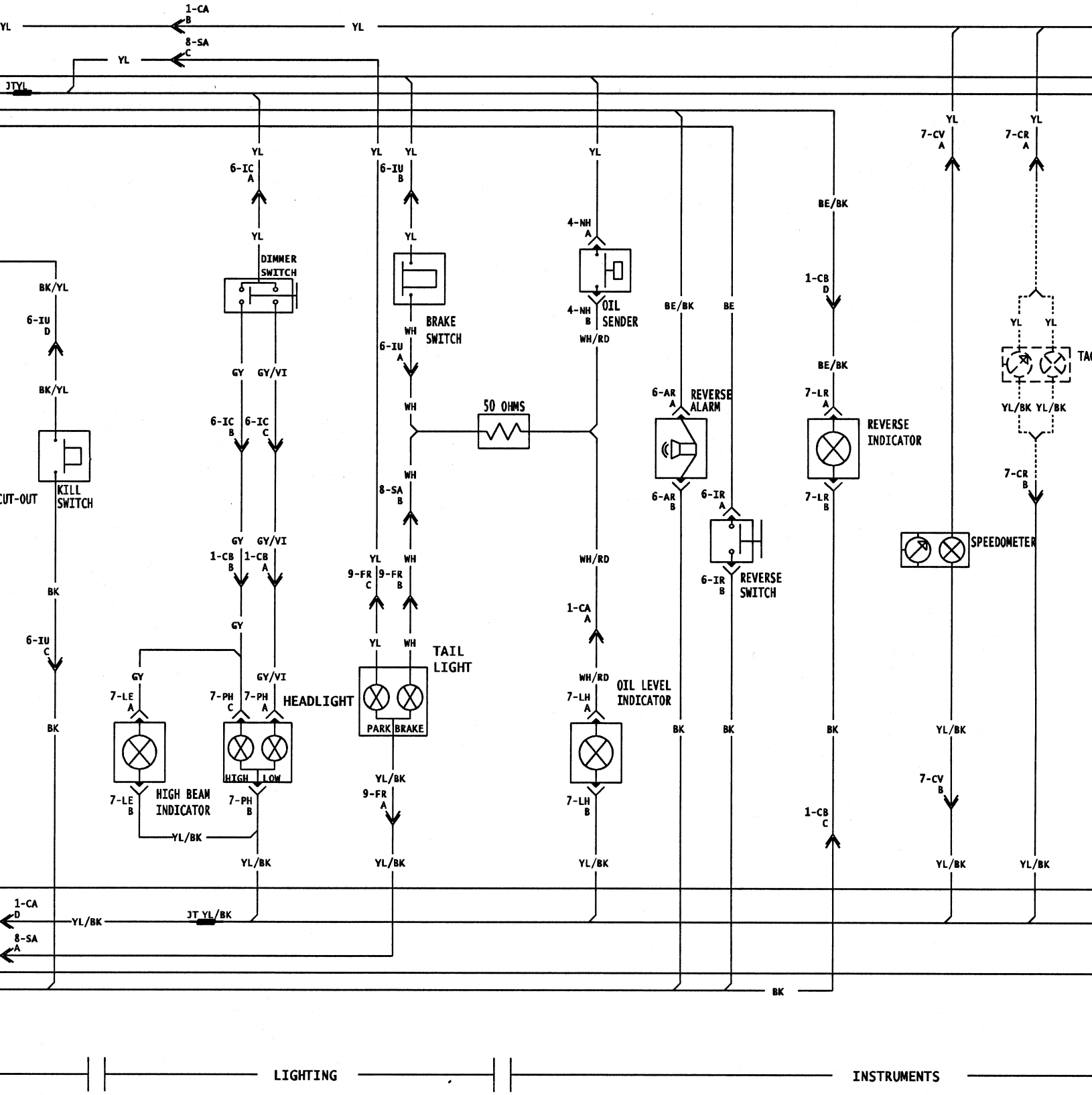
*** CONTACT BETWEEN YL/BK AND BK ON MANUAL START MODELS.

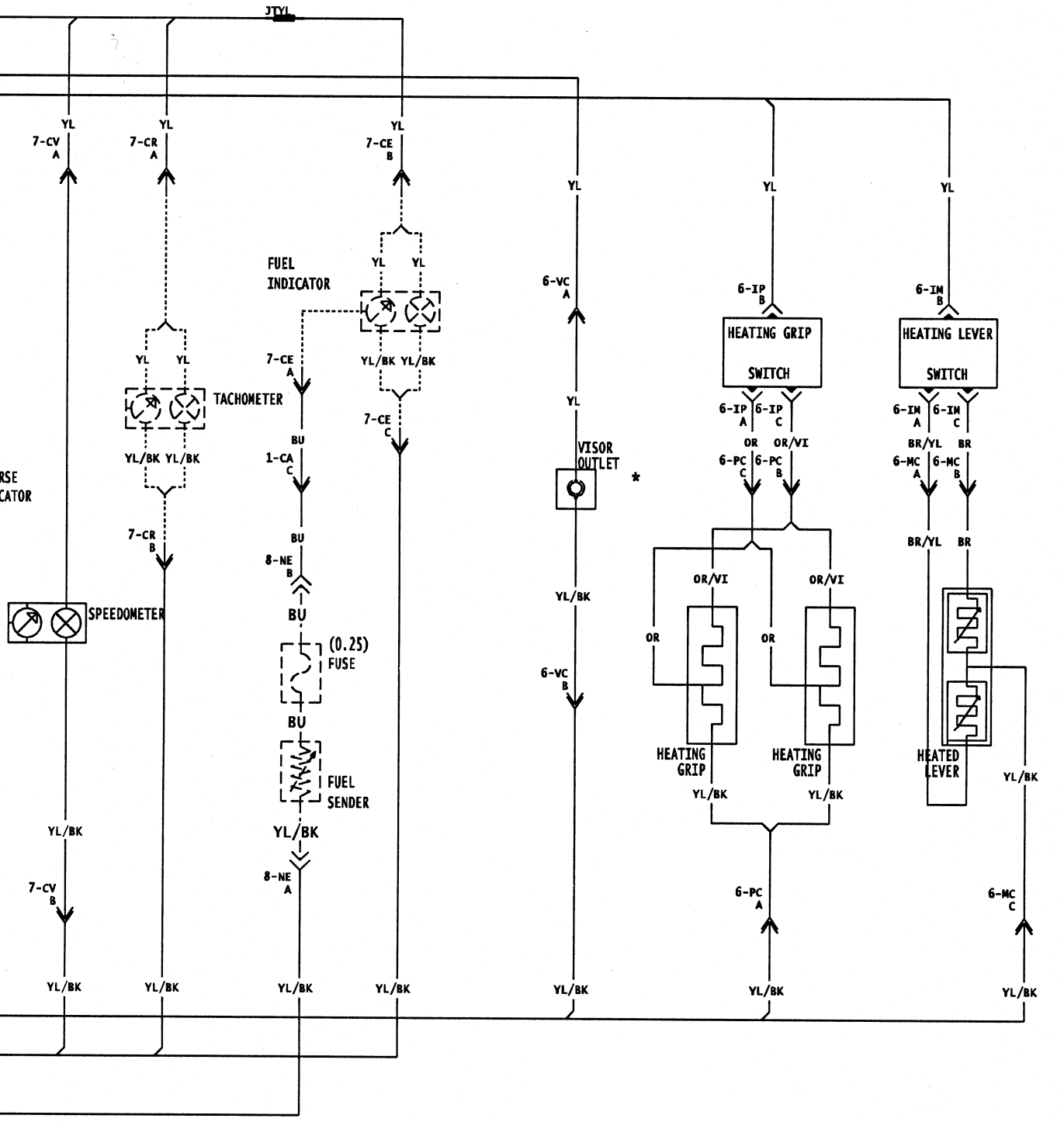
MIT FAN 500, MX Z FAN 380/440/500



STARTER AND IGNITION SWITCHES

LIGHTING


1-CA B
YL
YL
8-SA C
YL
JTYL
YL
6-IC A
YL
DIMMER SWITCH
BK/YL
6-IU D
BK/YL
KILL SWITCH
CUT-OUT
GY
GY/VI
6-IC B
6-IC C
GY
GY/VI
1-CB B
1-CB A
BK
6-IU C
GY
GY
7-LE A
GY/VI
7-PH C
7-PH A
HEADLIGHT
BK
7-LE B
HIGH BEAM INDICATOR
HIGH
LOW
7-PH B
YL/BK
YL/BK
YL
YL
6-IU B
YL
BRAKE SWITCH
WH
6-IU A
WH
50 OHMS
WH
8-SA B
YL
WH
9-FR C
9-FR B
YL
WH
TAIL LIGHT
PARK BRAKE
YL/BK
9-FR A
YL/BK
YL
4-NH A
4-NH B
OIL SENDER
WH/RD
WH/RD
1-CA A
WH/RD
7-LH A
OIL LEVEL INDICATOR
7-LH B
YL/BK
BE/BK
BE
6-AR A
REVERSE ALARM
6-AR B
6-IR A
6-IR B
REVERSE SWITCH
BK
BK
BE/BK
1-CB D
BE/BK
7-LR A
REVERSE INDICATOR
7-LR B
BK
1-CB C
YL
7-CV A
YL/BK
7-CV B
YL/BK
YL
7-CR A
YL
YL
TAC
YL/BK
YL/BK
7-CR B
SPEEDOMETER
YL/BK
1-CA D
YL/BK
JT YL/BK
8-SA A
BK
LIGHTING
INSTRUMENTS

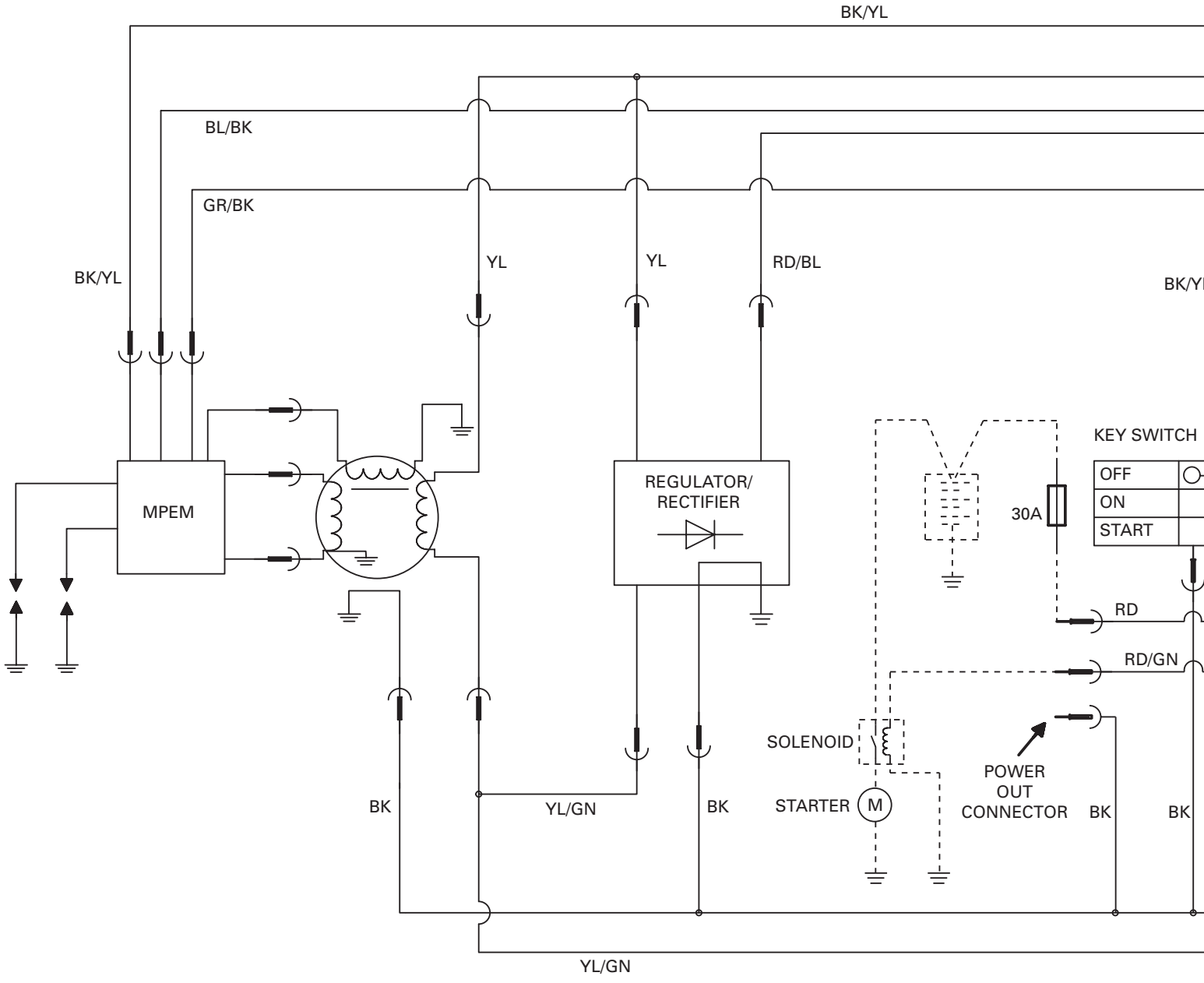


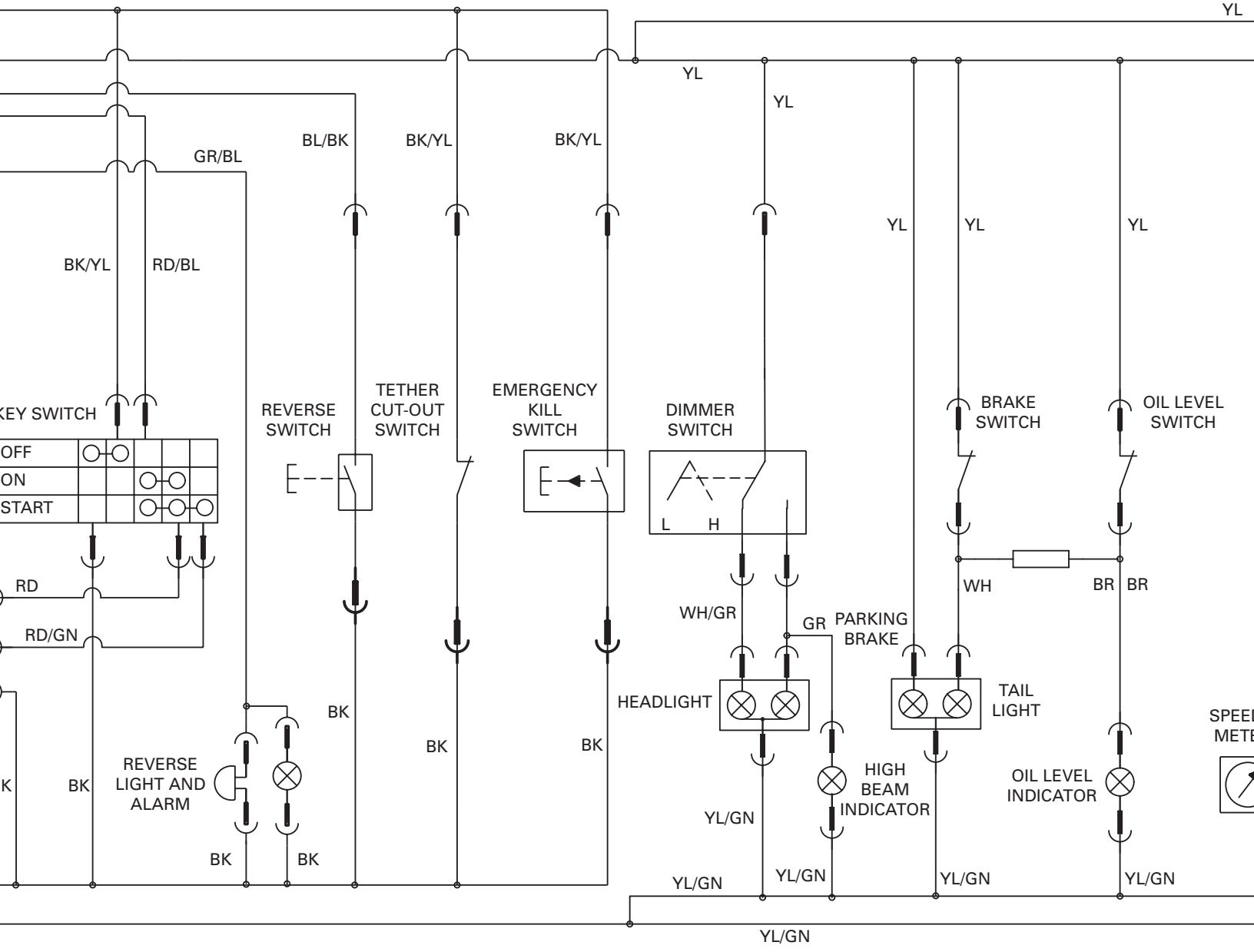
UMENTS

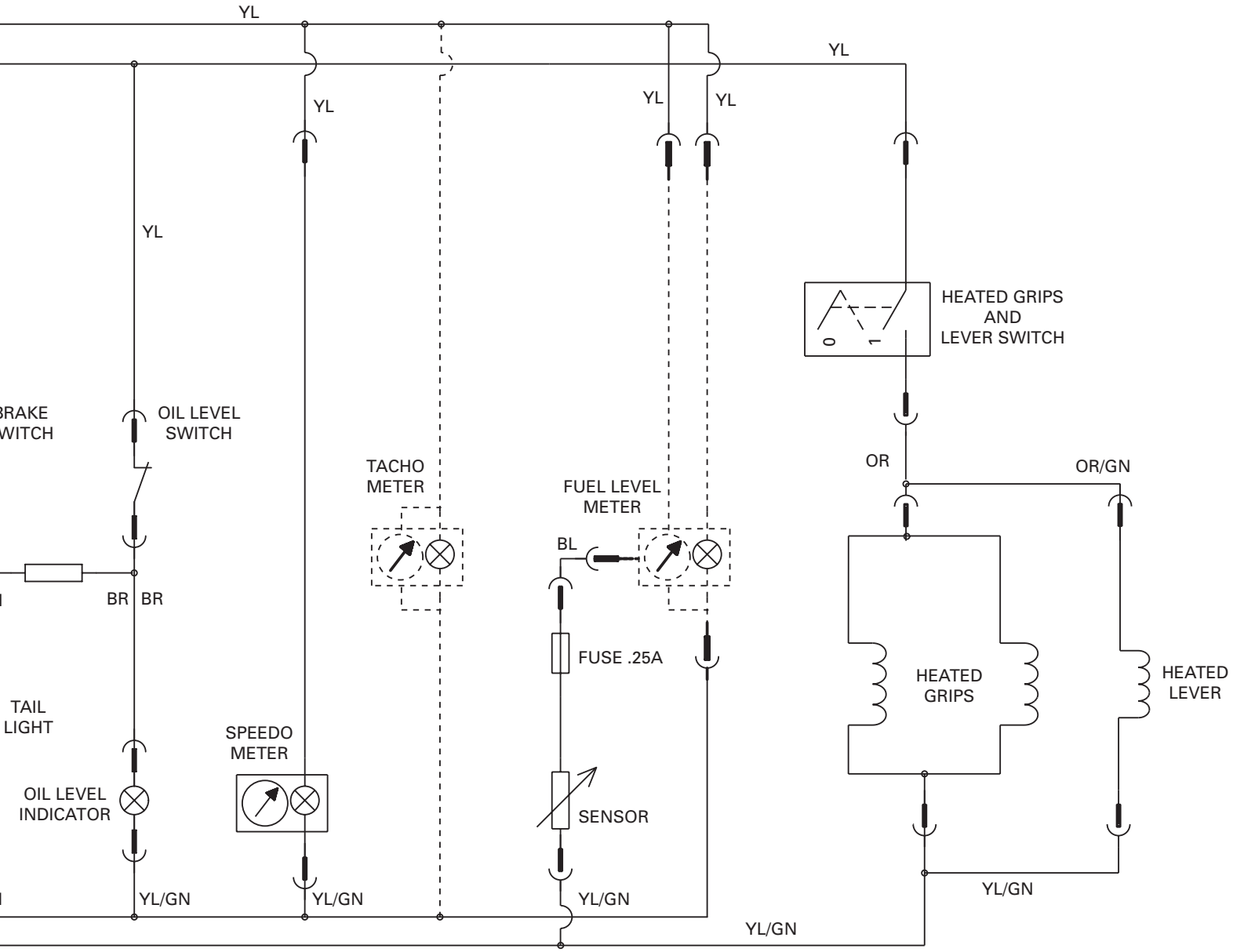
HEATING ELEMENTS

ANNEX 2 SKANDIC LT

2001 SKANDIC LT

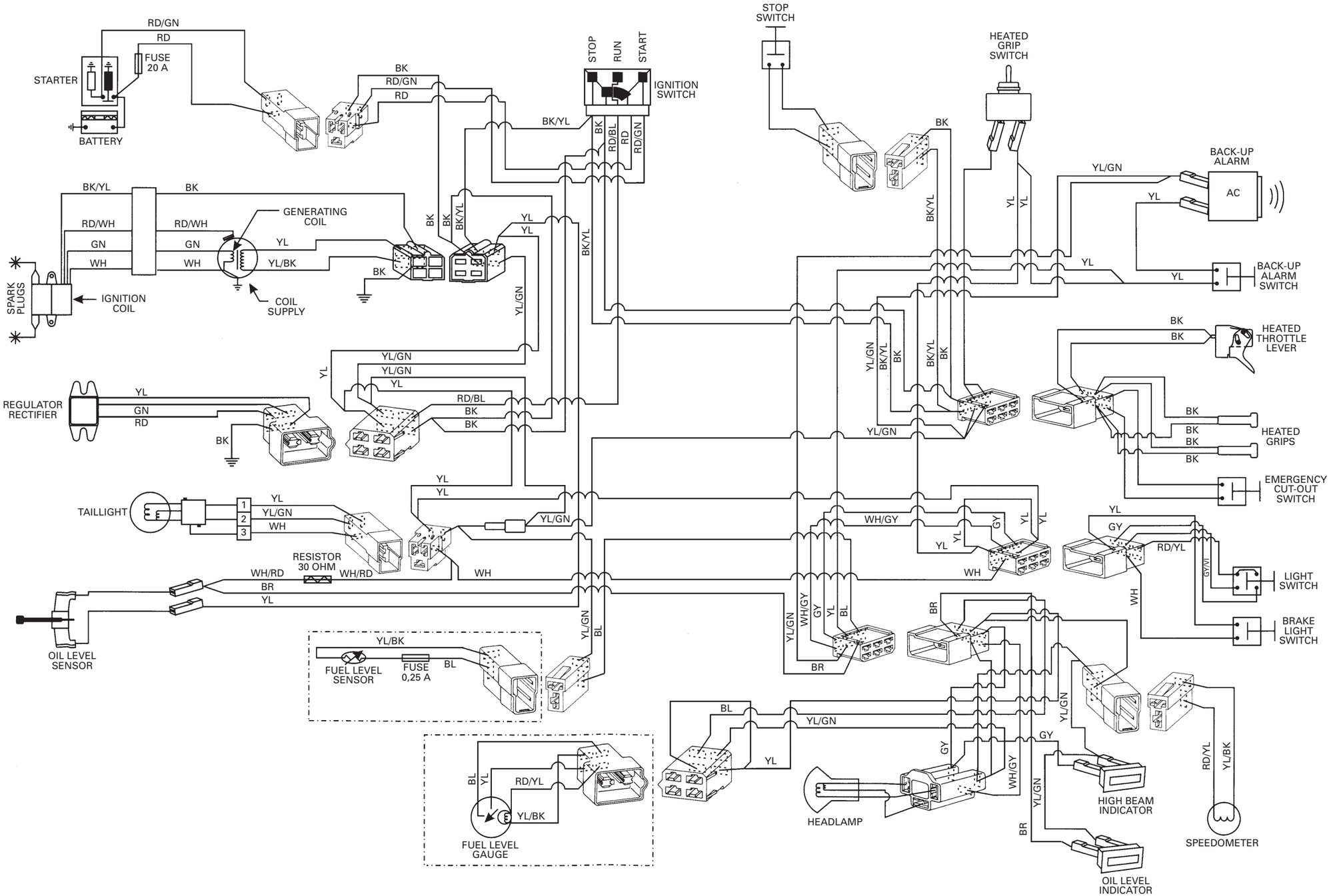



YL
YL
YL
BL/BK
BK/YL
BK/YL
GR/BL
BK/YL
RD/BL
YL
YL
YL
KEY SWITCH
OFF
ON
START
REVERSE SWITCH
TETHER CUT-OUT SWITCH
EMERGENCY KILL SWITCH
DIMMER SWITCH
L
H
BRAKE SWITCH
OIL LEVEL SWITCH
RD
RD/GN
WH
BR
BR
WH/GR
GR
PARKING BRAKE
HEADLIGHT
TAIL LIGHT
BK
BK
BK
BK
REVERSE LIGHT AND ALARM
BK
BK
HIGH BEAM INDICATOR
OIL LEVEL INDICATOR
YL/GN
YL/GN
YL/GN
YL/GN
YL/GN
YL/GN


YL
YL
YL
YL
YL
YL
HEATED GRIPS
AND
LEVER SWITCH
0
1
BRAKE
WITCH
OIL LEVEL
SWITCH
TACHO
METER
FUEL LEVEL
METER
OR
OR/GN
BL
BR
BR
FUSE .25A
HEATED
GRIPS
HEATED
LEVER
TAIL
LIGHT
SPEEDO
METER
OIL LEVEL
INDICATOR
SENSOR
YL/GN
YL/GN
YL/GN
YL/GN
YL/GN

ANNEX 3 SKANDIC WT/SWT

2001 SKANDIC WT/SWT



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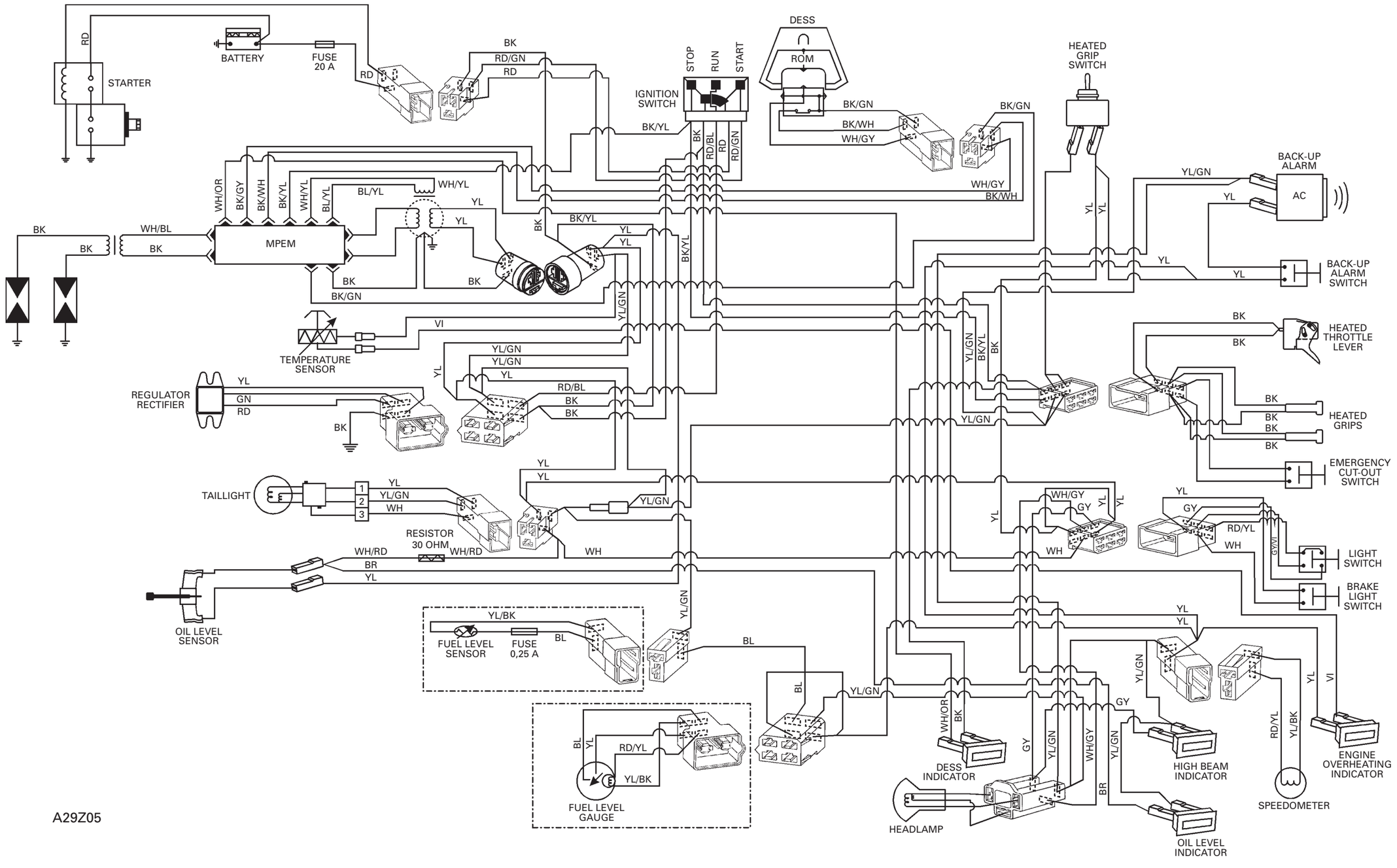
ANNEX 4 SKANDIC WT LC

2001 SKANDIC WT LC



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Version française également disponible

2001

ski-doo

Grand Touring SE
Mach Z STD/Tech Plus

Volume 2

Shop Manual

484 200 024

2001
Shop Manual

VOLUME 2

GRAND TOURING SE

MACH Z STD/TECH PLUS

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RECREATIONAL PRODUCTS

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SAFETY NOTICE

This manual has been prepared as a guide to correctly service and repair some 2001 Ski-Doo snowmobiles. See model list below.

This edition was primarily published to be used by snowmobile mechanical technicians who are already familiar with all service procedures relating to Bombardier made snowmobiles. Mechanical technicians should attend continuous training courses given by Bombardier Training Dept.

Please note that the instructions will apply only if proper hand tools and special service tools are used.

This *Shop Manual* uses technical terms which may be slightly different from the ones used in the *Parts Catalog*.

It is understood that this manual may be translated into another language. In the event of any discrepancy, the English version shall prevail.

The content depicts parts and/or procedures applicable to the particular product at time of writing *Service* and *Warranty Bulletins* may be published to update the content of this manual. Make sure to read and understand these.

In addition, the sole purpose of the illustrations throughout the manual, is to assist identification of the general configuration of the parts. They are not to be interpreted as technical drawings or exact replicas of the parts.

The use of Bombardier parts is most strongly recommended when considering replacement of any component. Dealer and/or distributor assistance should be sought in case of doubt.

The engines and the corresponding components identified in this document should not be utilized on product(s) other than those mentioned in this document.

Torque wrench tightening specifications must be strictly adhered to. Locking devices (ex.: locking tab, self-locking fasteners, etc.) must be installed or replaced with new ones. If the efficiency of a locking device is impaired, it must be renewed.

This manual emphasizes particular information denoted by the wording and symbols:

⚠ WARNING

Identifies an instruction which, if not followed, could cause serious personal injury including possibility of death.

CAUTION: Denotes an instruction which, if not followed, could severely damage vehicle components.

NOTE: Indicates supplementary information needed to fully complete an instruction.

Although the mere reading of such information does not eliminate the hazard, your understanding of the information will promote its correct use. Always use common shop safety practice.

Bombardier Inc. disclaims liability for all damages and/or injuries resulting from the improper use of the contents. We strongly recommend that any services be carried out and/or verified by a highly skilled professional mechanic. It is understood that certain modifications may render use of the vehicle illegal under existing federal, provincial and state regulations.

WHAT'S NEW

INTRODUCTION

- Procedure to change self-locking fasteners.

CARBURETOR AND FUEL PUMP

- Procedure to check DPM manifold for leaks.
- New pilot screw adjustment on GT SE.

STEERING SYSTEM

- Ski alignment specifications.

INTRODUCTION

This *Shop Manual Volume 2* covers the following Bombardier made 2001 snowmobiles:

MODELS	MODEL NUMBER
MACH* Z STD (BLACK) (Canada)	1656
MACH* Z STD (BLACK) (U.S.)	1657
MACH* Z STD (YELLOW) (Canada)	1658
MACH* Z STD (YELLOW) (U.S.)	1659
MACH* Z STD (YELLOW) (Europe)	1660
MACH* Z TECH PLUS (YELLOW) (Canada)	1661
MACH* Z TECH PLUS (YELLOW) (U.S.)	1662
MACH* Z TECH PLUS (BLACK) (Canada)	1819
MACH* Z TECH PLUS (BLACK) (U.S.)	1820
GRAND TOURING* SE (BLACK) (Canada and U.S.)	1786
GRAND TOURING* SE (BLACK) (Europe)	1787
GRAND TOURING* SE (BLUE) (Canada and U.S.)	1788

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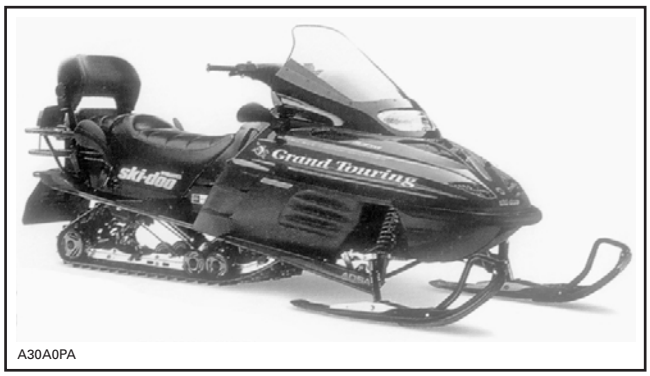
Grand Touring SE and Mach Z STD/TECH PLUS

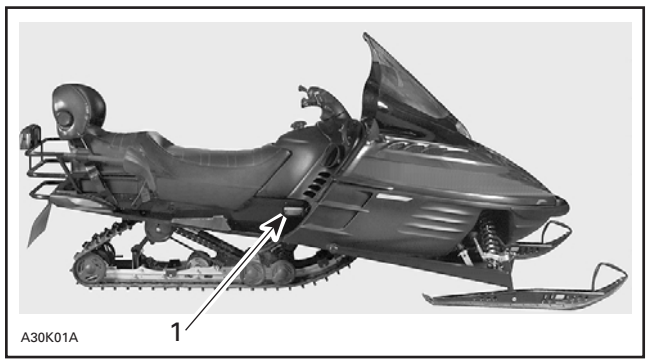
These are CK3 Series models.



TYPICAL — CK3 SERIES

VEHICLE IDENTIFICATION NUMBER

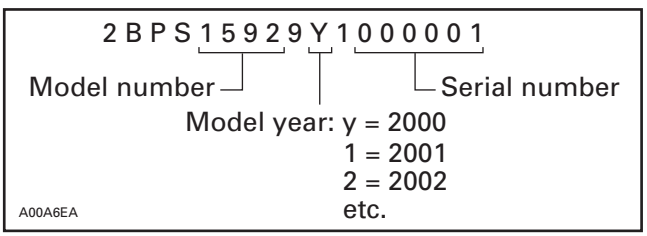
Vehicle Identification Number Location



TYPICAL

1. Vehicle identification number

Identification Number Meaning



ENGINE SERIAL NUMBER

Engine Serial Number Location

1. Engine serial number

LIST OF ABBREVIATIONS USED IN THIS MANUAL

A	ampere
amp	ampere
A•h	ampere-hour
AC	alternate current
ACM	acceleration and control modulator
ADSA	advanced direct shock action
BDC	bottom dead center
BTDC	before top dead center
°C	degree Celsius
cc	cubic centimeter
CDI	capacitor discharge ignition
CTR	center
cm	centimeter
cm^2	square centimeter
cm^3	cubic centimeter
DC	direct current
DESS	digitally encoded security system
DPM	digital performance management
°F	degree Fahrenheit
FC	fan cooled
fl. oz	fluid ounce
ft	foot
GRD	ground
H.A.C.	high altitude compensator
hal.	halogen
HI	high
imp. oz	imperial ounce
in	inch
in^2	square inch
in^3	cubic inch
k	kilo (thousand)
kg	kilogram
km/h	kilometer per hour
kPa	Kilopascal
L	liter
lb	pound
lbf	pound (force)
lbf/in^2	pound per square inch
LH	left hand
LO	low
LT	long track
m	meter
MAG	magneto
Max.	maximum
Min.	minimum
mL	milliliter
mm	millimeter
M.E.	millennium edition
MPEM	multi-purpose electronic module
MPH	mile per hour
N	newton
N.A.	not applicable
no.	number
00.0	continuity
0.L	open line (open circuit)
O.D.	outside diameter
OPT	optional
oz	ounce
P/N	part number
PSI	pound per square inch

PTO	power take off
R	rectangular
RH	right hand
RAVE	Rotax adjustable variable exhaust
RER	Rotax electronic reverse
RPM	revolution per minute
RMS	root mean square
RRIM	reinforced reaction injection molding
Sp. Gr.	specific gravity
ST	semi-trapez
TDC	top dead center
TRA	total range adjustable
U.S. oz	ounce (United States)
V	volt
Vac	volt (alternative current)

ARRANGEMENT OF THE MANUAL

The manual is divided into 11 major sections:

01 SERVICE TOOLS AND SERVICE PRODUCTS
02 LUBRICATION AND MAINTENANCE
03 TROUBLESHOOTING
04 ENGINE
05 TRANSMISSION
06 ELECTRICAL
07 REAR SUSPENSION
08 STEERING/FRONT SUSPENSION
09 BODY/FRAME
10 TECHNICAL DATA
11 WIRING DIAGRAMS

Each section is divided in various subsections, and again, each subsection has one or more division.

This *Shop Manual* uses technical terms wich may be slightly different from the ones in the parts catalog.

TYPICAL PAGE

Page heading indicates section and subsection detailed.

Subsection title indicates beginning of the subsection.

Italic subtitle above exploded view indicate pertaining models.

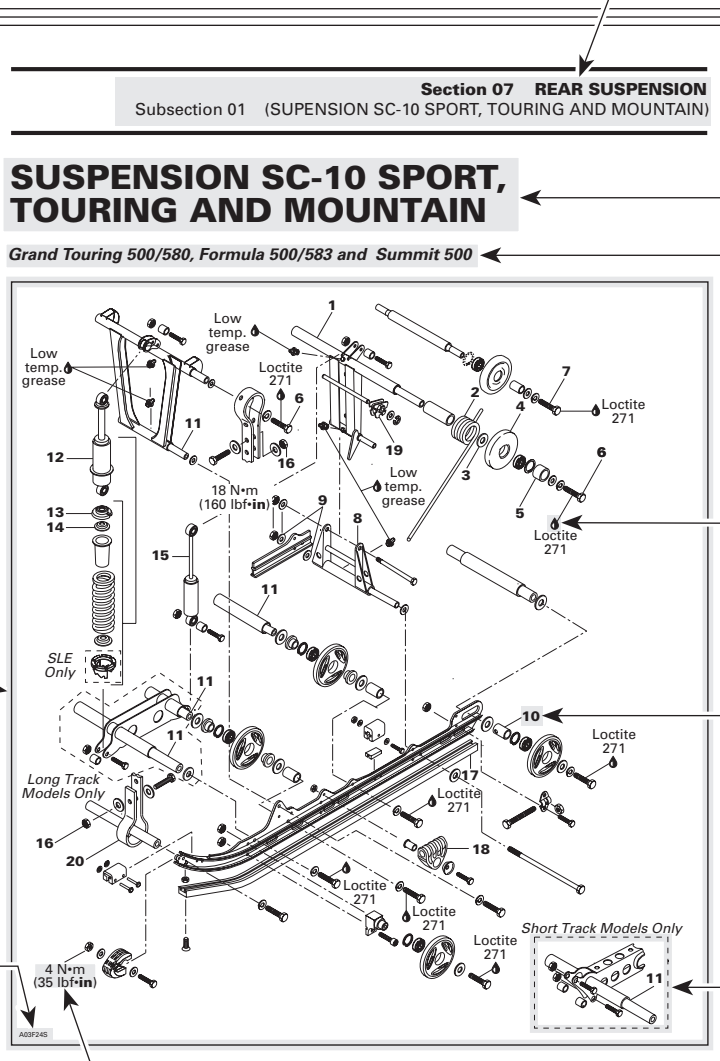
Exploded view assists you in identifying parts and related positions.

Drop represents a liquid product to be applied to a surface. In this case Loctite 271 to screw threads.

Bold face number indicates special procedure concerning this part.

Illustration number for publishing process.

Dotted box contains parts of a particular model in this case the short track models only.



Tightening torque nearby fastener. In this case, nut must be torqued to 4 N•m or 35 lbf•**in**.

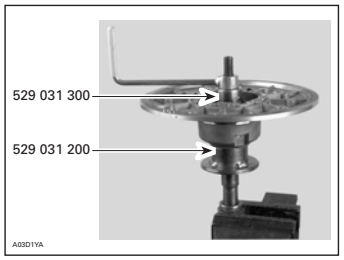
CAUTION: Pay attention to torque specifications. Some of these are in lbf•**in** instead of lbf•ft. Use appropriate torque wrench.

Page numbering system:
07: REAR SUSPENSION section
01: SUSPENSION SC-10 SPORT, TOURING AND MOUNTAIN subsection
1: First page of this subsection

A01A28S

TYPICAL PAGE

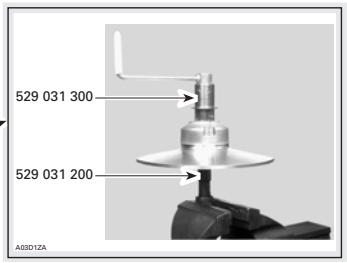
Turn puller handle and sliding half at once to extract the bushing.



IMPORTANT: Large bushing retaining screws and washers must be removed before small bushing installation.

Coat bushing outside diameter with Loctite 609 (P/N 413 703 100).

Install bushing as following photo.



ASSEMBLY

Came Slider Shoe

When replacing slider shoes **no. 4**, always install a new set (3 shoes) to maintain equal pressure on the cam.

Assemble driven pulley components by reversing the disassembly procedure.

Cam

Coat cam **no. 18** interior with anti-seize lubricant.

INSTALLATION

Countershaft

CAUTION: Always apply anti-seize lubricant (P/N 413 701 000) on the countershaft before final pulley installation.

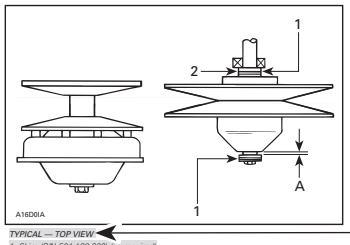
A-Series and B-Series Only

Should installation procedure be required, refer to BRAKE 05-05 then look for **Brake Disc and Countershaft Bearing Adjustment**.

Reinstall the pulley on the countershaft by reversing the removal procedure.

All Models

Check end play of driven pulley on countershaft by pushing pulley towards outer housing so that the inner shims (P/N 504 108 200) contact it. Measure end play at the mounting screw end between shim(s) and puley. See illustration.



TYPICAL — TOP VIEW

1. Shim (P/N 504 108 200) (as required)
2. Contact
A. 0 to 1 mm (0 to 3/64 in)

Torque retaining screw **no. 13** to 25 N•m (18 lbf•ft).

ADJUSTMENT

Refer to PULLEY DISTANCE AND ALIGNMENT 05-04 to adjust pulley distance. Adjust drive belt height between pulley halves to obtain specified belt deflection.

Title indicates main procedure to be carried-out.

Italic bold face type setting indicates a particular procedure concerning a model.

Italic bold face setting in this case indicates that particular procedure for A and B-Series is finished, so from this point, all models are concerned.

"TYPICAL" caption indicates a general view which does not represent full detail. "TOP VIEW" caption helps you in understanding illustration.

Call-outs for above illustration.

Illustration always follows text to which it pertains.

Reference to look up a certain section and subsection. In this case it concerns pulleys adjustment.

Subtitle indicates a particular procedure for the named part.

Bold face number following part name refers to exploded view at beginning of subsection.

A01A2BS

INTRODUCTION

GENERAL INFORMATION

The information and component/system descriptions contained in this manual are correct at time of publication. Bombardier Inc. however, maintains a policy of continuous improvement of its products without imposing upon itself any obligation to install them on products previously manufactured.

Due to late changes, it may have some differences between the manufactured product and the description and/or specifications in this document.

Bombardier Inc. reserves the right at any time to discontinue or change specifications, designs, features, models or equipment without incurring obligation.

USEFUL PUBLICATIONS

Refer to *Parts Catalogs* to order the right parts.

PARTS CATALOG	
MODELS	P/N
MACH Z	484 400 173
GRAND TOURING SE	484 400 183

Use *Specification Booklet* to find rapidly the right specs.

1997-2001 SPECIFICATION BOOKLET (P/N 484 300 198).

ILLUSTRATIONS AND PROCEDURES

Illustrations and photos show the typical construction of the different assemblies and, in all cases, may not reproduce the full detail or exact shape of the parts shown. However, they represent parts which have the same or a similar function.

CAUTION: Most components of those vehicles are built with parts dimensioned in the metric system. Most fasteners are metric and must not be replaced by customary fasteners or vice versa. Mismatched or incorrect fasteners could cause damage to the vehicle or possible personal injury.

As many of the procedures in this manual are interrelated, we suggest, that before undertaking any task, you read and thoroughly understand the entire section or subsection in which the procedure is contained.

A number of procedures throughout the book require the use of special tools. Before commencing any procedure, be sure that you have on hand all the tools required, or approved equivalents.

The use of RIGHT and LEFT indications in the text, always refers to driving position (when sitting on vehicle).

TYPICAL

1. *Left*
2. *Right*

SELF-LOCKING FASTENERS PROCEDURE

The following describes the most common application procedures when working with self-locking fasteners.

Use a metal brush or a screwtap to clean the hole properly then use a solvent (Methyl-Chloride), let act during 30 minutes and wipe off. The solvent utilization is to ensure the adhesive works properly.

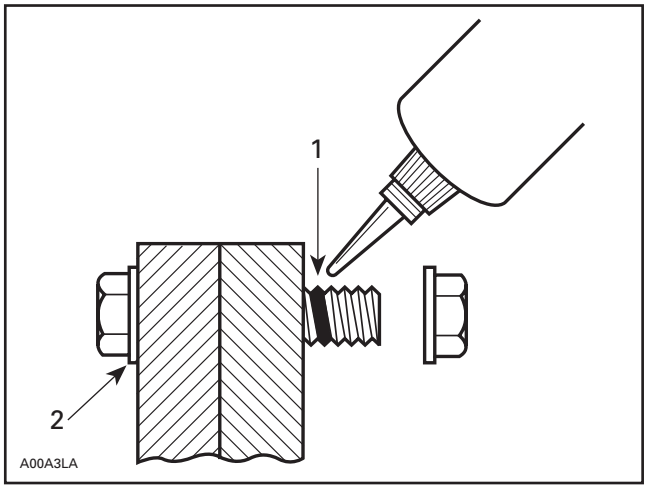
LOCTITE APPLICATION PROCEDURE

The following describes the most common application procedures when working with Loctite products.

NOTE: Always use proper strength Loctite product as recommended in this *Shop Manual*.

THREADLOCKER

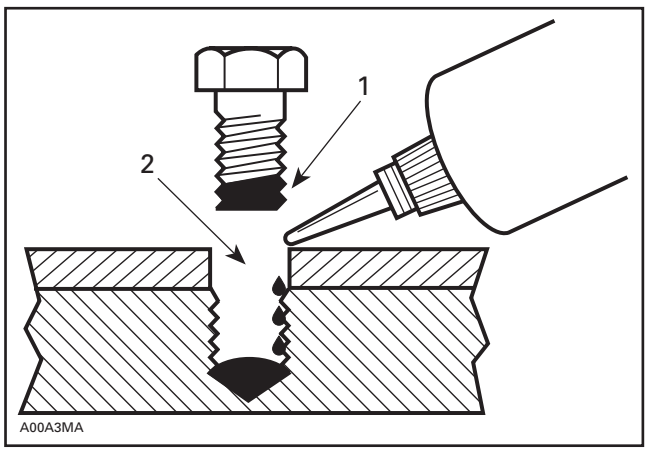
Uncovered Holes (bolts and nuts)



1. Apply here
2. Do not apply

1. Clean threads (bolt and nut) with solvent.
2. Apply Loctite Primer N (P/N 293 800 041) on threads and allow to dry.
3. Choose proper strength Loctite threadlocker.
4. Fit bolt in the hole.
5. Apply a few drops of threadlocker at proposed tightened nut engagement area.
6. Position nut and tighten as required.

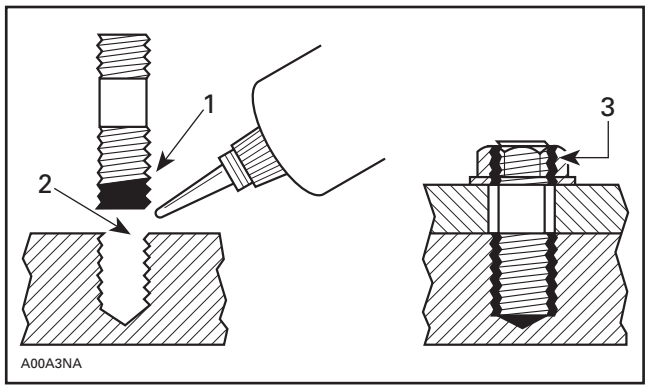
Blind Holes



1. On threads
2. On threads and at the bottom of hole

1. Clean threads (bolt and hole) with solvent.
2. Apply Loctite Primer N (P/N 293 800 041) on threads (bolt and nut) and allow to dry for 30 seconds.
3. Choose proper strength Loctite threadlocker.
4. Apply several drops along the threaded hole and at the bottom of the hole.
5. Apply several drops on bolt threads.
6. Tighten as required.

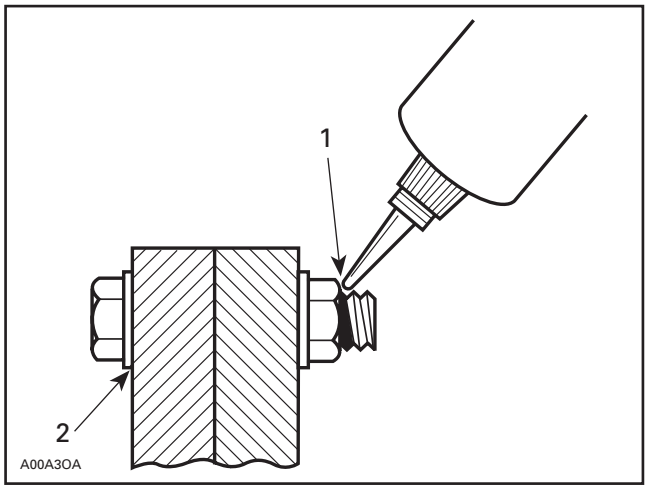
Stud in Blind Holes



1. On threads
2. On threads and in the hole
3. Onto nut threads

1. Clean threads (stud and hole) with solvent.
2. Apply Loctite Primer N (P/N 293 800 041) on threads and allow to dry.
3. Put several drops of proper strength Loctite threadlocker on female threads and in hole.
4. Apply several drops of proper strength Loctite on stud threads.
5. Install stud.
6. Install cover, etc.
7. Apply drops of proper strength Loctite on uncovered threads.
8. Tighten nuts as required.

Preassembled Parts

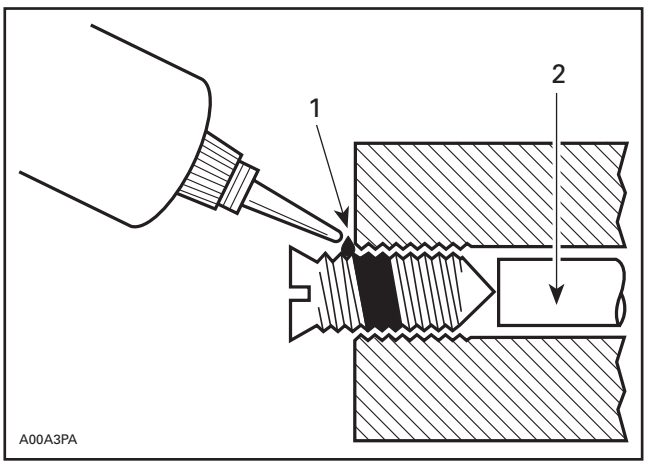


1. Apply here
2. Do not apply

1. Clean bolts and nuts with solvent.
2. Assemble components.
3. Tighten nuts.
4. Apply drops of proper strength Loctite on bolt/nut contact surfaces.
5. Avoid touching metal with tip of flask.

NOTE: For preventive maintenance on existing equipment, retighten nuts and apply proper strength Loctite on bolt/nut contact surfaces.

Adjusting Screw



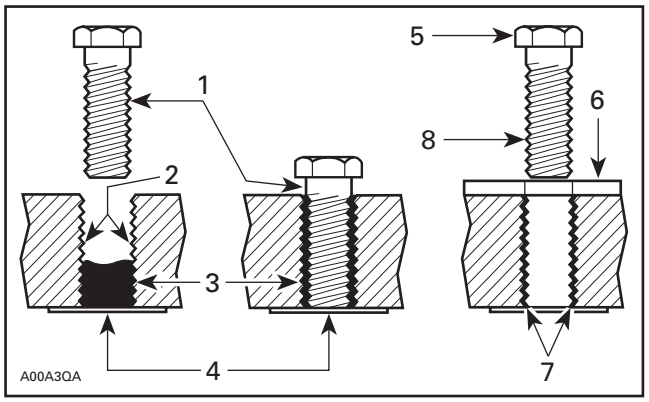
1. Apply here
2. Plunger

1. Adjust screw to proper setting.
2. Apply drops of proper strength Loctite threadlocker on screw/body contact surfaces.
3. Avoid touching metal with tip of flask.

NOTE: If it is difficult to readjust, heat screw with a soldering iron (232°C (450°F)).

STRIPPED THREAD REPAIR

Stripped Threads



1. Release agent
2. Stripped threads
3. Form-A-Thread
4. Tape
5. Cleaned bolt
6. Plate
7. New threads
8. Threadlocker

Standard Thread Repair

1. Follow instructions on Loctite FORM-A-THREAD 81668 package.
2. If a plate is used to align bolt:
   a. Apply release agent on mating surfaces.
   b. Put waxed paper or similar film on the surfaces.
3. Twist bolt when inserting it to improve thread conformation.

NOTE: NOT intended for engine stud repairs.

Repair of Small Holes/Fine Threads

Option 1: Enlarge damaged hole, then follow **Standard Thread Repair** procedure.

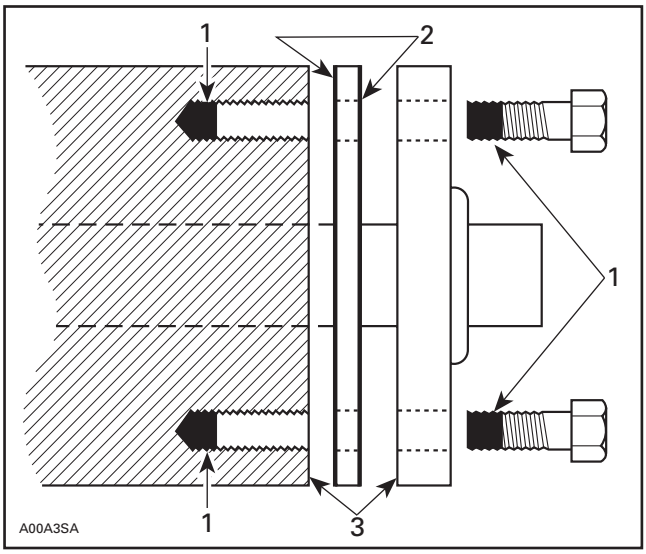
Option 2: Apply FORM-A-THREAD on the screw and insert in damaged hole.

Permanent Stud Installation (light duty)

1. Use a stud or thread on desired length.
2. DO NOT apply release agent on stud.
3. Do a **Standard Thread Repair**.
4. Allow to cure for 30 minutes.
5. Assemble.

GASKET COMPOUND

All Parts



1. Proper strength Loctite
2. Loctite Primer N (P/N 413 708 100) and Gasket Eliminator 515 (P/N 413 702 700) on both sides of gasket
3. Loctite Primer N only

1. Remove old gasket and other contaminants with Loctite Chisel remover (P/N 413 708 500). Use a mechanical mean if necessary.

NOTE: Avoid grinding.

2. Clean both mating surfaces with solvent.
3. Spray Loctite Primer N on both mating surfaces and on both sides of gasket. Allow to dry 1 or 2 minutes.
4. Apply GASKET ELIMINATOR 515 (P/N 413 702 700) on both sides of gasket, using a clean applicator.
5. Place gasket on mating surfaces and assemble immediately.

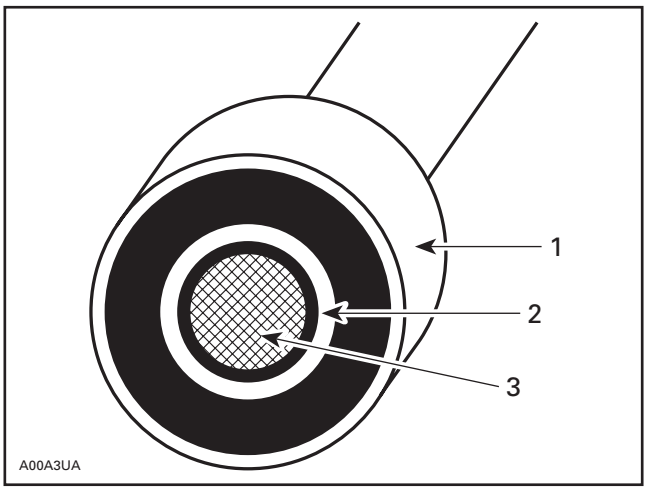
NOTE: If the cover is bolted to blind holes (above), apply proper strength Loctite in the hole and on threads. Tighten.

If holes are sunken, apply proper strength Loctite on bolt threads.

6. Tighten as usual.

MOUNTING ON SHAFT

Mounting with a Press



1. Bearing
2. Proper strength Loctite
3. Shaft

Standard

1. Clean shaft external part and element internal part.
2. Apply a strip of proper strength Loctite on shaft circumference at insert or engagement point.

NOTE: Retaining compound is always forced out when applied on shaft.

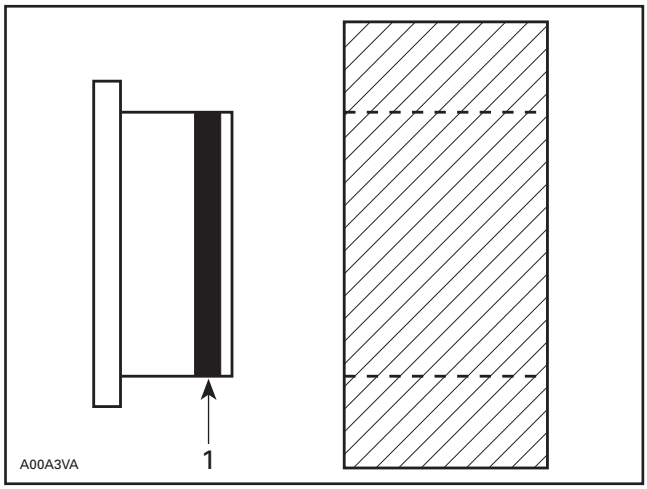
3. DO NOT use anti-seize Loctite or any similar product.
4. No curing period is required.

Mounting in Tandem

1. Apply retaining compound on internal element bore.
2. Continue to assemble as shown above.

CASE-IN COMPONENTS

Metallic Gaskets



1. Proper strength Loctite

1. Clean inner housing diameter and outer gasket diameter.
2. Spray housing and gasket with Loctite Primer N (P/N 293 800 041).
3. Apply a strip of proper strength Loctite on leading edge of outer metallic gasket diameter.

NOTE: Any Loctite product can be used here. A low strength liquid is recommended as normal strength and gap are required.

4. Install according to standard procedure.
5. Wipe off surplus.
6. Allow it to cure for 30 minutes.

NOTE: Normally used on worn-out housings to prevent leaking or sliding.

It is generally not necessary to remove gasket compound applied on outer gasket diameter.

TIGHTENING TORQUES

Tighten fasteners to torque mentioned in exploded views and text. When they are not specified refer to following table. Bold face size (e.g. **M4**) indicates nominal value (mean value).

N•m	FASTENER SIZE (8.8 GRADE)	Lbf•**in**
2	**M4**	18
3	M4	27
4	**M5**	35
8	M6	71
9	M6	80
10	**M6**	89
11	**M6**	97
12	**M6**	106

N•m	FASTENER SIZE (8.8 GRADE)	Lbf•ft
21	M8	15
22	M8	16
23	**M8**	17
24	M8	18
25	M8	18
43	M10	32
44	M10	32
45	M10	33
46	M10	34
47	M10	35
48	**M10**	35
49	M10	36
50	M10	37
51	M10	38
52	M10	38
53	M10	39
76	M12	56
77	M12	57
78	M12	58
79	M12	58
80	**M12**	59
81	M12	60
82	M12	60
83	M12	61
84	M12	62
121	M14	89
122	M14	90
123	M14	91

N•m	FASTENER SIZE (8.8 GRADE)	Lbf•ft
124	M14	91
125	M14	92
126	M14	93
127	M14	94
128	M14	94
129	M14	95
130	M14	96
131	M14	97
132	M14	97
133	M14	98
134	M14	99
135	**M14**	100
136	M14	100
137	M14	101
138	M14	102
139	M14	103
140	M14	103
141	M14	104
142	M14	105
143	M14	105
144	M14	106
145	M14	107
146	M14	108
147	M14	108
148	M14	109
149	M14	110
150	M14	111

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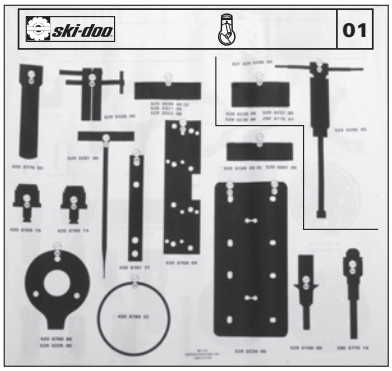
SERVICE TOOLS

This is a list of tools to properly service Ski-Doo snowmobiles. The list includes both the mandatory tools included in a kit (P/N 861 743 700) and the optional tools that are ordered separately. The list of Service Products, both mandatory and optional, are not part of any kit and must all be ordered separately. If you need to replace or add to your tool inventory these items can be ordered through the regular parts channel.

Following mention points out new tool and product:

WORKSHOP — MANDATORY SERVICE TOOLS

Tool board
(P/N 529 034 000)

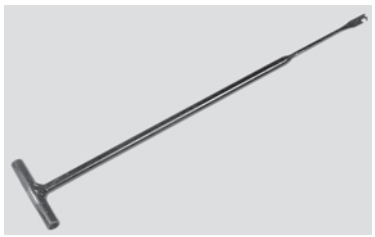


A00A3X4

APPLICATION
All models.

ENGINE — MANDATORY SERVICE TOOLS

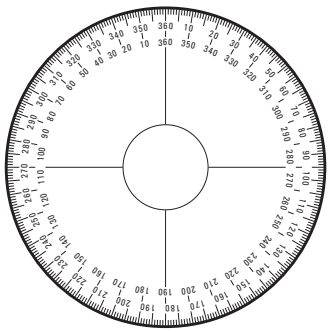
Exhaust spring installer/remover
(P/N 529 035 400)



A01B584

APPLICATION
CK3 series.

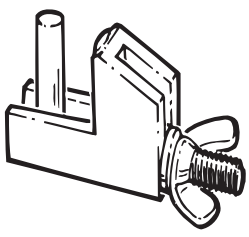
Degree wheel
(P/N 529 035 607)



A00B514

APPLICATION
All rotary valve engines.
NOTE: This tool replaces degree wheel (P/N 295 000 007).

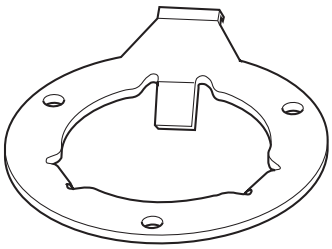
Hose pincher (2)
(P/N 295 000 076)



A01B2I4

APPLICATION
All vehicles.
NOTE: Only the P/N has been changed. This hose pincher is identical to the P/N 529 009 900.

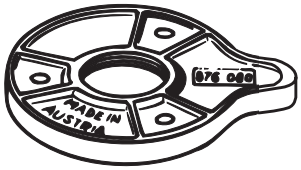
Fan holder
(P/N 420 876 357)



A00C0Q4

APPLICATION
377, 443 and 503 engines.

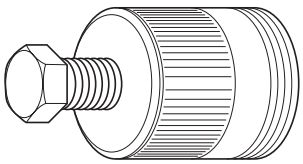
Magneto puller ring
(P/N 420 876 080)



A00C1R4

APPLICATION
All engines except 247.

Magneto puller
(P/N 529 035 547)



A00C1A4

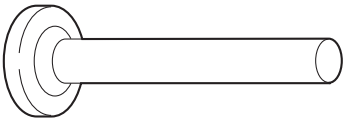
APPLICATION
All engines except 247.
NOTE: The previous extractor (P/N 529 022 500) can be upgraded by replacing the screw with the new one (P/N 529 035 549).

Aligning pin (4)
(P/N 529 018 900)

A00A1D4

APPLICATION
467, 494 and 582 engines.

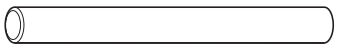
Pusher
(washer behind the impeller)
(P/N 529 020 700)



A00C3H4

APPLICATION
Rotary valve engines.

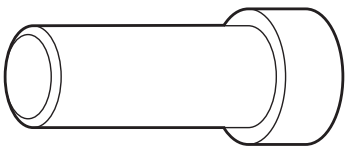
Rotary valve shaft pusher
(P/N 420 876 612)



A00C0F4

APPLICATION
Rotary valve engines with a 10 mm impeller shaft.

Rotary valve seal pusher
(valve side)
(P/N 420 876 607)



A00C0Y4

APPLICATION
Rotary valve engines.

ENGINE (continued) — MANDATORY SERVICE TOOLS

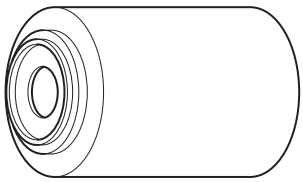
Rotary valve shaft seal pusher (inner, water pump side)
(P/N 420 876 512)

A00C374

APPLICATION

Rotary valve engines, 1991 and newer with a 10 mm impeller shaft.

Rotary valve shaft seal pusher (outer, water pump side)
(P/N 420 877 050)

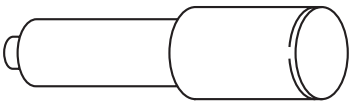


A00C0X4

APPLICATION

Rotary valve engines.

Bearing pusher (rotary valve)
(P/N 420 876 500)

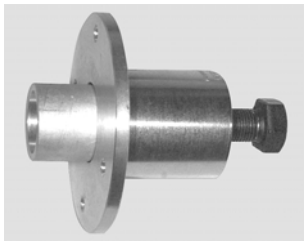


A00B2J4

APPLICATION

Rotary valve engines.

Ceramic seal pusher
(P/N 420 877 820)

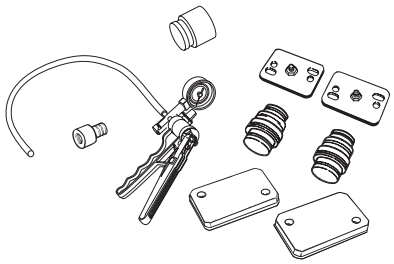


A00B524

APPLICATION

494 and 670 engines with ceramic seal on water pump side.

Engine leak tester kit
(P/N 861 749 100)

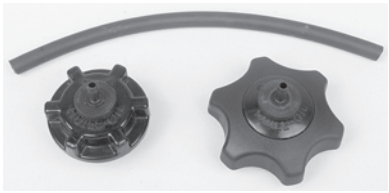


A01B2D5

APPLICATION

All engines.

Fuel and oil system leak tester kit
(P/N 529 033 100)



A01B5E4

APPLICATION

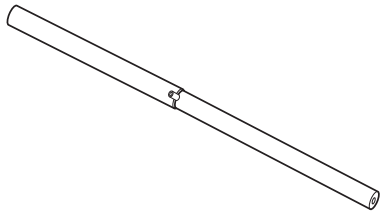
All models.

Choke plunger tool

A) (P/N 529 032 100)

NEW

B) (P/N 529 035 602)



A01C5D4

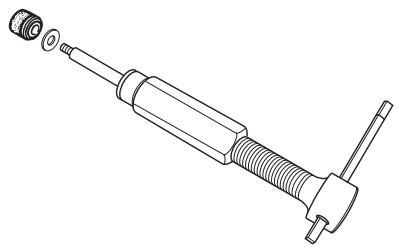
APPLICATION

A) All models equipped with chokes except ZX series (small end for 30, 32 and 34 mm carburetor and big end for 38 mm carburetor).

B) VM type carburetor on ZX series.

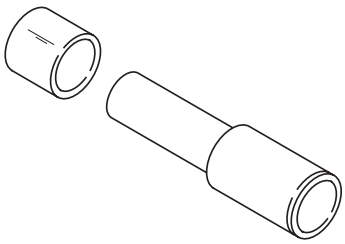
ENGINE (continued) — MANDATORY SERVICE TOOLS

1) Piston pin puller
(P/N 529 035 503)



A02B094

2) Sleeve kit 18 mm
(P/N 529 035 541)
3) Sleeve kit 20 mm
(P/N 529 035 542)



A01B5A4

NOTE: 18 mm sleeve kit contains 1 shouldered sleeve and 3 sleeves. 20 mm sleeve kit contains 1 shouldered sleeve and 2 sleeves.

APPLICATION

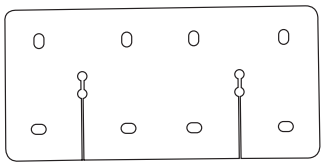
1) All engines.

2) 277, 443, 503 and 809 engine.

3) 593, 670 and 693 engines.

NOTE: The previous piston pin puller (P/N 529 029 000) can be upgraded by adding protector (P/N 529 035 513) and replacing the expansion sleeve with appropriate sleeve kit.

Rubber pad
(P/N 529 023 400)

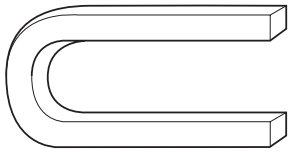


A01B4C4

APPLICATION

All cageless bearing engines.

Rotary valve circlip tool
A) (P/N 529 029 100)
B) (P/N 529 020 800)



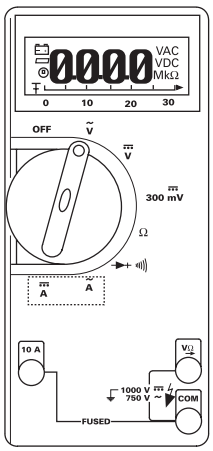
A00C3I4

APPLICATION

A) 1994 and on rotary valve engines.

B) Up to 1993 rotary valve engines.

Multimeter
(P/N 529 022 000)

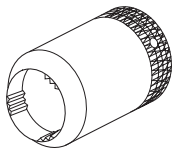


F01B1O4

APPLICATION

All models.

Choke/DESS nut tool
(P/N 529 034 600)



A01B554

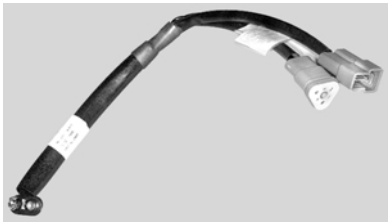
APPLICATION

All models equipped with a choke and/or a DESS.

NOTE: This tool replaces choke nut tool (P/N 529 032 200).

9-volt adaptor
(P/N 529 035 675)

NEW



A00B5G4

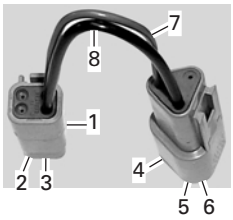
APPLICATION

All models equipped with a DESS.

ENGINE (continued) — MANDATORY SERVICE TOOLS

Homemade adaptor

NEW



A00B5J4

Required parts:

1) Female housing (P/N 515 175 245)
2) Female terminal (2) (P/N 409 015 100)
3) Female lock (P/N 515 175 246)
4) Male housing (P/N 409 207 000)
5) Male terminal (2) (P/N 278 000 631)
6) Male lock (P/N 409 207 600)
7) RED wire in position 1 (4-wire connector) and B (3-wire connector)
8) BLACK wire in position 2 (4-wire connector) and C (3-wire connector)

APPLICATION

2001 Mach Z TECH PLUS.

1-2) Programmer kit (P/N 529 035 718)

2) Communication cables (P/N 529 001 052)

NEW

A01B5B5

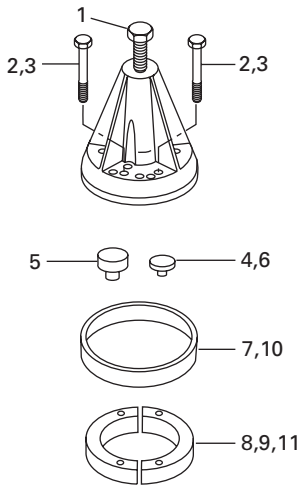
APPLICATION

All models equipped with a DESS.

ENGINE (continued) — RECOMMENDED SERVICE TOOLS

The following tools are highly recommended to optimize your basic tool kit and reduce repair time.

1-2) Crankshaft bearing puller with screw (P/N 420 877 635)



APPLICATION
All engines.

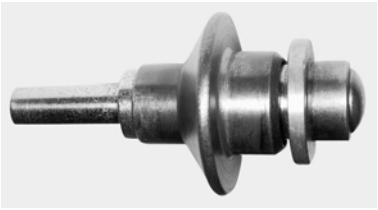
1) Screw M16 x 1.5 x 150	(P/N 420 940 755)
2) Screw M8 x 40 (4)	(P/N 420 840 681)
3) Screw M8 x 70 (4)	(P/N 420 841 201)
4) Crankshaft protector 247 engine.	(P/N 420 976 890)
5) Crankshaft protector PTO All engines except 247.	(P/N 420 876 552)
6) Crankshaft protector MAG All engines except 247.	(P/N 420 876 557)
7) Puller ring Use with half rings (P/N 420 977 475 or 420 276 025).	(P/N 420 977 490)
8) Half ring (2) For 72 mm O.D. bearings.	(P/N 420 977 475)
9) Half ring (2) For 62 mm O.D. bearings.	(P/N 420 276 025)
10) Puller ring For half rings (P/N 420 977 479).	(P/N 420 977 494)
11) Half ring For 80 mm O.D. bearings.	(P/N 420 977 479)

ENGINE (continued) — RECOMMENDED SERVICE TOOLS

Piston circlip installer

A) (P/N 529 035 561) 18 mm

B) (P/N 529 035 562) 20 mm



A00B4Y4

APPLICATION

A) All engines except 593, 670 and 693.

NOTE: This tool replaces circlip installer (P/N 529 016 900).

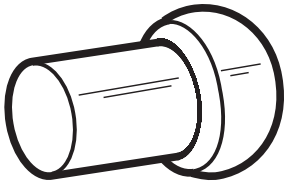
B) 593, 670 and 693 engines.

NOTE: This tool replaces circlip installer (P/N 290 877 016).

Piston pin/connecting rod bearing centering tool

(P/N 529 009 100)

NOTE: New diameter is 9.65 mm (0.380 in).



A01B1R4

APPLICATION

All engines except cageless and 670 engines.

Ring compressor

A) (P/N 420 876 090) (62 mm)

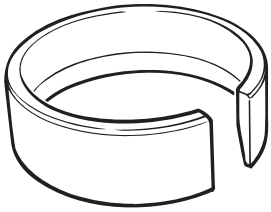
B) (P/N 420 876 974) (69.5 mm)

C) (P/N 420 876 970) (72 mm)

D) (P/N 420 876 972) (76 mm)

E) (P/N 420 876 975) (67.5 mm)

F) (P/N 529 030 800) (78 mm)



A01B1T4

APPLICATION

A) 377 engine.

B) 467 and 494 engines.

C) 503, 253 and 536 engines.

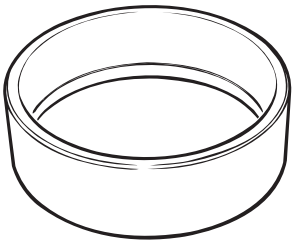
D) 582, 583 and 643 engines.

E) 443 and 447 engines.

F) 670 engine.

Magneto coil centering ring

(P/N 420 876 922)



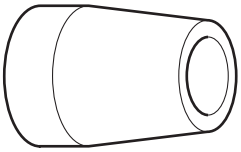
A01B1V4

APPLICATION

All engines with Nippondenso CDI (160 W).

Seal protector sleeve

(P/N 420 276 900) (MAG)



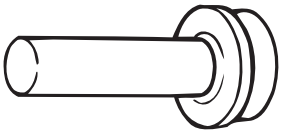
A00C0D4

APPLICATION

247 engine.

Polyamid ring pusher

(P/N 420 276 930)



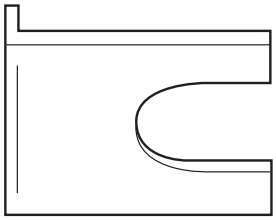
A00C0Z4

APPLICATION

247 engine.

Crankshaft feeler gauge

(P/N 420 876 620)



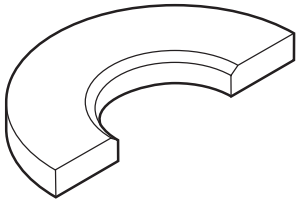
A00C114

APPLICATION

377, 443, 447 and 503 engines.

ENGINE (continued) — RECOMMENDED SERVICE TOOLS

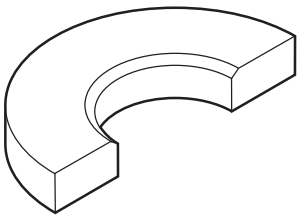
Crankshaft distance gauge
(5.7 mm)
(P/N 420 876 822)



A00C294

APPLICATION
377, 443 and 447 engines.

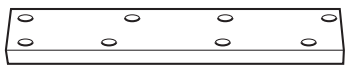
Crankshaft distance gauge
(12.7 mm)
(P/N 420 876 824)



A00C3A4

APPLICATION
503 engine.

Cylinder aligning tool
A) (P/N 420 876 904)
(on exhaust side)
B) (P/N 420 876 171)
(on intake side)



A00B084

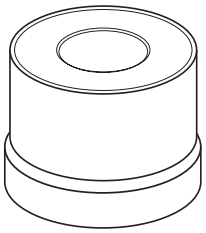
APPLICATION
A) 2-cylinder liquid cooled engines.
B) 2-cylinder fan cooled engines.

Driver tool
(P/N 529 035 521)

A00B4O4

APPLICATION
Mini Z.

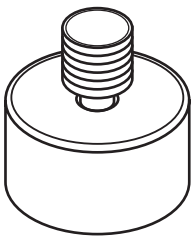
Attachment
(P/N 529 035 522)



A00B4P4

APPLICATION
Mini Z.

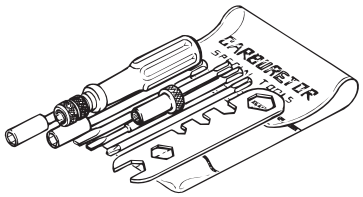
Pilot 22 mm
(P/N 529 035 523)



A00B4Q4

APPLICATION
Mini Z.

Carburetor tool kit
(P/N 404 112 000)



A00B2F4

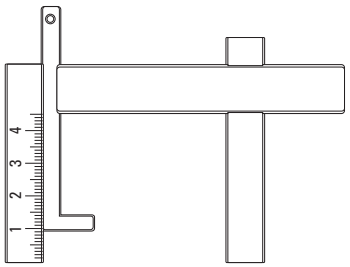
APPLICATION
All models.

Adaptor
(P/N 529 033 800)
(TYPICAL)

A00B4H4

APPLICATION
1997 and 1998 Grand Touring SE
1998 Summit x 670.

Float level gauge
(P/N 529 035 520)

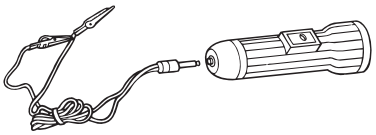


A00B4N4

APPLICATION
All models.

ENGINE (continued) — RECOMMENDED SERVICE TOOLS

Circuit tester
(continuity light)
(P/N 414 012 200)



A00C214

APPLICATION
All vehicles.

Stroboscopic timing light
(P/N 529 031 900)

A00B4F4

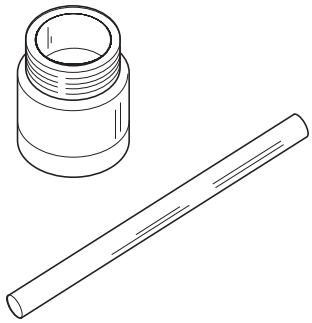
APPLICATION
All engines.

Bypass wires
(P/N 529 033 300)

A00I094

APPLICATION
360 W magneto
(Grand Touring 700/SE).

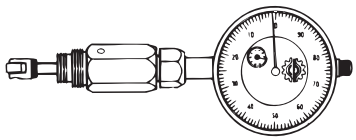
RAVE movement indicator
(P/N 861 725 800)



A18B014

APPLICATION
All RAVE equipped engines.

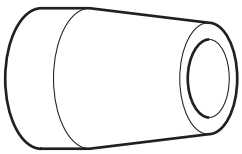
Dial indicator
(TDC gauge)
(P/N 414 104 700)



A00B4E4

APPLICATION
All engines.

Seal protector sleeve
A) (P/N 420 876 980)
B) (P/N 420 876 490)



A00C0D4

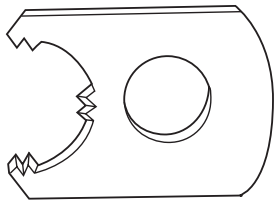
APPLICATION
A) Rotary valve engines with 10 mm shaft.
B) Rotary valve engines with 12 mm shaft.

Magneto puller
(P/N 420 976 235)

F01B294

APPLICATION
247 engine.

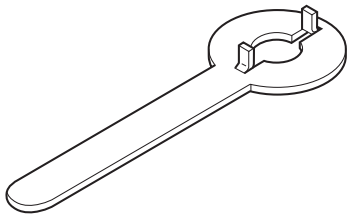
Injection pump gear holder
(P/N 420 876 695)



A00B314

APPLICATION
253, 377, 447 and 503 engines.

Injection pump gear holder
(P/N 420 277 905)

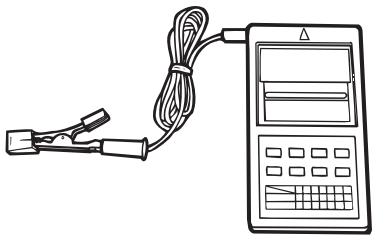


A00C164

APPLICATION
All liquid cooled engines.

ENGINE (continued) — RECOMMENDED SERVICE TOOLS

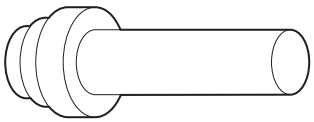
Digital/induction type tachometer
(P/N 529 014 500)



F01B1G4

APPLICATION
All engines.

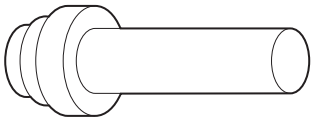
MAG seal pusher
(P/N 420 277 875)



A00C0V4

APPLICATION
277 engine.

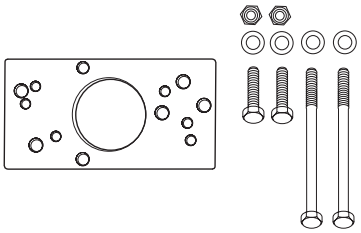
PTO seal pusher
(P/N 420 876 660)



A00C0V4

APPLICATION
277 engine.

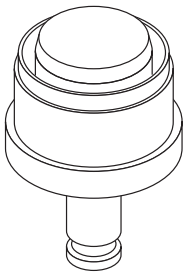
Base puller plate kit
(P/N 529 024 900)



A05C0M4

APPLICATION
277 engine.

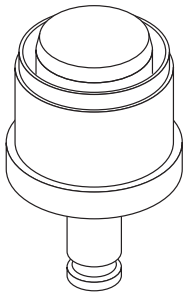
Insertion jig
(magneto side seal)
(P/N 420 876 516)



A00C3T4

APPLICATION
779 engine.

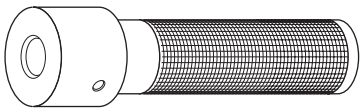
Insertion jig
(magneto seal)
(P/N 420 876 514)



A00C3U4

APPLICATION
454, 494, 599, 670, 699 and 809 engines.

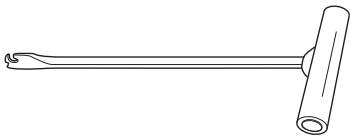
Handle for insertion jig
(P/N 420 877 650)



A00C3V4

APPLICATION
454, 494, 599, 670, 699, 779 and 809 engines.

Exhaust spring installer/remover
(P/N 529 035 559)

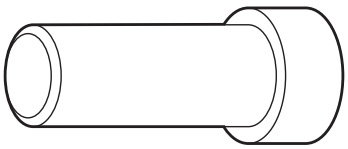


A00C3S4

APPLICATION
All models except CK3 series.

NOTE: This tool replaces exhaust spring installer/remover (P/N 529 028 100).

Rotary valve seal and
shaft pusher
(P/N 420 876 605)



A00C0Y4

APPLICATION
Rotary valve engines 1990 models and older.

ENGINE (continued) — RECOMMENDED SERVICE TOOLS

Seal pusher (rotary valve)
(P/N 420 876 510)

A00C374

APPLICATION

All rotary valve shaft seals with a 12 mm I.D.

Rotary valve shaft pusher
(P/N 420 876 610)

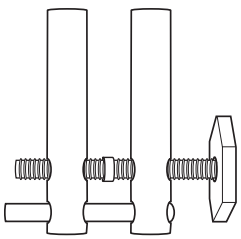
A00C0F4

APPLICATION

All rotary valve engines with 12 mm shaft.

Large hose pincher
(P/N 529 032 500)

(TYPICAL)



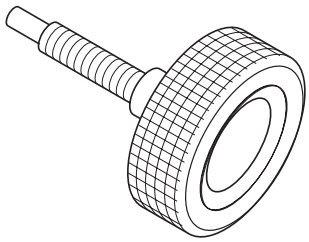
F01B234

APPLICATION

All vehicles.

TRANSMISSION — MANDATORY SERVICE TOOLS

Driven pulley opening tool
(P/N 529 017 200)



A00A1A4

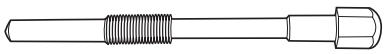
APPLICATION
All non-RER models.

Clutch holder
(P/N 529 006 400)

A01B154

APPLICATION
All TRA drive pulleys.

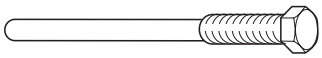
TRA drive pulley puller
(P/N 529 022 400)



A06B014

APPLICATION
TRA drive pulley for the 454, 494, 599, 670, 699, 779 and 809 engines.

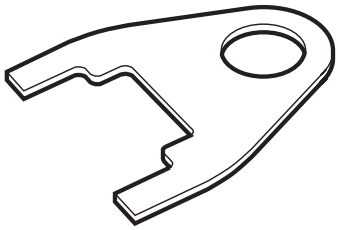
TRA drive pulley puller
(P/N 529 007 900) (25 mm)



A18B044

APPLICATION
TRA drive pulley for 443, 467, 503, 536 and 537 engines.

Forks (3)
(P/N 529 005 500)

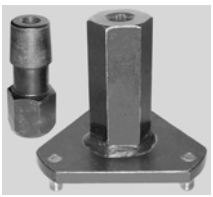


A16B014

APPLICATION
All vehicles equipped with a TRA drive pulley.

Tool kit
(P/N 529 025 400)

NEW



A00B5N4

APPLICATION
Comet® 102C drive pulley.

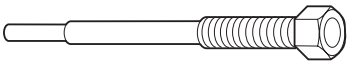
Drive pulley puller
(P/N 529 025 000)

NEW

A00B5M4

APPLICATION
Comet® 102C drive pulley.

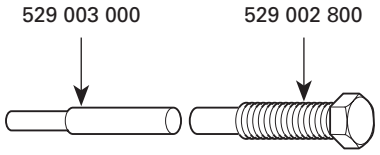
Drive pulley puller
(P/N 529 002 100)
(standard threads)



A00C084

APPLICATION
Square shaft, standard (SAE) threads.

Drive pulley puller
(P/N 860 414 200)
(square shaft metric)
Consists of:



A00C095

APPLICATION
Square shaft, metric threads drive pulley.

TRANSMISSION (continued) — MANDATORY SERVICE TOOLS

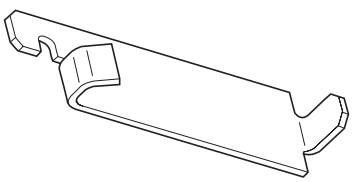
Transmission alignment bar
A) (P/N 529 026 900)
B) (P/N 529 030 000)
C) (P/N 529 035 586)
D) (P/N 529 026 700)
E) (P/N 529 035 530)
F) (P/N 529 031 000)
G) (P/N 529 035 527)
H) (P/N 529 035 572)
I) (P/N 529 035 594)

A01B4D4

APPLICATION
A) Tundra II LT/R.
B) S-Series with Bombardier Lite.
C) S-Series with Bombardier Lite and RER.
D) F-Series, S-Series and ZX series with TRA.
E) S-Series with TRA and RER.
F) Skandic WT LC/SWT.
G) CK3 series except 1998 Mach Z series.
H) 1998 Mach Z series.
I) CK3 series with RER.

Spring scale hook (long)
A) (P/N 529 006 500)
B) (P/N 529 030 900)
C) (P/N 529 035 557)

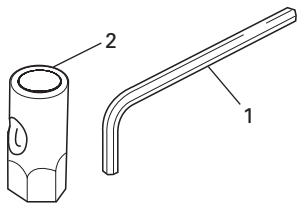
(TYPICAL)



A00B4A4

APPLICATION
A) Tundra II LT.
B) F-Series and S-Series (1995 and newer).
C) CK3 without RER.

Drive belt tension adjuster tool
(P/N 529 008 700)

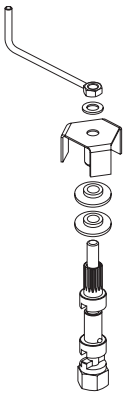


A15B044

Parts included:
1) Hexagonal wrench (P/N 420 876 730).
2) Socket wrench (P/N 529 015 000).

APPLICATION
All vehicles except Élan, Tundra II and Skandic WT.

Pulley spring compressor
(P/N 529 035 524)

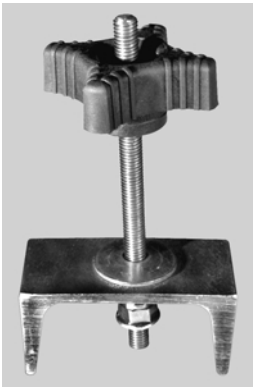


A02D1P4

APPLICATION
All models.

NOTE: This tool has Acme threads and replaces spring compressor (P/N 529 018 600).

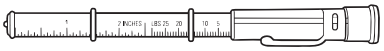
Driven pulley spring compressor
(P/N 529 035 300)



A05B034

APPLICATION
Tundra R.

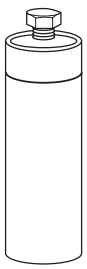
Tension tester
(P/N 414 348 200)



A00C074

APPLICATION
All models.

Countershaft bearing installer
(P/N 529 030 200)

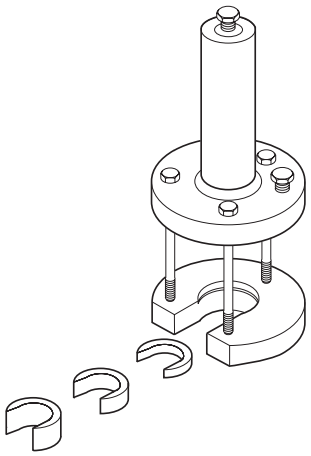


A00A194

APPLICATION
S-Series and F-Series.

TRANSMISSION (continued) — MANDATORY SERVICE TOOLS

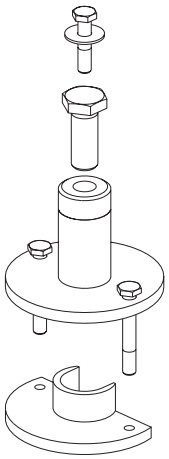
Countershaft bearing remover
(P/N 529 030 100)



A00A274

APPLICATION
S-Series and F-Series.

Countershaft bearing remover/installer
(P/N 529 035 554)

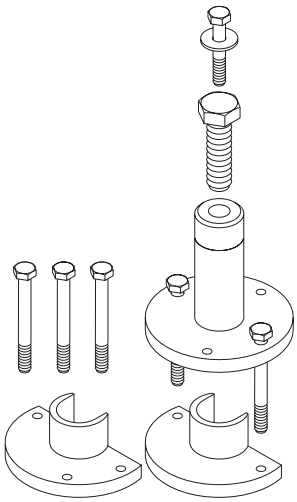


A01B5C4

APPLICATION
CK3 series.

Countershaft bearing remover/installer
(P/N 529 035 699)

NEW

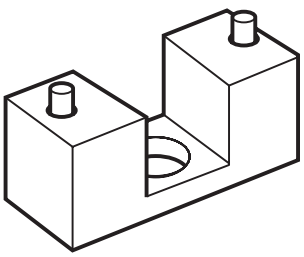


A00B5K4

APPLICATION
ZX and CK3 Series.

NOTE: This tool replaces CK3 series countershaft bearing remover/installer (P/N 529 035 554).

Spring cover tool
(P/N 529 027 300)



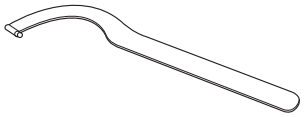
A01B4M4

APPLICATION
Bombardier Lite drive pulley.

TRANSMISSION (continued) — RECOMMENDED SERVICE TOOLS

The following tools are highly recommended to optimize your basic tool kit and reduce repair time.

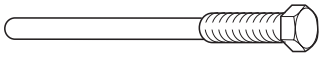
Clutch holder
(P/N 529 027 600)



A02B034

APPLICATION
Bombardier Lite drive pulley.

Drive pulley puller
(P/N 529 031 400)



A18B044

APPLICATION
Bombardier Lite drive pulley, except Élan.

Driven pulley opening tool
(P/N 529 035 501)

A03D2P4

APPLICATION
S and CK3 series with RER.

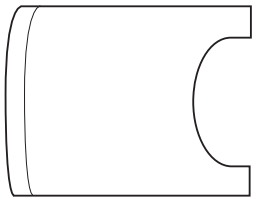
NOTE: This tool replaces driven pulley opening tool (P/N 529 019 500).

Driven pulley opening tool
(P/N 529 034 200)

A05B044

APPLICATION
Tundra R.

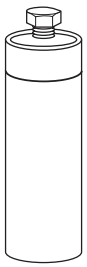
Alignment tool
(P/N 420 476 010)



A00C1D4

APPLICATION
Skandic WT and Alpine II gearbox.

Countershaft bearing installer
(P/N 529 018 800)

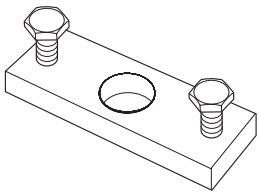


A00A194

APPLICATION
PRS chassis.

TRANSMISSION (continued) — RECOMMENDED SERVICE TOOLS

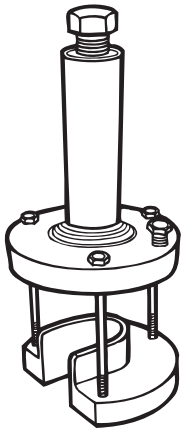
Cam pusher
(P/N 529 012 900)



A18B064

APPLICATION
Tundra II LT.

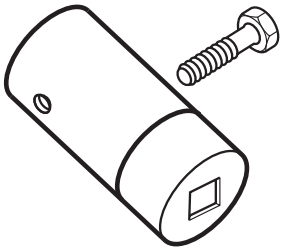
Countershaft bearing remover
(P/N 529 018 700)



A00A164

APPLICATION
PRS chassis.

Drive pulley puller
(P/N 529 023 100)



A00C3J4

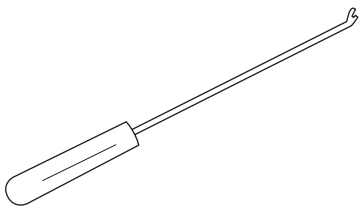
APPLICATION
Élan.

Transmission ball mounting pin
(P/N 420 476 020)

A00C1C4

APPLICATION
Alpine II 3-speed gearbox.

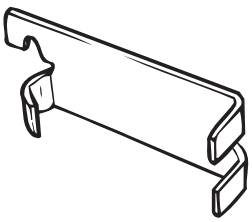
Transmission adjuster
(P/N 529 028 500)



A00D0X4

APPLICATION
F-Series equipped with "twist shifter" reverse transmission.

Spring scale hook (long)
(P/N 529 015 200)



A01B514

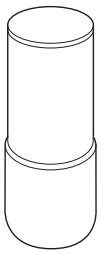
APPLICATION
1994 models and older except Alpine II.

Alignment bar
A) (P/N 529 025 600)
B) (P/N 529 028 200)
C) (P/N 529 028 300)
D) (P/N 529 026 800)
E) (P/N 529 031 000)

A01B4D4

APPLICATION
A) PRS chassis.
B) Alpine II.
C) Élan.
D) Safari L.
E) Skandic WT 1996.

Burnishing bar
(P/N 529 026 402)

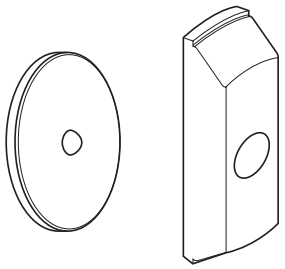


A00B464

APPLICATION
Tundra II LT, Safari L and Skandic.

TRANSMISSION (continued) — RECOMMENDED SERVICE TOOLS

Large bushing extractor
(P/N 529 031 100)



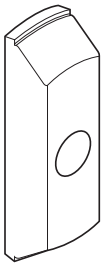
A00B4I4

APPLICATION

Formula type driven pulley.

NOTE: Use this tool only with former puller (P/N 529 018 600) that has regular threads.

Large bushing extractor
(P/N 529 035 576)



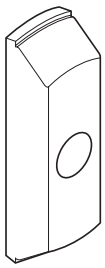
A02D1Q4

APPLICATION

Formula type driven pulley.

NOTE: Use this tool only with new puller (P/N 529 035 524) that has Acme threads and support plate included with extractor (P/N 529 031 100).

Large bushing extractor
(P/N 529 035 575)



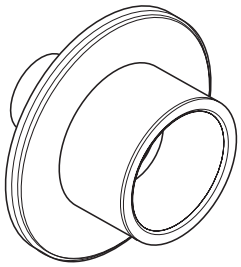
A02D1Q4

APPLICATION

LPV 27 driven pulley.

NOTE: Use this tool only with new puller (P/N 529 035 524) that has Acme threads and support plate included with extractor (P/N 529 031 100).

Large bushing installer and small bushing extractor
(P/N 529 031 200)

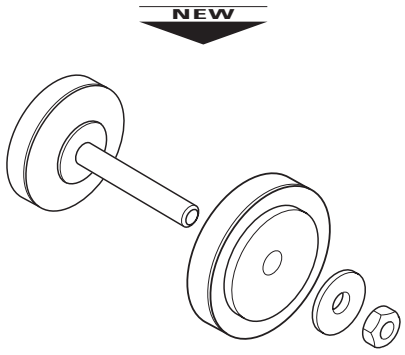


A00B4J4

APPLICATION

All models except Tundra/R, Skandic WT/SWT/WT LC and S-Series with RER.

Chaincase seal pusher
(P/N 529 035 584)



A00B504

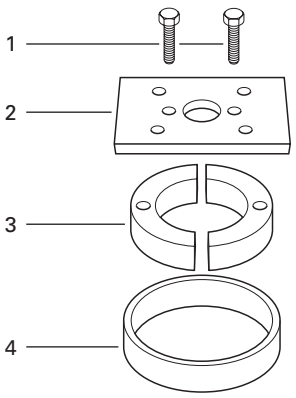
APPLICATION

S, F, CK3 and ZX series.

NOTE: This tool replaces chaincase upper seal pusher (P/N 529 032 300).

3-speed transmission bearing extractor

1) Screw M8 x 25 (2) (P/N 207 182 544)
2) Plate
3) Half ring (2) (P/N 420 876 330)
4) Ring (P/N 420 977 480)



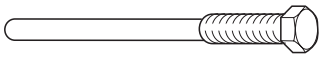
A00C1B4

APPLICATION

Alpine II 3-speed transmission.

TRANSMISSION (continued) — RECOMMENDED SERVICE TOOLS

TRA drive pulley puller (27 mm)
(P/N 529 010 100)

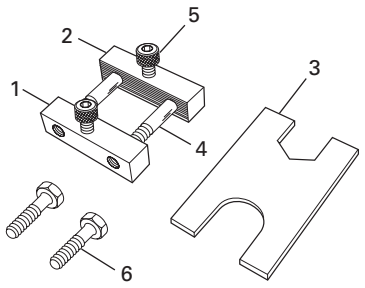


A18B044

APPLICATION

TRA drive pulley (27 mm) shaft except 454, 670 and 779 engines.

Drive axle sprocket adjuster
(P/N 861 725 700)



A01B2O4

Parts included in the kit:

1) Block with threads
   (P/N 529 010 700)
2) Block without threads
   (P/N 529 010 800)
3) Plate
   (P/N 529 010 600)
4) Bolt M10 (2)
   (P/N 222 007 565)
5) Allen screw M8 (2)
   (P/N 222 983 065)
6) Screw M8 (2)
   (P/N 222 082 565)

NOTE: When the tool is to be used between tunnel and sprocket use screws M8.

APPLICATION

All vehicles except Élan.

Transmission adjuster
(P/N 529 030 300)

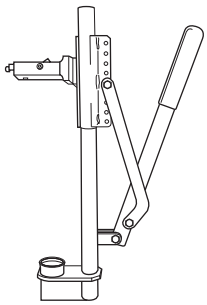
A03D1T4

APPLICATION

Vehicles equipped with "push-pull shifter" reverse transmission.

SUSPENSION — MANDATORY SERVICE TOOLS

Shock spring removal kit
(P/N 529 035 504)
Replacement clevis pin:
(P/N 414 528 400)



A01B4O4

APPLICATION

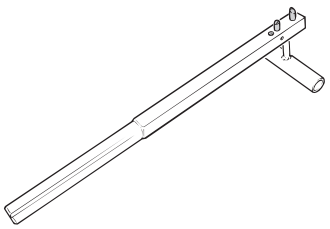
All suspensions with coil spring.

NOTE: The previous shock spring removal kit (P/N 529 027 100) can be upgraded by replacing the stopper with a wider stopper (P/N 529 035 551).

SUSPENSION (continued) — RECOMMENDED SERVICE TOOLS

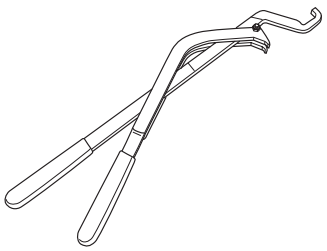
A) Track cleat remover
(P/N 529 008 200)
Pins
(P/N 529 008 204)

NOTE: Pins can be rotated 180° depending on whether the tool is used by a left-hander or right-hander.



A01B1J4

B) Track cleat remover
(P/N 529 028 700)



A01F224

APPLICATION

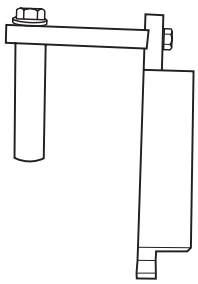
A) 1993 and older.

B) 1994 and newer except Élan and Tundra II.

Camber angle tool
(P/N 529 021 600)

NOTE: Angle finder with a magnetic base must be used.

Suggestion: K-D tool no. 2968

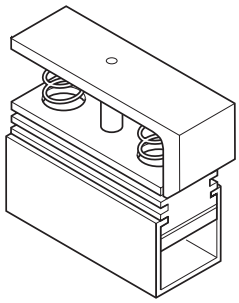


A06B024

APPLICATION

All DSA front suspensions.

Track tension gauge
(P/N 529 021 500)



A00B3X4

APPLICATION

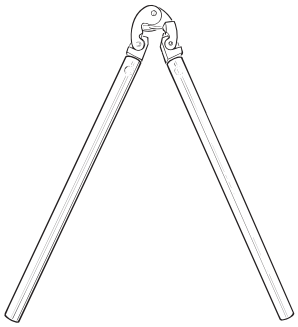
All models except Élan.

Track cleat installer

A) (P/N 529 008 500)
Narrow

B) (P/N 529 028 800)
Narrow

C) (P/N 529 007 700)
Wide



A01B1M4

APPLICATION

A) 1993 and older.

B) 1994 and newer.

C) 1992 and older with wide cleat opening.

Dome guide
(P/N 529 026 500)

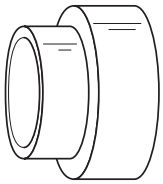
A06F1B4

APPLICATION

T/A shocks.

SUSPENSION (continued) — RECOMMENDED SERVICE TOOLS

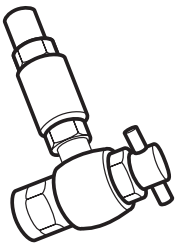
Piston guide
A) (P/N 529 026 600)
B) (P/N 529 035 608)



A06F1C4

APPLICATION
A) Most T/A shocks.
B) C-46 T/A shocks.

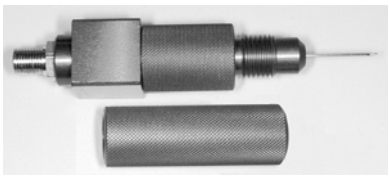
Gas shock valve tool
(tire valve type)
(P/N 529 035 570)



A02F134

APPLICATION
1999 and older T/A shocks and some 2000 and up T/A shocks.

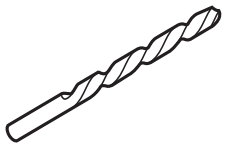
Tool for shock (needle type)
(P/N 529 035 614)



A00B5I4

APPLICATION
Most 2000 and up T/A shocks.

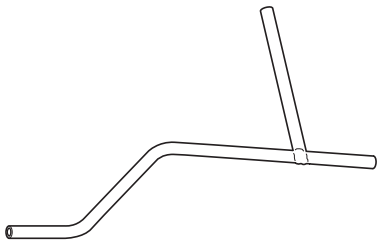
Drill bit
(P/N 529 031 800)



A01B564

APPLICATION
All 3/16 inch rivets.

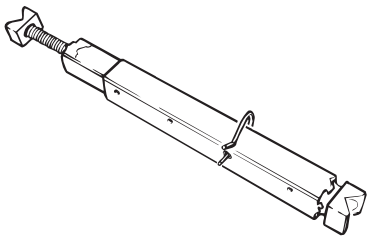
Spring installer (bar)
(P/N 529 005 000)



A00C1I4

APPLICATION
Tundra II LT, Scout and all SC-10 suspensions.

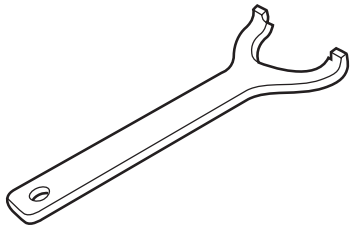
Drive axle holder
(P/N 529 007 200)



A01B1E4

APPLICATION
All models.

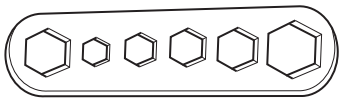
Kayaba shock adjustment tool
(P/N 529 035 582)



A00A1K4

APPLICATION
C-7 suspension.

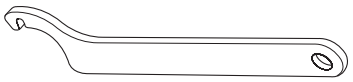
Hexagonal wrench
(P/N 529 014 700)



A19B024

APPLICATION
All SC-10 suspensions, Safari and Skandic prior to 1995.

Suspension adjustment wrench
(P/N 529 017 100)



A15B094

APPLICATION
1992 and old Formula C-7.

Suspension adjustment wrench
(P/N 529 032 900)

A02F114

APPLICATION
ARM and SC 10 II suspensions.

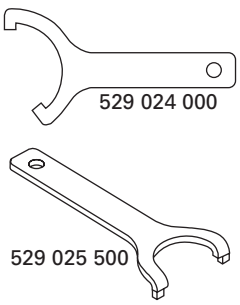
SUSPENSION (continued) — RECOMMENDED SERVICE TOOLS

Suspension adjustment wrench
(P/N 529 034 100)

A02F124

APPLICATION
CK3 series.

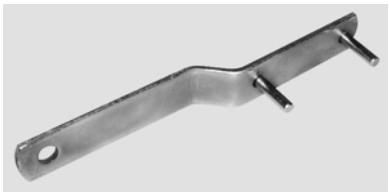
Adjustment wrench
(P/N 861 743 900)
Consists of:



A00B4B4

APPLICATION
1998 and older models with T/A shock.

Adjustment wrench
(P/N 520 000 126)



A00B5H4

APPLICATION
SC-10 II (coupling blocks).

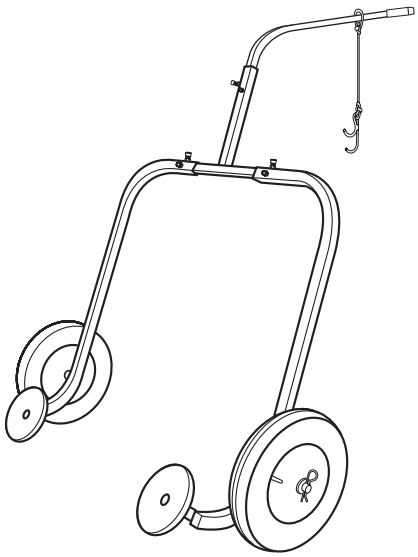
VEHICLES — RECOMMENDED SERVICE TOOLS

Protective mat
(P/N 529 030 600)

A01B45W

APPLICATION
All vehicles.

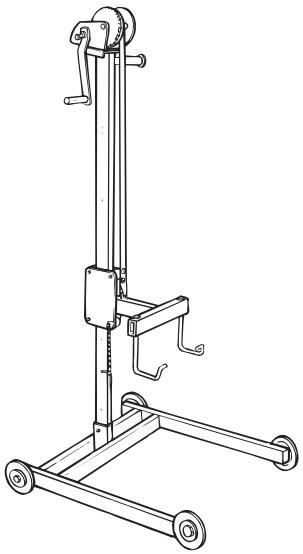
Dolly
(P/N 529 029 900)



A00B4CJ

APPLICATION
All models.

Snowmobile jack
(P/N 529 020 000)



A01A1JJ

APPLICATION
All models.

VEHICLES (continued) — RECOMMENDED SERVICE TOOLS

Template for hood drilling
(P/N 529 034 400)

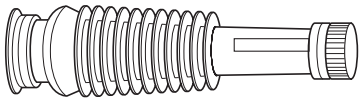
A02H154

APPLICATION

S-Series.

NOTE: To drill new hood prior to install meters.

Flexible spout for oil container
(P/N 414 837 300)

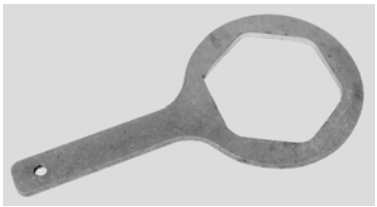


F04B044

APPLICATION

All models.

Adjustment wrench
(P/N 529 035 603)



A32B044

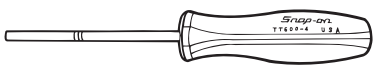
APPLICATION

To remove and install fuel tank nut on ZX series.

Terminal (Packard) remover
Not sold by Bombardier

Snap-on
TT 600-4

NEW



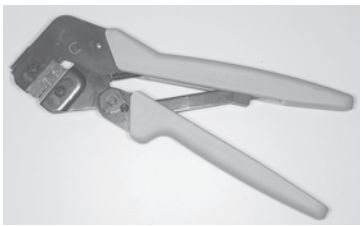
F01B1J4

APPLICATION

Models with Packard connectors.

Crimping tool
(P/N 295 100 164)

NEW



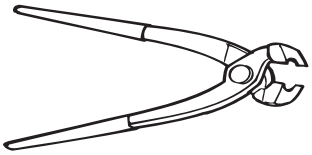
F00B0E4

APPLICATION

Models with AMP connectors.

Hose clamp pliers
(P/N 295 000 070)

NEW



F01D174

APPLICATION

Some models.

SERVICE PRODUCTS

MANDATORY SERVICE PRODUCTS

Retaining compound
(P/N 413 703 100)
Loctite® RC/609:
Retaining compound (10 mL) (green)

A00B2S4

APPLICATION

Used for retaining bushings, bearings in slightly worn housing or on shaft.

Sealing compound
(P/N 420 297 906)

A00B564

APPLICATION

To seal crankcase on all ZX series engines.

NOTE: This product replaces the larger tube (P/N 420 297 905).

Paste gasket
(P/N 413 702 700)
Loctite® 515:
Gasket eliminator (50 mL)

A00B2T4

APPLICATION

Crankcase halves and gearbox mating surfaces.

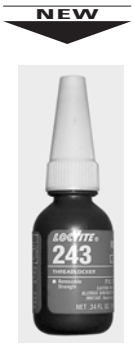
Paste gasket
(P/N 293 800 038)
Loctite® 518:
Gasket eliminator (50 mL)

F01B124

APPLICATION

Crankcase halves and gearbox mating surfaces.

Medium-strength threadlocker
(P/N 293 800 060)
Loctite® 243:
Threadlocker (10 mL)
(blue, medium strength)



F00A0O4

APPLICATION

Flywheel nut, crankcase studs, etc.

NOTE: This product replaces Loctite 242 (P/N 293 800 015).

High strength threadlocker
(P/N 293 800 005)
Loctite® 271:
Threadlocker (10 mL)
(red, high strength)

A00B2U4

APPLICATION

Fasteners and studs up to 25 mm (1 in) diameter.

MANDATORY SERVICE PRODUCTS (continued)

Gasket/paint remover
(P/N 413 708 500)
Loctite® Chisel
510 g (18 oz)

A00B574

APPLICATION

Clean mating surfaces of cylinders and crankcase. Remove carbon in combustion chambers.

Loctite® primer
(P/N 293 800 041)
Primer N
128 g (5 oz)

A00B3N4

APPLICATION

To prepare mating surfaces before applying paste gasket, retaining compound or threadlockers.

NOTE: Only the P/N has been changed. This product is identical to the P/N 413 708 100.

Molykote PG 54
(P/N 420 899 763)
(10 g)

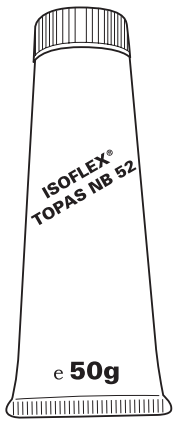
NEW

A00B5F4

APPLICATION

Lubricate pawl and pawl lock of rewind starter.

Grease Isoflex
(P/N 293 550 021)
(50 g)



A00B554

APPLICATION

To lubricate some crankshaft bearings on some engines.

Petamo grease
(P/N 420 899 271)

A00B584

APPLICATION

To lubricate lip of all ZX series engine crankshaft seals.

RECOMMENDED SERVICE PRODUCTS

Premix oil
(P/N 413 803 100)
(12 x 500 mL)

A00B5L4

APPLICATION
All pre-mix models.

BOMBARDIER injection oil
(P/N 413 802 900)
(12 x 1 liter)
(P/N 413 803 000)
(3 x 4 liter)
(P/N 413 803 200)
(205 liter)

F01B2H4

APPLICATION
All engines.

BOMBARDIER Formula XP-S synthetic injection oil
(P/N 413 710 500)
(12 x 1 liter)
(P/N 413 711 000)
(3 x 4 liter)
(P/N 413 710 700)
(205 liter)

A02F144

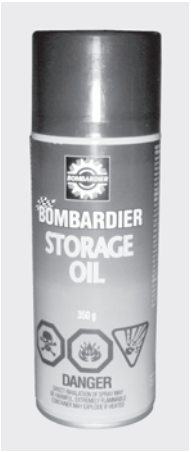
APPLICATION
All engines.

Premixed coolant - 52°C (- 62°F)
(P/N 413 711 802)
(16 x 1 L)

A00B5E4

APPLICATION
All liquid cooled models.

Storage oil
(P/N 413 711 600)
(350 g spray can) (12 x 350 g)



A02B054

APPLICATION
All models.

NOTE: Only the P/N has been changed. This product is identical to the P/N 496 014 100.

Fuel stabilizer
(P/N 413 408 600)
(12 x 8 oz)

A00B3V4

APPLICATION
All models.

RECOMMENDED SERVICE PRODUCTS (continued)

Chaincase oil
(P/N 413 801 900)
(16 x 250 mL)

A00B2R4

APPLICATION

Chaincase lubricant on all fan-cooled models except Skandic WT series.

Synthetic chaincase oil
(P/N 413 803 300)
(12 x 355 mL)

A01B4Q4

APPLICATION

Chaincase lubricant on all liquid-cooled models and Skandic WT series.

Grease LMZ no. 1
(P/N 413 707 500)
(400 g)

A00B1Y4

APPLICATION

Mainly used between regulators or rectifiers and frame to transfer the heat build-up and to assure a good ground.

Synthetic grease
(P/N 413 711 500)
(400 g)

A01B574

APPLICATION

For front and rear suspension components and drive axle bearing.

Super Lube (grease)
(P/N 293 550 014)

A00B474

APPLICATION

Exhaust tail pipe grommet.

BOMBARDIER LUBE
(P/N 293 600 016)
(12 x 14 oz)

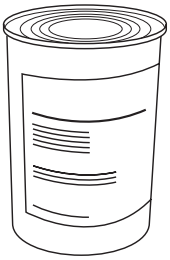
A00B4W4

APPLICATION

Steering ball joints on all models.

Shock oil
(P/N 293 600 035)
(32 oz)

(TYPICAL)



A02F154

APPLICATION

T/A shocks.

RECOMMENDED SERVICE PRODUCTS (continued)

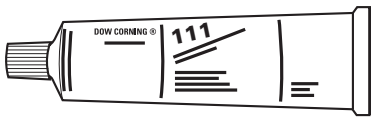
Anti-seize lubricant
(P/N 293 800 070)
Loctite anti-seize lubricant 236 mL (8 oz)

A00B594

APPLICATION

Mounting surfaces of driven pulley and brake disc on countershaft.

Molykote 111
(P/N 413 707 000)

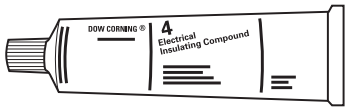


A00B3W4

APPLICATION

Crankshaft seals on all engines except ZX series ones.

Silicone dielectric grease
(P/N 293 550 004)
(3 oz)



A00B1X4

APPLICATION

On all electric connections. High tension coil and spark plug connections. Connector housings, etc.

NOTE: Only the P/N has been changed. This product is identical to the P/N 413 701 700.

Parts cleaner
(P/N 413 711 809)
(320 g)

A00B4X4

APPLICATION

Engine crankcase joining surfaces, pulleys and any greasy surfaces.

Bombardier cleaner
(P/N 293 110 001)
(400 g)
(P/N 293 110 002)
(4 L)

F01B2J4

APPLICATION

All models.

Plastic & vinyl cleaner
(P/N 413 711 200)
(6 x 1 L)

A00B4V4

APPLICATION

Hood, bottom pan and seat.

RECOMMENDED SERVICE PRODUCTS (continued)

High temperature threadlocker
(P/N 413 711 400)
Loctite 648 (green) (5 mL)

A00B3D4

APPLICATION
To fasten oil injection nozzle to crankcase.

NOTE: Only the P/N has been changed. This product is identical to the P/N 420 899 788.

Pipe sealant
(P/N 293 800 018)
Loctite 592 (50 mL)

A00B2W4

APPLICATION
Engine plugs and senders.

NOTE: Only the P/N has been changed. This product is identical to the P/N 413 702 300.

Clear silicone
(P/N 293 800 033)

F01B1S4

APPLICATION
All models to seal bottom pan.

High temperature RTV sealant
(P/N 413 710 300)
Ultra Copper
(80 mL)

A00B5A4

APPLICATION
All models.

General purpose instant adhesive
(P/N 293 800 021)
Loctite 495 (3 g)

A00B2V4

APPLICATION
Rubber to metal bonding and most hard plastic.

NOTE: Only the P/N has been changed. This product is identical to the P/N 413 703 200.

Gel instant adhesive
(P/N 413 708 300)
Loctite 454-40
20 g (.70 oz)

A00B3O4

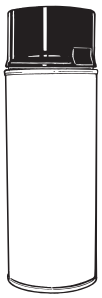
APPLICATION
Isolating foam and rubber strip.

Tough adhesive
(P/N 413 408 300)
Loctite Black Max
3 mL (.10 oz)

A00B3P4

APPLICATION
Shifter boot or grip.

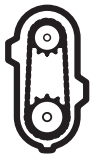
Paint for frame touch-up
(P/N 413 401 000)
Black semi-gloss
(spray can)



A00B3H4

APPLICATION
All models with a black frame.

PERIODIC MAINTENANCE CHART

SYSTEM	PART/TASK	10-HOUR OR 500 km (300 mi) INSPECTION (to be performed by dealer)	WEEKLY OR EVERY 240 km (150 mi)	MONTHLY OR EVERY 800 km (500 mi)	ONCE A YEAR OR EVERY 3200 km (2000 mi)	STORAGE (to be performed by dealer)	PRE-SEASON PREPARATION (to be performed by dealer)	REFER TO
	Rewind Starter Lubrication and Rope Condition					✔	✔	Subsection 04-07
	Engine Head Nuts	✔			✔	✔		Appropriate section: See Top End
	Engine Mount Nuts	✔			✔	✔		Appropriate section: See ENGINE REMOVAL
	Exhaust System	✔		✔		✔		Appropriate section: See ENGINE REMOVAL
	Engine Lubrication					✔	✔	This section no. 1
	Cooling System Condition	✔			✔		✔	Subsection 04-06
	Coolant Replacement					✔		Subsection 04-06
	Condition of Seals					✔	✔	Subsection 04-02
	Injection Oil Filter Condition			✔				Subsection 04-05
	Injection Oil Filter Replacement					✔		Subsection 04-05
	Oil Injection Pump Adjustment	✔			✔		✔	Subsection 04-05
	Fuel Stabilizer					✔		This section no. 2
	Fuel Filter Replacement						✔	This section no. 3
	Fuel Lines and Connections	✔				✔	✔	Subsection 04-09
	Carburetor Adjustment	✔			✔		✔	Subsection 04-08
	Throttle Cable Inspection	✔			✔	✔	✔	Subsection 04-09
	Air Filter Cleaning			✔			✔	This section no. 4
	Drive Belt Condition	✔	✔				✔	This section no. 5
	Condition of Drive and Driven Pulleys	✔		✔		✔		Subsections 05-03 and 05-04
	Cleaning of Drive and Driven Pulleys						✔	Subsections 05-03 and 05-04
	Retorquing of Drive Pulley Screw	✔						Subsection 05-03
	Driven Pulley Preload	✔			✔	✔		Subsection 05-04
	Brake Fluid Level	✔	✔				✔	Subsection 05-06
	Brake Fluid Change (once a year)					✔		Subsection 05-06
	Brake Condition	✔	✔			✔	✔	Subsection 05-06
	Brake Adjustment			✔		✔		Subsection 05-06
	Drive Chain Tension	✔		✔		✔		Subsection 05-07
	Countershaft Lubrication**	✔		✔		✔		Subsection 05-06
	Chaincase Oil Level	✔		✔			✔	Subsection 05-07
	Chaincase Oil Change	✔				✔		Subsection 05-07
	Lubrication of Drive Axle Bearing**	✔		✔		✔		Subsection 07-03

SYSTEM	PART/TASK	10-HOUR OR 500 km (300 mi) INSPECTION (to be performed by dealer)	WEEKLY OR EVERY 240 km (150 mi)	MONTHLY OR EVERY 800 km (500 mi)	ONCE A YEAR OR EVERY 3200 km (2000 mi)	STORAGE (to be performed by dealer)	PRE-SEASON PREPARATION (to be performed by dealer)	REFER TO
	Handlebar Bolts. Retorque to 26 N•m (19 lbf•ft)	✔				✔		Subsection 08-02
	Steering and Front Suspension Mechanism Condition	✔		✔		✔		Subsections 08-02 and 08-03
	Steering and Front Suspension Mechanism Lubrication**	✔		✔		✔		Subsections 08-02 and 08-03
	Wear and Condition of Skis and Runners	✔	✔			✔		Subsection 08-03
	Steering and Ski Leg Camber Adjustment	✔		✔		✔		Subsection 08-02
	Suspension Adjustments	AS REQUIRED						Subsection 07-02 and *Operator's Guide*
	Suspension Lubrication**				✔	✔		Subsection 07-02
	Suspension Condition	✔		✔		✔		Subsection 07-02
	Suspension Stopper Strap Condition				✔	✔		Subsection 07-02
	Track Condition	✔		✔		✔		Subsection 07-04
	Track Tension and Alignment	✔	AS REQUIRED					Subsection 07-04
	Spark Plugs*	✔		✔			✔	Subsection 06-03
	Engine Timing	✔					✔	Subsection 06-02
	Battery Condition	✔		✔		✔	✔	Subsection 06-04
	Headlight Beam Aiming				✔		✔	Subsection 09-02
	Wiring Harnesses, Cables and Lines	✔		✔		✔		Subsection 09-02
	Operation of Lighting System (HI/LO beam, brake light, etc.) Test Operation of Emergency Cut-Out Switch and Tether Cut-Out Switch	✔	✔			✔		*Operator's Guide*
	Rags in Air Intake and Exhaust System					✔	✔	This section no. 5
	Engine Compartment	✔		✔		✔		This section no. 6
	Vehicle Cleaning and Protection	✔		✔		✔		This section no. 7

* Before installing new spark plugs at pre-season preparation, it is suggested to burn excess storage oil by starting the engine with the old spark plugs. Only perform this operation in a well-ventilated area.

**Lubricate whenever the vehicle is used in wet conditions (wet snow, rain, puddles).

NO. 1 ENGINE LUBRICATION

At Storage

Engine internal parts must be lubricated to protect them from possible rust formation during the storage period.

Proceed as follows:

Start the engine and allow it to run at idle speed until the engine reaches its operating temperature.

⚠ WARNING

Ensure the track is free of all particles which could be thrown out while it is rotating. Keep hands, tools, feet and clothing clear of track. Ensure no one is standing in close proximity to the vehicle.

Stop the engine.

Remove air silencer to spray storage oil (P/N 496 014 100) into each carburetor bore.

Restart engine and run at idle speed.

Inject storage oil until the engine stalls or until a sufficient quantity of oil has entered the engine (approximately half a can).

With the engine stopped, remove the spark plug and spray storage oil (P/N 496 014 100) into each cylinder.

Crank slowly 2 or 3 revolutions to lubricate cylinders.

Reinstall the spark plugs and the outlet primer hose or air silencer.

⚠ WARNING

This procedure must only be performed in a well-ventilated area. Do not run engine during storage period.

At Pre-Season Preparation

Add 500 mL (17 U.S. oz) of recommended injection oil to the first full filled fuel tank.

NO. 2 FUEL STABILIZER

With the new fuel additives, it is critical to use the fuel stabilizer (P/N 413 408 600) (250 mL) to prevent fuel deterioration, gum formation and fuel system components corrosion. Follow manufacturer's instructions for proper use.

Pour fuel stabilizer in fuel tank prior to starting engine for internal parts lubrication so that stabilizer flows everywhere in fuel system.

After engine starting, use primer several times so that stabilizer flows inside it.

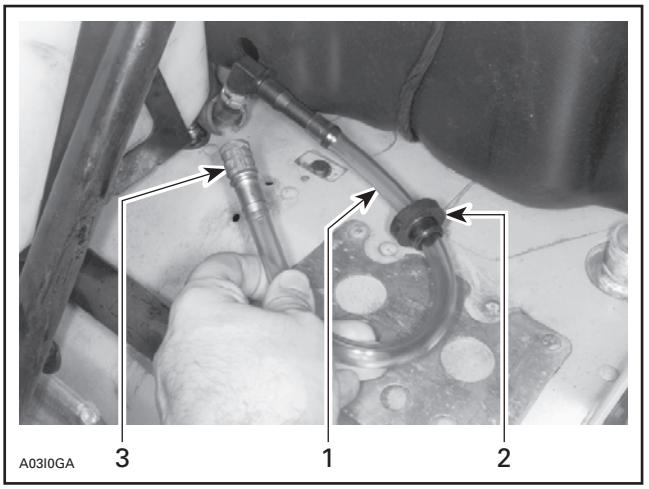
Do not drain fuel system.

CAUTION: Fuel stabilizer should be added prior engine lubrication to ensure carburetor(s) protection against varnish deposit.

NO. 3 FUEL FILTER REPLACEMENT

Drain fuel tank.

Remove fuel line grommet from fuel tank and pull out inlet fuel line from tank.



TYPICAL

1. *Inlet fuel line*
2. *Position of grommet when installing*
3. *Fuel filter*

Replace fuel filter. To facilitate the fuel line installation, slide grommet on fuel line about 50 mm (2 in) away from elbow then install grommet on fuel tank and push elbow through grommet.

NO. 4 AIR FILTER CLEANING

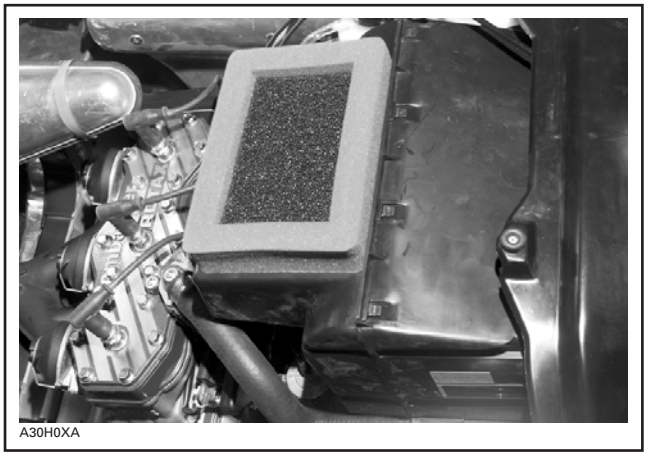
CAUTION: These snowmobiles have been calibrated with the filter installed. Operating the snowmobile without it may cause engine damage.

Remove air filter from air deflector by pulling it.

Lift hood and remove air filter from air intake silencer.

To clean the filter, shake the snow out of it then, dry it out.

Check that the air box is clean and dry then properly reinstall the filter.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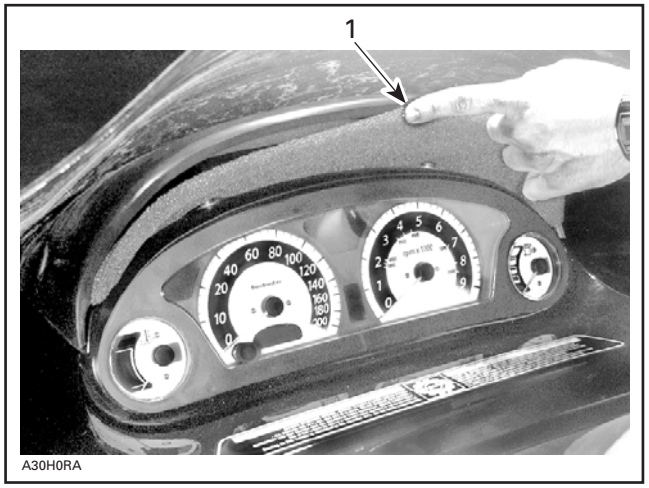
AIR FILTER INSTALLED

Insert air filter so its top edge is flush with air deflector.



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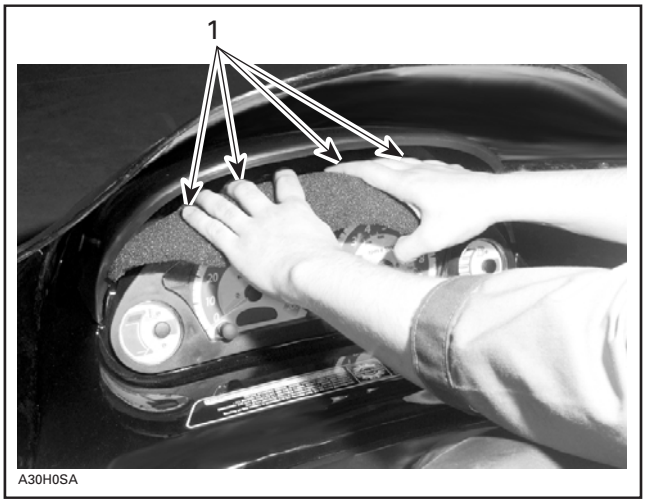
TYPICAL

1. Top edge of filter flush with air deflector

Reinstall filter over dashboard sticking bottom edge first.

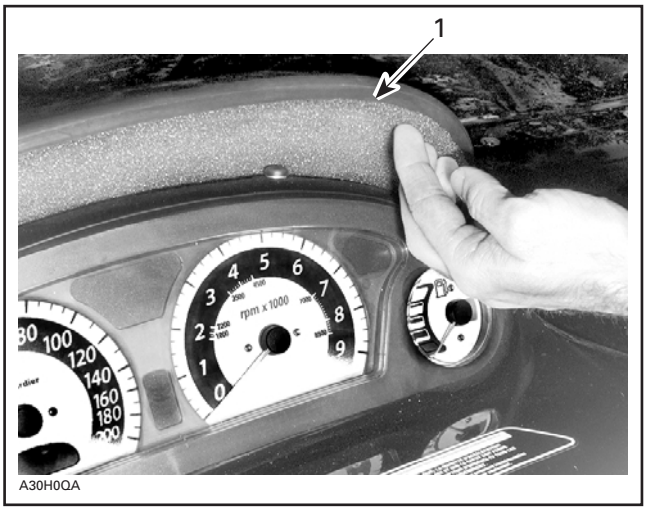


A30H0SA

TYPICAL

1. Stick bottom edge first

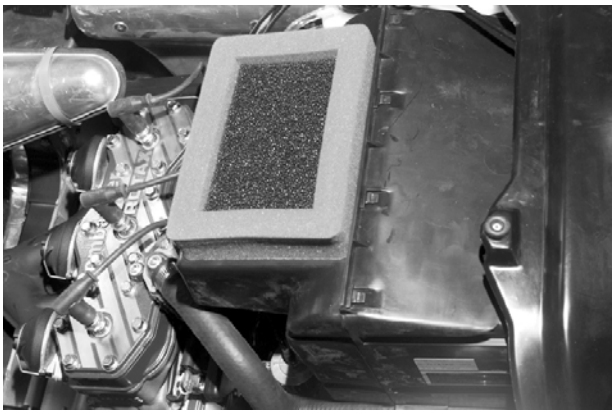
Finalize filter top edge installation.



A30H0QA

TYPICAL

1. Push top edge of filter under air deflector lip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NO. 5 RAGS IN AIR INTAKE AND EXHAUST SYSTEM

At storage preparation, block air intake hole and exhaust system hole using clean rags.

Remove those rags at pre-season preparation.

NO. 6 ENGINE COMPARTMENT

Keep clean of grass, twigs, cloth, etc. These are combustible under certain conditions.

NO. 7 VEHICLE CLEANING AND PROTECTION

Remove any dirt or rust.

To clean the entire vehicle, use only flannel clothes or Kimtowels® wipers no. 58-380 from Kimberly-Clark.

CAUTION: It is necessary to use flannel cloths or Kimtowels wipers on windshield and hood to avoid damaging further surfaces to clean.

To clean the entire vehicle, including metallic parts with a **thick** coat of grease, use Endust® imported by Bristol Myers, available at hardware stores or supermarkets.

For bottom pan cleaning, use Bombardier Cleaner (P/N 293 110 001 (spray can 400 g) and P/N 293 110 002 (4 L)).

CAUTION: Do not use Bombardier Cleaner on decals or vinyl.

To clean the entire vehicle, including metallic parts with a **thin** coat of grease, use Simple Green® from Sunshine Makers Inc., available at hardware stores or at automotive parts retailer.

For vinyl and plastic parts, use Vinyl & Plastic Cleaner (P/N 413 711 200 (6 x 1 L)).

To remove scratches on windshield or hood: Start with "Slip Streamer Motorcycle Windshield Heavy Duty Scratch, Remover". Finish with "Slip Streamer Motorcycle Cleaner and Polish".

NOTE: The latest product may be use alone if only light scratches are noticeable.

CAUTION: Never clean plastic parts or hood with strong detergent, degreasing agent, paint thinner, acetone, products containing chlorine, etc.

Inspect the hood and repair any damage.

Touch up all metal spots where paint has been scratched off. Spray all metal parts including shock chromed rods with BOMBARDIER LUBE (P/N 293 600 016).

Remove drive belt and spray BOMBARDIER LUBE (P/N 293 600 016) on drive and driven pulley sheaves.

Wax the hood and the painted portion of the frame for better protection.

NOTE: Apply wax on glossy finish only. Protect the vehicle with a cover to prevent dust accumulation during storage.

CAUTION: The snowmobile has to be stored in a cool and dry place and covered with an opaque tarpaulin. This will prevent sun rays and grime from affecting plastic components and vehicle finish.

Lift rear of vehicle until track is clear of the ground. Install on a snowmobile mechanical stand.

NOTE: Do not release track tension.

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ENGINE

The following chart is provided to help in diagnosing the probable source of troubles. It should be used as a guideline. Some causes or corrections may not apply to a specific model.

SYMPTOM	**ENGINE BACKFIRES.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check spark plugs.** a. Carbon accumulation caused by defective spark plug(s). *Clean carbon accumulation and replace spark plugs.*
	2. Check ignition timing. a. Timing is too advanced. *Set timing according to specifications (refer to TECHNICAL DATA).*
	3. Check carburetor. a. Fuel passages obstructed. *Clean carburetor and install new filter(s).* b. Fuel level too low. *Adjust float level according to specifications.*
	4. Check cooling system. a. Low antifreeze level. *Adjust antifreeze level. Then check clamps or hoses.* b. Defective tank cap. *Replace cap.* c. Air in system. *Bleed system.*

SYMPTOM	**ENGINE SUDDENLY TURNS OFF AT HIGH RPM AND/OR WITH LIGHT LOAD.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check that all 3 ground wires are well connected.**

SYMPTOM	ENGINE SUDDENLY TURNS OFF.
CONDITION	NORMAL USE.
Test/Inspection	**1. Perform engine leak test. Refer to ENGINE LEAK VERIFICATION FLOW CHART. Check possible piston seizure.** a. Damaged gasket and/or seal. *Replace defective parts.*
	2. "Four-corner" seizure of piston(s). a. Accelerating too fast when engine is cold. Piston expands faster than cylinder. *Replace piston(s). Ask driver to refer to warm-up procedure in* Operator's Guide.
	3. Piston(s) seizure on exhaust side (color on piston dome is correct). a. Kinked fuel tank vent tube. *Relocate fuel tank vent tube.* b. Leaks at fuel line connections or damaged fuel lines. *Replace defective lines.* c. Fuel does not flow through carburetor(s) (foreign particles in needle area and/or varnish formation in carburetor(s)). *Clean carburetor(s) and install new filter(s).* d. Spark plug heat range is too warm. *Install spark plugs with appropriate heat range (refer to TECHNICAL DATA).* e. Improper ignition timing. *Adjust according to specifications (refer to TECHNICAL DATA).* f. Restriction in exhaust system. *Replace.* g. Compression ratio is too high. *Install genuine parts.* h. Carburetor calibration is too lean. *Adjust according to specifications (refer to TECHNICAL DATA).* i. Improper reed valve adjustment or damage. *Adjust according to specifications (refer to 809 ENGINE TYPE) and/or install Bombardier's recommended reed valve.* j. Poor oil quality. *Use BOMBARDIER injection oil.* k. Leaks at air intake silencer. *Replace air intake silencer grommets.*
	4. Melted and/or perforated piston dome; melted section at ring end gap. a. When piston reaches TDC, mixture is ignited by heated areas in combustion chamber. This situation is due to an incomplete combustion of a poor oil quality. *Clean residue accumulation in combustion chamber and replace piston(s).* *Use BOMBARDIER injection oil.* b. Spark plug heat range is too high. *Install recommended spark plugs (refer to TECHNICAL DATA).* c. Ignition timing is too advanced. *Adjust according to specifications (refer to TECHNICAL DATA).* d. Inadequate fuel quality. *Use appropriate fuel.* e. Carburetion is too lean. *Adjust according to specifications (refer to TECHNICAL DATA).*

	5. Seized piston all around the circumference (dry surface). a. Lack of oil, damaged oil line or defective injection pump. *Replace defective part(s).*
	6. Grooves on intake side of piston only. a. Oil film eliminated by water (snow infiltration in engine). *Replace piston(s) and check if intake system leaks.*
	7. Piston color is dark due to seizure on intake and exhaust sides. a. Cooling system leaks and lowers coolant level. *Tighten clamps or replace defective parts. Add antifreeze in cooling system until appropriate level is reached.* b. Accumulation of foreign particles in needle valve and/or main jet area. *Clean carburetor(s).*
	8. Cracked or broken piston(s). a. Cracked or broken piston(s) due to excessive piston/cylinder clearance or engine overreving. *Replace piston(s). Check piston/cylinder clearance (refer to TECHNICAL DATA). Adjust drive pulley according to specifications (refer to TECHNICAL DATA) and/or clean pulley sheaves if they are contaminated with greasy particles.*
	9. DPM manifold air vent is obstructed. a. Carburetion is too lean. *Ensure proper air vent.*

SYMPTOM	**PISTON RING AND CYLINDER SURFACES ARE GROOVED.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check oil quality.** a. Poor oil quality. *Use BOMBARDIER injection oil.*
	2. Check injection pump and its hoses. a. Inadequate injection pump adjustment and/or defective hoses. *Adjust pump according to specifications (refer to ENGINE) and/or replace hoses.*

SYMPTOM	ENGINE DOES NOT OFFER MAXIMUM POWER AND/OR DOES NOT REACH MAXIMUM OPERATING RPM.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check spark plug condition and gap.** a. Fouled spark plugs or wrong spark plug gap. *Replace or readjust gap.*
	2. Check if there is water in fuel. a. There is water in fuel. *Drain fuel system, then fill it with appropriate fuel.*
	3. Check items listed in ENGINE RUNS OUT OF FUEL (refer to fuel and oil system subsection).
	4. Check carburetor adjustments and cleanliness. a. Inadequate carburetor adjustments or dirt accumulation. *Adjust according to specifications (refer to TECHNICAL DATA) or clean.*
	5. Check drive belt. a. Worn belt. *Replace belt if width is 3 mm (1/8") less than nominal dimension (refer to TECHNICAL DATA).*
	6. Check track adjustment. a. Too much tension and/or improper alignment. *Align track and adjust its tension to specifications (refer to TECHNICAL DATA).*
	7. Check drive pulley. a. Improper calibration screw adjustments (TRA pulley) and/or worn bushing(s). *Adjust according to specifications (refer to TECHNICAL DATA) and/or replace bushing(s).*
	8. Check driven pulley. a. Worn bushing and/or spring tension. *Replace spring and/or adjust its tension according to specifications (refer to TECHNICAL DATA).*
	9. Check exhaust system. a. Restriction or exhaust system leaks. *Replace or reseal with Ultra Copper.*
	10. Check ignition timing. a. Decrease in power due to retarded ignition. *Adjust according to specifications (refer to TECHNICAL DATA).*
	11. Check engine compression. a. Worn piston(s) and ring(s). *Replace (refer to TECHNICAL DATA for specifications).*
	12. Check engine cooling system. a. Antifreeze level is low, cap fails to pressurize system or air circulates through lines. *Adjust level, replace cap or bleed cooling system.*
	13. Check reed valve. a. Improper tightness and/or opening. *Replace or adjust. Refer to proper engine subsection.*

SYMPTOM	ENGINE DETONATION AT MAXIMUM RPM.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check which type of fuel is used.** a. Octane number is too low and/or alcohol level is too high. *Use recommended fuel type.*
	2. Check spark plug type. a. Improper spark plug heat range. *Install recommended spark plugs (refer to TECHNICAL DATA).*
	3. Check exhaust system. a. Too much restriction. *Replace.*
	4. Check ignition timing. a. Timing is too advanced. *Adjust according to specifications (refer to TECHNICAL DATA).*
	5. Check carburetion. a. Fouled and/or improper carburetor components. *Clean or replace according to specifications (refer to TECHNICAL DATA).*
	6. Check compression ratio and combustion chamber volume. a. Compression ratio is too high. *Install genuine parts.*

SYMPTOM	ENGINE TURNS OVER BUT FAILS TO START.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check switches.** a. Ignition switch, emergency cut-out switch or tether switch is in the OFF position. *Place all switches in the RUN or ON position. If it still does not work, connect DESS switch BK/GN and BK/WH wires together (harness side).*
	2. Check fuel valve. a. Fully open fuel valve.
	3. Check fuel level. a. Mixture not rich enough to start cold engine. *Check fuel tank level and use choke.*
	4. Check spark plug. a. Defective spark plug (no spark) or wrong spark plug gap. *Replace spark plugs or readjust gap.*
	5. Check amount of fuel on spark plug. a. Flooded engine (spark plug wet when removed). *Do not overprime or overchoke. Remove wet spark plugs, turn ignition switch to OFF and crank engine several times. Install clean dry spark plugs. Start engine following usual starting procedure.*
	6. Check fuel lines. a. No fuel to the engine (spark plugs dry when removed). *Check fuel tank level; turn fuel valve on if applicable; check fuel filter, replace if clogged; check condition of fuel and impulse lines and their connections.*
	7. Check engine compression. a. Insufficient engine compression. *Replace defective part(s) (ex.: piston(s), ring(s), etc.).*

SYMPTOM	**IRREGULAR ENGINE IDLE.**
CONDITION	NORMAL USE AFTER ENGINE WARM UP.
Test/Inspection	**1. Check choke.** a. Choke plunger may be partially opened. *Readjust.*
	2. Check carburetor adapter. a. Air enters through a crack. *Replace.*
	3. Check air screw position. a. Inadequate fuel/air mixture. *Adjust according to specifications (refer to TECHNICAL DATA).*
	4. Check ignition system trigger coil air gap. a. Air gap is too large. *Adjust according to specifications (refer to TECHNICAL DATA).*
	5. Check dimension of pilot jet. a. Inadequate fuel/air mixture. *Adjust according to specifications (refer to TECHNICAL DATA).*
	6. Check reed valve. a. Improper tightness and/or opening. *Replace or adjust. Refer to proper ENGINE subsection.*
	7. Perform engine leak test. a. Leaking gaskets allow air to enter in engine. *Replace defective parts.*
	8. DPM manifold air vent is obstructed. a. Carburetion is too lean. *Ensure proper air vent.*

SYMPTOM	HIGH ENGINE OPERATING TEMPERATURE.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check temperature gauge sensor.** a. False reading. *Check terminal connections. If problem still persists, replace sensor.*
	2. Verify antifreeze level and check if there is air infiltration in the system or if there are leaks in gasket areas. a. Low antifreeze level or air in system. *Add antifreeze until recommended level is reached, bleed system and/or tighten clamps at fitting.*
	3. Check if antifreeze flows through system properly. a. Foreign particles and/or broken coolant pump impeller. *Clean cooling system and/or replace coolant pump impeller.*
	4. Check antifreeze concentration. a. Antifreeze concentration is too high. *Adjust concentration according to Bombardier's recommendations.*
	5. Check tank cap. a. Cap does not hold pressure. *Replace.*
	6. Check carburetion. a. Improperly adjusted or inadequate carburetor components. *Adjust according to specifications (refer to TECHNICAL DATA) or replace inadequate component(s).*
	7. Check cylinder head gaskets. a. Worn gaskets. *Replace.*
	8. Check ignition timing. a. Ignition timing is too advanced. *Adjust according to specifications (refer to TECHNICAL DATA).*
	9. Check if there are leaks at air intake silencer and/or engine crankcase. a. Leak(s). *Repair or replace.*
	10. Check condition and heat range of spark plugs. a. Melted spark plug tip or inadequate heat range. *Replace.*

SYMPTOM	**ENGINE EQUIPPED WITH RAVE VALVE DOES NOT REACH ITS FULL OPERATING RPM (500 TO 1000 RPM SLOWER).**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check RAVE valve pistons.** a. Valve piston(s) is (are) too far out. *Screw valve piston(s) to bottom.*
	2. Check RAVE valve stems. a. Bent RAVE valve stem(s). *Replace.*
	3. Check RAVE valves. a. Jammed valve(s). *Clean.*
	4. Check tension of RAVE springs. a. Inadequate spring tension. *Replace.*
	5. Check RAVE pressure holes. a. Clogged holes. *Clean.*
	6. Check clamps or sleeves. a. Damaged clamp(s) or sleeve(s). *Replace.*
	7. Check exhaust tightness. a. Exhaust system is leaking leading to a too low back pressure. *Replaces parts and reseal.*

SYMPTOM	**ENGINE EQUIPPED WITH RAVE. ENGINE HESITATES AT MID-SPEED AND REACHES MAXIMUM PERFORMANCE ONLY AFTER A WHILE.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check RAVE valve spring(s).** a. Spring tension is too weak or spring(s) is (are) broken. *Replace.*
	2. Check RAVE valve cover red adjustment screws. a. Adjustment screw(s) is (are) too loose. *Adjust according to ASSEMBLY PROCEDURE in appropriate engine subsections.*
	3. Check RAVE valve movement (RAVE movement indicator P/N 861 725 800). a. Valve(s) is (are) stuck in open position. *Clean.*

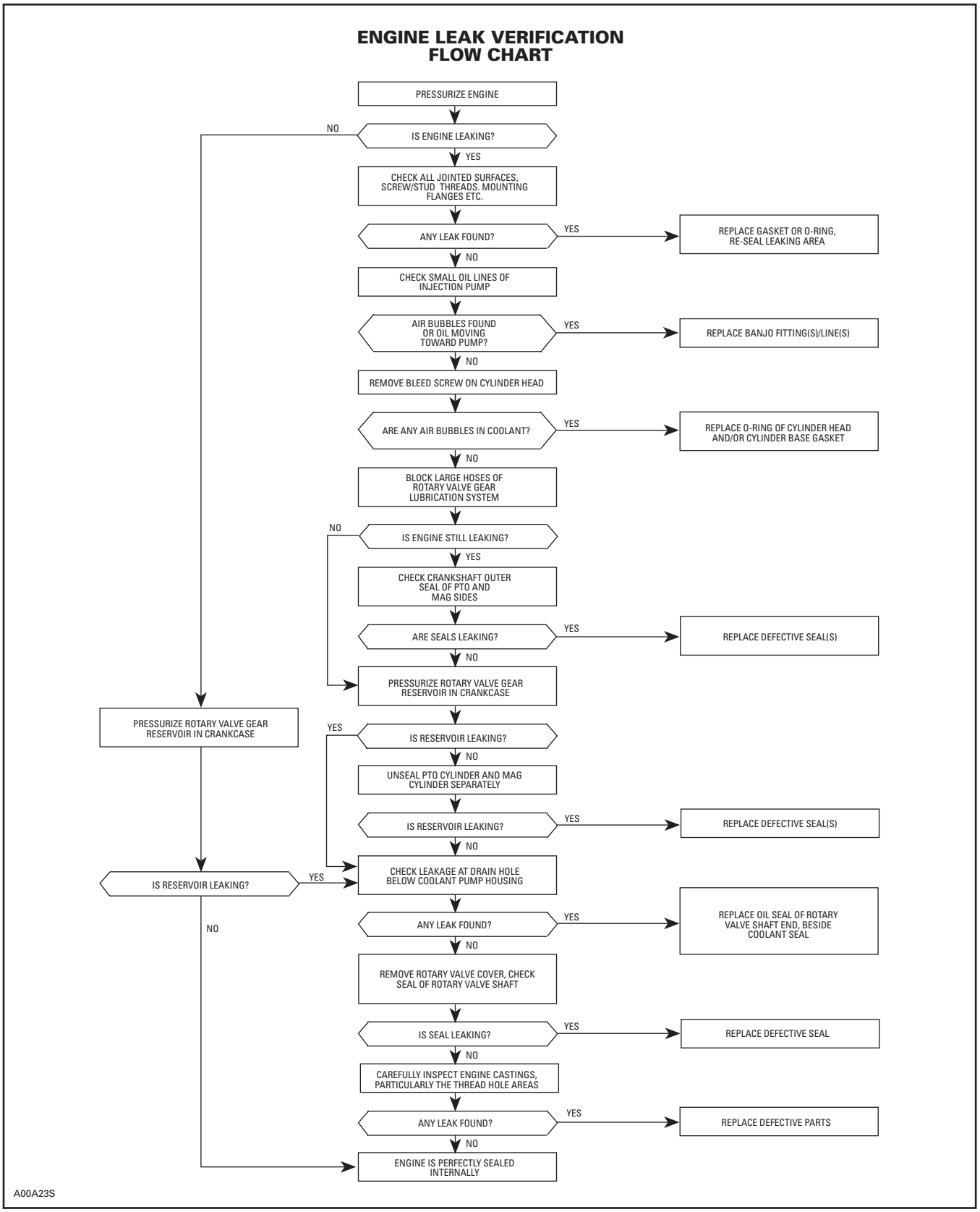
SYMPTOM	**REWIND STARTER ROPE DOES NOT REWIND.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check rewind spring.** a. Broken spring. *Replace spring.*

SYMPTOM	REWIND STARTER PAWL DOES NOT ENGAGE.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check stopper spring.** a. Broken stopper spring. *Replace.*
	2. Check pawl and pawl lock. a. Pawl and pawl lock have stuck together because of heat. *Replace.*
	3. Check pawl and rope sheave. a. Pawl and rope sheave have stuck together because of heat. *Replace.*

SYMPTOM	ENGINE PINGING.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check fuel lines.** a. Bent fuel lines (preventing fuel from flowing through). *Relocate or replace fuel lines.*
	2. Check if carburetor(s) is (are) clean. a. Dirt prevents fuel from flowing through. *Clean.*
	3. Check ignition timing. a. Timing is too advanced. *Adjust according to specifications (refer to TECHNICAL DATA).*
	4. Check compression ratio. a. Compression ratio is too high. *Replace inadequate part(s) to obtain manufacturer's recommended compression ratio or use a higher grade fuel.*

SYMPTOM	ENGINE GENERATES A LOT OF VIBRATIONS.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check engine supports and stopper.** a. Loose and/or broken supports or interference between support(s) and chassis. *Retighten to specification (refer to TECHNICAL DATA) or replace.*
	2. Check drive pulley (refer to: vibrations coming from drive pulley).
	3. Check carburetor synchronization. a. Throttle slide heights are adjusted differently and/or throttle slide openings are unsynchronized. *Adjust throttle slide heights and throttle cable.*

ENGINE LEAK VERIFICATION FLOW CHART



FUEL AND OIL SYSTEMS

The following chart is provided to help in diagnosing the probable source of troubles. It should be used as a guideline. Some causes or corrections may not apply to a specific model.

SYMPTOM	**HIGH FUEL CONSUMPTION OR RICH MIXTURE.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check fuel tank.** a. Perforated fuel tank. *Replace fuel tank.*
	2. Check fuel pump, reservoir and carburetor fittings. a. Leaking fittings. *Replace defective part.*
	3. Check choke adjustment. a. Fuel flows through choke circuit while engine runs. *Readjust choke.*
	4. Check float height in carburetor(s). a. Fuel level is too high in float bowl(s). *Adjust according to specifications (refer to TECHNICAL DATA).*
	5. Check needle valve. a. Foreign particles prevent needle valve(s) from closing and/or worn seating area. *Clean or replace needle valve(s), then clean seating area.*

SYMPTOM	**FUEL LEAKS IN ENGINE BASE WHEN ENGINE IS STOPPED.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check items 3, 4 and 5 of HIGH FUEL CONSUMPTION.**
	2. Check fuel pump diaphragm. a. Cracked diaphragm. *Replace.*

SYMPTOM	ENGINE LACKS POWER OR STALLS AT HIGH RPM.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check fuel tank vent hose.** a. Kinked or clogged hose. *Relocate or replace.*
	2. Check fuel filter. a. Clogged filter. *Replace.*
	3. Check fuel lines. a. Kinked or clogged lines. *Relocate or replace.*
	4. Check fuel pump flow. a. Dried diaphragm. *Replace.*
	5. Check if carburetor(s) is (are) clean. a. Varnish. *Clean.*

SYMPTOM	HIGH INJECTION OIL CONSUMPTION.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check oil injection pump adjustment.** a. Oil injection pump adjusted too rich. *Adjust.*
	2. Check injection pump identification. a. Wrong pump installed. *Replace with the appropriate pump. Refer to OIL INJECTION SYSTEM.*
	3. Check injection oil lines and their fitting. a. Leaking lines and/or cover. *Replace defective part(s).*
	4. Check injection pump cover gasket. a. Worn gasket. *Replace.*

SYMPTOM	ENGINE RUNS OUT OF FUEL (OR LEAN MIXTURE).
CONDITION	NORMAL USE.
Test/Inspection	**1. Check fuel filter ball located in fuel tank. Ball must move freely.** a. Corrosion due to oxidation at installation. *Replace fuel filter.*
	2. Check if lines are perforated or kinked and make sure they do not leak at fittings. a. Lines are too big for their fittings or are improperly routed. *Replace or properly relocate lines.*
	3. Check fuel pump outlet flow. a. Dirt clogging fuel pump lines or torn membrane. *Clean or replace fuel pump.*
	4. Check carburetor needle valve(s). a. Dirt (varnish, foreign particle) clogging fuel line inlets. *Clean.*
	5. Check main jet. a. Dirt (varnish, foreign particle) accumulation at main jet. *Clean.*
	6. Check float height in carburetor bowl(s). a. Running out of fuel at high speed because float height is too low. *Adjust float height according to specifications.*

SYMPTOM	DPM SEEMS TO BE DEFECTIVE.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check 1 A fuse.** a. Burnt fuse or corroded terminals. *Clean or replace fuse.*
	2. Fuel mixture is too rich or too poor. a. Possible damage to DPM. *Unplug 1 A fuse while engine is running. The carburetion is now identical to that of carburetors without a DPM provided, of course, that all pipe fittings are tight and that solenoids are in good condition, None must be half-open. If problem is resolved, DPM is faulty.*

TRANSMISSION AND BRAKE SYSTEMS

The following charts are provided to help in diagnosing the probable source of troubles. It should be used as a guideline. Some causes or corrections may not apply to a specific model.

TRANSMISSION

SYMPTOM	**THE SNOWMOBILE ACCELERATES SLOWLY, ESPECIALLY WHEN IT IS STOPPED.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check drive belt condition.** a. Belt is too narrow (drive belt engagement is higher in drive pulley). *Replace belt if width is less than specified in DRIVE BELT.*
	2. Check distance between pulleys and/or drive belt deflection. a. Distance is too small between pulleys or deflection is too high (drive belt engagement is higher in drive pulley). *Adjust distance between pulleys and/or drive belt deflection according to specifications (refer to TECHNICAL DATA).*
	3. Check driven pulley sliding half play. a. Jammed sliding half. *Replace.*
	4. Check spring tension of driven pulley sliding half. a. Sliding half rotation is accelerated when spring tension is too weak. *Adjust according to specifications (refer to TECHNICAL DATA).*
	5. Refer to VIBRATIONS ORIGINATING FROM DRIVEN PULLEY and check items listed.
	6. Check drive pulley spring tension. a. Spring tension is too weak. *Replace.*

SYMPTOM	**ENGINE MAXIMUM RPM IS TOO HIGH AND TOP SPEED IS NOT REACHED.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check items 1, 2 and 3 of THE SNOWMOBILE ACCELERATES SLOWLY, ESPECIALLY WHEN IT IS STOPPED.**
	2. Check driven pulley spring tension. a. Spring tension is too stiff. *Adjust according to specifications (refer to TECHNICAL DATA).*
	3. Check position of the calibration screws. (TRA drive pulley) a. Selected numbers are too high. *Adjust according to specifications (refer to TECHNICAL DATA).*
	4. Refer to VIBRATIONS ORIGINATING FROM DRIVEN PULLEY and check items listed.

SYMPTOM	LOOSENESS IS FELT IN DRIVE SYSTEM WHEN ACCELERATING/DECELERATING.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check drive chain tension.** a. Drive chain is too loose. *Adjust.*
	2. Check play of driven pulley splines. a. Worn splines. *Replace.*

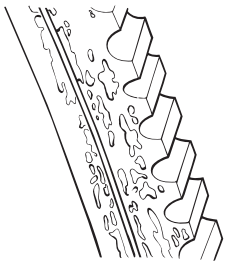
SYMPTOM	VIBRATIONS ORIGINATING FROM DRIVE PULLEY.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check drive belt.** a. Belt width is uneven at many places. *Replace.*
	2. Check tightening torque of drive pulley screw. a. Moving governor cup. *Retighten screw.*
	3. Spring cover screws. a. Spring cover moves and restrains sliding half movement. *Retighten screws.*
	4. Check spring cover (TRA TYPE) and/or outer half bushings. a. Excessive gap between bushings and inner half shaft, thus restraining sliding half movements. *Replace bushing(s).*
	5. Check sliding half slider shoes. a. Worn slider shoes. *Replace.*

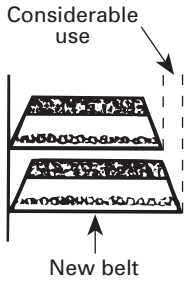
SYMPTOM	VIBRATIONS ORIGINATING FROM DRIVEN PULLEY.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check sliding half play.** a. Sliding half runout. *Replace sliding half bushing.*
	2. Check sliding half and fixed half straightness. a. Sliding half/fixed half runout. *Replace.*
	3. Check cam slider shoes. a. One or two slider shoes out of three are broken. *Replace.*

SYMPTOM	PULLEYS DO NOT DOWN SHIFT PROPERLY.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check driven pulley spring tension.** a. Spring tension is too weak. *Adjust according to specifications (refer to TECHNICAL DATA).*
	2. Refer to VIBRATIONS COMING FROM DRIVEN PULLEY and check items listed.
	3. Check drive pulley bushings (cleanliness, wear, etc.). a. Bushings stick to fixed half pulley shaft. *Clean or replace.*
	4. Check driven pulley spring tension. a. Spring tension is too weak. *Replace.*

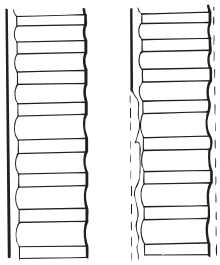
SYMPTOM	IN REVERSE ENGINE BOGS AND DRIVEN PULLEY OPENS TOO FAST (DRIVE BELT IS LOW IN DRIVEN PULLEY).
CONDITION	NORMAL USE.
Test/Inspection	**1. Check pulley distance and alignment.** a. Improper adjustment. *Adjust according to specifications (refer to PULLEY DISTANCE AND ALIGNMENT) and make sure that engine stopper is resting against engine.*

SYMPTOM	UNEVEN BELT WEAR ON ONE SIDE ONLY.
CONDITION	NORMAL USE.
Test/Inspection A00D09Y	**1. Check tightening torque of engine mount bolts.** a. Loose engine mount. *Tighten engine mount nuts/bolts equally.*
	2. Check pulley alignment. a. Pulley misalignment. *Align pulleys.*
	3. Check drive belt contact area on pulleys. a. Rough or scratched pulley surfaces. *Repair or replace pulley half.*
	4. Check driven pulley sliding half play. a. Driven pulley bushing worn. *Replace bushing.*

SYMPTOM	BELT GLAZED EXCESSIVELY OR HAVING BAKED APPEARANCE.
CONDITION	NORMAL USE.
Test/Inspection  A00D0AY	**1. Check if drive pulley bushings are worn.** a. Insufficient pressure on belt sides. *Replace bushing.* **2. Check condition of drive pulley fixed half shaft.** a. Rusted drive or driven pulley shafts. *Clean shaft with fine steel wool.* **3. Check if pulley halves are clean.** a. Oil on pulley surfaces. *Clean pulley halves.* **4. Check pulley calibration.** a. Improper pulley calibration. *Calibrate according to specifications.*

SYMPTOM	BELT WORN EXCESSIVELY IN TOP WIDTH.
CONDITION	NORMAL USE.
Test/Inspection  A00D0BY	**1. Check drive pulley.** a. Excessive slippage due to irregular outward actuation movement of drive pulley. *Carry out drive pulley inspection.* **2. Check drive belt identification number.** a. Improper belt angle (wrong type of belt). *Replace belt with an appropriate drive belt.* **3. Check drive belt width.** a. Considerable use. *Replace belt if less than specified in DRIVE BELT.*

SYMPTOM	BELT WORN NARROW IN ONE SECTION.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check if parking brake is released.** a. Parking brake is engaged. *Release parking brake.*
	2. Check track tension/alignment. a. Frozen or too tight track. *Liberate track from ice or check track tension and alignment.*
	3. Check drive pulley. a. Drive pulley not functioning properly. *Repair or replace drive pulley.*
	4. Check idle speed. a. Engine idle speed too high. *Adjust according to specifications.*
	5. Check drive belt length. a. Incorrect belt length. *Replace belt with an appropriate drive belt (refer to TECHNICAL DATA).*
	6. Check distance between pulleys. a. Incorrect pulley distance. *Readjust according to specifications.*
	7. Check belt deflection. a. Deflection is too small. *Adjust according to specifications.*



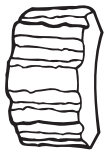
A00D0CY

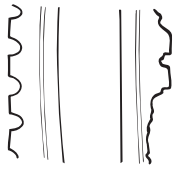
SYMPTOM	BELT SIDES WORN CONCAVE.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check pulley half surfaces.** a. Rough or scratched pulley half surfaces. *Repair or replace.*
	2. Check drive belt identification number. a. Unspecified type of belt. *Replace belt with an appropriate drive belt (refer to TECHNICAL DATA).*

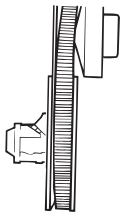
A00D0DY

SYMPTOM	**BELT DISINTEGRATION.**
CONDITION	NORMAL USE.
Test/Inspection A00D0EY	**1. Check drive belt identification number.** a. Excessive belt speed. *Using unspecified type of belt. Replace belt with proper type of belt (refer to TECHNICAL DATA).* **2. Check if pulley halves are clean.** a. Oil on pulley surfaces. *Clean pulley surfaces with fine emery cloth and wipe clean using Loctite Safety Solvent (P/N 413 708 200) and a cloth.*

SYMPTOM	**BELT EDGE CORD BREAKAGE.**
CONDITION	NORMAL USE.
Test/Inspection A00D0FY	**1. Check pulley alignment.** a. Pulley misalignment. *Align pulley according to specifications (refer to TECHNICAL DATA).*

SYMPTOM	**FLEX CRACKS BETWEEN COGS.**
CONDITION	NORMAL USE.
Test/Inspection  A00D0GY	**1. Check drive belt condition.** a. Considerable use, belt wearing out. *Replace.*

SYMPTOM	**SHEARED COGS, COMPRESSION SECTION FRACTURED OR TORN.**
CONDITION	NORMAL USE.
Test/Inspection  A00D0HY	**1. Check drive belt rotational direction.** a. Improper belt installation. *Replace.* **2. Check if drive belt rubs against components.** a. Belt rubbing on stationary object. *Relocate components.* **3. Check drive pulley.** a. Violent engagement of drive pulley. *Check drive pulley engagement speed, drive pulley bushings and components.*

SYMPTOM	**BELT "FLIP-OVER" AT HIGH SPEED.**
CONDITION	NORMAL USE.
Test/Inspection  A00D0IY	**1. Check pulley alignment.** a. Pulley misalignment. *Align pulley according to specifications (refer to TECHNICAL DATA).*
	2. Check drive belt identification number. a. Using unspecified type of belt. *Replace belt with an appropriate drive belt.*

BRAKE SYSTEM

HYDRAULIC BRAKE

SYMPTOM	**SPONGY BRAKE CONDITION.**
CONDITION	NORMAL USE.
Test/Inspection	*Replace brake fluid and bleed system. If problem still occurs, replace master cylinder.*

SYMPTOM	**BRAKE FLUID LEAKING.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check for loosen hose connectors.** *Replace copper washers and retighten.*
	2. Check for damaged hose, master cylinder and caliper. *Replace part(s) and check for proper mounting.*

SYMPTOM	**BRAKE SYSTEM IS NOISY.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check brake pad thickness.** a. Pads are worn up to wear warner. *Replace.*

ELECTRICAL SYSTEM

The following chart is provided to help in diagnosing the probable source of troubles. It should be used as a guideline. Some causes or corrections may not apply to a specific model.

SYMPTOM	**STARTER DOES NOT TURN.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check fuse.** a. Burnt fuse. *Check wiring condition and replace fuse.*
	2. Check continuity of starter switch contact points. a. Poor contact of starter switch contact points. *Repair or replace switch.*
	3. Check continuity between starter switch and solenoid. a. Open circuit between starter switch and solenoid switch. *Repair.*

SYMPTOM	**STARTER TURNS; BUT DOES NOT CRANK THE ENGINE.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check battery capacity.** a. Shorted battery cell(s). *Replace.*
	2. Check battery charge. a. Weak battery. *Recharge battery and verify recharge system and wires.*
	3. Check wire connection. a. Inadequate connection (too much resistance). *Clean and reconnect.*
	4. Check solenoid switch contact disc. a. Burnt or poor contact of solenoid switch contact disc. *Replace solenoid switch.*
	5. Check continuity of solenoid switch pull-in winding. a. Open circuit of solenoid switch pull-in winding. *Replace solenoid switch.*
	6. Check brushes. a. Poor contact of brushes. *Replace brushes.*
	7. Check commutator. a. Burnt commutator. *Turn commutator on a lathe. Respect outer diameter wear limit.* *Refer to ELECTRIC STARTER.*

	8. Check height of commutator mica. a. Commutator mica too high. *Undercut mica.*
	9. Check field coil resistance. a. Shorted field coil. *Repair or replace yoke.*
	10. Check armature resistance. a. Shorted armature. *Repair or replace armature.*
	11. Check tension of brush springs. a. Weak brush spring tension. *Replace springs.*
	12. Check yoke assembly magnets. a. Weak magnets. *Replace yoke assembly.*
	13. Check if bushings are worn. a. Worn bushings. *Replace bushings.*

SYMPTOM	**STARTER TURNS, BUT OVERRUNNING CLUTCH PINION DOES NOT MESH WITH RING GEAR.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check clutch pinion gear.** a. Worn clutch pinion gear. *Replace clutch.*
	2. Check clutch. a. Defective clutch. *Replace clutch.*
	3. Check movement of clutch on splines. a. Poor movement of clutch on splines. *Clean and correct.*
	4. Check clutch bushing. a. Worn clutch bushing. *Replace clutch.*
	5. Check starter bushings. a. Worn starter bushing(s). *Replace bushing(s).*
	6. Check ring gear. a. Worn ring gear. *Replace ring gear.*

SYMPTOM	ELECTRIC STARTER KEEPS TURNING WHEN ENGINE IS STARTED.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check clutch.** a. Jammed clutch pinion gear. *Replace or clean.*
	2. Check movement of clutch on splines. a. Clutch is stuck on splines. *Clean.*
	3. Check starter brackets. a. Broken bracket(s). *Replace bracket(s).*
	4. Check ignition switch. a. Ignition switch does not return to its ON position or is short-circuited. *Adjust switch position. Face nut is too far in.*
	5. Check starter relay. a. Shorted starter relay winding(s). *Replace starter relay.*
	6. Check starter relay contacts. a. Melted starter relay contacts. *Replace starter relay.*
	7. Check starter relay. a. Starter relay returns poorly. *Replace starter relay.*

SYMPTOM	NOISE OCCURENCE WHEN STARTING ENGINE.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check if ring gear is well-mounted to drive pulley inner half.** a. Loose and/or broken bolts. *Retighten bolts using thread locker or replace ring gear and drive pulley inner half.*

SYMPTOM	REGULATOR BLACK WIRE IS MELTED (HARNESS SIDE).
CONDITION	NORMAL USE.
Test/Inspection	**1. Check that big ground wire at battery is well connected to chassis.** a. Corroded and/or loose connection(s). *Clean and/or retighten.*

SYMPTOM	OPTIONAL ELECTRIC STARTER DOES NOT WORK WHEN TURNING IGNITION SWITCH.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check connection of BLACK wire (solenoid ground) in 3-wire housing coming from magneto (white housing).** a. Corroded and/or loose connection(s). *Clean and/or retighten.*

SYMPTOM	ELECTRIC STARTER SOMETIMES DOES NOT WORK WHEN TURNING IGNITION SWITCH.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check battery cables and starter wires.** a. Corroded and/or loose connection(s). *Clean and/or retighten.*
	2. Check fuse. a. Oxidized or burnt fuse. *Clean or replace.*
	3. Check wiring harness connections. a. Oxidized connections. *Clean or replace defective terminals.*
	4. Check ignition switch. a. Defective contacts in ignition switch. *Replace.*
	5. Check solenoid of electric starter. a. Shorted solenoid wiring harness or eroded contact washer. *Replace.*

SYMPTOM	ENGINE DOES NOT START — NO SPARK AT SPARK PLUG.
CONDITION	AT ENGINE CRANKING.
Test/Inspection	**1. Verify spark plug condition.** a. Defective, improperly set, worn-out, fouled. *Identify source of problem and correct. Replace spark plugs.*
	2. Verify spark plug cap resistance with an ohmmeter. a. Defective part. *Replace cap.*
	3. Verify if problem originated from electrical system wiring harness and/or accessories and/or ignition cut-out switches by unplugging the 3-wire connectors between the magneto/generator and the vehicle wiring harness. Check condition of connectors. a. Heating, rotating or sharp part in contact with harness. Improper harness routing. Defective switch(es). Corroded connector terminals. *Replace or repair damaged wires. Reroute where necessary. Replace defective switch(es). Clean terminals and apply silicone dielectric grease.*
	4. Verify trigger coil resistance with an ohmmeter and connector condition. a. Defective coil. Corroded connector terminals. *Replace defective coil. Clean terminals and apply silicone dielectric grease.*
	5. Verify condition of ignition coil. a. Mechanically damaged part. Vibration problem. Electrically damaged part. *Tighten mounting screws. Replace ignition coil.*
	6. Verify condition of ignition generator coils. a. Mechanically damaged part. Vibration problem. Electrically damaged part. *Tighten mounting screws. Replace coils.*
	7. Verify MPEM. a. Mechanically damaged part. Vibration problem. Electrically damaged part. *Tighten mounting screws. Replace MPEM, retest and verify ignition timing.*

SYMPTOM	CDI MODULE DOES NOT WORK.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check that high tension coil wires do not touch any metal parts.** a. Short circuit. *Isolate and reroute wires.*

SYMPTOM	ENGINE STALLS.
CONDITION	AT LOW SPEED.
Test/Inspection	**1. Verify items 4, 5 and 6 above.**

SYMPTOM	**IRREGULAR ENGINE SPEED.**
CONDITION	AT HIGH SPEED.
Test/Inspection	**1. Verify items 4, 5 and 6 above.**
CONDITION	AT LOW SPEED.
Test/Inspection	**1. Verify items 4 and 5 above and trigger coil/flywheel protrusion air gap.** a. Air gap too large. *Readjust air gap.*

SYMPTOM	**ENGINE IS MISFIRING — ERRATIC SPARK AT SPARK PLUG.**
CONDITION	RIDING ON WET SNOW.
Test/Inspection	**1. Verify if spark plug wires and/or spark plug cap seals are sealing out moisture.** a. Defective wires and/or seals. *Replace defective part.*
	2. Verify if ignition system wiring harness connectors are in good condition and/or are sealing out moisture. a. Loose connectors, corroded terminals or defective parts. *Clean terminals and apply silicone dielectric grease. Replace defective parts.*
CONDITION	NORMAL USE.
Test/Inspection	**1. Verify misfiring by observing flash of stroboscopic timing light; unplug connectors between magneto/generator and vehicle wiring harness to isolate problem. Check condition of connectors.** a. Defective spark plug(s) and/or cable(s)/cap(s). Defective electrical system wiring harness and/or accessories and/ignition cut-out switches. Condition of connector terminals. *Replace defective parts and/or repair damaged wires. Replace defective switch(es). Clean terminals and apply silicone dielectric grease.*
CONDITION	RIDING IN DEEP AND THICK SNOW.
Test/Inspection	**1. Perform all verifications outlined under ENGINE DOES NOT START — NO SPARK AT SPARK PLUG.**
	2. Verify spark plugs. Proceed with spark plug analysis in order to identify source of problem. a. Defective and/or worn spark plug(s) and/or cable(s) and/or cap(s). *Replace defective part(s). Proceed with ignition system testing procedures. Perform engine analysis.*

SYMPTOM	FOULED (BLACK) SPARK PLUG TIP.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check carburetor(s).** a. Carburetion is too rich. *Adjust according to specifications (refer to TECHNICAL DATA).*
	2. Check injection oil consumption. a. Injection pump flow is too high. *Adjust according to specifications or replace.*
	3. Check oil quality. a. Poor oil quality that creates deposits. *Use BOMBARDIER injection oil.*
	4. Check engine compression. a. Leaking piston ring(s). *Replace.*

SYMPTOM	SPARK PLUG TIP(S) IS (ARE) LIGHT GREY.
CONDITION	NORMAL USE.
Test/Inspection	**1. Refer to ENGINE SLOWS DOWN OR STOPS AT HIGH RPM and check items listed.**
	2. Check spark plug heat range. a. Spark plug heat range is too high. *Replace by Bombardier's recommended spark plug (refer to TECHNICAL DATA).*
	3. Check if air intake silencer leaks. a. Air surplus coming from opening(s) located between halves. *Seal.*
	4. Check carburetor adapter collars. a. Loose collar(s). *Tighten.*
	5. Check carburetor adapter(s). a. Cracked or deformed adapter(s). *Replace.*

SYMPTOM	RER (ROTAX ELECTRONIC REVERSE) DOES NOT WORK.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check idle speed.** a. Wrong idle speed. *Adjust according to specification (refer to TECHNICAL DATA).*
	2. Check spark plug. a. Faulty spark plug. *Replace.*
	3. Check drive belt deflection. a. Wrong deflection. *Adjust according to specification (refer to TECHNICAL DATA).*
	4. Check carburetor synchronization and air screw adjustment. a. Wrong adjustment. *Adjust according to specification (refer to TECHNICAL DATA) and read carburetor subsection.*
	5. Check electrical connections. a. Bad electrical connections or damaged wires. *Clean or replace.*
	6. Check MPEM. a. Faulty MPEM. *Replace.*

SYMPTOM	HEADLAMP NOT LIGHTING.
CONDITION	WHITE BULB.
Test/Inspection	**1. Check bulb.** a. Gas leak. *Replace bulb.*
CONDITION	BROKEN ELEMENT.
Test/Inspection	**1. Check for loose headlamp housing and bulb socket.** a. Vibration problem. *Tighten headlamp mounting screws. Lock bulb in socket. Replace bulb.*
CONDITION	MELTED FILAMENT (ENDS OF ELEMENT HOLDER) AND BLACK BULB.
Test/Inspection	**1. Check voltage at headlamp at different speeds. It must not be above 15 Vac.** NOTE: If quartz halogen bulb is involved, ensure that proper voltage regulator is installed. a. Excessive voltage in lighting circuit. *Replace voltage regulator and ensure proper grounding. Retest.*

SYMPTOM	**HEADLAMP DIMING.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check voltage at headlamp at different speeds. It must not be below 11 Vac.** a. Insufficient voltage in lighting circuit. *Replace voltage regulator and retest.*
	2. Visually inspect wiring harness for damaged and/or melted wires and/or bad wire terminal crimping and/or connections. a. Heating, rotating or sharp part in contact with harness. Improper harness routing. *Repair/replace damaged wires and/or terminals. Reroute harness where necessary.*
	3. On manual start models: Verify regulator ground. a. Rusted or loose retaining screws. *Clean, apply lithium grease (LMZ1) and firmly tighten screws.*
	4. Verify if there is an interconnection between AC and DC current. a. Faulty installation of optional equipment. *Find optional equipment connected directly to DC ground (BK wire or chassis) or to any DC hot wire (RD, RD/BL). Disconnect and reconnect to AC current (YL and YL/BK wires).*
	5. Verify if optional electric accessories are overloading the magneto/generator. a. Excessive electrical load to magneto/generator. *Reduce the electrical load by removing excess accessories. Reconnect as recommended by manufacturer.*
	6. Hot Grips brand: Verify if they were connected in parallel by mistake. a. Excessive electrical load to magneto/generator. *Reconnect as recommended by manufacturer.*
	7. Bombardier heating grips: Verify if the return wires of the elements were grounded to the chassis by mistake. a. Faulty installation of optional equipment. *Reconnect as recommended by manufacturer.*
	8. Verify if heating grips installation overloads the magneto capacity. a. Excessive electrical load to magneto/generator. *Reduce the electrical load by removing accessories.*

SYMPTOM	FALSE FUEL AND/OR TEMPERATURE GAUGE READINGS.
CONDITION	NORMAL USE.
Test/Inspection	**1. Verify if gauge was connected on DC current by mistake (in case of optional installation).** a. Faulty installation of optional equipment. *Find optional wires connected directly to DC ground (BK wire to chassis) or to any DC hot wire (RD, RD/BL). Disconnect and reconnect to AC current (YL and YL/BK wires).*
	2. Verify sender unit for free movement and/or correct arm position. a. Defective or damaged part. *Correct or replace sender unit.*
	3. Verify sender unit/gauge wiring harness condition. a. Heating, rotating or sharp part in contact with harness. Improper harness routing. *Replace or repair damaged wires. Reroute where necessary.*

SYMPTOM	WITH ENGINE IDLING NO ELECTRICAL ACCESSORIES WORK.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check idle speed.** a. Too low idle speed. *Readjust to specifications.*
	2. Verify regulator. a. Faulty regulator. *Replace.*

SYMPTOM	BRAKE LIGHT REMAINS ON.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check if bulb is properly installed.** a. Bulb is not installed correctly (contact elements are reversed). *Install bulb correctly.*
	2. Check brake switch. a. Switch contact remains closed. *Replace brake switch.*

SYMPTOM	**REAR LIGHT BULB FLASHES.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check bulb tightness in housing.** a. Looseness at bulb contact elements. *Install bulb correctly.*
	2. Check if rear light is properly connected. a. Connector housing is partially connected. *Install connector housing properly.*
	3. Check continuity of wires. a. Corroded terminals and/or broken wires. *Replace terminal(s) or crimp defective wires.*

SYMPTOM	**TACHOMETER DOES NOT WORK.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check continuity of wires.** a. Corroded terminals and/or broken wires. *Replace terminal(s) or crimp defective wires.*
	2. Check tachometer part number. a. Models with 360 W magneto have a different tachometer. *Replace with appropriate one.*

SYMPTOM	**HIGH BEAM PILOT LAMP LIGHTS UP WHEN LOW BEAM IS SELECTED.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check proper connections.** a. YELLOW wire connected to pilot lamp. Mixed-up connections with heating element pilot lamps. *Reconnect a YELLOW/BLACK wire to pilot lamp. YELLOW wires are connected to heating element pilot lamps.*

SUSPENSION AND TRACK

The following chart is provided to help in diagnosing the probable source of troubles. It should be used as a guideline. Some causes or corrections may not apply to a specific model.

SYMPTOM	**SUSPENSION IS TOO LOW.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check condition of spring.** a. Spring is weaken or broken. *Replace spring.*
	2. Check preload of spring. a. Low spring preload. *Increase preload to the recommended position.*

SYMPTOM	**REAR SUSPENSION BOTTOMS OUT.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check rear spring preload or rear arm spring preload.** a. Spring tension is too low. *Increase rear arm spring preload.*

SYMPTOM	**SLIDER SHOES WEAR OUT PREMATURELY.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check track tension.** a. Pressure is too great on slider shoes. *Adjust according to specifications (refer to TECHNICAL DATA).* *Replace defective parts.*

SYMPTOM	**TRACK CLEATS BECOME BLUE.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check track tension.** a. Pressure is too great on cleats. *Adjust according to specifications (refer to TECHNICAL DATA).*
	2. Check slider shoes and/or suspension retaining screws. a. Worn slider shoes or lost retaining screws. *Replace defective parts and/or tighten loose screws.*

SYMPTOM	NOISE OR VIBRATIONS ORIGINATING FROM THE TRACK.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check slide suspension retaining bolts.** a. Missing bolt(s) allowing movement of certain components which in turn interfere with track rotation. *Replace missing bolt(s).*
	2. Check condition of idler wheel(s). a. Idler wheel rubber is damaged. *Replace.*
	3. Check guide cleats. a. Top portion of guide cleat(s) is bent. *Replace.*
	4. Check sprockets. a. One or various teeth of drive shaft sprockets are broken. *Replace sprocket(s).*
	5. Check track rods and/or internal traction teeth. a. One or various track rods and/or teeth are broken. *Replace track.*

SYMPTOM	DERAILING TRACK.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check track tension.** a. Track is too loose. *Adjust.*
	2. Check if track and slider shoes are properly aligned. a. Improper alignment. *Adjust.*

SYMPTOM	REAR SUSPENSION IS TOO STIFF.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check track tension.** a. Track is too tight. *Adjust.*
	2. Check if axles are properly lubricated. a. Improper lubrication and/or contaminated grease (sticky oil sludge). *Clean and/or lubricate.*
	3. Check rear spring preload. a. Too much preload. *Adjust to recommended position.*

SYMPTOM	WHEN HANDLEBAR IS TURNED, SNOWMOBILE UNDERSTEERS.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check ski runner condition.** a. Worn ski runners. *Replace.*
	2. Check tension of ski spring adjustment cams. a. Insufficient ski pressure on the ground. *Increase spring preload.*
	3. Check if front arm stopper strap is too long. a. Insufficient ski pressure on the ground. *Shorten stopper strap.*
	4. Check front arm spring tension. a. Insufficient ski pressure on the ground. *Loosen spring tension.*

SYMPTOM	HANDLEBAR IS DIFFICULT TO TURN.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check position of ski spring adjustment cams.** a. More pressure on the ground when cam increases spring preload. *Reduce ski spring preload.*
	2. Check position of stopper strap. a. More weight when stopper strap is short. *Lengthen front arm stopper strap.*
	3. Check position of front arm shock adjustment cam(s). a. When spring tension is weak, more weight is transferred to the skis. *Increase spring preload.*
	4. Check condition of ball joints. a. Corrosion restrains movement. *Lubricate or replace.*
	5. Check swing arm camber. a. Too much ski leg inclination. *Adjust camber to specifications.*
	6. Check for proper lubrication. a. Components need lubrication. *Lubricate. Refer to LUBRICATION AND MAINTENANCE.*

SYMPTOM	**THE SNOWMOBILE IS UNSTABLE (IT MOVES FROM LEFT TO RIGHT AND VICE VERSA).**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check ski runner condition.** a. Worn or bent ski runners. *Replace ski runners.*
	2. Check ski alignment. a. Improper ski alignment. *Align skis in order to obtain proper toe-out (opening) (to adjust, refer to STEERING SYSTEM).*
	3. Check if bushings are too loose in steering system. a. Bushings are too loose. *Replace.*
	4. Check ski pressure. a. NOTE: If all parts are in good condition and the customer still complains about an unstable snowmobile, consider the installation of optional Proactive Control System.

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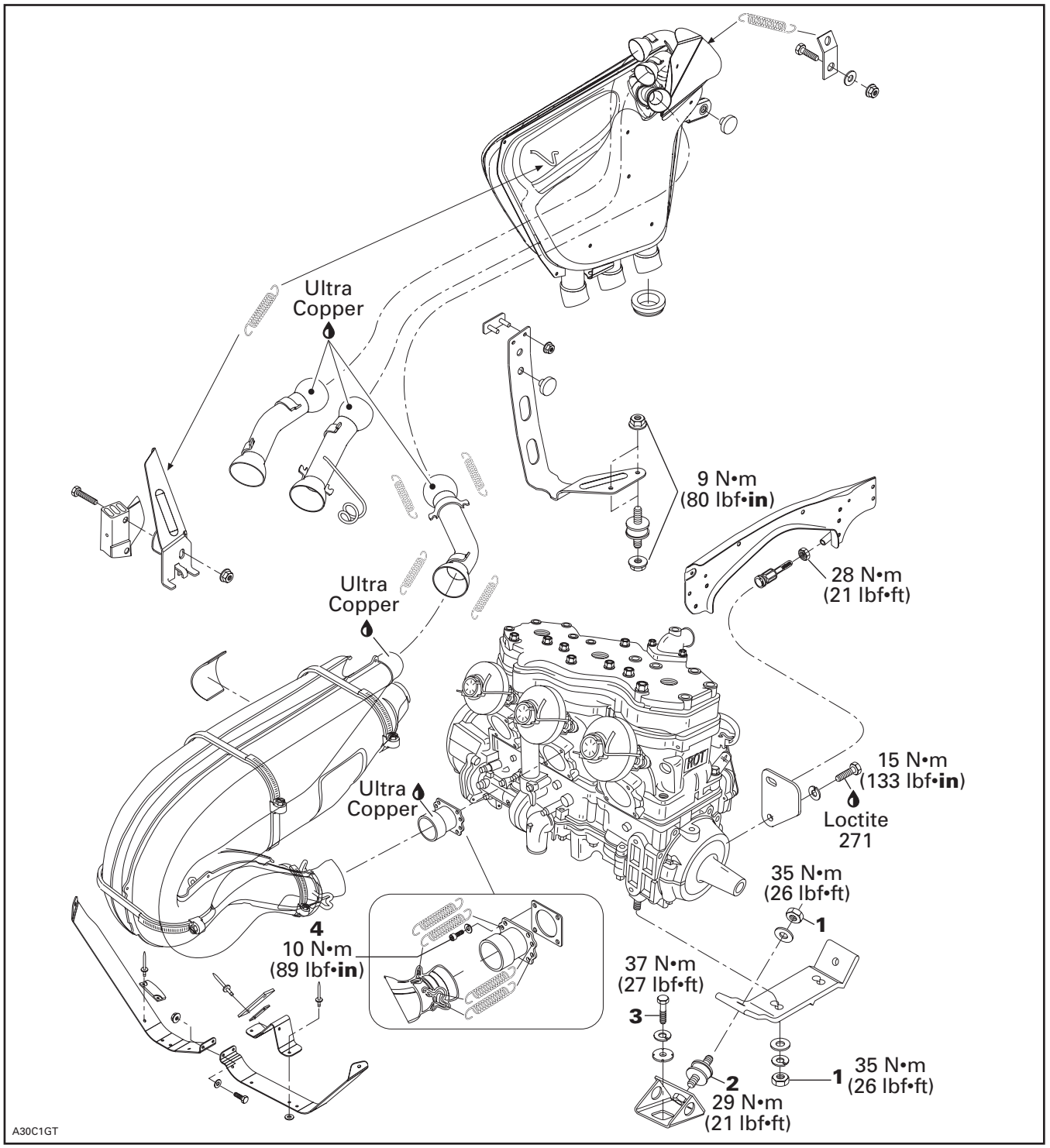
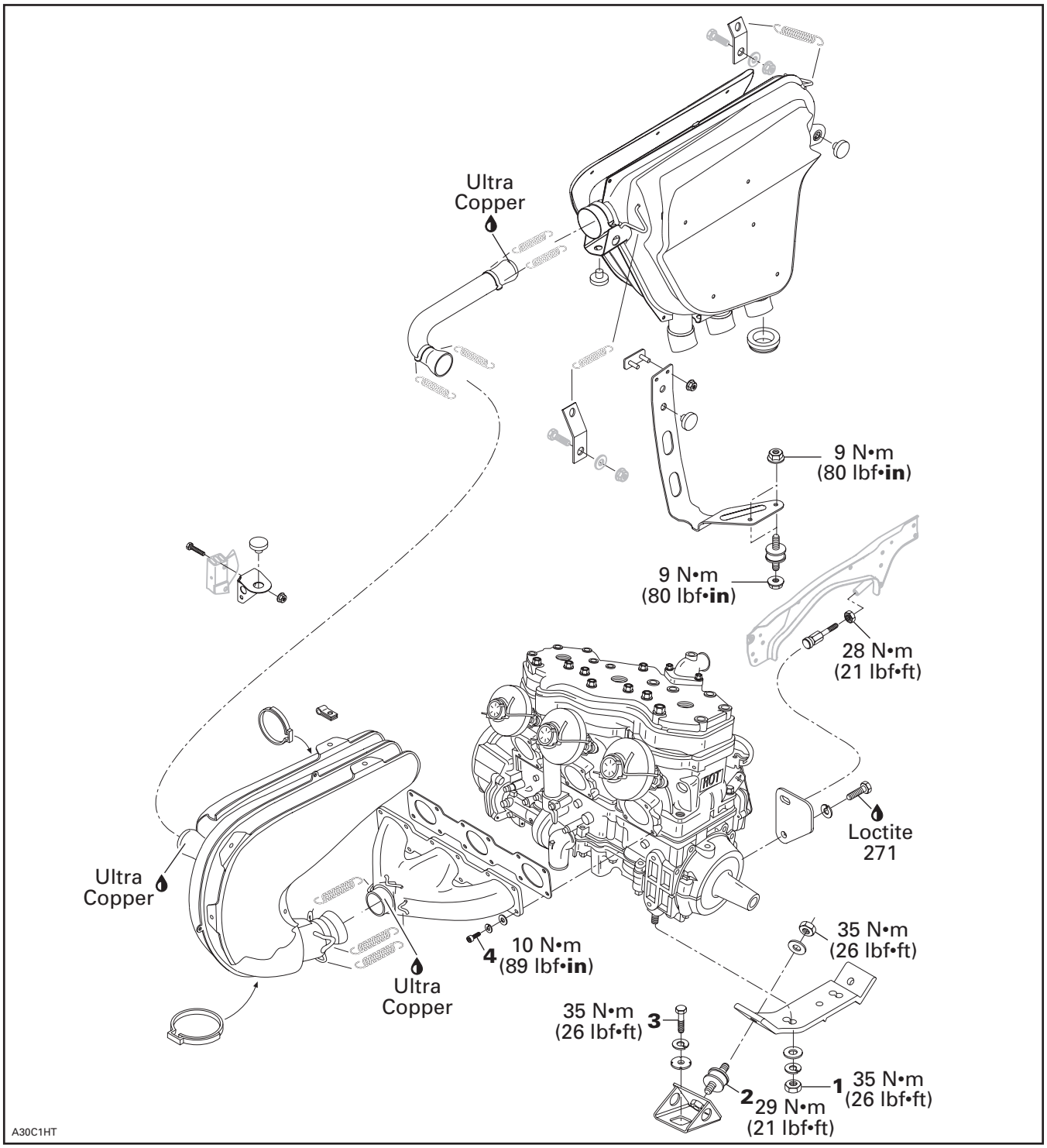
809 ENGINE TYPE

Mach Z STD/TECH PLUS



TYPICAL

Grand Touring SE



PARTS FLAT RATE

REMOVAL FROM VEHICLE

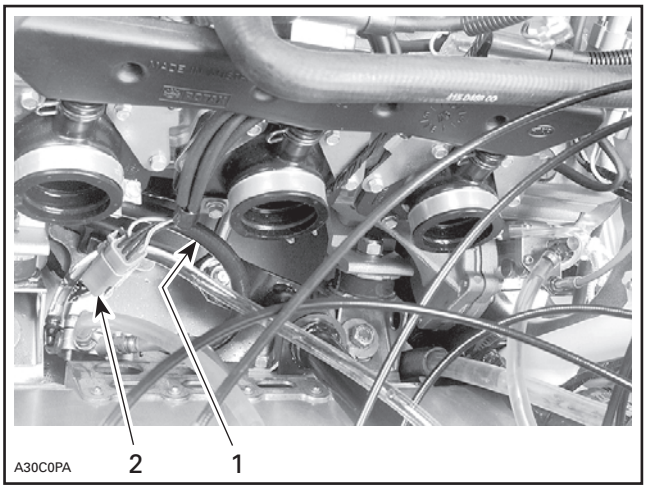
Open hood and close fuel shut-off valve.

Drain engine coolant.

Remove or unplug the following then lift off engine from engine compartment.

NOTE: 3-cylinder engine is more heavy then a 2 cylinder engine. It weights about 45 kg (100 lb). Use of a hoist is recommended.

– guard
– air silencer
– drive belt
– driven pulley
– speedometer cable from angle drive
– rewind starter handle
– drive pulley (not necessary if engine has not to be disassemble)
– hood, refer to BODY
– carburetors
– impulse hose and high tension coil connector housing



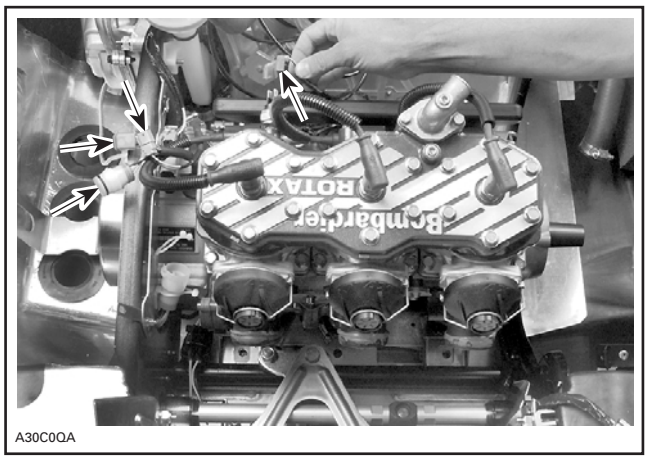
TYPICAL

1. *Impulse hose*
2. *High tension coil connector housing*

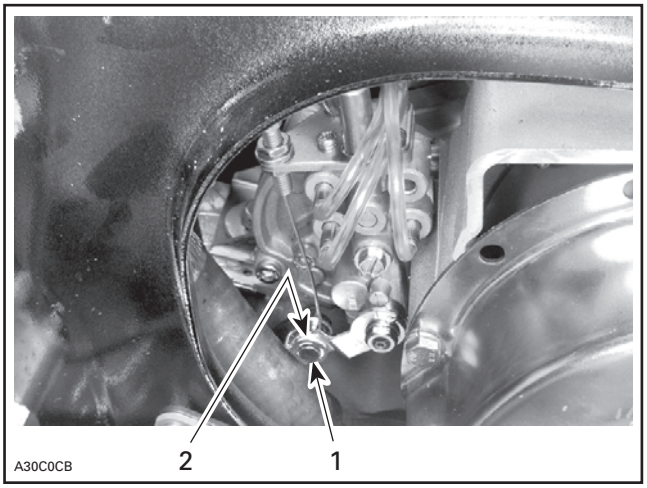
– exhaust pipes using exhaust spring remover/ installer (P/N 529 035 400)

TYPICAL

– tuned pipes
– after muffler
– wiring connections



– oil injection inlet line at oil injection pump, install hose pincher
– oil pump cable



1. Remove circlip
2. Plastic washer

– coolant hoses at cylinder head and at front bottom of engine
– engine support screws
– engine stopper (left rear of engine)
– removable side member.

Turn steering left side. Remove engine from vehicle.

1,2,3,4, Engine Support Nut and Manifold Screw

Torque the engine/support nuts **no. 1** to 35 N•m (26 lbf•ft).

Torque rubber mount **no. 2** to support bracket to 29 N•m (21 lbf•ft).

Torque rubber mount/support screw to 37 N•m (27 lbf•ft).

Torque manifold screws **no. 4** to 10 N•m (89 lbf•**in**).

Torque removable side member screws to 7 N•m (62 lbf•**in**).

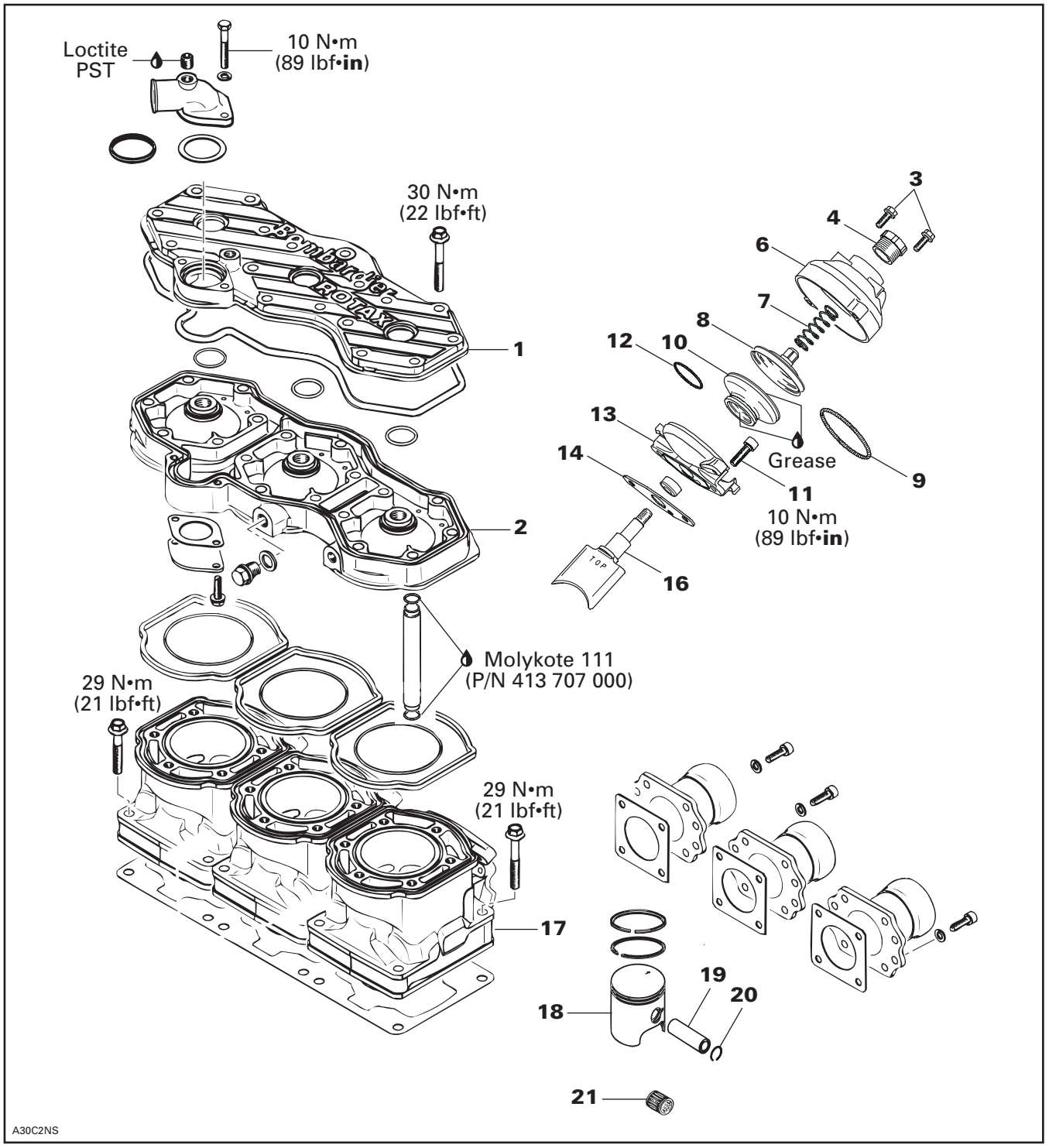
Torque removable side member nut over countershaft support to 15 N•m (133 lbf•**in**).

INSTALLATION ON VEHICLE

To install engine on vehicle, reverse removal procedure. However, pay attention, to all appropriate component/system reinstallation procedures described throughout this *Shop Manual* and to the following:

– It is easier to install oil pump cable before installing engine on vehicle.
– After throttle cable installation, check carburetor maximum throttle opening and oil injection pump adjustment.
– Check pulley alignment and drive belt tension.
– Should a light exhaust leak be experienced at muffler ball joint, Ultra Copper (P/N 413 710 300) can be used.

TOP END


Loctite
PST
10 N•m
(89 lbf•in)
30 N•m
(22 lbf•ft)
Bombardier
ROTAX
1
2
3
4
6
7
8
12
10
13
14
Grease
9
11
10 N•m
(89 lbf•in)
16
TOP
Molykote 111
(P/N 413 707 000)
29 N•m
(21 lbf•ft)
29 N•m
(21 lbf•ft)
17
18
19
20
21
A30C2NS

COMPONENT REMOVAL

Most engine components can be removed with engine on vehicle such as:

– cylinder head
– piston(s)
– cylinder(s)
– rewind starter
– oil pump
– water pump
– magneto flywheel
– RAVE valve(s).

CLEANING

Discard all gaskets and O-rings.

Clean all metal components in a non-ferrous metal cleaner.

Scrape off carbon formation from cylinder exhaust port cylinder head and piston dome using a wooden spatula.

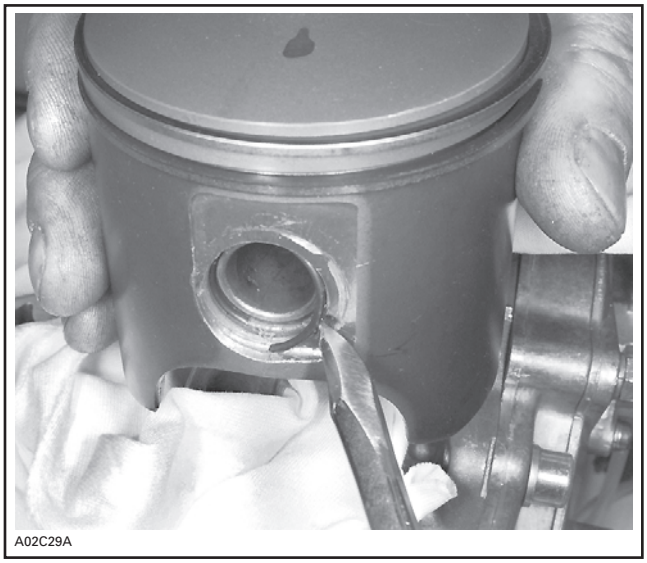
NOTE: The letters ''AUS'' (over an arrow on the piston dome) must be visible after cleaning.

Clean the piston ring groove with a groove cleaner tool or with a piece of broken ring.

DISASSEMBLY

18, Piston

Place a clean cloth or rubber pad (P/N 529 023 400) over crankcase then with a pointed tool inserted in piston notch, remove circlip **no. 20** from piston **no. 18**.



TYPICAL

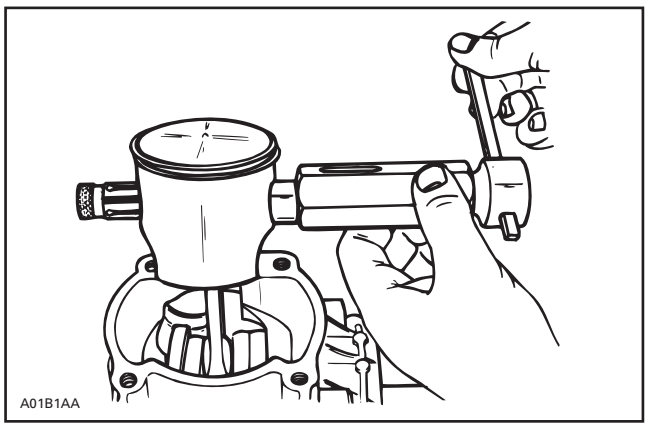
To remove piston pin **no. 19**, use piston pin puller (P/N 529 035 503) as follows:

Fully screw puller handle.

Insert puller end into piston pin.

Screw (LH threads) extracting nut.

Hold puller firmly and rotate puller handle counterclockwise to pull piston pin.



TYPICAL

RAVE System

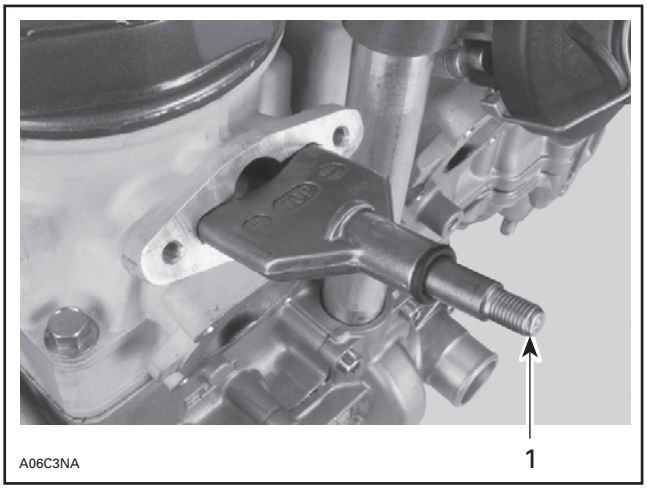
NOTE: RAVE stands for Rotax Adjustable Variable Exhaust.

Remove screws **no. 3**, cover **no. 6** and spring **no. 7**.

Unscrew valve piston **no. 9**.

Remove cylindrical screws **no. 11** then valve rod housing **no. 13**. Remove bellows **no. 10** and spring **no. 12**.

Pull out exhaust valve **no. 16**.



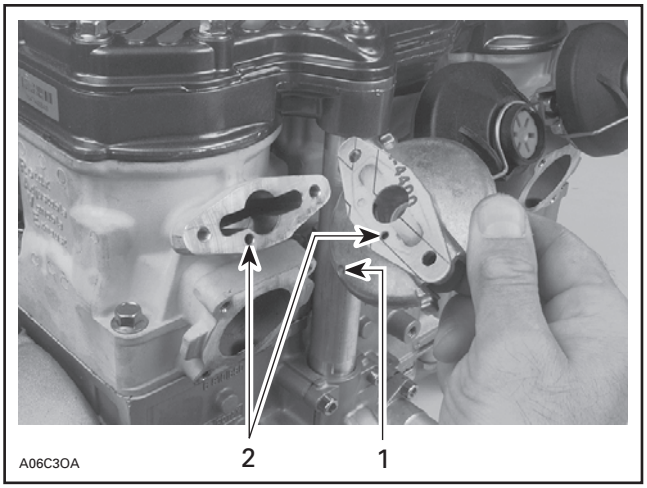
1. Exhaust valve

INSPECTION

NOTE: Refer to LEAK TEST AND ENGINE DIMENSIONS MEASUREMENT.

RAVE System

Check valve rod housing and cylinder for clogged passages.



1. Draining hole
2. Passages

NOTE: Oil dripping from draining hole indicates a loosen spring or damaged bellows.

10, Bellows

Check for cracked, dried or perforated bellows.

7, Spring

ENGINE TYPE	SPRING P/N	WIRE DIA. mm (in)	FREE LENGTH mm (in)	PRELOAD IN N (LBF) AT COMPRESSED LENGTH OF 14.7 mm (.579 in)
809 on GT SE	420 239 945	1.0 (.039)	48.5 (1.91)	0.0203 (.0045)
809 on Mach Z	420 239 941	0.8 (.031)	52.5 (2.07)	0.0110 (.0025)

ASSEMBLY

RAVE System

Install RAVE valve with its mention top as illustrated in the removal photo. Tighten red cap **no. 4** screw to bottom.

17,18, Cylinder and Piston

NOTE: Be sure to restore the chamfer around all cylinder sleeve port openings.

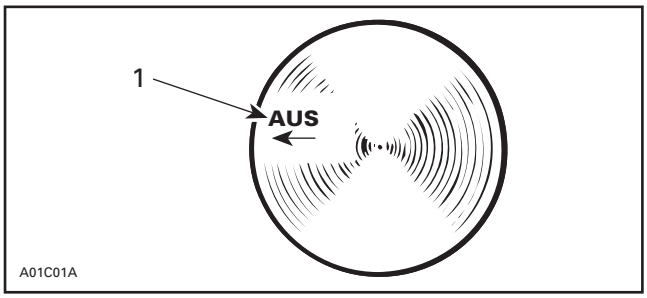
Before inserting piston in cylinder, lubricate the cylinder with new injection oil or equivalent.

1,2,17, Cylinder Head Cover, Cylinder Head and Cylinder

Check flatness of part sealing surfaces.

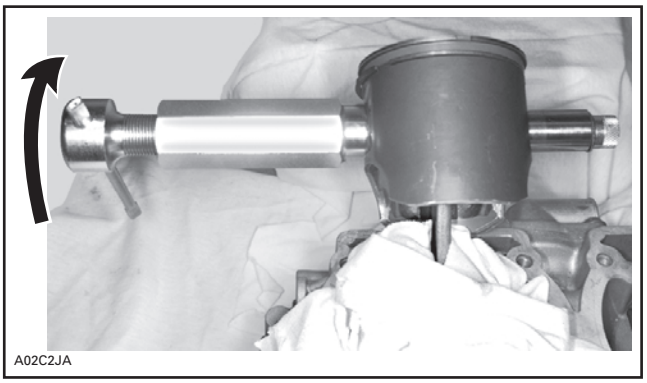
Refer to LEAK TEST AND ENGINE DIMENSION MEASUREMENT and look for **Checking Surface Flatness**.

– Mount piston over connecting rod with the letters "AUS" (over an arrow on the piston dome) facing in the direction of exhaust port (see illustration below).



1. Exhaust

Install piston pin puller and turn handle until piston pin is correctly positioned in piston.

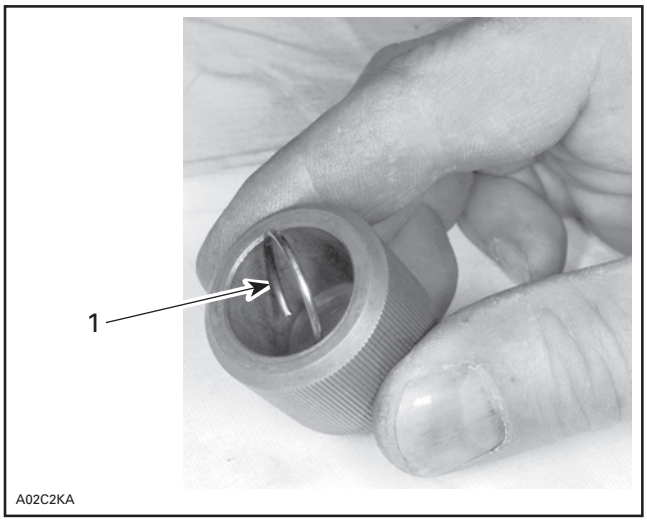


TYPICAL

CAUTION: Always install new circlips.

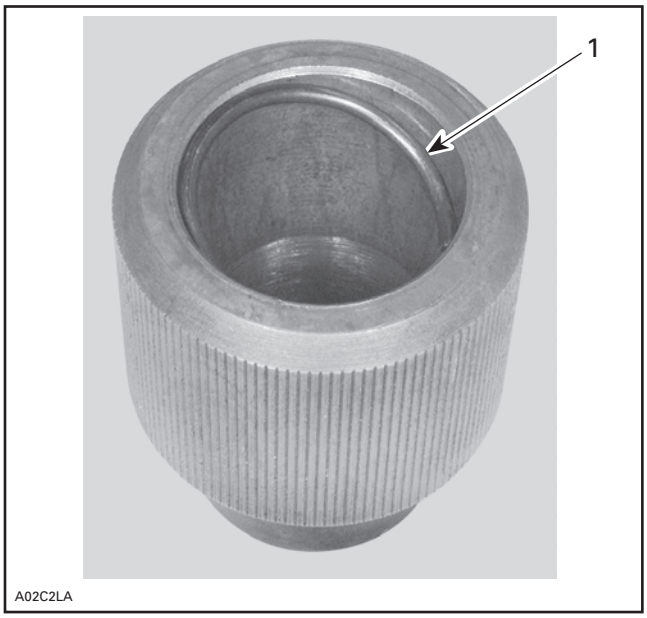
To minimize the effect of acceleration forces on circlip, install each circlip so the circlip break is at 6 o'clock as illustrated. Use piston circlip installer (P/N 529 035 561).

Insert circlip in tool at an angle.



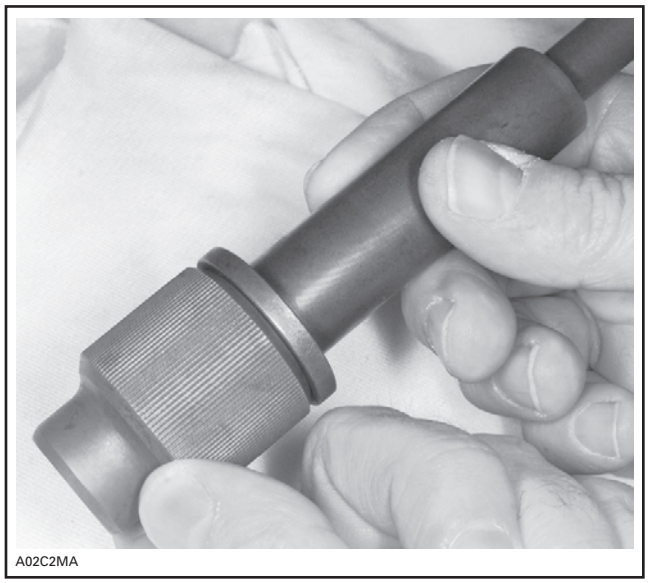
TYPICAL
1. Circlip

Square it up using a finger.



TYPICAL
1. Circlip

Continue to square it up using round end of circlip installer.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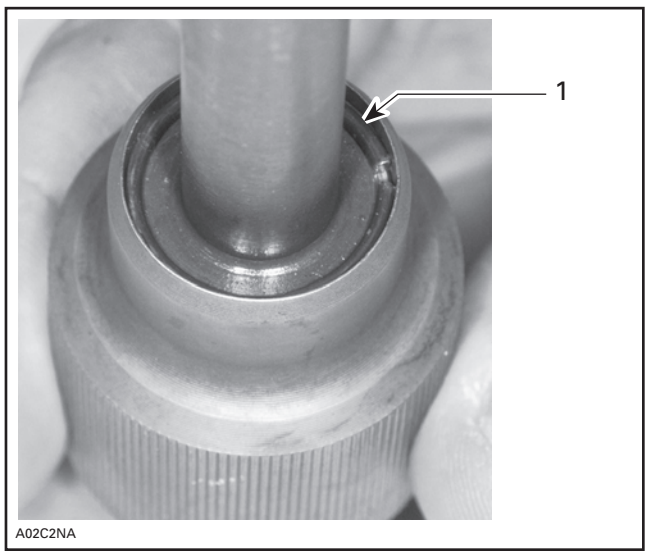
TYPICAL

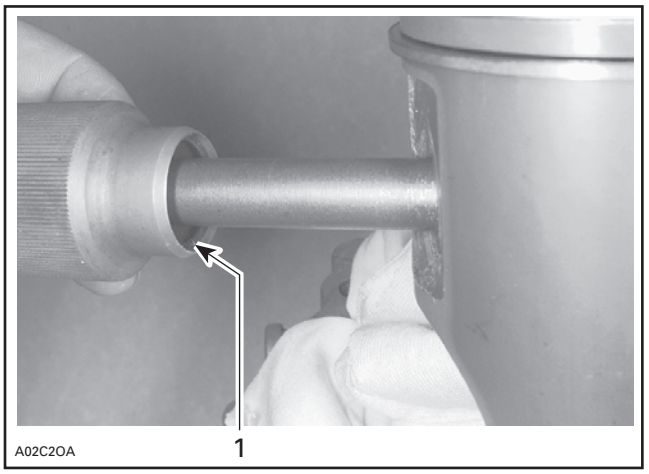
Using square end of tool, push circlip in until it rests in groove.



A02C2NA

TYPICAL
1. Circlip in groove

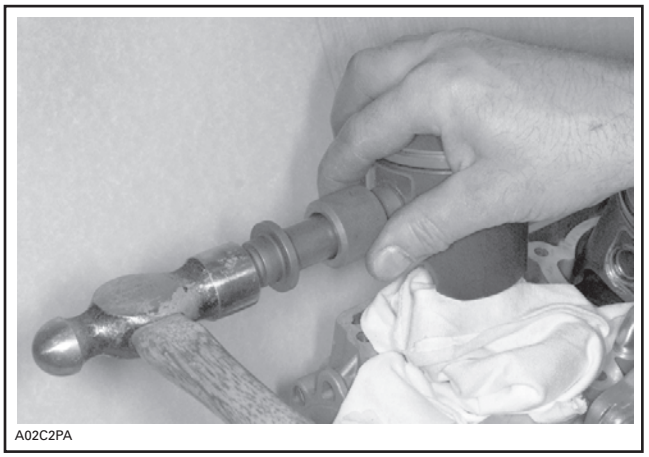
Mount tool in piston making sure that circlip break is facing down.



A02C2OA

TYPICAL
1. Circlip break facing down

Hold tool firmly against piston then strike on round end of tool. Circlip will move from tool groove to piston groove.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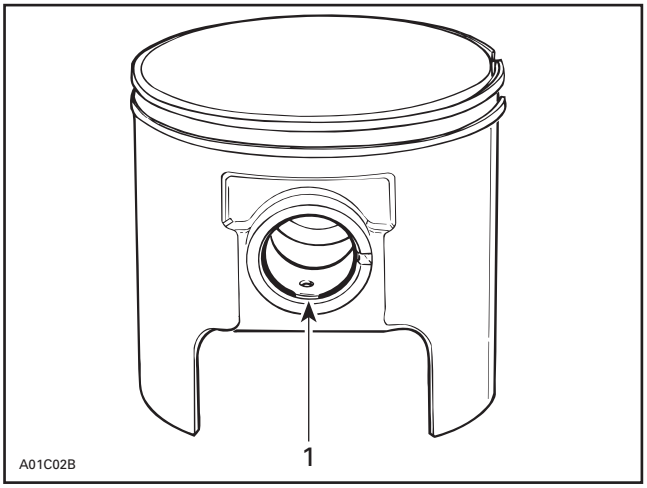
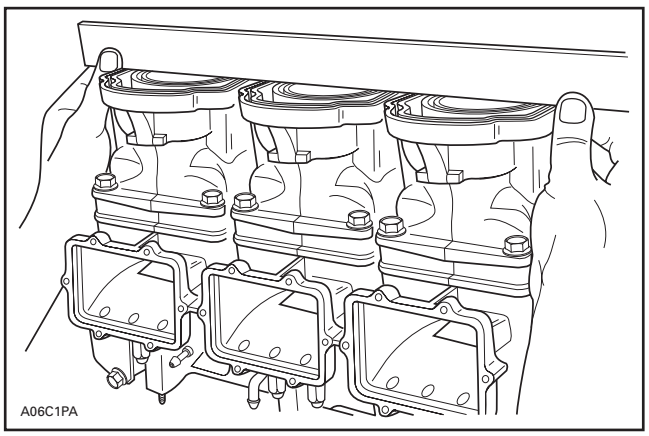
TYPICAL



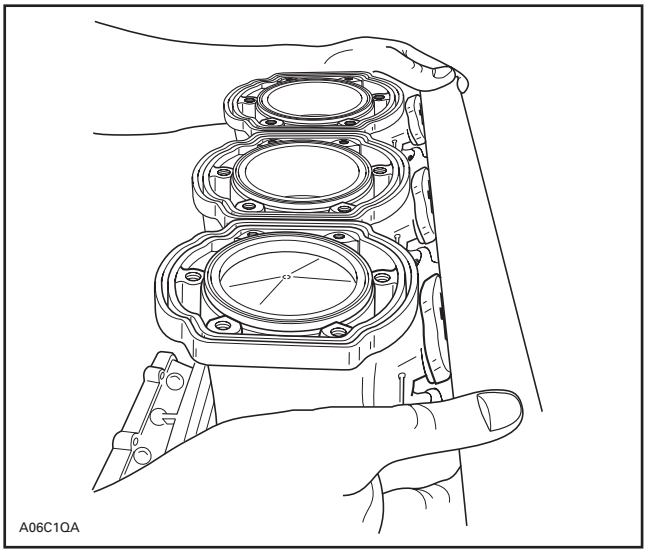
TYPICAL
1. Circlip break

CAUTION: Circlips must not move freely after installation; if so, replace them.

Install cylinders and check for same height.



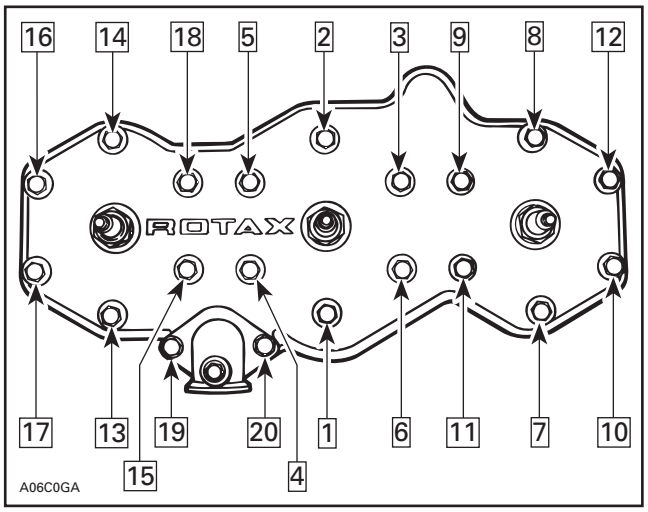
Also check for proper cylinder alignment.



At assembly, torque cylinder head screws in the following illustrated sequence. Tightening torques are:

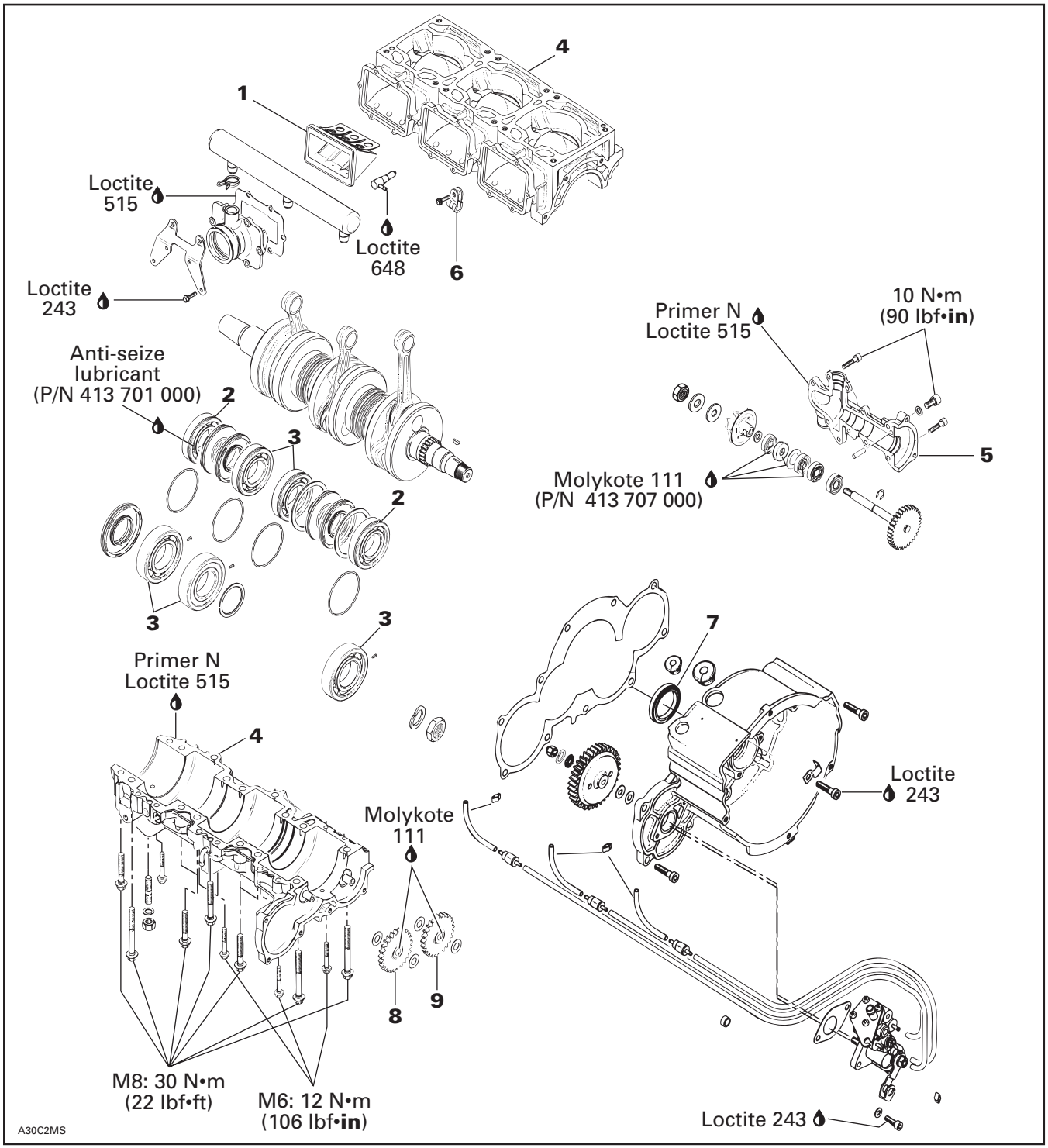
M6 screws: 12 N•m (106 lbf•**in**)

M8 screws: 30 N•m (22 lbf•ft)



TYPICAL

BOTTOM END



TYPICAL

NOTE: Engine must be removed from chassis to perform the following procedures.

CLEANING

Discard all oil seals, gaskets, O-rings and sealing rings.

Clean all metal components in a non-ferrous metal cleaner. Use Gasket remover (P/N 413 708 500) accordingly.

Remove old paste gasket from crankcase mating surfaces with Gasket remover (P/N 413 708 500).

CAUTION: Never use a sharp object to scrape away old sealant as score marks incurred are detrimental to crankcase sealing.

DISASSEMBLY

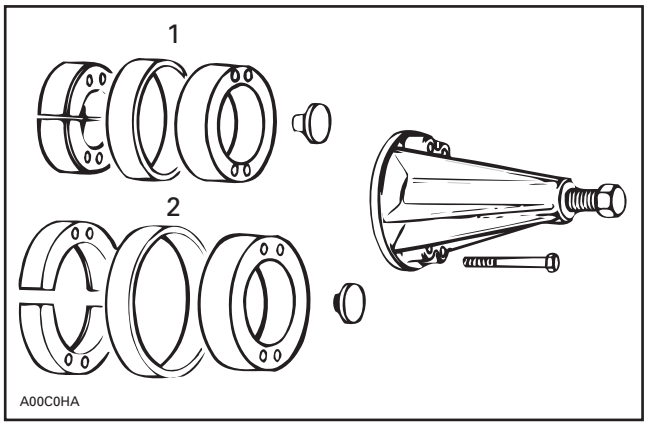
General

To remove drive pulley, refer to DRIVE PULLEY.

To remove magneto, refer to CDI SYSTEM.

2,3, Crankshaft Bearing

To remove bearings from crankshaft, use a protective cap and special puller, as illustrated.



1. PTO side
2. MAG side

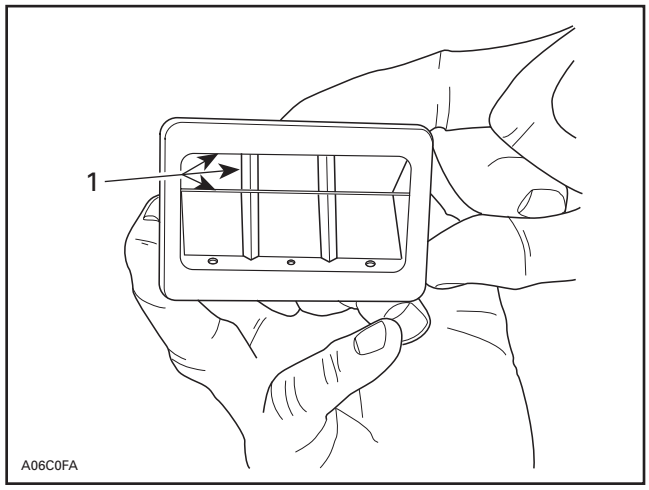
INSPECTION

NOTE: Refer to LEAK TEST AND ENGINE DIMENSIONS MEASUREMENT.

1, Reed Valve

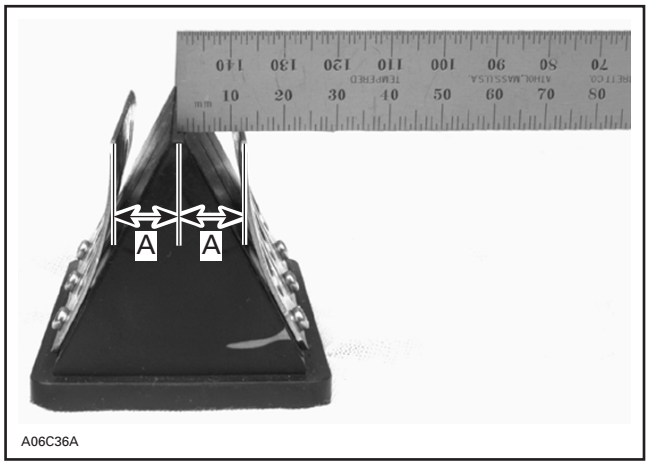
With blade stopper removed, check reed valve for proper tightness. There must be no play between blade and valve body when exerting a finger pressure on blade at blade stopper location.

In case of a play, turn blade upside down and recheck. If there is still a play, replace blade and/or valve body.



1. No play

Check distance from blade stopper outer edge and center of reed valve block.



TYPICAL
A. 17.0 - 0, + 0.75 mm (.669 - 0, + .030 in)

Bent blade stopper as required to obtain the proper distance.

Blade stoppers may slightly interfere with crankcase during installation. Adjusted distance will be reduced automatically upon installation.

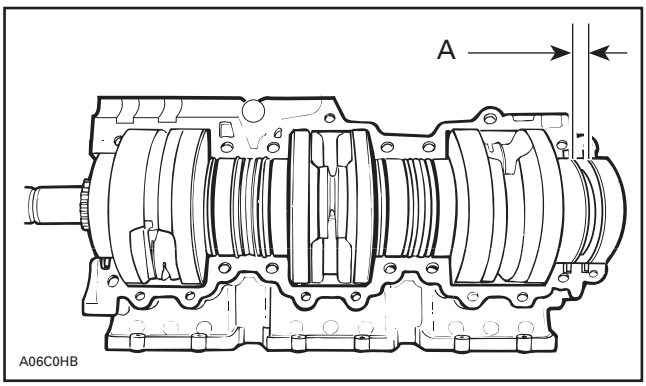
ASSEMBLY

2,3, Crankshaft Bearing and Anti-Seize Lubricant

Smear anti-seize lubricant (P/N 413 701 000) on part of crankshaft where bearing fits.

Prior to installation, place bearings into an oil container filled with injection oil previously heated to 75°C (167°F). This will expand bearing and ease installation.

Outer PTO bearing is 8 mm (5/16 in) from inner bearing.



TYPICAL
A. 8 mm (5/16 in)

Outer PTO Bearing Lubrication

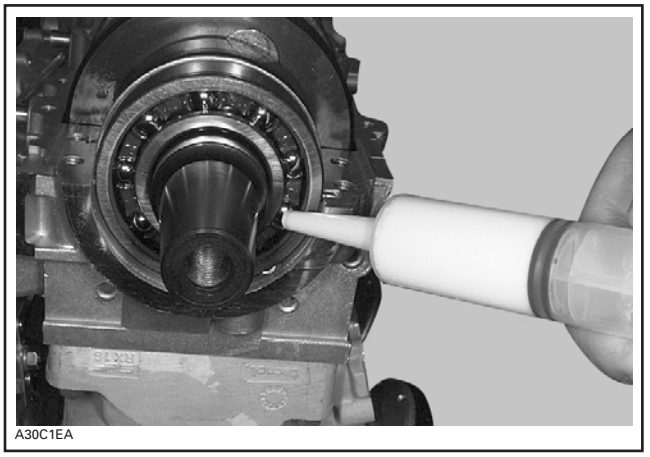
Outer PTO bearing must be lubricated with Isoflex grease (P/N 293 550 021).

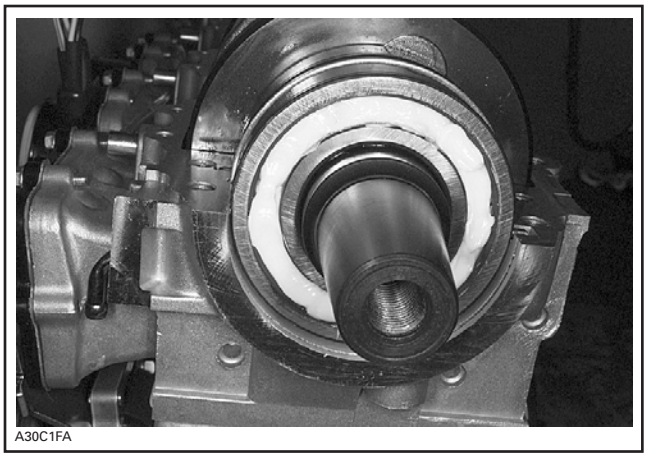
CAUTION: Use only the recommended Isoflex grease. Make sure not to push Isoflex grease between outside bearing race and half crankcase.

NOTE: The 50 g tube corresponds to 50 cc of grease.

Total quantity of Isoflex grease to be applied is 21 to 26 cc.

Apply 21 to 26 cc of grease to outside bearing cage and seal.


A30C1EA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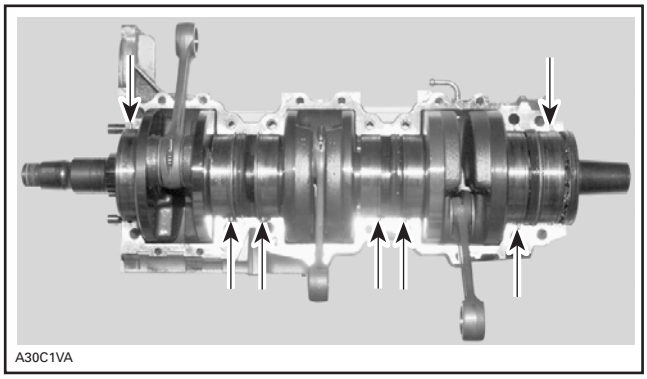
4, Crankcase

At crankshaft installation, position drive pins as illustrated.



TYPICAL — DRIVE PINS

Crankcase halves **no. 4** and water pump housing are factory matched and therefore, are not interchangeable as single halves.

Prior to joining of crankcase halves, spray some new injection oil (or equivalent) in bearings and on all moving parts of the crankshaft. Spray Primer N (P/N 413 708 100) on one of mating surfaces. Let it dry for 10 to 20 minutes.

Apply Loctite 515 (P/N 413 702 700) on the other mating surface.

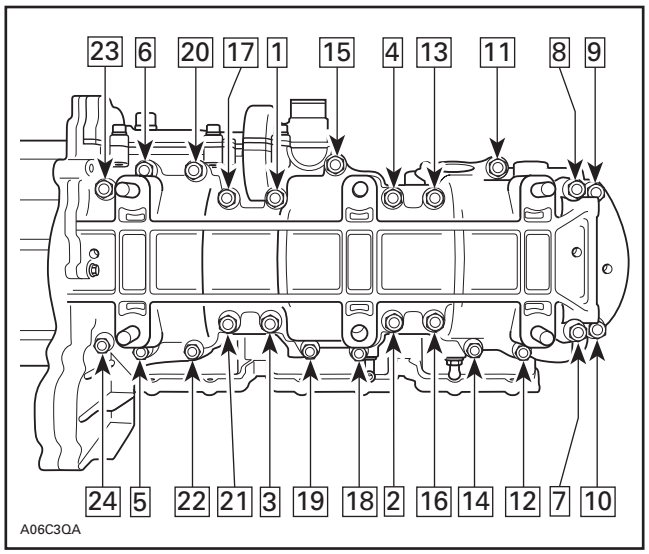
NOTE: Primer N allows Loctite 515 to fully cure on aluminum surfaces. It increases filling capacity and reduce curing time.

Align both crankcase halves before tightening screws.

Torque crankcase screws in the following illustrated sequence. Tightening torques are:

M6 screws: 12 N•m (106 lbf•**in**)

M8 screws: 30 N•m (22 lbf•ft)



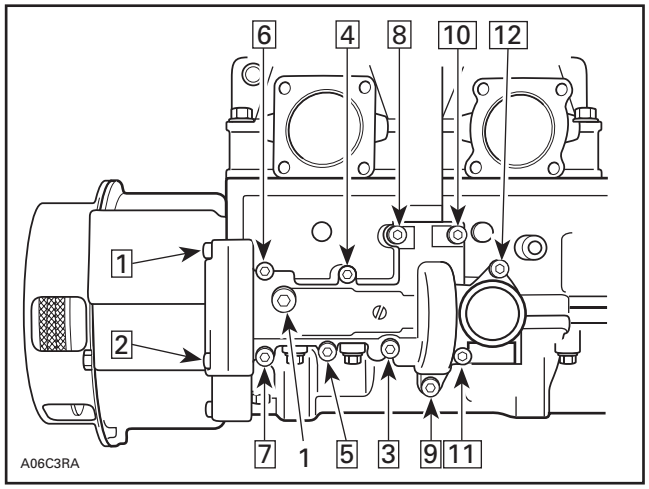
TYPICAL

5, Water Pump Housing

Spray Primer N (P/N 413 708 100) on one of mating surfaces. Let it dry for 10 to 20 minutes.

Apply Loctite 515 (P/N 413 702 700) on the other mating surface.

Tighten water pump housing screws to 10 N•m (90 lbf•**in**) following sequence as illustrated.



1. Oil level plug

Add chaincase synthetic oil (P/N 413 802 800) into water pump housing until oil level reach bottom of plug hole. See above illustration. Total capacity is about 14 cc (.47 U.S. oz).

This oil addition is needed only when servicing water pump. During normal engine operation, this oil can flow through engine. After that fuel/oil mixture will lubricate water pump bearings by scavenging.

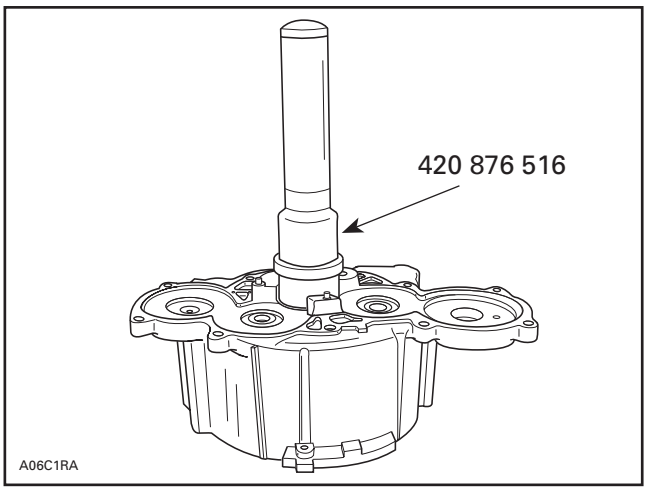
6, Screw

Apply Loctite 243 on screw threads. Install the screw retaining oil line clip first. If experiencing leaks at carburetor adaptor, use primer N and Loctite 515 on sealing surfaces of crankcase and adaptor.

7, Seal

Install seal using pusher (P/N 420 876 516).

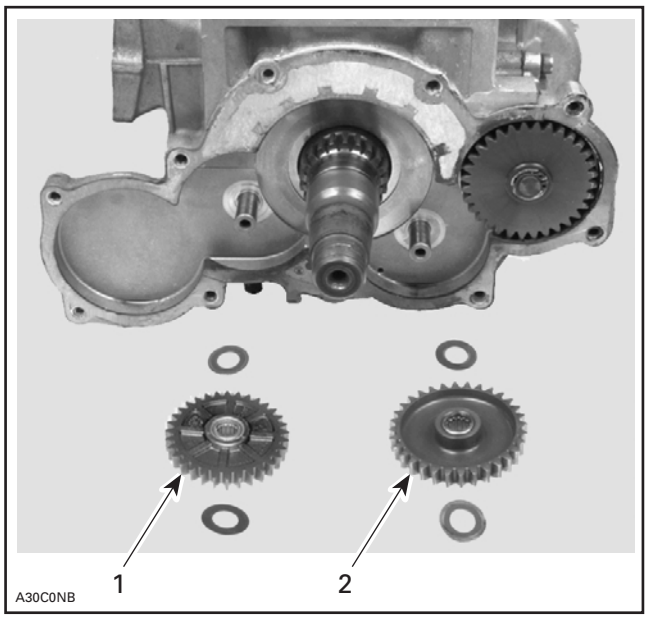
CAUTION: Make sure oil seal is fully pushed against stator shoulder.



8,9, Plastic Gear and Steel Gear

Apply Molykote 111 to needle bearing of each gear.

Install plastic gear on oil pump side. Steel gear goes on water side.



TYPICAL

1. *Plastic gear*
2. *Steel gear*

LEAK TEST AND ENGINE DIMENSION MEASUREMENT

LEAK TEST

The following gives verification procedures for liquid cooled engines.

PREPARATION

IMPORTANT: All cylinders have to be checked individually.

1. Remove tuned pipe/muffler and exhaust manifold or exhaust sockets.
2. Install plugs over exhaust flanges. Tighten with previously removed screws.
3. Remove RAVE valves and install plugs over flanges. Tighten with previously removed screws.
4. Remove carburetor(s).
5. Remove resonator and install a plug on intake rubber boot resonator outlet.
6. Insert plug(s) in intake rubber boot(s). Tighten with clamps already there.
7. Using a hose pincher(s) (P/N 295 000 076), block impulse hose(s).
8. Install air pump on any valve of exhaust plug.

NOTE: If necessary, lubricate air pump piston with mild soap.

CAUTION: Using hydrocarbon lubricant (such as engine oil) will damage rubber seal of pump piston.

9. Rotate crankshaft so that piston goes to BDC (Bottom Dead Center) on side where the pump is installed. This will open exhaust port.
10. Activate pump and pressurize engine to 34 kPa (5 PSI). Do not exceed this pressure.
11. Engine must stand this pressure during 3 minutes. If pressure drops before 3 minutes, check tester kit by spraying a soapy solution on pump piston, all plugs and fittings.
    - If tester kit is leaking, bubbles will indicate where leak comes from.
    - If tester kit is not leaking, check engine as per following procedure.
12. Proceed the same for remaining cylinders.

PROCEDURE

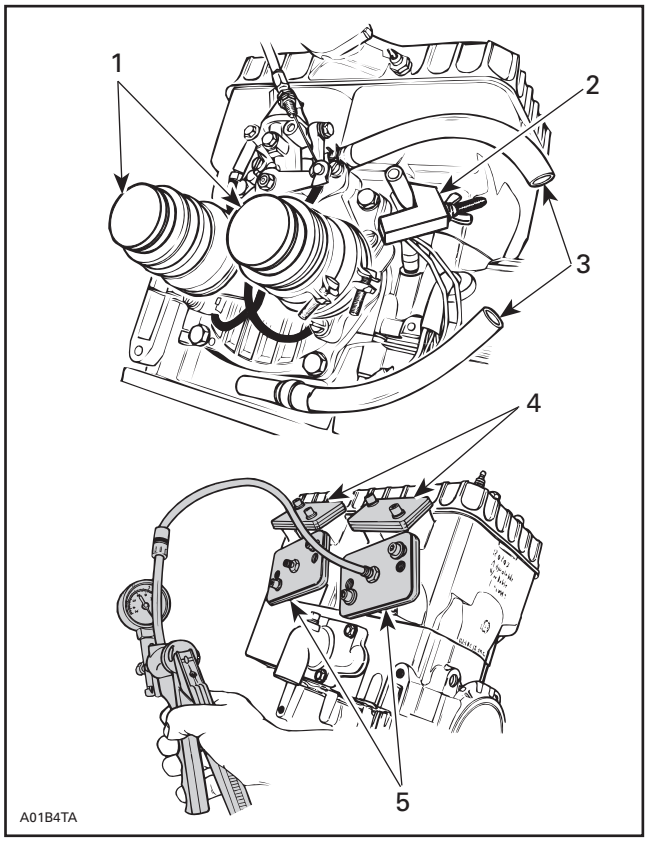
NOTE: A flow chart has been prepared as a visual reference. See last page of this chapter.

Using flow chart and following text, pressurize area to be tested and spray soapy solution at the indicated location.

TEST PRESSURE: 34 kPa (5 PSI)
for 3 minutes

- If there is a leak at the tested location, it is recommended to continue testing next items before overhauling engine. There is a possibility of more than one leak.
- If there is no leak at the tested location, continue pumping to maintain pressure and continue with next items until leak is found.

Engine



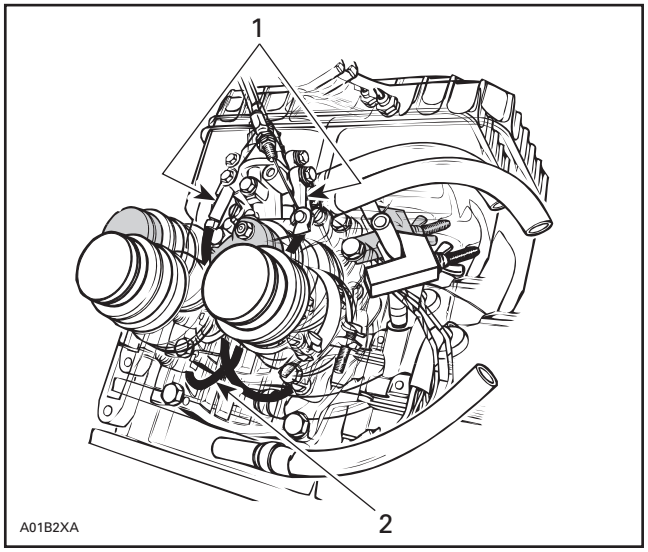
TYPICAL

1. *Blocked intake flanges*
2. *Blocked impulse fitting*
3. *Open ends (if applicable)*
4. *Blocked RAVE valve flanges (if applicable)*
5. *Blocked exhaust flanges*

Check the following:

1. All jointed surfaces and screw/stud threads of engine:
   - spark plug base, insulator
   - cylinder head
   - cylinder base
   - crankcase halves (joint)
   - oil injection pump mounting flange (gasket)
   - coolant pump housing
   - bleed screws/plugs.

2. Small injection oil lines coming from pump.



TYPICAL

1. *Banjo fittings*
2. *Small injection oil lines*

Check for air bubbles or oil column going toward pump. It indicates defective check valve in banjo fitting (or lines).

3. Remove cooling system cap.

Check for air bubbles in antifreeze. It indicates defective cylinder head O-ring or cylinder base gasket.

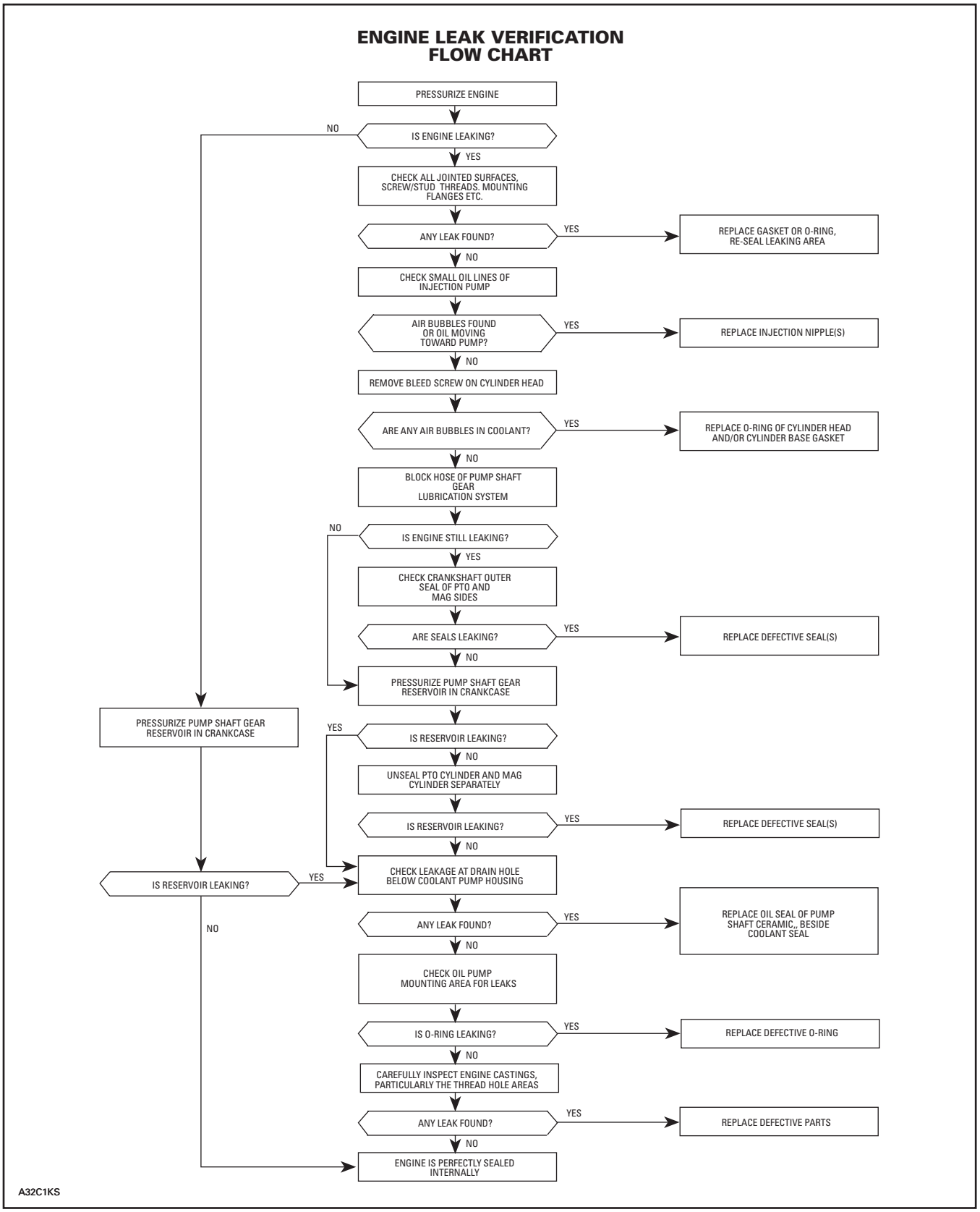
4. Remove drive pulley then check crankshaft outer seal.
5. Remove rewind starter and magneto system then check crankshaft outer seal.
6. If leak still persists, it indicates a defective casting somewhere in engine.

   Disassemble engine and carefully check for defects in castings. Pay attention to tapped holes which may go through engine sealed area and thus lead to leakage.

FINALIZING REASSEMBLY

After reassembling engine, always recheck for leakage.

ENGINE LEAK VERIFICATION FLOW CHART



ENGINE DIMENSION MEASUREMENT

This section covers all engine types.

CYLINDER HEAD WARPAGE

ENGINE TYPE	MAXIMUM
809	0.05 mm (.002 in) per 50 mm (2 in) of surface
	0.5 mm (.020 in) for total length of cylinder head

Check gasketed surface of the cylinder head with a straightedge and a feeler gauge.

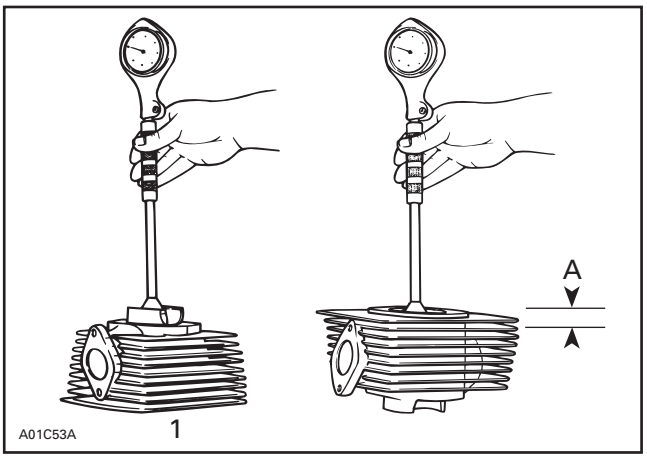
CYLINDER TAPER

ENGINE TYPE	MAXIMUM
809	0.10 mm (.004 in)

Compare cylinder diameter 16 mm (5/8 in) from top of cylinder to just below its intake port area.

On rotary valve engines, measure just below auxiliary transfer port, facing exhaust port. If the difference exceeds the specified dimension the cylinder should be rebored and honed or should be replaced.

NOTE: Be sure to restore the chamfer around all cylinder sleeve port openings.



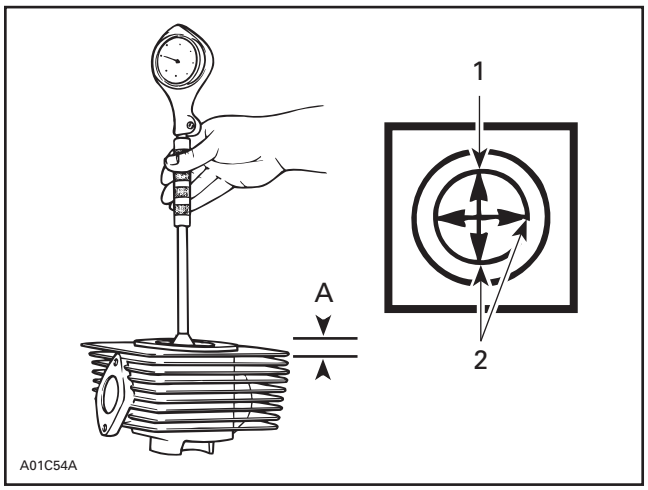
1. Below the intake port
A. 16 mm (5/8 in) from top

CYLINDER OUT OF ROUND

ENGINE TYPE	MAXIMUM
809	0.08 mm (.003 in)

Measuring 16 mm (5/8 in) from top of cylinder with a cylinder gauge, check if the cylinder out of round is more than the specified dimension. If larger, cylinder should be rebored and honed or should be replaced.

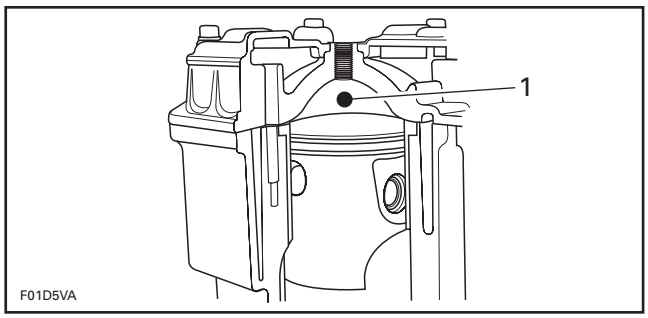
NOTE: Be sure to restore the chamfer around all cylinder sleeve port openings.



1. Piston pin position
2. Measures to be compared
A. 16 mm (5/8 in)

COMBUSTION CHAMBER VOLUME MEASUREMENT

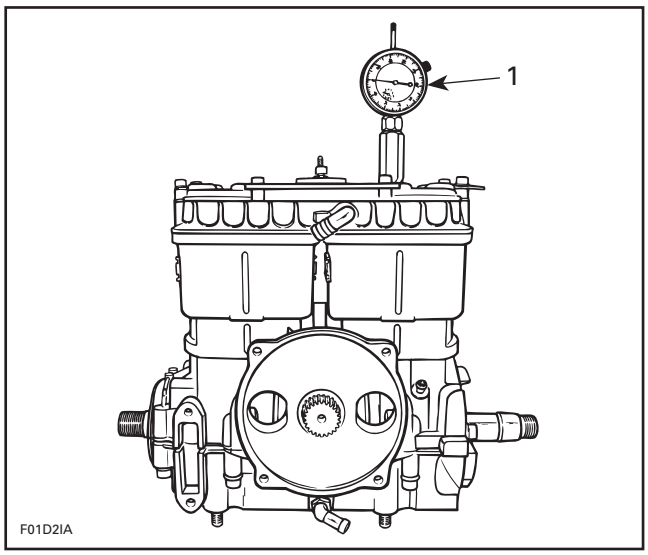
The combustion chamber volume is the region in the cylinder head above the piston at Top Dead Center. It is measured with the cylinder head installed on the engine.



1. Combustion chamber

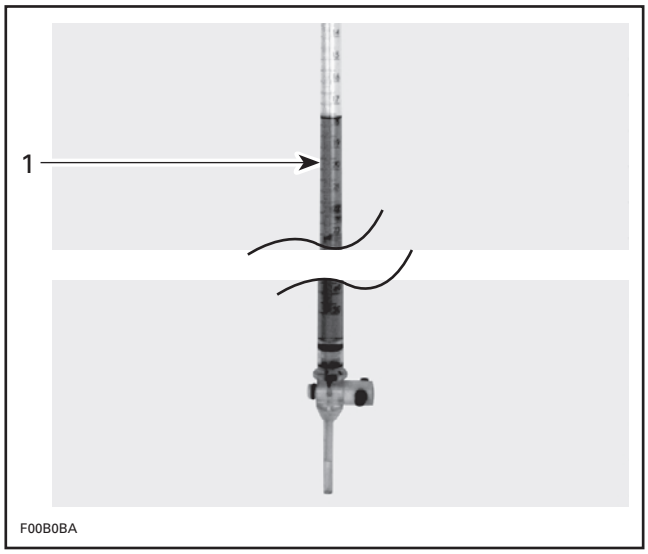
NOTE: When checking the combustion chamber volume, engine must be cold, piston must be free of carbon deposit and cylinder head must be leveled.

1. Remove both spark plugs and bring one piston to Top Dead Center a using a TDC gauge.



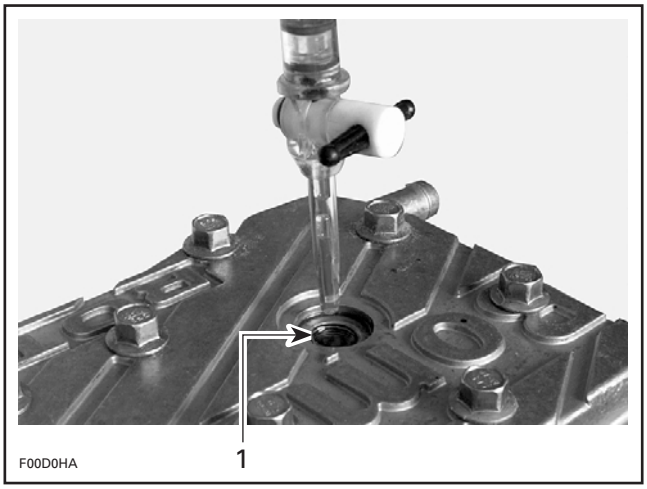
1. Bring piston to TDC

2. Obtain a graduated burette (capacity 0 - 50 cc) and fill with an equal part (50/50) of gasoline and injection oil.



1. Graduated burette (0 - 50 cc)

3. Open burette valve to fill its tip. Add liquid in burette until level reaches 0 cc.
4. Inject the burette content through the spark plug hole until liquid touches the top spark plug hole.



1. Top of spark plug hole

NOTE: The liquid level in cylinder must not drop for a few seconds after filling. If so, there is a leak between piston and cylinder. The recorded volume would be false.

5. Let burette stand upward for about 10 minutes, until liquid level is stabilized.
6. Read the burette scale to obtain the quantity of liquid injected in the combustion chamber.

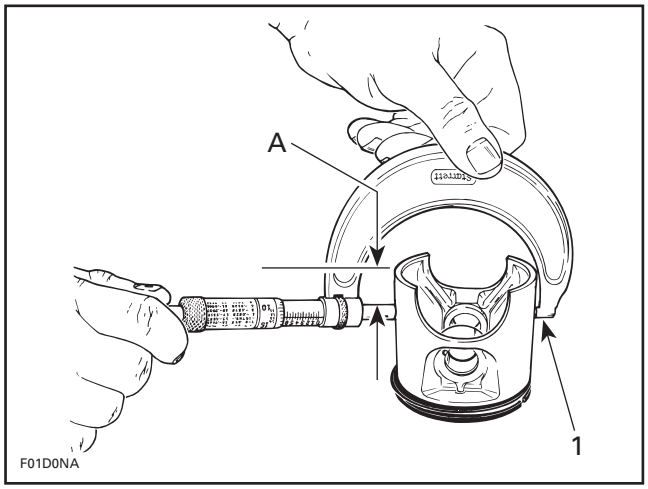
NOTE: When the combustion chamber is filled to top of spark plug hole, it includes an amount of 2.25 cc corresponding to the spark plug tip.

7. Repeat the procedure for the other cylinder.

ENGINE TYPE	COMBUSTION CHAMBER VOLUME (cc) (up to top thread of spark plug hole)
809	26.29 ± 1.1

USED PISTON MEASUREMENT

Using a micrometer, measure piston at A perpendicularly (90°) to piston pin.



1. Measuring perpendicularly (90°) to piston pin axis
A. See table below

ENGINE TYPE	DIMENSION A mm (in)
809	28.7 (1.13)

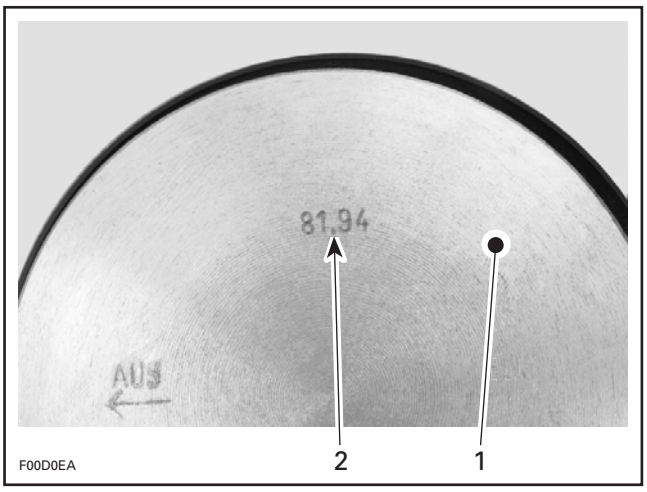
The measured dimension should be the same as the one scribed on piston dome. If not, install a new piston.

CYLINDER/PISTON CLEARANCE

Used and New Pistons

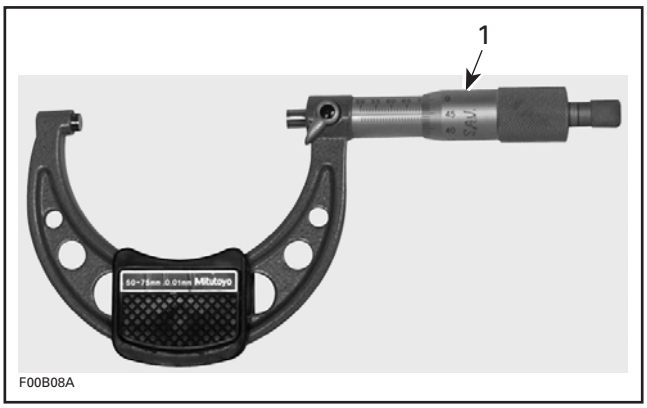
NOTE: Make sure used piston is not worn. See USED PISTON MEASUREMENT above.

Take the measurement on the piston dome.



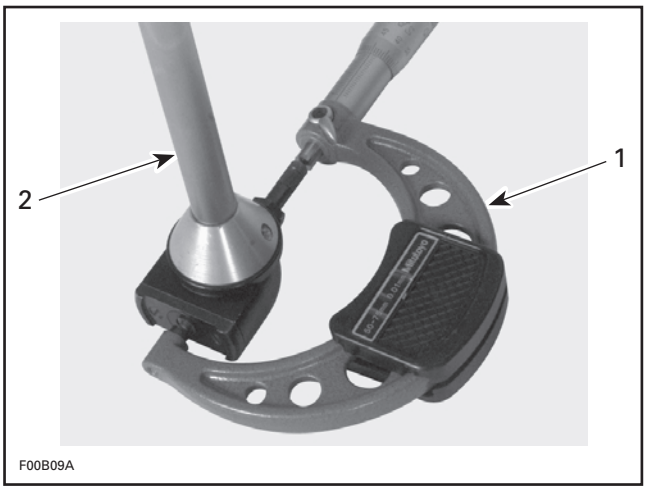
1. Piston dome
2. Piston measurement

Adjust and lock a micrometer to the specified value on the piston dome.

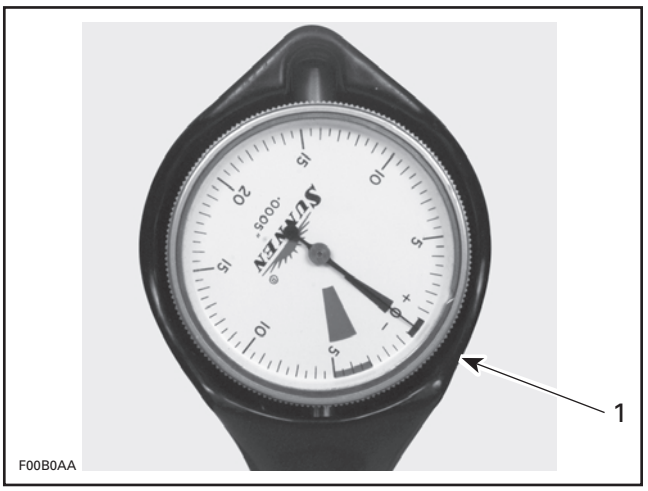


1. Micrometer set to the piston dimension

With the micrometer set to the piston dimension, adjust a cylinder bore gauge to the micrometer dimension and set the indicator to 0.

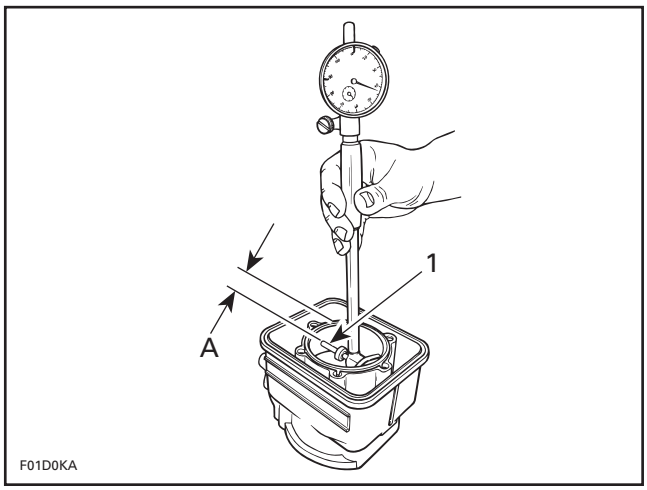


1. Use the micrometer to set the cylinder bore gauge
2. Dial bore gauge



1. Indicator set to 0 (zero)

Position the dial bore gauge at 16 mm (5/8 in) below cylinder top edge.



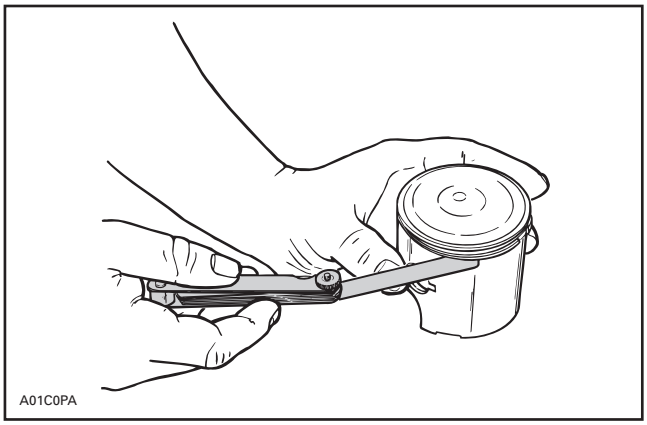
1. Measuring perpendicularly (90°) to piston pin axis
A. 16 mm (5/8 in)

Read the measurement on the cylinder bore gauge. The result is the exact piston/cylinder wall clearance. If clearance exceeds specified tolerance, replace cylinder or rebore. Refer to TECHNICAL DATA.

NOTE: Make sure the cylinder bore gauge indicator is set exactly at the same position as with the micrometer, otherwise the reading will be false.

RING/PISTON GROOVE CLEARANCE

Using a feeler gauge check clearance between rectangular ring and groove. Replace piston if clearance exceeds specified tolerance. Refer to TECHNICAL DATA.

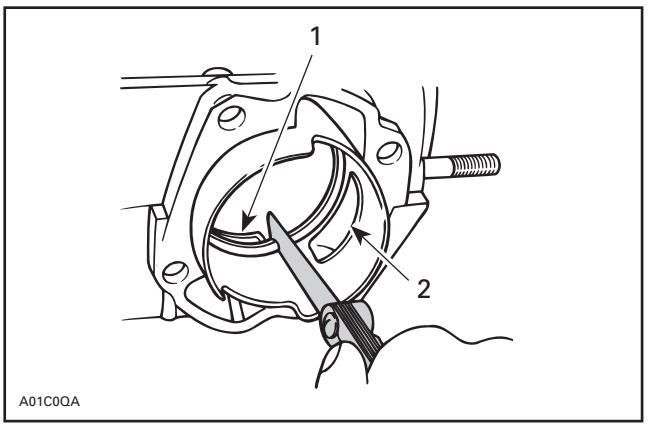


RING END GAP

Position ring half-way between transfer ports and intake port. On rotary valve engines, position ring just below transfer ports.

NOTE: In order to correctly position the ring in the cylinder, use piston as a pusher.

Using a feeler gauge, check ring end gap. Replace ring if gap exceeds specified tolerance. Refer to TECHNICAL DATA.



1. Transfer port
2. Intake port

CRANKSHAFT DEFLECTION

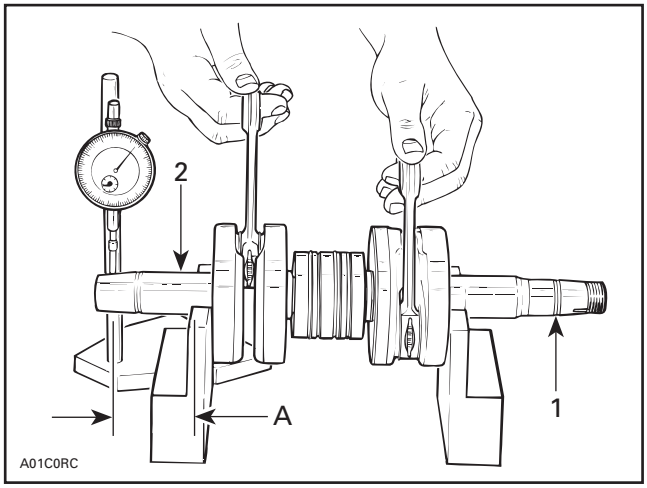
Crankshaft deflection is measured with a dial indicator.

Measuring (in engine)

First, check deflection with crankshaft in engine. If deflection exceeds the specified tolerance, recheck deflection using V-shaped blocks to determine the defective part(s). See below.

Measuring (on bench)

Once engine is disassembled, check crankshaft deflection on V-shaped blocks. If deflection exceeds the specified tolerance, it can be worn bearings or a bent crankshaft. Remove crankshaft bearings and check deflection again on V-shaped blocks to determine the defective part(s). See measurement A in following illustration.



TYPICAL

1. *Measure at mid point between the key and the first thread*
2. *Mid point of crankshaft bearing*

A. See table below

Crankshaft Deflection on PTO Side

ENGINE TYPE	DISTANCE A mm (in)	MAXIMUM ON PTO SIDE mm (in)
809	94.4 (3.717)	0.06 (.0024)

Crankshaft Deflection on MAG Side

ENGINE TYPE	MAXIMUM ON MAG SIDE mm (in)
809	0.05 (.002)

Crankshaft Deflection in Center of Crankshaft

ENGINE TYPE	MAXIMUM IN CENTER OF CRANKSHAFT
809	0.08 mm (.0031 in)

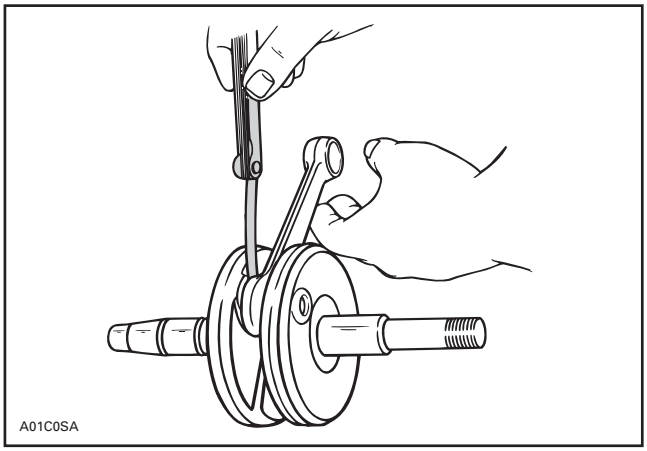
NOTE: Crankshaft deflection cannot be correctly measured between centers of a lathe.

If the deflection exceeds the specified tolerance, crankshaft should be repaired or replaced.

CONNECTING ROD BIG END AXIAL PLAY

ENGINE TYPE	NEW PARTS min. – max.	WEAR LIMIT
809	0.31 - 0.68 (.012 - .027 in)	1.20 mm (.047 in)

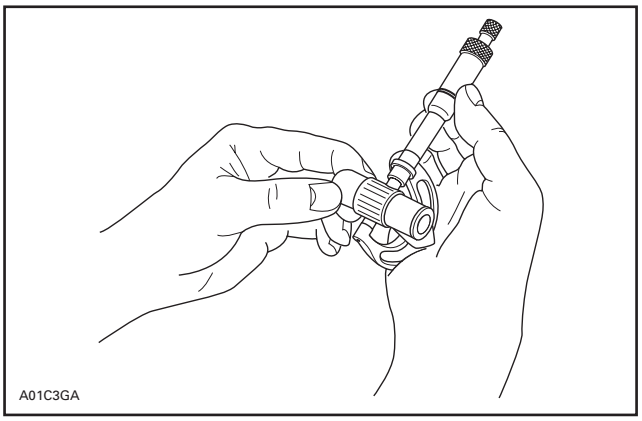
Using a feeler gauge, measure distance between thrust washer and crankshaft counterweight. If the distance exceeds specified tolerance, repair or replace the crankshaft.

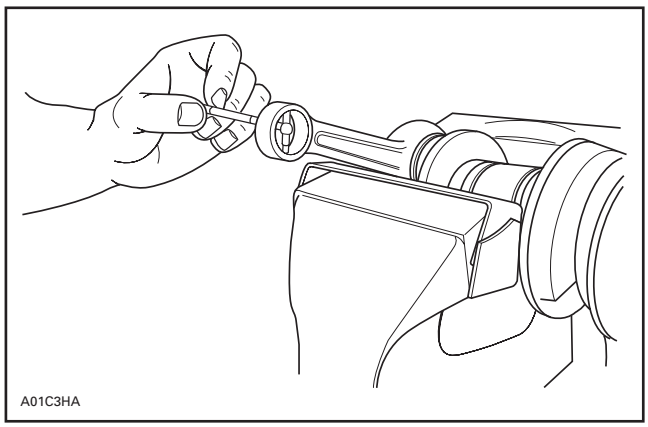


TYPICAL

CONNECTING ROD/PISTON PIN CLEARANCE

Measure piston pin with its needle bearing. Compare to inside diameter of connecting rod.





ENGINE TYPE	NEW PARTS min. – max.	WEAR LIMIT
809	0.003 - 0.012 mm (.0001 - .0005 in)	0.015 mm (.0006 in)

CONNECTING ROD/CRANKPIN CLEARANCE

ENGINE TYPE	NEW PARTS min. – max.	WEAR LIMIT
809	0.024 - 0.038 mm (.0004 - .0015 in)	0.06 mm (.0024 in)

CRANKSHAFT END-PLAY

End-play is not adjustable but it should be between 0.10 - 0.30 mm (.004 - .012 in).

CHECKING SURFACE FLATNESS

Intake manifold, intake manifold cover can be checked for perfectly mating surfaces.

Lay part on a surface plate (marble, mirror or thick glass plate).

Holding down one end of part, try pushing down the other end.

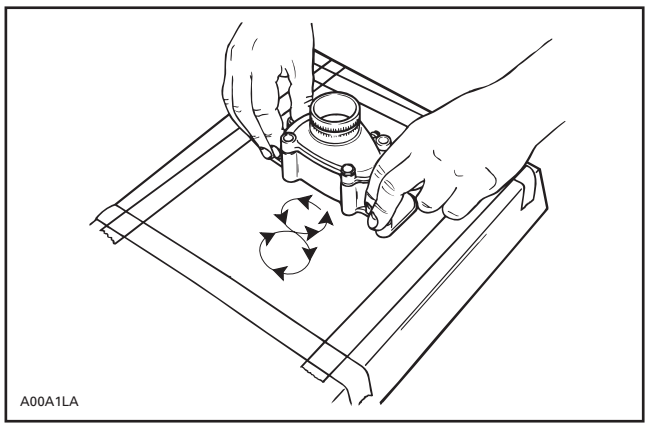
If any play is felt, part must be rectified.

RECTIFYING SURFACES

Stick a fine sand paper sheet on the surface plate then lightly oil the sand paper.

Rub part mating surface on sand paper using 8-figure movements.

Sand until mating surface is perfectly straight.



CHECKING CRANKSHAFT ALIGNMENT

Install a degree wheel (P/N 414 352 900) on crankshaft end.

Remove all spark plugs.

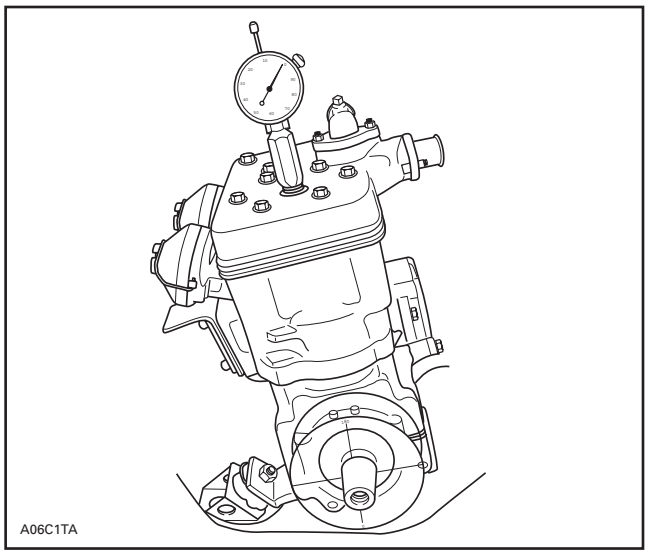
Install a TDC gauge (P/N 414 104 700) in spark plug hole on MAG side.

Bring MAG piston at top dead center.

Rotate degree wheel (not crankshaft) so that 360° mark aligns with center of crankcase. Scribe a mark on crankcase.

Remove TDC gauge and install it on center cylinder.

Bring center piston to top dead center. Degree wheel must rotate with crankshaft.



TYPICAL

Interval between cylinders must be 120° ± 0.5.

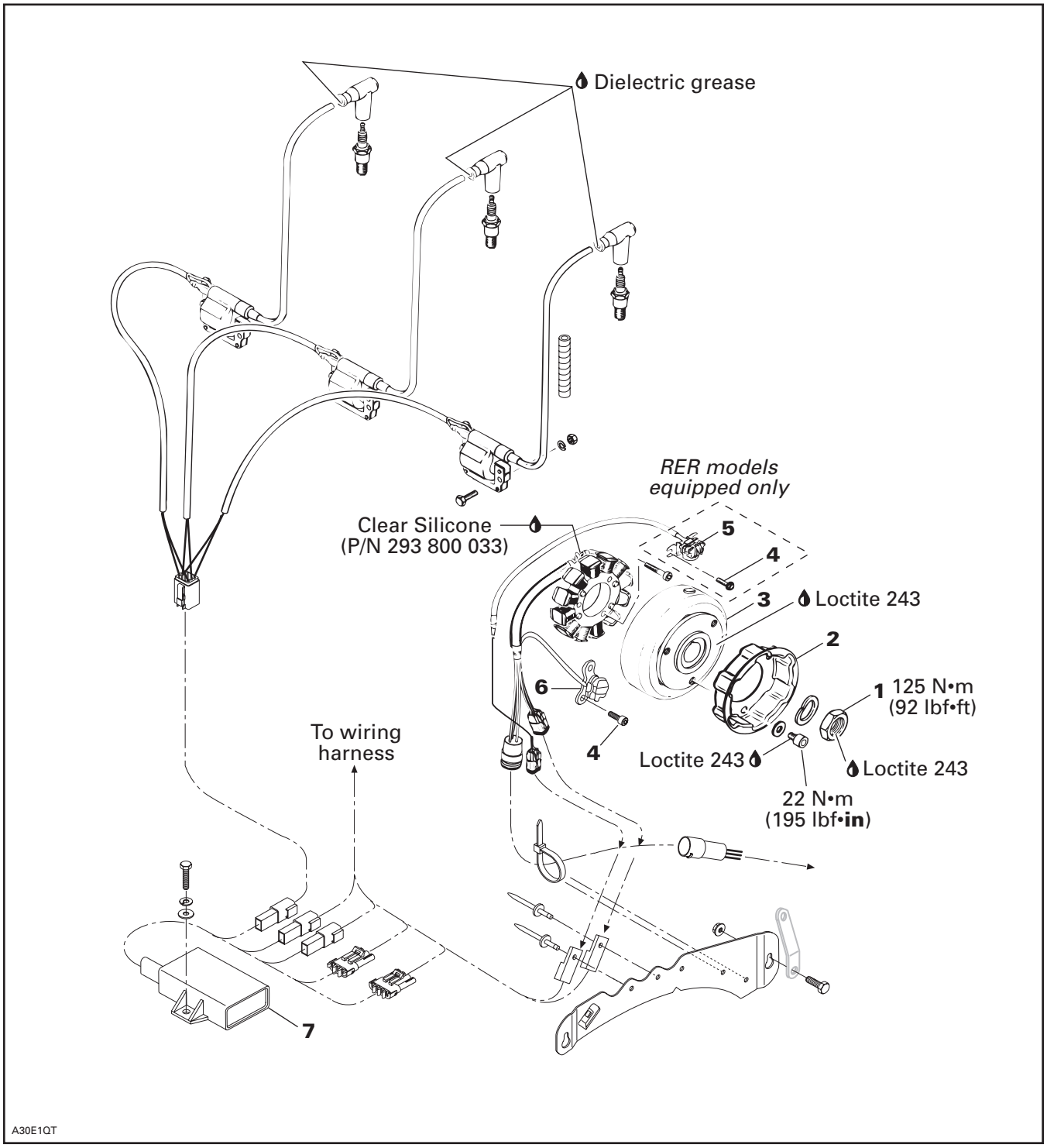
Proceed the same with MAG side piston.

Any other reading indicates a misaligned (twisted) crankshaft.

CDI SYSTEM

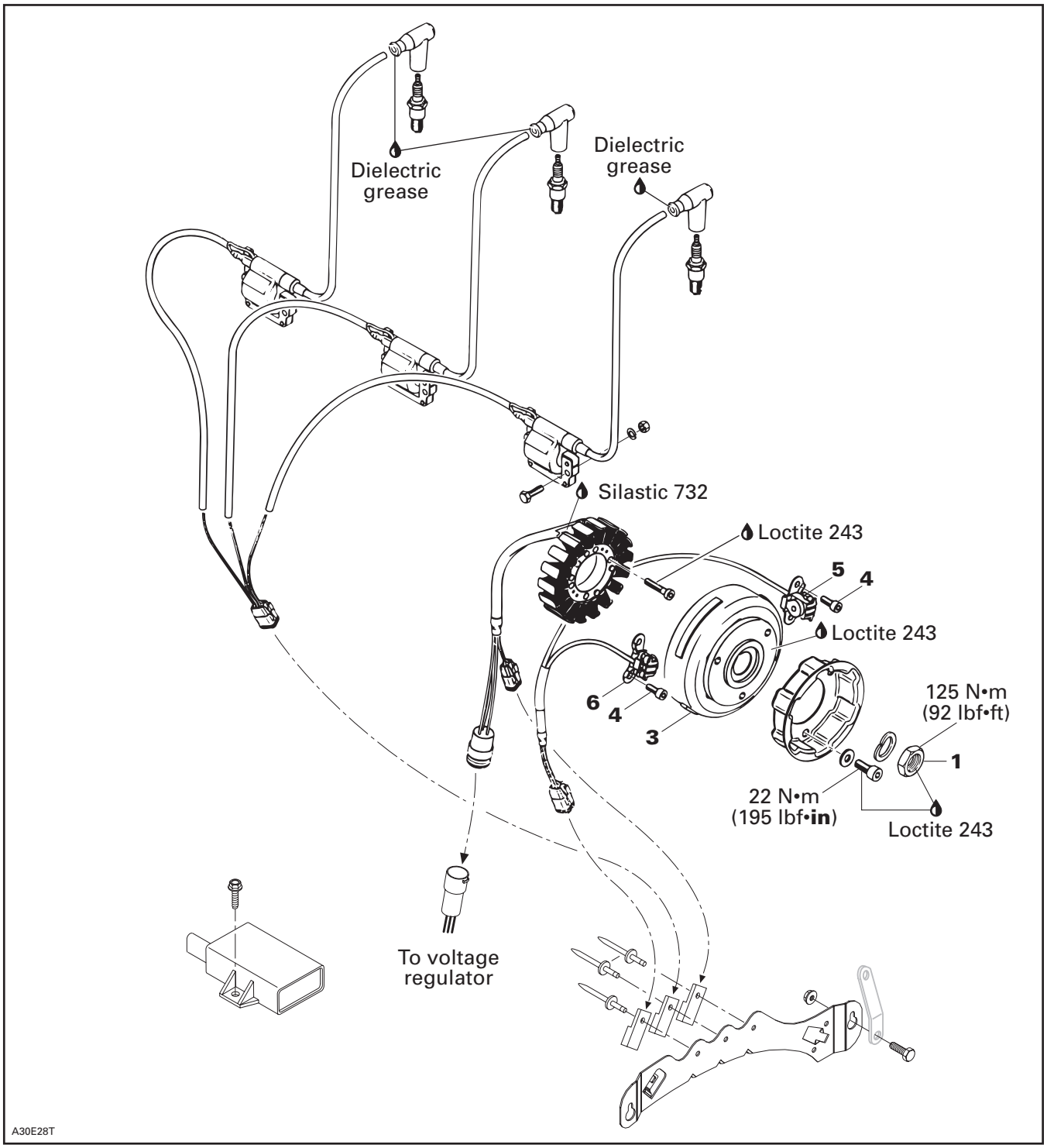
NIPPONDENSO TRIGGER COIL IGNITION SYSTEM

290 W on Mach Z STD/TECH PLUS



TYPICAL

360 W on Grand Touring SE



PARTS FLAT RATE

NOTE: The following procedures can be done without removing the engine from chassis. To facilitate magneto removal, hold drive pulley with tool (P/N 529 027 600).

CDI means Capacitor Discharge System.

CLEANING

Clean all metal components in a non-ferrous metal cleaner.

CAUTION: Clean stator and magneto using only a clean cloth.

DISASSEMBLY

3, Magneto Flywheel

To gain access to magneto assembly, remove the following parts as needed on different engines:

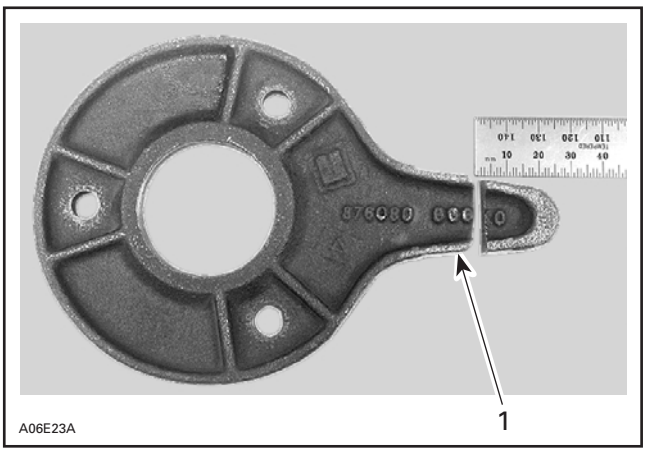
– tuned pipe(s) and muffler

– rewind starter

– starting pulley no. 2.

To remove magneto flywheel retaining nut no. 1:

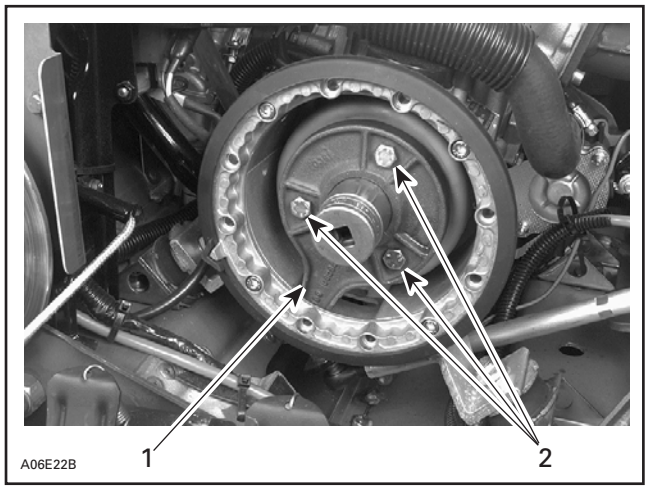
Use magneto puller ring (P/N 420 876 080). Former puller has to be modified as shown.



1. Cut by 25 mm (1 in)

Install puller with its tab in magneto housing opening.

CAUTION: Use only M8 x 20 mm screws to bolt puller to magneto.



TYPICAL

1. Tab in magneto housing opening
2. M8 x 20 mm screws

– Remove magneto flywheel nut, using a 30 mm socket machined to 40 mm (1.580 in) outside diameter by 16 mm (5/8 in) long.

NOTE: To correctly remove a threadlocked fastener it is first necessary to tap on the fastener to break threadlocker bond. This will eliminate the possibility of thread breakage.

To remove magneto flywheel, install the puller (P/N 529 022 500).

– Tighten puller bolt and at the same time, tap on bolt head using a hammer to release magneto flywheel from its taper.

5,6, Trigger Coil

NOTE: As spare parts only trigger coil with GN/BL and GY/BL wires is available. This trigger coil can replace any of both trigger coils installed on RER models.

Magneto and stator plate must be removed before trigger coil removal.

To replace trigger coil:

– Disconnect trigger coil connector housing.

– Remove grommet from crankcase where trigger coil wire exits magneto housing.

– Remove retaining screws no. 4.

– Remove trigger coil and carefully pull wires.

– Install new trigger coil and other parts removed.

ASSEMBLY

3, Magneto Flywheel

Clean crankshaft extension (taper) and apply Loctite 243 (blue) on taper, then position Woodruff key, flywheel and lock washer on crankshaft.

Clean nut threads and apply Loctite 243 (blue) then tighten nut 125 N•m (92 lbf•ft).

At reassembly coat all electric connections except Deutsch housings (waterproof gray housing) with silicone dielectric grease (P/N 293 550 004) to prevent corrosion or moisture penetration.

CAUTION: Do not use silicone sealant, this product will corrode contacts. Do not apply silicone dielectric grease on any Deutsch (gray) housing otherwise housing seal will be damaged.

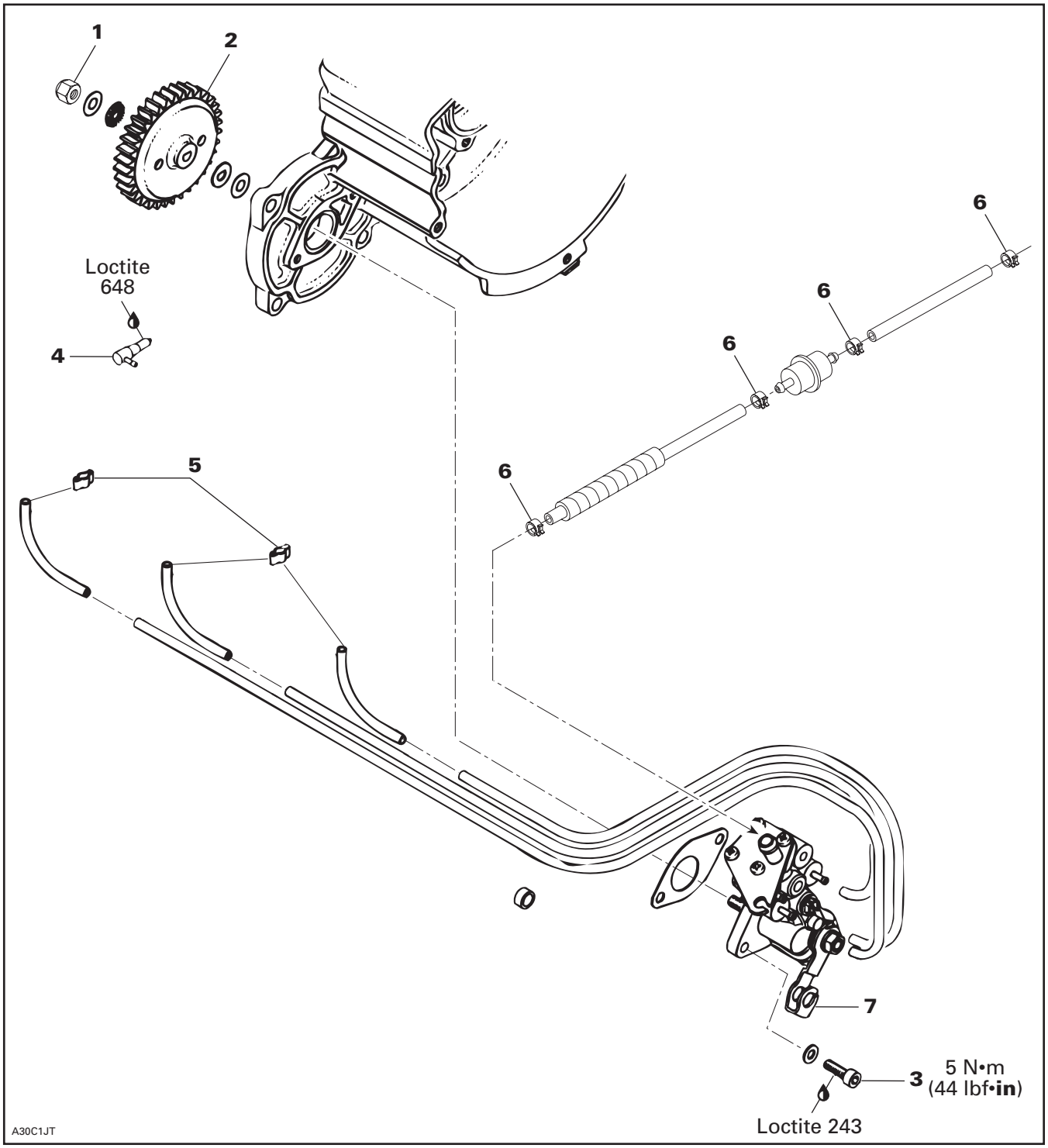
Ignition Timing

Check as described in IGNITION TIMING.

OIL INJECTION SYSTEM

OIL INJECTION PUMP

809 Engine



⚠ WARNING

Wipe off any oil spills. Oil is highly flammable.

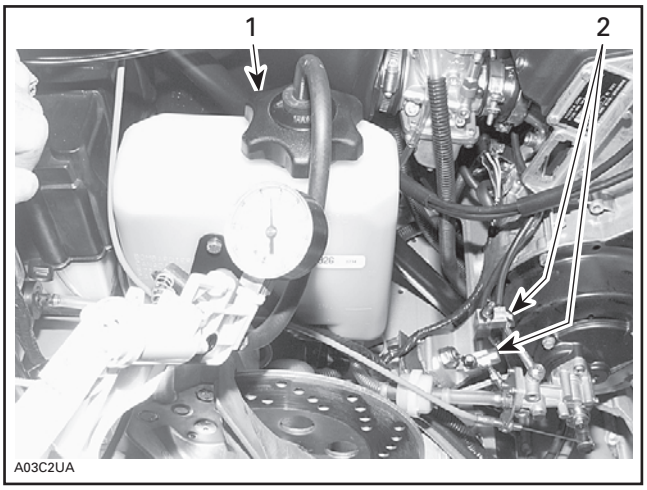
OIL SYSTEM LEAK TEST

All Models

The following test will indicate any leak from oil reservoir to the banjo fitting(s).

Install on oil reservoir special cap of leak testing kit (P/N 529 033 100).

Install hose pinchers (P/N 295 000 076) on outlet hoses.



TYPICAL

1. *Special cap on reservoir*
2. *Hose pinchers on outlet hoses*

Connect pump of leak testing kit to special cap.

Pressurize oil system to 34 kPa (5 PSI). That pressure must not drop during 3 minutes.

If pressure drops, locate leak(s) and repair/replace leaking component(s). To ease locating leak(s) spray soapy water on components, bubbles will indicate leak location(s).

OIL PUMP IDENTIFICATION

7, Pump Lever

Different engines need different pumps. See identification on lever no. 7.

CAUTION: Always mount proper pump on engine.

ENGINE TYPE	OIL PUMP IDENTIFICATION
809	15

NOTE: The following procedures can be done without removing the engine from chassis.

CLEANING

Clean all metal components in a non-ferrous metal cleaner.

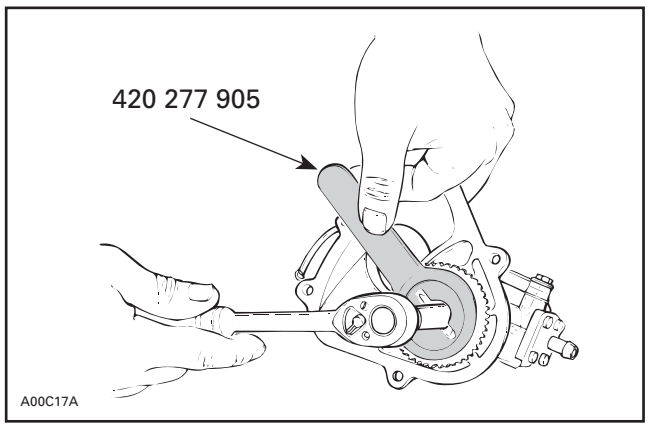
DISASSEMBLY

NOTE: Some oil pump components are not available as single parts.

1,2, Gear Retaining Nut and Oil Pump Gear

To remove gear retaining nut, first extract the needle roller with pliers then lock gear in place using one of the following gear holder.

ENGINE TYPE	TOOL P/N
809	420 277 905



TYPICAL

ASSEMBLY

2, Oil Pump Gear

At gear assembly, apply a light coat of low temperature grease (P/N 413 706 100) on gear teeth.

5,6, Spring Clip and Clamp

Always check for spring clips tightness.

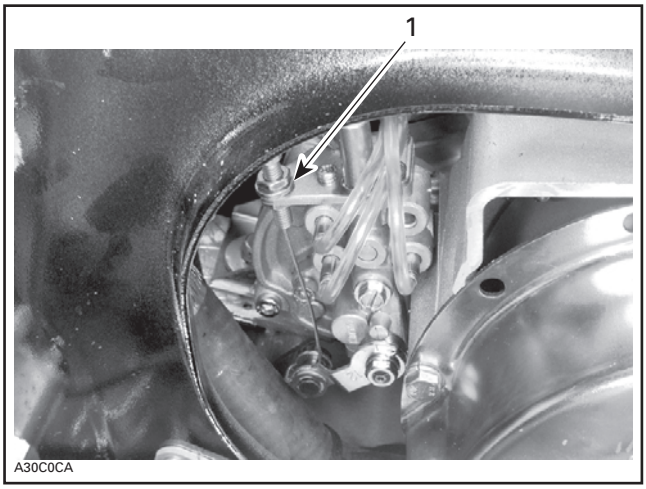
3, Screw

Torque to 5 N•m (44 lbf•**in**).

Make sure cable barrel is well seated in oil pump lever.

Secure barrel with plastic washer and circlip.

Install cable lock washer above support.



1. Lock washer

Verify cable and oil pump lever operation.

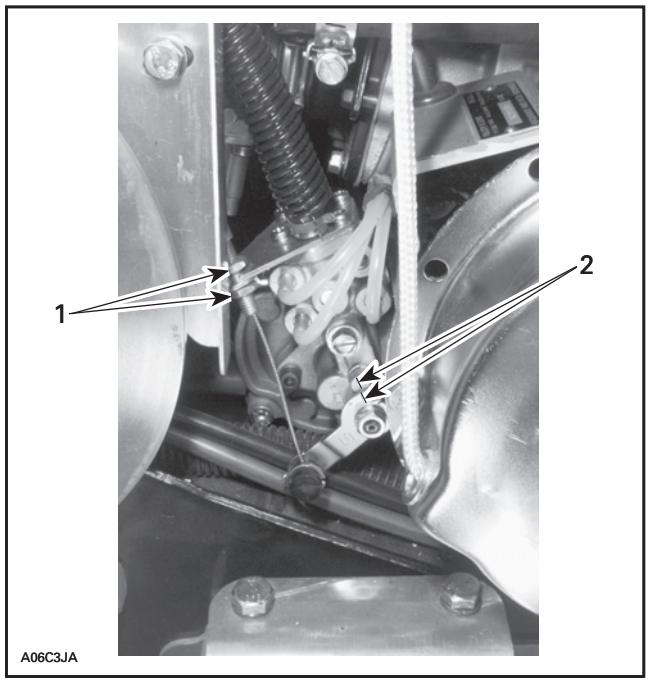
ADJUSTMENT

Prior to adjusting the pump, make sure all carburetor adjustments are completed.

Synchronizing Pump with Carburetor

Eliminate the throttle cable free-play by pressing the throttle lever until a light resistance is felt, then hold in place. The aligning marks on the pump casting and on the lever must align. If not, loosen the adjuster nut and adjust accordingly.

Retighten the adjuster nut.

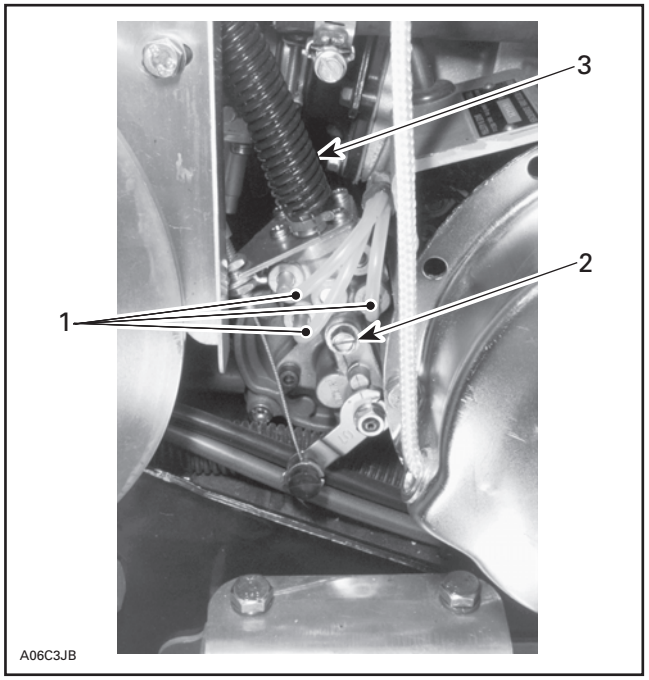


1. Adjuster nut
2. Marks in line

CAUTION: Proper oil injection pump adjustment is very important. Any delay in the opening of the pump can result in serious engine damage.

To Bleed Oil Lines

Bleed main oil line (between tank and pump) by loosening the bleeder screw until air has escaped from the line. Add injection oil as required.

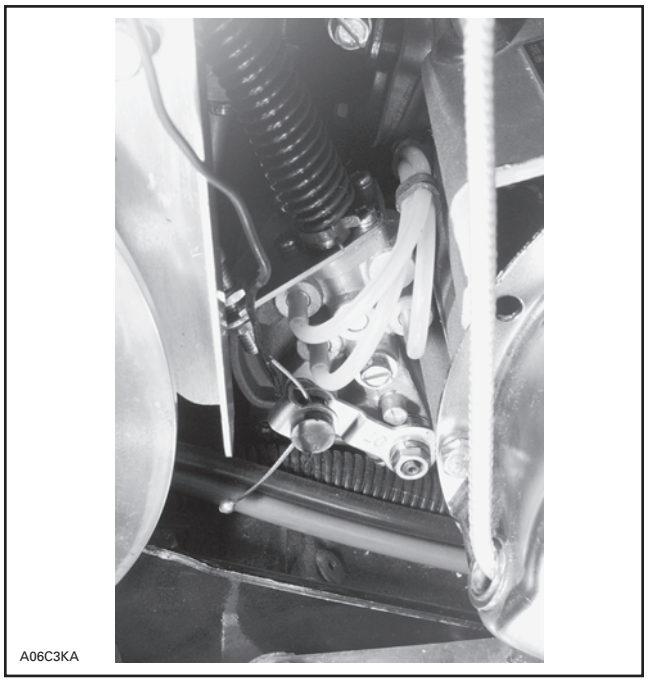


1. Small oil lines
2. Bleeder screw
3. Main oil line

Reinstall all parts.

Bleed the small oil line between pump and intake manifold by running engine at idle while holding the pump lever in fully open position.

NOTE: Make a J hook out of mechanical wire to lift the lever.



TYPICAL — ENGINE AT IDLE

⚠ WARNING

Ensure not to operate carburetor throttle mechanism. Secure the rear of the vehicle on a stand.

CHECKING OPERATION

Oil Pump

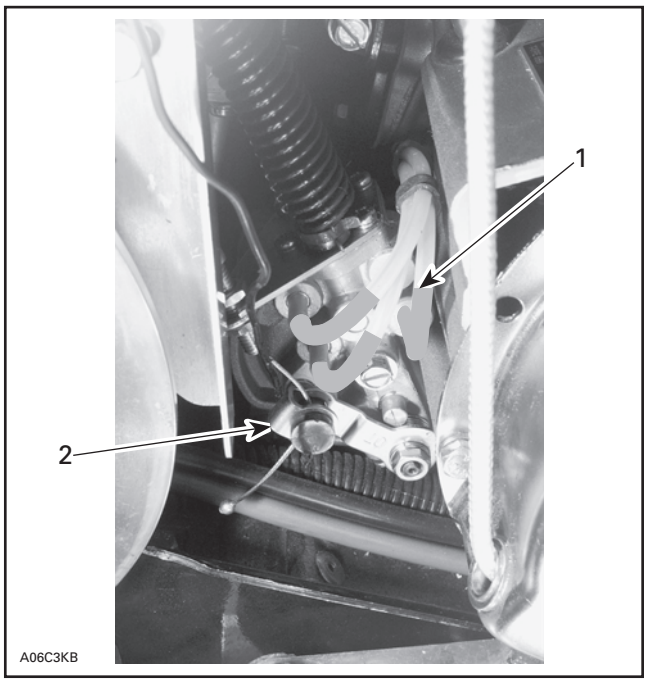
On Vehicle

NOTE: Main oil line must be full of oil. See bleeding procedure above.

Lift rear of vehicle and support with a mechanical stand. Unplug oil lines from pump. Start engine and stop it as soon as it fires.

Check that oil in small oil lines has been sucked up (this will be indicated by a clear section of small oil lines). Repeat the procedure until this condition is attained.

Reconnect small oil lines, start engine and run at idle while holding the pump lever in fully open position. Oil columns must advance into small oil lines.



TYPICAL — ENGINE AT IDLE

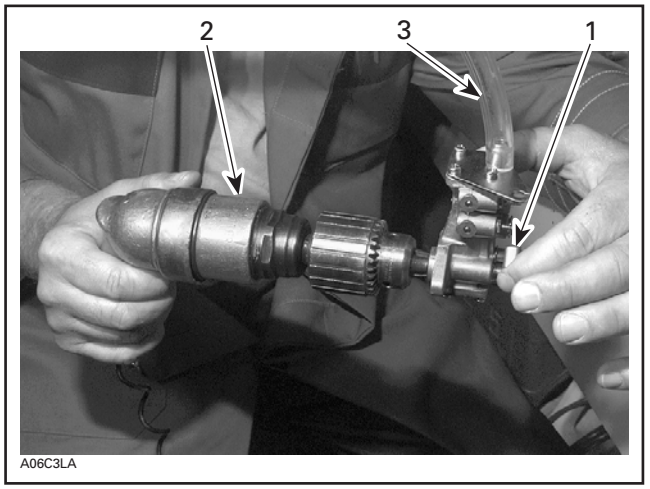
1. *Oil columns advancing*
2. *Fully open position*

If not, remove pump assembly and check the pump gear and drive shaft (if applicable) for defects, replace as necessary. Test pump as describes below.

NOTE: Through normal use, oil level must not drop in small tubes. If oil drops, verify check valve operation in injection nozzle. Replace as necessary.

Test Bench

Connect a hose filled with injection oil to main line fitting. Insert other hose end in an injection oil container. Using a clockwise rotating drill rotate pump shaft. Oil must drip from outer fittings while holding lever in a fully open position. If not replace pump.



TYPICAL

1. *Fully open position*
2. *Clockwise rotating drill*
3. *Main line*

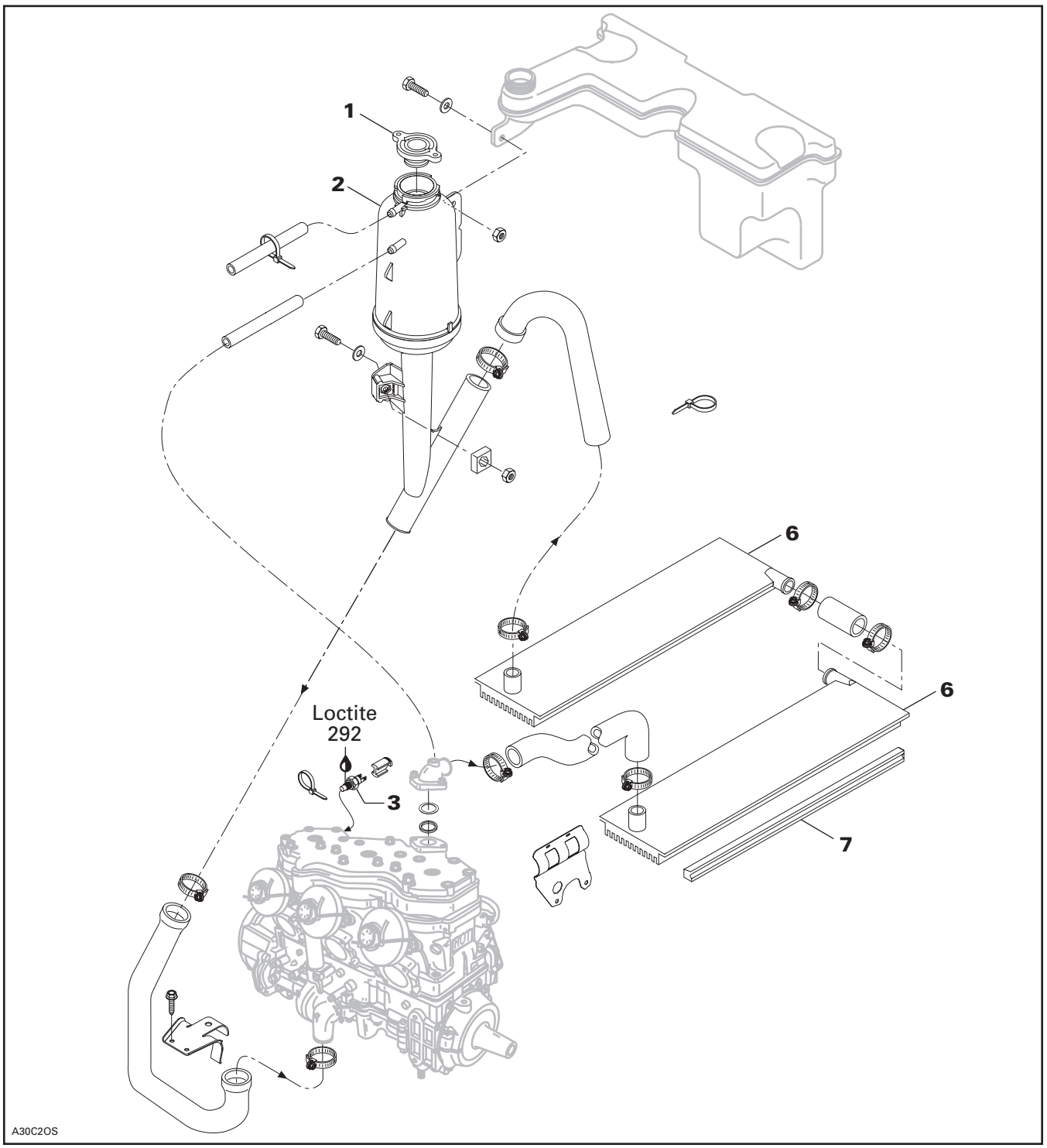
4, Check Valve

To verify this check valve, proceed the same as for checking pump operation on vehicle. First unplug oil line from check valve. After restarting the engine, check that a clear section in small oil line is present. Reconnect oil line.

Run engine at idle. Oil column must advance. If the check valve is faulty, oil column will go back and forth. Replace if so.

LIQUID COOLING SYSTEM

809 Engine



TYPICAL

COOLING SYSTEM LEAK TEST

Install special plug (radiator cap) (P/N 529 021 400) and hose pincher (P/N 529 009 900) on overflow hose. Pressurize coolant reservoir to 100 kPa (15 PSI).

Check all hoses and cylinder/base for coolant leaks. Spray a soap/water solution and look for air bubbles.

TYPICAL

INSPECTION

Check general condition of hoses and clamp tightness.

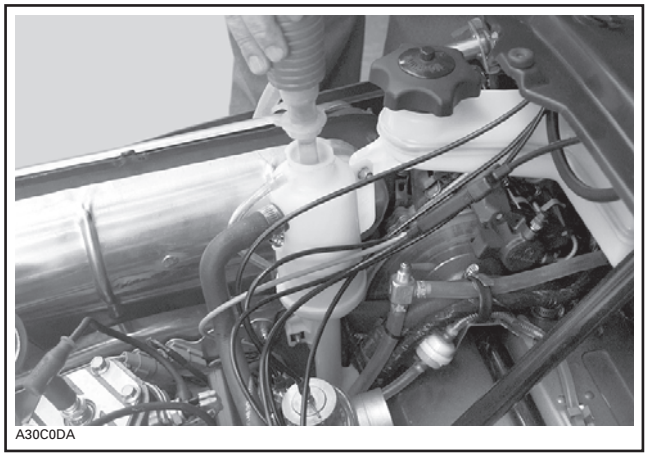
DRAINING THE SYSTEM

⚠ WARNING

Never drain or refill the cooling system when engine is hot.

To drain the cooling system, siphon the coolant mixture from the coolant tank.

Disconnect hose from water pump housing to drain coolant from engine.



TYPICAL

When the coolant level is low enough, lift the rear of vehicle to drain the radiators.

DISASSEMBLY AND ASSEMBLY

3,4, Sender and Plug

Apply Loctite 592 (P/N 413 702 300) thread sealant on sender and plug to avoid leaks.

1, Pressure Cap

Check if the cap pressurizes the system. If not, install a new 90 kPa (13 PSI) cap (do not exceed this pressure).

6,7, Radiator and Radiator Protector

Insert radiator protector into radiator C-rail.

COOLING SYSTEM REFILLING PROCEDURE

Recommended Coolant

Use Premixed coolant - 52°C (- 62°F) (P/N 413 711 802) (16 x 1L). Do not reinstall pressure cap.

CAUTION: To prevent rust formation or freezing condition, always replenish the system with recommended premixed coolant.

System Capacity

Refer to TECHNICAL DATA.

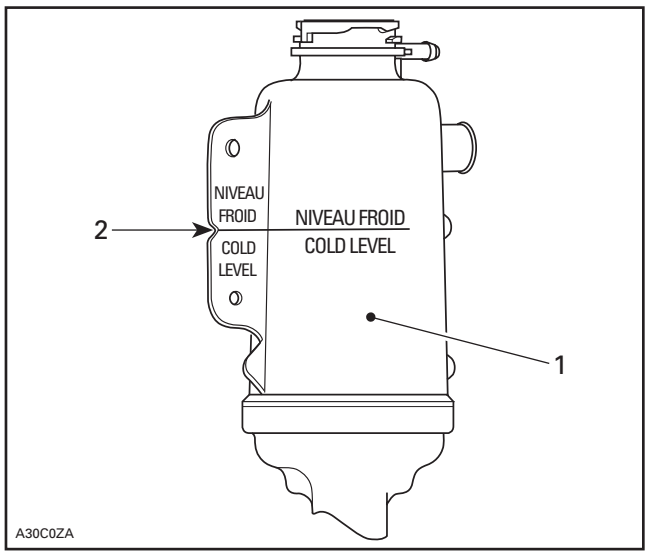
Refilling Procedure

Lift front of vehicle until the tunnel is horizontal. With engine cold, refill coolant tank up to cold level line. Wait a few minutes then refill to line. Install pressure cap. Start engine. Refill up to line while engine is idling until all air bubbles have excaped from system (about 4 to 5 minutes). Install pressure cap.

To make sure coolant flows through radiators, touch them by hand. They must feel warm.

Put back front of vehicle on the ground.

When engine has completely cooled down, recheck coolant level in coolant tank and refill up to line.



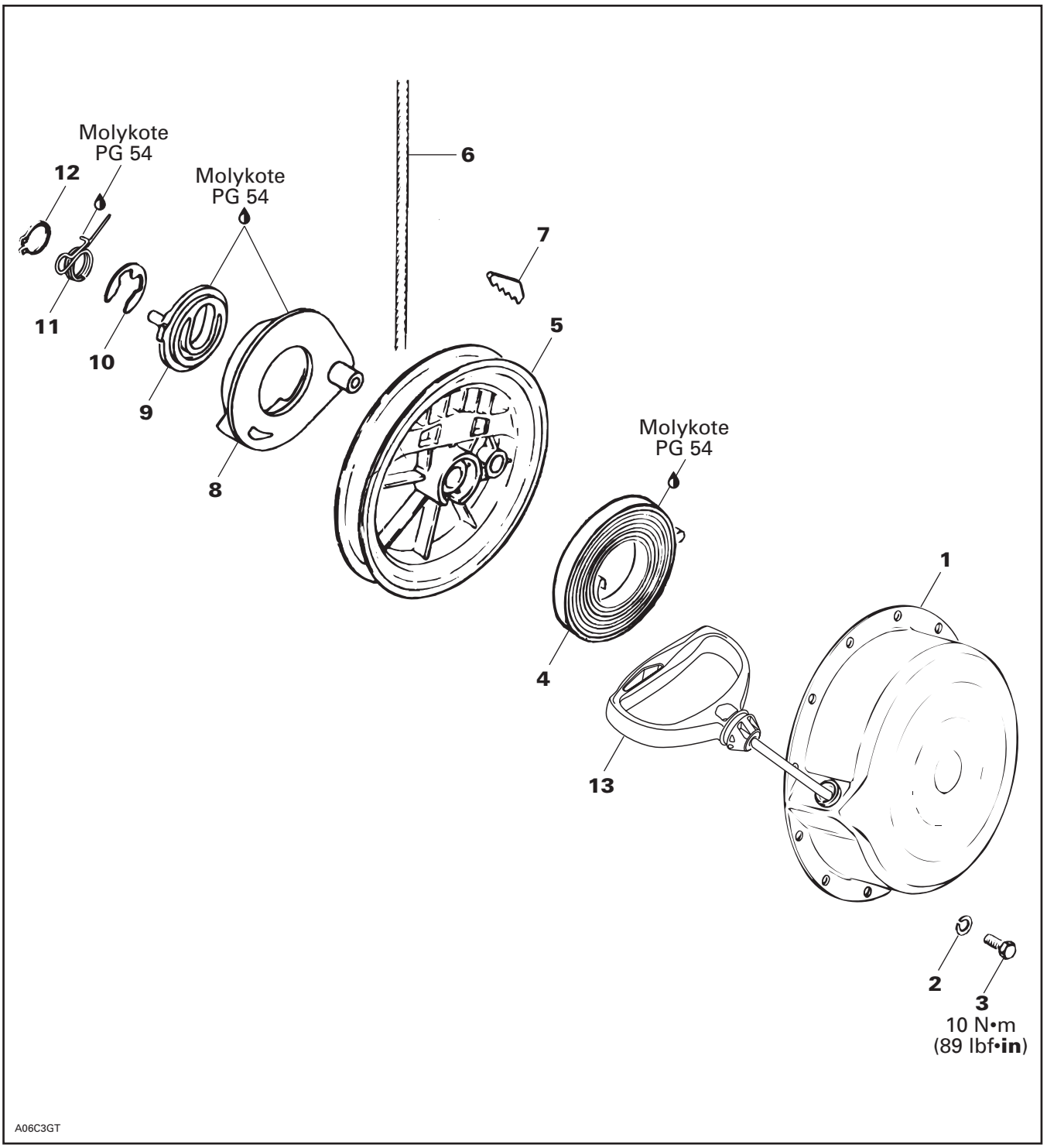
TYPICAL

1. *Coolant tank*
2. *COLD LEVEL line*

Check coolant concentration (freezing point) with proper tester.

REWIND STARTER

All Models



INSPECTION

NOTE: Due to dust accumulation, rewind starter must be periodically cleaned, inspected and relubricated.

CAUTION: It is of the utmost importance that the rewind starter springs be lubricated periodically using specific lubricant. Otherwise, rewind starter component life will be shortened and/or rewind starter will not operate properly under very cold temperatures.

Check if rope no. 6 is fraying, replace if so.

When pulling starter grip, mechanism must engage within 30 cm (1 ft) of rope pulled. If not, disassemble rewind starter, clean and check for damaged plastic parts. Replace as required, lubricate, reassemble and recheck.

When releasing starter grip, it must return to its stopper and stay against it. If not, check for proper spring preload or damages. Readjust or replace as required.

When pulling starter grip 10 times in a row, it must return freely. If not, check for damaged parts or lack of lubrication. Replace parts or lubricate accordingly.

REMOVAL

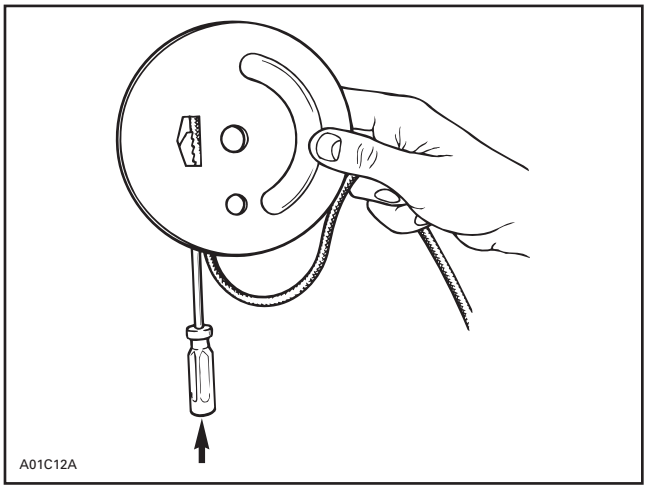
Using a small screwdriver, extract rope knot from starter grip no. 13. Cut rope close to knot. Tie a knot near starter.

Remove screws no. 3 and washers no. 2 securing rewind starter no. 1 to engine then remove rewind starter.

DISASSEMBLY

To remove rope from rewind starter mechanism:

– First remove locking ring no. 12, locking spring no. 11, circlip no. 10, pawl lock no. 9 and pawl no. 8.
– Let sheave get free to release spring preload.
– Remove sheave no. 5 from starter housing no. 1.
– Disengage key no. 7 and pull out rope no. 6.



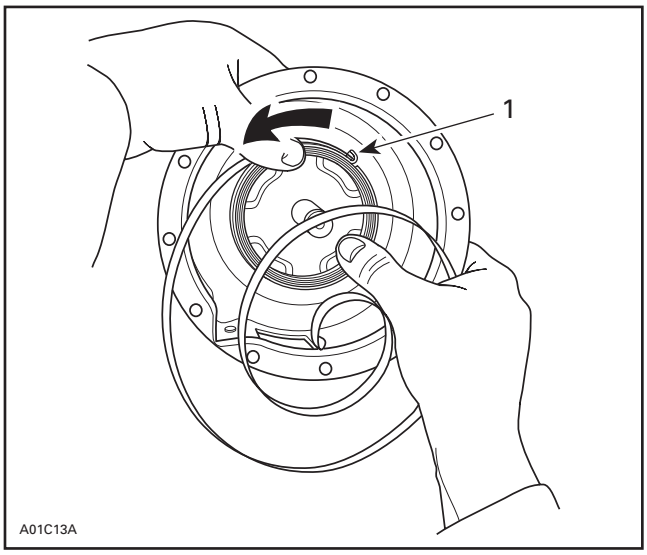
GENTLY TAP ON KEY

ASSEMBLY

At assembly, position spring no. 4 outer end into spring guide notch then wind the spring counterclockwise into guide.

⚠ WARNING

Since the spring is tightly wound inside the guide it may fly out when rewind is handled. Always handle with care.

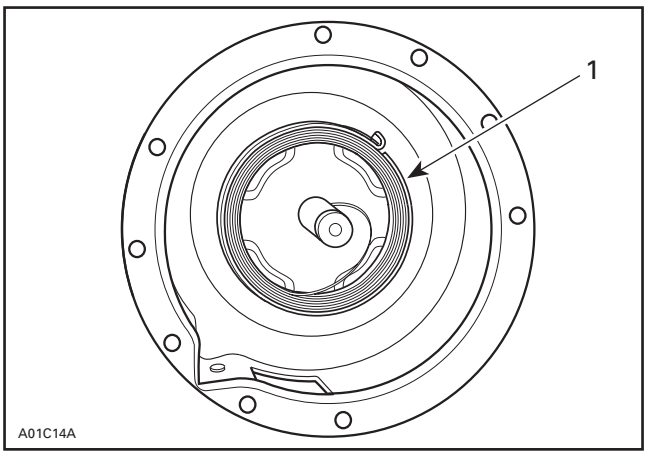


1. Outer end into guide notch

NOTE: Due to dust accumulation, rewind starter must be periodically cleaned, inspected and relubricated.

CAUTION: It is of the utmost importance that the rewind starter spring(s) be lubricated periodically using specific lubricant. Otherwise, rewind starter component life will be shortened and/or rewind starter will not operate properly under very cold temperatures.

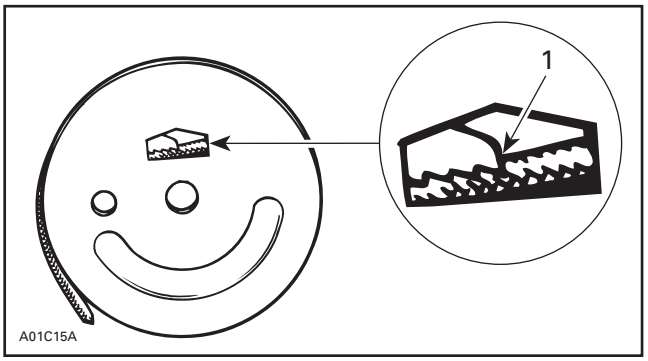
Lubricate spring assembly with Molykote PG 54 (P/N 420 899 763) and position into starter housing as illustrated.



1. Grease inside spring guide

CAUTION: The use of standard multi-purpose grease could result in rewind starter malfunction.

To install a new rope **no. 6**: insert rope into sheave **no. 5** orifice and lock it with the key **no. 7** as illustrated.



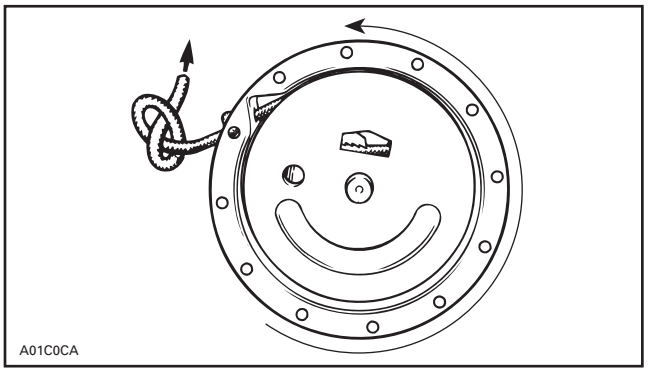
1. Push to lock

To adjust rope tension:

Wind rope on sheave and place rope sheave into starter housing making sure that the sheave hub notch engages in the rewind spring hook.

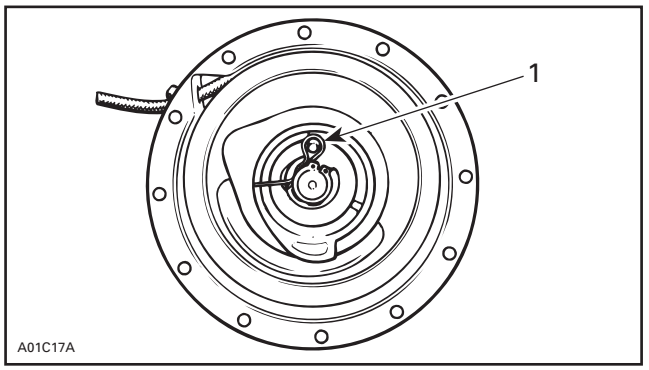
Rotate the sheave counterclockwise until rope end is accessible through starter housing orifice.

Pull the rope out of the starter housing and temporarily make a knot to hold it. One turn preload will give 7 turns of tension when fully extended.



Position pawl **no. 8**, pawl lock **no. 9** and circlip **no. 10**.

Install locking spring **no. 11** and lubricate with Molykote PG 54 (P/N 420 899 763).



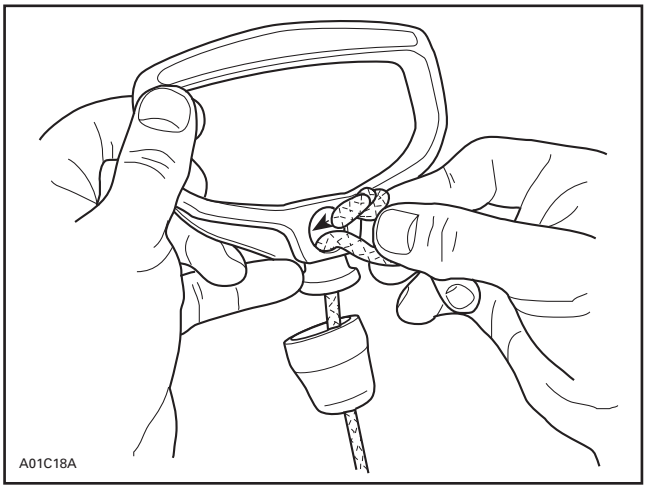
1. Spring coated with MOLYKOTE PG 54

Install locking ring.

INSTALLATION

Reinstall rewind starter assembly on engine.

Prior to installing starter grip no. 13 on new rope, it is first necessary to fuse the rope end with a lit match. Pass rope through starter grip and tie a knot in the rope end. Fuse the knot with a lit match then insert rope end down and pull the starter grip over the knot.

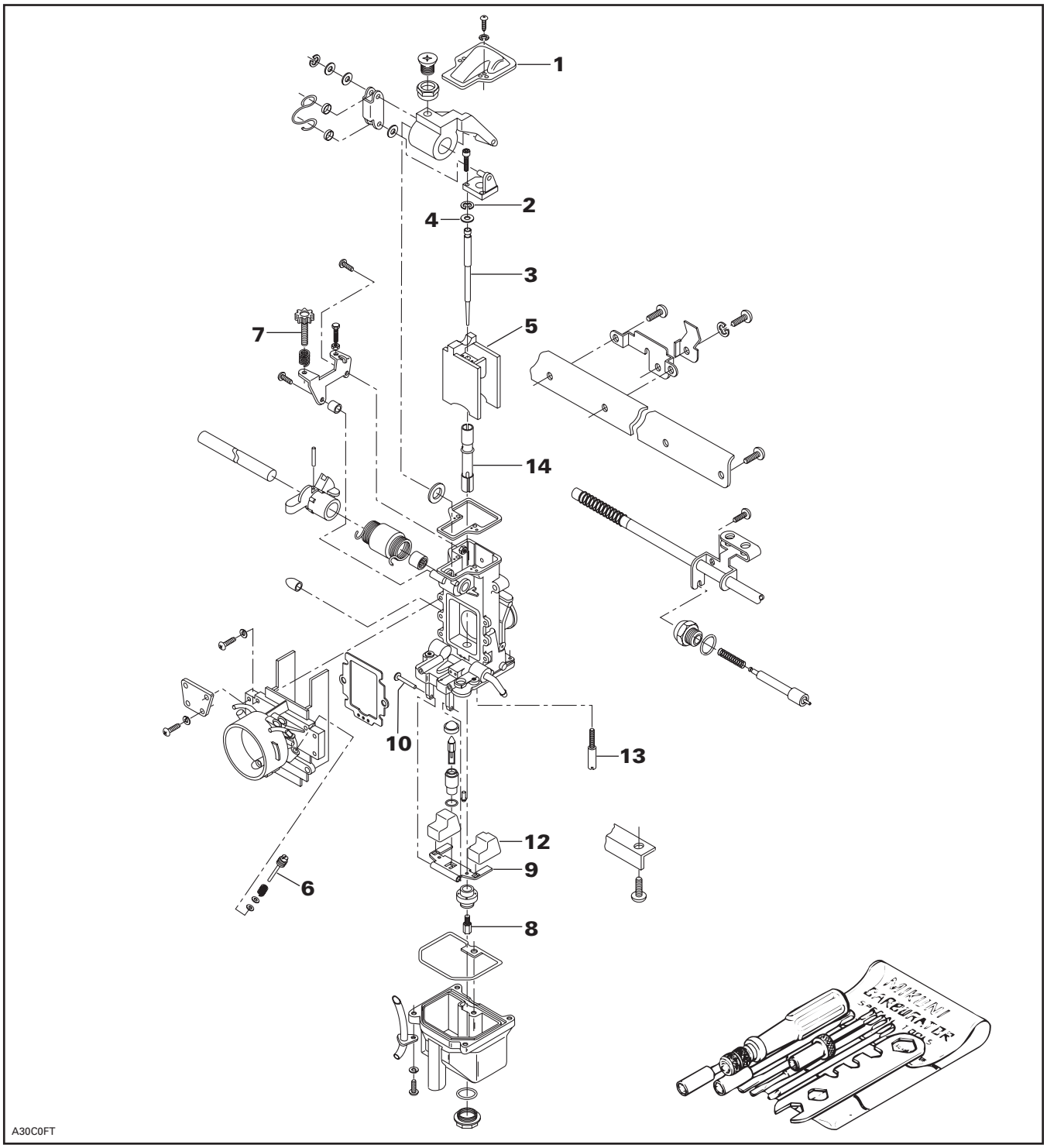


TYPICAL

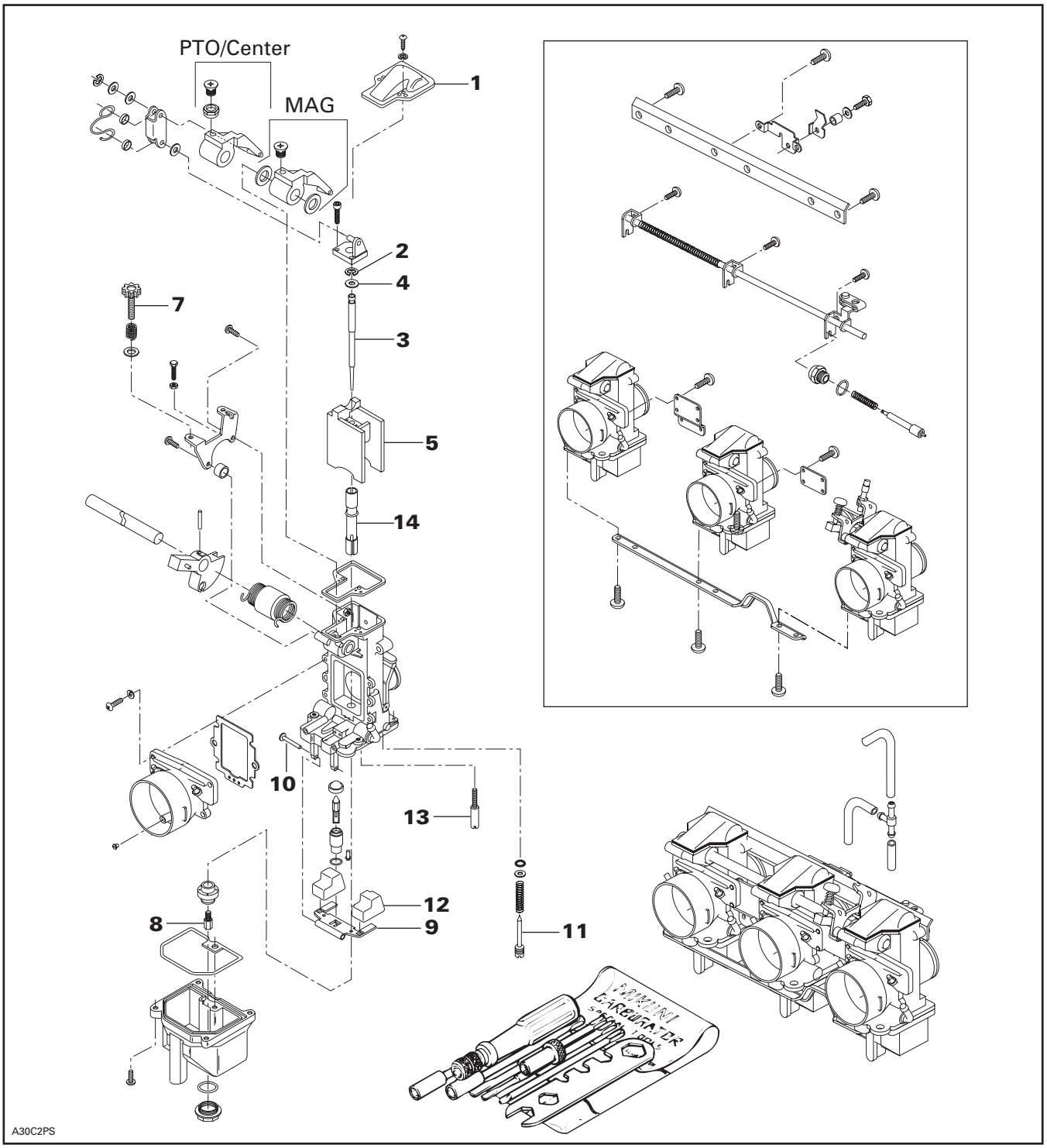
CARBURETOR AND FUEL PUMP

CARBURETOR

TM Type on Mach Z STD and TECH PLUS



TM Type on GT SE

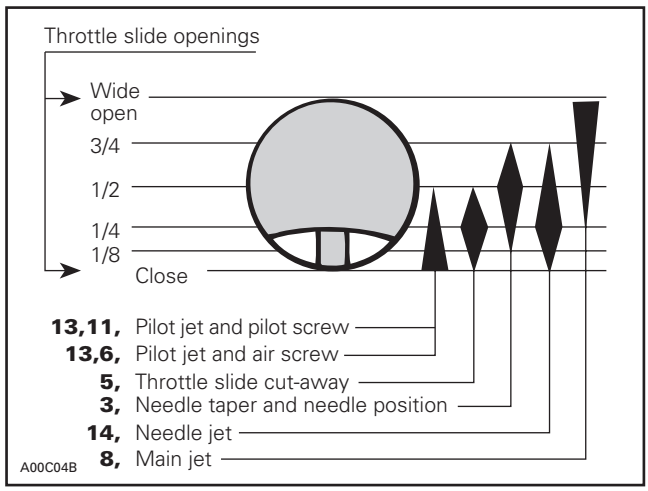


PARTS FLAT RATE

CARBURETOR CIRCUIT OPERATION VERSUS THROTTLE OPENING

The following illustration shows the part of the carburetor which begins and stops to function at different throttle slide openings.

Note that the wider part of symbol corresponds to the opening mostly affected. For instance, throttle slide cut-away begins to function at closed position but it is most effective at 1/4 opening and decreases up to 1/2 opening.



VIEW FROM AIR INTAKE OPENING

NOTE: For fine tuning refer to TECHNICAL DATA and to SPARK PLUG.

NOTE: For high altitude regions, a service bulletin will give information about calibration according to altitude and temperature.

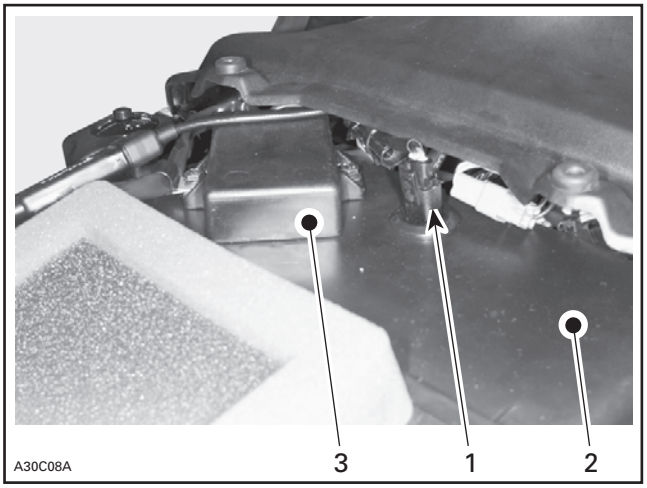
REMOVAL

All Models

Close fuel shut-off valve.

Grand Touring SE and Mach Z TECH PLUS

Unplug air temperature sensor connector from air intake silencer and remove MPEM, as shown in the next photo.



TYPICAL

1. *Air temperature sensor*
2. *Air intake silencer*
3. *MPEM*

Twist DPM manifold and detach from air intake silencer.

All Models

Unhook latches then, remove air intake silencer from left hand side.On Grand Touring SE remove choke cable and lever from air silencer.

Disconnect fuel inlet lines. It is easier to disconnect MAG side carburetor fuel inlet lines when carburetors are partially removed.

Grand Touring SE and Mach Z TECH PLUS

Unplug DPM solenoid connector and autoprimer solenoid connector on Grand Touring SE.

Disconnect throttle cable from throttle shaft.

Unfasten choke cable from choke rod.

Remove carburetors and DPM manifold as an assembly from engine.

CLEANING AND INSPECTION

The entire carburetor should be cleaned with a general solvent and dried with compressed air before disassembly.

CAUTION: Heavy duty carburetor cleaner may be harmful to the float material and to the rubber parts, O-rings, etc. Therefore, it is recommended to remove those parts prior to cleaning.

Carburetor body and jets should be cleaned in a carburetor cleaner following manufacturer's instructions.

⚠ WARNING

Solvent with a low flash point such as gasoline, naphtha, benzol, etc., should not be used as they are flammable and explosive.

Check inlet needle tip condition. If worn, the inlet needle and seat must be replaced as a matched set.

NOTE: Install needle valve for snowmobile carburetor only. It is designed to operate with a fuel pump system.

Check throttle slide for wear. Replace as necessary.

Check idle speed screw straightness. Replace as necessary.

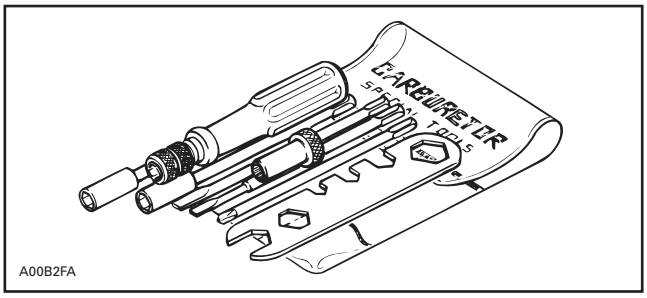
Check for fuel soaked into float no. 12; replace as necessary.

Check float for cracks or other damages affecting free movement; replace as necessary.

Inspect throttle cable and housing for any damages. Replace as necessary.

DISASSEMBLY AND ASSEMBLY

NOTE: To ease the carburetor disassembly and assembly procedures it is recommended to use carburetor tool kit (P/N 404 112 000).



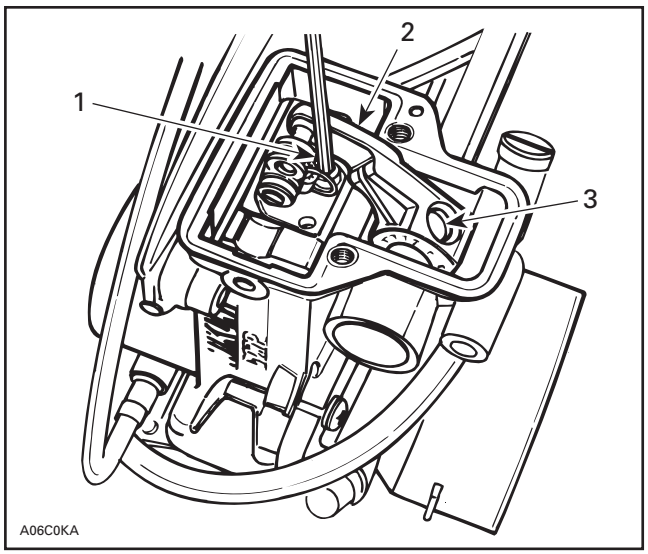
2,3, E-Clip and Needle

To remove needle or to change its position or to remove throttle slide, remove carburetor cover.

Except for MAG side carburetor, unscrew locking screw and adjusting nut form throttle shaft.

Move arm aside just enough for unscrewing Allen screw retaining throttle slide. At reassembly apply Loctite 243 (P/N 293 800 060).

For MAG side carburetor, raise throttle slide half way then unscrew Allen screws.



1. Allen screw
2. Arm moved aside
3. Locking screw and adjusting nut removed

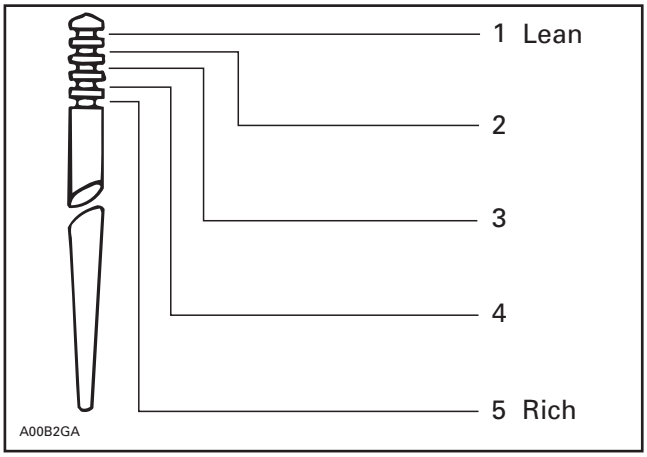
The position of the needle in the throttle slide is adjustable by means of an E-clip inserted into 1 of 5 grooves located on the upper part of the needle. Position 1 (at top) is the leanest, 5 (at bottom) the richest.

NOTE: The last digit of the needle identification number gives the recommended calibrated position of the E-clip **from the top** of the needle.

Example: 6DH4-3

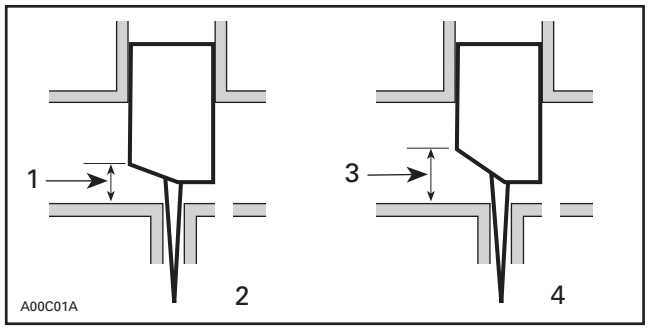
Needle identification

Recommended calibrated position. of the E-clip **from top**



CLIP POSITIONS

The size of the throttle slide cut-away affects the fuel mixture between 1/8 to 1/2 throttle opening.



1. *Low cut-away*
2. *Rich mixture*
3. *High cut-away*
4. *Lean mixture*

8, Main Jet

The main jet installed in the carburetor has been selected for a temperature of - 20°C (0°F) at sea level. Different jetting can be installed to suit temperature and/or altitude changes.

CARBURETOR FLOAT LEVEL ADJUSTMENT

CAUTION: Spark plugs will foul if float is adjusted too low. Engine may be damaged if float is adjusted too high.

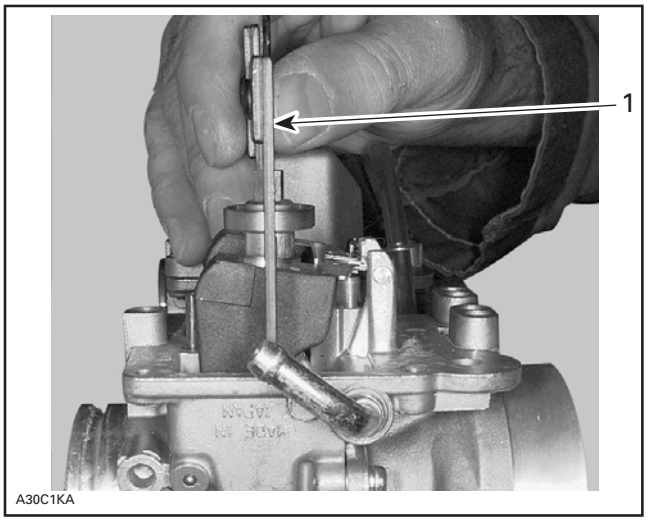
9,10, Float Arm and Float Arm Pin

Correct fuel level in float chamber is vital toward maximum engine efficiency. To check for correct float level proceed as follows:

– Make sure that float arm is symmetrical — not distorted.

– Remove float bowl and gasket from carburetor.

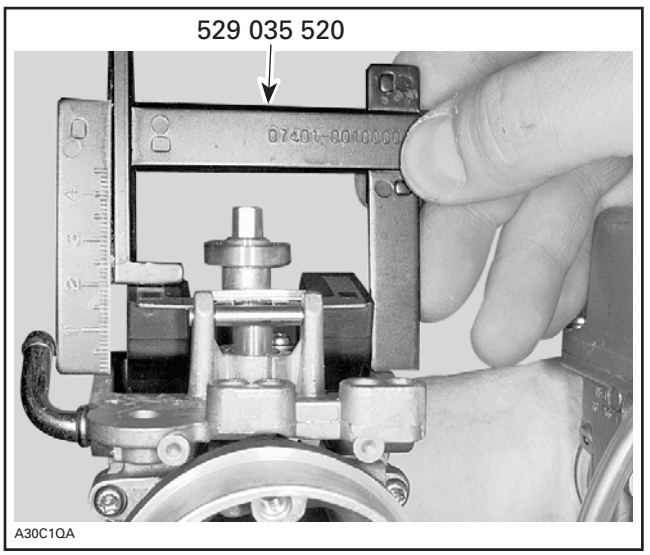
– With carburetor chamber upside-down on a level surface, measure height H between bowl seat and **top** edge of float arm. Keep ruler perfectly vertical and in line with main jet hole.



TYPICAL — TM TYPE

1. *Ruler vertical and in line with main jet*

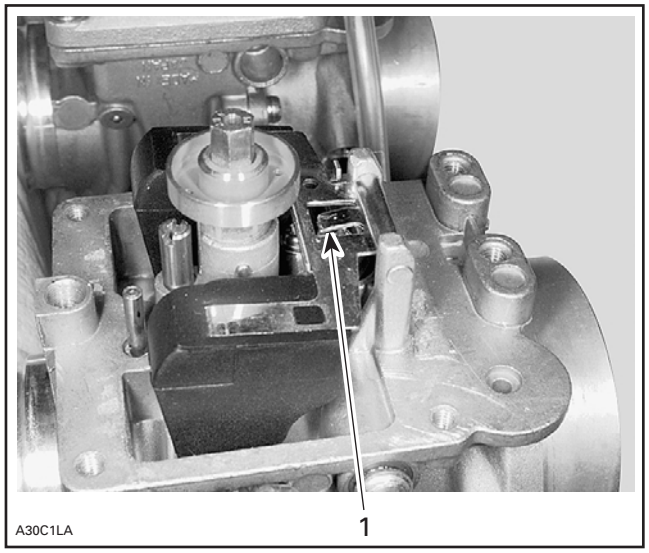
Float level height can be check using tool (P/N 529 035 520). Keep tool in line with main jet as explained above.



CARBURETOR TYPE	FLOAT HEIGHT H	
	± 1 mm	(± .040 in)
All TM	21.0	(.827)

To Adjust Height H

– Bend the contact tab of float arm until the specified height is reached.



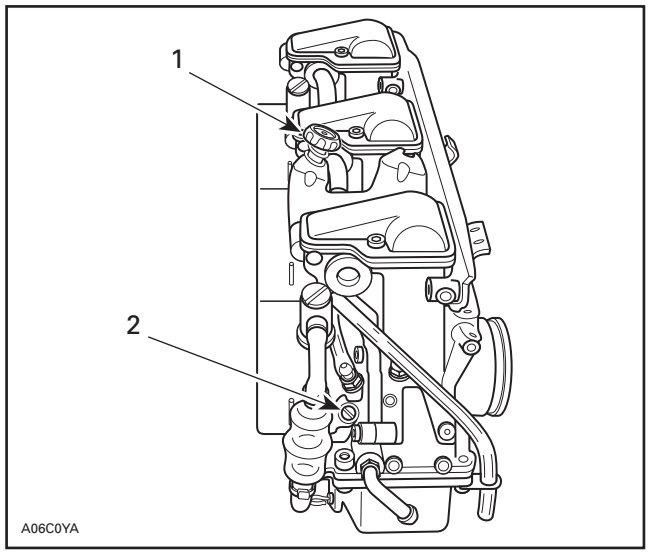
TYPICAL — TM TYPE
1. Contact tab

CARBURETOR ADJUSTMENTS

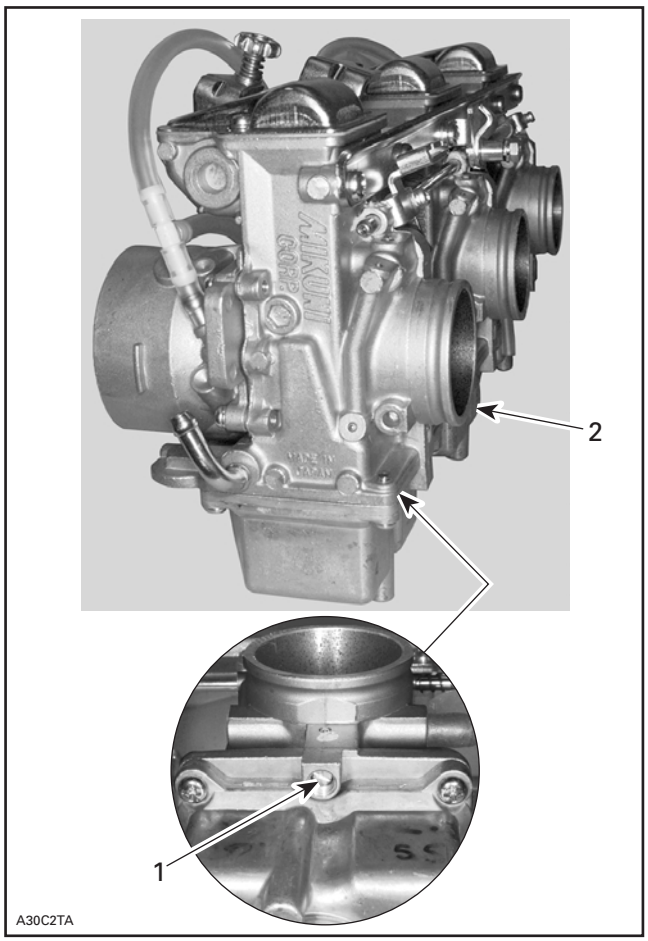
Adjustments should be performed following this sequence:

– air screw adjustment on Mach Z STD/TECH PLUS
– pilot screw adjustment on Grand Touring SE
– throttle slide height (preliminary idle speed adjustment)
– throttle cable adjustment
– carburetor synchronization (triple carburetor models)
– final idle speed adjustment (engine running)
– oil pump and carburetor synchronization.

TM Type Carburetor



TYPICAL — MACH Z STD/TECH PLUS
1. Idle speed screw
2. Air screw (on each carburetor)



GRAND TOURING SE
1. Idle speed screw
2. Pilot screw (on each carburetor)

6,11, Air Screw and Pilot Screw

Completely close the **air screw or pilot screw depending on model** (until a slight seating resistance is felt) then back off as specified.

Refer to TECHNICAL DATA for the specifications.

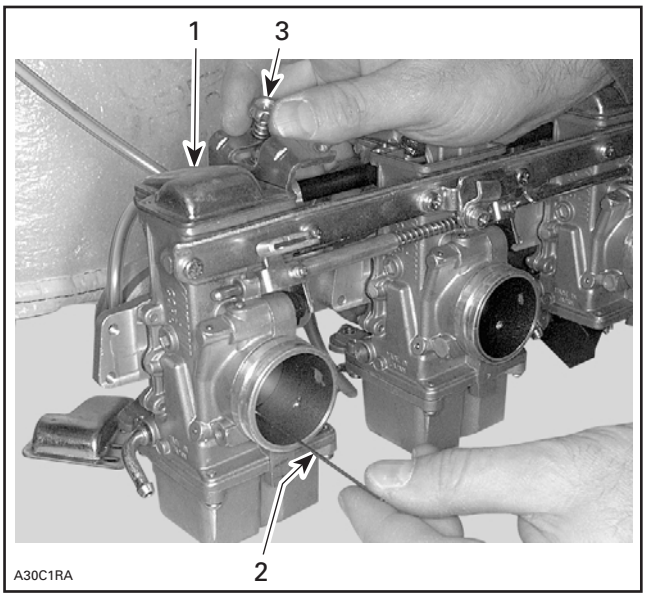
Throttle Slide Height (preliminary idle speed adjustment)

Remove carburetor covers.

First proceed on MAG carburetor.

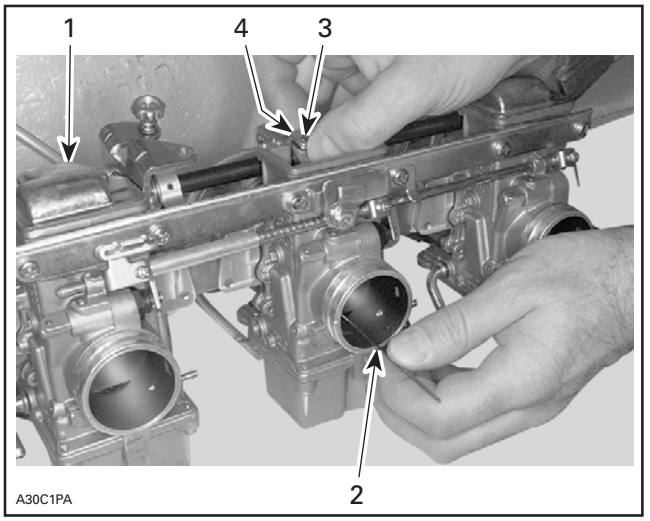
Using a drill bit to measure throttle slide height (see following table) on **outlet** side of carburetor (engine side).

Adjust by turning idle speed screw **no. 7**.



1. Adjust MAG carburetor first
2. Drill used as a gauge to measure throttle height
3. Idle speed screw

For center and PTO carburetors loosen locking screws. Use same drill bit as for MAG carburetor to measure throttle slide height. Turn adjusting nut to adjust.



1. MAG carburetor adjusted first
2. Drill used as a gauge to measure throttle height
3. Locking screw
4. Adjusting nut

Tighten locking screws and recheck throttle height.

NOTE: By adjusting all throttle slides at same height TM carburetors synchronization is done at same time.

Final idle speed adjustment (engine running at idle speed) should be within 1/2 turn of idle speed screw from preliminary adjustment.

MODELS	THROTTLE SLIDE HEIGHT mm (in)
All TM	1.3 (.051)

INSTALLATION

CAUTION: Never allow throttle slide(s) to snap shut.

Prior to install carburetor, adjust air screw and preliminary idle speed as described above.

To install carburetor on engine, inverse removal procedure.

However, pay attention to the following:

On applicable models, make sure to align tab of carburetor and air intake silencer (if applicable) with notch of adaptor(s). On applicable models, install adaptor with UP mark facing up.

CAUTION: The rubber flange must be checked for cracks and/or damage. At assembly, the flange must be perfectly matched with the air intake manifold or severe engine damage will occur. Beside do not interchange carburetors, the jetting may be different on each side. A red dot is printed on MAG carburetor (blue on PTO side) and on the high tension coil support. Match the carburetor and the support dots.

Install clamps in a way that their tightening bolts are staggered — not aligned.

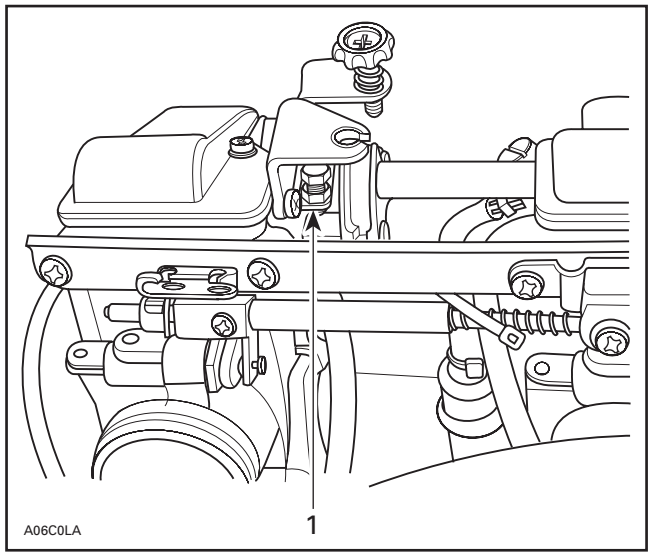
Carburetor Synchronization

All 3 carburetor slides must start to open at the same time.

Carburetor synchronization is done when adjusting throttle slide height. See above.

Full Throttle Adjustment

To avoid stress on throttle cable when throttle lever is against handlebar grip, stop screw must not contact stopper. There must be slight free play (up to 0.5 mm (.020 in)) between stop screw and its stopper.



TYPICAL — FULL THROTTLE POSITION

1. Free play between stop screw and its stopper

CHOKE

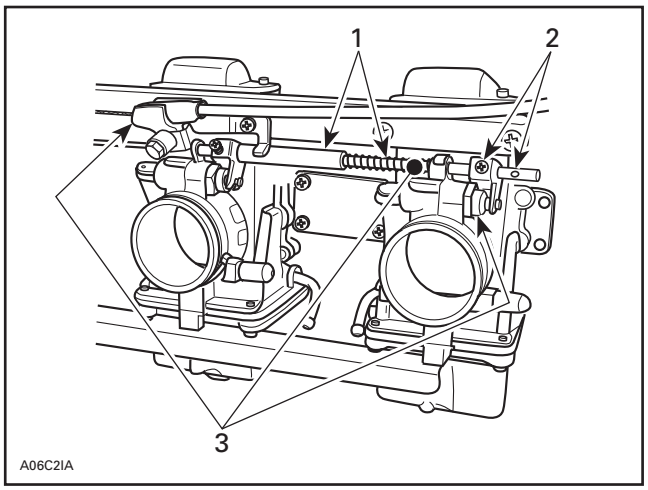
Choke Rod

Check for free movement of choke rod. If hard to slide, remove 3 plunger ferrules then choke rod.

Thoroughly clean choke rod and its mounting hole on each carburetor.

Remove plunger grommet from each carburetor. Fill the grommet interior with dielectric grease (P/N 293 550 004). Reinstall the grommets.

Apply dielectric grease (P/N 293 550 004) on choke rod and reinstall it with its return spring and spacer on PTO side. Make sure that ferrule screws align with each rod hole. Tighten screws to 2 N•m (18 lbf•**in**).



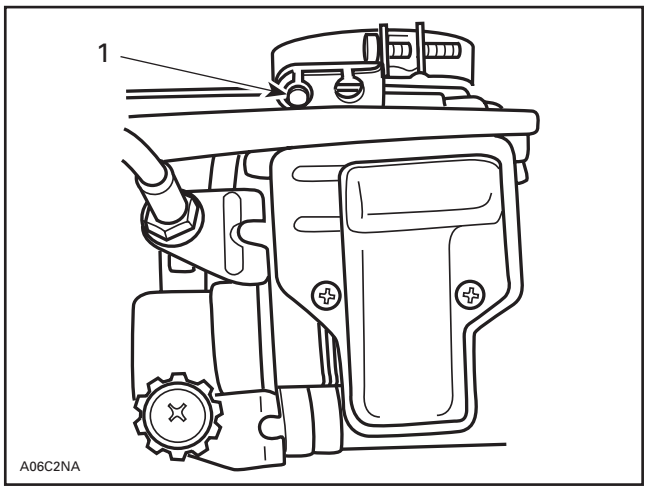
1. Spacer and spring on PTO side
2. Ferrule screw aligned with rod hole
3. Dielectric grease

Apply dielectric grease (P/N 293 550 004) on cable housing end.

All 3 plungers must start to open at the same time. Bend ferrule end as required. Do not change position of ferrule on rod. Its screw must remain in line with choke rod hole.

Choke Cable Adjustment

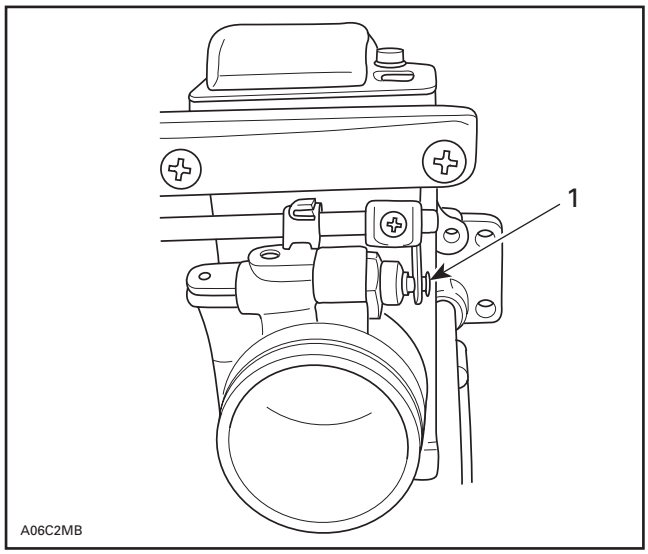
Choke cable barrel must be in left hole of sliding rod lever.



1. Cable barrel in left hole

Air intake silencer must be reinstalled and choke cable properly routed before finalizing adjustment.

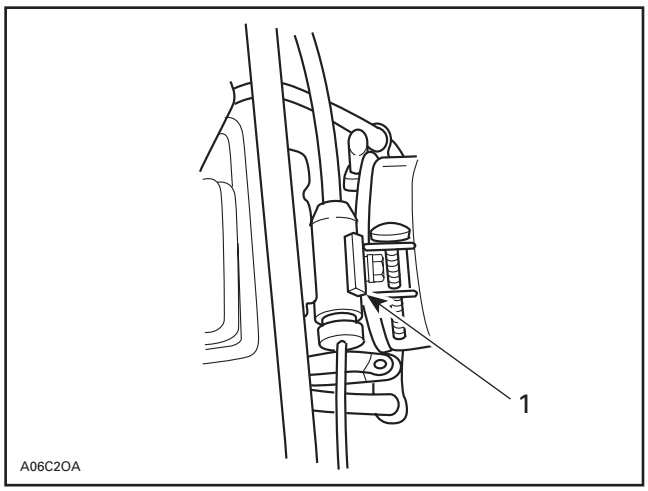
Adjust choke cable to obtain a maximum gap of approximately 0.3 mm (.012 in) between tab and plunger when choke lever is not activated.



1. 0.3 mm (.012 in) gap maximum

NOTE: If there is no gap between tab and plunger, a rich condition will occur and throttle response will be affected; if the gap is too great, the plunger stroke will be reduced causing poor cold engine starting.

If adjustment is required, loosen cable support on middle carburetor to change choke cable position.



1. Choke cable support

After adjustment, retighten screw.

DPM

Mach Z Tech Plus and Grand Touring SE

TESTING

MPEM

Solenoids are supplied by the MPEM. If this MPEM does not work, there will be no current on the compensation solenoid RD/BU and BR/BU connectors (6-VA housing); and on the RD/GN and BK connectors (6-VA housing).

Unplug enrichment solenoid wire. Connect a good solenoid to MPEM output connector.

Disconnect engine temperature sensor connector. The MPEM now operates as though the engine temperature was - 20°C (- 4°F) to simulate a big mixture enrichment.

For the compensation solenoid, the air temperature sensor must be at room temperature. Operate the engine at 4000 RPM. The solenoid must vibrate.

Start the engine and observe the solenoid. A vibrating solenoid indicates that the MPEM is in good working order. If not, replace the MPEM and repeat test.

Solenoid

Static Test

Unplug electric connector of solenoid and connect it to a 12 V battery. The solenoid must sound when it opens. Repeat test several times.

Dynamic Test

When checking the enrichment solenoid, disconnect engine temperature sensor connector. The DPM system now operates as though the engine temperature was - 20°C (- 4°F) to allow maximum mixture enrichment.

Remove the solenoid, hold it in hand and start the engine.

For the enrichment solenoid, check if it vibrates as soon as the engine is started.

For the compensation solenoid, the air temperature sensor must be at room temperature. Operate the engine at 3500 RPM. The solenoid must vibrate.

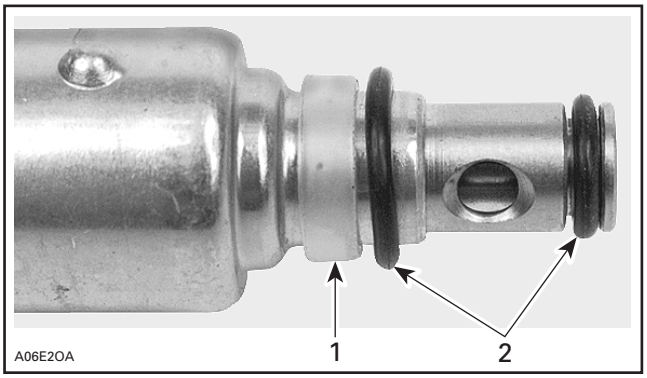
Temperature Sensor (air and engine)

At room temperature 20°C (68°F), the sensor resistance must be 2500 Ω ± 300.

PARTS REMOVAL AND INSTALLATION

Solenoid

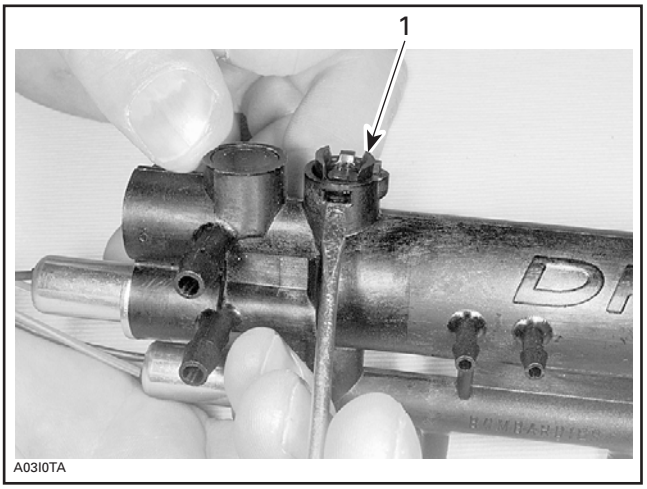
At reassembly, ensure that solenoid seals are in place.



1. *Plastic seal*
2. *O-rings*

Installation of compensation solenoid must be done as follows:

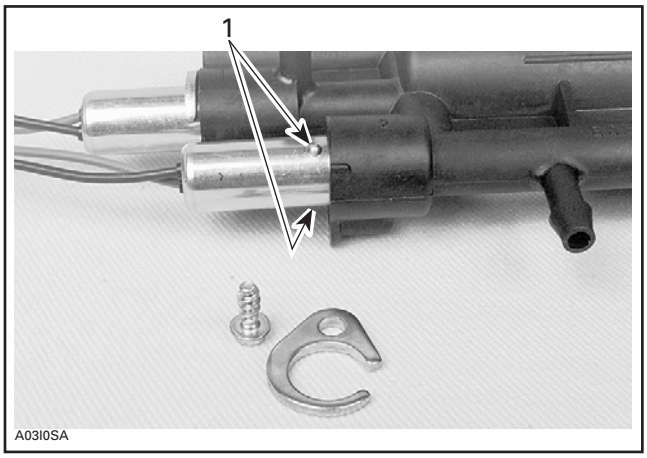
Remove transfer gallery plug by pushing 2 tabs.



TYPICAL

1. *Transfer gallery plug*

Partially insert compensation solenoid into DPM manifold.

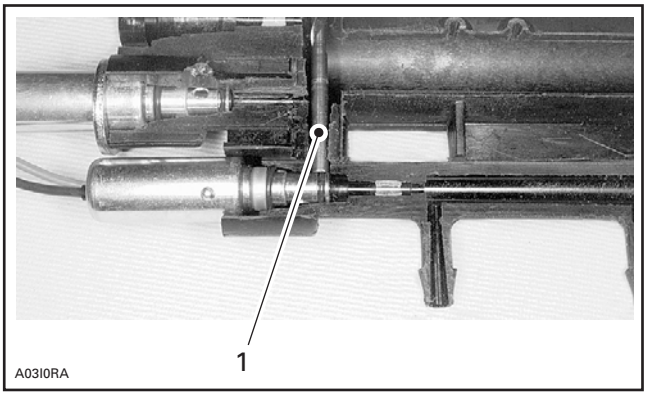


TYPICAL

1. *Embosses not engaged*

Insert a 5/32 in drill bit with its round end first into the transfer gallery.

Fully push solenoid into DPM manifold while maintaining a pressure on drill bit. This will guide the solenoid O-ring.

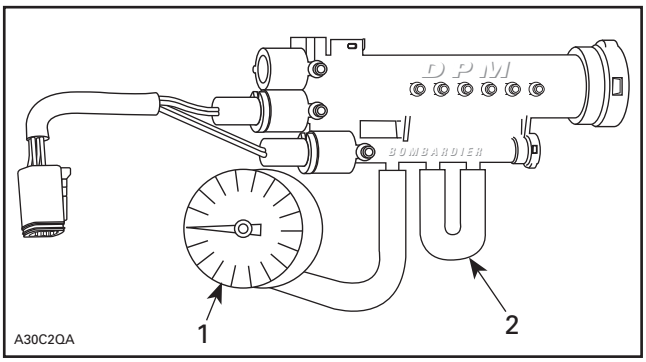


TYPICAL — CUT-AWAY

1. *Drill bit round end guiding solenoid O-ring*

DPM MANIFOLD LEAK TESTING

Disconnect all 3 carburetor venturi hoses from DPM. Using a tubing, connect 2 carburetor venturi nipples together as per following illustration and proceed with air tightness test by connecting tester onto third nipple; must hold 35 kPa (5 PSI) vacuum for 10 seconds.



TYPICAL

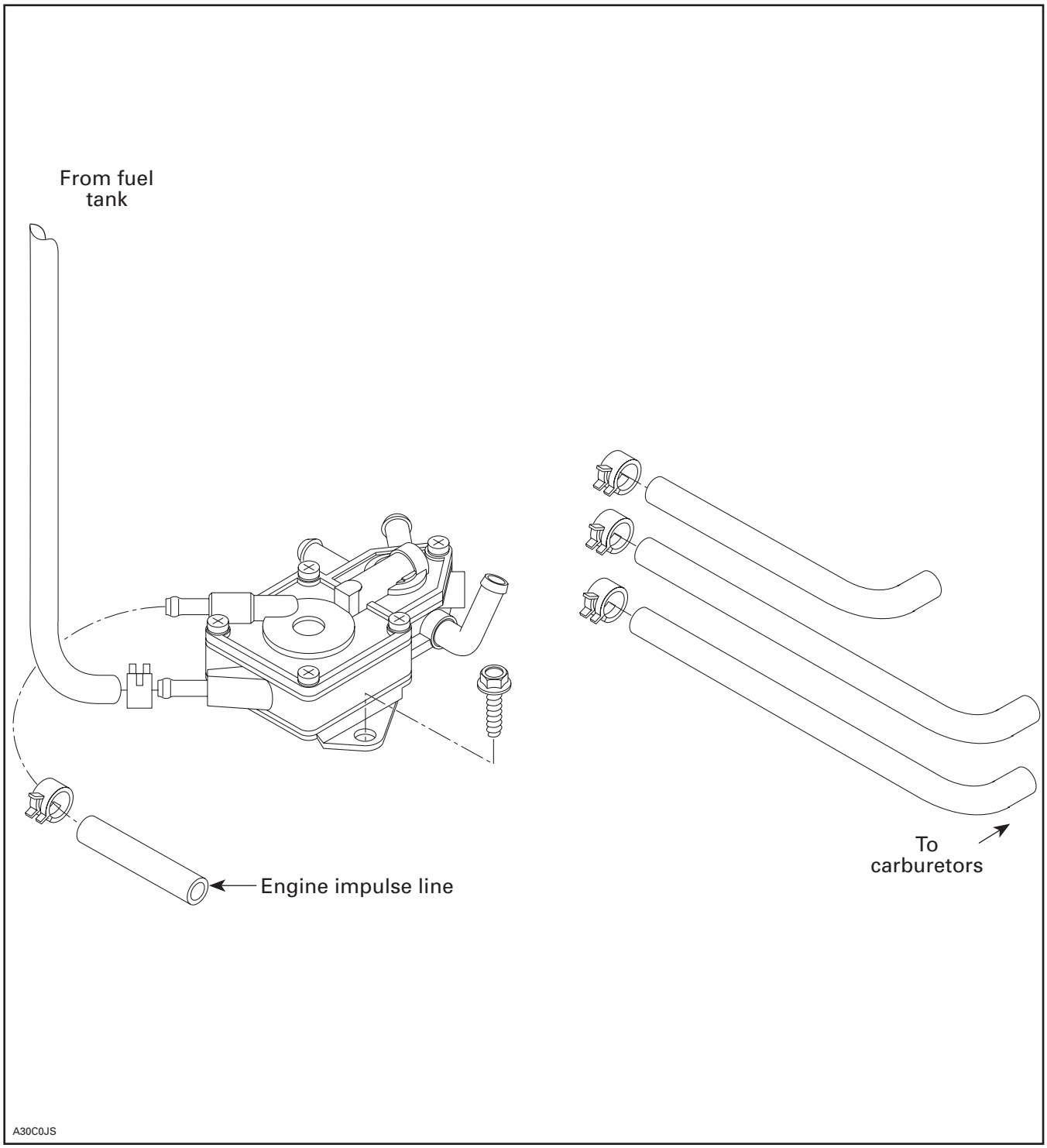
1. *Tester*
2. *Tubing*

Repair leaks (if any).

Reconnect carburetor venturi hoses to DPM.

FUEL PUMP

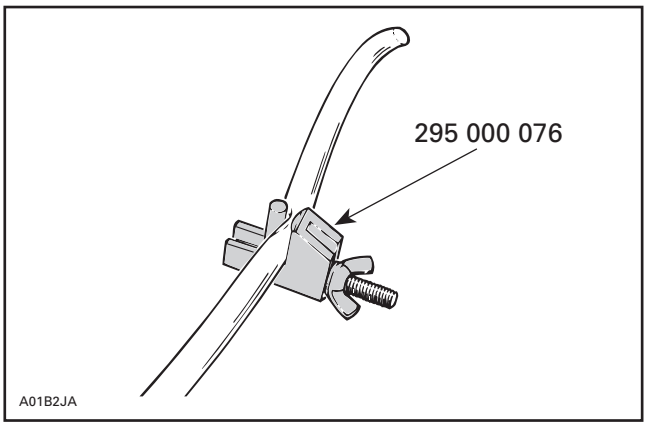
All Models



PARTS FLAT RATE

REMOVAL

Install a hose pincer (P/N 295 000 076) on fuel supply line close to pump inlet.



Disconnect fuel outlet line(s).

Disconnect impulse line.

Remove screws securing fuel pump support to chassis.

PUMP VERIFICATION

Check fuel pump valves operation as follows:

Connect a clean plastic tubing to the inlet nipple and alternately apply pressure and vacuum with pump of leak test kit. The inlet valve should release with pressure and hold under vacuum.

Repeat the same procedure at the outlet nipple. This time the outlet valve should hold with pressure and release under vacuum.

NOTE: Plug 2 outlets with finger while checking outlet valve.

Check impulse diaphragm and gasket as follows:

Connect a clean plastic tubing to the impulse nipple. Either apply pressure or vacuum max 35 kPa (5 PSI). The diaphragm/gasket must not leak.

CLEANING AND INSPECTION

The entire pump should be cleaned with general purpose solvent before disassembly.

Fuel pump components should be cleaned in general purpose solvent and dried with compressed air.

⚠ WARNING

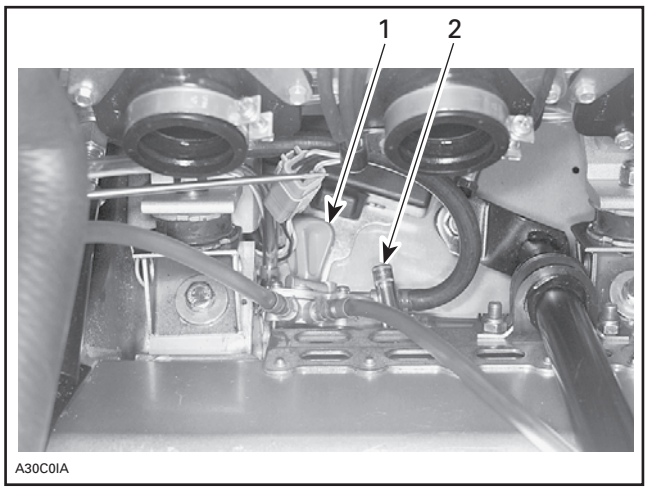
Solvent with a low flash point such as gasoline, naphtha, benzol, etc., should not be used as each is flammable and explosive.

Inspect diaphragm. The pumping area should be free of holes, tears or imperfections. Replace as needed.

INSTALLATION

To install, first insert a pick in bottom hole of pump support to hold it in place.

Fasten top screw using a long socket with grease inside to restrain screw.



1. Pick inserted in pump support bottom hole
2. Socket on top screw head to be fastened

⚠ WARNING

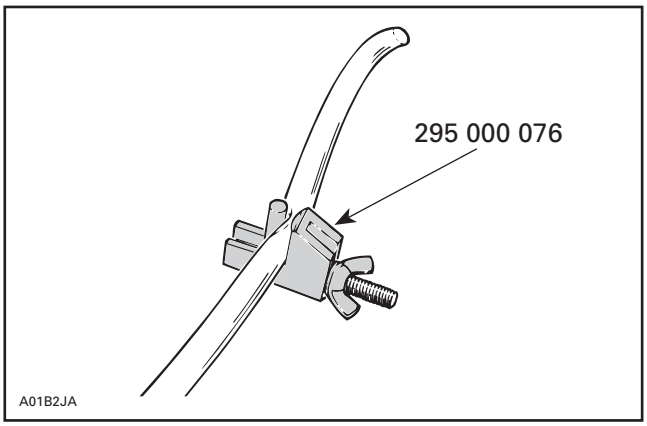
Pressure test to ensure there is no leak in fuel system.

FUEL TANK AND THROTTLE CABLE

Fuel Tank Lines

⚠ WARNING

When draining a fuel tank or whenever a fuel line is disconnected, obstruct line with a hose pincher (P/N 295 000 076) or equivalent device. Fuel is flammable and explosive under certain conditions. Ensure work area is well ventilated. Do not smoke or allow open flames or sparks in the vicinity



Impulse/Fuel Lines Spring Clips (all models)

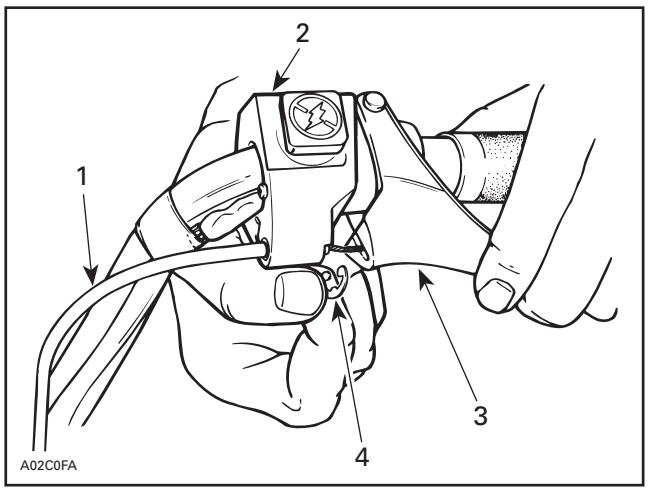
Always reposition spring clips after any repair to prevent possible leaks.

Throttle Cable Circlip at Handlebar (all models)

Put silicone grease (P/N 293 550 004) around cable barrel. Locate circlip as per illustration.

⚠ WARNING

If this procedure is disregarded, throttle might be half-open at normally closed position and the engine will speed up when starting.



TYPICAL

1. *Throttle cable housing*
2. *Throttle handle housing*
3. *Throttle handle*
4. *Circlip*

Adjust throttle cable as specified in CARBURETOR AND FUEL PUMP.

Throttle Cable Routing

CAUTION: Check that throttle cable is routed away from sharp edges, hot or vibrating parts. When turning steering while engine is running, idle speed must not vary.

Fuel Level Sensor

Inspection

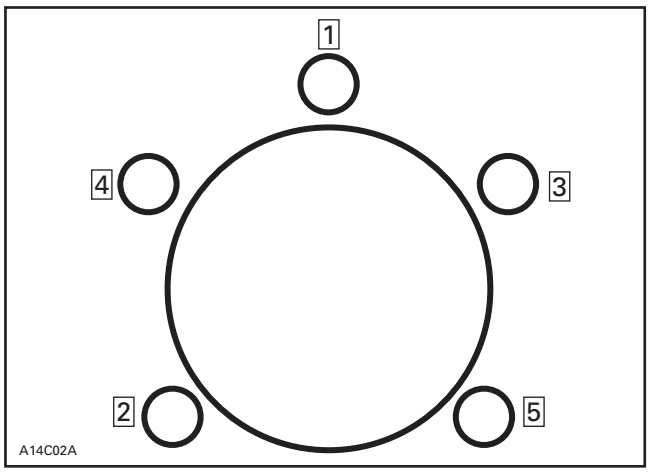
Visually inspect the condition of connectors and wiring throughout the circuit. Connections must be clean and tight, and wiring free of damage. Repair as necessary. Use silicone dielectric grease to prevent corrosion at the connectors. Operate the engine to see if the problem has been corrected.

Fuse Replacement

A 0.25 ampere fuse protects fuel level sensor circuitry. Remove seat to gain access.

Fuel Level Sensor Screws

Torque fuel level sensor retaining screws to 1 N•m (8 lbf•**in**) in the sequence shown and then to 2.5 N•m (22 lbf•**in**), using the same sequence.



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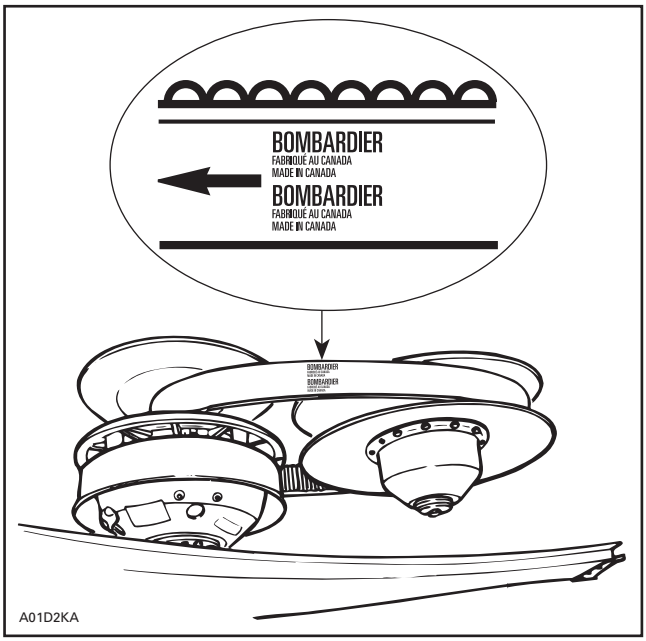
DRIVE BELT

2001 APPLICATION CHART

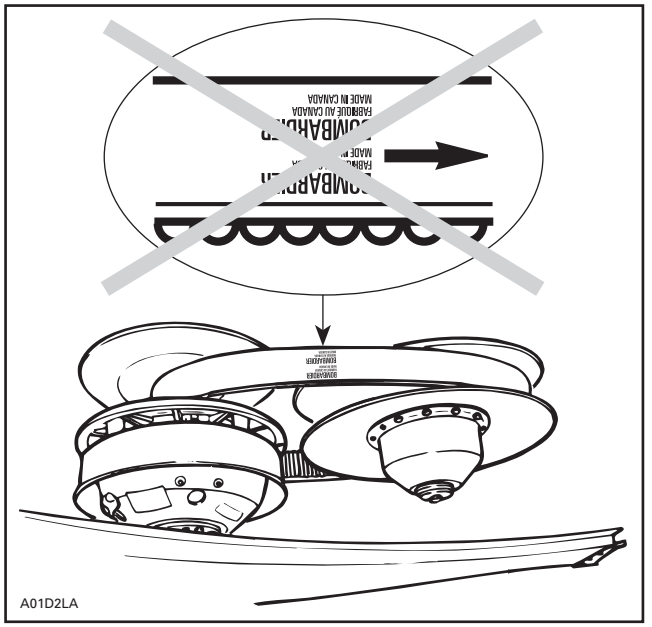
MODEL	PART NUMBER	WIDTH (NEW) ± 0.25 mm (.010 in)	MINIMUM WIDTH (WEAR LIMIT) mm (in)
CK3 Series	417 300 066	35.10 (1.382)	33.00 (1.299)

ROTATION DIRECTION

The maximum drive belt life span is obtained when the drive belt is installed as shown. This will ensure that correct direction of rotation is respected.



CORRECT



INCORRECT

NOTE: For used drive belt, mark and reinstall in the same position.

DRIVE BELT DEFLECTION MEASUREMENT

NOTE: The drive belt deflection measurement must be performed each time a new drive belt is installed.

NOTE: To obtain an accurate drive belt deflection measurement, it is suggested to allow a break-in period of 50 km (30 mi).

Before checking the belt deflection, ensure vehicle has the proper belt (refer to the application chart).

Adjust pulley distance and alignment. Refer to PULLEY DISTANCE AND ALIGNMENT.

To obtain maximum vehicle performance, the belt tension must be adjusted according to specifications shown in the accompanying chart.

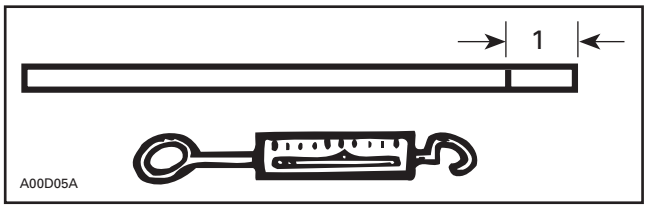
MODEL	DEFLECTION mm (in)	FORCE kg (lb)	HEIGHT† OVER DRIVEN PULLEY
All models	38 ± 5 (1.496 ± .197)	11.5 (25)	0 - 1.5 mm (0 - 1/16 in)

† FOR REFERENCE ONLY

To Check Tension

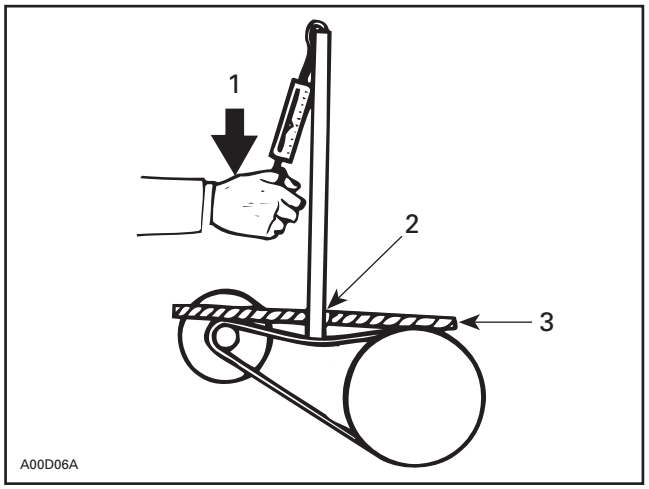
Position a reference rule on drive belt.

Wooden Stick and Spring Scale Method



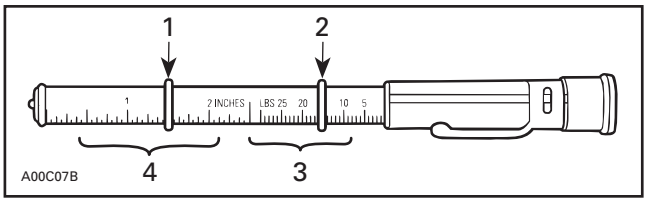
1. Mark specified deflection

Using spring scale and stick, apply specified force on drive belt halfway between pulleys as shown.



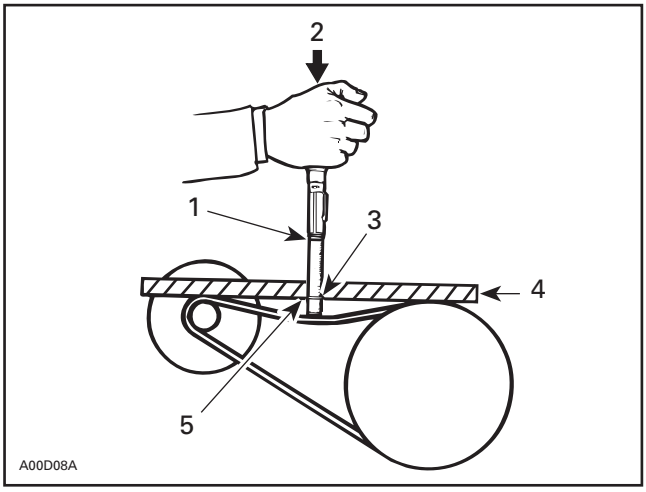
1. Force
2. Read deflection here
3. Reference rule

Or use the belt tension tester (P/N 414 348 200).



1. Lower O-ring
2. Upper O-ring
3. Force (read down)
4. Deflection (read up)

1. Slide lower O-ring of deflection scale to specified measure.
2. Slide upper O-ring to 0 (zero) on the force scale.
3. Apply pressure until lower O-ring is flush with edge of rule and read force on the upper scale at top edge of O-ring.



1. *Upper O-ring — force*
2. *Force*
3. *Lower O-ring — deflection*
4. *Reference rule*
5. *Deflection*

DEFLECTION ADJUSTMENT

Adjust pulley distance according to specification, refer to PULLEY DISTANCE AND ALIGNMENT.

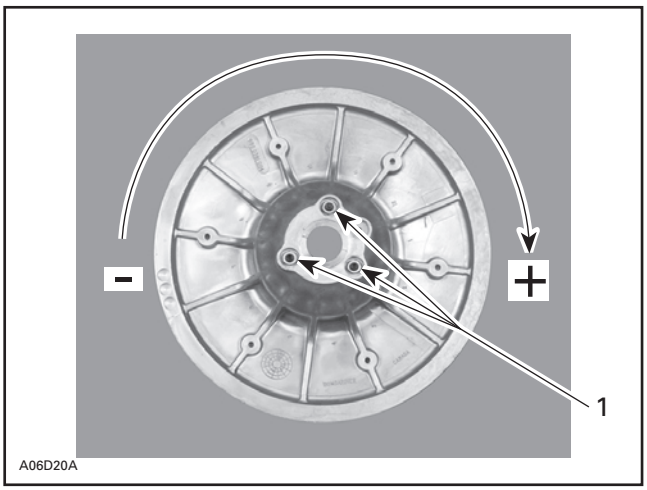
Models Equipped with Formula Type Driven Pulley

Adjust drive belt deflection using Allen screws, as shown.

To increase deflection: turn Allen screws clockwise.

To decrease deflection: turn Allen screws counterclockwise.

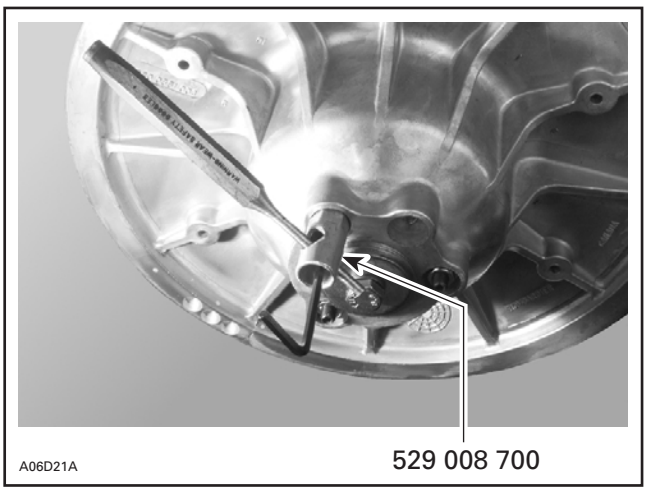
NOTE: Turn Allen screws 1/4 turn at a time, then rotate driven pulley to allow drive belt to settle in pulley. Check deflection, repeat as required.



TYPICAL

1. *Allen screws with jam nuts*

Allen screws must be restrained while tightening jam nut to prevent throwing adjustment out. Use drive belt tension adjuster (P/N 529 008 700).



TYPICAL

Models Equipped with HPV27 Type Driven Pulley

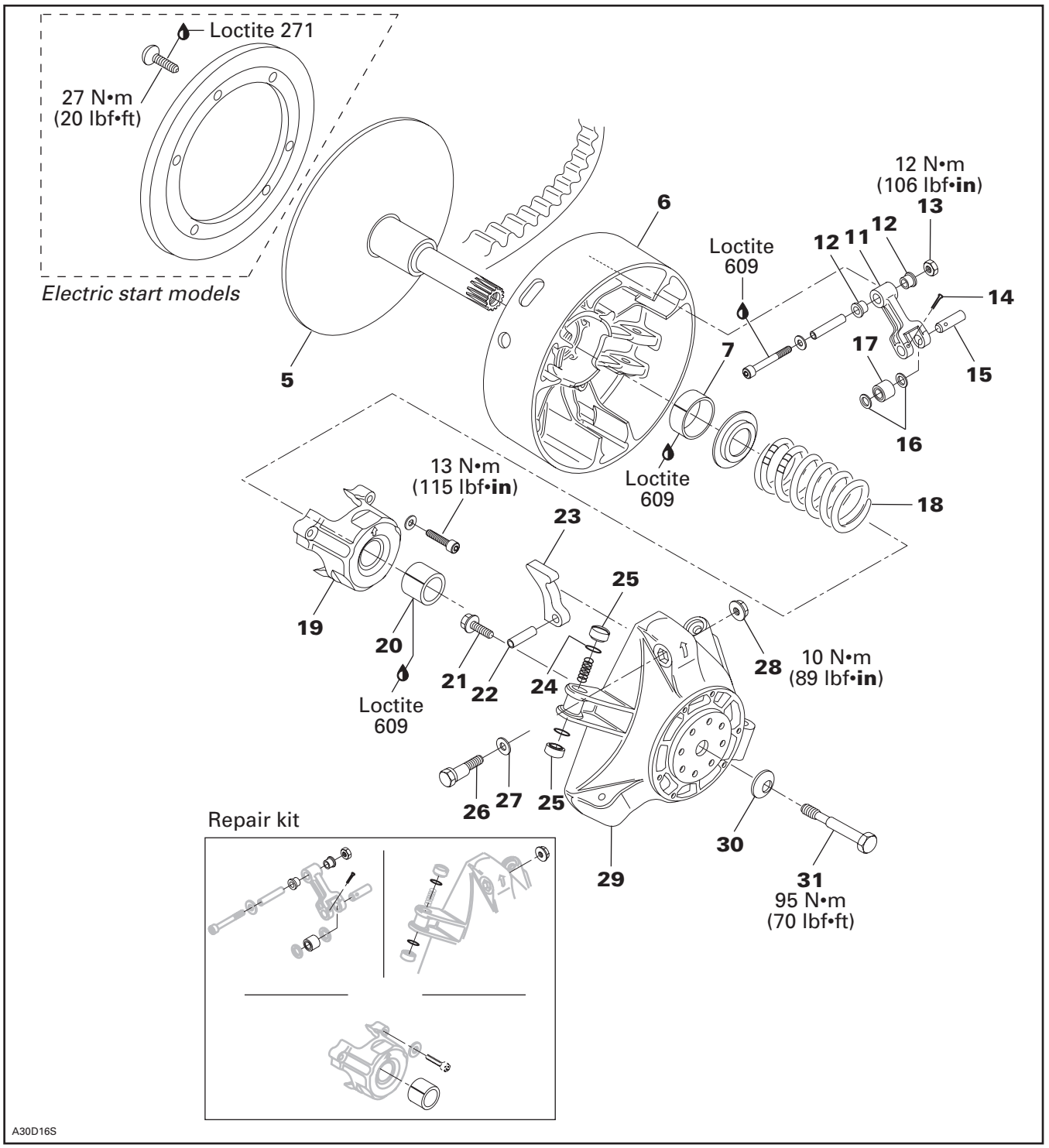
Loosen screws and turn adjustment ring accordingly. Retighten screws.

DRIVE PULLEY

TRA

All Models

NOTE: This is a lubrication free drive pulley.



GENERAL

Some drive pulley components (return spring, ramp) can be changed to improve vehicle performance in high altitude regions. A Service Bulletin will give information about calibration according to altitude.

CAUTION: Such modifications should only be performed by experienced mechanics since they can greatly affect vehicle performance. Verify spring specifications before installation. Do not only refer to the spring color code.

NOTE: TRA drive pulley stands for Total Range Adjustable drive pulley.

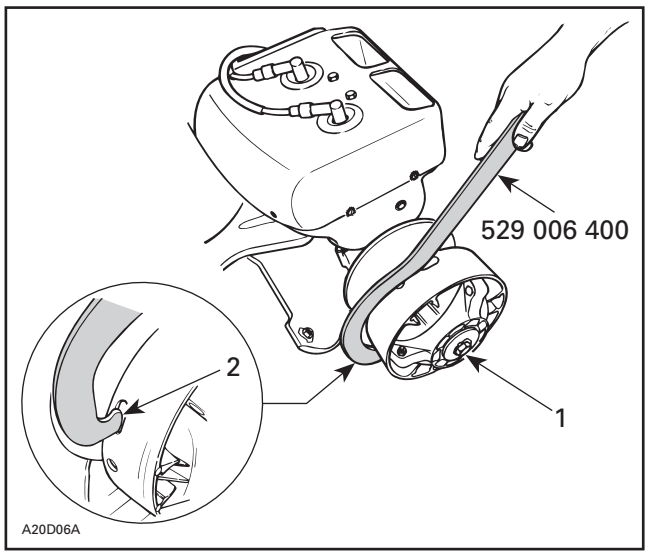
⚠ WARNING

Any drive pulley repairs must be performed by an authorized Bombardier snowmobile dealer, or other such qualified person. Subcomponent installation and assembly tolerances require strict adherence to procedures detailed.

REMOVAL

30,31, Conical Spring Washer and Screw

Use holder (P/N 529 006 400).



TYPICAL

1. *Retaining screw*
2. *Insert in any slot*

⚠ WARNING

Never use any type of impact wrench at drive pulley removal and installation.

Remove retaining screw.

To remove drive pulley ass'y and/or fixed half from engine, use puller (P/N 529 022 400).

CAUTION: These pulleys have metric threads. Do not use imperial threads puller. Always tighten puller by hand to ensure that the drive pulley has the same type of threads (metric vs imperial) prior to fully tightening.

To Remove Drive Pulley Ass'y:

Retain drive pulley with clutch holder.

Install puller in pulley shaft then tighten.

DISASSEMBLY

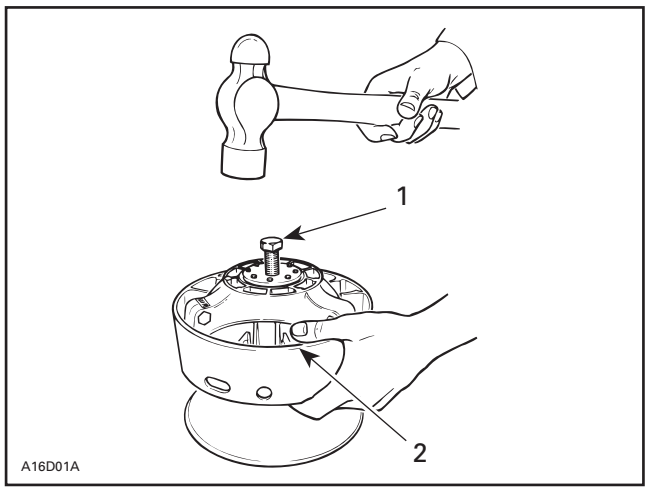
1,2, Screw and Ring Gear

CAUTION: Retaining screws must be heated before disassembly. Do not exceed 150°C (300°F).

5,6, Fixed and Sliding Half

CAUTION: Do not tap on governor cup.

Screw puller into fixed half shaft about 13 mm (1/2 in). Raise drive pulley and hold it by the sliding half while knocking on puller head to disengage fixed half.



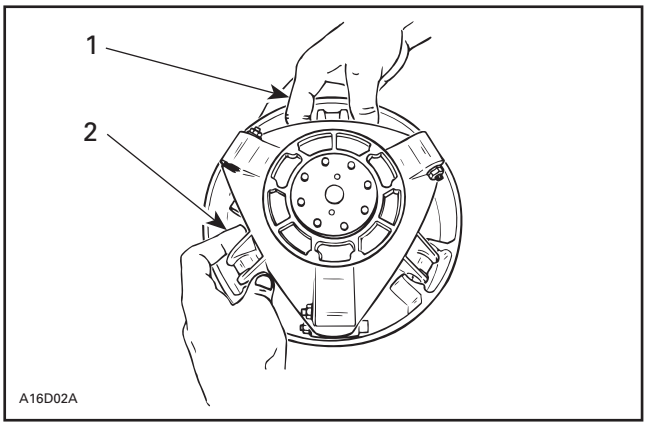
1. *Puller*
2. *Holding sliding half*

NOTE: No components marking is required before disassembling this drive pulley since it has factory mark and arrows as indexing reference.

25,29, Slider Shoe and Governor Cup

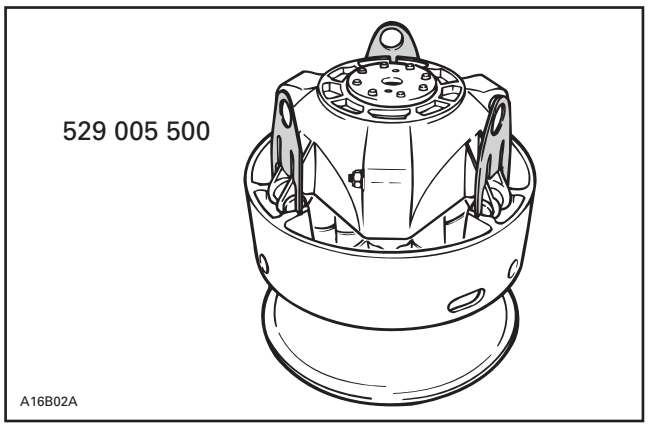
Carefully lift governor cup until slider shoes come at their highest position into guides.

Hold a slider shoe set then carefully lift its housing and remove slider shoes. Proceed the same way for other housings lifting one at a time.



1. Hold slider shoes
2. Lift one housing at a time

NOTE: To ease disassembly, forks (P/N 529 005 500) should be used to hold slider shoes prior to removing governor cup.



19, Spring Cover Ass'y

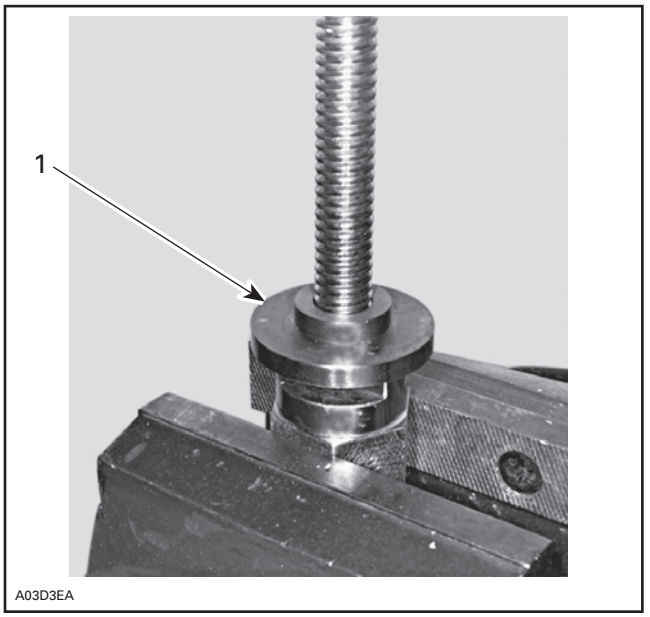
It is pushed by clutch spring pressure.

⚠ WARNING

Clutch spring is very strong. Never attempt to remove spring cover without the recommended tools.

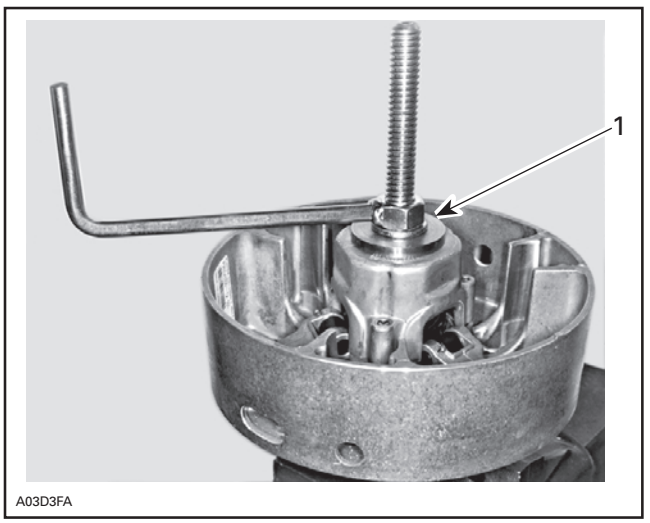
Use spring compressor (P/N 529 035 524).

Install support guide.



1. Support guide

Install sliding half then a second support guide. These support guides will prevent bushing damages.



1. Support guide

Remove 3 Allen screws retaining spring cover then unscrew compressor.

CLEANING

5,6, Fixed and Sliding Half

Clean pulley faces and shaft with fine steel wool and dry cloth.

5, Fixed Half and Crankshaft End

Parts must be at room temperature before cleaning.

Using a paper towel with cleaning solvent, clean crankshaft tapered end and the taper inside the fixed half of the drive pulley, crankshaft threads and retaining screw threads.

⚠ WARNING

This procedure must be performed in a well-ventilated area.

CAUTION: Avoid contact between cleaner and crankshaft seal because damage may occur.

Remove all hardened oil deposits that have baked on crankshaft and pulley tapered surfaces with coarse or medium steel wool and/or sand paper no. 600.

CAUTION: Do not use any other type of abrasive.

Reclean mounting surfaces with paper towel and cleaning solvent.

Wipe off the mounting surfaces with a clean, dry paper towel.

CAUTION: Mounting surfaces must be free of any oil, cleaner or towel residue.

7,20, Bushing

Only use petrol base cleaner when cleaning bushings.

CAUTION: Do not use acetone to clean bushing.

INSPECTION

Drive pulley should be inspected annually.

16,17, Thrust Washer and Roller

Check roller for roundness of external diameter. Check thrust washer for thickness wear. Replace as required.

CAUTION: Ensure rollers are in good condition. Replace as required.

9,12, Fitting Bolt Ass'y and Flanged Bushing

Check for wear, replace as required. When installing old style flanged bushing (made of black plastic), use a size "O" (letter) drill bit to ream inside diameter.

24,25, O-Ring and Slider Shoe

Check if O-rings are cracked, cut or crushed. Replace as required.

Check slider shoes for wear. Replace if groove is not apparent on top.

5,29, Fixed Half and Governor Cup

Inspect splines and free play between both parts. Maximum free play is 0.5 mm (.020 in) measured at calibration screw radius. Replace if required.

7,20, Sliding Half and Spring Cover Bushing

Visually inspect coating. Replace if worn.

Sliding Half Bushing Replacement

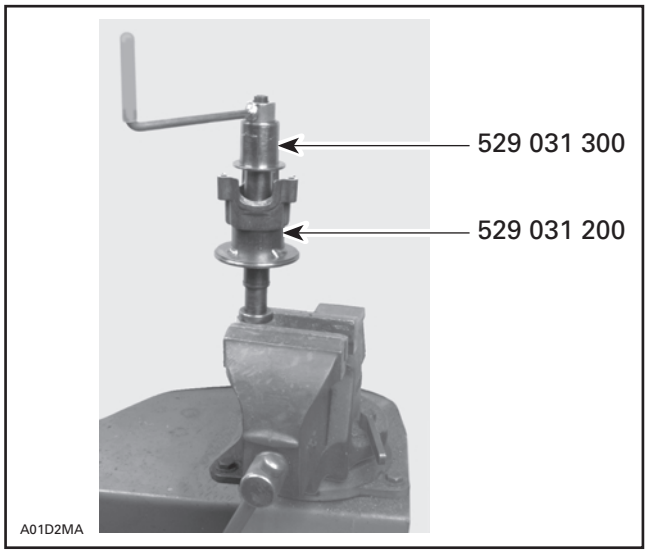
This bushing is not replacable. If worn out, replace sliding half ass'y.

Spring Cover Bushing Replacement

Under normal use there is no need to replace this bushing.

Mount compressor (P/N 529 035 524) in a vise.

Use tools (P/N 529 031 300 and 529 031 200) to remove old bushing.



CAUTION: Bushing must be bonded with retaining compound.

Apply retaining compound Loctite 609 outside of bushing then press it down to counterbore from outside end.

CAUTION: Insert bushing from sliding half side (inner side) of spring cover.

ASSEMBLY

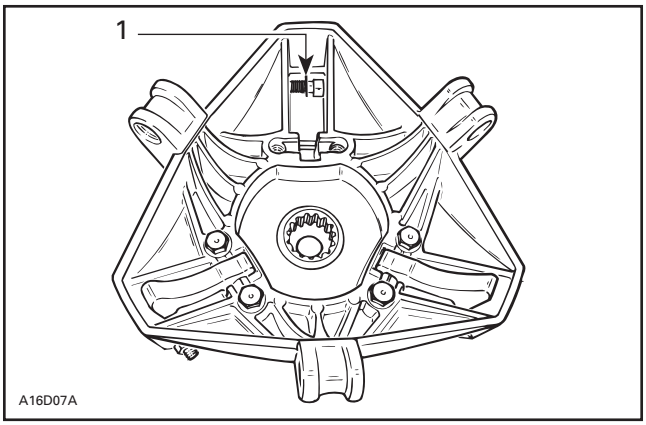
NOTE: This drive pulley is lubrication free. Do not lubricate any component.

1,2,3, Screw, Ring Gear and Loctite 271

Apply Loctite 271 (P/N 413 702 900) on threads and then torque to 27 N•m (20 lbf•ft).

26,27,28, Calibration Screw, Washer and Locking Nut

When installing calibration screw, make sure to install washer as shown.



1. Washer

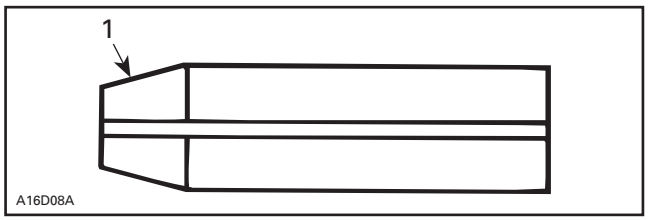
Torque locking nut to 10 N•m (89 lbf•**in**).

15, Pin

Always use the same type of pin as originally installed when servicing. Different types have different weights for calibration purpose. Refer to TECHNICAL DATA.

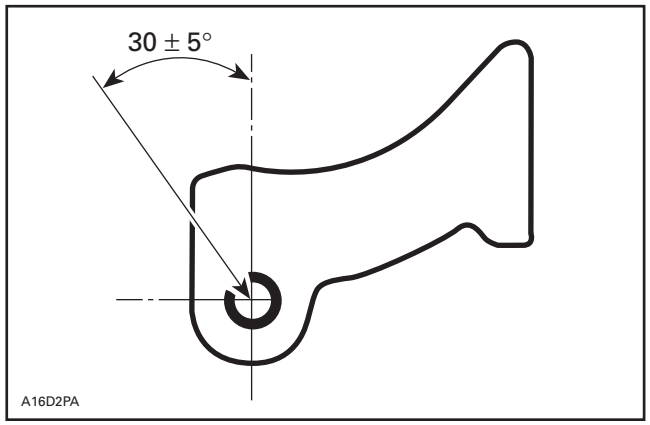
21,22,23, Ramp, Dowel Tube and Screw

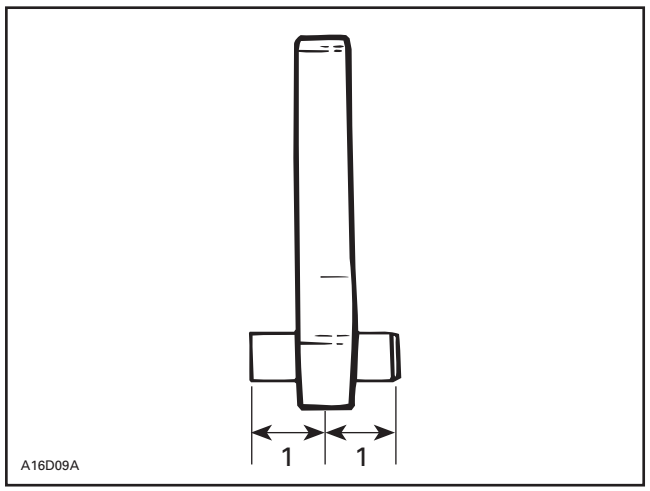
Insert dowel tube from chamfered side. Make sure ramp is centered on dowel tube.



1. Chamfered side

Position dowel tube split at the illustrated angle.





1. Equal distance

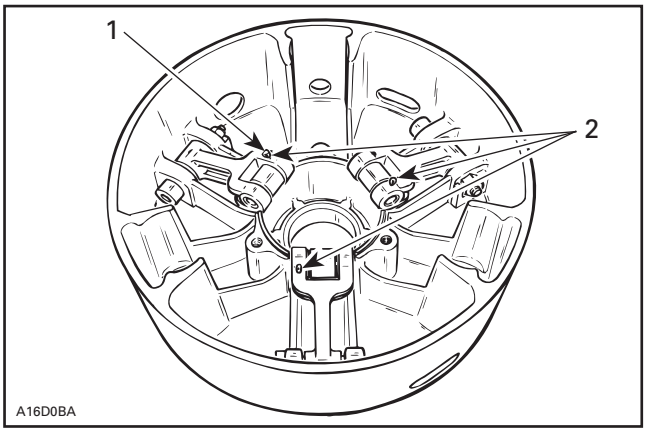
Torque screws to 10 N•m (89 lbf•**in**).

9,11,13,14, Screw, Lever Ass'y, Nut and Cotter Pin

Always install lever assemblies so that cotter pins are on the shown side. Besides install cotter pin head on top when lever is sat at bottom of sliding half. Bend cotter pin ends to sit perfectly against lever.

⚠ WARNING

Whenever replacing centrifugal levers, always replace all 3 at the same time. Otherwise, drive pulley misbalancing will occur because of levers difference.



1. Head on top
2. All on the same side

CAUTION: Lever assemblies must be installed so that cotter pins are on the same side.

Torque nuts to 12 N•m (106 lbf•**in**).

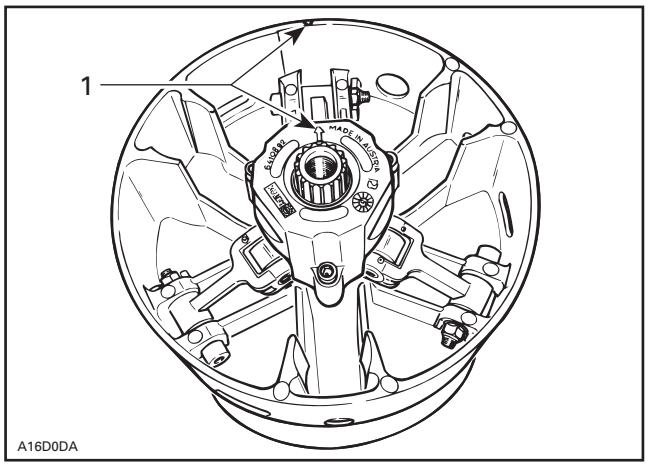
CAUTION: Lever ass'y and rollers must move easily after installation.

5,6,18,19, Fixed Half, Sliding Half, Spring, Spring Cover and Screw

To install spring cover, use spring compressor (P/N 529 035 524).

Assemble fixed and sliding halves. Note that fixed halves have different cone angle. Match cone angle with crankshaft.

Lift sliding half against spring cover and align spring cover arrow with sliding half mark.

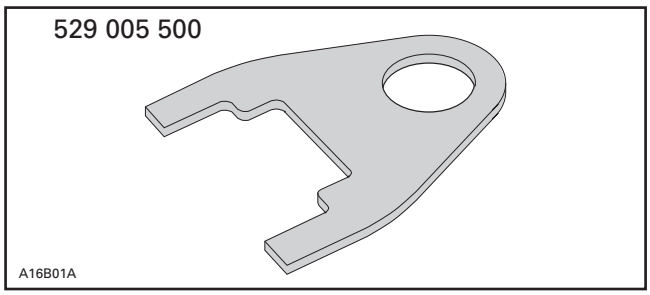


1. Align

Install and torque screws to 13 N•m (115 lbf•**in**).

6,25,29, Sliding Half, Slider Shoe and Governor Cup

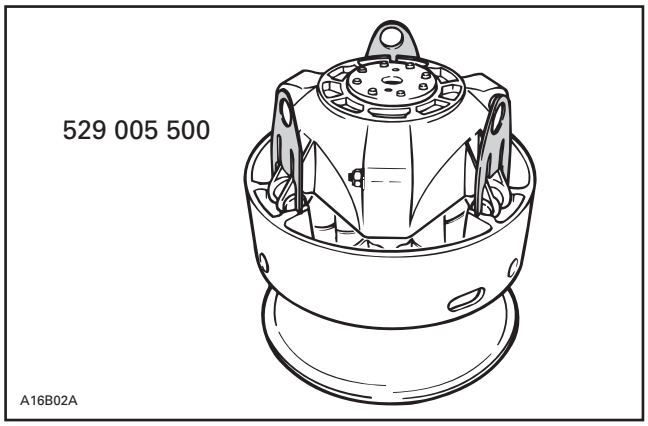
To install governor cup, use following tool:



Insert spring and slider shoes into governor cup so that groove in each slider shoe is vertical to properly slide in guides.

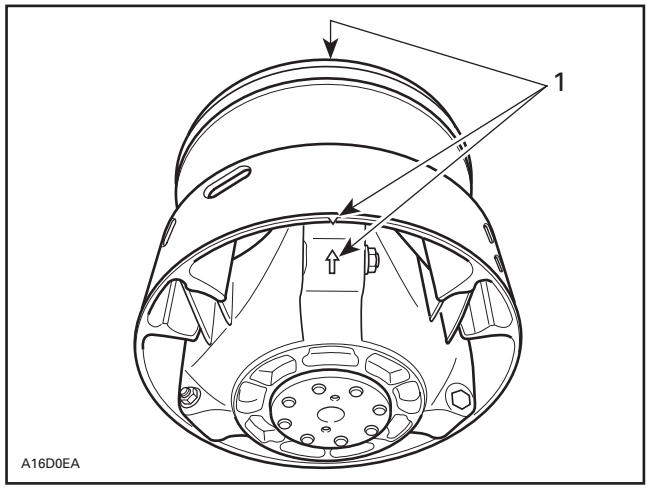
CAUTION: Make sure O-rings are installed on slider shoes and their grooves are positioned vertically.

Install fork (P/N 529 005 500) into slider shoe grooves to maintain them for governor cup installation. Proceed on 3 set of slider shoes.



Make sure to align governor cup arrow with sliding half and fixed half mark.

NOTE: If fixed half has no mark, align governor cup mark with segment no. 1 of inner half. Segments are identified on engine side.



1. Align

Carefully slide governor cup into sliding half. Align mark of governor cup with mark of fixed half.

Remove forks and push governor cup so that its splines engage with fixed half shaft splines.

CAUTION: Make sure splines of both parts are fully engaged.

INSTALLATION

⚠ WARNING

Do not apply anti-seize or any lubricant on crankshaft and drive pulley tapers.

⚠ WARNING

Never use any type of impact wrench at drive pulley removal and installation.

Clean mounting surfaces as described in CLEANING above.

Drive Pulley Ass'y

The installation procedure must be strictly adhered to as follows.

Install drive pulley on crankshaft extension.

Install conical washer with its concave side towards drive pulley then install screw.

⚠ WARNING

Never substitute conical washer and/or screw with jobber ones. Always use Bombardier genuine parts for this particular case.

Use holder. See REMOVAL procedure.

Torque screw to 80 to 100 N•m (59 to 74 lbf•ft).

Install drive belt and guard.

Raise and block the rear of the vehicle and support it with a mechanical stand.

⚠ WARNING

Ensure that the track is free of particles which could be thrown out while track is rotating. Keep hands, tools, feet and clothing clear of track. Ensure nobody is standing near the vehicle.

Accelerate the vehicle at low speed (maximum 30 km/h (20 MPH) and apply the brake, repeat 5 times.

Recheck the torque of 80 to 100 N•m (59 to 74 lbf•ft).

⚠ WARNING

After 10 hours of operation the transmission system of the vehicle must be inspected to ensure the retaining screw is properly torqued.

DRIVE PULLEY ADJUSTMENT

The drive pulley is factory calibrated to transmit maximum engine power at a predefined RPM. Factors such as ambient temperature, altitude or surface condition may vary this critical engine RPM thus affecting snowmobile efficiency.

This adjustable drive pulley allows setting maximum engine RPM in the vehicle to maintain maximum power.

Calibration screws should be adjusted so that actual maximum engine RPM in vehicle matches with the maximum horsepower RPM given in TECHNICAL DATA.

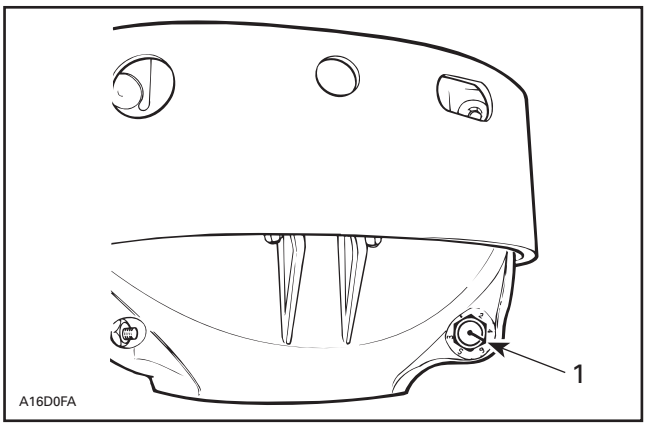
NOTE: Use precision digital tachometer for engine RPM adjustment.

NOTE: The adjustment has an effect on high RPM only.

To adjust, modify ramp end position by turning calibration screws.

26,28,29, Calibration Screw, Locking Nut and Governor Cup

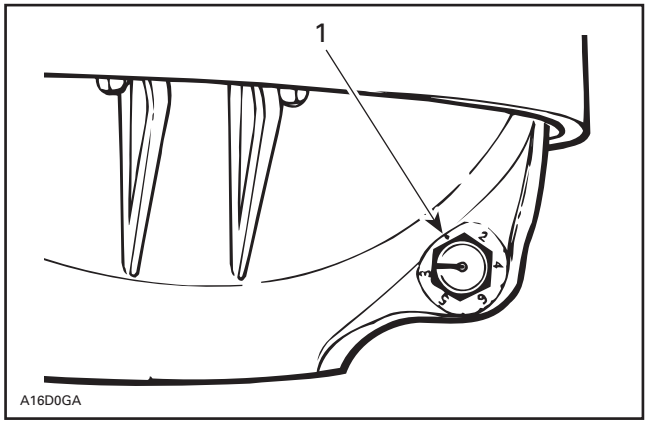
Calibration screw has a notch on top of its head.



1. Notch

Governor cup has 6 positions numbered 2 to 6. Note that in position 1 there is no stamped number (due to its location on casting).

See TECHNICAL DATA for original setting.



1. Position 1 (not numbered)

Each number modifies maximum engine RPM by about 200 RPM.

Lower numbers decrease engine RPM in steps of 200 RPM and higher numbers increase it in steps of 200 RPM.

Example:

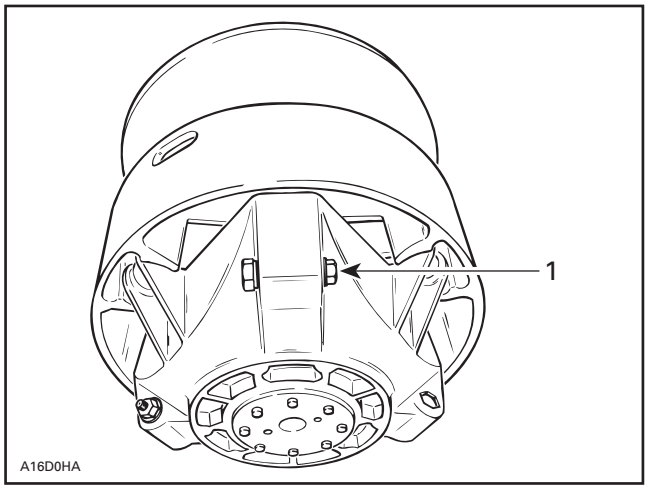
Calibration screw is set at position 3 and is changed to position 5. So maximum engine RPM is increased by about 400 RPM.

To Adjust:

Just loosen locking nut enough to pull calibration screw **partially** out and adjust to desired position. Do not completely remove the locking nut. Torque locking nuts to 10 N•m (89 lbf•**in**).

CAUTION: Do not completely remove calibration screw otherwise its inside washer will fall off.

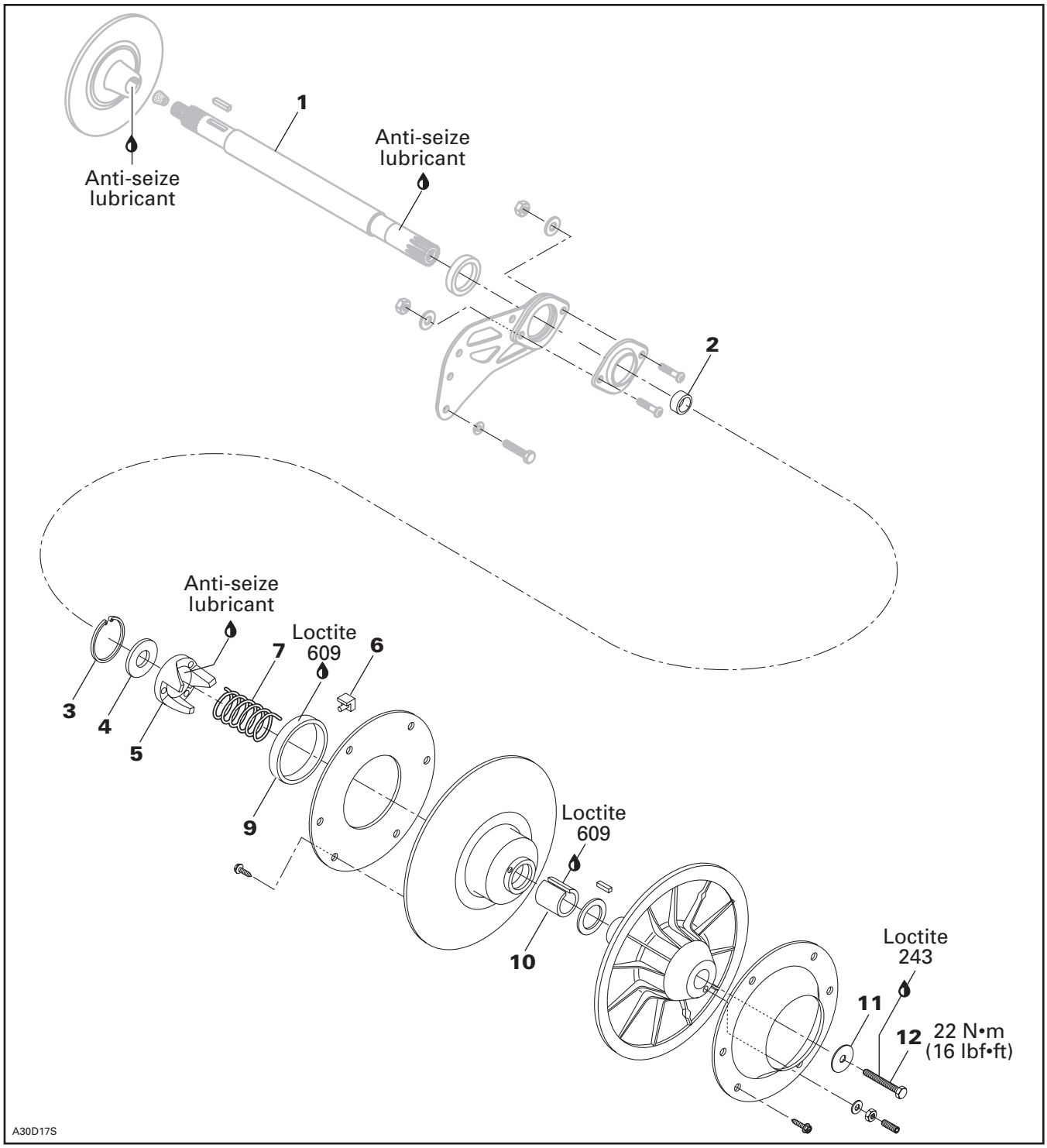
CAUTION: Always adjust all 3 calibration screws and make sure they are all set at the same number.



1. Loosen just enough to permit rotating of calibration screw

DRIVEN PULLEY

Formula Type on Mach Z STD



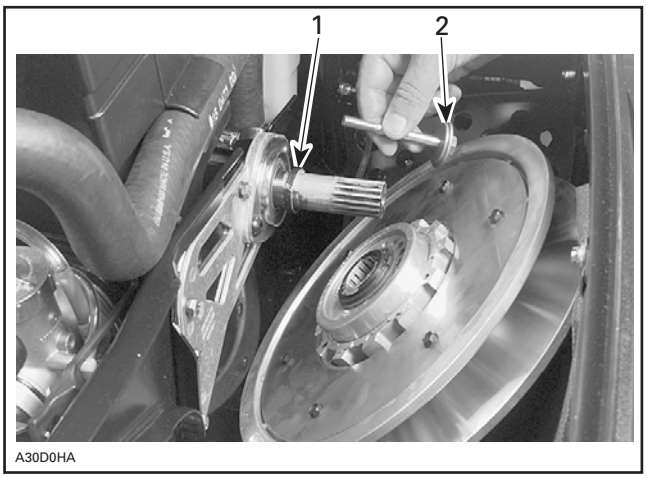
REMOVAL

Remove guard and drive belt from vehicle.

Remove cap screw **no. 12** and shouldered washer **no. 11** then pull the driven pulley from the countershaft.

Note shouldered washer position for reinstallation.

Take care not to loose spacer **no. 2**.



TYPICAL

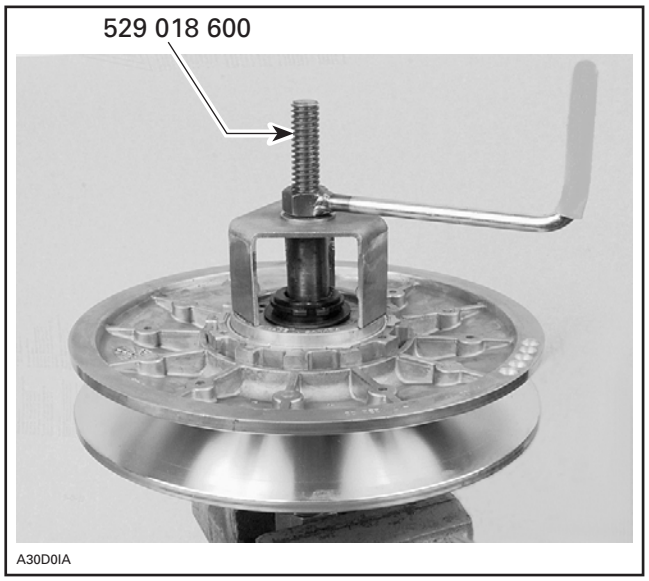
1. *Spacer*
2. *Shoulder on this side*

1, Countershaft

Should countershaft **no. 1** removal be required, refer to BRAKE then look for **Countershaft and Brake Disc Removal**.

DISASSEMBLY

Use spring compressor (P/N 529 018 600).



Remove snap ring **no. 3** and washer **no. 4** to disassemble the cam and the 2 pulley halves.

⚠ WARNING

Driven pulley cam is spring loaded, use above mentioned tool.

CLEANING

9,10, Large Bushing and Small Bushing

During break-in period (about 10 hours of use), teflon from bushing moves to cam or shaft surface. A teflon over teflon running condition occurs, leading to low friction. So it is normal to see gray teflon deposit on cam or shaft. Do not remove that deposit, it is not dust.

When a dust deposit has to be removed from the cam or the shaft, use dry cloth to avoid removing transferred teflon.

Pulley Half Cleaning

Use Parts Cleaner (P/N 413 711 809).

INSPECTION

9,10, Bushings

Check for cracks, scratch and for free movement when assembled to fixed half.

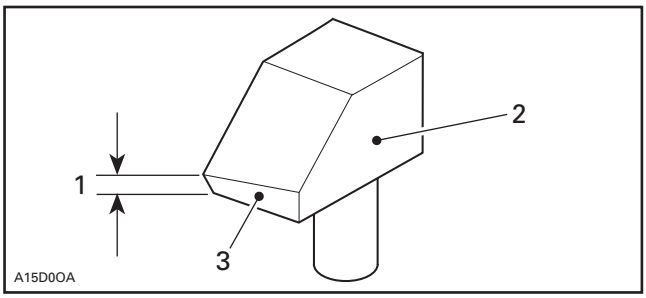
Using a dial bore gauge measure bushing diameter. Measuring point must be at least 5 mm (1/4 in) from bushing edge.

Replace bushing(s) if worn more than specified.

DRIVEN PULLEY BUSHING WEAR LIMIT mm (in)	
Small bushing	38.30 (1.508)
Large bushing	89.15 (3.510)

6, Slider Shoe

Check cam slider shoes for wear. Replace when inside edge of cam slider shoe slope base is worn to 1 mm (.039 in) or less.



1. Measure thickness of slope base here
2. Sliding pulley side
3. Slope base

ASSEMBLY

6, Cam Slider Shoe

When replacing slider shoes, always install a new set (3 shoes) to maintain equal pressure on the cam.

Assemble driven pulley components by reversing the disassembly procedure.

5, Cam

Coat cam interior with anti-seize lubricant.

INSTALLATION

1, Countershaft

CAUTION: Always apply anti-seize lubricant (P/N 413 701 000) on the countershaft before final pulley installation.

Should installation procedure be required, refer to BRAKE then look for **Brake Disc and Countershaft Bearing Adjustment**.

Reinstall the pulley on the countershaft by reversing the removal procedure.

Driven pulley end-play is 0 (zero).

12, Pulley Retaining Screw

Torque to 22 N•m (16 lbf•ft).

ADJUSTMENT

Refer to PULLEY DISTANCE AND ALIGNMENT to adjust pulley distance. Adjust drive belt height in driven pulley to obtain specified belt deflection. Turn Allen screws **no. 10** equally accordingly.

7, Spring

General

It is usual to experience spring setting during breaking period of a new spring. The factory spring preload is slightly higher (about 1 kg (2 lb)) to compensate for spring setting. Specifications in TECHNICAL DATA are applicable after break-in period (about 10 hours of use).

Spring Torsional Pre-Load

To check spring pre-load adjustment, use spring scale hook (P/N 529 006 500) and a spring scale.

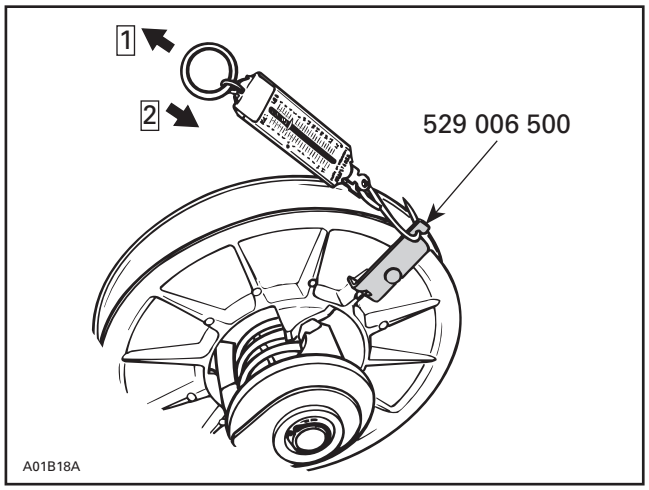
Remove drive belt.

Install the hook on the sliding half. Preventing fixed half from turning, pull sliding half with the spring scale perpendicularly with pulley axle.

Take 1st measurement when sliding half begins to turn. Rotate sliding half to 10 mm (3/8 in) of rotation. Hold fish scale at this position. Slowly release tension from fish scale and take 2nd measurement when sliding half begins to return. Spring pre-load is the average measurement between these 2.

$$\frac{\text{1st measurement (when opening)} + \text{2nd measurement (when closing)}}{2} = \text{Spring pre-load}$$

Example: $\frac{\text{3.8 kg (8.4 lb) (when opening)} + \text{3.4 kg (7.5 lb) (when closing)}}{2} = \text{3.6 kg (8 lb) Actual spring pre-load}$

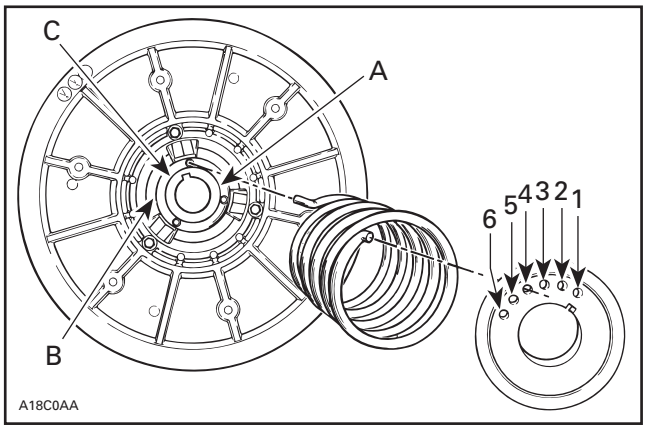


TYPICAL

Step 1: 1st measurement
Step 2: 2nd measurement

To adjust spring pre-load, relocate spring end in cam, moving it clockwise to increase the pre-load and counterclockwise to decrease it. Refer to TECHNICAL DATA.

NOTE: If spring pre-load can not be adjusted, try to relocate the other end of spring in sliding pulley (holes A, B and C).



TYPICAL

Letters and numbers shown in illustration are actual letters and numbers embossed on parts

NOTE: Always recheck torsional pre-load after adjusting.

Pulley Alignment and Drive Belt Deflection

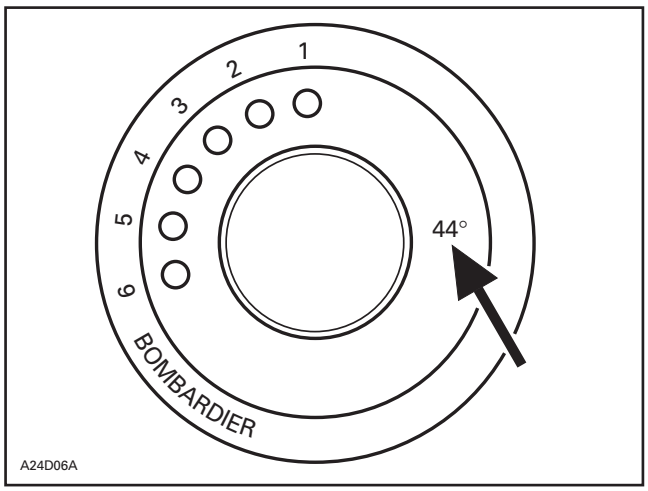
Refer to PULLEY DISTANCE AND ALIGNMENT and DRIVE BELT to perform adjustments.

CAUTION: Drive belt and pulley adjustments must always be checked whenever pulleys have been removed, replaced or disassembled.

5, Cam

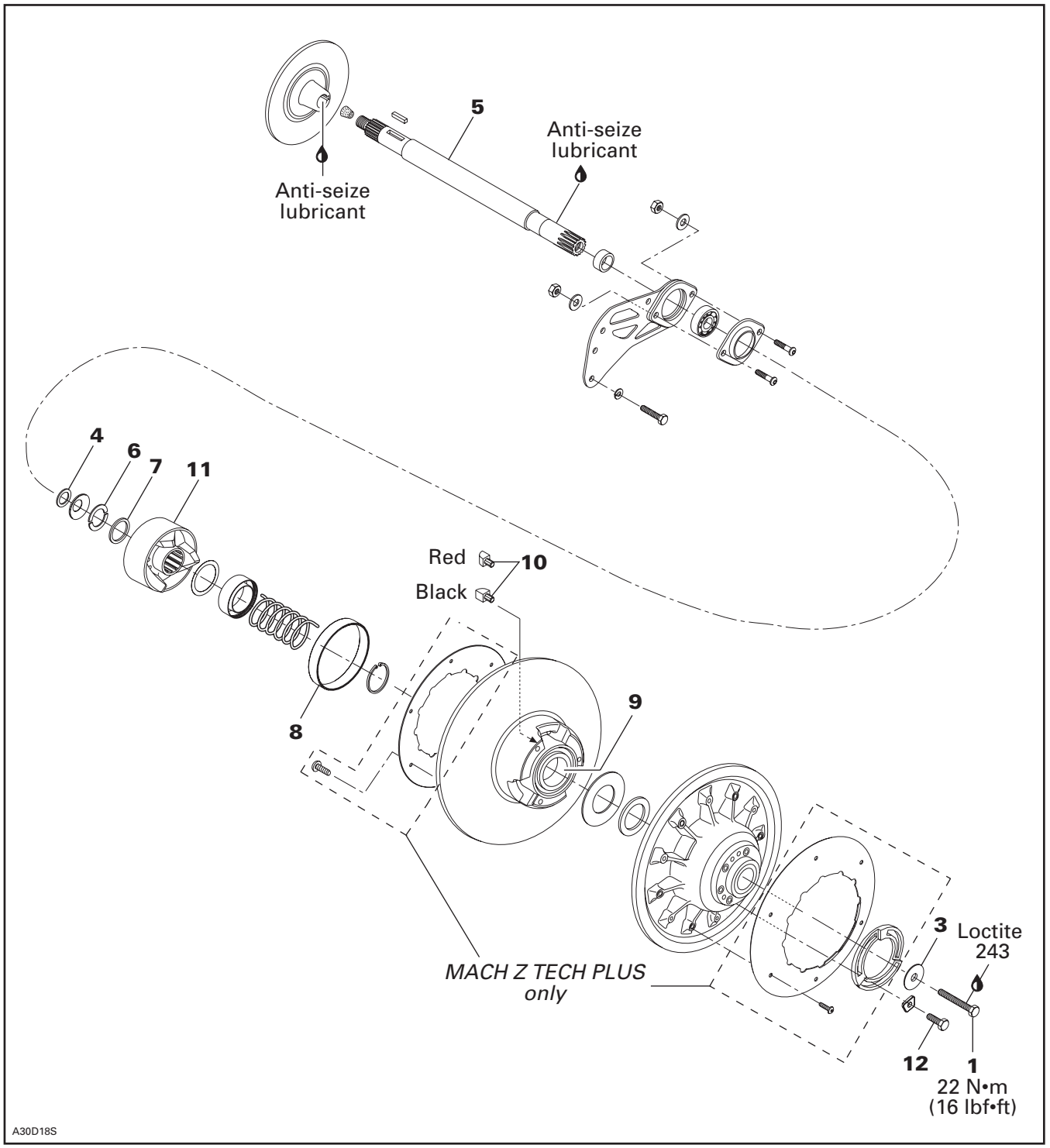
Make sure to install proper cam. Refer to TECHNICAL DATA.

Cam angle is identified on cam.



NOTE: For high altitude regions, a Service Bulletin will give information about calibration according to altitude.

HPV27 on Mach Z TECH PLUS and Grand Touring SE



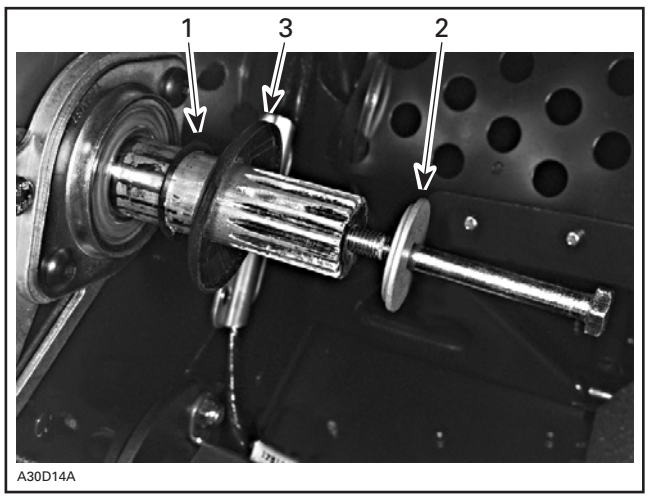
REMOVAL

Remove guard and drive belt from vehicle.

Remove cap screw **no. 1** and shouldered washer **no. 13** then pull the driven pulley from the countershaft.

Note shouldered washer position for reinstallation.

Take care not to loose spacer **no. 4**.



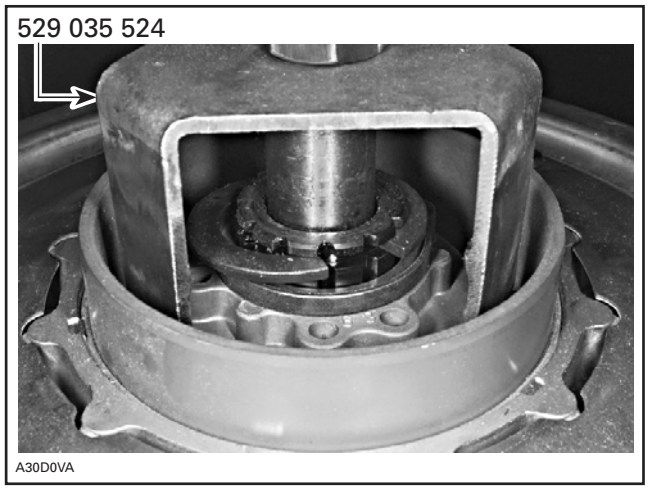
1. Spacer
2. Shoulder on this side
3. Concave side facing driven pulley

5, Countershaft

Should countershaft **no. 5** removal be required, refer to BRAKE then look for **Countershaft and Brake Disc Removal**.

DISASSEMBLY

Use spring compressor (P/N 529 035 524).



Remove half keys **no. 6** and washer **no. 7** to disassemble the cam and the 2 pulley halves.

⚠ WARNING

Driven pulley cam is spring loaded, use above mentioned tool.

CLEANING

8,9, Large Bushing and Small Bushing

During break-in period (about 10 hours of use), teflon from bushing moves to cam or shaft surface. A teflon over teflon running condition occurs, leading to low friction. So it is normal to see gray teflon deposit on cam or shaft. Do not remove that deposit, it is not dust.

When a dust deposit has to be removed from the cam or the shaft, use dry cloth to avoid removing transferred teflon.

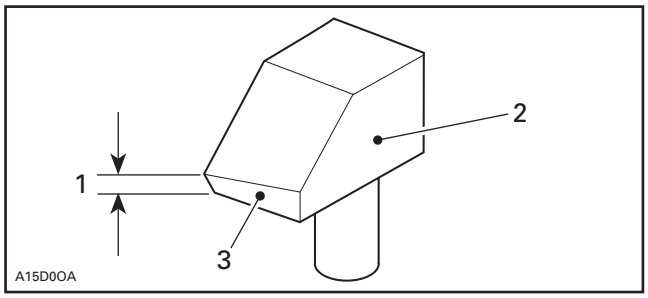
Pulley Half Cleaning

Use Parts Cleaner (P/N 413 711 809).

INSPECTION

10, Slider Shoe

Check cam slider shoes for wear. Replace when inside edge of cam slider shoe slope base is worn to 1 mm (.039 in) or less.



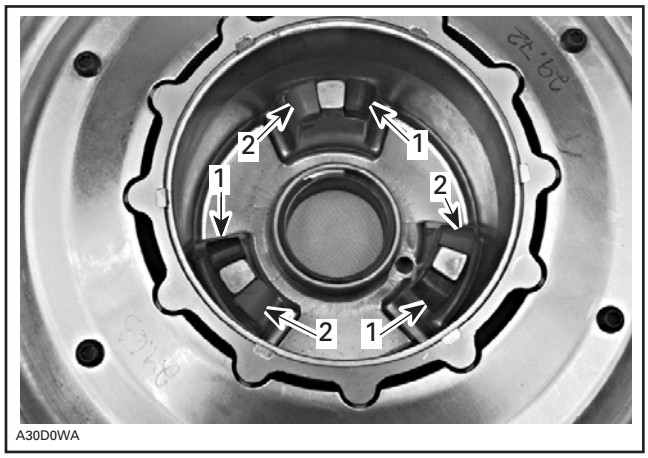
1. Measure thickness of slope base here
2. Sliding pulley side
3. Slope base

ASSEMBLY

10, Cam Slider Shoe

When replacing slider shoes, always install a new set (3 shoes) to maintain equal pressure on the cam.

Install slider shoes as per following photo. Red slider shoes are being used for reverse and black ones for forward.



1. *BLACK slider shoe*
2. *RED slider shoe*

12, Screws

These screws are machined at there end. With the adjustment ring steel to position 0 (zero), screw ends are flush with inner side of fixed pulley half when tighten.

CAUTION: If any of these screws is not flush with inner side of sliding pulley, bushings will worn unequally.

Assemble driven pulley components by reversing the disassembly procedure.

11, Cam

Coat cam interior with anti-seize lubricant.

INSTALLATION

5, Countershaft

CAUTION: Always apply anti-seize lubricant (P/N 413 701 000) on the countershaft before final pulley installation.

Should installation procedure be required, refer to BRAKE then look for **Brake Disc and Countershaft Bearing Adjustment**.

Reinstall the pulley on the countershaft by reversing the removal procedure.

Driven pulley end-play is 0 (zero).

1, Pulley Retaining Screw

Torque to 22 N•m (16 lbf•ft).

ADJUSTMENT

Refer to PULLEY DISTANCE AND ALIGNMENT to adjust pulley distance. Adjust drive belt height in driven pulley to obtain specified belt deflection. Loosen screws **no. 12**, turn adjustment ring then retighten screws.

Pulley Alignment and Drive Belt Deflection

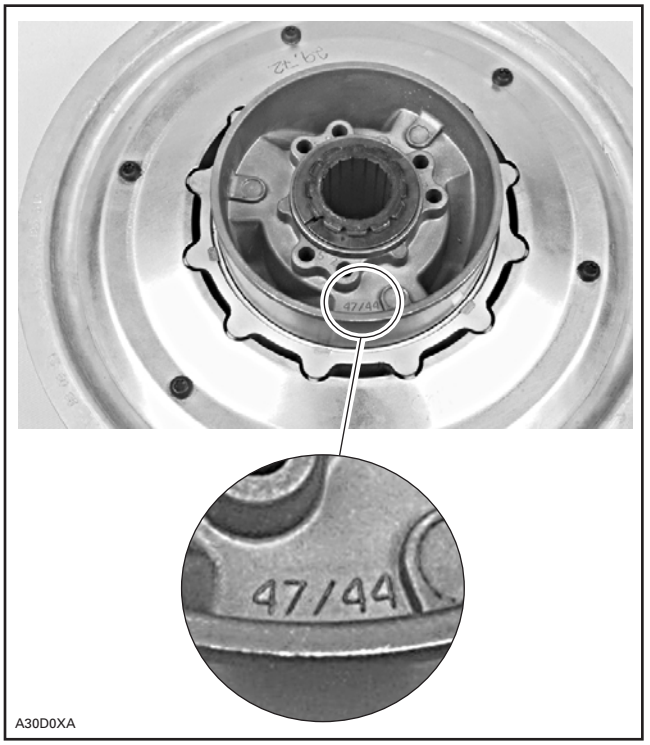
Refer to PULLEY DISTANCE AND ALIGNMENT and DRIVE BELT to perform adjustments.

CAUTION: Drive belt and pulley adjustments must always be checked whenever pulleys have been removed, replaced or disassembled.

11, Cam

Make sure to install proper cam. Refer to TECHNICAL DATA.

Cam angle is identified on cam.



NOTE: For high altitude regions, a Service Bulletin will give information about calibration according to altitude.

PULLEY DISTANCE AND ALIGNMENT

GENERAL

The pulley distance we will refer to in this section, is the space separating the drive and driven pulley outside diameters (Z measurement).

This basic distance is provided as an assembly guide and indicates the dimensions between which satisfactory belt deflection will be obtained.

Both pulley distance adjustment and pulley alignment must be carried out to ensure the highest efficiency of the transmission system. Furthermore, optimum drive belt operation and minimal wear will be obtained only with proper pulley alignment.

CAUTION: Before checking pulley adjustment, the rear suspension must be mounted on the vehicle and track tension/alignment must be done. Always check pulley adjustment after suspension is adjusted.

⚠ WARNING

Failure to correctly perform pulley alignment may cause the vehicle to creep forward at idle.

All Pulley Alignment Specifications Refer to:

X = Distance between straight bar and drive pulley fixed half edge, **measured between pulleys**.

Y = Distance between straight bar and drive pulley fixed half edge, **measured at the end of straight bar**.

Z = Distance between outside diameter of pulleys.

GENERAL PROCEDURE

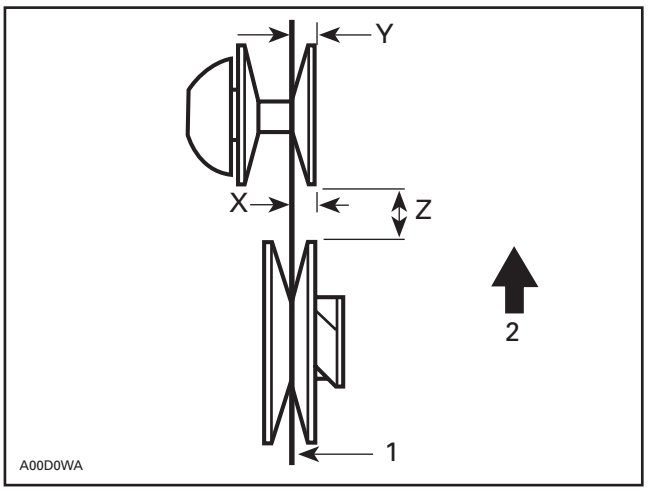
Remove guard and drive belt.

By turning and pushing the sliding half, open the driven pulley. Insert a straight bar 9.5 mm (.375 in) square, 48 cm (19 in) long or the proper alignment template into the opened driven pulley.

Measuring Procedure

Using Straight Bar

Always measure distances X and Y from the farther straight bar side (including its thickness to the fixed half edge).



TYPICAL

1. *Straight bar*
2. *Front of vehicle*

The distance Y **must** exceed distance X to compensate for the twist due to the engine torque.

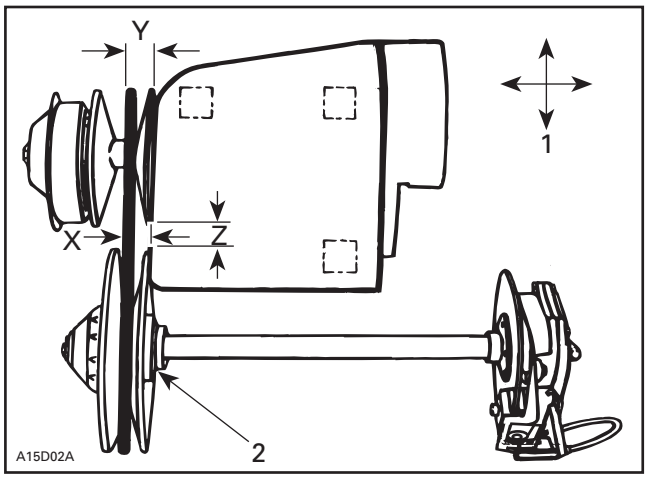
Drive Belt Deflection

NOTE: When pulley distance and alignment are adjusted to specifications, refer to DRIVE BELT to adjust drive belt deflection.

CAUTION: This section deals mainly with adjustment procedures. For complete assembly requirements, refer to the proper ENGINE or TRANSMISSION installation section.

PULLEY ALIGNMENT AND DISTANCE SPECIFICATIONS CHART

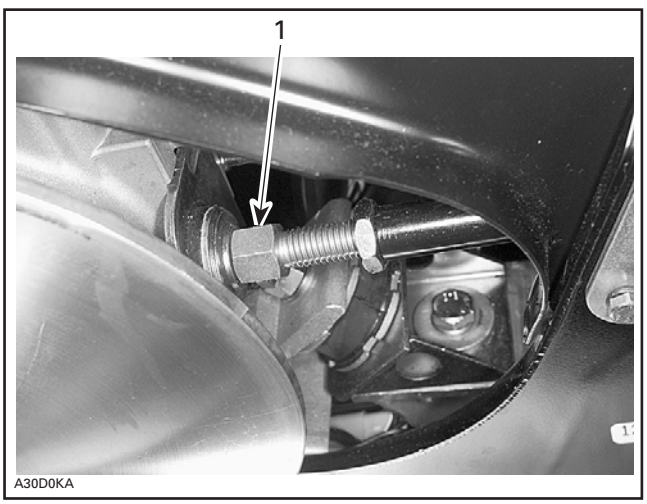
MODELS	PULLEY DISTANCE	OFFSET	
	Z	X	Y-X
	± 0.50 mm (± .020 in)	± 0.50 mm (± .020 in)	± 0.5 mm (± .020 in)
Mach Z STD/TECH PLUS	121.0 (4.764)	35.5 (1.398)	1.5 (.060)
Grand Touring SE	121.0 (4.764)	35.5 (1.398)	1.0 (.039)



TYPICAL

1. *Engine movement*
2. *Contact*

NOTE: Prior to performing pulley adjustment, loosen torque rod nut to allow engine movement. Engine supports have tendency to stick to frame, work engine loose prior to aligning.



1. *Loosen*

Pulley Distance Adjustment Method

Engine Movement

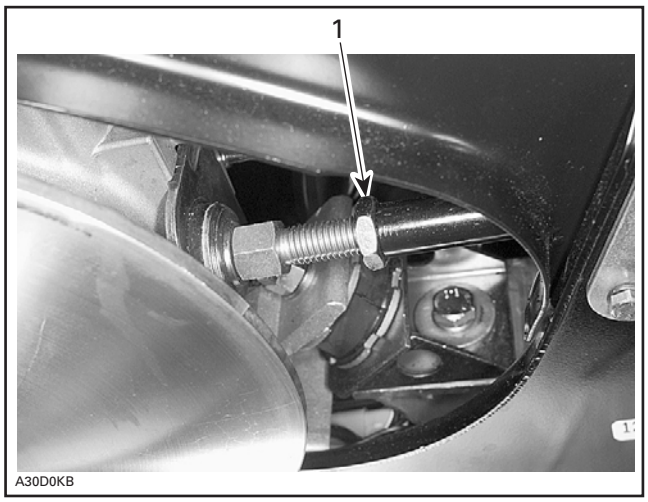
The engine support has slotted mounting holes. Move engine to obtain specified distance between pulleys.

Pulley Alignment Method

Engine Movement

Loosen the 4 bolts retaining engine support to the frame. Position engine to obtain the specified alignment.

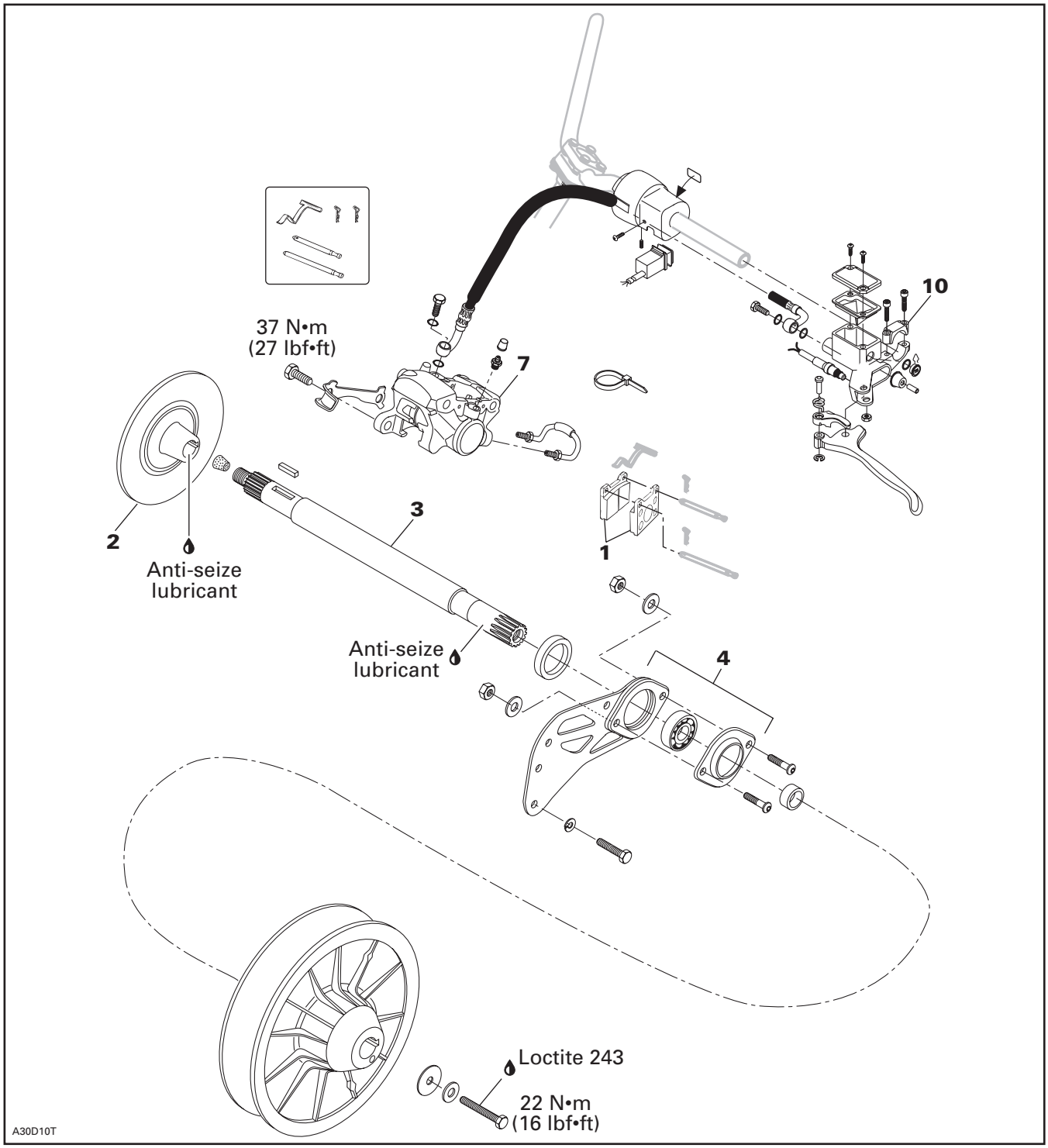
NOTE: After alignment, adjust torque rod so it slightly contacts stopper plate. Do not over tighten, it will disalign pulleys.



1. *Retighten*

BRAKE

HYDRAULIC DISC BRAKE



REMOVAL

BRAKE DISC REMOVAL

Brake disc can be withdraw without removing caliper. Proceed as follows:

- Remove belt guard, belt and driven pulley.
- Remove air silencer.
- Unbolt bearing support no. 4 from chassis.
- Unbolt caliper from chaincase.
- Open chaincase and remove upper sprocket.
- Pull countershaft no. 3 toward driven pulley side to free from chaincase and disc.
- Remove disc.

DISASSEMBLY

Only brake pads are available as spare parts. If caliper or master cylinder are damaged, replace each of them as an assembly.

CLEANING

Clean all metal components in a general purpose solvent. Thoroughly dry all components before assembling.

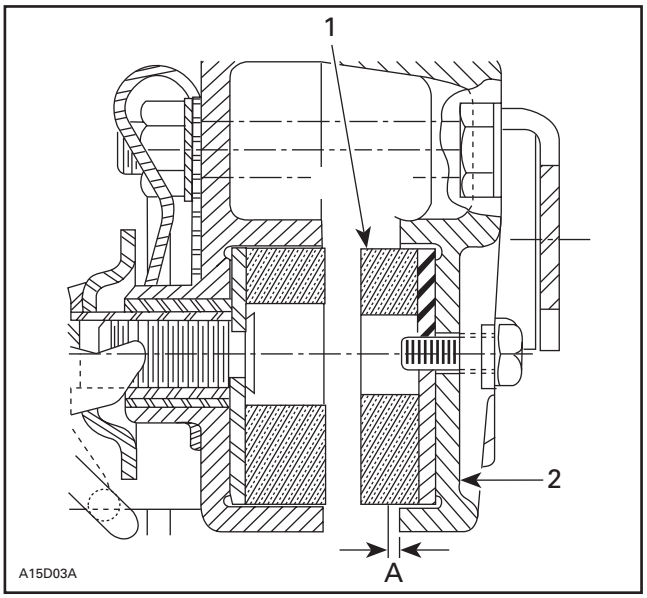
CAUTION: Do not clean brake pads in solvent. Soiled brake pads must be replaced by new ones.

INSPECTION

1, Brake Pad

Brake pads must be replaced when lining is 1 mm (1/32 in) thick or less.

CAUTION: Brake pads must always be replaced in pairs.



TYPICAL

1. *Fixed pad*
2. *Inner caliper*

A. 1 mm (1/32 in) minimum

2, Brake Disc

Check for scoring, cracking or bending, replace as required.

CAUTION: Brake disc should never be machined.

⚠ WARNING

Always install a new nut when servicing.

INSTALLATION

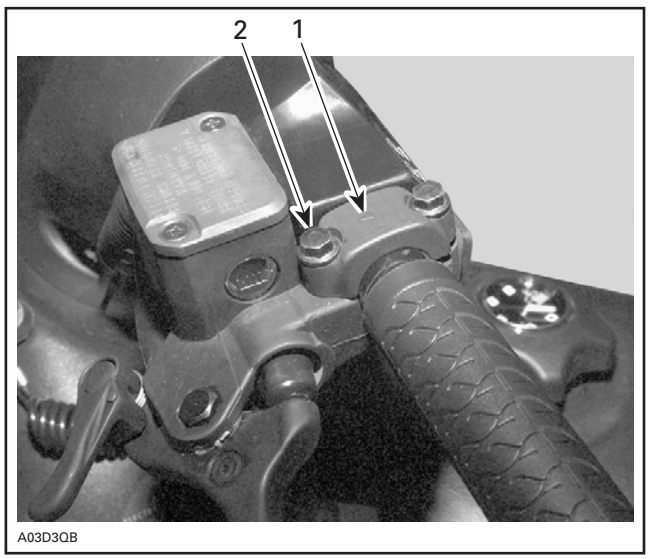
To install brake, reverse removal procedure paying attention to the following.

⚠ WARNING

Avoid getting oil on brake pads.

10, Upper Clamp

Install upper clamp with its arrow pointing at front of vehicle. Tighten to 8 N•m (71 lbf•**in**) front screw before rear one.



TYPICAL

1. *Arrow on upper clamp pointing at front of vehicle*
2. *Tighten front screw first*

2, Brake Disc

Apply anti-seize lubricant (P/N 413 701 000) on shaft.

The disc hub exceeds the disc more from one side than from the other. Install disc with the longer exceeding portion toward driven pulley.

1,7, Brake Pads and Caliper

Each time a new caliper or new brake pads are installed, proceed with the following:

– With caliper not bolted to chaincase, apply brake few times until both new pads are touching each other.
– Push back pads and repeat above step.
– Push back pads then fasten caliper to chaincase.
– Proceed with bleeding as described below.

ADJUSTMENT

Countershaft Bearing

Insert countershaft (with brake disc) from chaincase side through countershaft support (driven pulley side), then insert into chaincase.

Install countershaft bearing **no. 4** and ensure that countershaft is properly aligned, then tighten 3 retaining screws.

Torque castellated nut of upper sprocket to 60 N•m (44 lbf•ft).

CAUTION: Upper sprocket castellated nut must be tightened *before* bolting bearing support.

Close chaincase.

5, Brake Light

There is no adjustment on these models. Check that switch is securely installed.

BLEEDING

Change brake fluid once a year.

Bleed brake system as follows:

Keep sufficient DOT 4 brake fluid in reservoir at all times.

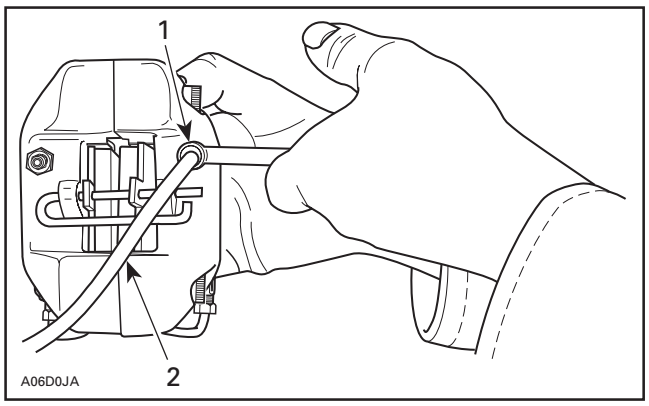
CAUTION: Use only DOT 4 brake fluid.

Install a hose on left side bleeder. Route this hose to a container.

Pump a few times brake lever and while holding brake lever depressed, open left side bleeder and check for air to escape.

Repeat with the same bleeder until no air appears in hose.

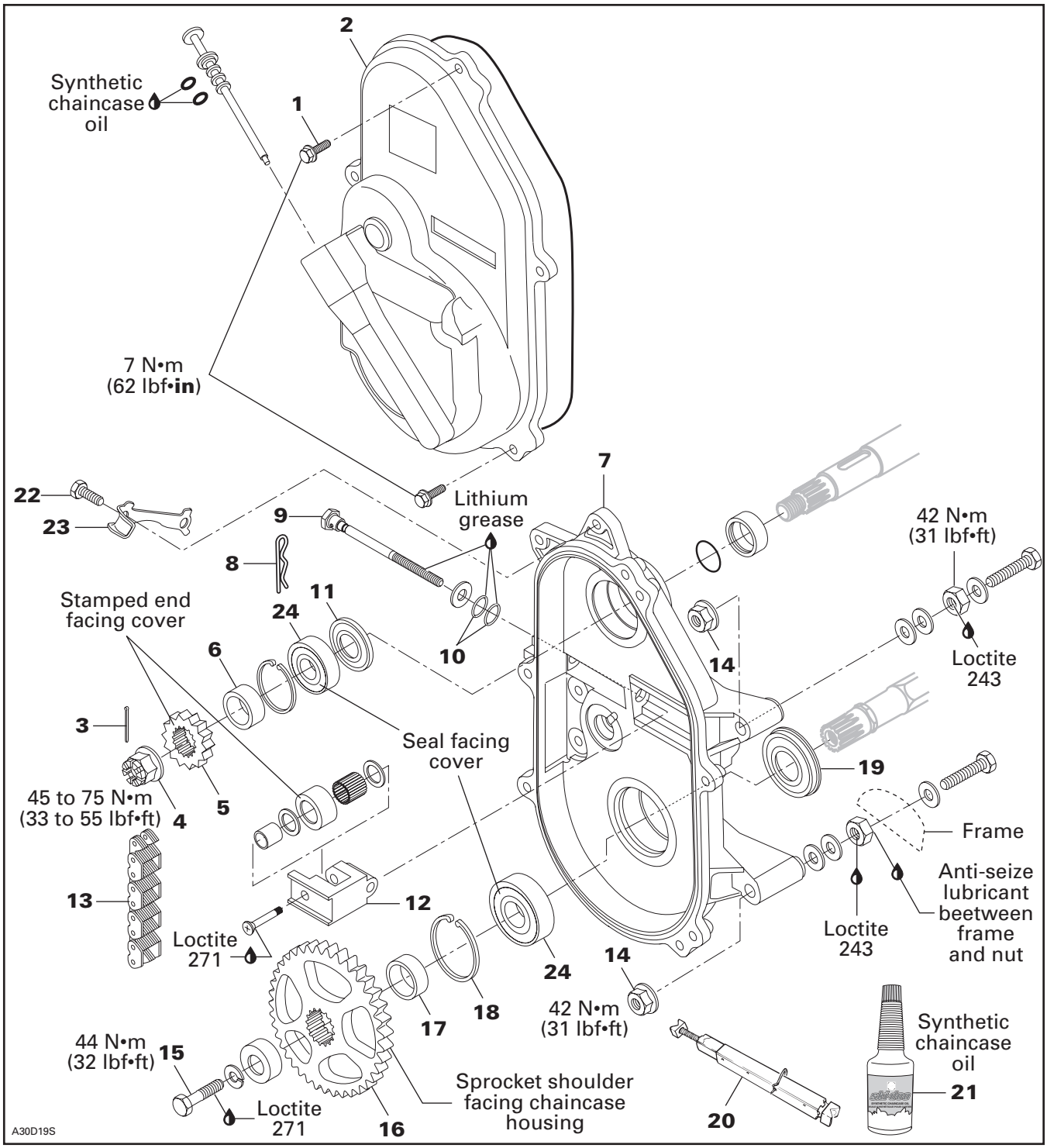
Proceed the same way with the right side bleeder.



TYPICAL

1. *Open bleeder*
2. *Clear hose to catch used brake fluid*

CHAINCASE


Synthetic chaincase oil
2
1
7 N•m (62 lbf•in)
22
23
9
8
Lithium grease
7
42 N•m (31 lbf•ft)
Loctite 243
Stamped end facing cover
11
24
6
10
14
3
Seal facing cover
19
45 to 75 N•m (33 to 55 lbf•ft)
4
5
Frame
13
12
Anti-seize lubricant beetween frame and nut
Loctite 271
Loctite 243
24
14
17
18
42 N•m (31 lbf•ft)
Synthetic chaincase oil
44 N•m (32 lbf•ft)
15
Sprocket shoulder facing chaincase housing
21
Loctite 271
16
20
A30D19S

REMOVAL

To remove chaincase proceed as follows.

Remove tuned pipes and muffler.

⚠ WARNING

Never remove exhaust components when engine is hot.

Remove hair pin **no. 8**. Release drive chain tension by unscrewing tensioner adjustment screw.

Drain oil by removing chaincase cover **no. 2**.

3,4,5,6,13,16,17, Cotter Pin, Nut, Sprocket, Shim and Drive Chain

Apply parking brake.

Remove cotter pin **no. 3** and nut **no. 4** retaining upper sprocket **no. 5** and screw **no. 15** retaining lower sprocket **no. 16**. Pull sprockets and drive chain simultaneously. Remove shims **nos. 6** and **17**.

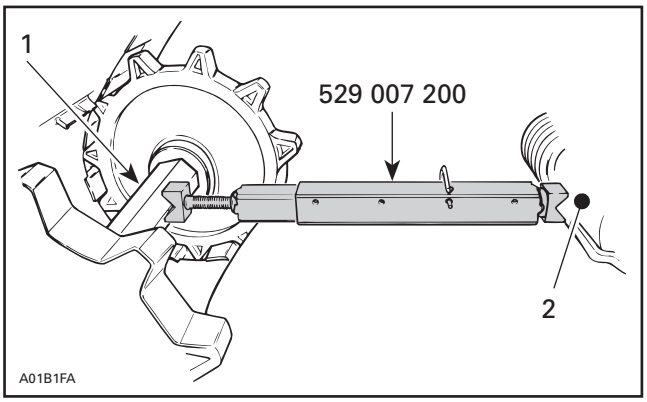
NOTE: Should countershaft removal be required, refer to BRAKE then look for **Countershaft Removal**.

Release parking brake.

Remove 3 nuts **no. 14**.

Unfold locking tab **no. 23** then remove caliper retaining screws **no. 22**.

Release track tension, use drive axle holder **no. 20** (P/N 529 007 200).



TYPICAL

1. *Drive axle*
2. *Suspension cross shaft*

Pry out drive axle oil seal **no. 19** from chaincase.

Pull chaincase from drive axle and countershaft.

Using 2 large screwdrivers inserted between chaincase **no. 7** and frame, pry complete assembly from vehicle.

INSPECTION

Visually inspect the chain for cracked, damaged or missing links. Check for worn or defective bearings, sprockets and chain tensioner components.

⚠ WARNING

If chain deflection is greater than 38 mm (1.5 in) (without chain tensioner), replace chain and check condition of sprockets.

GEAR RATIO MODIFICATION

For particular applications, the number of teeth of the sprockets can be increased or decreased on lower and upper sprockets.

Refer to TECHNICAL DATA for gear ratios.

CAUTION: Gear ratio modifications should only be performed by experienced mechanics since they can greatly affect vehicle performance.

NOTE: For high altitude regions, a Service Bulletin will give information about calibration according to altitude.

INSTALLATION

Reverse removal procedure and pay attention to the following. Replace oil seals, gaskets and O-rings.

11, Oil Seal

Using an appropriate pusher, press the oil seal into chaincase hub. Oil seal must fit flush with the chaincase edge.

NOTE: Should installation procedure for countershaft be required, refer to BRAKE.

24, Bearings

Bearing seal must face chaincase cover.

5,16, Sprockets

Position the sprockets with the writing facing the chaincase cover. Sprocket hub faces toward chaincase.

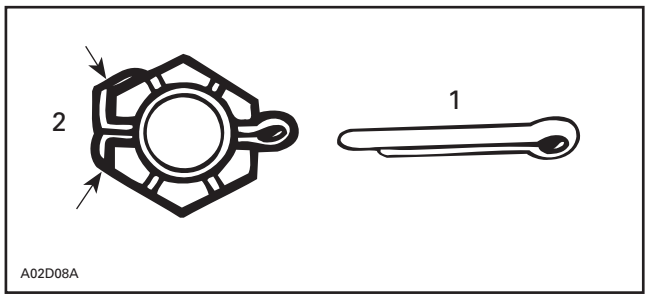
4, Upper Sprocket Castellated Nut

Torque to 45 to 75 N•m (33 to 55 lbf•ft).

Install new cotter pin in the position shown.

CAUTION: When removing a cotter pin always replace with a new one.

CAUTION: Cotter pin will rub on chaincase cover if installed otherwise.



1. New
2. Fold cotter pin over castellated nut flats only

18, Circlip

CAUTION: It is of the utmost importance to install the circlip otherwise damage to the chaincase components may occur.

DRIVE CHAIN ADJUSTMENT

NOTE: Brake disc key must be in good condition before checking chain free play.

10, O-Ring

Replace O-ring **no. 10** on tensioner adjustment screw. Fully tighten tensioner adjustment screw **by hand**, then back off only far enough for hair pin to engage in locking hole.

This initial adjustment should provide 3-5 mm (1/8-13/64 in) free-play when measured at the outer circumference of the brake disc.

CAUTION: Free-play must not exceed 5 mm (13/64 in), readjust if necessary.

⚠ WARNING

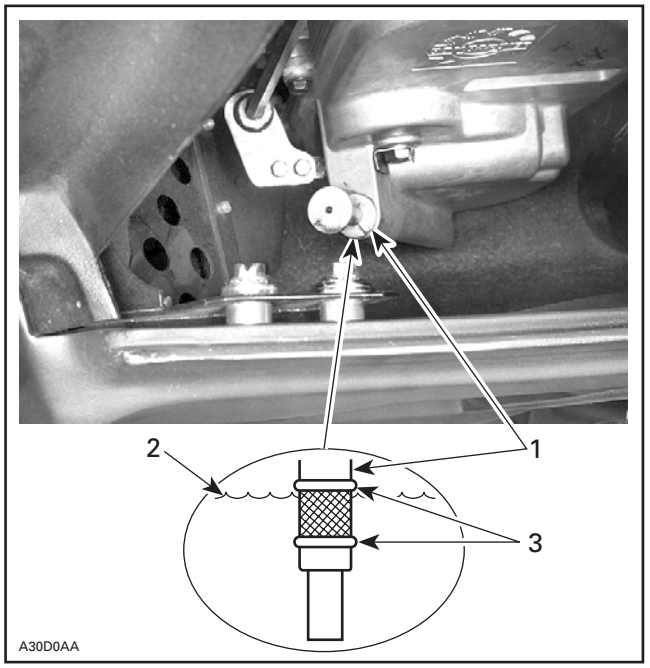
If the specified free-play is not reached with the tensioner screw fully tightened, replace chain and check the condition of sprockets.

21, Chaincase Oil

Pour 250 mL (8.5 U.S. oz) of synthetic chaincase oil (P/N 413 803 300) into chaincase.

NOTE: Chaincase oil capacity is 250 mL (8.5 U.S. oz).

Check oil level with the dipstick then add if required. Remove metal particles from magnet.



TYPICAL

1. Dipstick
2. Oil level
3. Level between marks

NOTE: Chaincase must be in its proper position when checking oil level.

ADJUSTMENT

Pulley Alignment

Refer to PULLEY DISTANCE AND ALIGNMENT.

Track Tension and Alignment

Refer to TRACK.

DRIVE CHAIN

SILENT CHAIN

All CK3 models are equipped with a 13-plates wide silent chain. Fit chain on sprockets to make sure that you are using right ones according to width. Refer to TECHNICAL DATA.

NOTE: No work (separation, lengthening) can be done on the silent chain type.

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IGNITION TIMING

NIPPONDENSO TRIGGER COIL SYSTEM

Normally ignition timing adjustment should not be required. It has been set at factory and it should remain correctly adjusted since every part is fixed and not adjustable. The only time the ignition timing might have to be changed would be when removing and reinstalling the magneto housing, replacing the crankshaft, the magneto flywheel, the trigger coil or the MPEM. If the ignition timing is found incorrect, first check for proper crankshaft alignment. This might be the indication of a twisted crankshaft.

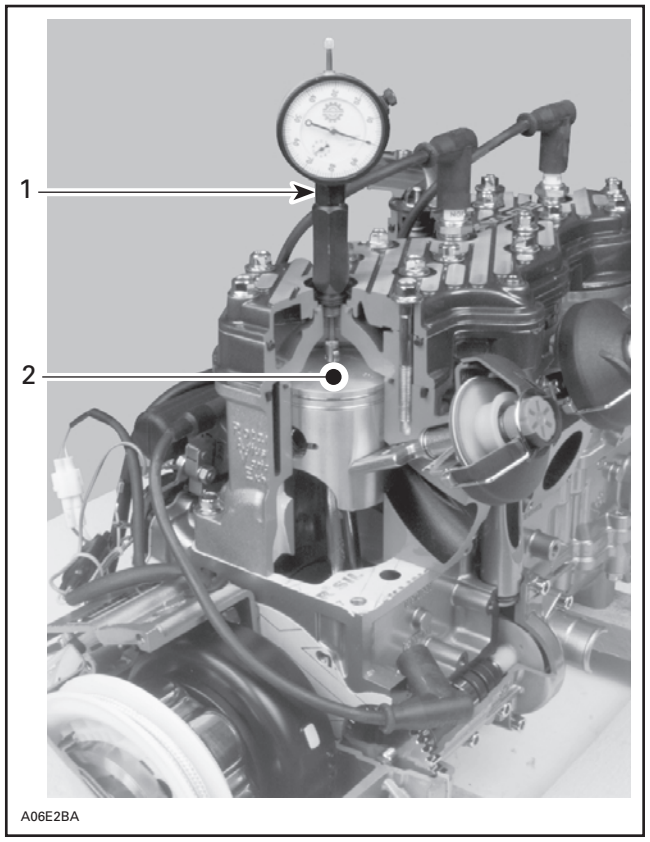
The ignition timing can be checked with either the engine hot or cold. Also, the ignition timing is to be checked at 3500 RPM with a timing light.

NOTE: Between 3000 and 4000 RPM, the spark advance does not change. So when checking ignition timing at 3500 RPM, a change in engine speed within ± 500 RPM will not affect the timing mark when checked with the timing light.

IMPORTANT: During the first 8 hours the timing curve is retarded by 2° between 4500 RPM and maximum RPM. Because checking ignition timing is done at a lower RPM, this will not affect the 3500 RPM timing specification. There will be no further timing adjustment required before and after these hours.

Scribing a Timing Mark

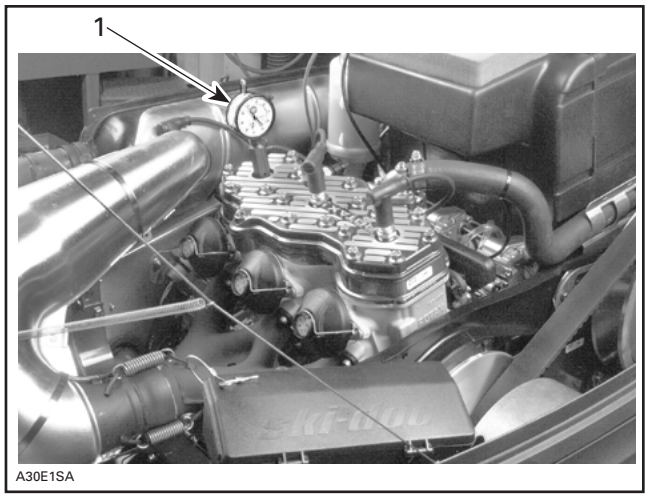
1. Clean the area around the MAG spark plug, and remove it.
2. Install the TDC gauge in the spark plug hole, (magneto side) and adjust as follows:
   a. Position the MAG piston at approximately TDC.



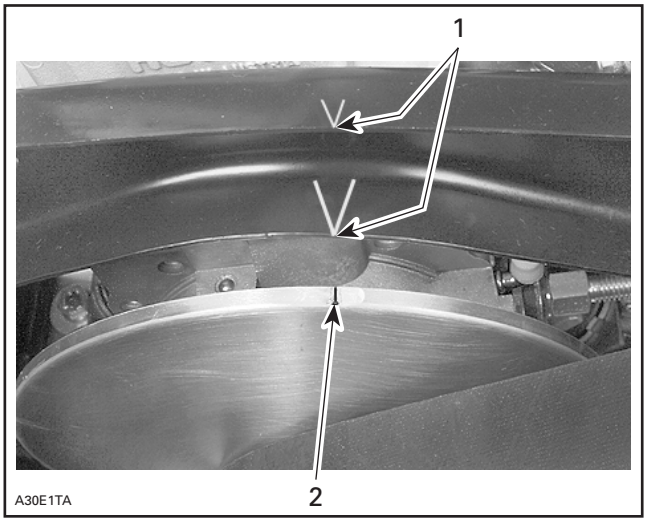
TYPICAL
1. *TDC gauge on MAG side*
2. *MAG side piston at TDC*

   b. Assemble the gauge to the adaptor and tighten the roller lock nut. Do not tighten the adaptor lock nut.
   c. Screw the adaptor into the spark plug hole and tighten to prevent movement in the plug hole.
   d. Position the dial face toward the PTO. Move the gauge down until the needle just begins to move, then move down a further 5 or 6 mm (approximately 1/4 in). Tighten adaptor lock nut by hand.

3. Locate the piston TDC position as follows:
   a. Slowly rotate the drive pulley back and forth across TDC while observing the needle. Note that the needle stops moving only as the piston is changing direction.
   b. Rotate the dial face so that "0" is in line with the needle when it stops moving.
   c. Again, slowly rotate the drive pulley back and forth across TDC and adjust the dial face to "0", until the needle always stops exactly at "0" before changing direction.
   d. "0" now indicates exact TDC.
4. Rotate the drive pulley clockwise, one-quarter turn then carefully rotate it counterclockwise until the needle indicates the specified measurement, indicated in TECHNICAL DATA.
5. Scribe one mark on removable side member upper ridge and one on lower ridge just above drive pulley center line. These both marks will be used as a reference point.
6. With the TDC gauge indicating specified timing, scribe a mark on drive pulley inner half in line with both marks previously scribed on removable side member.



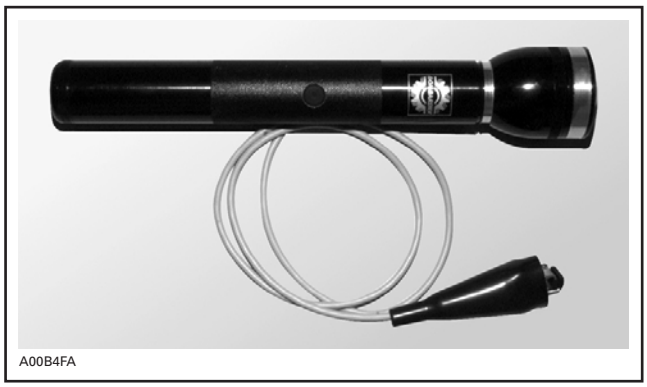
1. TDC gauge indicating specified timing



1. Marks on side member used as reference point
2. Timing mark in line with both marks on side member

Checking Ignition Timing

Use timing light (P/N 529 031 900).



TIMING LIGHT (P/N 529 031 900)

To check the ignition timing, refer to illustration and proceed as follows:

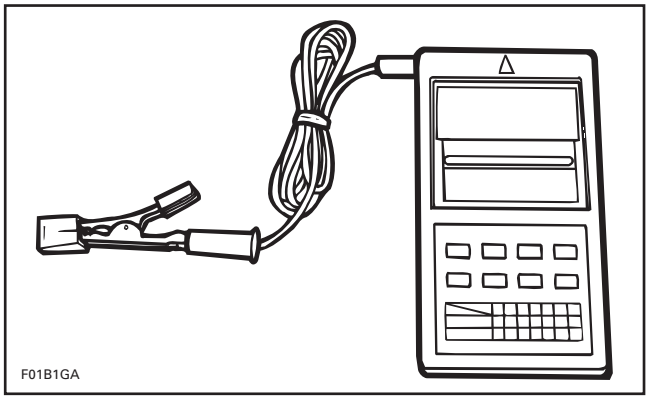
⚠ WARNING

Place ski tips against a wall, raise rear of vehicle on a stand, so that track does not contact the ground. Do not allow anyone in front of or behind the vehicle while engine is running. Keep clear of track and do not wear loose clothing which can get caught in moving parts.

1. Connect the timing light pick-up to a spark plug cable.

NOTE: To avoid an incorrect reading due to parallax, view both marks scribed on removable side member and the timing mark in a straight line.

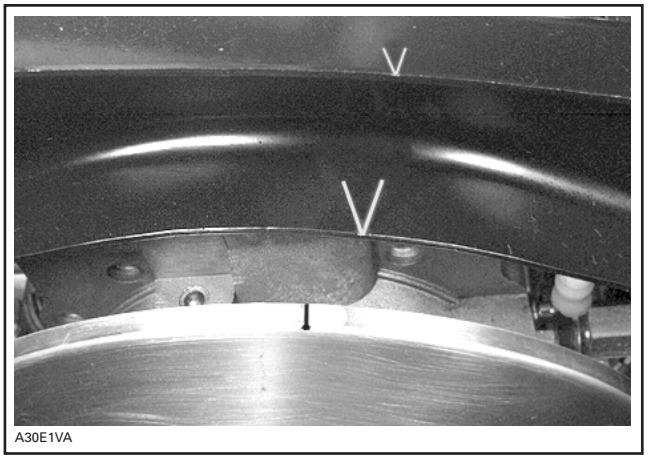
Connect a digital induction type tachometer (P/N 529 014 500).



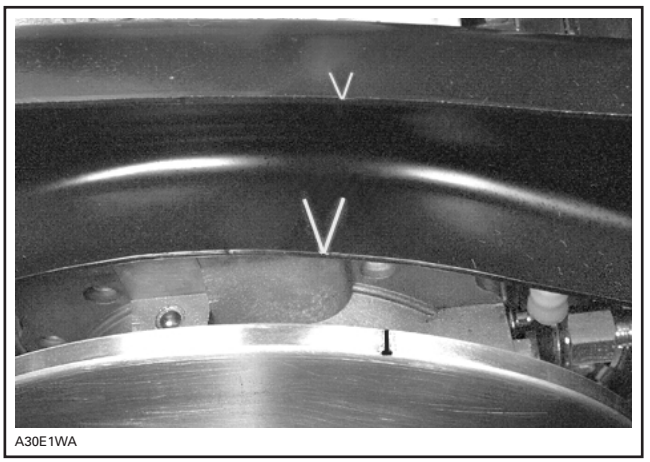
TACHOMETER (P/N 529 014 500)

2. Start the engine and point timing light on timing mark. Bring engine to 3500 RPM for a brief instant.

The timing mark must be aligned with both marks on side member. If not, note if timing is retarded or advanced. Tolerance is ± 1°.



TIMING RETARDED BY ABOUT 2°



TIMING ADVANCED BY ABOUT 2°

Changing Timing

Timing can only be changed using the programmer (P/N 529 035 718).

With Engine Running

All Models

If the below mentioned tools are not available start engine. Turn on programmer then enter password.

Increase engine speed to 2000 - 2500 RPM then follow the same procedure as **With Engine Stopped**.

When data are being transferred, you must rev the engine at 2000 - 2500 RPM and make sure connection between programmer and vehicle is good.

Engine will misfire during vehicle information is transferred from MPEM to programmer. If engine stalls, restart it, keep engine speed at 2000 - 2500 RPM and select no. 3 VEHICLE INFO again.

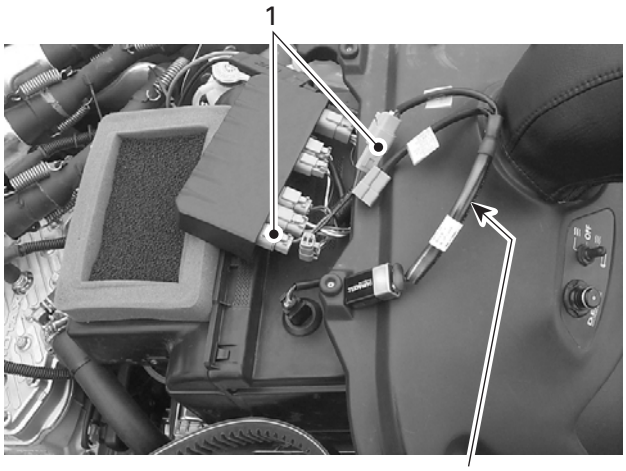
With Engine Stopped

Mach Z STD

Connect 9-volt adaptor (P/N 529 035 675) to MPEM.

Mach Z TECH PLUS

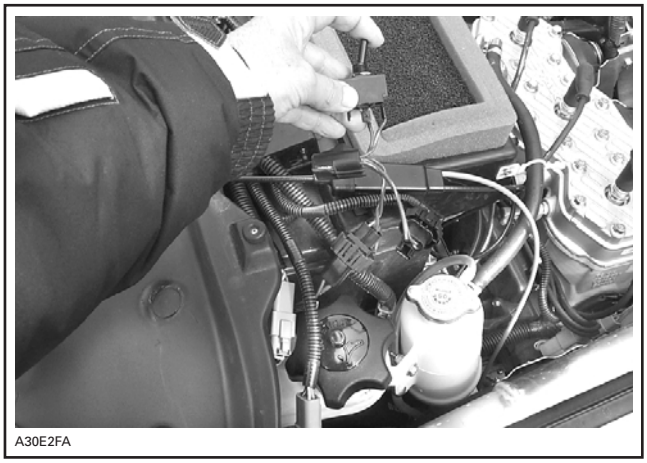
On this model MPEM can be supplied with external power using the 9-volt adaptor (P/N 529 035 675) and a homemade adaptor, refer to TOOL for details.



1. Homemade adaptor

Grand Touring SE

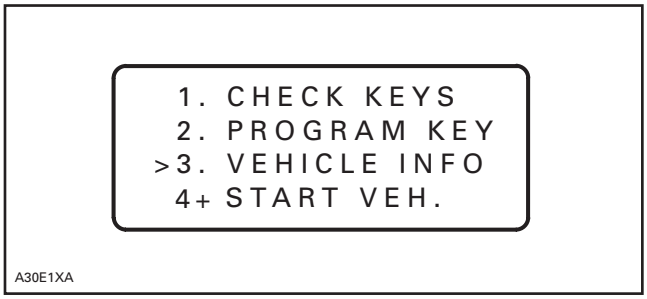
Connect bypass wire (P/N 529 033 300) and turn it on.



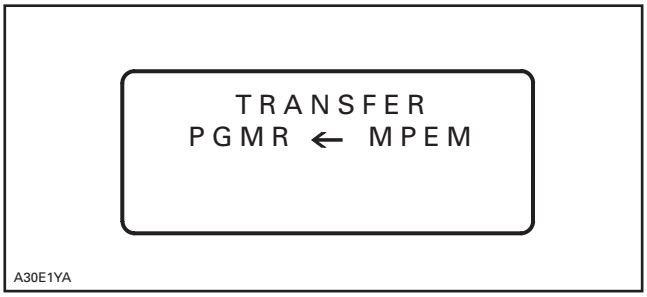
All Models

Turn on programmer then enter password.

From main menu select no. 3. INFO VEHICLE.

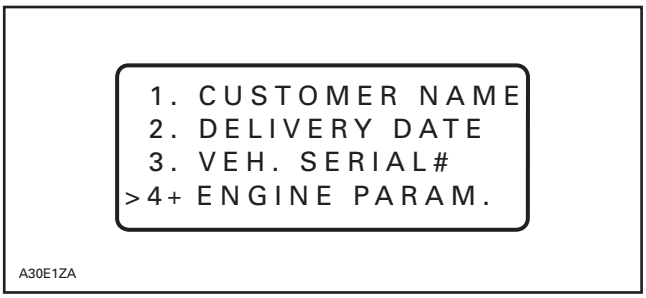


Vehicle information is transferred from MPEM to programmer.

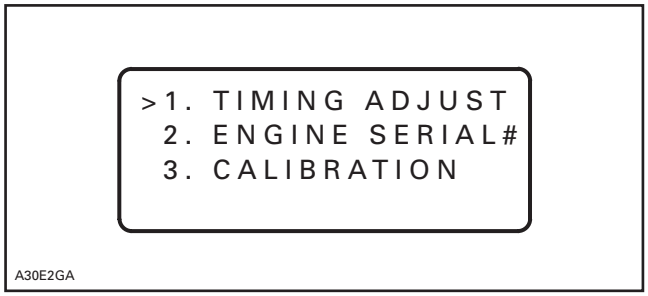


NOTE: In fact the programmer takes a copy of all vehicle parameters scribed in MPEM. This copy will be modified within the programmer then transferred to the MPEM.

Select no. 4. ENGINE PARAMETER.

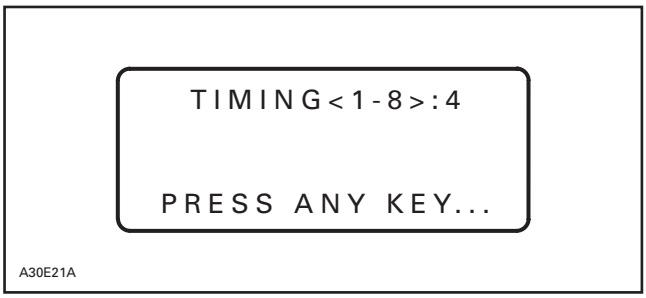


Select no. 1 TIMING ADJUSTMENT.



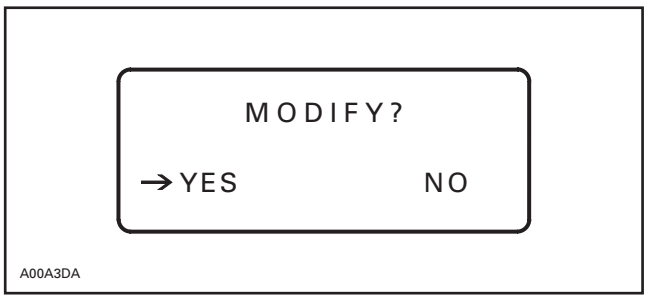
Press ENTER.

Now the display shows the engine timing correction factor that is programmed in the MPEM. In the following example timing correction factor is 4.

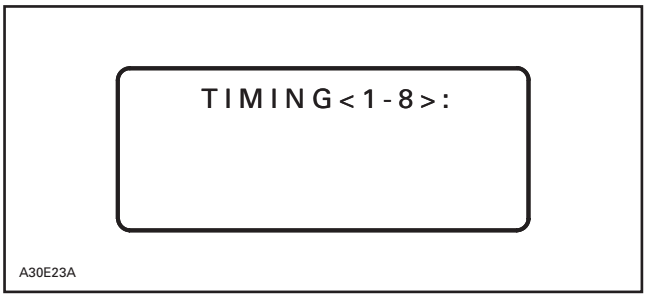


Press any key.

Select YES using the key ↔.



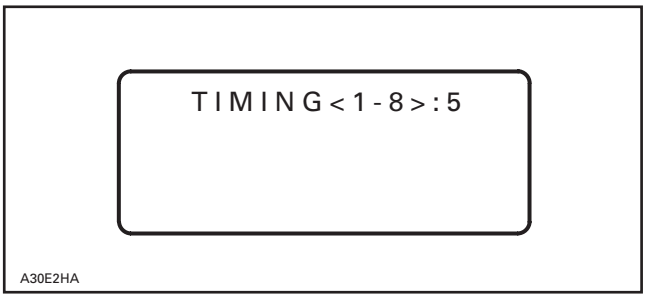
Press ENTER.



Select a timing correction factor corresponding to correction needed.

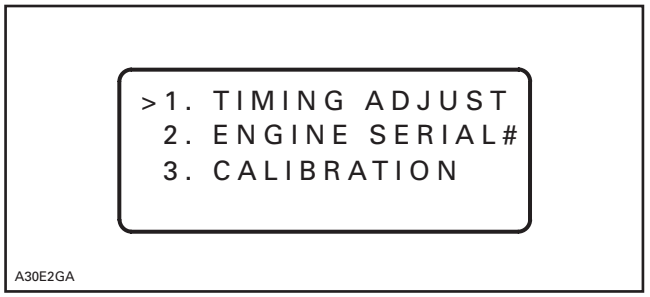
Example: Timing mark as verified with a timing light at 3500 RPM was too early by 2°. The correction factor programmed is no. 4.

Select correction factor no. 5. This will retard the timing by 2° because the difference between correction factor no. 4 and no. 5 is - 2° (passing from 1° to - 1°).

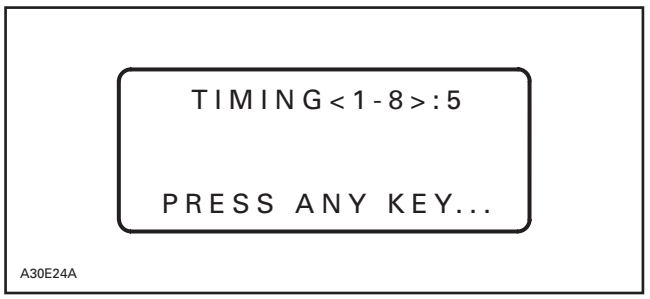


IGNITION CORRECTION FACTOR	
CORRECTION FACTOR PROGRAMMED IN MPEM	IGNITION TIMING CORRECTION
2	3°
3	2°
4	1°
1	0°
5	- 1°
6	- 2°
7	- 3°
8	- 4°

Press ENTER.

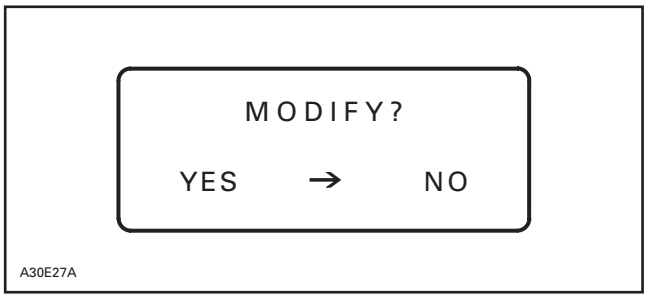


Press ENTER.

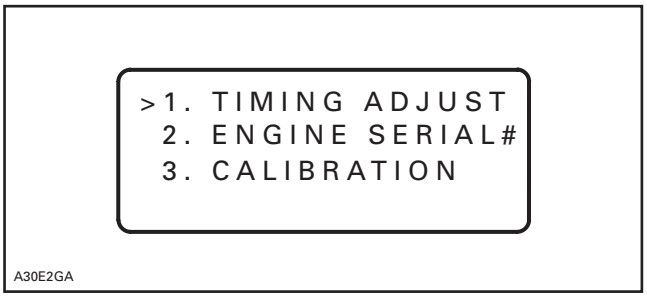


The display confirms that correction factor has been changed to no. 5.

Press any key.

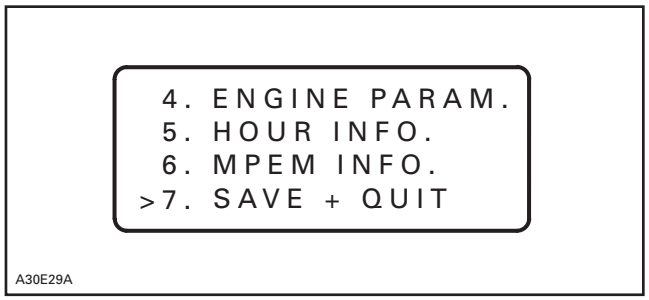


If the new correction factor selected above is the good one select NO and press ENTER. Otherwise select YES to choose an other correction factor.

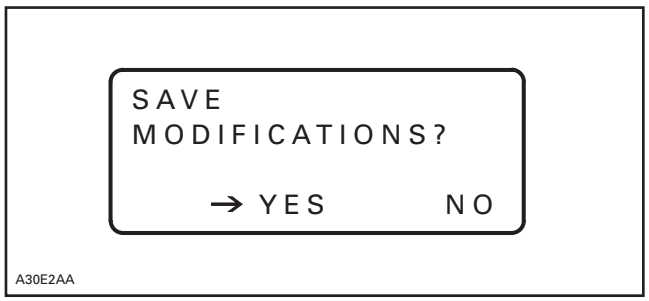


Press MENU.

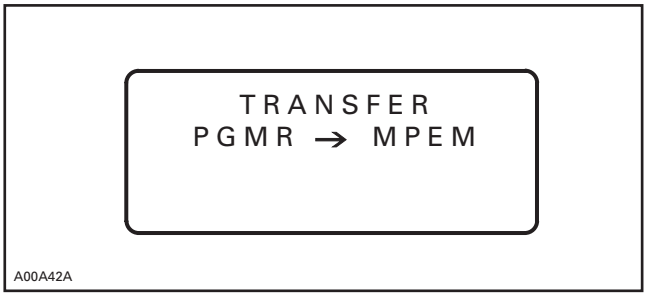
Scroll to no. 7 SAVE AND QUIT.



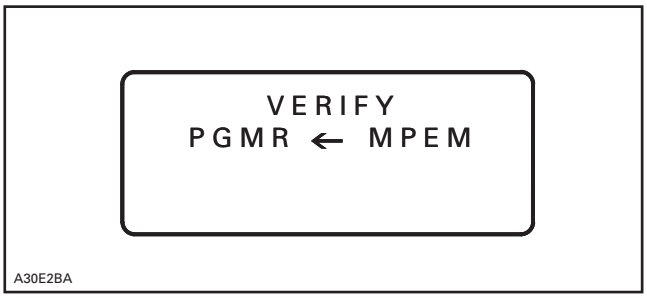
Press ENTER.



Press ENTER.

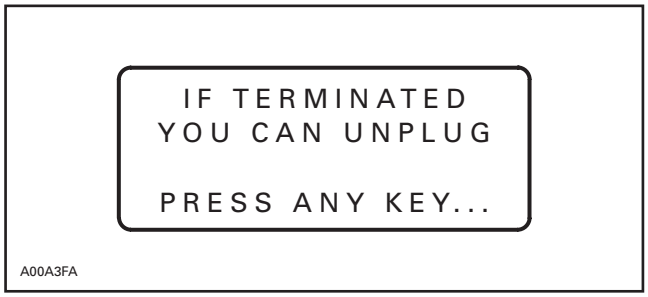


During a very short period of time the following message will appear.

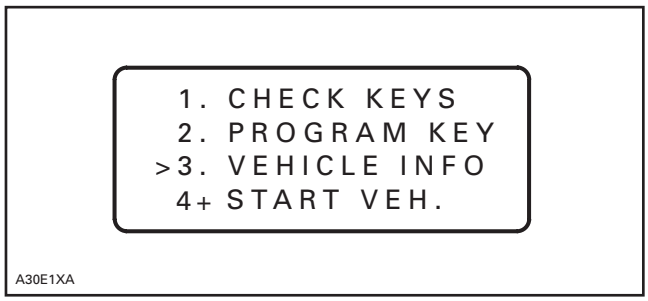


After the programmer has verified, following message will appear.

Press any key.



Press any key.



Unplug bypass wire or 9-volt adaptor. Stop engine when using the **With Engine Running** procedure.

SPARK PLUGS

NGK SPARK PLUG

All Models

NGK SPARK PLUG NUMBERING SYSTEM

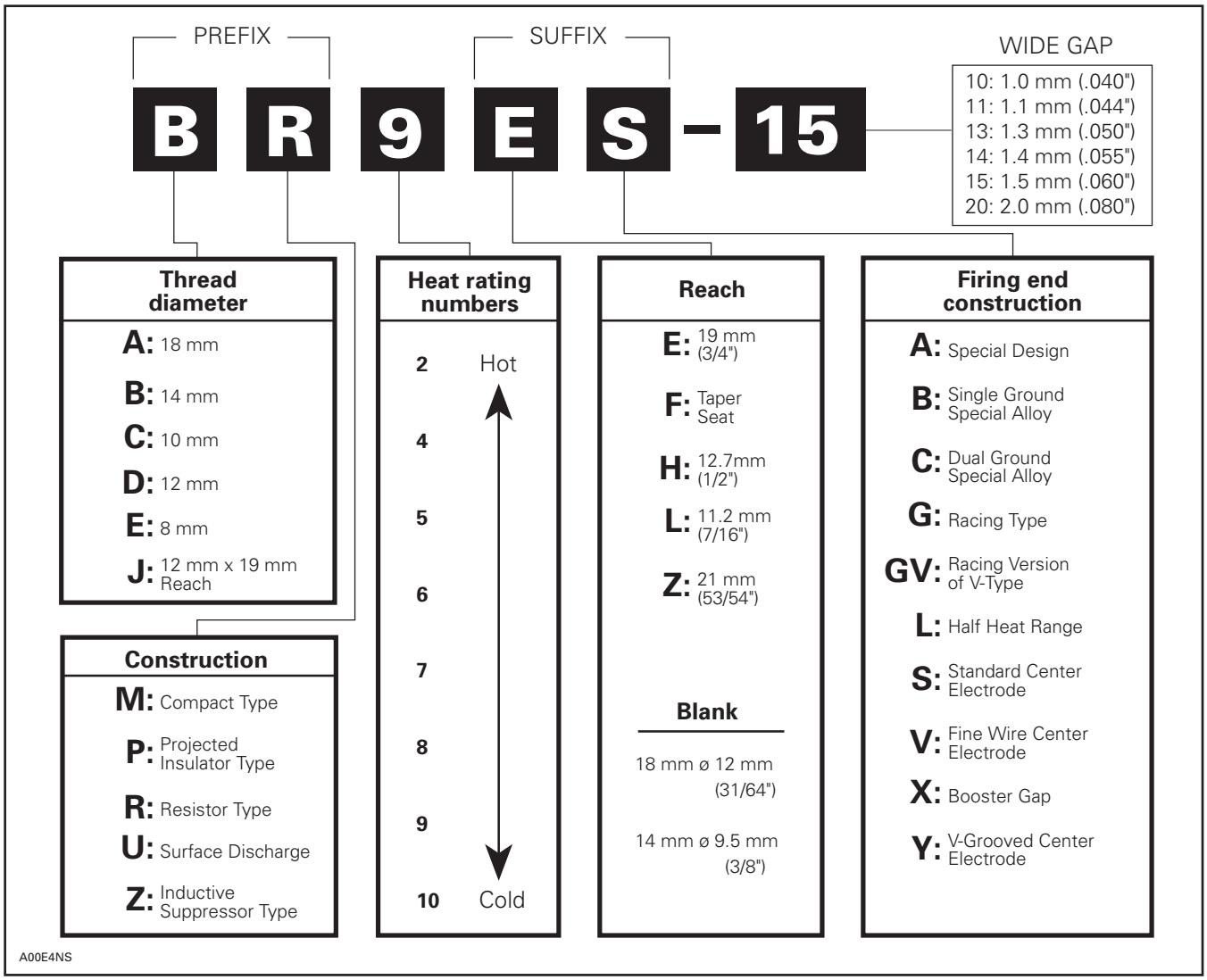
Bombardier uses NGK brand spark plugs on all its snowmobile models.

The heat range identification system is:

Low number → hot plug

High number → cold plug

DESIGN SYMBOLS USED IN NGK SPARK PLUGS



CROSSCUTS AND GAP STYLES OF SPARK PLUGS

Standard Type | Projected Insulator Type | Taper Seat Type | V-Type | Surface Discharge Type

A01E1PS

DISASSEMBLY

First unscrew the spark plug 1 turn.

Clean the spark plug and cylinder head with pressurized air, then completely unscrew.

⚠ WARNING

Whenever using compressed air, always wear protective eye wear.

HEAT RANGE

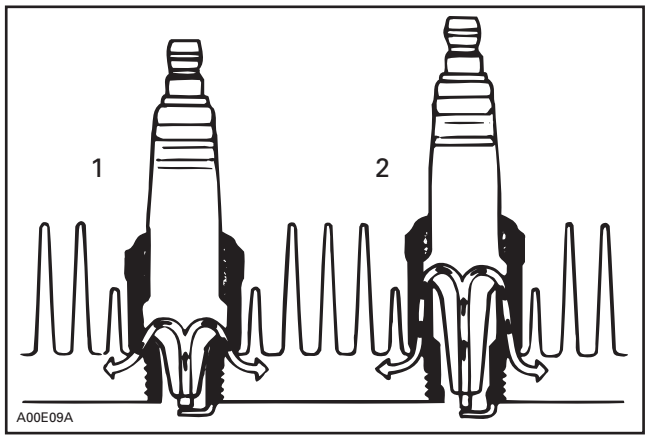
The proper operating temperature or heat range of the spark plugs is determined by the spark plug ability to dissipate the heat generated by combustion.

The longer the heat path between the electrode tip to the plug shell, the hotter the spark plug operating temperature will be — and inversely, the shorter the heat path, the colder the operating temperature will be.

A **cold** type plug has a relatively short insulator nose and transfers heat very rapidly into the cylinder head.

Such a plug is used in heavy duty or continuous high speed operation to avoid overheating.

The **hot** type plug has a longer insulator nose and transfers heat more slowly away from its firing end. It runs hotter and burns off combustion deposits which might tend to foul the plug during prolonged idle or low speed operation.



1. Cold
2. Hot

CAUTION: Severe engine damage might occur if a wrong heat range plug is used.

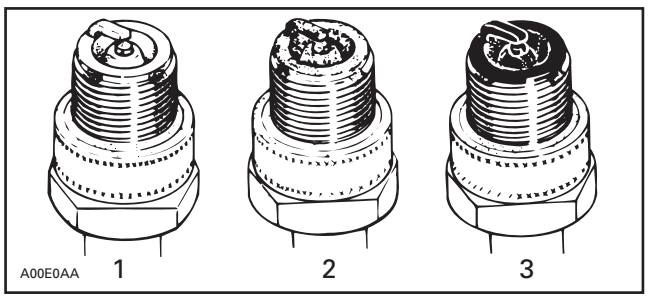
A **too hot** plug will result in overheating and pre-ignition, etc.

A **too cold** plug will result in fouling (shorting the spark plug) or may create carbon build up which can heat up red-hot and cause pre-ignition or detonation.

FOULING

Fouling of the spark plug is indicated by irregular running of the engine, decreased engine speed due to misfiring, reduced performance, and increased fuel consumption. This is due to a loss of compression. Other possible causes are: prolonged idling, or running on a too rich mixture due to a faulty carburetor adjustment or incorrect fuel and/or fuel mixing. The plug face of a fouled spark plug has either a dry coating of soot or an oily, glossy coating given by an excess either of oil or of oil with soot. Such coatings form a conductive connection between the center electrode and ground.

SPARK PLUG ANALYSIS



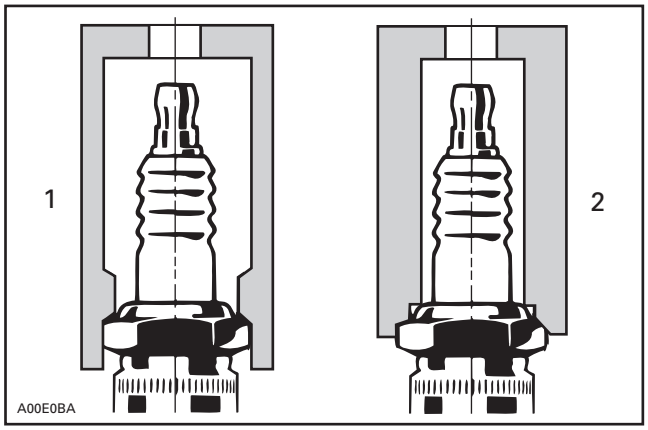
1. Overheated (light grey)
2. Normal (brownish)
3. Fouled (black)

The plug electrode and piston dome reveal the condition of the engine, operating condition, method of driving and fuel mixture. For this reason it is advisable to inspect the spark plug at regular intervals, examining the plug electrode and the piston dome.

SPARK PLUG INSTALLATION

Prior to installation make sure that contact surfaces of the cylinder head and spark plug are free of grime.

1. Using a wire feeler gauge, set electrode gap according to TECHNICAL DATA.
2. Apply anti-seize lubricant (P/N 293 800 070) over the spark plug threads to prevent possible seizure.
3. Hand screw spark plug into cylinder head and tighten with a torque wrench and a proper socket.



1. Proper socket
2. Improper socket

SPARK PLUG TIGHTENING TORQUE

MODELS	SPARK PLUGS	TORQUE N•m (lbf•ft)
All models	NGK	27 (20)

BATTERY

REMOVAL

⚠ WARNING

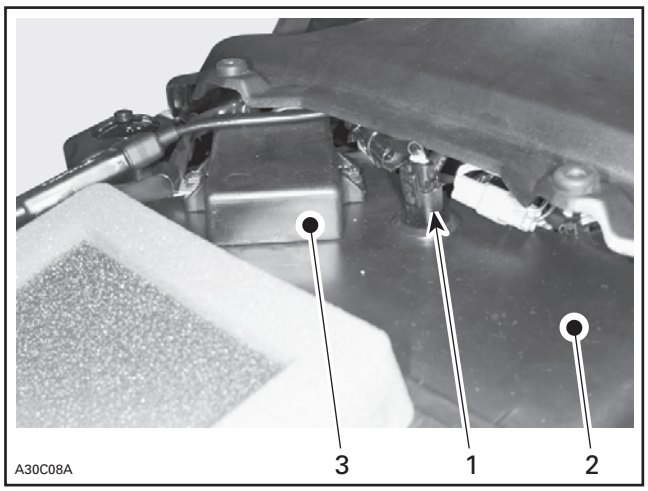
Battery BLACK negative cable must always be disconnected first and connected last.

⚠ WARNING

Never charge or boost battery while installed on vehicle.

Air Intake Silencer Removal

Unplug air temperature sensor connector from air intake silencer and remove MPEM, as shown in the next photo.



TYPICAL

1. *Air temperature sensor*
2. *Air intake silencer*
3. *MPEM*

Then twist DPM manifold and detach from air intake silencer.

Remove air intake silencer.

Unfasten battery retaining strips.

Open strips.

Remove vent tube.

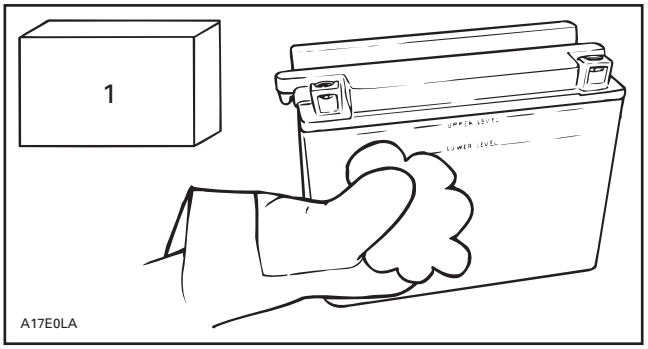
Withdraw battery from vehicle being careful not lean it so that electrolyte flows out of vent tube.

CAUTION: Should any electrolyte spillage occur, immediately wash off with a solution of baking soda and water to prevent damage to vehicle components.

CLEANING

Clean the battery, battery casing, vent tube, caps, cables and battery posts using a solution of baking soda and water.

CAUTION: Do not allow cleaning solution to enter battery interior since it will destroy the electrolyte.



1. Baking soda

Remove corrosion from battery cable terminals and battery posts using a firm wire brush.

INSPECTION

Visually inspect battery case for cracks or other possible damage. If case is damaged, replace battery and thoroughly clean battery tray and close area with water and baking soda.

⚠ WARNING

Should the battery casing be damaged, wear a suitable pair of non-absorbent gloves when removing the battery by hand.

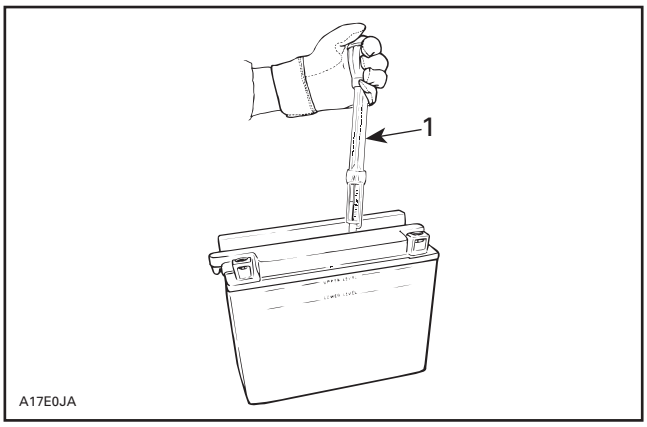
Inspect battery posts for security of mounting.

Inspect for cracked or damaged battery caps, replace defective caps.

⚠ WARNING

Battery caps do not have vent holes. Make sure that vent tube is not obstructed.

HYDROMETER TEST



1. Specific gravity 1.260

A hydrometer measures the charge of a battery in terms of specific gravity of the electrolyte. Most hydrometers give a true reading at 27°C (80°F).

In order to obtain correct readings, adjust the initial reading by **adding** .004 points to the hydrometer readings for each 5.5°C (10°F) **above 27°C (80°F)** and by **subtracting** .004 point for every 5.5°C (10°F) **below 27°C (80°F)**.

This chart will be useful to find the correct reading.

ELECTROLYTE TEMPERATURE		OPERATION TO PERFORM		
°C	°F			
38 32	100 90	add	.008 .004	to the reading
27	80	CORRECT READING		
21 16 10 4 - 1 - 7 - 12 - 18 - 23 - 29 - 34 - 40	70 60 50 40 30 20 10 0 - 10 - 20 - 30 - 40	subtract	.004 .008 .012 .016 .020 .024 .028 .032 .036 .040 .044 .048	from the reading

EXAMPLE NO. 1
Temperature below 27°C (80°F):
Hydrometer reading: 1.250
Electrolyte temperature: - 7°C (20°F)
Subtract .024 Sp. Gr.
Corrected Sp. Gr. is 1.226

EXAMPLE NO. 2
Temperature above 27°C (80°F):
Hydrometer reading: 1.235
Electrolyte temperature: 38°C (100°F)
Add .008 Sp. Gr.
Corrected Sp. Gr. is 1.243

CAUTION: Do not install a partially charged battery on a snowmobile since the casing might crack at freezing temperature 0°C (32°F). The following chart shows the freezing point of the electrolyte in relation to the charge of the battery.

TEMPERATURE CORRECTED SPECIFIC GRAVITY	BATTERY CHARGE	FREEZING POINT OF ELECTROLYTE
1.260	Fully charged	- 59°C (- 74°F)
1.230	3/4 charged	- 40°C (- 40°F)
1.200	1/2 charged	- 27°C (- 16°F)
1.170	1/4 charged	- 18°C (0°F)
1.110	Discharged	- 7°C (+ 19°F)

BATTERY STORAGE

Disconnect and remove battery from the vehicle.

Check electrolyte level in each cell, add distilled water up to upper level line.

CAUTION: Do not overfill.

The battery must always be stored in fully charged condition. If required, charge until specific gravity of 1.260 is obtained.

CAUTION: Battery electrolyte temperature must not exceed 50°C (122°F). The casing should not feel hot.

Clean battery terminals and cable connections using a wire brush. Apply a light coat of dielectric grease (P/N 413 701 700) or petroleum jelly on terminals.

Clean battery casing and caps using a solution of baking soda and water. Do not allow cleaning solution to enter battery, otherwise it will destroy the electrolyte. Rinse battery with clear water and dry well using a clean cloth.

Store battery on a wooden shelf in a cool dry place. Such conditions reduce self-discharging and keep fluid evaporation to a minimum.

ACTIVATION OF NEW BATTERY

⚠ WARNING

Never charge or boost battery while installed on vehicle.

CAUTION: Prior to charging the battery, always remove it from the vehicle to prevent electrolyte spillage.

A new battery is factory fresh dry charged. For storage purposes, it is fitted with a temporary sealing tube.

Do not remove the sealing tube or loosen battery caps unless activation is desired.

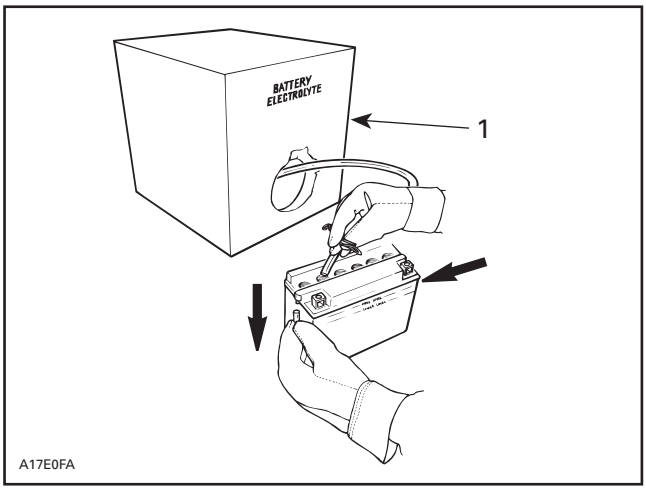
In case of accidental premature removal of caps or sealing tube, battery should be given a full charge.

Perform the following operations anytime a new battery is to be installed.

1. Remove the sealing tube from the vent elbow. Install vent tube, included in the battery kit, to battery elbow.

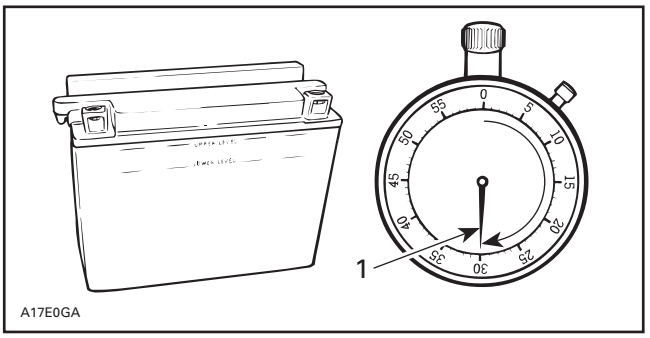
⚠ WARNING

Failure to remove the sealing tube could result in an explosion.



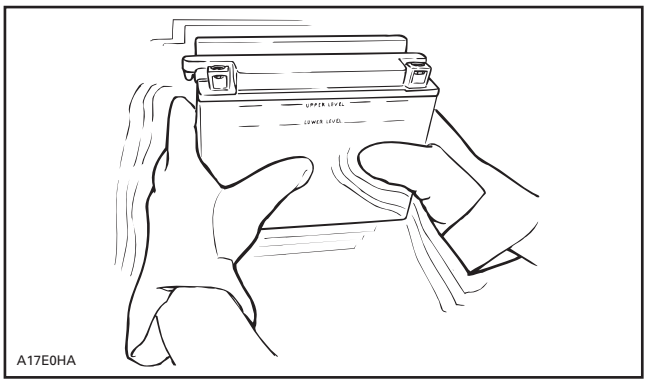
1. Battery electrolyte

2. Remove caps and fill battery to UPPER LEVEL line with electrolyte (specific gravity: 1.260 at 20°C (68°F)).
3. Allow the battery to stand for 30 minutes MINIMUM so that electrolyte soaks through battery cells.

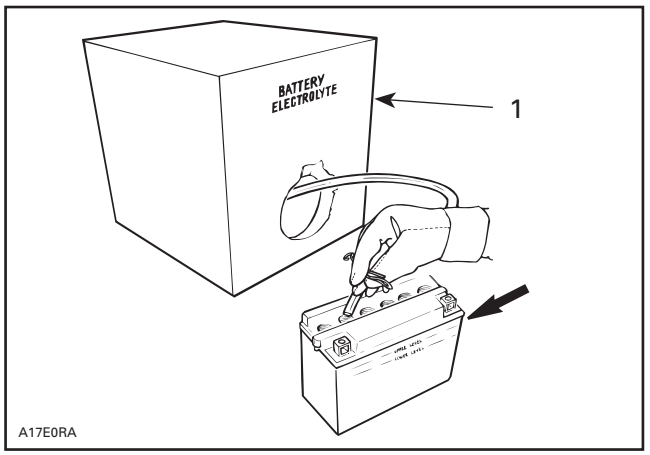


1. 30 minutes

4. Allow gas bubbles to escape by lightly shaking battery by hand.

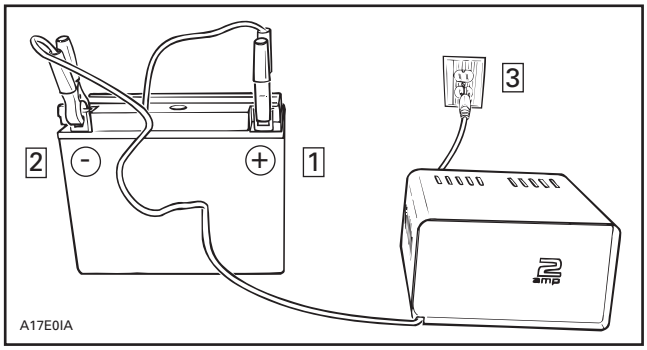


5. Readjust the electrolyte level to the UPPER LEVEL line.



1. Battery electrolyte

6. Connect a 2 A battery charger for 10 to 20 hours.

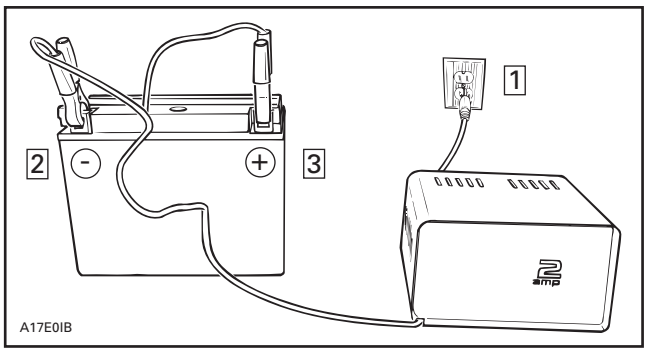


CAUTION: If charging rate raises higher than 2.4 A reduce it immediately. If cell temperature rises higher than 50°C (122°F) (if the casing feels hot) discontinue charging temporarily or reduce the charging rate.

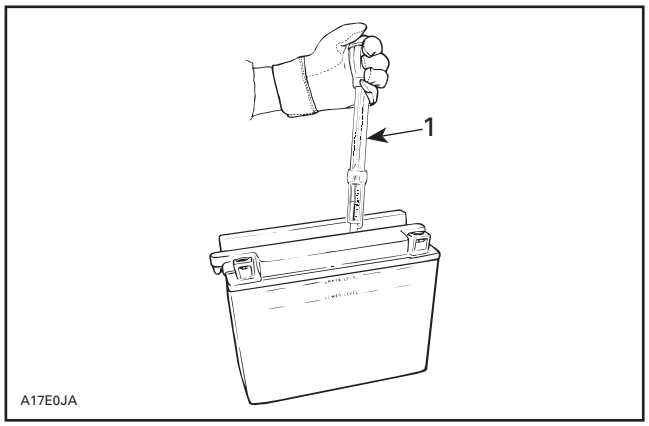
⚠ WARNING

Gases given off by a battery being charged are highly explosive. Always charge in a well ventilated area. Keep battery away from cigarettes or open flames. Always turn battery charger off prior to disconnecting cables. Otherwise a spark will occur and battery might explode.

7. Disconnect battery charger.

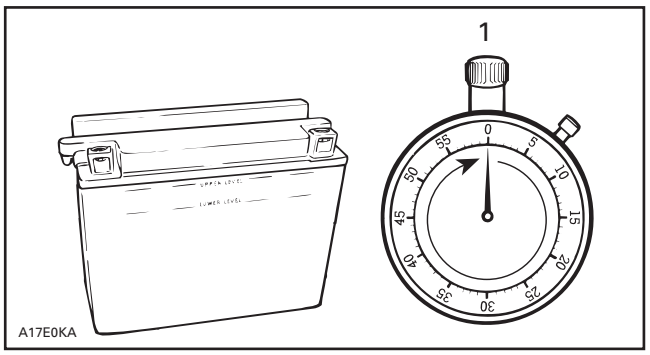


8. Test battery state of charge. Use a hydrometer.



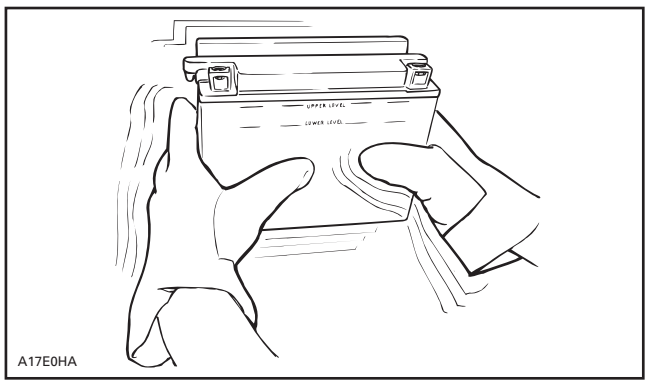
1. Specific gravity 1.260

9. Let battery settle for 1 hour.

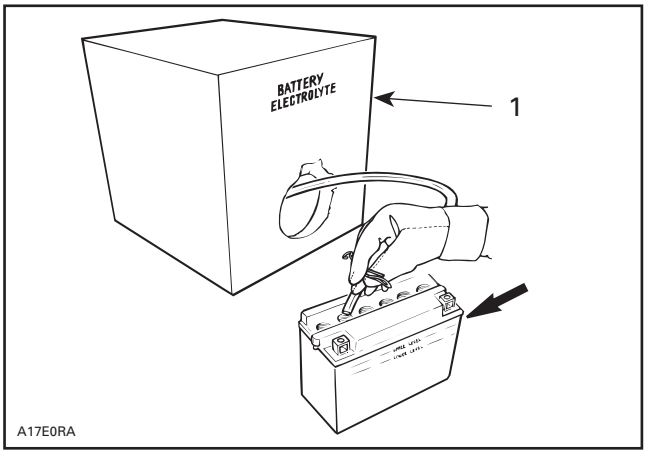


1. 60 minutes

10. Allow gas bubbles to escape by lightly shake battery.

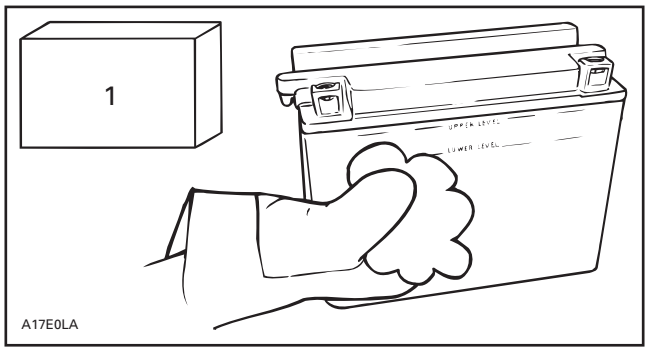


11. Readjust electrolyte level.



1. Battery electrolyte

12. Reinstall caps and clean any electrolyte spillage using a solution of baking soda and water.



1. Baking soda

CAUTION: Do not allow cleaning solution to enter battery interior since it will destroy the electrolyte.

NOTE: It is recommended to verify the battery charge once a month. If necessary, fully charge battery.

SERVICING

Electrolyte Level

Since a battery has been activated (see above), add distilled water to top up electrolyte.

TIPS FOR CHARGING A USED BATTERY

CAUTION: Prior to charging the battery, always remove it from the vehicle to prevent electrolyte spillage.

For best results, battery should be charged when the electrolyte and the plates are at room temperature. A battery that is cold may not accept current for several hours after charging began.

Do not charge frozen battery. If the battery charge is very low, the battery may freeze. If it is suspected to be frozen, keep it in a heated area for about 2 hours before charging.

⚠ WARNING

Do not place battery near open flame.

Time required to charge a battery will vary depending some factors such as:

– Battery temperature: Charging time is increased as the temperature goes down. The current accepted by a cold battery will remain low. As the battery warms up, it will accept a higher rate of charge.
– State of charge: Because the electrolyte is nearly pure water in a completely discharged battery, it cannot accept current as well as electrolyte. This is the reason the battery will not accept current when the charging cycle first begins. As the battery remains on the charger, the current from the charger causes the electrolytic acid content to rise which makes the electrolyte a better conductor and then, the battery will accept a higher charging rate.
– Type of charger: Battery chargers vary in the amount of voltage and current that they can supply. Therefore, time required for the battery to begin accepting measurable current will also vary.

Charging a Very Flat or Completely Discharged Battery

Unless this procedure is properly followed, a good battery may be needlessly replaced.

– Measure the voltage at the battery posts with an accurate voltmeter. If it is below 10 volts, the battery will accept current at very low rate, in term of milliamperes, because electrolyte is nearly pure water as explained above. It could be some time before the charging rate increases. Such low current flow may not be detectable on some charger ammeters and the battery will seem not to accept any charge.
– Only for this particular case, set the charger to a high rate.

NOTE: Some chargers have a polarity protection feature which prevents charging unless the charger leads are connected to the correct battery terminals. A completely discharged battery may not have enough voltage to activate this circuitry, even though the leads are connected properly. This will make it appear that the battery will not accept a charge. Follow the charger manufacturer's instruction telling how to bypass or override this circuitry so that the charger will turn on and charge a low-voltage battery.

– Since the battery chargers vary in the amount of voltage and current they provide, the time required for the battery to accept measurable charger current might be up to approximately 10 hours or more.
– If the charging current is not up to a measurable amount at the end of about 10 hours, the battery should be replaced.
– If the charging current is measurable before the end or at the end of about 10 hours, the battery is good and charging should be completed in the normal manner as specified in **Activation of a new battery**.
– It is recommended that any battery recharged by this procedure be load tested prior to returning it to service.

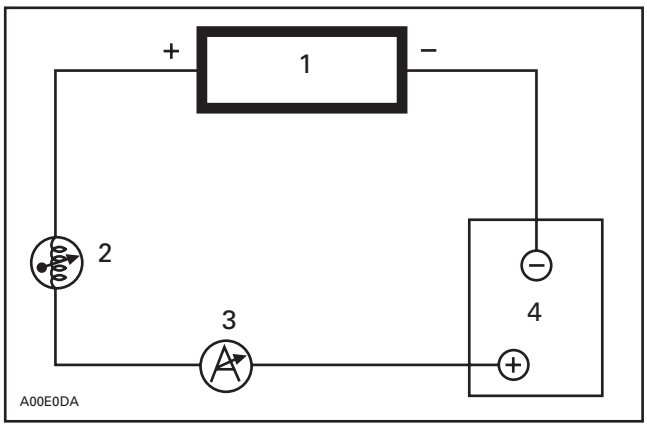
BATTERY CHARGING EQUIPMENT

The battery charger should have an adjustable charging rate. Variable adjustment is preferred, but a unit which can be adjusted in small increments is acceptable.

The battery charger must be equipped with an ammeter capable of accurately measuring current of less than one ampere.

If the present charger is not adjustable to the proper current values, a rheostat can be connected in series with the battery to provide adjustment. 12 ohm, 50 watt rheostat, such as OHMITE — 0314 or MALLORY 50K 12P, are available from electronic parts supply shops and they are suitable for use with most chargers if the peak current is to be held below 2 A.

If you need an accurate ammeter, we recommend the use of: SHURITE — 5202 (0 to 3 A) or — 5203 (0 to 5 A) available from electronic parts supply shops.



1. Charger
2. Rheostat 12 Ω 50 W
3. Ammeter
4. Battery

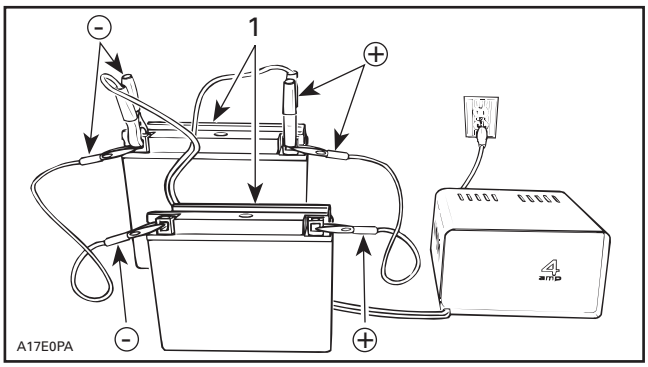
For a service application and a permanent installation, both ammeter and rheostat can be built into a small box adjacent to your charger.

CAUTION: Adequate ventilation MUST be provided to cool the rheostat.

Charging 2 or More Batteries at a Time

Connect all positives together and use a charger with a capacity (rated) equal to: number of batteries to be charged multiply by 2 A.

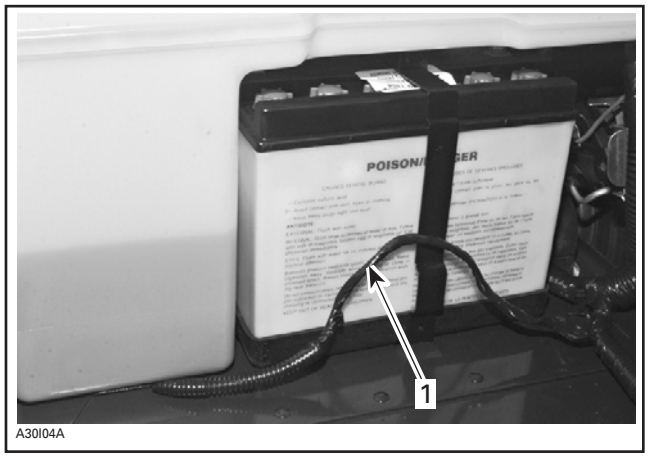
For example: Charging 5 batteries at a time requires a 10 A rated charger (5 × 2 A = 10 A).



TYPICAL
1. Two batteries = 4 A

INSTALLATION OF BATTERY

Make sure that harness of oil reservoir low level sensor is positioned between fuel tank and battery strip.



REAR VIEW — FUEL TANK REMOVED FOR CLARITY

1. *Harness of oil reservoir low level sensor*

Position battery onto battery support on vehicle.

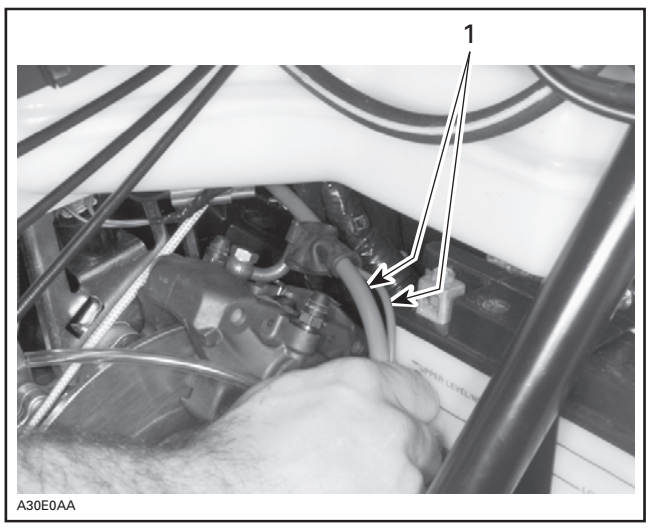
NOTE: To ease battery insertion, use soap with water.

Install vent tube on battery.

NOTE: Ensure that vent tube is not kinked or blocked. Cut vent tube if necessary.

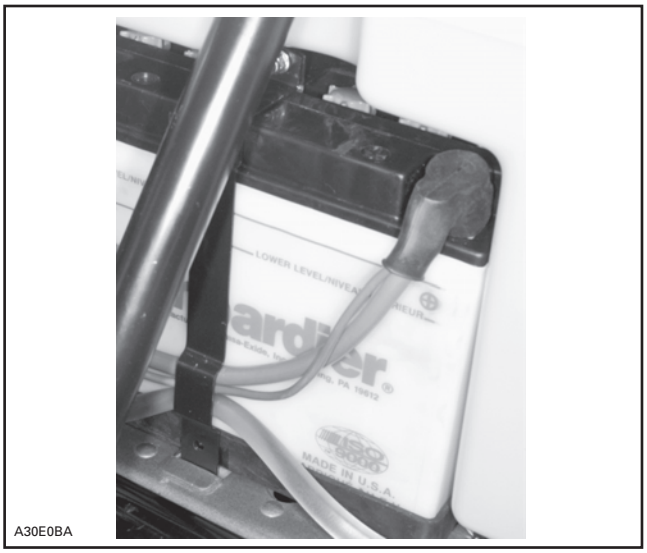
Red Positive Cable and Wire

Move RED positive cable and wire from right side of engine compartment to battery positive post, as shown in the next photo.



1. *Move RED positive cable and wire*

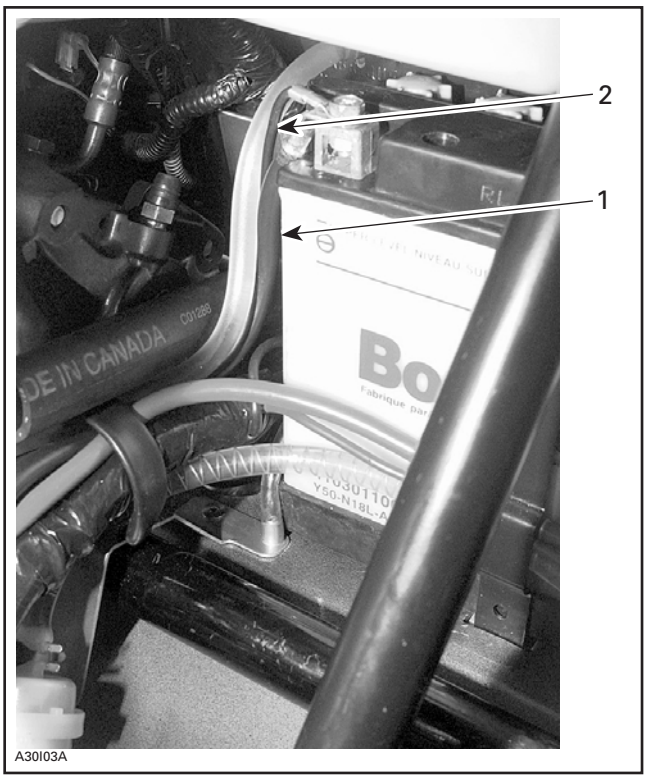
Connect RED positive cable and RED wire to positive battery terminal. Refer to the following photo for proper cable positioning.



RED POSITIVE (+) BATTERY CABLE AND WIRE POSITIONING

Black Negative Cable and Wires

Connect BLACK negative cable and BLACK wire LAST. Refer to the following photo for proper cable positioning.



1. *BLACK negative (-) battery cable*
2. *BLACK wire*

⚠ WARNING

Always connect the battery cables exactly in the specified order. Connect RED positive cable first, then BLACK negative ground cable.

Apply silicone dielectric grease (P/N 413 701 700) on battery posts and connectors.

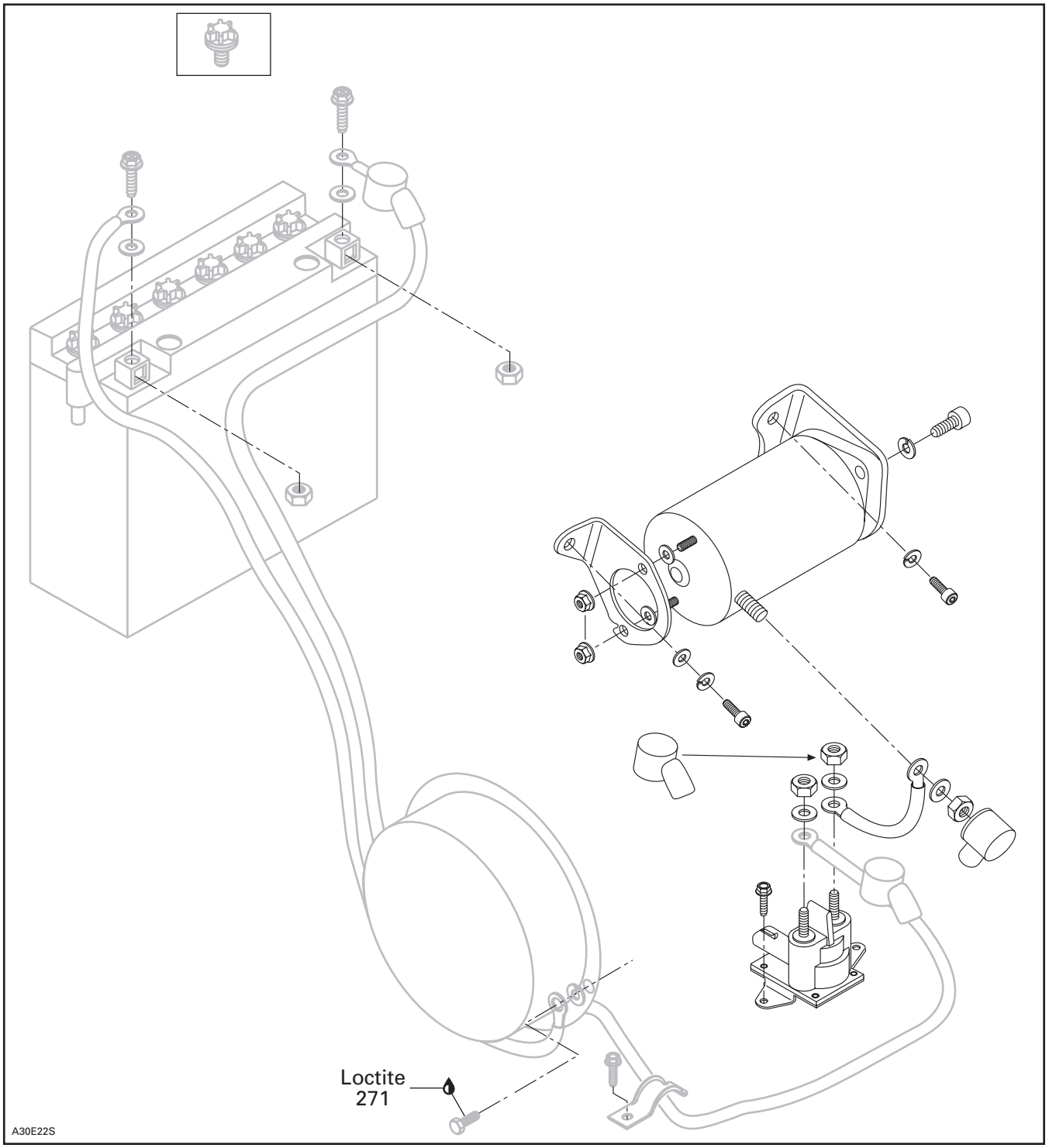
Ensure vent tube is properly installed on battery elbow and chassis fitting.

Close and fasten retaining strips and ensure that RED positive battery cable and oil injection supply hose are routed into front retaining strip recess.

Reinstall air intake silencer with hose. Install DPM manifold, MPEM and air temperature sensor.

CAUTION: Negative battery terminal should always be disconnected FIRST and reconnected LAST.

ELECTRIC STARTER



REMOVAL

– Disconnect BLACK ground cable from battery.
– Disconnect RED positive cable from battery.
– Disconnect RED cable from starter solenoid switch.
– Remove starter from engine.

CAUTION: Support drive housing adequately to prevent damage when pressing bushing.

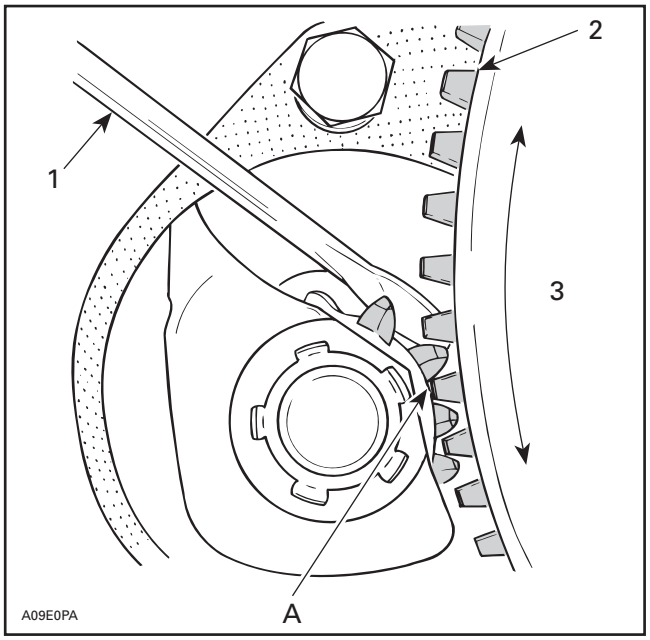
INSTALLATION

Make sure that starter and engine mating surfaces are free of grime. Serious trouble may arise if starter is not properly aligned.

Install starter.

NOTE: Check proper engaging depth of starter pinion teeth to ring gear teeth (see illustration). Install hardened washers (P/N 503 007 900) between engine and starter supports accordingly.

CAUTION: All starter bracket fasteners must be secured with Loctite 271 (P/N 413 707 400).



TYPICAL

1. *Screwdriver pulling starter pinion*
2. *Ring gear*
3. *No excessive backlash*

A. 0.5 to 1.5 mm (.020 to .060 in)

Connect RED cable to starter solenoid switch.

Connect the RED positive cable to battery.

Connect BLACK cable to battery.

⚠ WARNING

Always disconnect ground cable first and connect last.

SOLENOID SWITCH

Inspect connections and clean as necessary. Solenoid switch condition can be checked with an ohmmeter.

Disconnect large cables from solenoid making sure that red positive from battery does not touch chassis.

Install test probes on larges connectors of solenoid.

Turn ignition key to start position. Reading should be under 1 ohm.

TESTING PROCEDURE

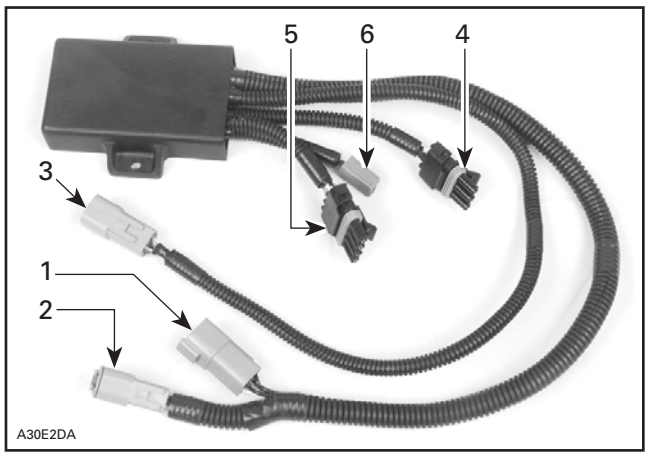
GENERAL

The following chart gives the engine types with their implemented system.

ENGINE TYPE	IGNITION SYSTEM	CHARGING SYSTEM OUTPUT
809 on Mach Z STD/TECH PLUS	BOMBARDIER 290 W	290
809 on GT SE	BOMBARDIER 360 W	360

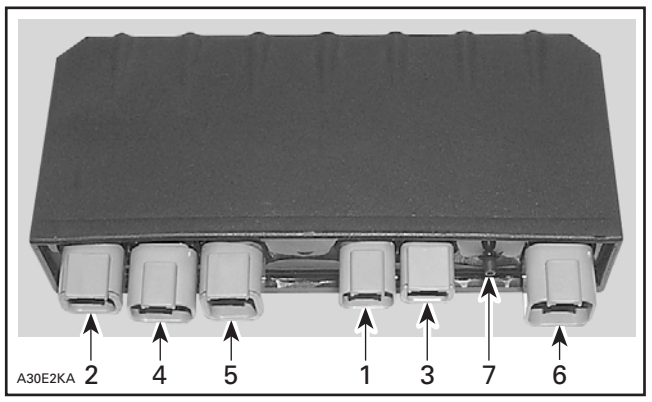
Multi-Purpose Electronic Module (MPEM) Identification

The BOMBARDIER 290 W MPEM receives electricity produced by 2 generating coils (low and high speed). It is smaller than the 360 W MPEM.



TYPICAL — BOMBARDIER 290 W MPEM — NON-RER MODELS

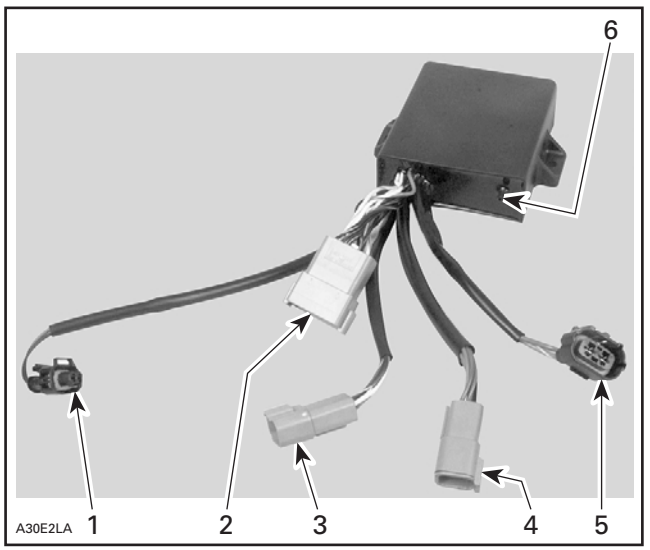
1. *High tension coils, 4-DC housing*
2. *Generating coils (low and high speed), 4-DD housing*
3. *Trigger coil, 4-DF housing*
4. *DESS switch, 4-DB housing*
5. *DESS pilot lamp and ignition/kill switches, 4-DA housing*
6. *External power supply 4-DE housing*



TYPICAL — BOMBARDIER 290 W MPEM — RER MODELS

1. *High tension coils, 6-DD housing*
2. *Generating coils (low and high speed) and trigger coil, 6-DB housing*
3. *Air temperature sensor, 6-DF housing*
4. *Trigger coils, 6-DC housing*
5. *DPM solenoid, 4-DF housing*
6. *Reverse switch and alarm, DESS pilot lamp and ignition/kill switches, 6-DA housing*
7. *Atmospheric pressure nipple*

The Bombardier 360 W MPEM receives DC electricity produced by the unique coil.



TYPICAL — BOMBARDIER 360 W MPEM

1. *Air temperature sensor, 6-TA housing*
2. *Power supply, ground, DESS switch, reverse switch and alarm, high tension coils, kill switch, 6-DC housing*
3. *Trigger coils, 6-DB housing*
4. *DPM engine temperature sensor and solenoids, 6-VA housing*
5. *Battery/regulator connection, 6-DA housing*
6. *Atmospheric pressure nipple*

Checking Calibration Program

CAUTION: Do not interchange MPEM from a model to an other. Even if the P/N stamped on the MPEM is the same, calibration program may be different. When ordering a new MPEM always refer to appropriate model parts catalog. The service P/N published in parts catalogs are the ones with the good calibration program according to model.

With Engine Running

All Models

If the belowmentionned tools are not available start engine. Turn on programmer then enter password.

Increase engine speed to 2000-2500 RPM then follow the same procedure as **With Engine Stopped**.

CAUTION: Engine must run till the end of the procedure.

When data are being transferred, you must rev the engine at 2000-2500 RPM and make sure connection between programmer and vehicle is good.

Engine will misfire while vehicle information is being transferred from MPEM to programmer. If engine stalls, restart it, keep engine speed at 2000-2500 RPM and select no. 3 VEHICLE INFO again.

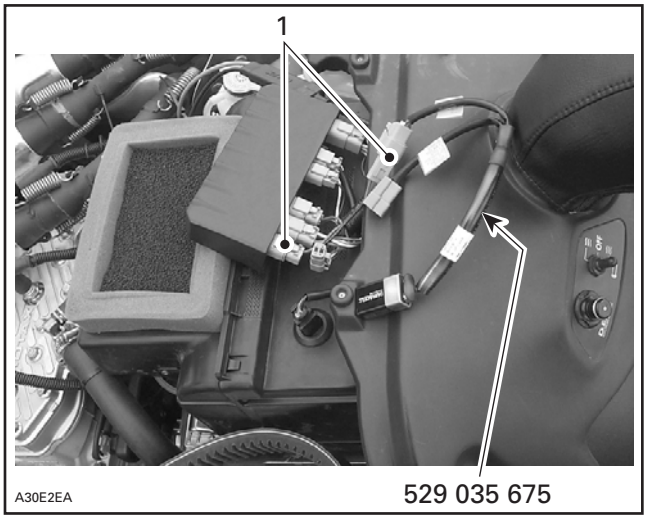
With Engine Stopped

Mach Z STD

Connect 9-volt adaptor (P/N 529 035 675) to MPEM.

Mach Z TECH PLUS

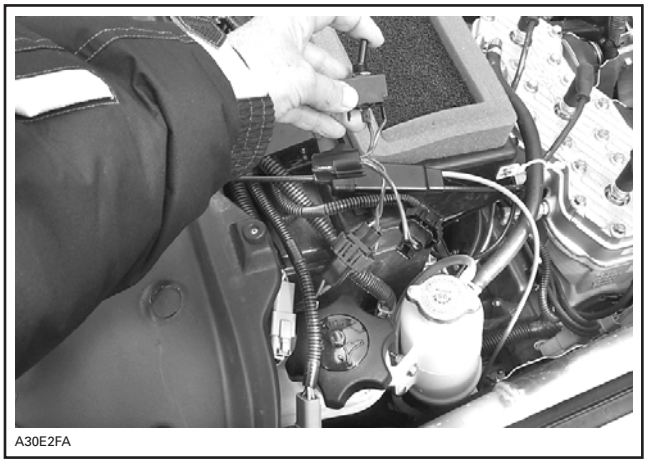
On this model MPEM can be supplied with external power using the 9-volt adaptor (P/N 529 035 675) and a homemade adaptor, refer to TOOL for details.



1. Homemade adaptor

Grand Touring SE

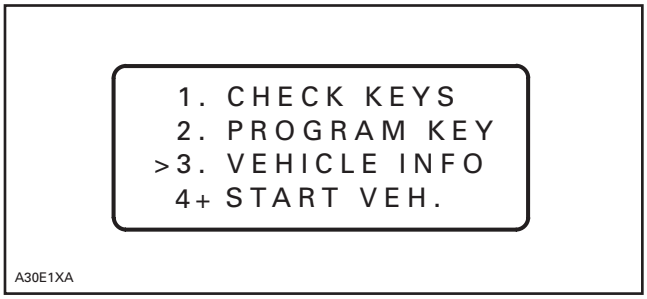
Connect bypass wire (P/N 529 033 300) and turn it on.



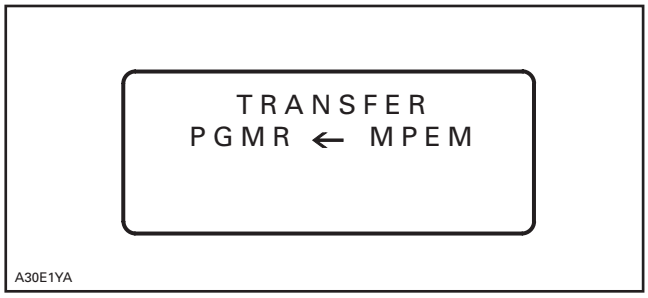
All Models

Turn on programmer then enter password.

From main menu select no. 3. INFO VEHICLE.

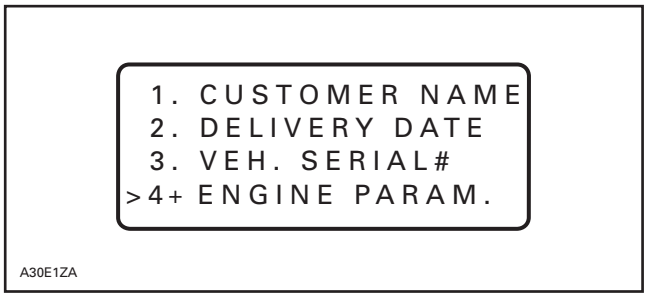


Vehicle information is transferred from MPEM to programmer.

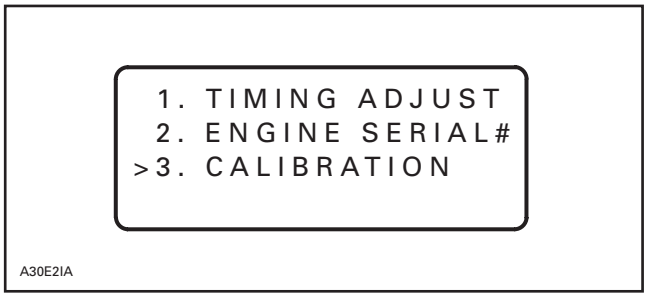


NOTE: In fact the programmer takes a **copy** of all vehicle parameters scribed in MPEM. This copy will be modified within the programmer then transferred to the MPEM.

Select no. 4. ENGINE PARAMETER.

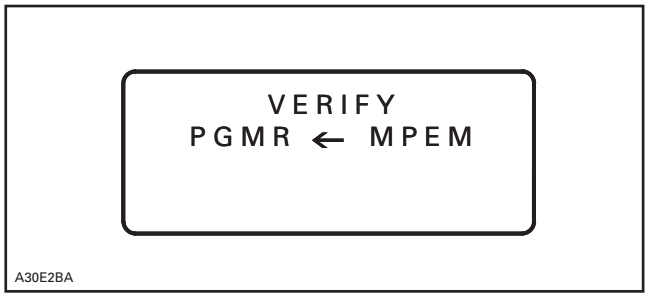


Select no. 3 CALIBRATION.

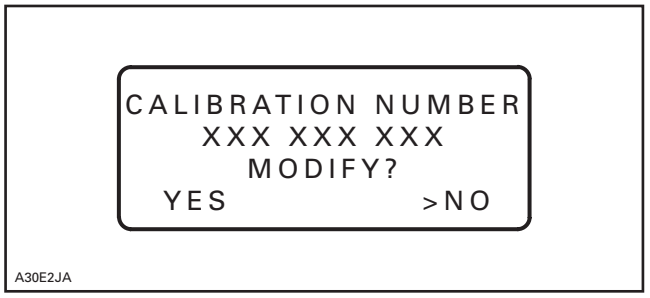


Press ENTER.

←Trs appears and following screen temporarily:



And then following screen showing the actual calibration number in the MPEM.



Check for proper calibration number. See table below.

Select NO and press ENTER.

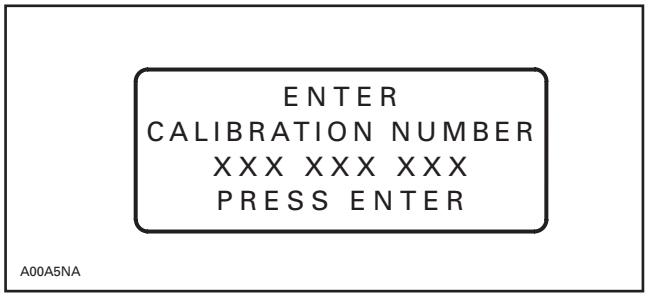
Press MENU twice then turn off programmer, unplug it from MPEM. Remove bypass wire or 9-volt adaptor.

Stop engine when using **With Engine Running** procedure.

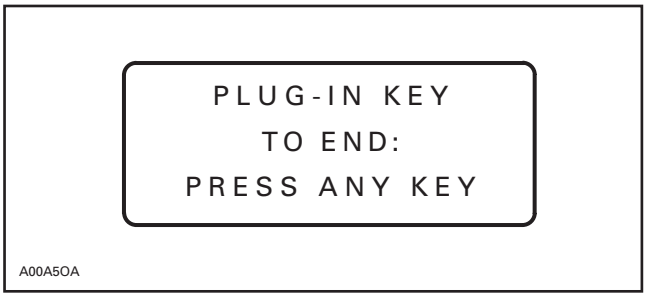
	MODEL		
	Mach Z STD	Mach Z TECH PLUS	Grand Touring SE
CALIBRATION PROGRAM NUMBER (SOFTWARE)	515 175 431	512 059 293	512 059 289
MPEM N/P (HARDWARE)	515 175 432	512 059 294	512 059 290
CALIBRATED MPEM N/P (HARDWARE AND SOFTWARE)	515 175 430	512 059 292	512 059 288

Changing MPEM Calibration Program

Proceed the same as for checking MPEM calibration but select YES to MODIFY? and press ENTER following screen appears:

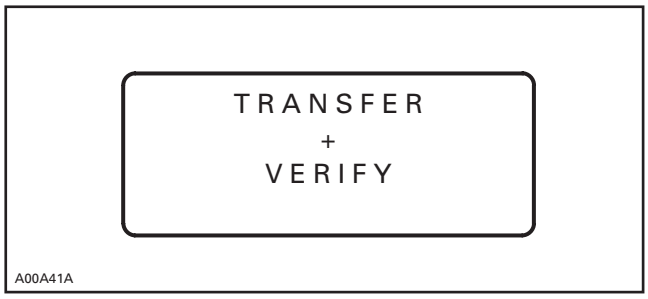


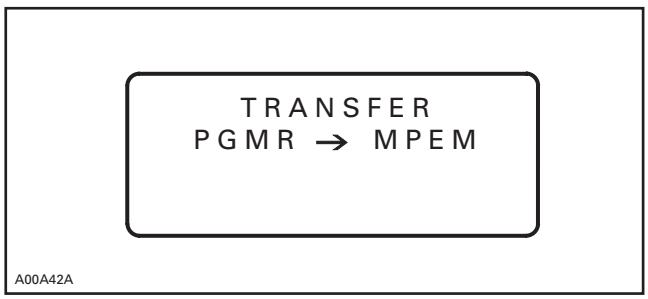
Enter new calibration number and press ENTER, following screen appears:

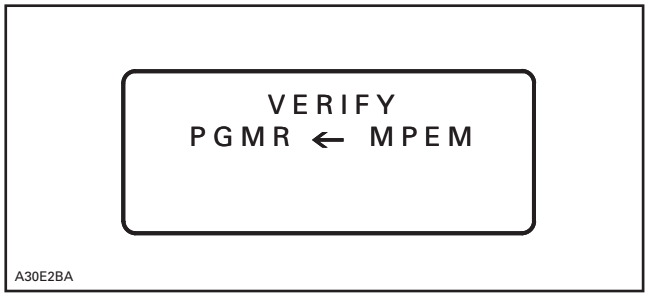


Simultaneously with the following operation a transfer will occur: ←**Trs**. At this point, be ready to rev the engine so it won't fall below the 2000 RPM mark when not using bypass wire or 9-volt adaptor.

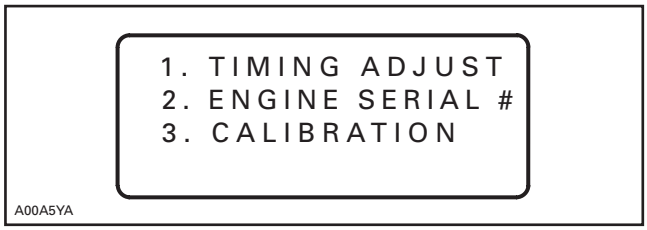
Plug-in the desired calibration cartridge (special red key) onto the programmer post, the following screens will appear temporarily:



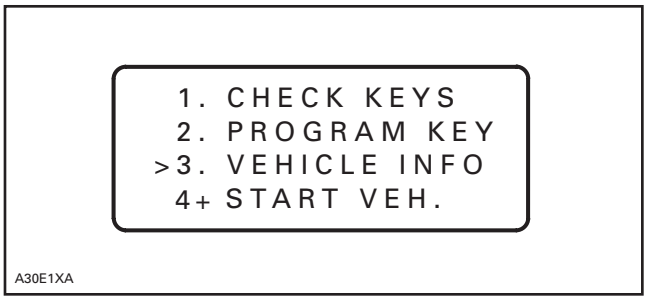




Press any key, ←**Trs** will show followed by next screen:



Press MENU twice, following screen will show:



After procedure is completed, ensure engine idle speed with engine hot is 1800-2000 RPM.

Stop the engine.

RER Equipped Models

After changing calibration, start engine with vehicle lanyard and verify the reverse (RER) function; this test will confirm that MPEM is correct. If reverse (RER) function does not operate, you must redo the calibration download.

SYSTEM TESTING

IGNITION SYSTEM TESTING SEQUENCE

In the case of ignition problems, check the following in the prescribed order until the problem can be solved.

1. Sparking/spark plug condition.
2. Electrical connectors.
3. Ignition switches, DESS switch and emergency switch.
4. Ignition generator coil voltage.
5. Trigger coil.
6. Ignition module voltage.
7. High voltage coil output.
8. MPEM voltage supply.
9. MPEM.

LIGHTING SYSTEM TESTING SEQUENCE

1. Electrical connectors.
2. Magneto output (lighting generator coil).

Testing Conditions

Voltage measurements are always taken upon vehicle starting. Readings when the engine is running will be higher than indicated range. Part temperature must be approximately 20°C (68°F) (room temperature), otherwise readings could be distorted.

Analysis of Readings

Voltage Readings

When testing the different magneto components, it is important to take into consideration that readings vary according to the force applied onto the manual starter. It is therefore important to employ enough force upon each trial.

The reading must be 3 times within or above the range indicated in the corresponding table. If the reading is too low, the part is considered to be defective and must be replaced.

Resistance Readings

Place multimeter selector switch to Ω in order to measure resistance. Readings must be within the indicated range. Otherwise, the part is considered to be defective and must be replaced.

CAUTION: When taking measurements, it is useless to try to start the vehicle since readings would then be distorted.

Intermittent Ignition Problems

It is difficult to make a diagnostic in the case of intermittent ignition problems. Thus, problems occurring only when the engine operating temperature is normal must be checked in similar conditions.

In most cases when problems are caused by temperature or vibrations, these can only be solved by replacing parts. Most problems cannot be detected when the engine is stopped.

Multiple Problems

As a matter of fact, more that one component can be defective. As a result, if the problem remains although a part was replaced, start over the whole verification from the beginning in order to identify the other defective component.

1. SPARKING

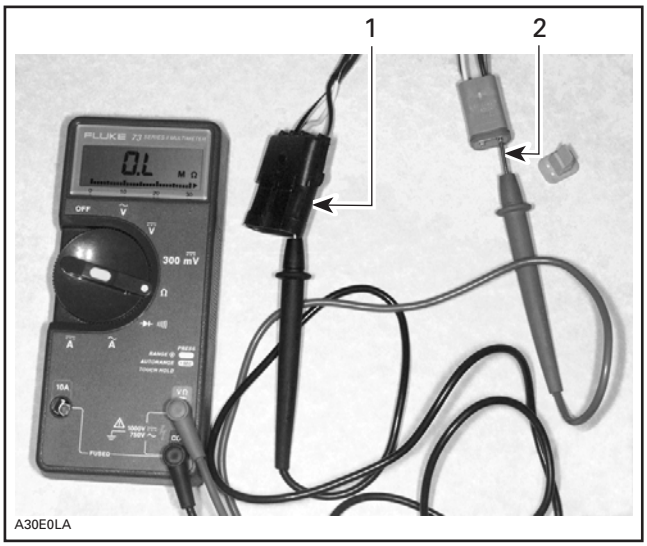
During this operation, it is important to use the snowmobile spark plug and not a new one. Bring the plug in contact with the engine. If no spark is produced, replace the spark plug with a new one and do the test again.

2. ELECTRICAL CONNECTOR TESTING

Make sure that none of the connectors are disconnected.

3. IGNITION SWITCH, TETHER CORD SWITCH AND EMERGENCY SWITCH TESTING

Disconnect connector housing from engine and check resistance as indicated in IGNITION table.



TYPICAL — 290 W

1. *BK/YL wire, 4-DA-A-M housing (harness side)*
2. *BK wire, 4-DD-2-F housing (harness side)*

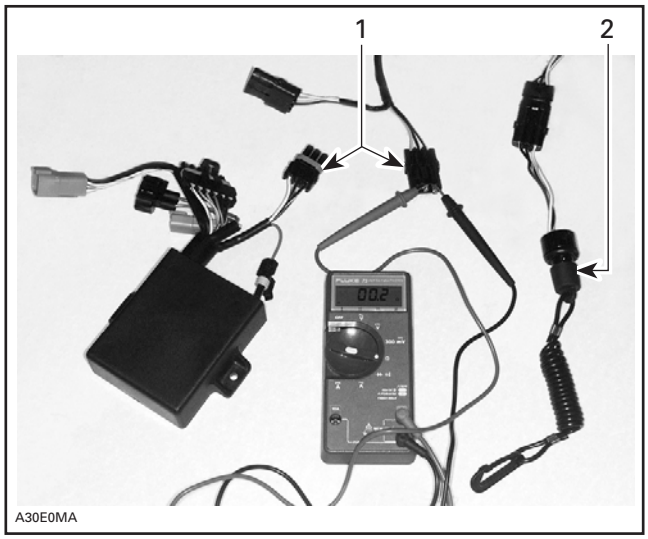
If readings are acceptable, go on to next step.

If readings are inadequate, individually check each switch as follows.

DESS Switch

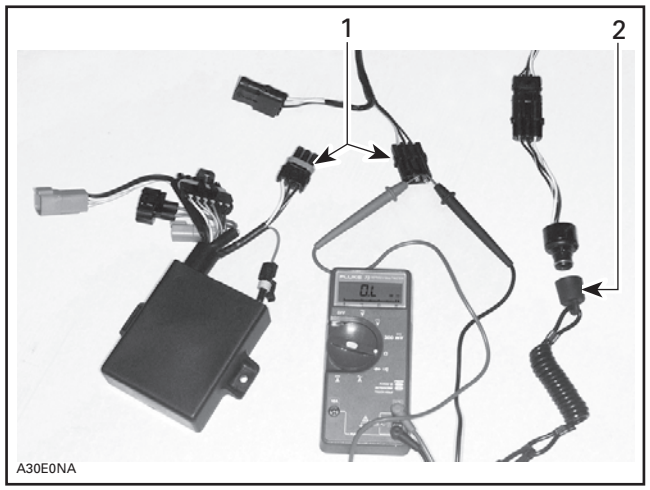
Tether Cord Switch

Unplug 4-DB housing (6-DC on 360 W models) connected to main wiring harness. Check using a multimeter by connecting probes to BLACK/GREEN and BLACK/WHITE wires. The multimeter should indicate a closed circuit (0 $_{\Omega}$) in operating position and a open circuit (0.L $_{M\Omega}$) in off position.



TYPICAL — HARNESS REMOVED FOR CLARITY

1. *Housing disconnected*
2. *DESS cap in place*



TYPICAL — HARNESS REMOVED FOR CLARITY

1. *Housing disconnected*
2. *DESS cap removed*

DESS Switch Wire

Check continuity (null resistance) between switch center terminal and WHITE/GRAY wire connector.

Check continuity (null resistance) between switch side ring and BLACK/GREEN wire connector.

If readings do not correspond to the above mentioned indications, replace switch.

If none of these verifications are conclusive, the problem finds its source in the main wiring harness. Proceed as follows:

NOTE: For the next step, no switch must be connected to the main wiring harness.

Disconnect all switches from the main wiring harness and check the continuity of each wire by connecting probes to the end of wires of the same color. Repeat with all other wires. It is important to mention that all wires of the same color within a given harness are connected together. These wires should therefore have a closed circuit. On the other hand, BLACK and BLACK/YELLOW wires must have an open circuit (0.L $_{M\Omega}$).

Repair or replace if necessary.

4. IGNITION GENERATOR COIL VOLTAGE TESTING

290 W Models Only

General

When manually starting the engine while the spark plug is installed, the engine will tend to accelerate beyond the compression point. This will result in higher magneto output power.

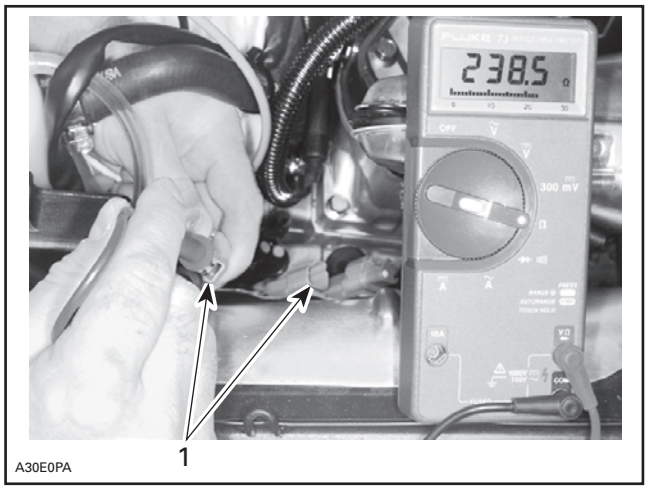
1. Disconnect 4-DD housing (6-DB on Mach Z Tech Plus) between the magneto and the MPEM.
2. Connect multimeter probes to WHITE and RED wires and bring the selector switch to $\tilde{V}$ and the scale to 00.0^{VAC}.
3. Activate the manual starter and check values indicated by the multimeter.
4. Repeat operation 3 times.
5. Compare readings with those appearing in the IGNITION table.

5. TRIGGER COIL TESTING

All Models

Resistance Testing

1. Connect probes to WHITE/YELLOW and BLUE/YELLOW wires from trigger coil housing.
2. Activate the manual starter and check values indicated by the multimeter.
3. Repeat operation 3 times.
4. Compare readings with those appearing in the IGNITION table.



1. 10-04 housing

6. MPEM VOLTAGE TESTING

All Models

1. Disconnect the housing between module and high voltage coils.
2. Connect multimeter probes to WHITE/BLUE and BLACK wires coming out from module. Place the selector switch to $\tilde{V}$ and the scale to 00.0^{Vac}.
3. Activate the manual starter and check values indicated by the multimeter.
4. Repeat operation 3 times.
5. Compare readings with those appearing in the IGNITION table.

7. HIGH VOLTAGE COIL VOLTAGE TESTING

1. Disconnect spark plug cap from spark plug.
2. Fasten alligator clip to spark plug cable, near the spark plug.
3. Connect other multimeter wire to engine (ground), then place selector switch to $\tilde{V}$ and scale to 0.00^{Vac}.
4. Activate the manual starter and check values indicated by the multimeter.
5. Repeat operation 3 times.
6. Compare readings with those appearing in the IGNITION table.

8. MPEM SUPPLY VOLTAGE TESTING

Grand Touring SE Only

1. Disconnect the 6-DA and 6-DC housings between module and main harness.
2. Connect multimeter probes to RED/BLUE and BLACK wires coming out from harness. Place the selector switch to $\tilde{V}$ and the scale to 00.0^{Vdc}.
3. Activate the manual starter and check values indicated by the multimeter.
4. Repeat operation 3 times.
5. Compare readings with those appearing in the IGNITION table.

9. MPEM TESTING

Grand Touring SE Only

1. Disconnect the MPEM.
2. Install a known-good MPEM.
3. Activate the manual starter and check values indicated by the multimeter.

CONCLUSION

All Models

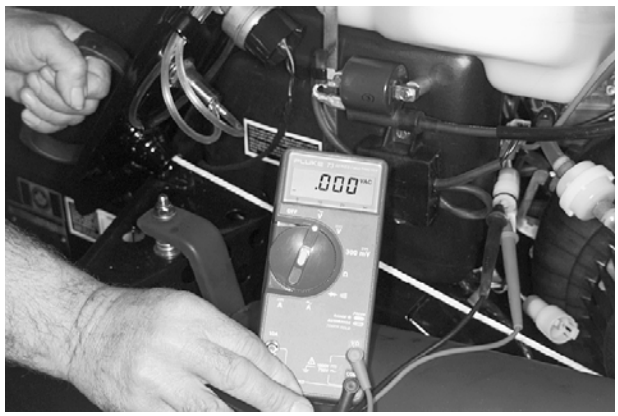
If none of the above testing operations produced valid results, it is strongly recommended to keep on testing according to the list appearing in the Resistance column of the IGNITION table.

Set the multimeter as indicated.

LIGHTING GENERATOR COIL VOLTAGE TESTING

NOTE: For 290 W system, the lighting generator coil is not part of the ignition system. It is a self-contained system used to supply current to the lighting system and to other devices working on alternating current. However, this system can be tested using a multimeter.

1. Disconnect round 2-MO housing from engine (YELLOW, YELLOW wires).
2. Connect multimeter probes to YELLOW wires, then place selector switch to $\tilde{V}$ and scale to 0.00^{Vac}.
3. Activate the manual starter and check values indicated by the multimeter.
4. Repeat operation 3 times.



A05E0EA

TYPICAL

5. Compare readings with those appearing in the LIGHTING table.

CONCLUSION

If none of the above testing operations produced valid results, it is strongly recommended to keep on testing according to the list appearing in the Resistance column of the LIGHTING table.

Set the multimeter as indicated.

ELECTRIC ACCESSORIES TESTING

Grand Touring SE Only

All accessories are supplied with electricity only when engine is running at 800 RPM or faster.

The MPEM controls the electricity supply to accessories. To short-circuit this feature, avoiding to let engine idling during testing, connect the bypass wires (P/N 529 033 300).

1. Disconnect the 6-DA housing.
2. Connect bypass wires (P/N 529 033 300) to the harness housing in series into the 6-DA housing.
3. Turn bypass switch on. All accessories receive the battery voltage.

IGNITION SYSTEM TESTING (CK3 SERIES — 290 W NON-RER)								
Part	Test to be performed	Wire color	Multimeter probe connection	Resistance Ω		Voltage V		Note
				Value (Ohms)	Multimeter scale	Value (Volts)	Multimeter scale	
Ignition and kill switches	Running insulation	BK and BK/YL	4-DD-2-F 4-DA-A-M	0.L	00.0 MΩ	—	—	No stop switch must be operational.
	Continuity in stop position	BK and BK/YL	4-DD-2-F 4-DA-A-M	00.0 - 00.5	00.0 Ω	—	—	Only one stop switch must be operational. Test one at a time.
DESS switch	Insulation in stop position	BK/GN and BK/WH	4-DB-B-M 4-DB-C-M	0.L	00.0 MΩ	—	—	Tether cord cap should be off.
	Running continuity	BK/GN and BK/WH	4-DB-B-M 4-DB-C-M	00.0 - 00.5	00.0 Ω	—	—	Tether cord cap should be in place.
Ignition generator coil	Output	WH and RD	4-DD-3-F 4-DD-1-F	25.0 - 56.0	00.0 Ω	30.0 - 50.0	00.0Vac	—
		WH and BK/RD	4-DD-3-F 4-DD-4-F	3.5 - 8.1	00.0 Ω	4.0 - 10.0	00.0Vac	—
	Coil insulation	BK and RD	4-DD-2-F 4-DD-1-F	0.L	00.0 MΩ	—	—	—
	Ground continuity	BK and engine	4-DD-2-F and engine	00.0 - 00.5	00.0 Ω	—	—	The term "engine" refers to the engine metal parts connected to the magneto housing.
Trigger coil	Resistance and output	WH/YL and BL/YL	4-DF-2-F 4-DF-1-F	190 - 300	00.0 Ω	.200 - .350	.000Vac	—
MPEM	Output voltage	WH/BL and BK	4-DC-(1,2,3)-M 4-DC-(6,5,4)-M	—	—	10.0 - 20.0 3 times	00.0Vac	No switch must be operational and tether cord cap must be in place.
High voltage coil	Primary winding resistance	WH/BL and BK	4-DC-(1,2,3)-F 4-DC-(6,5.4)-F	00.2 - 00.5 3 times	00.0 Ω	—	—	—
	Secondary winding resistance (spark plug cap included)	Spark plug cap and engine	In spark plug cap and on engine	10.5 K - 19 K 3 times	00.0 KΩ	**CAUTION:** Do not measure high voltage coil output voltage.		
	Secondary winding resistance (without spark plug cap)	BK and engine	In spark plug wire and on engine	6 K - 13 K 3 times	00.0 KΩ	**CAUTION:** Do not measure high voltage coil output voltage.		
	Secondary winding voltage	BK and engine	On spark plug wire and on engine	—	—	1.5 - 2.5 3 times	0.00Vac	The measurement must be taken on the spark plug wire (without the spark plug).
Spark plug cap	Cap resistance	—	Spark plug side and wire side	4.0 K - 6.0 K 3 times	00.0 KΩ	—	—	—

M: Male F: Female

IGNITION SYSTEM TESTING (CK3 SERIES — 290 W RER)								
Part	Test to be performed	Wire color	Multimeter probe connection	Resistance Ω		Voltage V		Note
				Value (Ohms)	Multimeter scale	Value (Volts)	Multimeter scale	
Ignition and kill switches	Running insulation	BK and BK/YL	6-DB-2-F 6-DA-3-F	0.L	00.0 $_{M\Omega}$	—	—	No stop switch must be operational.
	Continuity in stop position	BK and BK/YL	6-DB-2-F 6-DA-3-F	00.0 - 00.5	00.0 $_{\Omega}$	—	—	Only one stop switch must be operational. Test one at a time.
DESS switch	Insulation in stop position	BK/GN and BK/WH	6-DA-2-F 6-DA-1-F	0.L	00.0 $_{\Omega}$	—	—	Tether cord cap should be off.
	Running continuity	BK/GN and BK/WH	6-DA-2-F 6-DA-1-F	00.0 - 00.5	00.0 $_{\Omega}$	—	—	Tether cord cap should be in place.
Ignition generator coil	Output	WH and RD	6-DB-3-F 6-DB-1-F	25.0 - 56.0	00.0 $_{\Omega}$	30.0 - 50.0	00.0 Vac	—
		WH and BK/RD	6-DB-3-F 6-DB-4-F	3.5 - 8.1	00.0 $_{\Omega}$	4.0 - 10.0	00.0 Vac	—
	Coil insulation	BK and RD	6-DB-2-F 6-DB-1-F	0.L	00.0 $_{M\Omega}$	—	—	—
	Ground continuity	BK and engine	6-DB-2-F and engine	00.0 - 00.5	00.0 $_{\Omega}$	—	—	The term "engine" refers to the engine metal parts connected to the magneto housing.
Trigger coil no. 1	Resistance and output	WH/YL and BL/YL	6-DC-1-F 6-DC-4-F	190 - 300	00.0 $_{\Omega}$	.200 - .350	.000 Vac	—
Trigger coil no. 2	Resistance and output	GY/YL and GN/YL	6-DC-2-F 6-DC-3-F	190 - 300	00.0 $_{\Omega}$	.200 - .350	.000 Vac	—
MPEM	Output voltage	WH/BL and BK	2-BA-(1,2,3)-M 2-BA-(6,5,4)-M	—	—	10.0 - 20.0 3 times	00.0 Vac	No switch must be operational and tether cord cap must be in place.
High voltage coil	Primary winding resistance	WH/BL and BK	4-DC-(1,2,3)-F 4-DC-(6,5.4)-F	00.2 - 00.5 3 times	00.0 $_{\Omega}$	—	—	—
	Secondary winding resistance (spark plug cap included)	Spark plug cap and engine	In spark plug cap and on engine	10.5 K - 19 K 3 times	00.0 $_{K\Omega}$	**CAUTION:** Do not measure high voltage coil output voltage.		
	Secondary winding resistance (without spark plug cap)	BK and engine	In spark plug wire and on engine	6 K - 13 K 3 times	00.0 $_{K\Omega}$	**CAUTION:** Do not measure high voltage coil output voltage.		
	Secondary winding voltage	BK and engine	On spark plug wire and on engine	—	—	1.5 - 2.5 3 times	0.00 Vac	The measurement must be taken on the spark plug wire (without the spark plug).
Spark plug cap	Cap resistance	—	Spark plug side and wire side	4.0 K - 6.0 K 3 times	00.0 $_{K\Omega}$	—	—	—

M: Male F: Female

NOTE: Stop switches include the ignition switch and the emergency cut-out switch.

It is important to take note that voltage measurements must be taken while starting the vehicle using the manual starter.

Voltages obtained upon starting are proportional to the force applied onto the manual starter. A low voltage is therefore normal under a low cranking force.

Perform testing in the prescribed order and replace any parts not performing according to specifications.

It is important to resume all tests when replacing a component.

If not specified, the probe connecting sequence is not important.

LIGHTING SYSTEM TESTING (CK3 SERIES — 290 W)								
Part	Test to be performed	Wire color	Multimeter probe connection	Resistance Ω		Voltage V		Note
				Value (Ohms)	Multimeter scale	Value (Volts)	Multimeter scale	
Lighting generator coil	Output	YL and YL	2-MO-B-F and 2-MO-C-F	00.15 - 00.35	00.0 Ω	3.0 - 7.0	00.0 Vac	—
	Coil insulation	YL and engine	2-MO-(B,C)-F and engine	0.L	00.0 MΩ	—	—	The term "engine" refers to the engine metal parts connected to the magneto housing.
	Ground continuity	BK and engine	2-MO-A-F and engine	00.0 - 00.5	00.0 Ω	—	—	

M: Male F: Female

NOTE: It is important to take note that voltage measurements must be taken while starting the vehicle using the manual starter.

Voltages obtained upon starting are proportional to the force applied onto the manual starter. A low voltage is therefore normal under a low cranking force.

Perform testing in the prescribed order and replace any parts not performing according to specifications.

It is important to resume all tests when replacing a component.

If not specified, the probe connecting sequence is not important.

IGNITION SYSTEM TESTING (CK3 SERIES — 360 W)								
Part	Test to be performed	Wire color	Multimeter probe connection	Resistance Ω		Voltage V		Note
				Value (Ohms)	Multimeter scale	Value (Volts)	Multimeter scale	
Ignition and kill switches	Running insulation	BK and BK/YL	6-DC-9-F 6-DC-3-F	0.L	00.0 MΩ	—	—	No stop switch must be operational.
	Continuity in stop position	BK and BK/YL	6-DC-9-F 6-DC-3-F	00.0 - 00.5	00.0 Ω	—	—	Only one stop switch must be operational. Test one at a time.
DESS switch	Insulation in stop position	BK/GN and BK/WH	6-DC-2-F 6-DC-1-F	0.L	00.0 MΩ	—	—	Tether cord cap must be off.
	Running continuity	BK/GN and BK/WH	6-DC-2-F 6-DC-1-F	00.0 - 00.5	00.0 Ω	—	—	Tether cord cap must be in place.
MPEM	Supply from GY wire	RD/GY and BK	6-DC-10-F 6-DC-9-F	—	—	Battery voltage within 0.5	00.0 Vdc	—
	Supply from RD/BL wire	RD/BL and BK	6-DA-A-M 6-DC-9-F	—	—	2.00 - 3.50	00.0 Vdc	—
	Supply from RD/WH wire	RD/WH and BK	6-DA-B-M 6-DC-9-F	—	—	Battery voltage within 0.5	00.0 Vdc	—
	Ground continuity	BK and engine	6-DC-9-F and engine	00.0 - 00.5	00.0 Ω	—	—	The term "engine" refers to the engine metal parts connected to the magneto housing.
Trigger coil no. 1	Resistance and output	WH/YL and BL/YL	6-DB-1-F 6-DB-4-F	190 - 300	00.0 Ω	.200 - .350	.000 Vac	The test can be done on 2-BE housing, but this would not validate the harness.
Trigger coil no. 2	Resistance and output	GY/YL and GN/YL	6-DB-3-F 6-DB-2-F	190 - 300	00.0 Ω	.200 - .350	.000 Vac	The test can be done on 2-BE housing, but this would not validate the harness.
Ignition module	Output voltage	WH/BL and BK	2-DG-(1,2,3)-M 2-DG-(6,5,4)-M	—	—	10.0 - 20.0 3 times	00.0 Vac	No switch must be operational and tether cord cap must be in place.
High voltage coil	Primary winding resistance	WH/BL and BK	2-DG-(1,2,3)-F 2-DG-(6,5.4)-F	00.2 - 00.5 3 times	00.0 Ω	—	—	—
	Secondary winding resistance (spark plug cap included)	Spark plug cap and engine	In spark plug cap and on engine	10.5 K - 19 K 3 times	00.0 KΩ	**CAUTION:** Do not measure high voltage coil output voltage.		
	Secondary winding resistance (without spark plug cap)	BK and engine	In spark plug wire and on engine	6 K - 13 K 3 times	00.0 KΩ	**CAUTION:** Do not measure high voltage coil output voltage.		
	Secondary winding voltage	BK and engine	On spark plug wire and on engine	—	—	1.5 - 2.5 3 times	0.00 Vac	The measurement must be taken on the spark plug wire (without the spark plug).
Spark plug cap	Cap resistance	—	Spark plug side and wire side	4.0 K - 6.0 K 3 times	00.0 KΩ	—	—	—

M: Male F: Female

NOTE: Stop switches include the ignition switch, and the emergency cut-out switch.

It is important to take note that voltage measurements must be taken while starting the vehicle using the manual starter.

Voltages obtained upon starting are proportional to the force applied onto the manual starter. A low voltage is therefore normal under a low cranking force.

Perform testing in the prescribed order and replace any parts not performing according to specifications.

It is important to resume all tests when replacing a component.

If not specified, the probe connecting sequence is not important.

LIGHTING SYSTEM TESTING (CK3 SERIES — 360 W)								
Part	Test to be performed	Wire color	Multimeter probe connection	Resistance Ω		Voltage V		Note
				Value (Ohms)	Multimeter scale	Value (Volts)	Multimeter scale	
Lighting generator coil	Output	YL and YL	2-MO-(A,B,C)-F and 2-MO-(A,B,C)-F	00.0 - 00.5 3 times	00.0 Ω	3.5 - 5.5 3 times	00.0 Vac	Do the test between A and B, A and C and B and C.
	Coil insulation	YL and engine	2-MO-(A,B,C)-F and engine	0.L	00.0 MΩ	—	—	The term "engine" refers to the engine metal parts connected to the magneto housing.

M: Male F: Female

NOTE: It is important to take note that voltage measurements must be taken while starting the vehicle using the manual starter.

Voltages obtained upon starting are proportional to the force applied onto the manual starter. A low voltage is therefore normal under a low cranking force.

Perform testing in the prescribed order and replace any parts not performing according to specifications.

It is important to resume all tests when replacing a component.

If not specified, the probe connecting sequence is not important.

INSPECTION OF AC CIRCUIT ISOLATION

290 W Models

If AC circuit is not isolated from frame, headlamp beam will weaken.

INSPECTION

Disconnect regulator/rectifier.

Connect one digital ohmmeter probe (needle ohmmeter will not offer enough precision) to frame and other probe to YELLOW wire (2-RE-A).

Measured resistance must be infinite. If such is not the case, it means there is a connection between AC circuit and frame.

Disconnect one accessory at the time to identify the faulty circuit.

INSPECTION OF HEATING ELEMENTS

All measurements must be performed at 21°C (70°F).

Throttle Lever Heating Element

Resistance Measurement

Mach Z STD/TECH PLUS

HIGH INTENSITY	YELLOW/BLACK wire BROWN wire	1.96 to 3.64 ohms
LOW INTENSITY	YELLOW/BLACK wire BROWN/YELLOW wire	8.05 to 14.95 ohms

Grand Touring SE

YELLOW/BLACK wire BROWN wire	65 to 80 ohms

Current Measurement

Mach Z STD/TECH PLUS

HIGH INTENSITY	BROWN wire	0.23 A minimum
LOW INTENSITY	BROWN/YELLOW wire	0.13 A minimum

Handlebar Grip Heating Element

Resistance Measurement

Mach Z STD/TECH PLUS

LOW INTENSITY	YELLOW/BLACK wire ORANGE/VIOLET wire	17.7 to ① 20.7 ohms
HIGH INTENSITY	YELLOW/BLACK wire ORANGE wire	8.73 to ① 10.67 ohms

Grand Touring SE

RED/YELLOW wire ORANGE wire	6.5 to 8 ohms ①

① When measuring resistance at terminals the actual value will be half the measurement in table. The reason for that is the elements are connected in parallel. Therefore the total resistance is half the resistance of one element.

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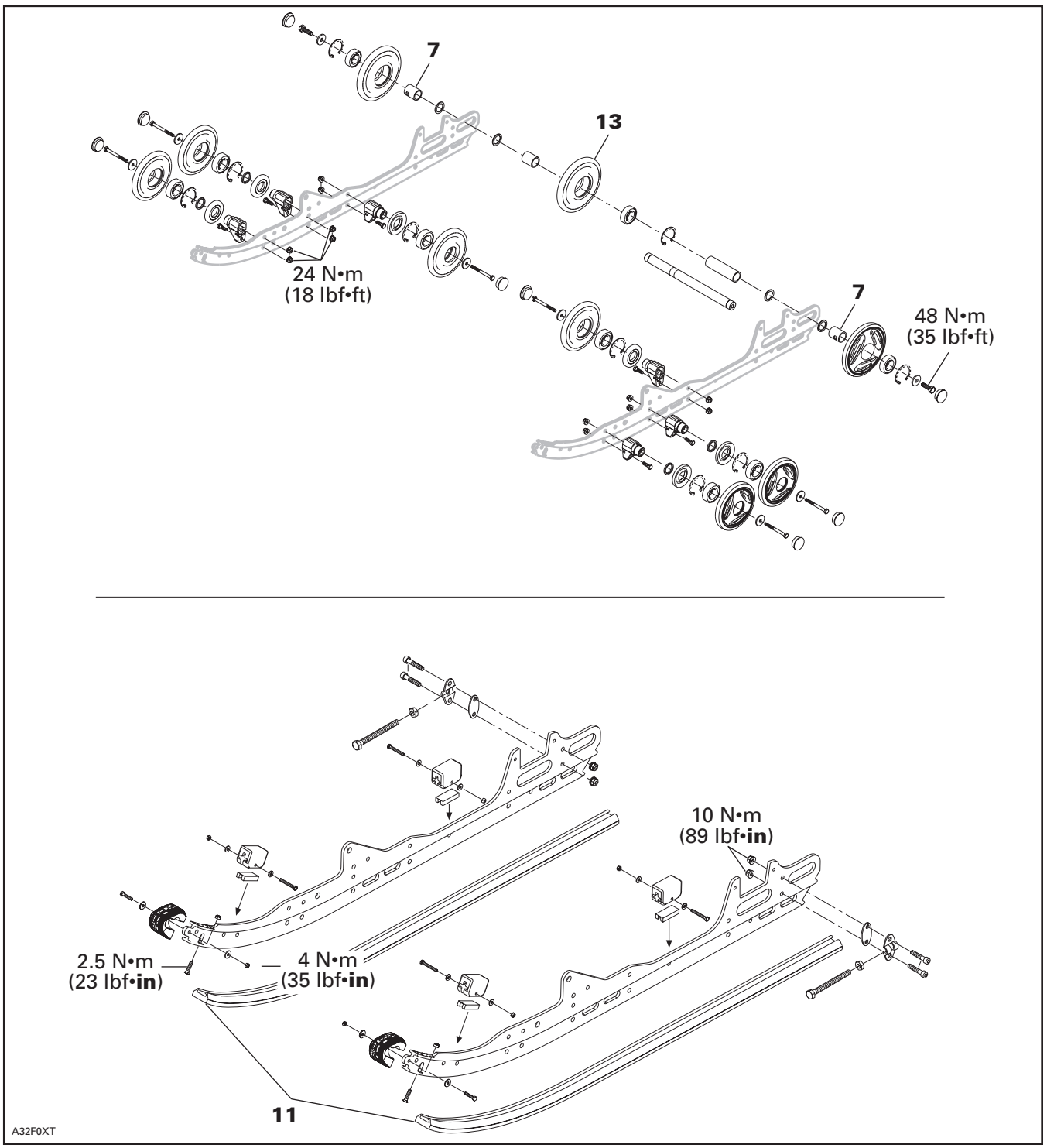
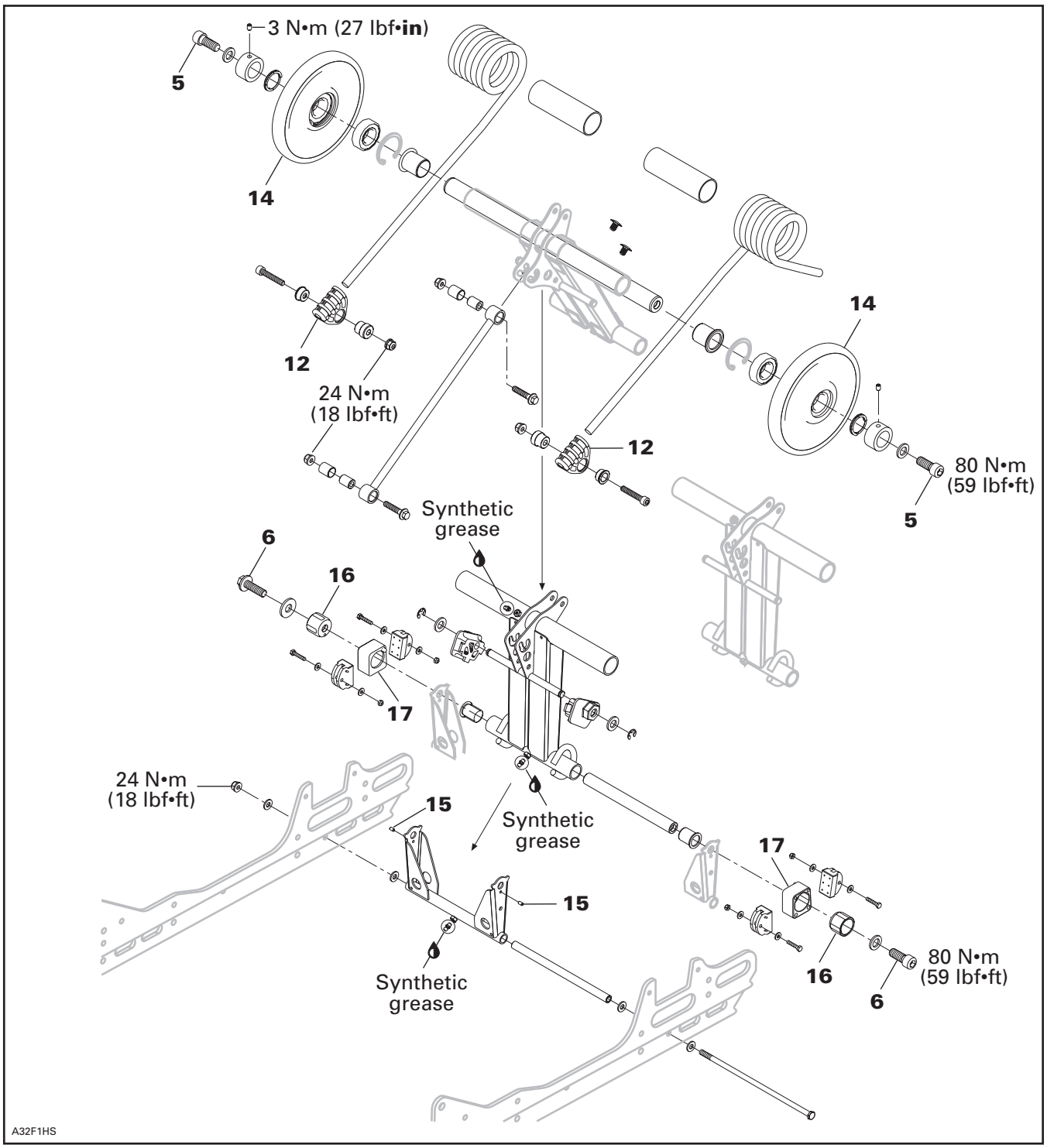
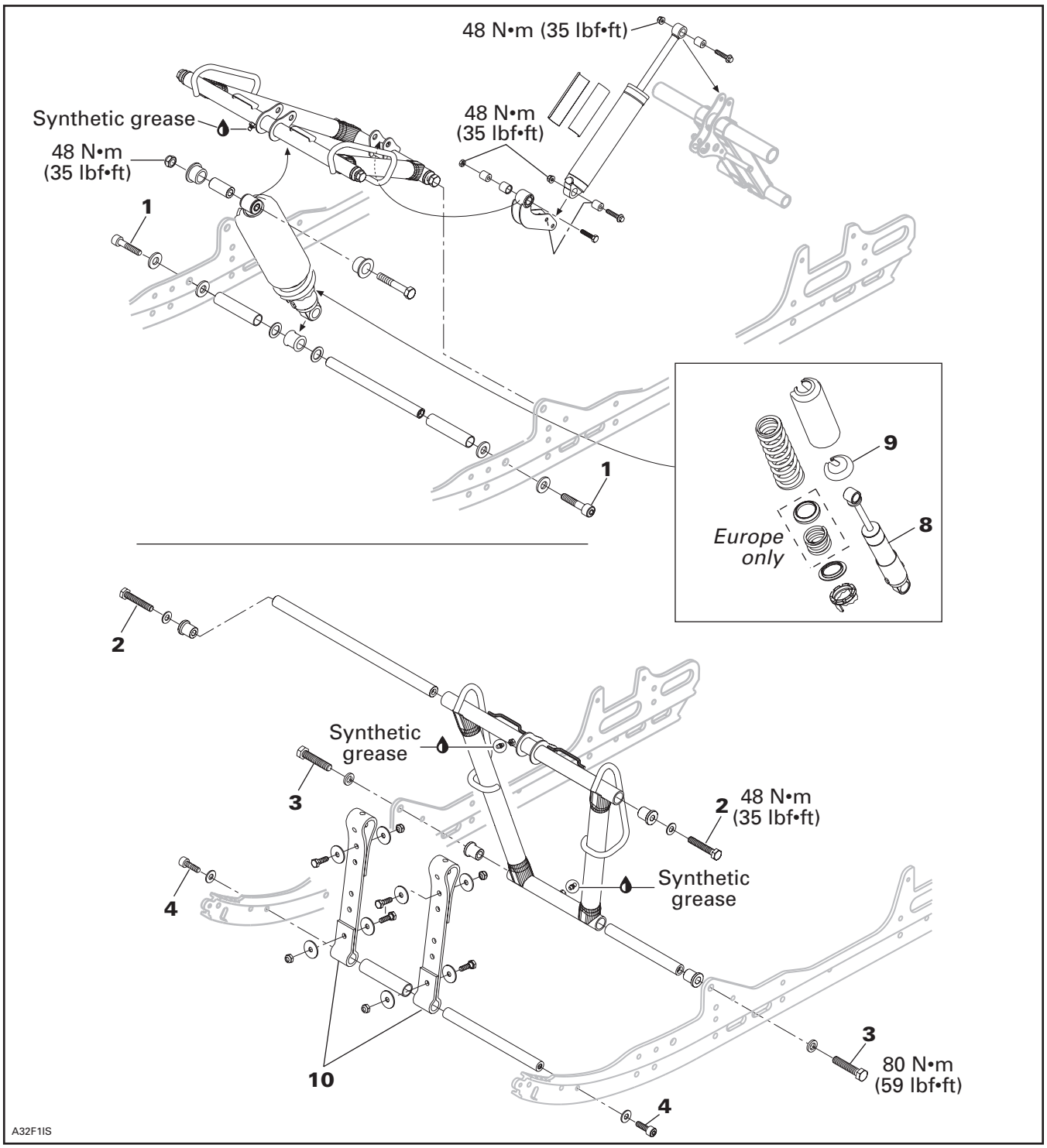
SC-10 II SUSPENSION

SC-10 II





PARTS FLAT RATE

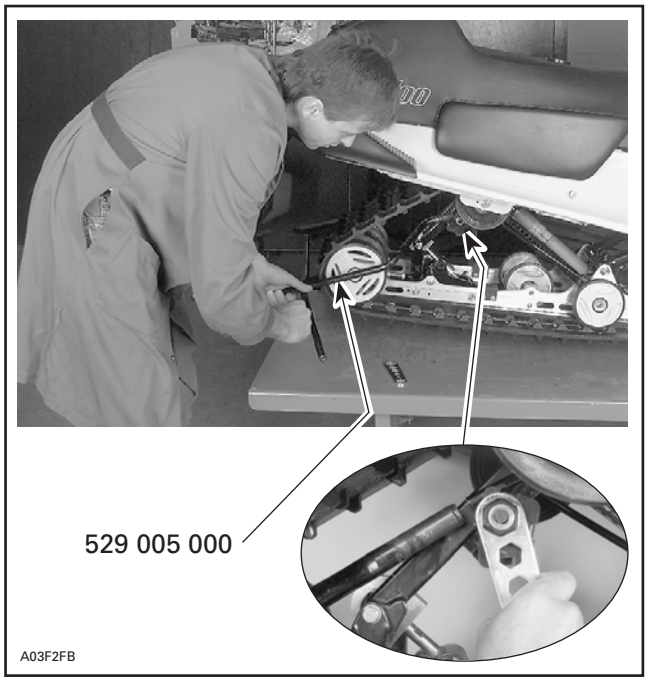

48 N•m (35 lbf•ft)
Synthetic grease
48 N•m
(35 lbf•ft)
48 N•m
(35 lbf•ft)
1
1
9
8
Europe
only
2
Synthetic
grease
3
2
48 N•m
(35 lbf•ft)
4
Synthetic
grease
10
3
80 N•m
(59 lbf•ft)
4
A32F1IS

SUSPENSION ASSEMBLY REMOVAL

19, Cam

Decrease spring preload by turning cams accordingly.

Slightly turn adjusting cam to expose spring end. Using spring installer (P/N 529 005 000), remove both springs from adjusting cams.



TYPICAL

Lift rear of vehicle and support it off the ground.

Loosen track tension.

1,2,3,4,5,6, Self-Locking Screws

CAUTION: These self-locking screws must always be replaced by new ones everytime they are removed.

NOTE: To prevent axle from turning when unscrewing self-locking screws, proceed as follows:

– Remove one self-locking screw then install a 10 mm shorter non-self-locking one in place. Torque as specified in exploded view.
– Remove the opposite self-locking screw.
– Remove the temporary installed non-self-locking screw.
– If it doesn't work, heat bolt head to melt threadlocker.

Remove rear arm top axle self-locking screws **no. 5** from chassis.

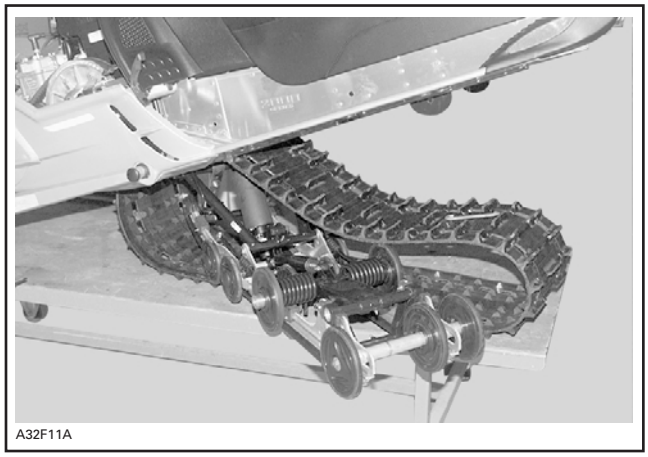
Lift rear of vehicle at least 1 m (3 ft).

TYPICAL

A. At least 1 m (3 ft)

Remove both self-locking screws **no. 2** retaining front arm to tunnel.

Remove suspension.

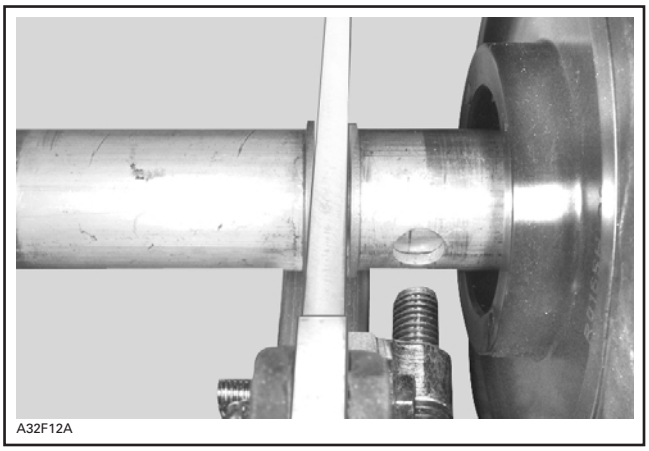


DISASSEMBLY AND ASSEMBLY

Inspect track thoroughly before reinstalling suspension. Refer to TRACK.

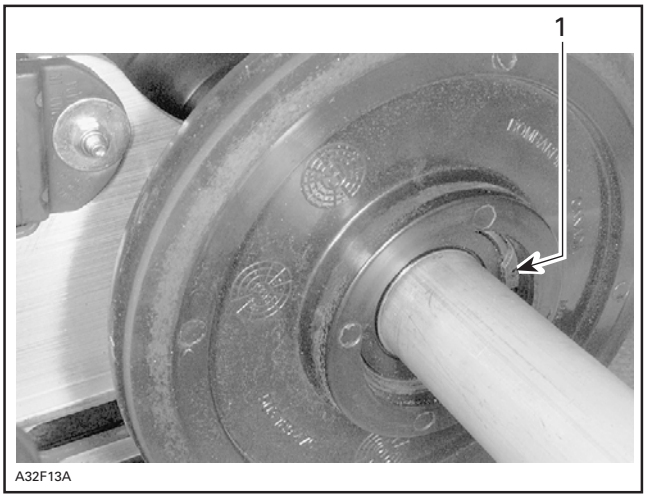
7, Outer Bushing

At installation, hole must face adjustment screw.



13,14, Center Rear Wheel and Top Idler Wheels

At installation, circlip must face inner side.

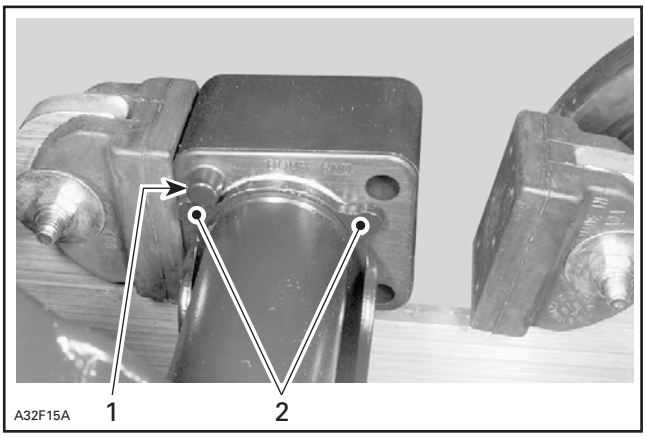


1. Circlip facing inner side

17, Block

Both blocks are identified R or L (right or left), see second following photo. At installation, make sure to install proper block on proper side.

Also, note that protrusion must be positioned above stoppers.

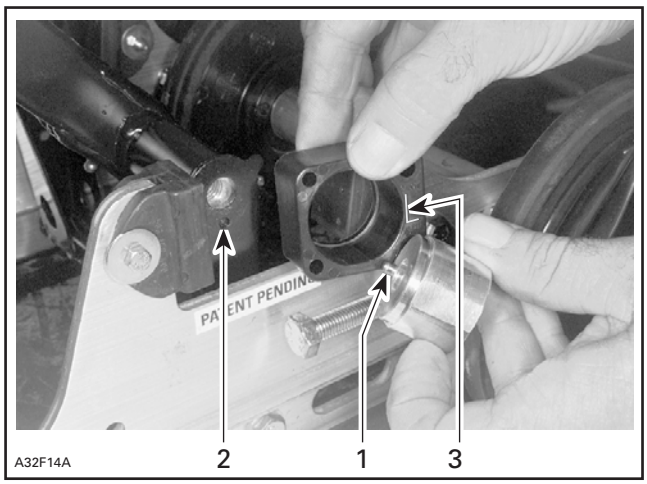


1. Protrusion
2. Stoppers

15,16, Dowel Pin and Block Guide

Dowel pin must exceed block guide by 2 to 2.3 mm (.079 to .091 in).

At installation, insert dowel pin into pivot arm hole.



LEFT SIDE SHOWN

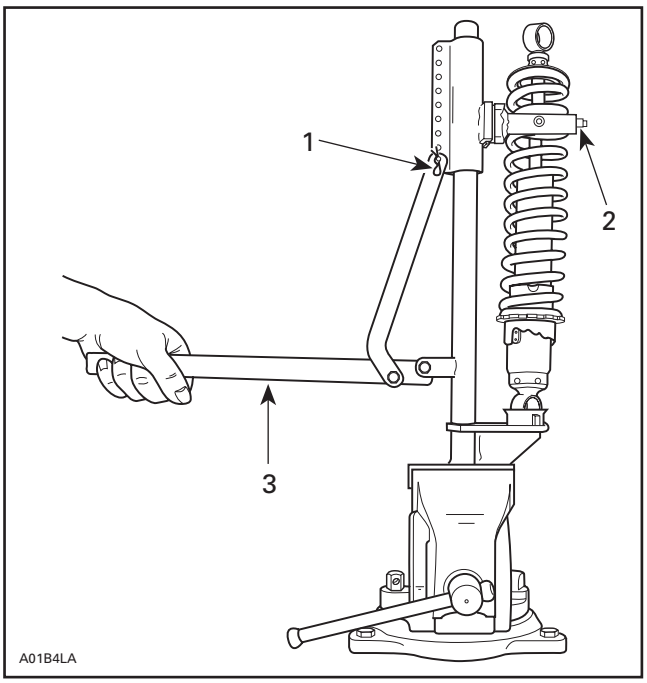
1. Dowel pin
2. Pivot arm hole
3. L identification for left side

8,9, Front Shock and Spring Stopper

Use shock spring remover (P/N 529 035 504) and put it in a vise. Mount shock in it and turn shock so that spring coils matched spring compressor.

Close and lock bar. Adjust handle horizontal by changing position of clevis pin.

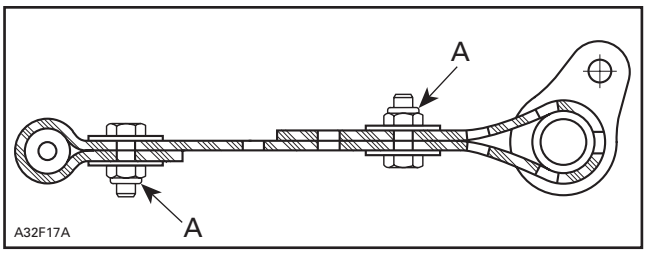
Push down on handle until it locks. Remove spring stopper then release handle.



1. *Clevis pin*
2. *Bar*
3. *Handle horizontal*

10, Stopper Strap

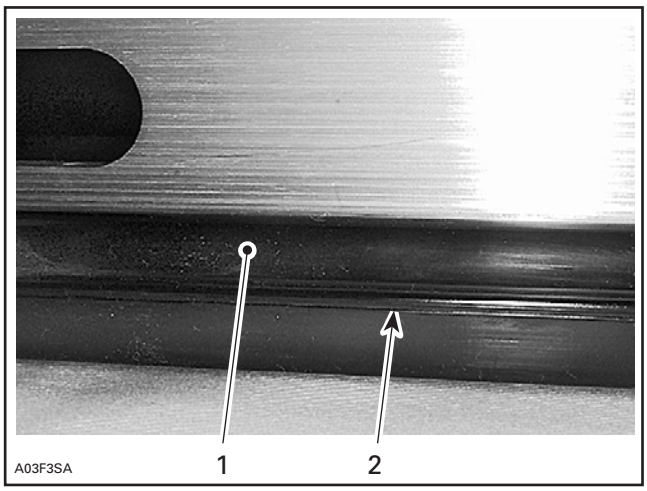
Inspect strap for wear or cracks, bolt and nut for tightness. If loose, inspect hole for deformation. Replace as required. Make sure it is attached through proper holes. Torque nut to 7 N•m (62 lbf•**in**).



*A. 7 N•m (62 lbf•**in**)*

11, Slider Shoe

Molding line is the wear limit indicator.



TYPICAL

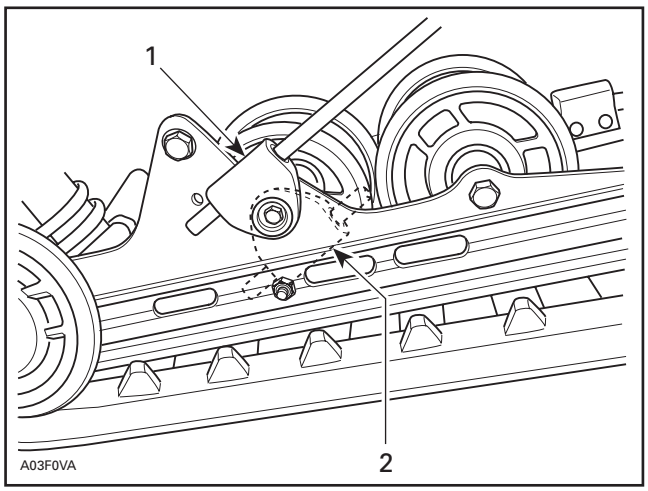
1. *Slider shoe*
2. *Molding line (wear limit indicator)*

Replace slider shoes when wear limit is reached.

CAUTION: Slider shoes must always be replaced in pairs.

12, Spring Support

CAUTION: To avoid track damage, spring supports must be mounted upward.



TYPICAL — RIGHT SIDE SHOWN

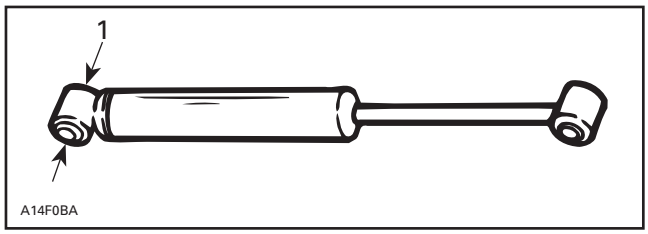
1. *Right position: upward*
2. *Wrong position*

SHOCK ABSORBER INSPECTION

All Models Equipped with Hydraulic Shock

NOTE: Hydraulic shocks are painted black or dark gray.

Secure the shock body end in a vise with its rod upward.



1. Clamp

CAUTION: Do not clamp directly on shock body.

Examine each shock for leaks. Extend and compress the piston several times over its entire stroke. Check that it moves smoothly and with uniform resistance with its rod upward.

Pay attention to the following conditions that will denote a defective shock:

– A skip or a hang back when reversing stroke at mid travel.
– Seizing or binding condition except at extreme end of either stroke.
– Oil leakage.
– A gurgling noise, after completing one full compression and extension stroke.

Renew if any faults are present.

All Models Equipped with Gas Pressurized Shock

NOTE: Gas pressurized shocks are light gray or purple painted, or bare aluminum.

Gas shock can be inspected as follows:

Because of gas pressure, strong resistance is felt when compressing shock. When released, the shock will extend unassisted. Renew as required.

If suspecting an internal gas leak between oil chamber and gas chamber, check shock as follows:

Install shock in a vise clamping on its bottom eyelet with its rod upward.

Let it stand for 5 minutes.

Completely push down the shock rod then release.

Rod must come out at a steady speed. If speed suddenly increases particularly at end of extension, replace shock.

All Types of Shock

If suspecting a frozen shock proceed as follows:

Place shock in a freezer (temperature below 0°C (32°F)) for 4 hours.

Push down on rod and note its resistance. If shock is frozen it will be impossible or almost impossible to compress it.

INSTALLATION

Install assembled suspension into track with front portion first.

Insert rear portion of suspension into track.

Bolt front arm and rear arm.

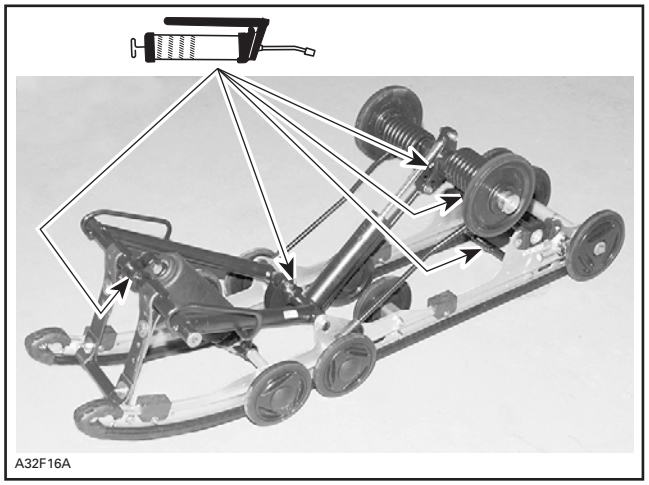
Adjust track tension.

RIDE ADJUSTMENT

Refer to *Operator's Guide*.

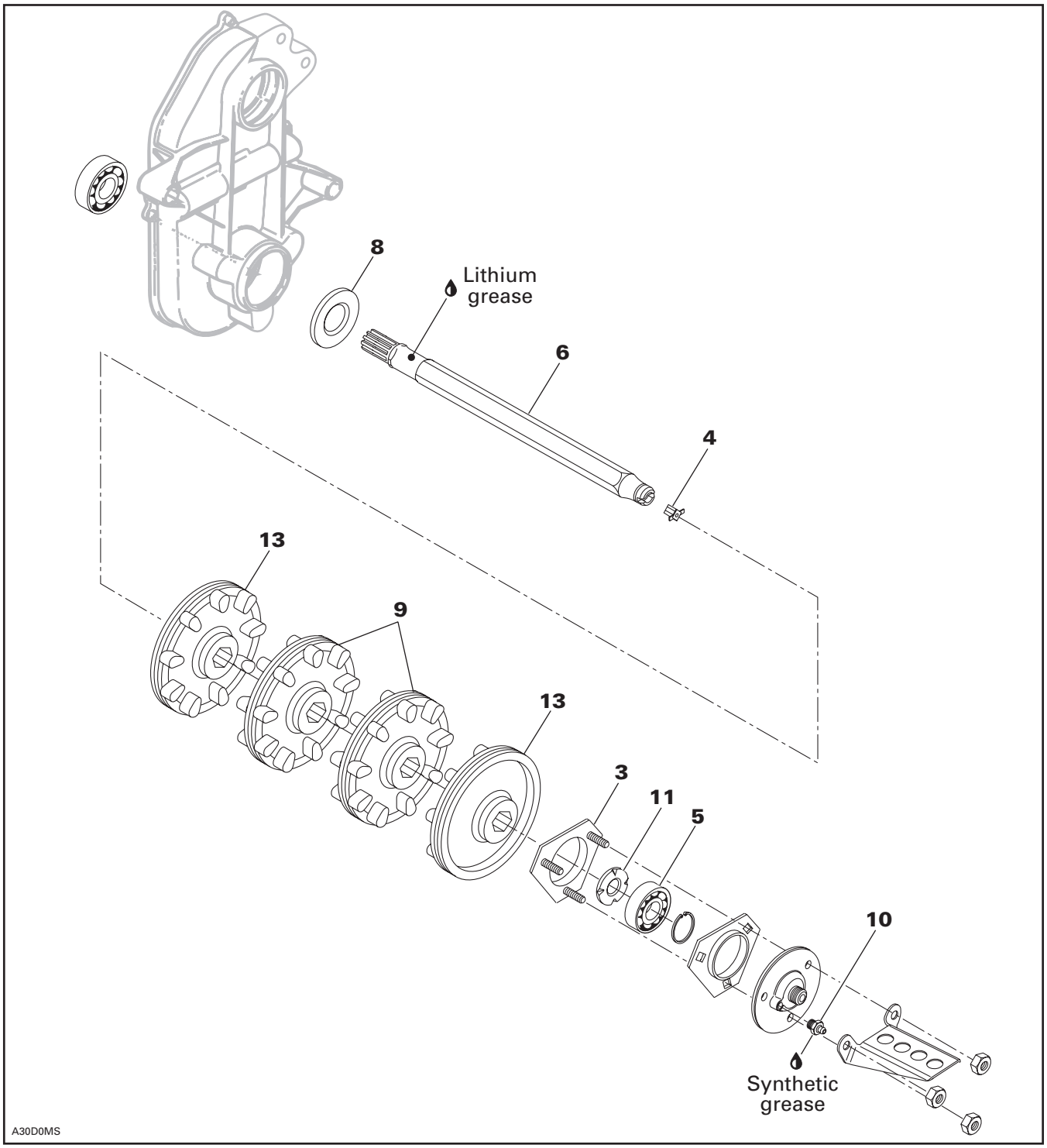
LUBRICATION

Lubricate front and rear arms at grease fittings using synthetic grease (P/N 413 711 500).



SC-10 II: 5 GREASE FITTINGS

DRIVE AXLE



REMOVAL

Drain oil from chaincase. Release drive chain tension. Remove chaincase cover.

Raise and block rear of vehicle off the ground.

Remove suspension. Refer to SC-10 SUSPENSION.

2,8, End Bearing Housing and Seal

Remove outer flange cover of bearing housing.

Remove chain and sprocket then circlip and bearing from drive axle.

Pry oil seal from chaincase.

6,9,13, Drive Axle and Sprocket

Release drive axle sprocket from track and at the same time, pull the drive axle toward the end bearing housing side.

Remove drive axle from vehicle.

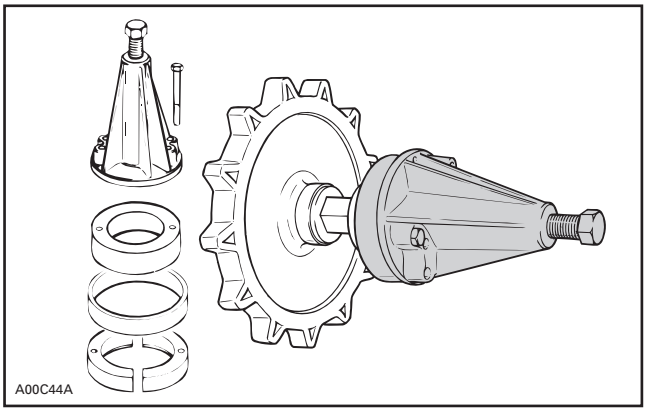
DISASSEMBLY

4, Speedometer Drive Insert

Remove speedometer drive insert.

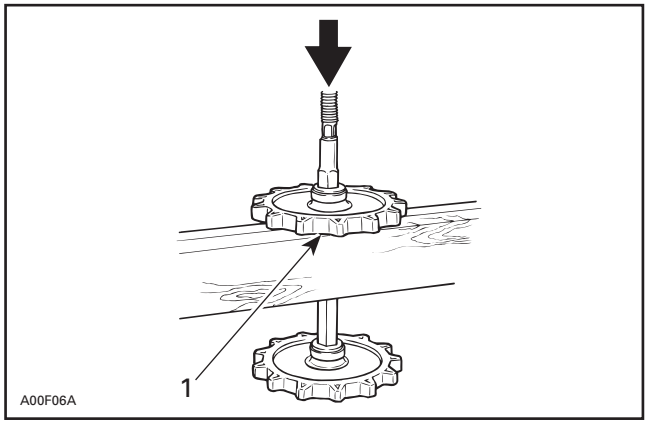
5,12, Bearing

To remove bearings, use puller assembly, ring and half rings as illustrated.



9,13, Sprocket and Half-Sprocket

To remove press fit sprockets, use a press and a suitable support as illustrated.



TYPICAL

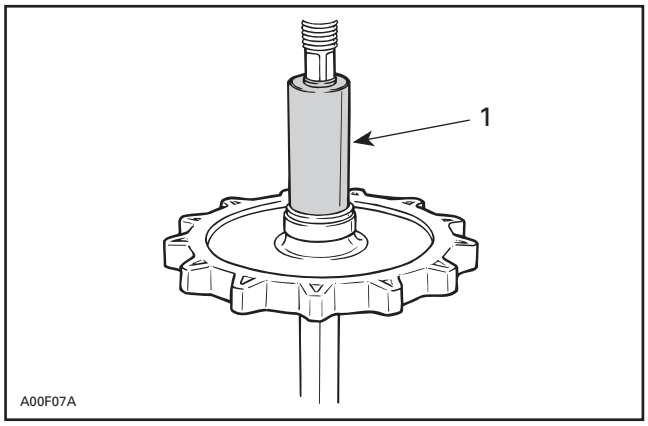
1. Support sprocket near hub

NOTE: Two different types of sprocket press fit can be found. Ensure to replace ring reinforced sprockets with the same type.

ASSEMBLY

8,9,13, Drive Axle and Sprocket

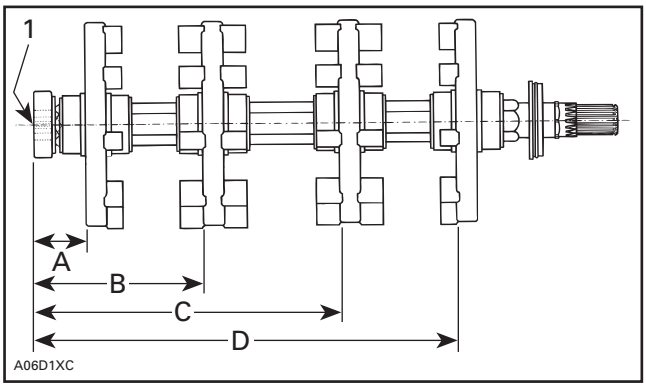
To assemble press fit sprockets, use a press and a suitable pipe as illustrated. Sprockets must be assembled according to the following dimensions.



TYPICAL

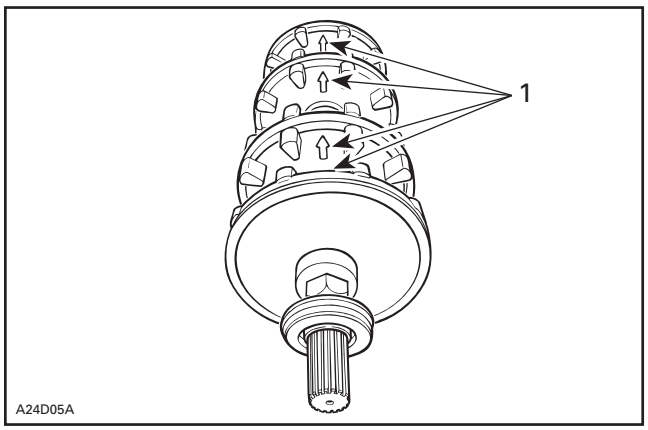
1. Pipe

CK3 Series



1. Measure from end of drive axle
A. 49 mm (1.929 in)
B. 151.2 mm (5.953 in)
C. 274.2 mm (10.795 in)
D. 376.3 mm (14.815 in)

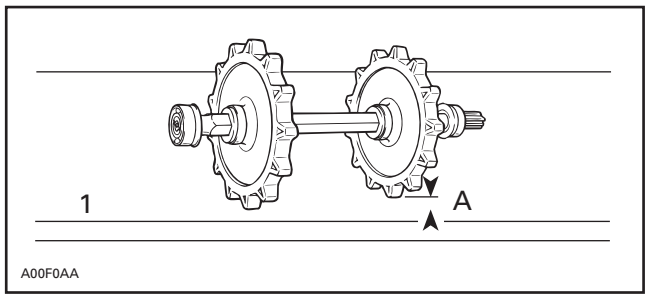
Ensure to align indexing marks of each sprocket when assembling.



TYPICAL
1. Indexing marks aligned

The maximum desynchronization for the sprockets is 1.5 mm (1/16 in).

To check this tolerance, place axle assembly on a plane surface and measure the gap between sprocket tooth and surface.



1. Plane surface
A. 1.5 mm (1/16 in) MAXIMUM

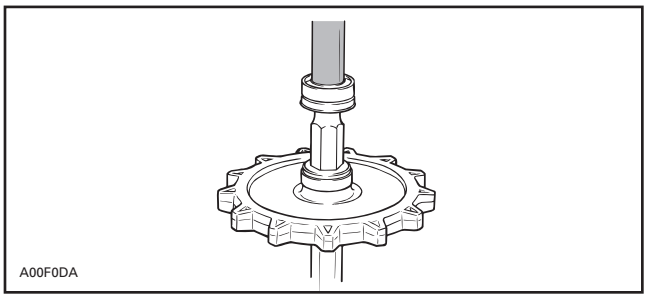
CAUTION: The same sprocket must not be pressed twice on the axle. If synchronization is found to be defective, use a new sprocket.

11, Bearing Protector

At assembly, flat side of bearing protector must be against bearing.

5,12, Bearing

Always push bearing by inner race.



The bearing on the splined side of axle must be pushed until it is seated on shaft shoulder. Each bearing must have its shield facing the sprocket.

LUBRICATION

15, Grease Fitting

Lubricate end housing bearing with synthetic grease (P/N 413 711 500).

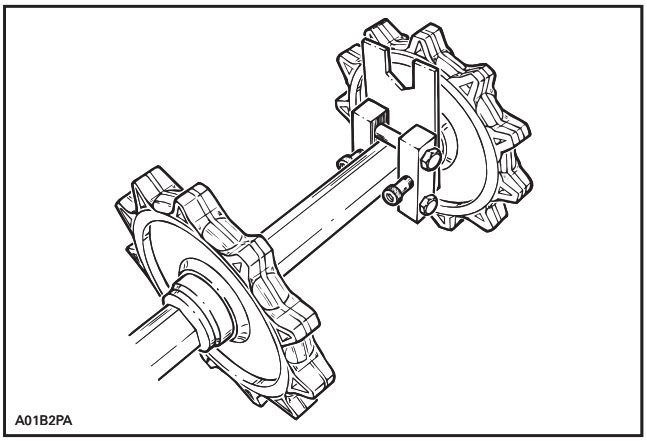
ADJUSTMENT

Sprocket/Track Alignment

CAUTION: Do not temper with sprocket/track alignment if frame or suspension is damaged.

Sprockets might be repositioned to fit lugs without removing drive axle.

Use drive axle sprocket adjuster kit (P/N 861 725 700).



TYPICAL

TRACK

TRACK TYPE APPLICATION

Refer to TECHNICAL DATA.

GENERAL

This section gives guidelines for track removal. Some components require more detailed disassembly procedures. In these particular cases, refer to the pertaining section in this manual.

INSPECTION

Visually inspect track for:

– cuts and abnormal wear
– broken rods
– broken or missing track cleats.

If track is damaged or rods are broken, replace track. For damaged or missing cleats, replace by new ones, using cleat remover (P/N 529 028 700). Use narrow-cleat installer (P/N 529 008 500).

⚠ WARNING

Do not operate a snowmobile with a cut, torn or damaged track.

REMOVAL

Remove the following parts:

– speedometer cable
– muffler
– chaincase cover
– suspension
– drive axle seal
– end bearing housing
– sprockets and chain
– drive axle (toward end bearing housing)
– track.

INSTALLATION

Reverse the removal procedure.

NOTE: When installing the track, respect rotation direction indicated by an arrow on track thread.

Check sprocket/track alignment as described in DRIVE AXLE.

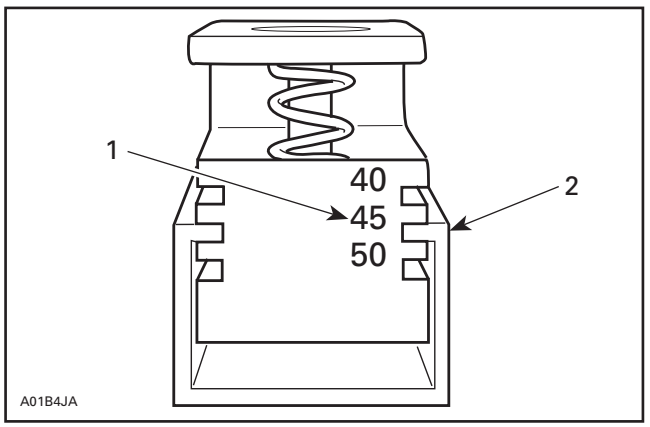
Track Tension and Alignment

Track tension and alignment are inter-related. Do not adjust one without checking the other. Track tension procedure must be carried out prior to track alignment.

Tension

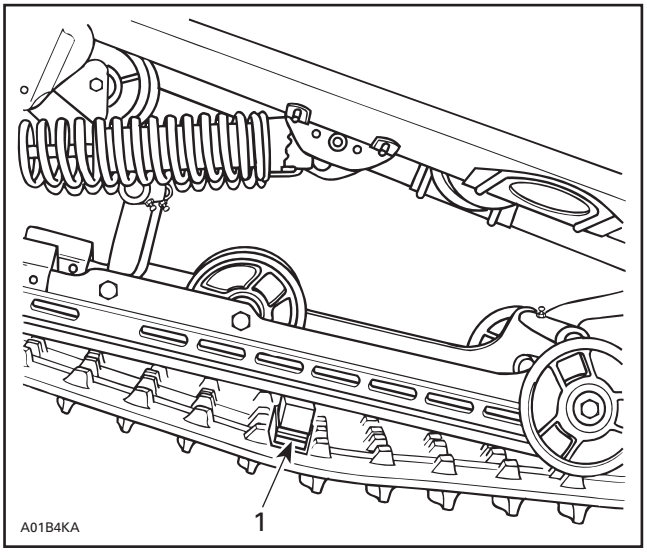
Lift the rear of vehicle and support with a mechanical stand. Allow the slide to extend normally. Check the gap half-way between front and rear idler wheels. Measure between slider shoe and bottom inside of track.

When using the track tension gauge (P/N 529 021 500), slide U-shape extrusion to proper deflection.



1. Example: 45 mm
2. Extrusion

Insert pre-setted gauge between slider shoe and track. Allow gauge to settle by forcing track up and down. Track tension is as specified when edge of gauge reaches line.



TYPICAL
1. Line

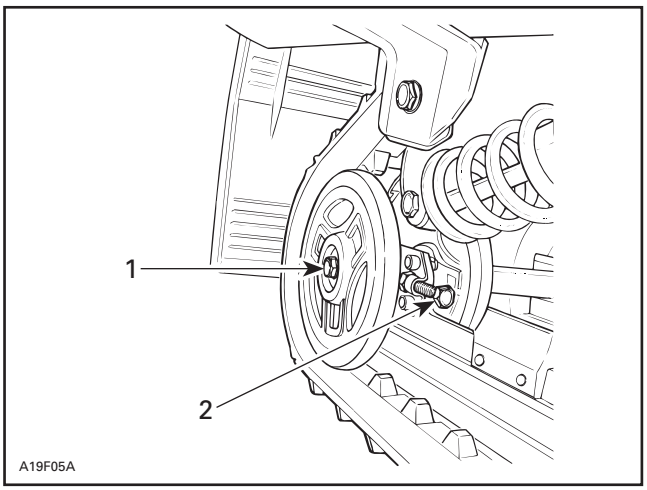
NOTE: Lightly oil track tension gauge center pin to avoid sticking.

All Models

Refer to TECHNICAL DATA for proper tension values.

CAUTION: Too much tension will result in excessive stress on suspension components. If too loose, the track will have a tendency to thump.

To adjust, loosen the rear idler wheel retaining screws then loosen or tighten the adjuster bolts located on the inner side of the rear idler wheels.



TYPICAL
1. Retaining screw
2. Adjuster bolt

Alignment

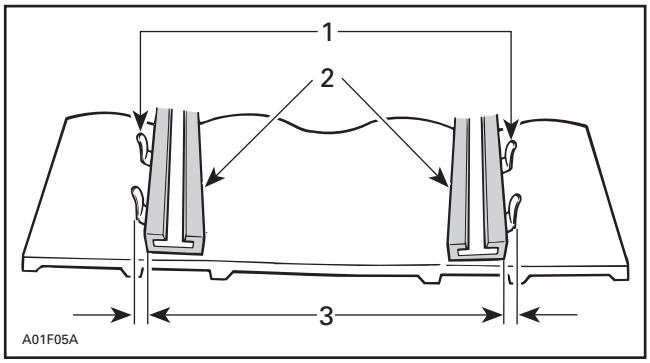
⚠ WARNING

Before checking track tension, ensure that the track is free of all particles which could be thrown out while it is rotating. Keep hands, tools, feet and clothing clear of track. Ensure no one is standing in close proximity to the vehicle.

All Models

With rear of vehicle supported off the ground, start engine and allow the track to rotate **slowly**.

Check that the track is well centered; equal distance on both sides between edges of track guides and slider shoes.

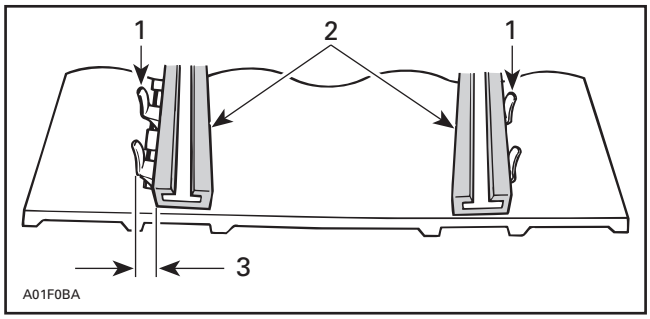


1. Guides
2. Slider shoes
3. Equal distance

⚠ WARNING

Before checking track alignment, ensure that the track is free of all particles which could be thrown out while track is rotating. Keep hands, tools, feet and clothing clear of track.

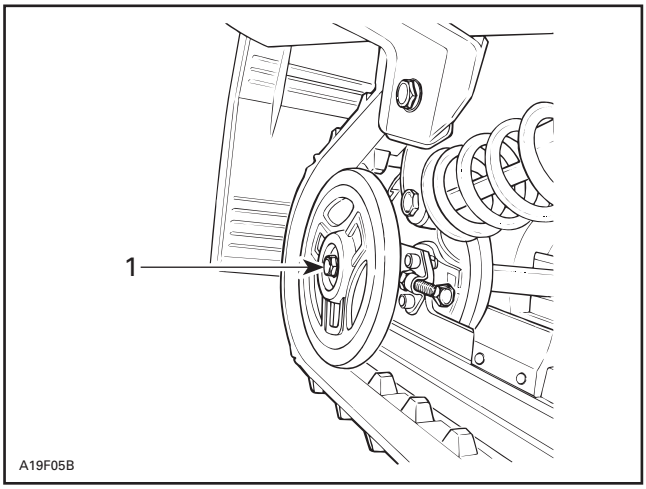
To correct, stop engine then tighten the adjuster bolt on side where guides are farthest to slide. Recheck alignment.



1. Guides
2. Slider shoes
3. Tighten on this side

NOTE: Torque retaining screw to 48 N•m (35 lbf•ft) after adjustment.

Tighten the idler wheel retaining screws.



TYPICAL

1. Retighten

Restart engine, rotate track **slowly** and recheck alignment.

Track Cleat

Removal

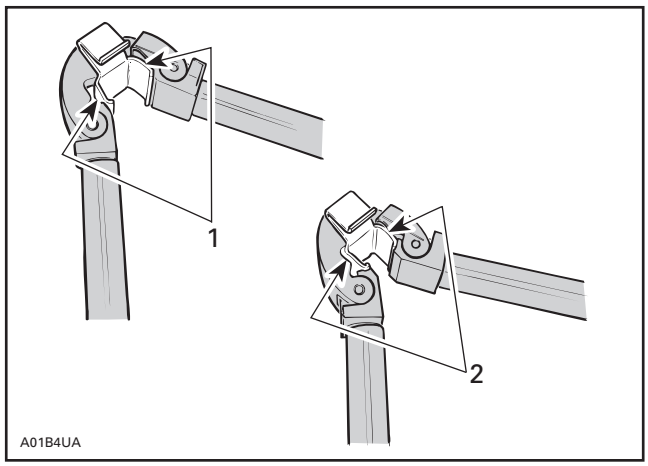
– Raise rear of vehicle off the ground and lift snow-guard then rotate track to expose a cleat to be replaced.

– Using track cleat remover (P/N 529 028 700) for all models.

Installation

NOTE: Keep the same pitch between guide cleats.

– Place new cleat in position and using narrow track cleat installer (P/N 529 008 500) bend cleat then push tabs into rubber.



TYPICAL

1. First step
2. Second step (to push tabs into rubber)

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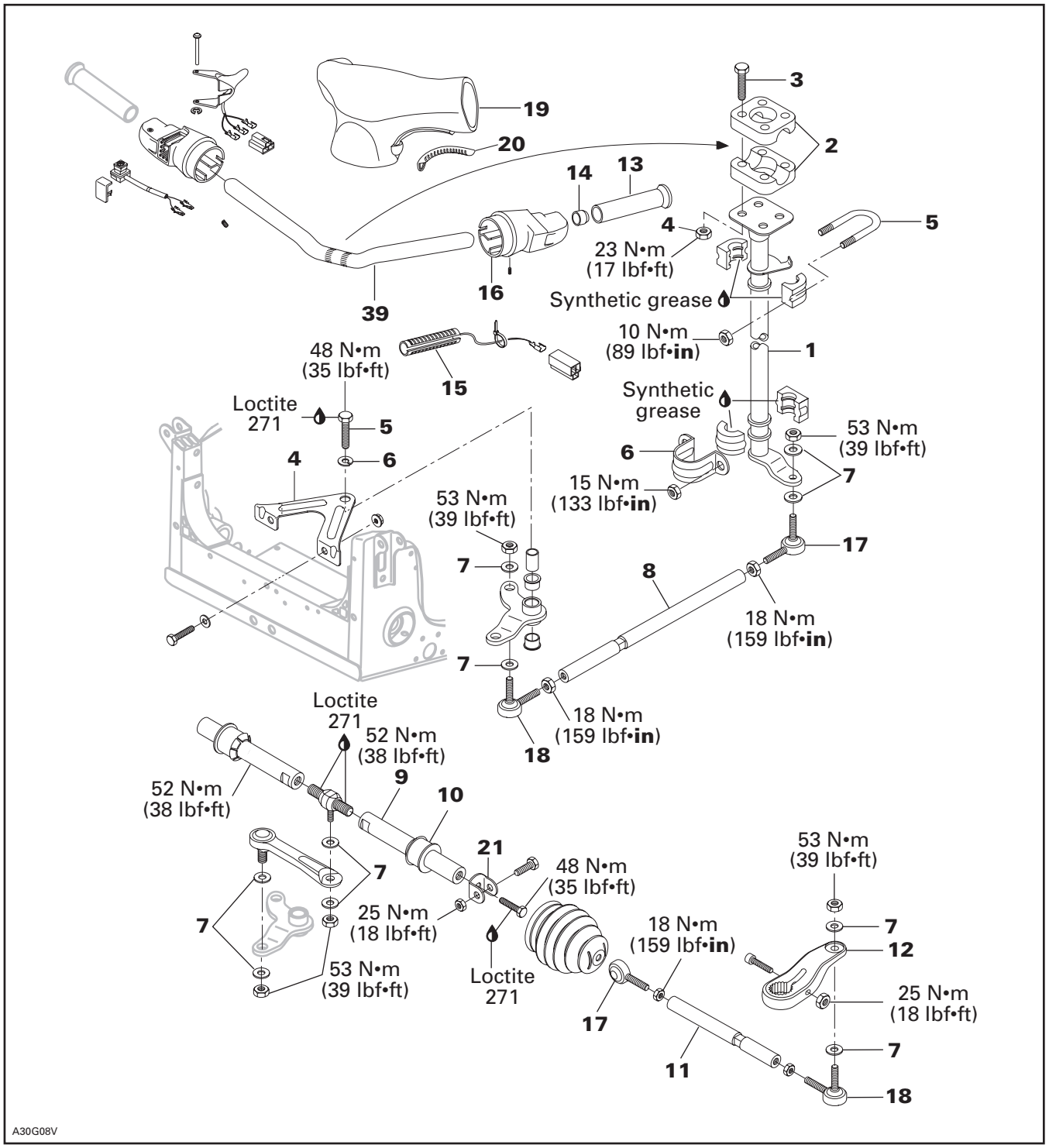
STEERING SYSTEM

CK3 Series



TYPICAL

⚠ WARNING

On Grand Touring SE do not lift vehicle by steering column.

DISASSEMBLY AND ASSEMBLY

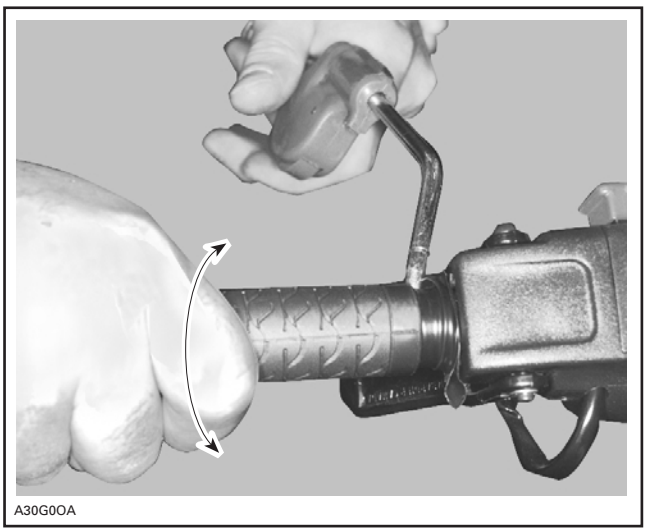
13, Grip

Grips must be carefully removed to prevent damaging the heating elements.

Heat grip with a heat gun.

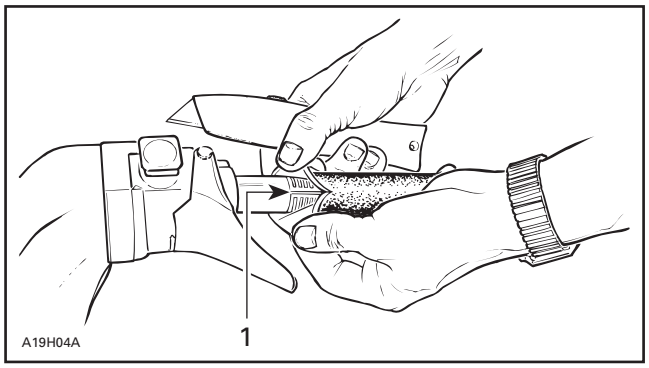
Apply tape to handlebar near the grip to protect paint.

Inject compressed air into the handlebar and twist grip as pulling it out.



The grips might be unremovable as explained above, in this case, carefully proceed as follows to prevent damaging the heating elements.

Locate the element wires inside the handlebar; look through end of grip. Start cutting the grip exactly opposite the element wires and immediately peel it open to locate the gap in the heating element, as shown.



TYPICAL

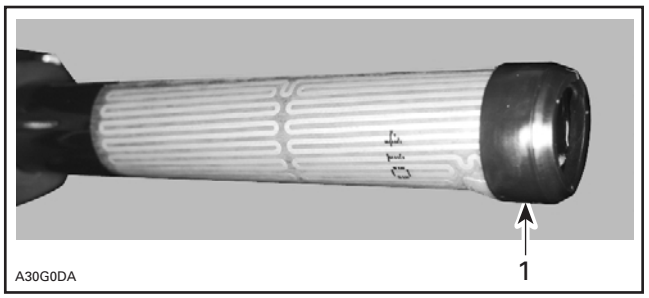
1. Gap in the heating element opposite the wires

Continue cutting along the gap and remove the grip.

If required, slowly peel heating element **no. 15** from handlebar and remove it.

To install, stick the heating element to the handlebar making sure the wires do not interfere with operation of the accelerator or brake handle.

Prior to install grips, position heating element protector **no. 14**.



1. Heating element protector

⚠ WARNING

Never use lubricants (e.g. oil, grease, etc.) to install the handlebar grip, use a mix of soap and water. Mix 40 parts of water with one part of dish washing soap (recommended: Ultra Joy, Sunlight or Palmolive).

Heat the grip with a heater gun or a spot light to ease installation. Insert new grip with compressed air.

A30G0NA

Tilt Handlebar Mechanism

Grand Touring SE and Mach Z TECH PLUS Only

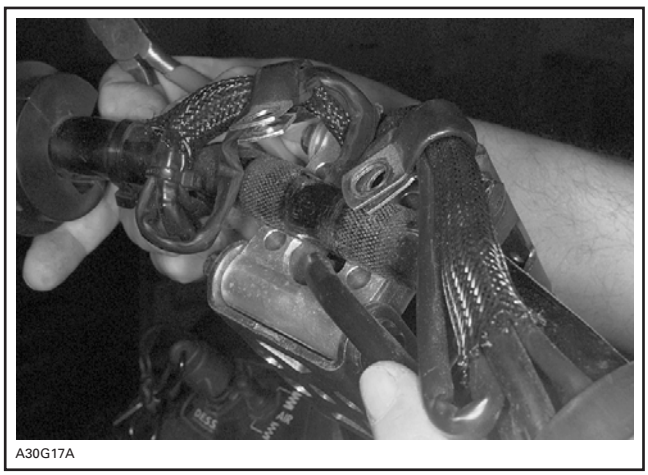
Move handlebar to its higher position.

Remove Allen screw retaining locking lever. Pull out locking lever.

Remove steering pad. Unhook throttle cable from throttle lever.

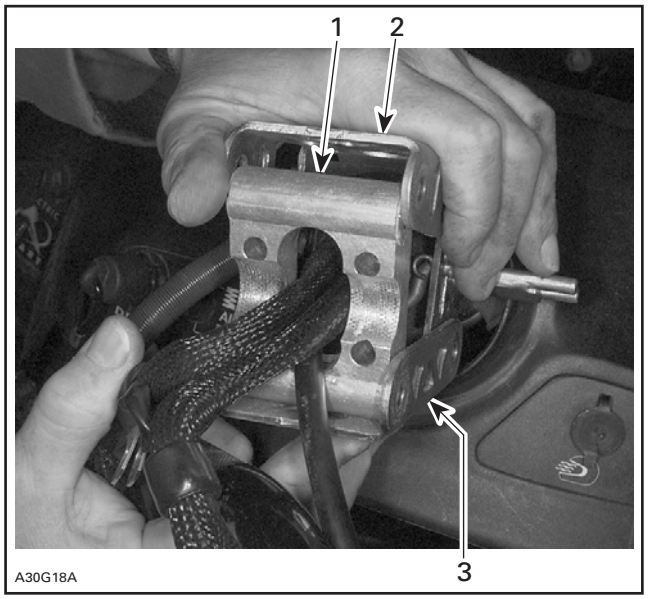
Unscrew all 4 nuts and bolts securing handlebar.

NOTE: Do not unbolt master cylinder needlessly. Move handlebar apart, keeping master cylinder reservoir in upward position.


A30G17A

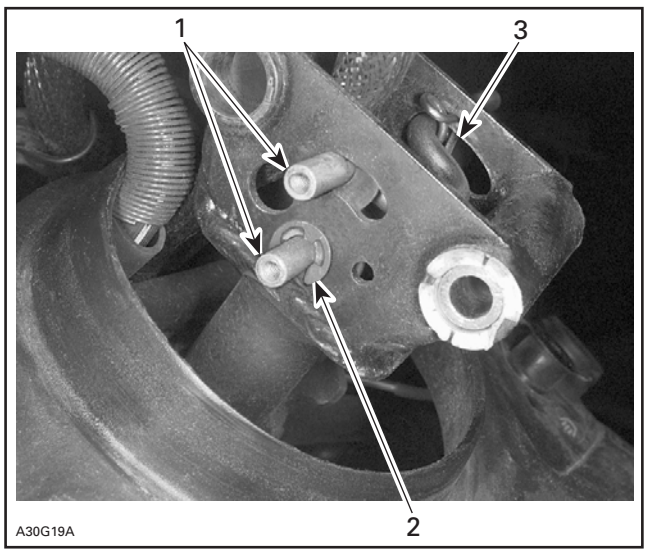
HANDLEBAR READY TO BE MOVED

Unbolt 4 nuts and bolts retaining clamp, front and rear arms.



1. *Clamp*
2. *Front arm*
3. *Rear arm*

Remove plate, circlip on left side then, plastic washer on right side.

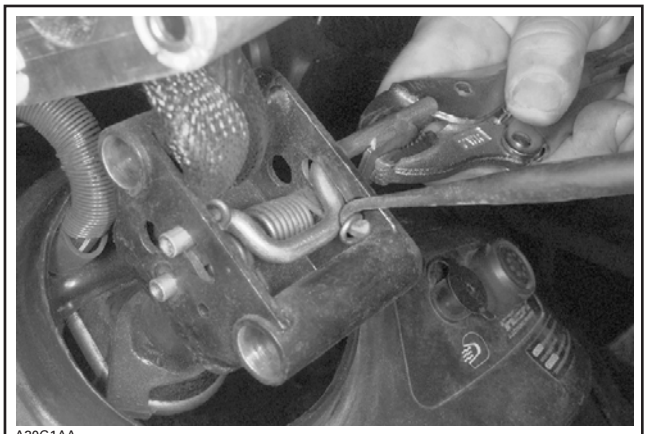


1. *Plate removed*
2. *Circlip to be removed*
3. *Plastic washer on right side*

Using a hook, pull spring right side end to allow removing welded lock.

⚠ WARNING

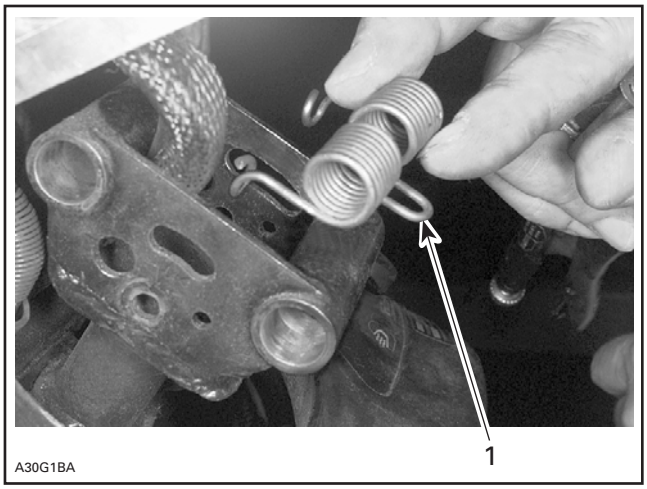
Spring will be ejected upon welded lock removal.



WELDED LOCK REMOVAL

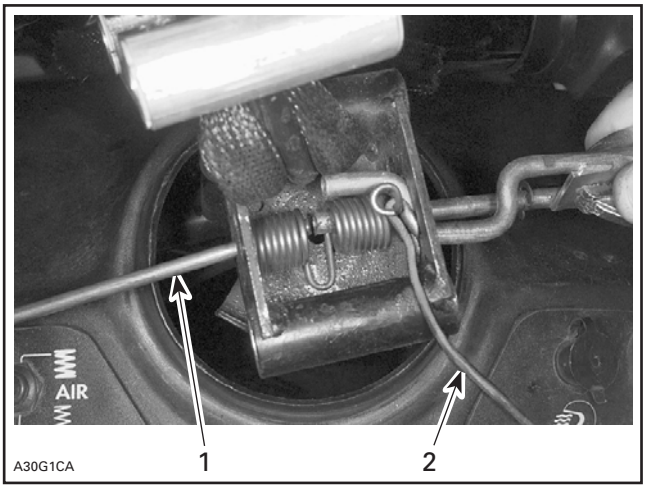
To reassemble tilt handlebar mechanism, reverse disassembly procedure. However, pay attention to the following:

Install spring with its locking tab facing bottom and rear.



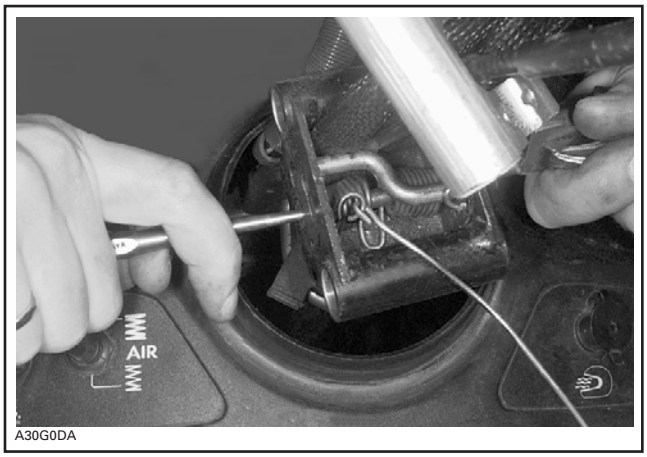
1. Spring tab

Hold left side portion of spring with a punch inserted in lower bracket. Pull right side spring end with a hook during welded lock insertion.

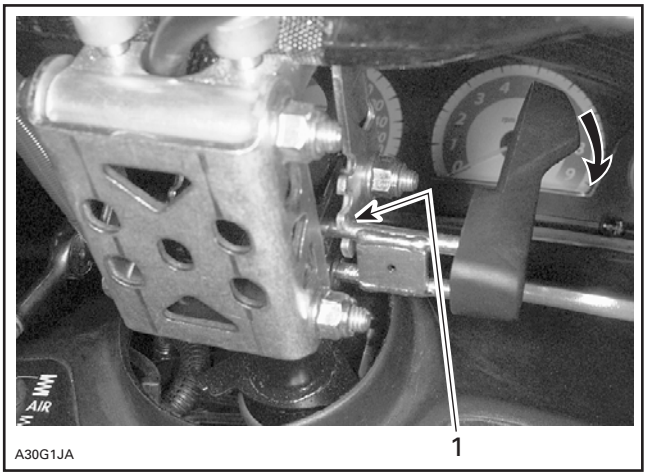


1. Punch
2. Hook to pull spring end

Proceed the same with left side spring end.

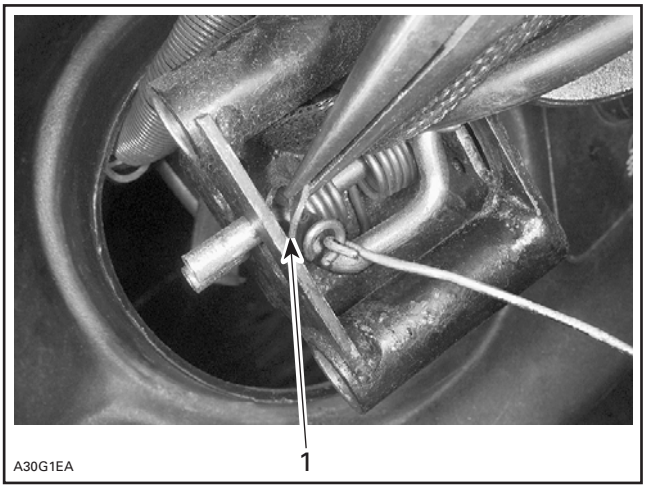


Temporary install locking lever. Push it forward in order to maintain locking rod fully engaged. Tighten screws retaining plate while keeping locking rod fully engaged.

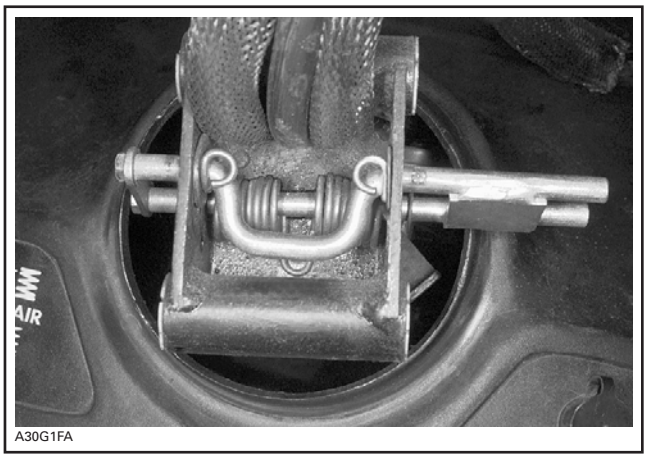


1. Locking rod fully engaged

Install a new plastic washer on each end of spring.



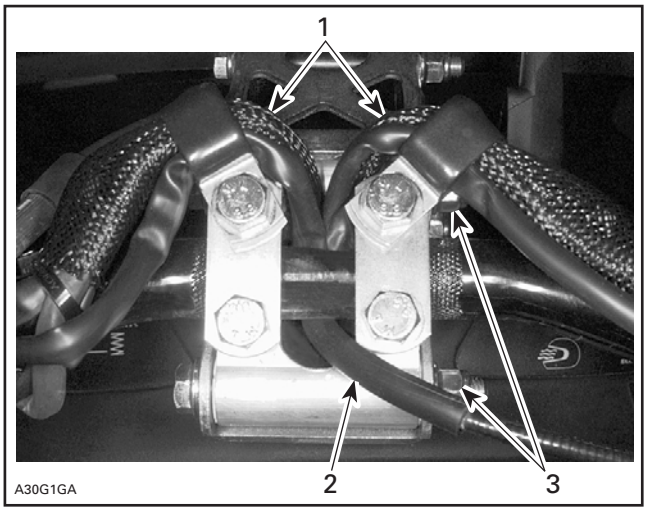
1. Plastic washers



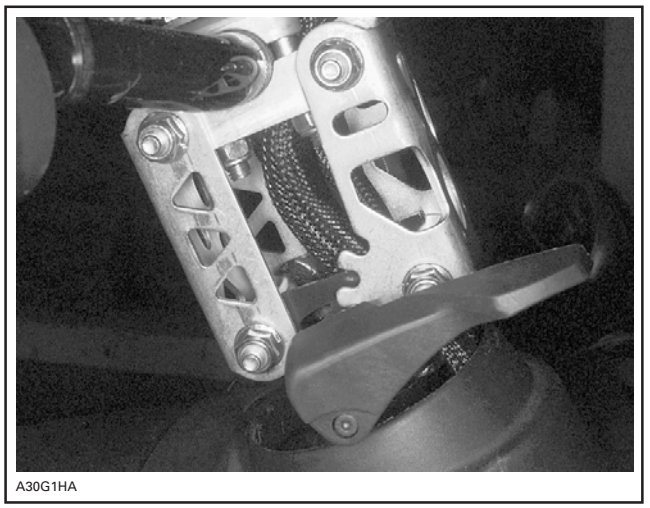
WELDED LOCK INSTALLED

Throttle cable must be under handlebar and wiring harnesses above.

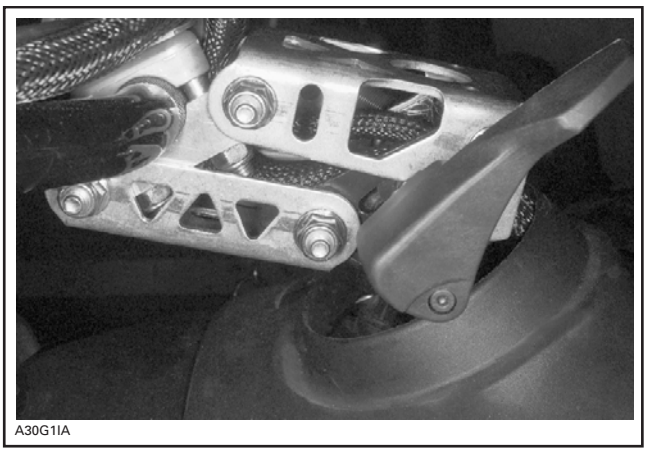
All 4 nuts retaining front and rear arms must be on right side.



1. Wiring harnesses
2. Throttle cable
3. Nuts on right side



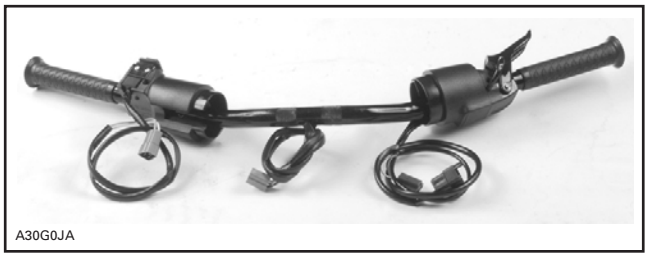
HANDLEBAR IN UPPER POSITION



HANDLEBAR IN LOWER POSITION

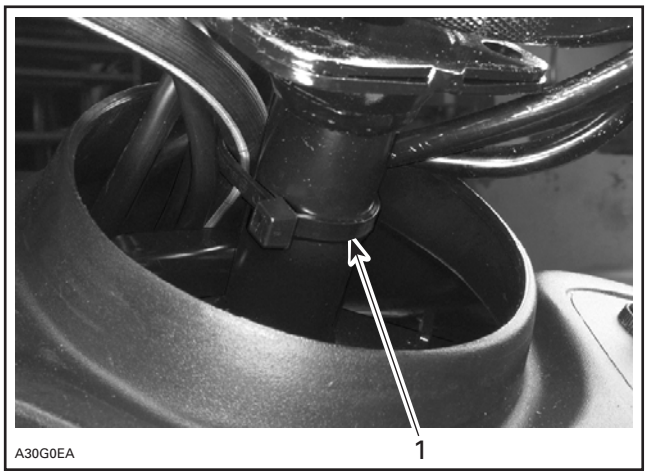
1, Steering Column

Remove steering pad, remove master cylinder from handlebar and put it aside. Remove circlip retaining throttle cable to throttle housing. Unplug all connector housings of handlebar switches. Remove handlebar assembly.



HANDLEBAR ASSEMBLY

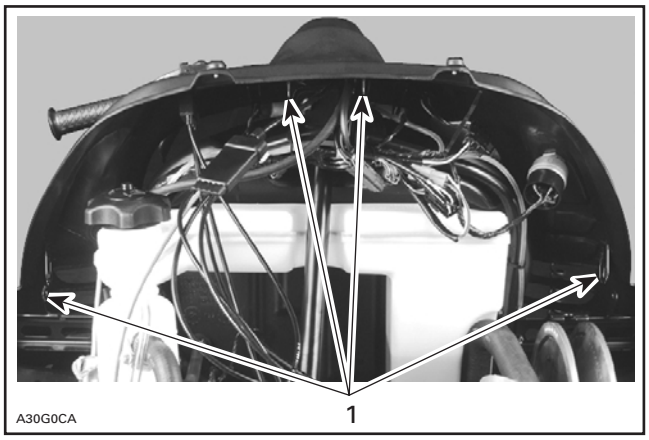
Cut locking tie retaining brake line and throttle cable to steering column.



1. Cut this locking tie

Remove the air intake silencer then center and magneto side carburetors.

Unbolt console at center and sides.



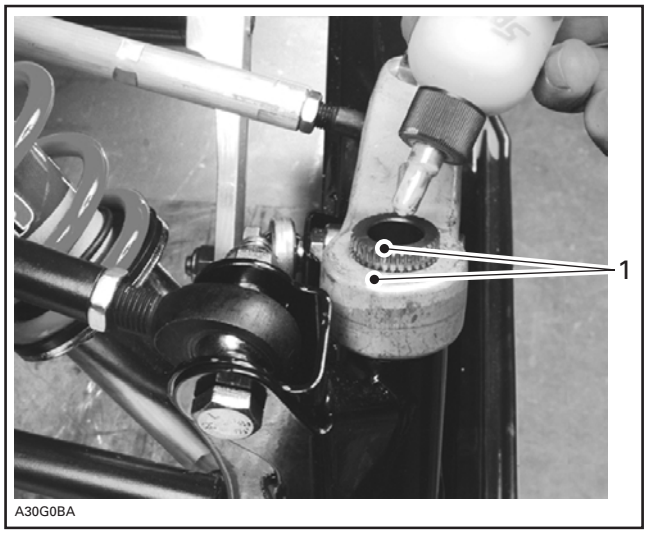
1. Unbolt console

Detach the short tie rod (under the engine) from the steering column. Note that a hardened flat washer **no. 7** goes on each side of steering column lever.

Unfasten steering column from vehicle.

12, Steering Arm

To maintain correct steering geometry for reassembling, scribe mark the steering arm and ski leg before disassembly.



1. Marks

10, Bushing

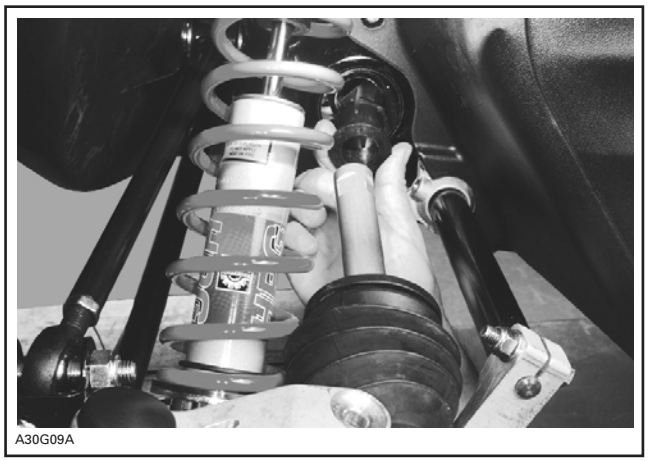
Unscrew ball joint **no. 18** from steering arm.

Unscrew sliding rod **no. 9**.

Detach rubber boot from frame. Pull out sliding rod.

Working from engine compartment, drive out bushing **no. 10**.

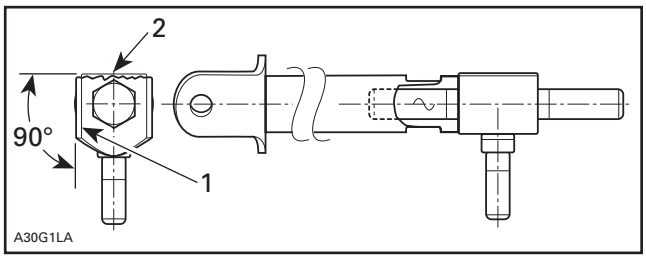
Install a new bushing proceeding from front suspension pit.



BUSHING INSTALLATION

21, Bracket

Bracket must be installed at 90° from top of center ball joint.

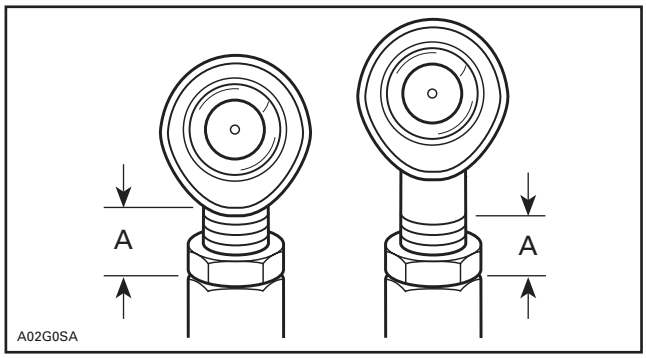


FRONT VIEW AND SIDE VIEW

1. *Bracket*
2. *Top of center ball joint*

17,18, Ball Joint (left hand and right hand threads)

The maximum external threaded length not engaged in the tie rod must not exceed 20 mm (25/32 in).

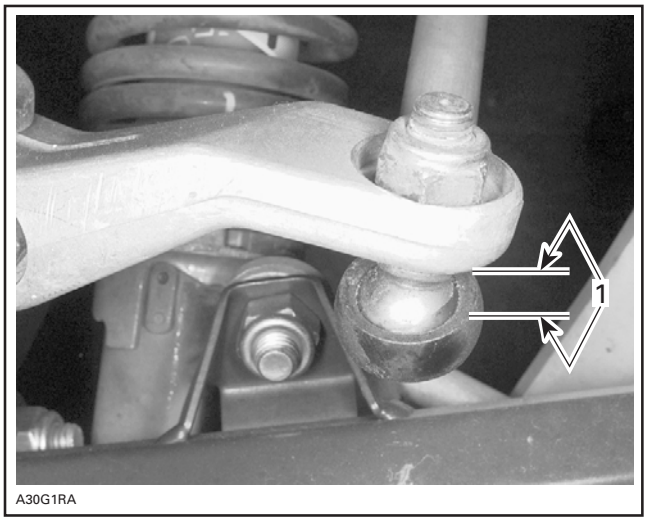


TYPICAL

A. 20 mm (25/32 in) max.

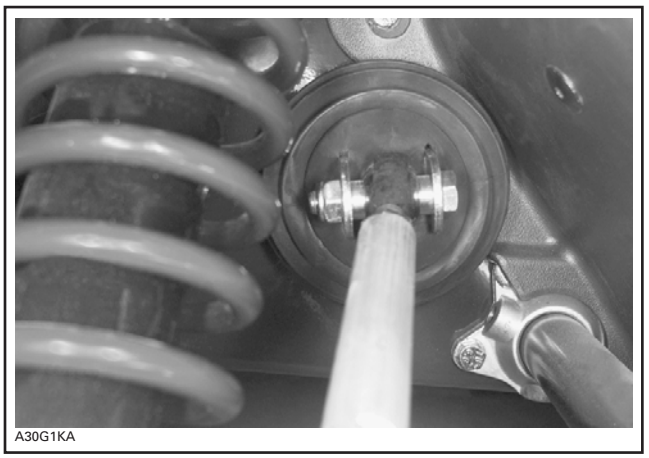
The ball joint should be restrained when tightening the tie rod end lock nut. Align it so the tie rod end cut-off section is parallel to the steering arm when assembled on the vehicle, refer to the following illustration.

For proper torque specifications refer to the specific exploded view for the vehicle being serviced.



TYPICAL

1. *Parallel*



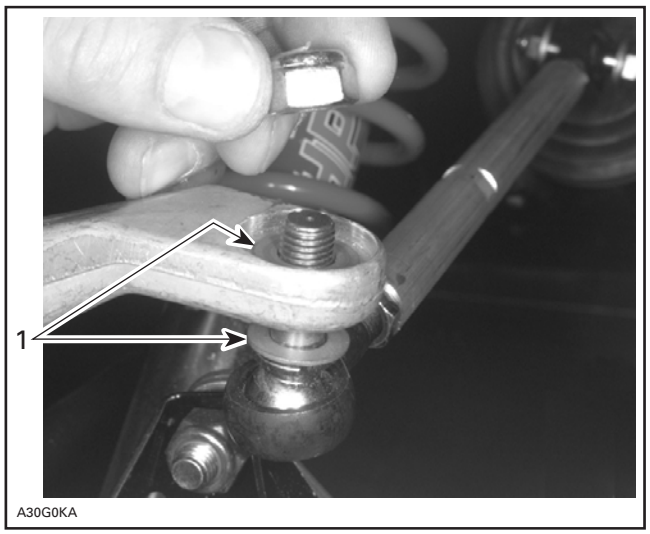
TIE ROD BALL JOINT PARALLEL TO BRACKET BEFORE TIGHTENING

⚠ WARNING

The cut off section of the ball joint must run parallel with the steering arm. When tightening lock nuts, restrain ball joint with appropriate size wrench. The maximum external threaded length not engaged in the tie rod must not exceed 20 mm (25/32 in).

7, Hardened Washer

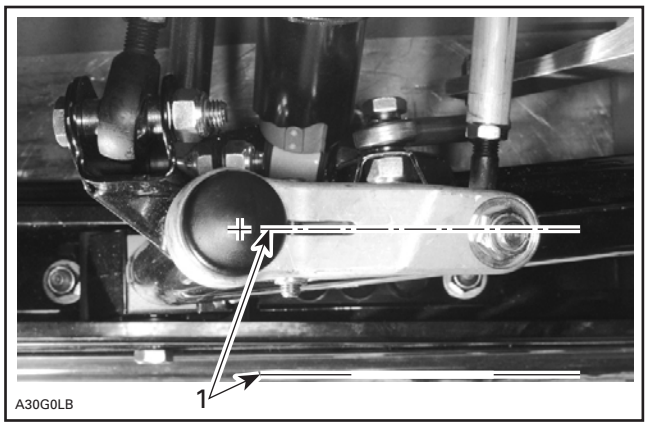
Install a hardened washer on each side of the arm.



1. Hardened washers

12, Steering Arm

Steering arm axis (from plastic cap center to ball center of ball joint) must run parallel to ski.



1. Parallel

Tighten the steering arm pinch bolt and nut to the torque specified in the exploded view.

INSPECTION

Check skis and runner shoes for wear, replace as necessary. Refer to FRONT SUSPENSION.

12, Steering Arm

Make sure steering arm and ski leg splines interlock.

⚠ WARNING

Any parts having worn splines have to be replaces with new ones.

Check the general condition of the steering system components for wear. Replace if necessary.

15, Heating Grip Element

Refer to TESTING PROCEDURE.

17,18, Ball Joint (left hand and right hand threads)

Inspect ball joint ends for wear or looseness, if excessive, replace them.

HANDLEBAR ADJUSTMENT

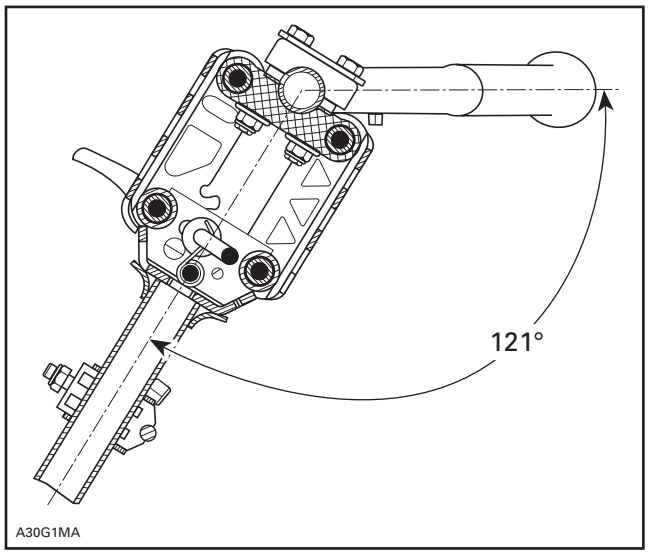
Mach Z STD

Loosen all 4 nuts **no. 4** retaining steering clamps **no. 2**.

Adjust the steering handlebar to the desired position.

Grand Touring SE and Mach Z TECH PLUS

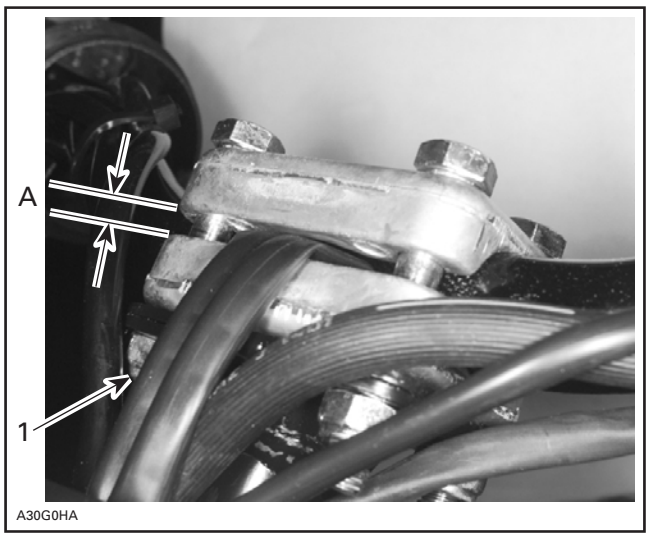
With tilt handlebar mechanism is upper position, install handlebar at 121° from steering column.



All Models

Lock the handlebar in place by tightening the 4 nuts as specified in the illustrations.

CAUTION: Tighten the nuts equally in a criss-cross sequence and ensure there is an equal gap on each side of the clamps.



TYPICAL

1. Torque to 23 N•m (17 lbf•ft)
A. Equal gap all around

⚠ WARNING

Avoid contact between the brake handle and the windshield by NOT adjusting the handlebar too high.

⚠ WARNING

Make sure that the steering pad and all controls are properly fixed to their normal location on the handlebar.

19,20, Steering Pad and Rubber Attachment

CAUTION: Prior to installation, perform handlebar adjustment.

Properly fit the steering pad to the handlebar. Assemble using the 2 rubber attachments.

⚠ WARNING

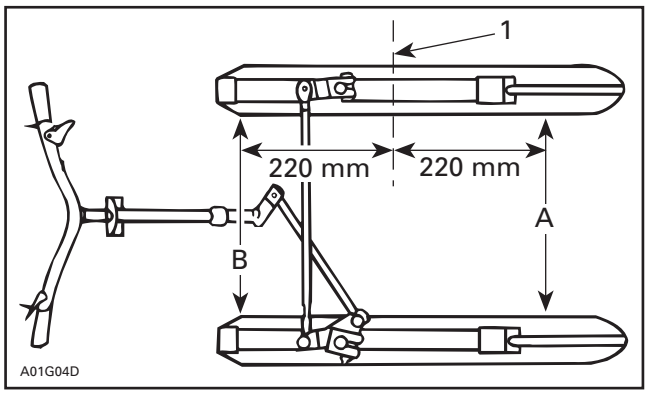
Make sure that the steering pad and all controls are properly fixed to their normal location on the handlebar.

STEERING ADJUSTMENT (skis)

Definitions

TOE-OUT:

A difference measured between the front edge of the skis "A" and rear edge "B" as viewed from the top. It is adjustable. For all CK3 models, toe-out is measured at 220 mm (8-21/32 in) from ski pivot bolt axis.



TYPICAL

1. Ski pivot bolt axis

CAMBER:

A specific inward or outward tilt angle of ski leg compared to a vertical line when viewing the vehicle from front.

Adjustments

Adjustments should be performed following this sequence:

– Pivot arm centering.
– Set camber angle.
– Set toe-out.

PIVOT ARM CENTERING

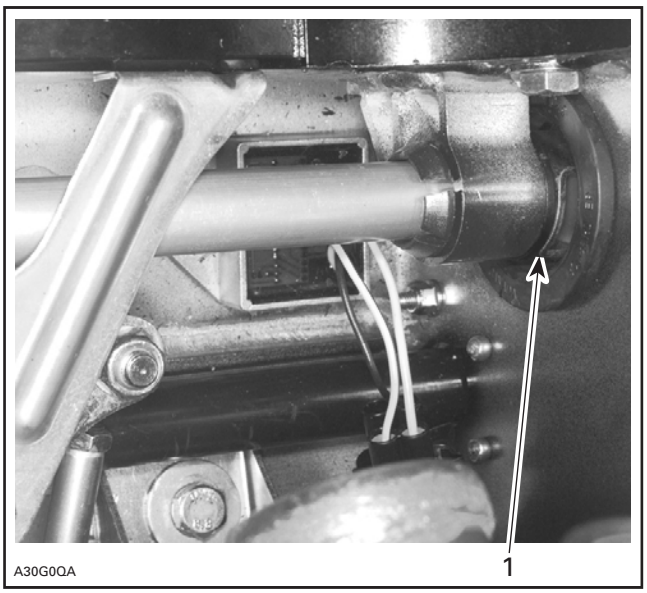
⚠ WARNING

Do not attempt to adjust straight ahead ski position by turning the ball joint on tie rod **no. 8**.

8,17,18,21, Tie Rod, Ball Joint and Bracket

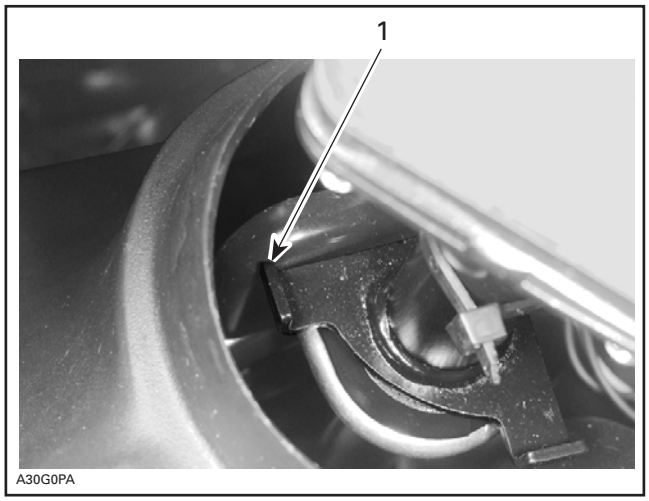
Remove steering pad.

Turn handlebar all the way to the right. Check that the right side bracket **no. 21** is against the bushing **no. 10**.



1. Bracket against the bushing

Keeping the handlebar in that position, check that the stopper on the steering column is almost touching the plate.

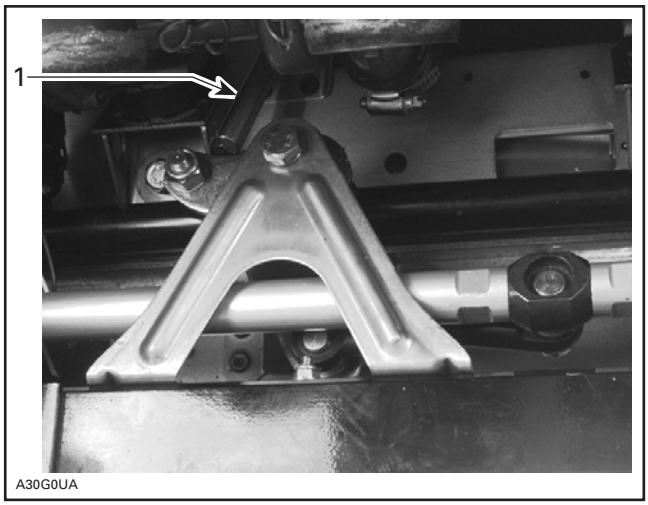


1. Stopper almost touching the plate

Loosen the jam nuts on tie rod **no. 8** (LH threads on steering column end) and turn tie rod accordingly. Align and retighten the jam nuts to 18 N•m (159 lbf•**in**).

⚠ WARNING

Never lengthen this tie rod so that threaded portion of ball joint exceeds 20 mm (25/32 in).



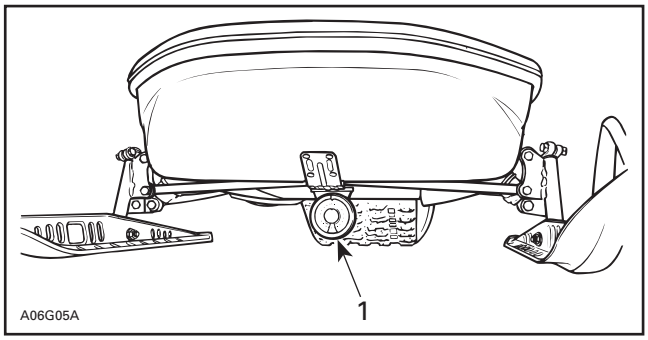
*1. Tie rod **no. 8***

CAMBER

NOTE: Identical adjustments are required on both sides of the vehicle.

– Make sure the vehicle is leveled by placing an angle finder under the main frame member as shown on the following illustration.

– Vehicle skis must be off the ground.

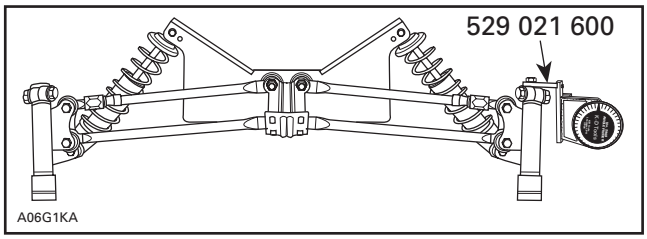


TYPICAL

1. Angle finder

Using special tool (P/N 529 021 600) mounted to the ski leg, position the angle finder on the tool as shown in the following illustration. An alternate location for the angle finder if the special tool is not available is the outside of the ski leg housing.

CAUTION: Angle finder must sit square against swing arm. Positioning angle finder against weld bead or decal may result in false reading.



TYPICAL — CAMBER ADJUSTMENT SET-UP

Adjusting

– Loosen lock nut on both upper control arms.
– Unbolt both upper control arms at ski leg housing. Turn tie rod half turn at a time to obtain the specified value when skis are not touching ground. Bolt upper control arms.

MODEL	CAMBER ± 0.5°
GT SE	Not Adjustable
Mach Z STD/TECH PLUS	- 0.5

NOTE: Because of a negative camber, skis will lean toward center of vehicle.

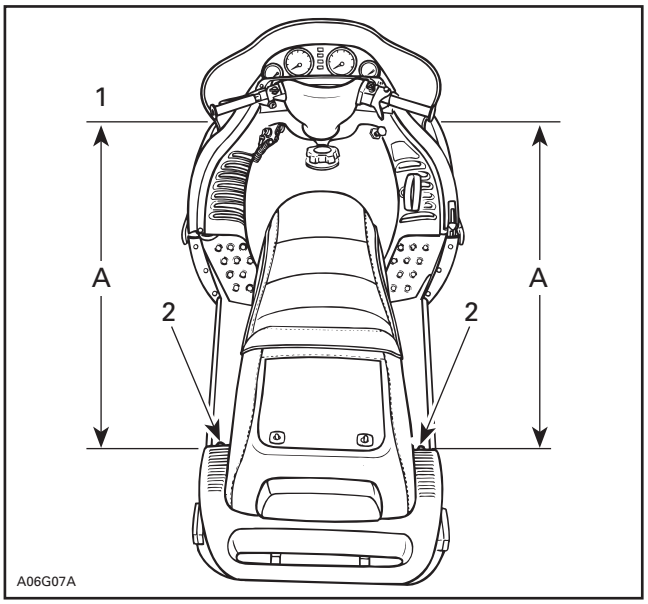
Tighten lock nut on both upper control arms.

SKI TOE-OUT

Lift front of vehicle off the ground.

Make sure that handlebar is in straight ahead position by measuring from the extremities of the grips to the rearmost edge of the tunnel, as shown.

NOTE: The reference point must be the same relative to each side.



TYPICAL

1. Equal distance A on each side
2. Same reference point

⚠ WARNING

Do not attempt to adjust skis straight ahead position by turning ball joint on tie rod no. 8.

Loosen jam nuts of both tie rods no. 11.

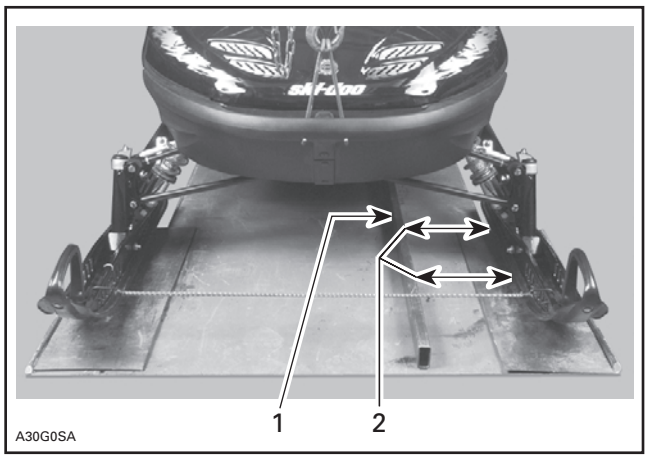
NOTE: Hook a rubber cord in front of skis to keep them closed and to eliminate all free play.

Toe-out must be as specified when skis are in a straight-ahead position and the front of vehicle is lifted off the ground.

MODEL	TOTAL TOE-OUT + 3 mm (+ 1/8 in) - 0 mm (- 0 in)
GT SE	12 (1/2)
Mach Z STD/TECH PLUS	8 (5/16)

Place a straight edge against pre-adjusted track and measure the distance between front and rear of skis and straight edge. Measuring points are 220 mm (8-21/32 in) at front and rear of ski pivot axis.

To reduce tolerance when measuring, set one ski to proper toe-out (half the total toe-out) then measure from that ski to the opposite ski.



1. Straight edge
2. Measure at 220 mm (8-21/32 in) from ski pivot axis

LUBRICATION

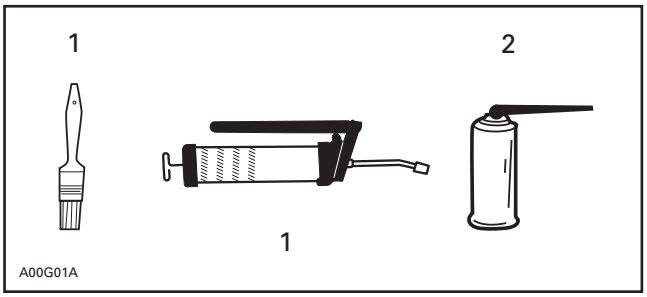
⚠ WARNING

Do not lubricate throttle cable or housing.

26, Grease Fittings

Only use synthetic grease (P/N 413 711 500).

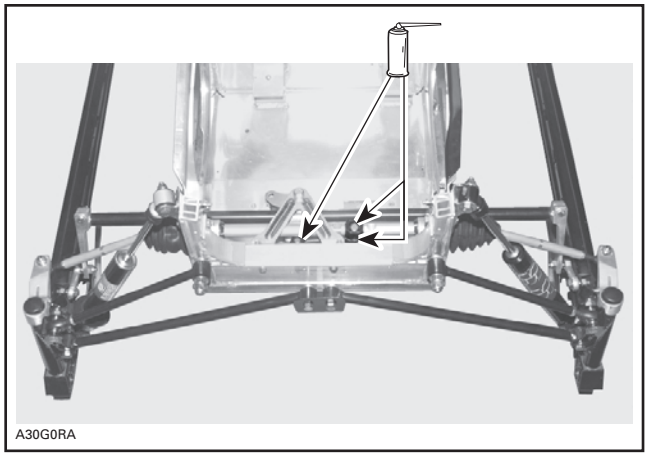
The following symbols will be used to show what type of lubricant should be used at the suitable locations.

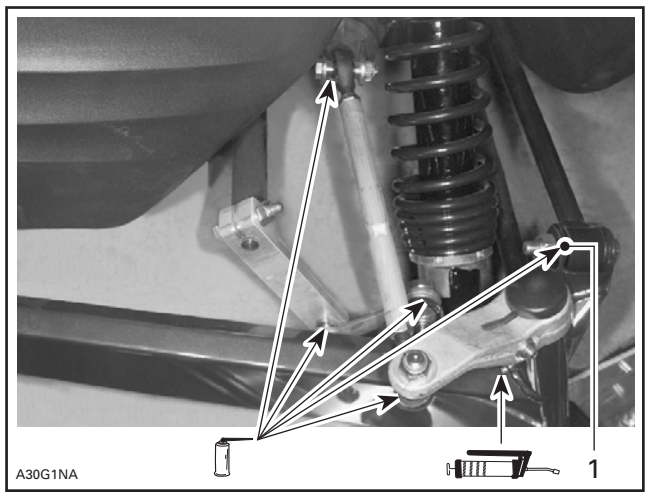


1. Synthetic grease (P/N 413 711 500)
2. BOMBARDIER LUBE (P/N 293 600 016)

Lubricate:

– steering column bushings
– short tie rod ends
– ball stud lever
– upper arm ball joint on Mach Z STD/TECH PLUS only
– ski legs
– stabilizer ball joints.

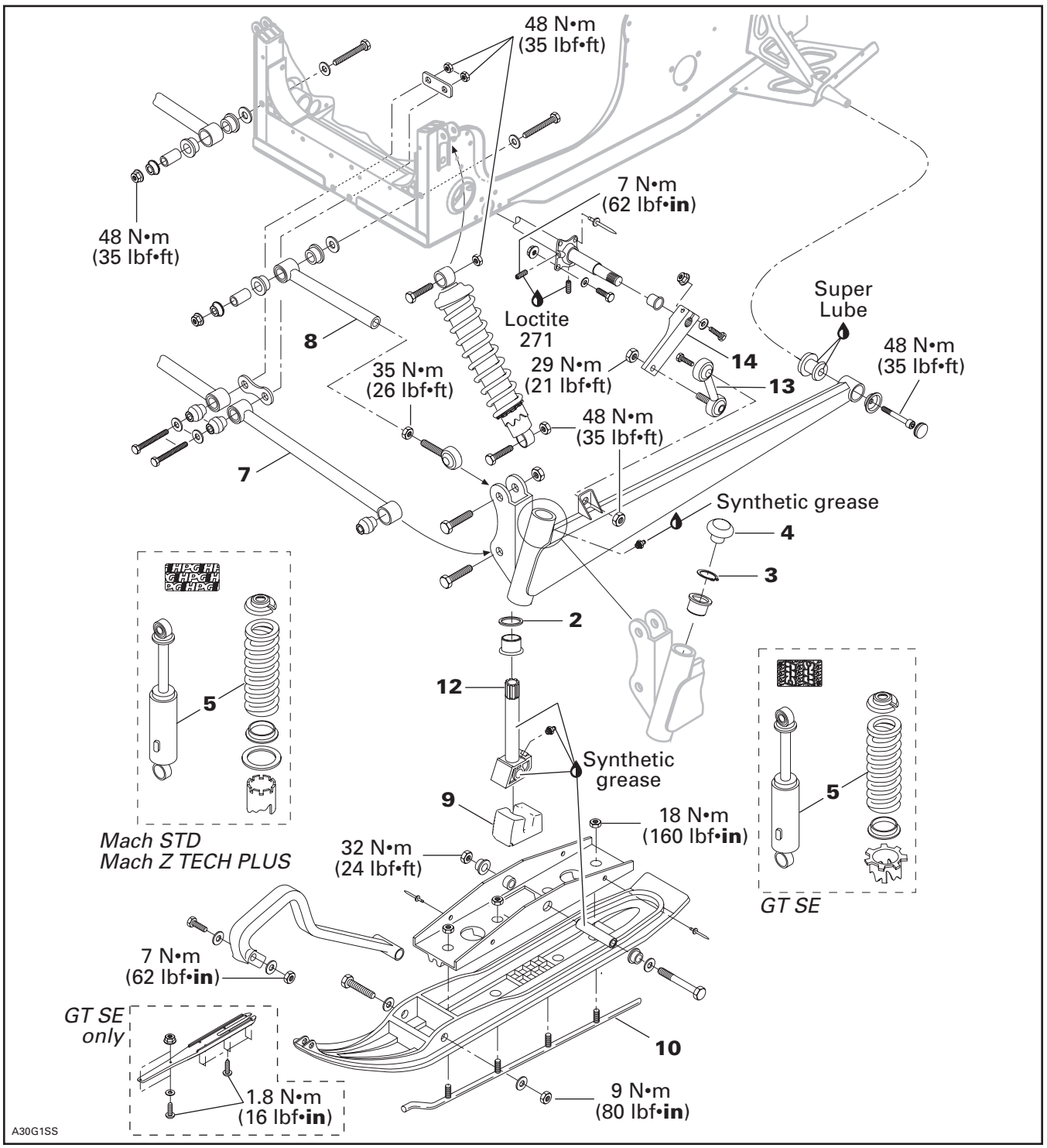




TYPICAL
1. Upper arm ball joint on Mach Z STD/TECH PLUS only

SUSPENSION AND SKI SYSTEM

CK3 Series

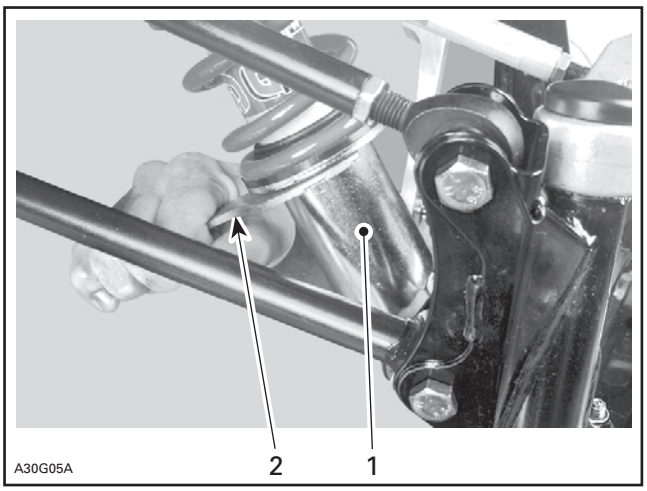


DISASSEMBLY

5, Shock

Lift front of vehicle and support it off the ground.

Reduce spring preload by turning adjusting ring accordingly with the adjustment wrench in vehicle tool box.



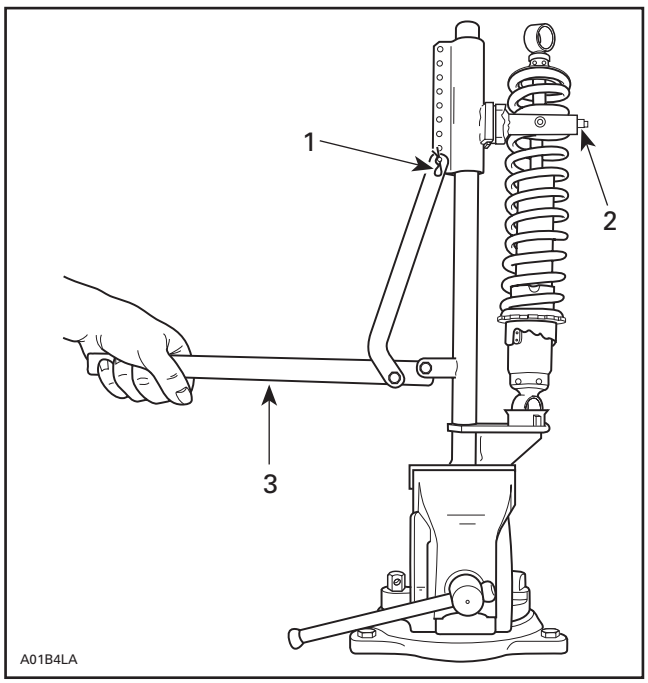
TYPICAL

1. *Shock cam*
2. *Adjustment wrench*

Remove lower bolt then upper bolt of shock.

For shock spring disassembly use shock spring remover (P/N 529 027 100) in a vise. Mount shock in it and turn shock so that spring coils matched spring compressor.

Close and lock the bar. Adjust the handle horizontal position by changing the position of the clevis pin.



1. *Clevis pin*
2. *Bar*
3. *Handle horizontal*

Push down on the handle until it locks. Remove spring stopper then release handle.

1, Swing Arm

Lift front of vehicle and support it off the ground.

Remove cap **no. 4**, circlip **no. 3** then loosen steering arm bolt and pull up steering arm. Ski leg may fall off from swing arm. Note washer **no. 2** position.

Unbolt lower end of shock from swing arm.

Unbolt arms.

Unbolt tie rod **no. 13** ball joint from swing arm.

Unbolt rear of swing arm from frame.

Pull swing arm off the vehicle.

INSPECTION

Check all rubber cushions for crack and wear. Replace as required.

Check straightness of ski leg **no. 12** and make sure that splines are properly interlocking with steering arm. Replace as required.

Check for straightness of swing arm. Replace as required.

Check for clogged grease fittings. Clean or replace as required.

Check skis and runners **no. 10** for wear, replace as necessary.

Check condition of ski stopper **no. 9**. Replace it when deteriorated.

To check condition of shock, refer to SC-10 II SUSPENSION then look for **Shock Absorber Inspection**.

INSTALLATION

For assembly, reverse the disassembly procedure. However, pay attention to the following.

Apply synthetic grease (P/N 413 711 500) to ski leg components.

Tighten nuts and screws to proper torque as mentioned in exploded view.

7,8, Upper and Lower Half Arms

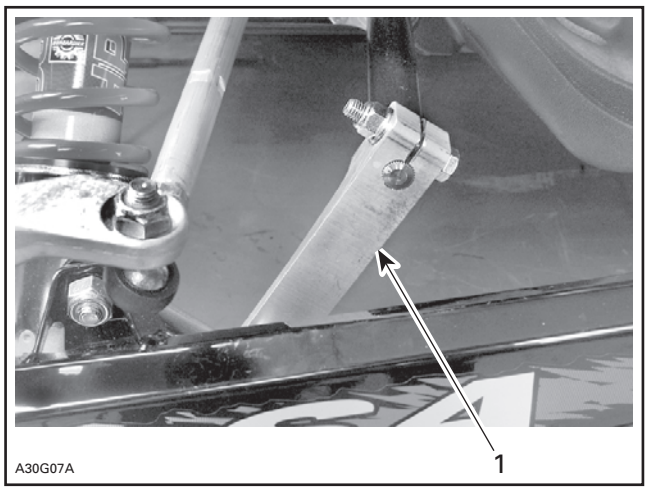
Position half arms and tie rods horizontally before tightening nuts.

8, Adjustable Arm

Refer to STEERING SYSTEM for proper camber adjustment using these arms.

13,14, Tie Rod and Lever

Install levers pointing downward on both sides at same angle, see following photo.



1. Lever pointing downward

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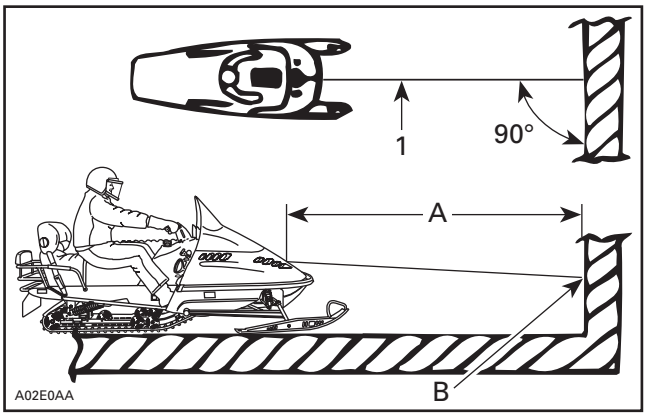
BODY

INSTALLATION AND ADJUSTMENT

HEADLAMP BEAM AIMING

Beam aiming is correct when center of high beam is 25 mm (1 in) below the headlamp horizontal center line, scribed on a test surface, 381 cm (12 ft 6 in) away.

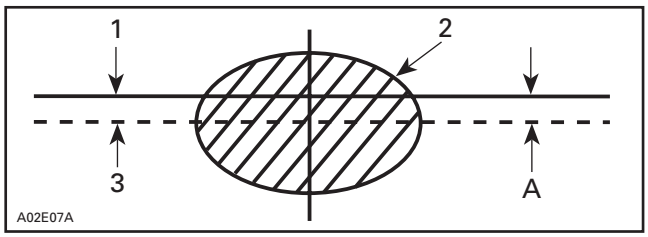
Measure headlamp center distance from ground. Scribe a line at this height on test surface (wall or screen). Light beam center should be 25 mm (1 in) below scribed line.



TYPICAL

1. *Headlamp center line*

A. 381 cm (12 ft 6 in)
B. 25 mm (1 in) below center line



1. *Headlamp horizontal*
2. *Light beam (high beam) (projected on the wall)*
3. *Light beam center*

A. 25 mm (1 in)

Required Conditions

Place the vehicle on a flat surface perpendicular to test surface (wall or screen) and 381 cm (12 ft 6 in) away from it.

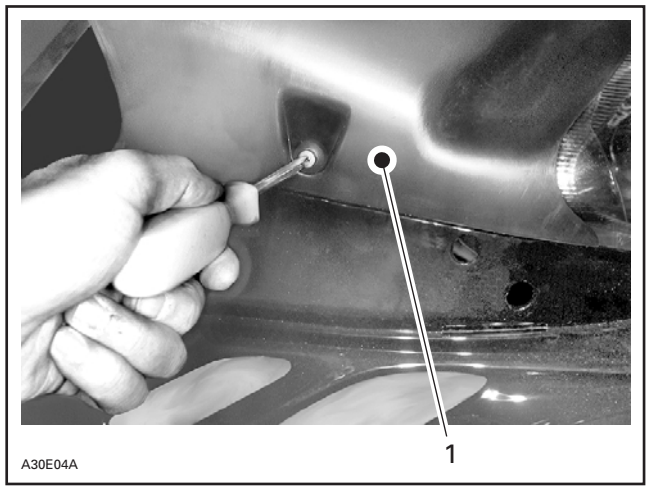
Rider or equivalent weight must be on the vehicle.

Select **high** beam.

BULB REPLACEMENT

Headlamp

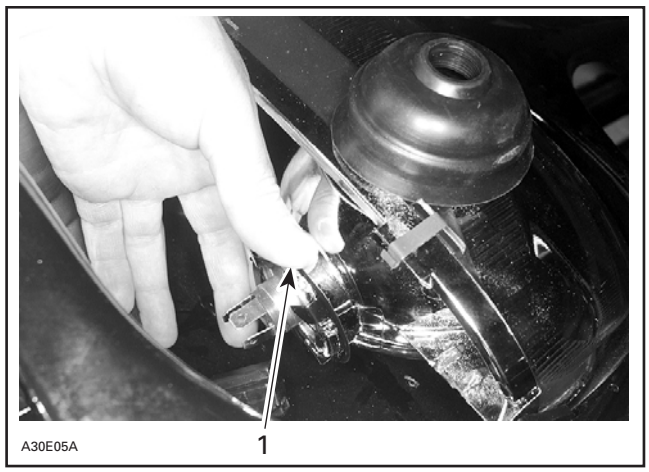
If any headlight bulb is burnt, remove windshield, air filter then, air deflector.



1. *Air deflector*

Unplug burnt bulb connector. Remove the rubber boot.

Unfasten bulb retainer ring. Detach the bulb and replace. Properly reinstall parts including air filter.



1. *Locking ring*

CAUTION: Never touch glass portion of an halogen bulb with bare fingers, as it shortens its operating life. If by mistake glass is touched, clean it with isopropyl alcohol which will not leave a film on the bulb.

Taillight

If the taillight bulb is burnt, expose the bulb by removing red plastic lens. To remove, unscrew the 2 retaining screws. Verify all lights after replacement.

DECAL

To remove a decal; heat old decal with a heat gun and peel off slowly.

Using isopropyl alcohol, clean the surface and dry thoroughly.

Apply liquid soap to new decal and carefully position the decal. Using a sponge or a squeegee, remove the air bubbles and surplus water working from the center toward the edges. Allow to air dry.

CAUTION: Do not apply isopropyl alcohol or solvent directly on decals. Use only in a well ventilated area.

WINDSHIELD INSTALLATION

Remove protective film.

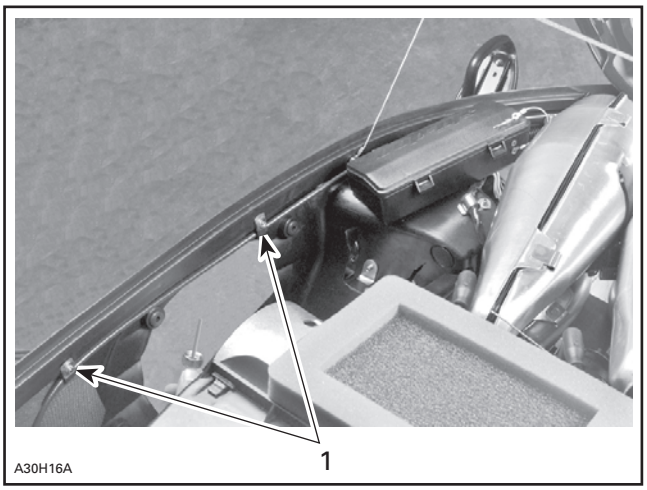
Position the windshield on the hood then push it down until the tabs are fully inserted into the hood slots. Lock the windshield tabs in position.

HOOD

All Models Except Grand Touring SE

Unfasten speedometer cable from angle drive.

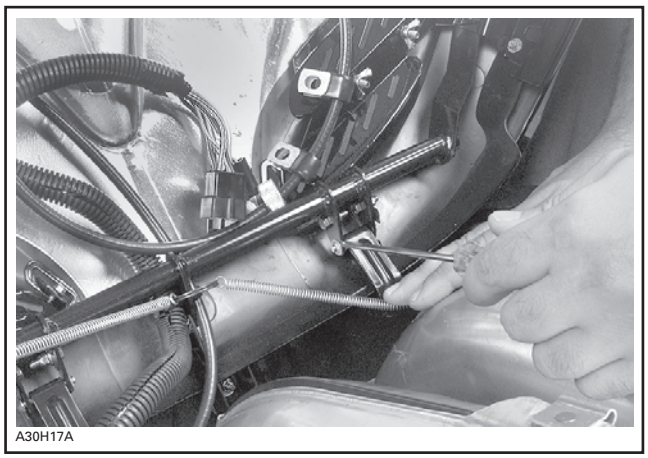
Remove clips holding speedometer cable to bottom pan.



1. Clips

All Models

Remove hinge pin push nuts.



Unplug wiring harnesses then retaining cables.

Remove hinge pins, cables, spring and hood.

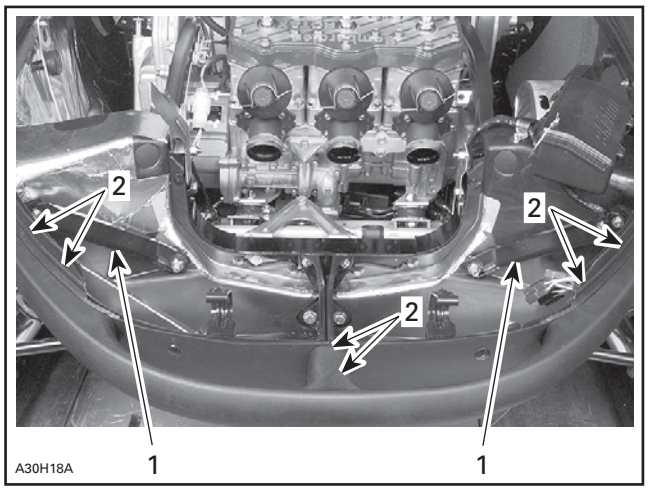
HALF BOTTOM PAN

Remove hood.

Remove tuned pipes and tail pipes. Remove muffler when RH side half bottom pan has to be removed.

Unbolt suspension tower bracket on appropriate side.

Remove 4 screws, 1 nut and 1 rivet retaining front bumper.

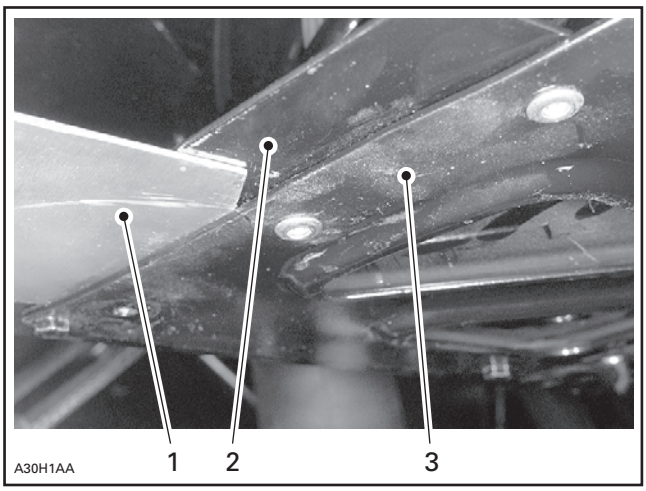


1. Suspension tower bracket
2. Bottom pan screws, nut and rivet

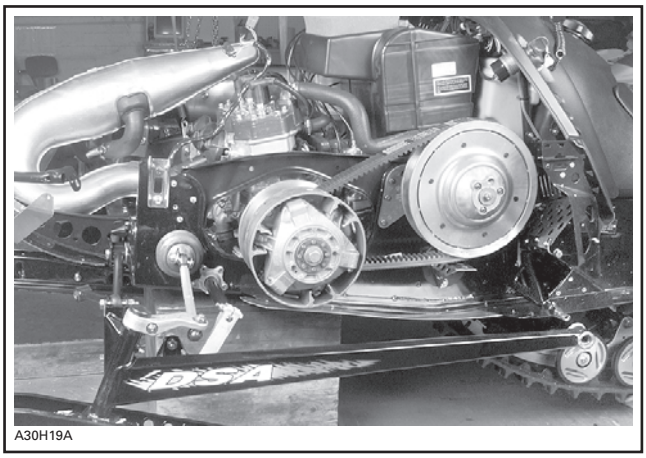
Unfasten swing arm at rear pivot.

Drill all rivets retaining half bottom pan to be removed.

At installation, insert bottom pan protector between tunnel and footrest.

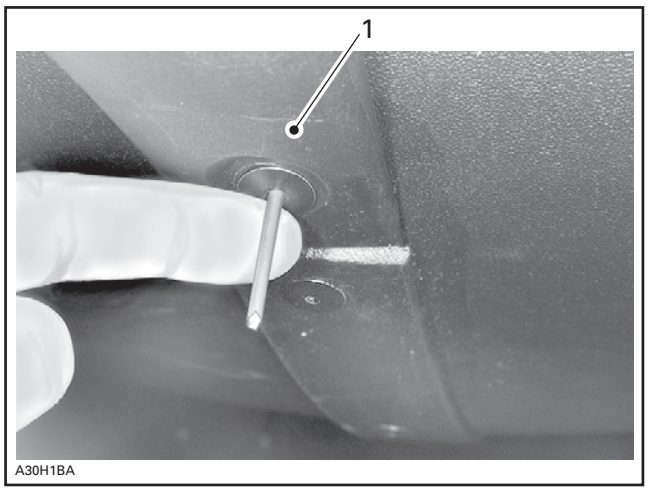


1. *Bottom pan protector*
2. *Footrest*
3. *Tunnel*



VEHICLE READY TO RECEIVE LH SIDE HALF BOTTOM PAN

When riveting bottom pan, do not install front rivet. That rivet is installed with the bumper.



FRONT — SEEN FROM UNDERNEATH

1. *Bumper*

GUARD

Disassembly and Assembly

NOTE: For additional information (ex.: exploded view) refer to the correspondent parts catalog.

⚠ WARNING

Engine should be running only with guard well secured in place.

Inspection

Check guard mounting bosses, clips and retainers for wear.

WIRING HARNESS

⚠ WARNING

Ensure all terminals are properly crimped on the wires and that all connector housings are properly fastened. Keep wires away from any rotating, moving, heating and vibrating parts. Use proper fastening devices as required.

CABLES

⚠ WARNING

Before installation, ensure that all cables are in perfect condition. Properly install the cable ends and secure them in place. Pay attention to route them properly, away from any rotating, moving, heating, or vibrating parts.

PIPING

⚠ WARNING

Always ensure that the fuel, vent, primer, impulse, injection oil and rotary valve oil lines are properly fixed to their connectors, that they are not perforated or kinked and that they are properly routed away from any rotating, moving, heating or vibrating parts. Also check for leaks. Replace if required.

NOTE: Refer to proper *Parts Catalog* to find suitable clip part numbers.

PLASTIC MAINTENANCE AND REPAIR

MAINTENANCE

Clean the vehicle thoroughly, removing all dirt and grease accumulation.

To clean use a soft clean cloth and either soapy water or isopropyl alcohol.

To remove grease, oil or glue use isopropyl alcohol.

CAUTION: Do not apply isopropyl alcohol or acetone directly on decals.

CAUTION: The following products must not be used to clean or wax any of the plastic components used on the vehicles:

- gasoline
- brake fluid
- kerosene
- diesel fuel
- lighter fluid
- varsol
- naphtha
- acetone
- strong detergents
- abrasive cleaners
- waxes containing an abrasive or a cleaning agent in their formula.

Apply wax on glossy finish only. Protect the vehicle with a cover to prevent dust accumulation during storage.

CAUTION: If for some reason the snowmobile has to be stored outside it is preferable to cover it with an opaque tarpaulin. This will prevent the sun rays from affecting the plastic components and the vehicle finish.

REPAIR

⚠ WARNING

Polycarbonate windshields must never be repaired by welding or otherwise.

⚠ WARNING

Material should be repaired and repainted in a well-ventilated area only.

NOTE: When working on a Thermo Plastic Olefin (TPO) surface, never use a grinder or a high revolution tool such as an air or electric buffer. Use of such tools could overheat material and liberate agents in it thus causing a bad adhesion.

REPAIR PROCEDURE FOR HOOD (MADE OF TPO)

Small Scratches

- Sand and scuff area.
- Feather out edges.
- Paint with a matching acrylic auto touch-up paint.

Deep Scratches

Preparation

- Sand and scuff area.
- Make a V groove using a knife or a rough round file.
- Clean surface with isopropyl alcohol or Crest® AS-X or BS-X Super Solv. Allow to dry thoroughly.
- Apply a light coat of Crest AF-S Flex Stik Adhesion Promoter. Allow 10 minutes to dry.
- Apply Crest Formula 21 CF-PR Universal Plastic Repair directly to the repair area. Allow 30 minutes cure time before sanding.

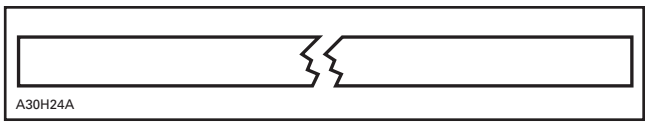
Finishing

– Carefully hand or machine sand with 80 grit paper.
– Cover with TP-E epoxy mixed in equal quantities. Never use polyester fillers over formula 21.
– After 30 minutes, sand with fine 220 or 320 grit paper. Wipe or blow-off area.
– Prep for paint. Apply Crest AF-S Flex Stik to aid in paint adhesion.
– Prime and paint, following manufacturer's recommendations or use Crest Prima Flex and one of Crest's Flexible Bumper Coats AF1-18.

Large Crack

Preparation

– Clean repair area with Crest AS-X or BS-X Super Solv. Allow to dry thoroughly.

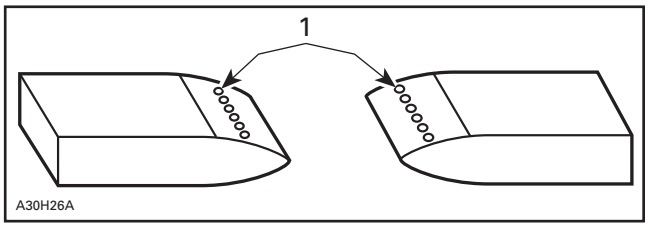


CROSS SECTION OF TORN HOOD

– Restore shape of plastic with heat gun, avoid overheating, let cool.
– Enlarge area to be repaired, bevel, soften edges on both sides. Avoid smearing or melting the plastic.

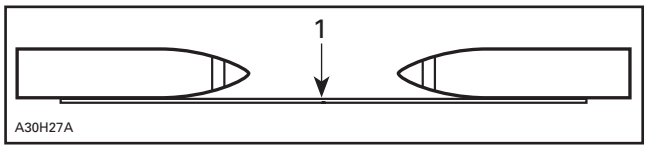
A. 10 mm (3/8 in)

– Drill 3 mm (1/8 in) diameter holes, 10 mm (3/8 in) apart, around beveled edge of repair area.



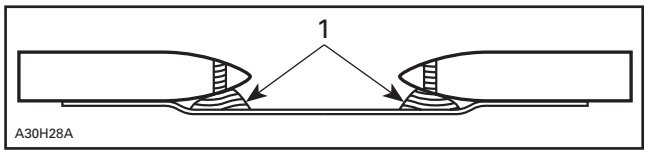
1. Holes

– Scuff the repair area with coarse sandpaper. Clean scuffed area with a clean, dry rag or clean, oil-free compressed air.
– Apply a light coat of Crest AF-S Flex Stik Adhesion Promoter. Allow 10 minutes to dry.
– Install 50 mm (2 in) paper tape Crest no. RPT on rear of repair.

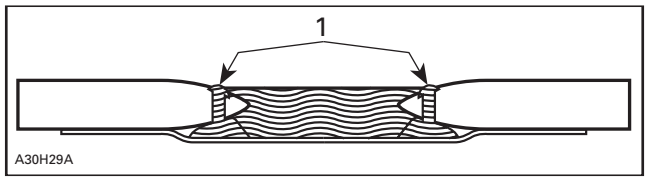


1. Paper tape

– Apply Crest Formula 21 CF-PR Universal Plastic Repair directly to the repair area (to just beyond pinning holes). Allow 30 minutes cure time before sanding.



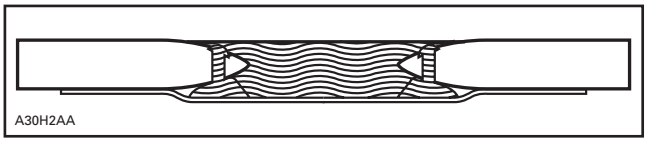
1. Fill area between tape and pinning holes



1. Fill just above pinning holes to form structural base

Finishing

– Carefully hand or machine sand with 80 grit paper.
– Cover with TP-E epoxy mixed in equal quantities. Never use polyester fillers over formula 21.
– After 30 minutes, sand with fine 220 or 320 grit paper. Wipe or blow-off area.
– Prep for paint. Apply Crest AF-S Flex Stik to aid in paint adhesion.
– Prime and paint, following manufacturer's recommendations or use Crest Prima Flex and one of Crest's Flexible Bumper Coats AF1-18.



NOTE: Painting must be done in a dust free area such as a paint booth.

Crest products are available from following locations:

CREST MAIN OFFICE AND MANUFACTURING PLANT	
CREST INDUSTRIES, INC. 3841 13th Street Wyandotte, Michigan 48192	Phone: 734-283-4100 Toll Free: 1-800-822-4100 Fax: 1-800-344-4461 Fax: 734-283-4461 E-Mail: info@crestauto.com www.crestauto.com

DISTRIBUTOR WAREHOUSE LOCATIONS		
UNITED STATES		CANADA
CREST EAST COAST, INC. P.O. Box 550 1109 Industrial Parkway Brick, New Jersey 08723 Phone: 732-458-9000 Fax: 732-458-5753 CREST PRODUCTS, INC. *Shipping Address:* 125 Production Drive Yorktown, Virginia 23693 Phone: 757-599-6572 Virginia: 1-800-572-5025 Outstate: 1-800-368-5033 Fax: 757-599-6630 *Mailing Address:* P.O. Box 2018 Grafton, Virginia 23692 CREST INDUSTRIES SOUTHEAST, INC. *Shipping Address:* 1400-B Woodstock Rd. Roswell, Georgia 30075 *Mailing Address:* 11530 Bowen Road Roswell, Georgia 30075 Phone: 770-642-7670 Toll Free: 1-800-552-0876 Fax: 770-642-7679	CREST INDUSTRIES, INC. (CREST MID-WEST) 231 Larkin Williams Ind. Court St. Louis, Missouri 63026 Phone: 314-349-4800 Toll Free: 1-800-733-2737 Fax: 314-349-4888 Toll Free Fax: 1-800-776-2737 **CREST MIDWEST REGIONAL BRANCH WAREHOUSES** CREST INDUSTRIES, INC. P.O. Box 635 Mountain Home, Arkansas 72653 Phone: 501-491-5583 Toll Free: 1-800-733-2737 CREST INDUSTRIES, INC. 4200 Jackson Street, Unit 9 Denver, Colorado 80216 Phone: 303-320-3900 Toll Free: 1-800-733-2737 Fax: 303-320-6509 REM-CO DISTRIBUTING, INC. 5625 S. Adams Tacoma, Washington 98409 Phone: 253-474-5414 Toll Free: 1-800-735-7224 Fax: 253-474-7339	J2 PRODUCTS A DIVISION OF SAWILL LTD. 54 Audia Court, Unit 2A Concord, Ontario, L4K 3N4 *Phone:* Toronto: 416-665-1404 Concord: 905-669-9410 *Fax:* Concord: 905-669-9419 WHEEL-IN AUTOMOTIVE SUPPLY *Shipping Address:* No. 1, 3911A Brandon St. S.E. Calgary, Alberta, T2G 4A7 Phone: 403-287-0775 *Mailing Address:* P.O. Box 40036 929-42nd Avenue S.E. Calgary, Alberta, T2G 5G5

FRAME

FRAME CLEANING

NOTE: For aluminum frames use only aluminum cleaner and follow instructions on container. (Dursol cleaner or equivalent).

Clean frame and tunnel with appropriate cleaners and rinse with high pressure hose.

Touch up all metal spots where paint has been scratched off. Spray all bare metal parts of vehicle with metal protector.

Seat Cleaning

For all models, it is recommend to clean the seat with a solution of **warm soapy water**, using a soft clean cloth.

CAUTION: Avoid use of harsh detergents such as strong soaps, degreasing solvents, abrasive cleaners, paint thinners, etc. that may cause damage to the seat cover.

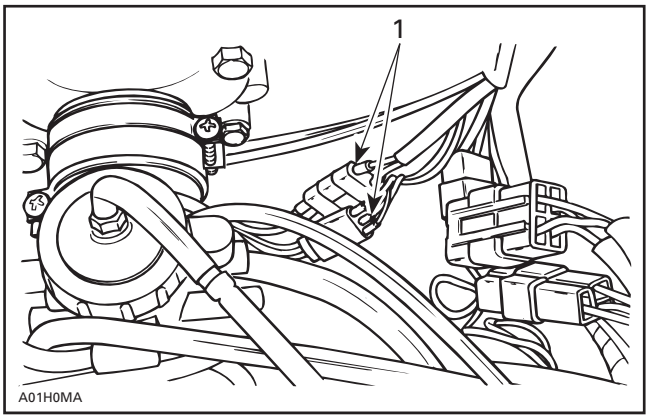
FRAME WELDING

Aluminum Frame
(refer to specialized welding shop)

– argon-oxygen/acetylene welding

– rod: ER-4043 (3/32 in).

CAUTION: Before performing electrical welding anywhere on the vehicle, unplug MPEM. On models equipped with a battery, also unplug the negative cable. This will protect the electronic box and battery against damage caused by flowing current when welding.



TYPICAL

1. Unplug before electrical welding

CAUTION: If welding is to be done near plastic material, it is recommended to either remove the part from the area or to protect it with aluminum foil to prevent damage.

FRAME COMPONENT REPLACEMENT

Drilling Procedure

When drilling self-piercing rivets, use Supertanium™ drill bit (P/N 529 031 800), available in a 5 mm (3/16 in) size and shipped in packs of 2.

For proper drilling instructions and to prevent premature wear, follow the procedure below.

Always use a variable speed electric drill.

Partially drill rivet end — not the rivet head.

Maintain a slow to medium speed at all times when drilling. The proper speed is attained when a constant chip is ejected.

NOTE: To increase bit life, use Bombardier synthetic chaincase oil (P/N 413 803 300) as a cutting oil.

CAUTION: High speed drilling will cause excessive heat which may destroy the cutting edge of the bit, therefore avoid using pneumatic drills.

Remove part riveted.

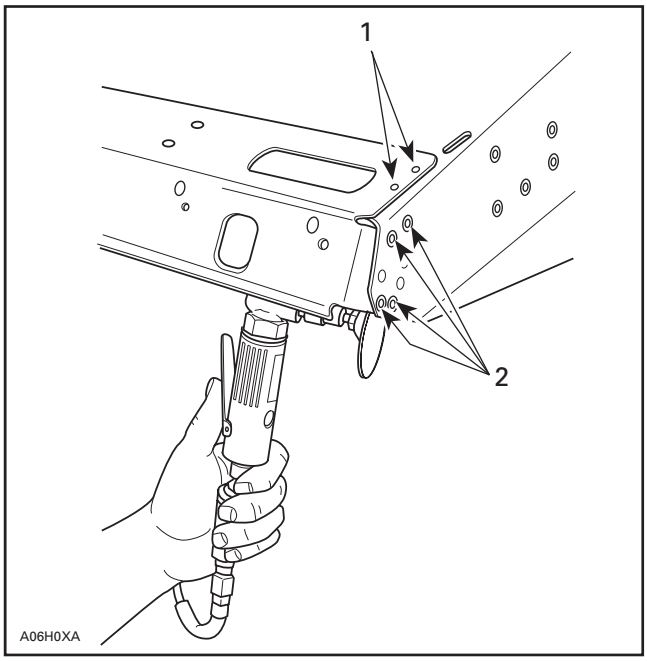
Punch out rivet head from drilled end.

If rivet is only accessible from head; ground rivet head completely and punch out remaining part of rivet.

Grinding Procedure

Rear Cap

Grind rivet heads from top of rear cap and underneath for side retaining rivets.



1. Rivets heads ground
2. Rivets to be ground from underneath

To remove rivet, strike with a punch from rivet head side.

Make a chamfer from underneath on all 4 corner holes.

TECHNICAL DATA

SI* METRIC INFORMATION GUIDE

BASE UNITS

DESCRIPTION	UNIT	SYMBOL
length	meter	m
mass	kilogram	kg
force	newton	N
liquid	liter	L
temperature	Celsius	°C
pressure	kilopascal	kPa
torque	newton•meter	N•m
speed	kilometer per hour	km/h

PREFIXES

PREFIX	SYMBOL	MEANING	VALUE
kilo	k	one thousand	1 000
centi	c	one hundredth	0.01
milli	m	one thousandth	0.001
micro	µ	one millionth	0.000001

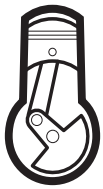
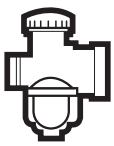
CONVERSION FACTORS

TO CONVERT	TO †	MULTIPLY BY
in	mm	25.4
in	cm	2.54
in^2	cm^2	6.45
in^3	cm^3	16.39
ft	m	0.3
oz	g	28.35
lb	kg	0.45
lbf	N	4.4
lbf•**in**	N•m	0.11
lbf•ft	N•m	1.36
lbf•ft	lbf•**in**	12
PSI (lbf/in^2)	kPa	6.89
imp. oz	U.S. oz	0.96
imp. oz	mL	28.41
imp. gal	U.S. gal	1.2
imp. gal	L	4.55
U.S. oz	mL	29.57
U.S. gal	L	3.79
MPH	km/h	1.61
Fahrenheit	Celsius	(°F - 32) ÷ 1.8
Celsius	Fahrenheit	(°C x 1.8) + 32

* The international system of units abbreviates SI in all languages.

† To obtain the inverse sequence, divide by the given factor. To convert **mm** to **in**, divide by 25.4.

NOTE: Conversion factors are rounded off to 2 decimals for easier use.

	VEHICLE MODEL			GRAND TOURING SE	MACH Z STD	MACH Z TECH PLUS
	ENGINE TYPE			**809**	**809**	**809**
	Number of Cylinders			3	3	3
	Bore		mm (in)	70.5 (2.776)	70.50 (2.776)	70.50 (2.776)
	Stroke		mm (in)	68.0 (2.677)	68.0 (2.677)	68.0 (2.677)
	Displacement		cm^3 (in^3)	796.3 (48.59)	796.3 (48.59)	796.3 (48.59)
	Compression Ratio (corrected)			6.8	6.8	6.8
	Maximum Power Engine Speed ①		± 100 RPM	8000	8300	8300
	Piston Ring Type		$1^{st}/2^{nd}$	ST/R	ST/R	ST/R
	Ring End Gap	New Wear Limit	mm (in) mm (in)	0.2 (.008) 1.0 (.039)	0.2 (.008) 1.0 (.039)	0.2 (.008) 1.0 (.039)
	Ring/Piston Groove Clearance	New Wear Limit	mm (in) mm (in)	0.03 (.0012) 0.2 (.0079)	0.03 (.0012) 0.2 (.0079)	0.03 (.0012) 0.2 (.0079)
	Piston/Cylinder Wall Clearance	New Wear Limit	± 0.016 mm (± .0006 in) mm (in)	0.095 (.0037) 0.20 (.0079)	0.095 (.0037) 0.20 (.0079)	0.095 (.0037) 0.20 (.0079)
	Connecting Rod Big End Axial Play	New Wear Limit	mm (in) mm (in)	0.39 (.0154) 1.2 (.0472)	0.39 (.0154) 1.2 (.0472)	0.39 (.0154) 1.2 (.0472)
	Maximum Crankshaft End-play ②		mm (in)	0.3 (.012)	0.3 (.012)	0.3 (.012)
	Maximum Crankshaft Deflection at PTO		mm (in)	0.06 (.0024)	0.06 (.0024)	0.06 (.0024)
	Magneto Generator Output		W	360	290	290
	Ignition Type			CDI	CDI	CDI
	Spark Plug Make and Type			NGK BR8ES	NGK BR9ES	NGK BR9ES
	Spark Plug Gap		mm (in)	0.45 (.018)	0.45 (.018)	0.45 (.018)
	Ignition Timing BTDC ③		mm (in)	2.59 (.102)	1.94 (.076)	2.59 (.102)
	Trigger Coil ④		Ω	190 – 300	190 – 300	190 – 300
	Generating Coil ④	Low Speed	Ω	N.A.	25 – 56	25 – 56
		High Speed	Ω	N.A.	3.5 – 8.1	3.5 – 8.1
	Lighting Coil ④		Ω	0.0 – 0.05	0.15 – 0.35	0.15 – 0.35
	High Tension Coil ④	Primary	Ω	0.2 – 0.5	0.2 – 0.5	0.2 – 0.5
		Secondary	kΩ	6 – 13	6 – 13	6 – 13
	Carburetor Type		PTO/CTR/MAG	TM 38 C321	TM 38 C317	TM 38 C317
	Main Jet		PTO/CTR/MAG	450/470/470	290	290
	Needle Jet			876 O-2	327 O-2	327 O-2
	Pilot Jet			15	50	50
	Needle Identification — clip position			8BCY01-42-4	8ADY1-41-3	8ADY1-41-3
	Slide Cut-Away			2.0	2.0	2.0
	Float Adjustment		± 1 mm (± .040 in)	21.0 (.83)	21.0 (.83)	21.0 (.83)
	Air Screw Adjustment		± 1/16 Turn	Closed	4-1/2	4-1/2
	Idle Speed		± 200 RPM	2000	2000	2000
	Gas Type/Pump Octane Number			Super Unleaded/91	Super Unleaded/91	Super Unleaded/91
	Gas/Oil Ratio			Injection	Injection	Injection
	Type			Liquid	Liquid	Liquid
	Axial Fan Belt Adjustment	Deflection	mm (in)	N.A.	N.A.	N.A.
		Force	kg (lbf)	N.A.	N.A.	N.A.
	Thermostat Opening Temperature		°C (°F)	N.A.	N.A.	N.A.
	Radiator Cap Opening Pressure		kPa (PSI)	N.A.	N.A.	N.A.
	ENGINE COLD N•m (lb•ft)	Drive Pulley Retaining Screw		⑤	⑤	⑤
		Exhaust Manifold Nuts or Bolts		21 (16)	21 (16)	21 (16)
		Magneto Ring Nut		125 (92)	125 (92)	125 (92)
		Crankcase Nuts or Screws	M6 M8	11 (8) 29 (21)	11 (8) 29 (21)	11 (8) 29 (21)
		Crankcase/Engine Support Nuts or Screws		40 (29)	40 (29)	40 (29)
		Cylinder Head Nuts		29 (21)	29 (21)	29 (21)
		Crankcase/Cylinder Nuts or Screws		29 (21)	29 (21)	29 (21)
		Axial Fan Shaft Nut		N.A.	N.A.	N.A.

	VEHICLE MODEL				GRAND TOURING SE	MACH Z STD	MACH Z TECH PLUS
	ENGINE TYPE				**809**	**809**	**809**
	Chain Drive Ratio				24/43	26/43	26/43
	Chain	Pitch		in	3/8	3/8	3/8
		Type/Links Qty/Plates Qty			Silent 72/13	Silent 72/13	Silent 72/13
	Drive Pulley	Type of Drive Pulley			TRA	TRA	TRA
		Ramp Identification and Roller Pin Type			299 ⑤	295 ⑤	295 ⑤
		Calibration Screw Position or Calibration Disc Quantity			3	3	3
		Spring Color			Violet/Yellow	Green/Blue	Green/Blue
		Spring Length		± 1.5 mm (± .060 in)	157.9 (6.22)	147.4 (5.80)	147.4 (5.80)
		Clutch Engagement		± 200 RPM	3300	4200	4200
	Driven Pulley	Type			HPV27	Formula	HPV27
		Spring Preload		± 0.7 kg (± 1.5 lb)	N.A.	7.0 (15.4)	N.A.
		Cam Angle		Degree	47 – 44	53 – 44	47 – 44
	Pulley Distance	Z		± 0.5 mm (± .020 in)	121.0 (4.764)	121.0 (4.764)	121.0 (4.764)
	Offset	X		± 0.5 mm (± .020 in)	35.5 (1.398)	35.5 (1.398)	35.5 (1.398)
		Y – X	MIN. – MAX.	mm (in)	0.5 – 1.5 (.020 – .060)	1.0 – 2.0 (.039 – .079)	1.0 – 2.0 (.039 – .079)
	Drive Belt Part Number (P/N)				417 300 066	417 300 066	417 300 066
	Drive Belt Width (new) ①			mm (in)	35.1 (1.382)	35.1 (1.382)	35.1 (1.382)
	Drive Belt Adjustment		Deflection	± 5 mm (± .197 in)	38 (1.496)	38 (1.496)	38 (1.496)
			Force ②	kg (lbf)	11.5 (25)	11.5 (25)	11.5 (25)
	Track	Width		cm (in)	38.1 (15.0)	38.1 (15.0)	38.1 (15.0)
		Length		cm (in)	345.5 (136)	307.4 (121)	307.4 (121)
		Profile Height		mm (in)	22.3 (.878)	22.3 (.878)	22.3 (.878)
		Adjustment	Deflection	mm (in)	30 – 35 (1-3/16 – 1-3/8)	30 – 35 (1-3/16 – 1-3/8)	30 – 35 (1-3/16 – 1-3/8)
			Force ③	kg (lbf)	7.3 (16)	7.3 (16)	7.3 (16)
	Suspension Type		Track		SC-10 II	SC-10 II	SC-10 II
			Ski		ADSA	ADSA	ADSA
	Length			cm (in)	303.5 (119.5)	277.5 (109.3)	277.5 (109.3)
	Width			cm (in)	117.4 (46.2)	117.4 (46.2)	117.4 (46.2)
	Height			cm (in)	130.0 (51.2)	114.3 (45.0)	114.3 (45.0)
	Ski Stance			cm (in)	104.1 (41)	104.1 (41)	104.1 (41)
	Toe-out and Camber			mm (in) degree	12 (1/2) - 4.5	16 (5/8) - 2.5	16 (5/8) - 2.5
	Mass (dry)			kg (lb)	279 (614)	254 (559)	254 (559)
	Ground Contact Area			cm^2 (in^2)	7356.7 (1140.3)	6670.9 (1034)	6670.9 (1034)
	Ground Contact Pressure			kPa (PSI)	3.72 (.539)	3.74 (.542)	3.74 (.542)
	Frame Material				Aluminum	Aluminum	Aluminum
	Bottom Pan Material				Impact Copolymer	Impact Copolymer	Impact Copolymer
	Hood Material				TPO	TPO	TPO
	Battery			V (A•h)	12/20	N.A.	N.A.
	Headlight			W	H4 60/55	H4 60/55	H4 60/55
	Taillight and Stoplight			W	8/27	8/27	8/27
	Tachometer and Speedometer Bulbs			W	3	3	3
	Fuel and Temperature Gauge Bulbs			W	3	3	3
	Fuse	Starter Solenoid		A	30	N.A.	N.A.
		Fuel Level Sensor		A	0.25	0.25	0.25
	Fuel Tank			L (U.S. gal)	42 (11.1)	42 (11.1)	42 (11.1)
	Chaincase/Gearbox			mL (U.S. oz)	250 (8.5)	250 (8.5)	250 (8.5)
	Cooling System ④			L (U.S. oz)	5.1 (172.5)	5.0 (169)	5.0 (169)
	Injection Oil Reservoir			L (U.S. oz)	4.1 (138.7)	4.1 (138.7)	4.1 (138.7)

ENGINE LEGEND

BTDC: Before Top Dead Center
CDI: Capacitor Discharge Ignition
CTR: Center
K: Kilo (x 1000)
MAG: Magneto Side
N.A.: Not Applicable
PTO: Power Take Off Side
R: Rectangular
ST: Semi-Trapezoidal

① The maximum horsepower RPM applicable on the vehicle. It may be different under certain circumstances and BOMBARDIER INC. reserves the right to modify it without obligation.

② Crankshaft end-play is not adjustable on these models. Specification is given for verification purposes only.

③ At 3500 RPM with headlamp turned on.

④ All resistance measurements must be performed with parts at room temperature (approx. 20°C (68°F)). Temperature greatly affects resistance measurements.

⑤ Drive pulley retaining screw: torque to 90 to 100 N•m (66 to 74 lbf•ft), install drive belt, accelerate the vehicle at low speed (maximum 30 km/h (20 MPH)) and apply the brake; repeat 5 times. Recheck the torque of 90 to 100 N•m (66 to 74 lbf•ft).

VEHICLE LEGEND

ADSA: Advanced Direct Shock Action
TPO: Thermo Plastic Olefin
TRA: Total Range Adjustable
N.A.: Not Applicable

① Minimum allowable width may not be less than 3.0 mm (1/8 in) of new drive belt.

② Force applied midway between pulleys to obtain specified tension deflection.

③ Force or downward pull applied to track to obtain specified tension deflection.

④ Coolant mixture: 60% antifreeze/40% water.

⑤ Lever with roller pin (P/N 417 004 308) (solid).

WIRING DIAGRAMS

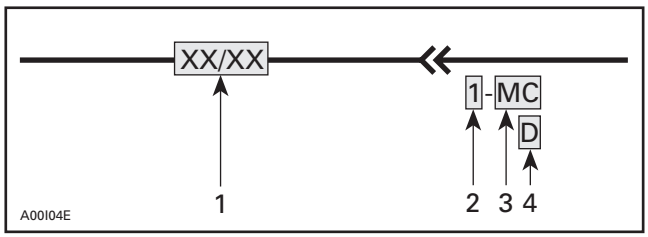
MODELS	WIRING DIAGRAM PAGE	HEADLIGHT (watt)	TAILLIGHT (watt)	ELECTRICAL SYSTEM OUTPUT (watt)
Mach Z	Annex 1	60/55 hal.	8/27	290
Mach Z Tech Plus	Annex 2	60/55 hal.	8/27	290
GT SE	Annex 3	60/55 hal.	8/27	360

hal. = halogen

WIRING DIAGRAM LEGEND

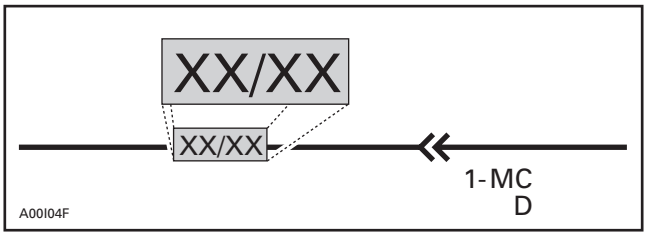
⚠ WARNING

Ensure all terminals are properly crimped on the wires and all connector housings are properly fastened.



1. *Wire colors*
2. *Connector housing area*
3. *Housing code per area*
4. *Wire connector location in housing*

WIRE COLORS

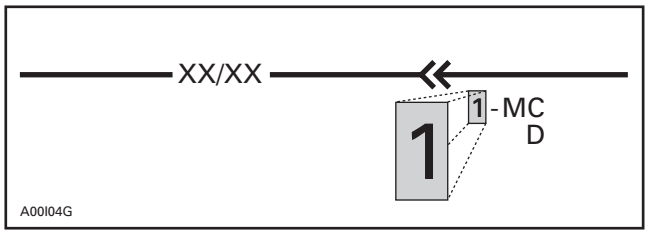


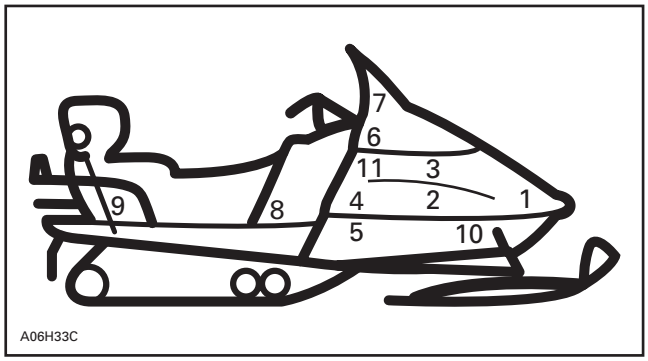
The first color of a wire is the main color, second color is the stripe.

Example: YL/BK is a YELLOW wire with a BLACK stripe.

COLOR CODE					
BE	–	BEIGE	OR	–	ORANGE
BK	–	BLACK	RD	–	RED
BU	–	BLUE	VI	–	VIOLET
BR	–	BROWN	WH	–	WHITE
GN	–	GREEN	YL	–	YELLOW
GY	–	GREY			

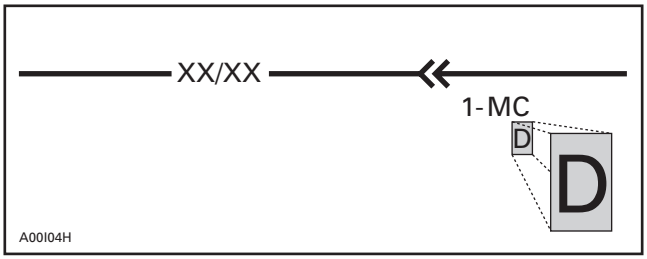
CONNECTOR HOUSING AREA

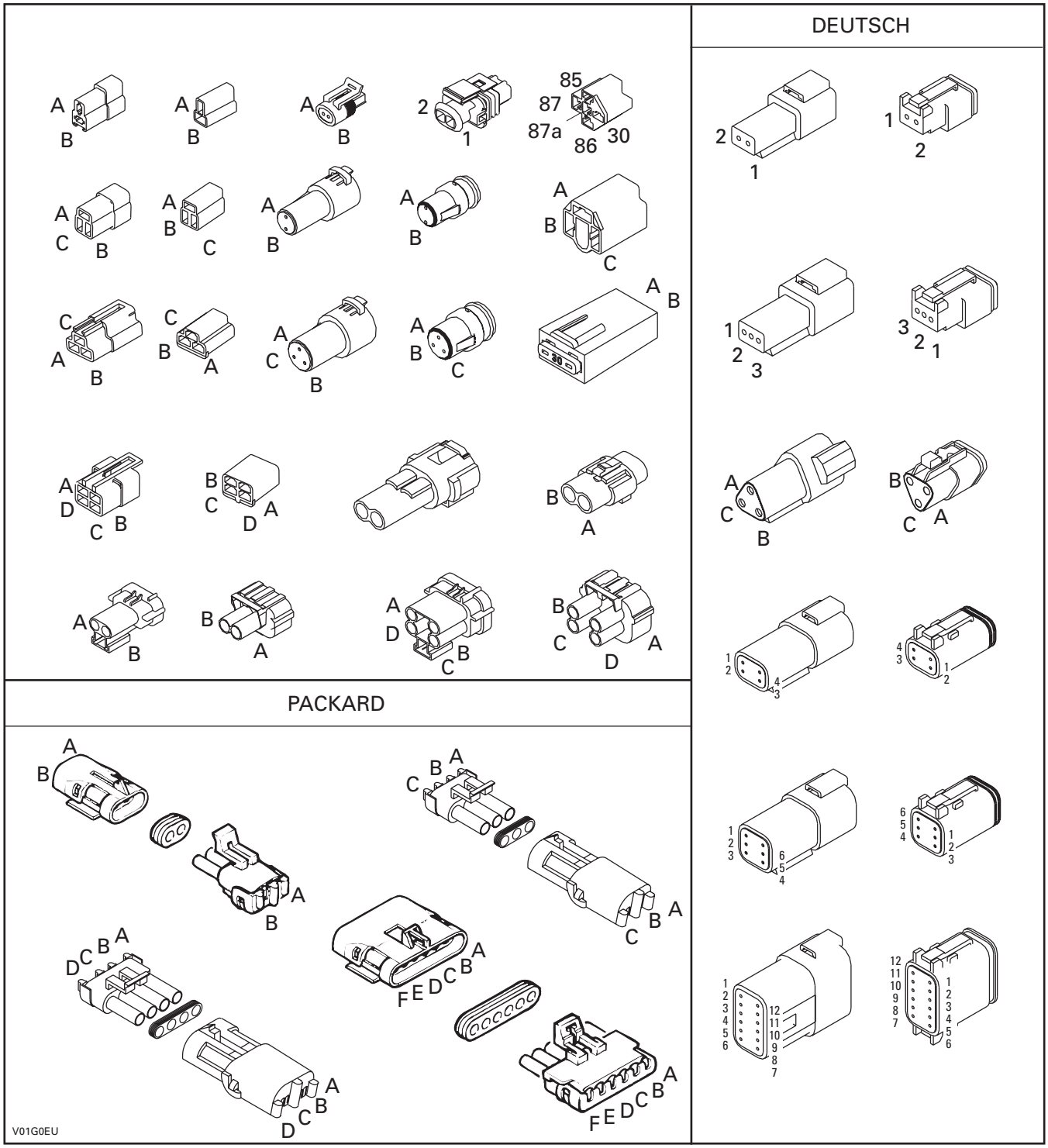




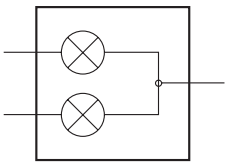
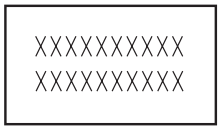
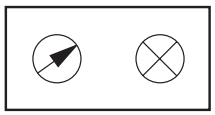
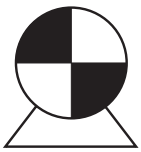
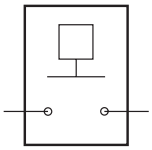
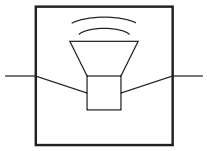
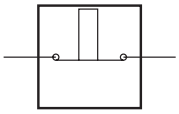
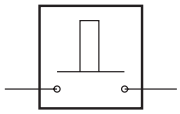
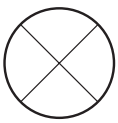
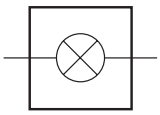
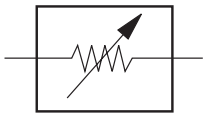
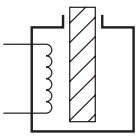
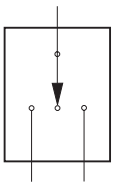
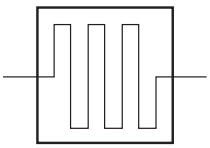
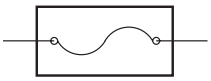
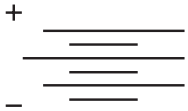
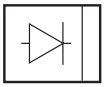
AREA	LOCATION
1	Front of engine compartment
2	Magneto
3	Carburetors
4	Near of intake silencer
5	Near driven pulley
6	Under console
7	Under hood
8	Near fuel tank
9	Rear of seat
10	Under engine
11	On injection oil reservoir

CONNECTOR LOCATION IN HOUSING




DEUTSCH
PACKARD
V01G0EU

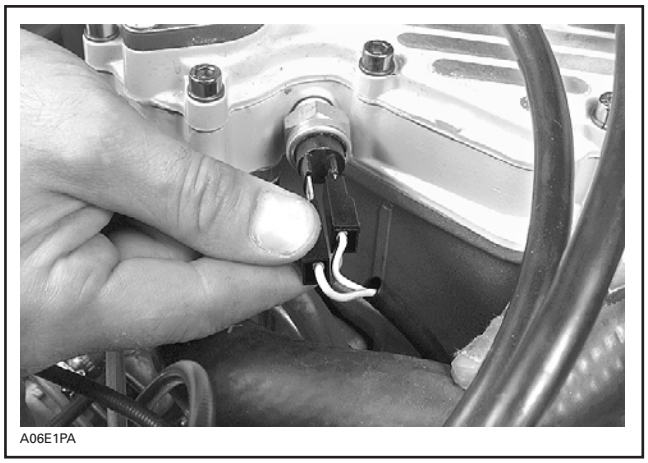
SYMBOLS DESCRIPTION

Beam and tail light 	Female terminal	Male terminal	Electronic module 
Meter 	Electric motor 	Low level sensor 	Buzzer 
Ignition coil	Normally close switch 	Normally open switch 	Male terminal on instrument
Engine ground	Frame ground Frame	Spark plug	Meter movement
Bulb 	Pilot 	Analog sensor 	Solenoid valve 
Magneto (Delta)	3 position switch 	Heating element 	Fuse 
Trigger coil	Battery 	Diode 	Partially illustrated component

A00E9PS

UNPLUGING CONNECTORS

Always unplug connectors by pulling on housing not on wire.

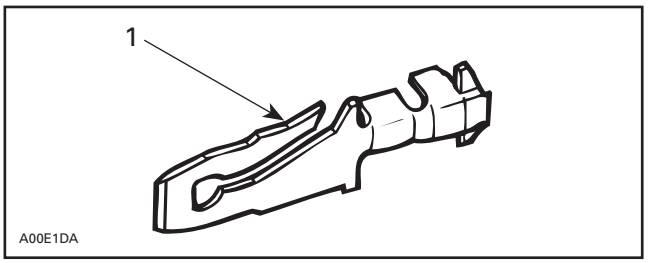


TYPICAL

TAB AND RECEPTACLE CONNECTORS REMOVAL

Tab Connector

It is locked in its housing by a spring tab on its side. Removal is done by squeezing this tab.



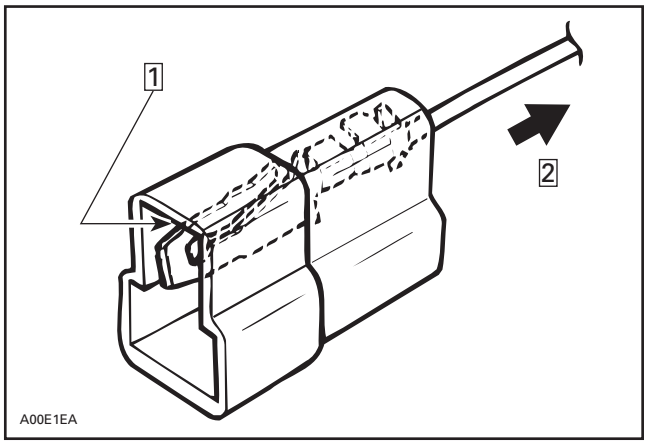
TAB CONNECTOR

1. Locking tab

To remove:

– Insert a screwdriver or Snap-on TT 600-5 from opposite side of wire and pry locking tab.

– While holding locking tab pried, pull connector toward wire side.

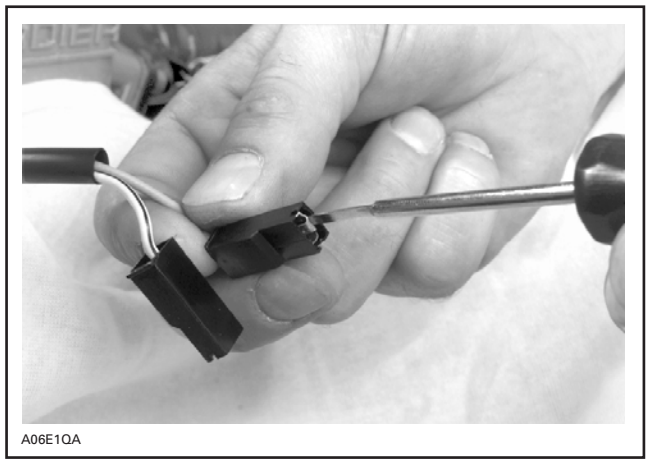


Step 1: Insert screwdriver here
Step 2: Pull this side

Locking Receptacle Connector

To remove:

– Insert tool Snap-on TT 600-5 in access opening then pull housing toward wire side.

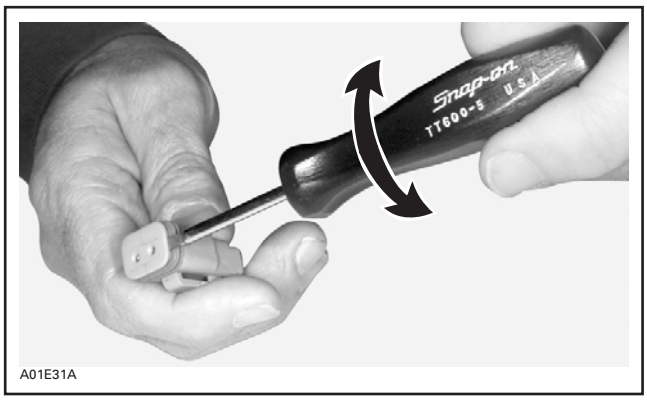


Waterproof Connector Housing

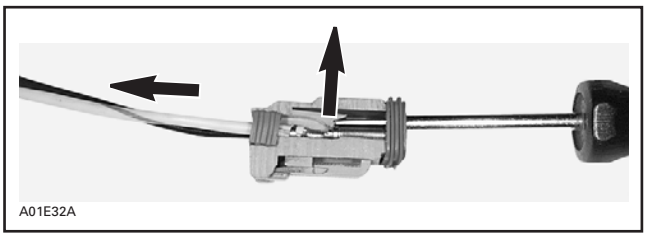
Female Connector Housing

To remove:

– Insert tool Snap-on TT 600-5 under lock and twist to lift it.



– Pry tab to free connector then pull wire out of housing.

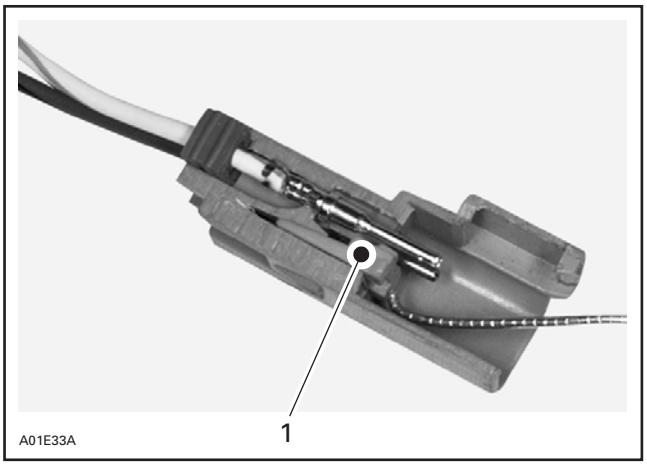


FEMALE CONNECTOR HOUSING — CUT-AWAY

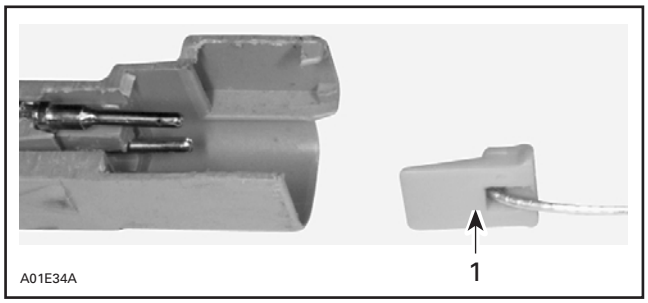
Male Connector Housing

To remove:

– Using a small hook, pull out the lock.

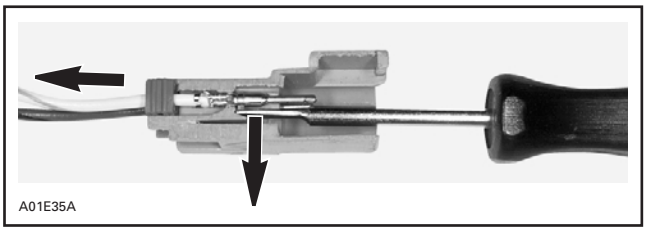


1. Lock



1. Lock

– Pry tab to free connector then pull wire out of housing.

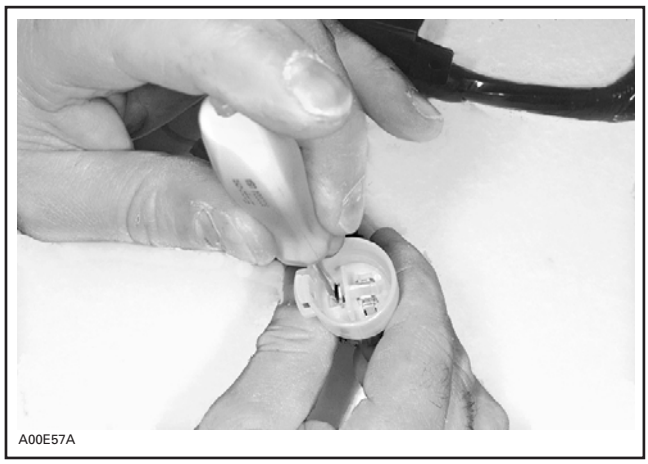


MALE CONNECTOR HOUSING — CUT-AWAY

Round Connector Housing

Female Connector Housing

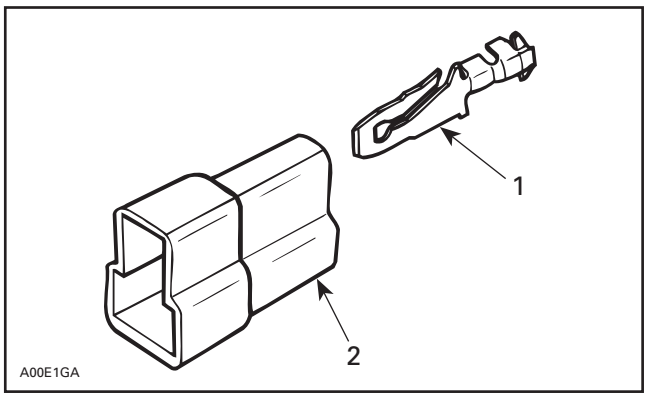
Male Connector Housing



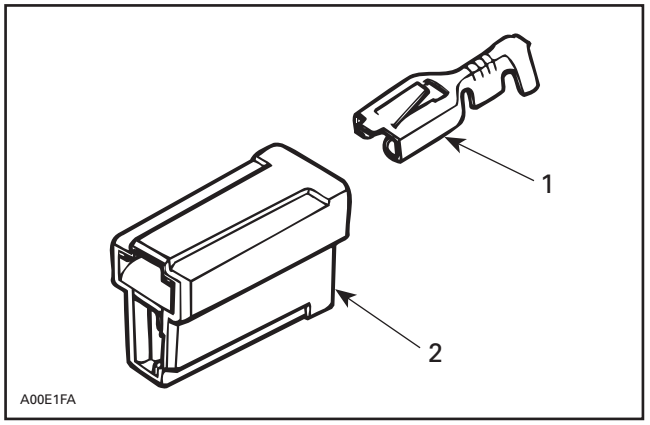
TAB AND RECEPTACLE CONNECTORS INSTALLATION

Prior to installing, make sure locking tab is sufficiently lifted to properly lock.

Insert tab and receptacle connectors in their respective housings as shown in following illustrations. Push sufficiently so that they snap. Try pulling wire to ensure they are properly locked.



1. Tab
2. Housing



TYPICAL
1. Receptacle
2. Housing

ACCESSORIES INSTALLATION

On all **electric start models:** The direct current (DC) utilizes the snowmobile frame as ground "wire" while all alternating current (AC) consumers (lights, heated grips, fuel gauge, etc.) utilize a separate ground wire.

Never interconnect AC and DC grounds as an AC voltage drop will result. When installing accessories on **any** snowmobile, connect their wires directly to the YELLOW and YELLOW/BLACK lighting coil wires.

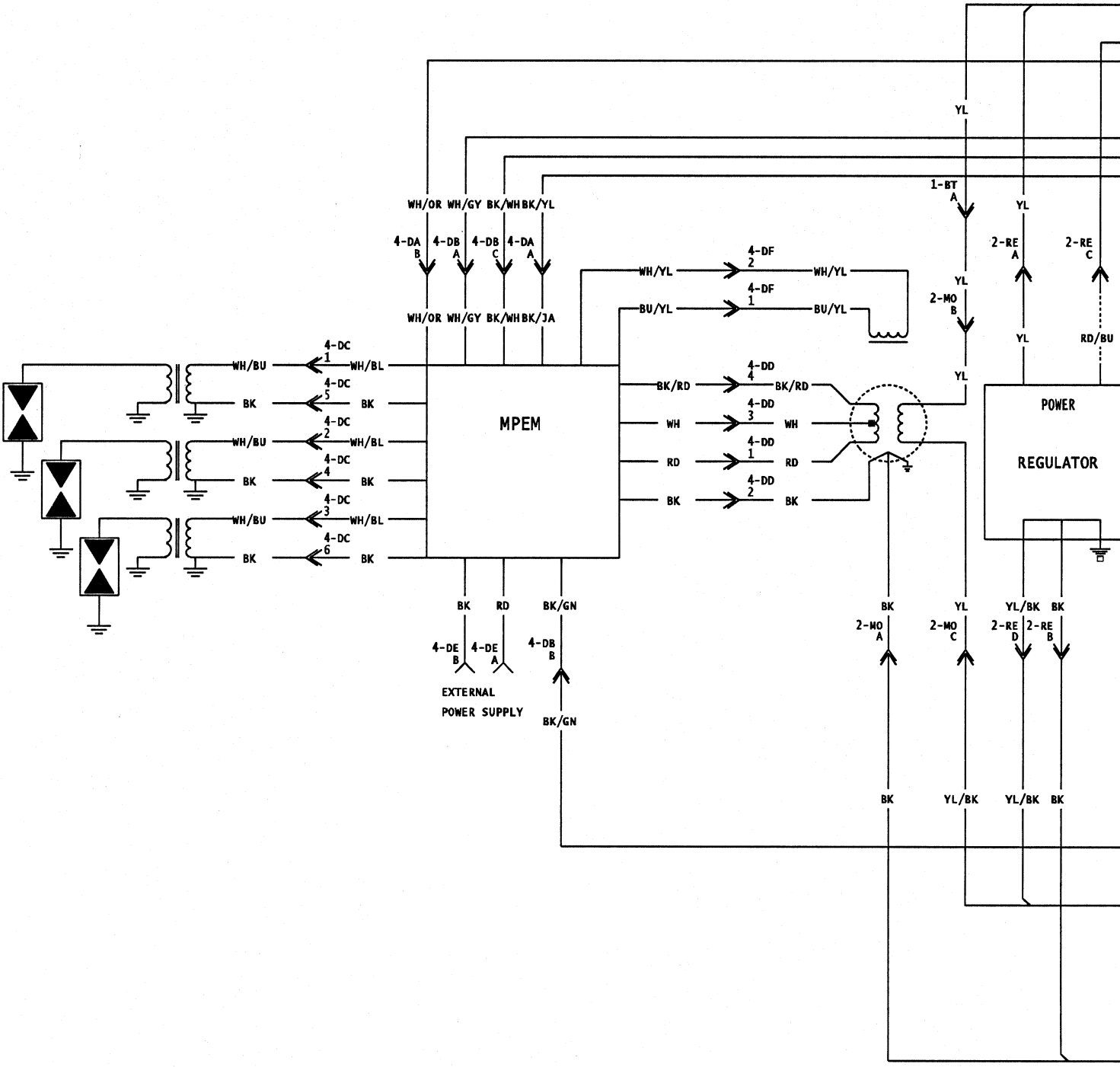
Even if **manual start models** have an AC ground to the chassis (on voltage regulator), all accessories utilize a ground wire isolated from chassis. When an electric starter kit is installed, the voltage regulator and its ground wire are replaced by a voltage rectifier/regulator unit permitting a completely isolated AC circuit.

⚠ WARNING

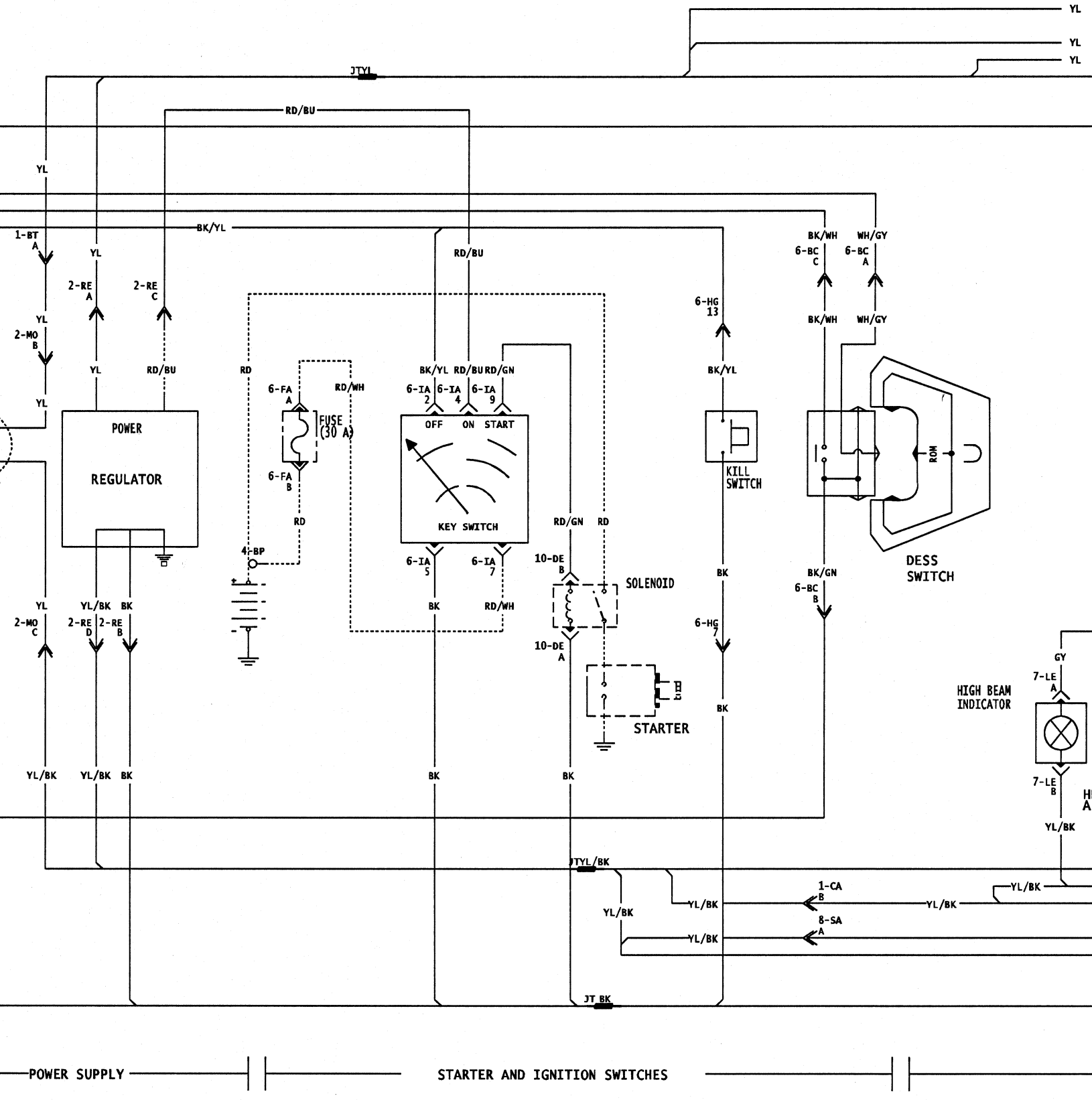
Keep wires away from any rotating, moving, heating, vibrating or sharp edge. Use proper fastening devices as required.

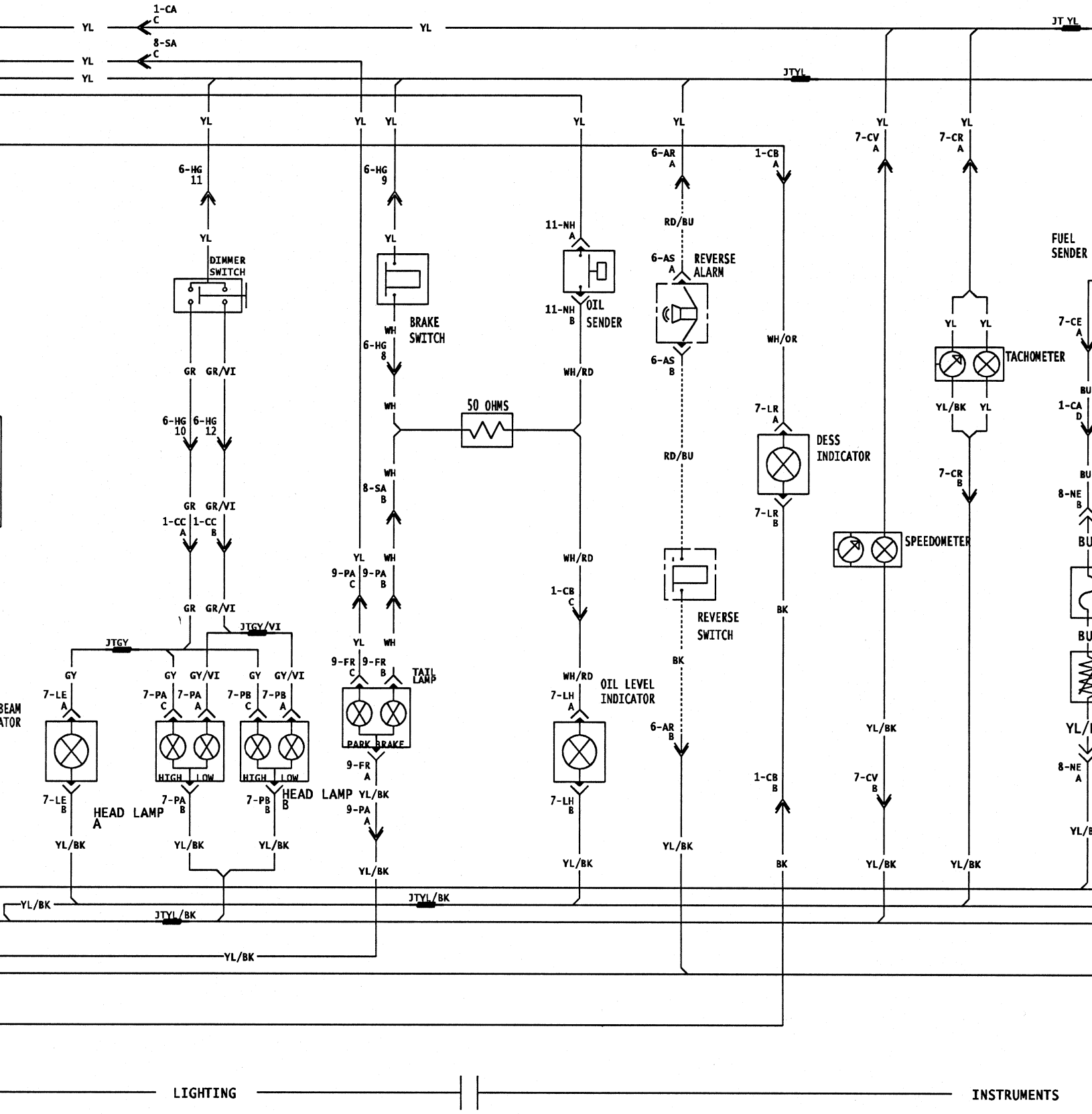
ANNEX 1 MACH Z

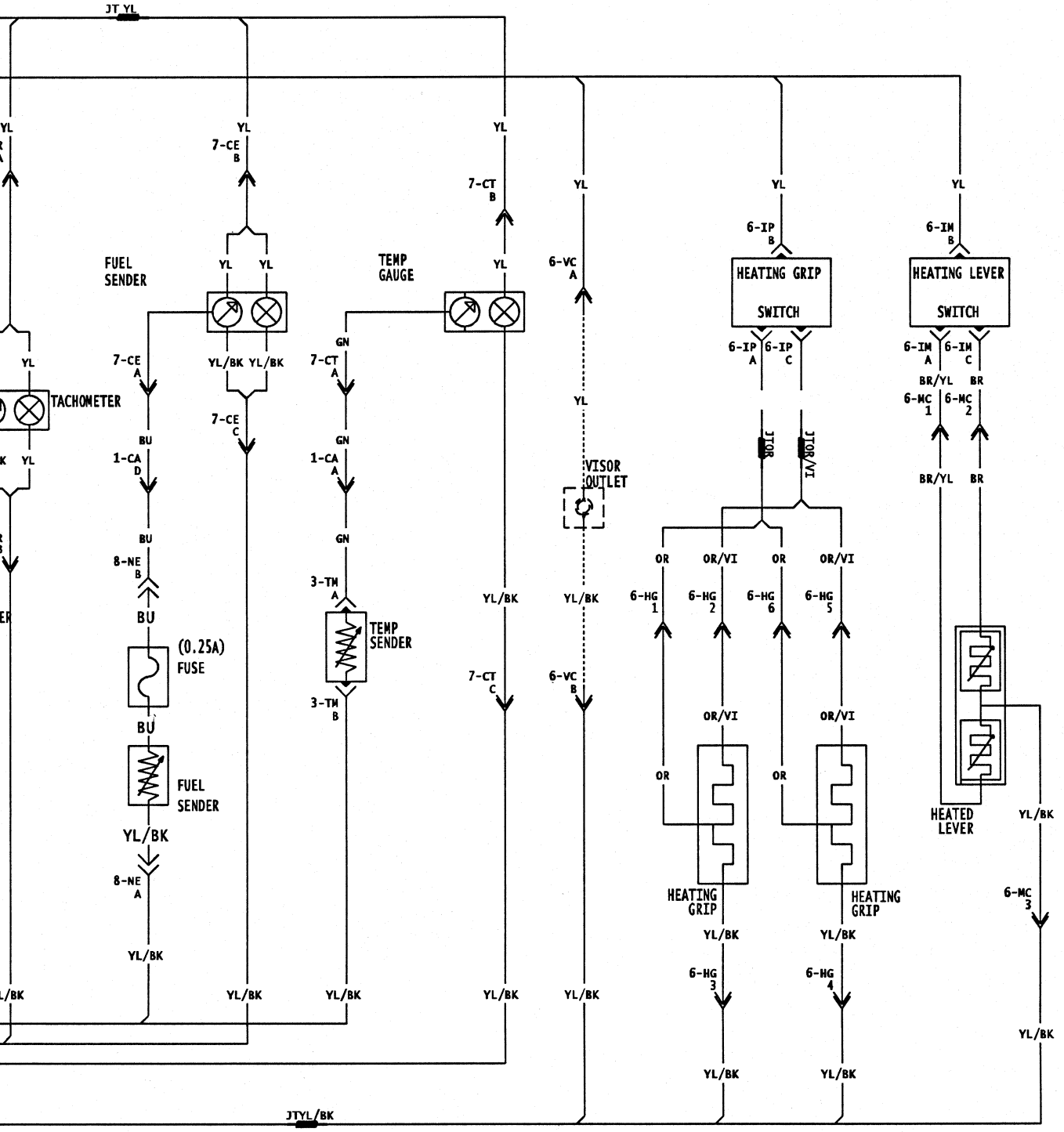
2001 MACH Z



IGNITION SYSTEM — POWER SUPPLY


YL
YL
YL
JTYL
RD/BU
YL
BK/YL
1-BT A
YL
2-RE A
2-RE C
YL
2-MO B
YL
RD/BU
YL
POWER
REGULATOR
RD
6-FA A
RD/WH
FUSE (30 A)
6-FA B
RD
4-BP
BK/YL RD/BU RD/GN
6-IA 2
6-IA 4
6-IA 9
OFF ON START
KEY SWITCH
6-IA 5
6-IA 7
BK
RD/WH
RD/GN RD
10-DE B
SOLENOID
10-DE A
STARTER
6-HG 13
BK/YL
KILL SWITCH
BK
6-HG 7
BK
BK/WH WH/GY
6-BC C
6-BC A
BK/WH WH/GY
ROM
DESS SWITCH
BK/GN
6-BC B
YL
2-MO C
YL/BK BK
2-RE D
2-RE B
YL/BK YL/BK BK
BK
BK
GY
7-LE A
HIGH BEAM INDICATOR
7-LE B
YL/BK
JTYL/BK
YL/BK
YL/BK
1-CA B
YL/BK
YL/BK
8-SA A
YL/BK
JT BK
POWER SUPPLY
STARTER AND IGNITION SWITCHES


1-CA C
8-SA C
YL
JTYL
6-HG 11
6-HG 9
6-HG 10
6-HG 12
6-HG 8
DIMMER SWITCH
BRAKE SWITCH
11-NH A
11-NH B
OIL SENDER
50 OHMS
6-AR A
6-AS A
REVERSE ALARM
6-AS B
RD/BU
1-CB A
WH/OR
7-LR A
DESS INDICATOR
7-LR B
BK
7-CV A
7-CR A
TACHOMETER
FUEL SENDER
7-CE A
1-CA D
8-NE B
GR
GR/VI
1-CC A
1-CC B
8-SA B
WH
WH/RD
9-PA C
9-PA B
1-CB C
JTGY
JTGY/VI
GY
GY/VI
9-FR C
9-FR B
TAIL LAMP
PARK BRAKE
9-FR A
7-LE A
7-LE B
7-PA C
7-PA A
7-PA B
7-PB C
7-PB A
7-PB B
HIGH
LOW
HEAD LAMP A
HEAD LAMP B
7-LH A
7-LH B
OIL LEVEL INDICATOR
REVERSE SWITCH
6-AR B
1-CB B
7-CV B
7-CR B
SPEEDOMETER
YL/BK
JTYL/BK
LIGHTING
INSTRUMENTS

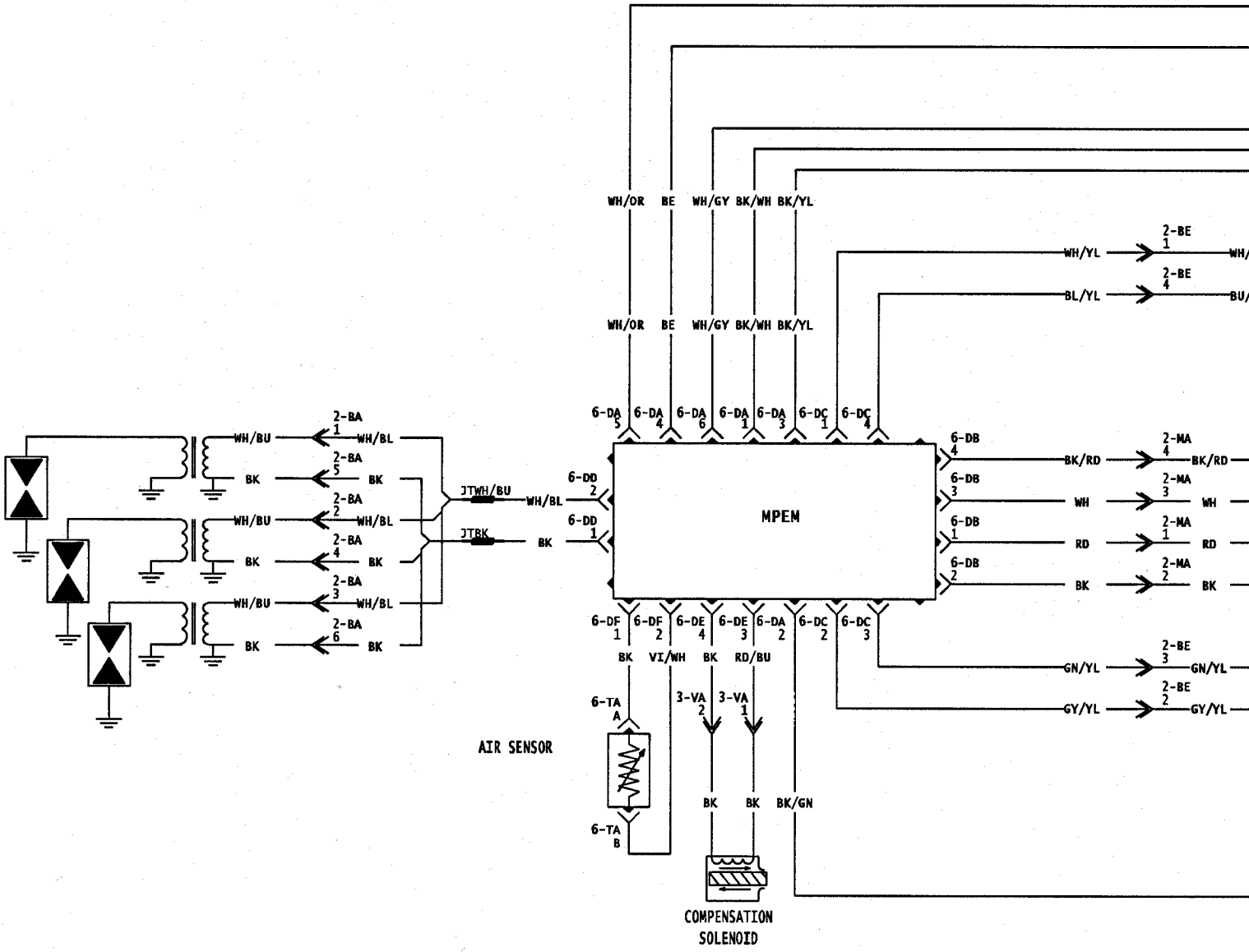


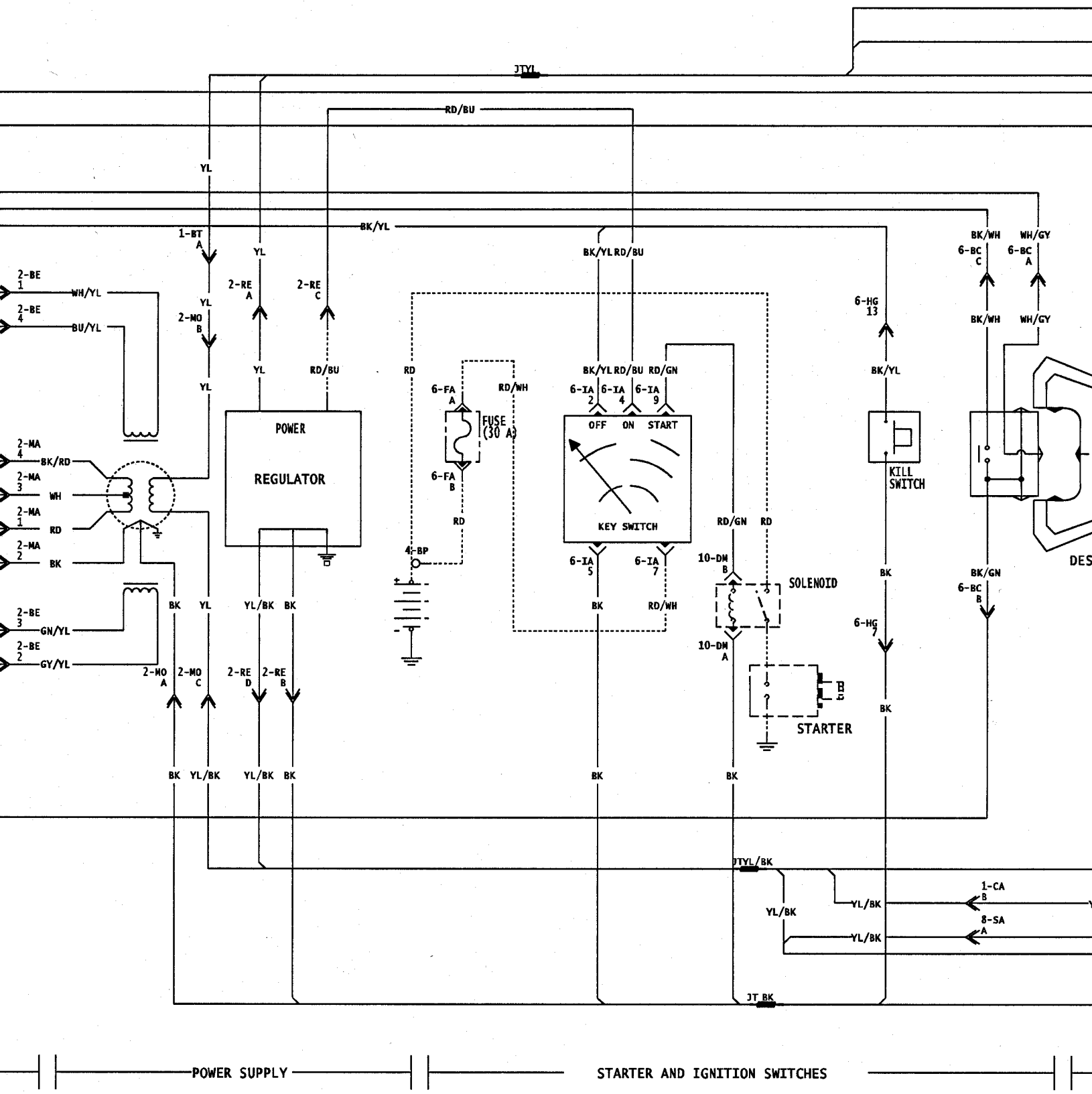
INSTRUMENTS

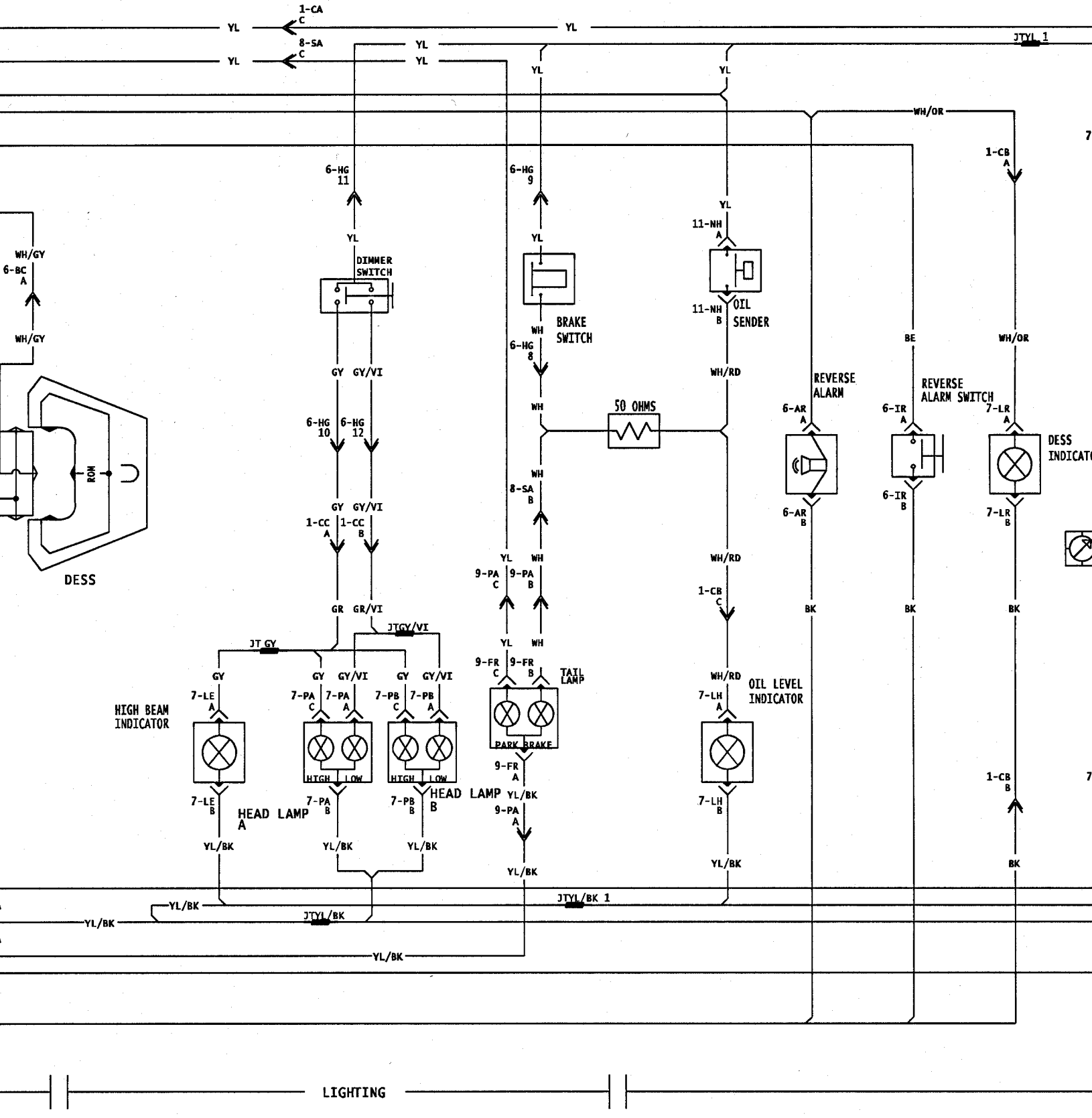
HEATING ELEMENTS

ANNEX 2 MACH Z TECH PLUS

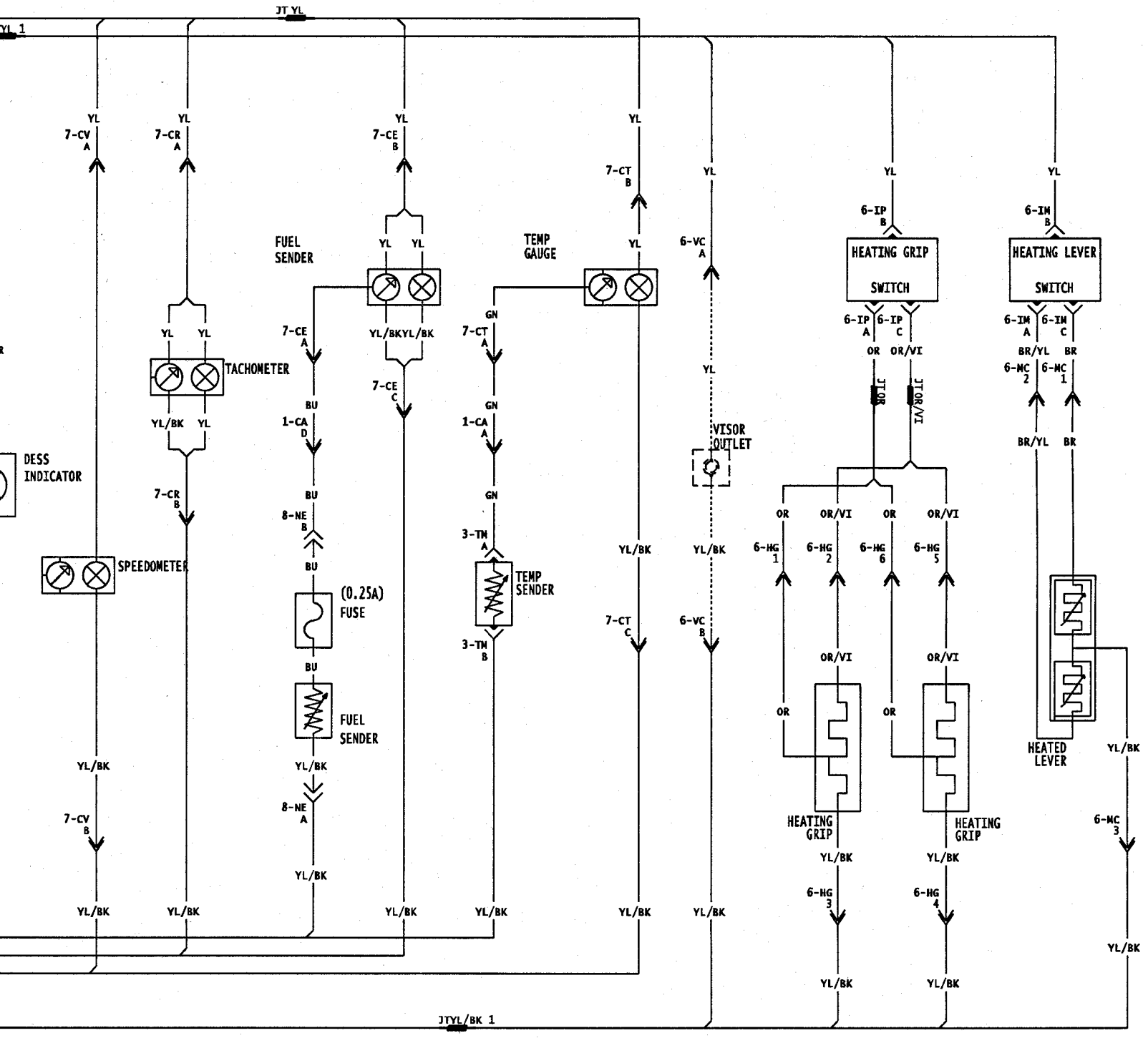
2001 MACH Z TECH PLUS




JTYL
RD/BU
YL
BK/YL
1-BT A
2-BE 1 WH/YL
2-BE 4 BU/YL
2-MO B
2-RE A
2-RE C
POWER
REGULATOR
2-MA 4 BK/RD
2-MA 3 WH
2-MA 1 RD
2-MA 2 BK
2-BE 3 GN/YL
2-BE 2 GY/YL
2-MO A
2-MO C
2-RE D
2-RE B
RD
RD/WH
6-FA A
FUSE (30 A)
6-FA B
4-BP
BK/YL RD/BU RD/GN
6-IA 2
6-IA 4
6-IA 9
OFF ON START
KEY SWITCH
6-IA 5
6-IA 7
RD/GN
10-DM B
SOLENOID
10-DM A
STARTER
6-HG 13
KILL SWITCH
6-HG 7
BK/WH
WH/GY
6-BC C
6-BC A
BK/GN
6-BC B
DES
JTYL/BK
YL/BK
1-CA B
8-SA A
JT BK
POWER SUPPLY
STARTER AND IGNITION SWITCHES

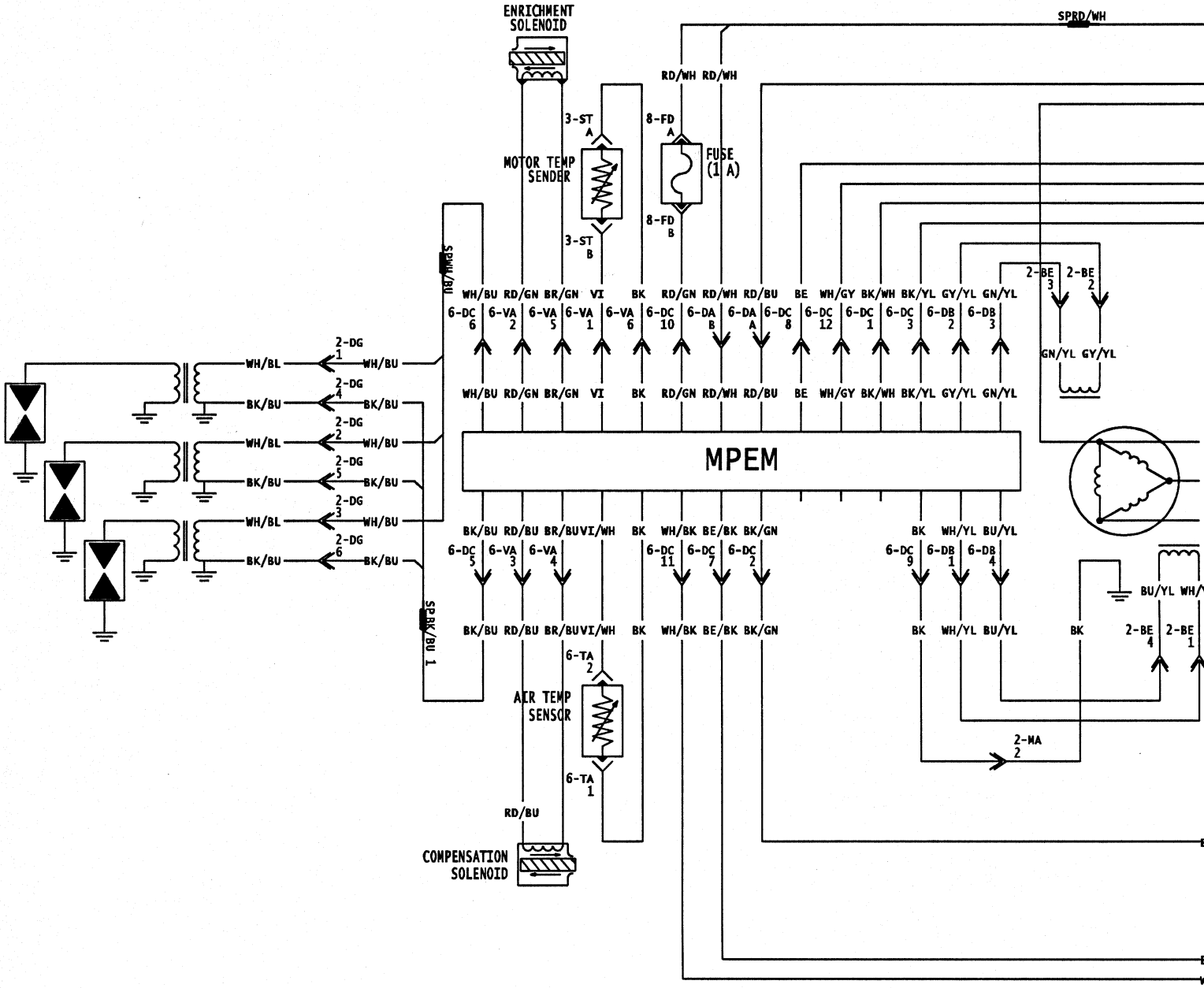

1-CA C
YL
8-SA C
YL
YL
YL
JTYL 1
WH/OR
7
1-CB A
6-HG 11
6-HG 9
YL
YL
11-NH A
WH/GY
6-BC A
WH/GY
DIMMER SWITCH
BRAKE SWITCH
11-NH B
OIL SENDER
WH
6-HG 8
WH/RD
BE
WH/OR
GY GY/VI
6-HG 10
6-HG 12
WH
50 OHMS
REVERSE ALARM
6-AR A
REVERSE ALARM SWITCH
6-IR A
7-LR A
DESS INDICAT
RON
DESS
WH
8-SA B
GY GY/VI
1-CC A
1-CC B
YL WH
9-PA C
9-PA B
WH/RD
1-CB C
6-AR B
6-IR B
7-LR B
BK
BK
BK
GR GR/VI
JTGY/VI
JT GY
YL WH
9-FR C
9-FR B
TAIL LAMP
WH/RD
OIL LEVEL INDICATOR
GY
GY
GY/VI
GY
GY/VI
7-LE A
7-PA C
7-PA A
7-PB C
7-PB A
7-LH A
HIGH BEAM INDICATOR
PARK BRAKE
HIGH
LOW
HIGH
LOW
9-FR A
YL/BK
1-CB B
7
7-LE B
7-PA B
7-PB B
HEAD LAMP A
HEAD LAMP B
9-PA A
7-LH B
YL/BK
YL/BK
YL/BK
YL/BK
BK
JTYL/BK 1
YL/BK
JTYL/BK
YL/BK
YL/BK

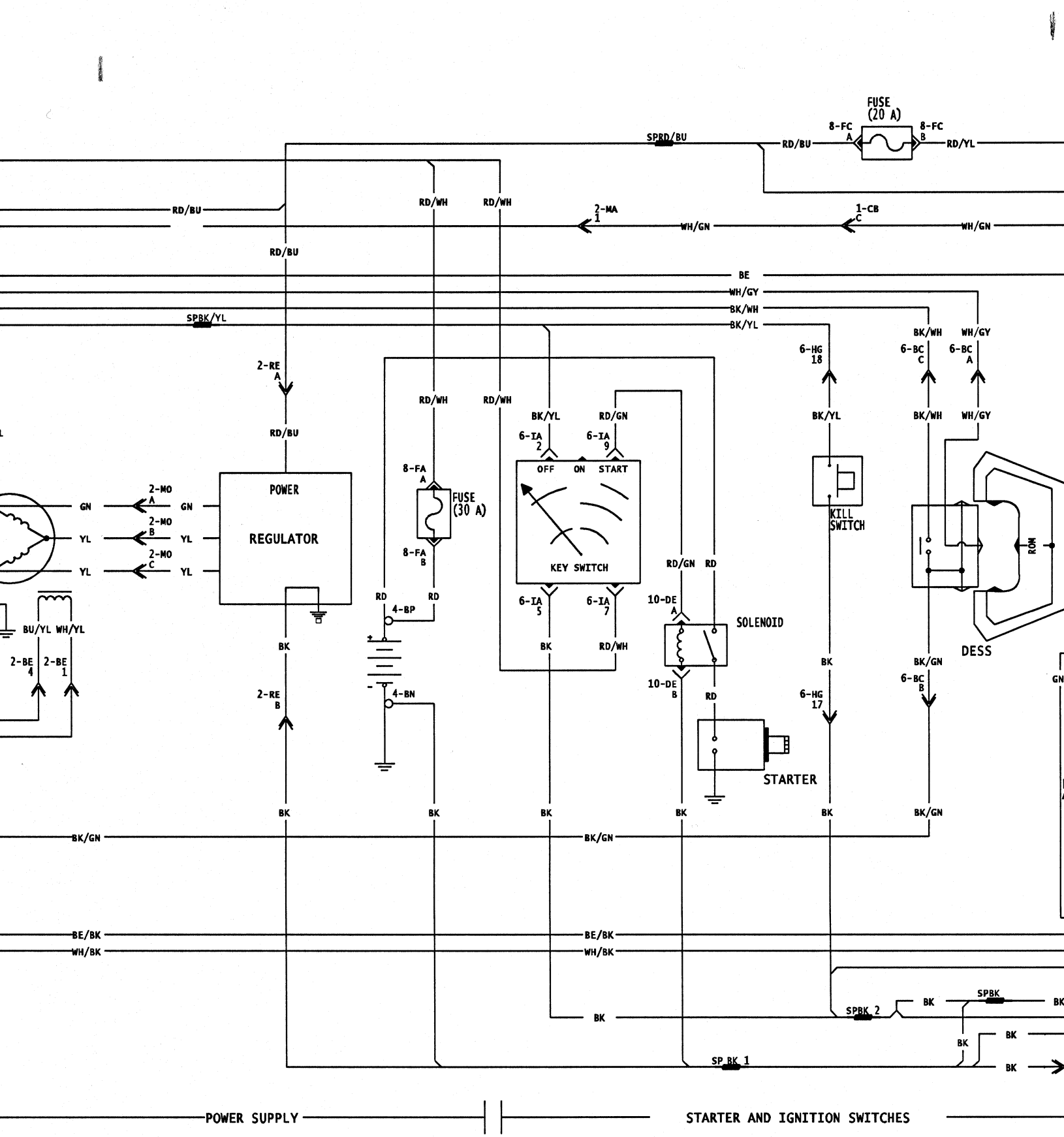
LIGHTING

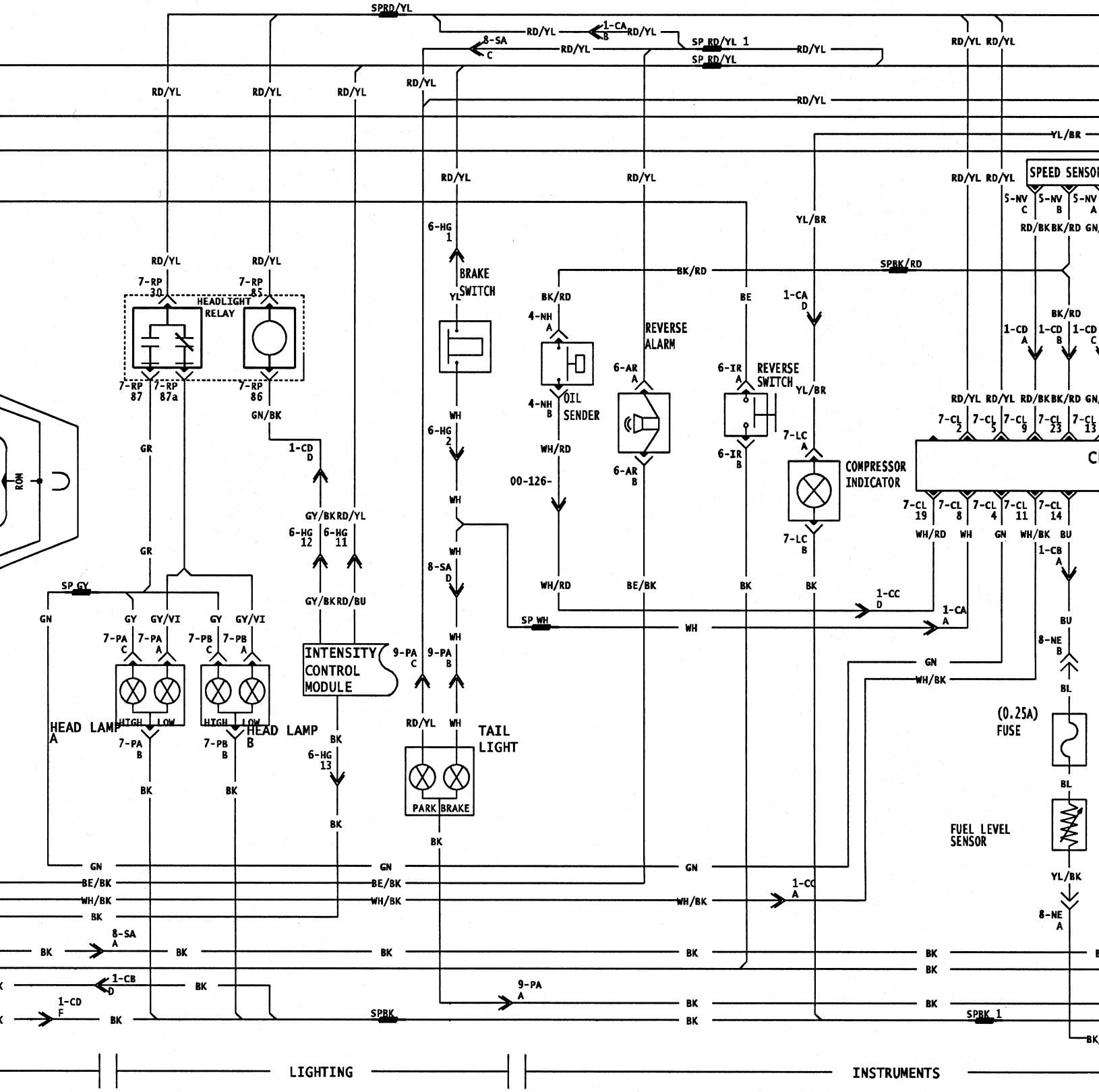

JT YL
YL 1
YL
7-CV A
7-CR A
7-CE B
7-CT B
6-VC A
6-IP B
6-IM B
FUEL SENDER
TEMP GAUGE
HEATING GRIP SWITCH
HEATING LEVER SWITCH
TACHOMETER
DESS INDICATOR
SPEEDOMETER
7-CE A
YL/BK YL/BK
7-CE C
BU
1-CA D
8-NE B
(0.25A) FUSE
FUEL SENDER
8-NE A
YL/BK
7-CV B
7-CT A
GN
1-CA A
3-TM A
TEMP SENDER
3-TM B
7-CT C
6-VC B
VISOR OUTLET
6-IP A
6-IP C
OR
OR/VI
JT OR
JT OR/VI
6-HG 1
6-HG 2
6-HG 6
6-HG 5
HEATING GRIP
6-HG 3
6-HG 4
6-IM A
6-IM C
BR/YL
BR
6-MC 2
6-MC 1
HEATED LEVER
6-MC 3
JTYL/BK 1
INSTRUMENTS
HEATING ELEMENTS

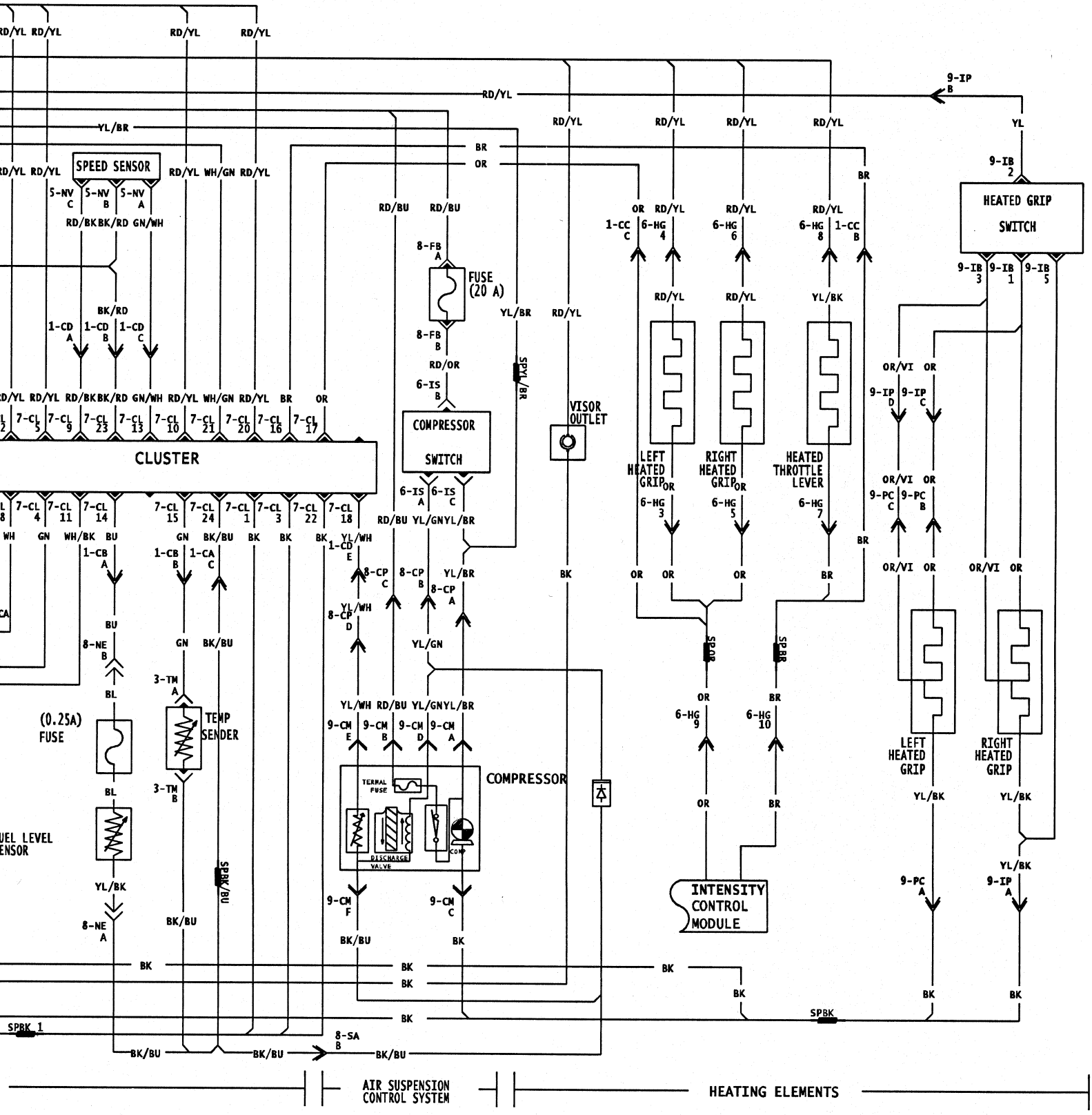
ANNEX 3 GT SE

2001 GRAND TOURING SE




FUSE
(20 A)
8-FC
A
8-FC
B
SPRD/BU
RD/BU
RD/YL
RD/BU
RD/WH
RD/WH
2-MA
1
WH/GN
1-CB
C
WH/GN
RD/BU
BE
WH/GY
BK/WH
BK/YL
SPBK/YL
2-RE
A
RD/BU
RD/WH
RD/WH
BK/YL
RD/GN
6-IA
2
6-IA
9
OFF
ON
START
KEY SWITCH
6-IA
5
6-IA
7
BK
RD/WH
8-FA
A
FUSE
(30 A)
8-FA
B
RD
4-BP
RD
4-BN
2-MO
A
2-MO
B
2-MO
C
GN
YL
YL
GN
YL
YL
POWER
REGULATOR
BU/YL
WH/YL
2-BE
4
2-BE
1
2-RE
B
BK
RD/GN
RD
10-DE
A
SOLENOID
10-DE
B
RD
STARTER
6-HG
18
BK/YL
KILL
SWITCH
BK
6-HG
17
BK/WH
WH/GY
6-BC
C
6-BC
A
DESS
ROM
BK/GN
6-BC
B
GN
BK
BK
BK
BK
BK
BK/GN
BK/GN
BK/GN
BE/BK
WH/BK
BE/BK
WH/BK
BK
SPBK 2
BK
SPBK
BK
BK
BK
SP BK 1
BK
POWER SUPPLY
STARTER AND IGNITION SWITCHES


SPRD/YL
RD/YL
1-CA B
8-SA C
SP RD/YL 1
SP RD/YL
YL/BR
SPEED SENSOR
5-NV C
5-NV B
5-NV A
RD/BK
BK/RD
GN/
7-RP 30
7-RP 85
HEADLIGHT RELAY
7-RP 87
7-RP 87a
7-RP 86
GN/BK
GR
1-CD D
6-HG 1
BRAKE SWITCH
YL
6-HG 2
WH
8-SA D
BK/RD
4-NH A
4-NH B
OIL SENDER
WH/RD
00-126-
REVERSE ALARM
6-AR A
6-AR B
BE
6-IR A
6-IR B
REVERSE SWITCH
1-CA D
7-LC A
7-LC B
COMPRESSOR INDICATOR
1-CD A
1-CD B
1-CD C
7-CL 2
7-CL 5
7-CL 9
7-CL 23
7-CL 13
7-CL 19
7-CL 8
7-CL 4
7-CL 11
7-CL 14
WH/RD
WH
GN
WH/BK
BU
1-CB A
1-CC D
1-CA A
8-NE B
BL
(0.25A) FUSE
FUEL LEVEL SENSOR
YL/BK
8-NE A
SP GY
GY
GY/VI
7-PA C
7-PA A
7-PA B
7-PB C
7-PB A
7-PB B
HEAD LAMP A
HEAD LAMP B
HIGH
LOW
GY/BK
RD/YL
6-HG 12
6-HG 11
GY/BK
RD/BU
INTENSITY CONTROL MODULE
9-PA C
9-PA B
9-PA A
6-HG 13
TAIL LIGHT
PARK BRAKE
BK
BE/BK
WH/BK
SP WH
1-CC A
8-SA A
1-CB D
1-CD F
SPRK
SPRK 1
LIGHTING
INSTRUMENTS


SPEED SENSOR
CLUSTER
FUSE (20 A)
COMPRESSOR SWITCH
VISOR OUTLET
HEATED GRIP SWITCH
LEFT HEATED GRIP
RIGHT HEATED GRIP
HEATED THROTTLE LEVER
(0.25A) FUSE
TEMP SENDER
COMPRESSOR
TERMAL FUSE
DISCHARGE VALVE
INTENSITY CONTROL MODULE
AIR SUSPENSION CONTROL SYSTEM
HEATING ELEMENTS

ski-doo

ski-doo®

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RECREATIONAL PRODUCTS

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Version française également disponible

2001

ski-doo

ski-doo®

Grand Touring STD 500/600
Grand Touring GS 700
Formula Deluxe STD 500/600
Formula Deluxe GS 700
Formula Deluxe GSE 600/700
MX Z STD 500/600/700/800
MX Z Trail 500/600/700
MX Z Adrenaline 600/700
MX Z X 600/700/800
Summit STD 600/700
Summit X 700/800
Summit H.M. 700
Summit H.M. X 800

Volume 3

Shop Manual

484 200 026

2001
Shop Manual

VOLUME 3

GRAND TOURING STD 500/STD 600/GS 700

FORMULA DELUXE STD 500/600
FORMULA DELUXE GS 700
FORMULA DELUXE GSE 600/700

MX Z STD 500/600/700/800
MX Z TRAIL 500/600/700
MX Z ADRENALINE 600/700
MX Z X 600/700/800

SUMMIT STD 600/700
SUMMIT X 700/800
SUMMIT H.M. 700
SUMMIT H.M. X 800

BOMBARDIER
RECREATIONAL PRODUCTS

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SAFETY NOTICE

This manual has been prepared as a guide to correctly service and repair some 2001 Ski-Doo snowmobiles. See model list below.

This edition was primarily published to be used by snowmobile mechanic technicians who are already familiar with all service procedures relating to Bombardier made snowmobiles. Mechanic technicians should attend continuous training courses given by Bombardier Training Dept.

Please note that the instructions will apply only if proper hand tools and special service tools are used.

This *Shop Manual* uses technical terms which may be slightly different from the ones used in the *Parts Catalog*.

It is understood that this manual may be translated into another language. In the event of any discrepancy, the English version shall prevail.

The content depicts parts and/or procedures applicable to the particular product at time of writing. *Service* and *Warranty Bulletins* may be published to update the content of this manual. Make sure to read and understand these.

In addition, the sole purpose of the illustrations throughout the manual, is to assist identification of the general configuration of the parts. They are not to be interpreted as technical drawings or exact replicas of the parts.

The use of Bombardier parts is most strongly recommended when considering replacement of any component. Dealer and/or distributor assistance should be sought in case of doubt.

The engines and the corresponding components identified in this document should not be utilized on product(s) other than those mentioned in this document.

Torque wrench tightening specifications must be strictly adhered to. Locking devices (ex.: locking tab, self-locking fasteners, etc.) must be installed or replaced with new ones. If the efficiency of a locking device is impaired, it must be renewed.

This manual emphasizes particular information denoted by the wording and symbols:

⚠ WARNING

Identifies an instruction which, if not followed, could cause serious personal injury including possibility of death.

CAUTION: Denotes an instruction which, if not followed, could severely damage vehicle components.

NOTE: Indicates supplementary information needed to fully complete an instruction.

Although the mere reading of such information does not eliminate the hazard, your understanding of the information will promote its correct use. Always use common shop safety practice.

Bombardier Inc. disclaims liability for all damages and/or injuries resulting from the improper use of the contents. We strongly recommend that any services be carried out and/or verified by a highly skilled professional mechanic. It is understood that certain modifications may render use of the vehicle illegal under existing federal, provincial and state regulations.

WHAT'S NEW

SERVICE TOOLS AND SERVICE PRODUCTS

- New 21 mm circlip installer.
- New C-36 and C-46 service tools.
- Reintroduction of Molykote G-n paste for RAVE valve stem.

493, 593, 693 AND 793 ENGINES TYPES

- New oil seal on RAVE valve stem.
- New Isoflex grease application.
- New tightening sequence for crankcase screws.

OIL INJECTION SYSTEM

- Adjustment procedure.

REWIND STARTER

- New type of lubricant is used on all moving parts.

CARBURETOR AND FUEL PUMP

- TM carburetor repair procedure.

SC-10 II SUSPENSION

- New BOSS shock servicing procedure.
- New T/A HPG shock repair procedure.

SC-10 MOUNTAIN SUSPENSION

- New subsection.

INTRODUCTION

This *Shop Manual Volume 3* covers the following Bombardier made 2001 snowmobiles:

MODELS	MODEL NUMBER
GRAND TOURING* STD 500 (BLACK) (Canada)	1799
GRAND TOURING STD 500 (BLACK) (U.S.)	1800
GRAND TOURING STD 500 (BLACK) (Europe)	1801
GRAND TOURING STD 500 (CLOUD) (Canada)	1802
GRAND TOURING STD 500 (CLOUD) (U.S.)	1803
GRAND TOURING STD 600 (BLACK) (Canada)	1794
GRAND TOURING STD 600 (BLACK) (U.S.)	1795
GRAND TOURING STD 600 (BLACK) (Europe)	1796
GRAND TOURING STD 600 (CLOUD) (Canada)	1797
GRAND TOURING STD 600 (CLOUD) (U.S.)	1798
GRAND TOURING GS 700 (BLACK)(Canada)	1789
GRAND TOURING GS 700 (BLACK) (U.S.)	1790
GRAND TOURING GS 700 (BLACK) (Europe)	1791
GRAND TOURING GS 700 (CLOUD)(Canada)	1792
GRAND TOURING GS 700 (CLOUD) (U.S.)	1793
FORMULA* DELUXE STD 500 (RED) (Canada)	1778
FORMULA DELUXE STD 500 (RED) (U.S.)	1779
FORMULA DELUXE STD 500 (CLOUD) (Canada)	1780
FORMULA DELUXE STD 500 (CLOUD) (U.S.)	1781
FORMULA DELUXE STD 600 (RED) (Canada)	1773
FORMULA DELUXE STD 600 (RED) (U.S.)	1774
FORMULA DELUXE STD 600 (CLOUD) (Canada)	1775
FORMULA DELUXE STD 600 (CLOUD) (U.S.)	1776
FORMULA DELUXE STD 600 (CLOUD) (Europe)	1777
FORMULA DELUXE GS 700 (RED) (Canada)	1768
FORMULA DELUXE GS 700 (RED) (U.S.)	1769
FORMULA DELUXE GS 700 (CLOUD) (Canada)	1770
FORMULA DELUXE GS 700 (CLOUD) (U.S.)	1771
FORMULA DELUXE GS 700 (CLOUD) (Europe)	1772
FORMULA DELUXE GSE 600 (RED) (Canada)	1831
FORMULA DELUXE GSE 600 (RED) (U.S.)	1832
FORMULA DELUXE GSE 600 (CLOUD) (Canada)	1833
FORMULA DELUXE GSE 600 (CLOUD) (U.S.)	1834
FORMULA DELUXE GSE 700 (RED) (Canada)	1764
FORMULA DELUXE GSE 700 (RED) (U.S.)	1765
FORMULA DELUXE GSE 700 (CLOUD) (Canada)	1766
FORMULA DELUXE GSE 700 (CLOUD) (U.S.)	1767
MX Z TRAIL 500 (YELLOW) (Canada)	1706
MX Z TRAIL 500 (YELLOW) (U.S.)	1707
MX Z TRAIL 500 (BLACK) (Canada)	1708
MX Z TRAIL 500 (BLACK) (U.S.)	1709
MX Z TRAIL 600 (YELLOW) (Canada)	1691
MX Z TRAIL 600 (YELLOW) (U.S.)	1692
MX Z TRAIL 600 (BLACK) (Canada)	1693
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MX Z STD 500 (BLACK) (Canada)	1713
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MX Z STD 600 (YELLOW) (Europe)	1703
MX Z STD 600 (BLACK) (Canada)	1704
MX Z STD 600 (BLACK) (U.S.)	1705
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MX Z STD 700 (YELLOW) (U.S.)	1687
MX Z STD 700 (BLACK) (Canada)	1688
MX Z STD 700 (BLACK) (U.S.)	1689
MX Z STD 700 (BLACK) (Europe)	1690
MX Z STD 700 (YELLOW) (Europe)	1703
MX Z STD 800 (YELLOW) (Canada)	1870
MX Z STD 800 (YELLOW) (U.S.)	1871
MX Z STD 800 (BLACK) (Canada)	1872
MX Z STD 800 (BLACK) (U.S.)	1873
MX Z ADRENALINE 600 (YELLOW) (Canada)	1695
MX Z ADRENALINE 600 (YELLOW) (U.S.)	1696
MX Z ADRENALINE 600 (BLACK) (Canada)	1697
MX Z ADRENALINE 600 (BLACK) (U.S.)	1698
MX Z ADRENALINE 600 (RED) (Canada)	1689
MX Z ADRENALINE 600 (RED) (U.S.)	1700

INTRODUCTION

MODELS	MODEL NUMBER
MX Z ADRENALINE 700 (YELLOW) (Canada)	1680
MX Z ADRENALINE 700 (YELLOW) (U.S.)	1681
MX Z ADRENALINE 700 (BLACK) (Canada)	1682
MX Z ADRENALINE 700 (BLACK) (U.S.)	1683
MX Z ADRENALINE 700 (RED) (Canada)	1684
MX Z ADRENALINE 700 (RED) (U.S.)	1685
MX Z ADRENALINE 800 (YELLOW) (Canada)	1856
MX Z ADRENALINE 800 (YELLOW) (U.S.)	1857
MX Z ADRENALINE 800 (BLACK) (Canada)	1858
MX Z ADRENALINE 800 (BLACK) (U.S.)	1859
MX Z ADRENALINE 800 (RED) (Canada)	1860
MX Z ADRENALINE 800 (RED) (U.S.)	1861
MX Z X 600 (YELLOW) (Canada)	1825
MX Z X 600 (YELLOW) (U.S.)	1826
MX Z X 600 (BLACK) (Canada)	1827
MX Z X 600 (BLACK) (U.S.)	1828
MX Z X 600 (RED) (Canada)	1829
MX Z X 600 (RED) (U.S.)	1830
MX Z X 700 (YELLOW) (Canada)	1670
MX Z X 700 (YELLOW) (U.S.)	1671
MX Z X 700 (BLACK) (Canada)	1672
MX Z X 700 (BLACK) (U.S.)	1673
MX Z X 700 (RED) (Canada)	1674
MX Z X 700 (RED) (U.S.)	1675
MX Z X 800 (YELLOW) (Canada)	1663
MX Z X 800 (YELLOW) (U.S.)	1664
MX Z X 800 (BLACK) (Canada)	1665
MX Z X 800 (BLACK) (U.S.)	1666
MX Z X 800 (BLACK) (Europe)	1667
MX Z X 800 (RED) (Canada)	1668
MX Z X 800 (RED) (U.S.)	1669
SUMMIT STD 600 (YELLOW) (Canada)	1758
SUMMIT STD 600 (YELLOW) (U.S.)	1759
SUMMIT STD 600 (BLACK) (Canada)	1760
SUMMIT STD 600 (BLACK) (U.S.)	1761
SUMMIT STD 700 (YELLOW) (Canada)	1753
SUMMIT STD 700 (YELLOW) (U.S.)	1754
SUMMIT STD 700 (YELLOW) (Europe)	1757
SUMMIT STD 700 (BLACK) (Canada)	1755
SUMMIT STD 700 (BLACK) (U.S.)	1756
SUMMIT H.M. 700 (YELLOW) (Canada)	1735
SUMMIT H.M. 700 (YELLOW) (U.S.)	1736
SUMMIT H.M. 700 (BLACK) (Canada)	1737
SUMMIT H.M. 700 (BLACK) (U.S.)	1738
SUMMIT H.M. 800 (YELLOW) (Canada)	1862
SUMMIT H.M. 800 (YELLOW) (U.S.)	1863
SUMMIT H.M. 800 (BLACK) (Canada)	1864
SUMMIT H.M. 800 (BLACK) (U.S.)	1865

MODELS	MODEL NUMBER
SUMMIT X 700 (YELLOW) (Canada)	1747
SUMMIT X 700 (YELLOW) (U.S.)	1748
SUMMIT X 700 (BLACK) (Canada)	1749
SUMMIT X 700 (BLACK) (U.S.)	1750
SUMMIT X 700 (RED) (Canada)	1751
SUMMIT X 700 (RED) (U.S.)	1752
SUMMIT X 800 (YELLOW) (Canada)	1740
SUMMIT X 800 (YELLOW) (U.S.)	1741
SUMMIT X 800 (YELLOW) (Europe)	1746
SUMMIT X 800 (BLACK) (Canada)	1742
SUMMIT X 800 (BLACK) (U.S.)	1743
SUMMIT X 800 (RED) (Canada)	1744
SUMMIT X 800 (RED) (U.S.)	1745
SUMMIT H.M. X 800 (YELLOW) (Canada)	1723
SUMMIT H.M. X 800 (YELLOW) (U.S.)	1724
SUMMIT H.M. X 800 (BLACK) (Canada)	1725
SUMMIT H.M. X 800 (BLACK) (U.S.)	1726
SUMMIT H.M. X 800 (RED) (Canada)	1727
SUMMIT H.M. X 800 (RED) (U.S.)	1728
SUMMIT H.M. X 800 (RED) (Europe)	1824

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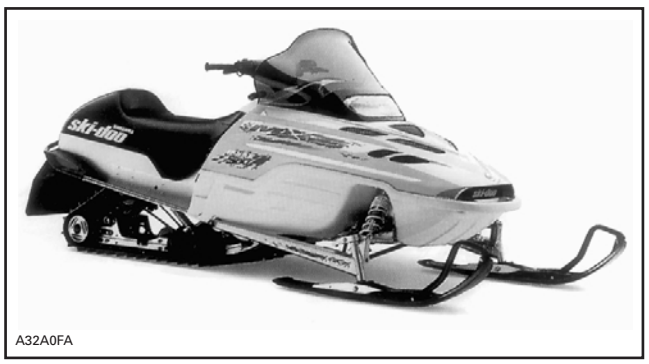
All the above listed models are ZX Series models.



TYPICAL — ZX SERIES

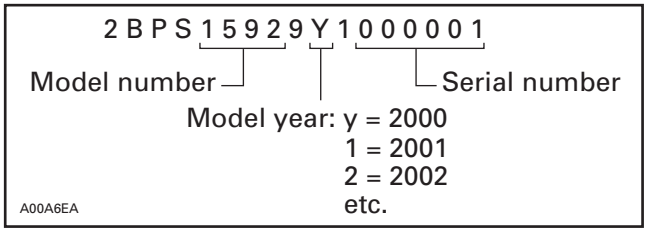
VEHICLE IDENTIFICATION NUMBER

Vehicle Identification Number Location

TYPICAL

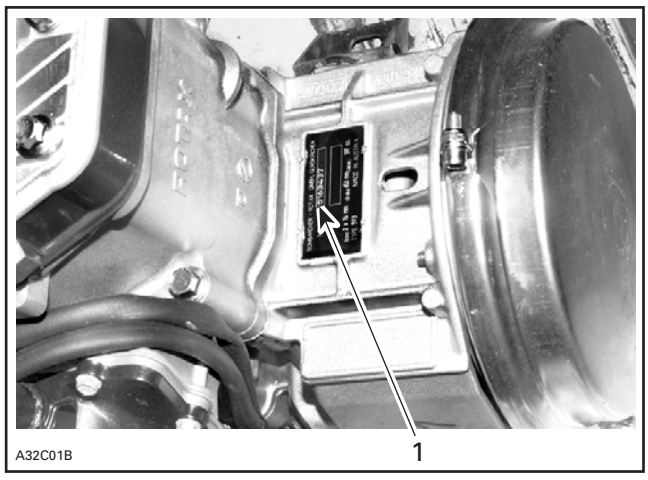
1. Vehicle identification number

Identification Number Meaning



ENGINE SERIAL NUMBER

Engine Serial Number Location



TYPICAL

1. Engine serial number

LIST OF ABBREVIATIONS USED IN THIS MANUAL

A	ampere
amp	ampere
A•h	ampere-hour
AC	alternate current
ACM	acceleration and control modulator
ADSA	advanced direct shock action
BDC	bottom dead center
BTDC	before top dead center
°C	degree Celsius
cc	cubic centimeter
CDI	capacitor discharge ignition
CTR	center
cm	centimeter
cm^2	square centimeter
cm^3	cubic centimeter
DC	direct current
DESS	digitally encoded security system
DPM	digital performance management
°F	degree Fahrenheit
FC	fan cooled
fl. oz	fluid ounce
ft	foot
GRD	ground
H.A.C.	high altitude compensator
hal.	halogen
HI	high
IFP	internal floating piston
imp. oz	imperial ounce
in	inch
in^2	square inch
in^3	cubic inch
k	kilo (thousand)
kg	kilogram
km/h	kilometer per hour
kPa	Kilopascal
L	liter
lb	pound
lbf	pound (force)

lbf/in²	pound per square inch
LH	left hand
LO	low
LT	long track
m	meter
MAG	magneto
Max.	maximum
Min.	minimum
mL	milliliter
mm	millimeter
M.E.	millennium edition
MPEM	multi-purpose electronic module
MPH	mile per hour
N	newton
N.A.	not applicable
no.	number
00.0	continuity
0.L	open line (open circuit)
O.D.	outside diameter
OPT	optional
oz	ounce
P/N	part number
PSI	pound per square inch
PTO	power take off
R	rectangular
RH	right hand
RAVE	Rotax adjustable variable exhaust
RER	Rotax electronic reverse
RPM	revolution per minute
RMS	root mean square
RRIM	reinforced reaction injection molding
Sp. Gr.	specific gravity
ST	semi-trapez
TDC	top dead center
TRA	total range adjustable
U.S. oz	ounce (United States)
V	volt
Vac	volt (alternative current)

ARRANGEMENT OF THE MANUAL

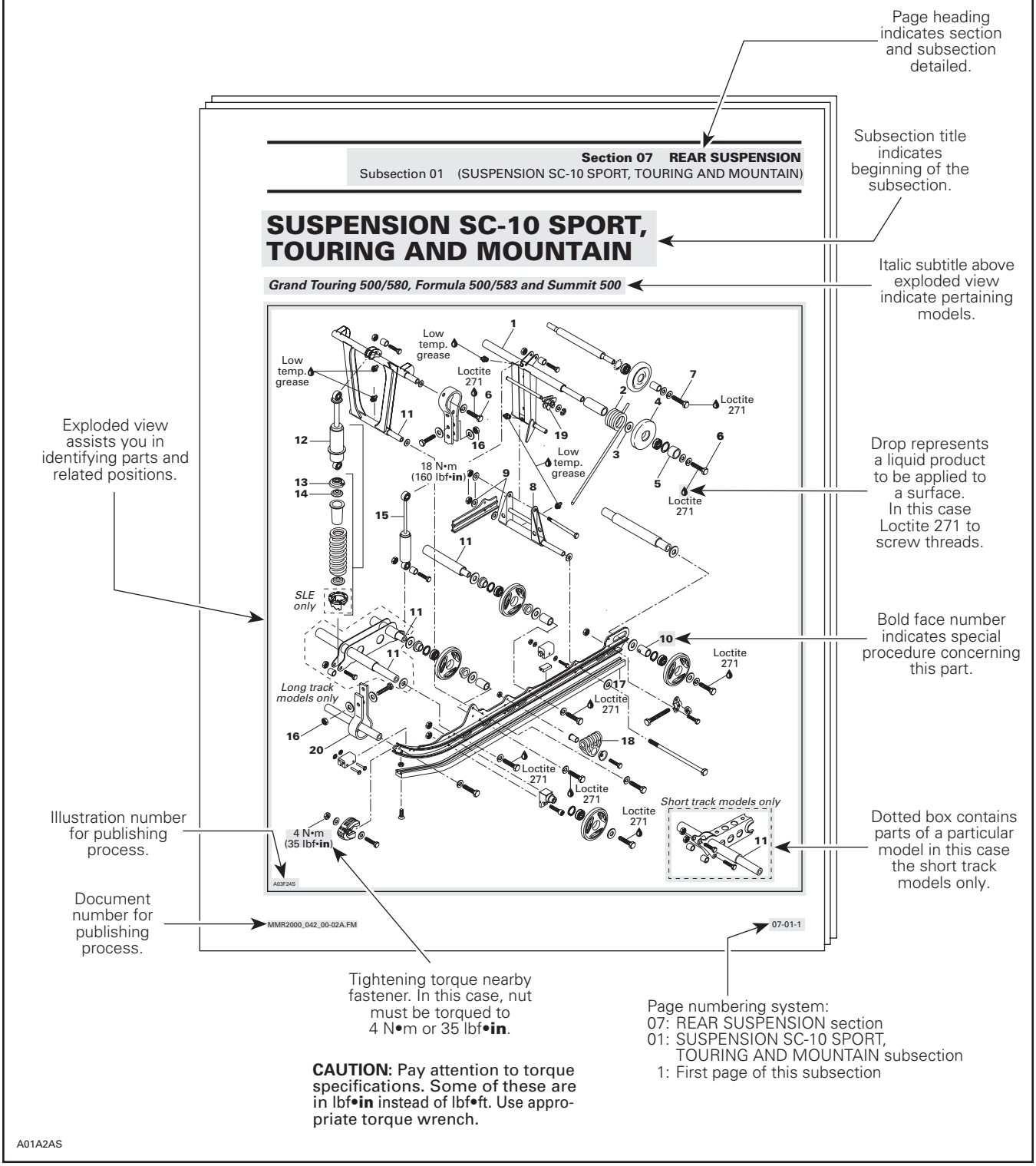
The manual is divided into 11 major sections:

01 SERVICE TOOLS AND SERVICE PRODUCTS
02 LUBRICATION AND MAINTENANCE
03 TROUBLESHOOTING
04 ENGINE
05 TRANSMISSION
06 ELECTRICAL
07 REAR SUSPENSION
08 STEERING/FRONT SUSPENSION
09 BODY/FRAME
10 TECHNICAL DATA
11 WIRING DIAGRAMS

Each section is divided in various subsections, and again, each subsection has one or more division.

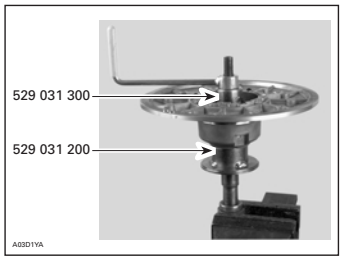
This *Shop Manual* uses technical terms wich may be slightly different from the ones in the parts catalog.

TYPICAL PAGE



TYPICAL PAGE

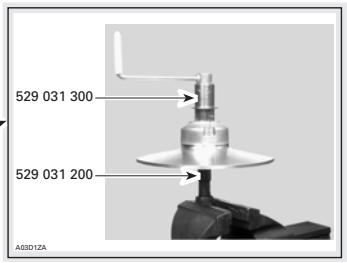
Turn puller handle and sliding half at once to extract the bushing.



IMPORTANT: Large bushing retaining screws and washers must be removed before small bushing installation.

Coat bushing outside diameter with Loctite 609 (P/N 413 703 100).

Install bushing as following photo.



ASSEMBLY

Came Slider Shoe

When replacing slider shoes **no. 4**, always install a new set (3 shoes) to maintain equal pressure on the cam.

Assemble driven pulley components by reversing the disassembly procedure.

Cam

Coat cam **no. 18** interior with anti-seize lubricant.

INSTALLATION

Countershaft

CAUTION: Always apply anti-seize lubricant (P/N 413 701 000) on the countershaft before final pulley installation.

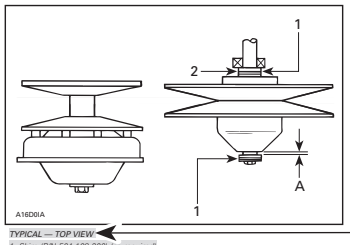
A-Series and B-Series Only

Should installation procedure be required, refer to BRAKE then look for **Brake Disc and Countershaft Bearing Adjustment**.

Reinstall the pulley on the countershaft by reversing the removal procedure.

All Models

Check end play of driven pulley on countershaft by pushing pulley towards outer housing so that the inner shims (P/N 504 108 200) contact it. Measure end play at the mounting screw end between shim(s) and puley. See illustration.



TYPICAL — TOP VIEW.
1. Shim (P/N 504 108 200) (as required)
2. Contact
A. 0 to 1 mm (0 to 3/64 in)

Torque retaining screw **no. 13** to 25 N•m (18 lbf•ft).

ADJUSTMENT

Refer to PULLEY DISTANCE AND ALIGNMENT to adjust pulley distance. Adjust drive belt height between pulley halves to obtain specified belt deflection.

Title indicates main procedure to be carried-out.

Italic bold face type setting indicates a particular procedure concerning a model.

Italic bold face setting in this case indicates that particular procedure for A and B-Series is finished, so from this point, all models are concerned.

"TYPICAL" caption indicates a general view which does not represent full detail. "TOP VIEW" caption helps you in understanding illustration.

Illustration always follows text to which it pertains.

Call-outs for above illustration.

Subtitle indicates a particular procedure for the named part.

Reference to look up a certain section and subsection. In this case it concerns pulleys adjustment.

Bold face number following part name refers to exploded view at beginning of subsection.

A01A2BS

GENERAL INFORMATION

The information and component/system descriptions contained in this manual are correct at time of publication. Bombardier Inc. however, maintains a policy of continuous improvement of its products without imposing upon itself any obligation to install them on products previously manufactured.

Due to late changes, it may have some differences between the manufactured product and the description and/or specifications in this document.

Bombardier Inc. reserves the right at any time to discontinue or change specifications, designs, features, models or equipment without incurring obligation.

USEFUL PUBLICATIONS

Refer to *Parts Catalogs* to order the right parts.

PARTS CATALOG	
MODELS	P/N
Grand Touring 500/600/GS 700	484 400 163
Formula 500/600/700	484 400 143
MX Z 500/600700	484 400 123
MX Z X 800	484 400 213
Summit 600/700/800	484 400 133

Use *Specification Booklet* to find rapidly the right specs.

1997-2001 SPECIFICATION BOOKLET (P/N 484 300 198).

ILLUSTRATIONS AND PROCEDURES

Illustrations and photos show the typical construction of the different assemblies and, in all cases, may not reproduce the full detail or exact shape of the parts shown. However, they represent parts which have the same or a similar function.

CAUTION: Most components of those vehicles are built with parts dimensioned in the metric system. Most fasteners are metric and must not be replaced by customary fasteners or vice-versa. Mismatched or incorrect fasteners could cause damage to the vehicle or possible personal injury.

As many of the procedures in this manual are interrelated, we suggest, that before undertaking any task, you read and thoroughly understand the entire section or subsection in which the procedure is contained.

A number of procedures throughout the book require the use of special tools. Before commencing any procedure, be sure that you have on hand all the tools required, or approved equivalents.

The use of RIGHT and LEFT indications in the text, always refers to driving position (when sitting on vehicle).

TYPICAL

1. *Left*
2. *Right*

SELF-LOCKING FASTENERS PROCEDURE

The following describes the most common application procedures when working with self-locking fasteners.

Use a metal brush or a tap to clean the hole properly then use a solvent (Methyl-Chloride), let act during 30 minutes and wipe off. The solvent utilization is to ensure the adhesive works properly.

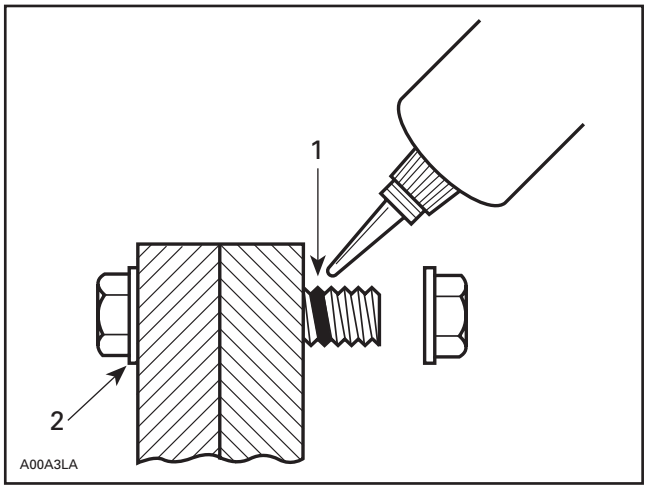
LOCTITE APPLICATION PROCEDURE

The following describes the most common application procedures when working with Loctite products.

NOTE: Always use proper strength Loctite product as recommended in this *Shop Manual*.

THREADLOCKER

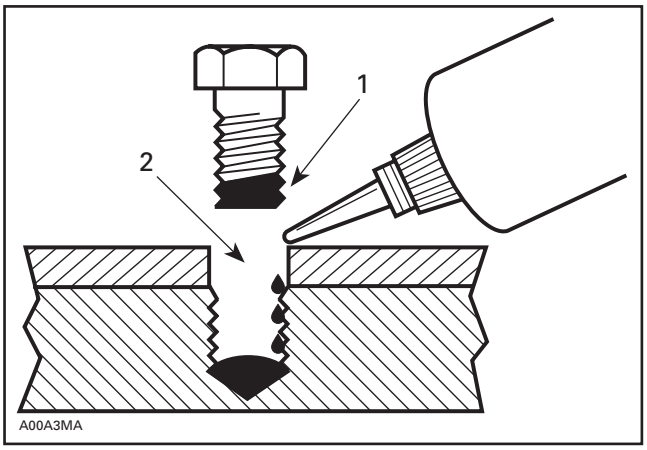
Uncovered Holes (bolts and nuts)



1. Apply here
2. Do not apply

1. Clean threads (bolt and nut) with solvent.
2. Apply Loctite Primer N (P/N 293 800 041) on threads and allow to dry.
3. Choose proper strength Loctite threadlocker.
4. Fit bolt in the hole.
5. Apply a few drops of threadlocker at proposed tightened nut engagement area.
6. Position nut and tighten as required.

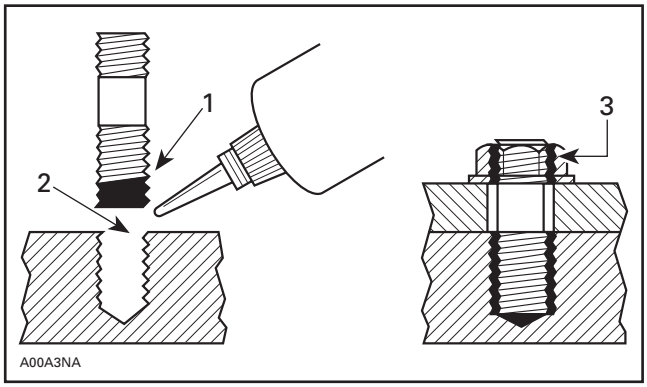
Blind Holes



1. On threads
2. On threads and at the bottom of hole

1. Clean threads (bolt and hole) with solvent.
2. Apply Loctite Primer N (P/N 293 800 041) on threads (bolt and nut) and allow to dry for 30 seconds.
3. Choose proper strength Loctite threadlocker.
4. Apply several drops along the threaded hole and at the bottom of the hole.
5. Apply several drops on bolt threads.
6. Tighten as required.

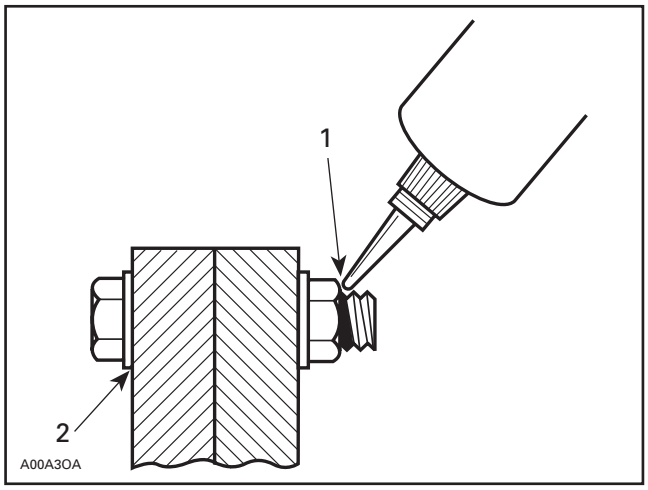
Stud in Blind Holes



1. On threads
2. On threads and in the hole
3. Onto nut threads

1. Clean threads (stud and hole) with solvent.
2. Apply Loctite Primer N (P/N 293 800 041) on threads and allow to dry.
3. Put several drops of proper strength Loctite threadlocker on female threads and in hole.
4. Apply several drops of proper strength Loctite on stud threads.
5. Install stud.
6. Install cover, etc.
7. Apply drops of proper strength Loctite on uncovered threads.
8. Tighten nuts as required.

Preassembled Parts

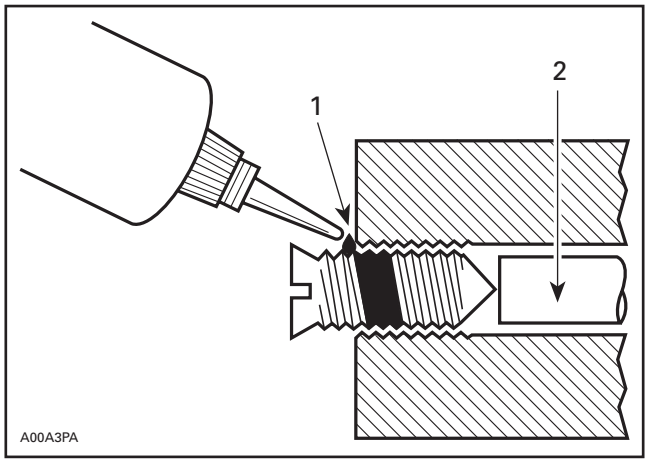


1. Apply here
2. Do not apply

1. Clean bolts and nuts with solvent.
2. Assemble components.
3. Tighten nuts.
4. Apply drops of proper strength Loctite on bolt/nut contact surfaces.
5. Avoid touching metal with tip of flask.

NOTE: For preventive maintenance on existing equipment, retighten nuts and apply proper strength Loctite on bolt/nut contact surfaces.

Adjusting Screw



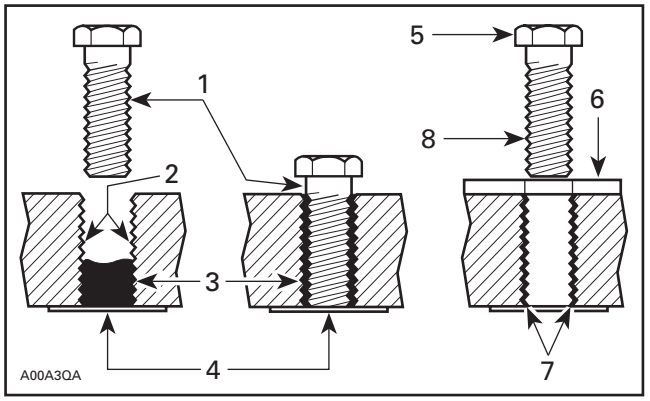
1. Apply here
2. Plunger

1. Adjust screw to proper setting.
2. Apply drops of proper strength Loctite threadlocker on screw/body contact surfaces.
3. Avoid touching metal with tip of flask.

NOTE: If it is difficult to readjust, heat screw with a soldering iron (232°C (450°F)).

STRIPPED THREAD REPAIR

Stripped Threads



1. Release agent
2. Stripped threads
3. Form-A-Thread
4. Tape
5. Cleaned bolt
6. Plate
7. New threads
8. Threadlocker

Standard Thread Repair

1. Follow instructions on Loctite FORM-A-THREAD 81668 package.
2. If a plate is used to align bolt:
   a. Apply release agent on mating surfaces.
   b. Put waxed paper or similar film on the surfaces.
3. Twist bolt when inserting it to improve thread conformation.

NOTE: NOT intended for engine stud repairs.

Repair of Small Holes/Fine Threads

Option 1: Enlarge damaged hole, then follow **Standard Thread Repair** procedure.

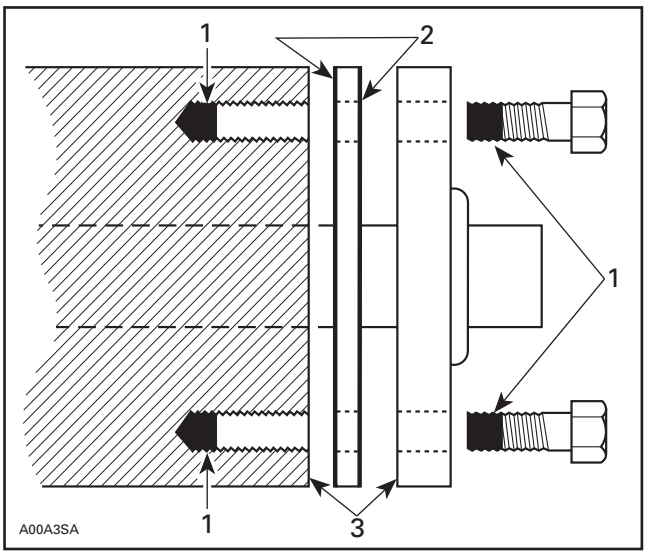
Option 2: Apply FORM-A-THREAD on the screw and insert in damaged hole.

Permanent Stud Installation (light duty)

1. Use a stud or thread on desired length.
2. DO NOT apply release agent on stud.
3. Do a **Standard Thread Repair**.
4. Allow to cure for 30 minutes.
5. Assemble.

GASKET COMPOUND

All Parts



1. Proper strength Loctite
2. Loctite Primer N (P/N 413 708 100) and Gasket Eliminator 515 (P/N 413 702 700) on both sides of gasket
3. Loctite Primer N only

1. Remove old gasket and other contaminants with Loctite Chisel remover (P/N 413 708 500). Use a mechanical mean if necessary.

NOTE: Avoid grinding.

2. Clean both mating surfaces with solvent.
3. Spray Loctite Primer N on both mating surfaces and on both sides of gasket. Allow to dry 1 or 2 minutes.
4. Apply GASKET ELIMINATOR 515 (P/N 413 702 700) on both sides of gasket, using a clean applicator.
5. Place gasket on mating surfaces and assemble immediately.

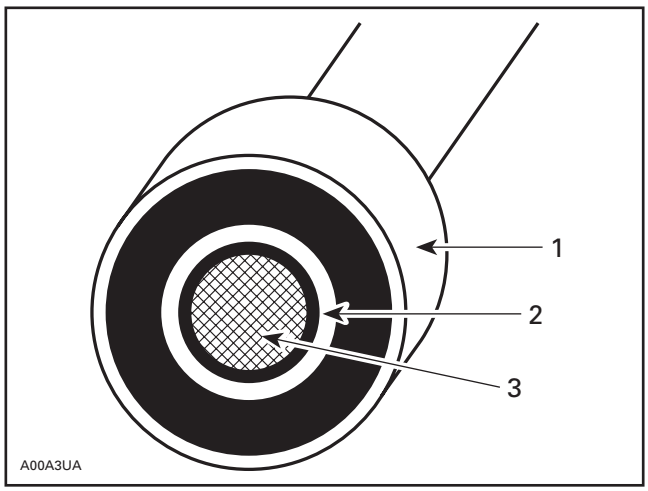
NOTE: If the cover is bolted to blind holes (above), apply proper strength Loctite in the hole and on threads. Tighten.

If holes are sunken, apply proper strength Loctite on bolt threads.

6. Tighten as usual.

MOUNTING ON SHAFT

Mounting with a Press



1. Bearing
2. Proper strength Loctite
3. Shaft

Standard

1. Clean shaft external part and element internal part.
2. Apply a strip of proper strength Loctite on shaft circumference at insert or engagement point.

NOTE: Retaining compound is always forced out when applied on shaft.

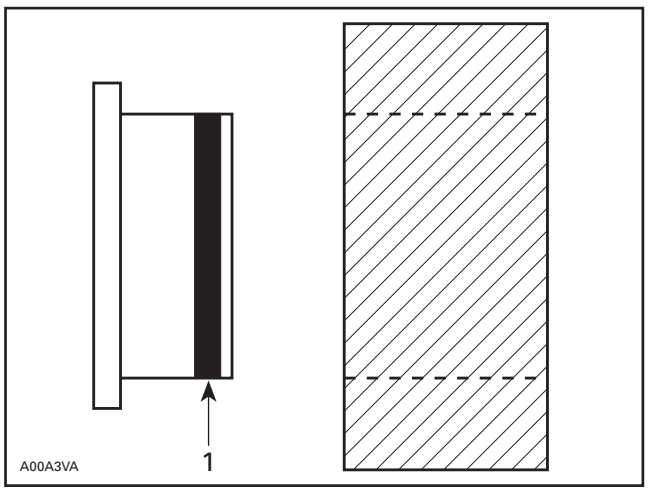
3. DO NOT use anti-seize Loctite or any similar product.
4. No curing period is required.

Mounting in Tandem

1. Apply retaining compound on internal element bore.
2. Continue to assemble as shown above.

CASE-IN COMPONENTS

Metallic Gaskets



1. Proper strength Loctite

1. Clean inner housing diameter and outer gasket diameter.
2. Spray housing and gasket with Loctite Primer N (P/N 293 800 041).
3. Apply a strip of proper strength Loctite on leading edge of outer metallic gasket diameter.

NOTE: Any Loctite product can be used here. A low strength liquid is recommended as normal strength and gap are required.

4. Install according to standard procedure.
5. Wipe off surplus.
6. Allow it to cure for 30 minutes.

NOTE: Normally used on worn-out housings to prevent leaking or sliding.

It is generally not necessary to remove gasket compound applied on outer gasket diameter.

TIGHTENING TORQUES

Tighten fasteners to torque mentioned in exploded views and text. When they are not specified refer to following table. Bold face size (e.g. **M4)** indicates nominal value (mean value).

N•m	FASTENER SIZE (8.8 GRADE)	Lbf•**in**
2	**M4**	18
3	M4	27
4	**M5**	35
8	M6	71
9	M6	80
10	**M6**	89
11	**M6**	97
12	**M6**	106

N•m	FASTENER SIZE (8.8 GRADE)	Lbf•ft
21	M8	15
22	M8	16
23	**M8**	17
24	M8	18
25	M8	18
43	M10	32
44	M10	32
45	M10	33
46	M10	34
47	M10	35
48	**M10**	35
49	M10	36
50	M10	37
51	M10	38
52	M10	38
53	M10	39
76	M12	56
77	M12	57
78	M12	58
79	M12	58
80	**M12**	59
81	M12	60
82	M12	60
83	M12	61
84	M12	62
121	M14	89
122	M14	90

N•m	FASTENER SIZE (8.8 GRADE)	Lbf•ft
123	M14	91
124	M14	91
125	M14	92
126	M14	93
127	M14	94
128	M14	94
129	M14	95
130	M14	96
131	M14	97
132	M14	97
133	M14	98
134	M14	99
135	**M14**	100
136	M14	100
137	M14	101
138	M14	102
139	M14	103
140	M14	103
141	M14	104
142	M14	105
143	M14	105
144	M14	106
145	M14	107
146	M14	108
147	M14	108
148	M14	109
149	M14	110
150	M14	111

We would be pleased if you could communicate to Bombardier any suggestions you may have concerning our publications.

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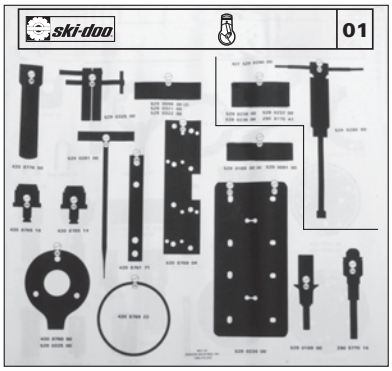
SERVICE TOOLS

This is a list of tools to properly service Ski-Doo snowmobiles. The list includes both the mandatory tools included in a kit (P/N 861 743 700) and the optional tools that are ordered separately. The list of Service Products, both mandatory and optional, are not part of any kit and must all be ordered separately. If you need to replace or add to your tool inventory these items can be ordered through the regular parts channel.

Following mention points out new tool and product:

WORKSHOP — MANDATORY SERVICE TOOLS

Tool board
(P/N 529 034 000)

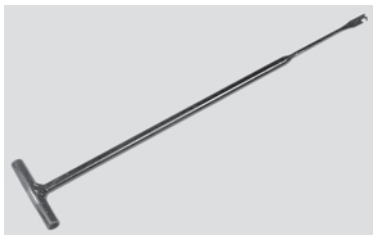


A00A3X4

APPLICATION
All models.

ENGINE — MANDATORY SERVICE TOOLS

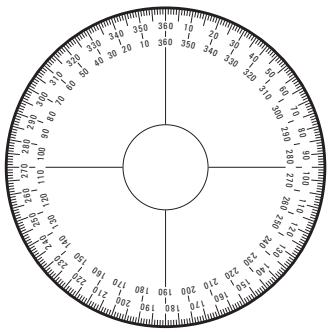
Exhaust spring installer/remover
(P/N 529 035 400)



A01B584

APPLICATION
CK3 series.

Degree wheel
(P/N 529 035 607)

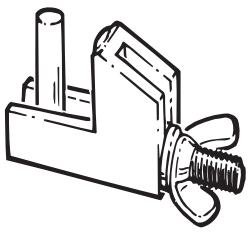


A00B514

APPLICATION
All rotary valve engines.

NOTE: This tool replaces degree wheel (P/N 295 000 007).

Hose pincher (2)
(P/N 295 000 076)

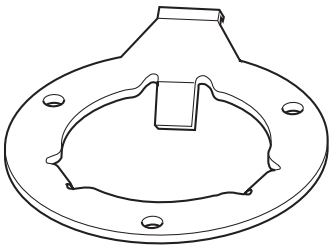


A01B2I4

APPLICATION
All vehicles.

NOTE: Only the P/N has been changed. This hose pincher is identical to the P/N 529 009 900.

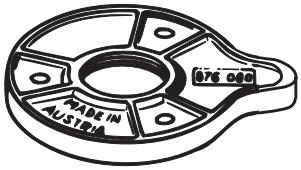
Fan holder
(P/N 420 876 357)



A00C0Q4

APPLICATION
377, 443 and 503 engines.

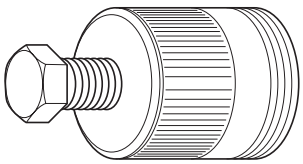
Magneto puller ring
(P/N 420 876 080)



A00C1R4

APPLICATION
All engines except 247.

Magneto puller
(P/N 529 035 547)

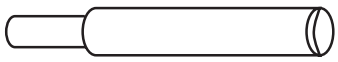


A00C1A4

APPLICATION
All engines except 247.

NOTE: The previous extractor (P/N 529 022 500) can be upgraded by replacing the screw with the new one (P/N 529 035 549).

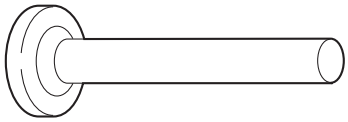
Aligning pin (4)
(P/N 529 018 900)



A00A1D4

APPLICATION
467, 494 and 582 engines.

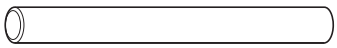
Pusher
(washer behind the impeller)
(P/N 529 020 700)



A00C3H4

APPLICATION
Rotary valve engines.

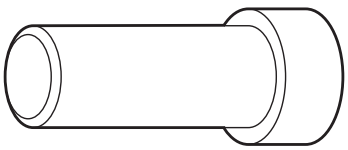
Rotary valve shaft pusher
(P/N 420 876 612)



A00C0F4

APPLICATION
Rotary valve engines with a 10 mm impeller shaft.

Rotary valve seal pusher
(valve side)
(P/N 420 876 607)



A00C0Y4

APPLICATION
Rotary valve engines.

ENGINE (continued) — MANDATORY SERVICE TOOLS

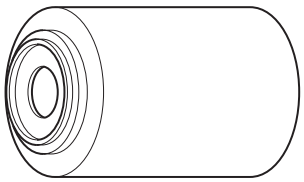
Rotary valve shaft seal pusher (inner, water pump side)
(P/N 420 876 512)

A00C374

APPLICATION

Rotary valve engines, 1991 and newer with a 10 mm impeller shaft.

Rotary valve shaft seal pusher (outer, water pump side)
(P/N 420 877 050)

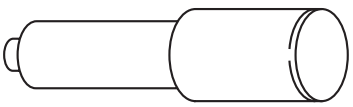


A00C0X4

APPLICATION

Rotary valve engines.

Bearing pusher (rotary valve)
(P/N 420 876 500)

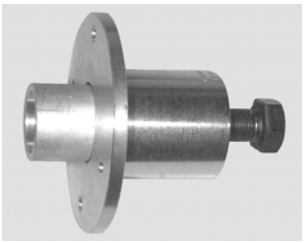


A00B2J4

APPLICATION

Rotary valve engines.

Ceramic seal pusher
(P/N 420 877 820)

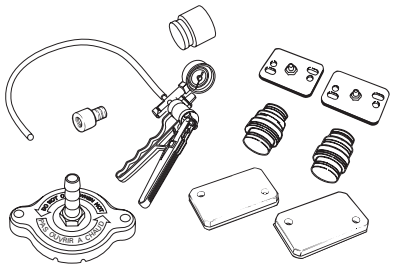


A00B524

APPLICATION

494 and 670 engines with ceramic seal on water pump side.

Engine leak tester kit
(P/N 861 749 100)



A01B5F4

APPLICATION

All engines.

Fuel and oil system leak tester kit
(P/N 529 033 100)

A01B5E4

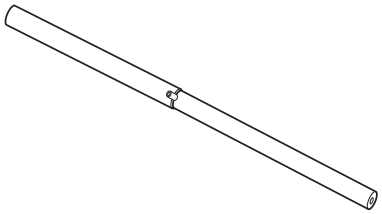
APPLICATION

All models.

Choke plunger tool
A) (P/N 529 032 100)

NEW

B) (P/N 529 035 602)



A01C5D4

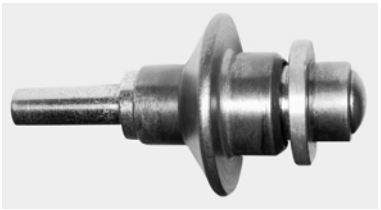
APPLICATION

A) All models equipped with chokes except ZX series (small end for 30, 32 and 34 mm carburetor and big end for 38 mm carburetor).

B) VM type carburetor on ZX series.

Piston circlip installer
(P/N 529 035 563) 21 mm

NEW



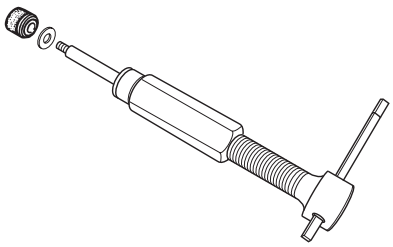
A00B4Y4

APPLICATION

793 Engine.

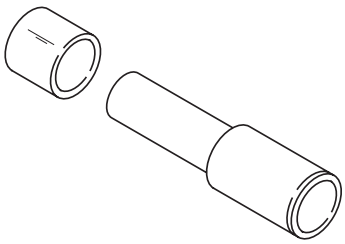
ENGINE (continued) — MANDATORY SERVICE TOOLS

1) Piston pin puller
(P/N 529 035 503)



A02B094

2) Sleeve kit 18 mm
(P/N 529 035 541)
3) Sleeve kit 20 mm
(P/N 529 035 542)



A01B5A4

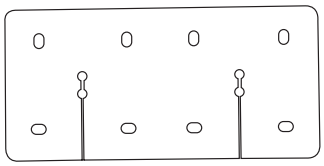
NOTE: 18 mm sleeve kit contains 1 shouldered sleeve and 3 sleeves. 20 mm sleeve kit contains 1 shouldered sleeve and 2 sleeves.

APPLICATION

1) All engines.
2) 277, 443, 503 and 809 engine.
3) 593, 670 and 693 engines.

NOTE: The previous piston pin puller (P/N 529 029 000) can be upgraded by adding protector (P/N 529 035 513) and replacing the expansion sleeve with appropriate sleeve kit.

Rubber pad
(P/N 529 023 400)

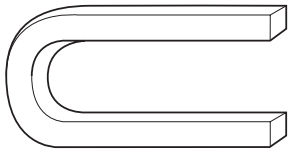


A01B4C4

APPLICATION

All cageless bearing engines.

Rotary valve circlip tool
A) (P/N 529 029 100)
B) (P/N 529 020 800)

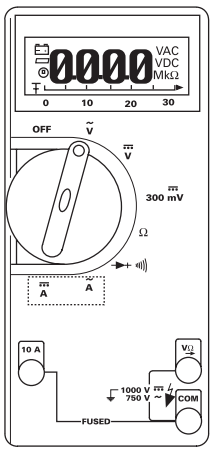


A00C3I4

APPLICATION

A) 1994 and on rotary valve engines.
B) Up to 1993 rotary valve engines.

Multimeter
(P/N 529 022 000)

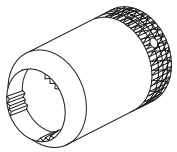


F01B1O4

APPLICATION

All models.

Choke/DESS nut tool
(P/N 529 034 600)



A01B554

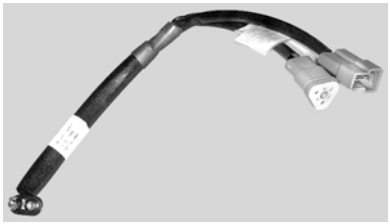
APPLICATION

All models equipped with a choke and/or a DESS.

NOTE: This tool replaces choke nut tool (P/N 529 032 200).

9-volt adaptor
(P/N 529 035 675)

NEW



A00B5G4

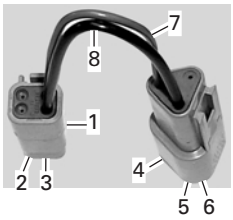
APPLICATION

All models equipped with a DESS.

ENGINE (continued) — MANDATORY SERVICE TOOLS

Homemade adaptor

NEW



A00B5J4

Required parts:

1) Female housing (P/N 515 175 245)
2) Female terminal (2) (P/N 409 015 100)
3) Female lock (P/N 515 175 246)
4) Male housing (P/N 409 207 000)
5) Male terminal (2) (P/N 278 000 631)
6) Male lock (P/N 409 207 600)
7) RED wire in position 1 (4-wire connector) and B (3-wire connector)
8) BLACK wire in position 2 (4-wire connector) and C (3-wire connector)

APPLICATION

2001 Mach Z TECH PLUS.

1-2) Programmer kit (P/N 529 035 718)

2) Communication cables (P/N 529 001 052)

NEW

A01B5B5

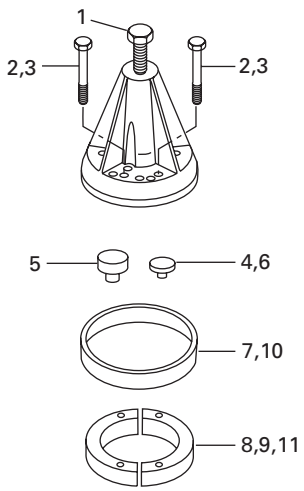
APPLICATION

All models equipped with a DESS.

ENGINE (continued) — RECOMMENDED SERVICE TOOLS

The following tools are highly recommended to optimize your basic tool kit and reduce repair time.

1-2) Crankshaft bearing puller with screw
(P/N 420 877 635)



A01B547

APPLICATION
All engines.

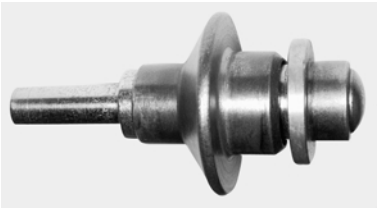
1) Screw M16 x 1.5 x 150	(P/N 420 940 755)
2) Screw M8 x 40 (4)	(P/N 420 840 681)
3) Screw M8 x 70 (4)	(P/N 420 841 201)
4) Crankshaft protector 247 engine.	(P/N 420 976 890)
5) Crankshaft protector PTO All engines except 247.	(P/N 420 876 552)
6) Crankshaft protector MAG All engines except 247.	(P/N 420 876 557)
7) Puller ring Use with half rings (P/N 420 977 475 or 420 276 025).	(P/N 420 977 490)
8) Half ring (2) For 72 mm O.D. bearings.	(P/N 420 977 475)
9) Half ring (2) For 62 mm O.D. bearings.	(P/N 420 276 025)
10) Puller ring For half rings (P/N 420 977 479).	(P/N 420 977 494)
11) Half ring For 80 mm O.D. bearings.	(P/N 420 977 479)

ENGINE (continued) — RECOMMENDED SERVICE TOOLS

Piston circlip installer

A) (P/N 529 035 561) 18 mm

B) (P/N 529 035 562) 20 mm



A00B4Y4

APPLICATION

A) All engines except 593, 670 and 693.

NOTE: This tool replaces circlip installer (P/N 529 016 900).

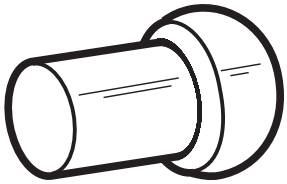
B) 593, 670 and 693 engines.

NOTE: This tool replaces circlip installer (P/N 290 877 016).

Piston pin/connecting rod bearing centering tool

(P/N 529 009 100)

NOTE: New diameter is 9.65 mm (0.380 in).



A01B1R4

APPLICATION

All engines except cageless and 670 engines.

Ring compressor

A) (P/N 420 876 090) (62 mm)

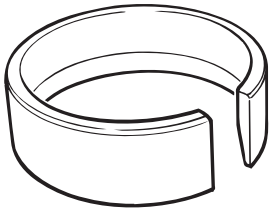
B) (P/N 420 876 974) (69.5 mm)

C) (P/N 420 876 970) (72 mm)

D) (P/N 420 876 972) (76 mm)

E) (P/N 420 876 975) (67.5 mm)

F) (P/N 529 030 800) (78 mm)



A01B1T4

APPLICATION

A) 377 engine.

B) 467 and 494 engines.

C) 503, 253 and 536 engines.

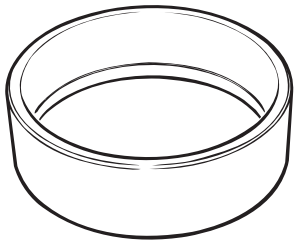
D) 582, 583 and 643 engines.

E) 443 and 447 engines.

F) 670 engine.

Magneto coil centering ring

(P/N 420 876 922)



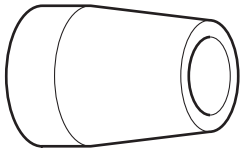
A01B1V4

APPLICATION

All engines with Nippondenso CDI (160 W).

Seal protector sleeve

(P/N 420 276 900) (MAG)



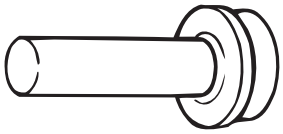
A00C0D4

APPLICATION

247 engine.

Polyamid ring pusher

(P/N 420 276 930)



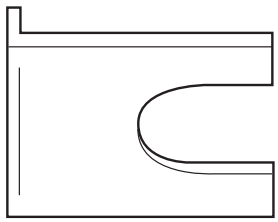
A00C0Z4

APPLICATION

247 engine.

Crankshaft feeler gauge

(P/N 420 876 620)



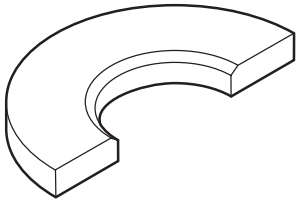
A00C114

APPLICATION

377, 443, 447 and 503 engines.

ENGINE (continued) — RECOMMENDED SERVICE TOOLS

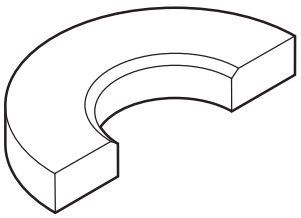
Crankshaft distance gauge
(5.7 mm)
(P/N 420 876 822)



A00C294

APPLICATION
377, 443 and 447 engines.

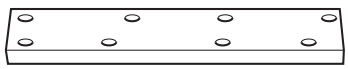
Crankshaft distance gauge
(12.7 mm)
(P/N 420 876 824)



A00C3A4

APPLICATION
503 engine.

Cylinder aligning tool
A) (P/N 420 876 904)
(on exhaust side)
B) (P/N 420 876 171)
(on intake side)



A00B084

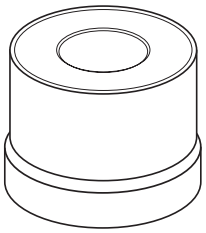
APPLICATION
A) 2-cylinder liquid cooled engines.
B) 2-cylinder fan cooled engines.

Driver tool
(P/N 529 035 521)

A00B4O4

APPLICATION
Mini Z.

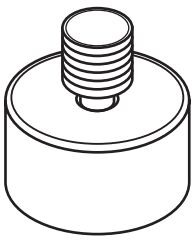
Attachment
(P/N 529 035 522)



A00B4P4

APPLICATION
Mini Z.

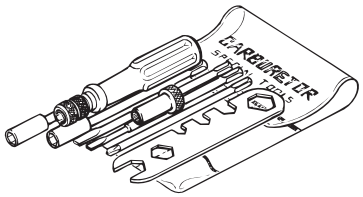
Pilot 22 mm
(P/N 529 035 523)



A00B4Q4

APPLICATION
Mini Z.

Carburetor tool kit
(P/N 404 112 000)



A00B2F4

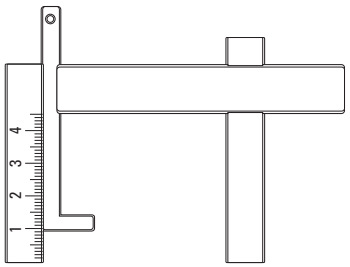
APPLICATION
All models.

Adaptor
(P/N 529 033 800)
(TYPICAL)

A00B4H4

APPLICATION
1997 and 1998 Grand Touring SE
1998 Summit x 670.

Float level gauge
(P/N 529 035 520)

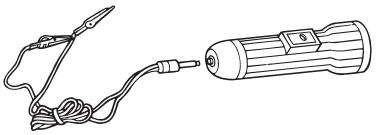


A00B4N4

APPLICATION
All models.

ENGINE (continued) — RECOMMENDED SERVICE TOOLS

Circuit tester
(continuity light)
(P/N 414 012 200)



A00C214

APPLICATION
All vehicles.

Stroboscopic timing light
(P/N 529 031 900)

A00B4F4

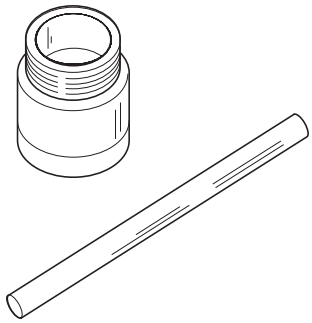
APPLICATION
All engines.

Bypass wires
(P/N 529 033 300)

A00I094

APPLICATION
360 W magneto
(Grand Touring 700/SE).

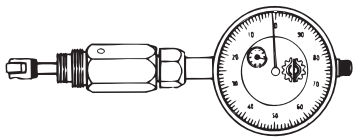
RAVE movement indicator
(P/N 861 725 800)



A18B014

APPLICATION
All RAVE equipped engines.

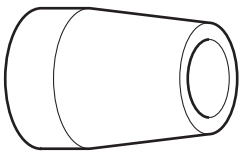
Dial indicator
(TDC gauge)
(P/N 414 104 700)



A00B4E4

APPLICATION
All engines.

Seal protector sleeve
A) (P/N 420 876 980)
B) (P/N 420 876 490)



A00C0D4

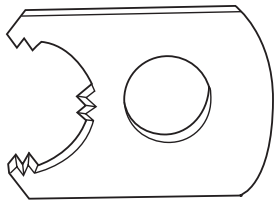
APPLICATION
A) Rotary valve engines with 10 mm shaft.
B) Rotary valve engines with 12 mm shaft.

Magneto puller
(P/N 420 976 235)

F01B294

APPLICATION
247 engine.

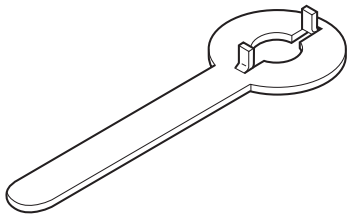
Injection pump gear holder
(P/N 420 876 695)



A00B314

APPLICATION
253, 377, 447 and 503 engines.

Injection pump gear holder
(P/N 420 277 905)

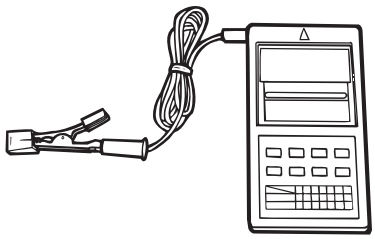


A00C164

APPLICATION
All liquid cooled engines.

ENGINE (continued) — RECOMMENDED SERVICE TOOLS

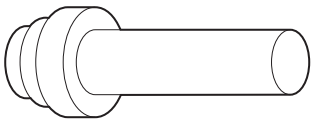
Digital/induction type tachometer
(P/N 529 014 500)



F01B1G4

APPLICATION
All engines.

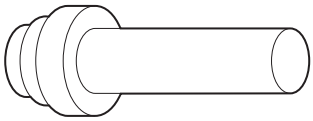
MAG seal pusher
(P/N 420 277 875)



A00C0V4

APPLICATION
277 engine.

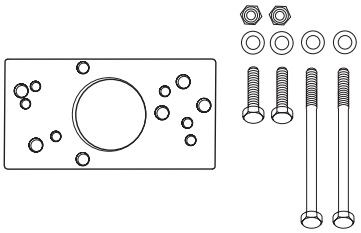
PTO seal pusher
(P/N 420 876 660)



A00C0V4

APPLICATION
277 engine.

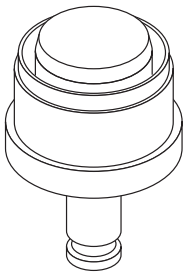
Base puller plate kit
(P/N 529 024 900)



A05C0M4

APPLICATION
277 engine.

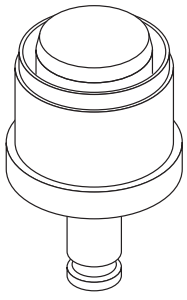
Insertion jig
(magneto side seal)
(P/N 420 876 516)



A00C3T4

APPLICATION
779 engine.

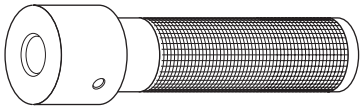
Insertion jig
(magneto seal)
(P/N 420 876 514)



A00C3U4

APPLICATION
454, 494, 599, 670, 699 and 809 engines.

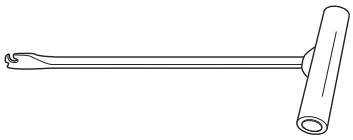
Handle for insertion jig
(P/N 420 877 650)



A00C3V4

APPLICATION
454, 494, 599, 670, 699, 779 and 809 engines.

Exhaust spring installer/remover
(P/N 529 035 559)

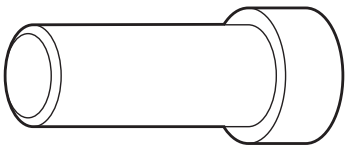


A00C3S4

APPLICATION
All models except CK3 series.

NOTE: This tool replaces exhaust spring installer/remover (P/N 529 028 100).

Rotary valve seal and
shaft pusher
(P/N 420 876 605)



A00C0Y4

APPLICATION
Rotary valve engines 1990 models and older.

ENGINE (continued) — RECOMMENDED SERVICE TOOLS

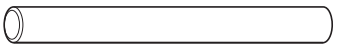
Seal pusher (rotary valve)
(P/N 420 876 510)

A00C374

APPLICATION

All rotary valve shaft seals with a 12 mm I.D.

Rotary valve shaft pusher
(P/N 420 876 610)



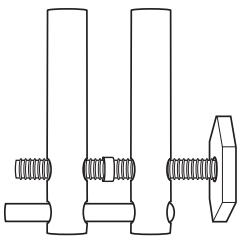
A00C0F4

APPLICATION

All rotary valve engines with 12 mm shaft.

Large hose pincher
(P/N 529 032 500)

(TYPICAL)



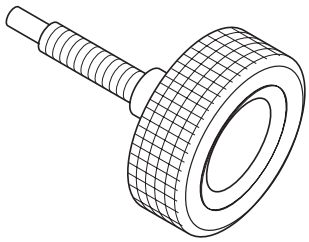
F01B234

APPLICATION

All vehicles.

TRANSMISSION — MANDATORY SERVICE TOOLS

Driven pulley opening tool
(P/N 529 017 200)



A00A1A4

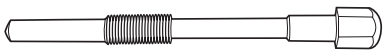
APPLICATION
All non-RER models.

Clutch holder
(P/N 529 006 400)

A01B154

APPLICATION
All TRA drive pulleys.

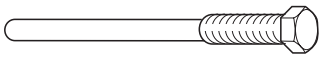
TRA drive pulley puller
(P/N 529 022 400)



A06B014

APPLICATION
TRA drive pulley for the 454, 494, 599, 670, 699, 779 and 809 engines.

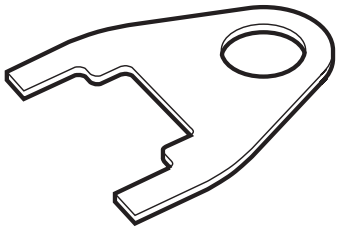
TRA drive pulley puller
(P/N 529 007 900) (25 mm)



A18B044

APPLICATION
TRA drive pulley for 443, 467, 503, 536 and 537 engines.

Forks (3)
(P/N 529 005 500)

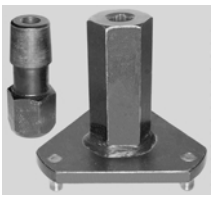


A16B014

APPLICATION
All vehicles equipped with a TRA drive pulley.

Tool kit
(P/N 529 025 400)

NEW



A00B5N4

APPLICATION
Comet® 102C drive pulley.

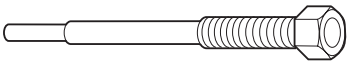
Drive pulley puller
(P/N 529 025 000)

NEW

A00B5M4

APPLICATION
Comet® 102C drive pulley.

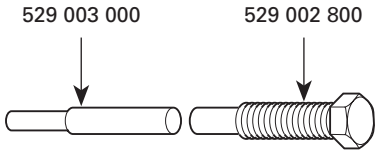
Drive pulley puller
(P/N 529 002 100)
(standard threads)



A00C084

APPLICATION
Square shaft, standard (SAE) threads.

Drive pulley puller
(P/N 860 414 200)
(square shaft metric)
Consists of:



A00C095

APPLICATION
Square shaft, metric threads drive pulley.

TRANSMISSION (continued) — MANDATORY SERVICE TOOLS

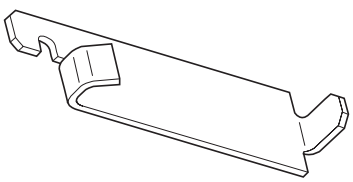
Transmission alignment bar
A) (P/N 529 026 900)
B) (P/N 529 030 000)
C) (P/N 529 035 586)
D) (P/N 529 026 700)
E) (P/N 529 035 530)
F) (P/N 529 031 000)
G) (P/N 529 035 527)
H) (P/N 529 035 572)
I) (P/N 529 035 594)

A01B4D4

APPLICATION
A) Tundra II LT/R.
B) S-Series with Bombardier Lite.
C) S-Series with Bombardier Lite and RER.
D) F-Series, S-Series and ZX series with TRA.
E) S-Series with TRA and RER.
F) Skandic WT LC/SWT.
G) CK3 series except 1998 Mach Z series.
H) 1998 Mach Z series.
I) CK3 series with RER.

Spring scale hook (long)
A) (P/N 529 006 500)
B) (P/N 529 030 900)
C) (P/N 529 035 557)

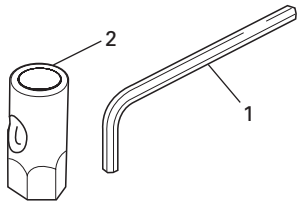
(TYPICAL)



A00B4A4

APPLICATION
A) Tundra II LT.
B) F-Series and S-Series (1995 and newer).
C) CK3 without RER.

Drive belt tension adjuster tool
(P/N 529 008 700)

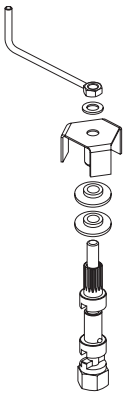


A15B044

Parts included:
1) Hexagonal wrench (P/N 420 876 730).
2) Socket wrench (P/N 529 015 000).

APPLICATION
All vehicles except Élan, Tundra II and Skandic WT.

Pulley spring compressor
(P/N 529 035 524)

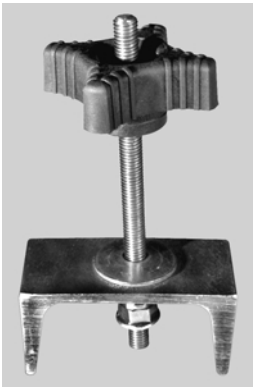


A02D1P4

APPLICATION
All models.

NOTE: This tool has Acme threads and replaces spring compressor (P/N 529 018 600).

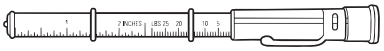
Driven pulley spring compressor
(P/N 529 035 300)



A05B034

APPLICATION
Tundra R.

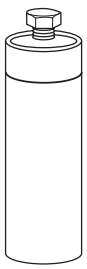
Tension tester
(P/N 414 348 200)



A00C074

APPLICATION
All models.

Countershaft bearing installer
(P/N 529 030 200)

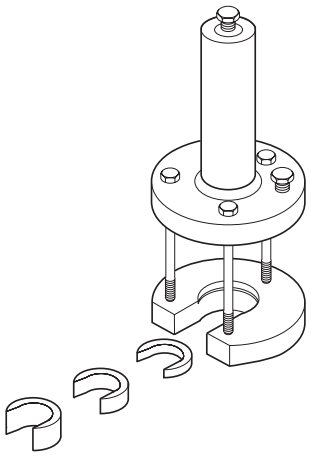


A00A194

APPLICATION
S-Series and F-Series.

TRANSMISSION (continued) — MANDATORY SERVICE TOOLS

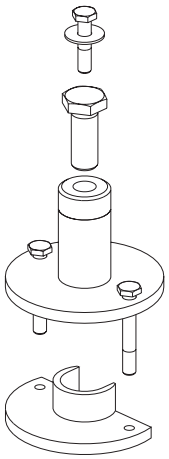
Countershaft bearing remover
(P/N 529 030 100)



A00A274

APPLICATION
S-Series and F-Series.

Countershaft bearing remover/installer
(P/N 529 035 554)

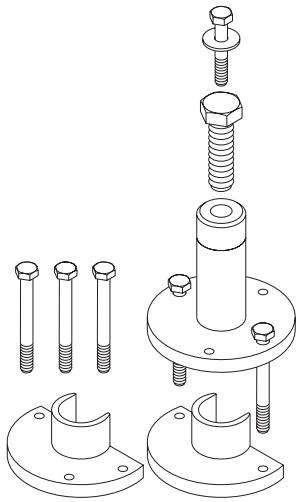


A01B5C4

APPLICATION
CK3 series.

Countershaft bearing remover/installer
(P/N 529 035 699)

NEW

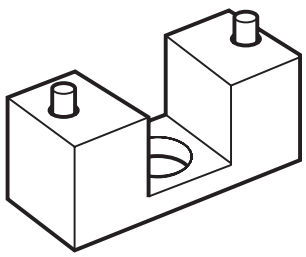


A00B5K4

APPLICATION
ZX and CK3 Series.

NOTE: This tool replaces CK3 series countershaft bearing remover/installer (P/N 529 035 554).

Spring cover tool
(P/N 529 027 300)



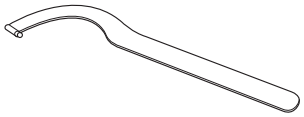
A01B4M4

APPLICATION
Bombardier Lite drive pulley.

TRANSMISSION (continued) — RECOMMENDED SERVICE TOOLS

The following tools are highly recommended to optimize your basic tool kit and reduce repair time.

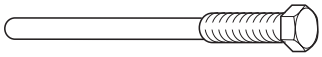
Clutch holder
(P/N 529 027 600)



A02B034

APPLICATION
Bombardier Lite drive pulley.

Drive pulley puller
(P/N 529 031 400)



A18B044

APPLICATION
Bombardier Lite drive pulley, except Élan.

Driven pulley opening tool
(P/N 529 035 501)

A03D2P4

APPLICATION
S and CK3 series with RER.

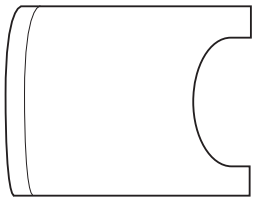
NOTE: This tool replaces driven pulley opening tool (P/N 529 019 500).

Driven pulley opening tool
(P/N 529 034 200)

A05B044

APPLICATION
Tundra R.

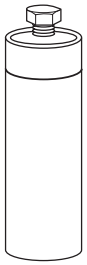
Alignment tool
(P/N 420 476 010)



A00C1D4

APPLICATION
Skandic WT and Alpine II gearbox.

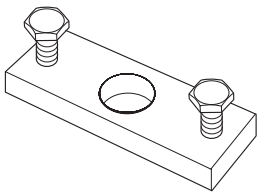
Countershaft bearing installer
(P/N 529 018 800)



A00A194

APPLICATION
PRS chassis.

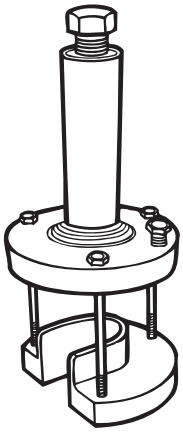
Cam pusher
(P/N 529 012 900)



A18B064

APPLICATION
Tundra II LT.

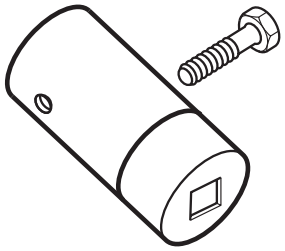
Countershaft bearing remover
(P/N 529 018 700)



A00A164

APPLICATION
PRS chassis.

Drive pulley puller
(P/N 529 023 100)



A00C3J4

APPLICATION
Élan.

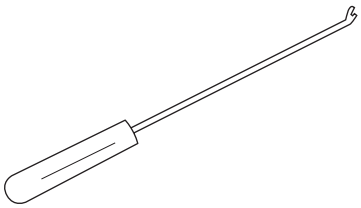
Transmission ball mounting pin
(P/N 420 476 020)

A00C1C4

APPLICATION
Alpine II 3-speed gearbox.

TRANSMISSION (continued) — RECOMMENDED SERVICE TOOLS

Transmission adjuster
(P/N 529 028 500)

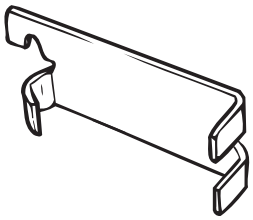


A00D0X4

APPLICATION

F-Series equipped with "twist shifter" reverse transmission.

Spring scale hook (long)
(P/N 529 015 200)



A01B514

APPLICATION

1994 models and older except Alpine II.

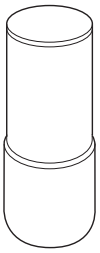
Alignment bar
A) (P/N 529 025 600)
B) (P/N 529 028 200)
C) (P/N 529 028 300)
D) (P/N 529 026 800)
E) (P/N 529 031 000)

A01B4D4

APPLICATION

A) PRS chassis.
B) Alpine II.
C) Élan.
D) Safari L.
E) Skandic WT 1996.

Burnishing bar
(P/N 529 026 402)

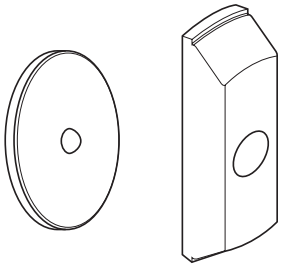


A00B464

APPLICATION

Tundra II LT, Safari L and Skandic.

Large bushing extractor
(P/N 529 031 100)



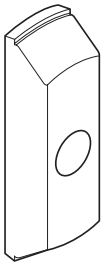
A00B4I4

APPLICATION

Formula type driven pulley.

NOTE: Use this tool only with former puller (P/N 529 018 600) that has regular threads.

Large bushing extractor
(P/N 529 035 576)



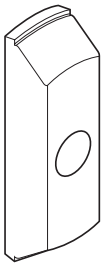
A02D1Q4

APPLICATION

Formula type driven pulley.

NOTE: Use this tool only with new puller (P/N 529 035 524) that has Acme threads and support plate included with extractor (P/N 529 031 100).

Large bushing extractor
(P/N 529 035 575)



A02D1Q4

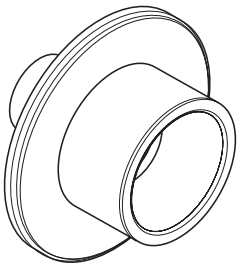
APPLICATION

LPV 27 driven pulley.

NOTE: Use this tool only with new puller (P/N 529 035 524) that has Acme threads and support plate included with extractor (P/N 529 031 100).

TRANSMISSION (continued) — RECOMMENDED SERVICE TOOLS

Large bushing installer and small bushing extractor
(P/N 529 031 200)

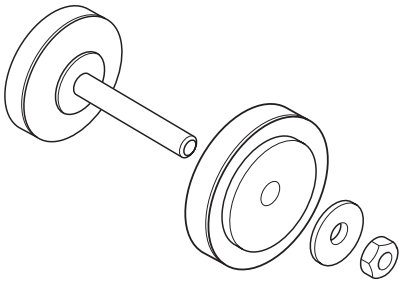


A00B4J4

APPLICATION

All models except Tundra/R, Skandic WT/SWT/WT LC and S-Series with RER.

Chaincase seal pusher
(P/N 529 035 584)



A00B504

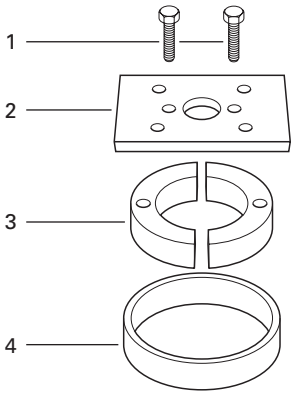
APPLICATION

S, F, CK3 and ZX series.

NOTE: This tool replaces chaincase upper seal pusher (P/N 529 032 300).

3-speed transmission bearing extractor

1) Screw M8 x 25 (2) (P/N 207 182 544)
2) Plate
3) Half ring (2) (P/N 420 876 330)
4) Ring (P/N 420 977 480)

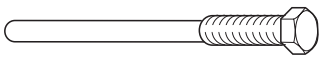


A00C1B4

APPLICATION

Alpine II 3-speed transmission.

TRA drive pulley puller (27 mm)
(P/N 529 010 100)

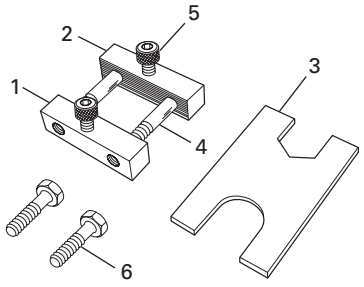


A18B044

APPLICATION

TRA drive pulley (27 mm) shaft except 454, 670 and 779 engines.

Drive axle sprocket adjuster
(P/N 861 725 700)



A01B2O4

Parts included in the kit:

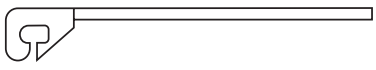
1) Block with threads (P/N 529 010 700)
2) Block without threads (P/N 529 010 800)
3) Plate (P/N 529 010 600)
4) Bolt M10 (2) (P/N 222 007 565)
5) Allen screw M8 (2) (P/N 222 983 065)
6) Screw M8 (2) (P/N 222 082 565)

NOTE: When the tool is to be used between tunnel and sprocket use screws M8.

APPLICATION

All vehicles except Élan.

Transmission adjuster
(P/N 529 030 300)



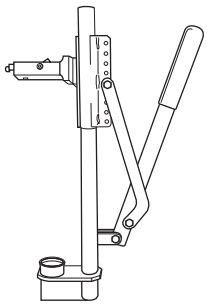
A03D1T4

APPLICATION

Vehicles equipped with "push-pull shifter" reverse transmission.

SUSPENSION — MANDATORY SERVICE TOOLS

Shock spring removal kit
(P/N 529 035 504)
Replacement clevis pin:
(P/N 414 528 400)



A01B4O4

APPLICATION

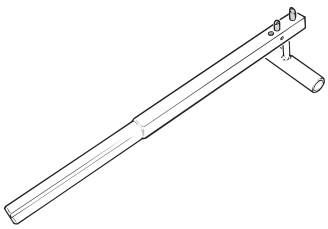
All suspensions with coil spring.

NOTE: The previous shock spring removal kit (P/N 529 027 100) can be upgraded by replacing the stopper with a wider stopper (P/N 529 035 551).

SUSPENSION (continued) — RECOMMENDED SERVICE TOOLS

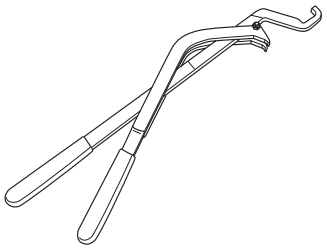
A) Track cleat remover
(P/N 529 008 200)
Pins
(P/N 529 008 204)

NOTE: Pins can be rotated 180° depending on whether the tool is used by a left-hander or right-hander.



A01B1J4

B) Track cleat remover
(P/N 529 028 700)



A01F224

APPLICATION

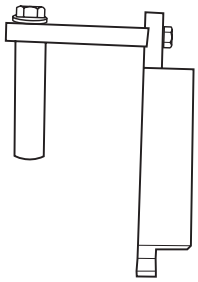
A) 1993 and older.

B) 1994 and newer except Élan and Tundra II.

Camber angle tool
(P/N 529 021 600)

NOTE: Angle finder with a magnetic base must be used.

Suggestion: K-D tool no. 2968

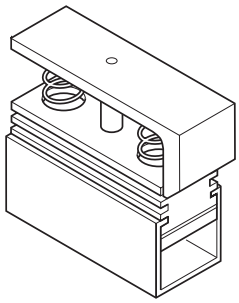


A06B024

APPLICATION

All DSA front suspensions.

Track tension gauge
(P/N 529 021 500)



A00B3X4

APPLICATION

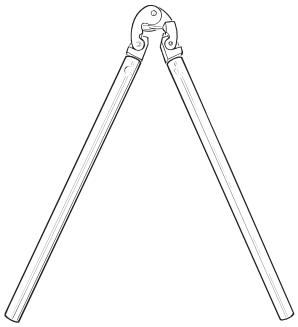
All models except Élan.

Track cleat installer

A) (P/N 529 008 500)
Narrow

B) (P/N 529 028 800)
Narrow

C) (P/N 529 007 700)
Wide



A01B1M4

APPLICATION

A) 1993 and older.

B) 1994 and newer.

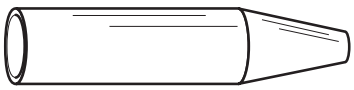
C) 1992 and older with wide cleat opening.

Dome guide

A) (P/N 529 026 500)

NEW

B) (P/N 529 035 728)



A06F1B4

APPLICATION

A) C-36 T/A shocks.

B) C-46 T/A shocks.

SUSPENSION (continued) — RECOMMENDED SERVICE TOOLS

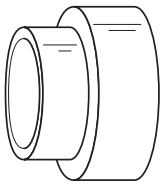
Shock wrench
(P/N 529 035 727)

NEW

A00F224

All T/A shocks

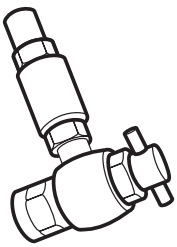
Piston guide
A) (P/N 529 026 600)
B) (P/N 529 035 608)



A06F1C4

APPLICATION
A) C-36 T/A shocks.
B) C-46 T/A shocks.

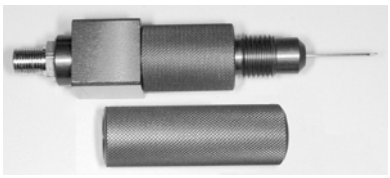
Gas shock valve tool
(tire valve type)
(P/N 529 035 570)



A02F134

APPLICATION
1999 and older T/A shocks and some 2000 and up T/A shocks.

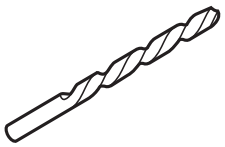
Tool for shock (needle type)
(P/N 529 035 614)



A00B5I4

APPLICATION
Most 2000 and up T/A shocks.

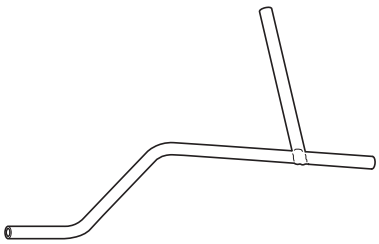
Drill bit
(P/N 529 031 800)



A01B564

APPLICATION
All 3/16 inch rivets.

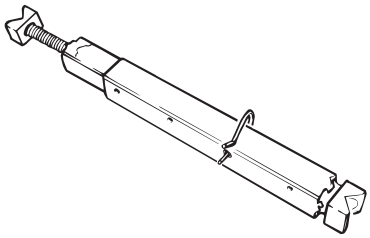
Spring installer (bar)
(P/N 529 005 000)



A00C1I4

APPLICATION
Tundra II LT, Scout and all SC-10 suspensions.

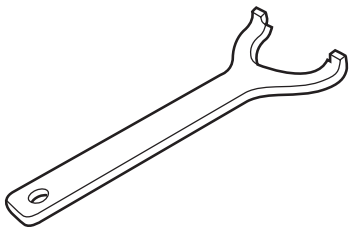
Drive axle holder
(P/N 529 007 200)



A01B1E4

APPLICATION
All models.

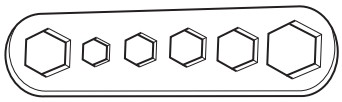
Kayaba shock adjustment tool
(P/N 529 035 582)



A00A1K4

APPLICATION
C-7 suspension.

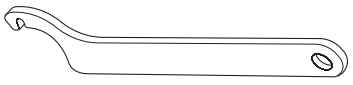
Hexagonal wrench
(P/N 529 014 700)



A19B024

APPLICATION
All SC-10 suspensions, Safari and Skandic prior to 1995.

Suspension adjustment wrench
(P/N 529 017 100)



A15B094

APPLICATION
1992 and old Formula C-7.

SUSPENSION (continued) — RECOMMENDED SERVICE TOOLS

Suspension adjustment wrench
(P/N 529 032 900)

A02F114

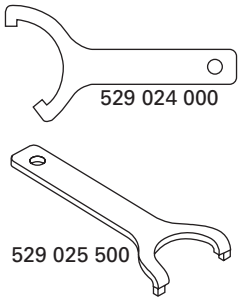
APPLICATION
ARM and SC 10 II suspensions.

Suspension adjustment wrench
(P/N 529 034 100)

A02F124

APPLICATION
CK3 series.

Adjustment wrench
(P/N 861 743 900)
Consists of:



A00B4B4

APPLICATION
1998 and older models with T/A shock.

Adjustment wrench
(P/N 520 000 126)

A00B5H4

APPLICATION
SC-10 II (coupling blocks).

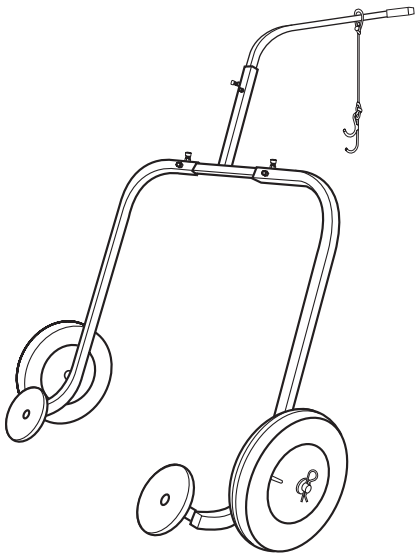
VEHICLES — RECOMMENDED SERVICE TOOLS

Protective mat
(P/N 529 030 600)

A01B45W

APPLICATION
All vehicles.

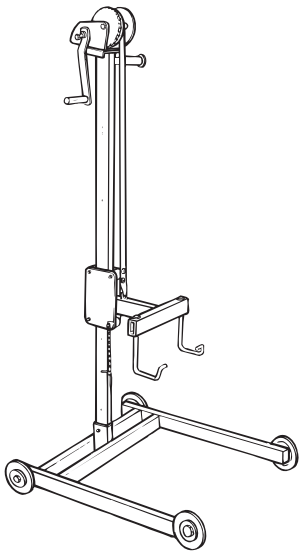
Dolly
(P/N 529 029 900)



A00B4CJ

APPLICATION
All models.

Snowmobile jack
(P/N 529 020 000)



A01A1JJ

APPLICATION
All models.

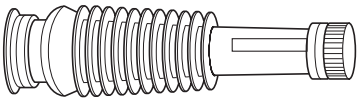
VEHICLES (continued) — RECOMMENDED SERVICE TOOLS

Template for hood drilling
(P/N 529 034 400)

A02H154

APPLICATION
S-Series.
NOTE: To drill new hood prior to install meters.

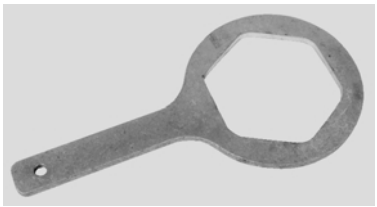
Flexible spout for oil container
(P/N 414 837 300)



F04B044

APPLICATION
All models.

Adjustment wrench
(P/N 529 035 603)

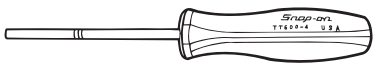


A32B044

APPLICATION
To remove and install fuel tank nut on ZX series.

Terminal (Packard) remover
Not sold by Bombardier

Snap-on
TT 600-4
NEW

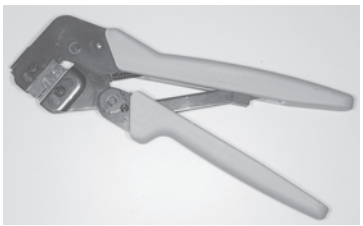


F01B1J4

APPLICATION
Models with Packard connectors.

Crimping tool
(P/N 295 100 164)

NEW

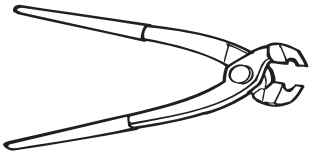


F00B0E4

APPLICATION
Models with AMP connectors.

Hose clamp pliers
(P/N 295 000 070)

NEW



F01D174

APPLICATION
Some models.

SERVICE PRODUCTS

MANDATORY SERVICE PRODUCTS

Retaining compound
(P/N 413 703 100)
Loctite® RC/609:
Retaining compound (10 mL)
(green)

A00B2S4

APPLICATION

Used for retaining bushings, bearings in slightly worn housing or on shaft.

Sealing compound
(P/N 420 297 906)
(30 mL)

A00B564

APPLICATION

To seal crankcase on all ZX series engines.

NOTE: This product replaces the larger tube (P/N 420 297 905).

Paste gasket
(P/N 413 702 700)
Loctite® 515:
Gasket eliminator (50 mL)

A00B2T4

APPLICATION

Crankcase halves and gearbox mating surfaces.

Paste gasket
(P/N 293 800 038)
Loctite® 518:
Gasket eliminator (50 mL)

F01B124

APPLICATION

Crankcase halves and gearbox mating surfaces.

Medium-strength threadlocker
(P/N 293 800 060)
Loctite® 243:
Threadlocker (10 mL)
(blue, medium strength)

NEW

F00A0O4

APPLICATION

Flywheel nut, crankcase studs, etc.

NOTE: This product replaces Loctite 242 (P/N 293 800 015).

High strength threadlocker
(P/N 293 800 005)
Loctite® 271:
Threadlocker (10 mL)
(red, high strength)

A00B2U4

APPLICATION

Fasteners and studs up to 25 mm (1 in) diameter.

MANDATORY SERVICE PRODUCTS (continued)

Gasket/paint remover
(P/N 413 708 500)
Loctite® Chisel
510 g (18 oz)

A00B574

APPLICATION

Clean mating surfaces of cylinders and crankcase. Remove carbon in combustion chambers.

Loctite® primer
(P/N 293 800 041)
Primer N
128 g (5 oz)

A00B3N4

APPLICATION

To prepare mating surfaces before applying paste gasket, retaining compound or threadlockers.

NOTE: Only the P/N has been changed. This product is identical to the P/N 413 708 100.

Molykote PG 54
(P/N 420 899 763)
(10 g)

NEW

A00B5F4

APPLICATION

To lubricate pawl and pawl lock of rewind starter.

Molykote G-n paste
(P/N 711 297 433)
(50 g)

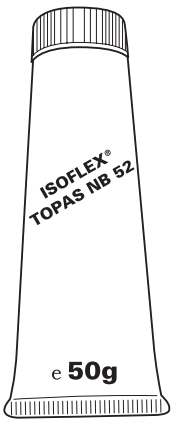
NEW

A00B5P4

APPLICATION

To lubricate RAVE valve stem on engine with oil seal in RAVE housing.

Grease Isoflex
(P/N 293 550 021)
(50 g)



A00B554

APPLICATION

To lubricate some crankshaft bearings on some engines.

Petamo grease
(P/N 420 899 271)

A00B584

APPLICATION

To lubricate lip of all ZX series engine crankshaft seals.

RECOMMENDED SERVICE PRODUCTS

Premix oil
(P/N 413 803 100)
(12 x 500 mL)

A00B5L4

APPLICATION
All pre-mix models.

BOMBARDIER injection oil
(P/N 413 802 900)
(12 x 1 liter)
(P/N 413 803 000)
(3 x 4 liter)
(P/N 413 803 200)
(205 liter)

F01B2H4

APPLICATION
All engines.

BOMBARDIER Formula XP-S synthetic injection oil
(P/N 413 710 500)
(12 x 1 liter)
(P/N 413 711 000)
(3 x 4 liter)
(P/N 413 710 700)
(205 liter)

A02F144

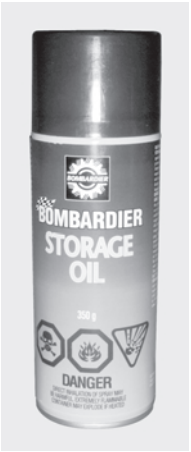
APPLICATION
All engines.

Premixed coolant - 52°C (- 62°F)
(P/N 413 711 802)
(16 x 1 L)

A00B5E4

APPLICATION
All liquid cooled models.

Storage oil
(P/N 413 711 600)
(350 g spray can) (12 x 350 g)



A02B054

APPLICATION
All models.

NOTE: Only the P/N has been changed. This product is identical to the P/N 496 014 100.

Fuel stabilizer
(P/N 413 408 600)
(12 x 8 oz)

A00B3V4

APPLICATION
All models.

RECOMMENDED SERVICE PRODUCTS (continued)

Chaincase oil
(P/N 413 801 900)
(16 x 250 mL)

A00B2R4

APPLICATION

Chaincase lubricant on all fan-cooled models except Skandic WT series.

Synthetic chaincase oil
(P/N 413 803 300)
(12 x 355 mL)

A01B4Q4

APPLICATION

Chaincase lubricant on all liquid-cooled models and Skandic WT series.

Grease LMZ no. 1
(P/N 413 707 500)
(400 g)

A00B1Y4

APPLICATION

Mainly used between regulators or rectifiers and frame to transfer the heat build-up and to assure a good ground.

Synthetic grease
(P/N 413 711 500)
(400 g)

A01B574

APPLICATION

For front and rear suspension components and drive axle bearing.

Super Lube (grease)
(P/N 293 550 014)

A00B474

APPLICATION

Exhaust tail pipe grommet.

BOMBARDIER LUBE
(P/N 293 600 016)
(12 x 14 oz)

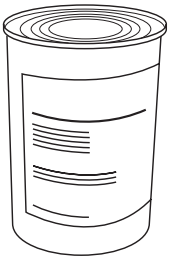
A00B4W4

APPLICATION

Steering ball joints on all models.

Shock oil
(P/N 293 600 035)
(32 oz)

(TYPICAL)



A02F154

APPLICATION

T/A shocks.

RECOMMENDED SERVICE PRODUCTS (continued)

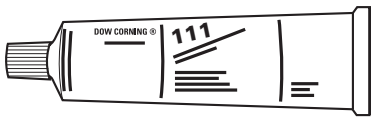
Anti-seize lubricant
(P/N 293 800 070)
Loctite anti-seize lubricant 236 mL (8 oz)

A00B594

APPLICATION

Mounting surfaces of driven pulley and brake disc on countershaft.

Molykote 111
(P/N 413 707 000)

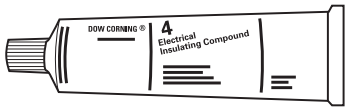


A00B3W4

APPLICATION

Crankshaft seals on all engines except ZX series ones.

Silicone dielectric grease
(P/N 293 550 004)
(3 oz)



A00B1X4

APPLICATION

On all electric connections. High tension coil and spark plug connections. Connector housings, etc.

NOTE: Only the P/N has been changed. This product is identical to the P/N 413 701 700.

Parts cleaner
(P/N 413 711 809)
(320 g)

A00B4X4

APPLICATION

Engine crankcase joining surfaces, pulleys and any greasy surfaces.

Bombardier cleaner
(P/N 293 110 001)
(400 g)
(P/N 293 110 002)
(4 L)

F01B2J4

APPLICATION

All models.

Plastic & vinyl cleaner
(P/N 413 711 200)
(6 x 1 L)

A00B4V4

APPLICATION

Hood, bottom pan and seat.

RECOMMENDED SERVICE PRODUCTS (continued)

High temperature threadlocker
(P/N 413 711 400)
Loctite 648 (5 mL)
(green)

A00B3D4

APPLICATION

To fasten oil injection nozzle to crankcase.

NOTE: Only the P/N has been changed. This product is identical to the P/N 420 899 788.

Pipe sealant
(P/N 293 800 018)
Loctite 592 (50 mL)

A00B2W4

APPLICATION

Engine plugs and senders.

NOTE: Only the P/N has been changed. This product is identical to the P/N 413 702 300.

Clear silicone
(P/N 293 800 033)

F01B1S4

APPLICATION

All models to seal bottom pan.

High temperature RTV sealant
(P/N 413 710 300)
Ultra Copper
(80 mL)

A00B5A4

APPLICATION

All models.

General purpose instant adhesive
(P/N 293 800 021)
Loctite 495 (3 g)

A00B2V4

APPLICATION

Rubber to metal bonding and most hard plastic.

NOTE: Only the P/N has been changed. This product is identical to the P/N 413 703 200.

Gel instant adhesive
(P/N 413 708 300)
Loctite 454-40
20 g (.70 oz)

A00B3O4

APPLICATION

Isolating foam and rubber strip.

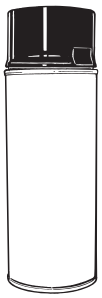
Tough adhesive
(P/N 413 408 300)
Loctite Black Max
3 mL (.10 oz)

A00B3P4

APPLICATION

Shifter boot or grip.

Paint for frame touch-up
(P/N 413 401 000)
Black semi-gloss
(spray can)



A00B3H4

APPLICATION

All models with a black frame.

PERIODIC MAINTENANCE CHART

SYSTEM	PART/TASK	10-HOUR OR 500 km (300 mi) INSPECTION (to be performed by dealer)	WEEKLY OR EVERY 240 km (150 mi)	MONTHLY OR EVERY 800 km (500 mi)	ONCE A YEAR OR EVERY 3200 km (2000 mi)	STORAGE (to be performed by dealer)	PRE-SEASON PREPARATION (to be performed by dealer)	REFER TO
	Rewind Starter Lubrication and Rope Condition					✔	✔	Subsection 04-07
	Engine Head Screws	✔			✔	✔		Appropriate section: See TOP END
	Engine Mount Nuts	✔			✔	✔		Appropriate section: See ENGINE REMOVAL
	Exhaust System	✔		✔		✔		Appropriate section: See ENGINE REMOVAL
	Engine Lubrication					✔	✔	This section no. 1
	Cooling System Condition	✔			✔		✔	Subsection 04-06
	Coolant Replacement					✔		Subsection 04-06
	Condition of Seals					✔	✔	Subsection 04-02
	Injection Oil Filter Condition			✔				Subsection 04-05
	Injection Oil Filter Replacement					✔		Subsection 04-05
	Oil Injection Pump Adjustment	✔			✔		✔	Subsection 04-05
	Fuel Stabilizer					✔		This section no. 2
	Fuel Filter Replacement						✔	This section no. 3
	Fuel Lines and Connections	✔				✔	✔	Subsection 04-09
	Carburetor Adjustment	✔			✔		✔	Subsection 04-08
	Throttle Cable Inspection	✔			✔	✔	✔	Subsection 04-09
	Air Filter Cleaning			✔			✔	This section no. 4
	Drive Belt Condition	✔	✔				✔	This section no. 5
	Condition of Drive and Driven Pulleys	✔		✔		✔		Subsections 05-03 and 05-04
	Cleaning of Drive and Driven Pulleys						✔	Subsections 05-03 and 05-04
	Retorquing of Drive Pulley Screw	✔						Subsection 05-03
	Driven Pulley Preload	✔			✔	✔		Subsection 05-04
	Brake Fluid Level	✔	✔				✔	Subsection 05-06
	Brake Fluid Change (once a year)					✔		Subsection 05-06
	Brake Condition	✔	✔			✔	✔	Subsection 05-06
	Drive Chain Tension	✔		✔		✔		Subsection 05-07
	Countershaft Lubrication**	✔		✔		✔		Subsection 05-06
	Chaincase or Gearbox Oil Level	✔		✔			✔	Subsections 05-07 and 05-08
	Chaincase or Gearbox Oil Change	✔				✔		Subsections 05-07 and 05-08
	Lubrication of Drive Axle Bearing**	✔		✔		✔		Subsection 07-03

SYSTEM	PART/TASK	10-HOUR OR 500 km (300 mi) INSPECTION (to be performed by dealer)	WEEKLY OR EVERY 240 km (150 mi)	MONTHLY OR EVERY 800 km (500 mi)	ONCE A YEAR OR EVERY 3200 km (2000 mi)	STORAGE (to be performed by dealer)	PRE-SEASON PREPARATION (to be performed by dealer)	REFER TO
	Handlebar Bolts. Retorque to 26 N•m (19 lbf•ft)	✔				✔		Subsection 08-02
	Steering and Front Suspension Mechanism Condition	✔		✔		✔		Subsections 08-02 and 08-03
	Steering and Front Suspension Mechanism Lubrication**	✔		✔		✔		Subsections 08-02 and 08-03
	Wear and Condition of Skis and Runners	✔	✔			✔		Subsection 08-03
	Steering and Ski Leg Camber Adjustment	✔		✔		✔		Subsection 08-02
	Suspension Adjustments	AS REQUIRED						Subsection 07-02 and *Operator's Guide*
	Suspension Lubrication**				✔	✔		Subsection 07-02
	Suspension Condition	✔		✔		✔		Subsection 07-02
	Suspension Stopper Strap Condition				✔	✔		Subsection 07-02
	Track Condition	✔		✔		✔		Subsection 07-04
	Track Tension and Alignment	✔	AS REQUIRED					Subsection 07-04
	Spark Plugs*	✔		✔			✔	Subsection 06-03
	Engine Timing	✔					✔	Subsection 06-02
	Battery Condition	✔		✔		✔	✔	Subsection 06-04
	Headlight Beam Aiming				✔		✔	Subsection 09-02
	Wiring Harnesses, Cables and Lines	✔		✔		✔		Subsection 09-02
	Operation of Lighting System (HI/LO beam, brake light, etc.) Test Operation of Emergency Cut-Out Switch and Tether Cut-Out Switch	✔	✔			✔		*Operator's Guide*
	Rags in Air Intake and Exhaust System					✔	✔	This section no. 5
	Engine Compartment	✔		✔		✔		This section no. 6
	Vehicle Cleaning and Protection	✔		✔		✔		This section no. 7

* Before installing new spark plugs at pre-season preparation, it is suggested to burn excess storage oil by starting the engine with the old spark plugs. Only perform this operation in a well-ventilated area.

**Lubricate whenever the vehicle is used in wet conditions (wet snow, rain, puddles).

NO. 1 ENGINE LUBRICATION

At Storage

Engine internal parts must be lubricated to protect them from possible rust formation during the storage period.

Proceed as follows:

Start the engine and allow it to run at idle speed until the engine reaches its operating temperature.

⚠ WARNING

Ensure the track is free of all particles which could be thrown out while it is rotating. Keep hands, tools, feet and clothing clear of track. Ensure no one is standing in close proximity to the vehicle.

Stop the engine.

Remove air silencer to spray storage oil (P/N 496 014 100) into each carburetor bore.

Restart engine and run at idle speed.

Inject storage oil until the engine stalls or until a sufficient quantity of oil has entered the engine (approximately half a can).

With the engine stopped, remove the spark plug and spray storage oil (P/N 496 014 100) into each cylinder.

Crank slowly 2 or 3 revolutions to lubricate cylinders.

Reinstall the spark plugs and air silencer.

⚠ WARNING

This procedure must only be performed in a well-ventilated area. Do not run engine during storage period.

At Pre-Season Preparation

Add 500 mL (17 U.S. oz) of recommended injection oil to the first full filled fuel tank.

NO. 2 FUEL STABILIZER

With the new fuel additives, it is critical to use the fuel stabilizer (P/N 413 408 600) (250 mL) to prevent fuel deterioration, gum formation and fuel system components corrosion. Follow manufacturer's instructions for proper use.

Pour fuel stabilizer in fuel tank prior to starting engine for internal parts lubrication so that stabilizer flows everywhere in fuel system.

After engine starting, use primer several times so that stabilizer flows inside it.

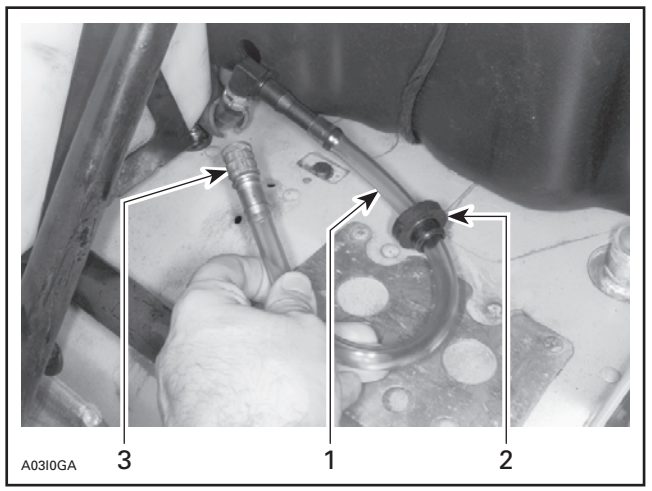
Do not drain fuel system.

CAUTION: Fuel stabilizer should be added prior engine lubrication to ensure carburetor(s) protection against varnish deposit.

NO. 3 FUEL FILTER REPLACEMENT

Drain fuel tank.

Remove fuel line grommet from fuel tank and pull out inlet fuel line from tank.



TYPICAL

1. *Inlet fuel line*
2. *Position of grommet when installing*
3. *Fuel filter*

Replace fuel filter. To facilitate the fuel line installation, slide grommet on fuel line about 50 mm (2 in) away from elbow then install grommet on fuel tank and push elbow through grommet.

NO. 4 AIR FILTER CLEANING

CAUTION: These snowmobiles have been calibrated with the filters installed. Operating the snowmobile without them may cause engine damage.

Remove primary air filters.

A32H0LA

PRIMARY FILTER LOCATION

A32H0RA

REMOVAL OF RIGHT SIDE PRIMARY FILTER GRILL

A32H0SA

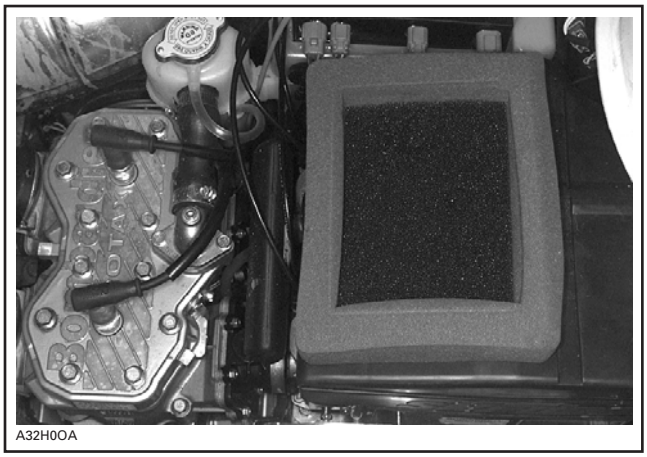
REMOVAL OF FILTER FROM ITS GRILL

Lift hood and remove primary filter from air duct.

Remove secondary filter from air intake silencer.

To clean the filters, shake the snow out of them then, dry it out.

Check that the air box is clean and dry then properly reinstall the filter.


A32H0OA

SECONDARY FILTER INSTALLED ON AIR SILENCER

NO. 5 RAGS IN AIR INTAKE AND EXHAUST SYSTEM

At storage preparation, block air intake hole and exhaust system hole using clean rags.

Remove those rags at pre-season preparation.

NO. 6 ENGINE COMPARTMENT

Keep clean of grass, twigs, cloth, etc. These are combustible under certain conditions.

NO. 7 VEHICLE CLEANING AND PROTECTION

Remove any dirt or rust.

To clean the entire vehicle, use only flannel clothes or Kimtowels® wipers no. 58-380 from Kimberly-Clark.

CAUTION: It is necessary to use flannel cloths or Kimtowels wipers on windshield and hood to avoid damaging further surfaces to clean.

To clean the entire vehicle, including metallic parts with a **thick** coat of grease, use Endust® imported by Bristol Myers, available at hardware stores or supermarkets.

For bottom pan cleaning, use Bombardier Cleaner (P/N 293 110 001 (spray can 400 g) and P/N 293 110 002 (4 L)). Then, finish with Vinyl & Plastic Cleaner (P/N 413 711 200 (6 x 1L)).

CAUTION: Do not use Bombardier Cleaner on decals or vinyl.

To clean the entire vehicle, including metallic parts with a **thin** coat of grease, use Simple Green® from Sunshine Makers Inc., available at hardware stores or at automotive parts retailer.

For vinyl and plastic parts, use Vinyl & Plastic Cleaner (P/N 413 711 200 (6 x 1 L)).

CAUTION: Never clean plastic parts or hood with strong detergent, degreasing agent, paint thinner, acetone, products containing chlorine, etc.

Inspect the hood and repair any damage.

Touch up all metal spots where paint has been scratched off. Spray all metal parts including shock chromed rods with BOMBARDIER LUBE (P/N 293 600 016).

Remove drive belt and spray BOMBARDIER LUBE (P/N 293 600 016) on drive and driven pulley sheaves.

Wax the hood and the painted portion of the frame for better protection.

NOTE: Apply wax on glossy finish only. Protect the vehicle with a cover to prevent dust accumulation during storage.

CAUTION: The snowmobile has to be stored in a cool and dry place and covered with an opaque tarpaulin. This will prevent sun rays and grime from affecting plastic components and vehicle finish.

Lift rear of vehicle until track is clear of the ground. Install on a snowmobile mechanical stand.

NOTE: Do not release track tension.

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ENGINE

The following chart is provided to help in diagnosing the probable source of troubles. It should be used as a guideline. Some causes or corrections may not apply to a specific model.

SYMPTOM	**ENGINE BACKFIRES.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check spark plugs.** a. Carbon accumulation caused by defective spark plug(s). *Clean carbon accumulation and replace spark plugs.*
	2. Check ignition timing. a. Timing is too advanced. *Set timing according to specifications (refer to TECHNICAL DATA).*
	3. Check carburetor. a. Fuel passages obstructed. *Clean carburetor and install new filter(s).* b. Fuel level too low. *Adjust float level according to specifications.*
	4. Check cooling system. a. Low antifreeze level. *Adjust antifreeze level. Then check clamps or hoses.* b. Defective tank cap. *Replace cap.* c. Air in system. *Bleed system.*

SYMPTOM	**ENGINE SUDDENLY TURNS OFF AT HIGH RPM AND/OR WITH LIGHT LOAD.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check that all ground wires are well connected.**

SYMPTOM	ENGINE SUDDENLY TURNS OFF.
CONDITION	NORMAL USE.
Test/Inspection	**1. Perform engine leak test. Refer to ENGINE LEAK VERIFICATION FLOW CHART. Check possible piston seizure.** a. Damaged gasket and/or seal. *Replace defective parts.*
	2. "Four-corner" seizure of piston(s). a. Accelerating too fast when engine is cold. Piston expands faster than cylinder. *Replace piston(s). Ask driver to refer to warm-up procedure in* Operator's Guide.
	3. Piston(s) seizure on exhaust side (color on piston dome is correct). a. Kinked fuel tank vent tube. *Relocate fuel tank vent tube.* b. Leaks at fuel line connections or damaged fuel lines. *Replace defective lines.* c. Fuel does not flow through carburetor(s) (foreign particles in needle area and/or varnish formation in carburetor(s)). *Clean carburetor(s) and install new filter(s).* d. Spark plug heat range is too warm. *Install spark plugs with appropriate heat range (refer to TECHNICAL DATA).* e. Improper ignition timing. *Adjust according to specifications (refer to TECHNICAL DATA).* f. Restriction in exhaust system. *Replace.* g. Compression ratio is too high. *Install genuine parts.* h. Carburetor calibration is too lean. *Adjust according to specifications (refer to TECHNICAL DATA).* i. Improper reed valve adjustment or damage. *Adjust according to specifications (refer to 493, 593, 693 AND 793 ENGINES TYPES) and/or install Bombardier's recommended reed valve.* j. Poor oil quality. *Use BOMBARDIER oil.* k. Leaks at air intake silencer. *Replace air intake silencer grommets.*
	4. Melted and/or perforated piston dome; melted section at ring end gap. a. When piston reaches TDC, mixture is ignited by heated areas in combustion chamber. This situation is due to an incomplete combustion of a poor oil quality. *Clean residue accumulation in combustion chamber and replace piston(s). Use BOMBARDIER injection oil.* b. Spark plug heat range is too high. *Install recommended spark plugs (refer to TECHNICAL DATA).* c. Ignition timing is too advanced. *Adjust according to specifications (refer to TECHNICAL DATA).* d. Inadequate fuel quality. *Use appropriate fuel.* e. Carburetion is too lean. *Adjust according to specifications (refer to TECHNICAL DATA).*

	5. Seized piston all around the circumference (dry surface). a. Lack of oil, damaged oil line or defective injection pump. *Replace defective part(s).*
	6. Grooves on intake side of piston only. a. Oil film eliminated by water (snow infiltration in engine). *Replace piston(s) and check if intake system leaks.*
	7. Piston color is dark due to seizure on intake and exhaust sides. a. Cooling system leaks and lowers coolant level. *Tighten clamps or replace defective parts. Add antifreeze in cooling system until appropriate level is reached.* b. Accumulation of foreign particles in needle and/or main jet area. *Clean carburetor(s).*
	8. Cracked or broken piston(s). a. Cracked or broken piston(s) due to excessive piston/cylinder clearance or engine overreving. *Replace piston(s). Check piston/cylinder clearance (refer to TECHNICAL DATA). Adjust drive pulley according to specifications (refer to TECHNICAL DATA) and/or clean pulley sheaves if they are contaminated with greasy particles.*
	9. DPM manifold air vent is obstructed. a. Carburetion is too lean. *Ensure proper air vent.*

SYMPTOM	**PISTON RING AND CYLINDER SURFACES ARE GROOVED.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check oil quality.** a. Poor oil quality. *Use BOMBARDIER injection oil.*
	2. Check injection pump and its hoses. a. Inadequate injection pump adjustment and/or defective hoses. *Adjust pump according to specifications (refer to ENGINE) and/or replace hoses.*

SYMPTOM	ENGINE DOES NOT OFFER MAXIMUM POWER AND/OR DOES NOT REACH MAXIMUM OPERATING RPM.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check spark plug condition and gap.** a. Fouled spark plugs or wrong spark plug gap. *Replace or readjust gap.*
	2. Check if there is water in fuel. a. There is water in fuel. *Drain fuel system, then fill it with appropriate fuel.*
	3. Check items listed in ENGINE RUNS OUT OF FUEL (refer to Fuel and Oil System subsection).
	4. Check carburetor adjustments and cleanliness. a. Inadequate carburetor adjustments or dirt accumulation. *Adjust according to specifications (refer to TECHNICAL DATA) or clean.*
	5. Check drive belt. a. Worn belt. *Replace belt if width is 3 mm (1/8") less than nominal dimension (refer to TECHNICAL DATA).*
	6. Check track adjustment. a. Too much tension and/or improper alignment. *Align track and adjust its tension to specifications (refer to TECHNICAL DATA).*
	7. Check drive pulley. a. Improper calibration screw adjustments (TRA pulley) and/or worn bushing(s). *Adjust according to specifications (refer to TECHNICAL DATA) and/or replace bushing(s).*
	8. Check driven pulley. a. Worn bushing and/or spring tension. *Replace spring and/or adjust its tension according to specifications (refer to TECHNICAL DATA).*
	9. Check exhaust system. a. Restriction or exhaust system leaks. *Replace or reseal with Ultra Copper.*
	10. Check ignition timing. a. Decrease in power due to retarded ignition. *Adjust according to specifications (refer to TECHNICAL DATA).*
	11. Check engine compression. a. Worn piston(s) and ring(s). *Replace (refer to TECHNICAL DATA for specifications).*
	12. Check engine cooling system. a. Antifreeze level is low, cap fails to pressurize system or air circulates through lines. *Adjust level, replace cap or bleed cooling system.*
	13. Check reed valve. a. Improper tightness and/or opening. Replace or adjust. Refer to proper ENGINE subsection.

SYMPTOM	ENGINE DETONATION AT MAXIMUM RPM.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check which type of fuel is used.** a. Octane number is too low and/or alcohol level is too high. *Use recommended fuel type.*
	2. Check spark plug type. a. Improper spark plug heat range. *Install recommended spark plugs (refer to TECHNICAL DATA).*
	3. Check exhaust system. a. Too much restriction. *Replace.*
	4. Check ignition timing. a. Timing is too advanced. *Adjust according to specifications (refer to TECHNICAL DATA).*
	5. Check carburetion. a. Fouled and/or improper carburetor components. *Clean or replace according to specifications (refer to TECHNICAL DATA).*
	6. Check compression ratio and combustion chamber volume. a. Compression ratio is too high. *Install genuine parts.*

SYMPTOM	ENGINE TURNS OVER BUT FAILS TO START.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check switches.** a. Ignition switch, emergency cut-out switch or tether switch is in the OFF position. *Place all switches in the RUN or ON position. If it still does not work, connect DESS switch BK/GN and BK/WH wires together (harness side).*
	2. Check fuel level. a. Mixture not rich enough to start cold engine. *Check fuel tank level and use choke.*
	3. Check spark plug. a. Defective spark plug (no spark) or wrong spark plug gap. *Replace spark plugs or readjust gap.*
	4. Check amount of fuel on spark plug. a. Flooded engine (spark plug wet when removed). *Do not overprime or overchoke. Remove wet spark plugs, turn ignition switch to OFF and crank engine several times. Install clean dry spark plugs. Start engine following usual starting procedure.*
	5. Check fuel lines. a. No fuel to the engine (spark plugs dry when removed). *Check fuel tank level; turn fuel valve on if applicable; check fuel filter, replace if clogged; check condition of fuel and impulse lines and their connections.*
	6. Check engine compression. a. Insufficient engine compression. *Replace defective part(s) (ex.: piston(s), ring(s), etc.).*

SYMPTOM	IRREGULAR ENGINE IDLE.
CONDITION	NORMAL USE AFTER ENGINE WARM UP.
Test/Inspection	**1. Check choke.** a. Choke plunger may be partially opened. *Readjust.*
	2. Check carburetor adapter. a. Air enters through a crack. *Replace.*
	3. Check air screw position. a. Inadequate fuel/air mixture. *Adjust according to specifications (refer to TECHNICAL DATA).*
	4. Check ignition system trigger coil air gap. a. Air gap is too large. *Adjust according to specifications (refer to TECHNICAL DATA).*
	5. Check dimension of pilot jet. a. Inadequate fuel/air mixture. *Adjust according to specifications (refer to TECHNICAL DATA).*
	6. Check reed valve. a. Improper tightness and/or opening. *Replace or adjust. Refer to proper ENGINE subsection.*
	7. Perform engine leak test. a. Leaking gaskets allow air to enter in engine. *Replace defective parts.*
	8. DPM manifold air vent is obstructed. a. Carburetion is too lean. *Ensure proper air vent.*

SYMPTOM	HIGH ENGINE OPERATING TEMPERATURE.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check temperature gauge sensor.** a. False reading. *Check terminal connections. If problem still persists, replace sensor.*
	2. Verify antifreeze level and check if there is air infiltration in the system or if there are leaks in gasket areas. a. Low antifreeze level or air in system. *Add antifreeze until recommended level is reached, bleed system and/or tighten clamps at fitting.*
	3. Check if antifreeze flows through system properly. a. Foreign particles and/or broken coolant pump impeller. *Clean cooling system and/or replace coolant pump impeller.*
	4. Check antifreeze concentration. a. Antifreeze concentration is too high. *Adjust concentration according to Bombardier's recommendations.*
	5. Check thermostat. a. Thermostat reacts slowly or not at all. *Replace.*
	6. Check tank cap. a. Cap does not hold pressure. *Replace.*
	7. Check carburetion. a. Improperly adjusted or inadequate carburetor components. *Adjust according to specifications (refer to TECHNICAL DATA) or replace inadequate component(s).*
	8. Check cylinder head gaskets. a. Worn gaskets. *Replace.*
	9. Check ignition timing. a. Ignition timing is too advanced. *Adjust according to specifications (refer to TECHNICAL DATA).*
	10. Check if there are leaks at air intake silencer and/or engine crankcase. a. Leak(s). *Repair or replace.*
	11. Check condition and heat range of spark plugs. a. Melted spark plug tip or inadequate heat range. *Replace.*

SYMPTOM	**ENGINE EQUIPPED WITH RAVE VALVE DOES NOT REACH ITS FULL OPERATING RPM (500 TO 1000 RPM SLOWER).**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check RAVE valve pistons.** a. Valve piston(s) is (are) too far out. *Screw valve piston(s) to bottom.*
	2. Check RAVE valve stems. a. Bent RAVE valve stem(s). *Replace.*
	3. Check RAVE valves. a. Jammed valve(s). *Clean.*
	4. Check tension of RAVE springs. a. Inadequate spring tension. *Replace.*
	5. Check RAVE pressure holes. a. Clogged holes. *Clean.*
	6. Check clamps or sleeves. a. Damaged clamp(s) or sleeve(s). *Replace.*
	7. Check exhaust tightness. a. Exhaust system is leaking leading to a too low back pressure. *Replaces parts and reseal.*

SYMPTOM	**ENGINE EQUIPPED WITH RAVE. ENGINE HESITATES AT MID-SPEED AND REACHES MAXIMUM PERFORMANCE ONLY AFTER A WHILE.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check RAVE valve spring(s).** a. Spring tension is too weak or spring(s) is (are) broken. *Replace.*
	2. Check RAVE valve cover red adjustment screws. a. Adjustment screw(s) is (are) too loose. *Adjust according to ASSEMBLY procedure in appropriate ENGINE subsections.*
	3. Check RAVE valve movement (RAVE movement indicator P/N 861 725 800). a. Valve(s) is (are) stuck in open position. *Clean.*

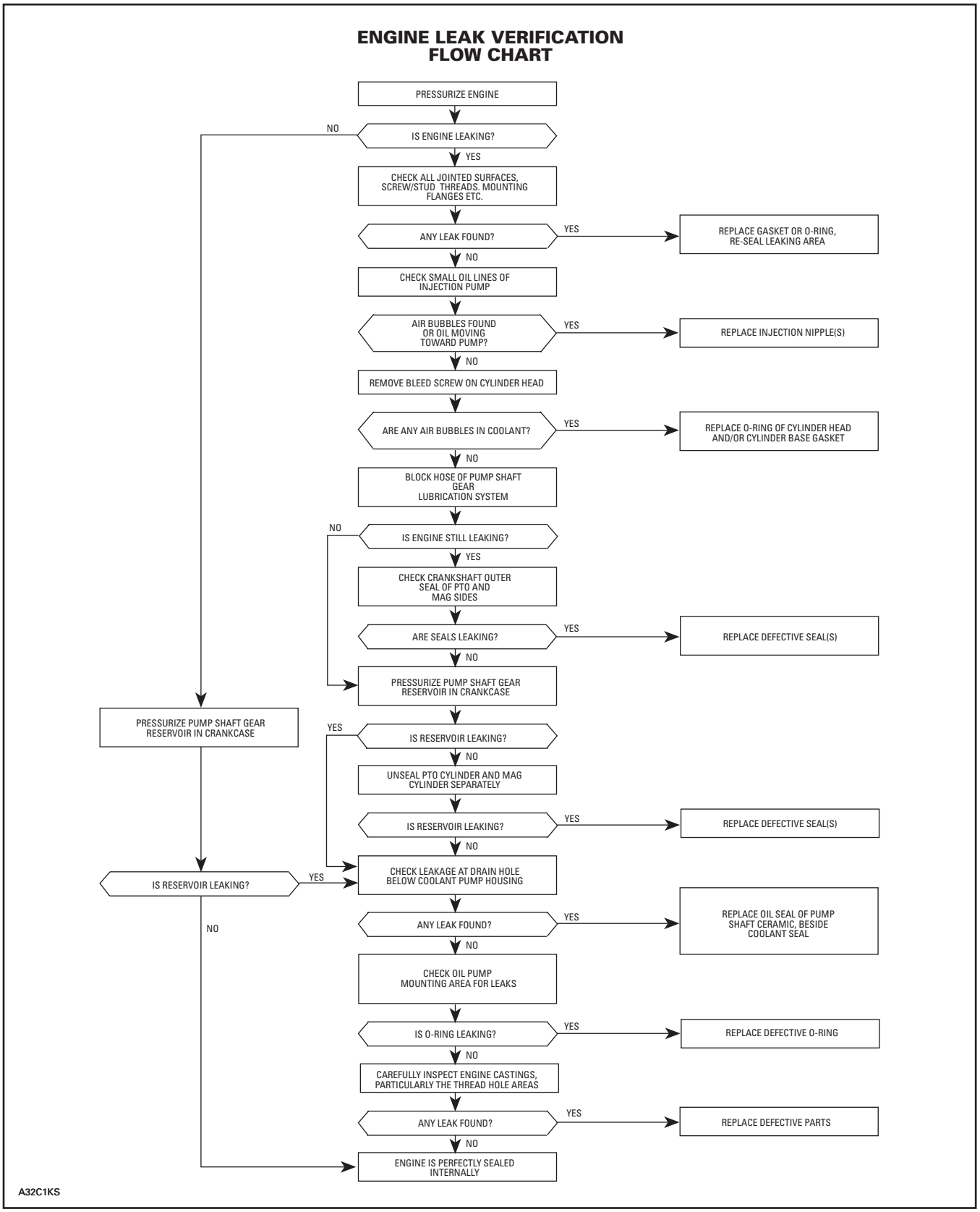
SYMPTOM	**REWIND STARTER ROPE DOES NOT REWIND.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check rewind spring.** a. Broken spring. *Replace spring.*

SYMPTOM	REWIND STARTER PAWL DOES NOT ENGAGE.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check stopper spring.** a. Broken stopper spring. *Replace.*
	2. Check pawl and pawl lock. a. Pawl and pawl lock have stuck together because of heat. *Replace.*
	3. Check pawl and rope sheave. a. Pawl and rope sheave have stuck together because of heat. *Replace.*

SYMPTOM	ENGINE PINGING.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check fuel lines.** a. Bent fuel lines (preventing fuel from flowing through). *Relocate or replace fuel lines.*
	2. Check if carburetor(s) is (are) clean. a. Dirt prevents fuel from flowing through. *Clean.*
	3. Check ignition timing. a. Timing is too advanced. *Adjust according to specifications (refer to TECHNICAL DATA).*
	4. Check compression ratio. a. Compression ratio is too high. *Replace inadequate part(s) to obtain manufacturer's recommended compression ratio or use a higher grade fuel.*

SYMPTOM	ENGINE GENERATES A LOT OF VIBRATIONS.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check engine supports and stopper.** a. Loose and/or broken supports or interference between support(s) and chassis. *Retighten to specification (refer to TECHNICAL DATA) or replace.*
	2. Check drive pulley (refer to: VIBRATIONS COMING FROM DRIVE PULLEY).
	3. Check carburetor synchronization. a. Throttle slide heights are adjusted differently and/or throttle slide openings are unsynchronized. *Adjust throttle slide heights and throttle cable.*

ENGINE LEAK VERIFICATION FLOW CHART



FUEL AND OIL SYSTEMS

The following chart is provided to help in diagnosing the probable source of troubles. It should be used as a guideline. Some causes or corrections may not apply to a specific model.

SYMPTOM	**HIGH FUEL CONSUMPTION OR RICH MIXTURE.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check fuel tank.** a. Perforated fuel tank. *Replace fuel tank.*
	2. Check fuel pump reservoir and carburetor fittings. a. Leaking fittings. *Replace defective part.*
	3. Check choke adjustment. a. Fuel flows through choke circuit while engine runs. *Readjust choke.*
	4. Check float height in carburetor(s). a. Fuel level is too high in float bowl(s). *Adjust according to specifications (refer to TECHNICAL DATA).*
	5. Check needle valve. a. Foreign particles prevent needle valve(s) from closing and/or worn seating area. *Clean or replace needle valve(s), then clean seating area.*

SYMPTOM	**FUEL LEAKS IN ENGINE BASE WHEN ENGINE IS STOPPED.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check items 3, 4 and 5 of HIGH FUEL CONSUMPTION.**
	2. Check fuel pump diaphragm. a. Cracked diaphragm. *Replace.*

SYMPTOM	ENGINE LACKS POWER OR STALLS AT HIGH RPM.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check fuel tank vent hose.** a. Kinked or clogged hose. *Relocate or replace.*
	2. Check fuel filter. a. Clogged filter. *Replace.*
	3. Check fuel lines. a. Kinked or clogged lines. *Relocate or replace.*
	4. Check fuel pump flow. a. Dried diaphragm. *Replace.*
	5. Check if carburetor(s) is (are) clean. a. Varnish. *Clean.*

SYMPTOM	HIGH INJECTION OIL CONSUMPTION.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check oil injection pump adjustment.** a. Oil injection pump adjusted too rich. *Adjust.*
	2. Check injection pump identification. a. Wrong pump installed. *Replace with the appropriate pump. Refer to OIL INJECTION SYSTEM.*
	3. Check injection oil lines and their fitting. a. Leaking lines and/or cover. *Replace defective part(s).*
	4. Check injection pump cover gasket. a. Worn gasket. *Replace.*
	5. Pressurize pump shaft gear reservoir. a. Leaking seal(s). *Replace seal(s).*

SYMPTOM	ENGINE RUNS OUT OF FUEL (OR LEAN MIXTURE).
CONDITION	NORMAL USE.
Test/Inspection	**1. Check fuel filter ball located in fuel tank. Ball must move freely.** a. Corrosion due to oxidation at installation. *Replace fuel filter.*
	2. Check if lines are perforated or kinked and make sure they do not leak at fittings. a. Lines are too big for their fittings or are improperly routed. *Replace or properly relocate lines.*
	3. Check fuel pump outlet flow. a. Dirt clogging fuel pump lines or torn membrane. *Clean or replace fuel pump.*
	4. Check carburetor needle valve(s). a. Dirt (varnish, foreign particle) clogging fuel line inlets. *Clean.*
	5. Check main jet. a. Dirt (varnish, foreign particle) accumulation at main jet. *Clean.*
	6. Check float height in carburetor bowl(s). a. Running out of fuel at high speed because float height is too low. *Adjust float height according to specifications.*

TRANSMISSION AND BRAKE SYSTEMS

The following charts are provided to help in diagnosing the probable source of troubles. It should be used as a guideline. Some causes or corrections may not apply to a specific model.

TRANSMISSION

SYMPTOM	THE SNOWMOBILE ACCELERATES SLOWLY, ESPECIALLY WHEN IT IS STOPPED.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check drive belt condition.** a. Belt is too narrow (drive belt engagement is higher in drive pulley). *Replace belt if width is less than specified in DRIVE BELT.*
	2. Check distance between pulleys and/or drive belt deflection. a. Distance is too small between pulleys or deflection is too high (drive belt engagement is higher in drive pulley). *Adjust distance between pulleys and/or drive belt deflection according to specifications (refer to TECHNICAL DATA).*
	3. Check driven pulley sliding half play. a. Jammed sliding half. *Replace.*
	4. Check spring tension of driven pulley sliding half. a. Sliding half rotation is accelerated when spring tension is too weak. *Adjust according to specifications (refer to TECHNICAL DATA).*
	5. Refer to VIBRATIONS ORIGINATING FROM DRIVEN PULLEY and check items listed.
	6. Check drive pulley spring tension. a. Spring tension is too weak. *Replace.*

SYMPTOM	ENGINE MAXIMUM RPM IS TOO HIGH AND TOP SPEED IS NOT REACHED.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check items 1, 2 and 3 of THE SNOWMOBILE ACCELERATES SLOWLY, ESPECIALLY WHEN IT IS STOPPED.**
	2. Check driven pulley spring tension. a. Spring tension is too stiff. *Adjust according to specifications (refer to TECHNICAL DATA).*
	3. Check position of the calibration screws. (TRA drive pulley) a. Selected numbers are too high. *Adjust according to specifications (refer to TECHNICAL DATA).*
	4. Refer to VIBRATIONS ORIGINATING FROM DRIVEN PULLEY and check items listed.

SYMPTOM	LOOSENESS IS FELT IN DRIVE SYSTEM WHEN ACCELERATING/DECELERATING.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check drive chain tension.** a. Drive chain is too loose. *Adjust.*
	2. Check play of driven pulley splines. a. Worn splines. *Replace.*

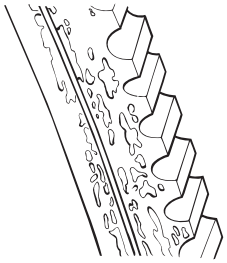
SYMPTOM	VIBRATIONS ORIGINATING FROM DRIVE PULLEY.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check drive belt.** a. Belt width is uneven at many places. *Replace.*
	2. Check tightening torque of drive pulley screw. a. Moving governor cup. *Retighten screw.*
	3. Spring cover screws. a. Spring cover moves and restrains sliding half movement. *Retighten screws.*
	4. Check spring cover (TRA type) and/or outer half bushings. a. Excessive gap between bushings and inner half shaft, thus restraining sliding half movements. *Replace bushing(s).*
	5. Check sliding half slider shoes. a. Worn slider shoes. *Replace.*

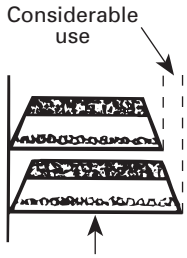
SYMPTOM	VIBRATIONS ORIGINATING FROM DRIVEN PULLEY.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check sliding half play.** a. Sliding half runout. *Replace sliding half bushing.*
	2. Check sliding half and fixed half straightness. a. Sliding half/fixed half runout. *Replace.*
	3. Check cam slider shoes. a. One or two slider shoes out of three are broken. *Replace.*

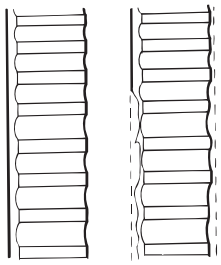
SYMPTOM	**PULLEYS DO NOT DOWN SHIFT PROPERLY.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check driven pulley spring tension.** a. Spring tension is too weak. *Adjust according to specifications (refer to TECHNICAL DATA).*
	2. Refer to VIBRATIONS COMING FROM DRIVEN PULLEY and check items listed.
	3. Check drive pulley bushings (cleanliness, wear, etc.). a. Bushings stick to fixed half pulley shaft. *Clean or replace.*
	4. Check driven pulley spring tension. a. Spring tension is too weak. *Replace.*

SYMPTOM	**IN REVERSE ENGINE BOGS AND DRIVEN PULLEY OPENS TOO FAST (DRIVE BELT IS LOW IN DRIVEN PULLEY).**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check pulley distance and alignment.** a. Improper adjustment. *Adjust according to specifications (refer to PULLEY DISTANCE AND ALIGNMENT) and make sure that engine stopper is resting against engine.*

SYMPTOM	**UNEVEN BELT WEAR ON ONE SIDE ONLY.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check tightening torque of engine mount bolts.** a. Loose engine mount. *Tighten engine mount nuts/bolts equally.*
 A00D09Y	**2. Check pulley alignment.** a. Pulley misalignment. *Align pulleys.*
	3. Check drive belt contact area on pulleys. a. Rough or scratched pulley surfaces. *Repair or replace pulley half.*
	4. Check driven pulley sliding half play. a. Driven pulley bushing worn. *Replace bushing.*

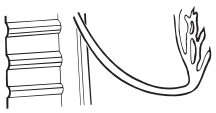
SYMPTOM	**BELT GLAZED EXCESSIVELY OR HAVING BAKED APPEARANCE.**
CONDITION	NORMAL USE.
Test/Inspection  A00D0AY	**1. Check if drive pulley bushings are worn.** a. Insufficient pressure on belt sides. *Replace bushing.* **2. Check condition of drive pulley fixed half shaft.** a. Rusted drive or driven pulley shafts. *Clean shaft with fine steel wool.* **3. Check if pulley halves are clean.** a. Oil on pulley surfaces. *Clean pulley halves.* **4. Check pulley calibration.** a. Improper pulley calibration. *Calibrate according to specifications.*

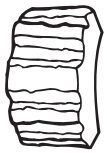
SYMPTOM	**BELT WORN EXCESSIVELY IN TOP WIDTH.**
CONDITION	NORMAL USE.
Test/Inspection  A00D0BY	**1. Check drive pulley.** a. Excessive slippage due to irregular outward actuation movement of drive pulley. *Carry out drive pulley inspection.* **2. Check drive belt identification number.** a. Improper belt angle (wrong type of belt). *Replace belt with an appropriate drive belt.* **3. Check drive belt width.** a. Considerable use. *Replace belt if less than specified in DRIVE BELT.*

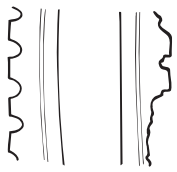
SYMPTOM	BELT WORN NARROW IN ONE SECTION.
CONDITION	NORMAL USE.
Test/Inspection  A00D0CY	**1. Check if parking brake is released.** a. Parking brake is engaged. *Release parking brake.*
	2. Check track tension/alignment. a. Frozen or too tight track. *Liberate track from ice or check track tension and alignment.*
	3. Check drive pulley. a. Drive pulley not functioning properly. *Repair or replace drive pulley.*
	4. Check idle speed. a. Engine idle speed too high. *Adjust according to specifications.*
	5. Check drive belt length. a. Incorrect belt length. *Replace belt with an appropriate drive belt (refer to TECHNICAL DATA).*
	6. Check distance between pulleys. a. Incorrect pulley distance. *Readjust according to specifications.*
	7. Check belt deflection. a. Deflection is too small. *Adjust according to specifications.*

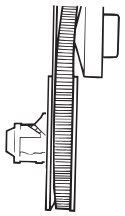
SYMPTOM	BELT SIDES WORN CONCAVE.
CONDITION	NORMAL USE.
Test/Inspection A00D0DY	**1. Check pulley half surfaces.** a. Rough or scratched pulley half surfaces. *Repair or replace.*
	2. Check drive belt identification number. a. Unspecified type of belt. *Replace belt with an appropriate drive belt (refer to TECHNICAL DATA).*

SYMPTOM	**BELT DISINTEGRATION.**
CONDITION	NORMAL USE.
Test/Inspection A00DOEY	**1. Check drive belt identification number.** a. Excessive belt speed. *Using unspecified type of belt. Replace belt with proper type of belt (refer to TECHNICAL DATA).* **2. Check if pulley halves are clean.** a. Oil on pulley surfaces. *Clean pulley surfaces with fine emery cloth and wipe clean using Parts Cleaner (P/N 413 711 809) and a cloth.*

SYMPTOM	**BELT EDGE CORD BREAKAGE.**
CONDITION	NORMAL USE.
Test/Inspection  A00DOFY	**1. Check pulley alignment.** a. Pulley misalignment. *Align pulley according to specifications (refer to TECHNICAL DATA).*

SYMPTOM	**FLEX CRACKS BETWEEN COGS.**
CONDITION	NORMAL USE.
Test/Inspection  A00D0GY	**1. Check drive belt condition.** a. Considerable use, belt wearing out. *Replace.*

SYMPTOM	**SHEARED COGS, COMPRESSION SECTION FRACTURED OR TORN.**
CONDITION	NORMAL USE.
Test/Inspection  A00D0HY	**1. Check drive belt rotational direction.** a. Improper belt installation. *Replace.* **2. Check if drive belt rubs against components.** a. Belt rubbing on stationary object. *Relocate components.* **3. Check drive pulley.** a. Violent engagement of drive pulley. *Check drive pulley engagement speed, drive pulley bushings and components.*

SYMPTOM	**BELT "FLIP-OVER" AT HIGH SPEED.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check pulley alignment.** a. Pulley misalignment. *Align pulley according to specifications (refer to TECHNICAL DATA).*
 A00D0IY	**2. Check drive belt identification number.** a. Using unspecified type of belt. *Replace belt with an appropriate drive belt.*

BRAKE SYSTEM

HYDRAULIC BRAKE

SYMPTOM	**SPONGY BRAKE CONDITION.**
CONDITION	NORMAL USE.
Test/Inspection	*Replace brake fluid and bleed system. If problem still occurs, replace master cylinder.*

SYMPTOM	**BRAKE FLUID LEAKING.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check for loosened hose connectors.** *Replace copper washers and retighten.*
	2. Check for damaged hose, master cylinder and caliper. *Replace part(s) and check for proper mounting.*

SYMPTOM	**BRAKE SYSTEM IS NOISY.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check brake pad thickness.** a. Pads are worn up to wear warner. *Replace.*

ELECTRICAL SYSTEM

The following chart is provided to help in diagnosing the probable source of troubles. It should be used as a guideline. Some causes or corrections may not apply to a specific model.

SYMPTOM	**STARTER DOES NOT TURN.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check fuse.** a. Burnt fuse. *Check wiring condition and replace fuse.*
	2. Check continuity of starter switch contact points. a. Poor contact of starter switch contact points. *Repair or replace switch.*
	3. Check continuity between starter switch and solenoid. a. Open circuit between starter switch and solenoid switch. *Repair.*

SYMPTOM	**STARTER TURNS; BUT DOES NOT CRANK THE ENGINE.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check battery capacity.** a. Shorted battery cell(s). *Replace.*
	2. Check battery charge. a. Weak battery. *Recharge battery and verify recharge system and wires.*
	3. Check wire connection. a. Inadequate connection (too much resistance). *Clean and reconnect.*
	4. Check solenoid switch contact disc. a. Burnt or poor contact of solenoid switch contact disc. *Replace solenoid switch.*
	5. Check continuity of solenoid switch pull-in winding. a. Open circuit of solenoid switch pull-in winding. *Replace solenoid switch.*
	6. Check brushes. a. Poor contact of brushes. *Replace brushes.*
	7. Check commutator. a. Burnt commutator. *Turn commutator on a lathe. Respect outer diameter wear limit.* *Refer to ELECTRIC STARTER.*

	8. Check height of commutator mica. a. Commutator mica too high. *Undercut mica.*
	9. Check field coil resistance. a. Shorted field coil. *Repair or replace yoke.*
	10. Check armature resistance. a. Shorted armature. *Repair or replace armature.*
	11. Check tension of brush springs. a. Weak brush spring tension. *Replace springs.*
	12. Check yoke assembly magnets. a. Weak magnets. *Replace yoke assembly.*
	13. Check if bushings are worn. a. Worn bushings. *Replace bushings.*

SYMPTOM	**STARTER TURNS, BUT OVERRUNNING CLUTCH PINION DOES NOT MESH WITH RING GEAR.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check clutch pinion gear.** a. Worn clutch pinion gear. *Replace clutch.*
	2. Check clutch. a. Defective clutch. *Replace clutch.*
	3. Check movement of clutch on splines. a. Poor movement of clutch on splines. *Clean and correct.*
	4. Check clutch bushing. a. Worn clutch bushing. *Replace clutch.*
	5. Check starter bushings. a. Worn starter bushing(s). *Replace bushing(s).*
	6. Check ring gear. a. Worn ring gear. *Replace ring gear.*

SYMPTOM	**ELECTRIC STARTER KEEPS TURNING WHEN ENGINE IS STARTED.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check clutch.** a. Jammed clutch pinion gear. *Replace or clean.*
	2. Check movement of clutch on splines. a. Clutch is stuck on splines. *Clean.*
	3. Check starter brackets. a. Broken bracket(s). Replace bracket(s).
	4. Check ignition switch. a. Ignition switch does not return to its ON position or is short-circuited. *Adjust switch position. Face nut is too far in.*
	5. Check starter relay. a. Shorted starter relay winding(s). *Replace starter relay.*
	6. Check starter relay contacts. a. Melted starter relay contacts. *Replace starter relay.*
	7. Check starter relay. a. Starter relay returns poorly. *Replace starter relay.*

SYMPTOM	**NOISE OCCURENCE WHEN STARTING ENGINE.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check if ring gear is well-mounted to drive pulley inner half.** a. Loose and/or broken bolts. *Retighten bolts using thread locker or replace ring gear and drive pulley inner half.*

SYMPTOM	**20 A FUSE LOCATED IN LEFT FRONT CORNER OF ENGINE COMPARTMENT IS BURNT.**
CONDITION	NORMAL USE.
Test/Inspection	**1. 20 A fuse burns when electric starter is activated with a faulty starter ground. Check that ground cable between chassis and starter bracket is well connected.** a. Broken, corroded and/or loose connection(s). *Replace, clean and/or retighten. Replace 20 A fuse.*

SYMPTOM	ELECTRIC STARTER SOMETIMES DOES NOT WORK WHEN TURNING IGNITION SWITCH.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check battery cables and starter wires.** a. Corroded and/or loose connection(s). *Clean and/or retighten.*
	2. Check fuse. a. Oxidized or burnt fuse. *Clean or replace.*
	3. Check wiring harness connections. a. Oxidized connections. *Clean or replace defective terminals.*
	4. Check ignition switch. a. Defective contacts in ignition switch. *Replace.*
	5. Check solenoid of electric starter. a. Shorted solenoid wiring harness or eroded contact washer. *Replace.*

SYMPTOM	**ENGINE DOES NOT START — NO SPARK AT SPARK PLUG.**
CONDITION	AT ENGINE CRANKING.
Test/Inspection	**1. Verify spark plug condition.** a. Defective, improperly set, worn-out, fouled. *Identify source of problem and correct. Replace spark plugs.*
	2. Verify spark plug wire and cap resistance with an ohmmeter. a. Defective part. *Replace.*
	3. Verify if problem originated from electrical system wiring harness and/or accessories and/or ignition cut-out switches by unplugging the 3-wire connectors between the magneto/generator and the vehicle wiring harness. Check condition of connectors. a. Heating, rotating or sharp part in contact with harness. Improper harness routing. Defective switch(es). Corroded connector terminals. *Replace or repair damaged wires. Reroute where necessary. Replace defective switch(es). Clean terminals and apply silicone dielectric grease.*
	4. Verify trigger coil resistance with an ohmmeter and connector condition. a. Defective coil. Corroded connector terminals. *Replace defective coil. Clean terminals and apply silicone dielectric grease.*
	5. Verify condition of ignition coil. a. Mechanically damaged part. Vibration problem. Electrically damaged part. *Tighten mounting screws. Replace ignition coil.*
	6. Verify condition of ignition generator coils. a. Mechanically damaged part. Vibration problem. Electrically damaged part. *Tighten mounting screws. Replace coils.*
	7. Verify MPEM. a. Mechanically damaged part. Vibration problem. Electrically damaged part. *Check that MPEM is properly mounted and secured. Replace MPEM, retest and verify ignition timing.*

SYMPTOM	**MPEM DOES NOT WORK.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check that high tension coil wires do not touch any metal parts.** a. Short circuit. *Isolate and reroute wires.*

SYMPTOM	**ENGINE STALLS.**
CONDITION	AT LOW SPEED.
Test/Inspection	**1. Verify items 4, 5 and 6 above.**

SYMPTOM	**IRREGULAR ENGINE SPEED.**
CONDITION	AT HIGH SPEED.
Test/Inspection	**1. Verify items 4, 5 and 6 above.**
CONDITION	AT LOW SPEED.
Test/Inspection	**1. Verify items 4 and 5 above and trigger coil/flywheel protrusion air gap.** a. Air gap too large. *Readjust air gap.*

SYMPTOM	**ENGINE IS MISFIRING — ERRATIC SPARK AT SPARK PLUG.**
CONDITION	RIDING ON WET SNOW.
Test/Inspection	**1. Verify if spark plug wires and/or spark plug cap seals are sealing out moisture.** a. Defective wires and/or seals. *Replace defective part.*
	2. Verify if ignition system wiring harness connectors are in good condition and/or are sealing out moisture. a. Loose connectors, corroded terminals or defective parts. *Clean terminals and apply silicone dielectric grease as specified (refer to CDI MAGNETO). Replace defective parts.*
CONDITION	NORMAL USE.
Test/Inspection	**1. Verify misfiring by observing flash of stroboscopic timing light; unplug connectors between magneto/generator and vehicle wiring harness to isolate problem. Check condition of connectors.** a. Defective spark plug(s) and/or cable(s)/cap(s). Defective electrical system wiring harness and/or accessories and/ignition cut-out switches. Condition of connector terminals. *Replace defective parts and/or repair damaged wires. Replace defective switch(es). Clean terminals and apply silicone dielectric grease as specified (refer to CDI MAGNETO).*
CONDITION	RIDING IN DEEP AND THICK SNOW.
Test/Inspection	**1. Perform all verifications outlined under ENGINE DOES NOT START — NO SPARK AT SPARK PLUG.**
	2. Verify spark plugs. Proceed with spark plug analysis in order to identify source of problem. a. Defective and/or worn spark plug(s) and/or cable(s) and/or cap(s). *Replace defective part(s). Proceed with ignition system testing procedures. Perform engine analysis.*

SYMPTOM	FOULED (BLACK) SPARK PLUG TIP.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check carburetor(s).** a. Carburetion is too rich. *Adjust according to specifications (refer to TECHNICAL DATA).*
	2. Check injection oil consumption. a. Injection pump flow is too high. *Adjust according to specifications or replace.*
	3. Check oil quality. a. Poor oil quality that creates deposits. *Use BOMBARDIER injection oil.*
	4. Check engine compression. a. Leaking piston ring(s). *Replace.*

SYMPTOM	SPARK PLUG TIP(S) IS (ARE) LIGHT GREY.
CONDITION	NORMAL USE.
Test/Inspection	**1. Refer to IRREGULAR ENGINE SPEED AT HIGH SPEED and check items listed.**
	2. Check spark plug heat range. a. Spark plug heat range is too high. *Replace by Bombardier's recommended spark plug (refer to TECHNICAL DATA).*
	3. Check if air intake silencer leaks. a. Air surplus coming from opening(s) located between halves. *Seal.*
	4. Check carburetor adapter collars. a. Loose collar(s). *Tighten.*
	5. Check carburetor adapter(s). a. Cracked or deformed adapter(s). *Replace.*

SYMPTOM	**HEADLAMP NOT LIGHTING.**
CONDITION	WHITE BULB.
Test/Inspection	**1. Check bulb.** a. Gas leak. *Replace bulb.*
CONDITION	BROKEN ELEMENT.
Test/Inspection	**1. Check for loose headlamp housing and bulb socket.** a. Vibration problem. *Tighten headlamp mounting screws. Lock bulb in socket. Replace bulb.*
CONDITION	MELTED FILAMENT (ENDS OF ELEMENT HOLDER) AND BLACK BULB.
Test/Inspection	**1. Check voltage at headlamp at different speeds. It must not be above 15 Vac.** NOTE: If quartz halogen bulb is involved, ensure that proper voltage regulator is installed. a. Excessive voltage in lighting circuit. *Replace voltage regulator and ensure proper grounding. Retest.*

SYMPTOM	**HEADLAMP DIMING.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check voltage at headlamp at different speeds. It must not be below 11 Vac.** a. Insufficient voltage in lighting circuit. *Replace voltage regulator and retest.*
	2. Visually inspect wiring harness for damaged and/or melted wires and/or bad wire terminal crimping and/or connections. a. Heating, rotating or sharp part in contact with harness. Improper harness routing. *Repair/replace damaged wires and/or terminals. Reroute harness where necessary.*
	3. On manual start models: Verify regulator ground. a. Rusted contact surfaces or loose retaining screws. *Clean, apply lithium grease (LMZ1) and firmly tighten screws.*
	4. Verify if there is an interconnection between AC and DC current. a. Faulty installation of optional equipment. Find optional equipment connected directly to DC ground (BK wire or chassis) or to any DC hot wire (RD, RD/BL). Disconnect and reconnect to AC current (YL and YL/BK wires).
	5. Verify if optional electric accessories are overloading the magneto/generator. a. Excessive electrical load to magneto/generator. *Reduce the electrical load by removing excess accessories. Reconnect as recommended by manufacturer.*
	6. Hot Grips brand: Verify if they were connected in parallel by mistake. a. Excessive electrical load to magneto/generator. *Reconnect as recommended by manufacturer.*
	7. Bombardier heating grips: Verify if the return wires of the elements were grounded to the chassis by mistake. a. Faulty installation of optional equipment. *Reconnect as recommended by manufacturer.*
	8. Verify if heating grips installation overloads the magneto/generator capacity. a. Excessive electrical load to magneto/generator. *Reduce the electrical load by removing accessories.*

SYMPTOM	**FALSE FUEL AND/OR TEMPERATURE GAUGE READINGS.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Verify sender unit for free movement and/or correct arm position.** a. Defective or damaged part. *Correct or replace sender unit.*
	2. Verify sender unit/gauge wiring harness condition. a. Heating, rotating or sharp part in contact with harness. Improper harness routing. *Replace or repair damaged wires. Reroute where necessary.*

SYMPTOM	WITH ENGINE IDLING NO ELECTRICAL ACCESSORIES WORK.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check idle speed.** a. Too low idle speed. *Readjust to specifications.*
	2. Verify regulator. a. Faulty regulator. *Replace.*

SYMPTOM	BRAKE LIGHT REMAINS ON.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check if bulb is properly installed.** a. Bulb is not installed correctly (contact elements are reversed). *Install bulb correctly.*
	2. Check brake switch. a. Switch contact remains closed. *Replace brake switch.*

SYMPTOM	REAR LIGHT BULB FLASHES.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check bulb tightness in housing.** a. Looseness at bulb contact elements. *Install bulb correctly.*
	2. Check if rear light is properly connected. a. Connector housing is partially connected. *Install connector housing properly.*
	3. Check continuity of wires. a. Corroded terminals and/or broken wires. *Replace terminal(s) or crimp defective wires.*

SYMPTOM	**TACHOMETER DOES NOT WORK.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check continuity of wires.** a. Corroded terminals and/or broken wires. *Replace terminal(s) or crimp defective wires.*

SYMPTOM	**HIGH BEAM PILOT LAMP LIGHTS UP WHEN LOW BEAM IS SELECTED.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check proper connections.** a. Other wire connected to pilot lamp. Mixed-up connections. *Reconnect YELLOW/BLACK and GRAY wires to pilot lamp. YELLOW wires are connected to heating element pilot lamps.*

SUSPENSION AND TRACK

The following chart is provided to help in diagnosing the probable source of troubles. It should be used as a guideline. Some causes or corrections may not apply to a specific model.

SYMPTOM	**SUSPENSION IS TOO LOW.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check condition of spring.** a. Spring is weakened or broken. *Replace spring.*
	2. Check preload of spring. a. Low spring preload. *Increase preload to the recommended position.*

SYMPTOM	**REAR SUSPENSION BOTTOMS OUT.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check rear spring preload or rear arm spring preload.** a. Spring tension is too low. *Increase rear arm spring preload.*

SYMPTOM	**SLIDER SHOES WEAR OUT PREMATURELY.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check track tension.** a. Pressure is too great on slider shoes. *Adjust according to specifications (refer to TECHNICAL DATA).* *Replace defective parts.*

SYMPTOM	**TRACK CLEATS BECOME BLUE.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check track tension.** a. Pressure is too great on cleats. *Adjust according to specifications (refer to TECHNICAL DATA).*
	2. Check slider shoes and/or suspension retaining screws. a. Worn slider shoes or lost retaining screws. *Replace defective parts and/or tighten loose screws.*

SYMPTOM	NOISE OR VIBRATIONS ORIGINATING FROM THE TRACK.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check slide suspension retaining bolts.** a. Missing bolt(s) allowing movement of certain components which in turn interfere with track rotation. *Replace missing bolt(s).*
	2. Check condition of idler wheel(s). a. Idler wheel rubber is damaged. *Replace.*
	3. Check guide cleats. a. Top portion of guide cleat(s) is bent. *Replace.*
	4. Check sprockets. a. One or various teeth of drive shaft sprockets are broken. *Replace sprocket(s).*
	5. Check track rods and/or internal traction teeth. a. One or various track rods and/or teeth are broken. *Replace track.*

SYMPTOM	DERAILING TRACK.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check track tension.** a. Track is too loose. *Adjust.*
	2. Check if track and slider shoes are properly aligned. a. Improper alignment. *Adjust.*
	3. Check for proper suspension fastening. a. Loose or lost retaining screws. *Install new screws and tighten to recommended torque.*

SYMPTOM	REAR SUSPENSION IS TOO STIFF.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check track tension.** a. Track is too tight. *Adjust.*
	2. Check if axles are properly lubricated. a. Improper lubrication and/or contaminated grease (sticky oil sludge). *Clean and/or lubricate.*
	3. Check rear spring preload. a. Too much preload. *Adjust to recommended position.*

SYMPTOM	WHEN HANDLEBAR IS TURNED, SNOWMOBILE UNDERSTEERS.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check ski runner condition.** a. Worn ski runners. *Replace.*
	2. Check tension of ski spring adjustment cams. a. Insufficient ski pressure on the ground. *Increase spring preload.*
	3. Check if front arm stopper strap is too long. a. Insufficient ski pressure on the ground. *Shorten stopper strap.*
	4. Check front arm spring tension. a. Insufficient ski pressure on the ground. *Loosen spring tension.*

SYMPTOM	**HANDLEBAR IS DIFFICULT TO TURN.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check position of ski spring adjustment cams.** a. More pressure on the ground when cam increases spring preload. *Reduce ski spring preload.*
	2. Check position of stopper strap. a. More weight when stopper strap is short. *Lengthen front arm stopper strap.*
	3. Check position of front arm shock adjustment cam(s). a. When spring tension is weak, more weight is transferred to the skis. *Increase spring preload.*
	4. Check condition of ball joints. a. Corrosion restrains movement. *Lubricate or replace.*
	5. Check swing arm camber. a. Too much ski leg inclination. *Adjust camber to specifications.*
	6. Check for proper lubrication. a. Components need lubrication. *Lubricate. Refer to LUBRICATION AND MAINTENANCE.*

SYMPTOM	**THE SNOWMOBILE IS UNSTABLE (IT MOVES FROM LEFT TO RIGHT AND VICE VERSA).**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check ski runner condition.** a. Worn or bent ski runners. *Replace ski runners.*
	2. Check ski alignment. a. Improper ski alignment. *Align skis in order to obtain proper toe-out (opening) (to adjust, refer to STEERING SYSTEM).*
	3. Check if bushings are too loose in steering system. a. Bushings are too loose. *Replace.*
	4. Check ski pressure. a. NOTE: If all parts are in good condition and the customer still complains about an unstable snowmobile, consider the installation of optional Proactive Control System.

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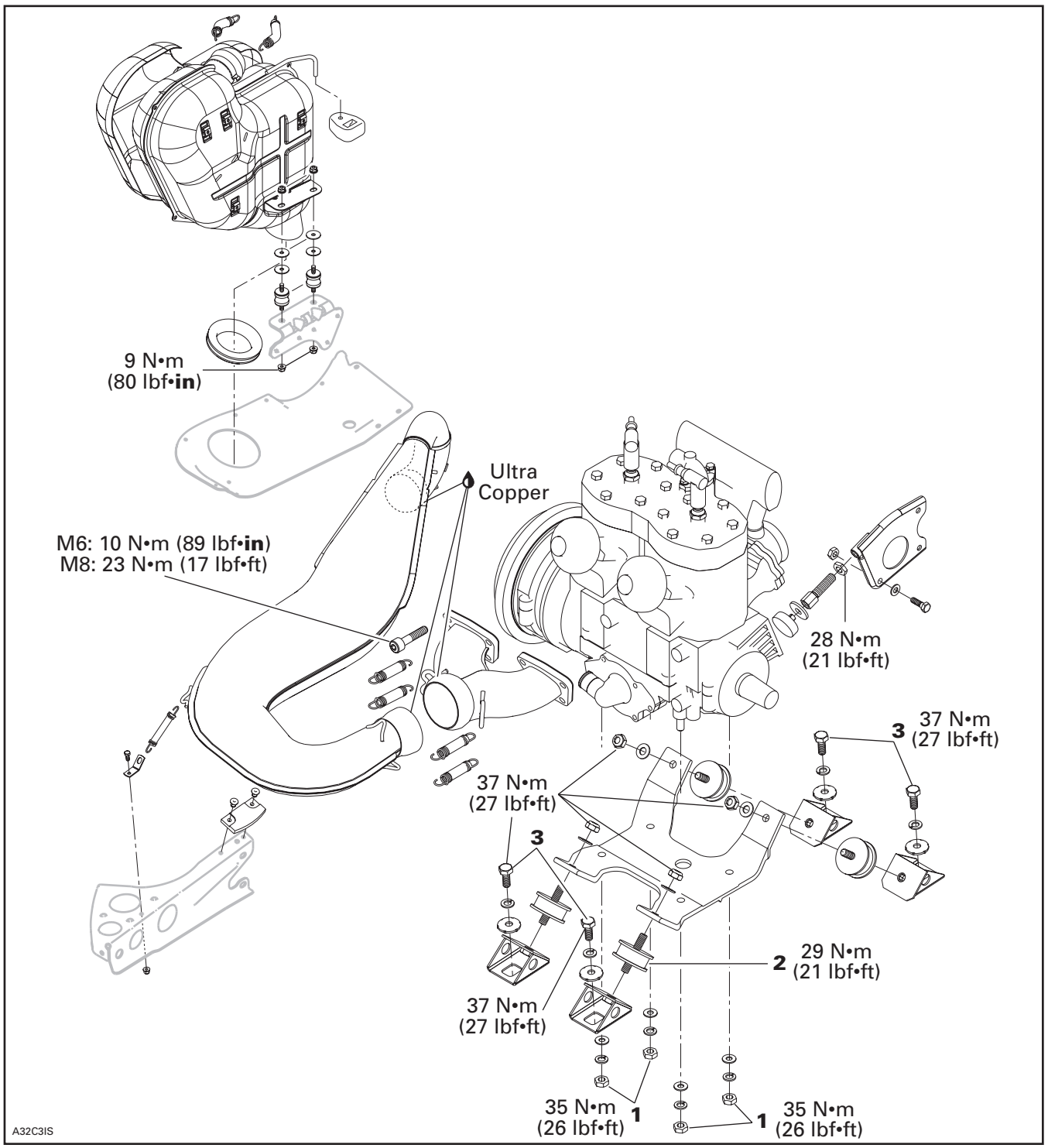
493, 593, 693 AND 793 ENGINE TYPES

ZX Series



TYPICAL

MAINTENANCE

Tuned pipe gear clamps must be retightened to 3.5 N•m (31 lbf•**in**) after the first 10 hours of use, then every 3200 km (2000 mi).

CAUTION: Do not over tighten.

NOTE: Replace with new ones any damaged gear clamps. Refer to appropriate *Parts Catalogs* to order new gear clamps.

REMOVAL FROM VEHICLE

Open hood.

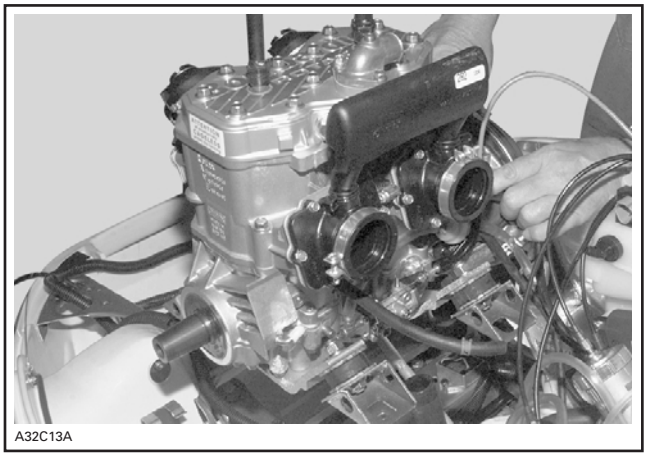
Remove tuned pipe and muffler.

Drain engine coolant.

Remove or unplug the following then lift off engine from engine compartment.

NOTE: Use of a hoist is recommended.

– guard
– air silencer
– drive belt
– rewind starter handle
– drive pulley (not necessary if engine has not to be disassemble)
– hood, refer to BODY
– carburetors
– impulse hose and electrical connectors
– oil injection inlet line at oil injection pump, install hose pincher
– oil pump cable
– coolant hoses between cylinder head and radiator
– coolant by-pass hose
– coolant hose at front of coolant reservoir
– engine support screws
– engine stopper (left rear of engine).


A32C13A

TYPICAL — ENGINE REMOVAL

1,2,3,4, Engine Support Nut and Manifold Screw

Torque the engine/support nuts **no. 1** to 35 N•m (26 lbf•ft).

Torque rubber mounts **no. 2** to support bracket to 29 N•m (21 lbf•ft).

Torque rubber mount/support nuts to 37 N•m (27 lbf•ft).

Torque support brackets/chassis screws **no. 3** to 37 N•m (27 lbf•ft).

Torque manifold screws **no. 4** to:

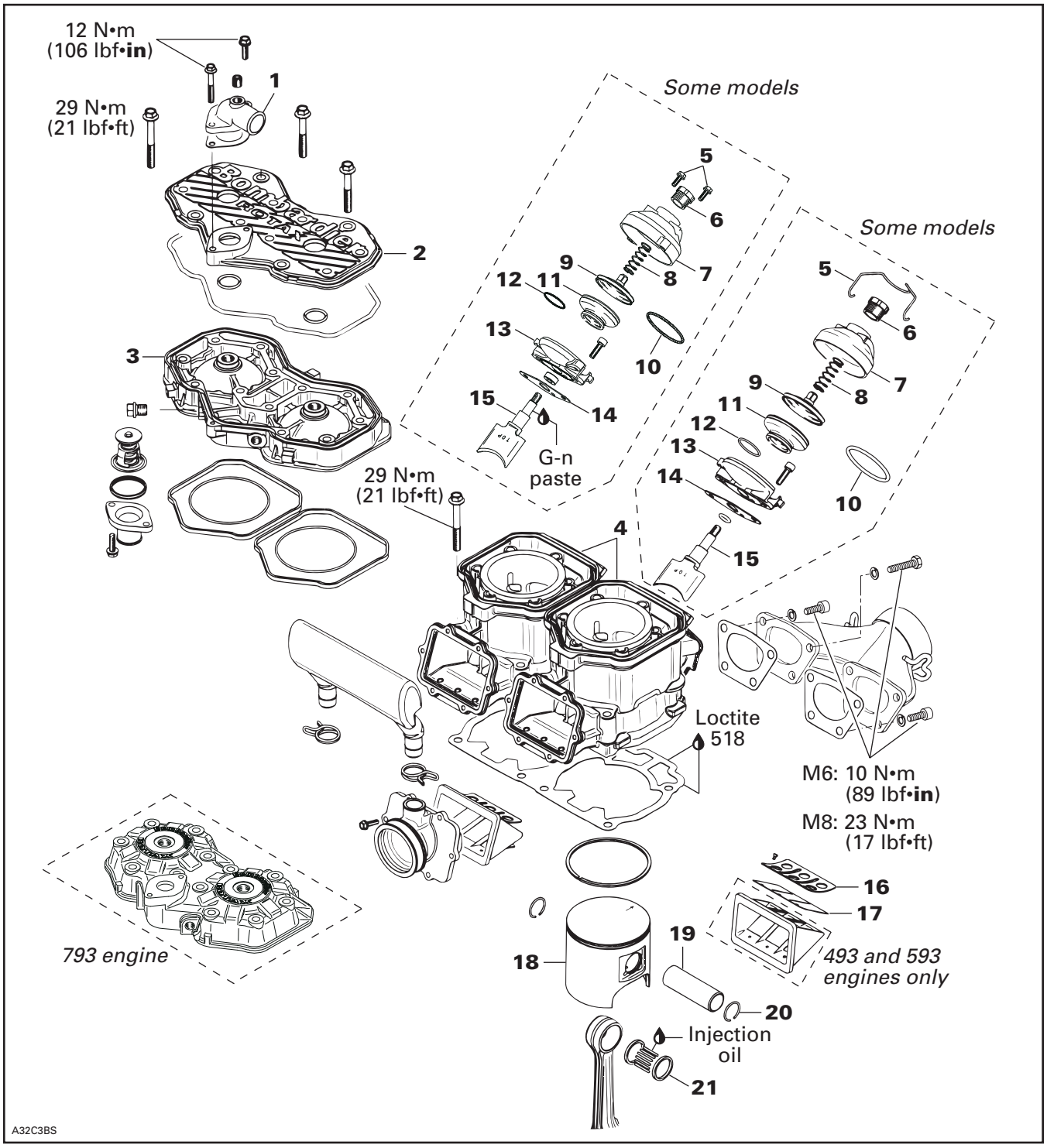
M6 = 10 N•m (89 lbf•**in**)
M8 = 23 N•m (17 lbf•ft)

INSTALLATION ON VEHICLE

To install engine on vehicle, reverse removal procedure. However, pay attention, to all appropriate component/system reinstallation procedures described throughout this *Shop Manual* and to the following:

– After throttle cable installation, check carburetor maximum throttle opening and oil injection pump adjustment.
– Check pulley alignment and drive belt tension.
– Seal exhaust ball joints with Ultra Copper (P/N 413 710 300).

TOP END


12 N•m
(106 lbf•in)
29 N•m
(21 lbf•ft)
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
Some models
Some models
G-n
paste
29 N•m
(21 lbf•ft)
Loctite
518
M6: 10 N•m
(89 lbf•in)
M8: 23 N•m
(17 lbf•ft)
793 engine
493 and 593
engines only
Injection
oil
A32C3BS

COMPONENT REMOVAL

Most engine components can be removed with engine on vehicle such as:

– cylinder head
– piston(s)
– cylinder(s)
– rewind starter
– oil pump
– water pump
– magneto flywheel
– RAVE valve(s)
– reed valve(s).

CLEANING

Discard all gaskets and O-rings.

Clean all metal components in a non-ferrous metal cleaner.

Scrape off carbon formation from cylinder exhaust port cylinder head and piston dome using a wooden spatula.

NOTE: The letters "AUS" (over an arrow on the piston dome) must be visible after cleaning.

Clean the piston ring groove with a groove cleaner tool or with a piece of broken ring.

DISASSEMBLY

RAVE System

NOTE: RAVE stands for Rotax Adjustable Variable Exhaust.

Remove spring clip or screws **no. 5**, cover **no. 7** and spring **no. 8**.

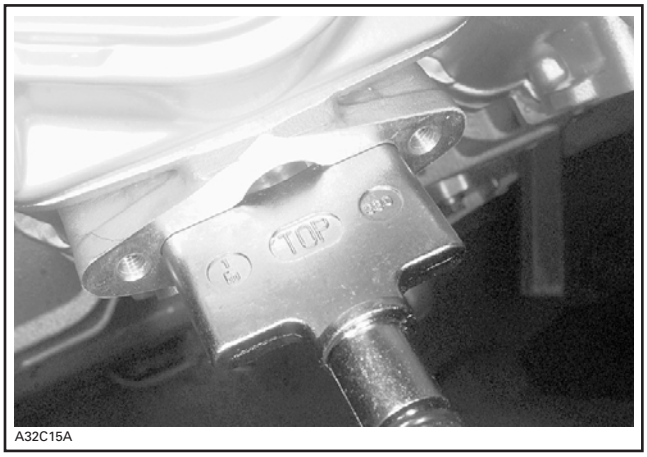
Remove spring **no. 10**.

Unscrew valve piston **no. 9**.

Remove bellows **no. 11** and spring **no. 12**.

Remove cylindrical screws. Remove valve housing **no. 13**.

Pull out exhaust valve **no. 15**.



A32C15A

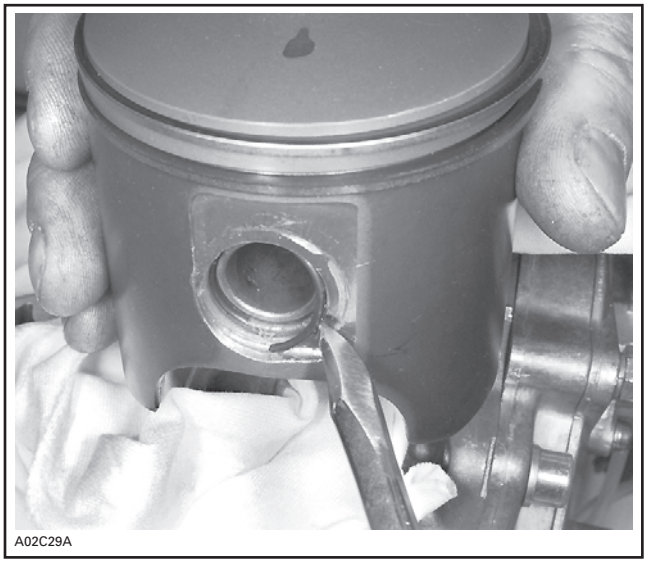
RAVE VALVE PARTIALLY REMOVED

2, Cylinder

Remove spark plugs, coolant outlet **no. 30**. Unscrew cylinder head cover **no. 2** then cylinder head **no. 3**.

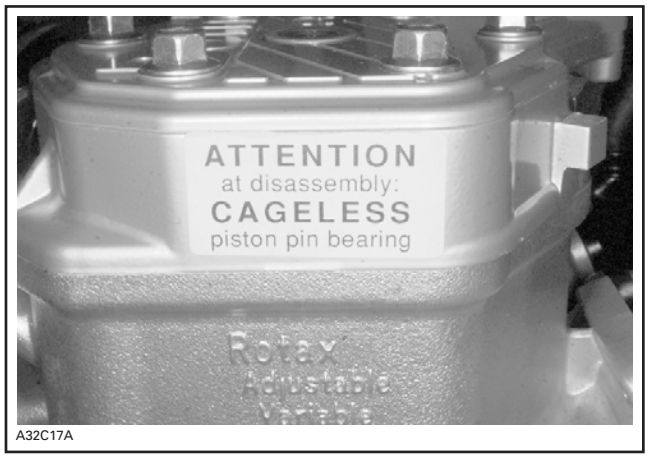
18, Piston

Place a clean cloth or rubber pad (P/N 529 023 400) over crankcase. then with a pointed tool inserted in piston notch, remove both circlips **no. 20** from piston **no. 18**.


A02C29A

TYPICAL

All engines are equipped with cageless piston pin bearings.

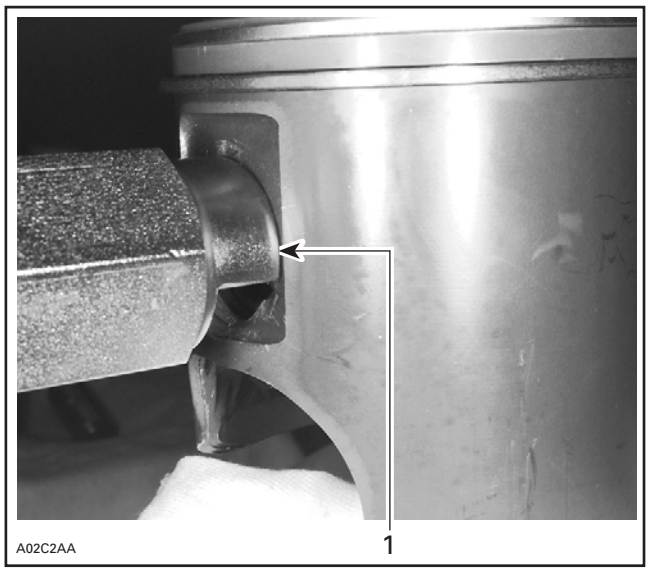


A32C17A

Use piston pin puller (P/N 529 035 503) along with 20 mm sleeve kit (P/N 529 035 542) and locating sleeve.

NOTE: The locating sleeve is the same that contains new cageless bearing.

Insert piston pin puller (P/N 529 035 503) making sure it sits squarely against piston.

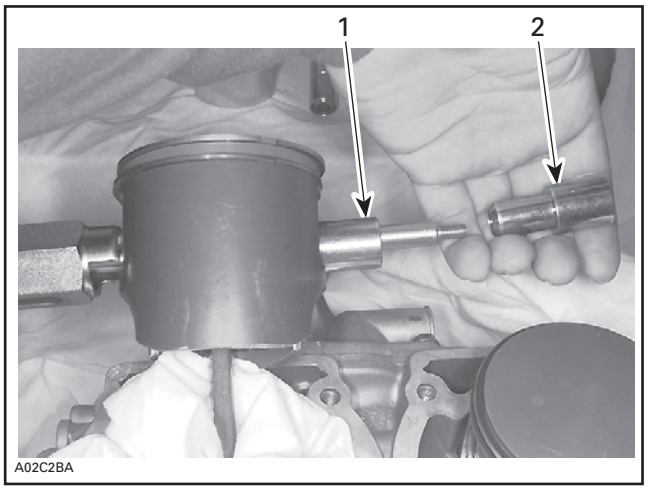


A02C2AA

TYPICAL

1. *Properly seated all around*

Install sleeve then shouldered sleeve over puller rod.



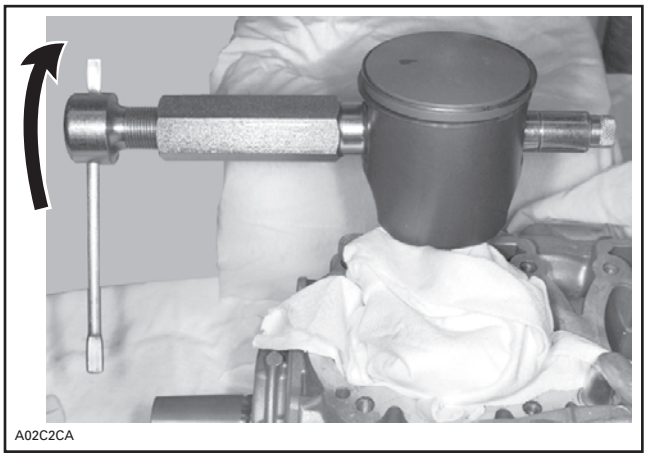
A02C2BA

TYPICAL — INSTALLATION OF SLEEVE KIT

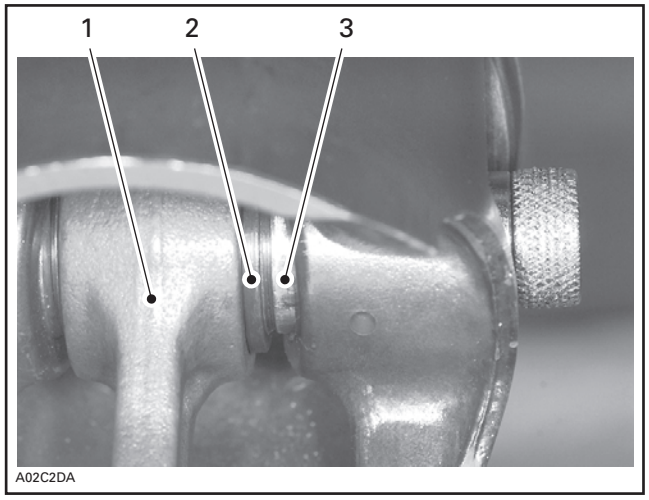
1. *Sleeve*
2. *Shouldered sleeve*

Screw (LH threads) extracting nut.

Pull out piston pin **no. 19** by unscrewing puller until shouldered sleeve end is flush with thrust washer of piston pin bearing.


A02C2CA

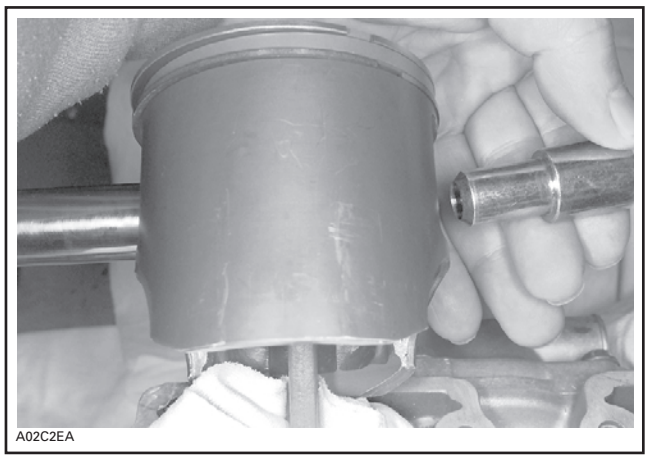
TYPICAL — PISTON PIN EXTRACTION



TYPICAL

1. *Sleeve inside bearing*
2. *Thrust washer*
3. *Shouldered sleeve end*

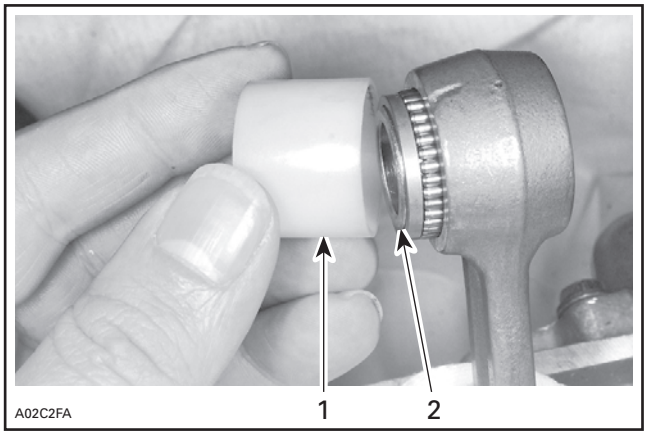
Remove puller. Pull out shouldered sleeve carefully.



TYPICAL

Remove piston from connecting rod.

Install locating sleeve. Then push needle bearings along with thrust washers and sleeve.



TYPICAL

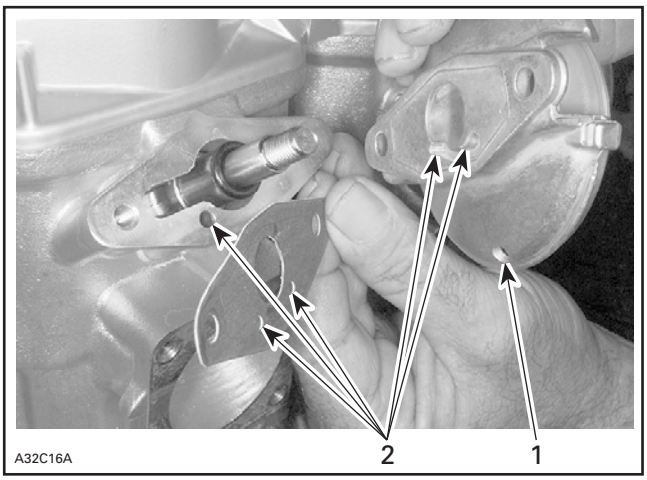
1. *Locating sleeve*
2. *Sleeve*

INSPECTION

NOTE: Refer to LEAK TEST AND ENGINE DIMENSIONS MEASUREMENT.

RAVE System

Check valve rod housing and cylinder for clogged passages.



1. *Draining hole*
2. *Passages*

NOTE: Oil dripping from draining hole indicates a loosen spring or damaged bellows.

11, Bellows

Check for cracked, dried or perforated bellows.

8, Spring

ENGINE TYPE	SPRING P/N	WIRE DIA. mm (in)	FREE LENGTH mm (in)	PRELOAD IN N (LBF) AT COMPRESSED LENGTH OF 14 mm (.551 in)
493	420 239 948	1.0 (.039)	38.0 (1.50)	19.5 (4.37)
593 and 693	420 239 944	0.9 (.035)	48.5 (1.91)	15.9 (3.56)
793 on all Summit	420 239 942	0.8 (.031)	42.5 (1.67)	7.3 (1.64)
793 on all MX Z	420 239 941	0.8 (.031)	52.5 (2.07)	10.5 (2.36)

ASSEMBLY

RAVE System

Install RAVE valve with its mention top as illustrated in the removal photo. Tighten red cap **no. 6** screw to bottom.

4,18, Cylinder and Piston

493 and 593 Engines Only

Be sure to restore the chamfer around all cylinder sleeve port openings.

All Engines

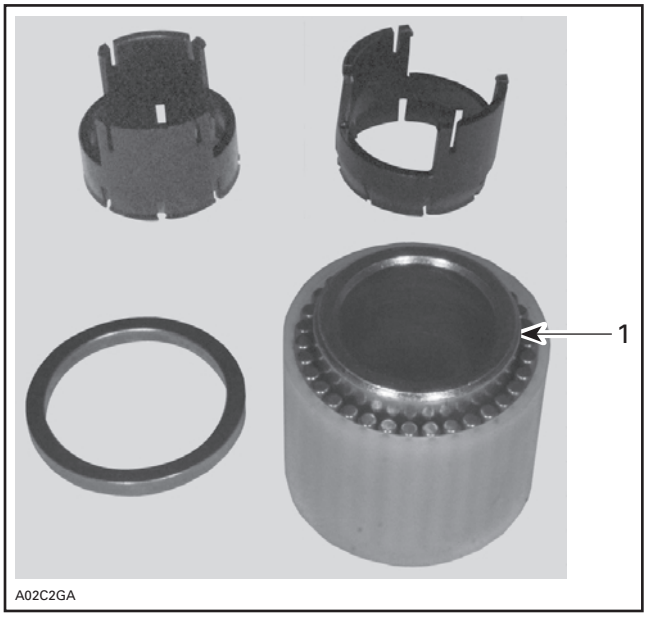
Before inserting piston in cylinder, lubricate the cylinder with new injection oil or equivalent.

2,3,4, Cylinder Head Cover, Cylinder Head and Cylinder

Check flatness of part sealing surfaces. Refer to LEAK TEST AND ENGINE DIMENSION MEASUREMENT and look for **Checking Surface Flatness**.

When installing a new cageless bearing, replace half plastic cages by sleeve.

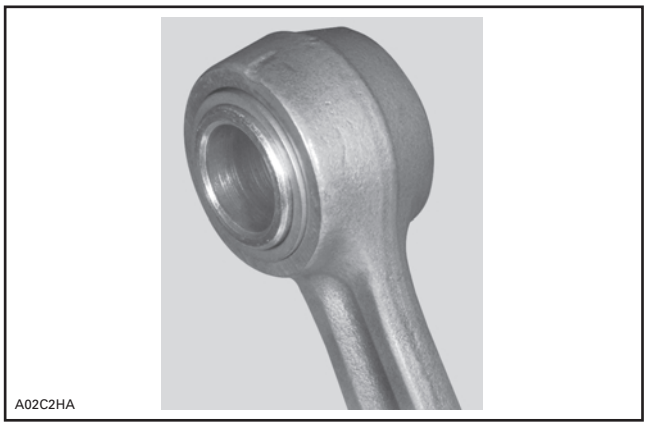
NOTE: 493 engine cageless bearings have 31 needles. 593, 693 and 793 engine cageless bearings have 28 needles.



TYPICAL
1. Sleeve

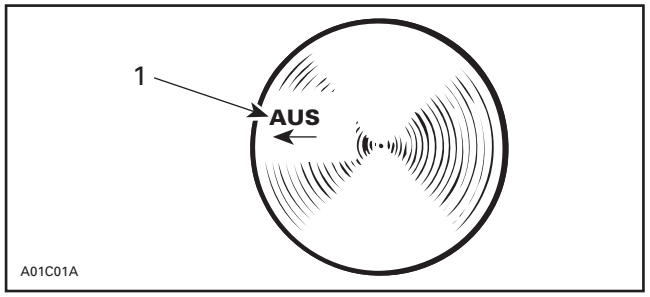
Grease thrust washers and install them on each end of needles.

Insert cageless bearing into connecting rod.



TYPICAL — CAGELESS BEARING AND SLEEVE INSTALLED

At assembly, place the pistons over the connecting rods with the letters **"AUS"** (over an arrow on the piston dome) facing in direction of the exhaust port.

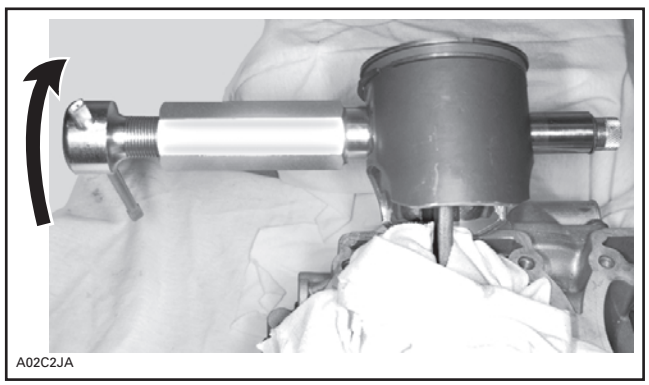


1. Exhaust

Install shouldered sleeve.

TYPICAL — SHOULDERED SLEEVE INSTALLATION

Install piston pin puller and turn handle until piston pin is correctly positioned in piston.



TYPICAL

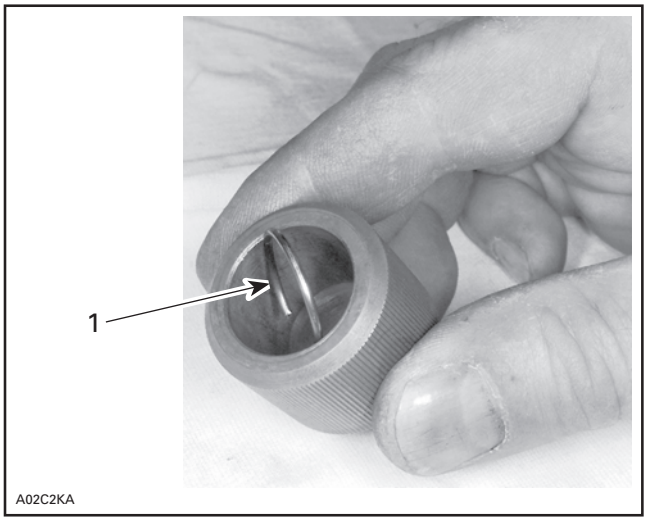
All Models

CAUTION: Always install new circlips.

To minimize the effect of acceleration forces on circlip, install each circlip so the circlip break is at 6 o'clock as illustrated. Use appropriate piston circlip installer.

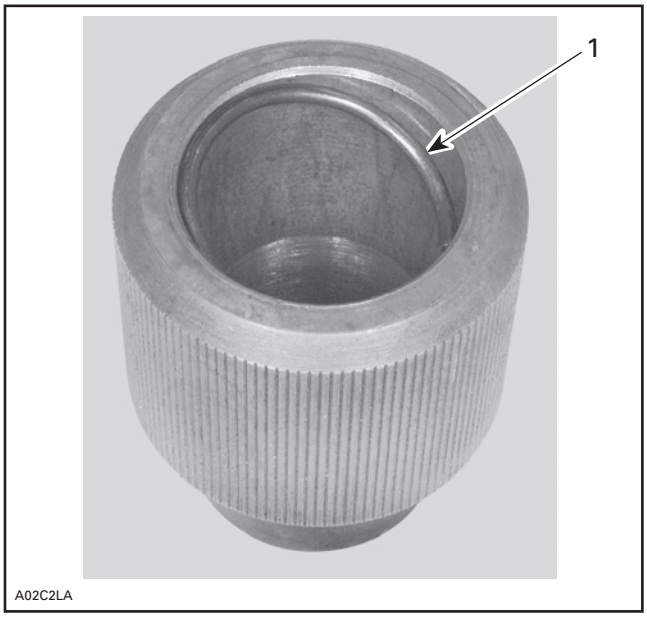
ENGINE TYPE	PISTON CIRCLIP INSTALLER (P/N)
493	529 035 561
593 and 693	529 035 562
793	529 035 563

Insert circlip in tool at an angle.



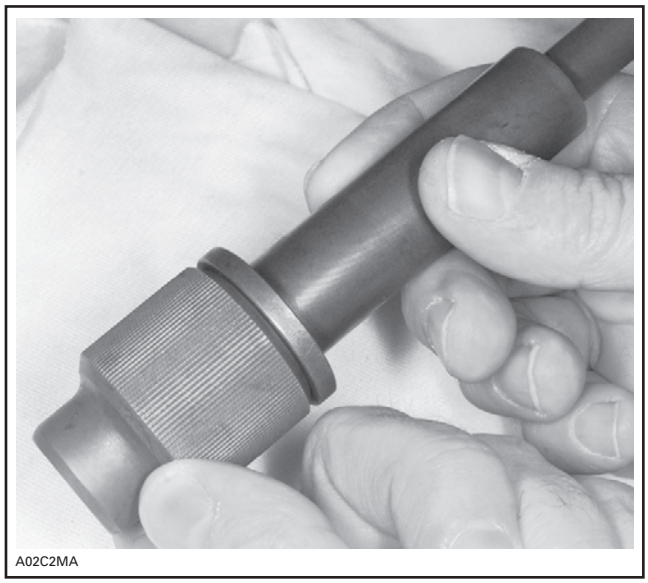
TYPICAL
1. Circlip

Square it up using a finger.



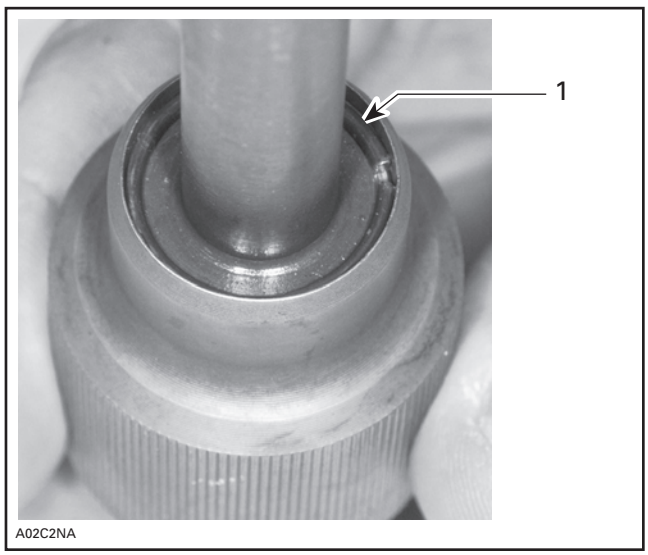
TYPICAL
1. Circlip

Continue to square it up using round end of circlip installer.



TYPICAL

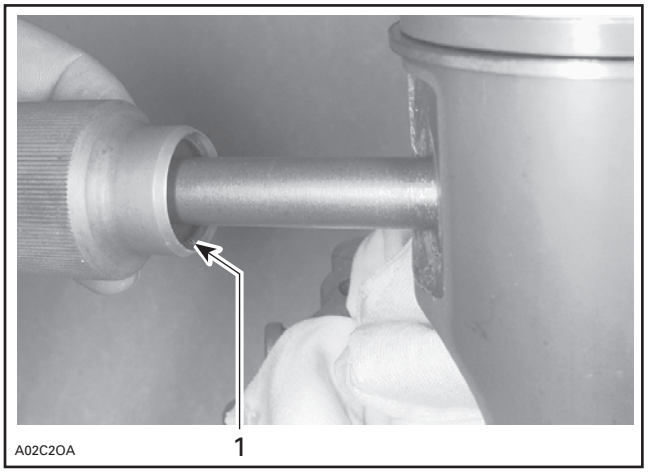
Using square end of tool, push circlip in until it rests in groove.



TYPICAL

1. Circlip in groove

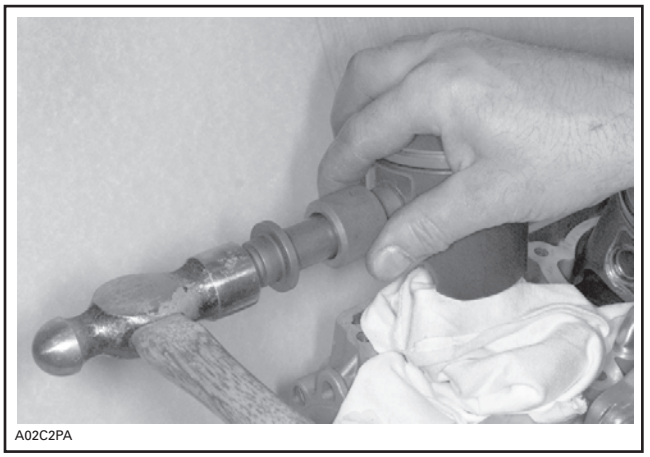
Mount tool in piston making sure that circlip break is facing down.



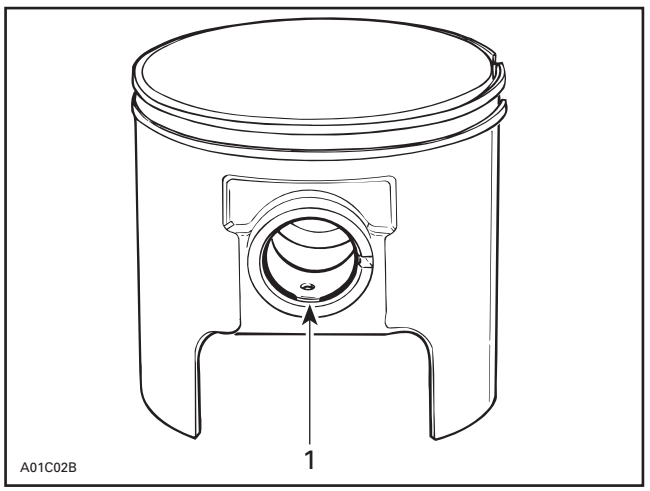
TYPICAL

1. Circlip break facing down

Hold tool firmly against piston then strike on round end of tool. Circlip will move from tool groove to piston groove.



TYPICAL



TYPICAL

1. Circlip break

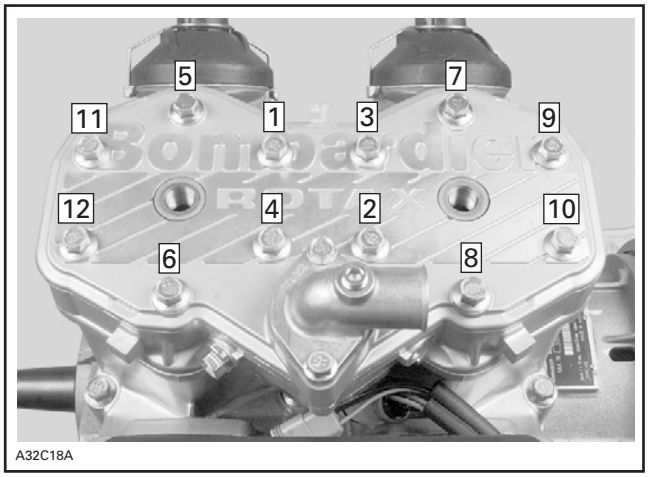
CAUTION: Circlips must not move freely after installation; if so, replace them.

Coat both sides of a new cylinder gasket with Loctite 518 then, install it on crankcase.

Loosely install cylinders.

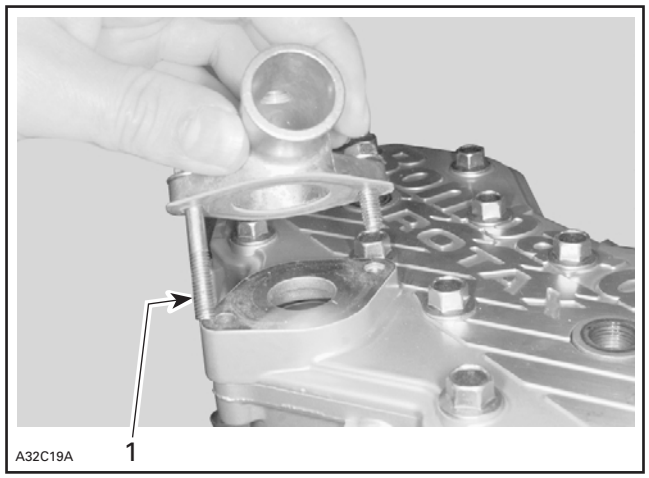
Install exhaust manifold then, tighten cylinder retaining screws to 29 N•m (21 lbf•ft) in a criss-cross sequence.

At assembly, torque cylinder head screws to 29 N•m (21 lbf•ft) in the following illustrated sequence.



TYPICAL

Install outlet socket and tighten screws to 12 N•m (106 lbf•**in**). Note position of longer screw.



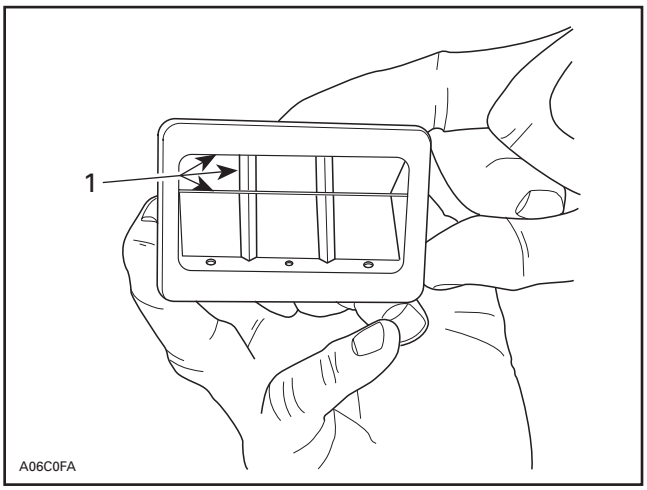
1. Longer screw

17, Reed Valve

Blades have a curved shape. Install with their curve facing reed block.

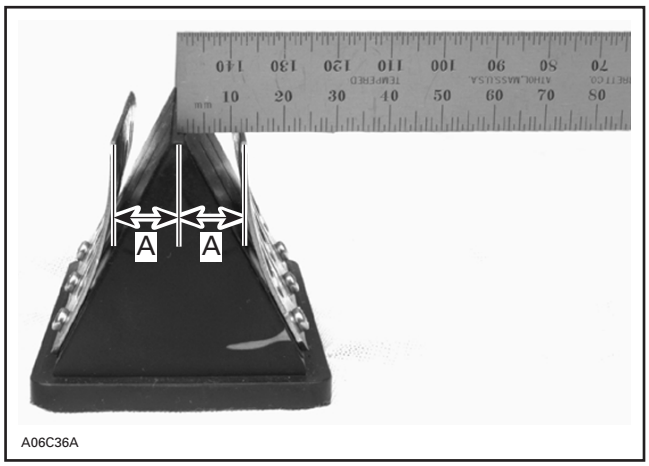
With blade stopper **no. 16** removed, check reed valve for proper tightness. There must be no play between blade and valve body when exerting a finger pressure on blade at blade stopper location.

In case of a play, turn blade upside down and recheck. If there is still a play, replace blade and/or valve body.



1. No play

Check distance from blade stopper outer edge and distance from center of reed valve block.

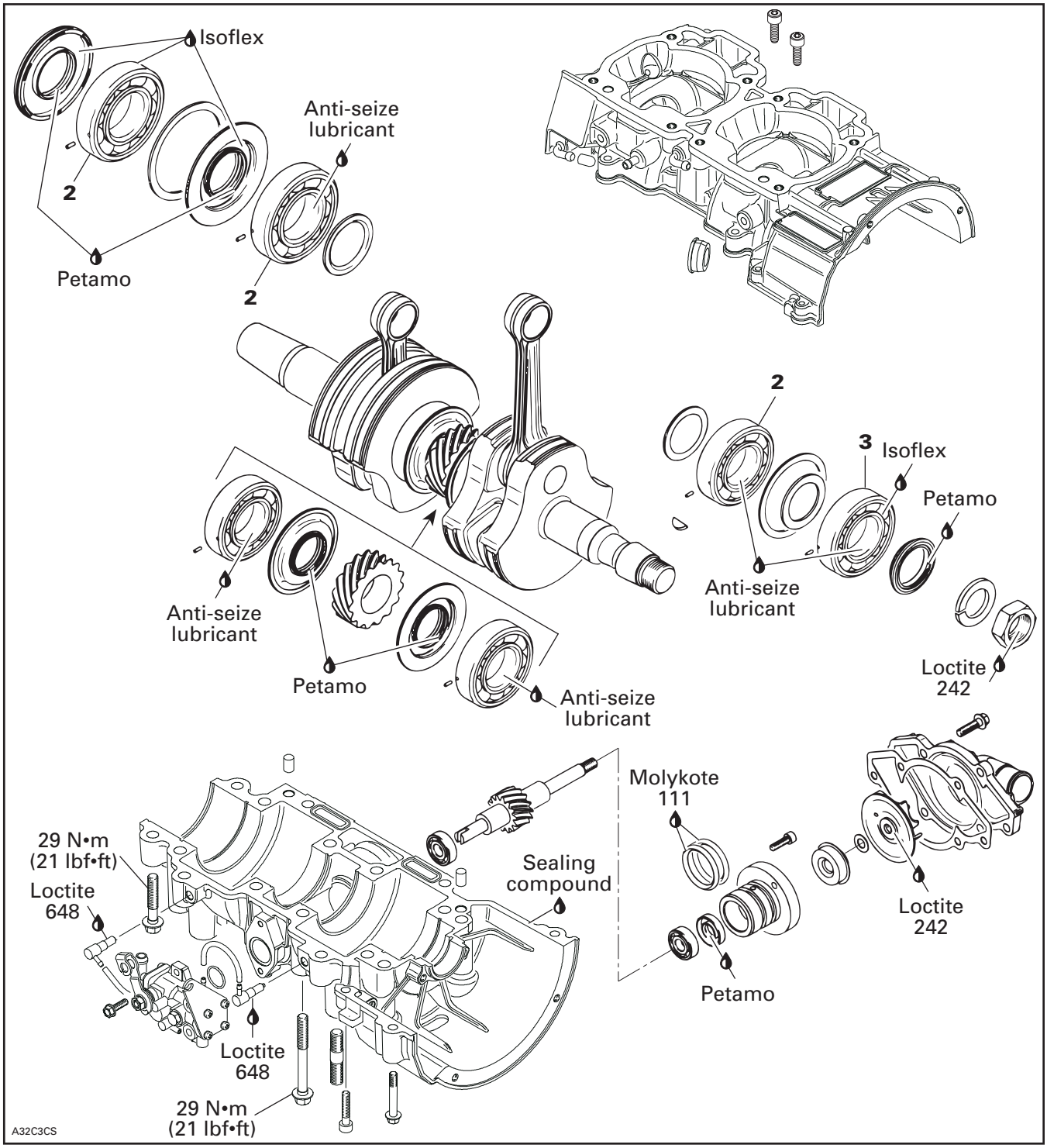


TYPICAL
A. 17.0 - 0, + 0.75 mm (.669 - 0, + .030 in)

Bent blade stopper as required to obtain the proper distance.

Blade stoppers may slightly interfere with cylinder during installation. Adjusted distance will be reduced automatically upon installation.

BOTTOM END


Isoflex
Anti-seize lubricant
2
Petamo
2
2
3
Isoflex
Petamo
Anti-seize lubricant
Anti-seize lubricant
Petamo
Anti-seize lubricant
Loctite 242
29 N•m (21 lbf•ft)
Loctite 648
Sealing compound
Molykote 111
Loctite 242
Petamo
Loctite 648
29 N•m (21 lbf•ft)
A32C3CS

NOTE: Engine must be removed from chassis to perform the following procedures.

CLEANING

Discard all oil seals, gaskets, O-rings and sealing rings.

Clean all metal components in a non-ferrous metal cleaner. Use Gasket remover (P/N 413 708 500) accordingly.

Remove old paste gasket from crankcase mating surfaces with Gasket remover (P/N 413 708 500).

CAUTION: Never use a sharp object to scrape away old sealant as score marks incurred are detrimental to crankcase sealing.

DISASSEMBLY

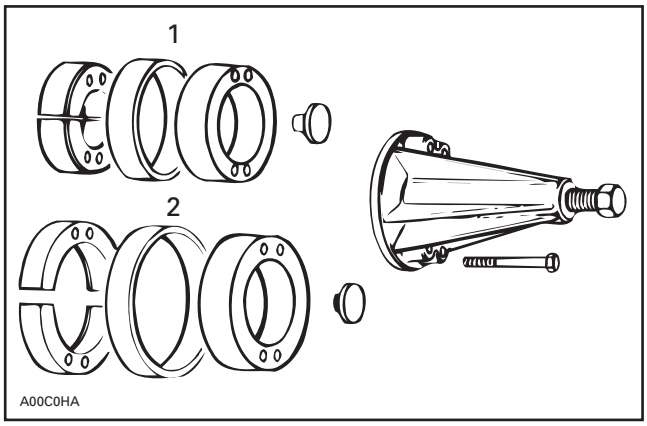
General

To remove drive pulley, refer to DRIVE PULLEY.

To remove magneto, refer to CDI SYSTEM.

2,3, Crankshaft Bearing

To remove bearings from crankshaft, use a protective cap and special puller, as illustrated.



1. PTO side
2. MAG side

INSPECTION

NOTE: Refer to LEAK TEST AND ENGINE DIMENSIONS MEASUREMENT.

ASSEMBLY

Coat lip of all seals with Petamo grease (P/N 420 899 271).

2, Crankshaft Bearing

Smear anti-seize lubricant (P/N 413 701 000) on part of crankshaft where bearing fits.

Prior to installation, place bearings into an oil container filled with injection oil previously heated to 75°C (167°F). This will expand bearing and ease installation.

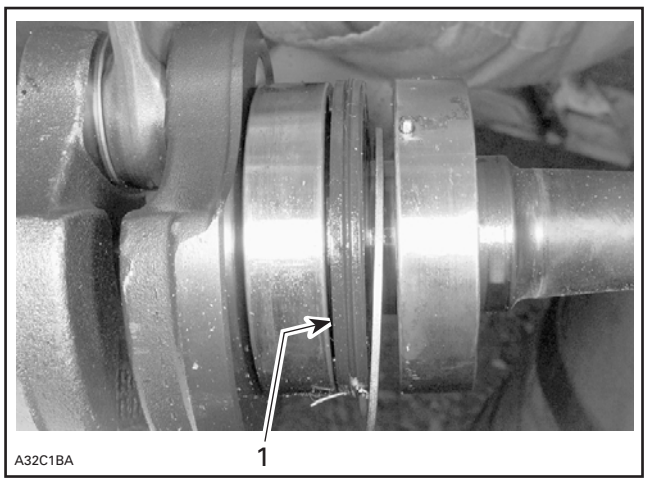
Some bearings must be lubricated with Isoflex grease (P/N 293 550 021).

CAUTION: Use only the recommended Isoflex grease. Make sure not to push Isoflex grease between outside bearing race and half crankcase.

NOTE: The 50 g tube corresponds to 50 cc of grease.

Put 45 to 50 mL of grease in a syringe.

Fill PTO side inner seal with Isoflex grease (about 10 mL).

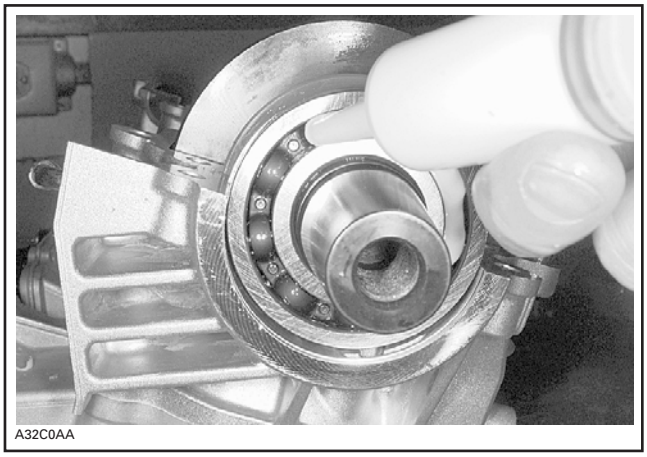


TYPICAL

1. PTO side inner seal filled with Isoflex grease

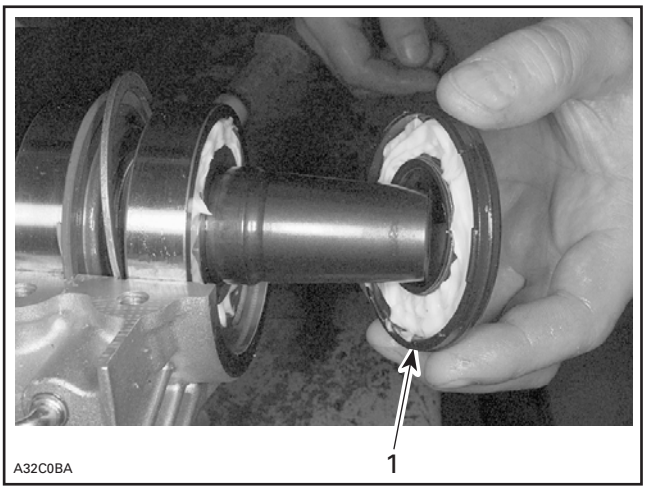
Put 35 to 40 mL of grease in a syringe.

With the syringe, fill the outer ball bearing with grease.


A32C0AA

BALLS COATED WITH A SEAM OF GREASE

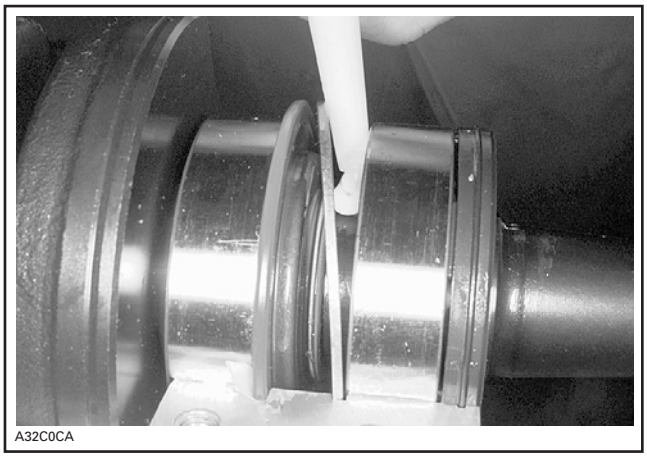
Coat inner side of outer seal (about 35 mL for 493 and 593 engine types and 40 mL for 693 and 793 engine types) and set it in place.



A32C0BA

1. Fill with grease and set in place

Use the remaining grease to coat the inner side of the ball bearing.

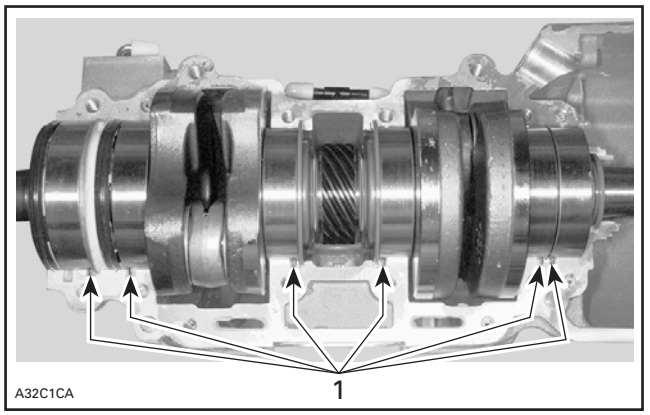

A32C0CA

693 and 793 Engines

Apply 6 mL of grease to MAG side outer bearing.

All Engines

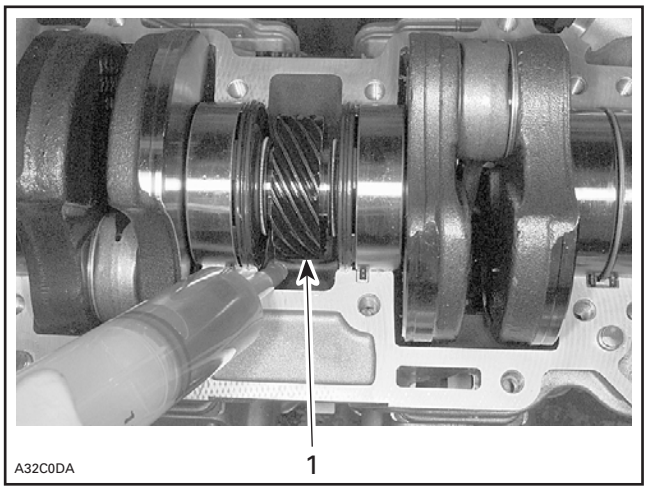
At crankshaft installation, position drive pins as illustrated.



A32C1CA

1. Position pins

Drop 50 mL (2 U.S. oz) of injection oil in the pan under central gear to lubricate pump gearing as per photo.



A32C0DA

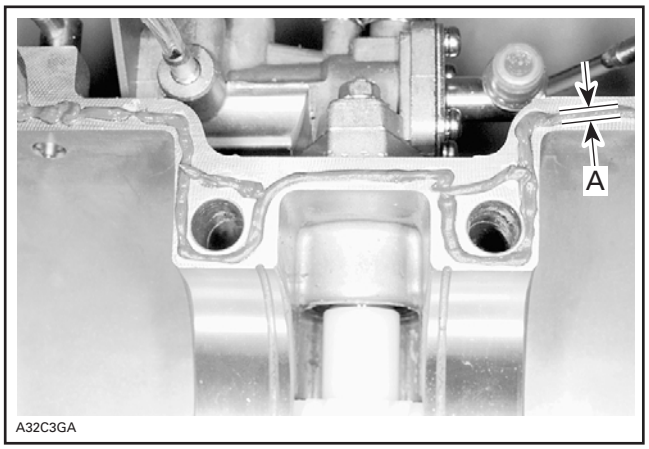
1. Oil bath

Crankcase Assembly

IMPORTANT: The total assembly sequence, including sealing compound spreading, screwing and torquing of bolts according to the proper sequence must be performed within 10 minutes. Do not wait between each bolt torquing. All bolts must be torqued in a row.

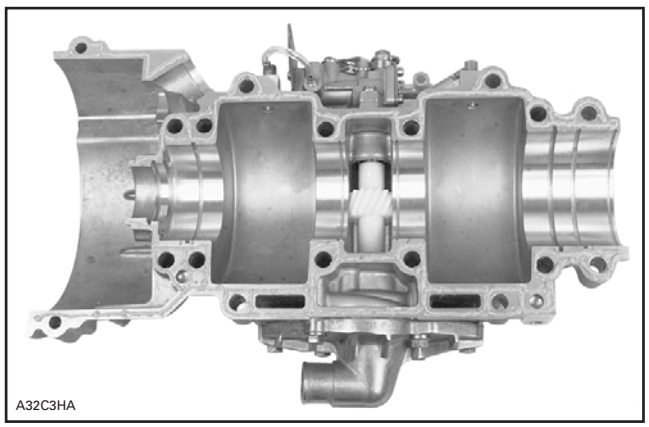
Before screwing both parts of crankcase, seal it with sealing compound (P/N 420 297 905). Make sure surfaces are clean and degreased before applying sealing compound.

Spread a seam of 2 to 3 mm (1/16 to 1/8 in) maximum in diameter on surface of lower crankcase half.



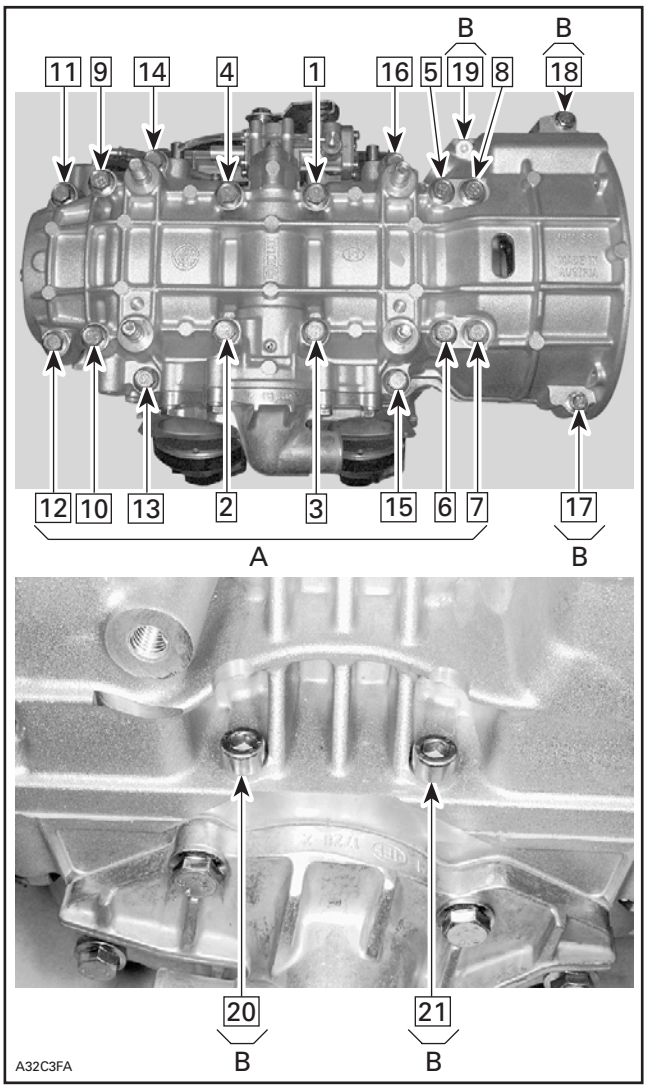
A. 2 to 3 mm (1/16 to 1/8 in) max.

As far as possible, sealing compound must be applied in one run to avoid any risks of leaking through the crankcase.



SEAMING COMPLETED — CONTACT SURFACES COVERED AND SCREW HOLES SURROUNDED

Screw all crankcase bolts in place in the following sequence and to the appropriate torque through a two steps torquing: first, screw bolts up to 60% of the final torque (18 N•m (13.5 lbf•ft) for most of the bolts), then, tighten to the required torque (i.e. 29 N•m (21 lbf•ft)).



A. Torque bolts 1 through 16 to 29 N•m (21 lbf•ft)
*B. Torque bolts 17 through 21 to 9 N•m (80 lbf•**in**)*

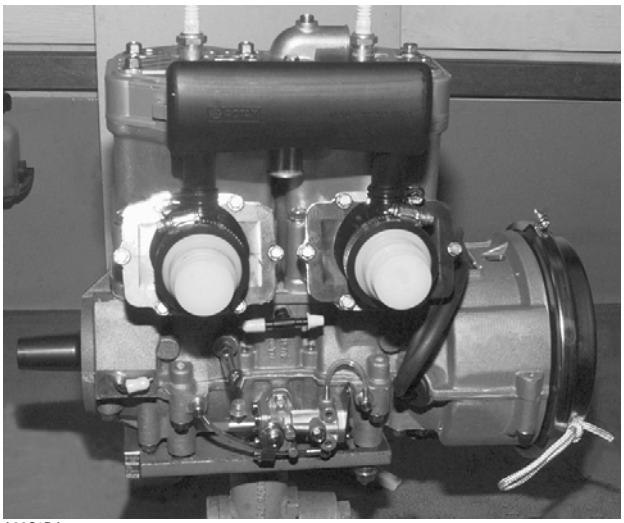
LEAK TEST AND ENGINE DIMENSION MEASUREMENT

LEAK TEST

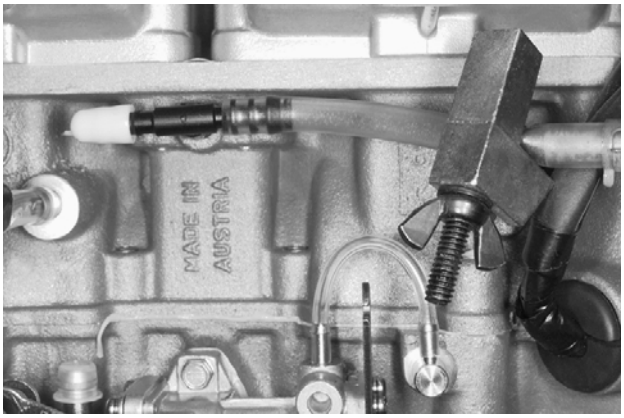
The following gives verification procedures for 2-cylinder reed valve liquid cooled engines.

PREPARATION

1. Remove tuned pipe.
2. Install plug over exhaust manifold.
3. Remove carburetors.
4. Insert plugs in intake rubber boots. Tighten with clamps already there.


A32C1DA

5. Using a hose pincher (P/N 295 000 076), block impulse hose.
6. Using hose pinchers (P/N 295 000 076), block pump shaft oil hose and lubrication nipple on PTO side.

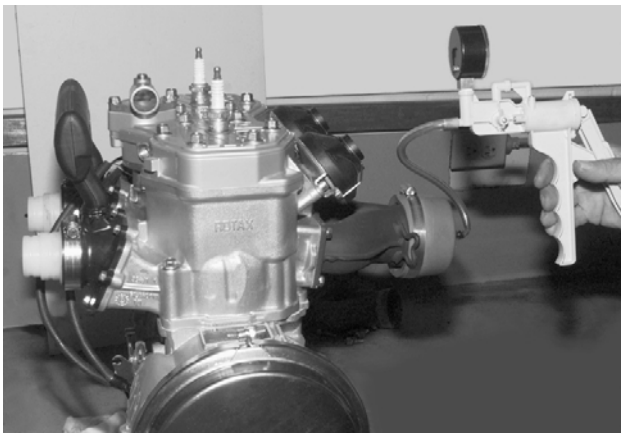


A32C1EA

7. Install air pump on exhaust plug.

NOTE: If necessary, lubricate air pump piston with mild soap.

CAUTION: Using hydrocarbon lubricant (such as engine oil) will damage rubber seal of pump piston.



A32C1FA

8. Activate pump and pressurize engine to 34 kPa (5 PSI). Do not exceed this pressure.
9. Engine must stand this pressure during 3 minutes. If pressure drops before 3 minutes, check tester kit by spraying a soapy solution on pump cylinder, all plugs and fittings.
   – If tester kit is leaking, bubbles will indicate where leak comes from.
   – If tester kit is not leaking, check engine as per following procedure.

PROCEDURE

NOTE: A flow chart has been prepared as a visual reference. See last page of this chapter.

Using flow chart and following text, pressurize area to be tested and spray soapy solution at the indicated location.

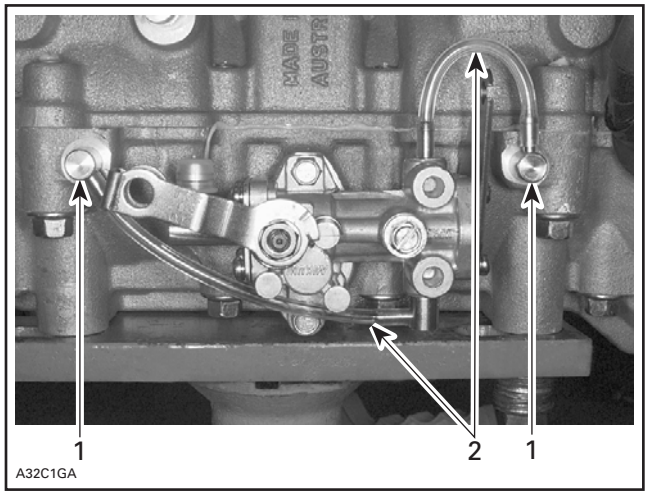
TEST PRESSURE: 34 kPa (5 PSI) for 3 minutes

– If there is a leak at the tested location, it is recommended to continue testing next items before overhauling engine. There is a possibility of more than one leak.
– If there is no leak at the tested location, continue pumping to maintain pressure and continue with next items until leak is found.

Engine

Check the following:

1. All jointed surfaces and screw/stud threads of engine:
   – spark plug base, insulator
   – cylinder head
   – RAVE valve bellows, piston and housing
   – cylinder
   – crankcase halves (joint)
   – oil injection pump mounting flange (O-ring, seal)
   – coolant pump housing
   – bleed screws/plugs.
2. Small injection oil lines coming from pump.



1. Injection nipples
2. Small injection oil lines

Check for air bubbles or oil column going toward pump. It indicates defective check valve in injection nipples.

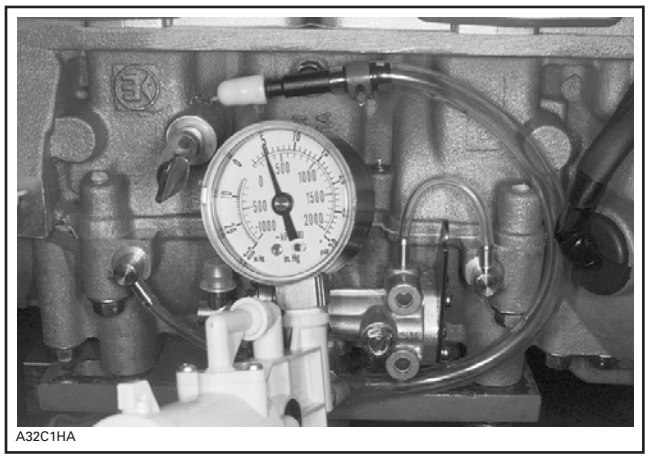
3. Remove cooling system cap.

Check for air bubbles in antifreeze. It indicates defective cylinder head O-ring or cylinder base gasket.

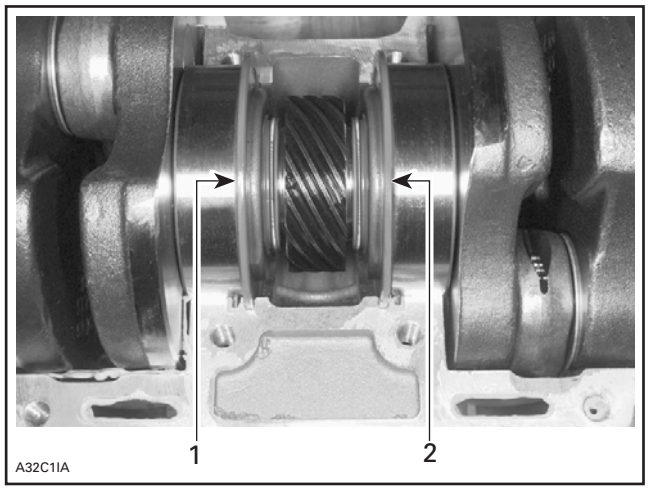
4. Remove drive pulley then check crankshaft outer seal.
5. Remove rewind starter and magneto system then check crankshaft outer seal.
6. Check pump shaft gear oil reservoir.

Pump Shaft Oil Gear Reservoir

Install air pump on adapter and pressurize as before.



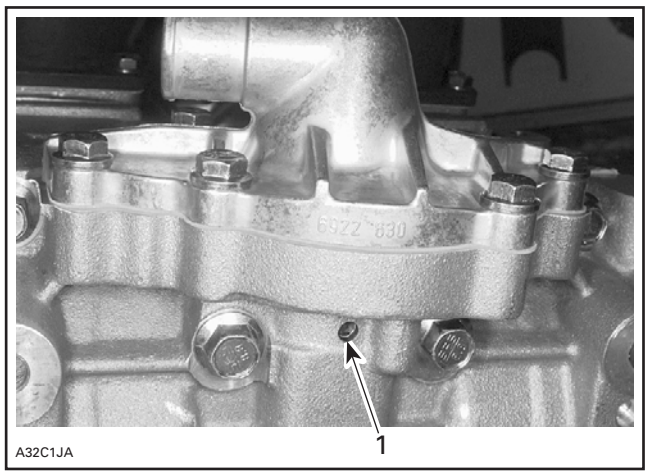
If pressure drops, it indicates a defective crankshaft inner seal.



CRANKSHAFT INSTALLED IN UPPER HALF CRANKCASE

1. *Crankshaft inner seal on PTO side*
2. *Crankshaft inner seal on MAG side*

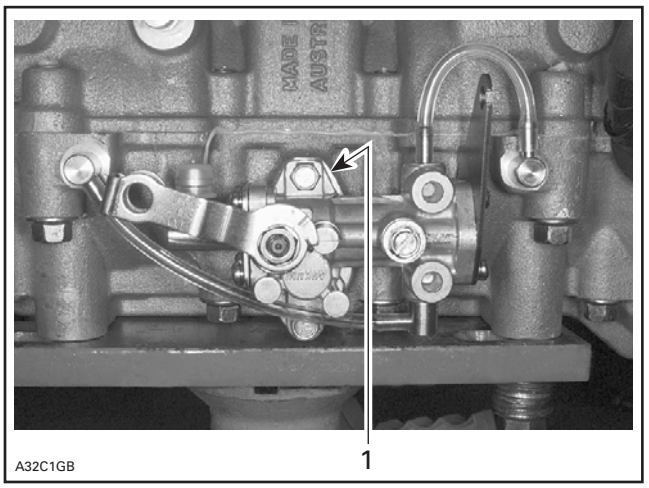
1. Check drain hole below coolant pump housing with soapy water.



1. *Drain hole*

If there is a leak, it indicates defective seal of pump shaft (oil seal beside coolant ceramic seal).

2. Leaks can be also on oil pump side. Check mounting area for leaks.



1. *Check mounting area*

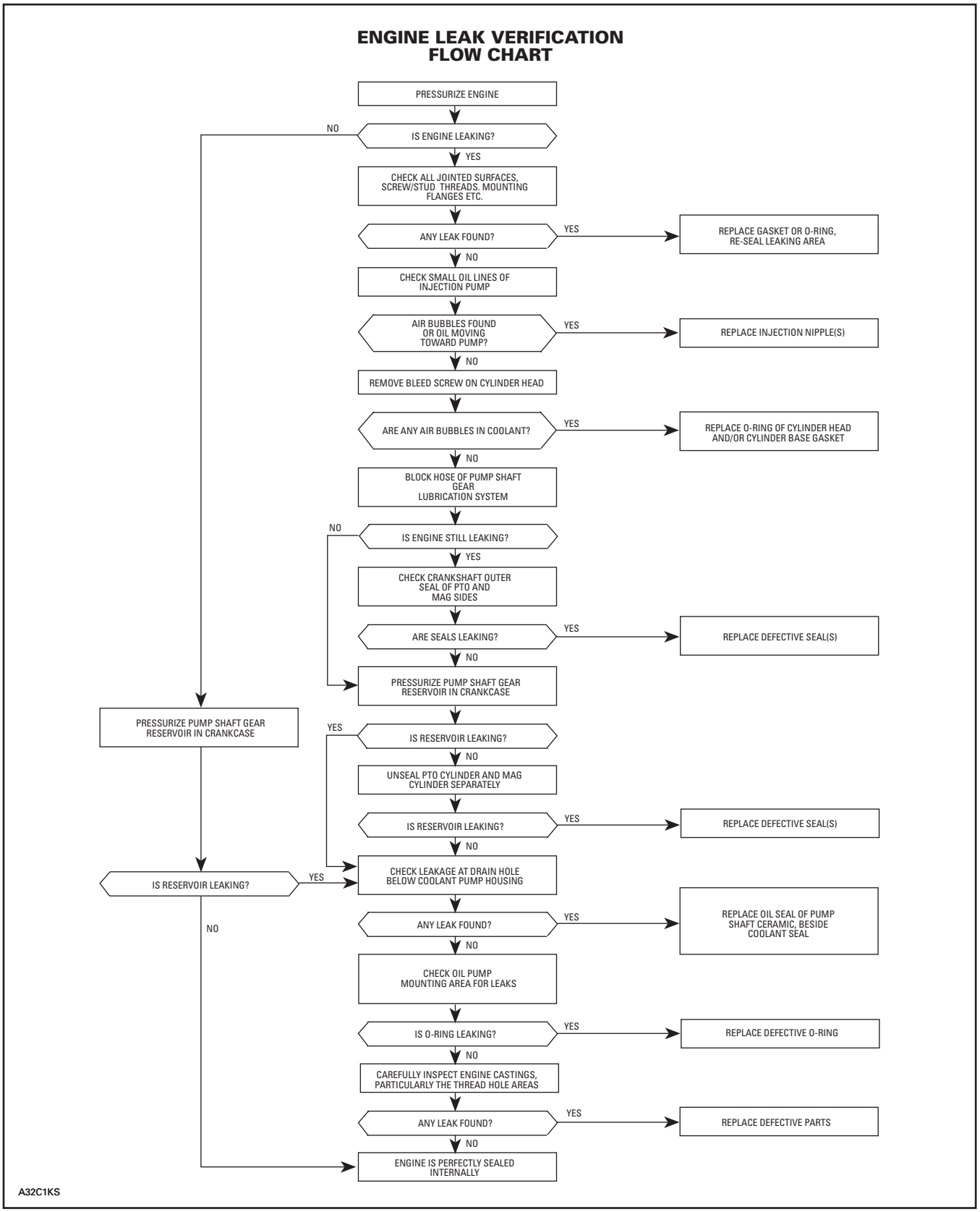
3. If leak still persists, it indicates a defective casting somewhere in engine.

   Disassemble engine and carefully check for defects in castings. Pay attention to tapped holes which may go through engine sealed area and thus lead to leakage.

FINALIZING REASSEMBLY

After reassembling engine, always recheck for leakage.

ENGINE LEAK VERIFICATION FLOW CHART



ENGINE DIMENSION MEASUREMENT

This section covers all engine types.

CYLINDER HEAD WARPAGE

ENGINE TYPE	MAXIMUM
All	0.05 mm (.002 in) per 50 mm (2 in) of surface
	0.5 mm (.020 in) for total length of cylinder head

Check gasketed surface of the cylinder head with a straightedge and a feeler gauge.

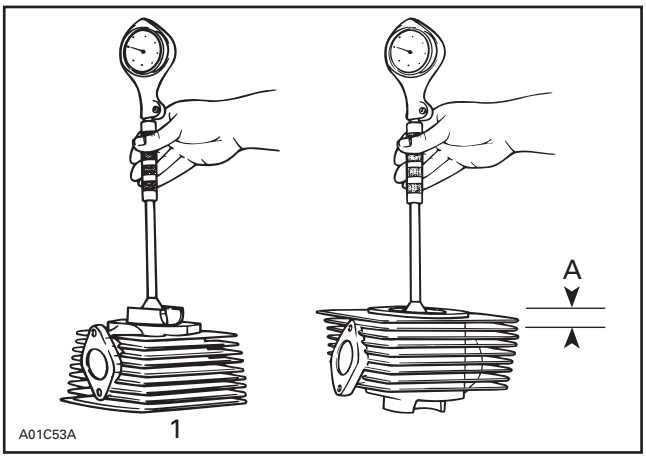
CYLINDER TAPER

ENGINE TYPE	MAXIMUM
All	0.10 mm (.004 in)

Compare cylinder diameter 16 mm (5/8 in) from top of cylinder to just below its intake port area.

If the difference exceeds the specified dimension the cylinder should be rebored and honed or should be replaced. Nikasil cylinder can be honed using diamond hone and can not be rebored.

NOTE: Be sure to restore the chamfer around all cylinder sleeve port openings.



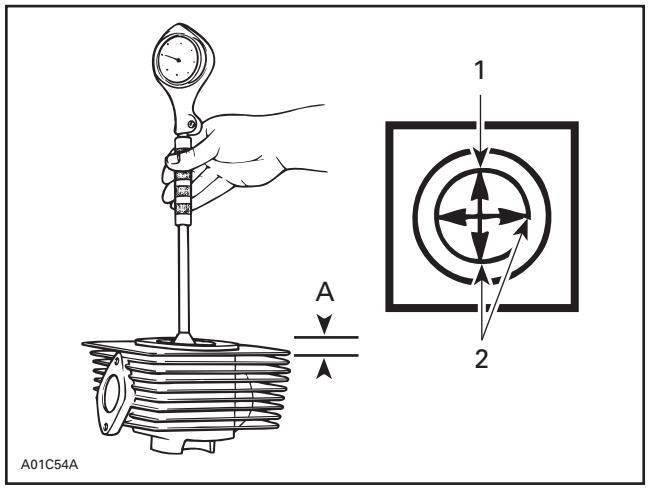
1. Below the intake port
A. 16 mm (5/8 in) from top

CYLINDER OUT OF ROUND

ENGINE TYPE	MAXIMUM
All	0.08 mm (.003 in)

Measuring 16 mm (5/8 in) from top of cylinder with a cylinder gauge, check if the cylinder out of round is more than the specified dimension. If larger, cylinder should be rebored and honed or should be replaced. Nikasil cylinder can be honed using diamond hone and can not be rebored.

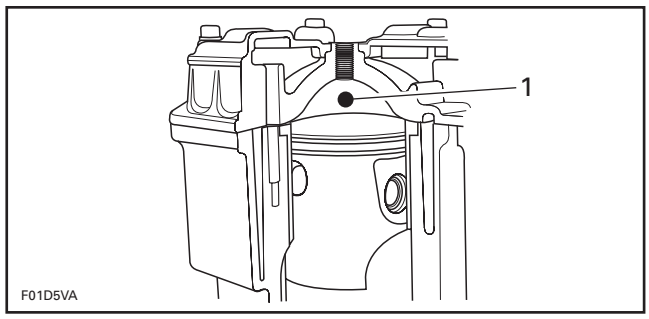
NOTE: Be sure to restore the chamfer around all cylinder sleeve port openings.



1. Piston pin position
2. Measures to be compared
A. 16 mm (5/8 in)

COMBUSTION CHAMBER VOLUME MEASUREMENT

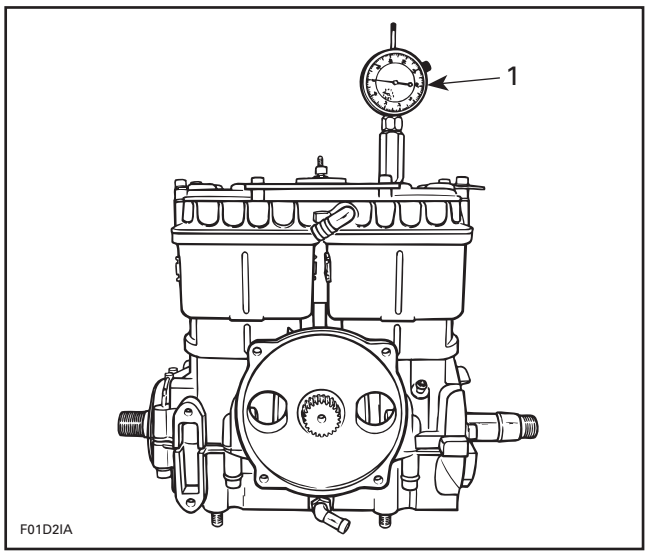
The combustion chamber volume is the region in the cylinder head above the piston at Top Dead Center. It is measured with the cylinder head installed on the engine.



1. Combustion chamber

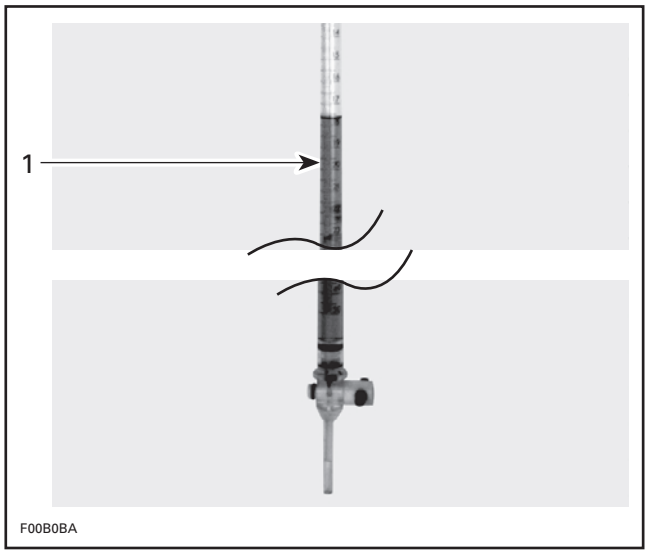
NOTE: When checking the combustion chamber volume, engine must be cold, piston must be free of carbon deposit and cylinder head must be leveled.

1. Remove both spark plugs and bring one piston to Top Dead Center a using a TDC gauge.



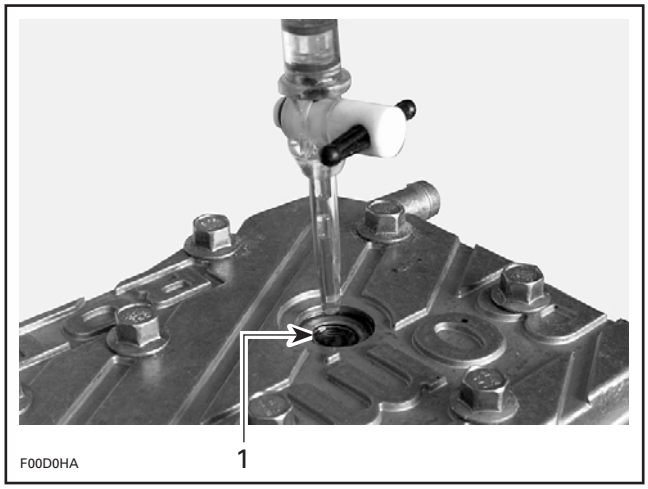
1. Bring piston to TDC

2. Obtain a graduated burette (capacity 0 - 50 cc) and fill with an equal part (50/50) of gasoline and injection oil.



1. Graduated burette (0-50 cc)

3. Open burette valve to fill its tip. Add liquid in burette until level reaches 0 cc.
4. Inject the burette content through the spark plug hole until liquid touches the top spark plug hole.



1. Top of spark plug hole

NOTE: The liquid level in cylinder must not drop for a few seconds after filling. If so, there is a leak between piston and cylinder. The recorded volume would be false.

5. Let burette stand upward for about 10 minutes, until liquid level is stabilized.
6. Read the burette scale to obtain the quantity of liquid injected in the combustion chamber.

NOTE: When the combustion chamber is filled to top of spark plug hole, it includes an amount of 2.25 cc corresponding to the spark plug well.

7. Repeat the procedure for the other cylinder.

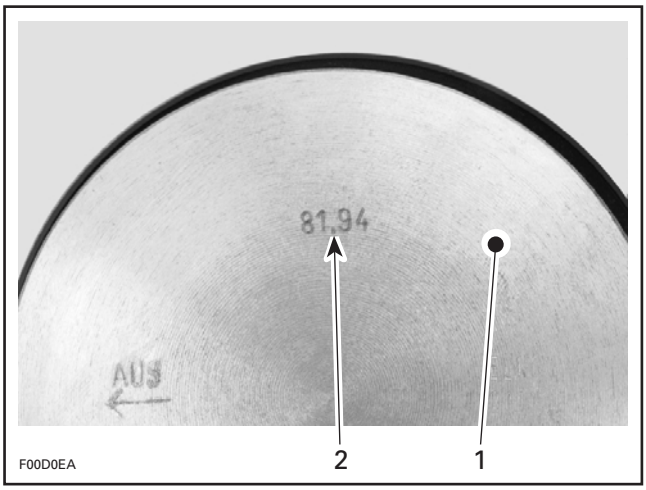
ENGINE TYPE	COMBUSTION CHAMBER VOLUME (CC) (up to top thread of spark plug hole)
493	24.88 ± 1.00
593	28.86 + 1.30 - 1.20
693	33.90 + 1.51 - 1.38
793	36.34 + 1.73 - 1.58

8. Install a thicker or thinner cylinder/crankcase gasket (refer to *Parts Catalogs*) in order to obtain the specified combustion chamber volume or the nearest.

ENGINE TYPE	CHANGE IN COMBUSTION CHAMBER VOLUME (CC) FOR EVERY 0.1 mm (.004 in) OF GASKET THICKNESS
493	0.38
593	0.45
693	0.48
793	0.53

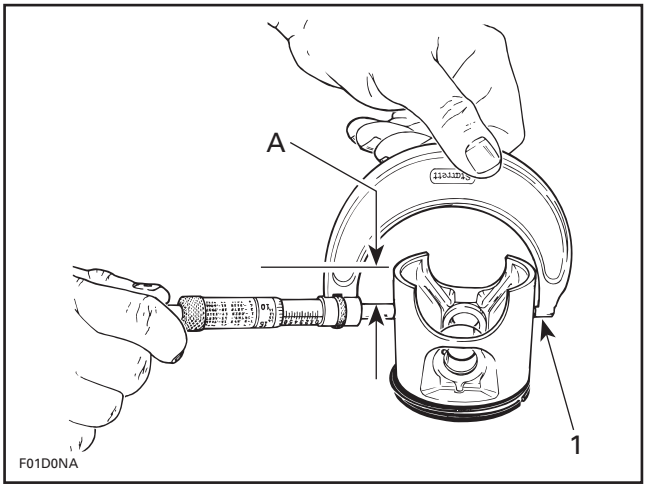
USED PISTON MEASUREMENT

Note the measurement on the piston dome.



1. Piston dome
2. Piston measurement

Using a micrometer, measure piston skirt at 15 mm (.590 in) perpendicularly (90°) to piston pin.



1. Measuring perpendicularly (90°) to piston pin axis
A. 15 mm (.590 in)

ENGINE TYPE	MAXIMUM PISTON SKIRT WEAR mm (in)
All	0.15 (.006)

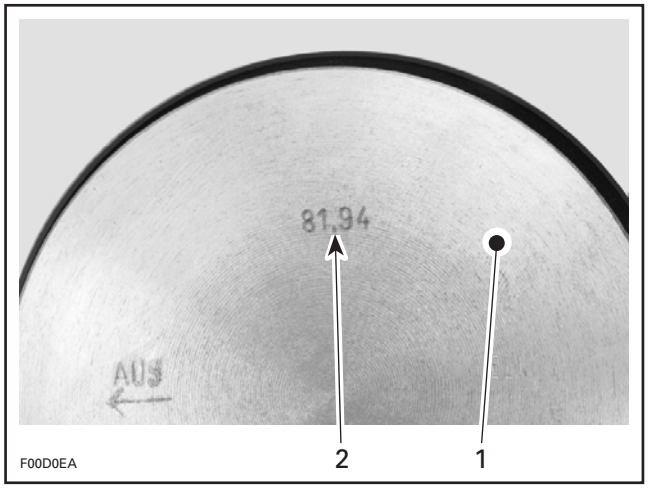
The measured dimension must not be less than 0.15 mm (.006 in) of the one scribed on piston dome. Otherwise, install a new piston.

CYLINDER/PISTON CLEARANCE

Used and New Pistons

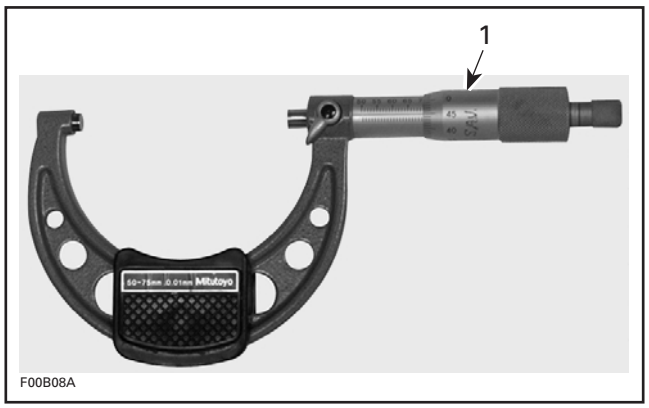
IMPORTANT: Make sure used piston is not worn more than specified. See USED PISTON MEASUREMENT above.

Take the measurement on the piston dome.



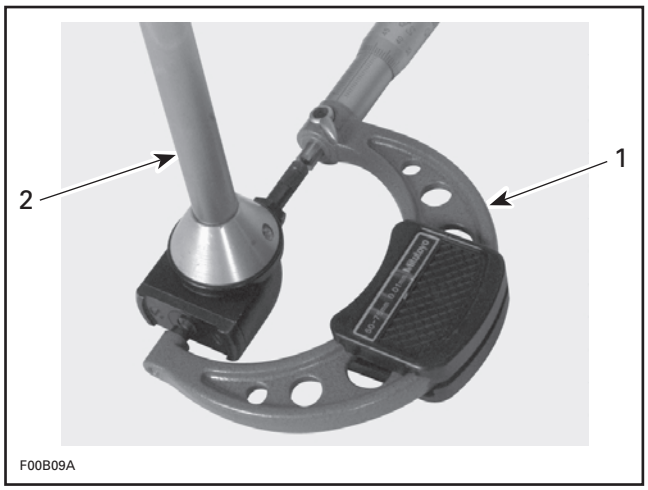
1. Piston dome
2. Piston measurement

Adjust and lock a micrometer to the specified value on the piston dome.

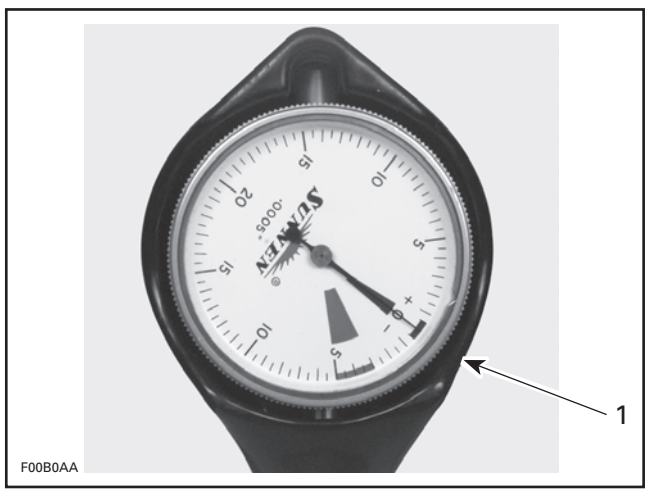


1. Micrometer set to the piston dimension

With the micrometer set to the piston dimension, adjust a cylinder bore gauge to the micrometer dimension and set the indicator to 0.



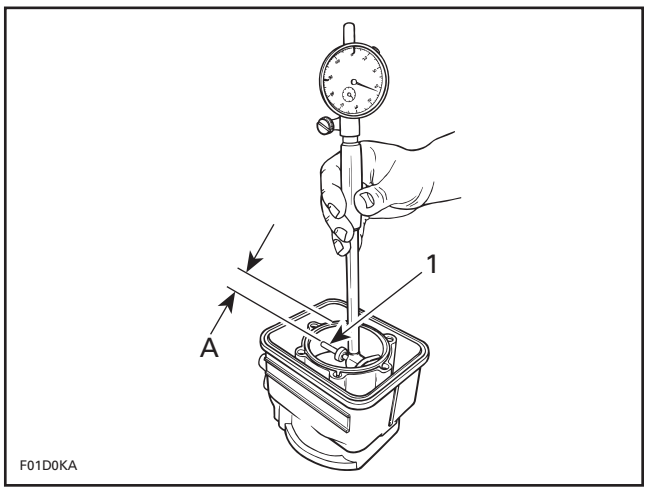
1. Use the micrometer to set the cylinder bore gauge
2. Dial bore gauge



1. Indicator set to 0 (zero)

IMPORTANT: Always remove cylinders from crankcase before measuring.

Position the dial bore gauge at 16 mm (5/8 in) below cylinder top edge.



1. Measuring perpendicularly (90°) to piston pin axis
A. 16 mm (5/8 in)

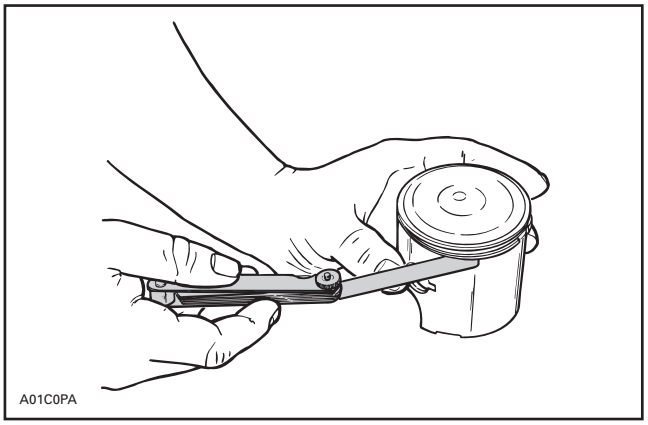
Read the measurement on the cylinder bore gauge. The result is the exact piston/cylinder wall clearance. If clearance exceeds specified tolerance, replace cylinder or rebore and install oversize piston depending on engine type. Refer to TECHNICAL DATA.

NOTE: Make sure the cylinder bore gauge indicator is set exactly at the same position as with the micrometer, otherwise the reading will be false.

IMPORTANT: The total piston/cylinder clearance (actual cylinder diameter minus actual piston skirt diameter) should be within 0.30 mm (.012 in).

RING/PISTON GROOVE CLEARANCE

Using a feeler gauge check clearance between rectangular ring and groove. Replace piston if clearance exceeds specified tolerance. Refer to TECHNICAL DATA.

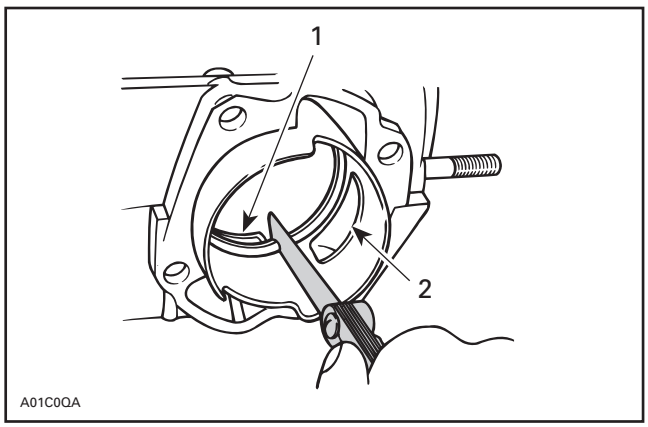


RING END GAP

Position ring half-way between transfer ports and intake port.

NOTE: In order to correctly position the ring in the cylinder, use piston as a pusher.

Using a feeler gauge, check ring end gap. Replace ring if gap exceeds specified tolerance. Refer to TECHNICAL DATA.



1. Transfer port
2. Intake port

CRANKSHAFT DEFLECTION

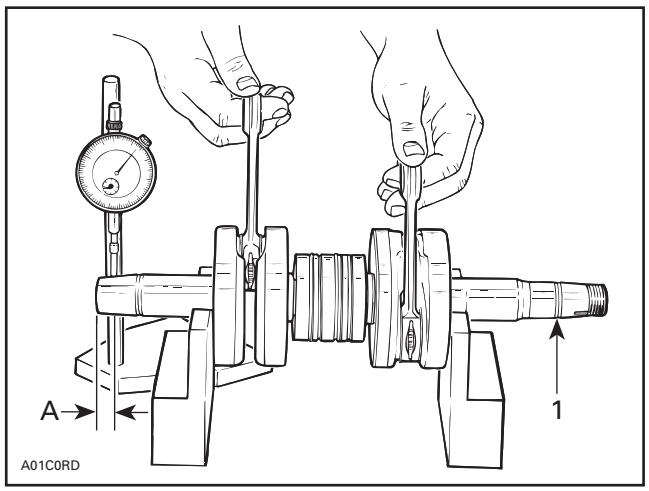
Crankshaft deflection is measured with a dial indicator.

Measuring (in crankcase)

First, check deflection with crankshaft in crankcase. If deflection exceeds the specified tolerance, recheck deflection using V-shaped blocks to determine the defective part(s). See below.

Measuring (on bench)

Once engine is disassembled, check crankshaft deflection on V-shaped blocks. If deflection exceeds the specified tolerance, it can be worn bearings or a bent crankshaft. Remove crankshaft bearings and check deflection again on V-shaped blocks to determine the defective part(s). See measurement A in following illustration.



TYPICAL

1. Measure at mid point between the key and the first thread
A. 3 mm (1/8 in)

Crankshaft Deflection on PTO Side

ENGINE TYPE	MAXIMUM ON PTO SIDE mm (in)
All	0.06 (.0024)

Crankshaft Deflection on MAG Side

ENGINE TYPE	MAXIMUM ON MAG SIDE mm (in)
All	0.05 (.002)

Crankshaft Deflection in Center of Crankshaft

ENGINE TYPE	MAXIMUM IN CENTER OF CRANKSHAFT mm (in)
All	0.08 (.0031)

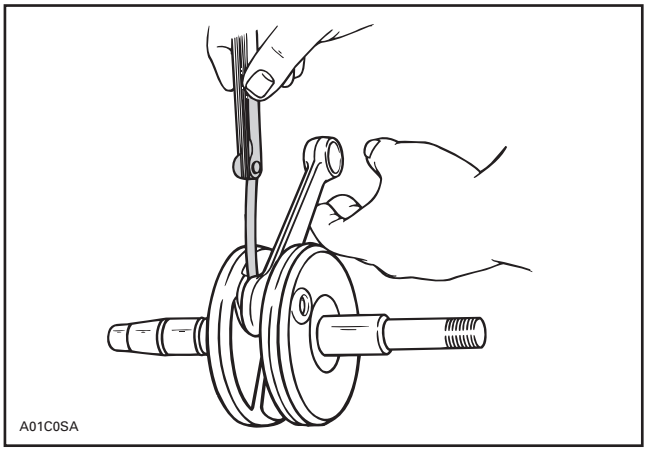
NOTE: Crankshaft deflection cannot be correctly measured between centers of a lathe.

If the deflection exceeds the specified tolerance, crankshaft should be repaired or replaced.

CONNECTING ROD BIG END AXIAL PLAY

ENGINE TYPE	NEW PARTS MIN. - MAX.	WEAR LIMIT
All	0.39 - 0.74 mm (.015 - .029 in)	1.20 mm (.047 in)

Using a feeler gauge, measure distance between thrust washer and crankshaft counterweight. If the distance exceeds specified tolerance, repair or replace the crankshaft.



TYPICAL

CRANKSHAFT END-PLAY

All Engine Types

End-play is not adjustable but it should be between 0.10 - 0.30 mm (.004 - .012 in).

CHECKING SURFACE FLATNESS

Intake manifold, intake manifold cover can be checked for perfectly mating surfaces.

Lay part on a surface plate (marble, mirror or thick glass plate).

Holding down one end of part, try pushing down the other end.

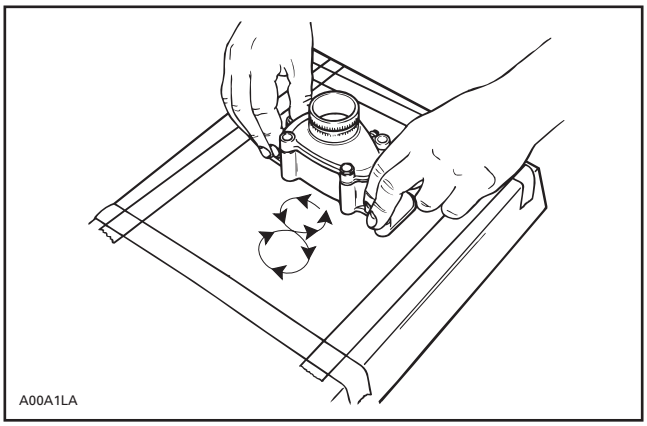
If any play is felt, part must be rectified.

RECTIFYING SURFACES

Stick a fine sand paper sheet on the surface plate then lightly oil the sand paper.

Rub part mating surface on sand paper using 8-figure movements.

Sand until mating surface is perfectly straight.



TYPICAL

CHECKING CRANKSHAFT ALIGNMENT

Install a degree wheel (P/N 414 352 900) on crankshaft end.

Remove both spark plugs.

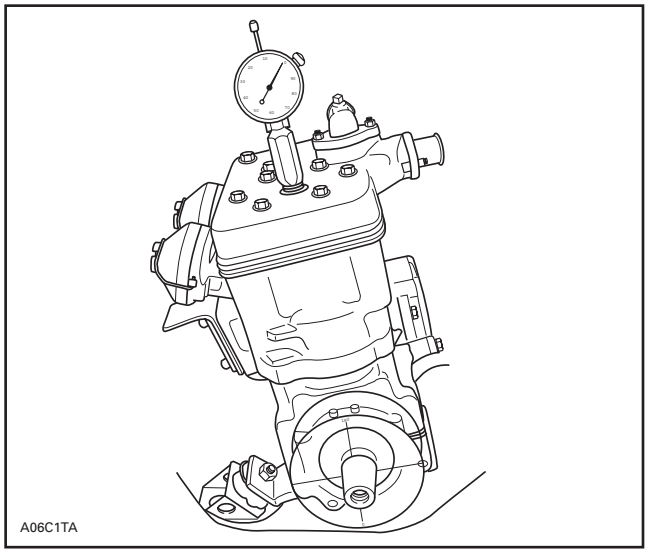
Install a TDC gauge (P/N 414 104 700) in spark plug hole on MAG side.

Bring MAG piston at top dead center.

Rotate degree wheel (not crankshaft) so that 360° mark aligns with center of crankcase. Scribe a mark on crankcase.

Remove TDC gauge and install it on center cylinder.

Bring PTO piston to top dead center. Degree wheel must rotate with crankshaft.



TYPICAL

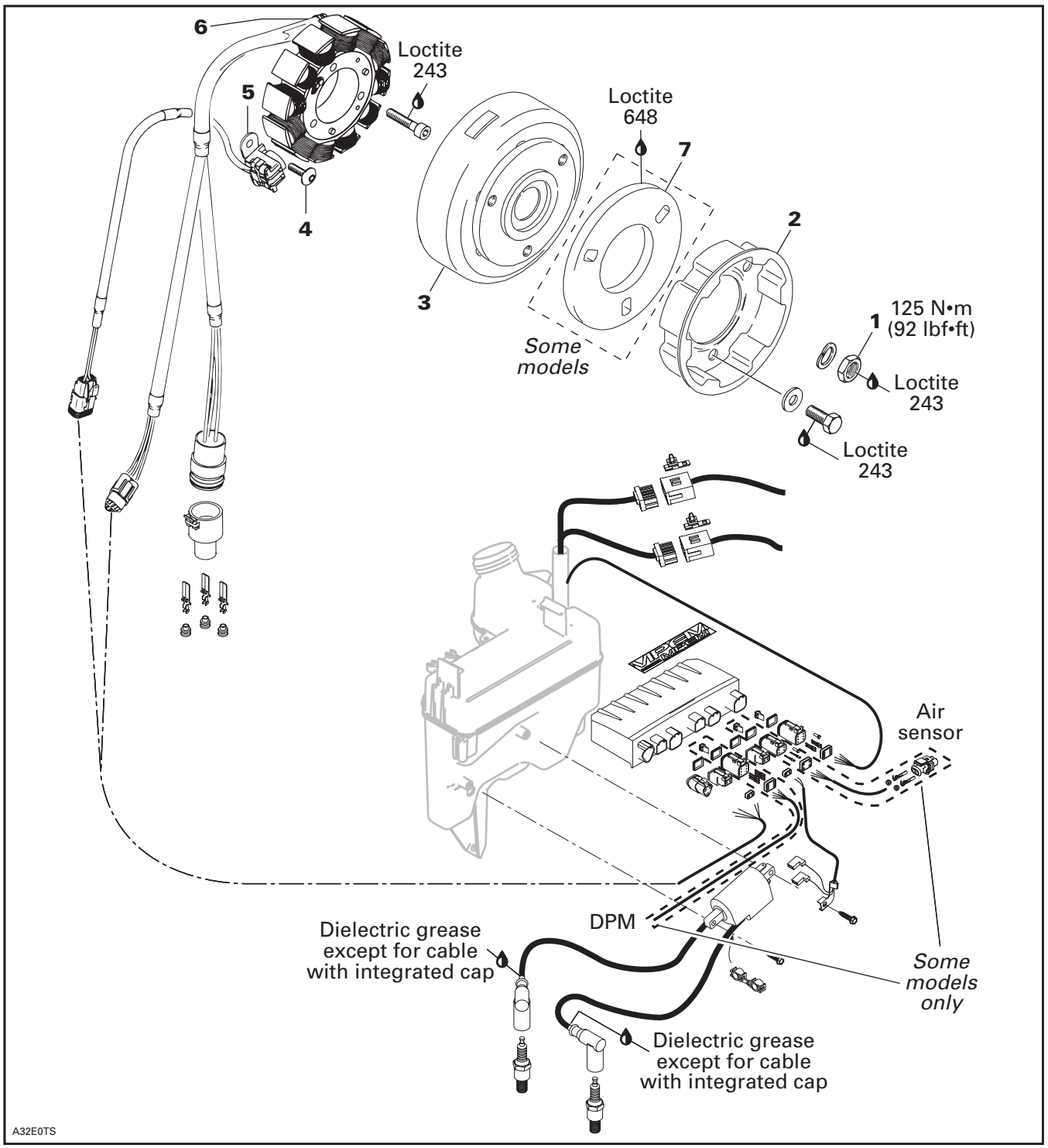
Interval between cylinders must be 180° ± 0.5.

Any other reading indicates a misaligned (twisted) crankshaft.

CDI SYSTEM

NIPPONDENSO TRIGGER COIL IGNITION SYSTEM

290 W on ZX Series



NOTE: The following procedures can be done without removing the engine from chassis. To facilitate magneto removal, hold drive pulley with tool (P/N 529 027 600).

CDI means Capacitor Discharge System.

CLEANING

Clean all metal components in a non-ferrous metal cleaner.

CAUTION: Clean stator and magneto using only a clean cloth.

DISASSEMBLY

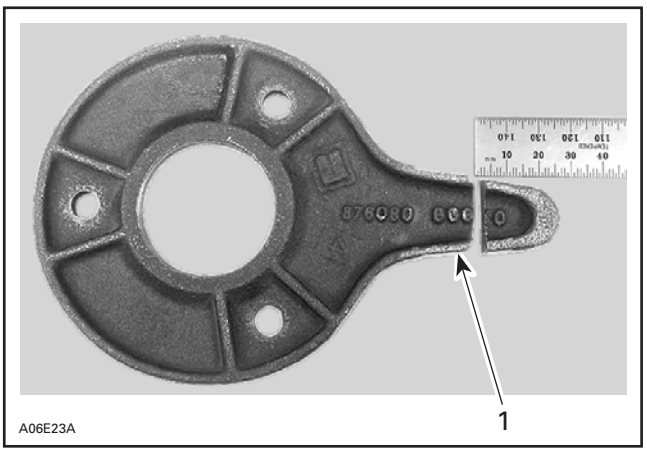
3, Magneto Flywheel

To gain access to magneto assembly, remove the following parts as needed on different engines:

– tuned pipe and muffler
– rewind starter
– starting pulley **no. 2**.

To remove magneto flywheel retaining nut **no. 1**:

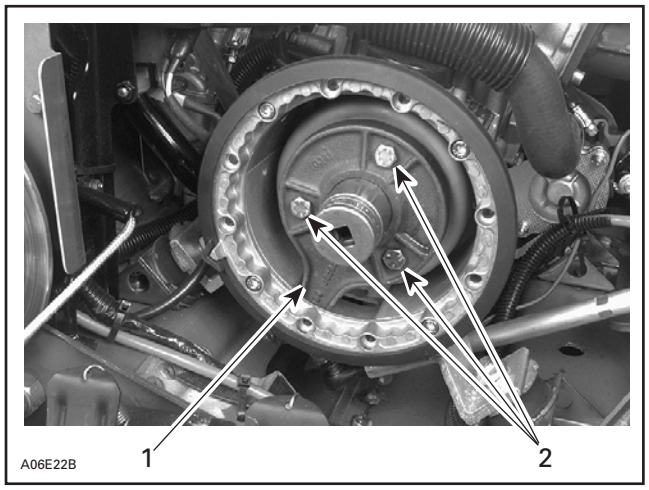
– Use magneto puller ring (P/N 420 876 080). Former puller has to be modified as shown.



1. Cut by 25 mm (1 in)

– Install puller ring with its tab in magneto housing opening.

CAUTION: Use only M8 x 20 mm screws to bolt puller to magneto. When a flywheel no. 7 is installed on magneto flywheel use M8 x 30 mm screws.

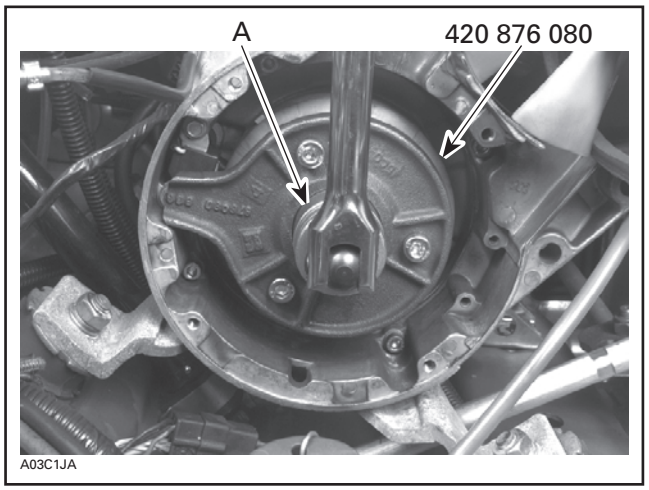


TYPICAL

1. Tab in magneto housing opening
2. M8 screws

– Remove magneto flywheel nut, using a 30 mm socket machined to 40 mm (1.580 in) outside diameter by 16 mm (5/8 in) long.

NOTE: To correctly remove a threadlocked fastener it is first necessary to tap on the fastener to break threadlocker bond. This will eliminate the possibility of thread breakage.



TYPICAL

A. 30 mm socket

To remove magneto flywheel, screw puller (P/N 529 022 500) into puller ring.

– Tighten puller bolt and at the same time, tap on bolt head using a hammer to release magneto flywheel from its taper.

5, Trigger Coil

Magneto and stator **no. 6** must be removed before trigger coil removal.

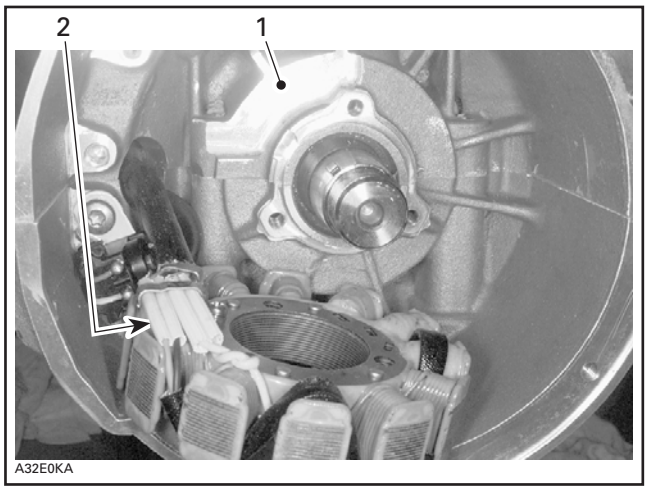
To replace trigger coil:

– Disconnect trigger coil connector housing.
– Remove grommet from crankcase where trigger coil wire exits magneto housing.
– Remove retaining screws **no. 4**.
– Remove trigger coil and carefully pull wires.
– Install new trigger coil and other parts removed.

ASSEMBLY

7, Stator Plate

Make sure to position stator plate in a way that its wire protectors are over recess of crankcase.



1. Crankcase recess
2. Wire protectors

3, Magneto Flywheel

Clean crankshaft extension (taper) and apply Loctite 243 (blue) on taper, then position Woodruff key, flywheel and lock washer on crankshaft.

Clean nut threads and apply Loctite 243 (blue) then tighten nut 125 N•m (92 lbf•ft).

At reassembly coat all electric connections except Deutsch housings (waterproof gray housing) with silicone dielectric grease (P/N 293 550 004) to prevent corrosion or moisture penetration.

CAUTION: Do not use silicone "sealant", this product will corrode contacts. Do not apply silicone dielectric grease on any Deutsch (gray) housing otherwise housing seal will be damaged.

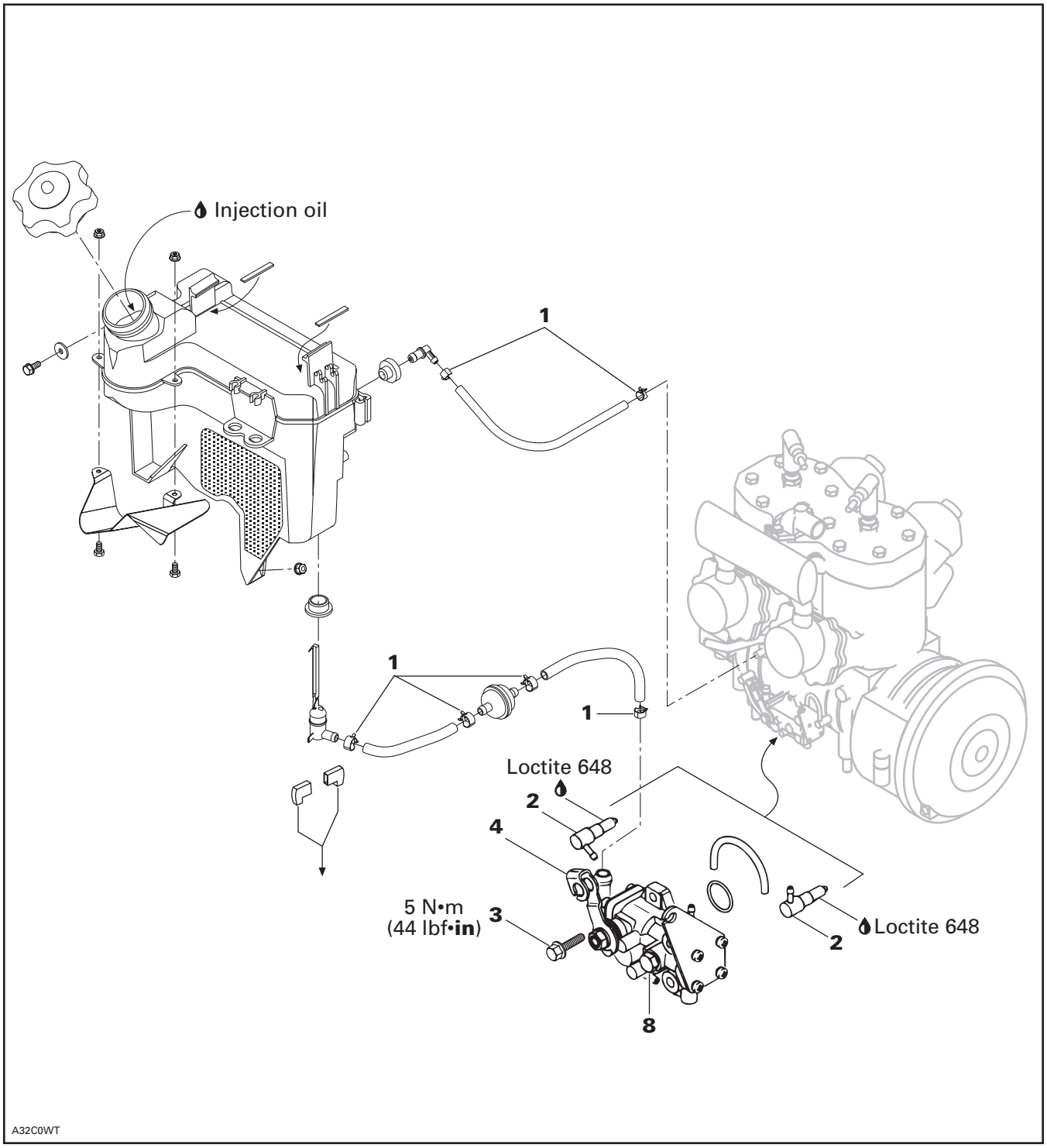
Ignition Timing

Check as described in IGNITION TIMING.

OIL INJECTION SYSTEM

OIL INJECTION PUMP

493, 593, 693 and 793 Engines



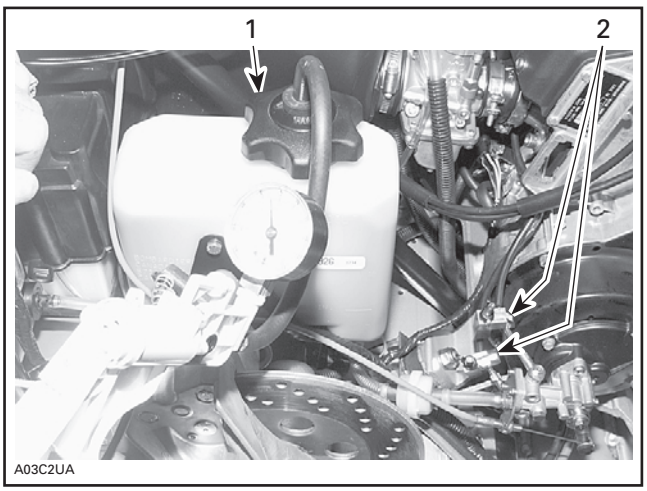
OIL SYSTEM LEAK TEST

All Models

The following test will indicate any leak from oil reservoir to the banjo fitting(s).

Install on oil reservoir special cap of leak testing kit (P/N 529 033 100).

Install hose pinchers (P/N 295 000 076) on outlet hoses.



TYPICAL

1. *Special cap on reservoir*
2. *Hose pinchers on outlet hoses*

Connect pump of leak testing kit to special cap.

Pressurize oil system to 34 kPa (5 PSI). That pressure must not drop during 3 minutes.

If pressure drops, locate leak(s) and repair/replace leaking component(s). To ease locating leak(s) spray soapy water on components, bubbles will indicate leak location(s).

OIL PUMP IDENTIFICATION

4, Pump Lever

Different engines need different pumps. See identification on lever no. 4.

CAUTION: Always mount proper pump on engine.

ENGINE TYPE	OIL PUMP IDENTIFICATION
493	L7
593	L9
693	L14
793	L14

NOTE: The following procedures can be done without removing the engine from chassis.

CLEANING

Clean all metal components in a non-ferrous metal cleaner.

DISASSEMBLY

NOTE: Some oil pump components are not available as single parts.

ASSEMBLY

1, Spring Clip

Always check for spring clips tightness.

3, Screw

Torque to 5 N•m (44 lbf•**in**).

Cable plastic elbow must be fastened and fully inserted.

Make sure cable barrel is well seated in oil pump lever.

Secure barrel with plastic washer and circlip.

Install cable lock washer on left side of support.

Verify cable and oil pump lever operation.

ADJUSTMENT

Prior to adjusting the pump, make sure all carburetor adjustments are completed.

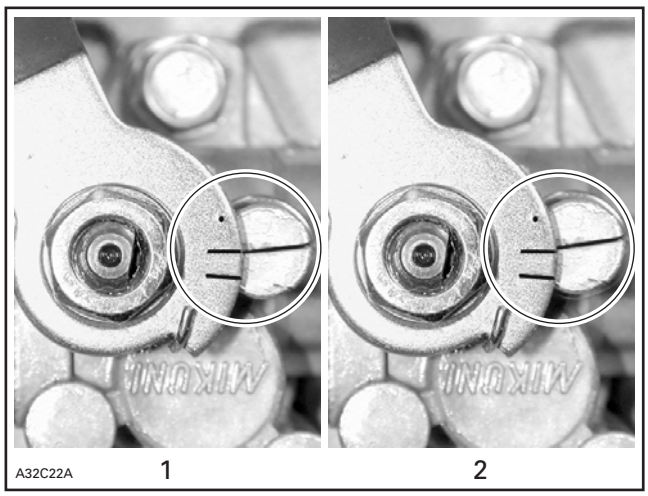
Synchronizing Pump with Carburetor

Because the oil pump is mounted low on engine, it is very difficult to avoid parallax problem and set a good adjustment.

Parallax Problem

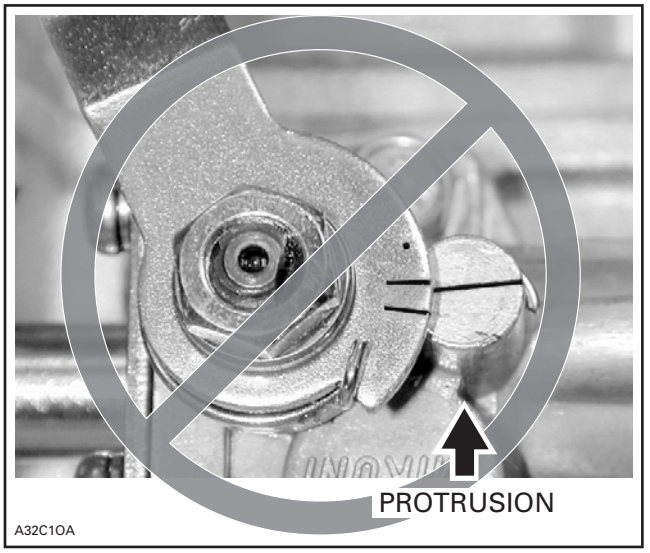
When adjusting pump lever, since the mechanic can not view the pump perpendicularly, the adjustment will not be accurate. Following photos show three different views of the same properly adjusted pump.

VIEW TOO HIGH — ADJUSTMENT SEEMS TO BE TOO RICH WHEN TOP OF BODY'S PROTRUSION CAN BE SEEN



VIEW STRAIGHT AHEAD — BODY'S PROTRUSION LOOKS LIKE A CIRCLE, MARK ON PUMP ALIGN WITH SECOND MARK ON LEVER (MARK ON DOT SIDE)

1. *Minimum setting*
2. *Maximum setting*



VIEW TOO LOW — ADJUSTMENT SEEMS TO BE TOO LEAN WHEN BOTTOM OF BODY'S PROTRUSION CAN BE SEEN

To avoid a bad adjustment, follow procedure below.

Procedure for Oil Pump Adjustment

Ensure carburetors are synchronized according to the technical specifications.

Remove air box. Carburetors may also be removed to improve visibility and ease adjustment of oil pump cable.

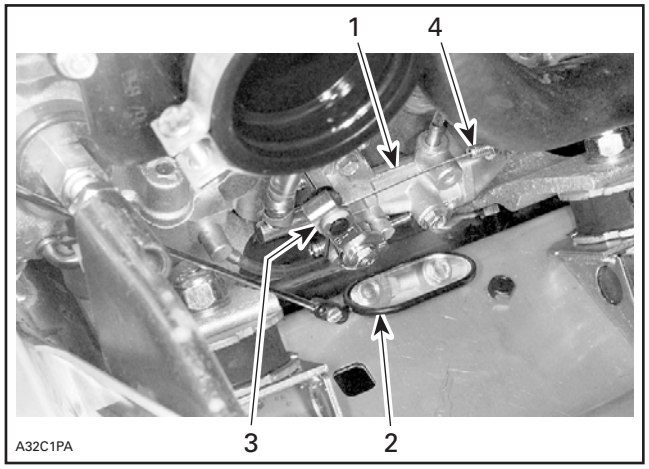
NOTE: Place carburetors on top of intake boots to keep cable routing near original location.

Lightly depress throttle lever to remove free play from cable.

Use a small round or oblong mirror to see the marks.

The second mark on pump lever must be aligned or up to 1 mm (.039 in) below pump casting mark. If not, loosen the adjuster nut and adjust accordingly.

Retighten the adjuster nut.

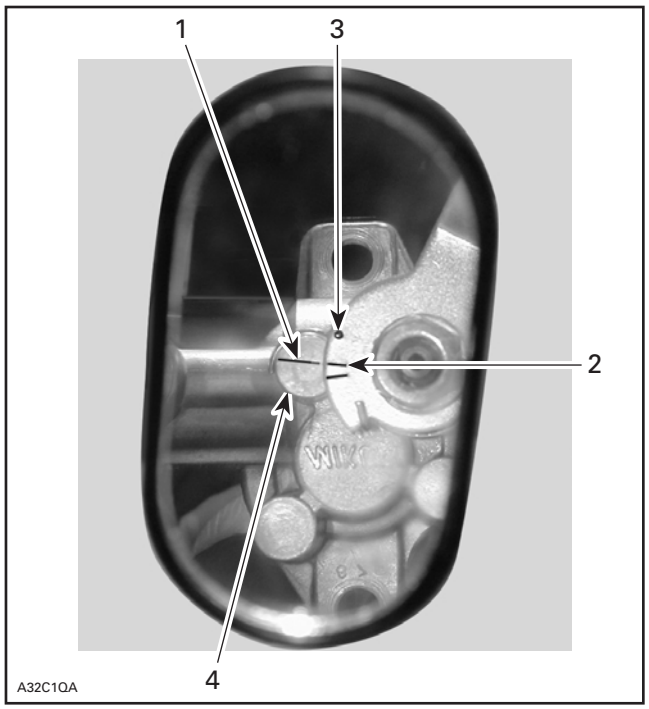


VIEW WITH AIR BOX, CARBURETORS AND FUEL PUMP REMOVED

1. *Oil pump*
2. *Mirror*
3. *Lever*
4. *Adjustment screw*

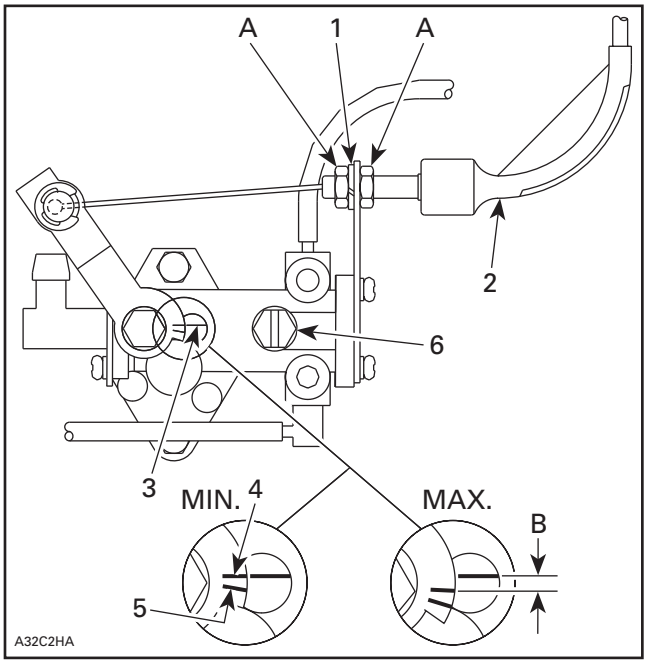
Make sure that view in mirror is straight ahead, without parallax problem.

Protrusion with fixed mark on pump must look like a full circle. See next photo.



VIEW FROM MIRROR SHOULD LOOK LIKE THIS

1. *Mark on pump casting*
2. *Second mark on lever*
3. *Dot*
4. *Pump protrusion as a circle, not a cylinder*



1. *Lock washer*
2. *Plastic elbow fastened and fully inserted*
3. *Pump casting mark*
4. *Second mark aligned or below*
5. *First mark*
6. *Bleeder screw*

A. *5 N•m (44 lbf•**in**)*
B. *Up to 1 mm (.039 in)*

CAUTION: Proper oil injection pump adjustment is very important. Any delay in the opening of the pump can result in serious engine damage.

To Bleed Oil Lines

Bleed main oil line (between tank and pump) by loosening the bleeder screw until air has escaped from the line. Add injection oil as required.

Reinstall all parts.

Bleed the small oil line between pump and engine by running engine at idle while holding the pump lever in fully open position.

NOTE: Make a J hook out of mechanical wire to lift the lever.

⚠ WARNING

Ensure not to operate carburetor throttle mechanism. Secure the rear of the vehicle on a stand.

CHECKING OPERATION

Oil Pump

On Vehicle

NOTE: Main oil line must be full of oil. See bleeding procedure above.

Lift rear of vehicle and support with a mechanical stand. Unplug small oil lines from pump. Start engine and stop it as soon as it fires.

Check that oil in small oil lines has been sucked up (this will be indicated by a clear section of small oil lines). Repeat the procedure until this condition is attained.

Reconnect small oil lines, start engine and run at idle while holding the pump lever in fully open position. Oil columns must advance into small oil lines.

If not, remove pump assembly and check the pump gear and drive shaft (if applicable) for defects, replace as necessary. Test pump as describes below.

NOTE: Through normal use, oil level must not drop in small tubes. If oil drops, verify check valve operation in injection nozzle. Replace as necessary.

Test Bench

Connect a hose filled with injection oil to main line fitting. Insert other hose end in an injection oil container. Using a clockwise rotating drill rotate pump shaft. Oil must drip from outer fittings while holding lever in a fully open position. If not replace pump.

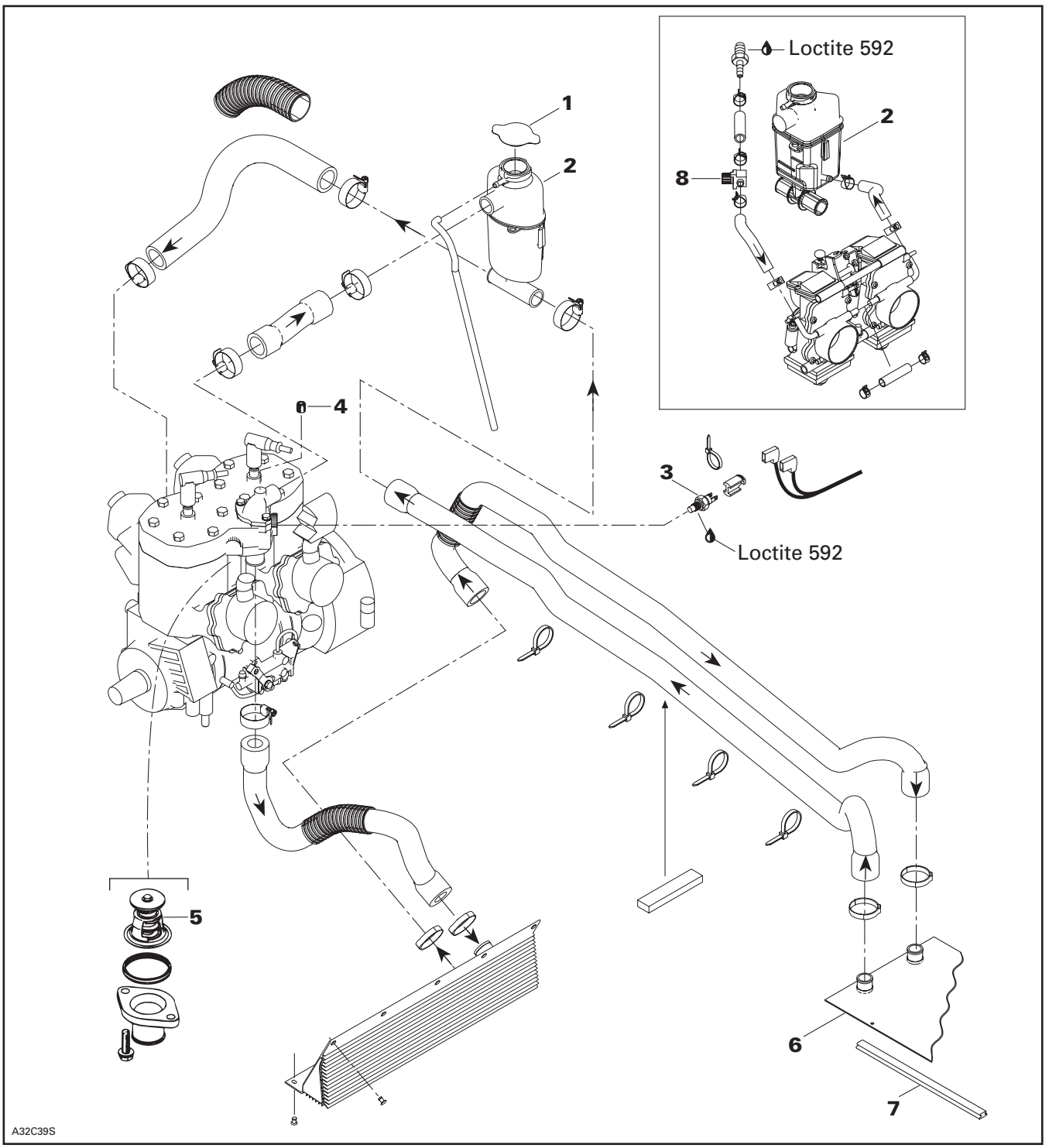
2, Check Valve

To verify this check valve, proceed the same as for checking pump operation on vehicle. First unplug oil line from check valve. After restarting the engine, check that a clear section in small oil line is present. Reconnect oil line.

Run engine at idle. Oil column must advance. If the check valve is faulty, oil column will go back and forth. Replace if so.

LIQUID COOLING SYSTEM

493, 593, 693 and 793 Engines



COOLING SYSTEM LEAK TEST

Install special radiator cap (P/N 529 021 400) included in engine leak tester kit (P/N 861 749 100) on coolant tank. Install hose pincher (P/N 295 000 076) on overflow hose. Using pump also included in kit pressurize all system through coolant reservoir to 100 kPa (15 PSI).

Check all hoses and cylinder/base for coolant leaks. Spray a soap/water solution and look for air bubbles.

INSPECTION

Check general condition of hoses and clamp tightness.

DRAINING THE SYSTEM

⚠ WARNING

Never drain or refill the cooling system when engine is hot.

To drain the cooling system, siphon the coolant mixture from the coolant tank. Disconnect hose at water pump.

DISASSEMBLY AND ASSEMBLY

3,4, Sender and Plug

Apply Loctite 592 (P/N 413 702 300) thread sealant on sender and plug to avoid leaks.

1, Pressure Cap

Check if the cap pressurizes the system. If not, install a new 90 kPa (13 PSI) cap (do not exceed this pressure).

6,7, Radiator and Radiator Protector

Insert radiator protector into radiator C-rail and crimp C-rail at rear end. Refer to FRAME for radiator removal.

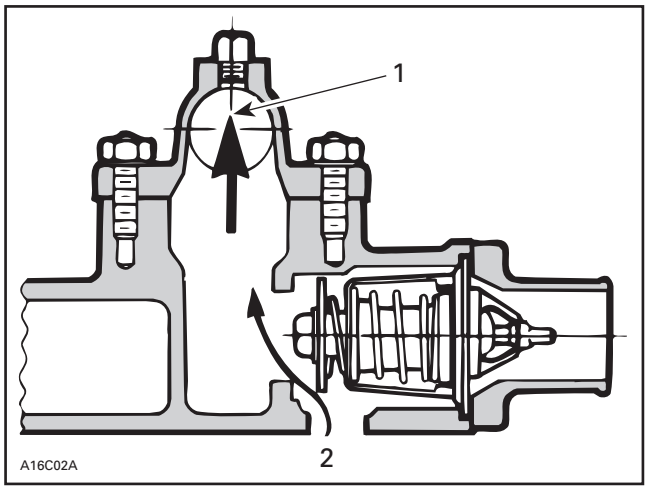
5, Thermostat

To check thermostat, put in water and heat water. Thermostat should start to open when water temperature reaches the following degree. It will be almost fully open at 50°C (122°F).

ENGINE	TEMPERATURE
493, 593, 693 and 793	42°C (108°F)

Thermostat is a double action type.

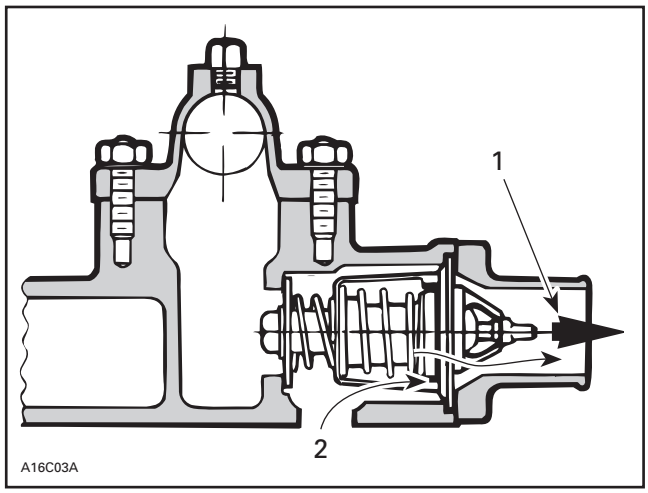
a. Its function is to give faster warm up of the engine by controlling a circuit; water pump — engine — coolant tank. This is done by bypassing the radiator circuit.



TYPICAL — CLOSED THERMOSTAT, COLD ENGINE

1. *To reservoir*
2. *From cylinders*

b. When the liquid is warmed enough, the thermostat opens progressively the circuit, water pump — engine — radiators — coolant tank to keep the liquid at the desired temperature. (See the diagram of the exploded view).



TYPICAL — OPEN THERMOSTAT, WARM ENGINE

1. *To radiators*
2. *From cylinders*

These 2 functions have the advantage of preventing a massive entry of cold water into the engine.

COOLING SYSTEM REFILLING PROCEDURE

Recommended Coolant

Use premixed coolant - 52°C (- 62°F) (P/N 413 711 802) (16 x 1 L). Do not reinstall pressure cap.

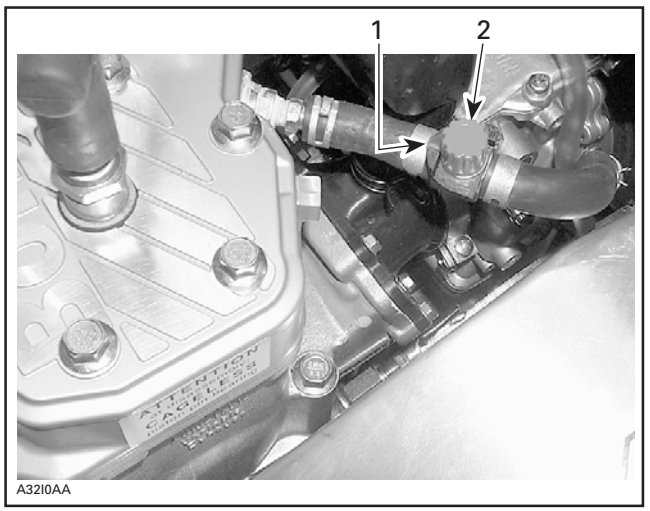
CAUTION: To prevent rust formation or freezing condition, always replenish the system with recommended premixed coolant.

System Capacity

Refer to TECHNICAL DATA.

Refilling Procedure

Open heated carburetor valve no. 8 on so equipped models.



HEATED CARBURETOR VALVE

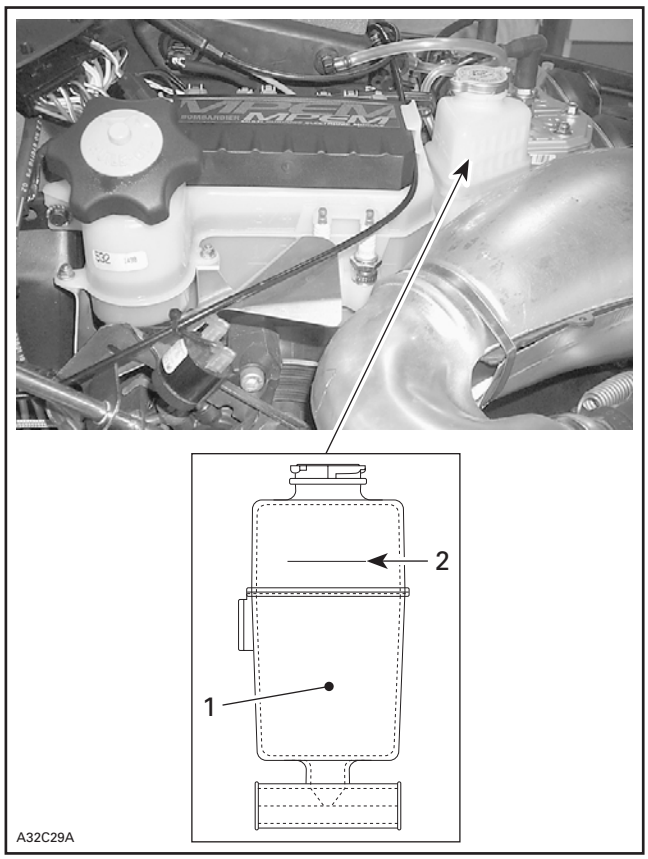
1. *ON*
2. *OFF*

Lift front of vehicle until the tunnel is horizontal. With engine cold, refill coolant tank no. 2 up to COLD LEVEL line. Wait a few minutes then refill to line. Start engine. Refill up to line while engine is idling until all air bubbles have escaped from system (about 4 to 5 minutes). Install pressure cap.

To make sure coolant flows through radiators, touch them by hand. They must feel warm.

Put back front of vehicle on the ground.

When engine has completely cooled down, re-check coolant level in coolant tank and refill up to line.

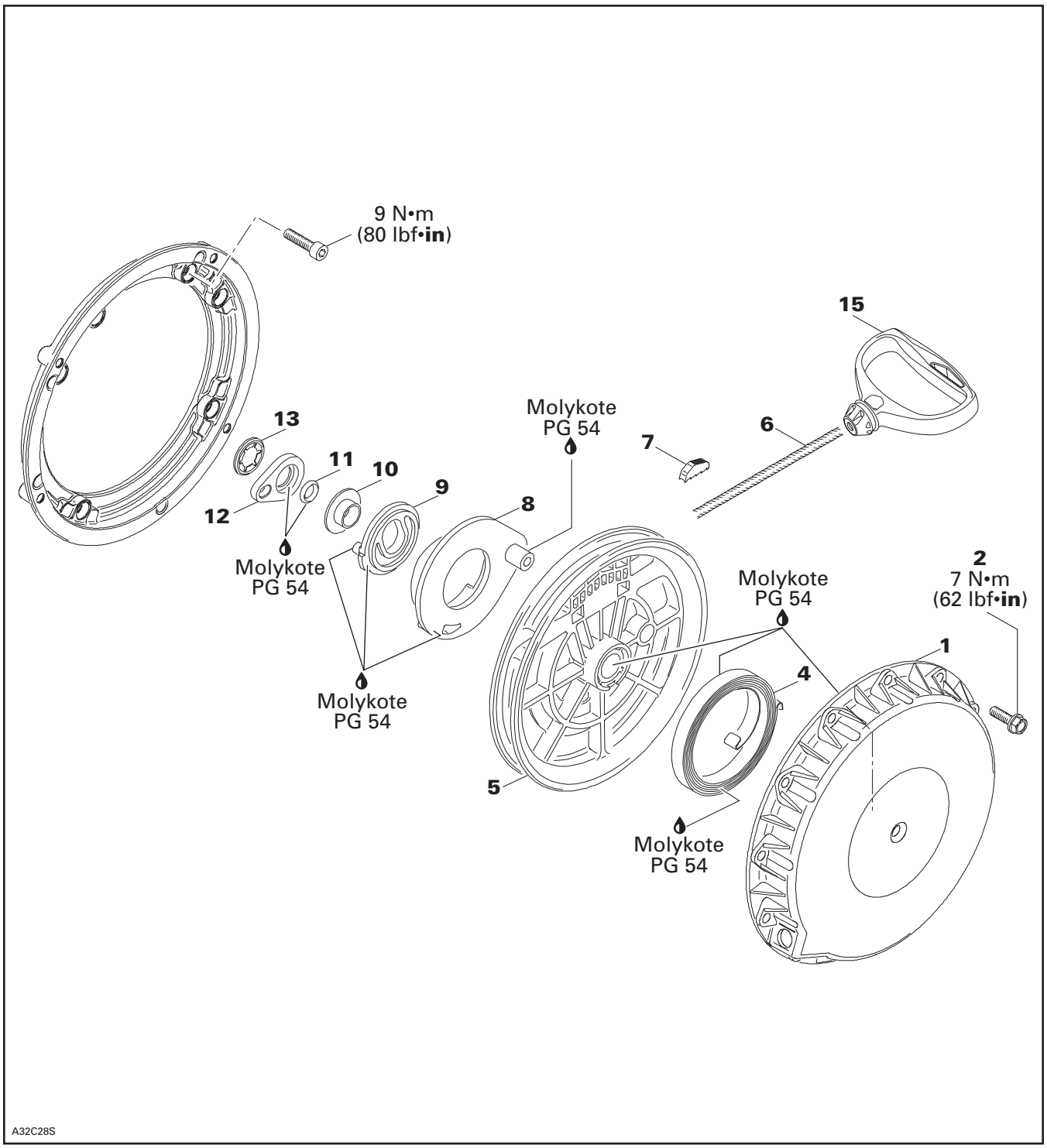


1. Coolant tank
2. COLD LEVEL line

Check coolant concentration (freezing point) with proper tester.

REWIND STARTER

Plastic Rewind Starter on All Models



INSPECTION

NOTE: Due to dust accumulation, rewind starter must be periodically cleaned, inspected and relubricated.

CAUTION: It is of the utmost importance that the rewind starter spring be lubricated periodically using specific lubricant. Otherwise, rewind starter component life will be shortened and/or rewind starter will not operate properly under very cold temperatures.

Check if rope **no. 6** is fraying, replace if so.

When pulling starter grip, mechanism must engage within 30 cm (1 ft) of rope pulled. If not, disassemble rewind starter, clean and check for damaged plastic parts. Replace as required, lubricate, reassemble and recheck. Always replace O-ring **no. 11** every time rewind starter is disassemble.

When releasing starter grip, it must return to its stopper and stay against it. If not, check for proper spring preload or damages. Readjust or replace as required.

When pulling starter grip 10 times in a row, it must return freely. If not, check for damaged parts or lack of lubrication. Replace parts or lubricate accordingly.

REMOVAL

Using a small screwdriver, extract rope knot from starter grip **no. 15**. Cut rope close to knot. Tie a knot near starter.

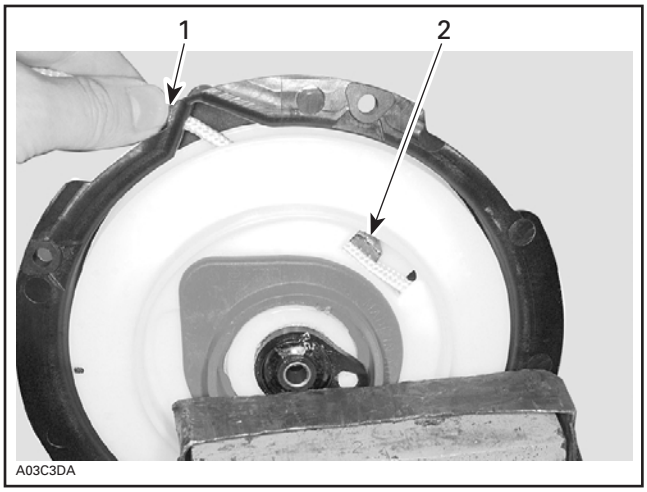
Remove screws **no. 2** securing rewind starter **no. 1** to engine then remove rewind starter.

Fan Cooled Engines Only

Remove pump from rewind starter cover.

ROPE REPLACEMENT

Completely pull out rope. Hold rewind starter in a vise.



1. Rope exit hole
2. Key to be removed

With a long thin pin punch inserted through rope exit hole, push key **no. 7**. Remove key and rope. Install a new rope and lock it using key **no. 7**.

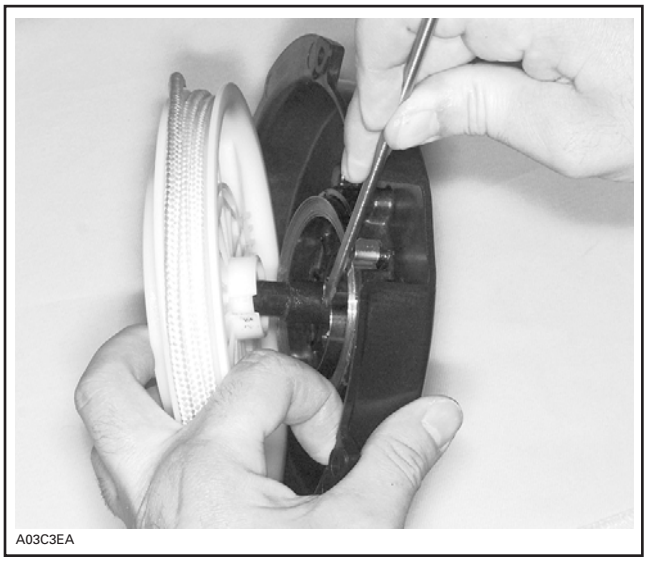
NOTE: When rope is completely pulled out, spring preload is 4-1/2 turns.

DISASSEMBLY

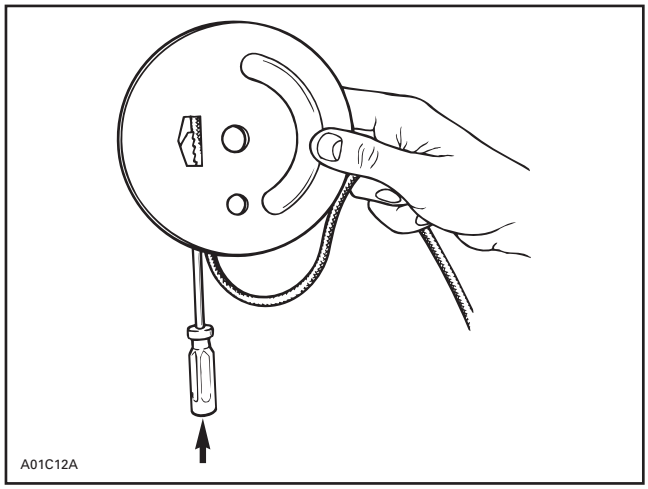
Undo knot previously tied at removal. Let sheave get free to release spring preload.

Cut push nut **no. 13** and discard. Remove locking element **no. 12**, O-ring **no. 11**, step collar **no. 10,** pawl lock **no. 9** and pawl **no. 8**.

Remove sheave **no. 5** from starter housing **no. 1**. Hold spring with a screwdriver.



Disengage key **no. 7** and pull out rope **no. 6**.



GENTLY TAP ON KEY

ASSEMBLY

At assembly, position spring **no. 4** outer end into spring guide notch then wind the spring counterclockwise into guide.

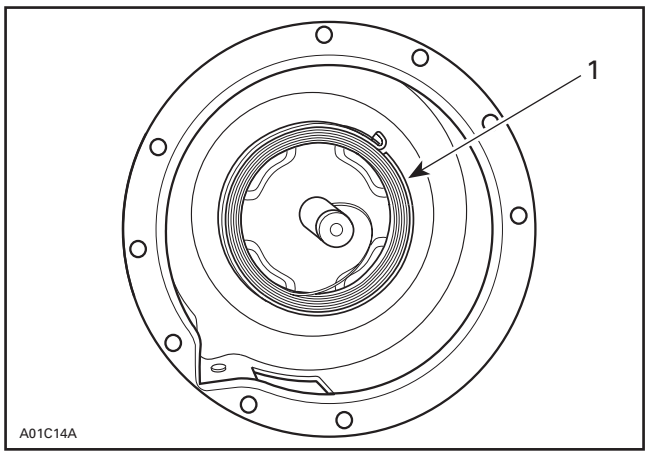
⚠ WARNING

Since the spring is tightly wound inside the guide it may fly out when rewind is handled. Always handle with care.

1. Outer end into guide notch

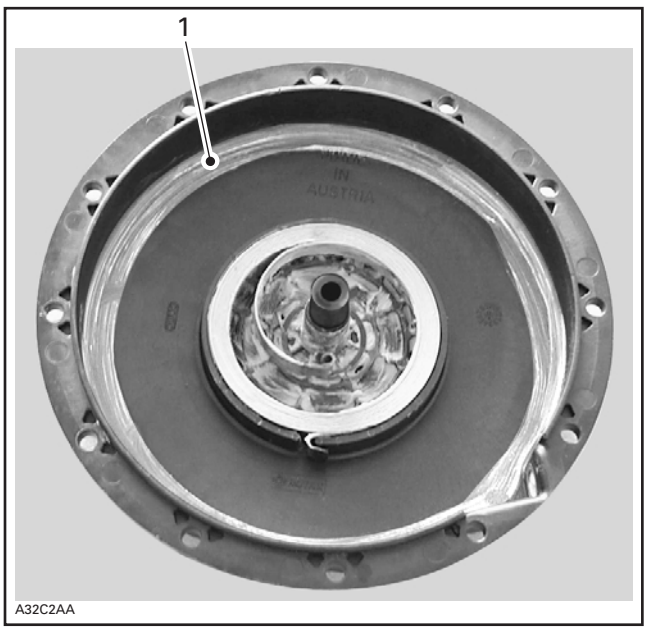
CAUTION: **It is of the utmost importance that the rewind starter spring be lubricated periodically using specific lubricant. Otherwise, rewind starter component life will be shortened and/or rewind starter will not operate properly under very cold temperatures.**

Lubricate spring assembly and 1 cm (1/2 in) wide on bottom of housing with Molykote PG 54 (P/N 420 899 763).



TYPICAL

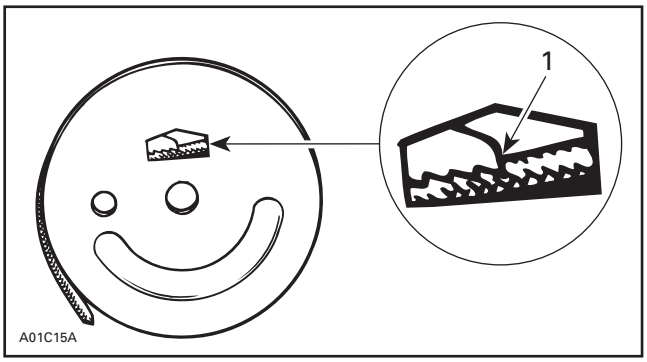
1. Molykote PG 54 inside spring guide



1. Molykote PG 54 applied 1 cm (1/2 in) wide on bottom of housing

CAUTION: The use of standard multi-purpose grease could result in rewind starter malfunction.

To install rope **no. 6**, insert rope into sheave **no. 5** orifice and lock it with the key **no. 7** as illustrated.



1. Push to lock

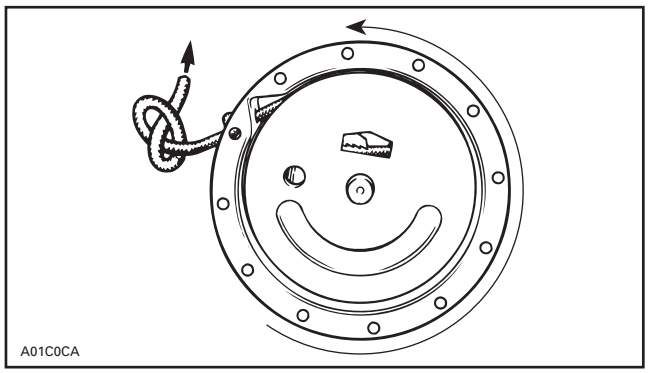
Lubricate housing post with silicone compound grease. Install sheave.

To adjust rope tension:

Wind rope on sheave and place rope sheave into starter housing making sure that the sheave hub notch engages in the rewind spring hook.

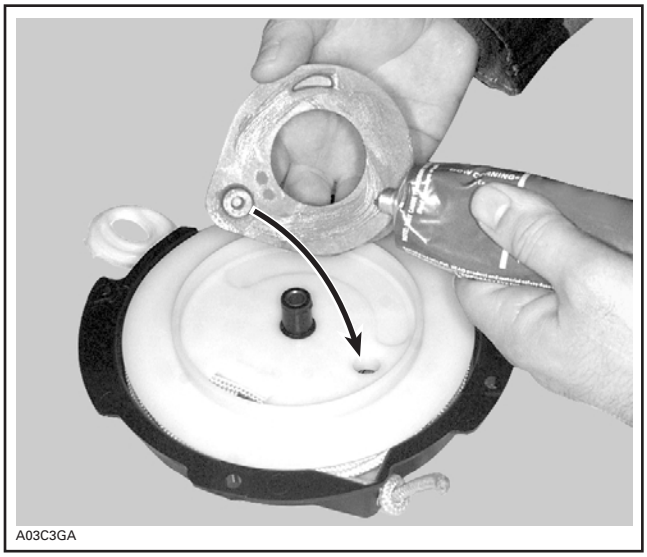
Rotate the sheave counterclockwise until rope end is accessible through rope exit hole. This will give 1/2 turn of preload.

Pull the rope out of the starter housing and temporarily make a knot to hold it.

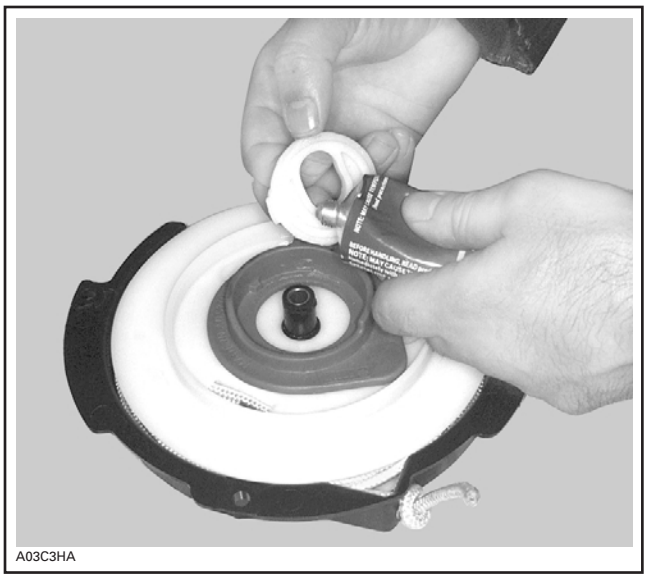


TYPICAL

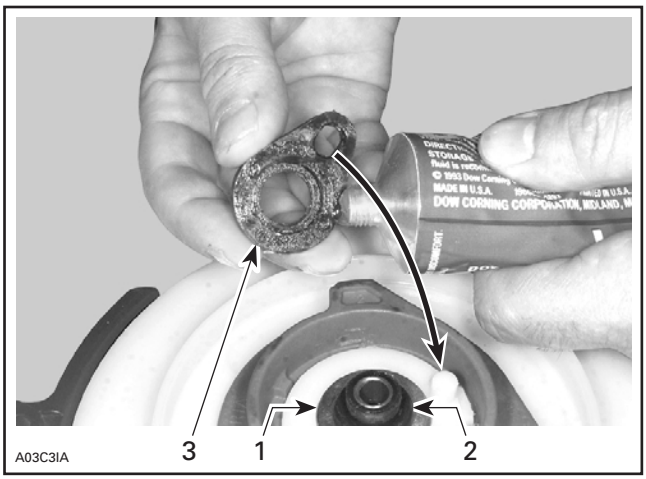
Lubricate pawl **no. 8** with Molykote PG 54 (P/N 420 899 763) then install over rope sheave.



Lubricate pawl lock **no. 9** with Molykote PG 54 (P/N 420 899 763). Install over pawl.



Install step collar **no. 10** with its sleeve first. Lubricate a new O-ring **no. 11** and locking element **no. 9** with Molykote PG 54 (P/N 420 899 763). Install over pawl lock.



1. Step collar
2. O-ring
3. Locking element

Position a new push nut **no. 13**.

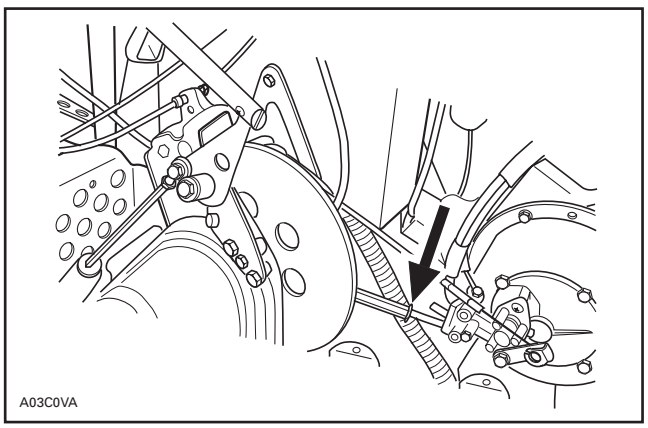
INSTALLATION

Fan Cooled Engines Only

Reinstall oil pump on rewind starter assembly.

All Models

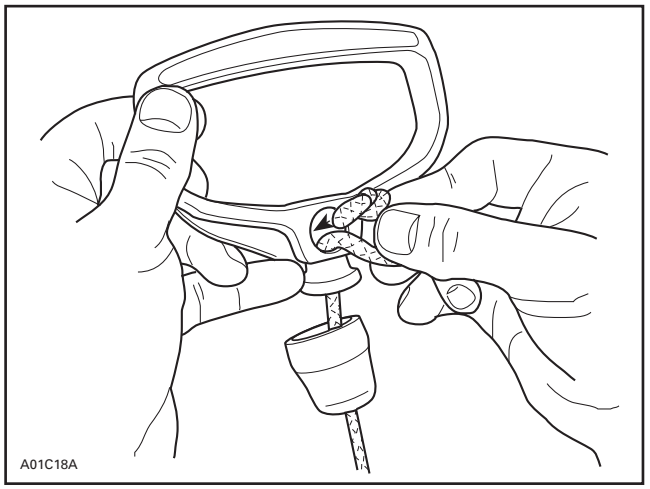
Thread starter rope **no. 6** through rope guide when applicable.



TYPICAL

Reinstall rewind starter assembly on engine.

Prior to installing starter grip **no. 15** on new rope, it is first necessary to fuse the rope end with a lit match. Pass rope through starter grip and tie a knot in the rope end. Fuse the knot with a lit match then insert rope end down and pull the starter grip over the knot.

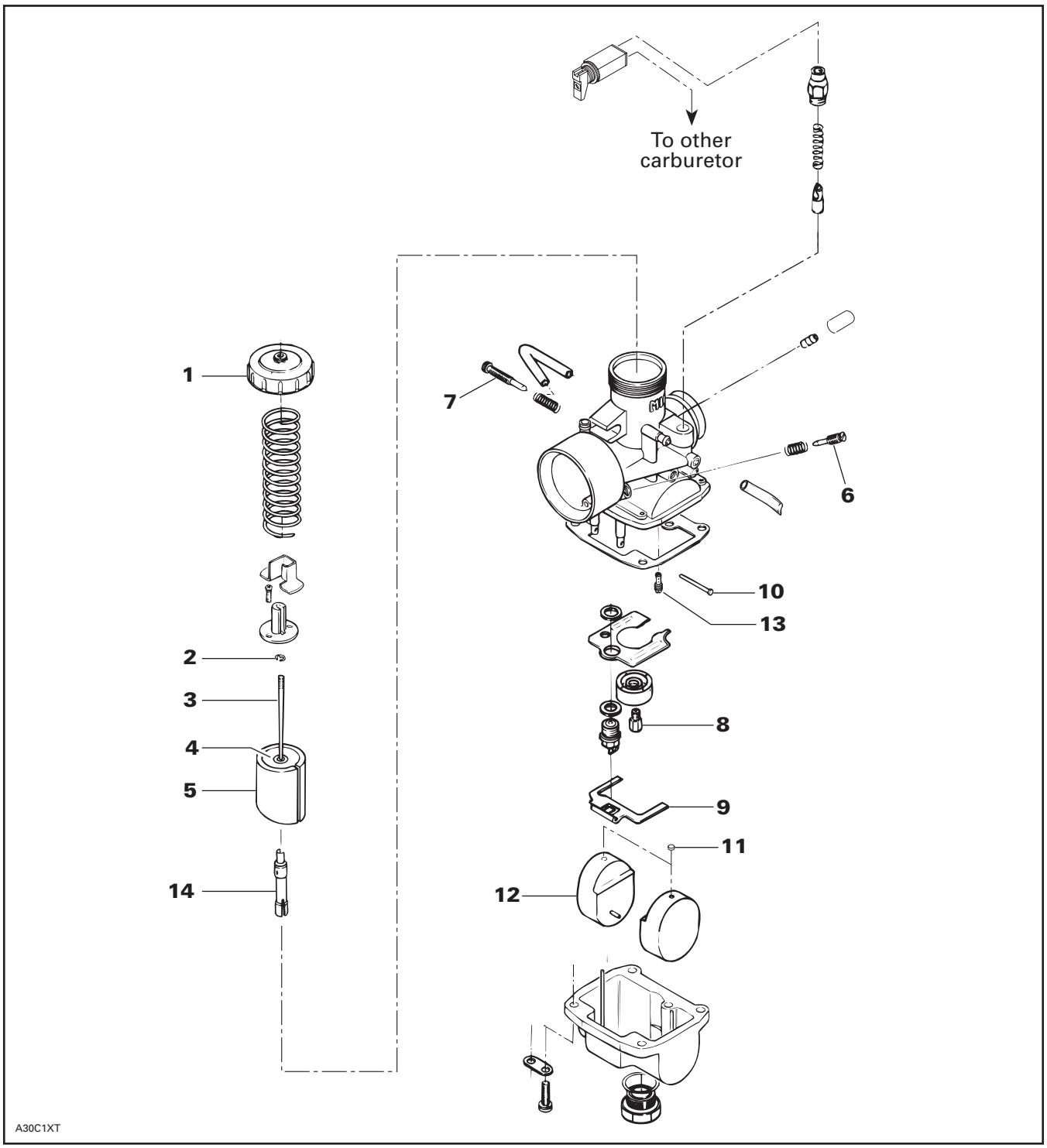


TYPICAL

CARBURETOR AND FUEL PUMP

CARBURETOR

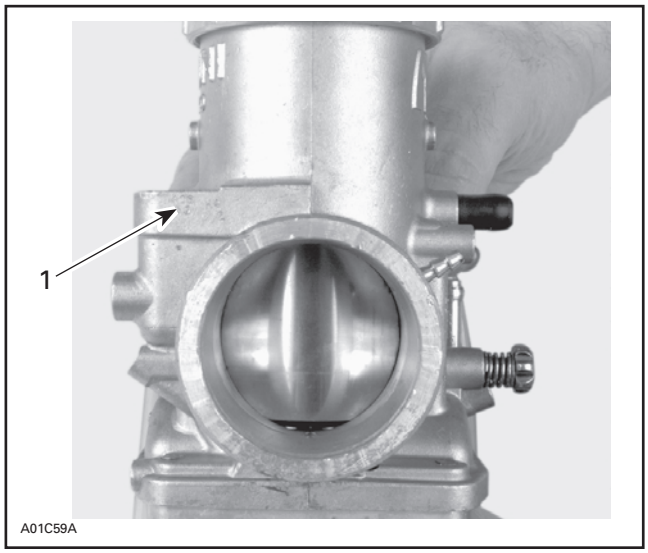
VM Type



TYPICAL

IDENTIFICATION

All carburetors are identified on their body.



TYPICAL
1. Identification: 34-482

REMOVAL

Unfasten clamps then, remove air intake silencer from left hand side.

Disconnect fuel inlet lines.

⚠ WARNING

Fuel is flammable and explosive under certain conditions. Always wipe off any fuel or oil spillage from the vehicle. Ensure work area is well ventilated. Do not smoke or allow open flames or sparks in the vicinity.

Unscrew carburetor cover **no. 1** then pull out throttle slide **no. 5** from carburetor.

⚠ WARNING

Exercise care when handling throttle slide. Scratches incurred may cause throttle slide to stick open in operation.

Disconnect throttle cable from throttle slide.

Remove carburetors from engine.

Unscrew choke plunger from each carburetor.

CLEANING AND INSPECTION

The entire carburetor should be cleaned with a general solvent and dried with compressed air before disassembly.

CAUTION: Heavy duty carburetor cleaner may be harmful to the float material and to the rubber parts, O-rings, etc. Therefore, it is recommended to remove those parts prior to cleaning.

Carburetor body and jets should be cleaned in a carburetor cleaner following manufacturer's instructions.

⚠ WARNING

Solvent with a low flash point such as gasoline, naphtha, benzol, etc., should not be used as they are flammable and explosive.

Check inlet needle tip condition. If worn, the inlet needle and seat must be replaced as a matched set.

NOTE: Install needle valve for snowmobile carburetor only. It is designed to operate with a fuel pump system.

Check throttle slide for wear. Replace as necessary.

Check idle speed screw straightness. Replace as necessary.

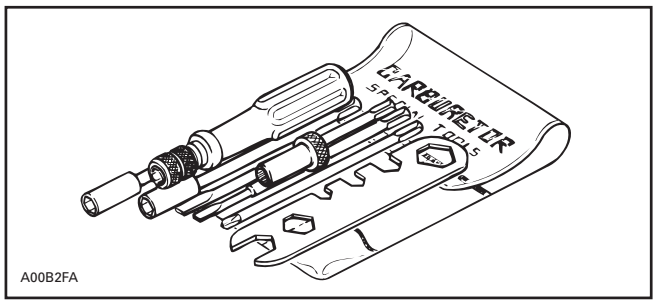
Check for fuel soaked into float **no. 12**; replace as necessary.

Check float for cracks or other damages affecting free movement; replace as necessary.

Inspect throttle cable and housing for any damages. Replace as necessary.

DISASSEMBLY AND ASSEMBLY

NOTE: To ease the carburetor disassembly and assembly procedures it is recommended to use carburetor tool kit (P/N 404 112 000).

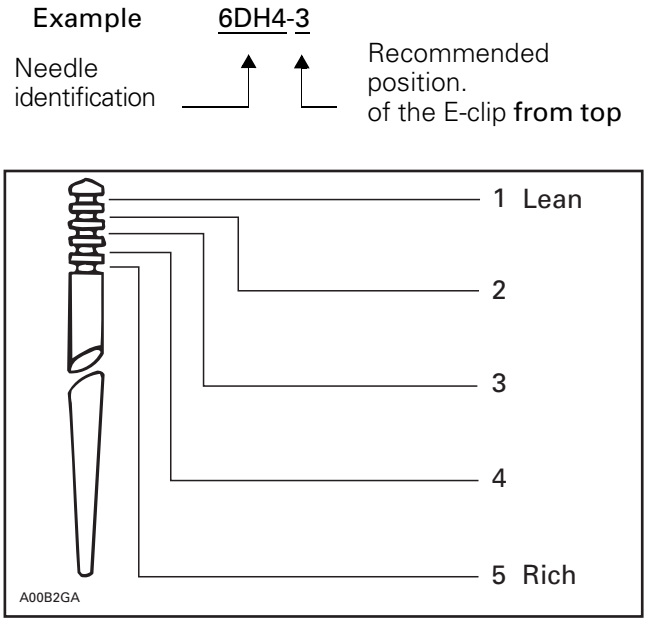


2,3, E-Clip and Needle

Remove screws from needle retaining plate to withdraw the needle.

The position of the needle in the throttle slide is adjustable by means of an E-clip inserted into 1 of 5 grooves located on the upper part of the needle. Position 1 (at top) is the leanest, 5 (at bottom) the richest.

NOTE: The last digit of the needle identification number gives the recommended calibrated position of the E-clip **from the top** of the needle.



CLIP POSITIONS

8, Main Jet

The main jet installed in the carburetor has been selected for a temperature of - 20°C (0°F) at sea level. Different jetting can be installed to suit temperature and/or altitude changes. A Service Bulletin will give information about calibration according to altitude and temperature.

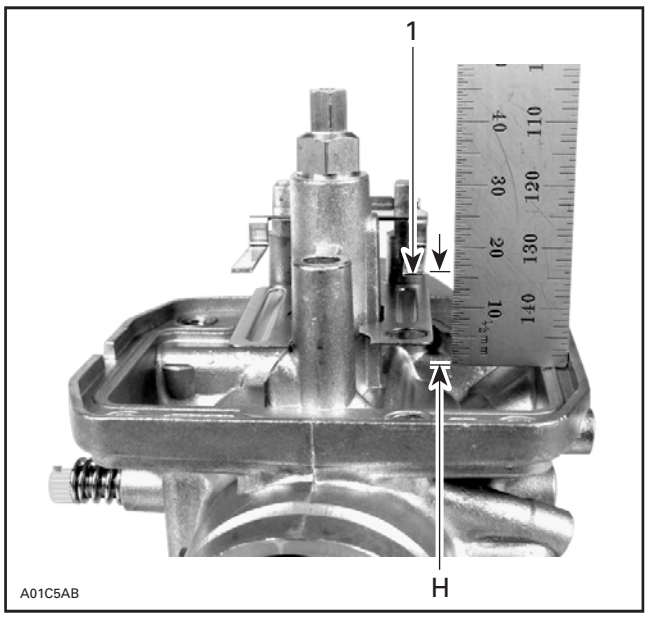
CARBURETOR FLOAT LEVEL ADJUSTMENT

CAUTION: Spark plugs will foul if float is adjusted too low. Engine may be damaged if float is adjusted too high.

9,10, Float Arm and Float Arm Pin

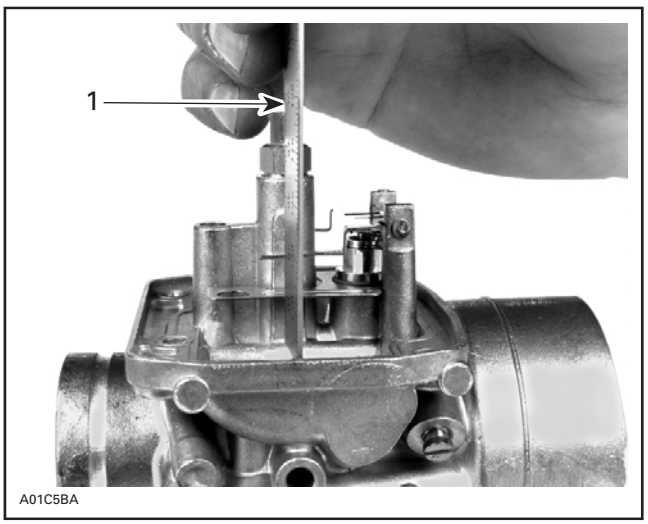
Correct fuel level in float chamber is vital toward maximum engine efficiency. To check for correct float level proceed as follows:

– Make sure that float arm is symmetrical — not distorted.
– Remove float bowl and gasket from carburetor.
– With carburetor chamber upside-down on a level surface, measure height H between bowl seat and **top** edge of float arm. Keep ruler perfectly vertical and in line with main jet hole.



TYPICAL — VM TYPE

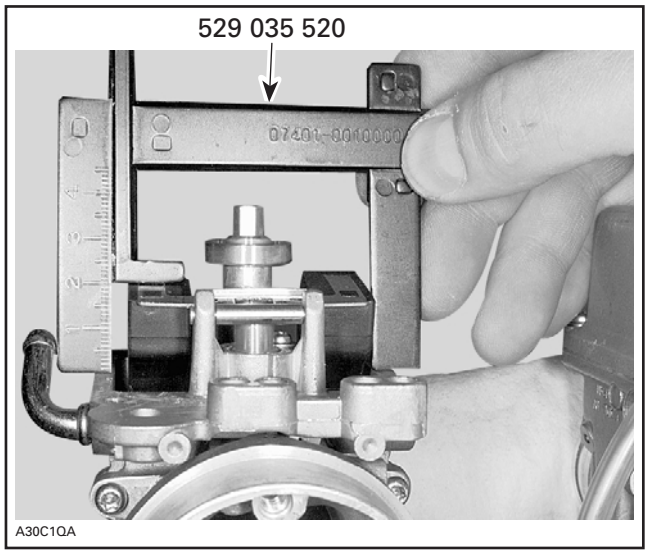
1. Measure from top of float arm
H: Float height (including float arm thickness)



TYPICAL — VM TYPE

1. Ruler vertical and in line with main jet

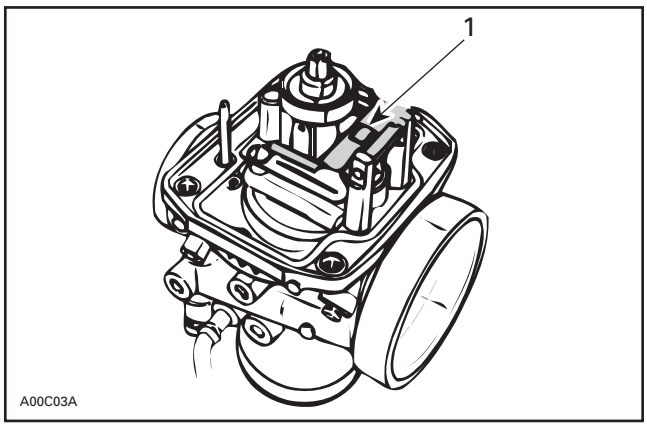
Float level height can be check using tool (P/N 529 035 520). Keep tool in line with main jet as explained above.



CARBURETOR IDENTIFICATION	FLOAT HEIGHT H	
	± 1 mm	(± .040 in)
VM 38-429	22.9	(.902)

To Adjust Height H

– Bend the contact tab of float arm until the specified height is reached.



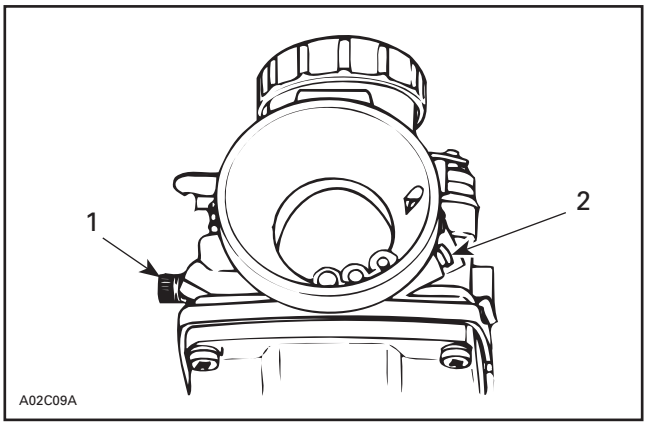
TYPICAL
1. Contact tab

CARBURETOR ADJUSTMENTS

NOTE: For high altitude regions, a Service Bulletin will give information about calibration according to altitude and temperature.

Adjustments should be performed following this sequence:

– air screw adjustment
– throttle slide height
(preliminary idle speed adjustment)
– throttle cable adjustment
– carburetor synchronization
– final idle speed adjustment (engine running)
– oil pump and carburetor synchronization.



1. Idle speed screw
2. Air screw

6, Air Screw Adjustment

Completely close the **air screw** (until a slight seating resistance is felt) then back off as specified.

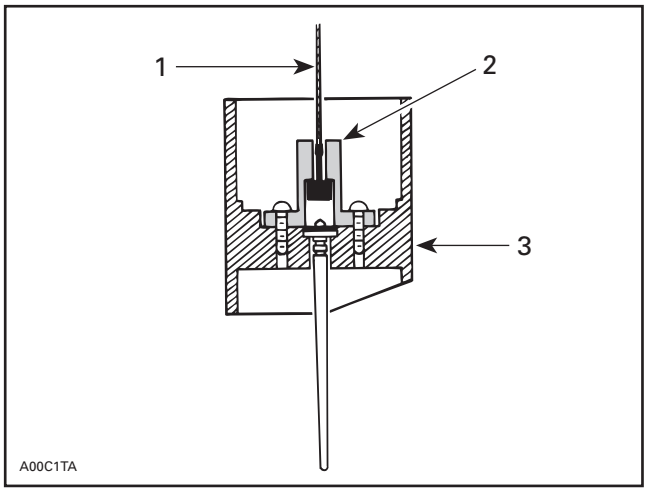
Turning screw in clockwise enrichners mixture and conversely, turning it out counterclockwise leans mixture.

Refer to TECHNICAL DATA for the specifications.

Throttle Slide Height (preliminary idle speed adjustment)

Hook throttle cable into the needle retainer plate.

NOTE: Do not obstruct hole in throttle slide when installing needle retaining plate. This is important to allow air escaping through and thus allowing a quick response.

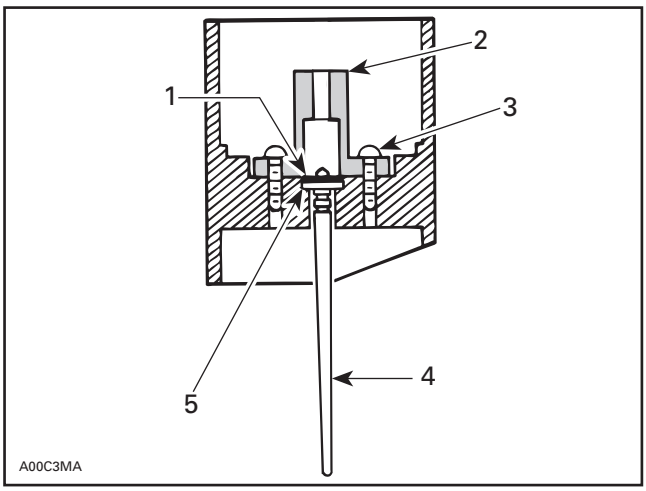


CENTER POST TYPE

1. *Throttle cable*
2. *Needle retaining plate*
3. *Throttle slide*

Make sure the nylon packing **no. 4** is installed on all applicable throttle slides.

CAUTION: Serious engine damage can occur if this notice is disregarded.



CENTER POST TYPE

1. *E-clip*
2. *Needle retaining plate*
3. *Screw*
4. *Needle*
5. *Nylon packing*

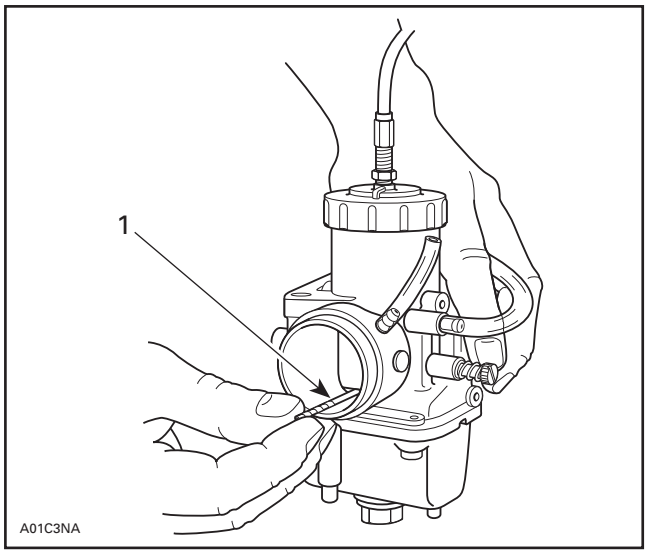
Using a drill bit adjust throttle slide height (see following table) by turning idle speed screw **no. 7**.

Throttle slide height is measured on **outlet** side of carburetor (engine side).

NOTE: Make sure that throttle cable does not hold throttle slide. Loosen cable adjuster accordingly.

Final idle speed adjustment (engine running at idle speed) should be within 1/2 turn of idle speed screw from preliminary adjustment.

MODELS	THROTTLE SLIDE HEIGHT ± 0.2 mm (± .008 in)
MX Z 500 Formula DLX 500 Grand Touring 500	1.4 (.055)



TYPICAL

1. *Drill bit used as gauge for throttle slide height*

INSTALLATION

CAUTION: Never allow throttle slide(s) to snap shut.

Prior to install carburetor, adjust air screw and preliminary idle speed as described above.

To install carburetor on engine, inverse removal procedure.

However, pay attention to the following:

On applicable models, make sure to align tab of carburetor and air intake silencer (if applicable) with notch of adaptor(s). On applicable models, install adaptor with UP mark facing up.

CAUTION: The rubber flange must be checked for cracks and/or damage. At assembly, the flange must be perfectly matched with the air intake manifold or severe engine damage will occur.

Install clamps in a way that their tightening bolts are staggered — not aligned.

Throttle Cable Adjustment

⚠ WARNING

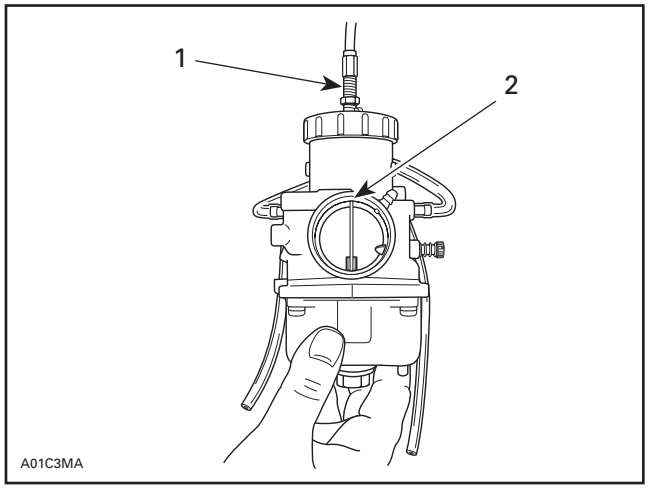
Ensure the engine is turned OFF, prior to performing the throttle cable adjustment.

Carburetors must be installed on engine and throttle cable properly routed.

For maximum performance, correct cable adjustment is critical.

At full opening throttle slide must be flush or 1.0 mm (.040 in) lower than the top of carburetor **outlet** bore (engine side). Use a mirror and look through air silencer.

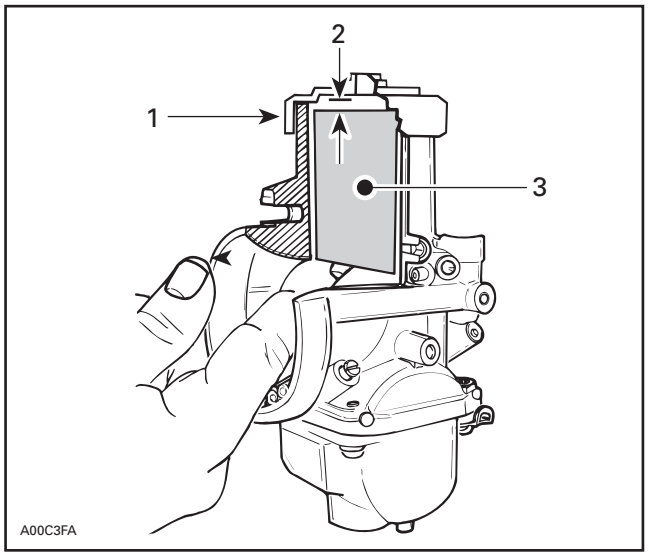
First loosen adjuster nut then turn throttle cable adjuster accordingly.



FULL OPENING (THROTTLE LEVER AGAINST HANDLE GRIP)

1. *Throttle cable adjuster*
2. *Throttle slide flush or 1.0 mm (.040 in) lower than carburetor outlet bore (engine side)*

Check that **with the throttle lever fully depressed**, there is a free play between the carburetor cover and top of throttle slide.



FULL OPENING (THROTTLE LEVER AGAINST HANDLE GRIP)

1. *Cover*
2. *Free play*
3. *Throttle slide*

⚠ WARNING

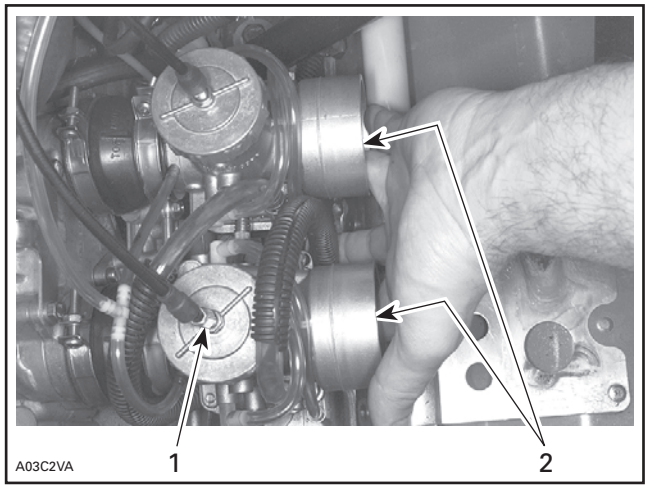
This gap is very important. If the throttle slide rests against the carburetor cover at full throttle opening, this will create too much strain and may damage the throttle cable or other components in throttle mechanism.

Carburetor Synchronization

When depressing throttle lever, both carburetor slides must start to open at same time.

Unlock cable adjustment lock nut on one carburetor.

Screw or unscrew cable adjuster until all carburetor slides start to open at same time. Cable play will be identical on all carburetors. Retighten jam nut.



TYPICAL

1. *Screw or unscrew adjuster*
2. *Check that all slides start to open at the same time*

Check throttle slide position at wide open throttle. Throttle slide must be flush or 1.0 mm (.040 in) lower than carburetor **outlet** bore. At that same position, check that throttle slide does not contact carburetor cover. Turn cable adjuster and recheck synchronization.

CAUTION: If the throttle slide rests against the carburetor cover at full throttle opening, this will create too much strain and may damage the throttle cable or other components in throttle mechanism.

CAUTION: Make sure all carburetors start to operate simultaneously.

Idle Speed Final Adjustment

CAUTION: Before starting engine for the final idle adjustment, make sure that oil pump is adjusted. The oil injection pump adjustment must be checked after each time carburetor idle is adjusted. Refer to OIL INJECTION SYSTEM.

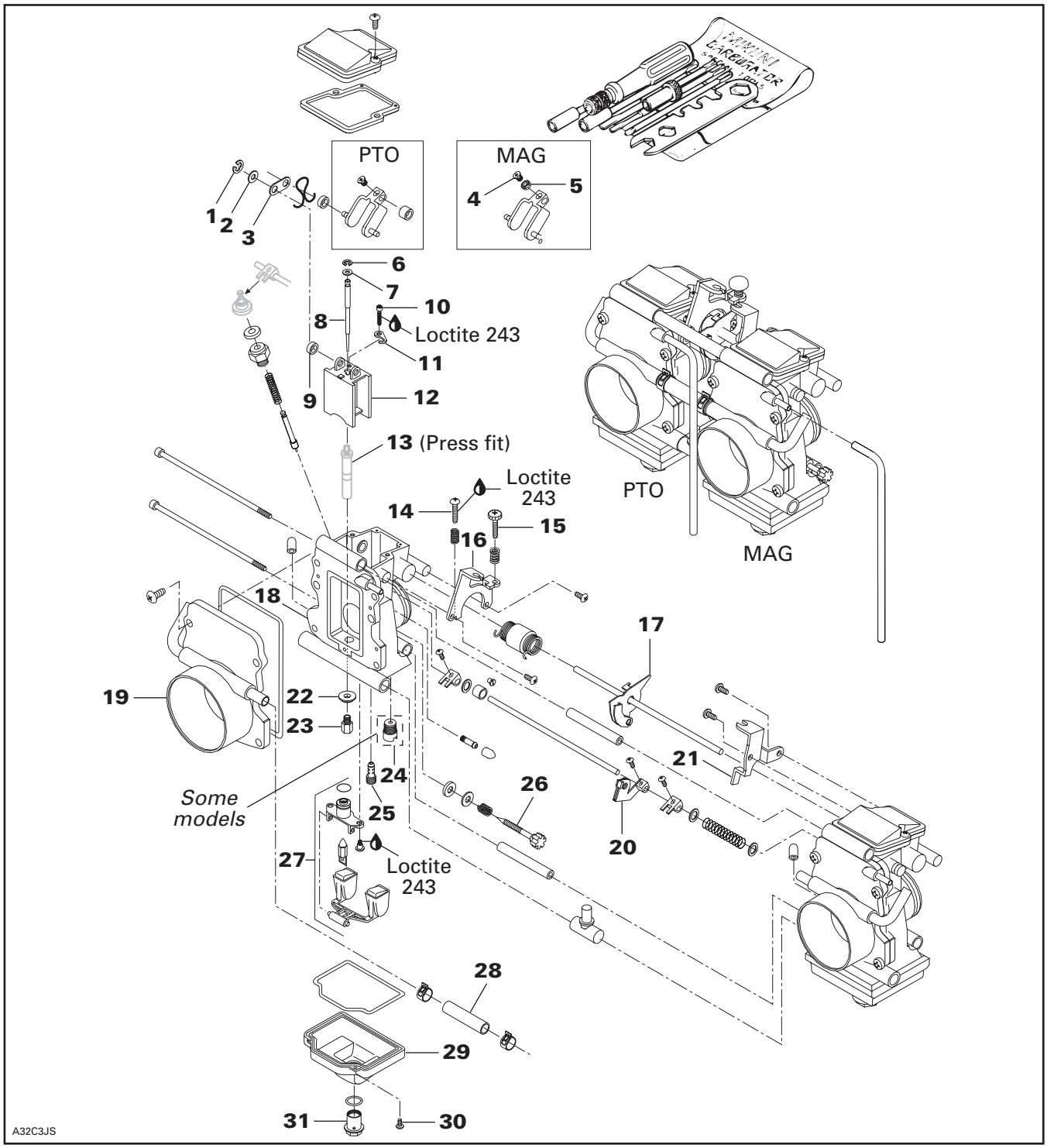
Start engine and allow it to warm then adjust idle speed to specifications by turning **idle speed** screw clockwise to increase engine speed or counterclockwise to decrease it.

Refer to TECHNICAL DATA for the specifications.

NOTE: Turn adjustment screw the same amount to keep carburetors synchronized.

CAUTION: Do not attempt to set the idle speed by using the air screw. Severe engine damage can occur.

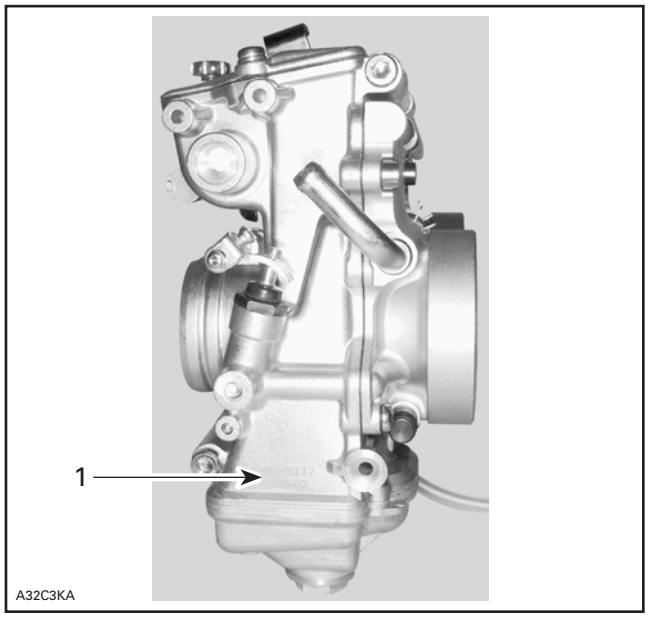
TM Type



PARTS FLAT RATE

IDENTIFICATION

TM type dual carburetor ass'y is identified on PTO side carburetor body.



TYPICAL
1. Identification: TM 40-B112

REMOVAL

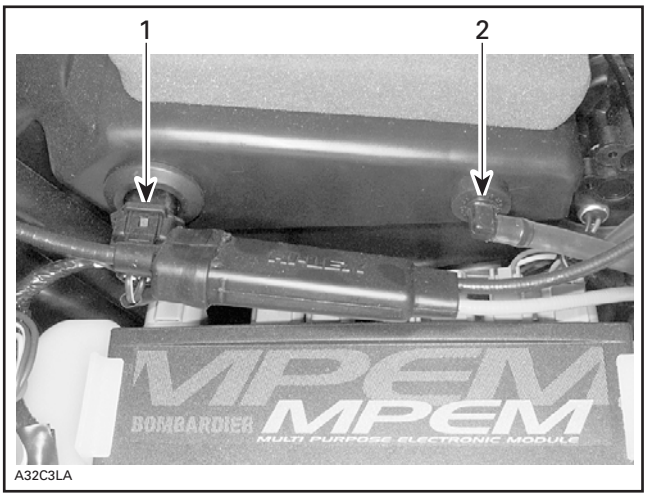
All Models

Lift hood.

DPM Models

Disconnect air temperature sensor connector at air silencer.

Disconnect DPM air vent hose nipple from air silencer.



DPM EQUIPPED MODELS
1. Air temperature sensor
2. DPM air vent hose nipple

Non-DPM Models

Disconnect carburetor float bowl vent hose nipple from air silencer.

DPM Models

Unhook DPM manifold from its supports.

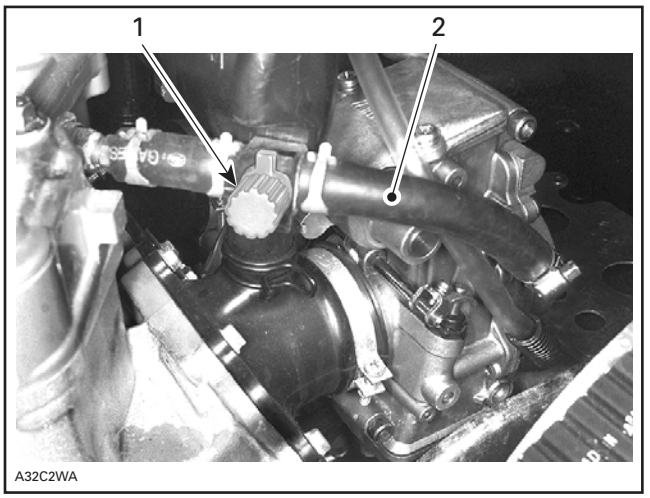
Remove DPM supports from air silencer.

All Models

Loosen clamps retaining air silencer adapter to carburetor assembly and remove air silencer.

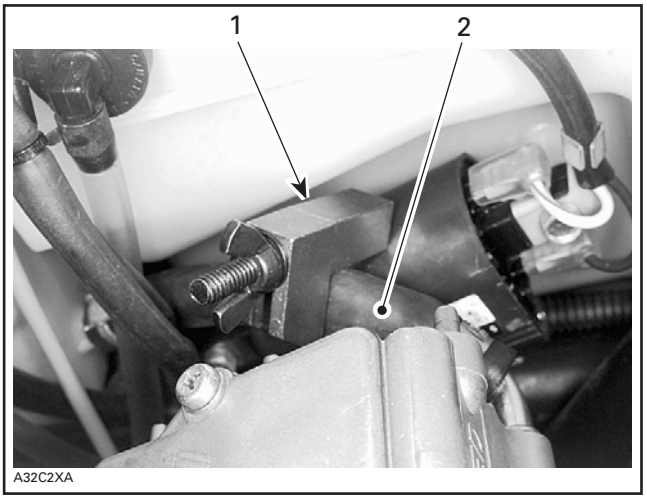
Heated Carburetor Models

Close valve at heated carburetor coolant inlet line.



1. Valve
2. Inlet line

Pinch heated carburetor coolant outlet line.



1. Pincher (P/N 295 000 076)
2. Outlet line

Disconnect both lines from carburetor assembly taking care to recuperate coolant.

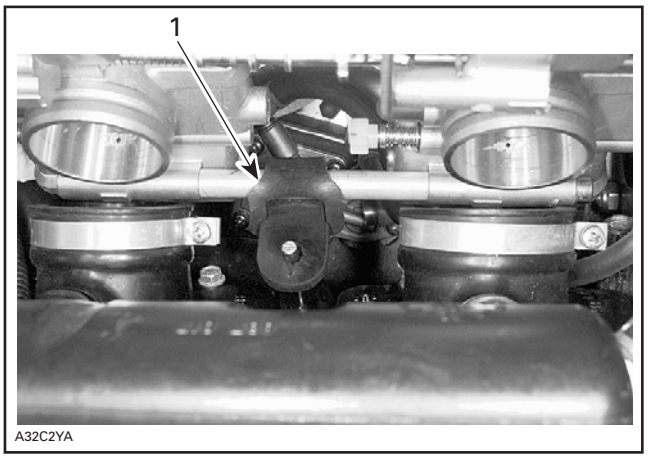
All Models

Disconnect throttle and choke cables.

Loosen clamps retaining dual carburetor assembly to carburetor sockets.

Gently slid out securing strap.

CAUTION: Securing strap between 2 carburetors has to be gently slid out to avoid breakage.



1. Securing strap

Remove dual carburetor assembly, pinch and disconnect fuel line. Take care to recuperate fuel.

⚠ WARNING

Fuel is flammable and explosive under certain conditions. Always wipe off any fuel or oil spillage from the vehicle. Ensure work area is well ventilated. Do not smoke or allow open flames or sparks in the vicinity.

CLEANING AND INSPECTION

All Models

The entire carburetor should be cleaned with a general solvent and dried with compressed air before disassembly.

CAUTION: Heavy duty carburetor cleaner may be harmful to the float material and to the rubber parts, O-rings, etc. Therefore, it is recommended to remove those parts prior to cleaning.

Carburetor body and jets should be cleaned in a carburetor cleaner following manufacturer's instructions. When jets are very dirty or coated with varnish and gum, replace them.

⚠ WARNING

Solvent with a low flash point such as gasoline, naphtha, benzol, etc., should not be used as they are flammable and explosive.

Check throttle slide for wear. Replace as necessary.

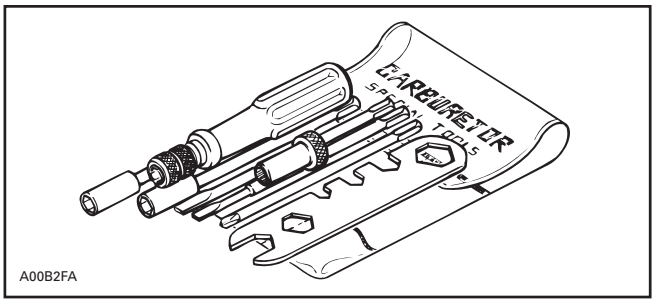
Check for fuel soaked into float no. 27; replace as necessary.

Check float for cracks or other damages affecting free movement; replace as necessary.

Inspect throttle and choke cables and housings for any damages. Replace as necessary.

DISASSEMBLY AND ASSEMBLY

NOTE: To ease the carburetor disassembly and assembly procedures it is recommended to use carburetor tool kit (P/N 404 112 000).



29, Float Bowl

Unscrew drain screw **no. 31** and screw **no. 30.** Remove float bowl.

Some float bowls have an integrated starter jet **no. 24**. In these cases do not mismatch float bowl.

27, Float and Needle Valve Ass'y

Unfasten both screws then, pull out float and needle valve ass'y **no. 27**.

At assembly, apply Loctite 243 on screw threads.

23, Main Jet

The main jet installed in the carburetor has been selected for a temperature of - 20°C (0°F) at sea level. Different jetting can be installed to suit temperature and/or altitude changes. A Service Bulletin will give information about calibration according to altitude and temperature.

Main jet **no. 23** may be removed without removing float bowl **no. 29** by first removing drain screw **no. 31**. At installation, make sure to install brass washer **no. 22** underneath main jet.

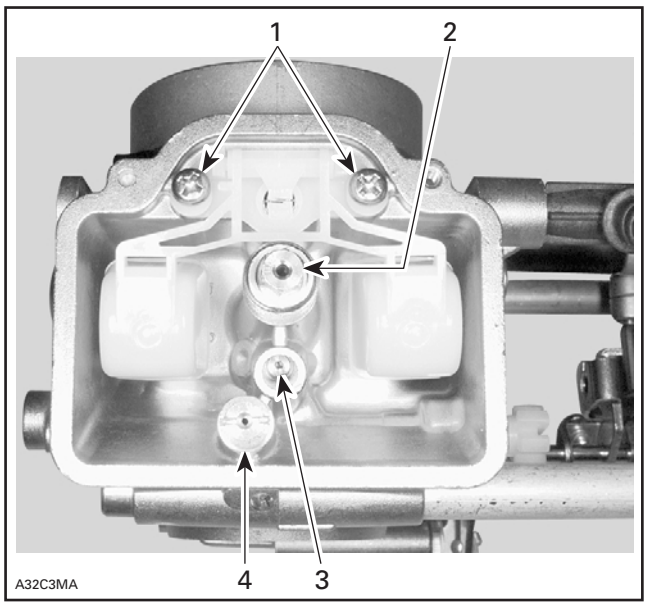
25, Pilot Jet

Use narrow screwdriver from carburetor tool kit (P/N 404 112 000) to unfasten pilot jet **no. 25**.

24, Starter Jet

Starter jet is part of choke system. Use a wide flat screwdriver for disassembly and assembly.

On some models there is no starter jet **no. 24**; instead, a hole in float bowl **no. 29** acts as a starter jet.



1. Float and needle valve ass'y screws
2. Main jet
3. Pilot jet
4. Starter jet located on carburetor body

12, Throttle Slide

Do not disassemble throttle slide needlessly.

CAUTION: After throttle slide reassembly, proceed with a leak test. See below for procedure.

Heated Carburetor Models

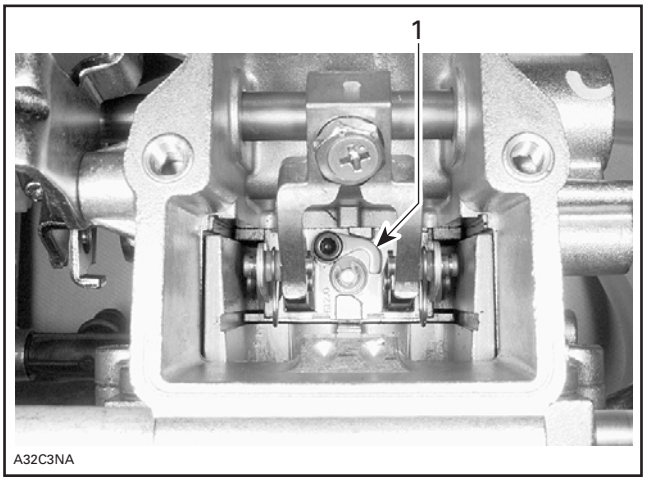
Disassemble both carburetors at the same time. Coolant hose between carburetor throttle slide covers must remain in place during the complete disassembly and assembly.

All Models

Remove carburetor cover.

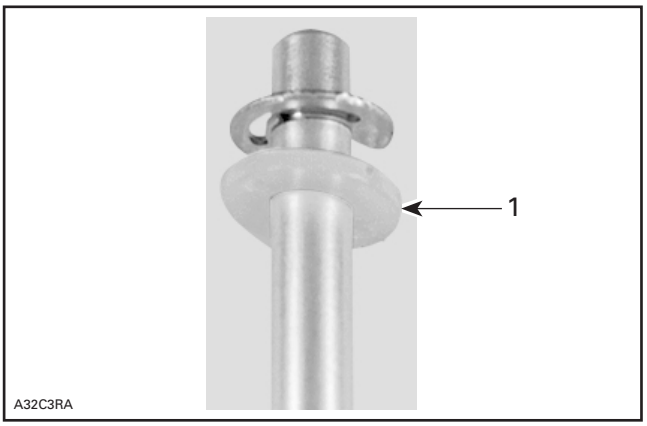
Loosen needle retainer screw **no. 10**.

Move aside needle retainer **no. 11**.



1. Needle retainer moved aside

Turn dual carburetor ass'y upside down to free needle **no. 8**. Take care not to loose plastic washer **no. 7** under needle circlip **no. 6**.

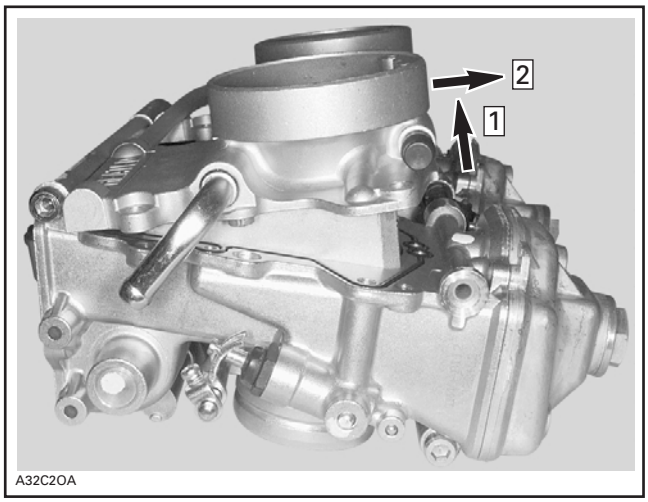


1. Plastic washer

Unscrew throttle slide cover **no. 19** screws.

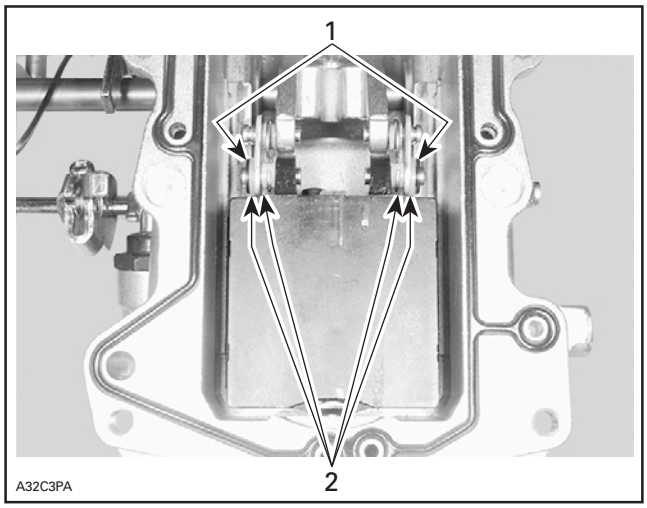
Open throttle 3/4 wide and keep that opening.

Lift throttle slide covers bottom first until there are free from carburetor bodies. Then, slide them out.



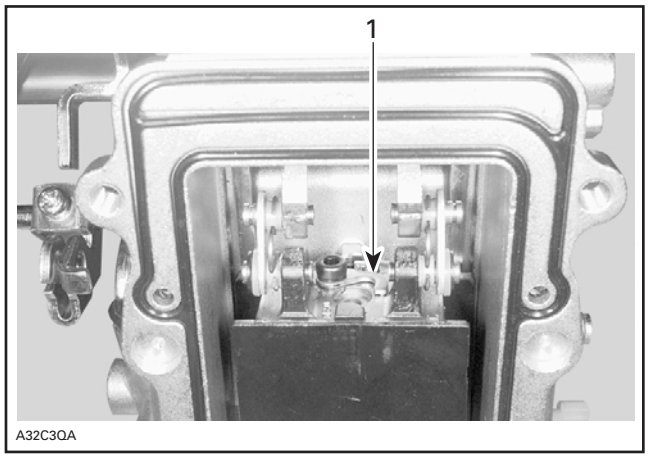
Step [1]: Lift bottom first
Step [2]: Slide out

Remove both circlips **no. 1** retaining throttle slide. Take care not to loose plastic washers **nos. 2** and **9**.



1. Circlips
2. Plastic washers

At throttle slide assembly, needle retainer must face carburetor body.



1. Needle retainer

Float Bowl Ventilation Leak Test

Plug fuel inlet line. Plug other carburetor ventilation nipple.

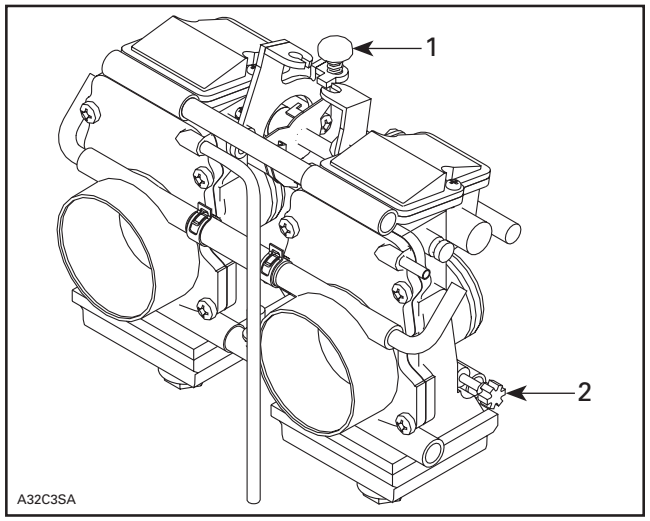
Connect a long tube to ventilation nipple on top side of throttle slide cover.

Float bowl ventilation circuit must hold a vaccum of 600 mm (24 in) of water.

CARBURETOR ADJUSTMENTS

Adjustments should be performed following this sequence:

– pilot screw adjustment
– carburetor synchronization and throttle slide height (preliminary idle speed adjustment)
– throttle cable adjustment
– choke cable adjustment
– oil pump and carburetor synchronization
– final idle speed adjustment (engine running).



1. Idle speed screw
2. Pilot screw (one on each carburetor)

Pilot Screw Adjustment

Completely close the **pilot screw** (until a slight seating resistance is felt) then back off as specified.

Turning screw in clockwise leans mixture and conversely, turning it out counterclockwise enrichners mixture.

Refer to TECHNICAL DATA for the specifications.

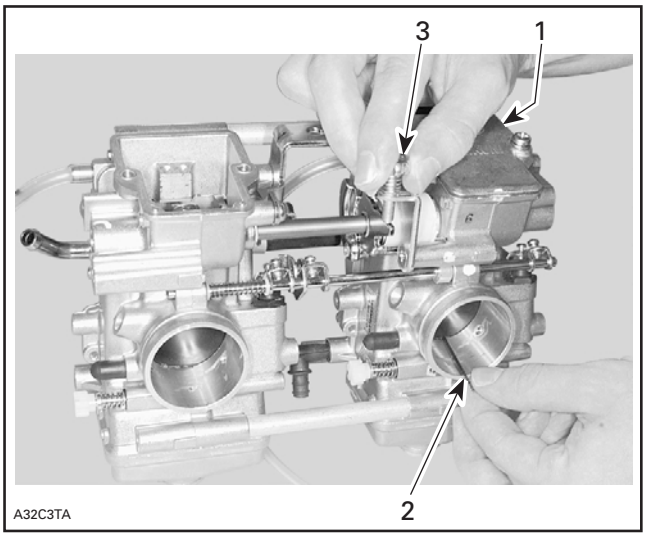
Carburetor Synchronization and Throttle Slide Height (preliminary idle speed adjustment)

Remove MAG side carburetor cover.

First proceed on PTO carburetor.

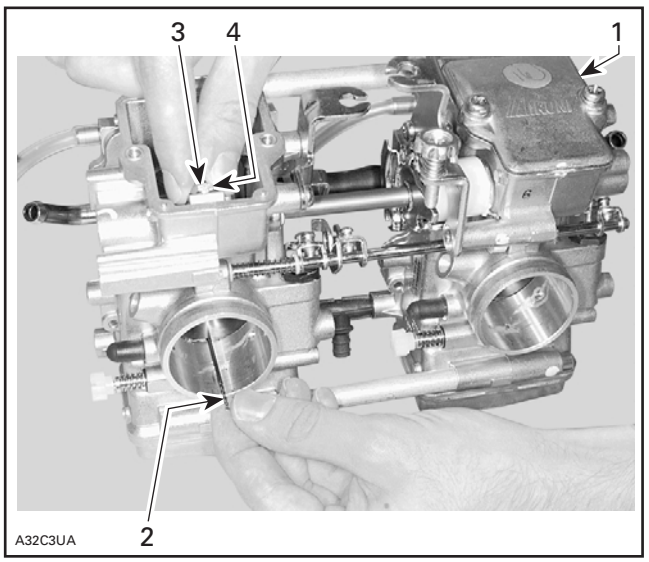
Using a drill bit to measure throttle slide height (see following table) on **outlet** side of carburetor (engine side).

Adjust by turning idle speed screw **no. 15**.



1. Adjust PTO carburetor first
2. Drill used as a gauge to measure throttle height
3. Idle speed screw

For MAG carburetor loosen locking screw. Use same drill bit as for PTO carburetor to measure throttle slide height. Turn adjusting nut to adjust.



1. PTO carburetor adjusted first
2. Drill used as a gauge to measure throttle height
3. Locking screw
4. Adjusting nut

Tighten locking screw and recheck throttle height.

NOTE: By adjusting both throttle slides at same height TM carburetors synchronization is done at same time.

NOTE: Make sure that throttle cable does not hold throttle slide. Loosen cable adjuster accordingly.

Final idle speed adjustment (engine running at idle speed) should be within 1/2 turn of idle speed screw from preliminary adjustment.

MODELS	THROTTLE SLIDE HEIGHT ± 0.2 mm (± .008 in)
MX Z 600 Summit 700	1.8 (.071)
Grand Touring 600 Formula DLX 600/GSE	1.8 (.071)
Summit 600/800	2.2 (.087)
Formula DLX 700 GS/GSE MX Z 700 Grand Touring 700 GS	1.5 (.059)
MX Z 800	1.7 (.067)

INSTALLATION

CAUTION: Never allow throttle slide(s) to snap shut.

Install dual carburetor assembly making sure to align securing strap in its bracket.

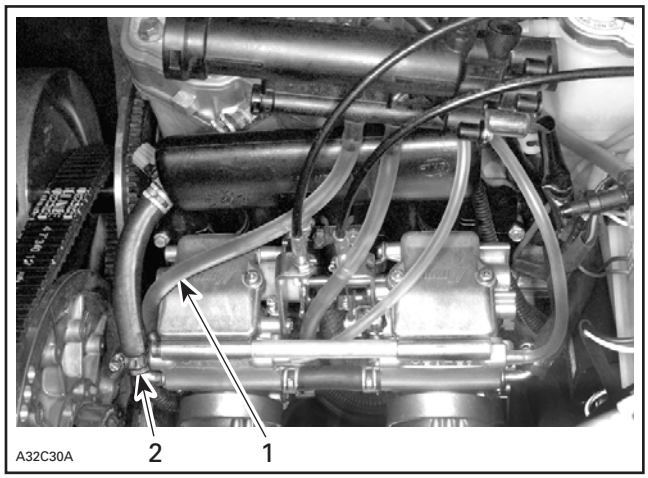
Make sure dual carburetor assembly is properly inserted into carburetor sockets, hold it in place and tighten retaining clamps.

Secure heated carburetor inlet and outlet lines with clamps, tighten to 1.5 to 2.0 N•m (13 to 18 lbf•**in**) and remove pincher on outlet line.

Allow coolant to flow from coolant tank to carburetor before opening valve.

Connect all hoses to dual carburetor assembly and to DPM, making sure there is no kinked hoses after reconnection.

NOTE: Left side DPM hose must be routed under heated carburetor coolant inlet hose.



1. Left side DPM hose
2. Heated carburetor coolant inlet hose

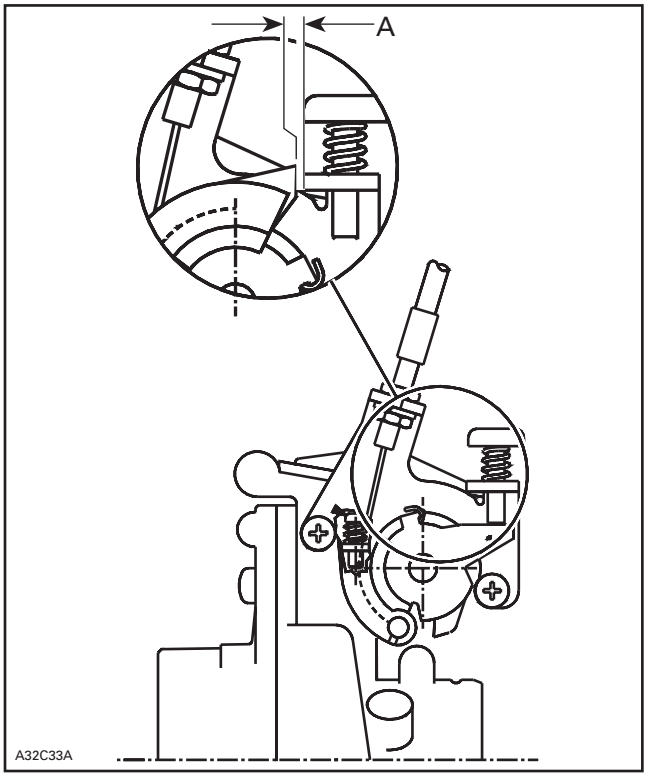
Throttle Cable Adjustment

Adjust throttle cable as per following procedure:

Loosen throttle cable housing adjusting and locking nuts.

Connect throttle cable barrel to carburetor cam lever no. 17.

While holding throttle lever to wide open throttle position, pull on the throttle cable until cam lever touches the stopper no. 16. In this position, tighten cable housing adjusting and locking nuts. As a confirmation, the gap should be in between 0.5 and 1 mm (1/64 and 1/32 in).



A. Between 0.5 and 1 mm (1/64 and 1/32 in)

Choke Cable Adjustment

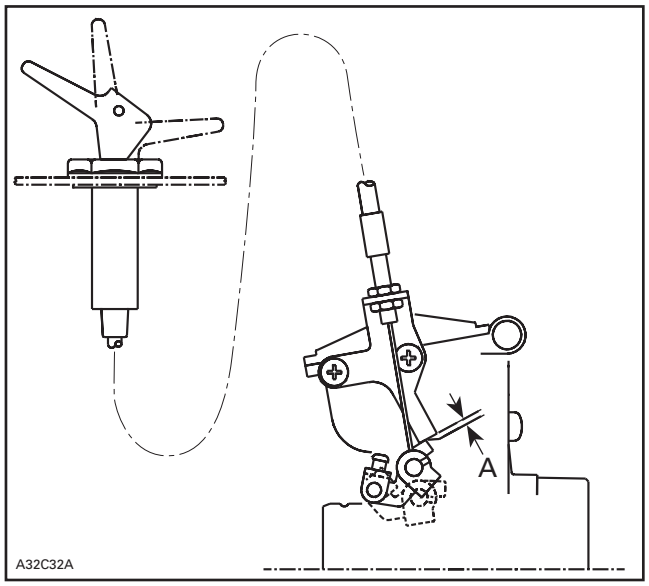
Adjust choke cable as per following procedure:

Loosen choke cable housing adjusting and locking nuts.

Connect choke cable on starter lever no. 20.

While choke lever is fully open, adjust choke cable until starter lever reaches the stopper. Tighten cable housing adjusting and locking nuts in this position.

As a confirmation, the gap between the stopper and the bracket should be in between 0 and 0.5 mm (0 and 1/64 in).



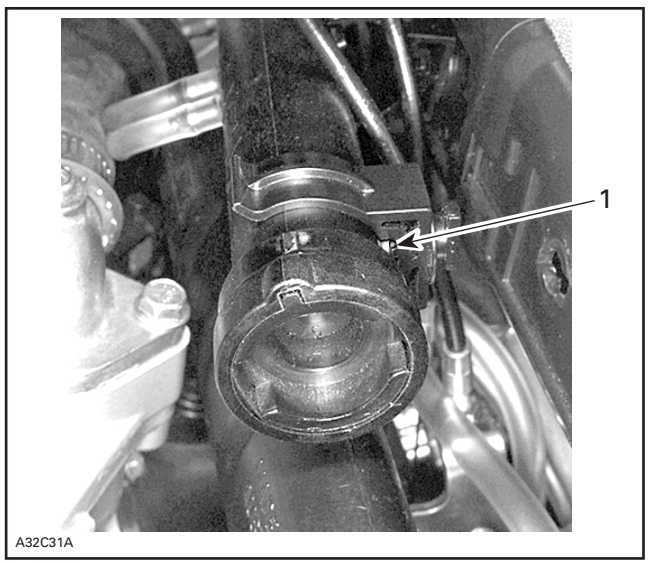
A. Between 0 and 0.5 mm (0 and 1/64 in)

Reinstall air silencer and DPM.

Reconnect DPM air vent hose at air silencer.

Make sure dual carburetor assembly properly slides into air silencer adapters; hold it in place and tighten clamps.

NOTE: DPM must be installed with its protrusion in higher support slot.



1. Protrusion in higher support slot

Reconnect DPM air vent hose nipple to air silencer.

Reconnect air temperature sensor connector to air silencer.

Idle Speed Final Adjustment

CAUTION: Before starting engine for the final idle adjustment, make sure that oil pump is adjusted. The oil injection pump adjustment must be checked after each time carburetor idle is adjusted. Refer to OIL INJECTION SYSTEM.

Start engine and allow it to warm then adjust idle speed to specifications by turning **idle speed** screw clockwise to increase engine speed or counterclockwise to decrease it.

Refer to TECHNICAL DATA for the specifications.

CAUTION: Do not attempt to set the idle speed by using the pilot screw. Severe engine damage can occur.

DPM

Some Models

TESTING

MPEM

Solenoid is supplied by the MPEM. If this MPEM does not work, there will be no current on the compensation solenoid.

Air temperature sensor must be at room temperature. Operate the engine at 4000 RPM. The solenoid must vibrate.

Start the engine and observe the solenoid. A vibrating solenoid indicates that the MPEM is in good working order. If not, replace the MPEM and repeat test.

Solenoid

Static Test

Unplug electric connector of solenoid and connect it to a 12 V battery. The solenoid must sound when it opens. Repeat test several times.

Dynamic Test

Air temperature sensor must be at room temperature. Operate the engine at 3500 RPM. The solenoid must vibrate.

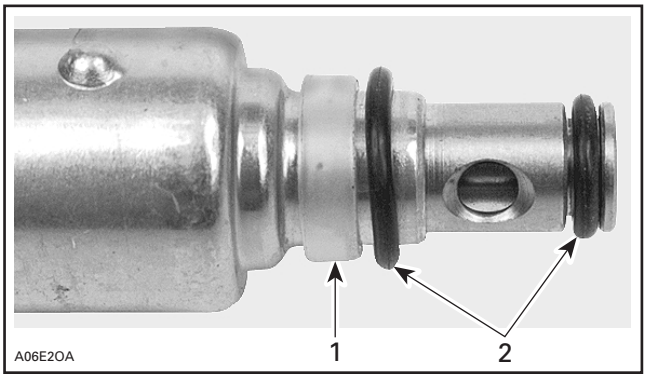
Air Temperature Sensor

At room temperature 20°C (68°F), the sensor resistance must be 2500 Ω ± 300.

PARTS REMOVAL AND INSTALLATION

Solenoid

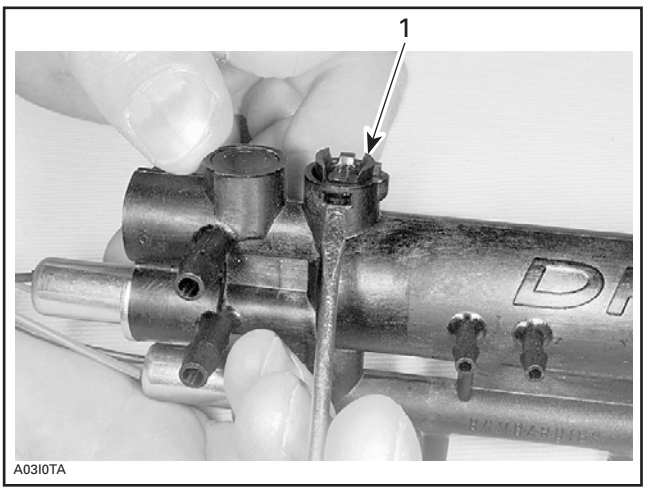
At reassembly, ensure that solenoid seals are in place.



1. *Plastic seal*
2. *O-rings*

Installation of compensation solenoid must be done as follows:

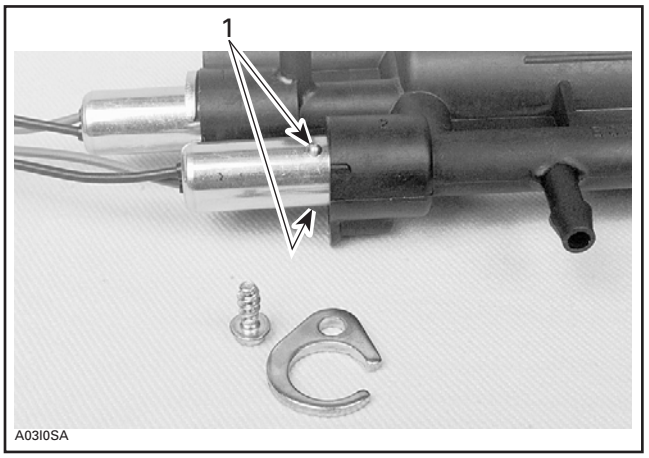
Remove transfer gallery plug by pushing 2 tabs.



TYPICAL

1. *Transfer gallery plug*

Partially insert compensation solenoid into DPM manifold.

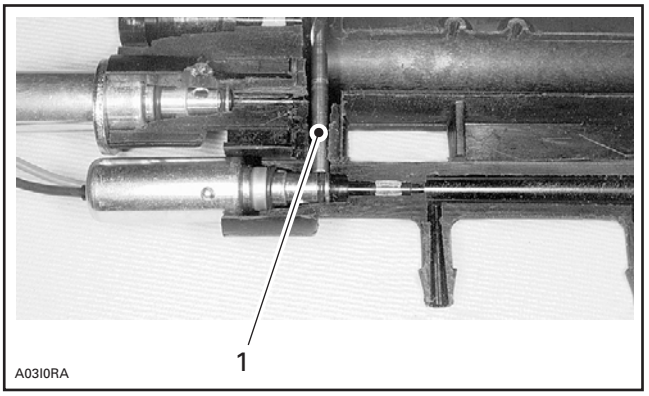


TYPICAL

1. *Embosses not engaged*

Insert a 5/32 in drill bit with its round end first into the transfer gallery.

Fully push solenoid into DPM manifold while maintaining a pressure on drill bit. This will guide the solenoid O-ring.



TYPICAL — CUT-AWAY

1. *Drill bit round end guiding solenoid O-ring*

DPM MANIFOLD LEAK TESTING

Disconnect all carburetor venturi hoses from DPM. Plug one venturi inlet nipple.

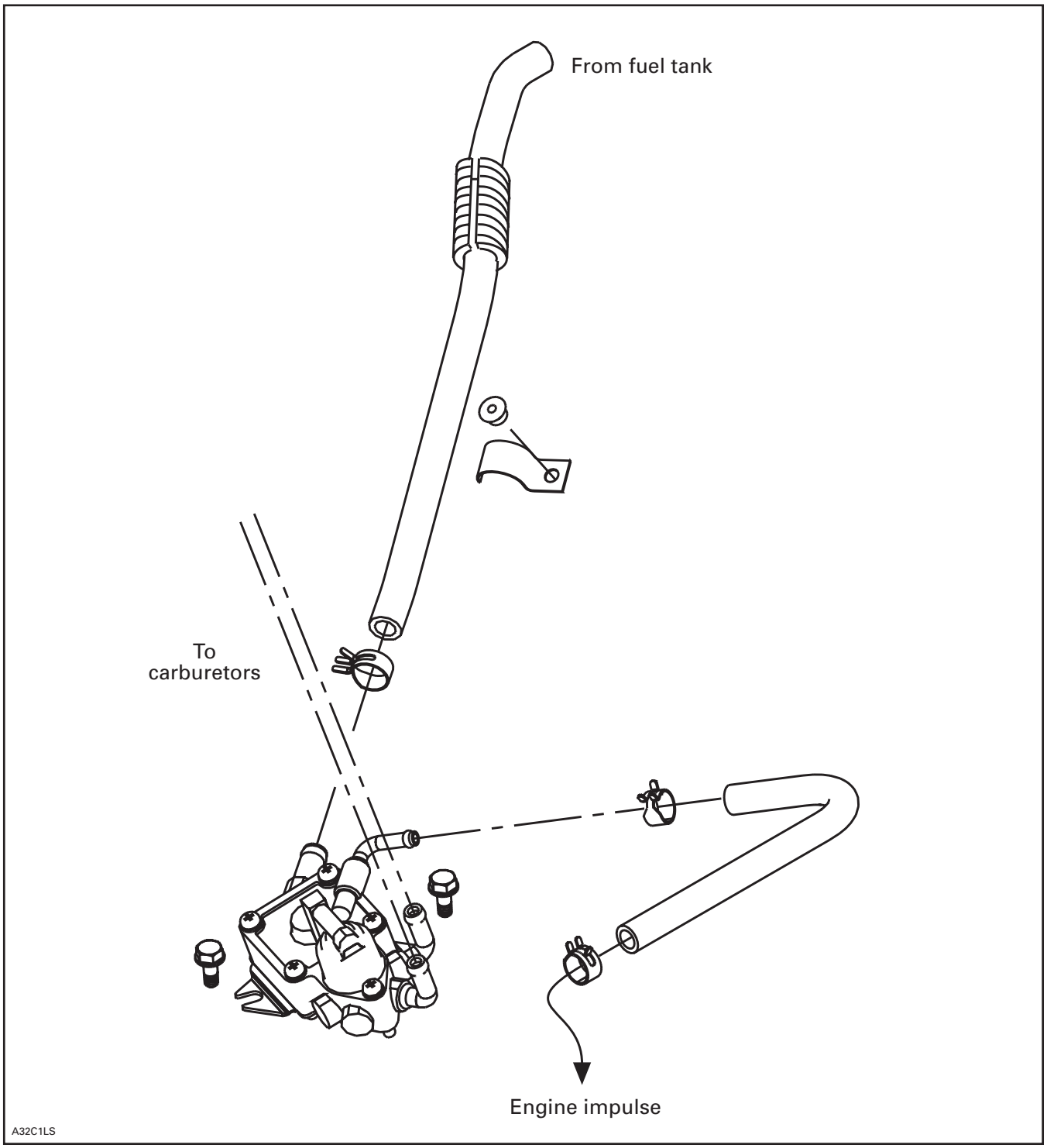
Proceed with air tightness test by connecting tester onto the other nipple; must hold 35 kPa (5 PSI) vacuum for 10 seconds.

Repair leaks (if any).

Reconnect carburetor venturi hoses to DPM.

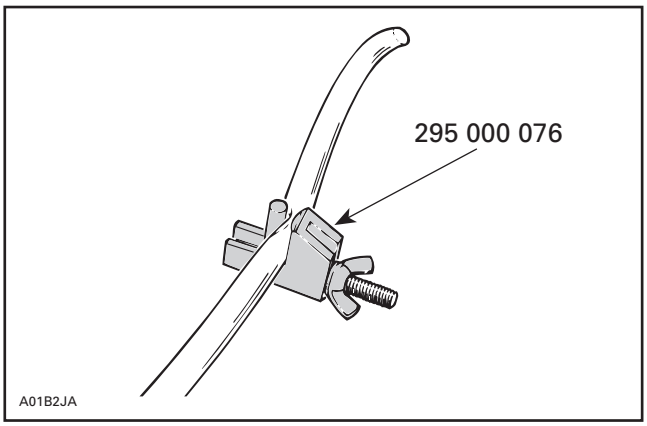
FUEL PUMP

All Models



REMOVAL

Install a hose pincer (P/N 295 000 076) on fuel supply line close to pump inlet.



Disconnect fuel outlet line(s).

Disconnect impulse line.

Remove screws securing fuel pump to chassis.

PUMP VERIFICATION

Check fuel pump valves operation as follows:

Connect a clean plastic tubing to the inlet nipple and alternately apply pressure and vacuum with pump of leak test kit. The inlet valve should release with pressure and hold under vacuum.

Repeat the same procedure at the outlet nipple. This time the outlet valve should hold with pressure and also under vacuum.

NOTE: Plug remaining outlet with finger while checking outlet valve.

Check impulse diaphragm and gasket on high-supply fuel pump with twin outlets as follows:

Connect a clean plastic tubing to the impulse nipple and plug vent hole on top cover on so equipped models. Either apply pressure or vacuum. The diaphragm/gasket must not leak.

CLEANING AND INSPECTION

The entire pump should be cleaned with general purpose solvent before disassembly.

Fuel pump components should be cleaned in general purpose solvent and dried with compressed air.

⚠ WARNING

Solvent with a low flash point such as gasoline, naphtha, benzol, etc., should not be used as each is flammable and explosive.

Inspect diaphragm. The pumping area should be free of holes, tears or imperfections. Replace as needed.

INSTALLATION

Inverse removal procedure.

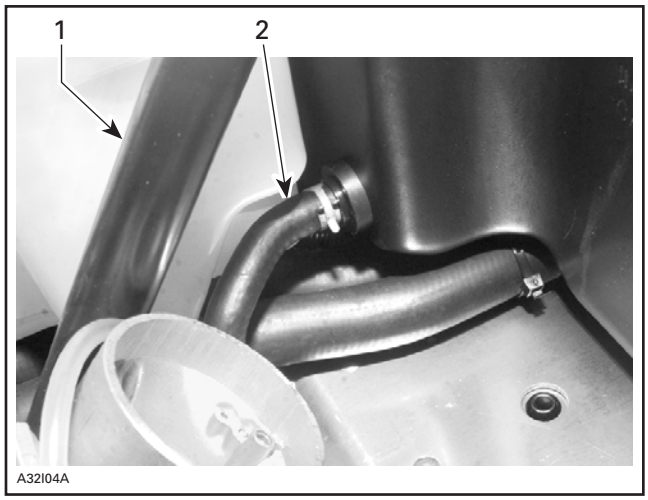
⚠ WARNING

Pressure test to ensure there is no leak in fuel system.

FUEL TANK AND THROTTLE CABLE

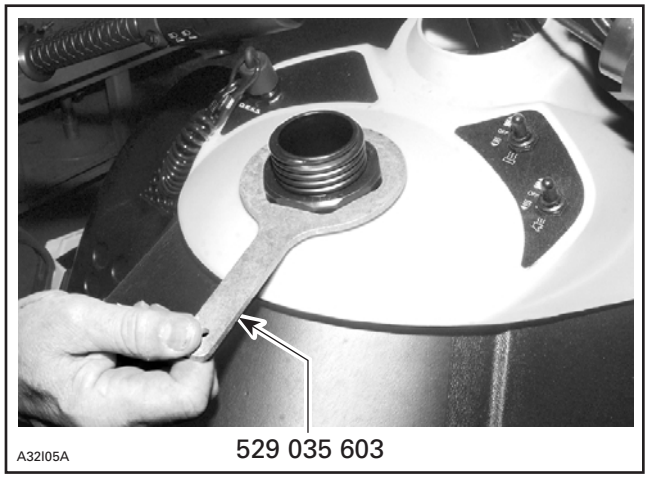
Fuel Tank

After draining fuel tank, unplug fuel line.

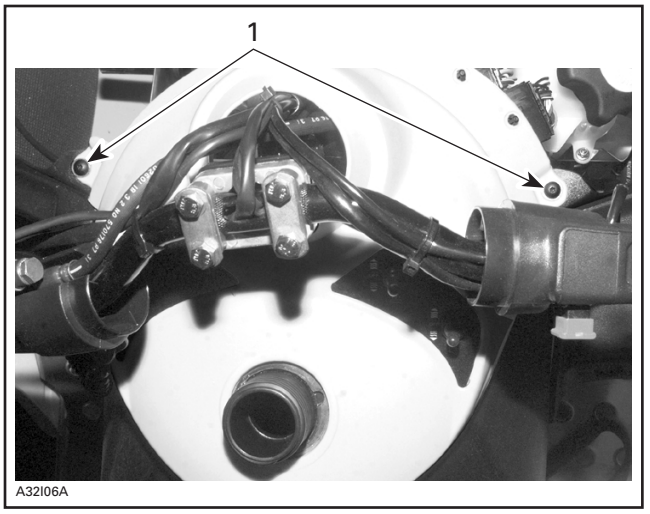


1. *Steering column*
2. *Fuel line*

Remove console nut using console nut key (P/N 529 035 603).



Unscrew console and move it toward front.



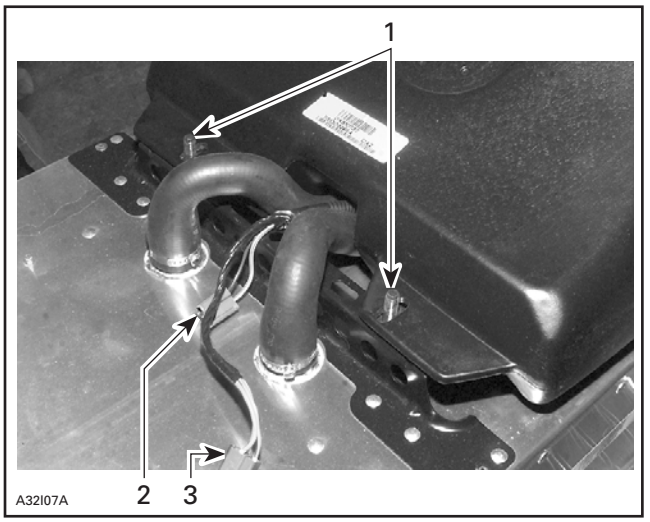
1. *Remove these screws*

Open storage compartment at rear of seat.

Remove nuts and washers retaining rear of seat then move seat rearward.

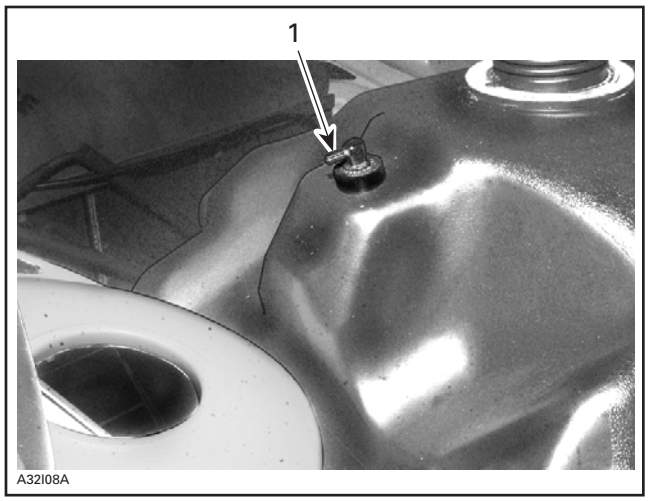
Disconnect taillight connector housing located between seat and fuel tank.

Remove seat then unbolt rear of fuel tank. Unplug electric fuel level gauge on so equipped models.



1. *Nuts retaining rear of fuel tank removed*
2. *Connector housing of electric fuel level gauge*
3. *Connector housing of taillight*

Move fuel tank rearward then, unplug vent tube from vent fitting at top front of fuel tank.

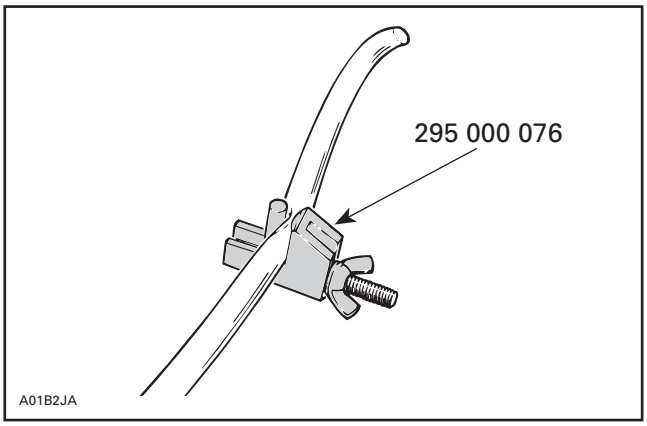


1. Vent fitting

Fuel Tank Lines

⚠ WARNING

Whenever a fuel line is disconnected, obstruct line with a hose pincher (P/N 295 000 076) or equivalent device. Fuel is flammable and explosive under certain conditions. Ensure work area is well ventilated. Do not smoke or allow open flames or sparks in the vicinity.



Impulse/Fuel Lines Spring Clips (all models)

Always reposition spring clips after any repair to prevent possible leaks.

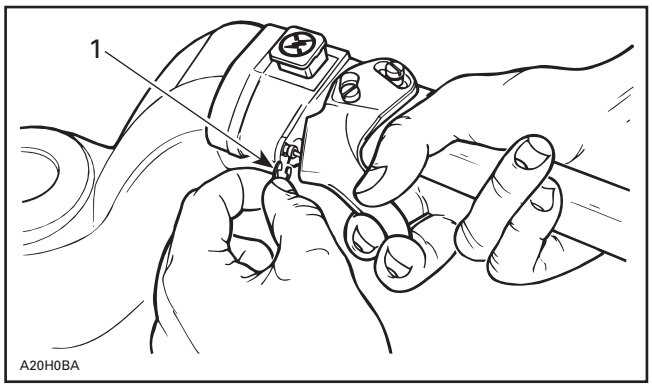
Throttle Cable Circlip at Handlebar (all models)

Put silicone grease (P/N 293 550 004) around cable barrel. Locate circlip as per illustration.

⚠ WARNING

If this procedure is disregarded, throttle might be half-open at normally closed position and the engine will speed up when starting.

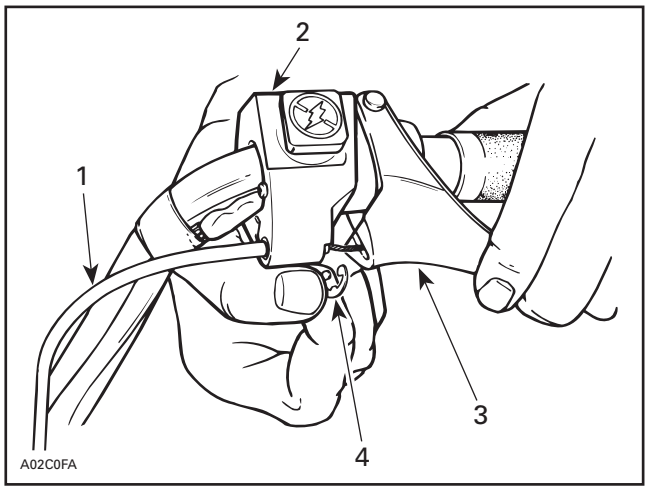
Models with Easy Action Throttle Lever



TYPICAL

1. Circlip

Other Models



TYPICAL

1. Throttle cable housing
2. Throttle handle housing
3. Throttle handle
4. Circlip

Adjust throttle cable as specified in CARBURETOR AND FUEL PUMP.

Throttle Cable Routing

CAUTION: Check that throttle cable is routed away from sharp edges, hot or vibrating parts. When turning steering while engine is running, idle speed must not vary.

Fuel Level Sensor

Inspection

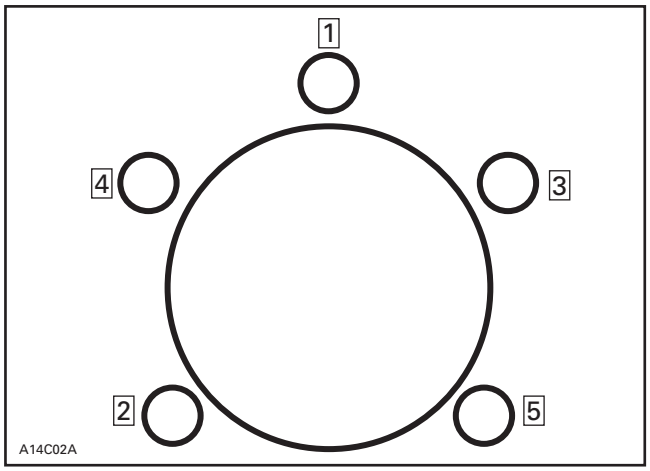
Visually inspect the condition of connectors and wiring throughout the circuit. Connections must be clean and tight, and wiring free of damage. Repair as necessary. Use silicone dielectric grease to prevent corrosion at the connectors. Operate the engine to see if the problem has been corrected.

Fuse Replacement

A 0.25 ampere fuse protects fuel level sensor circuitry. Remove seat to gain access.

Fuel Level Sensor Screws

Torque fuel level sensor retaining screws to 1 N•m (8 lbf•**in**) in the sequence shown and then to 2.5 N•m (22 lbf•**in**), using the same sequence.



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DRIVE BELT

2001 APPLICATION CHART

MODEL	PART NUMBER	WIDTH (NEW) ± 0.25 mm (.010 in)	MINIMUM WIDTH (WEAR LIMIT) mm (in)
All 493 and 593 engine equipped models except Summit 600	414 860 700	35.30 (1.390)	32.30 (1.272)
All 693 and 793 engine equipped models and Summit 600	417 300 127	36.35 (1.431)	33.35 (1.313)

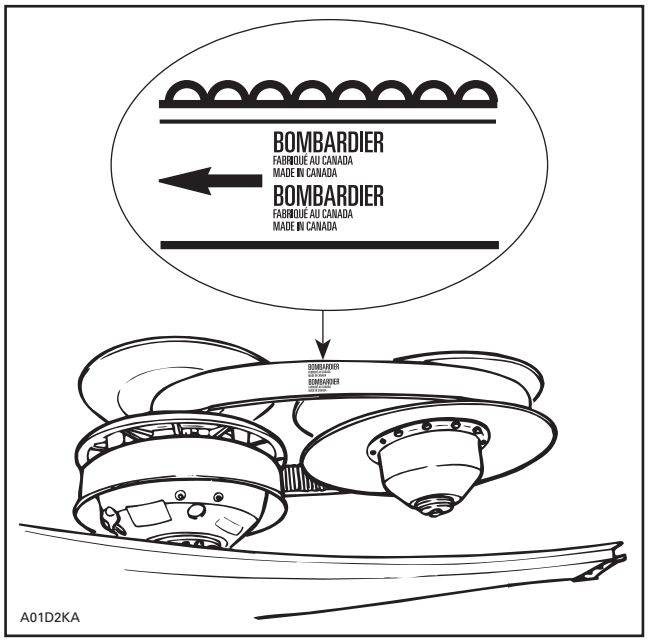
INSPECTION

Inspect belt for cracks, fraying or abnormal wear (uneven wear, wear on one side, missing cogs, cracked fabric). If abnormal wear is noted, probable cause could be pulley misalignment, excessive RPM with frozen track, fast starts without warm-up period, burred or rusty sheave, oil on belt or distorted spare belt.

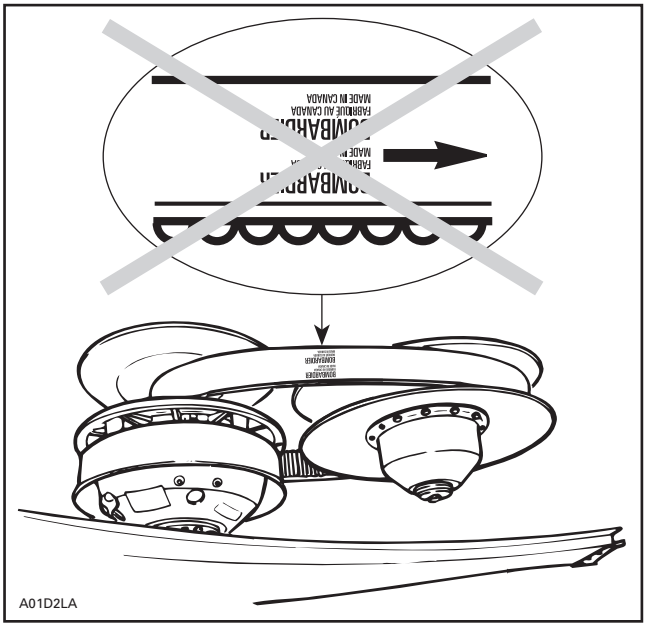
Check the drive belt width. Replace the drive belt if width is less than the minimum width recommended (see table above).

ROTATION DIRECTION

The maximum drive belt life span is obtained when the drive belt is installed as shown. This will ensure that correct direction of rotation is respected.



CORRECT



INCORRECT

NOTE: For used drive belt, mark and reinstall in the same position.

DRIVE BELT DEFLECTION MEASUREMENT

NOTE: The drive belt deflection measurement must be performed each time a new drive belt is installed.

NOTE: To obtain an accurate drive belt deflection measurement, it is suggested to allow a break-in period of 50 km (30 mi).

Before checking the belt deflection, ensure vehicle has the proper belt (refer to the *Application Chart*).

Adjust pulley distance and alignment. Refer to PULLEY DISTANCE AND ALIGNMENT.

To obtain maximum vehicle performance, the belt tension must be adjusted according to specifications shown in the accompanying chart.

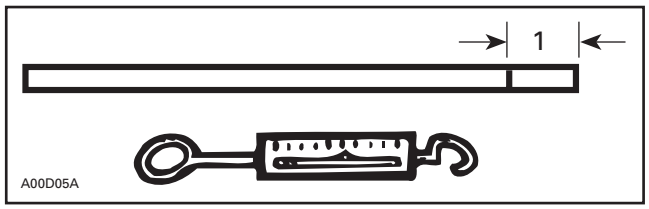
MODEL	DEFLECTION mm (in)	FORCE kg (lb)	HEIGHT† OVER DRIVEN PULLEY
All models	32 ± 5 (1.260 ± .197)	11.5 (25)	0 - 1.5 mm (0 - 1/16 in)

† FOR REFERENCE ONLY

To Check Tension

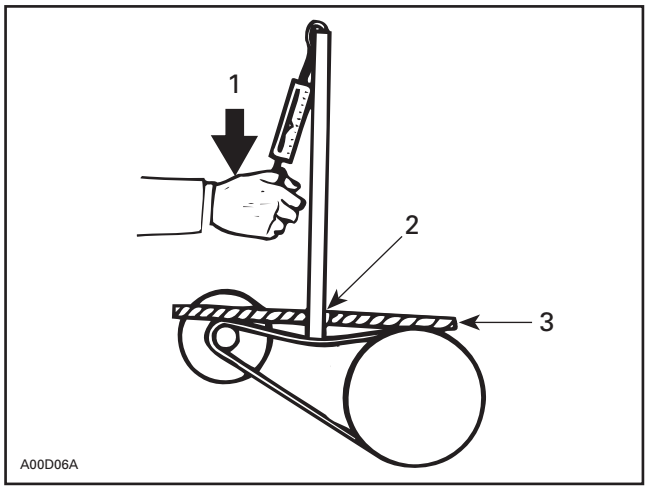
Position a reference rule on drive belt.

Wooden Stick and Spring Scale Method



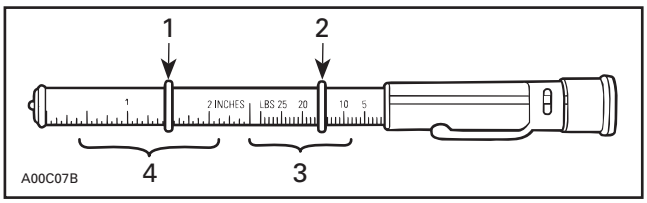
1. Mark specified deflection

Using spring scale and stick, apply specified force on drive belt halfway between pulleys as shown.



1. Force
2. Read deflection here
3. Reference rule

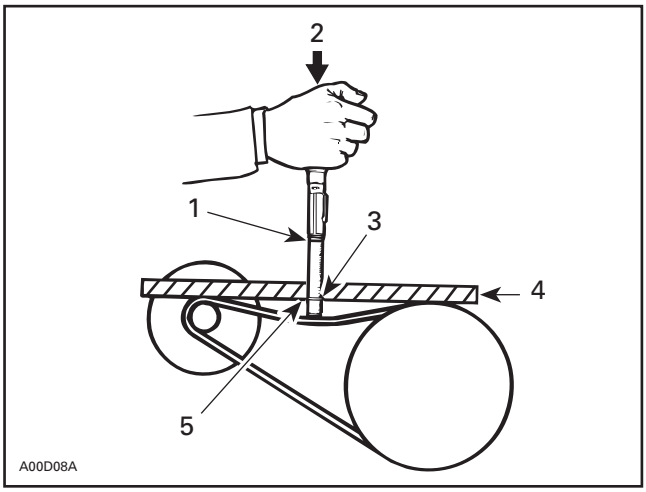
Or use the belt tension tester (P/N 414 348 200).



1. Lower O-ring
2. Upper O-ring
3. Force (read down)
4. Deflection (read up)

1. Slide lower O-ring of deflection scale to specified measure.
2. Slide upper O-ring to 0 (zero) on the force scale.

3. Apply pressure until lower O-ring is flush with edge of rule and read force on the upper scale at top edge of O-ring.



1. *Upper O-ring — force*
2. *Force*
3. *Lower O-ring — deflection*
4. *Reference rule*
5. *Deflection*

DEFLECTION ADJUSTMENT

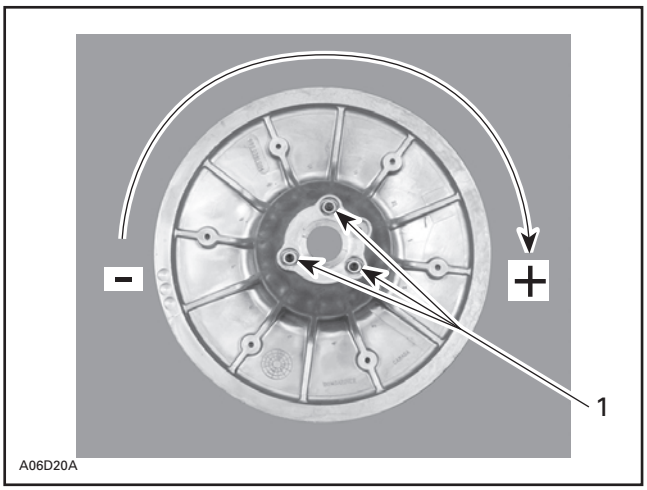
Adjust pulley distance according to specification, refer to PULLEY DISTANCE AND ALIGNMENT.

Adjust drive belt deflection using Allen screws, as shown.

To increase deflection: turn Allen screws clockwise.

To decrease deflection: turn Allen screws counterclockwise.

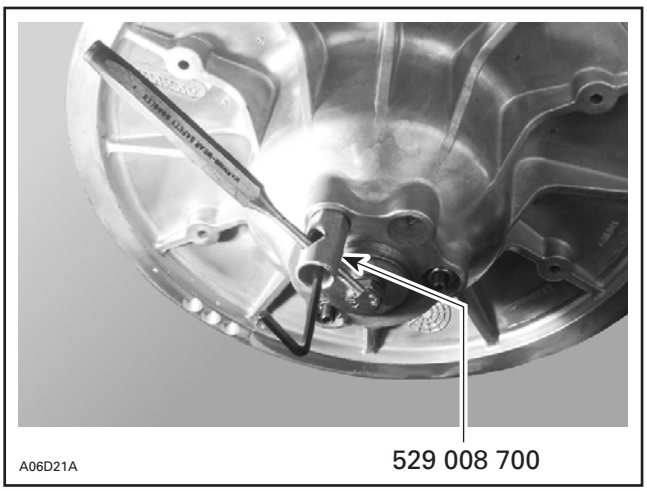
NOTE: Turn Allen screws 1/4 turn at a time, then rotate driven pulley to allow drive belt to settle in pulley. Check deflection, repeat as required.



TYPICAL

1. *Allen screw with jam nut*

Allen screws must be restrained while tightening jam nut to prevent throwing adjustment out. Use drive belt tension adjuster (P/N 529 008 700).



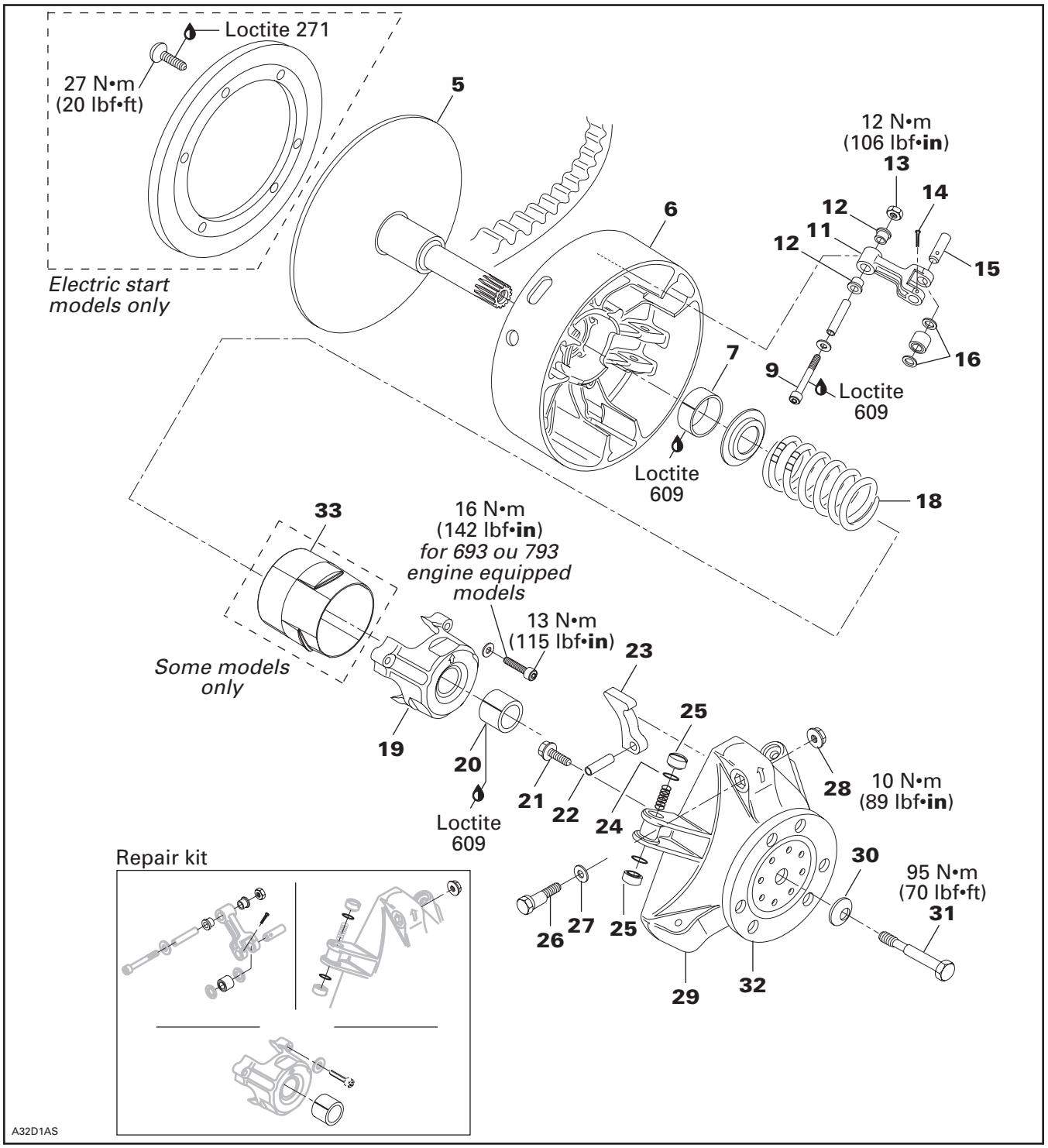
TYPICAL

DRIVE PULLEY

TRA

All Models

NOTE: This is a lubrication free drive pulley.



GENERAL

Some drive pulley components (return spring, ramp) can be changed to improve vehicle performance in high altitude regions. A service bulletin will give information about calibration according to altitude.

CAUTION: Such modifications should only be performed by experienced mechanics since they can greatly affect vehicle performance. Verify spring specifications before installation. Do not only refer to the spring color code.

NOTE: TRA drive pulley stands for Total Range Adjustable drive pulley.

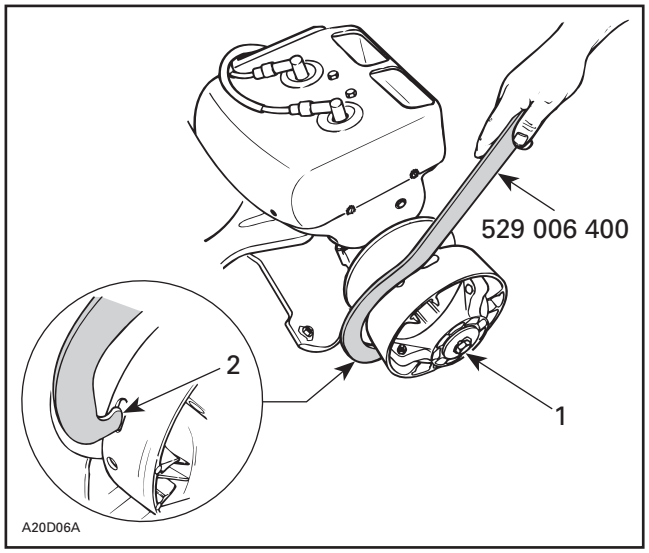
⚠ WARNING

Any drive pulley repairs must be performed by an authorized Bombardier snowmobile dealer, or other such qualified person. Subcomponent installation and assembly tolerances require strict adherence to procedures detailed.

REMOVAL

30,31, Conical Spring Washer and Screw

Use holder (P/N 529 006 400).



TYPICAL

1. *Retaining screw*
2. *Insert in any slot*

⚠ WARNING

Never use any type of impact wrench at drive pulley removal and installation.

Remove retaining screw.

To remove drive pulley ass'y and/or fixed half from engine, use puller (P/N 529 022 400).

CAUTION: These pulleys have metric threads. Do not use imperial threads puller. Always tighten puller by hand to ensure that the drive pulley has the same type of threads (metric vs imperial) prior to fully tightening.

To Remove Drive Pulley Ass'y:

Retain drive pulley with clutch holder.

Install puller in pulley shaft then tighten.

DISASSEMBLY

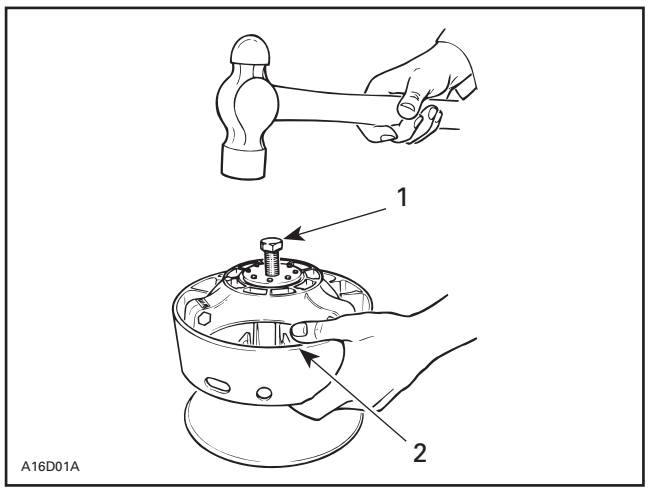
1,2, Screw and Ring Gear

CAUTION: Retaining screws must be heated before disassembly. Do not exceed 150°C (300°F).

5,6, Fixed and Sliding Half

CAUTION: Do not tap on governor cup.

Screw puller into fixed half shaft about 13 mm (1/2 in). Raise drive pulley and hold it by the sliding half while knocking on puller head to disengage fixed half.



1. *Puller*
2. *Holding sliding half*

NOTE: No components marking is required before disassembling this drive pulley since it has factory mark and arrows as indexing reference.

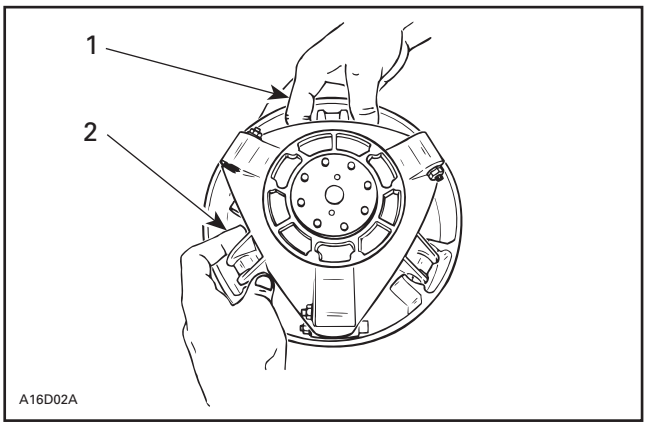
32, Cushion Drive

CAUTION: Do not disassemble cushion drive. Governor cup and cushion drive are factory balanced as an assembly.

25,29, Slider Shoe and Governor Cup

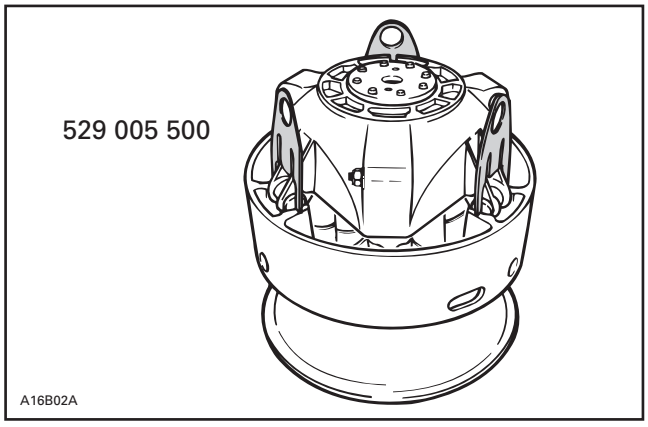
Carefully lift governor cup until slider shoes come at their highest position into guides.

Hold a slider shoe set then carefully lift its housing and remove slider shoes. Proceed the same way for other housings lifting one at a time.



1. Hold slider shoes
2. Lift one housing at a time

NOTE: To ease disassembly, forks (P/N 529 005 500) should be used to hold slider shoes prior to removing governor cup.



19, Spring Cover Ass'y

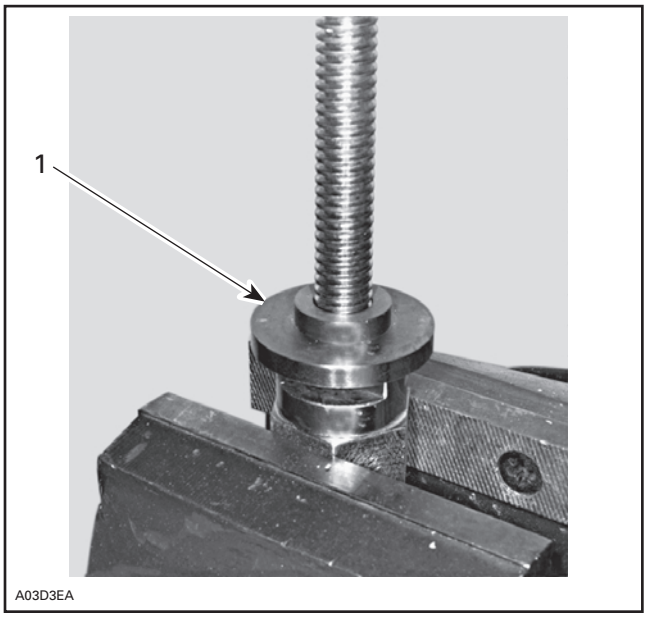
It is pushed by clutch spring pressure.

⚠ WARNING

Clutch spring is very strong. Never attempt to remove spring cover without the recommended tools.

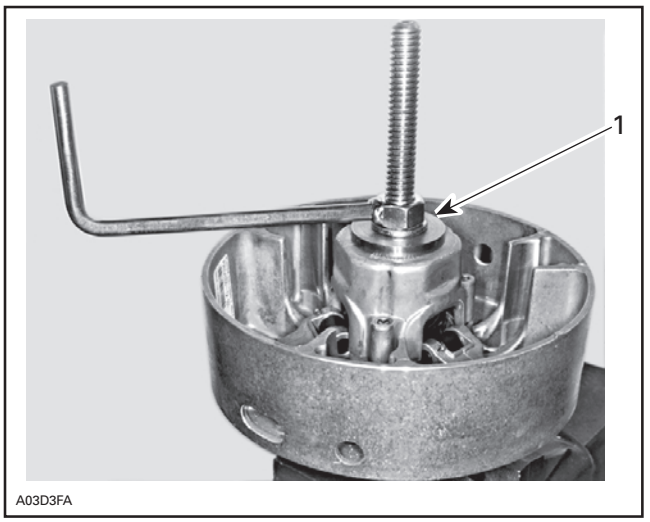
Use spring compressor (P/N 529 035 524).

Install support guide.



1. Support guide

Install sliding half then a second support guide. These support guides will prevent bushing damages.



1. Support guide

Remove 3 Allen screws retaining spring cover then unscrew compressor.

CLEANING

5,6, Fixed and Sliding Half

Clean pulley faces and shaft with fine steel wool and dry cloth.

5, Fixed Half and Crankshaft End

Parts must be at room temperature before cleaning.

Using a paper towel with cleaning solvent, clean crankshaft tapered end and the taper inside the fixed half of the drive pulley, crankshaft threads and retaining screw threads.

⚠ WARNING

This procedure must be performed in a well-ventilated area.

CAUTION: Avoid contact between cleaner and crankshaft seal because damage may occur.

Remove all hardened oil deposits that have baked on crankshaft and pulley tapered surfaces with coarse or medium steel wool and/or sand paper no. 600.

CAUTION: Do not use any other type of abrasive.

Reclean mounting surfaces with paper towel and cleaning solvent.

Wipe off the mounting surfaces with a clean, dry paper towel.

CAUTION: Mounting surfaces must be free of any oil, cleaner or towel residue.

7,20, Bushing

Only use petrol base cleaner when cleaning bushings.

CAUTION: Do not use acetone to clean bushing.

INSPECTION

Drive pulley should be inspected annually.

16,17, Thrust Washer and Roller

Check roller for roundness of external diameter. Check thrust washer for thickness wear. Replace as required.

CAUTION: Ensure rollers are in good condition. Replace as required.

9,12, Fitting Bolt Ass'y and Flanged Bushing

Check for wear, replace as required.

24,25, O-Ring and Slider Shoe

Check if O-rings are cracked, cut or crushed. Replace as required.

Check slider shoes for wear. Replace if groove is not apparent on top.

5,29, Fixed Half and Governor Cup

Inspect splines and free play between both parts. Maximum free play is 0.5 mm (.020 in) measured at calibration screw radius. Replace if required.

7,20, Sliding Half and Spring Cover Bushing

Visually inspect coating. Replace if worn.

Sliding Half Bushing Replacement

This bushing is not replacable. If worn out, replace sliding half ass'y.

Spring Cover Bushing Replacement

Under normal use there is no need to replace this bushing.

This bushing is not replacable. If worn out, replace spring cover ass'y.

ASSEMBLY

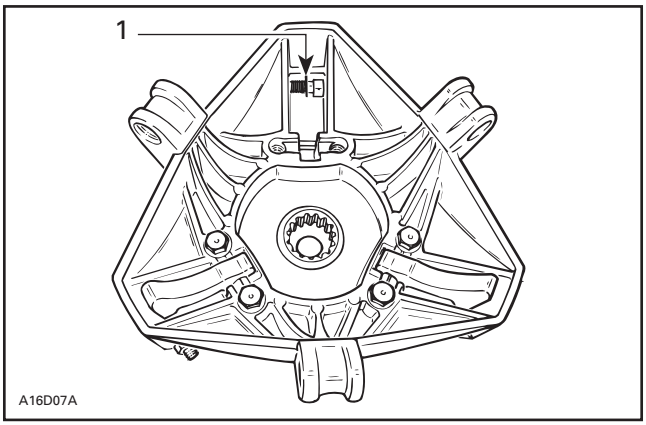
NOTE: This drive pulley is lubrication free. **Do not lubricate** any component.

1,2,3, Screw, Ring Gear and Loctite 271

Apply Loctite 271 (P/N 413 702 900) on threads and then torque to 27 N•m (20 lbf•ft).

26,27,28, Calibration Screw, Washer and Locking Nut

When installing calibration screw, make sure to install washer as shown.



1. Washer

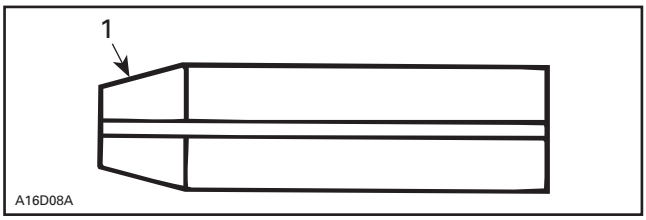
Torque locking nut to 10 N•m (89 lbf•**in**).

15, Pin

Always use the same type of pin as originally installed when servicing. Different types have different weights for calibration purpose. Refer to TECHNICAL DATA.

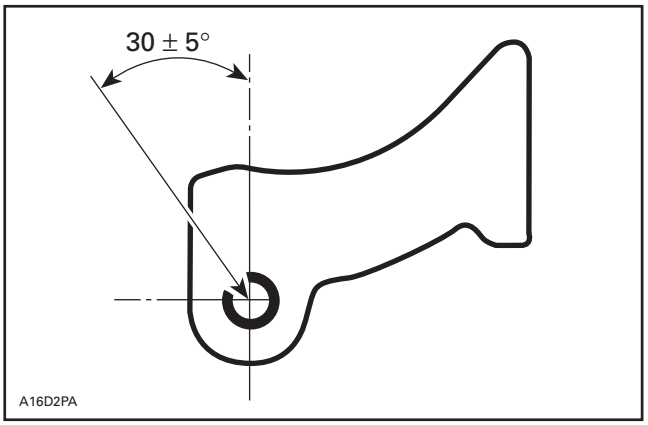
21,22,23, Ramp, Dowel Tube and Screw

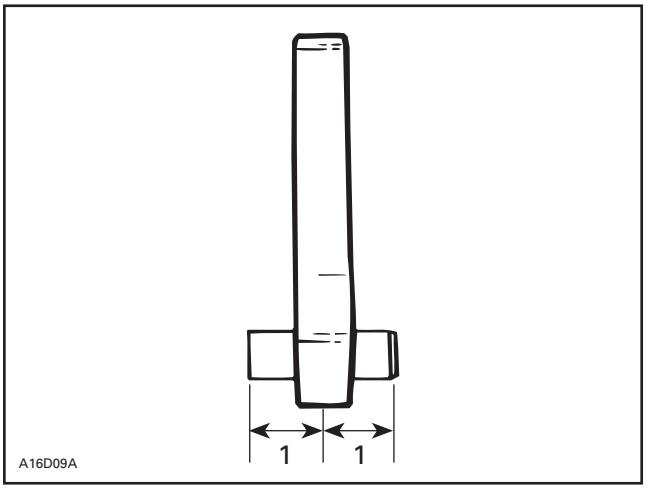
Insert dowel tube from chamfered side. Make sure ramp is centered on dowel tube.



1. Chamfered side

Position dowel tube split at the illustrated angle.





1. Equal distance

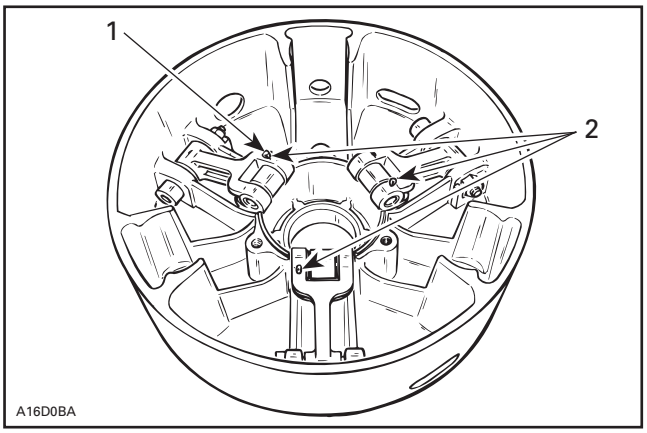
Torque screws to 10 N•m (89 lbf•**in**).

9,11,13,14, Screw, Lever Ass'y, Nut and Cotter Pin

Always install lever assemblies so that cotter pins are on the shown side. Besides install cotter pin head on top when lever is sat at bottom of sliding half. Bend cotter pin ends to sit perfectly against lever.

⚠ WARNING

Whenever replacing centrifugal levers, always replace all 3 at the same time. Otherwise, drive pulley misbalancing will occur because of levers difference.



1. Head on top
2. All on the same side

CAUTION: Lever assemblies must be installed so that cotter pins are on the same side.

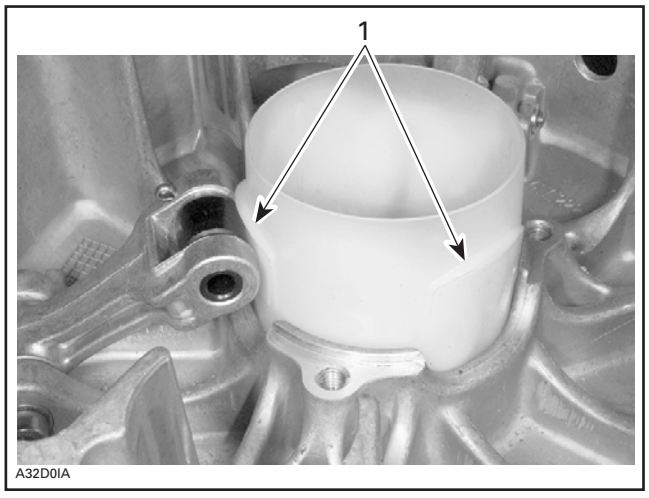
Torque nuts to 12 N•m (106 lbf•**in**).

CAUTION: Lever ass'y and rollers must move easily after installation.

33, Guard

Some Models Only

Install guard with its reinforcements in line with levers.



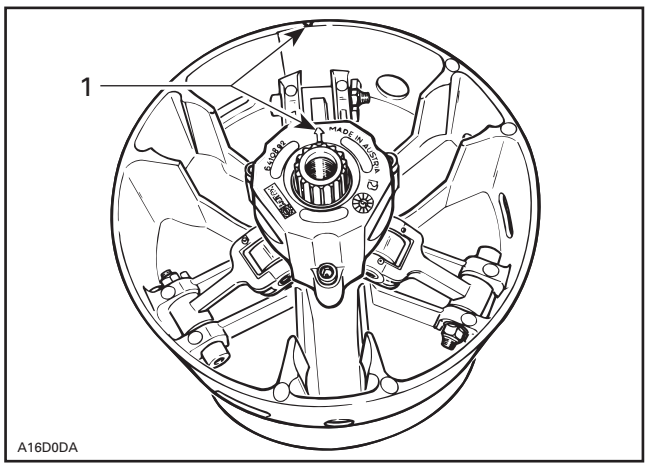
1. Reinforcements

5,6,18,19, Fixed Half, Sliding Half, Spring, Spring Cover and Screw

All Models

To install spring cover, use spring compressor (P/N 529 035 524). Align indexing arrows.

Assemble fixed and sliding halves.

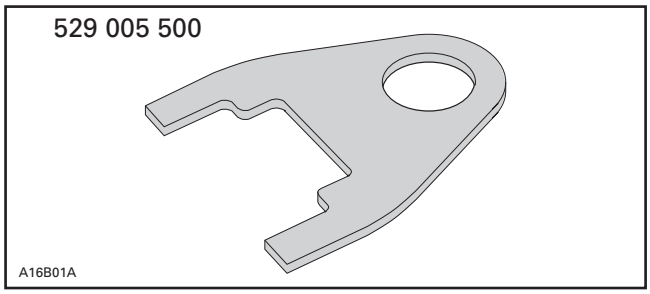


1. Align

Install and torque screws to 13 N•m (115 lbf•**in**) for 593 engine equipped models and to 16 N•m (142 lbf•**in**) for 693 and 793 engine equipped models.

6,25,29, Sliding Half, Slider Shoe and Governor Cup

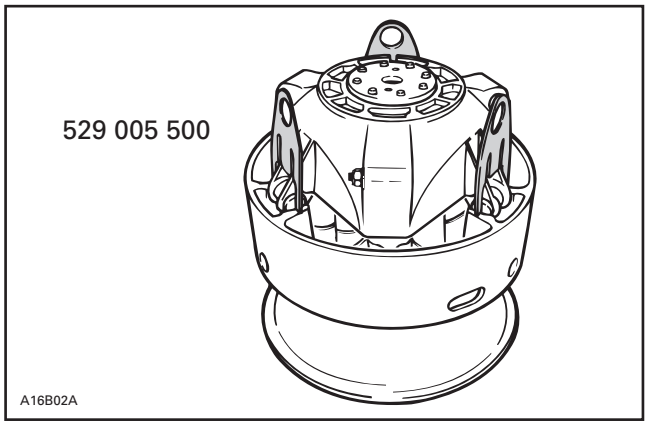
To install governor cup, use following tool:



Insert spring and slider shoes into governor cup so that groove in each slider shoe is vertical to properly slide in guides.

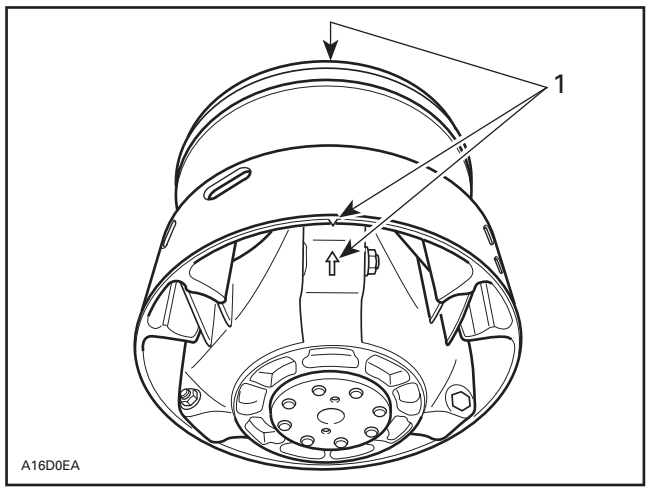
CAUTION: Make sure O-rings are installed on slider shoes and their grooves are positioned vertically.

Install fork (P/N 529 005 500) into slider shoe grooves to maintain them for governor cup installation. Proceed on 3 set of slider shoes.



Make sure to align governor cup arrow with sliding half and fixed half mark.

NOTE: If fixed half has no mark, align governor cup mark with segment no. 1 of inner half. Segments are identified on engine side.



1. Align

Carefully slide governor cup into sliding half. Align mark of governor cup with mark of fixed half.

Remove forks and push governor cup so that its splines engage with fixed half shaft splines.

CAUTION: Make sure splines of both parts are fully engaged.

INSTALLATION

⚠ WARNING

Do not apply anti-seize or any lubricant on crankshaft and drive pulley tapers.

⚠ WARNING

Never use any type of impact wrench at drive pulley removal and installation.

Clean mounting surfaces as described in CLEANING above.

Drive Pulley Ass'y

The installation procedure must be strictly adhered to as follows.

Install drive pulley on crankshaft extension.

Install conical washer with its concave side towards drive pulley then install screw.

⚠ WARNING

Never substitute conical washer and/or screw with jobber ones. Always use Bombardier genuine parts for this particular case.

Use holder. See removal procedure.

Torque screw to 80 to 100 N•m (59 to 74 lbf•ft).

Install drive belt and guard.

Raise and block the rear of the vehicle and support it with a mechanical stand.

⚠ WARNING

Ensure that the track is free of particles which could be thrown out while track is rotating. Keep hands, tools, feet and clothing clear of track. Ensure nobody is standing near the vehicle.

Accelerate the vehicle at low speed (maximum 30 km/h (20 MPH) and apply the brake, repeat 5 times.

Recheck the torque of 90 to 100 N•m (66 to 74 lbf•ft).

⚠ WARNING

After 10 hours of operation the transmission system of the vehicle must be inspected to ensure the retaining screw is properly torqued.

DRIVE PULLEY ADJUSTMENT

The drive pulley is factory calibrated to transmit maximum engine power at a predefined RPM. Factors such as ambient temperature, altitude or surface condition may vary this critical engine RPM thus affecting snowmobile efficiency.

This adjustable drive pulley allows setting maximum engine RPM in the vehicle to maintain maximum power.

Calibration screws should be adjusted so that actual maximum engine RPM in vehicle matches with the maximum horsepower RPM given in TECHNICAL DATA.

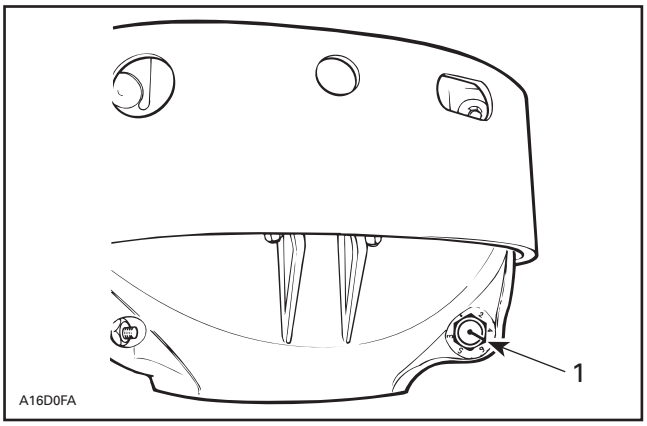
NOTE: Use precision digital tachometer for engine RPM adjustment.

NOTE: The adjustment has an effect on high RPM only.

To adjust, modify ramp end position by turning calibration screws.

26,28,29, Calibration Screw, Locking Nut and Governor Cup

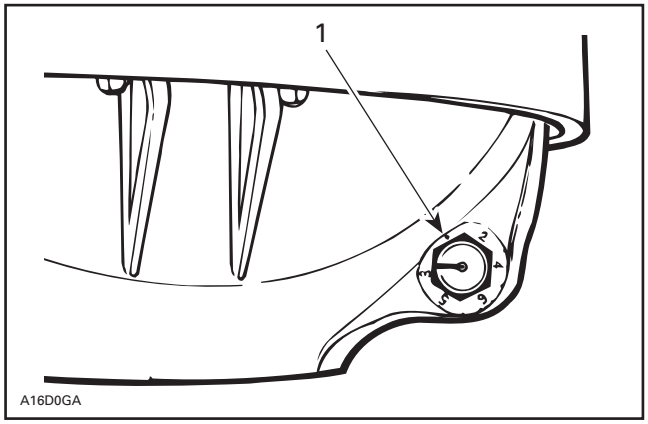
Calibration screw has a notch on top of its head.



1. Notch

Governor cup has 6 positions numbered 2 to 6. Note that in position 1 there is no stamped number (due to its location on casting).

See TECHNICAL DATA for original setting.



1. Position 1 (not numbered)

Each number modifies maximum engine RPM by about 200 RPM.

Lower numbers decrease engine RPM in steps of 200 RPM and higher numbers increase it in steps of 200 RPM.

Example:

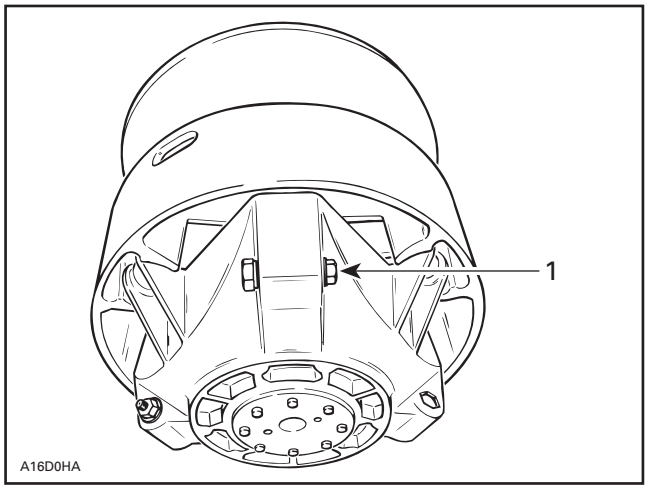
Calibration screw is set at position 3 and is changed to position 5. So maximum engine RPM is increased by about 400 RPM.

To Adjust:

Just loosen locking nut enough to pull calibration screw **partially** out and adjust to desired position. Do not completely remove the locking nut. Torque locking nuts to 10 N•m (89 lbf•**in**).

CAUTION: Do not completely remove calibration screw otherwise its inside washer will fall off.

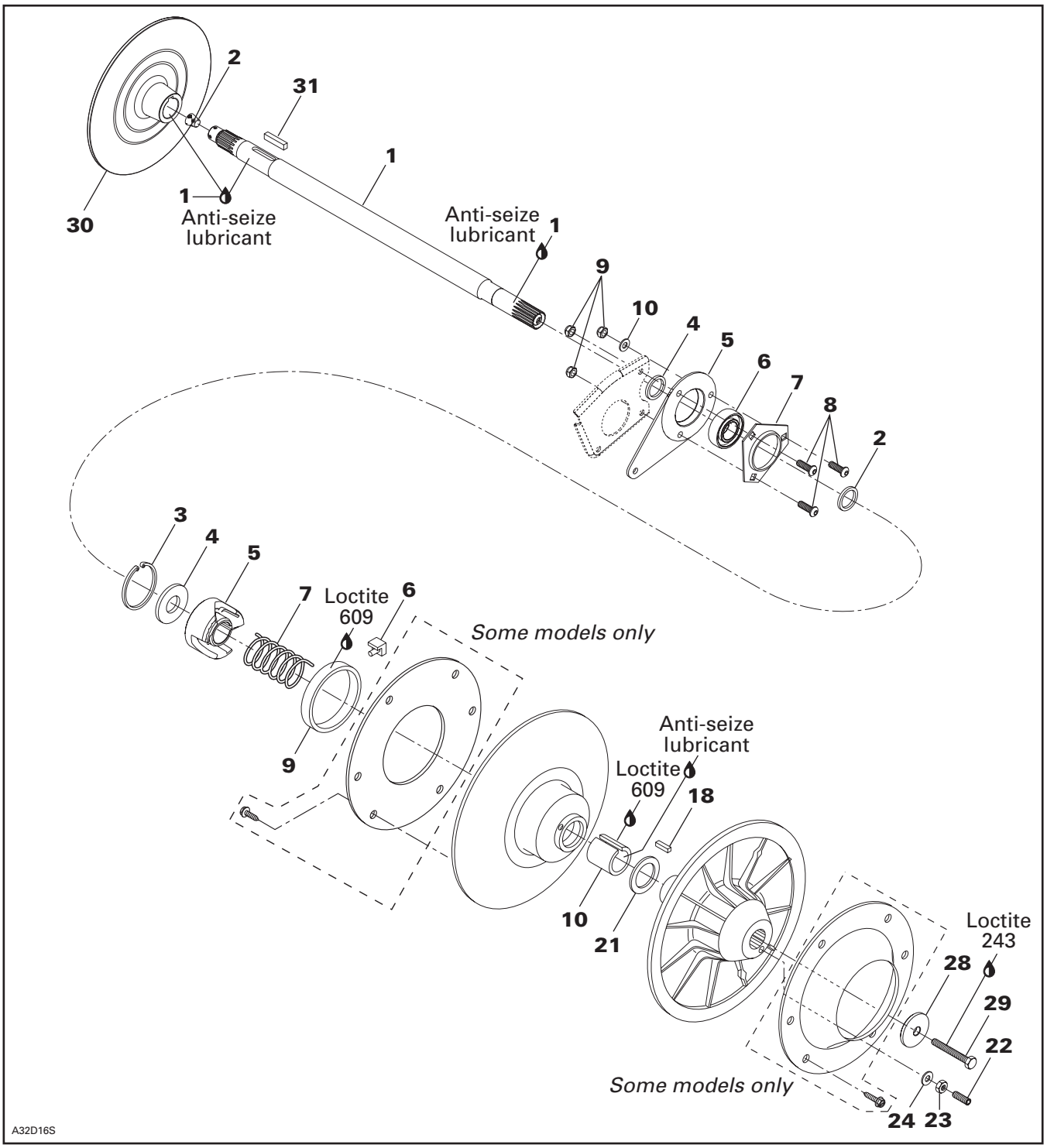
CAUTION: Always adjust all 3 calibration screws and make sure they are all set at the same number.



1. Loosen just enough to permit rotating of calibration screw

DRIVEN PULLEY

All Models



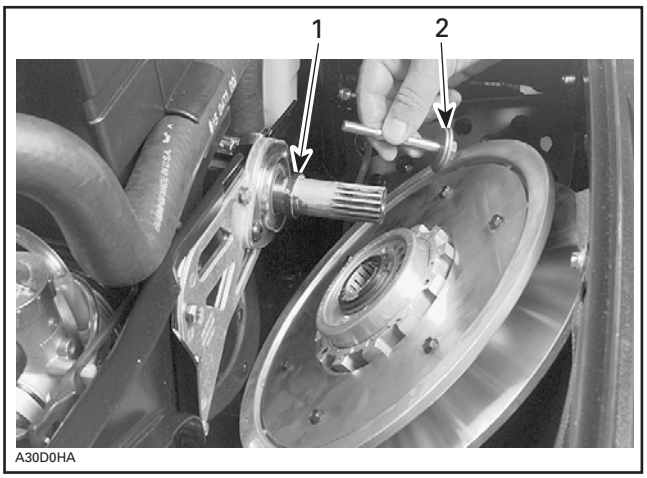
REMOVAL

Remove guard and drive belt from vehicle.

Remove cap screw **no. 12** and shouldered washer **no. 11** then pull the driven pulley from the countershaft.

Note shouldered washer position for reinstallation.

Take care not to loose spacer **no. 2**.



TYPICAL

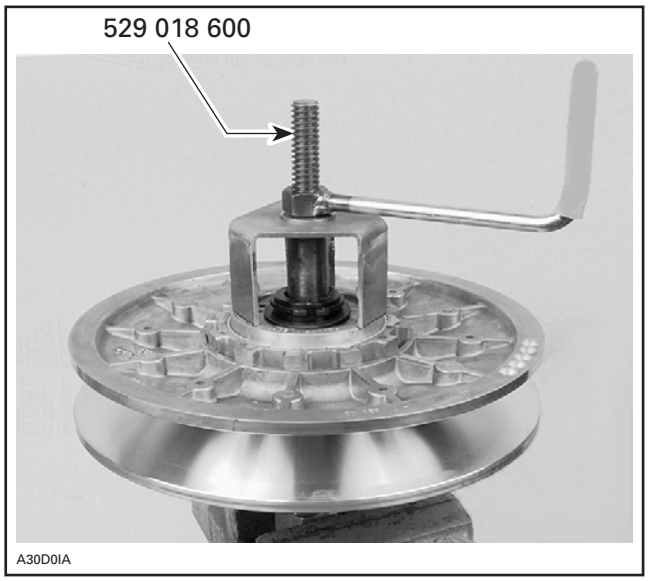
1. *Spacer*
2. *Shoulder on this side*

1, Countershaft

Should countershaft **no. 1** removal be required, refer to BRAKE then look for **Countershaft and Brake Disc Removal**.

DISASSEMBLY

Use spring compressor (P/N 529 018 600).



Remove snap ring **no. 3** and washer **no. 4** to disassemble the cam and the two pulley halves.

⚠ WARNING

Driven pulley cam is spring loaded, use above-mentioned tool.

CLEANING

9,10, Large Bushing and Small Bushing

During break-in period (about 10 hours of use), teflon from bushing moves to cam or shaft surface. A teflon over teflon running condition occurs, leading to low friction. So it is normal to see gray teflon deposit on cam or shaft. Do not remove that deposit, it is not dust.

When a dust deposit has to be removed from the cam or the shaft, use dry cloth to avoid removing transferred teflon.

Pulley Half Cleaning

Use Parts Cleaner (P/N 413 711 809).

INSPECTION

9,10, Bushings

Check for cracks, scratch and for free movement when assembled to fixed half.

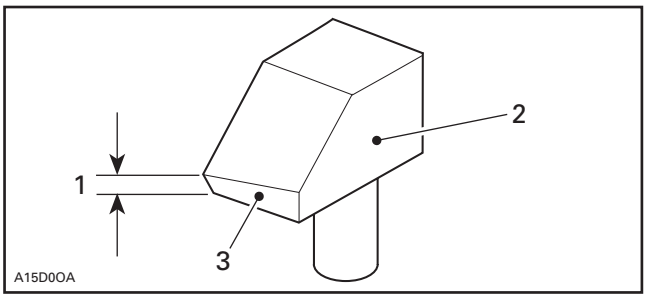
Using a dial bore gauge measure bushing diameter. Measuring point must be at least 5 mm (1/4 in) from bushing edge.

Replace bushing(s) if worn more than specified.

DRIVEN PULLEY BUSHING WEAR LIMIT mm (in)	
Small bushing	38.30 (1.508)
Large bushing	89.15 (3.510)

6, Slider Shoe

Check cam slider shoes for wear. Replace when inside edge of cam slider shoe slope base is worn to 1 mm (.039 in) or less.



1. Measure thickness of slope base here
2. Sliding pulley side
3. Slope base

ASSEMBLY

6, Cam Slider Shoe

When replacing slider shoes, always install a new set (three shoes) to maintain equal pressure on the cam.

Assemble driven pulley components by reversing the disassembly procedure.

5, Cam

Coat cam interior with anti-seize lubricant.

INSTALLATION

1, Countershaft

CAUTION: Always apply anti-seize lubricant (P/N 293 800 070) on the countershaft before final pulley installation.

Should installation procedure be required, refer to BRAKE then look for **Brake Disc and Countershaft Bearing Adjustment**.

Reinstall the pulley on the countershaft by reversing the removal procedure.

Driven pulley end-play is 0 (zero).

12, Pulley Retaining Screw

Torque to 22 N•m (16 lbf•ft).

ADJUSTMENT

Refer to PULLEY DISTANCE AND ALIGNMENT to adjust pulley distance. Adjust drive belt height in driven pulley to obtain specified belt deflection. Turn Allen screws **no. 10** equally accordingly.

7, Spring

General

It is usual to experience spring setting during break-in period of a new spring. The factory spring preload is slightly higher (about 1 kg (2 lb)) to compensate for spring setting. Specifications in TECHNICAL DATA are applicable after break-in period (about 10 hours of use).

Spring Torsional Pre-Load

To check spring pre-load adjustment, use spring scale hook (P/N 529 006 500) and a spring scale.

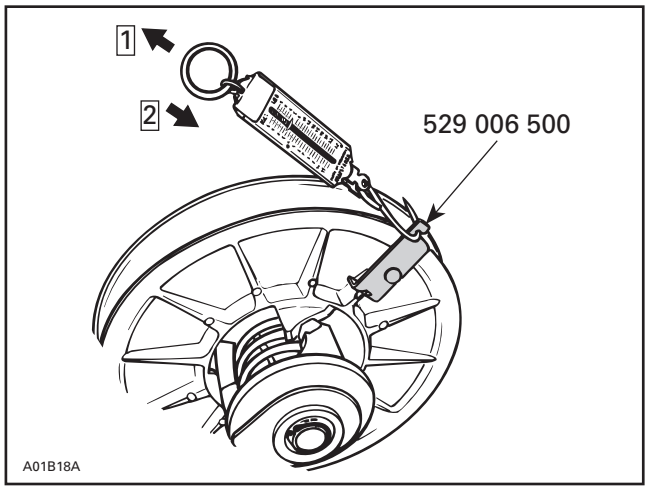
Remove drive belt.

Install the hook on the sliding half. Preventing fixed half from turning, pull sliding half with the spring scale perpendicularly with pulley axle.

Take 1st measurement when sliding half begins to turn. Rotate sliding half to 10 mm (3/8 in) of rotation. Hold fish scale at this position. Slowly release tension from fish scale and take 2nd measurement when sliding half begins to return. Spring pre-load is the average measurement between these two.

$$\frac{\text{1st measurement (when opening)} + \text{2nd measurement (when closing)}}{2} = \text{Spring pre-load}$$

Example: $\frac{\text{3.8 kg (8.4 lb) (when opening)} + \text{3.4 kg (7.5 lb) (when closing)}}{2} =$ 3.6 kg (8 lb) Actual spring pre-load

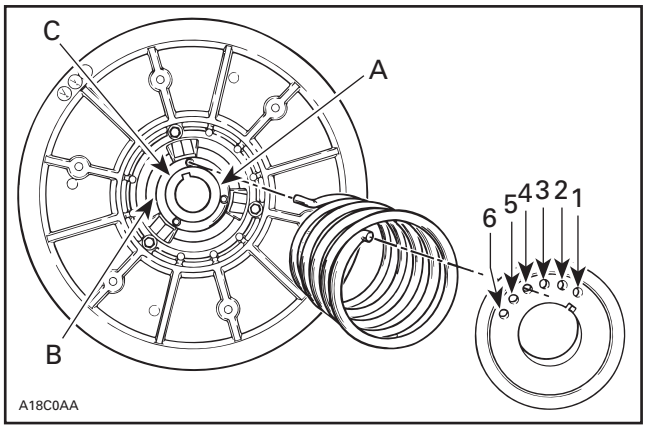


TYPICAL

Step 1: 1st measurement
Step 2: 2nd measurement

To adjust spring pre-load, relocate spring end in cam, moving it clockwise to increase the pre-load and counterclockwise to decrease it. Refer to TECHNICAL DATA.

NOTE: If spring pre-load can not be adjusted, try to relocate the other end of spring in sliding pulley (holes A, B and C).



TYPICAL

Letters and numbers shown in illustration are actual letters and numbers embossed on parts

NOTE: Always recheck torsional pre-load after adjusting.

Pulley Alignment and Drive Belt Deflection

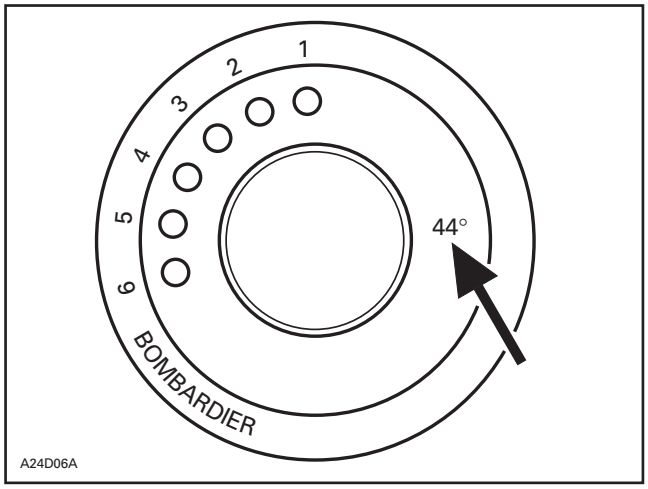
Refer to PULLEY DISTANCE AND ALIGNMENT and DRIVE BELT to perform adjustments.

CAUTION: Drive belt and pulley adjustments must always be checked whenever pulleys have been removed, replaced or disassembled.

5, Cam

Make sure to install proper cam. Refer to TECHNICAL DATA.

Cam angle is identified on cam.



NOTE: For high altitude regions, a service bulletin will give information about calibration according to altitude.

PULLEY DISTANCE AND ALIGNMENT

GENERAL

The pulley distance we will refer to in this section, is the space separating the drive and driven pulley outside diameters (Z measurement).

This basic distance is provided as an assembly guide and indicates the dimensions between which satisfactory belt deflection will be obtained.

Both pulley distance adjustment and pulley alignment must be carried out to ensure the highest efficiency of the transmission system. Furthermore, optimum drive belt operation and minimal wear will be obtained only with proper pulley alignment.

CAUTION: Before checking pulley adjustment, the rear suspension must be mounted on the vehicle and track tension/alignment must be done. Always check pulley adjustment after suspension is adjusted.

⚠ WARNING

Failure to correctly perform pulley alignment may cause the vehicle to creep forward at idle.

All Pulley Alignment Specifications Refer to:

X = Distance between straight bar and drive pulley fixed half edge, **measured between pulleys**.

Y = Distance between straight bar and drive pulley fixed half edge, **measured at the end of straight bar**.

Z = Distance between outside diameter of pulleys.

GENERAL PROCEDURE

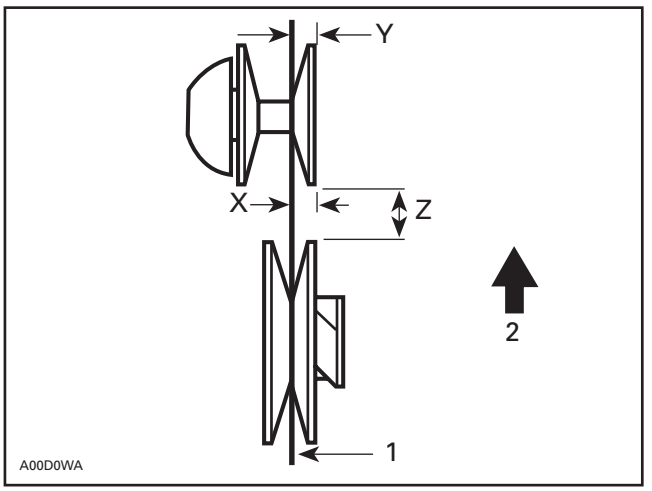
Remove guard and drive belt.

By turning and pushing the sliding half, open the driven pulley. Insert a straight bar 9.5 mm (.375 in) square, 48 cm (19 in) long or the proper alignment template into the opened driven pulley.

Measuring Procedure

Using Straight Bar

Always measure distances X and Y from the farther straight bar side (including its thickness to the fixed half edge).



TYPICAL

1. *Straight bar*
2. *Front of vehicle*

The distance Y **must** exceed distance X to compensate for the twist due to the engine torque.

Drive Belt Deflection

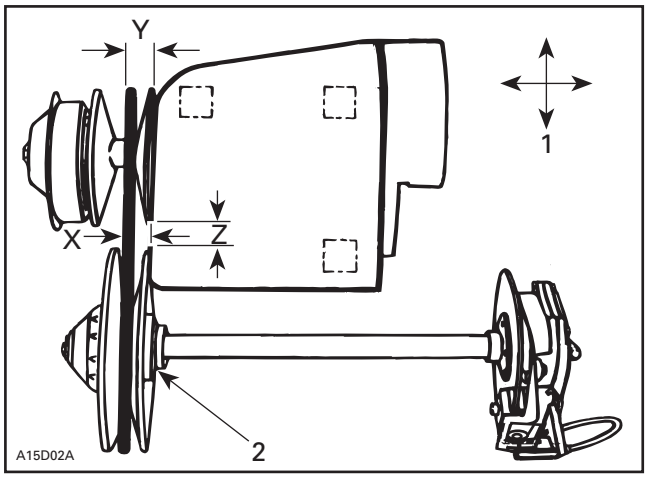
NOTE: When pulley distance and alignment are adjusted to specifications, refer to DRIVE BELT to adjust drive belt deflection.

CAUTION: This section deals mainly with adjustment procedures. For complete assembly requirements, refer to the proper ENGINE or TRANSMISSION installation section.

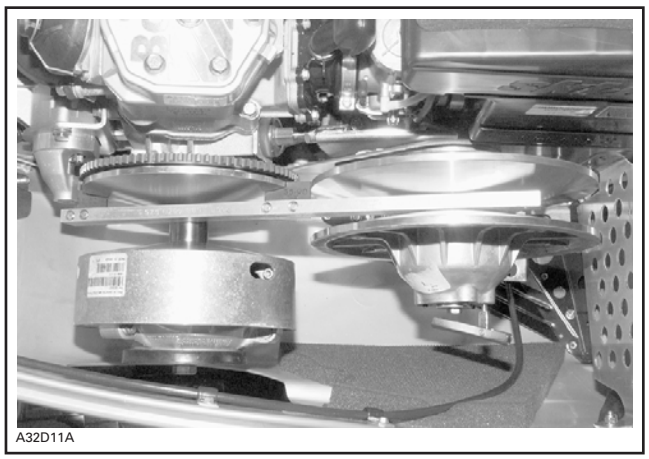
PULLEY ALIGNMENT AND DISTANCE SPECIFICATIONS CHART

MODEL	PULLEY DISTANCE	OFFSET		ALIGNMENT TEMPLATE ① P/N
	Z	X	Y-X	
	± 0.50 mm (.020 in)	± 0.50 mm (.020 in)	± 0.5 mm (.020 in)	
All	16.5 (.650)	35.50 (1.398)	1.5 (.060)	529 026 700

① Alignment templates have been made according to pulley alignment nominal values. However, they do not take into account allowed tolerances for alignment specifications. They are used as GO/NO GO gauges for quick alignment and pulley distance check and as templates to reach alignment nominal values.

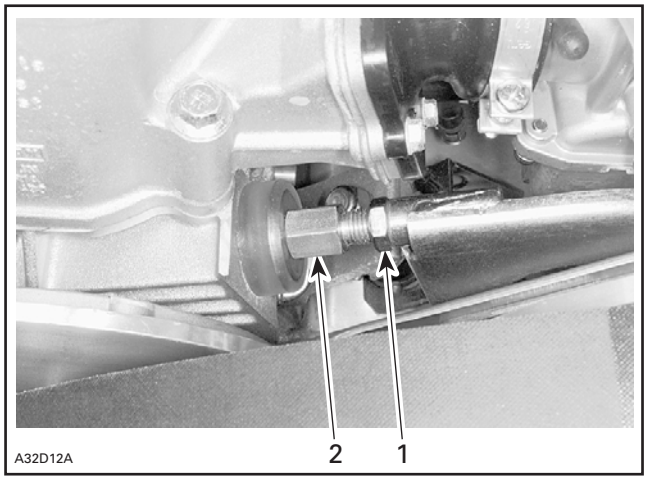


TYPICAL
1. *Engine movement*
2. *Contact*



ALIGNMENT BAR IN PULLEYS

NOTE: Prior to performing pulley adjustment, loosen torque rod nut to allow engine movement. Engine supports have tendency to stick to frame, work engine loose prior to aligning.



1. *Loosen lock nut first*
2. *Loosen*

Pulley Distance Adjustment Method

Engine Movement

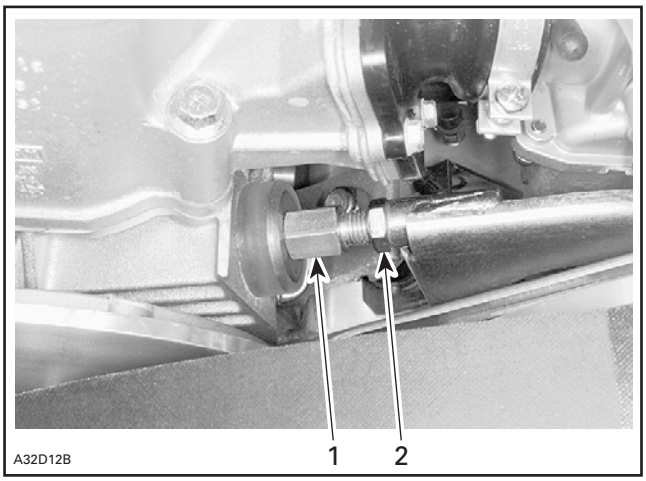
The engine support has slotted mounting holes. Move engine to obtain specified distance between pulleys.

Pulley Alignment Method

Engine Movement

Loosen the 4 bolts retaining engine support to the frame. Position engine to obtain the specified alignment.

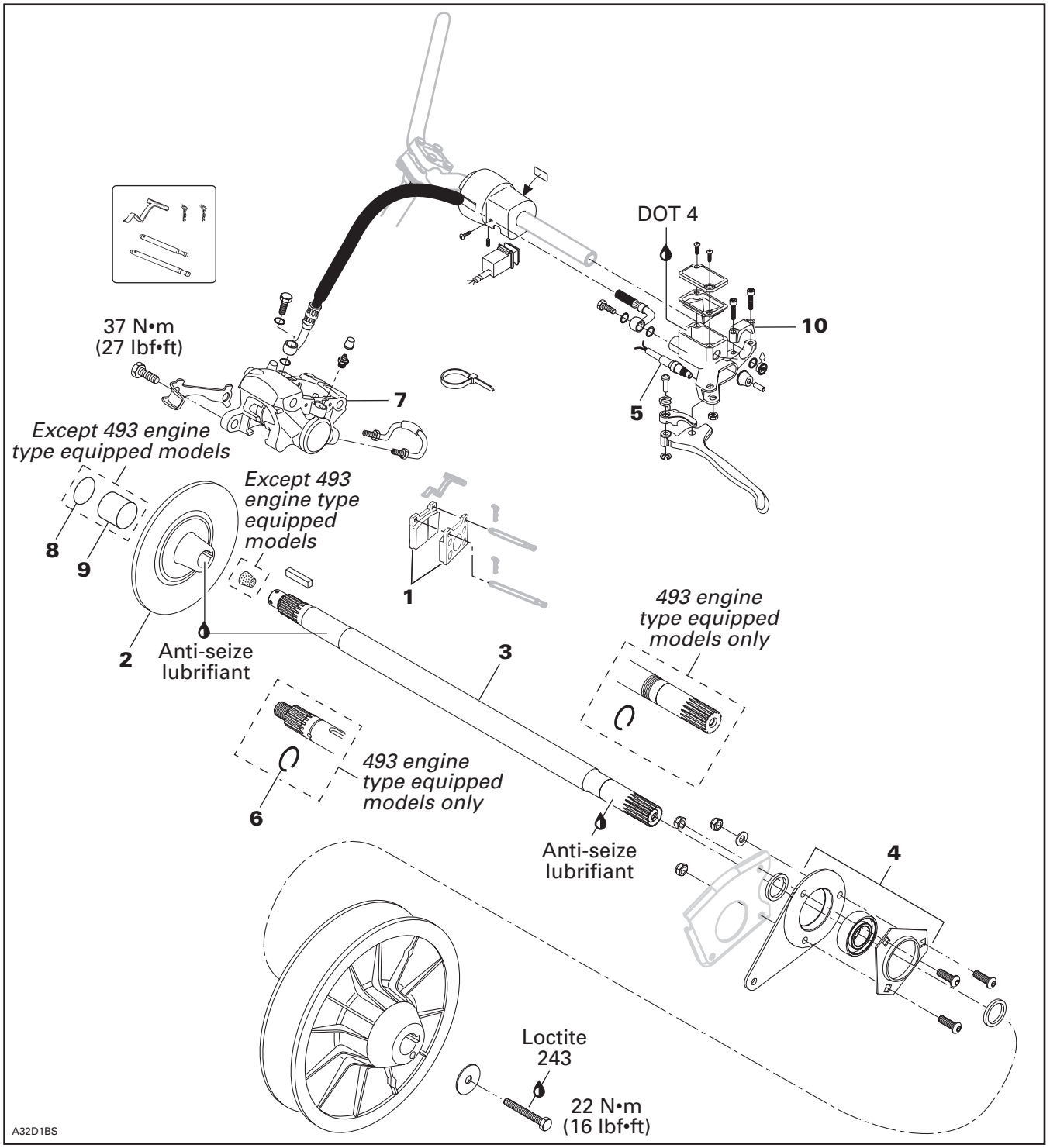
NOTE: After alignment, adjust torque rod so it slightly contacts stopper plate. Do not over tighten, it will disalign pulleys.



1. Slightly tighten
2. Retighten

BRAKE

HYDRAULIC DISC BRAKE



REMOVAL

All Models

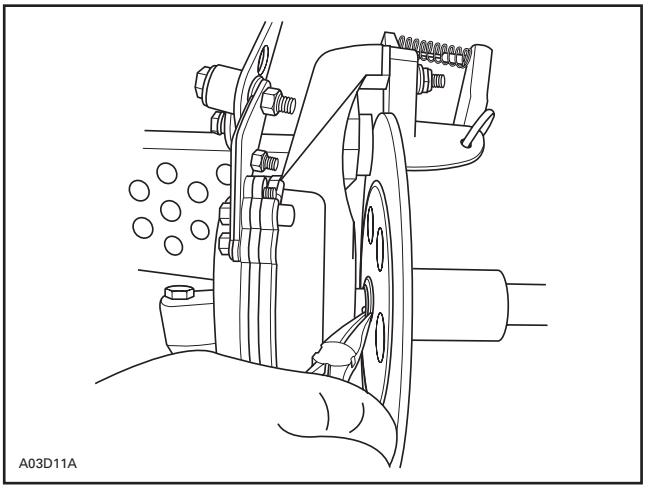
BRAKE DISC REMOVAL

Brake disc can be withdraw without removing chaincase. Proceed as follows:

– Remove belt guard, belt and driven pulley.
– Remove air silencer.
– Unbolt bearing support no. 4 from chassis.
– Unbolt caliper from chaincase.
– Open chaincase and remove upper sprocket.

493 Engine Type Equipped Models

– Pull countershaft ass'y no. 3 toward driven pulley side to get access to clip no. 6 on countershaft.



TYPICAL

All Models

– Pull countershaft no. 3 toward driven pulley side to free from chaincase and disc.
– Remove disc.

DISASSEMBLY

Only brake pads are available as spare parts. If caliper or master cylinder are damaged, replace each of them as an assembly.

CLEANING

Clean all metal components in a general purpose solvent. Thoroughly dry all components before assembling.

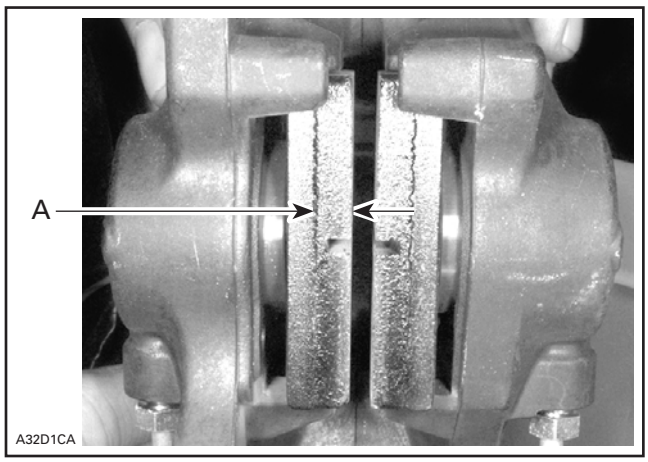
CAUTION: Do not clean brake pads in solvent. Soiled brake pads must be replaced by new ones.

INSPECTION

1, Brake Pad

Brake pads must be replaced when lining is 1 mm (1/32 in) thick or less.

CAUTION: Brake pads must always be replaced in pairs.



TYPICAL
A. 1 mm (1/32 in) minimum

2, Brake Disc

Check for scoring, cracking or bending, replace as required.

CAUTION: Brake disc should never be machined.

INSTALLATION

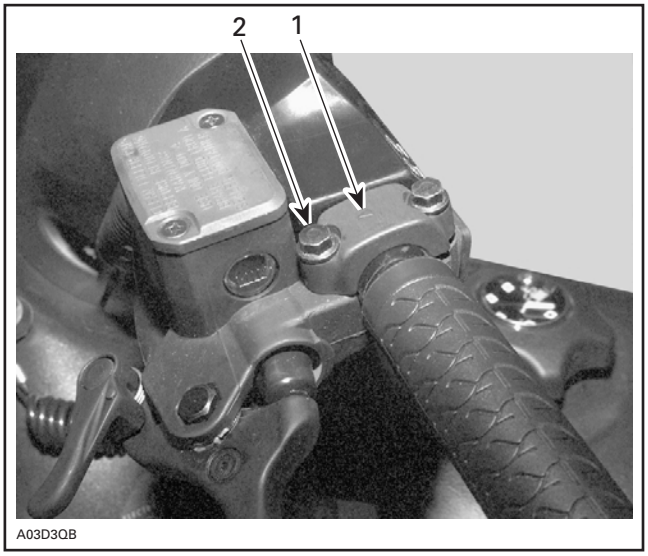
To install brake, reverse removal procedure paying attention to the following.

⚠ WARNING

Avoid getting oil on brake pads.

10, Upper Clamp

Install upper clamp with its arrow pointing at front of vehicle. Tighten to 8 N•m (71 lbf•**in**) front screw before rear one.



1. Arrow on upper clamp pointing at front of vehicle
2. Tighten front screw first

8,9, O-Ring and Spacer

All Models except 493 Engine Type Equipped Models

Make sure that O-ring and spacer are inserted into chaincase upper oil seal before reinstalling countershaft.

2, Brake Disc

Apply anti-seize lubricant (P/N 413 701 000) on shaft.

The disc hub exceeds the disc more from one side than from the other. Install disc with the longer exceeding portion toward driven pulley.

1,7, Brake Pads and Caliper

Each time a new caliper or new brake pads are installed, proceed with the following:

– With caliper not bolted to chaincase, apply brake few times until both new pads are touching each other.
– Push back pads and repeat above step.
– Push back pads then fasten caliper to chaincase.
– Proceed with bleeding as described below.

ADJUSTMENT

Countershaft Bearing

Insert countershaft (with brake disc) from chaincase side through countershaft support (driven pulley side), then insert into chaincase.

Torque castellated nut of upper sprocket to 60 N•m (44 lbf•ft).

CAUTION: Upper sprocket castellated nut must be tightened **before** bolting bearing support.

Close chaincase.

Install countershaft bearing **no. 4** and ensure that countershaft is properly aligned, then tighten 3 retaining screws.

BLEEDING

Change brake fluid once a year.

Bleed brake system as follows:

Keep sufficient DOT 4 brake fluid in reservoir at all times.

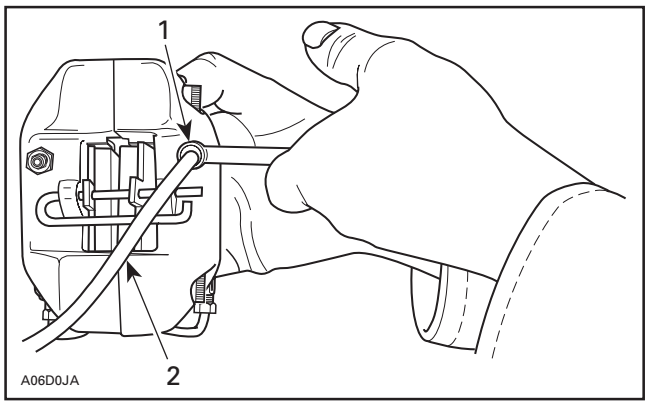
CAUTION: Use only DOT 4 brake fluid.

Install a hose on left side bleeder. Route this hose to a container.

Pump a few times brake lever and while holding brake lever depressed, open left side bleeder and check for air to escape.

Repeat with the same bleeder until no air appears in hose.

Proceed the same way with the right side bleeder.



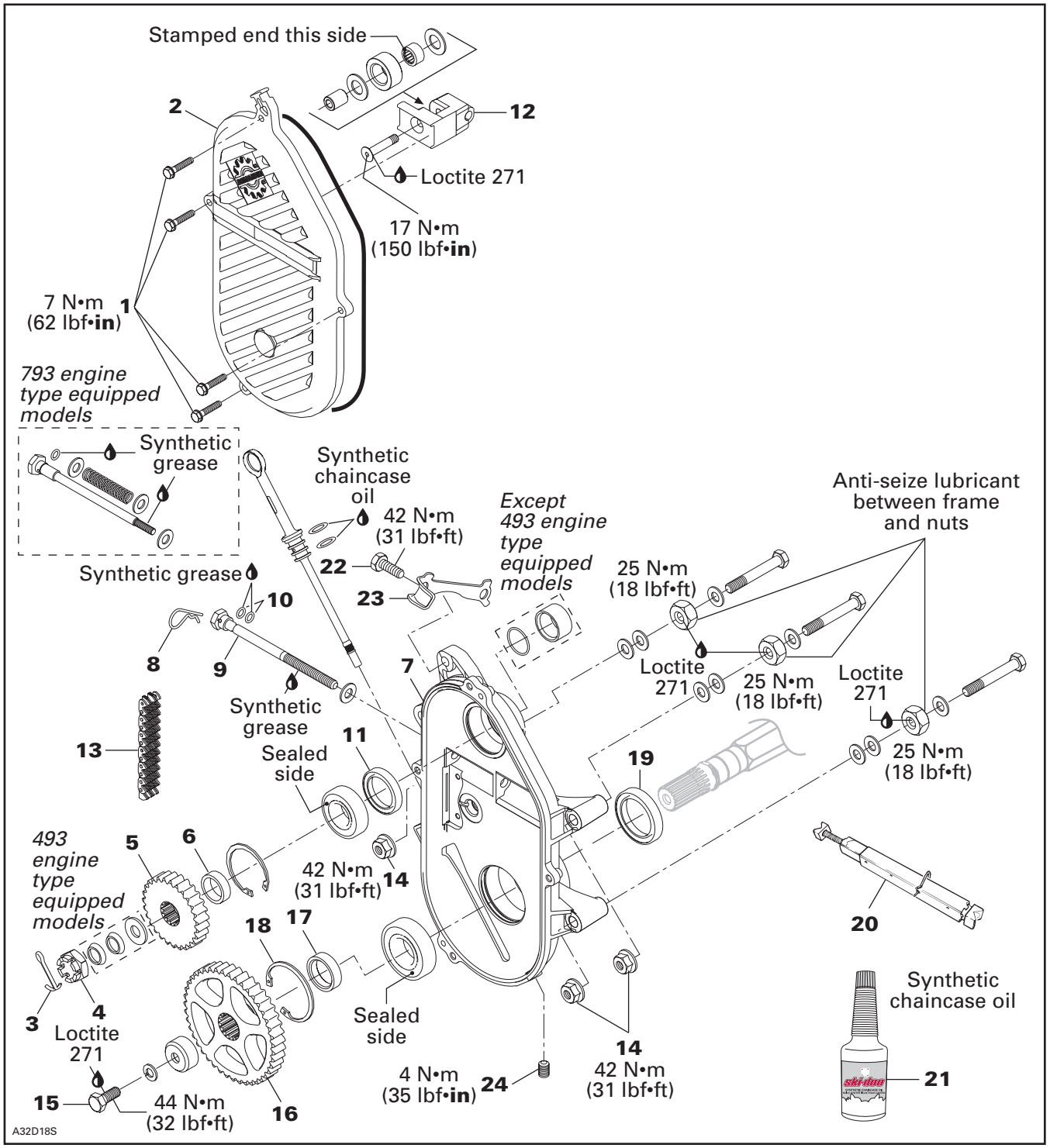
TYPICAL

1. Open bleeder
2. Clear hose to catch used brake fluid

5, Brake Light

There is no adjustment on these models. Check that switch is securely installed.

CHAINCASE


Stamped end this side
2
12
Loctite 271
17 N•m
(150 lbf•in)
7 N•m
(62 lbf•in)
1
793 engine
type equipped
models
Synthetic
grease
Synthetic
chaincase
oil
42 N•m
(31 lbf•ft)
22
23
Except
493 engine
type
equipped
models
Anti-seize lubricant
between frame
and nuts
25 N•m
(18 lbf•ft)
Synthetic grease
10
8
9
7
Loctite
271
25 N•m
(18 lbf•ft)
Loctite
271
25 N•m
(18 lbf•ft)
Synthetic
grease
13
11
Sealed
side
19
493
engine
type
equipped
models
5
6
42 N•m
(31 lbf•ft)
14
20
18
17
3
4
Loctite
271
Sealed
side
Synthetic
chaincase oil
15
44 N•m
(32 lbf•ft)
16
4 N•m
(35 lbf•in)
24
14
42 N•m
(31 lbf•ft)
21
A32D18S

REMOVAL AND DISASSEMBLY

To remove chaincase proceed as follows.

Remove tuned pipes and muffler.

⚠ WARNING

Never remove exhaust components when engine is hot.

Remove hair pin **no. 8**. Release drive chain tension by unscrewing tensioner adjustment screw.

Drain oil by removing drain plug **no. 24**.

3,4,5,6,13,16,17, Cotter Pin, Nut, Sprocket, Shim and Drive Chain

Apply parking brake.

Remove cotter pin **no. 3** and nut **no. 4** retaining upper sprocket **no. 5** and screw **no. 15** retaining lower sprocket **no. 16**. Pull sprockets and drive chain simultaneously. Remove shims **nos. 6** and **17**.

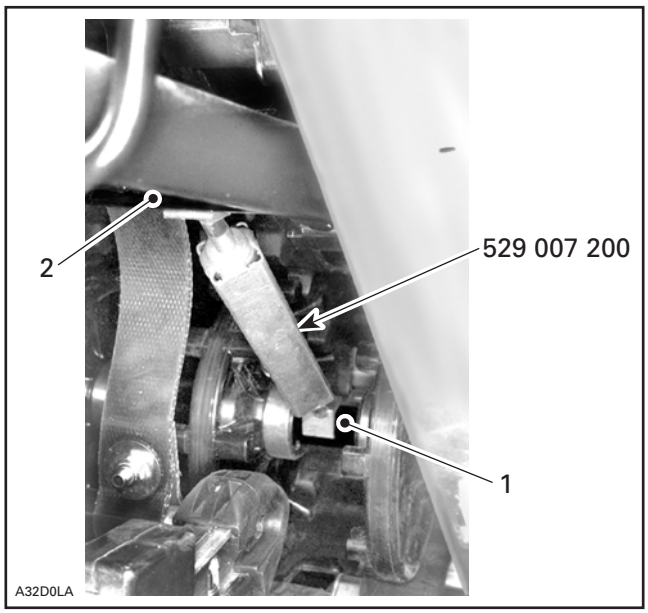
NOTE: Should countershaft removal be required, refer to BRAKE then look for **Countershaft Removal**.

Release parking brake.

Remove 3 nuts **no. 14**.

Unfold locking tab **no. 23** then remove caliper retaining screws **no. 22**.

Release track tension, use drive axle holder **no. 20** (P/N 529 007 200).

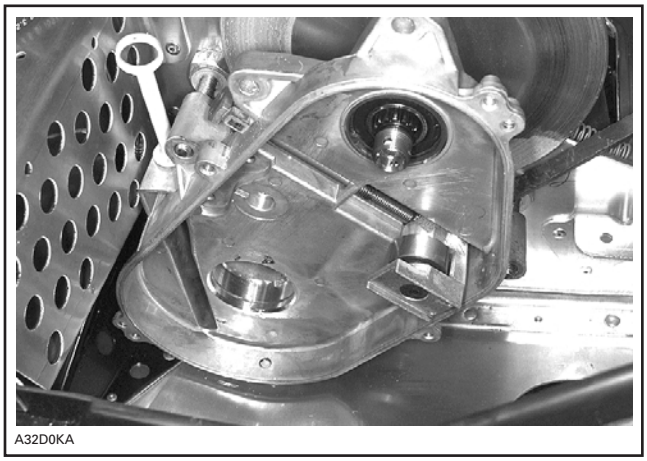


1. *Drive axle*
2. *Suspension front arm upper axle*

Pry out drive axle oil seal **no. 19** from chaincase.

Pull chaincase from drive axle and countershaft.

Using 2 large prybars inserted between chaincase housing **no. 7** and frame, pry complete assembly from vehicle.



CHAINCASE HOUSING REMOVAL

INSPECTION

Visually inspect the chain for cracked, damaged or missing links. Check for worn or defective bearings, sprockets and chain tensioner components.

⚠ WARNING

If chain deflection is greater than 38 mm (1.5 in) (without chain tensioner), replace chain and check condition of sprockets.

GEAR RATIO MODIFICATION

For particular applications, the number of teeth of the sprockets can be increased or decreased on lower and upper sprockets.

Refer to TECHNICAL DATA for gear ratios.

CAUTION: Gear ratio modifications should only be performed by experienced mechanics since they can greatly affect vehicle performance.

NOTE: For high altitude regions, a Service Bulletin will give information about calibration according to altitude.

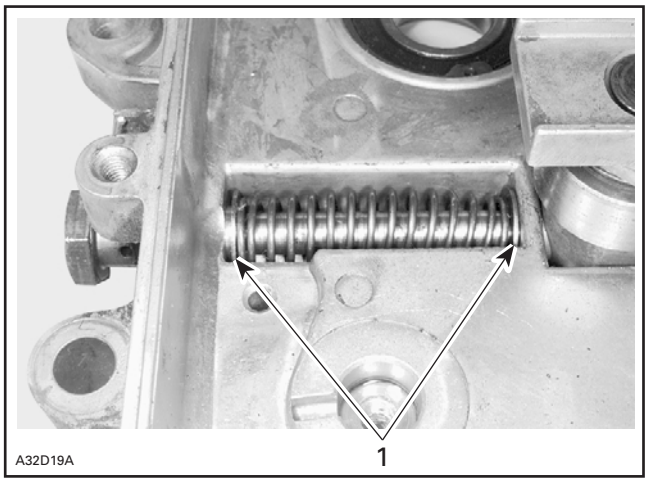
INSTALLATION AND ASSEMBLY

Reverse removal and disassembly procedure and pay attention to the following. Replace oil seals, gaskets O-rings and drain plug.

25, Hardened Washer

793 Engine Equipped Models Only

Make sure to install a hardened washer on each end of spring.



1. Hardened washers

All Models

11, Oil Seal

Using an appropriate pusher, press the oil seal into chaincase hub. Oil seal must fit flush with the chaincase edge.

NOTE: Should installation procedure for countershaft be required, refer to BRAKE.

5,16, Sprockets

Position the sprockets with the writing facing the chaincase cover. Sprocket hub faces toward chaincase.

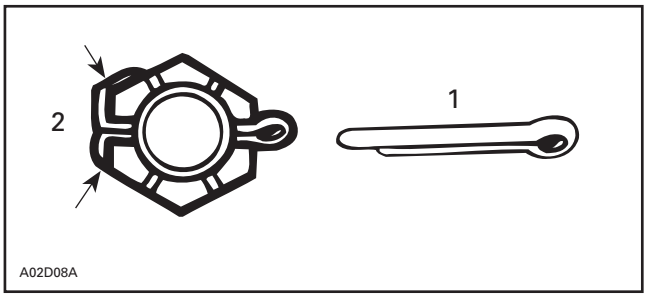
4, Upper Sprocket Castellated Nut

Torque to 45 to 75 N•m (33 to 55 lbf•ft).

Install new cotter pin in the position shown.

CAUTION: When removing a cotter pin always replace with a new one.

CAUTION: Cotter pin will rub on chaincase cover if installed otherwise.



1. New
2. Fold cotter pin over castellated nut flats only

18, Circlip

CAUTION: It is of the utmost importance to install the circlip otherwise damage to the chaincase components may occur.

DRIVE CHAIN ADJUSTMENT

NOTE: Brake disc key must be in good condition before checking chain free play.

10, O-Ring

Replace O-ring **no. 10** on tensioner adjustment screw. Fully tighten tensioner adjustment screw **by hand**, then back off only far enough for hair pin to engage in locking hole.

This initial adjustment should provide 3 - 5 mm (1/8 - 13/64 in) free-play when measured at the outer circumference of the brake disc.

CAUTION: Free-play must not exceed 5 mm (13/64 in), readjust if necessary.

⚠ WARNING

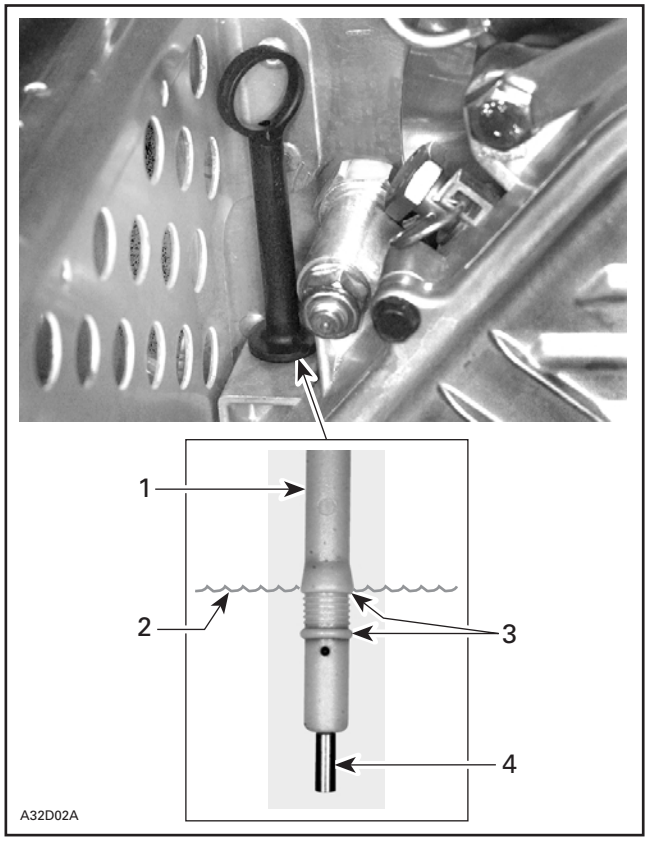
If the specified free-play is not reached with the tensioner screw fully tightened, replace chain and check the condition of sprockets.

21, Chaincase Oil

Pour 250 mL (8.5 U.S. oz) of synthetic chaincase oil (P/N 413 803 300) into chaincase.

NOTE: Chaincase oil capacity is 250 mL (8.5 U.S. oz).

Check oil level with the dipstick then add if required. Remove metal particles from magnet.



TYPICAL

1. *Dipstick*
2. *Oil level*
3. *Level between marks*
4. *Magnet*

NOTE: Chaincase must be in its proper position when checking oil level.

ADJUSTMENT

Pulley Alignment

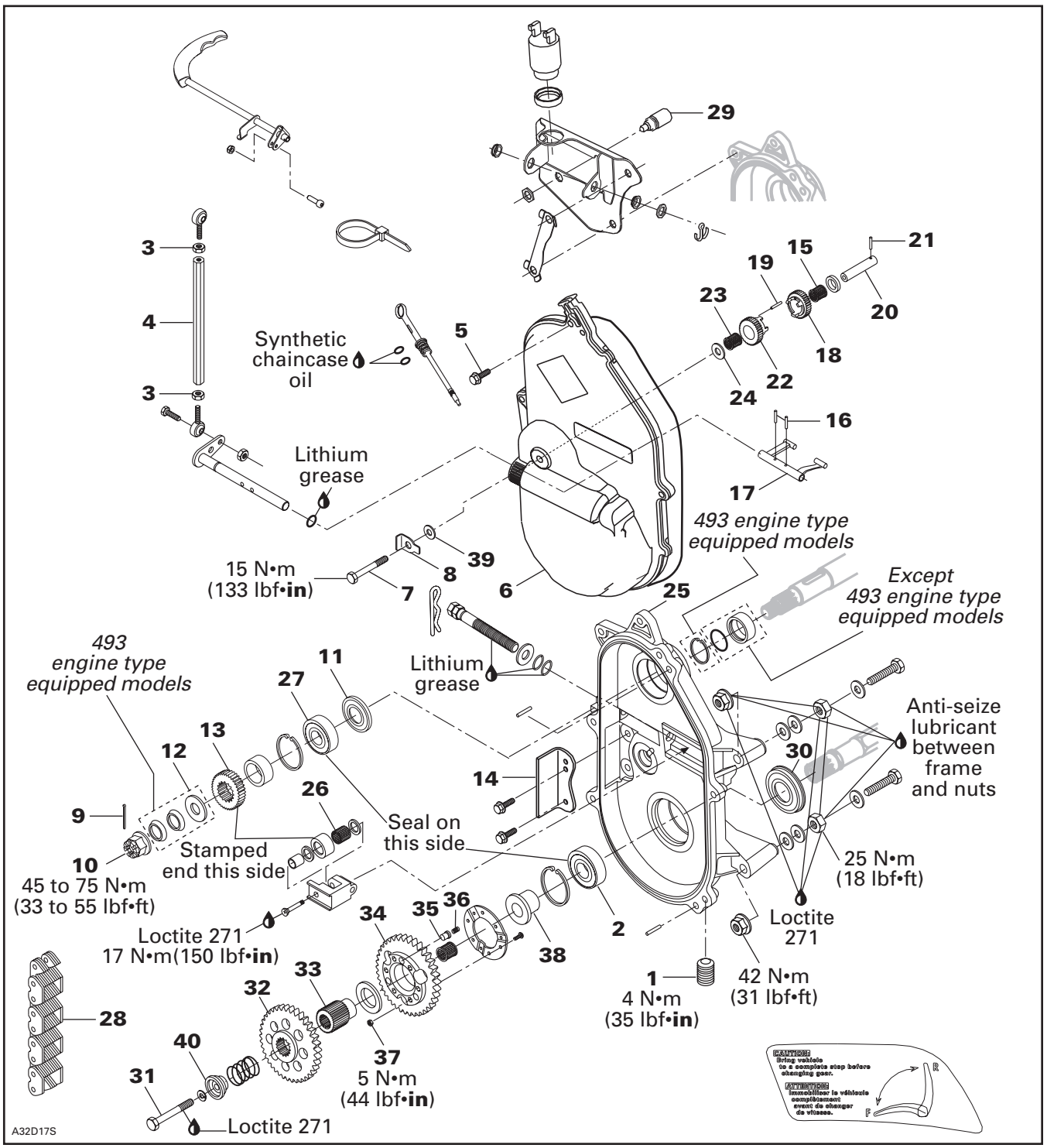
Refer to PULLEY DISTANCE AND ALIGNMENT.

Track Tension and Alignment

Refer to TRACK.

GEARBOX

Grand Touring 500/600/700 and Formula Deluxe 500/600/700



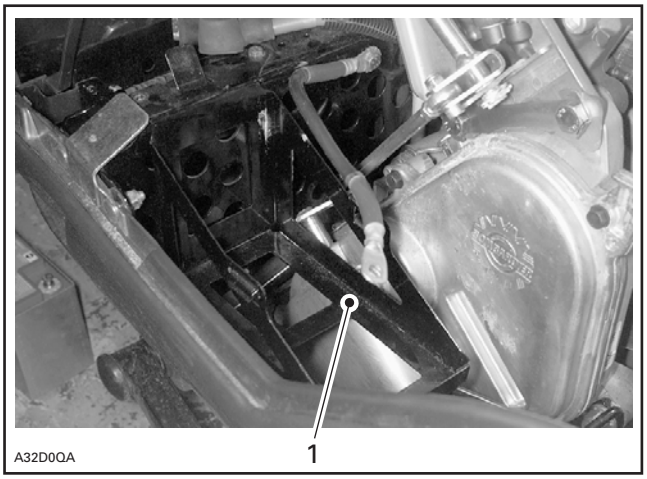
DISASSEMBLY

Disconnect negative cable from battery if so equipped.

Drain gearbox oil by removing drain plug **no. 1**.

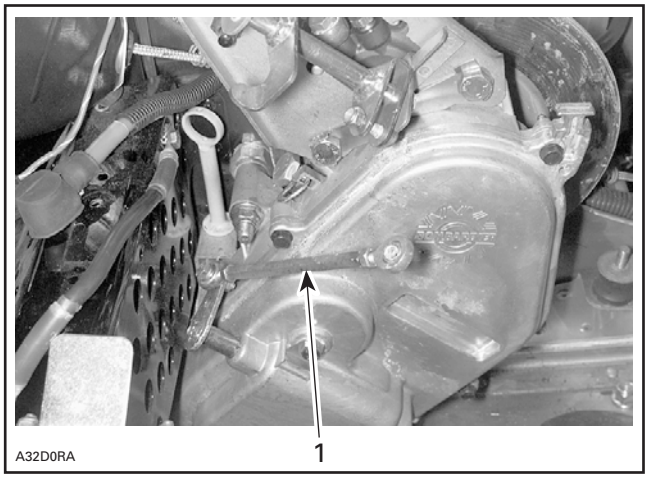
Remove tuned pipe, muffler and muffler grommet.

Remove battery then, battery rack if so equipped.



1. Battery rack

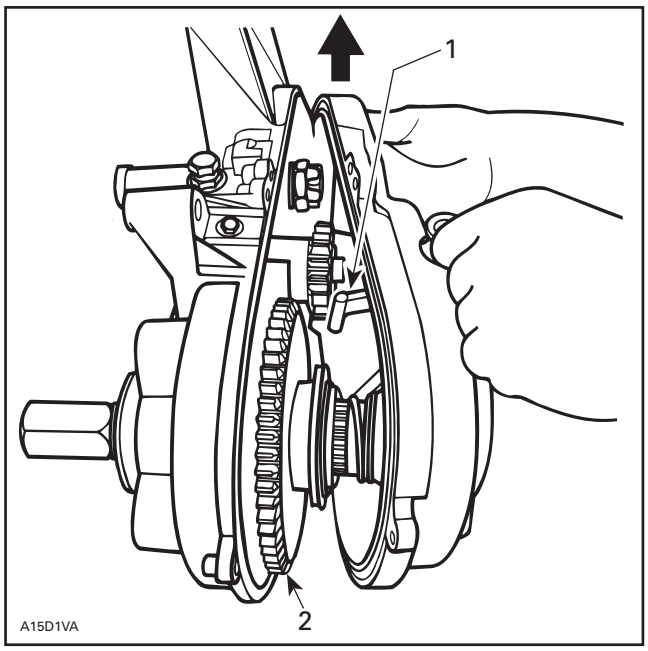
Unfasten tie rod from shifter.



1. Tie rod

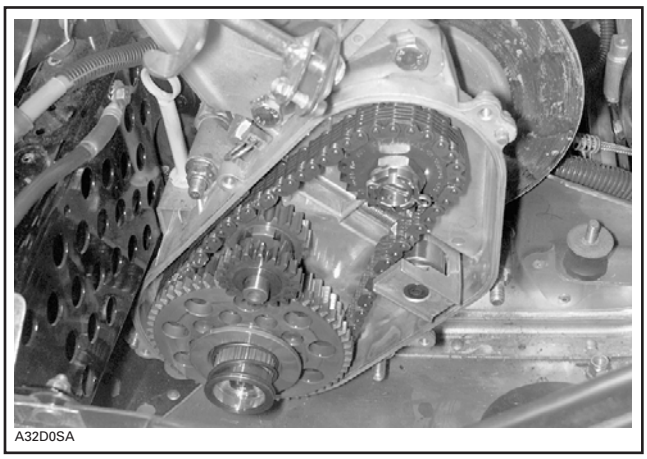
Unscrew cover screws **no. 5** as well as reverse axle screw **no. 7**.

Separate cover **no. 6** from housing and move it toward the front in order to disengage fork from sliding gear.



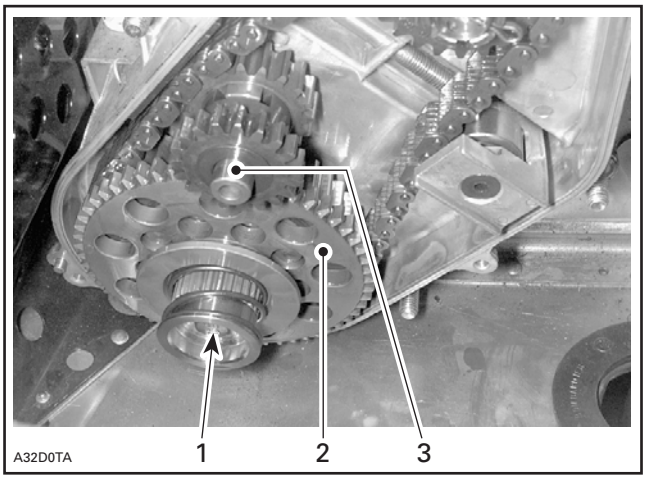
TYPICAL

1. Fork
2. Sliding gear



GEARBOX COVER REMOVED

Loosen chain tension, unscrew sliding gear retaining screw **no. 31**, then remove sliding gear **no. 32**.



1. *Retaining screw*
2. *Sliding gear*
3. *Reverse axle*

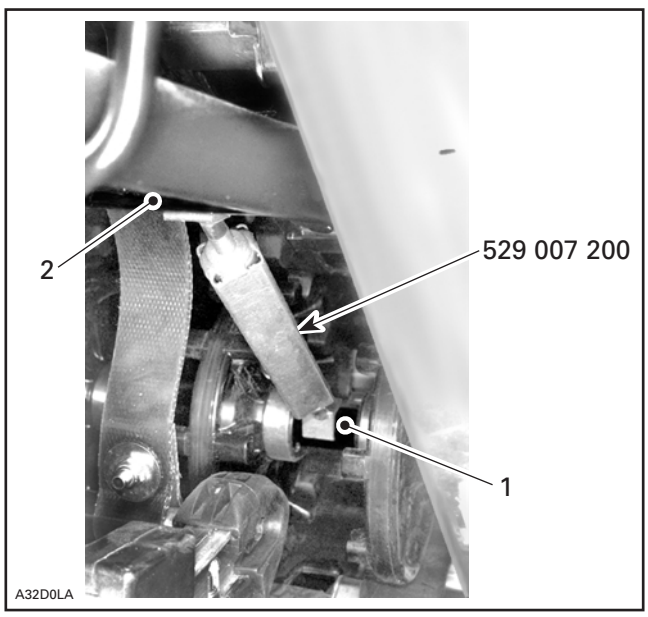
Remove 19-tooth reverse gear **no. 18** then remove reverse axle **no. 20**.

Remove coupling shaft **no. 33**, 44-tooth sprocket **no. 34**, spacer **no. 38** and chain **no. 28**.

First unscrew castellated nut **no. 10**, then remove 22-tooth sprocket **no. 12**.

Force 2 spring pins **no. 16** out to disengage fork **no. 17** from its axle.

Install drive axle holder (P/N 529 007 200) before removing gearbox housing.



1. *Drive axle*
2. *Suspension front arm upper axle*

INSPECTION

14, Chain Slider

Replace slider if maximum wear is 1.0 mm (.039 in) at contact point.

Bearings

Check bearing condition. There must be no discoloration, missing rollers, broken cages, etc.

Sprockets and Gears

Check teeth.

ASSEMBLY

Reinstall gearbox housing.

Sealed side of bearings **nos. 2** and **27** must face gearbox cover.

Do not reuse removed oil seals. Replace them with new ones.

Install bearing **no. 2** and circlip in chaincase bore.

Temporary install spacer **no. 38** with its large outer diameter against sprocket, 44-tooth sprocket **no. 34**, coupling shaft **no. 33**, cap **no. 40** and screw **no. 31**.

Place a 25 cm (10 in) rule against sprockets. Maximum allowable offset is 1 mm (.040 in).

a. If upper sprocket is too far in, possible causes are:

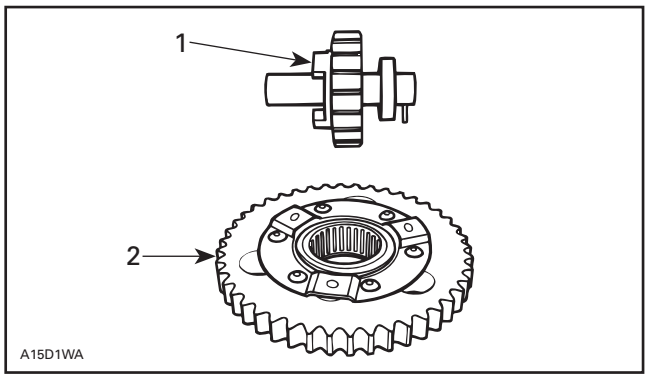
   1. Countershaft bearing on driven pulley side may be too far in. To check, pull out bearing then recheck sprocket alignment. Reposition bearing. Bearing housing (triangle) must be against frame without preload.
   2. Add shim(s) between chaincase and frame and reposition bearing on driven pulley side accordingly.

b. If upper sprocket is too far out, check:

   If there are too many shims between chaincase and frame. Remove shims accordingly and reposition bearing on driven pulley side.

Press needle bearing in 44-tooth sprocket. Assemble drive pins **no. 35** and their spring **no. 36** on 44-tooth sprocket. Tighten nut **no. 37** to 5 N•m (44 lbf•**in**) in a criss-cross sequence.

Insert spring pin **no. 21** in reverse axle up to inside diameter. Press needle bearing in 19-tooth sprocket. Install ring **no. 24** and 19-tooth sprocket on reverse axle.



1. Reverse axle ass'y
2. Sliding gear ass'y

Install shim **no. 13** and 22-tooth sprocket (drive) **no. 12** then tighten castellated nut **no. 10** and conical spring washer. Secure with a new cotter pin.

Install chain **no. 28**, 44-tooth sprocket **no. 34** and its spacer **no. 38**. Spacer's large outer diameter must be against sprocket. Insert coupling shaft **no. 32** in 44-tooth sprocket.

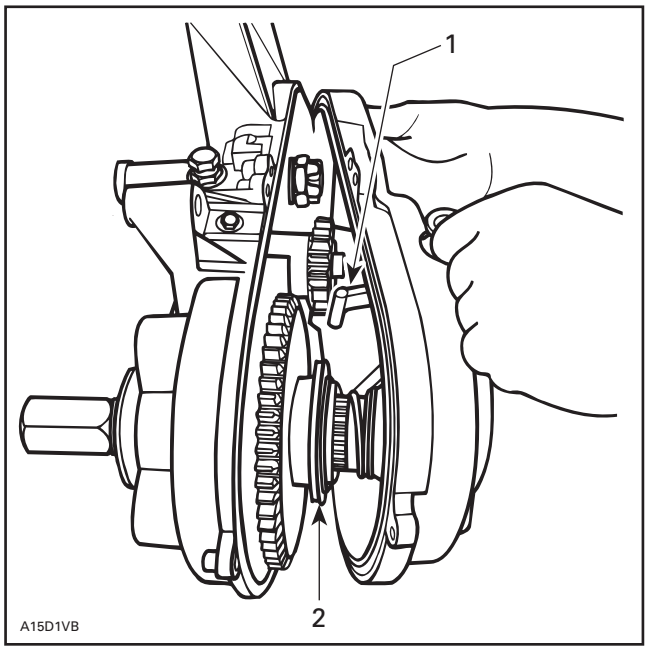
Install needle bearing **no. 15** (wider one) in reverse gear **no. 18**.

Install reverse axle **no. 20** (assembly) making sure to properly position spring pin in housing slot. Install alignment rod **no. 19**, reverse gear **no. 18** and spacer **no. 24**. Drive sprocket hole and driven gear hole must be aligned to insert alignment rod.

Mount chain tensioner (assembly) to adjustment screw already fixed to gearbox. Assemble fork **no. 17** to axle using spring pins **no. 16**. Apply grease on O-rings.

6, Cover

Join cover (assembly) to housing. Make sure fork tabs are behind sliding sprocket thrust washer.

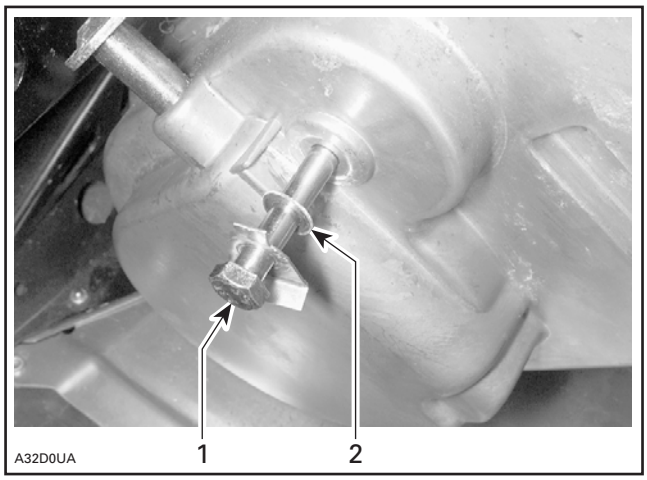


1. Fork tabs
2. Thrust washer

CAUTION: Gearbox cover must lay completely against housing.

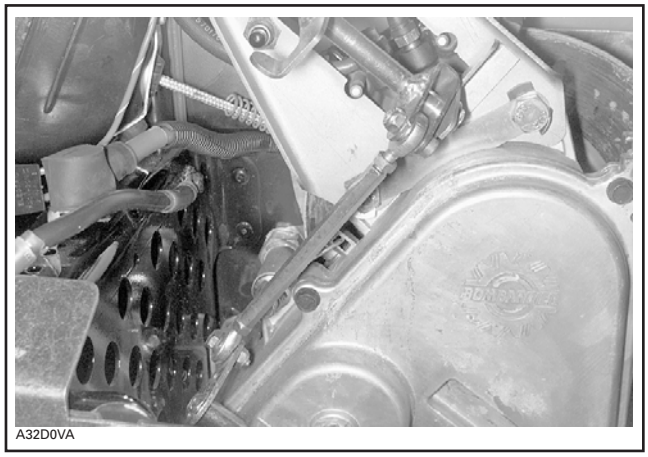
5,7,8,39, Screws, Locking Tab and Copper Washer

Tighten screws in a criss-cross sequence starting with the one above reverse axle. Install reverse axle screw, copper washer and bend locking tab against screw head flat.



1. Reverse axle screw
2. Copper washer

Bolt tie rod to shifter.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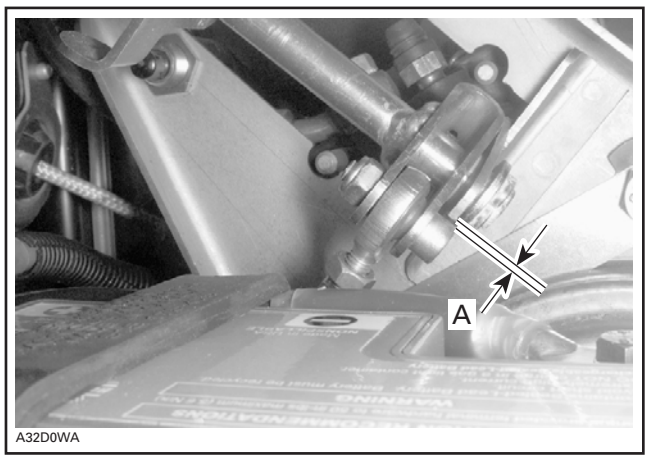
ADJUSTMENT

28, Chain

Fully tighten adjustment screw by hand, then back off only far enough for hair pin to engage in locking hole.

4, Gear Shift Linkage

1. Check proper fit of handle in console.
2. Shift into forward gear.
3. Loosen ball joint lock nuts on the tie-rod.
4. Lengthen tie-rod until distance between upper ball joint screw head and stopper is 0 to 0.3 mm (0 to .012 in).



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A. 0 to 0.3 mm (0 to .012 in)

NOTE: It is normal to feel a light friction when shifting into gear.

5. Statically test transmission operation in forward and reverse positions.
6. Hold linkage and tighten ball joint jam nut.

29, Alarm Switch

Adjust backup alarm switch so that buzzer sounds when transmission is in reverse gear while engine is running.

OIL CHANGE

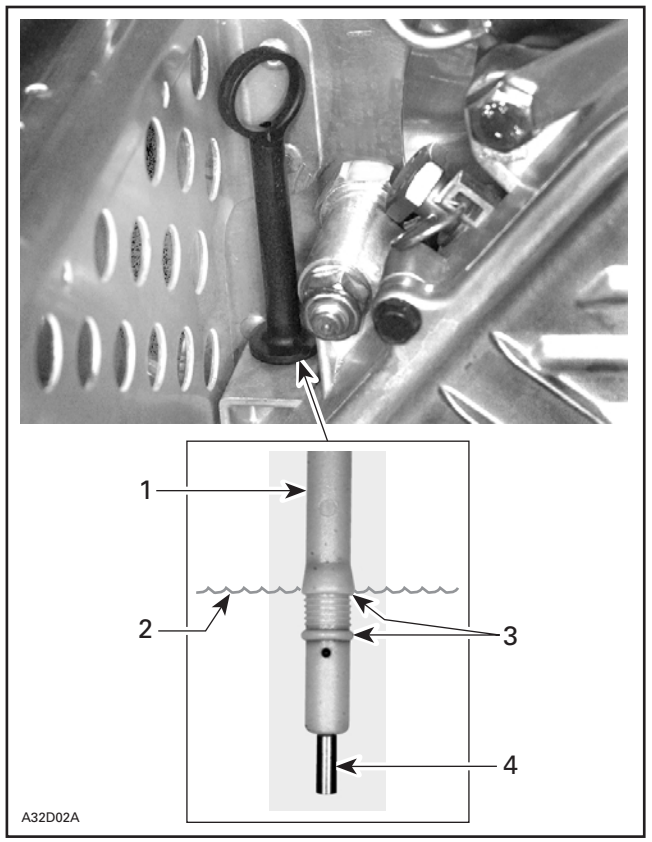
Place a container under bottom pan (gearbox side).

Remove drain plug.

NOTE: It is normal to find metallic particles stuck to dipstick magnet. If bigger pieces of metal are found, disassemble and check all parts.

Fill gearbox with Bombardier synthetic chaincase oil (P/N 413 802 800 — 12 x 250 mL). Oil capacity is 250 mL (8.5 oz).

Check oil level with dipstick. With dipstick unscrewed, oil level must be between MIN. and MAX. marks.



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TYPICAL

1. *Dipstick*
2. *Oil level*
3. *Level between marks*
4. *Magnet*

DRIVE CHAIN

SILENT CHAIN

There are 2 types of silent chains. One is 11-plates wide and the other is 13-plates wide (stronger). Do not interchange chains. Fit chain on sprockets to make sure that you are using right one according to width. Refer to TECHNICAL DATA.

NOTE: No work (separation, lengthening) can be done on the silent chain type.

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IGNITION TIMING

NIPPONDENSO TRIGGER COIL SYSTEM

Normally ignition timing adjustment should not be required. It has been set at factory and it should remain correctly adjusted since every part is fixed and not adjustable. The only time the ignition timing might have to be changed would be when replacing the crankshaft, the magneto flywheel, the trigger coil or the MPEM. If the ignition timing is found incorrect, first check for proper crankshaft alignment. This might be the indication of a twisted crankshaft.

The ignition timing can be checked with either the engine hot or cold. Also, the ignition timing is to be checked at 3500 RPM with a timing light.

NOTE: Between 3000 and 4000 RPM, the spark advance does not change. So when checking ignition timing at 3500 RPM, a change in engine speed within ± 500 RPM will not affect the timing mark when checked with the timing light.

IMPORTANT: During the first 8 hours (4 hours on Summit models) the timing curve is retarded by 3° between 4500 RPM and maximum RPM. Because checking ignition timing is done at a lower RPM, this will not affect the 3500 RPM timing specification. There will be no further timing adjustment required before and after these hours.

No tools were available at printing time for timing procedure.

SPARK PLUGS

NGK SPARK PLUG

All Models

NGK SPARK PLUG NUMBERING SYSTEM

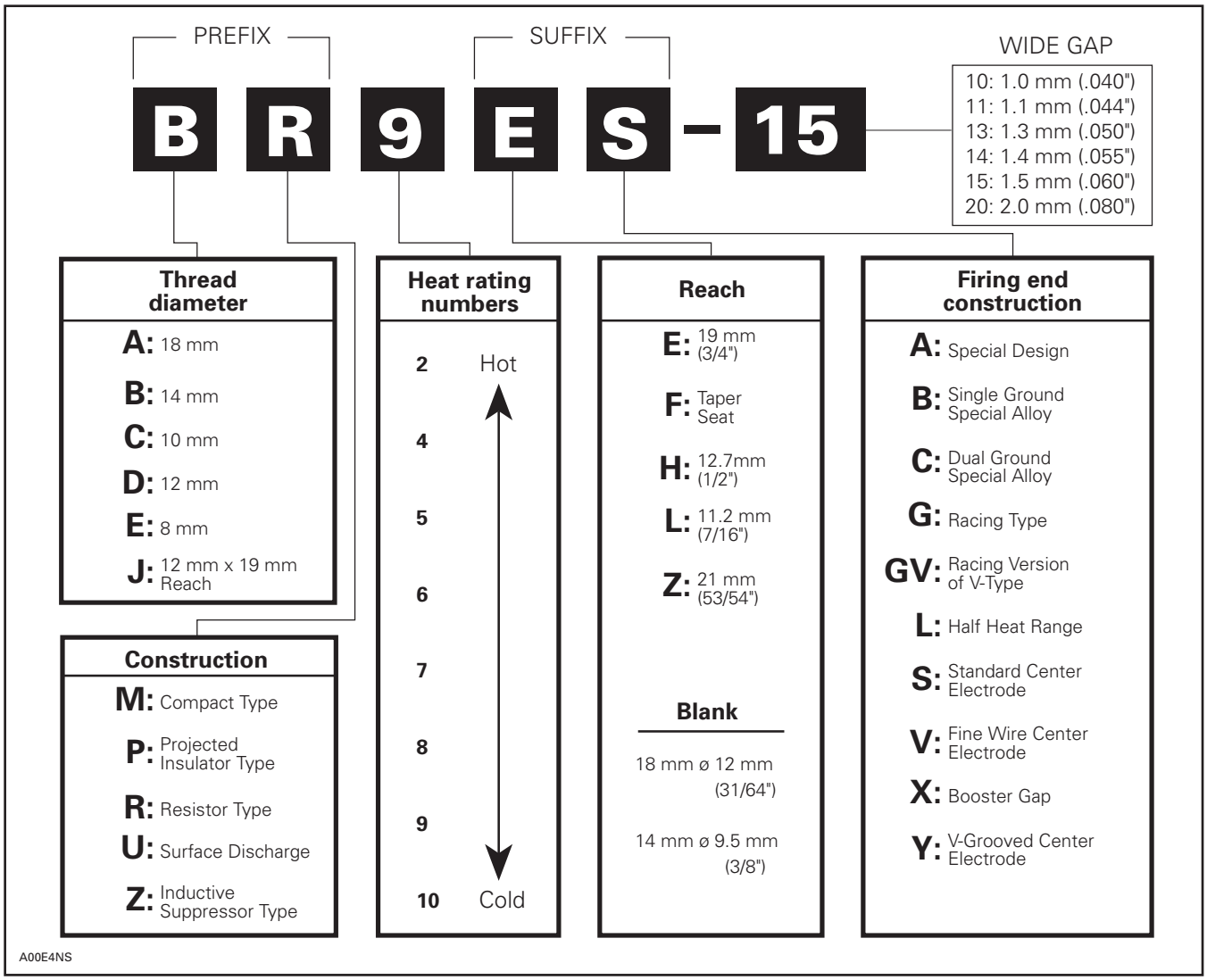
Bombardier uses NGK brand spark plugs on all its snowmobile models.

The heat range identification system is:

Low number → hot plug

High number → cold plug

DESIGN SYMBOLS USED IN NGK SPARK PLUGS



CROSSCUTS AND GAP STYLES OF SPARK PLUGS

DISASSEMBLY

First unscrew the spark plug 1 turn.

Clean the spark plug and cylinder head with pressurized air, then completely unscrew.

⚠ WARNING

Whenever using compressed air, always wear protective eye wear.

HEAT RANGE

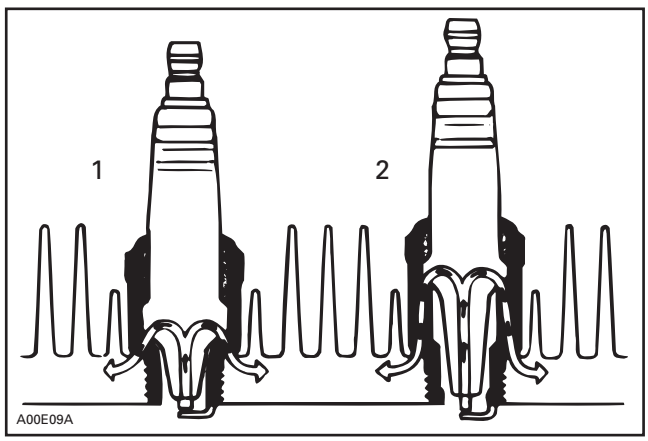
The proper operating temperature or heat range of the spark plugs is determined by the spark plug ability to dissipate the heat generated by combustion.

The longer the heat path between the electrode tip to the plug shell, the hotter the spark plug operating temperature will be — and inversely, the shorter the heat path, the colder the operating temperature will be.

A **cold** type plug has a relatively short insulator nose and transfers heat very rapidly into the cylinder head.

Such a plug is used in heavy duty or continuous high speed operation to avoid overheating.

The **hot** type plug has a longer insulator nose and transfers heat more slowly away from its firing end. It runs hotter and burns off combustion deposits which might tend to foul the plug during prolonged idle or low speed operation.



1. Cold
2. Hot

CAUTION: Severe engine damage might occur if a wrong heat range plug is used.

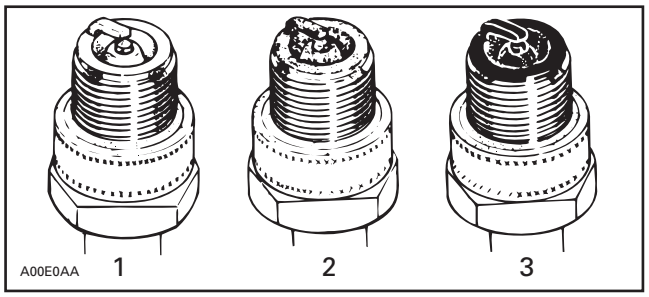
A **too hot** plug will result in overheating and pre-ignition, etc.

A **too cold** plug will result in fouling (shorting the spark plug) or may create carbon build up which can heat up red-hot and cause pre-ignition or detonation.

FOULING

Fouling of the spark plug is indicated by irregular running of the engine, decreased engine speed due to misfiring, reduced performance, and increased fuel consumption. This is due to a loss of compression. Other possible causes are: prolonged idling, or running on a too rich mixture due to a faulty carburetor adjustment or incorrect fuel and/or fuel mixing. The plug face of a fouled spark plug has either a dry coating of soot or an oily, glossy coating given by an excess either of oil or of oil with soot. Such coatings form a conductive connection between the center electrode and ground.

SPARK PLUG ANALYSIS



1. Overheated (light grey)
2. Normal (brownish)
3. Fouled (black)

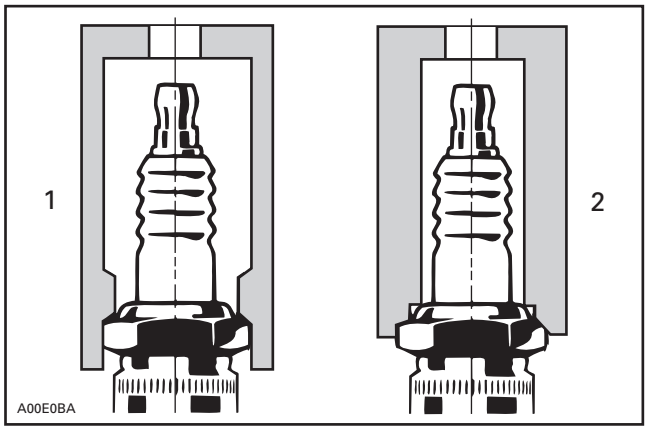
The plug electrode and piston dome reveal the condition of the engine, operating condition, method of driving and fuel mixture. For this reason it is advisable to inspect the spark plug at regular intervals, examining the plug electrode and the piston dome.

SPARK PLUG INSTALLATION

Prior to installation make sure that contact surfaces of the cylinder head and spark plug are free of grime.

1. Using a wire feeler gauge, set electrode gap according to TECHNICAL DATA.
2. Apply anti-seize lubricant (P/N 293 800 070) over the spark plug threads to prevent possible seizure.

3. Hand screw spark plug into cylinder head and tighten with a torque wrench and a proper socket.



1. Proper socket
2. Improper socket

SPARK PLUG TIGHTENING TORQUE

MODELS	SPARK PLUGS	TORQUE N•m (lbf•ft)
All models	NGK	27 (20)

BATTERY

BATTERY TESTING

There are 2 types of battery tests: unloaded and loaded. An unloaded test is made on a battery without discharging current. It is the simplest and commonly used. However, be aware that the voltage test can be good while the battery has not enough power to start the engine. A load test gives more accuracy of the battery condition.

Unload Test

Check charge condition using a multimeter.

With a multimeter, voltage readings appear instantly to show the state of charge. Always respect polarity. A fully charged battery will have a reading of 12.6 Vdc.

Load Test

This is the best test of battery condition under a starting load. Use a load testing device that has an adjustable load.

Apply a load of 3 times the ampere-hour rating of the battery. After 14 seconds check battery voltage; if battery is in good condition, it will have at least 10.5 Vdc.

REMOVAL

⚠ WARNING

Battery BLACK negative cable must always be disconnected first and connected last.

⚠ WARNING

Never charge or boost battery while installed on vehicle.

Unfasten battery retaining strap.

Withdraw battery from vehicle.

CLEANING

Clean the battery, battery casing, cables and battery posts using a solution of baking soda and water.

Remove corrosion from battery cable terminals and battery posts using a firm wire brush.

INSPECTION

Visually inspect battery case for cracks or other possible damage. If case is damaged, replace battery and thoroughly clean battery support and close area with water and baking soda.

⚠ WARNING

Should the battery casing be damaged, wear a suitable pair of non-absorbent gloves when removing the battery by hand.

Inspect battery posts for security of mounting.

BATTERY STORAGE

Disconnect and remove battery from the vehicle.

The battery must always be stored in fully charged condition.

Clean battery terminals and cable connections using a wire brush. Apply a light coat of dielectric grease (P/N 413 701 700) or petroleum jelly on terminals.

Clean battery casing and caps using a solution of baking soda and water. Rinse battery with clear water and dry well using a clean cloth.

Store battery on a wooden shelf in a cool dry place. Such conditions reduce self-discharging to a minimum.

Check for full charge condition every 40 days. Recharge battery as required.

ACTIVATION OF NEW BATTERY

⚠ WARNING

Never charge or boost battery while installed on vehicle.

CAUTION: Prior to charging the battery, always remove it from the vehicle.

Connect a 10 A battery charger for a few hours.

NOTE: It is recommended to verify the battery charge once a month. If necessary, fully charge battery.

⚠ WARNING

Do not place battery near open flame.

INSTALLATION

Position battery onto battery support on vehicle.

Fasten battery retaining strap making sure that negative cable is positioned as illustrated.

1. Negative cable under battery strap

⚠ WARNING

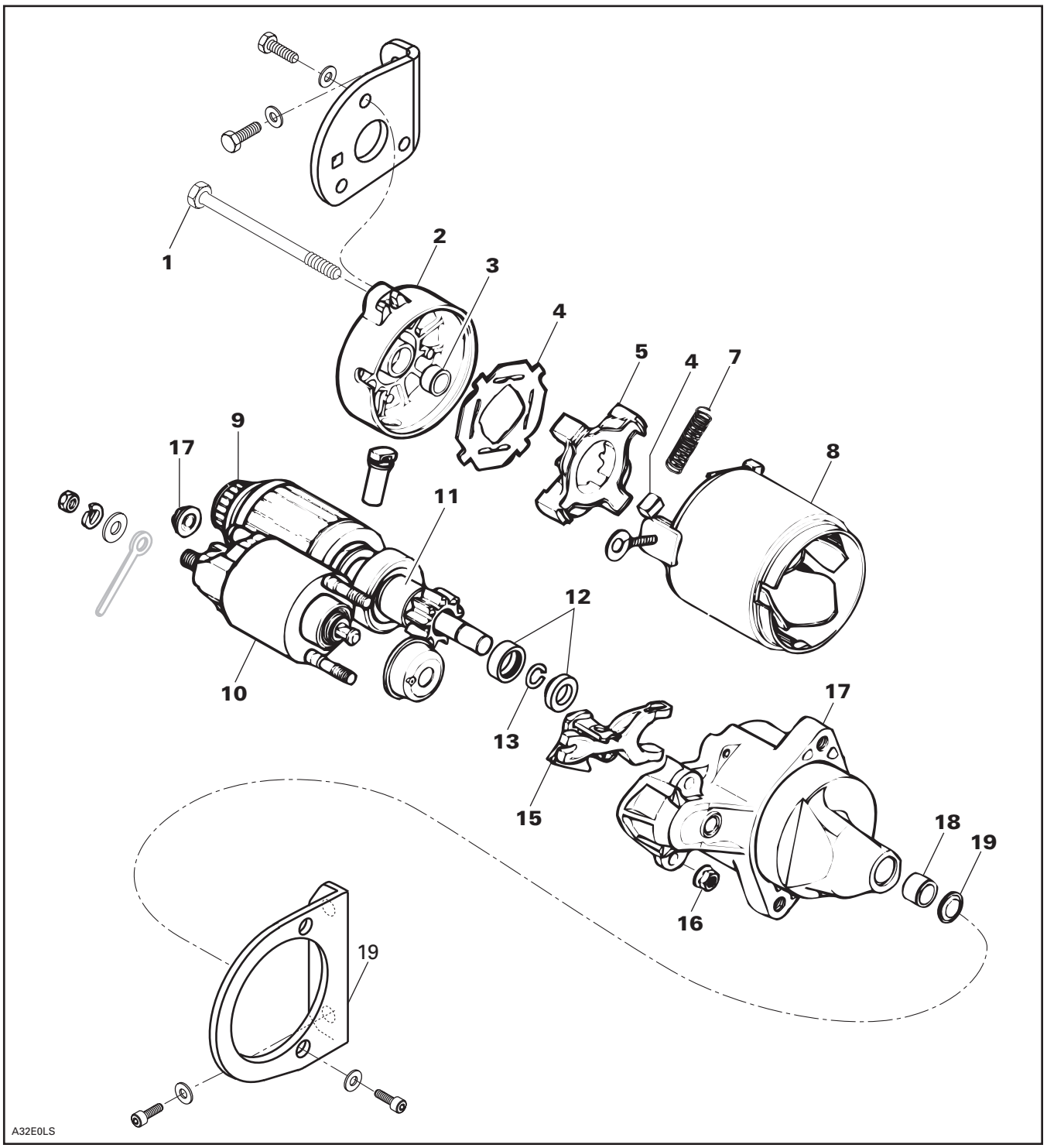
Always connect the battery cables exactly in the specified order. Connect RED positive cable first, then BLACK negative ground cable.

Apply silicone dielectric grease (P/N 413 701 700) on battery posts and connectors.

CAUTION: Negative battery terminal should always be disconnected FIRST and reconnected LAST.

ELECTRIC STARTER

ZX Series with Electric Starting



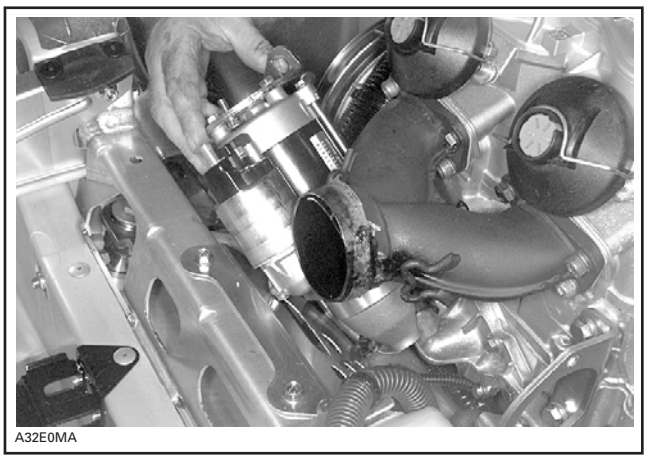
REMOVAL

– Disconnect BLACK ground cable from battery.
– Disconnect RED positive cable from battery.

⚠ WARNING

Always disconnect ground cable first and connect last.

– Remove tuned pipe.
– Disconnect RED cable and RED/GREEN wire from starter relay.
– Disconnect ground cable from MAG side bracket.
– Unbolt starter from PTO side bracket.
– Unbolt MAG side bracket from engine.
– Remove starter from engine.


A32E0MA

DISASSEMBLY

Disconnect bare wire linking starter and relay.

Remove nuts **no. 16** then relay **no. 10** by lifting and pulling to disengage from drive lever **no. 15**.

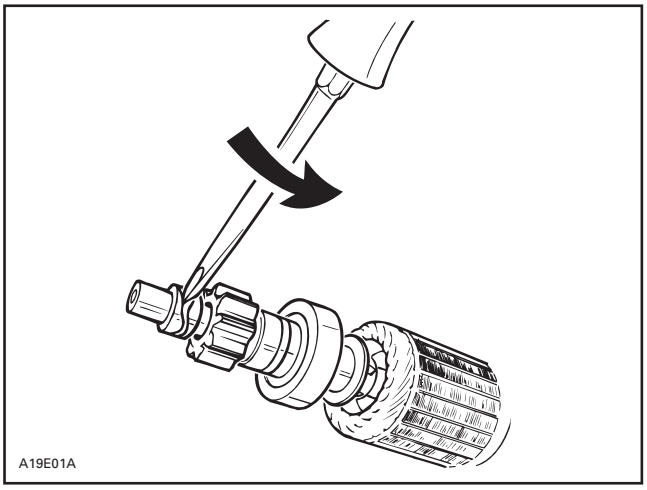
Unscrew starter screws (long) **no. 1** then pull yoke **no. 8** with end frame **no. 2** to separate from drive housing **no. 17**.

Pull armature **no. 9** with drive lever **no. 15**.

Remove insulator **no. 4** then brush springs **no. 7** being careful not to lose them since they will be projected out.

Pull brush holder **no. 5** from yoke **no. 8**.

Insert blade of a small screwdriver between stop collars.


A19E01A

TYPICAL

Twist screwdriver to separate stop collars **no. 12** thus giving access to circlip **no. 13**.

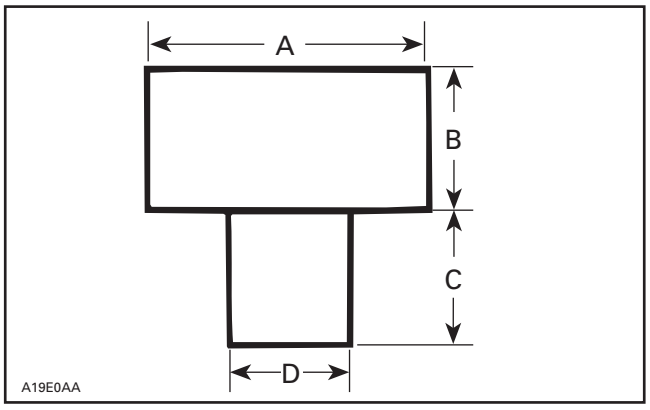
Remove outer collar, circlip then inner collar.

Remove overrunning clutch **no. 11**.

Check the wear on bushing **no. 18** by measuring the amount of radial play between the armature shaft and the bushing.

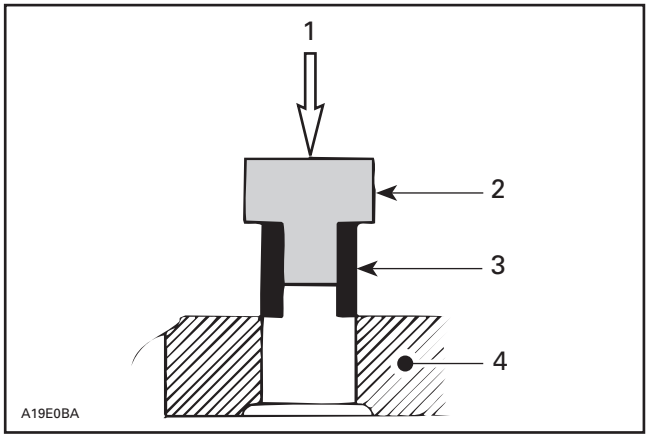
The radial play should not exceed 0.20 mm (.008 in). If greater, replace the bushing. To replace, press out the old one toward bushing cover and press in a new one with a bushing pusher. The correct size of the bushing pusher to use is given on next illustration.

CAUTION: Support drive housing adequately to prevent damage when pressing bushing.



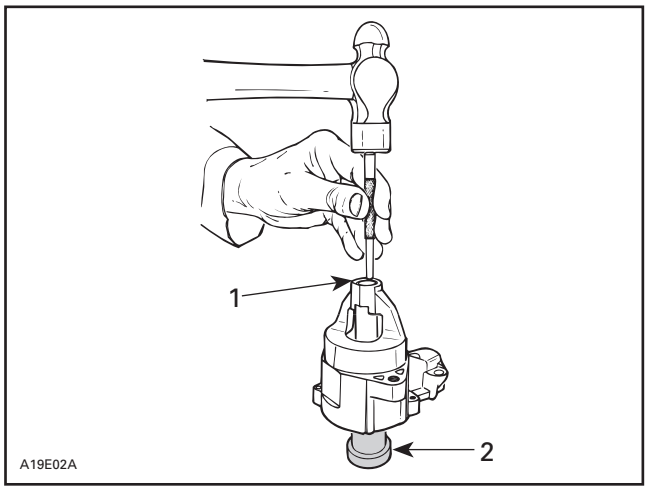
BUSHING PUSHER

A. 16 mm (5/8 in) diameter
B. 13 mm (1/2 in)
C. 11 mm (7/16 in)
D. 11.0 mm (.433 in)



1. Press-in
2. Bushing pusher
3. Bushing
4. Drive housing

Install bushing cover **no. 19** then, using a punch, stake bushing cover in place.



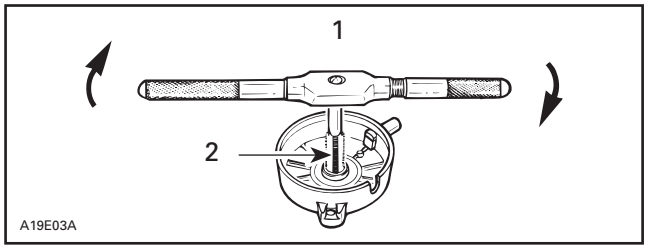
1. Stake bushing cover
2. Support

3, Bushing (end frame)

Check the wear on bushing **no. 3** by measuring the amount of radial play between the armature shaft and the bushing.

The radial play should not exceed 0.20 mm (.008 in). If greater, replace bushing as follows:

Using a 12 mm tap, cut threads into bushing so that the tap contacts the end frame. Continue to rotate tap until the bushing comes free.



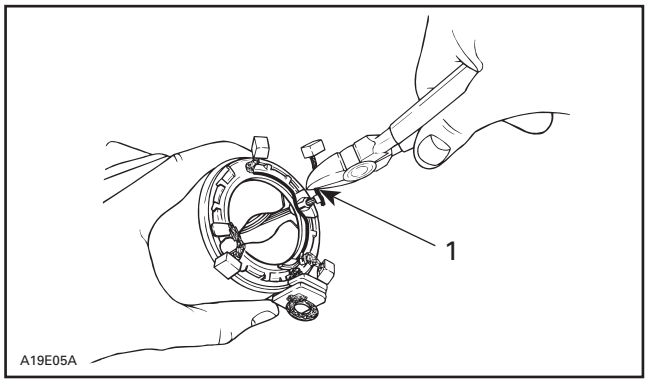
1. Turn until bushing goes out
2. 12 mm tap

To install new bushing, use the same bushing pusher as for drive housing bushing installation.

6, Brush

To replace brush **no. 6**, proceed as follows:

Cut brush wire close to connector at the welded portion.



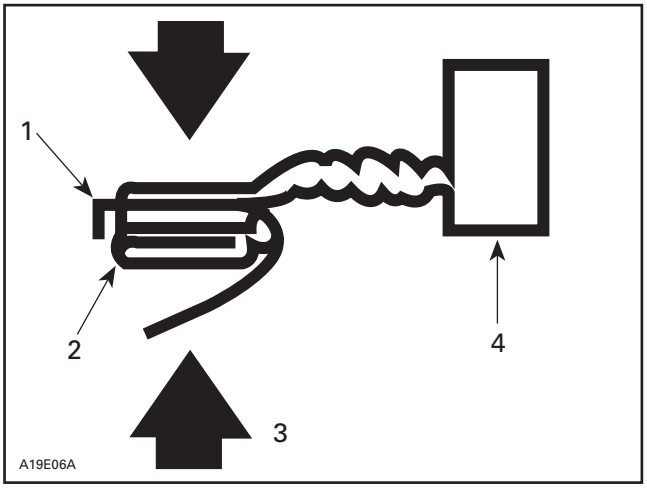
1. Cut close to connector

Remove burrs with a file on the remaining welded portion.

CAUTION: Be careful not to damage plastic portion of yoke.

Place spare brush plate edge against yoke connector edge (welded portion).

Crimp plate over yoke connector with a pair of pliers.



1. Plate edge
2. Yoke connector
3. Crimp
4. Spare brush

Solder the crimped portion.

CAUTION: Do not overheat and quickly perform soldering to prevent solder from flowing to the brush through the wire. Preferably use a heat sink.

CLEANING AND INSPECTION

CLEANING

CAUTION: Armature starter yoke ass'y and drive unit assembly must not be immersed in cleaning solvent.

Clean brushes and holder with a clean cloth soaked in solvent. Brushes must be dried thoroughly with a clean cloth.

Blow brush holder clean using compressed air.

⚠ WARNING

Always wear safety goggles when using compressed air.

Remove dirt, oil or grease from commutator using a clean cloth soaked in suitable solvent. Dry well using a clean, dry cloth.

Clean engine starter gear teeth and drive unit (clutch).

NOTE: Bushings must not be cleaned with grease dissolving agents.

Immerse all metal components in cleaning solution. Dry using a clean, dry cloth.

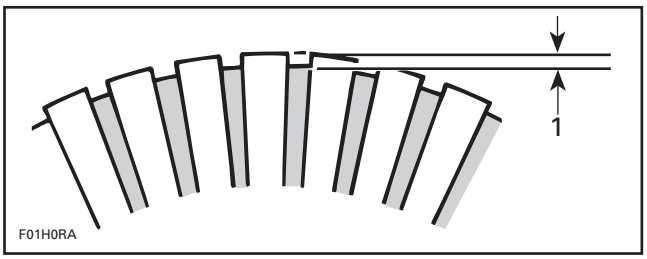
INSPECTION

Armature

NOTE: An ohmmeter may be used for the following testing procedures, except for the one concerning the shorted windings in the armature.

Check the commutator for roughness, burnt or scored surface. If necessary, turn the commutator on a lathe, enough to remove grime only.

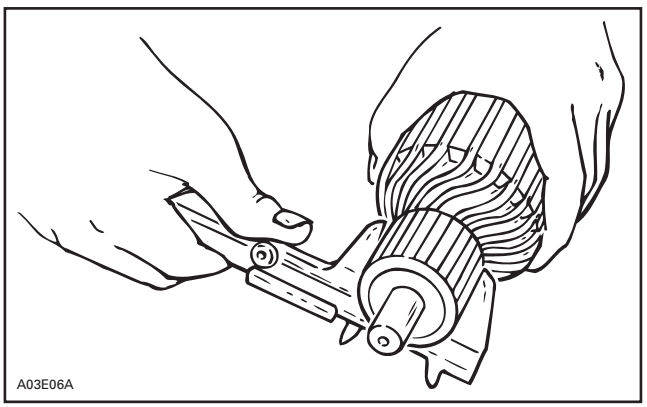
Check the commutator for mica depth. If the depth is less than 0.20 mm (.008 in), undercut the mica. Be sure that no burrs are left and no copper dust remains between the segments after the undercutting operation is completed.



1. Commutator undercut 0.20 mm (.008 in)

Check the commutator out-of-round condition with V Blocks and an indicator. If the commutator out-of-round is more than 0.40 mm (.016 in), the commutator should be turned on a lathe.

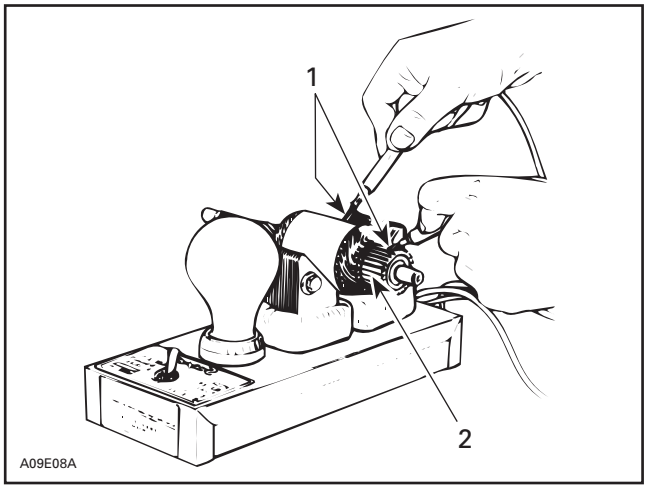
Check commutator outer diameter. If less than specified value, replace.



MODEL	WEAR LIMIT
ZX SERIES	27 mm (1.063 in)

Test for Ground Circuit in the Armature:

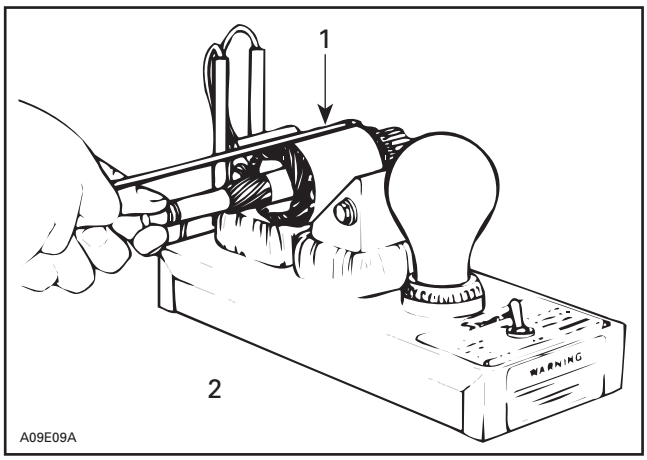
Use growler test probes. Check between armature core and the commutator bars. If growler lamp turns on, bars are grounded. If so, replace armature.



1. Test probes
2. Commutator bars

Test Armature for Shorted Winding:

When the armature is rotated in the growler with a steel strip (hacksaw blade) held above it, the strip will vibrate over that area of the armature which has short circuit. Replace armature if so.



1. Steel strip (hack-saw blade)
2. Growler

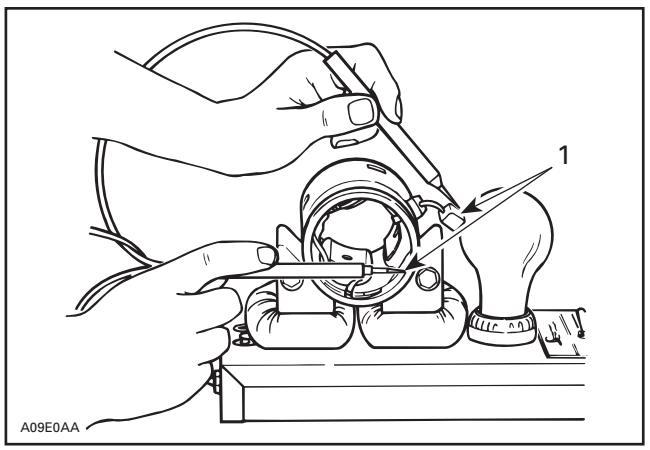
Test the Armature for Open Circuit:

Use growler test probes. Place one test probe on a commutator bar and the other test probe on the neighboring bar. Repeat this operation for all bars, moving one test probe at a time. If the growler lamp does not turn on, the armature circuit between these 2 bars is opened. The armature should be replaced or repaired; open circuits most often occur at the commutator riser where coils are soldered. (Burnt commutator bars are usually an indication of an open-circuit armature coil).

Field Windings and Brushes

Test the Field Winding for Open Circuit:

Use growler test probes. Place one test probe on the negative brush and the other test probe on the yoke. If growler lamp does not turn on, the field winding has an open-circuit. The yoke has to be repaired or replaced.



1. Test probes

Check the dynamic brake winding for open circuit by placing one test probe on the positive brush and the other probe on the negative brush.

If growler lamp does not turn on, the winding circuit is open-circuit and the yoke has to be repaired or replaced.

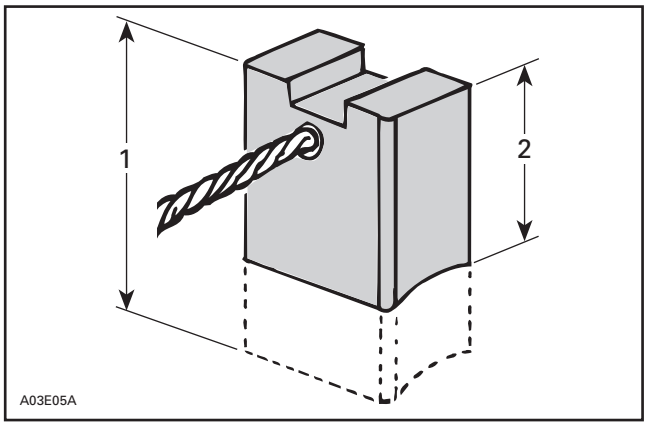
Brush Holder

Check the brush holder for insulation using growler test probes. Place one test probe on the insulated brush holder and the other test probe on the brush holder plate. If the growler lamp turns on, the brush holder has to be repaired or replaced.

Brush Length

Measure brush length. If less than the specified value, replace them.

MODEL	LENGTH	
	NEW	WEAR LIMIT
ZX SERIES	10 mm (.400 in)	6 mm (.236 in)



TYPICAL
1. *New*
2. *Wear limit*

Overrunning Clutch

The pinion of the overrunning clutch should turn smoothly in a clockwise direction, and should not slip in a counterclockwise direction. If defective, replace.

Check the pinion teeth for wear and damage. If defective, replace.

RELAY

Inspect connections and clean as necessary. Relay condition can be checked with an ohmmeter. Install test probes on **large** connectors of relay when it is activated (+ on RED/GREEN wire and – on relay body).

IMPORTANT: No current must be present on large cables when using ohmmeter, otherwise meter could be damaged.

ASSEMBLY

Prior to assembling, coat sliding surfaces and moving parts on armature shaft splines, overrunning clutch, relay plunger, drive lever and bushings with 10W30 engine oil.

Proceed as follows for assembling.

Secure drive housing in a vise.

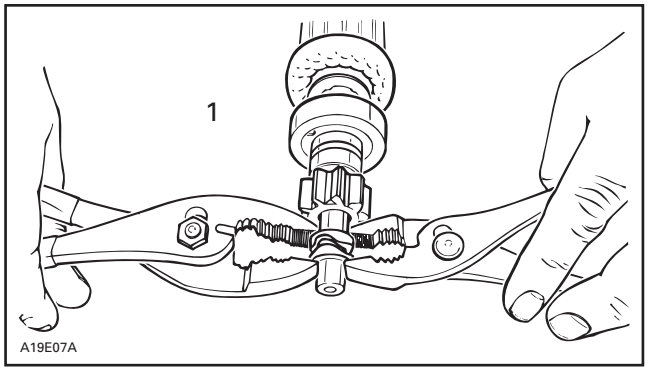
CAUTION: Do not overtighten since housing might be damaged.

Install overrunning clutch onto armature shaft. Insert **inner** collar onto shaft. Install a new circlip.

CAUTION: Always install a new circlip when servicing.

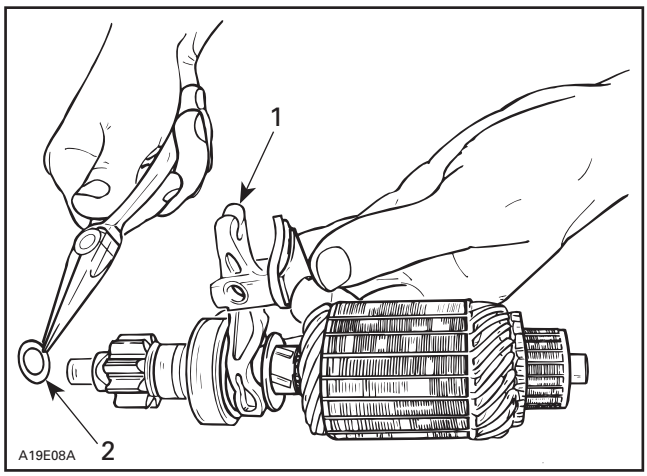
Insert **outer** collar being careful to match protrusions with notches of collars.

Using a pair of pliers on each side of stop collars, squeeze evenly until collars sit over circlip.



1. *Squeeze evenly*

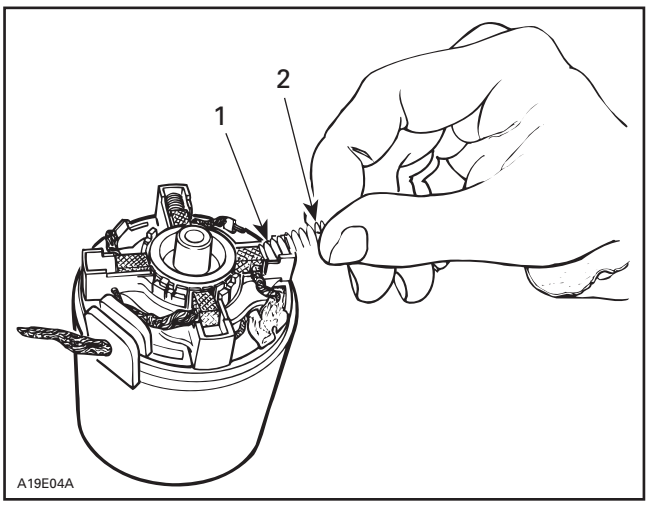
Install thrust washer against outer stop collar. Place drive lever onto overrunning clutch then insert into drive housing.



1. *Install on overrunning clutch*
2. *Install thrust washer*

Slide yoke over armature.

Install brush holder then brushes in their housings. Insert springs as follows: place one end of spring against brush, compress, then push the other end of spring onto its housing. Repeat for remaining springs.



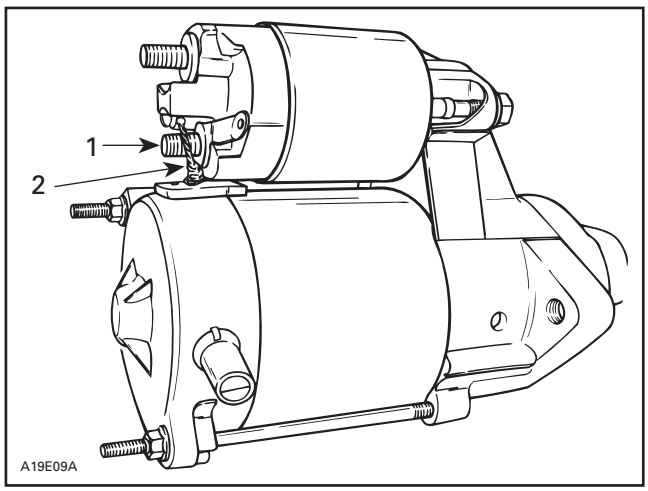
1. This end first
2. Push this end to complete

Secure insulator over brushes and springs. Properly install end frame and tighten screws.

Insert relay plunger inside of drive lever fork and secure to drive housing.

Connect starter bare wire to relay.

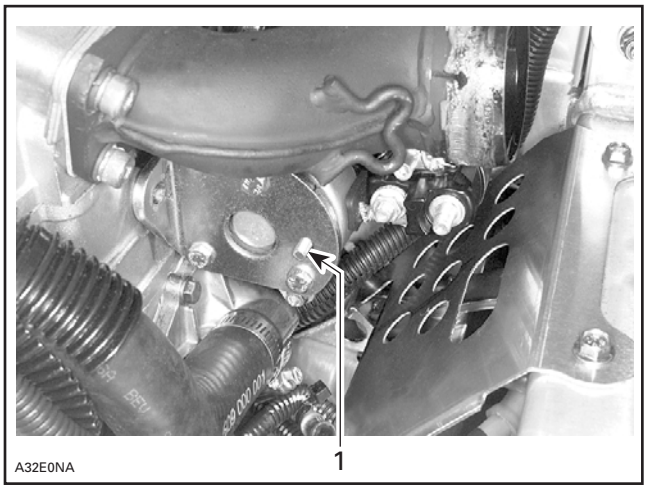
NOTE: Connect this wire on the **shorter** relay stud.



TYPICAL
1. Shorter stud
2. Bare wire

INSTALLATION

Install carriage bolt in MAG side bracket before installing starter.



1. Carriage bolt must be in place before starter installation

Make sure that starter and engine mating surfaces are free of grime. Serious trouble may arise if starter is not properly aligned.

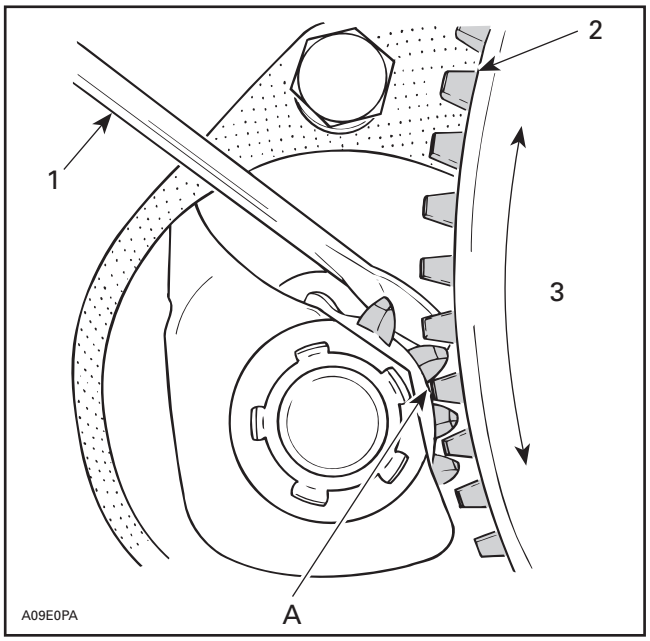
CAUTION: Make sure that both starter brackets are well seated against engine crankcase and starter before torquing all retaining bolts.

Torque all M8 bolts to 29 N•m (21 lbf•ft).

Torque all M6 bolts to 11 N•m (97 lbf•**in**).

NOTE: Check proper engaging depth of starter pinion teeth to ring gear teeth (see illustration). Install hardened washers (P/N 503 007 900) between engine and starter supports accordingly.

CAUTION: Always install new self-locking fasteners.



1. Screwdriver pulling starter pinion
2. Ring gear
3. No excessive backlash
A. 0.5 to 1.5 mm (.020 to .060 in)

Connect the RED battery cable and the RED wire to the large terminal of the relay. Connect RED/GREEN wire to small terminal of relay.

Connect BLACK cable to MAG side bracket.

Connect BLACK cable to battery.

⚠ WARNING

Always disconnect ground cable first and connect last.

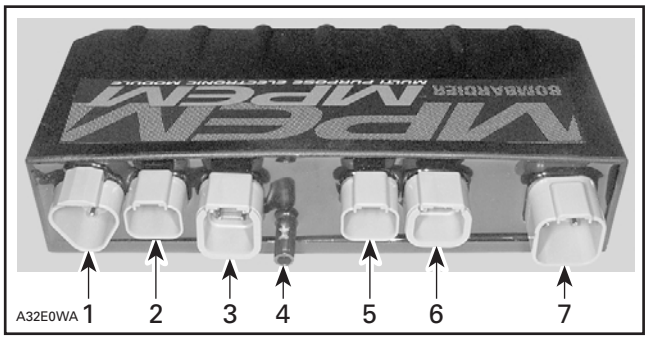
TESTING PROCEDURE

GENERAL

The following chart gives the engine types with their implemented system.

ENGINE TYPE	IGNITION SYSTEM	CHARGING SYSTEM OUTPUT
493, 593, 693 and 793	BOMBARDIER 290 W	290

Multi-Purpose Electronic Module (MPEM) Connections



TYPICAL — BOMBARDIER 290 W MPEM

1. *Generating coil and ground, 11-DB housing*
2. *Trigger coil, 11-DC housing*
3. *DPM solenoid, 11-DG housing*
4. *Atmospheric pressure nipple*
5. *High tension coil, 11-DD housing*
6. *Air temperature sensor, 11-DF housing*
7. *DESS, ignition and kill switches, DESS pilot lamp, 11-DA housing*

Checking Calibration Program

CAUTION: Do not interchange MPEM from a model to an other. Even if the P/N stamped on the MPEM is the same, calibration program may be different. When ordering a new MPEM always refer to appropriate model parts catalog. The service P/N published in parts catalogs are the ones with the good calibration program according to model.

With Engine Running

All Models

If the below mentionned tool is not available start engine. Turn on programmer then enter password.

Increase engine speed to 2000 - 2500 RPM then follow the same procedure as **With Engine Stopped**.

CAUTION: Engine must run till the end of the procedure.

When data are being transferred, you must rev the engine at 2000 - 2500 RPM and make sure connection between programmer and vehicle is good.

IMPORTANT: In following procedure each time ←**Trs** symbol appears, make sure to rev engine between 2000 and 2500 RPM.

Engine will misfire while vehicle information is being transferred from MPEM to programmer. If engine stalls, restart it, keep engine speed at 2000 - 2500 RPM and select no. 3 VEHICLE INFO again.

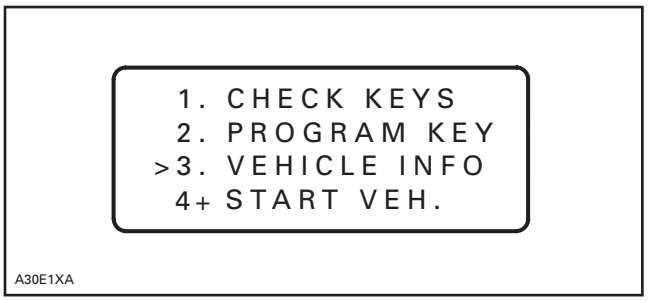
With Engine Stopped

All Models

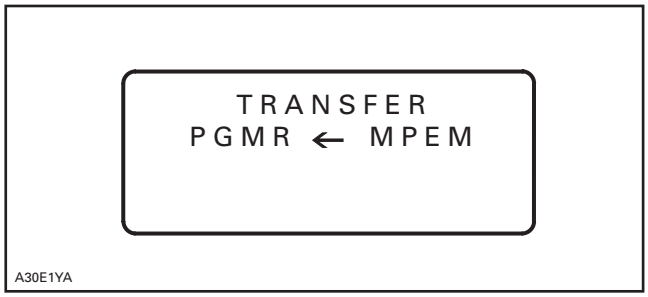
Connect 9-volt adaptor (P/N 529 035 675) to MPEM.

Turn on programmer then enter password.

From main menu select no. 3. VEHICLE INFO; ←**Trs**.

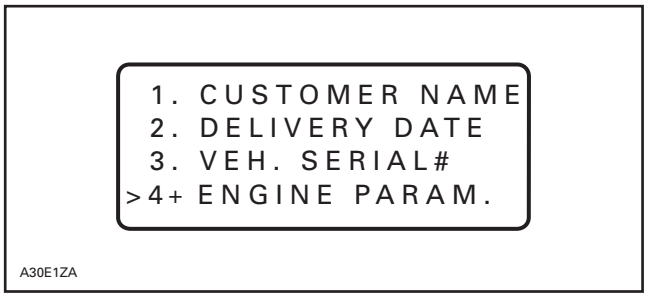


Vehicle information is transferred from MPEM to programmer.

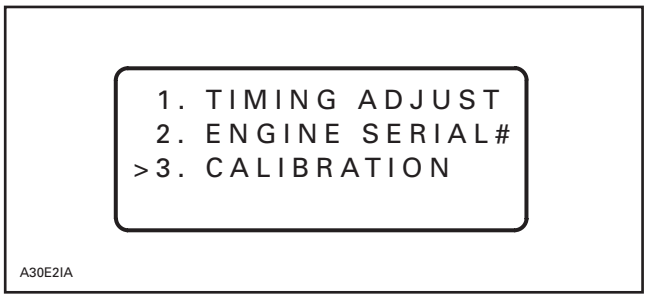


NOTE: In fact the programmer takes a **copy** of all vehicle parameters scribed in MPEM. This copy will be modified within the programmer then transferred to the MPEM.

Select no. 4. ENGINE PARAMETER.

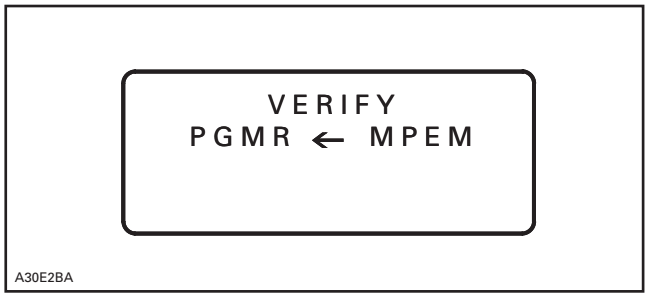


Select no. 3 CALIBRATION.

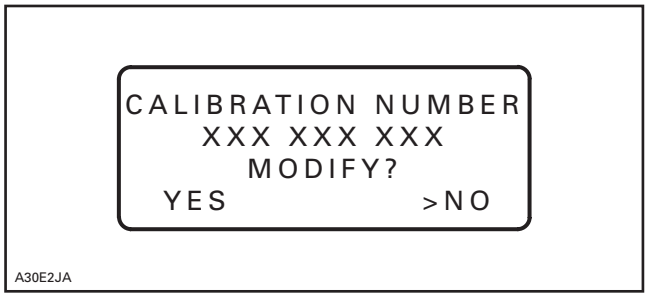


Press ENTER ←**Trs**.

Following screen appears temporarily:



And then following screen showing the actual calibration number in the MPEM.



Check for proper calibration number. See table below.

Select NO and press ENTER.

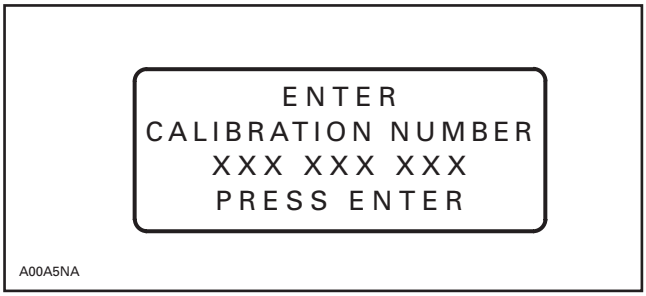
Press MENU twice; ←**Trs** then turn off programmer, unplug it from MPEM. Remove 9-volt adaptor.

Stop engine when using **With Engine Running** procedure.

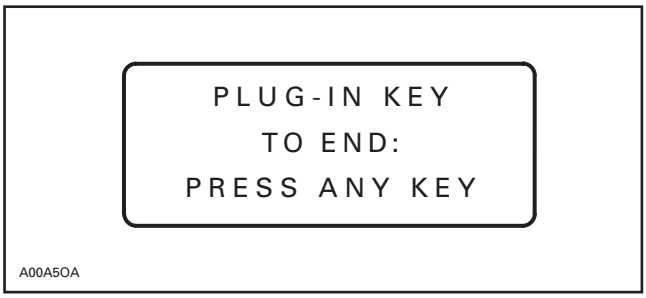
MODEL	CALIBRATED MPEM P/N (HARDWARE AND SOFTWARE)	CALIBRATION PROGRAM NUMBER (SOFTWARE)	MPEM P/N (HARDWARE)
Grand Touring 500 Formula DLX 500 MX Z 500 STD/TRAIL	515 175 380	512 059 137	512 059 201
Grand Touring 600 MX Z 600 STD/TRAIL Formula DLX 600	512 059 300	512 059 299	512 059 201
MX Z 600 ADRENALINE/X	512 059 298	512 059 299	512 059 202
Summit 600	512 059 296	512 059 297	512 059 353
Formula DLX 600 GSE	512 059 298	512 059 299	512 059 202
MX Z 700 STD/TRAIL	512 059 383	512 059 384	512 059 201
Grand Touring 700 GS Formula DLX 700 GS/GSE MX Z 700 ADRENALINE/X	512 059 385	512 059 384	512 059 202
Summit 700 STD/X/H.M./H.M X	512 059 380	512 059 381	512 059 382
MX Z 800 STD	512 059 387	512 059 432	512 059 201
MX Z 800 ADRENALINE/X	512 059 431	512 059 432	512 059 202
Summit 800 STD/X/H.M. X	512 059 360	512 059 361	512 059 382

Changing MPEM Calibration Program

Proceed the same as for checking MPEM calibration but select YES to MODIFY? and press ENTER following screen appears:

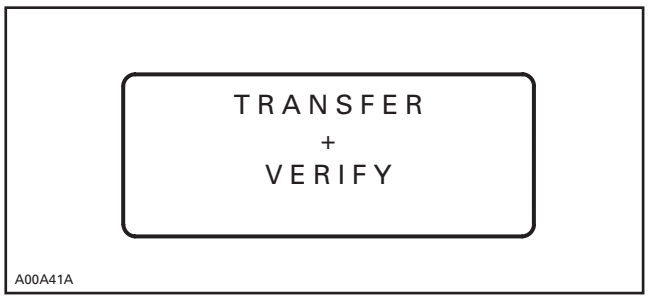


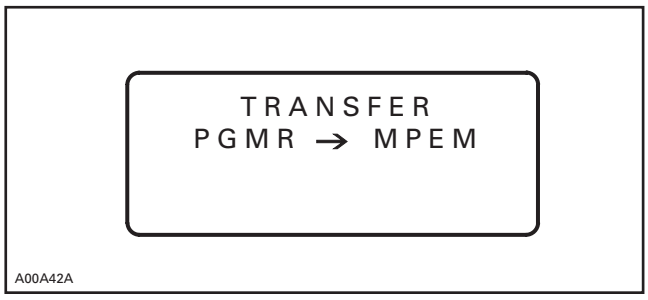
Enter new calibration number and press ENTER, following screen appears:

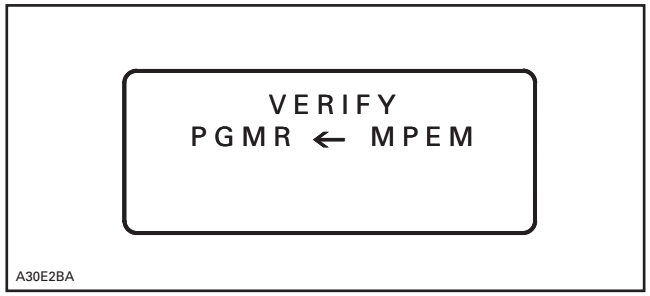


Simultaneously with the following operation a transfer will occur; ←**Trs**. At this point, be ready to rev the engine so it won't fall below the 2000 RPM mark when not using 9-volt adaptor.

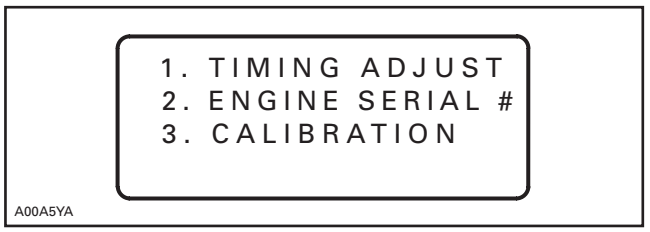
Plug-in the desired calibration cartridge (special red key) onto the programmer post, the following screens will appear temporarily:



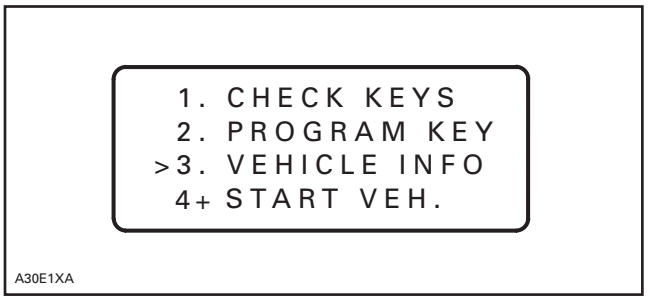




Press any key, display will show followed by next screen:



Press MENU twice, following screen will show:



After procedure is completed, ensure engine idle speed with engine hot is 1800 - 2000 RPM.

Stop the engine.

SYSTEM TESTING

IGNITION SYSTEM TESTING SEQUENCE

In the case of ignition problems, check the following in the prescribed order until the problem can be solved.

1. Sparking/spark plug condition.
2. Electrical connectors.
3. Ignition switches, DESS switch and emergency switch.
4. Ignition generator coil.
5. Trigger coil.
6. MPEM voltage.
7. High voltage coil.

LIGHTING SYSTEM TESTING SEQUENCE

1. Electrical connectors.
2. Magneto output (lighting generator coil).

Testing Conditions

Voltage measurements are always taken upon vehicle starting. Readings when the engine is running will be higher than indicated range. Part temperature must be approximately 20°C (68°F) (room temperature), otherwise readings could be distorted.

Analysis of Readings

Voltage Readings

When testing the different magneto components, it is important to take into consideration that readings vary according to the force applied onto the manual starter. It is therefore important to employ enough force upon each trial.

The reading must be 3 times within or above the range indicated in the corresponding table. If the reading is too low, the part is considered to be defective and must be replaced.

Resistance Readings

Place multimeter selector switch to Ω in order to measure resistance. Readings must be within the indicated range. Otherwise, the part is considered to be defective and must be replaced.

CAUTION: When taking measurements, it is useless to try to start the vehicle since readings would then be distorted.

Intermittent Ignition Problems

It is difficult to make a diagnostic in the case of intermittent ignition problems. Thus, problems occurring only when the engine operating temperature is normal must be checked in similar conditions.

In most cases when problems are caused by temperature or vibrations, these can only be solved by replacing parts. Most problems cannot be detected when the engine is stopped.

Multiple Problems

As a matter of fact, more that one component can be defective. As a result, if the problem remains although a part was replaced, start over the whole verification from the beginning in order to identify the other defective component.

1. SPARKING

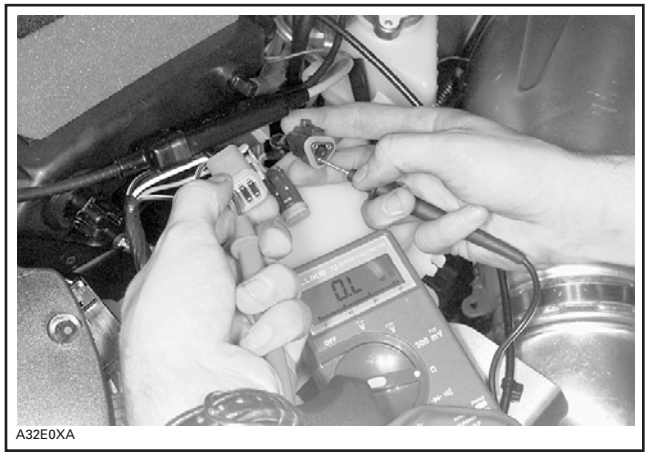
During this operation, it is important to use the snowmobile spark plug and not a new one. Bring the plug in contact with the engine. Pull rewind starter. If no spark is produced, replace the spark plug with a new one and do the test again.

2. ELECTRICAL CONNECTOR TESTING

Make sure that none of the connectors are disconnected.

3. IGNITION SWITCH, TETHER CORD SWITCH AND EMERGENCY SWITCH TESTING

Disconnect connector housings from MPEM and check resistance as indicated in IGNITION table.


A32E0XA

If readings are acceptable, go on to next step.

If readings are inadequate, individually check each switch as follows.

DESS Switch

Tether Cord Switch

Check using a multimeter by connecting probes to BLACK/GREEN and BLACK/WHITE wires. The multimeter should indicate a closed circuit (0 Ω) in operating position and a open circuit (0.L $M\Omega$) in off position.

DESS Switch Wire

Check continuity (null resistance) between switch center terminal and WHITE/GRAY wire connector.

Check continuity (null resistance) between switch side ring and BLACK/GREEN wire connector.

If readings do not correspond to the above mentioned indications, replace switch.

If none of these verifications are conclusive, the problem finds its source in the main wiring harness. Proceed as follows:

NOTE: For the next step, no switch must be connected to the main wiring harness.

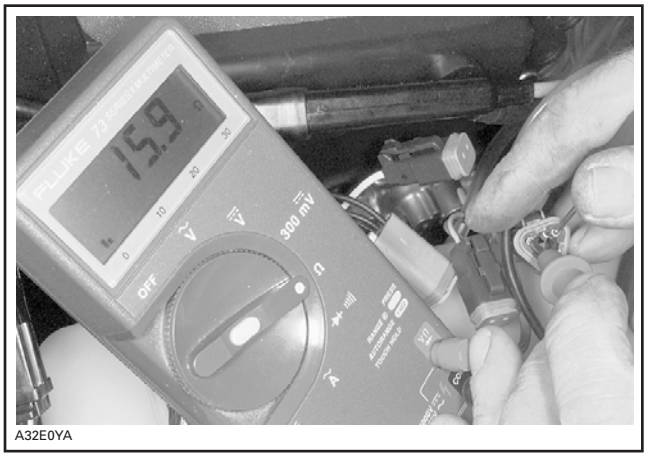
Disconnect all switches from the main wiring harness and check the continuity of each wire by connecting probes to the end of wires of the same color. Repeat with all other wires. It is important to mention that all wires of the same color within a given harness are connected together. These wires should therefore have a closed circuit. On the other hand, BLACK and BLACK/YELLOW wires must have an open circuit (0.L $M\Omega$).

Repair or replace if necessary.

4. IGNITION GENERATOR COIL TESTING

Resistance Testing

1. Disconnect housing between the magneto and the MPEM.
2. Connect multimeter probes to WHITE and RED wires and measure resistance.



A32E0YA

3. Compare readings with those appearing in the IGNITION table.

Voltage Testing

When manually starting the engine while the spark plug is installed, the engine will tend to accelerate beyond the compression point. This will result in higher magneto output power.

1. Disconnect housing between the magneto and the MPEM.
2. Connect multimeter probes to BLACK/RED and RED wires and bring the selector switch to $\tilde{V}$ and the scale to 00.0V_{AC}.

3. Activate the manual starter and check values indicated by the multimeter.
4. Repeat operation 3 times.
5. Compare readings with those appearing in the IGNITION table.

5. TRIGGER COIL TESTING

Resistance Testing

1. Connect probes to WHITE/YELLOW and BLUE/YELLOW wires from trigger coil housing.

A32E10A

2. Compare readings with those appearing in the IGNITION table.

Voltage Testing

1. Connect probes to WHITE/YELLOW and BLUE/YELLOW wires from trigger coil housing.
2. Activate the manual starter and check values indicated by the multimeter.
3. Repeat operation 3 times.
4. Compare readings with those appearing in the IGNITION table.

6. MPEM VOLTAGE TESTING

1. Disconnect the housing between module and high voltage coil.
2. Connect multimeter probes to WHITE/BLUE and BLACK wires coming out from module. Place the selector switch to $\tilde{V}$ and the scale to 00.0^{Vac}.

A32E0ZA

TYPICAL

3. Activate the manual starter and check values indicated by the multimeter.
4. Repeat operation 3 times.
5. Compare readings with those appearing in the IGNITION table.

7. HIGH VOLTAGE COIL TESTING

Resistance Testing

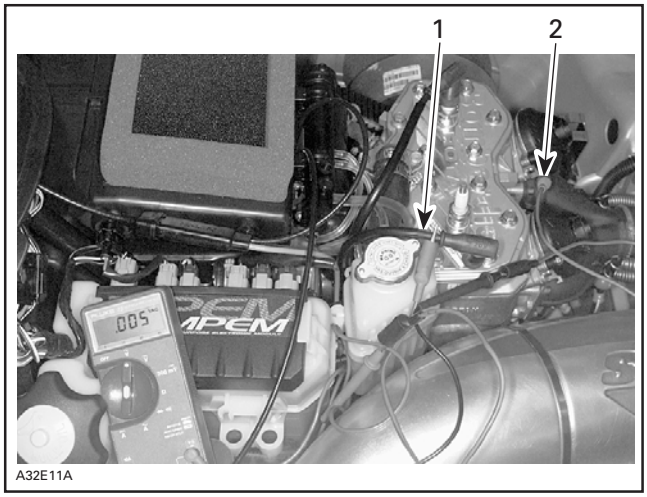
1. Unplug housing between high tension coil and MPEM.
2. Connect multimeter probes to WHITE/BLUE and BLACK wires and measure resistance.

A32E12A

3. Compare readings with those appearing in the IGNITION table.

Voltage Testing

1. Disconnect spark plug cap from spark plug.
2. Fasten alligator clip to spark plug cable, near the spark plug.
3. Connect other multimeter wire to engine (ground), then place selector switch to Ṽ and scale to 0.00^{Vac}.



1. MAG side spark plug cable
2. Connected to ground

4. Activate the manual starter and check values indicated by the multimeter.
5. Repeat operation 3 times.
6. Compare readings with those appearing in the IGNITION table.

CONCLUSION

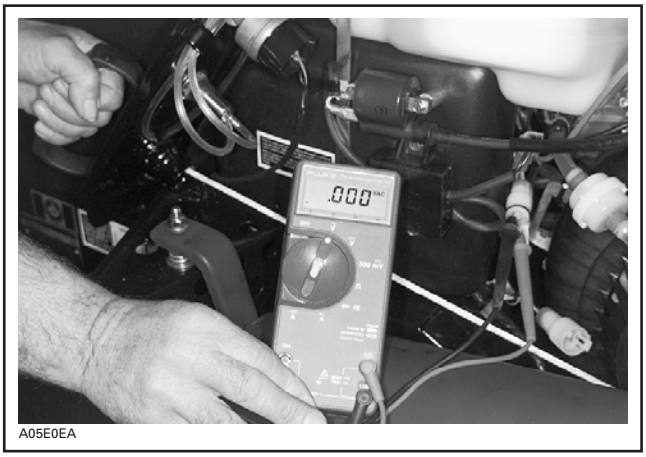
If none of the above testing operations produced valid results, it is strongly recommended to keep on testing according to the list appearing in the Resistance column of the IGNITION table.

Set the multimeter as indicated.

LIGHTING GENERATOR COIL VOLTAGE TESTING

NOTE: For 290 W system, the lighting generator coil is not part of the ignition system. It is a self-contained system used to supply current to the lighting system and to other devices working on alternating current. However, this system can be tested using a multimeter.

1. Disconnect round housing from engine (YELLOW, YELLOW wires).
2. Connect multimeter probes to YELLOW wires, then place selector switch to Ṽ and scale to 0.00^{Vac}.
3. Activate the manual starter and check values indicated by the multimeter.
4. Repeat operation 3 times.



TYPICAL

5. Compare readings with those appearing in the LIGHTING table.

CONCLUSION

If none of the above testing operations produced valid results, it is strongly recommended to keep on testing according to the list appearing in the Resistance column of the LIGHTING table.

Set the multimeter as indicated.

IGNITION SYSTEM TESTING (ZX SERIES — 290 W)								
PART	TEST TO BE PERFORMED	WIRE COLOR	MULTIMETER PROBE CONNECTION	RESISTANCE Ω		VOLTAGE V		NOTE
				VALUE (OHMS)	MULTIMETER SCALE	VALUE (VOLTS)	MULTIMETER SCALE	
Ignition and kill switches	Running insulation	BK and BK/YL	11-DB-C-F 11-DA-3-F	0.L	00.0 MΩ	—	—	No stop switch must be in run position.
	Continuity in stop position	BK and BK/YL	11-DB-C-F 11-DA-3-F	00.0 - 00.5	00.0 Ω	—	—	Only one stop switch must be in run position. Test one at a time.
DESS switch	Insulation in stop position	BK/GN and BK/WH	11-DA-2-F 11-DA-1-F	0.L	00.0 MΩ	—	—	Tether cord cap should be off.
	Running continuity	BK/GN and BK/WH	11-DA-2-F 11-DA-1-F	00.0 - 00.5	00.0 Ω	—	—	Tether cord cap should be in place.
Ignition generator coil	Output	RD and BK/RD	11-DB-A-F 11-DB-B-F	11.6 - 21.6	00.0 Ω	15.0 - 30.0	00.0 Vac	—
	Coil insulation	BK and RD	11-DB-A-F 11-DB-C-F	0.L	00.0 MΩ	—	—	—
	Ground continuity	BK and engine	11-DB-C-F and engine	00.0 - 00.5	00.0 Ω	—	—	The term "engine" refers to the engine metal parts connected to the magneto housing.
Trigger coil	Resistance and output	WH/YL and BL/YL	11-DC-2-F 11-DC-1-F	190 - 300	00.0 Ω	.200 - .350	.000 Vac	—
MPEM	Output voltage	WH/BL and BK	11-DD-1-F 11-DD-2-F	—	—	25.0 - 100.0	00.0 Vac	No switch must be in run position and tether cord cap must be in place.
High voltage coil	Primary winding resistance	WH/BL and BK	11-DD-1-F 11-DD-2-F	00.0 - 00.9	00.0 Ω	—	—	—
	All 493 and 593 engines and 693 on DLX and GT: Secondary winding resistance (spark plug wires and caps included)	PTO spark plug cap and MAG spark plug cap	In spark plug caps	17.6 K - 26.4 K	00.0 KΩ	**CAUTION:** Do not measure high voltage coil output voltage otherwise multimeter will be damaged.		
	793 engine and 693 on Summit and MX Z: Secondary winding resistance (spark plug wires and caps included)	PTO spark plug cap and MAG spark plug cap	In spark plug caps	14.5 K - 23.5 K	00.0 KΩ			
	All 493 and 593 engines and 693 on DLX and GT: Secondary winding resistance (without spark plug cap)	BK and BK	In spark plug wires	9.6 K - 14.4 K	00.0 KΩ			
	793 engine and 693 on Summit and MX Z: Secondary winding resistance (without spark plug wire and cap)	—	On high voltage coil	9.6 K - 14.4 K	00.0 KΩ			
	Secondary winding voltage	BK and engine	On spark plug wire and on engine	—	—	0.2 - 2.0	0.00 Vac	The measurement must be taken on the MAG spark plug wire, MAG spark plug cap disconnected but PTO spark plug cap installed on its spark plug.
	Insulation	Spark plug cap and BK	In spark plug cap 11-DD-2-F	0.L	00.0 MΩ	—	—	—
Spark plug cap	All 493 and 593 engines and 693 on DLX and GT: Cap resistance	—	Spark plug side and wire side	4.0 K - 6.0 K	00.0 KΩ	—	—	—

M: Male F: Female

NOTE: Stop switches include the ignition switch and the emergency cut-out switch.

It is important to take note that voltage measurements must be taken while starting the vehicle using the manual starter.

Voltages obtained upon starting are proportional to the force applied onto the manual starter. A low voltage is therefore normal under a low cranking force.

Perform testing in the prescribed order and replace any parts not performing according to specifications.

It is important to resume all tests when replacing a component.

If not specified, the probe connecting sequence is not important.

LIGHTING SYSTEM TESTING (ZX SERIES — 290 W)								
PART	TEST TO BE PERFORMED	WIRE COLOR	MULTIMETER PROBE CONNECTION	RESISTANCE Ω		VOLTAGE V		NOTE
				VALUE (OHMS)	MULTIMETER SCALE	VALUE (VOLTS)	MULTIMETER SCALE	
Lighting generator coil	Output	YL and YL	2-MO-B-F and 2-MO-C-F	00.1 - 00.4	00.0 Ω	0.5 - 2.0	00.0 Vac	—
	Coil insulation	YL and engine	2-MO-(B,C)-F and engine	0.L	00.0 MΩ	—	—	The term "engine" refers to the engine metal parts connected to the magneto housing.
	Ground continuity	BK and engine	2-MO-A-F and engine	00.0 - 00.5	00.0 Ω	—	—	

M: Male F: Female

NOTE: It is important to take note that voltage measurements must be taken while starting the vehicle using the manual starter.

Voltages obtained upon starting are proportional to the force applied onto the manual starter. A low voltage is therefore normal under a low cranking force.

Perform testing in the prescribed order and replace any parts not performing according to specifications.

It is important to resume all tests when replacing a component.

If not specified, the probe connecting sequence is not important.

INSPECTION OF AC CIRCUIT INSULATION

If AC circuit is not insulated from frame, headlamp beam will weaken.

INSPECTION

Disconnect regulator/rectifier.

Connect one digital ohmmeter probe (needle ohmmeter will not offer enough precision) to frame and other probe to YELLOW wire (2-MO).

Measured resistance must be infinite. If such is not the case, it means there is a connection between AC circuit and frame.

Disconnect one accessory at the time to identify the faulty circuit.

INSPECTION OF HEATING ELEMENTS

All measurements must be performed at 21°C (70°F).

Throttle Lever Heating Element

Current Measurement

HIGH INTENSITY	BROWN wire	0.23 A minimum
LOW INTENSITY	BROWN/YELLOW wire	0.13 A minimum

Handlebar Grip Heating Element

Resistance Measurement

LOW INTENSITY	YELLOW/BLACK wire ORANGE/VIOLET wire	17.7 to 20.7 ohms
HIGH INTENSITY	YELLOW/BLACK wire ORANGE wire	8.73 to 10.67 ohms

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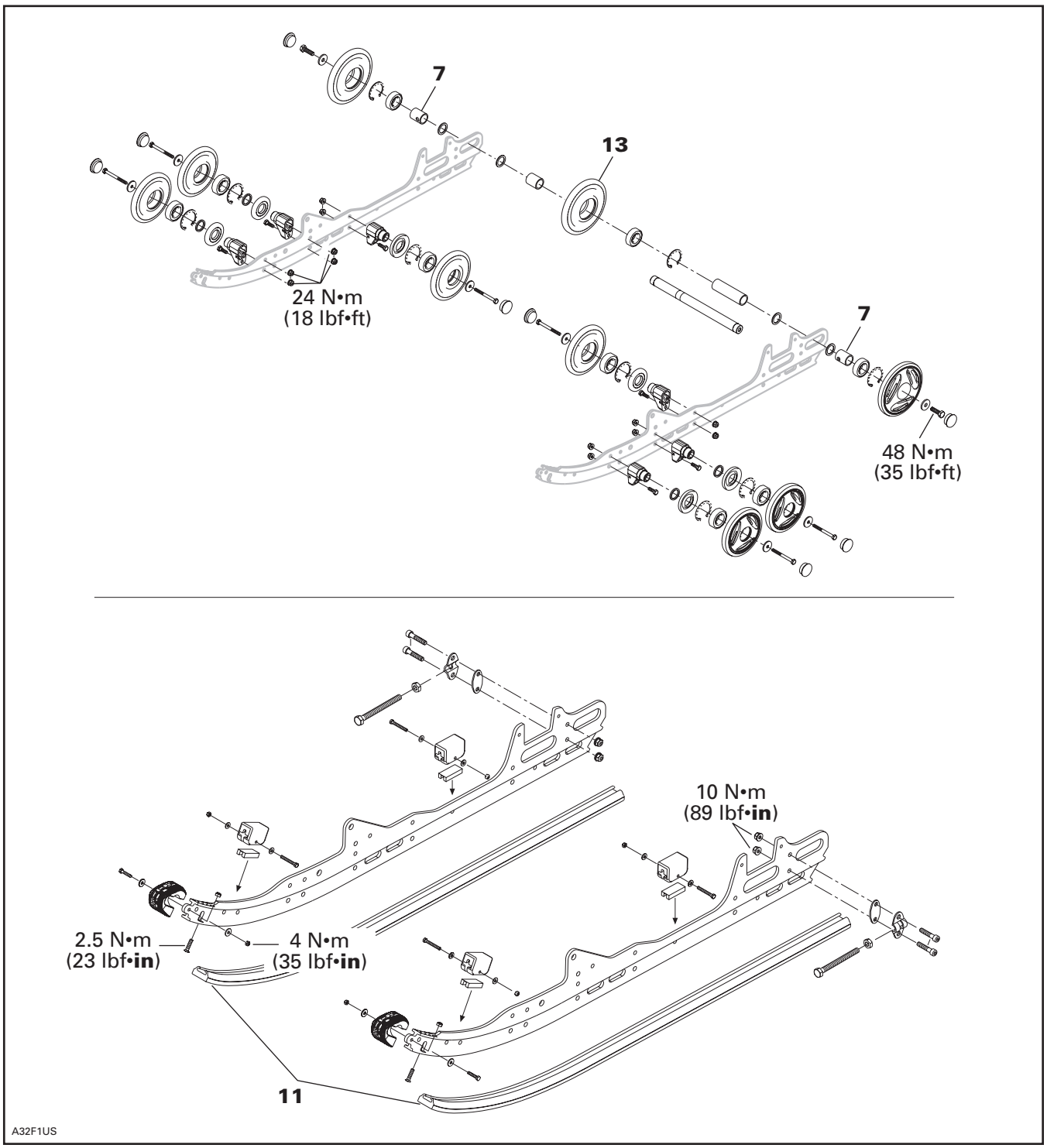
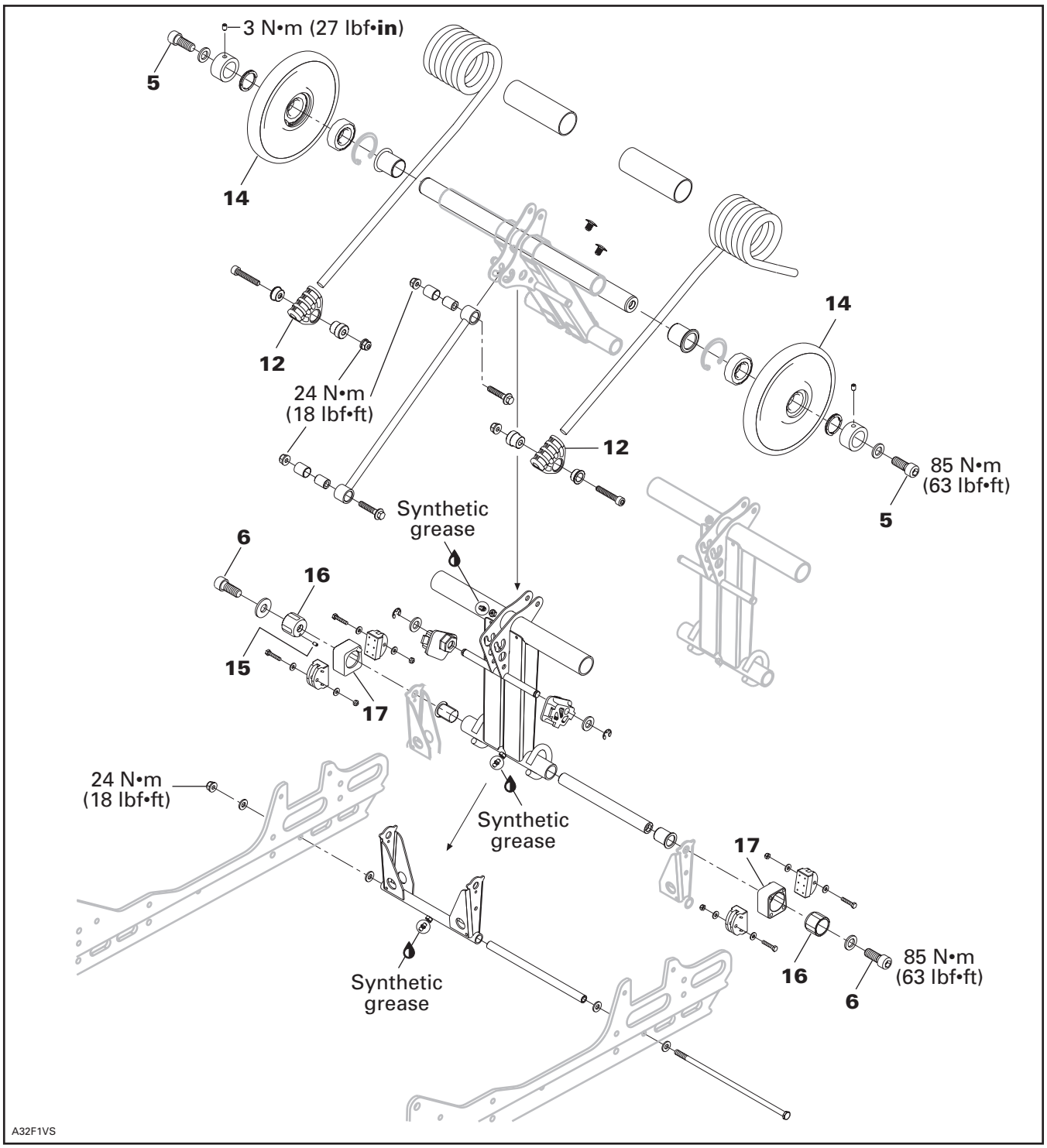
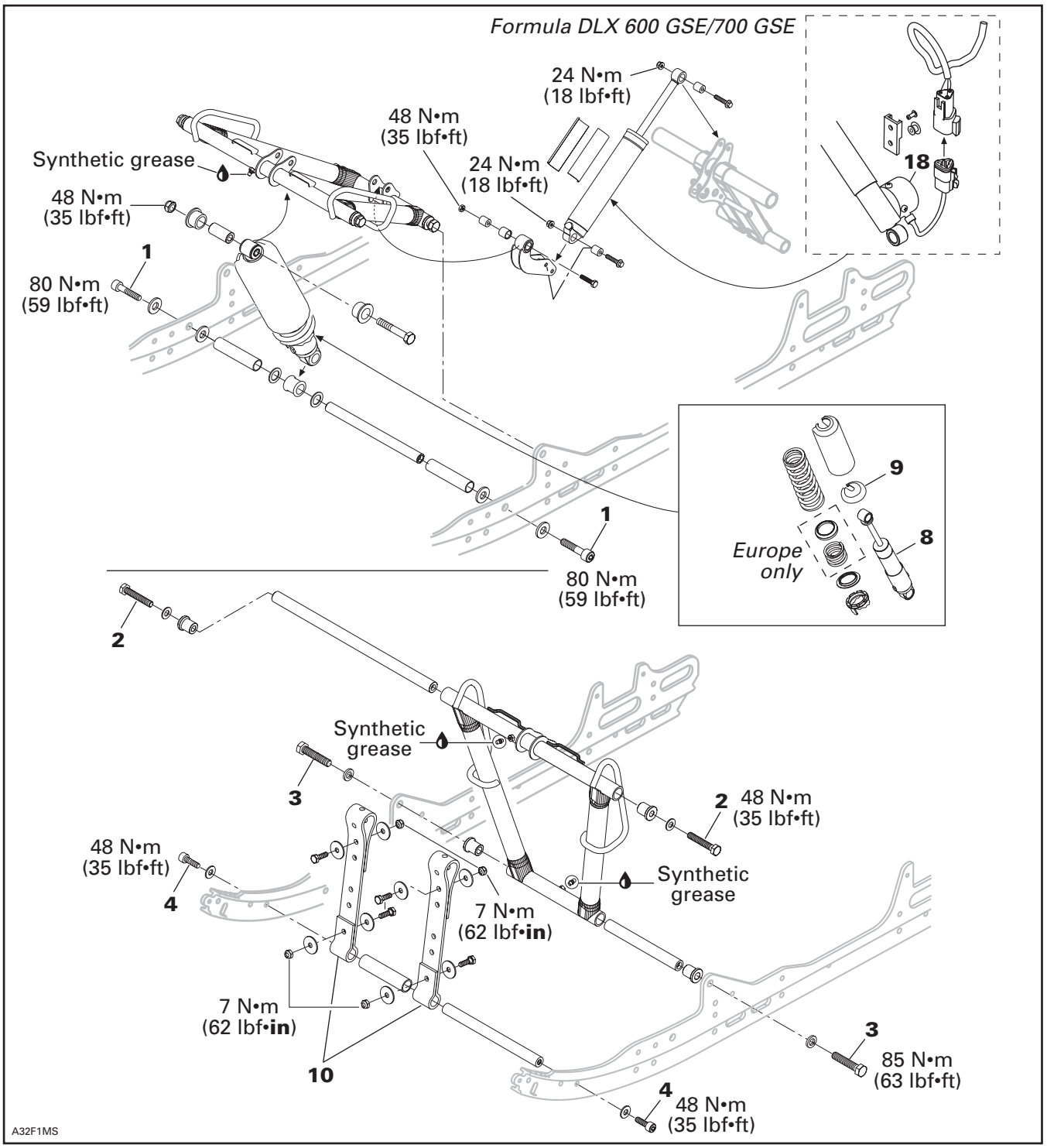
SC-10 II SUSPENSION

SC-10 II





PARTS FLAT RATE

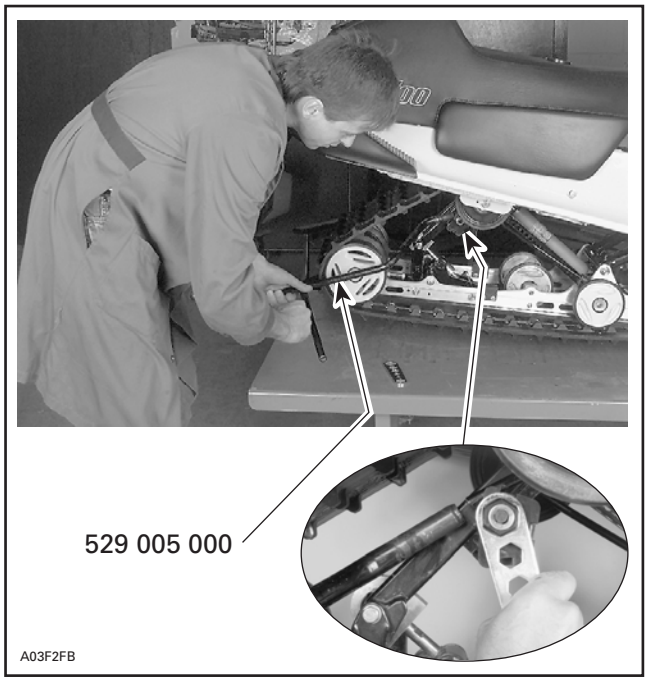

Formula DLX 600 GSE/700 GSE
24 N•m
(18 lbf•ft)
48 N•m
(35 lbf•ft)
Synthetic grease
24 N•m
(18 lbf•ft)
48 N•m
(35 lbf•ft)
18
1
80 N•m
(59 lbf•ft)
9
8
Europe
only
1
80 N•m
(59 lbf•ft)
2
Synthetic
grease
3
2
48 N•m
(35 lbf•ft)
48 N•m
(35 lbf•ft)
4
Synthetic
grease
7 N•m
(62 lbf•in)
7 N•m
(62 lbf•in)
10
3
85 N•m
(63 lbf•ft)
4
48 N•m
(35 lbf•ft)
A32F1MS

SUSPENSION ASSEMBLY REMOVAL

19, Cam

Decrease spring preload by turning cams accordingly.

Slightly turn adjusting cam to expose spring end. Using spring installer (P/N 529 005 000), remove both springs from adjusting cams.



TYPICAL

Lift rear of vehicle and support it off the ground.

Loosen track tension.

1,2,3,4,5,6, Self-Locking Screws

CAUTION: These self-locking screws must always be replaced by new ones everytime they are removed.

NOTE: To prevent axle from turning when unscrewing self-locking screws, proceed as follows:

– Remove one self-locking screw then install a 10 mm shorter non-self-locking one in place. Torque as specified in exploded view.
– Remove the opposite self-locking screw.
– Remove the temporary installed non-self-locking screw.
– If it doesn't work, heat bolt head to melt threadlocker.

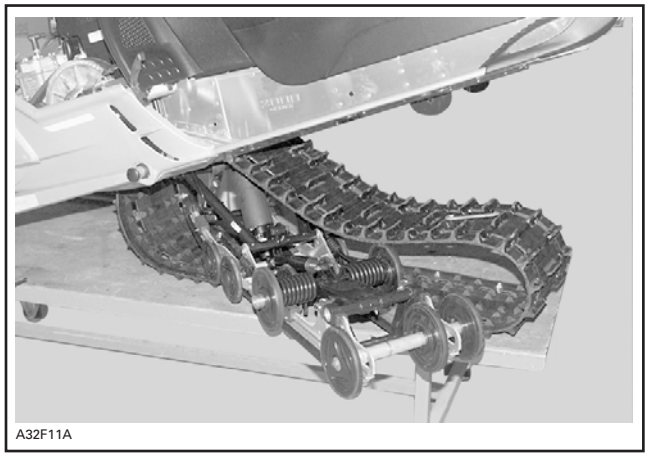
Remove rear arm top axle self-locking screws **no. 5** from chassis.

Lift rear of vehicle at least 1 m (3 ft).

TYPICAL
A. At least 1 m (3 ft)

Remove both self-locking screws **no. 2** retaining front arm to tunnel.

Remove suspension.

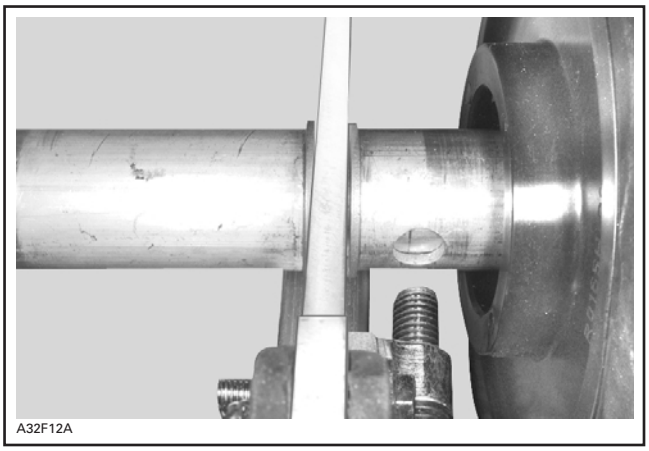


DISASSEMBLY AND ASSEMBLY

Inspect track thoroughly before reinstalling suspension. Refer to TRACK.

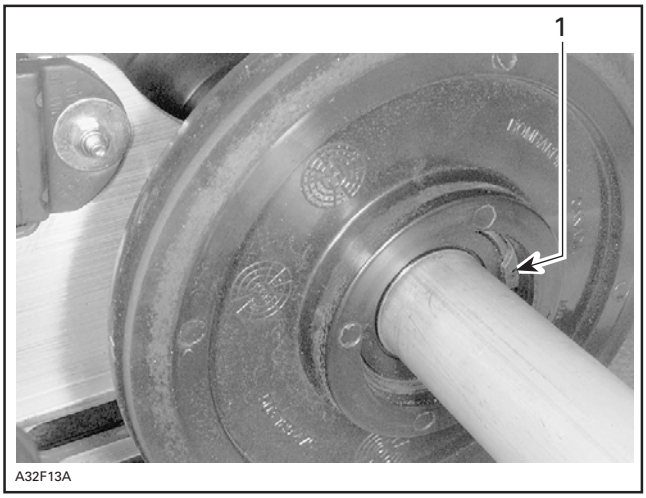
7, Outer Bushing

At installation, hole must face adjustment screw.



13,14, Center Rear Wheel and Top Idler Wheels

At installation, circlip must face inner side.

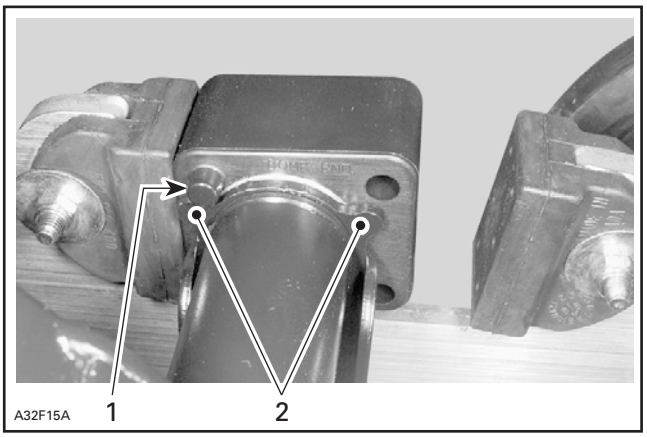


1. Circlip facing inner side

17, Block

Both blocks are identified R or L (right or left), see second following photo. At installation, make sure to install proper block on proper side.

Also, note that protrusion must be positioned above stoppers.

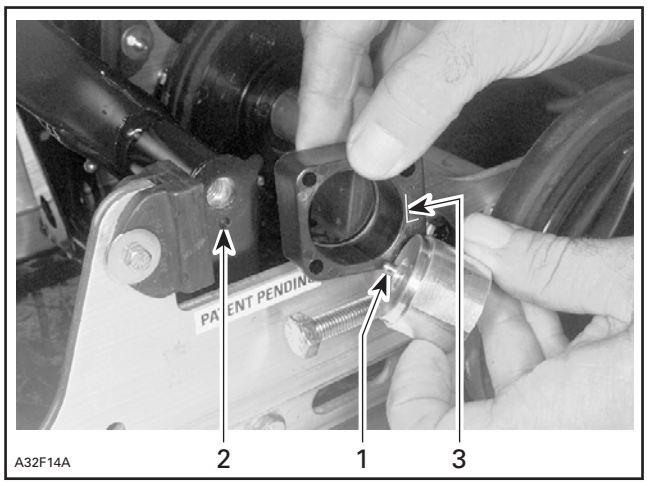


1. Protrusion
2. Stoppers

15,16, Dowel Pin and Block Guide

Dowel pin must exceed block guide by 2 to 2.3 mm (.079 to .091 in).

At installation, insert dowel pin into pivot arm hole.



LEFT SIDE SHOWN

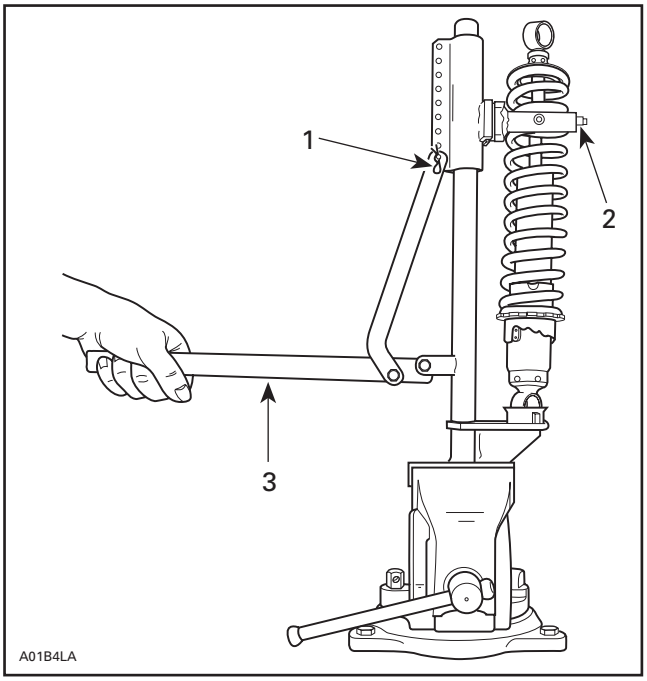
1. Dowel pin
2. Pivot arm hole
3. "L" identification for left side

8,9, Front Shock and Spring Stopper

Use shock spring remover (P/N 529 035 504) and put it in a vise. Mount shock in it and turn shock so that spring coils matched spring compressor.

Close and lock bar. Adjust handle horizontal by changing position of clevis pin.

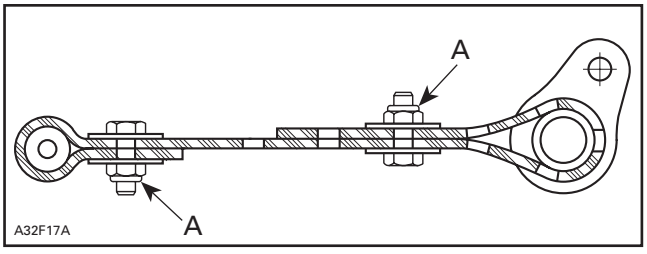
Push down on handle until it locks. Remove spring stopper then release handle.



1. *Clevis pin*
2. *Bar*
3. *Handle horizontal*

10, Stopper Strap

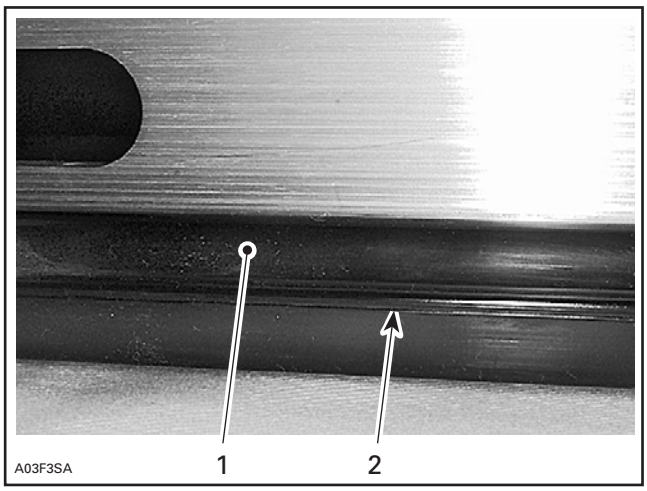
Inspect strap for wear or cracks, bolt and nut for tightness. If loose, inspect hole for deformation. Replace as required. Make sure it is attached through proper holes. Torque nut to 7 N•m (62 lbf•**in**).



*A. 7 N•m (62 lbf•**in**)*

11, Slider Shoe

Molding line is the wear limit indicator.



TYPICAL

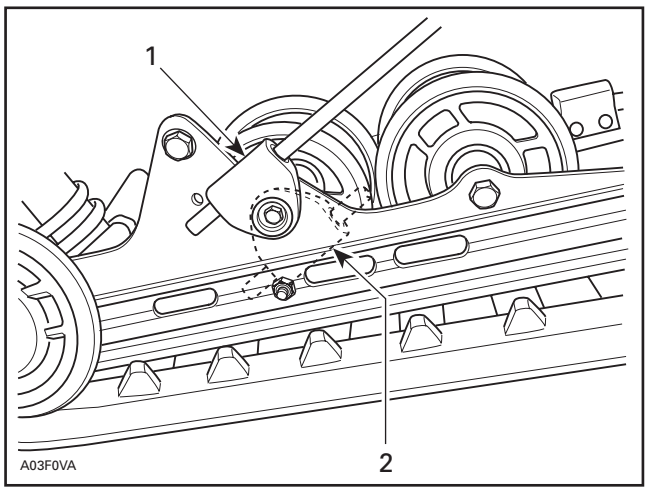
1. *Slider shoe*
2. *Molding line (wear limit indicator)*

Replace slider shoes when wear limit is reached.

CAUTION: Slider shoes must always be replaced in pairs.

12, Spring Support

CAUTION: To avoid track damage, spring supports must be mounted upward.



TYPICAL — RIGHT SIDE SHOWN

1. *Right position: upward*
2. *Wrong position*

BOSS SHOCK ABSORBER SERVICING

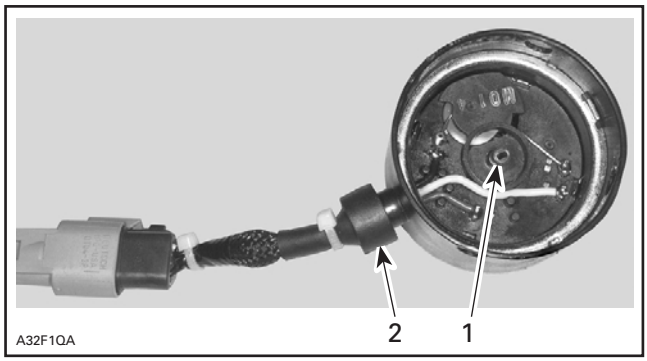
Formula DLX 600 GSE and 700 GSE

Only the actuator can be replaced.

Remove actuator retaining screws.

Connect actuator black wire (connector no. 3) to a 12-volt battery negative post.

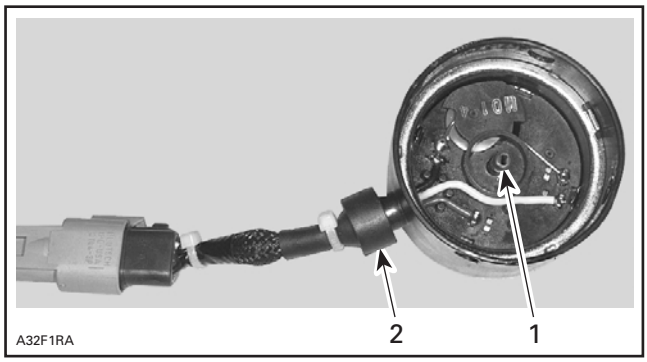
To select COMFORT position apply positive to yellow wire (connector no. 2) for one second. Actuator shaft must be in following position.



COMFORT POSITION — SHAFT SLOT IN LINE WITH WIRE HARNESS

1. *Shaft*
2. *Wire harness*

To select SPORT position apply positive to blue wire (connector no. 1) for one second. Actuator shaft must be in following position.

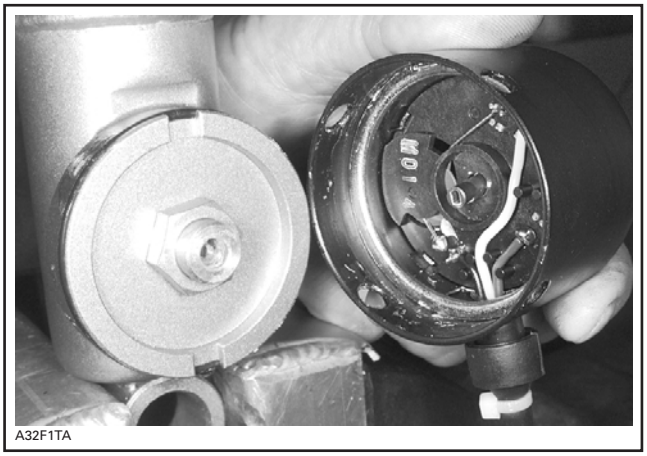


SPORT POSITION — SHAFT SLOT ABOUT 45° FROM WIRE HARNESS

1. *Shaft*
2. *Wire harness*

Replace actuator otherwise.

When reassembling actuator to shock body align shaft slot with valve tip. Wire harness must face shock body end.

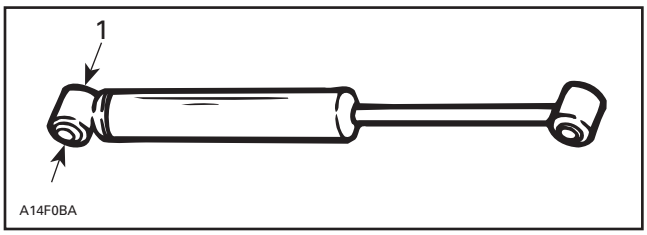


SHOCK ABSORBER INSPECTION

All Models Equipped with Hydraulic Shock

NOTE: Hydraulic shocks are painted black or dark gray.

Secure the shock body end in a vise with its rod upward.



1. Clamp

CAUTION: Do not clamp directly on shock body.

Examine each shock for leaks. Extend and compress the piston several times over its entire stroke. Check that it moves smoothly and with uniform resistance with its rod upward.

Pay attention to the following conditions that will denote a defective shock:

– A skip or a hang back when reversing stroke at mid travel.
– Seizing or binding condition except at extreme end of either stroke.
– Oil leakage.
– A gurgling noise, after completing one full compression and extension stroke.

Renew if any faults are present.

All Models Equipped with Gas Pressurized Shock

NOTE: Gas pressurized shocks are light gray or purple painted, or bare aluminum.

Gas shock can be inspected as follows:

Because of gas pressure, strong resistance is felt when compressing shock. When released, the shock will extend unassisted. Renew as required.

If suspecting an internal gas leak between oil chamber and gas chamber, check shock as follows:

Install shock in a vise clamping on its bottom eyelet with its rod upward.

Let it stand for 5 minutes.

Completely push down the shock rod then release.

Rod must come out at a steady speed. If speed suddenly increases particularly at end of extension, replace shock.

All Types of Shock

If suspecting a frozen shock proceed as follows:

Place shock in a freezer (temperature below 0°C (32°F)) for 4 hours.

Push down on rod and note its resistance. If shock is frozen it will be impossible or almost impossible to compress it.

HPG T/A SHOCK SERVICING

Disassembly and Assembly

There are two types of high pressure gas take apart (HPG T/A) shock. One type has a tire valve and the other has a needle valve.

SHOCK TYPE	INFLATION TOOL
Tire valve type	529 035 570
Needle valve type	529 035 614

T/A shocks come in two sizes. C-36 shock is 36 mm (1.417 in) in diameter and C-46 shock is 46 mm (1.811 in).

SHOCK SIZE	SERVICING TOOL
C-36	Piston guide 529 026 600
	Seal guide 529 026 500
	Shock wrench 529 035 727
C-46	Piston guide 529 035 608
	Seal guide 529 035 728
	Shock wrench 529 035 727

Release N_2 (nitrogen) pressure on any HPG T/A shock with internal floating piston (IFP).

⚠ WARNING

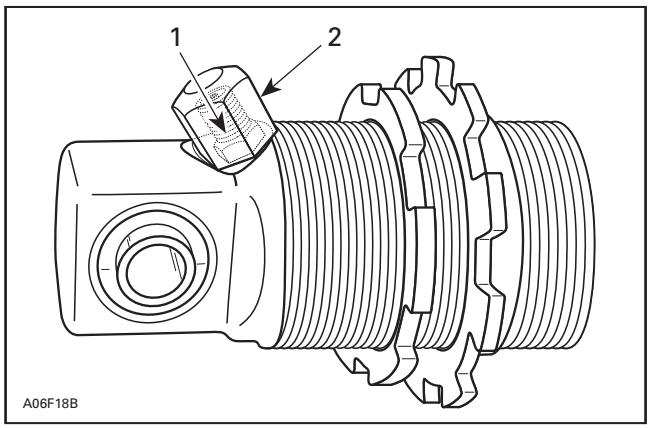
Nitrogen gas is under extreme pressure. Use caution when releasing this gas volume. Protective eye wear should be used.

All T/A Shock Types

Mount shock in a vise.

Tire Valve Type Shock

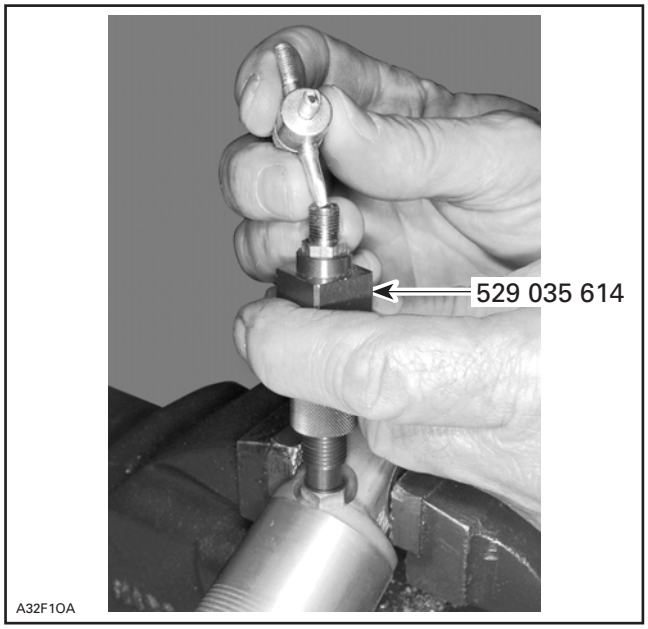
Remove tire valve cap and push on center rod of valve to release gas pressure.



1. Tire valve
2. Tire valve cap

Needle Valve Type Shock

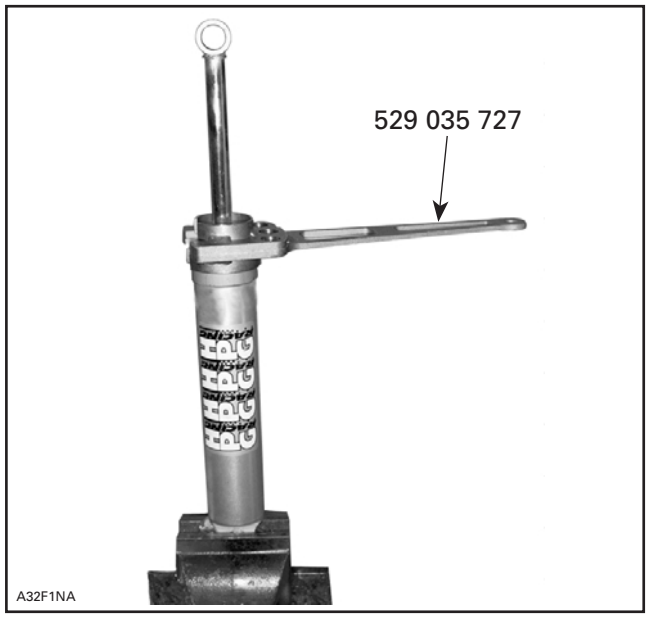
Remove screw on top of valve. Insert needle type shock tool (P/N 529 035 614) very slowly into rubber of needle valve. Push on shock tool valve center rod to release gas pressure.



Remove tool from shock.

All Types of Shock

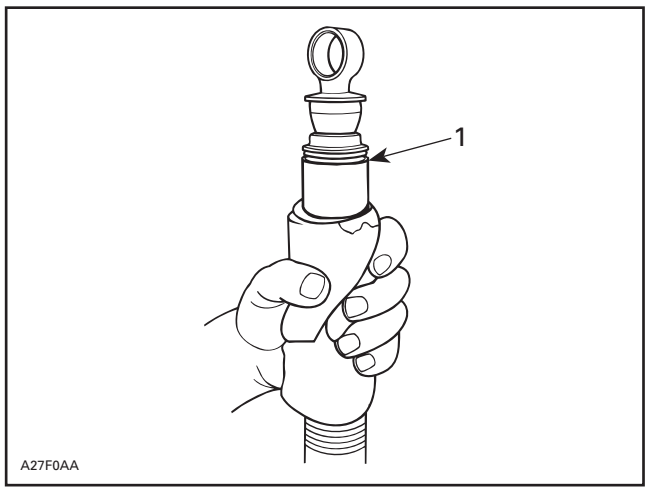
Using appropriate size of shock wrench (P/N 529 035 727) unscrew seal carrier.



TYPICAL

With the seal carrier removed, slowly lift and remove damper rod assembly from the damper body.

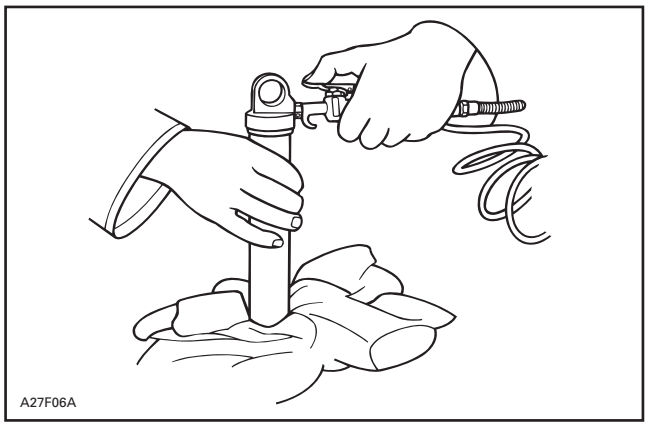
NOTE: Remove damper rod assembly slowly to reduce oil spillage and prevent piston seal damage by damper body threads. Wrap the damper body with a shop cloth to capture possible overflow oil while removing the damper piston.



1. Oil flows

Discard old oil into storage container. Never reuse damper oil during shock rebuild.

Remove valve core. Using compressed air pressure, carefully remove floating piston from damper body. Hold shock cloth over damper body opening to catch released floating piston. Allow room for floating piston to leave damper body.



TYPICAL

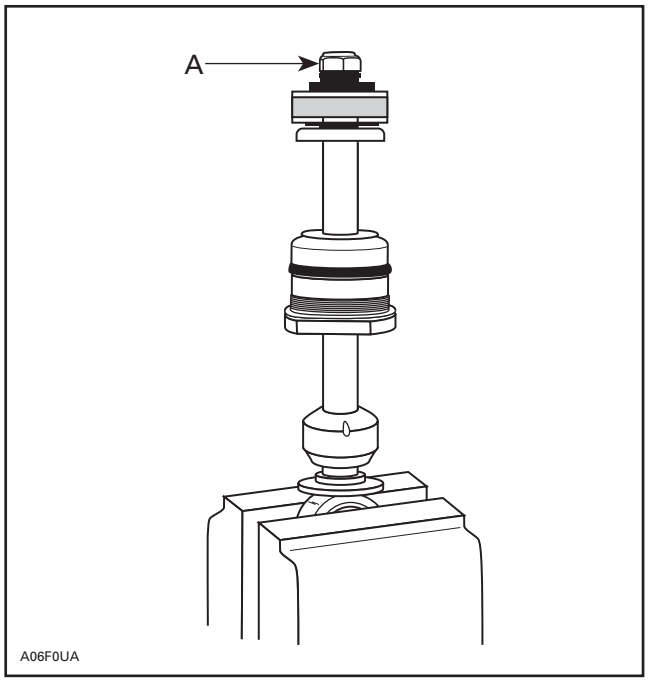
⚠ WARNING

Whenever using compressed air, use an O.S.H.A. approved air gun and wear protective eye wear.

Thoroughly clean, with a typical cleaning solution, and blow dry using low pressure air. Carefully inspect the damper body for any imperfections or signs of wear in the damper bore.

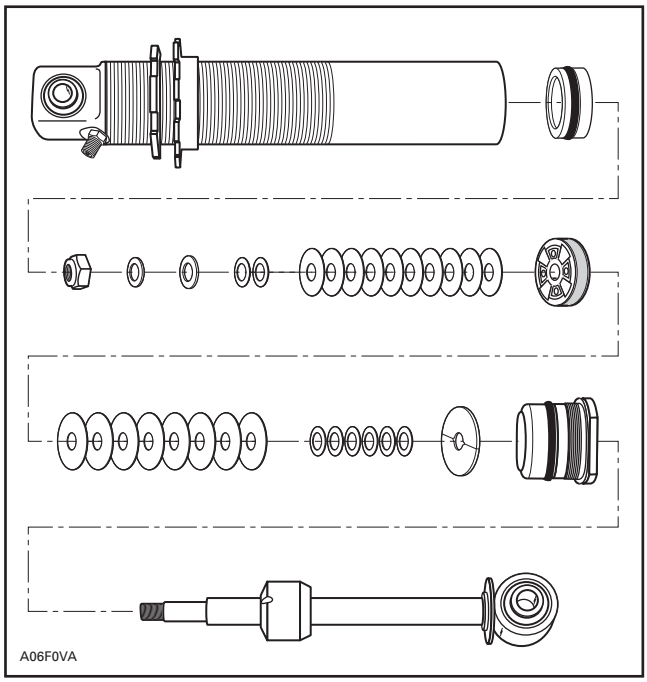
Replace damper body if wear is identified.

Holding the damper rod assembly in a bench vise, begin piston and valve removal.



A. Remove damper nut

Always arrange parts removed in the sequence of disassembly.



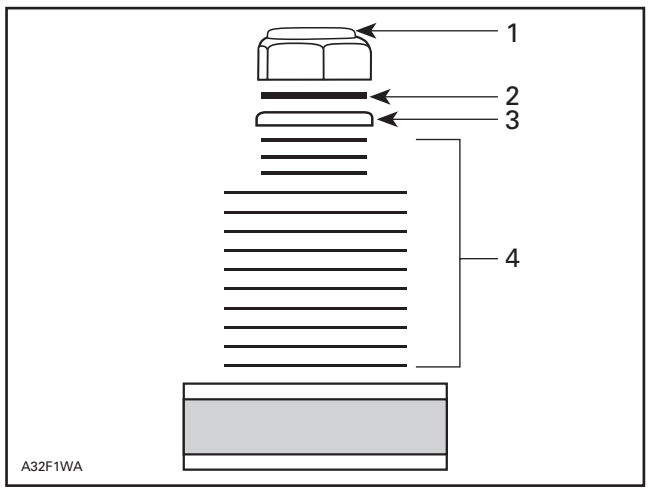
NOTE: As a general rule we suggest replacing the damper rod lock-nut after 4 rebuilds to ensure good locking friction and use Loctite† 271 each time.

NOTE: If revalving is to be done, it is imperative that you identify the original shim pack (size and number of shims). The seal carrier need not be removed if only revalving is to be done.

Shims can be measured by using a vernier caliper or a micrometer.

NOTE: All shims should be carefully inspected and any bent or broken shims must be replaced for the shock to function properly.

After the new or replacement shim pack has been selected, reassemble in the reverse order of disassembly. Torque piston nut 27 - 29 N•m (20 - 21 lbf•ft).



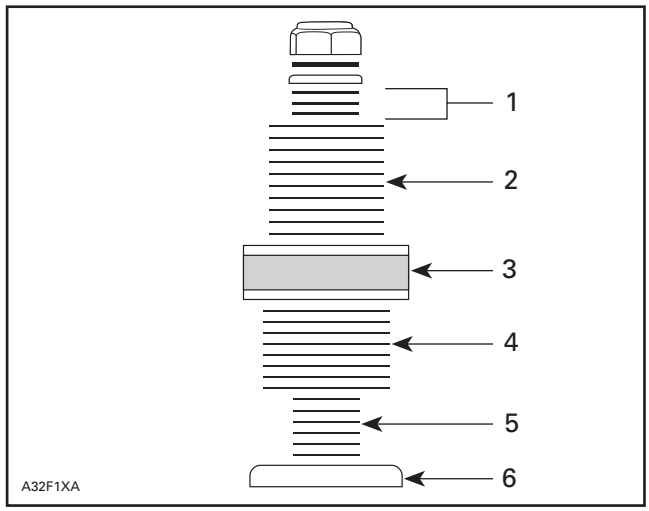
1. Damper nut
2. Spacer
3. Stopper with its round edge facing nut
4. Shim pack

CAUTION: The damper rod nut can only be re-used 4 times, then, must be replaced. Do not substitute this part for non – O.E.M. use Loctite 271 on nut each time.

This (these) spacer washer(s) must be used as shown to ensure damper rod nut does not bottom out or contact shaft threads.

Rebound valve stopper with round edge facing nut.

NOTE: Rebound shim stack must not reach into threads of damper shaft. Spacer under damper shaft nut is used to prevent damper shaft nut from bottoming on threads.

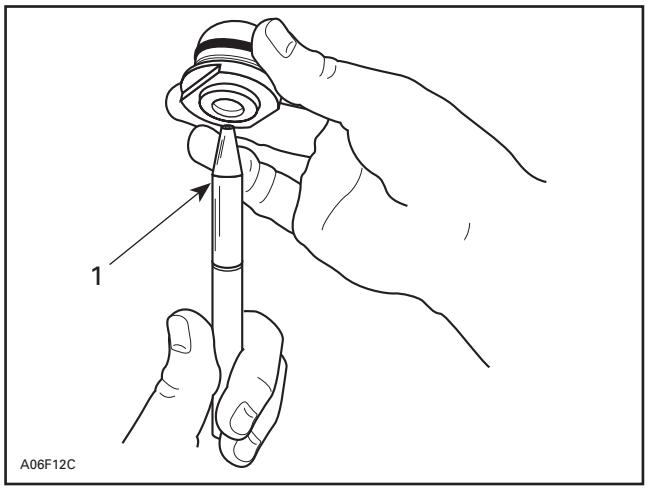


1. Rebound dampening shim pack
2. Rebound dampening shim pack
3. Piston
4. Compression dampening shim pack
5. Compression dampening shim pack
6. Stopper

If the seal carrier assembly is replaced, use seal pilot to guide seal over damper shaft. Lubricate seal carrier guide pilot before use.

CAUTION: Failure to use seal pilot will result in seal damage.

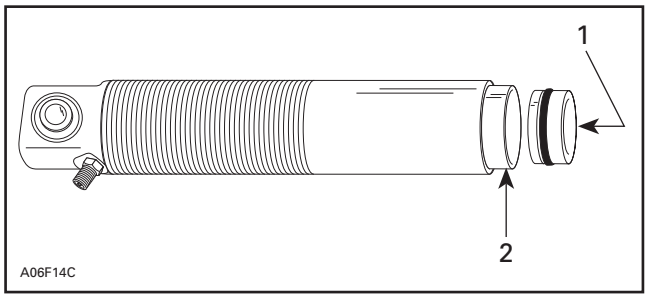
Reassemble damper rod assembly, taking care to properly assemble shim packs as required for your dampening needs. Ensure that the shaft piston is installed with the slits/larger intake holes facing the rebound shim stack.



1. Seal guide (P/N 529 035 728)

If floating piston has been removed, reinstall floating piston into damper body (ensure that valve core has been removed). Use Molykote G-n paste (P/N 711 297 433) to ease O-ring past damper body threads with floating piston guide.

CAUTION: Failure to install IFP correctly could result in shock damage.

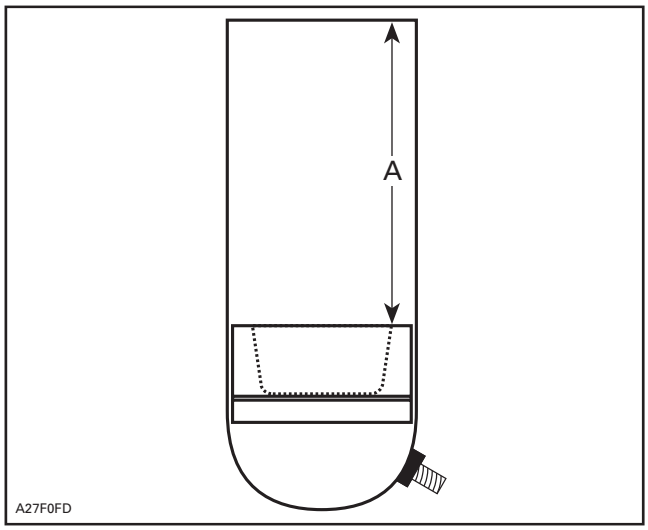


1. Push (slowly) by hand
2. Floating piston guide

NOTE: Lubricate inside of piston guide with Molykote G-n paste (P/N 711 297 433).

Install floating piston to the proper depth (190 mm (7.5 in)).

On all HPG take apart shocks, the floating piston is installed hollow side up.



A. Installation distance for floating piston installation

SHOCK P/N	INSTALLATION DISTANCE OF FLOATING PISTON mm
503 189 745	130
503 189 678	130
503 189 491	130
503 189 610	130
503 189 279	130
503 189 528	130
503 189 076	130
503 189 677	183
503 189 077	183
503 189 492	183
503 189 609	190
503 189 280	190
503 189 527	183

NOTE: If the floating piston is installed too far into the damper body, light air pressure through valve (with core removed) will move piston outward.

NOTE: Reinstall valve core after IFP has been installed at correct height and before adding oil.

⚠ WARNING

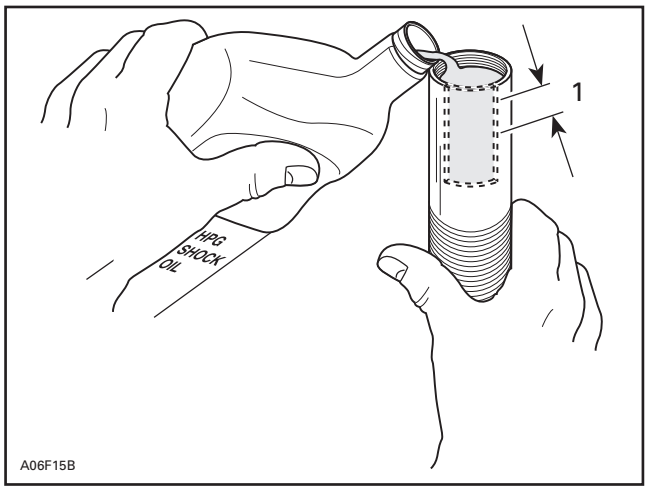
Whenever using compressed air exercise extreme caution, cover damper opening with shop cloth to reduce chance of possible injury.

CAUTION: Moisture laden compressed air will contaminate the gas chamber and rust floating piston.

⚠ WARNING

Always wear protective eye wear whenever using compressed air.

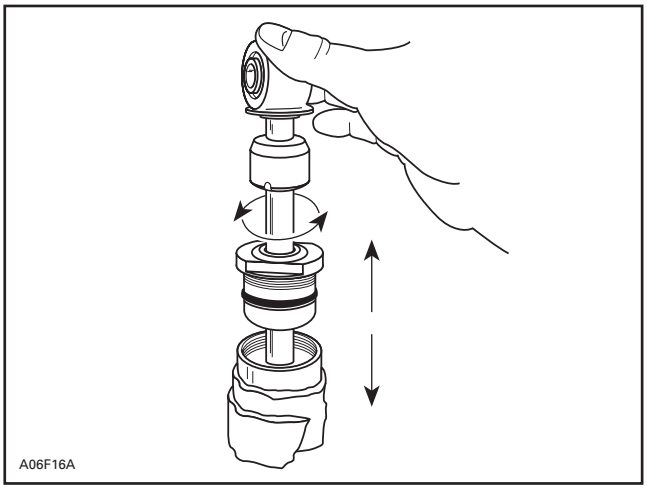
Fill the shock with Bombardier HPG shock oil (P/N 293 600 035) to approximately 10 mm (.393 in), from the base of seal carrier threads.



1. Fill to 10 mm (.393 in)

NOTE: Although we do not measure the exact amount of oil added to the damper, approximately 252 mL (8.52 oz. U.S.) will be used.

Carefully insert damper rod into the damper body. Lightly oil damper piston seal ring with shock oil to ease installation.



NOTE: Some shock oil will overflow when installing damper. Wrap damper with shop cloth to catch possible overflow oil.

CAUTION: Use care when passing piston into damper body at damper body threads.

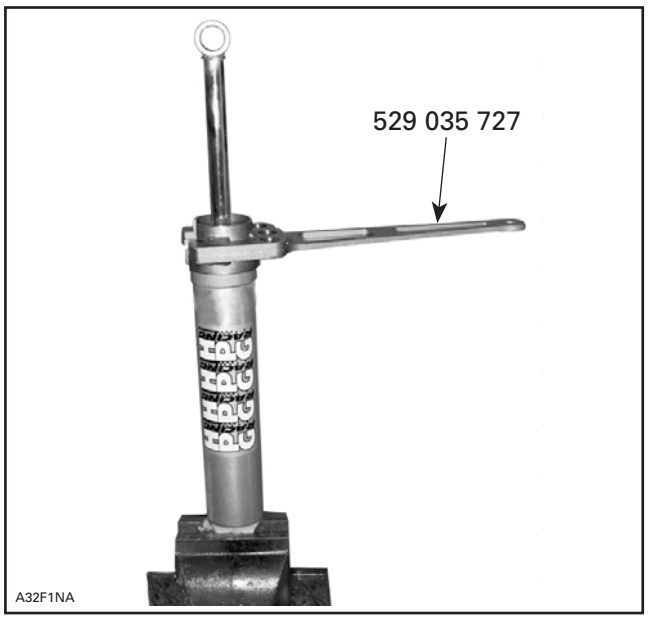
Slight oscillation of damper rod may be required to allow piston to enter damper body bore.

Slowly push piston into damper body. Slight up and down movement may be required to allow all air to pass through piston assembly. The gentle tapping of a small wrench, on the shock eye, may help dislodge air trapped in the submersed piston. Be careful not to drive the shaft any deeper into the oil than is necessary to just cover the shim stack.

NOTE: Fast installation of the damper rod may displace the floating piston from its original position. This must not occur if the damper is expected to perform as designed.

With damper rod piston into oil, TOP OFF damper oil volume. Oil level should be to damper body thread base.

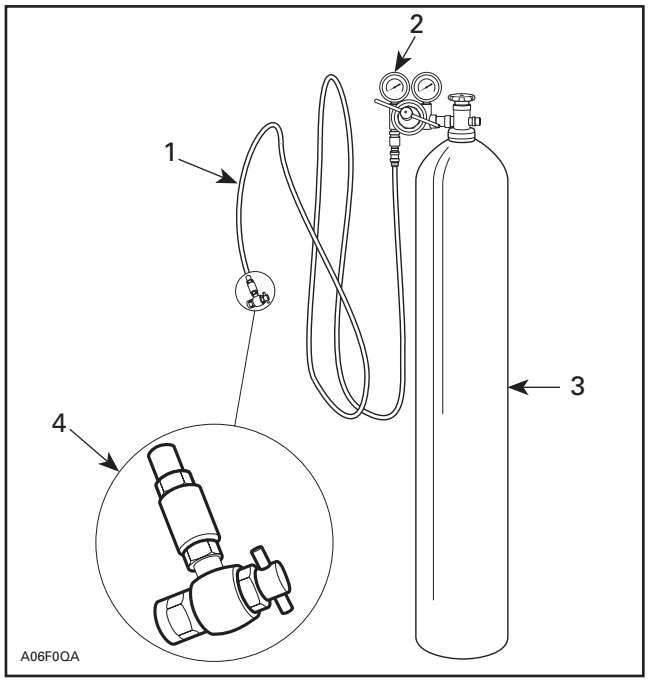
Seal carrier assembly can now be threaded into damper body. This should be done slowly to allow weapage of oil and to minimize IFP displacement. Torque seal carrier to 90 to 100 N•m (66 to 74 lbf•ft). After the seal carrier is fully in place avoid pushing the shaft into the body until the nitrogen charge is added.



When removing and retightening the tire valve acorn nut use minimal torque. When the cap is over tightened and subsequently removed it may prematurely break the seal of the tire valve to the shock body and cause a loss of nitrogen charge without being noticed. If you suspect this has happened then recharge the shock as a precaution. Inspect the valve cap before installation to ensure that the internal rubber gasket is in its proper position.

Adding Gas Pressure

Nitrogen (N_2) can now be added to damper body.



1. *High pressure hose*
2. *2 stage regulator, delivery pressure range 2070 kPa (300 PSI)*
3. *High pressure cylinder filled with industrial grade nitrogen*
4. *Valve tip (P/N 529 035 570) permanently installed*

NOTE: Never substitute another gas for nitrogen. Nitrogen has been selected for its inert qualities and will not contaminate the gas chamber of the shock.

Preset your pressure regulator to 2070 kPa (300 PSI) nitrogen (N_2), this gas pressure will restore the correct pressure for your damper.

CAUTION: Do not exceed the recommended pressure values.

⚠ WARNING

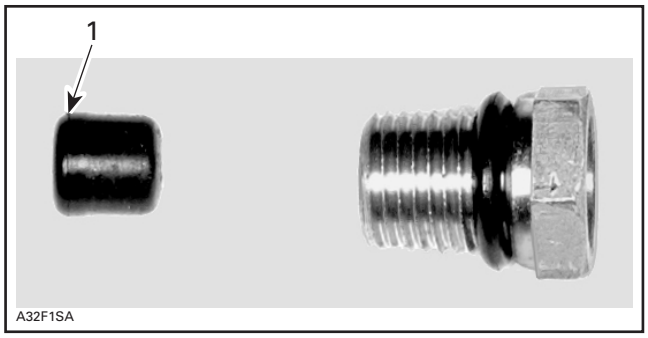
Whenever working with high pressure gas, use eye wear protection. Never direct gas pressure toward anybody.

Use appropriate inflation tool.

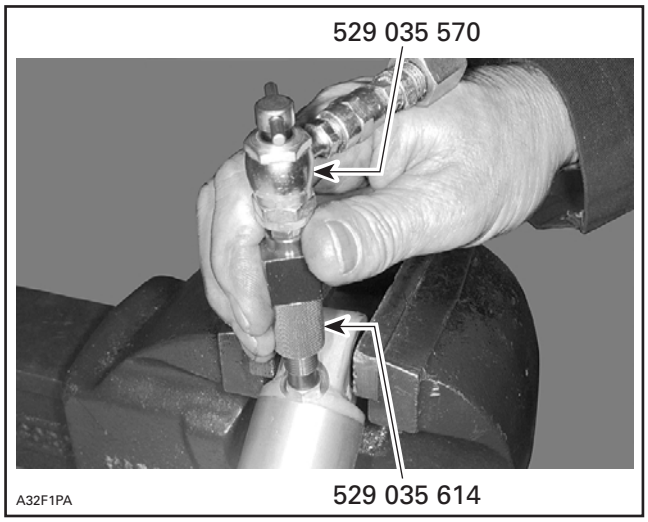
Needle Valve Type Shock

Insert needle type shock tool (P/N 529 035 614) very slowly into rubber of needle valve.

Rubber may pop out of needle valve when inserting tool needle. If so, remove valve core and rubber then, reinstall rubber with its larger diameter last.



1. *Larger diameter*



BOTH INFLATION TOOLS ARE USED ON NEEDLE VALVE TYPE SHOCK

All Shock Types

NOTE: Carefully inspect damper for gas or oil leaks. Any leaks must be corrected before continuing.

Damper gas pressure cannot be confirmed by using a pressure gauge. The volume of gas in the shock is very small, and the amount lost during gauge installation will lower the pressure too much and require refilling.

After recharging is complete the rebuilt shock should be bench-tested. Stroke the shock to ensure full travel and smooth compression and rebound action. If the shaft moves in or out erratically this could indicate too much air is trapped inside. If the shaft will not move or has partial travel then it may be hydraulically locked. In either event the shock must be rebuilt again. Pay particular attention to the placement of the IFP, quantity of oil and shim stack/piston assembly.

INSTALLATION

Install assembled suspension into track with front portion first.

Insert rear portion of suspension into track.

Bolt front arm and rear arm.

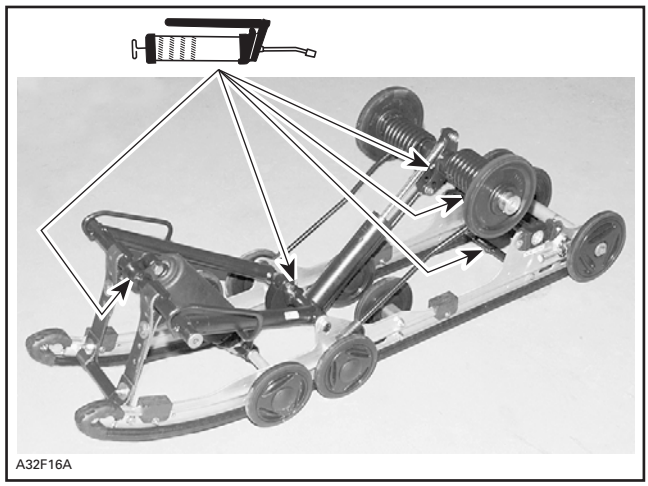
Adjust track tension.

RIDE ADJUSTMENT

Refer to *Operator's Guide*.

LUBRICATION

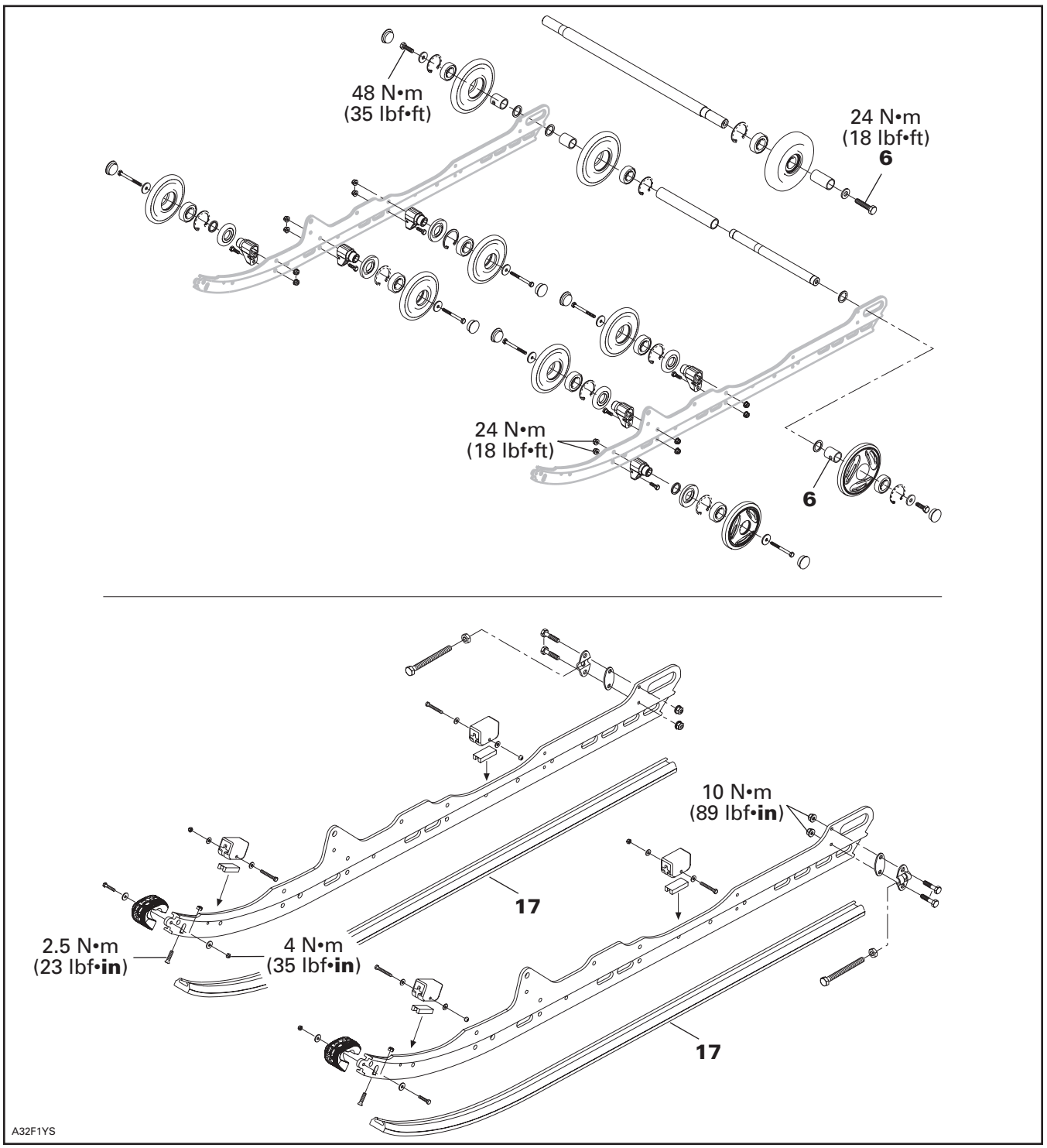
Lubricate front and rear arms at grease fittings using synthetic grease (P/N 413 711 500).

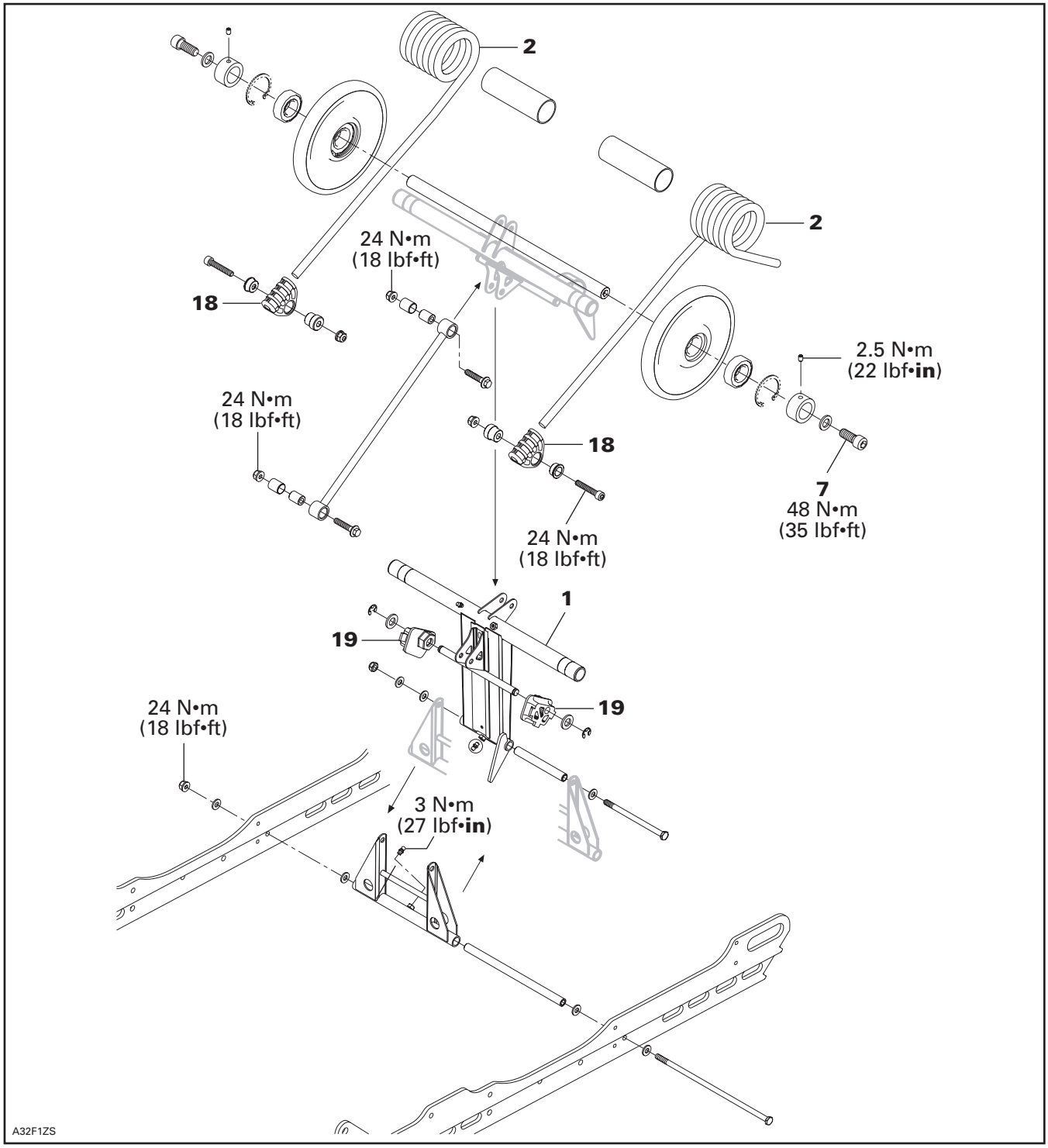


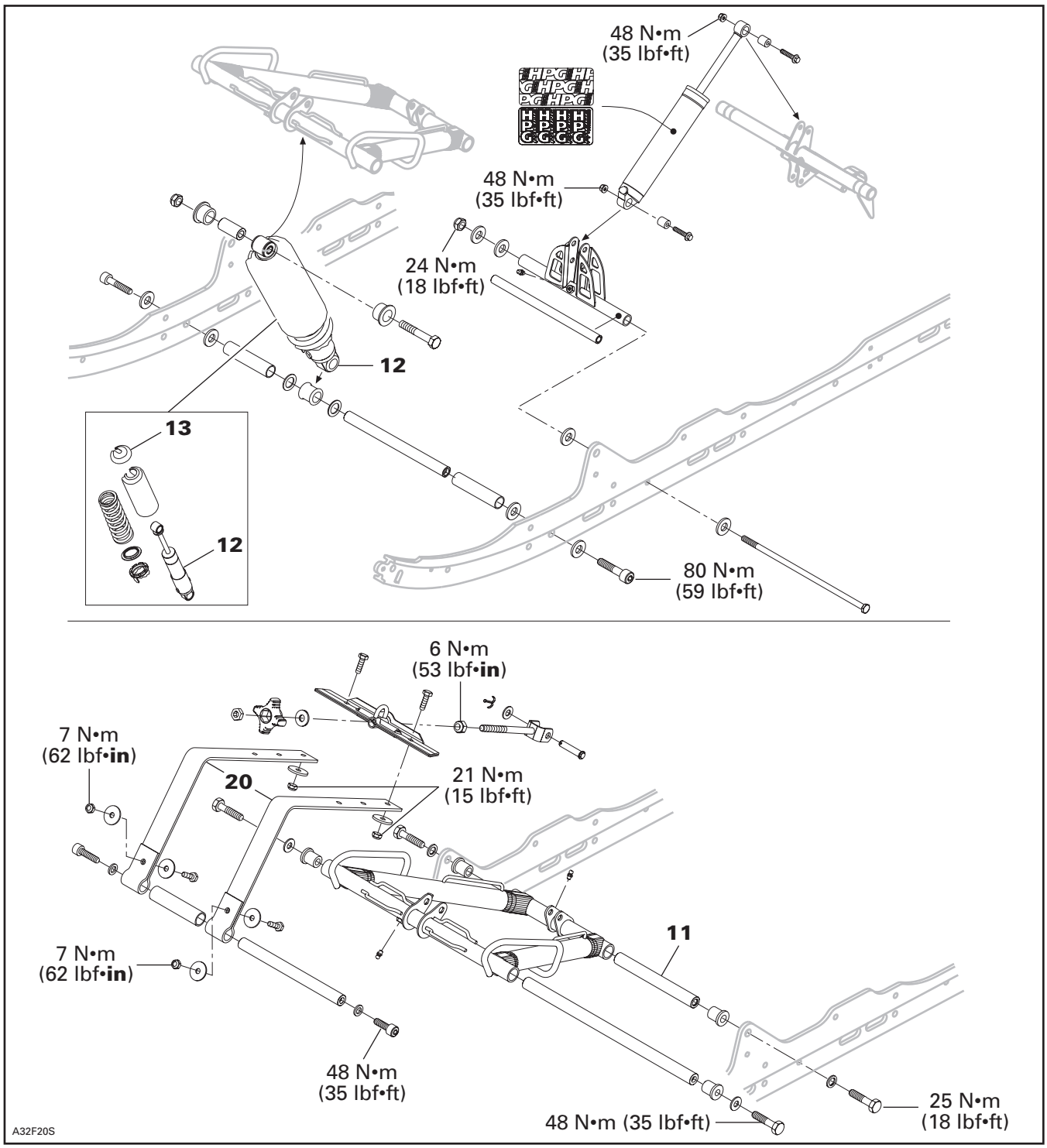
SC-10 II: 5 GREASE FITTINGS

SC-10 MOUNTAIN SUSPENSION

All Summit Models




2
2
24 N•m
(18 lbf•ft)
18
2.5 N•m
(22 lbf•in)
24 N•m
(18 lbf•ft)
18
7
48 N•m
(35 lbf•ft)
24 N•m
(18 lbf•ft)
1
19
19
24 N•m
(18 lbf•ft)
3 N•m
(27 lbf•in)
A32F1ZS


48 N•m
(35 lbf•ft)
48 N•m
(35 lbf•ft)
24 N•m
(18 lbf•ft)
12
13
12
80 N•m
(59 lbf•ft)
6 N•m
(53 lbf•in)
7 N•m
(62 lbf•in)
20
21 N•m
(15 lbf•ft)
11
7 N•m
(62 lbf•in)
48 N•m
(35 lbf•ft)
48 N•m (35 lbf•ft)
25 N•m
(18 lbf•ft)
A32F20S

COMPONENT REMOVAL AND INSTALLATION

Lift rear of vehicle and support it off the ground.

21, Rear Axle

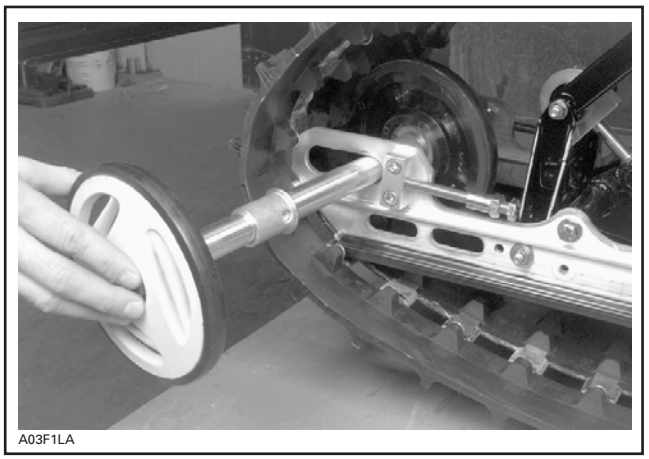
Remove screw on rear axle on side of offset wheel.

Completely loosen track tension.

Pull out rear axle from opposite side of offset inner wheel.

At assembly, align spacer hole with adjusting bolt.

Make sure to reinstall washer on each side of runner.

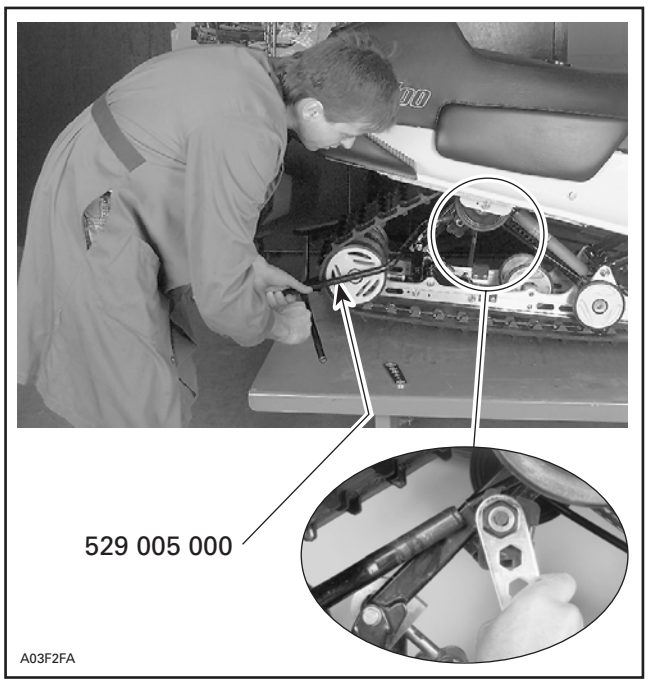

A03F1LA

TYPICAL

15, Rear Shock

Lift rear of vehicle.

Slightly turn adjusting cam to expose spring end. Using spring installer (P/N 529 005 000), remove left spring from adjusting cam.



A03F2FA

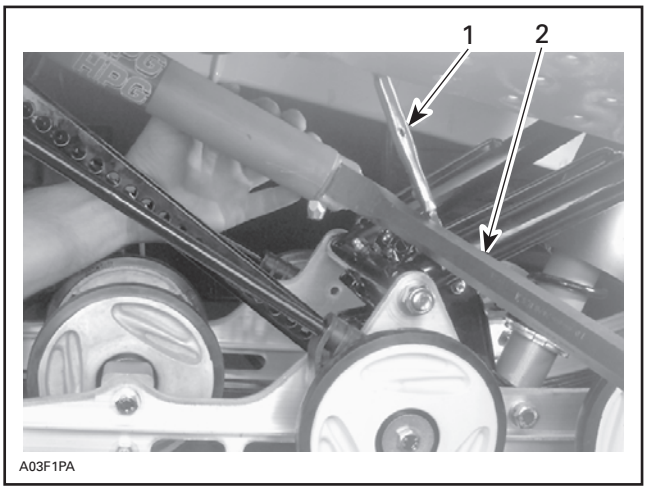
TYPICAL

Remove nut on top end of shock.

Remove nut on bottom end of shock. Pry up shock bottom end to ease removing bolt (gas shock only). See installation illustration below.

Installation is reverse of removal procedure. To easily compress gas shock absorber, use a pry bar and locking pliers as a stopper.

CAUTION: Take care not to damage grease fitting.



A03F1PA

TYPICAL

1. *Locking pliers*
2. *Pry bar*

12, Front Shock

Unfasten one end of stopper strap(s).

Unbolt shock and remove it.

2, Rear Spring

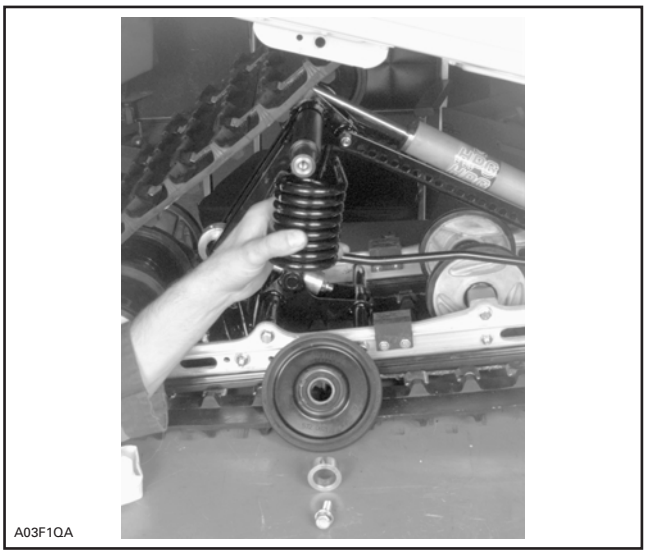
Remove spring ends from adjusting cams.

Unbolt rear arm top axle from chassis.

Unscrew set screws from locking ring at each end of top axle.

Remove spacers and top idler wheels.

Remove springs.



TYPICAL

At reassembly, respect THIS SIDE OUT inscription on wheel.

SUSPENSION ASS'Y REMOVAL

19, Cam

Decrease spring preload by turning cams accordingly.

Lift rear of vehicle and support it off the ground.

Loosen track tension.

Remove rear arm top axle screws no. 7 from chassis.

6,7, Self-Locking Screws

CAUTION: These self-locking screws must always be replaced by new ones everytime they are removed.

NOTE: To prevent axle from turning when unscrewing self-locking screws, proceed as follows:

- Remove one self-locking screw then install a 10 mm shorter non-self-locking one in place. Torque as specified in exploded view.
- Remove the opposite self-locking screw.
- Remove the temporary installed non-self-locking screw.
- If it doesn't work, heat bolt head to melt threadlocker.

Unscrew center idler wheel axle from tunnel then remove.

Lift rear of vehicle at least 1 m (3 ft).

TYPICAL
A. At least 1 m (3 ft)

Remove both self-locking screws no. 6 retaining front arm to tunnel.

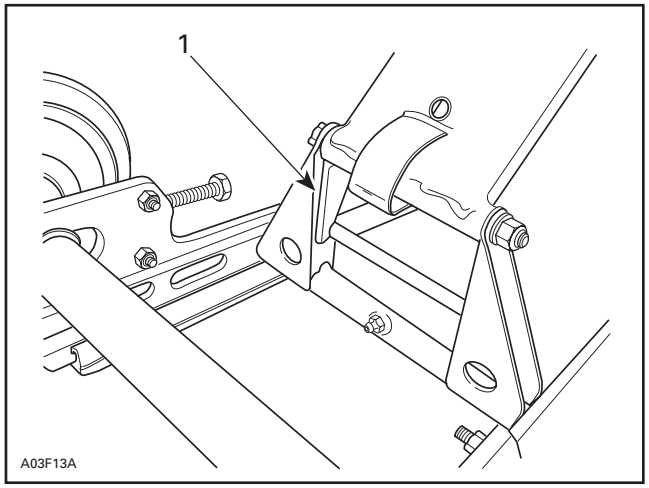
Remove suspension.

DISASSEMBLY AND ASSEMBLY

Inspect track thoroughly before reinstalling suspension. Refer to TRACK.

1, Rear Arm

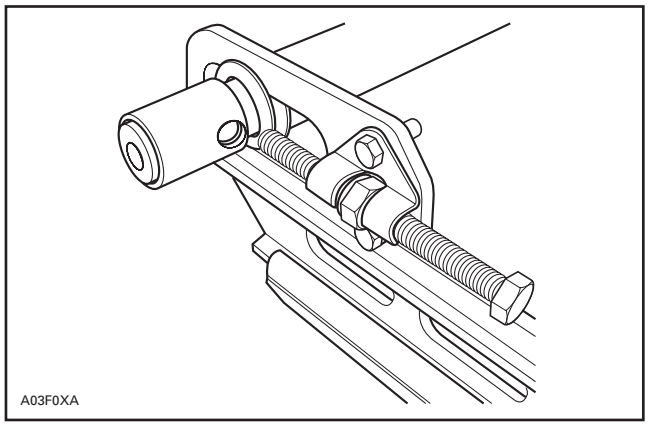
At installation, rear arm stroke limiter must be on rear side.



1. Stroke limiter on rear side

10, Outer Bushing

At installation, hole must face adjustment screw.



11, Axle

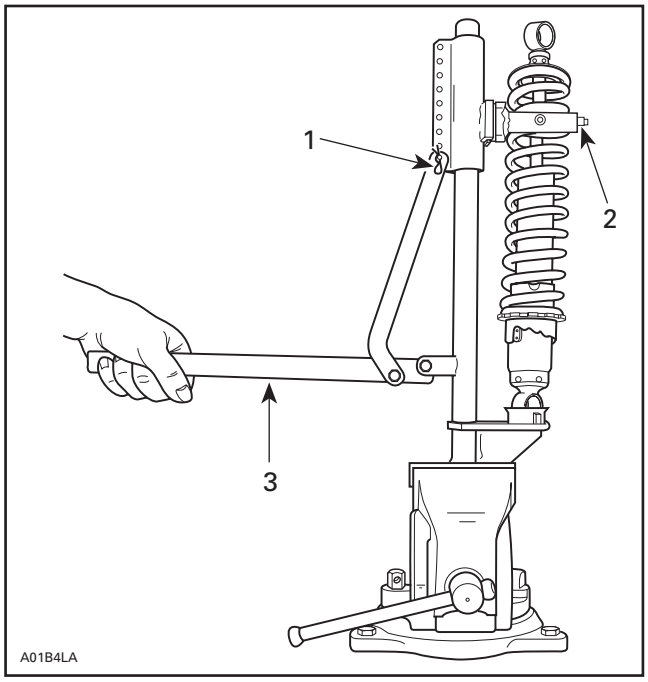
Note position of axles at disassembly. Axles with a paint stripe serve as idler wheel axles. These are more precise than those used as pivot axles. Idler wheel axles can be used as pivot axles but the opposite is not true.

12,13, Front Shock and Spring Stopper

Use shock spring remover (P/N 529 035 504) and put it in a vise. Mount shock in it and turn shock so that spring coils matched spring compressor.

Close and lock bar. Adjust handle horizontal by changing position of clevis pin.

Push down on handle until it locks. Remove spring stopper then release handle.



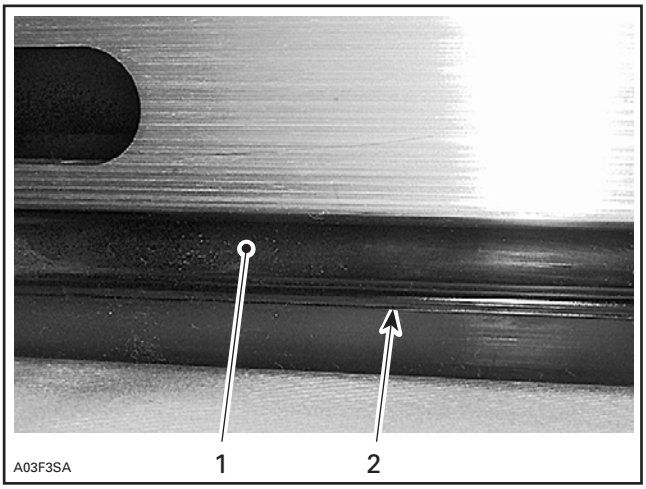
1. Clevis pin
2. Bar
3. Handle horizontal

20, Stopper Strap

Inspect strap for wear or cracks, bolt and nut for tightness. If loose, inspect hole for deformation. Replace as required. Torque nuts as specified in exploded view.

17, Slider Shoe

Molding line is the wear limit indicator.



TYPICAL

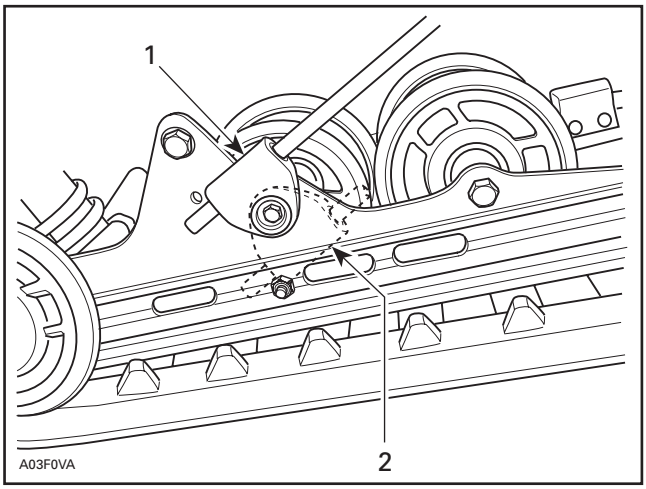
1. *Slider shoe*
2. *Molding line (wear limit indicator)*

Replace slider shoes when wear limit is reached.

CAUTION: Slider shoes must always be replaced in pairs.

18, Spring Support

CAUTION: To avoid track damage, spring supports must be mounted upward.



RIGHT SIDE SHOWN

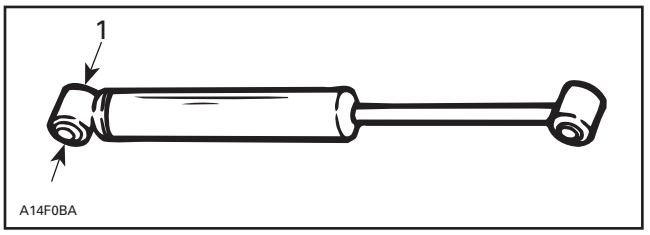
1. *Right position: upward*
2. *Wrong position*

SHOCK ABSORBER INSPECTION

All Models Equipped with Hydraulic Shock

NOTE: Hydraulic shocks are black painted.

Secure the shock body end in a vise with its rod upward.



1. Clamp

CAUTION: Do not clamp directly on shock body.

Examine each shock for leaks. Extend and compress the piston several times over its entire stroke. Check that it moves smoothly and with uniform resistance with its rod upward.

Pay attention to the following conditions that will denote a defective shock:

- A skip or a hang back when reversing stroke at mid travel.
- Seizing or binding condition except at extreme end of either stroke.
- Oil leakage.
- A gurgling noise, after completing one full compression and extension stroke.

Renew if any faults are present.

All Models Equipped with Gas Pressurized Shock

NOTE: Gas pressurized shocks are light gray or purple painted, or bare aluminum.

Gas shock can be inspected as follows:

Because of gas pressure, strong resistance is felt when compressing shock. When released, the shock will extend unassisted. Renew as required.

If suspecting an internal gas leak between oil chamber and gas chamber, check shock as follows:

Install shock in a vise clamping on its bottom eyelet with its rod upward.

Let it stand for 5 minutes.

Completely push down the shock rod then release.

Rod must come out at a steady speed. If speed suddenly increases particularly at end of extension, replace shock.

All Types of Shock

If suspecting a frozen shock proceed as follows:

Place shock in a freezer (temperature below 0°C (32°F)) for 4 hours.

Push down on rod and note its resistance. If shock is frozen it will be impossible or almost impossible to compress it.

HPG T/A SHOCK SERVICING

Refer to SC-10 II SUSPENSION.

INSTALLATION

Install assembled suspension into track with front portion first.

Insert rear portion of suspension into track.

Bolt front arm, rear arm then center top idler wheel axle.

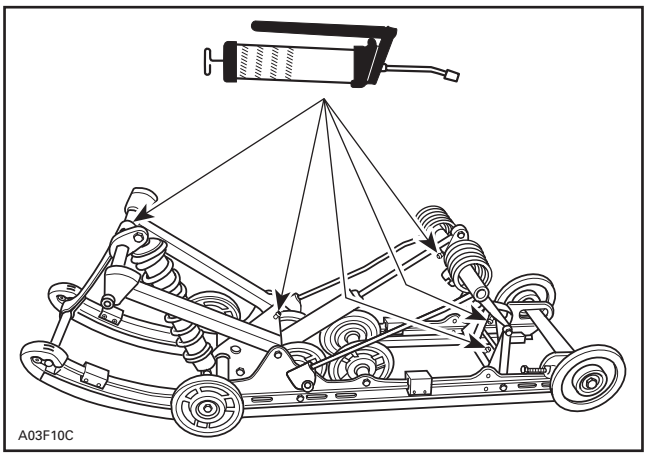
Adjust track tension.

RIDE ADJUSTMENT

Refer to *Operator's Guide*.

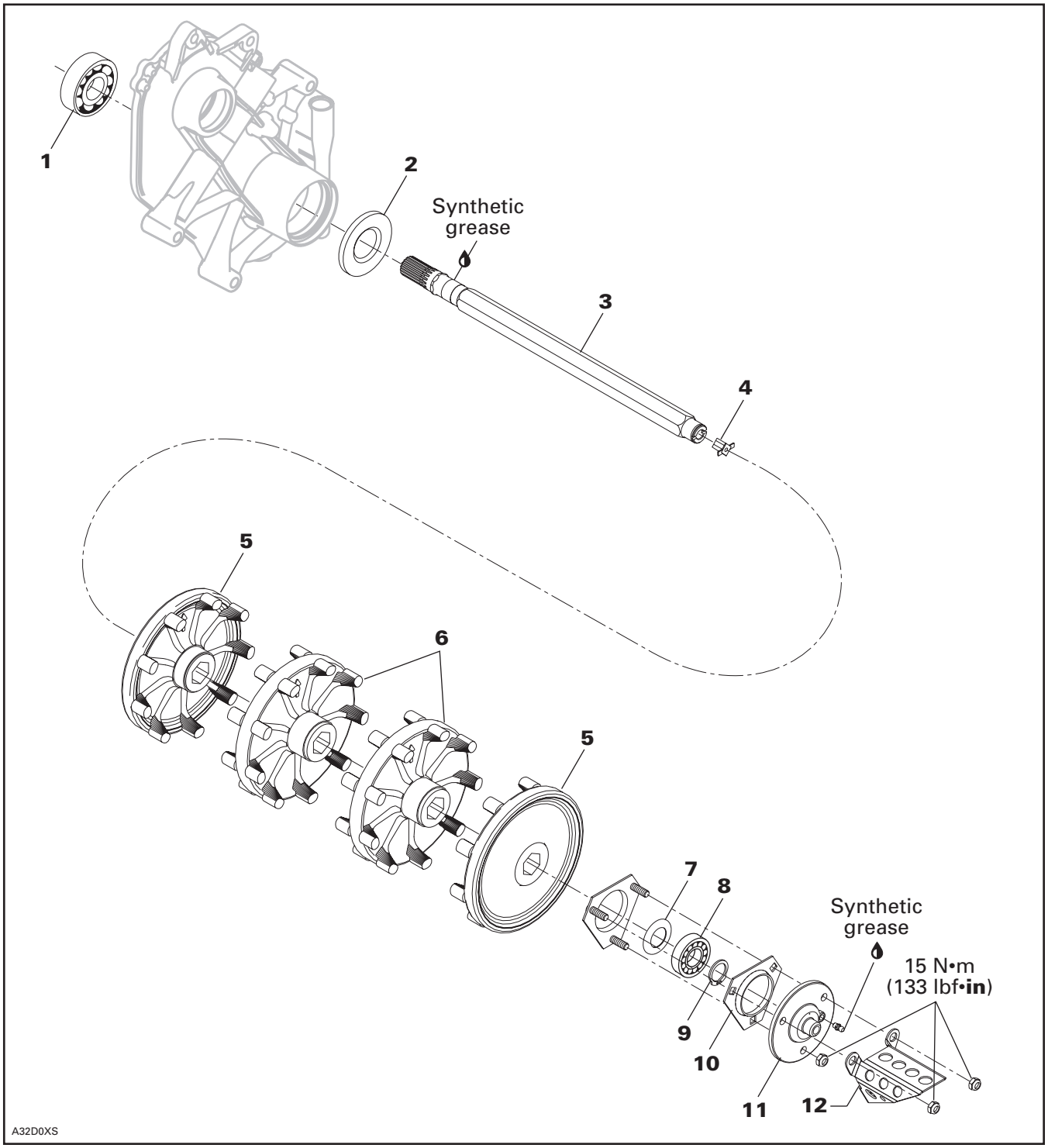
LUBRICATION

Lubricate front and rear arms at grease fittings using synthetic grease (P/N 413 711 500).



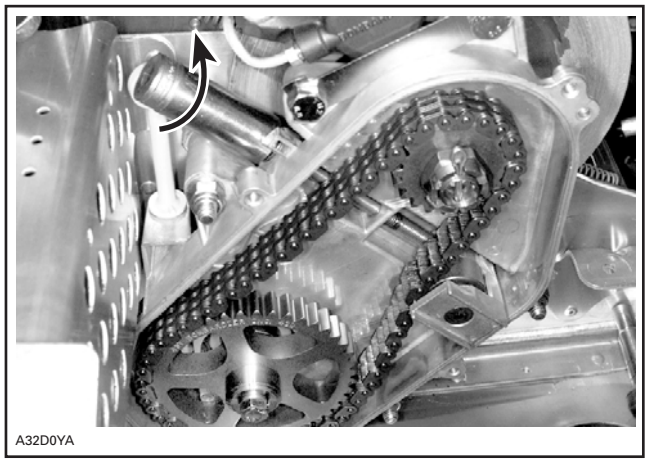
TYPICAL — 5 GREASE FITTINGS

DRIVE AXLE


1
2
Synthetic grease
3
4
5
6
5
7
8
Synthetic grease
15 N•m (133 lbf•in)
9
10
11
12
A32D0XS

REMOVAL

According to model, drain oil from chaincase or gearbox. Remove chaincase or gearbox cover. Release drive chain tension.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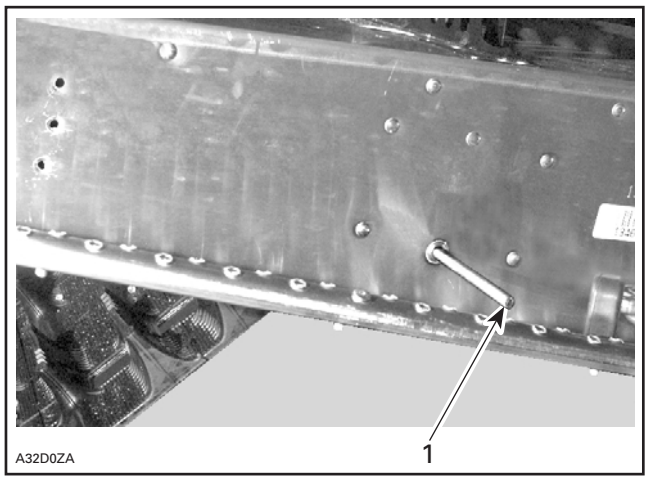
Raise and block rear of vehicle off the ground.

Remove suspension. Refer to proper subsection.

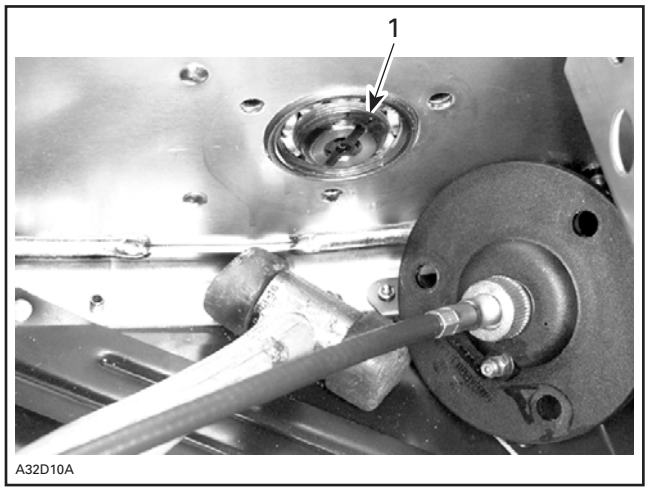
Track can be held in tunnel using a rod in place of center idler wheel axle.



A32D0ZA

1. Rod

Remove cable protector **no. 12**, plastic cover **no. 11**, outer flange **no. 10** and circlip **no. 9** from left side.



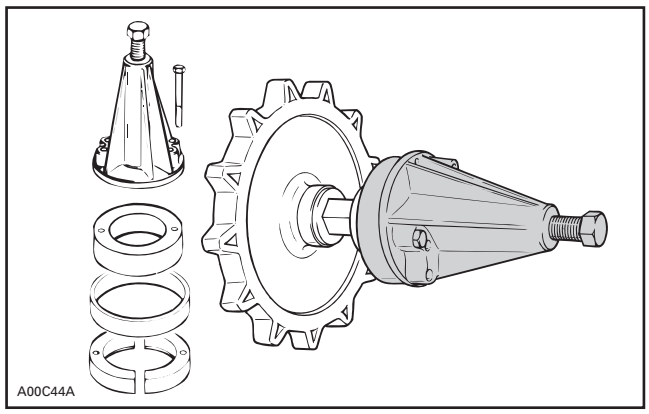
A32D10A

1. Circlip

Apply parking brake.

Remove chain and sprockets then circlip from right side.

Release drive axle sprocket from track and at the same time, push the drive axle **no. 3** toward the right side. Drive axle bearing **no. 1** in chaincase or gearbox will fall off.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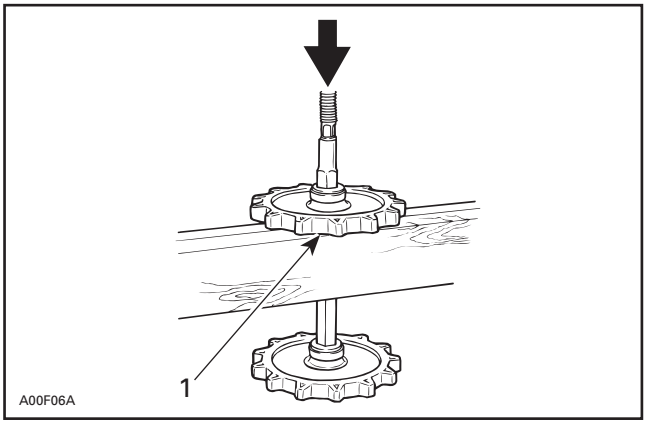
TYPICAL

5,6, Sprocket and Half-Sprocket

To remove press fit sprockets, use a press and a suitable support as illustrated.

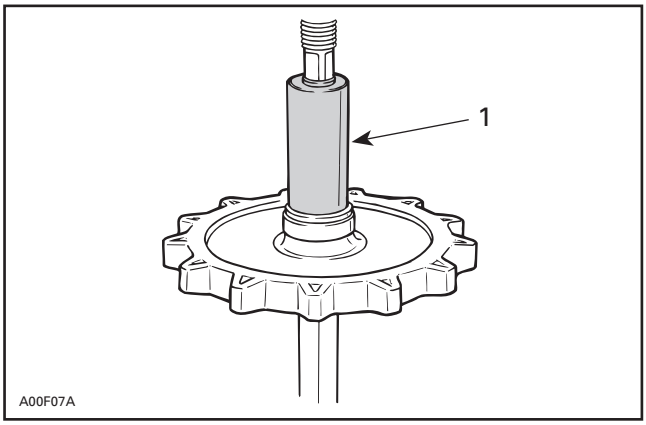


TYPICAL
1. Support sprocket near hub

ASSEMBLY

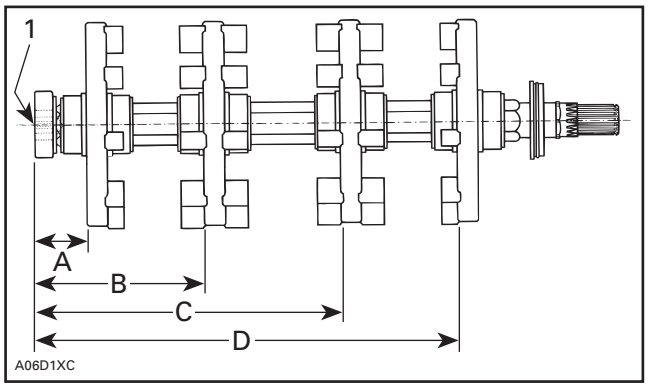
3,5,6, Drive Axle and Sprocket

To assemble press fit sprockets, use a press and a suitable pipe as illustrated. Sprockets must be assembled according to the following dimensions.



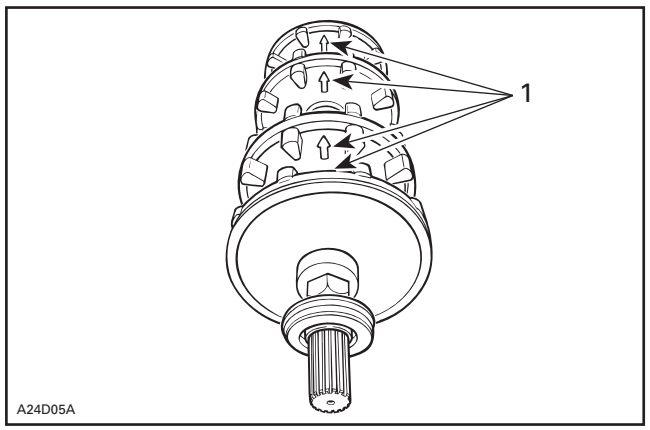
TYPICAL
1. Pipe

ZX Series



1. Measure from end of drive axle
A. 47.3 mm (1.862 in)
B. 149.8 mm (5.898 in)
C. 272.8 mm (10.740 in)
D. 375.3 mm (14.776 in)

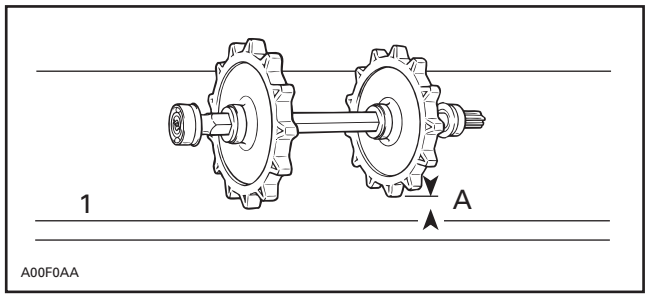
Ensure to align indexing marks of each sprocket when assembling.



TYPICAL
1. Indexing marks aligned

The maximum desynchronization for the sprockets is 1.5 mm (1/16 in).

To check this tolerance, place axle assembly on a plane surface and measure the gap between sprocket tooth and surface.



TYPICAL
1. Plane surface
A. 1.5 mm (1/16 in) MAXIMUM

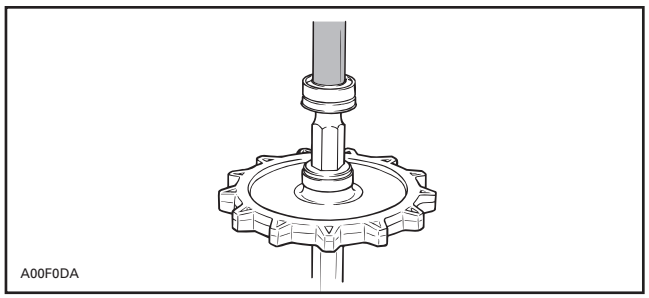
CAUTION: The same sprocket must not be pressed twice on the axle. If synchronization is found to be defective, use a new sprocket.

7, Bearing Protector

At assembly, flat side of bearing protector must be against bearing.

8, Bearing

Always push bearing by inner race.



TYPICAL

The bearing no. 8 must have its shield facing the sprocket.

The bearing no. 1 must have its shield facing right side (cover).

LUBRICATION

Lubricate end housing bearing with synthetic grease (P/N 413 711 500).

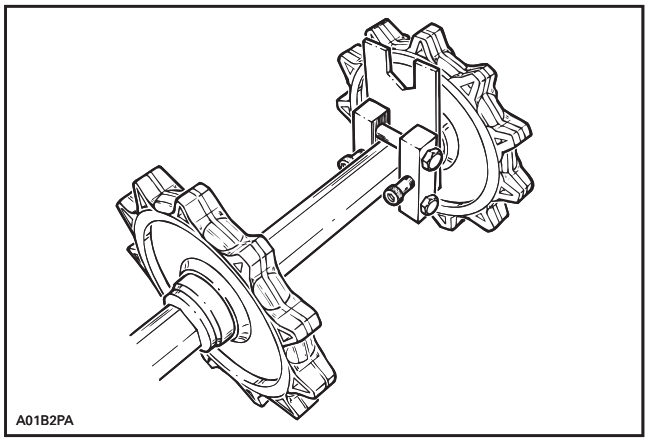
ADJUSTMENT

Sprocket/Track Alignment

CAUTION: Do not temper with sprocket/track alignment if frame or suspension is damaged.

Sprockets might be repositioned to fit lugs without removing drive axle.

Use drive axle sprocket adjuster kit (P/N 861 725 700).



TYPICAL

TRACK

TRACK TYPE APPLICATION

Refer to TECHNICAL DATA.

GENERAL

This section gives guidelines for track removal. Some components require more detailed disassembly procedures. In these particular cases, refer to the pertaining section in this manual.

INSPECTION

Visually inspect track for:

– cuts and abnormal wear
– broken rods
– broken or missing track cleats.

If track is damaged or rods are broken, replace track. For damaged or missing cleats, replace by new ones, using cleat remover (P/N 529 028 700). Use narrow-cleat installer (P/N 529 008 500).

⚠ WARNING

Do not operate a snowmobile with a cut, torn or damaged track.

REMOVAL

Remove the following parts:

– speedometer cable
– muffler
– chaincase or gearbox cover
– rear suspension
– drive axle seal
– end bearing housing
– sprockets and chain
– drive axle
– track.

INSTALLATION

Reverse the removal procedure.

NOTE: When installing the track, respect rotation direction indicated by an arrow on track thread.

Check sprocket/track alignment as described in DRIVE AXLE.

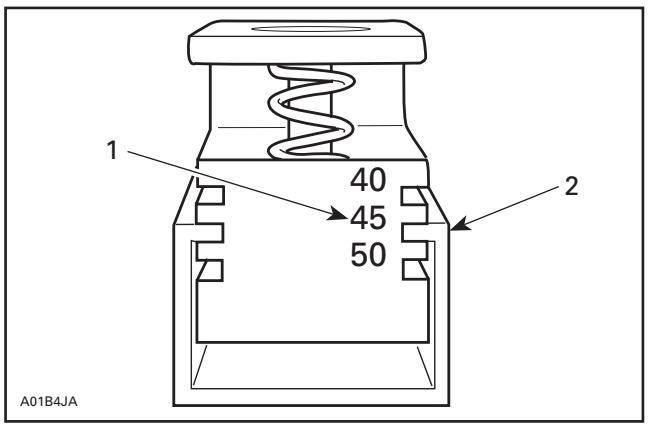
Track Tension and Alignment

Track tension and alignment are inter-related. Do not adjust one without checking the other. Track tension procedure must be carried out prior to track alignment.

Tension

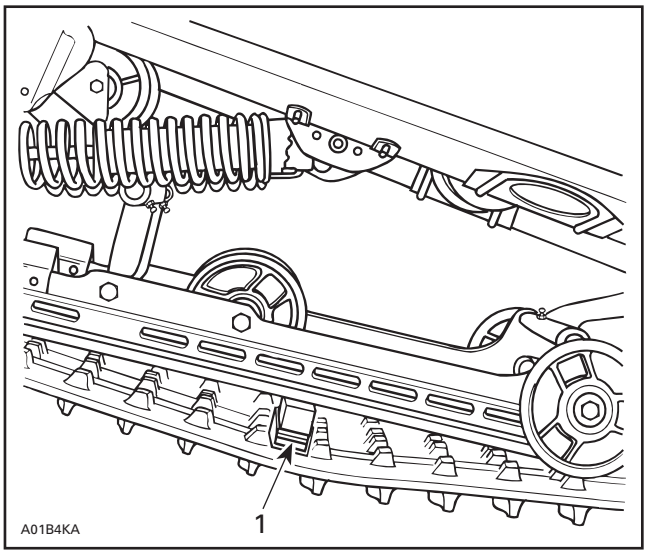
Lift the rear of vehicle and support with a mechanical stand. Allow the slide to extend normally. Check the gap half-way between front and rear idler wheels. Measure between slider shoe and bottom inside of track.

When using the track tension gauge (P/N 529 021 500), slide U shape extrusion to proper deflection.



1. Example: 45 mm
2. Extrusion

Insert pre-setted gauge between slider shoe and track. Allow gauge to settle by forcing track up and down. Track tension is as specified when edge of gauge reaches line.



TYPICAL
1. Line

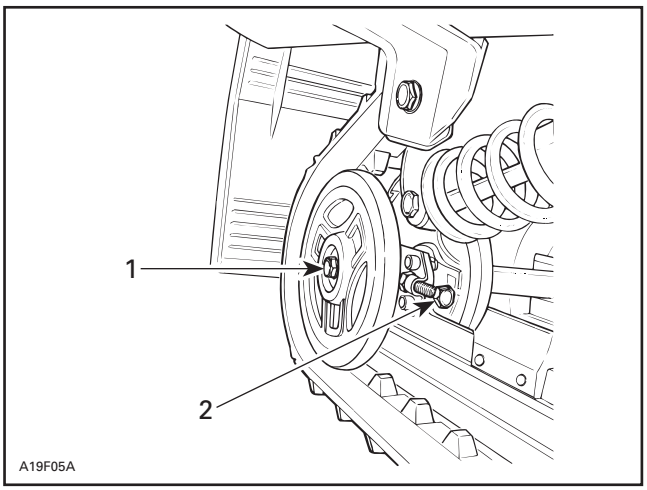
NOTE: Lightly oil track tension gauge center pin to avoid sticking.

All Models

Refer to TECHNICAL DATA for proper tension values.

CAUTION: Too much tension will result in power loss and excessive stress on suspension components. If too loose, the track will have a tendency to thump.

To adjust, loosen the rear idler wheel retaining screws then loosen or tighten the adjuster bolts located on the inner side of the rear idler wheels.



TYPICAL
1. Retaining screw
2. Adjuster bolt

Alignment

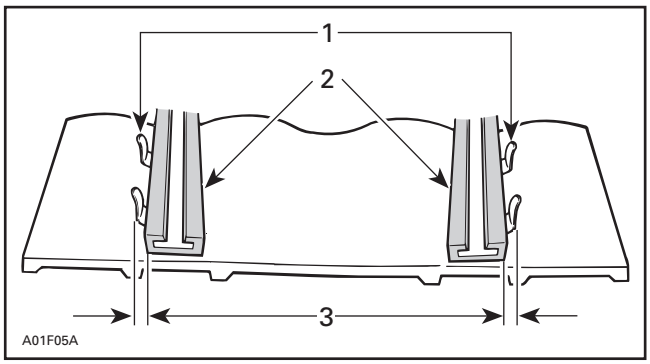
⚠ WARNING

Before checking track tension, ensure that the track is free of all particles which could be thrown out while it is rotating. Keep hands, tools, feet and clothing clear of track. Ensure no one is standing in close proximity to the vehicle.

All Models

With rear of vehicle supported off the ground, start engine and allow the track to rotate **slowly**.

Check that the track is well centered; equal distance on both sides between edges of track guides and slider shoes.

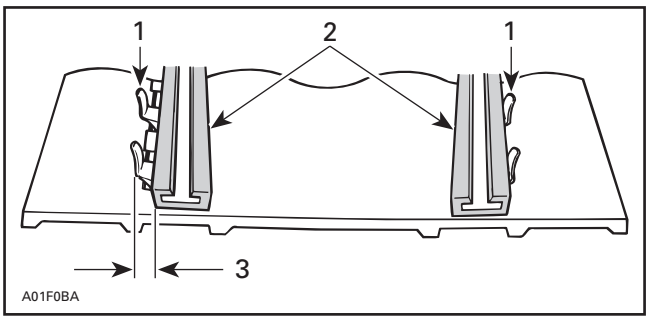


1. Guides
2. Slider shoes
3. Equal distance

⚠ WARNING

Before checking track alignment, ensure that the track is free of all particles which could be thrown out while track is rotating. Keep hands, tools, feet and clothing clear of track.

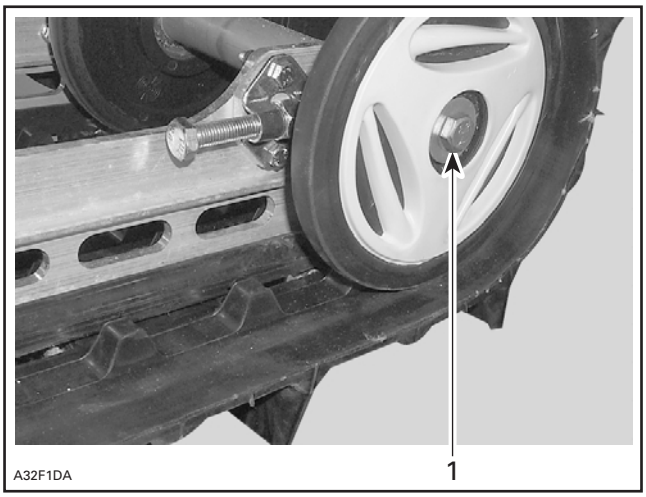
To correct, stop engine then tighten the adjuster bolt on side where guides are farthest to slide. Recheck alignment.



1. Guides
2. Slider shoes
3. Tighten on this side

NOTE: Torque retaining screw to 48 N•m (35 lbf•ft) after adjustment.

Tighten the idler wheel retaining screws.



TYPICAL
1. Retighten to 48 N•m (35 lbf•ft)

Restart engine, rotate track **slowly** and recheck alignment.

Track Cleat

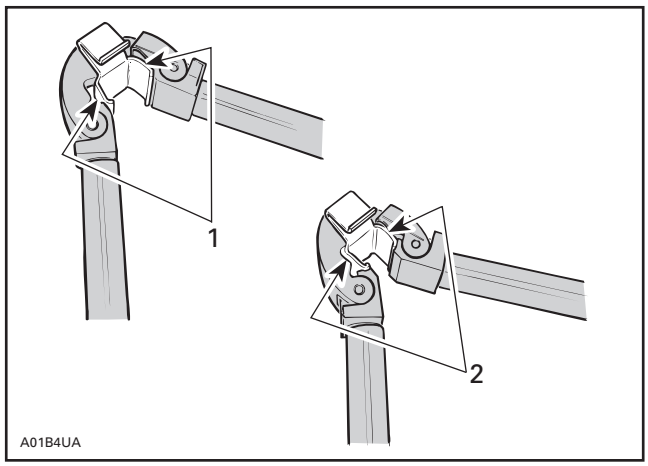
Removal

– Raise rear of vehicle off the ground and lift snowguard then rotate track to expose a cleat to be replaced.
– Using track cleat remover (P/N 529 028 700) for all models.

Installation

NOTE: Keep the same pitch between guide cleats.

– Place new cleat in position and using narrow track cleat installer (P/N 529 008 500) bend cleat then push tabs into rubber.



TYPICAL
1. First step
2. Second step (to push tabs into rubber)

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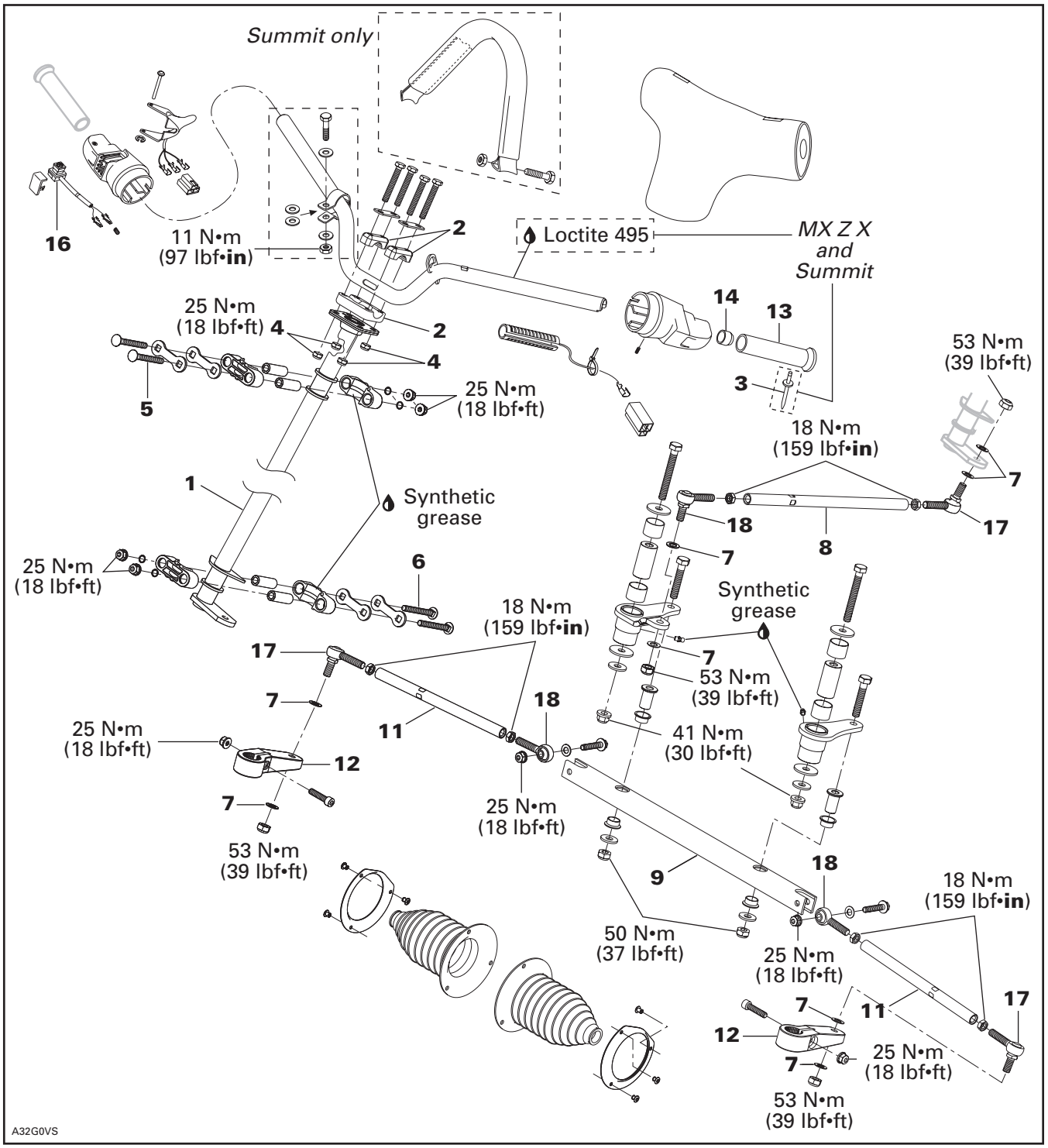
STEERING SYSTEM

ZX Series



DISASSEMBLY AND ASSEMBLY

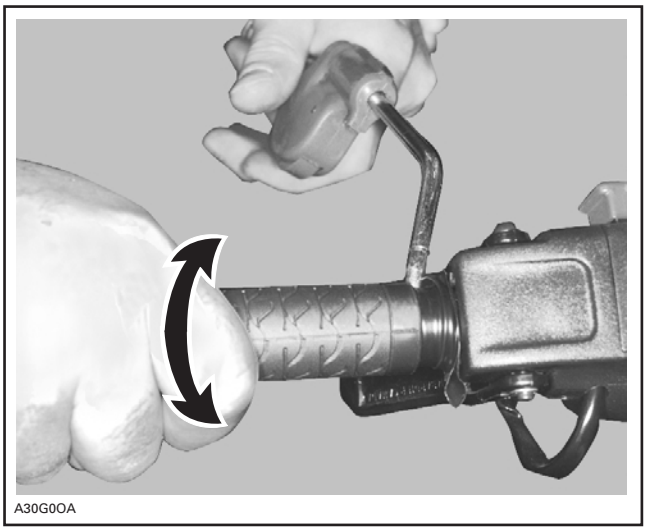
13, Grip

Grips must be carefully removed to prevent damaging the heating elements.

Heat grip with a heat gun.

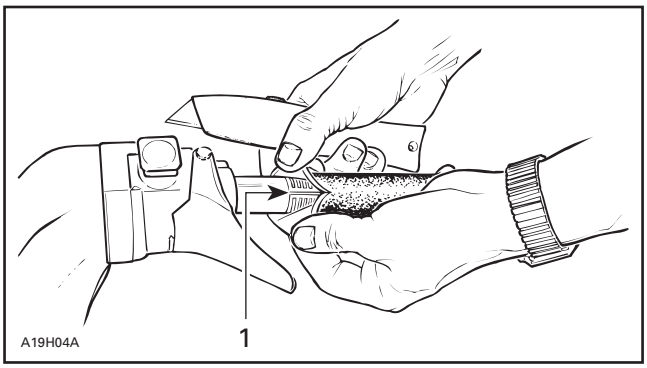
Apply tape to handlebar near the grip to protect paint.

Inject compressed air into the handlebar and twist grip as pulling it out.



The grips might be unremovable as explained above, in this case, carefully proceed as follows to prevent damaging the heating elements.

Locate the element wires inside the handlebar; look through end of grip. Start cutting the grip exactly opposite the element wires and immediately peel it open to locate the gap in the heating element, as shown.



TYPICAL

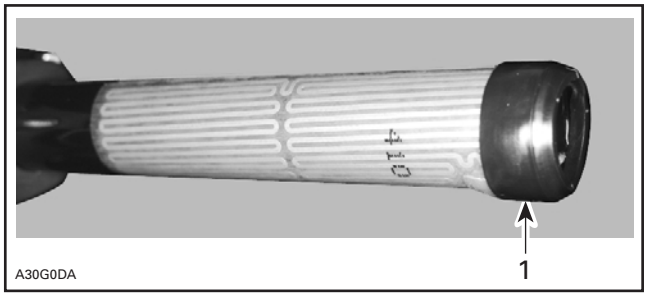
1. Gap in the heating element opposite the wires

Continue cutting along the gap and remove the grip.

If required, slowly peel heating element **no. 15** from handlebar and remove it.

To install, stick the heating element to the handlebar making sure the wires do not interfere with operation of the accelerator or brake handle.

Prior to install grips, position heating element protector **no. 14**.



1. Heating element protector

⚠ WARNING

Never use lubricants (e.g. oil, grease, etc.) to install the handlebar grip, use a mix of soap and water. Mix 40 parts of water with one part of dish washing soap (recommended: Ultra Joy, Sunlight or Palmolive).

Heat the grip with a heater gun or a spot light to ease installation. Insert new grip with compressed air.

TYPICAL

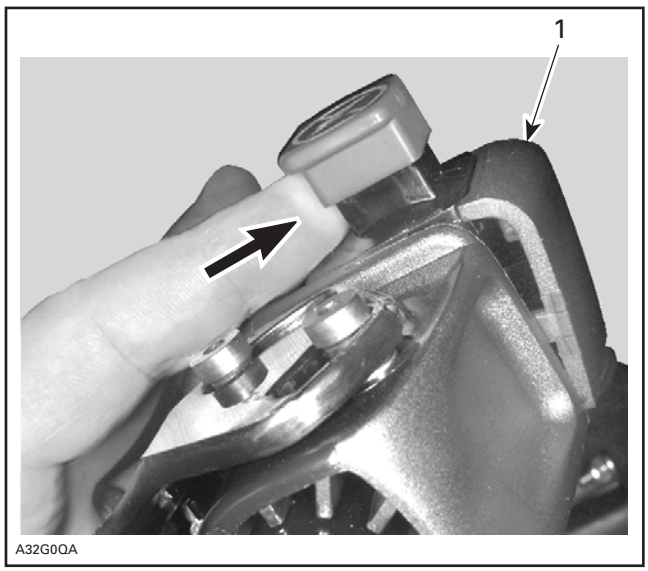
MX Z X and Summit

After grip installation apply few drops of Loctite 495 (P/N 293 800 021) 10 mm (3/8 in) deep between grip and handlebar.

Locate former rivet hole in handlebar then, drill 4.8 mm (3/16 in) dia. hole through grip in this position. Install rivet **no. 3**.

16, Cut-Out Switch

Push on switch to remove plastic cover.



1. Plastic cover

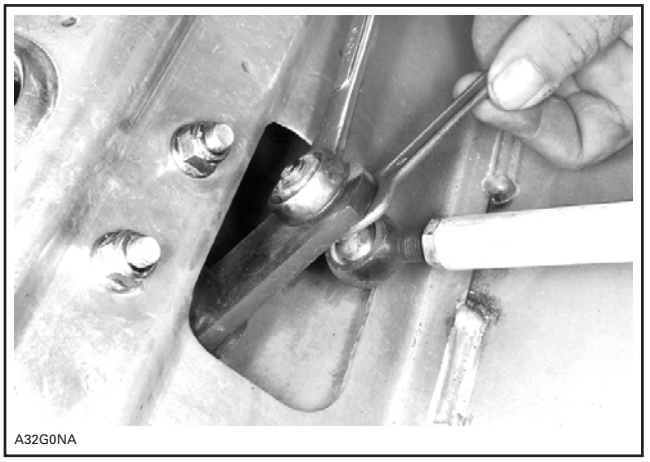
1, Steering Column

Remove steering pad, remove master cylinder from handlebar and put it aside. Remove circlip retaining throttle cable to throttle housing. Unplug all connector housings of handlebar switches. Remove handlebar ass'y.

Remove the air intake silencer.

Unbolt console.

Detach the short tie rod **no. 8** (engine has to be removed) from the steering column. Note that a hardened flat washer **no. 7** goes on each side of steering column lever.



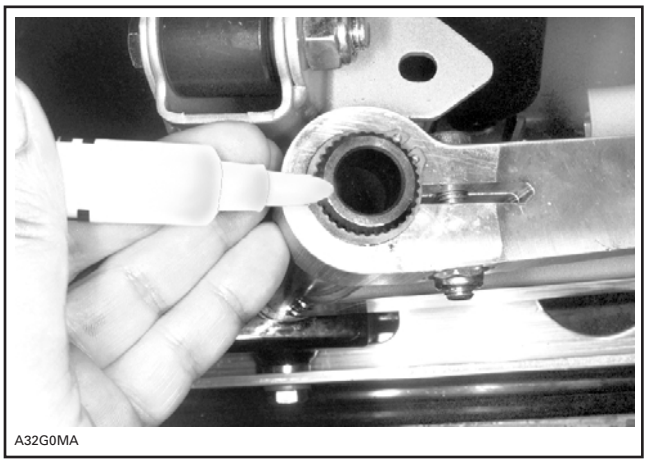
Disengage carriage bolts **no. 6** from chassis.

Disengage carriage bolts **no. 5** from steering support then, pull steering column from top.

Plastic U-clamps will come out along with steering column.

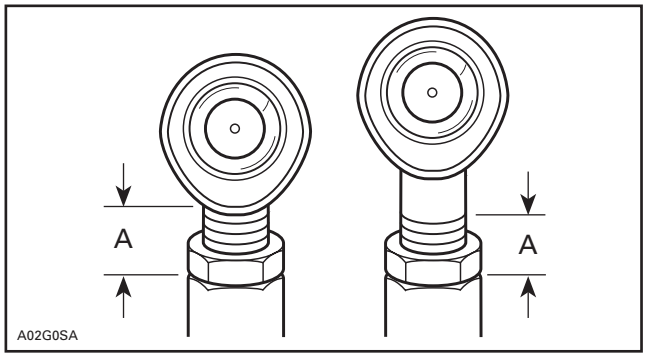
12, Steering Arm

To maintain correct steering geometry for reassembling, scribe mark the steering arm and ski leg before disassembly.



17,18, Ball Joint (left hand and right hand threads)

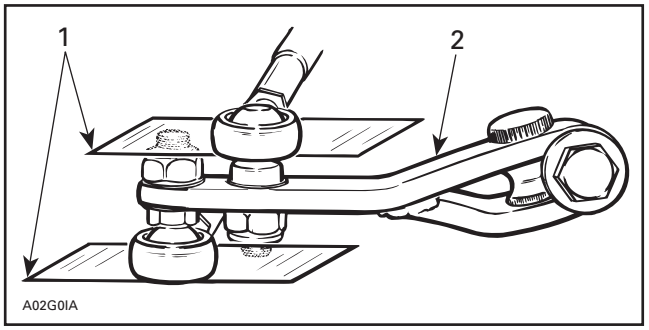
The maximum external threaded length not engaged in the tie rod must not exceed 20 mm (25/32 in).



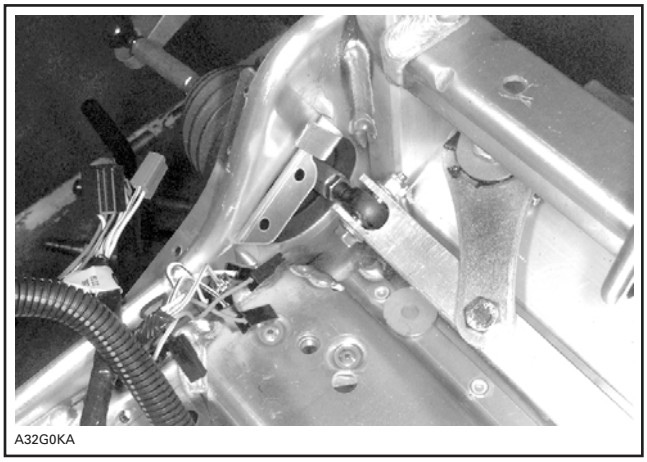
TYPICAL
A. 20 mm (25/32 in) max.

The ball joint should be restrained when tightening the tie rod end lock nut. Align it so the tie rod end is parallel to the steering arm when assembled on the vehicle, refer to the following illustration.

For proper torque specifications refer to the specific exploded view for the vehicle being serviced.



TYPICAL
1. Parallel with steering arm
2. Steering arm



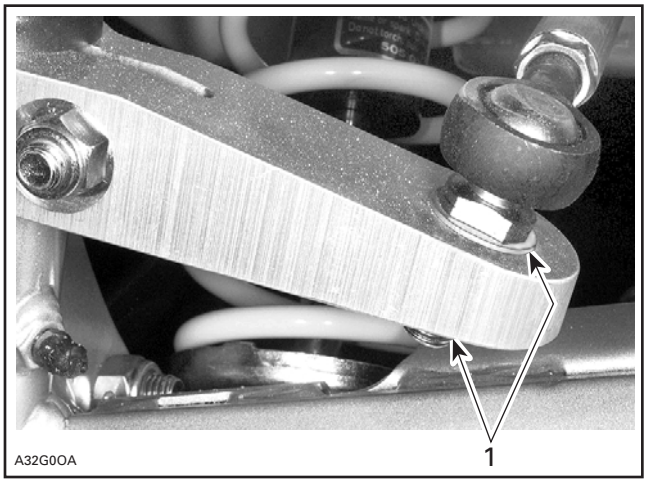
TIE ROD BALL JOINT PARALLEL TO SWIVEL BAR BEFORE TIGHTENING

⚠ WARNING

The cut off section of the ball joint must run parallel with the swivel bar no. 9. When tightening lock nuts, restrain ball joint with appropriate size wrench. The maximum external threaded length not engaged in the tie rod must not exceed 20 mm (25/32 in).

7, Hardened Washer

Install a hardened washer on each side of the arm.

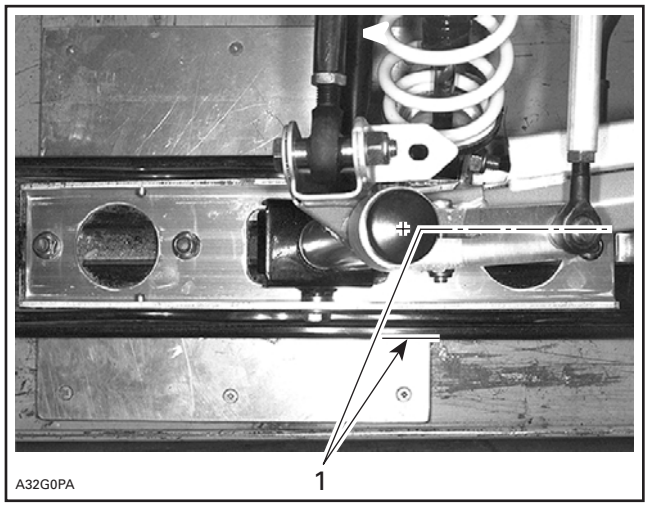


TYPICAL
1. Hardened washers

12, Steering Arm

The steering arm angles should be equal on both sides when skis are parallel with vehicle.

Steering arm axis (from plastic cap center to ball center of ball joint) must run parallel to ski.



TYPICAL
1. Parallel

Tighten the steering arm pinch bolt and nut to the torque specified in the exploded view.

INSPECTION

Check skis and runner shoes for wear, replace as necessary. Refer to FRONT SUSPENSION.

12, Steering Arm

Make sure steering arm and ski leg splines interlock.

⚠ WARNING

Any parts having worn splines have to be replaces with new ones.

Check the general condition of the steering system components for wear. Replace if necessary.

15, Heating Grip Element

Refer to TESTING PROCEDURE.

17,18, Ball Joint (left hand and right hand threads)

Inspect ball joint ends for wear or looseness, if excessive, replace them.

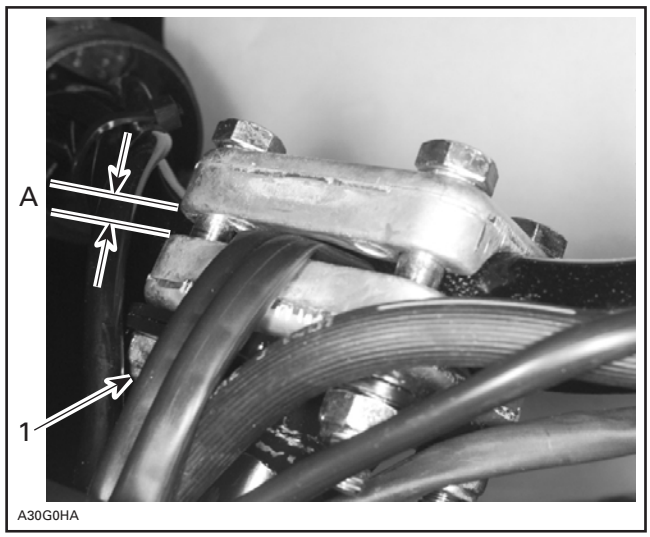
HANDLEBAR ADJUSTMENT

Loosen all 4 nuts **no. 4** retaining steering clamps **no. 2**.

Adjust the steering handlebar to the desired position.

Lock the handlebar in place by tightening the 4 nuts as specified in the illustrations.

CAUTION: Tighten the nuts equally in a crisscross sequence and ensure there is an equal gap on each side of the clamps.



TYPICAL
1. Torque to 25 N•m (18 lbf•ft)
A. Equal gap all around

⚠ WARNING

Avoid contact between the brake handle and the windshield by NOT adjusting the handlebar too high.

⚠ WARNING

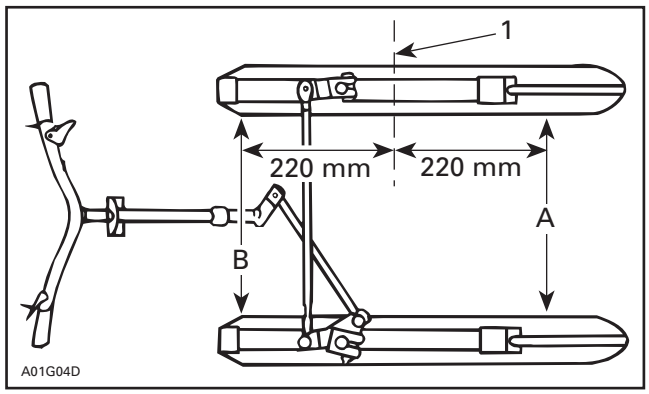
Make sure that the steering pad and all controls are properly fixed to their normal location on the handlebar.

STEERING ADJUSTMENT (skis)

Definitions

TOE-OUT:

A difference measured between the front edge of the skis "A" and rear edge "B" as viewed from the top. It is adjustable. For all ZX series models, toe-out is measured at 220 mm (8-21/32 in) from ski pivot bolt axis.



TYPICAL
1. Ski pivot bolt axis

CAMBER:

A specific inward or outward tilt angle of ski leg compared to a vertical line when viewing the vehicle from front.

Adjustments

Adjustments should be performed following this sequence:

– Pivot arm centering.
– Set camber angle.
– Check for a horizontal handlebar.
– Set toe-out.

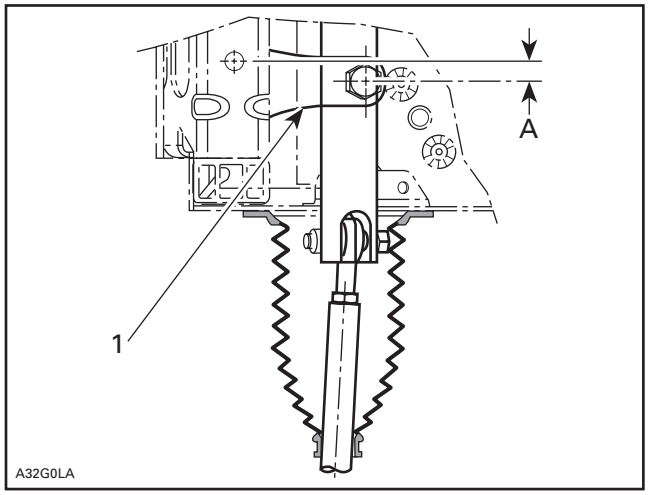
PIVOT ARM CENTERING

⚠ WARNING

Do not attempt to adjust straight ahead ski position by turning the ball joint on tie rod no. 8.

8,17,18, Tie Rod and Ball Joint

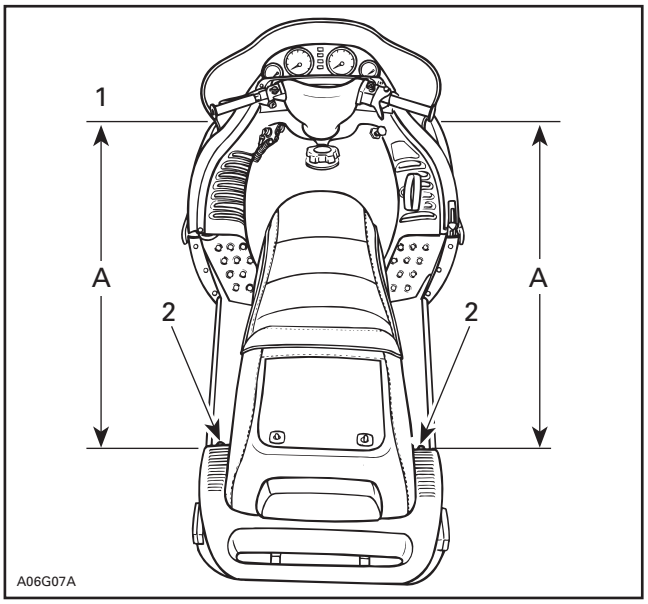
Turn handlebar until bolt center of left side swivel arm is 11 mm (.443 in) from chassis hole center.



1. Left side swivel arm
A. 11 mm (.443 in)

Check that handlebar is horizontal by measuring from the extremities of the grips to the rearmost edge of the tunnel, as shown.

NOTE: The reference point must be the same relative to each side.



TYPICAL
1. Equal distance A on each side
2. Same reference point

Remove engine.

Loosen the jam nuts on tie rod **no. 8** (LH threads on steering column end) and turn tie rod accordingly. Retighten the jam nuts to 18 N•m (159 lbf•**in**).

⚠ WARNING

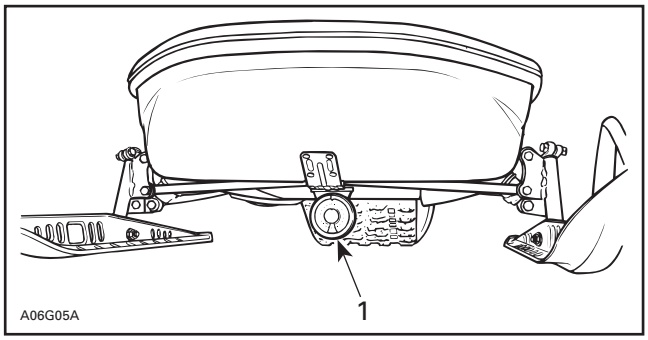
Never lengthen this tie rod so that threaded portion of ball joint exceeds 20 mm (25/32 in).

CAMBER

NOTE: Identical adjustments are required on both sides of the vehicle.

– Make sure the vehicle is leveled by placing an angle finder under the main frame member as shown on the following illustration.

– Vehicle skis must be off the ground.

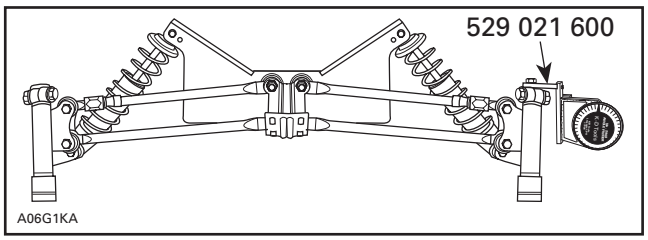


TYPICAL

1. Angle finder

Using special tool (P/N 529 021 600) mounted to the ski leg, position the angle finder on the tool as shown in the following illustration. An alternate location for the angle finder if the special tool is not available is the outside of the ski leg housing.

CAUTION: Angle finder must sit square against swing arm. Positioning angle finder against weld bead or decal may result in false reading.



TYPICAL — CAMBER ADJUSTMENT SET-UP

Adjusting

– Loosen lock nut on both upper control arms.

– Unbolt both upper control arms at ski leg housing. Turn tie rod half turn at a time to obtain the specified value when skis are not touching ground. Bolt upper control arms.

MODEL	CAMBER ± 1.0°
MX Z Trail	- 1
MX Z STD/X/Adrenaline	- 2
Others	Not adjustable

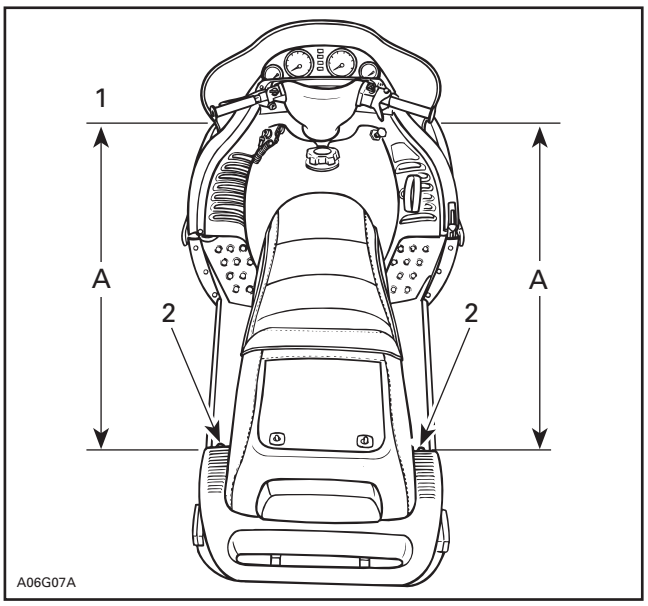
NOTE: Because of a negative camber, skis will lean toward center of vehicle.

Tighten lock nut on both upper control arms.

HANDLEBAR AND SKI TOE-OUT

Check that handlebar is horizontal when skis are in straight ahead position by measuring from the extremities of the grips to the rearmost edge of the tunnel, as shown.

NOTE: The reference point must be the same relative to each side.



TYPICAL

1. Equal distance A on each side
2. Same reference point

Adjustment is performed by adjusting length of left and right tie rods **no. 11**.

⚠ WARNING

Do not attempt to adjust skis straight ahead position by turning ball joint on tie rod no. 8.

Procedure:

– Loosen jam nuts of both tie rods **no. 11**.
– Turn the tie rod on one side to shorten its length.
– Lengthen the other one by turning it exactly the same amount, so that toe-out is not changed.

⚠ WARNING

Never lengthen tie rod so that threaded portion of ball joint exceeds 20 mm (25/32 in).

– Close front of skis manually to take all slack from steering mechanism.

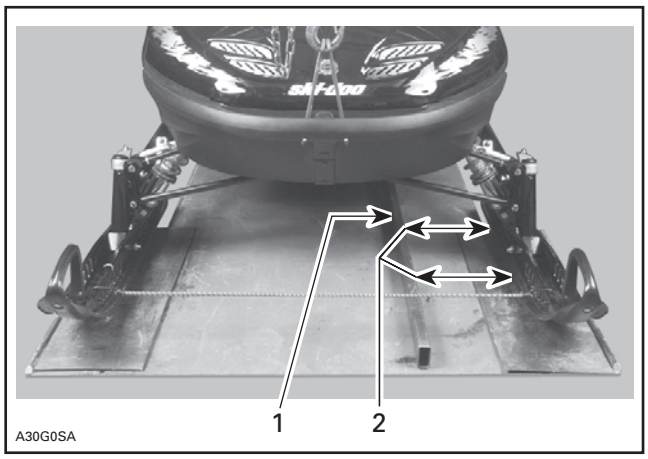
NOTE: A rubber cord must be hooked in front of skis to keep them closed.

Toe-out must be as specified when skis are in a straight-ahead position and the front of vehicle is lifted off the ground.

MODEL	TOTAL TOE-OUT + 3 mm (+ 1/8 in) - 0 mm (- 0 in)
MX Z STD/Adrenaline Summit	8.0 (5/16)
MX Z X	4.0 (5/32)
MX Z Trail Formula DLX Grand Touring	3.0 (1/8)

NOTE: To make sure skis are in a straight-ahead position, place a straight edge against pre-adjusted track and measure the distance between front and rear of skis and straight edge. Measuring points are 220 mm (8-21/32 in) at front and rear of ski pivot axis.

To reduce tolerance when measuring, set one ski to proper toe-out (half the total toe-out) then measure from that ski to the opposite ski.



TYPICAL

1. Straight edge
2. Measure at 220 mm (8-21/32 in) from ski pivot axis

LUBRICATION

⚠ WARNING

Do not lubricate throttle cable or housing.

26, Grease Fittings

Only use synthetic grease (P/N 413 711 500).

– Grease ski legs.
– Grease LH and RH swivel arms.

Grease stabilizer blocks in swing arm.

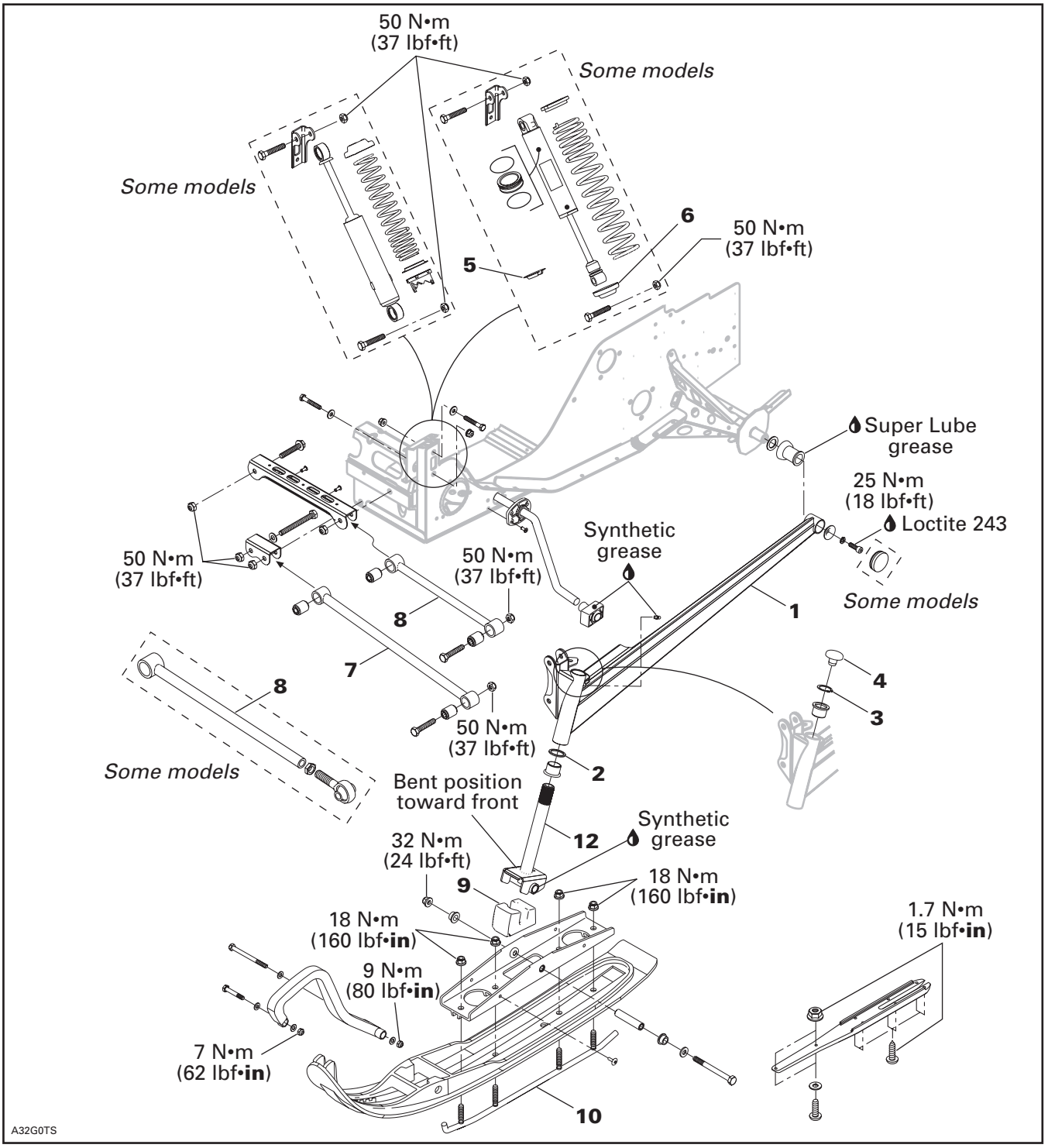
For all others lubrication points use BOMBARDIER LUBE (P/N 293 600 016).

Lubricate:

– Steering column bushings.
– Long tie rod ends.
– Short tie rod ends.
– Upper arm ball joint on so equipped models.

SUSPENSION AND SKI SYSTEM

ZX Series



DISASSEMBLY

5, Shock

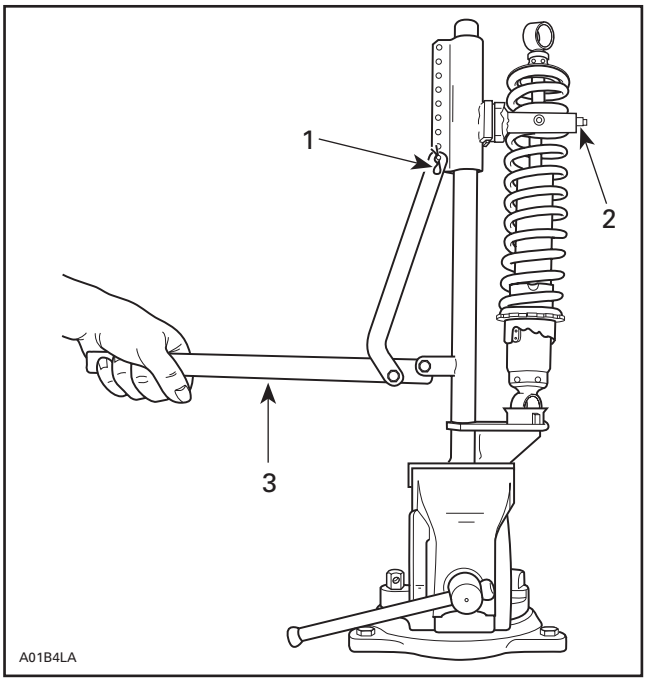
Lift front of vehicle and support it off the ground.

Reduce spring preload by turning adjusting ring accordingly.

Remove lower bolt then upper bolt of shock.

For shock spring disassembly use shock spring remover (P/N 529 027 100) in a vise. Mount shock in it and turn shock so that spring coils matched spring compressor.

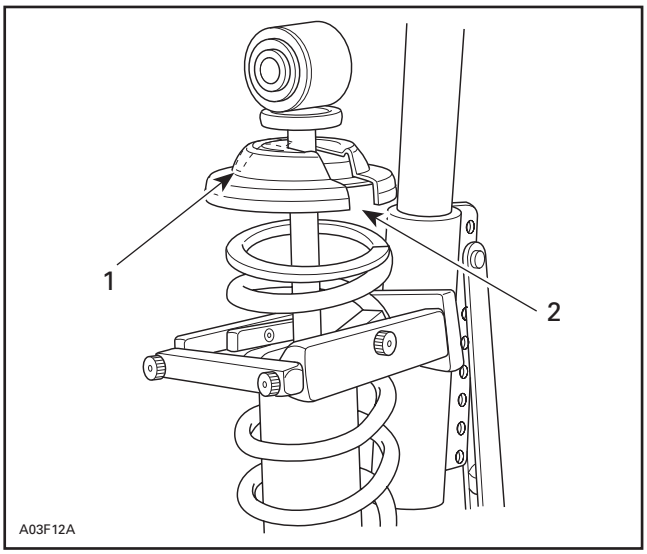
Close and lock the bar. Adjust the handle at horizontal position by changing the position of the clevis pin.



1. *Clevis pin*
2. *Bar*
3. *Handle horizontal*

Push down on the handle until it locks. Remove spring stopper then release handle.

At installation, cap opening **no. 6** must be 180° from spring stopper **no. 5** opening.

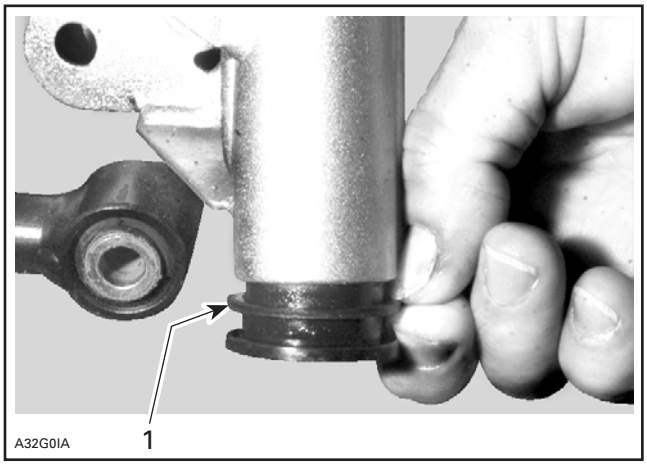


1. *Cap opening*
2. *Spring stopper opening*

1, Swing Arm

Lift front of vehicle and support it off the ground.

Remove cap **no. 4**, circlip **no. 3** then loosen steering arm bolt and pull up steering arm. Ski leg may fall off from swing arm. Note shim **no. 2** position.



1. *Shim **no. 2***

Unbolt lower end of shock from swing arm.

Unbolt upper and lower arms.

Unbolt rear of swing arm from frame.

Pull swing arm off the vehicle.

INSPECTION

Check all rubber cushions for crack and wear. Replace as required.

Check straightness of ski leg **no. 12** and make sure that splines are properly interlocking with steering arm. Replace as required.

Check for straightness of swing arm. Replace as required.

Check for clogged grease fittings. Clean or replace as required.

Check skis and runners **no. 10** for wear, replace as necessary.

Check condition of ski stopper **no. 9**. Replace it when deteriorated.

To check condition of shock, refer to SC-10 MOUNTAIN SUSPENSION then look for **Shock Absorber Inspection**.

INSTALLATION

For assembly, reverse the disassembly procedure. However, pay attention to the following.

Apply synthetic grease (P/N 413 711 500) to ski leg components.

Tighten nuts and screws to proper torque as mentioned in exploded view.

7,8, Upper and Lower Arms

Position arms and tie rods horizontally before tightening nuts.

8, Adjustable Arm

Some Models Only

Refer to STEERING SYSTEM for proper camber adjustment using these arms.

All Models

Proceed with toe-out adjustment, refer to STEERING SYSTEM.

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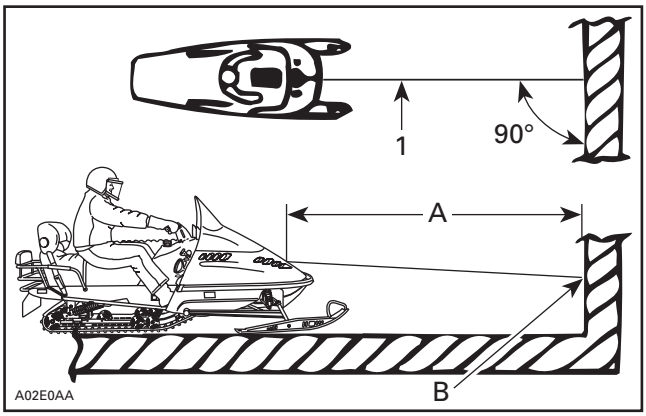
BODY

INSTALLATION AND ADJUSTMENT

HEADLAMP BEAM AIMING

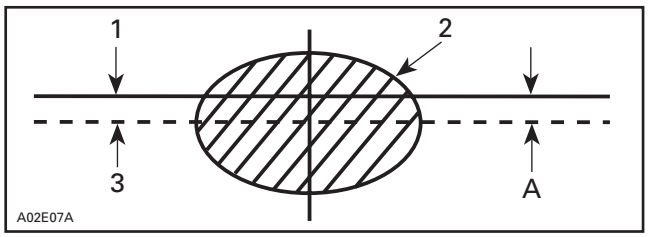
Beam aiming is correct when center of high beam is 25 mm (1 in) below the headlamp horizontal center line, scribed on a test surface, 381 cm (12 ft 6 in) away.

Measure headlamp center distance from ground. Scribe a line at this height on test surface (wall or screen). Light beam center should be 25 mm (1 in) below scribed line.



TYPICAL

1. Headlamp center line
A. 381 cm (12 ft 6 in)
B. 25 mm (1 in) below center line



1. Headlamp horizontal
2. Light beam (high beam) (projected on the wall)
3. Light beam center
A. 25 mm (1 in)

Required Conditions

Place the vehicle on a flat surface perpendicular to test surface (wall or screen) and 381 cm (12 ft 6 in) away from it.

Rider or equivalent weight must be on the vehicle.

Select **high** beam.

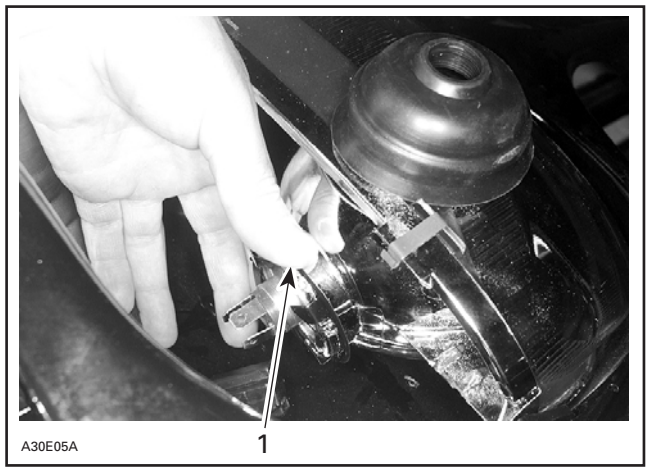
BULB REPLACEMENT

Headlamp

If any headlight bulb is burnt, remove windshield.

Unplug burnt bulb connector. Remove the rubber boot.

Unfasten bulb retainer ring. Detach the bulb and replace. Properly reinstall parts.



1. Locking ring

CAUTION: Never touch glass portion of an halogen bulb with bare fingers, as it shortens its operating life. If by mistake glass is touched, clean it with isopropyl alcohol which will not leave a film on the bulb.

Taillight

If the taillight bulb is burnt, expose the bulb by removing red plastic lens. To remove, unscrew the 2 retaining screws. Verify all lights after replacement.

DECAL

To remove a decal; heat old decal with a heat gun and peel off slowly.

Using isopropyl alcohol, clean the surface and dry thoroughly.

Apply liquid soap to new decal and carefully position the decal. Using a sponge or a squeegee, remove the air bubbles and surplus water working from the center toward the edges. Allow to air dry.

CAUTION: Do not apply isopropyl alcohol or solvent directly on decals. Use only in a well ventilated area.

WINDSHIELD INSTALLATION

Remove protective film.

Position the windshield on the hood then push it down until the tabs are fully inserted into the hood slots. Lock the windshield tabs in position.

GUARD

Disassembly and Assembly

NOTE: For additional information (ex.: exploded view) refer to the correspondent Parts Catalog.

⚠ WARNING

Engine should be running only with guard well secured in place.

Inspection

Check guard mounting bosses, clips and retainers for wear.

WIRING HARNESS

⚠ WARNING

Ensure all terminals are properly crimped on the wires and that all connector housings are properly fastened. Keep wires away from any rotating, moving, heating and vibrating parts. Use proper fastening devices as required.

CABLES

⚠ WARNING

Before installation, ensure that all cables are in perfect condition. Properly install the cable ends and secure them in place. Pay attention to route them properly, away from any rotating, moving, heating or vibrating parts.

PIPING

⚠ WARNING

Always ensure that the fuel, vent, primer, impulse, injection oil and rotary valve oil lines are properly fixed to their connectors, that they are not perforated or kinked and that they are properly routed away from any rotating, moving, heating or vibrating parts. Also check for leaks. Replace if required.

NOTE: Refer to proper *Parts Catalog* to find suitable clip part numbers.

PLASTIC MAINTENANCE AND REPAIR

MAINTENANCE

Clean the vehicle thoroughly, removing all dirt and grease accumulation.

To clean use a soft clean cloth and either soapy water or isopropyl alcohol.

To remove grease, oil or glue use isopropyl alcohol.

CAUTION: Do not apply isopropyl alcohol or acetone directly on decals.

CAUTION: The following products must not be used to clean or wax any of the plastic components used on the vehicles:

- gasoline
- brake fluid
- kerosene
- diesel fuel
- lighter fluid
- varsol
- naphtha
- acetone
- strong detergents
- abrasive cleaners
- waxes containing an abrasive or a cleaning agent in their formula.

Apply wax on glossy finish only. Protect the vehicle with a cover to prevent dust accumulation during storage.

CAUTION: If for some reason the snowmobile has to be stored outside it is preferable to cover it with an opaque tarpaulin. This will prevent the sun rays from affecting the plastic components and the vehicle finish.

REPAIR

⚠ WARNING

Polycarbonate windshields must never be repaired by welding or otherwise.

FRAME

FRAME CLEANING

NOTE: For bare aluminum frames use only aluminum cleaner and follow instructions on container. (Dursol cleaner or equivalent).

Clean frame and tunnel with appropriate cleaners and rinse with high pressure hose.

Touch up all metal spots where paint has been scratched off. Spray all bare metal parts of vehicle with metal protector.

Seat Cleaning

For all models, it is recommend to clean the seat with a solution of **warm soapy water**, using a soft clean cloth.

CAUTION: Avoid use of harsh detergents such as strong soaps, degreasing solvents, abrasive cleaners, paint thinners, etc. that may cause damage to the seat cover.

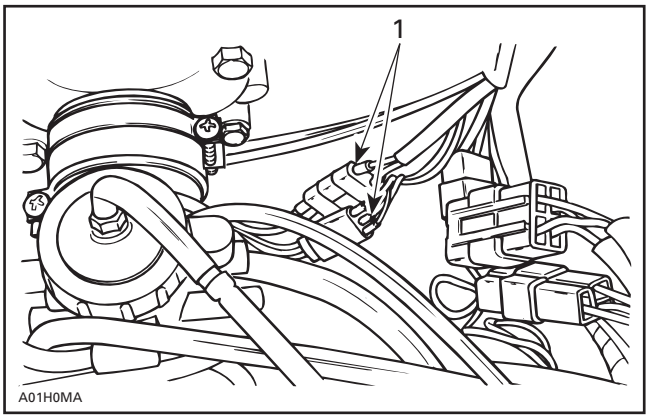
FRAME WELDING

Aluminum Frame
(refer to specialized welding shop)

– Use tungsten inert gas welding (TIG).

– Rod: ER-4043 (3/32 in).

CAUTION: Before performing electrical welding anywhere on the vehicle, unplug MPEM. On models equipped with a battery, also unplug the negative cable. This will protect the electronic box and battery against damage caused by flowing current when welding.



TYPICAL

1. Unplug before electrical welding

CAUTION: If welding is to be done near plastic material, it is recommended to either remove the part from the area or to protect it with aluminum foil to prevent damage.

FRAME COMPONENT REPLACEMENT

Drilling Procedure

When drilling self-piercing rivets, use Supertanium™ drill bit (P/N 529 031 800), available in a 5 mm (3/16 in) size and shipped in packs of 2.

For proper drilling instructions and to prevent premature wear, follow the procedure below.

Always use a variable speed electric drill.

Partially drill rivet end — not the rivet head.

Maintain a slow to medium speed at all times when drilling. The proper speed is attained when a constant chip is ejected.

NOTE: To increase bit life, use Bombardier synthetic chaincase oil (P/N 413 803 300) as a cutting oil.

CAUTION: High speed drilling will cause excessive heat which may destroy the cutting edge of the bit, therefore avoid using pneumatic drills.

Cut rivet using a chisel.

Remove part riveted.

Drive out remaining rivet head using a punch.

TECHNICAL DATA

SI* METRIC INFORMATION GUIDE

BASE UNITS

DESCRIPTION	UNIT	SYMBOL
length	meter	m
mass	kilogram	kg
force	newton	N
liquid	liter	L
temperature	Celsius	°C
pressure	kilopascal	kPa
torque	newton•meter	N•m
speed	kilometer per hour	km/h

PREFIXES

PREFIX	SYMBOL	MEANING	VALUE
kilo	k	one thousand	1 000
centi	c	one hundredth	0.01
milli	m	one thousandth	0.001
micro	µ	one millionth	0.000001

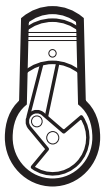
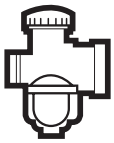
CONVERSION FACTORS

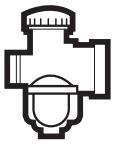
TO CONVERT	TO †	MULTIPLY BY
in	mm	25.4
in	cm	2.54
in^2	cm^2	6.45
in^3	cm^3	16.39
ft	m	0.3
oz	g	28.35
lb	kg	0.45
lbf	N	4.4
lbf•**in**	N•m	0.11
lbf•ft	N•m	1.36
lbf•ft	lbf•**in**	12
PSI (lbf/in^2)	kPa	6.89
imp. oz	U.S. oz	0.96
imp. oz	mL	28.41
imp. gal	U.S. gal	1.2
imp. gal	L	4.55
U.S. oz	mL	29.57
U.S. gal	L	3.79
MPH	km/h	1.61
Fahrenheit	Celsius	(°F - 32) ÷ 1.8
Celsius	Fahrenheit	(°C × 1.8) + 32

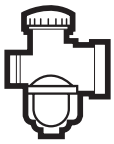
* The international system of units abbreviates SI in all languages.

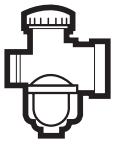
† To obtain the inverse sequence, divide by the given factor. To convert **mm** to **in**, divide by 25.4.

NOTE: Conversion factors are rounded off to 2 decimals for easier use.

	VEHICLE MODEL			MX Z 500 STD/TRAIL FORMULA DLX 500 GRAND TOURING 500	MX Z 600 STD/TRAIL/ ADRENALINE/X	FORMULA DLX 600 STD/GSE GRAND TOURING 600
	ENGINE TYPE			**493**	**593**	**593**
	Number of Cylinders			2	2	2
	Bore		mm (in)	69.50 (2.736)	76.00 (2.992)	76.00 (2.992)
	Stroke		mm (in)	65.80 (2.591)	65.80 (2.591)	65.80 (2.591)
	Displacement		cm^3 (in^3)	499.25 (30.47)	597.00 (36.43)	597.00 (36.43)
	Compression Ratio (corrected)			6.65	6.7	6.7
	Maximum Power Engine Speed ①		± 100 RPM	8000	8000	8000
	Piston Ring Type		$1^{st}/2^{nd}$	ST/N.A.	ST/N.A.	ST/N.A.
	Ring End Gap	New Wear Limit	mm (in) mm (in)	0.4 (.016) 1.0 (.039)	0.4 (.016) 1.0 (.039)	0.4 (.016) 1.0 (.039)
	Ring/Piston Groove Clearance	New Wear Limit	mm (in) mm (in)	0.04 (.0016) 0.2 (.0079)	0.04 (.0016) 0.2 (.0079)	0.04 (.0016) 0.2 (.0079)
	Piston/Cylinder Wall Clearance	New Wear Limit	± 0.016 mm (± .0006 in) mm (in)	0.10 (.0039) 0.20 (.0079)	0.120 (.0047) 0.20 (.0079)	0.120 (.0047) 0.20 (.0079)
	Connecting Rod Big End Axial Play	New Wear Limit	mm (in) mm (in)	0.39 (.0154) 1.2 (.0472)	0.39 (.0154) 1.2 (.0472)	0.39 (.0154) 1.2 (.0472)
	Maximum Crankshaft End-play ②		mm (in)	0.3 (.012)	0.3 (.012)	0.3 (.012)
	Maximum Crankshaft Deflection at PTO		mm (in)	0.06 (.0024)	0.06 (.0024)	0.06 (.0024)
	Magneto Generator Output		W	290	290	290
	Ignition Type			CDI	CDI	CDI
	Spark Plug Make and Type			NGK BR9ES	NGK BR9ES	NGK BR9ES
	Spark Plug Gap		± 0.05 mm (± .002 in)	0.45 (.018)	0.45 (.018)	0.45 (.018)
	Ignition Timing BTDC ③		mm (in)	3.00 (.118)	3.00 (.118)	3.00 (.118)
	Trigger Coil ④		Ω	190 – 300	190 – 300	190 – 300
	Generating Coil ④	Low Speed	Ω	11.6 – 21.6	11.6 – 21.6	11.6 – 21.6
		High Speed	Ω	N.A.	N.A.	N.A.
	Lighting Coil ④		Ω	0.1 – 0.4	0.1 – 0.4	0.1 – 0.4
	High Tension Coil ④	Primary	Ω	0.0 – 0.9	0.0 – 0.9	0.0 – 0.9
		Secondary	kΩ	9.5 – 16.5	9.5 – 16.5	9.5 – 16.5
	Carburetor Type		PTO/MAG	VM 38 429/429	TM 40-B91	TM 40-B112
	Main Jet		PTO/MAG	280/280	500/500	500/500
	Needle Jet			480-P-8	P-0 ⑤	P-0 ⑤
	Pilot Jet			40	20	20
	Needle Identification — Clip Position			6DEY10-4	9HFY2/53 ⑥	9HFY2/53 ⑥
	Slide Cut-Away			2.5	2.0	2.0
	Float Adjustment		± 1 mm (± .040 in)	22.9 (.902)	N.A.	N.A.
	Air or Pilot Screw Adjustment		± 1/16 Turn	1-1/4	1	1
	Idle Speed		± 200 RPM	1700	1600	1600
	Gas Type/Pump Octane Number			Unleaded/87	Unleaded/87	Unleaded/87
	Gas/Oil Ratio			Injection	Injection	Injection
	Type			Liquid	Liquid	Liquid
	Axial Fan Belt Adjustment	Deflection	mm (in)	N.A.	N.A.	N.A.
		Force	kg (lbf)	N.A.	N.A.	N.A.
	Thermostat Opening Temperature		°C (°F)	42 (108)	42 (108)	42 (108)
	Radiator Cap Opening Pressure		kPa (PSI)	90 (13)	90 (13)	90 (13)
	ENGINE COLD N•m (lbf•ft)	Drive Pulley Retaining Screw		⑦	⑦	⑦
		Exhaust Manifold Nuts or Bolts		23 (17)	23 (17)	23 (17)
		Magneto Ring Nut		125 (92)	125 (92)	125 (92)
		Crankcase Nuts or Screws	M6 M8	9 (7) 29 (21)	9 (7) 29 (21)	9 (7) 29 (21)
		Crankcase/Engine Support Nuts or Screws		35 (26)	35 (26)	35 (26)
		Cylinder Head Screws		29 (21)	29 (21)	29 (21)
		Crankcase/Cylinder Nuts or Screws		29 (21)	29 (21)	29 (21)
		Axial Fan Shaft Nut		N.A.	N.A.	N.A.

	VEHICLE MODEL			SUMMIT 600	MX Z 700 STD/TRAIL/ ADRENALINE/X
	ENGINE TYPE			593	693
	Number of Cylinders			2	2
	Bore		mm (in)	76.00 (2.992)	78.00 (3.071)
	Stroke		mm (in)	65.80 (2.591)	73.00 (2.874)
	Displacement		cm^3 (in^3)	597.00 (36.43)	697.64 (42.57)
	Compression Ratio (corrected)			6.7	6.7
	Maximum Power Engine Speed ①		± 100 RPM	8000	8000
	Piston Ring Type		$1^{st}/2^{nd}$	ST/N.A.	ST/N.A.
	Ring End Gap	New Wear Limit	mm (in) mm (in)	0.4 (.016) 1.0 (.039)	0.4 (.016) 1.0 (.039)
	Ring/Piston Groove Clearance	New Wear Limit	mm (in) mm (in)	0.04 (.0016) 0.2 (.0079)	0.04 (.0016) 0.2 (.0079)
	Piston/Cylinder Wall Clearance	New Wear Limit	± 0.016 mm (± .0006 in) mm (in)	0.120 (.0047) 0.20 (.0079)	0.118 (.0046) 0.20 (.0079)
	Connecting Rod Big End Axial Play	New Wear Limit	mm (in) mm (in)	0.39 (.0154) 1.2 (.0472)	0.39 (.0154) 1.2 (.0472)
	Maximum Crankshaft End-play ②		mm (in)	0.3 (.012)	0.3 (.012)
	Maximum Crankshaft Deflection at PTO		mm (in)	0.06 (.0024)	0.06 (.0024)
	Magneto Generator Output		W	290	290
	Ignition Type			CDI	CDI
	Spark Plug Make and Type			NGK BR9ES	NGK BR9ES
	Spark Plug Gap		± 0.05 mm (± .002 in)	0.45 (.018)	0.45 (.018)
	Ignition Timing BTDC ③		mm (in)	3.00 (.118)	3.36 (.132)
	Trigger Coil ④		Ω	190 – 300	190 – 300
	Generating Coil ④	Low Speed	Ω	11.6 – 21.6	11.6 – 21.6
		High Speed	Ω	N.A.	N.A.
	Lighting Coil ④		Ω	0.1 – 0.4	0.1 – 0.4
	High Tension Coil ④	Primary	Ω	0.0 – 0.9	0.0 – 0.9
		Secondary	kΩ	9.5 – 16.5	9.5 – 16.5
	Carburetor Type		PTO/MAG	TM 40-B94	TM 40-B97
	Main Jet		PTO/MAG	500/500	520/520
	Needle Jet			P-0 ⑤	P-0 ⑤
	Pilot Jet			20	17.5
	Needle Identification — Clip Position			9HFY2/53 ⑥	9ZLY3/58 ⑥
	Slide Cut-Away			2.0	2.0
	Float Adjustment		± 1 mm (± .040 in)	N.A.	N.A.
	Air or Pilot Screw Adjustment		± 1/16 Turn	1	1-1/2
	Idle Speed		± 200 RPM	1500	1500
	Gas Type/Pump Octane Number			Unleaded/87	Unleaded/87
	Gas/Oil Ratio			Injection	Injection
	Type			Liquid	Liquid
	Axial Fan Belt Adjustment	Deflection	mm (in)	N.A.	N.A.
		Force	kg (lbf)	N.A.	N.A.
	Thermostat Opening Temperature		°C (°F)	42 (108)	42 (108)
	Radiator Cap Opening Pressure		kPa (PSI)	90 (13)	90 (13)
	ENGINE COLD N•m (lbf•ft)	Drive Pulley Retaining Screw		⑦	⑦
		Exhaust Manifold Nuts or Bolts		23 (17)	23 (17)
		Magneto Ring Nut		125 (92)	125 (92)
		Crankcase Nuts or Screws	M6 M8	9 (7) 29 (21)	9 (7) 29 (21)
		Crankcase/Engine Support Nuts or Screws		35 (26)	35 (26)
		Cylinder Head Screws		29 (21)	29 (21)
		Crankcase/Cylinder Nuts or Screws		29 (21)	29 (21)
		Axial Fan Shaft Nut		N.A.	N.A.

	VEHICLE MODEL			FORMULA DLX 700 GS/GSE GRAND TOURING 700	SUMMIT 700 STD/X/H.M./H.M. X
	ENGINE TYPE			**693**	**693**
	Number of Cylinders			2	2
	Bore		mm (in)	78.00 (3.071)	78.00 (3.071)
	Stroke		mm (in)	73.00 (2.874)	73.00 (2.874)
	Displacement		cm^3 (in^3)	697.64 (42.57)	697.64 (42.57)
	Compression Ratio (corrected)			6.7	6.7
	Maximum Power Engine Speed ①		± 100 RPM	8000	8000
	Piston Ring Type		1st/2nd	ST/N.A.	ST/N.A.
	Ring End Gap	New Wear Limit	mm (in) mm (in)	0.4 (.016) 1.0 (.039)	0.4 (.016) 1.0 (.039)
	Ring/Piston Groove Clearance	New Wear Limit	mm (in) mm (in)	0.04 (.0016) 0.2 (.0079)	0.04 (.0016) 0.2 (.0079)
	Piston/Cylinder Wall Clearance	New Wear Limit	± 0.016 mm (± .0006 in) mm (in)	0.118 (.0046) 0.20 (.0079)	0.118 (.0046) 0.20 (.0079)
	Connecting Rod Big End Axial Play	New Wear Limit	mm (in) mm (in)	0.39 (.0154) 1.2 (.0472)	0.39 (.0154) 1.2 (.0472)
	Maximum Crankshaft End-play ②		mm (in)	0.3 (.012)	0.3 (.012)
	Maximum Crankshaft Deflection at PTO		mm (in)	0.06 (.0024)	0.06 (.0024)
	Magneto Generator Output		W	290	290
	Ignition Type			CDI	CDI
	Spark Plug Make and Type			NGK BR9ES	NGK BR9ES
	Spark Plug Gap		± 0.05 mm (± .002 in)	0.45 (.018)	0.45 (.018)
	Ignition Timing BTDC ③		mm (in)	3.36 (.132)	3.36 (.132)
	Trigger Coil ④		Ω	190 – 300	190 – 300
	Generating Coil ④	Low Speed	Ω	11.6 – 21.6	11.6 – 21.6
		High Speed	Ω	N.A.	N.A.
	Lighting Coil ④		Ω	0.1 – 0.4	0.1 – 0.4
	High Tension Coil ④	Primary	Ω	0.0 – 0.9	0.0 – 0.9
		Secondary	kΩ	9.5 – 16.5	9.5 –16.5
	Carburetor Type		PTO/MAG	TM 40-B115	TM 40-B100
	Main Jet		PTO/MAG	520/520	520/520
	Needle Jet			P-0 ⑤	P-0 ⑤
	Pilot Jet			17.5	17.5
	Needle Identification — Clip Position			9ZLY3/58 ⑥	9ZLY3/58 ⑥
	Slide Cut-Away			2.0	2.0
	Float Adjustment		± 1 mm (± .040 in)	N.A.	N.A.
	Air or Pilot Screw Adjustment		± 1/16 Turn	1-1/2	1-1/2
	Idle Speed		± 200 RPM	1500	1500
	Gas Type/Pump Octane Number			Unleaded/87	Unleaded/87
	Gas/Oil Ratio			Injection	Injection
	Type			Liquid	Liquid
	Axial Fan Belt Adjustment	Deflection	mm (in)	N.A.	N.A.
		Force	kg (lbf)	N.A.	N.A.
	Thermostat Opening Temperature		°C (°F)	42 (108)	42 (108)
	Radiator Cap Opening Pressure		kPa (PSI)	90 (13)	90 (13)
	ENGINE COLD N•m (lbf•ft)	Drive Pulley Retaining Screw		⑦	⑦
		Exhaust Manifold Nuts or Bolts		23 (17)	23 (17)
		Magneto Ring Nut		125 (92)	125 (92)
		Crankcase Nuts or Screws	M6 M8	9 (7) 29 (21)	9 (7) 29 (21)
		Crankcase/Engine Support Nuts or Screws		35 (26)	35 (26)
		Cylinder Head Screws		29 (21)	29 (21)
		Crankcase/Cylinder Nuts or Screws		29 (21)	29 (21)
		Axial Fan Shaft Nut		N.A.	N.A.

	VEHICLE MODEL			MX Z 800 STD/X/ADRENALINE	SUMMIT 800 STD/X/H.M./H.M. X
	ENGINE TYPE			**793**	**793**
	Number of Cylinders			2	2
	Bore		mm (in)	82.00 (3.228)	82.00 (3.228)
	Stroke		mm (in)	75.7 (2.980)	75.7 (2.980)
	Displacement		cm^3 (in^3)	799.50 (48.79)	799.50 (48.79)
	Compression Ratio (corrected)			6.52	6.52
	Maximum Power Engine Speed ①		± 100 RPM	7850	7850
	Piston Ring Type		$1^{st}/2^{nd}$	ST/N.A.	ST/N.A.
	Ring End Gap	New Wear Limit	mm (in) mm (in)	0.4 (.016) 1.0 (.039)	0.4 (.016) 1.0 (.039)
	Ring/Piston Groove Clearance	New Wear Limit	mm (in) mm (in)	0.04 (.0016) 0.2 (.0079)	0.04 (.0016) 0.2 (.0079)
	Piston/Cylinder Wall Clearance	New Wear Limit	± 0.013 mm (± .0005 in) mm (in)	0.145 (.0057) 0.20 (.0079)	0.145 (.0057) 0.20 (.0079)
	Connecting Rod Big End Axial Play	New Wear Limit	mm (in) mm (in)	0.39 (.0154) 1.2 (.0472)	0.39 (.0154) 1.2 (.0472)
	Maximum Crankshaft End-play ②		mm (in)	0.3 (.012)	0.3 (.012)
	Maximum Crankshaft Deflection at PTO		mm (in)	0.06 (.0024)	0.06 (.0024)
	Magneto Generator Output		W	290	290
	Ignition Type			CDI	CDI
	Spark Plug Make and Type			NGK BR9ES	NGK BR9ES
	Spark Plug Gap		± 0.05 mm (± .002 in)	0.45 (.018)	0.45 (.018)
	Ignition Timing BTDC ③		mm (in)	3.51 (.138)	3.51 (.138)
	Trigger Coil ④		Ω	190 – 300	190 – 300
	Generating Coil ④	Low Speed	Ω	11.6 – 21.6	11.6 – 21.6
		High Speed	Ω	N.A.	N.A.
	Lighting Coil ④		Ω	0.1 – 0.4	0.1 – 0.4
	High Tension Coil ④	Primary	Ω	0.0 – 0.9	0.0 – 0.9
		Secondary	kΩ	9.5 – 16.5	9.5 – 16.5
	Carburetor Type		PTO/MAG	TM 40-B103	TM 40-B106
	Main Jet		PTO/MAG	500/500	500/500
	Needle Jet			P-0 ⑤	P-0 ⑤
	Pilot Jet			17.5	17.5
	Needle Identification — Clip Position			9ZLY2/58 ⑥	9ZLY2/58 ⑥
	Slide Cut-Away			2.0	2.0
	Float Adjustment		± 1 mm (± .040 in)	N.A.	N.A.
	Air or Pilot Screw Adjustment		± 1/16 Turn	1-1/2	1-1/2
	Idle Speed		± 200 RPM	1500	1500
	Gas Type/Pump Octane Number			Unleaded/87	Unleaded/87
	Gas/Oil Ratio			Injection	Injection
	Type			Liquid	Liquid
	Axial Fan Belt Adjustment	Deflection	mm (in)	N.A.	N.A.
		Force	kg (lbf)	N.A.	N.A.
	Thermostat Opening Temperature		°C (°F)	42 (108)	42 (108)
	Radiator Cap Opening Pressure		kPa (PSI)	90 (13)	90 (13)
	ENGINE COLD N•m (lbf•ft)	Drive Pulley Retaining Screw		⑦	⑦
		Exhaust Manifold Nuts or Bolts		23 (17)	23 (17)
		Magneto Ring Nut		125 (92)	125 (92)
		Crankcase Nuts or Screws	M6 M8	9 (7) 29 (21)	9 (7) 29 (21)
		Crankcase/Engine Support Nuts or Screws		35 (26)	35 (26)
		Cylinder Head Screws		29 (21)	29 (21)
		Crankcase/Cylinder Nuts or Screws		29 (21)	29 (21)
		Axial Fan Shaft Nut		N.A.	N.A.

	VEHICLE MODEL				MX Z 500 STD	MX Z 500 TRAIL	FORMULA DLX 500 STD
	ENGINE TYPE				**493**	**493**	**493**
	Chain Drive Ratio				22/43	22/43	22/44
	Chain	Pitch		in	3/8	3/8	3/8
		Type/Links Qty/Plates Qty			Silent 74/11	Silent 74/11	Silent 74/11
	Drive Pulley	Type of Drive Pulley			TRA	TRA	TRA
		Ramp Identification and Roller Pin Type			281 ⑤	281 ⑤	281 ⑤
		Calibration Screw Position or Calibration Disc Quantity			3	3	3
		Spring Color			Green/Blue	Green/Blue	Green/Blue
		Spring Length		± 1.5 mm (± .060 in)	147.4 (5.80)	147.4 (5.80)	147.4 (5.80)
		Clutch Engagement		± 200 RPM	4100	4100	4100
	Driven Pulley	Type			Formula	Formula	Formula
		Spring Preload		± 0.7 kg (± 1.5 lb)	7.0 (15.4)	7.0 (15.4)	7.0 (15.4)
		Cam Angle		Degree	44	44	44
	Pulley Distance	Z		± 0.5 mm (± .020 in)	16.5 (.650)	16.5 (.650)	16.5 (.650)
	Offset	X		± 0.5 mm (± .020 in)	35.5 (1.398)	35.5 (1.398)	35.5 (1.398)
		Y – X	MIN. – MAX.	mm (in)	1.0 – 2.0 (.040 – .080)	1.0 – 2.0 (.040 – .080)	1.0 – 2.0 (.040 – .080)
	Drive Belt Part Number (P/N)				414 860 700	414 860 700	414 860 700
	Drive Belt Width (new) ①			mm (in)	35.3 (1.390)	35.3 (1.390)	35.3 (1.390)
	Drive Belt Adjustment		Deflection	± 5 mm (± .197 in)	32 (1.260)	32 (1.260)	32 (1.260)
			Force ②	kg (lbf)	11.3 (25)	11.3 (25)	11.3 (25)
	Track	Width		cm (in)	38.1 (15.0)	38.1 (15.0)	38.1 (15.0)
		Length		cm (in)	307.4 (121)	307.4 (121)	307.4 (121)
		Profile Height		mm (in)	22.3 (.880)	22.3 (.880)	22.3 (.880)
		Adjustment	Deflection	mm (in)	30 – 35 (1-3/16 – 1-3/8)	30 – 35 (1-3/16 – 1-3/8)	30 – 35 (1-3/16 – 1-3/8)
			Force ③	kg (lbf)	7.3 (16)	7.3 (16)	7.3 (16)
	Suspension Type		Track		SC-10 II	SC-10 II	SC-10 II
			Ski		ADSA	ADSA	ADSA
	Length			cm (in)	272.5 (107.3)	272.5 (107.3)	272.5 (107.3)
	Width			cm (in)	121.3 (47.7)	121.3 (47.7)	121.3 (47.7)
	Height			cm (in)	113.0 (44.5)	113.0 (44.5)	113.0 (44.5)
	Ski Stance			cm (in)	108 (42.5)	108 (42.5)	108 (42.5)
	Toe-out and Camber			mm (in) degree	8 (5/16) - 2	3 (1/8) - 1	3 (1/8) N.A.
	Mass (dry)			kg (lb)	213 (468)	213 (468)	225 (496)
	Ground Contact Area			cm^2 (in^2)	6670.9 (1034)	6670.9 (1034)	6670.9 (1034)
	Ground Contact Pressure			kPa (PSI)	3.13 (.454)	3.13 (.454)	3.31 (.480)
	Frame Material				Aluminum	Aluminum	Aluminum
	Bottom Pan Material				Impact Copolymer	Impact Copolymer	Impact Copolymer
	Hood Material				RRIM Polyurethane	RRIM Polyurethane	RRIM Polyurethane
	Battery			V/A•h	N.A.	N.A.	12/13
	Headlight			W	H4 60/55	H4 60/55	H4 60/55
	Taillight and Stoplight			W	8/27	8/27	8/27
	Tachometer and Speedometer Bulbs			W	3	3	3
	Fuel and Temperature Gauge Bulbs			W	N.A.	N.A.	3
	Fuse	Starter Solenoid		A	N.A.	N.A.	30
		Fuel Level Sensor		A	N.A.	N.A.	0.25
	Fuel Tank			L (U.S. gal)	37.3 (9.9)	37.3 (9.9)	37.3 (9.9)
	Chaincase/Gearbox			mL (U.S. oz)	250 (8.5)	250 (8.5)	250 (8.5)
	Cooling System ④			L (U.S. oz)	3.8 (128.5)	3.8 (128.5)	3.8 (128.5)
	Injection Oil Reservoir			L (U.S. oz)	3.5 (118.4)	3.5 (118.4)	3.5 (118.4)

	VEHICLE MODEL				GRAND TOURING 500	MX Z 600 STD/ ADRENALINE	MX Z 600 TRAIL
	ENGINE TYPE				493	593	593
	Chain Drive Ratio				22/44	24/43	24/43
	Chain	Pitch		in	3/8	3/8	3/8
		Type/Links Qty/Plates Qty			Silent 74/11	Silent 74/13	Silent 74/13
	Drive Pulley	Type of Drive Pulley			TRA	TRA	TRA
		Ramp Identification and Roller Pin Type			292X ⑤	293X ⑤	293X ⑤
		Calibration Screw Position or Calibration Disc Quantity			3	4	4
		Spring Color			Blue/Yellow	Green/White	Green/White
		Spring Length		± 1.5 mm (± .060 in)	115.1 (4.53)	110.7 (4.35)	110.7 (4.35)
		Clutch Engagement		± 200 RPM	3500	4100	4100
	Driven Pulley	Type			Formula	Formula	Formula
		Spring Preload		± 0.7 kg (± 1.5 lb)	7.0 (15.4)	7.0 (15.4)	7.0 (15.4)
		Cam Angle		Degree	44	47	47
	Pulley Distance	Z		± 0.5 mm (± .020 in)	16.5 (.650)	16.5 (.650)	16.5 (.650)
	Offset	X		± 0.5 mm (± .020 in)	35.5 (1.398)	35.5 (1.398)	35.5 (1.398)
		Y – X	MIN. – MAX.	mm (in)	1.0 – 2.0 (.040 – .080)	1.0 – 2.0 (.040 – .080)	1.0 – 2.0 (.040 – .080))
	Drive Belt Part Number (P/N)				414 860 700	414 860 700	414 860 700
	Drive Belt Width (new) ①			mm (in)	35.3 (1.390)	35.3 (1.390)	35.3 (1.390)
	Drive Belt Adjustment		Deflection	± 5 mm (± .197 in)	32 (1.260)	32 (1.260)	32 (1.260)
			Force ②	kg (lbf)	11.3 (25)	11.3 (25)	11.3 (25)
	Track	Width		cm (in)	38.1 (15.0)	38.1 (15.0)	38.1 (15.0)
		Length		cm (in)	345.5 (136)	307.4 (121)	307.4 (121)
		Profile Height		mm (in)	22.3 (.880)	22.3 (.880)	22.3 (.880)
		Adjustment	Deflection	mm (in)	30 – 35 (1-3/16 – 1-3/8)	30 – 35 (1-3/16 – 1-3/8)	30 – 35 (1-3/16 – 1-3/8)
			Force ③	kg (lbf)	7.3 (16)	7.3 (16)	7.3 (16)
	Suspension Type		Track		SC-10 II	SC-10 II	SC-10 II
			Ski		ADSA	ADSA	ADSA
	Length			cm (in)	297.8 (117.2)	272.5 (107.3)	272.5 (107.3)
	Width			cm (in)	121.3 (47.7)	121.3 (47.7)	121.3 (47.7)
	Height			cm (in)	123.2 (48.5)	113.0 (44.5)	113.0 (44.5)
	Ski Stance			cm (in)	108 (42.5)	108 (42.5)	108 (42.5)
	Toe-out and Camber			mm (in) degree	3 (1/8) N.A.	8 (5/16) - 2	3 (1/8) - 1
	Mass (dry)			kg (lb)	252 (554)	213 (469)	213 (469)
	Ground Contact Area			cm^2 (in^2)	7356.7 (1140)	6670.9 (1034)	6670.9 (1034)
	Ground Contact Pressure			kPa (PSI)	3.36 (.487)	3.13 (.469)	3.13 (.469)
	Frame Material				Aluminum	Aluminum	Aluminum
	Bottom Pan Material				Impact Copolymer	Impact Copolymer	Impact Copolymer
	Hood Material				RRIM Polyurethane	RRIM Polyurethane	RRIM Polyurethane
	Battery			V/A•h	12/13	N.A.	N.A.
	Headlight			W	H4 60/55	H4 60/55	H4 60/55
	Taillight and Stoplight			W	8/27	8/27	8/27
	Tachometer and Speedometer Bulbs			W	3	3	3
	Fuel and Temperature Gauge Bulbs			W	N.A.	N.A.	N.A.
	Fuse	Starter Solenoid		A	30	N.A.	N.A.
		Fuel Level Sensor		A	N.A.	N.A.	N.A.
	Fuel Tank			L (U.S. gal)	37.3 (9.9)	37.3 (9.9)	37.3 (9.9)
	Chaincase/Gearbox			mL (U.S. oz)	250 (8.5)	250 (8.5)	250 (8.5)
	Cooling System ④			L (U.S. oz)	4.0 (135.3)	3.8 (128.5)	3.8 (128.5)
	Injection Oil Reservoir			L (U.S. oz)	3.5 (118.4)	3.5 (118.4)	3.5 (118.4)

	VEHICLE MODEL				MX Z 600 X	GRAND TOURING 600	FORMULA DLX 600 STD/GSE
	ENGINE TYPE				**593**	**593**	**593**
	Chain Drive Ratio				24/43	23/44	24/44
	Chain	Pitch		in	3/8	3/8	3/8
		Type/Links Qty/Plates Qty			Silent 74/13	Silent 74/13	Silent 76/13
	Drive Pulley	Type of Drive Pulley			TRA	TRA	TRA
		Ramp Identification and Roller Pin Type			293X ⑤	281 ⑤	281 ⑤
		Calibration Screw Position or Calibration Disc Quantity			4	3	3
		Spring Color			Green/White	Blue/Yellow	Violet/Yellow
		Spring Length		± 1.5 mm (± .060 in)	110.7 (4.35)	115.1 (4.53)	157.9 (6.22)
		Clutch Engagement		± 200 RPM	4100	3600	3800
	Driven Pulley	Type			Formula	Formula	Formula
		Spring Preload		± 0.7 kg (± 1.5 lb)	7.0 (15.4)	7.0 (15.4)	7.0 (15.4)
		Cam Angle		Degree	47	47	50
	Pulley Distance	Z		± 0.5 mm (± .020 in)	16.5 (.650)	16.5 (.650)	16.5 (.650)
	Offset	X		± 0.5 mm (± .020 in)	35.5 (1.398)	35.5 (1.398)	35.5 (1.398)
		Y – X	MIN. – MAX.	mm (in)	1.0 – 2.0 (.040 – .080)	1.0 – 2.0 (.040 – .080)	1.0 – 2.0 (.040 – .080)
	Drive Belt Part Number (P/N)				414 860 700	414 860 700	414 860 700
	Drive Belt Width (new) ①			mm (in)	35.3 (1.390)	35.3 (1.390)	35.3 (1.390)
	Drive Belt Adjustment		Deflection	± 5 mm (± .197 in)	32 (1.260)	32 (1.260)	32 (1.260)
			Force ②	kg (lbf)	11.3 (25)	11.3 (25)	11.3 (25)
	Track	Width		cm (in)	38.1 (15.0)	38.1 (15.0)	38.1 (15.0)
		Length		cm (in)	307.4 (121)	345.5 (136)	307.4 (121)
		Profile Height		mm (in)	24.5 (1.0)	22.3 (.880)	22.3 (.880)
		Adjustment	Deflection	mm (in)	30 – 35 (1-3/16 – 1-3/8)	30 – 35 (1-3/16 – 1-3/8)	30 – 35 (1-3/16 – 1-3/8)
			Force ③	kg (lbf)	7.3 (16)	7.3 (16)	7.3 (16)
	Suspension Type		Track		SC-10 II	SC-10 II	SC-10 II
			Ski		ADSA	ADSA	ADSA
	Length			cm (in)	272.5 (107.3)	297.8 (117.2)	272.5 (107.3)
	Width			cm (in)	121.3 (47.7)	121.3 (47.7)	121.3 (47.7)
	Height			cm (in)	113.0 (44.5)	123.2 (48.5)	113.0 (44.5)
	Ski Stance			cm (in)	108 (42.5)	108 (42.5)	108 (42.5)
	Toe-out and Camber			mm (in) degree	4 (5/32) - 2	3 (1/8) N.A.	3 (1/8) N.A.
	Mass (dry)			kg (lb)	213 (469)	252 (555)	226 (497)
	Ground Contact Area			cm^2 (in^2)	6670.9 (1034)	7356.7 (1140)	6670.9 (1034)
	Ground Contact Pressure			kPa (PSI)	3.13 (.469)	3.36 (.487)	3.32 (.481)
	Frame Material				Aluminum	Aluminum	Aluminum
	Bottom Pan Material				Impact Copolymer	Impact Copolymer	Impact Copolymer
	Hood Material				RRIM Polyurethane	RRIM Polyurethane	RRIM Polyurethane
	Battery			V/A•h	N.A.	12/13	12/13
	Headlight			W	H4 60/55	H4 60/55	H4 60/55
	Taillight and Stoplight			W	8/27	8/27	8/27
	Tachometer and Speedometer Bulbs			W	3	3	3
	Fuel and Temperature Gauge Bulbs			W	N.A.	3	N.A.
	Fuse	Starter Solenoid		A	N.A.	30	30
		Fuel Level Sensor		A	N.A.	0.25	0.25
	Fuel Tank			L (U.S. gal)	37.3 (9.9)	37.3 (9.9)	37.3 (9.9)
	Chaincase/Gearbox			mL (U.S. oz)	250 (8.5)	250 (8.5)	250 (8.5)
	Cooling System ④			L (U.S. oz)	3.8 (128.5)	4.0 (135.3)	3.8 (128.5)
	Injection Oil Reservoir			L (U.S. oz)	3.5 (118.4)	3.5 (118.4)	3.5 (118.4)

	VEHICLE MODEL				SUMMIT 600	MX Z 700 STD/ ADRENALINE	MX Z 700 TRAIL
	ENGINE TYPE				593	693	693
	Chain Drive Ratio				19/43	25/43	25/43
	Chain	Pitch		in	3/8	3/8	3/8
		Type/Links Qty/Plates Qty			Silent 72/13	Silent 76/13	Silent 76/13
	Drive Pulley	Type of Drive Pulley			TRA	TRA	TRA
		Ramp Identification and Roller Pin Type			287 ⑥	300 ⑤	300 ⑤
		Calibration Screw Position or Calibration Disc Quantity			3	3	3
		Spring Color			Pink/White	Green/Violet	Green/Violet
		Spring Length		± 1.5 mm (± .060 in)	124.5 (4.90)	133.7 (5.26)	133.7 (5.26)
		Clutch Engagement		± 200 RPM	4500	3800	3800
	Driven Pulley	Type			Formula	Formula	Formula
		Spring Preload		± 0.7 kg (± 1.5 lb)	8.0 (17.6)	8.0 (17.6)	8.0 (17.6)
		Cam Angle		Degree	47	50	50
	Pulley Distance	Z		± 0.5 mm (± .020 in)	16.5 (.650)	16.5 (.650)	16.5 (.650)
	Offset	X		± 0.5 mm (± .020 in)	35.5 (1.398)	35.5 (1.398)	35.5 (1.398)
		Y – X	MIN. – MAX.	mm (in)	1.0 – 2.0 (.040 – .080)	1.0 – 2.0 (.040 – .080)	1.0 – 2.0 (.040 – .080)
	Drive Belt Part Number (P/N)				417 300 127	417 300 127	417 300 127
	Drive Belt Width (new) ①			mm (in)	36.35 (1.431)	36.35 (1.431)	36.35 (1.431)
	Drive Belt Adjustment		Deflection	± 5 mm (± .197 in)	32 (1.260)	32 (1.260)	32 (1.260)
			Force ②	kg (lbf)	11.3 (25)	11.3 (25)	11.3 (25)
	Track	Width		cm (in)	38.1 (15.0)	38.1 (15.0)	38.1 (15.0)
		Length		cm (in)	345.5 (136)	3307.4 (121)	307.4 (121)
		Profile Height		mm (in)	50.8 (2.0)	22.3 (.880)	22.3 (.880)
		Adjustment	Deflection	mm (in)	30 – 35 (1-3/16 – 1-3/8)	30 – 35 (1-3/16 – 1-3/8)	30 – 35 (1-3/16 – 1-3/8)
			Force ③	kg (lbf)	7.3 (16)	7.3 (16)	7.3 (16)
	Suspension Type		Track		SC-10 Mountain	SC-10 II	SC-10 II
			Ski		ADSA	ADSA	ADSA
	Length			cm (in)	293.9 (115.7)	272.5 (107.3)	272.5 (107.3)
	Width			cm (in)	107.3 (42.2)	121.3 (47.7)	121.3 (47.7)
	Height			cm (in)	113.0 (44.5)	113.0 (44.5)	113.0 (44.5)
	Ski Stance			cm (in)	94.0 (37.0)	108 (42.5)	108 (42.5)
	Toe-out and Camber			mm (in) degree	8 (5/16) N.A.	8 (5/16) - 2	3 (1/8) - 1
	Mass (dry)			kg (lb)	222 (489)	215 (472)	215 (472)
	Ground Contact Area			cm^2 (in^2)	7356.7 (1140)	6670.9 (1034)	6670.9 (1034)
	Ground Contact Pressure			kPa (PSI)	2.96 (.429)	3.16 (.458)	3.16 (.458)
	Frame Material				Aluminum	Aluminum	Aluminum
	Bottom Pan Material				Impact Copolymer	Impact Copolymer	Impact Copolymer
	Hood Material				RRIM Polyurethane	RRIM Polyurethane	RRIM Polyurethane
	Battery			V/A•h	N.A.	N.A.	N.A.
	Headlight			W	H4 60/55	H4 60/55	H4 60/55
	Taillight and Stoplight			W	8/27	8/27	8/27
	Tachometer and Speedometer Bulbs			W	3	3	3
	Fuel and Temperature Gauge Bulbs			W	N.A.	N.A.	N.A.
	Fuse	Starter Solenoid		A	N.A.	N.A.	N.A.
		Fuel Level Sensor		A	N.A.	N.A.	N.A.
	Fuel Tank			L (U.S. gal)	37.3 (9.9)	37.3 (9.9)	37.3 (9.9)
	Chaincase/Gearbox			mL (U.S. oz)	250 (8.5)	250 (8.5)	250 (8.5)
	Cooling System ④			L (U.S. oz)	4.0 (135.3)	3.8 (128.5)	3.8 (128.5)
	Injection Oil Reservoir			L (U.S. oz)	3.5 (118.4)	3.5 (118.4)	3.5 (118.4)

	VEHICLE MODEL				MX Z 700 X	GRAND TOURING 700 GS	FORMULA DLX 700 GS/GSE
	ENGINE TYPE				**693**	**693**	**693**
	Chain Drive Ratio				25/43	23/43	25/44
	Chain	Pitch		in	3/8	3/8	3/8
		Type/Links Qty/Plates Qty			Silent 76/13	Silent 74/13	Silent 76/13
	Drive Pulley	Type of Drive Pulley			TRA	TRA	TRA
		Ramp Identification and Roller Pin Type			300 ⑤	299 ⑤	299 ⑤
		Calibration Screw Position or Calibration Disc Quantity			3	3	3
		Spring Color			Green/Violet	Blue/Blue	Blue/Blue
		Spring Length		± 1.5 mm (± .060 in)	133.7 (5.26)	99.8 (3.93)	99.8 (3.93)
		Clutch Engagement		± 200 RPM	3800	3600	3600
	Driven Pulley	Type			Formula	Formula	Formula
		Spring Preload		± 0.7 kg (± 1.5 lb)	8.0 (17.6)	8.0 (17.6)	8.0 (17.6)
		Cam Angle		Degree	50	50	50
	Pulley Distance	Z		± 0.5 mm (± .020 in)	16.5 (.650)	16.5 (.650)	16.5 (.650)
	Offset	X		± 0.5 mm (± .020 in)	35.5 (1.398)	35.5 (1.398)	35.5 (1.398)
		Y – X	MIN. – MAX.	mm (in)	1.0 – 2.0 (.040 – .080)	1.0 – 2.0 (.040 – .080)	1.0 – 2.0 (.040 – .080))
	Drive Belt Part Number (P/N)				417 300 127	417 300 127	417 300 127
	Drive Belt Width (new) ①			mm (in)	36.35 (1.431)	36.35 (1.431)	36.35 (1.431)
	Drive Belt Adjustment		Deflection	± 5 mm (± .197 in)	32 (1.260)	32 (1.260)	32 (1.260)
			Force ②	kg (lbf)	11.3 (25)	11.3 (25)	11.3 (25)
	Track	Width		cm (in)	38.1 (15.0)	38.1 (15.0)	38.1 (15.0)
		Length		cm (in)	307.4 (121)	345.5 (136)	307.4 (121)
		Profile Height		mm (in)	22.3 (.880)	22.3 (.880)	22.3 (.880)
		Adjustment	Deflection	mm (in)	30 – 35 (1-3/16 – 1-3/8)	30 – 35 (1-3/16 – 1-3/8)	30 – 35 (1-3/16 – 1-3/8)
			Force ③	kg (lbf)	7.3 (16)	7.3 (16)	7.3 (16)
	Suspension Type		Track		SC-10 II	SC-10 II	SC-10 II
			Ski		ADSA	ADSA	ADSA
	Length			cm (in)	272.5 (107.3)	297.8 (117.2)	272.5 (107.3)
	Width			cm (in)	121.3 (47.7)	121.3 (47.7)	121.3 (47.7)
	Height			cm (in)	113.0 (44.5)	123.2 (48.5)	113.0 (44.5)
	Ski Stance			cm (in)	108 (42.5)	108 (42.5)	108 (42.5)
	Toe-out and Camber			mm (in) degree	4 (5/32) - 2	3 (1/8) N.A.	3 (1/8) N.A.
	Mass (dry)			kg (lb)	215 (472)	255 (560)	228 (502)
	Ground Contact Area			cm^2 (in^2)	6670.9 (1034)	7357 (1140)	6670.9 (1034)
	Ground Contact Pressure			kPa (PSI)	3.16 (.458)	3.40 (.493)	3.35 (.486)
	Frame Material				Aluminum	Aluminum	Aluminum
	Bottom Pan Material				Impact Copolymer	Impact Copolymer	Impact Copolymer
	Hood Material				RRIM Polyurethane	RRIM Polyurethane	RRIM Polyurethane
	Battery			V/A•h	N.A.	12/16	12/16
	Headlight			W	H4 60/55	H4 60/55	H4 60/55
	Taillight and Stoplight			W	8/27	8/27	8/27
	Tachometer and Speedometer Bulbs			W	3	3	3
	Fuel and Temperature Gauge Bulbs			W	N.A.	3	3
	Fuse	Starter Solenoid		A	N.A.	30	30
		Fuel Level Sensor		A	N.A.	0.25	0.25
	Fuel Tank			L (U.S. gal)	37.3 (9.9)	37.3 (9.9)	37.3 (9.9)
	Chaincase/Gearbox			mL (U.S. oz)	250 (8.5)	250 (8.5)	250 (8.5)
	Cooling System ④			L (U.S. oz)	3.8 (128.5)	4.0 (135.3)	3.8 (128.5)
	Injection Oil Reservoir			L (U.S. oz)	3.5 (118.4)	3.5 (118.4)	3.5 (118.4)

	VEHICLE MODEL				SUMMIT 700 STD/X (CAN./U.S.)	SUMMIT 700 STD (EUROPE)	SUMMIT 700 H.M.
	ENGINE TYPE				**693**	**693**	**693**
	Chain Drive Ratio				21/43	21/43	19/43
	Chain	Pitch		in	3/8	3/8	3/8
		Type/Links Qty/Plates Qty			Silent 74/13	Silent 74/13	Silent 72/13
	Drive Pulley	Type of Drive Pulley			TRA	TRA	TRA
		Ramp Identification and Roller Pin Type			299 ⑥	299 ⑤	299 ⑥
		Calibration Screw Position or Calibration Disc Quantity			4	3	4
		Spring Color			Violet/Yellow	Violet/Yellow	Violet/Yellow
		Spring Length		± 1.5 mm (± .060 in)	157.9 (6.22)	157.9 (6.22)	157.9 (6.22)
		Clutch Engagement		± 200 RPM	4100	3800	4100
	Driven Pulley	Type			Formula	Formula	Formula
		Spring Preload		± 0.7 kg (± 1.5 lb)	8.0 (17.6)	8.0 (17.6)	8.0 (17.6)
		Cam Angle		Degree	47	47	47
	Pulley Distance	Z		± 0.5 mm (± .020 in)	16.5 (.650)	16.5 (.650)	16.5 (.650)
	Offset	X		± 0.5 mm (± .020 in)	35.5 (1.398)	35.5 (1.398)	35.5 (1.398)
		Y – X	MIN. – MAX.	mm (in)	1.0 – 2.0 (.040 – .080))	1.0 – 2.0 (.040 – .080)	1.0 – 2.0 (.040 – .080)
	Drive Belt Part Number (P/N)				417 300 127	417 300 127	417 300 127
	Drive Belt Width (new) ①			mm (in)	36.35 (1.431)	36.35 (1.431)	36.35 (1.431)
	Drive Belt Adjustment		Deflection	± 5 mm (± .197 in)	32 (1.260)	32 (1.260)	32 (1.260)
			Force ②	kg (lbf)	11.3 (25)	11.3 (25)	11.3 (25)
	Track	Width		cm (in)	38.1 (15.0)	38.1 (15.0)	38.1 (15.0)
		Length		cm (in)	364.8 (144)	364.8 (144)	383.6 (151)
		Profile Height		mm (in)	50.8 (2.0)	50.8 (2.0)	50.8 (2.0)
		Adjustment	Deflection	mm (in)	30 – 35 (1-3/16 – 1-3/8)	30 – 35 (1-3/16 – 1-3/8)	30 – 35 (1-3/16 – 1-3/8)
			Force ③	kg (lbf)	7.3 (16)	7.3 (16)	7.3 (16)
	Suspension Type		Track		SC-10 Mountain	SC-10 Mountain	SC-10 Mountain
			Ski		ADSA	ADSA	ADSA
	Length			cm (in)	294.7 (116.0)	294.7 (116.0)	315.3 (124.1)
	Width			cm (in)	107.3 (42.2)	107.3 (42.2)	107.3 (42.2)
	Height			cm (in)	113.0 (44.5)	113.0 (44.5)	113.0 (44.5)
	Ski Stance			cm (in)	94.0 (37.0)	94.0 (37.0)	94.0 (37.0)
	Toe-out and Camber			mm (in) degree	3 (1/8) N.A.	3 (1/8) N.A.	8 (5/16) N.A.
	Mass (dry)			kg (lb)	224 (492)	224 (492)	226 (497)
	Ground Contact Area			cm^2 (in^2)	7356.7 (1140.3)	7356.7 (1140.3)	8271.1 (1282)
	Ground Contact Pressure			kPa (PSI)	2.99 (.434)	2.99 (.434)	2.68 (.389)
	Frame Material				Aluminum	Aluminum	Aluminum
	Bottom Pan Material				Impact Copolymer	Impact Copolymer	Impact Copolymer
	Hood Material				RRIM Polyurethane	RRIM Polyurethane	RRIM Polyurethane
	Battery			V/A•h	N.A.	N.A.	N.A.
	Headlight			W	H4 60/55	H4 60/55	H4 60/55
	Taillight and Stoplight			W	8/27	8/27	8/27
	Tachometer and Speedometer Bulbs			W	3	3	3
	Fuel and Temperature Gauge Bulbs			W	N.A.	N.A.	N.A.
	Fuse	Starter Solenoid		A	N.A.	N.A.	N.A.
		Fuel Level Sensor		A	N.A.	N.A.	N.A.
	Fuel Tank			L (U.S. gal)	37.3 (9.9)	37.3 (9.9)	37.3 (9.9)
	Chaincase/Gearbox			mL (U.S. oz)	250 (8.5)	250 (8.5)	250 (8.5)
	Cooling System ④			L (U.S. oz)	4.0 (135.3)	4.0 (135.3)	3.8 (128.5)
	Injection Oil Reservoir			L (U.S. oz)	3.5 (118.4)	3.5 (118.4)	3.5 (118.4)

	VEHICLE MODEL				MX Z 800 STD/ ADRENALINE	MX Z 800 X	SUMMIT 800 STD/X (CAN./U.S.)
	ENGINE TYPE				**793**	**793**	**793**
	Chain Drive Ratio				26/43	26/43	21/43
	Chain	Pitch		in	3/8	3/8	3/8
		Type/Links Qty/Plates Qty			Silent 76/13	Silent 76/13	Silent 74/13
	Drive Pulley	Type of Drive Pulley			TRA	TRA	TRA
		Ramp Identification and Roller Pin Type			300 ⑤	300 ⑤	300 ⑥
		Calibration Screw Position or Calibration Disc Quantity			3	3	3
		Spring Color			Violet/Yellow	Violet/Yellow	Violet/Yellow
		Spring Length		± 1.5 mm (± .060 in)	157.9 (6.22)	157.9 (6.22)	157.9 (6.22)
		Clutch Engagement		± 200 RPM	3800	3800	4100
	Driven Pulley	Type			Formula	Formula	Formula
		Spring Preload		± 0.7 kg (± 1.5 lb)	8.0 (17.6)	8.0 (17.6)	8.0 (17.6)
		Cam Angle		Degree	53/47	53/47	50/47
	Pulley Distance	Z		± 0.5 mm (± .020 in)	16.5 (.650)	16.5 (.650)	16.5 (.650)
	Offset	X		± 0.5 mm (± .020 in)	35.5 (1.398)	35.5 (1.398)	35.5 (1.398)
		Y – X	MIN. – MAX.	mm (in)	1.0 – 2.0 (.040 – .080)	1.0 – 2.0 (.040 – .080)	1.0 – 2.0 (.040 – .080)
	Drive Belt Part Number (P/N)				417 300 127	417 300 127	417 300 127
	Drive Belt Width (new) ①			mm (in)	36.35 (1.431)	36.35 (1.431)	36.35 (1.431)
	Drive Belt Adjustment		Deflection	± 5 mm (± .197 in)	32 (1.260)	32 (1.260)	32 (1.260)
			Force ②	kg (lbf)	11.3 (25)	11.3 (25)	11.3 (25)
	Track	Width		cm (in)	38.1 (15.0)	38.1 (15.0)	38.1 (15.0)
		Length		cm (in)	307.4 (121)	307.4 (121)	364.8 (144)
		Profile Height		mm (in)	25.4 (1.0)	25.4 (1.0)	50.8 (2.0)
		Adjustment	Deflection	mm (in)	30 – 35 (1-3/16 – 1-3/8)	30 – 35 (1-3/16 – 1-3/8)	30 – 35 (1-3/16 – 1-3/8)
			Force ③	kg (lbf)	7.3 (16)	7.3 (16)	7.3 (16)
	Suspension Type		Track		SC-10 II	SC-10 II	SC-10 Mountain
			Ski		ADSA	ADSA	ADSA
	Length			cm (in)	272.5 (107.3)	272.5 (107.3)	293.9 (115.7)
	Width			cm (in)	121.2 (47.7)	121.2 (47.7)	107.3 (42.2)
	Height			cm (in)	113.0 (44.5)	113.0 (44.5)	113.0 (44.5)
	Ski Stance			cm (in)	108 (42.5)	108 (42.5)	94.0 (37.0)
	Toe-out and Camber			mm (in) degree	8 (5/16) - 2	4 (5/32) - 2	8 (5/16) N.A.
	Mass (dry)			kg (lb)	215 (474)	215 (474)	225 (494)
	Ground Contact Area			cm^2 (in^2)	6671 (1034)	6671 (1034)	7356.7 (1140.3)
	Ground Contact Pressure			kPa (PSI)	3.16 (.458)	3.16 (.458)	3.00 (.435)
	Frame Material				Aluminum	Aluminum	Aluminum
	Bottom Pan Material				Impact Copolymer	Impact Copolymer	Impact Copolymer
	Hood Material				RRIM Polyurethane	RRIM Polyurethane	RRIM Polyurethane
	Battery			V/A•h	N.A.	N.A.	N.A.
	Headlight			W	H4 60/55	H4 60/55	H4 60/55
	Taillight and Stoplight			W	8/27	8/27	8/27
	Tachometer and Speedometer Bulbs			W	3	3	3
	Fuel and Temperature Gauge Bulbs			W	N.A.	N.A.	N.A.
	Fuse	Starter Solenoid		A	N.A.	N.A.	N.A.
		Fuel Level Sensor		A	N.A.	N.A.	N.A.
	Fuel Tank			L (U.S. gal)	37.3 (9.9)	37.3 (9.9)	37.3 (9.9)
	Chaincase/Gearbox			mL (U.S. oz)	250 (8.5)	250 (8.5)	250 (8.5)
	Cooling System ④			L (U.S. oz)	4.0 (135.3)	4.0 (135.3)	4.0 (135.3)
	Injection Oil Reservoir			L (U.S. oz)	3.5 (118.4)	3.5 (118.4)	3.5 (118.4)

	VEHICLE MODEL				SUMMIT 800 X (EUROPE)	SUMMIT 800 H.M./H.M. X (CAN./U.S.)	SUMMIT 800 H.M. X (EUROPE)
	ENGINE TYPE				793	793	793
	Chain Drive Ratio				21/43	19/43	19/43
	Chain	Pitch		in	3/8	3/8	3/8
		Type/Links Qty/Plates Qty			Silent 74/13	Silent 72/13	Silent 72/13
	Drive Pulley	Type of Drive Pulley			TRA	TRA	TRA
		Ramp Identification and Roller Pin Type			300 ⑤	300 ⑥	300 ⑤
		Calibration Screw Position or Calibration Disc Quantity			3	3	3
		Spring Color			Violet/Yellow	Violet/Yellow	Violet/Yellow
		Spring Length		± 1.5 mm (± .060 in)	157.9 (6.22)	157.9 (6.22)	157.9 (6.22)
		Clutch Engagement		± 200 RPM	3800	4100	3800
	Driven Pulley	Type			Formula	Formula	Formula
		Spring Preload		± 0.7 kg (± 1.5 lb)	8.0 (17.6)	8.0 (17.6)	8.0 (17.6)
		Cam Angle		Degree	50/47	50/47	50/47
	Pulley Distance	Z		± 0.5 mm (± .020 in)	16.5 (.650)	16.5 (.650)	16.5 (.650)
	Offset	X		± 0.5 mm (± .020 in)	35.5 (1.398)	35.5 (1.398)	35.5 (1.398)
		Y – X	MIN. – MAX.	mm (in)	1.0 – 2.0 (.040 – .080)	1.0 – 2.0 (.040 – .080)	1.0 – 2.0 (.040 – .080)
	Drive Belt Part Number (P/N)				417 300 127	417 300 127	417 300 127
	Drive Belt Width (new) ①			mm (in)	36.35 (1.431)	36.35 (1.431)	36.35 (1.431)
	Drive Belt Adjustment		Deflection	± 5 mm (± .197 in)	32 (1.260)	32 (1.260)	32 (1.260)
			Force ②	kg (lbf)	11.3 (25)	11.3 (25)	11.3 (25)
	Track	Width		cm (in)	38.1 (15.0)	38.1 (15.0)	38.1 (15.0)
		Length		cm (in)	364.8 (144)	383.6 (151)	383.6 (151)
		Profile Height		mm (in)	50.8 (2.0)	50.8 (2.0)	50.8 (2.0)
		Adjustment	Deflection	mm (in)	30 – 35 (1-3/16 – 1-3/8)	30 – 35 (1-3/16 – 1-3/8)	30 – 35 (1-3/16 – 1-3/8)
			Force ③	kg (lbf)	7.3 (16)	7.3 (16)	7.3 (16)
	Suspension Type		Track		SC-10 Mountain	SC-10 Mountain	SC-10 Mountain
			Ski		ADSA	ADSA	ADSA
	Length			cm (in)	293.9 (115.7)	315.3 (124.1)	315.3 (124.1)
	Width			cm (in)	107.3 (42.2)	107.3 (42.2)	107.3 (42.2)
	Height			cm (in)	113.0 (44.5)	113.0 (44.5)	113.0 (44.5)
	Ski Stance			cm (in)	94.0 (37.0)	94.0 (37.0)	94.0 (37.0)
	Toe-out and Camber			mm (in) degree	8 (5/16) N.A.	8 (5/16) N.A.	8 (5/16) N.A.
	Mass (dry)			kg (lb)	225 (494)	227 (499)	227 (499)
	Ground Contact Area			cm^2 (in^2)	7356.7 (1140.3)	8271.1 (1282)	8271.1 (1282)
	Ground Contact Pressure			kPa (PSI)	3.00 (.435)	2.69 (.390)	2.69 (.390)
	Frame Material				Aluminum	Aluminum	Aluminum
	Bottom Pan Material				Impact Copolymer	Impact Copolymer	Impact Copolymer
	Hood Material				RRIM Polyurethane	RRIM Polyurethane	RRIM Polyurethane
	Battery			V/A•h	N.A.	N.A.	N.A.
	Headlight			W	H4 60/55	H4 60/55	H4 60/55
	Taillight and Stoplight			W	8/27	8/27	8/27
	Tachometer and Speedometer Bulbs			W	3	3	3
	Fuel and Temperature Gauge Bulbs			W	N.A.	N.A.	N.A.
	Fuse	Starter Solenoid		A	N.A.	N.A.	N.A.
		Fuel Level Sensor		A	N.A.	N.A.	N.A.
	Fuel Tank			L (U.S. gal)	37.3 (9.9)	37.3 (9.9)	37.3 (9.9)
	Chaincase/Gearbox			mL (U.S. oz)	250 (8.5)	250 (8.5)	250 (8.5)
	Cooling System ④			L (U.S. oz)	4.0 (135.3)	3.8 (128.5)	3.8 (128.5)
	Injection Oil Reservoir			L (U.S. oz)	3.5 (118.4)	3.5 (118.4)	3.5 (118.4)

ENGINE LEGEND

BTDC: Before Top Dead Center

CDI: Capacitor Discharge Ignition

K: Kilo (x 1000)

ST: Semi-Trapezoidal

MAG: Magneto Side

N.A.: Not Applicable

PTO: Power Take Off Side

① The maximum horsepower RPM applicable on the vehicle. It may be different under certain circumstances and BOMBARDIER INC. reserves the right to modify it without obligation.

② Crankshaft end-play is not adjustable on these models. Specification is given for verification purposes only.

③ At 3500 RPM with headlamp turned on.

④ All resistance measurements must be performed with parts at room temperature (approx. 20°C (68°F)). Temperature greatly affects resistance measurements.

⑤ Press fit type, not replaceable.

⑥ Needle with one groove, not adjustable.

⑦ Drive pulley retaining screw: torque to 90 to 100 N•m (66 to 74 lbf•ft), install drive belt, accelerate the vehicle at low speed (maximum 30 km/h (20 MPH)) and apply the brake; repeat 5 times. Recheck the torque of 90 to 100 N•m (66 to 74 lbf•ft).

VEHICLE LEGEND

ADSA: Advanced Direct Shock Action

RRIM: Reinforced Reaction Injection Molding

TRA: Total Range Adjustable

N.A.: Not Applicable

① Minimum allowable width may not be less than 3.0 mm (1/8 in) of new drive belt.

② Force applied midway between pulleys to obtain specified tension deflection.

③ Force or downward pull applied to track to obtain specified tension deflection.

④ Coolant mixture: 60% antifreeze/40% water.

⑤ Lever with roller pin (P/N 417 004 308) (solid).

⑥ Lever with roller pin (P/N 417 004 309) (hollow).

WIRING DIAGRAMS

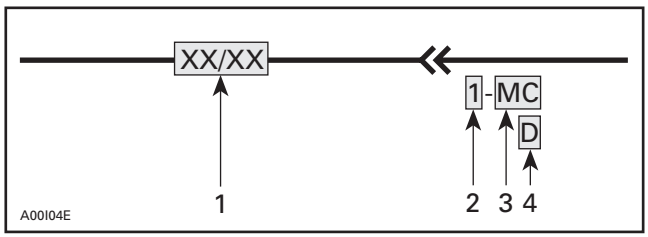
MODELS	WIRING DIAGRAM PAGE	HEADLIGHT (watt)	TAILLIGHT (watt)	ELECTRICAL SYSTEM OUTPUT (watt)
Grand Touring 500/600	Annex 1	60/55 hal.	8/27	290
Grand Touring 700	Annex 2	60/55 hal.	8/27	290
MX Z 500/600/700 STD/TRAIL	Annex 3	60/55 hal.	8/27	290
MX Z X/Adrenaline/600/700/800	Annex 4	60/55 hal.	8/27	290
Formula DLX STD/GS/GSE 600/700	Annex 5	60/55 hal.	8/27	290
Formula DLX STD 500/600	Annex 6	60/55 hal.	8/27	290
Summit 600/700/800	Annex 7	60/55 hal.	8/27	290

hal. = halogen

WIRING DIAGRAM LEGEND

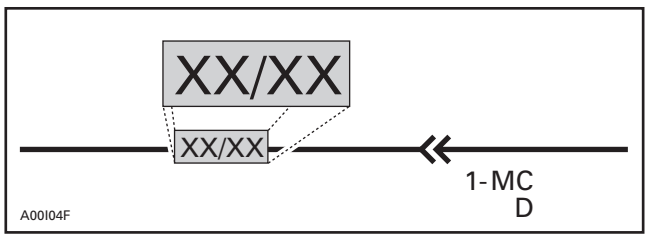
⚠ WARNING

Ensure all terminals are properly crimped on the wires and all connector housings are properly fastened.



1. Wire colors
2. Connector housing area
3. Housing code per area
4. Wire connector location in housing

WIRE COLORS

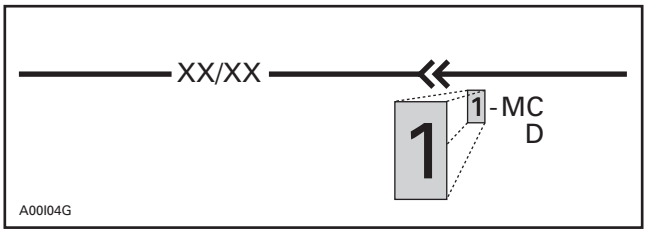


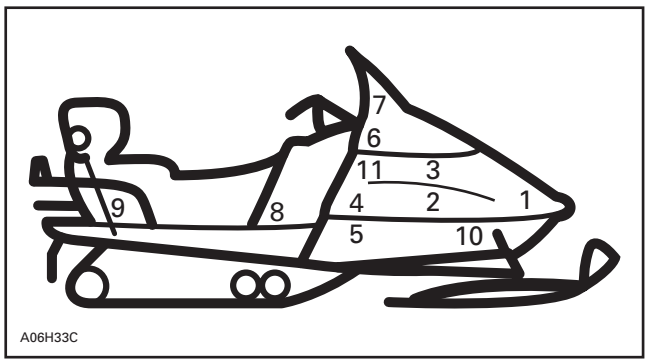
The first color of a wire is the main color, second color is the stripe.

Example: YL/BK is a YELLOW wire with a BLACK stripe.

COLOR CODE					
BE	–	BEIGE	OR	–	ORANGE
BK	–	BLACK	RD	–	RED
BU	–	BLUE	VI	–	VIOLET
BR	–	BROWN	WH	–	WHITE
GN	–	GREEN	YL	–	YELLOW
GY	–	GREY			

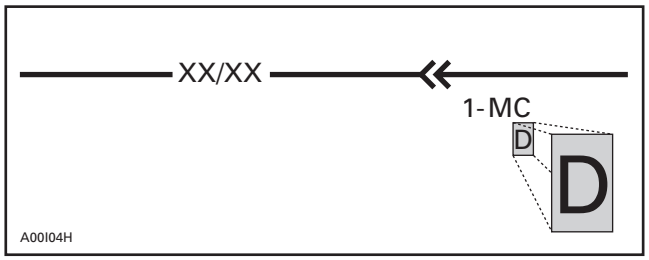
CONNECTOR HOUSING AREA

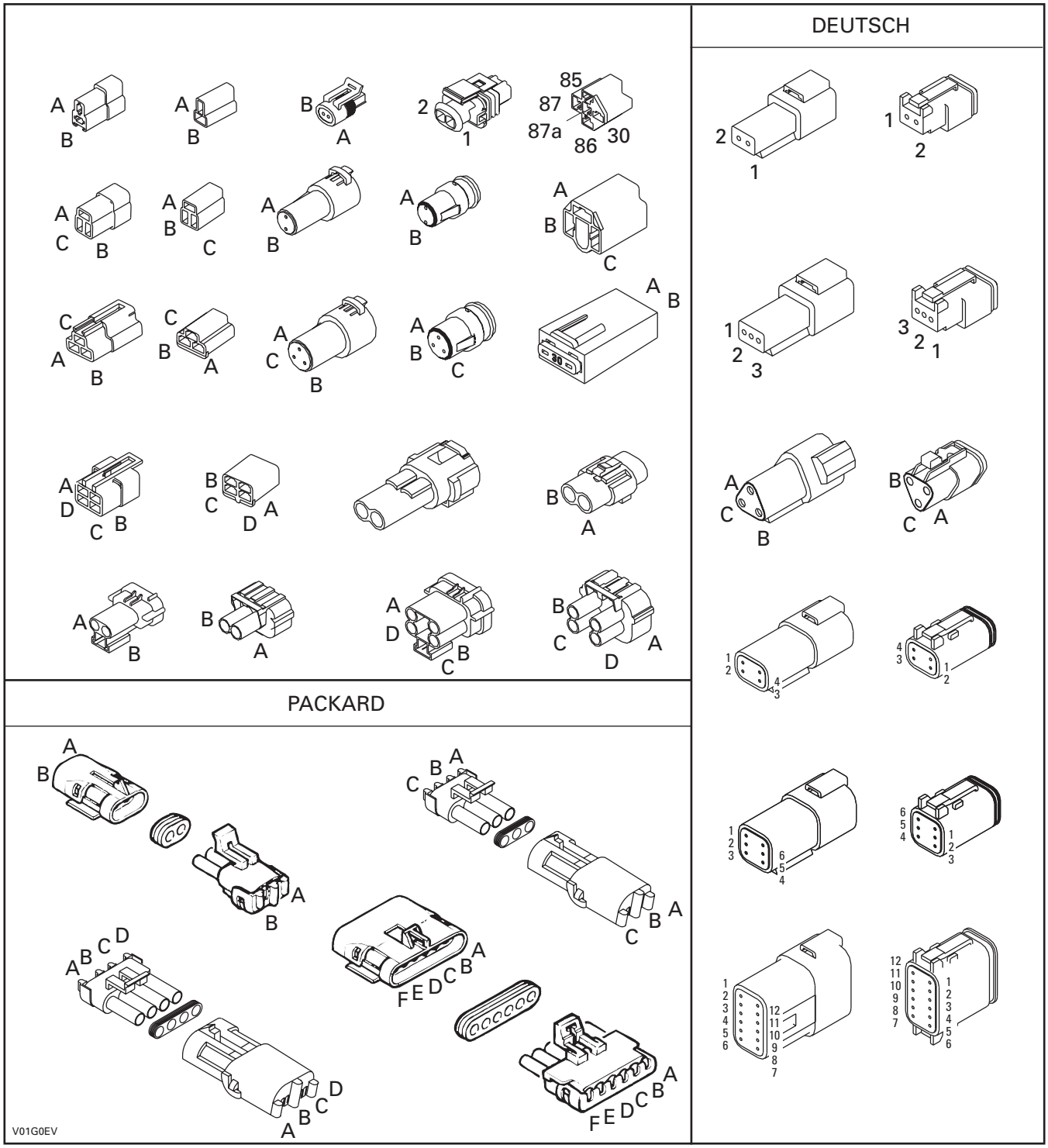




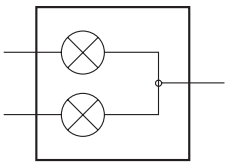
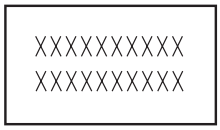
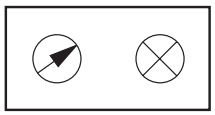
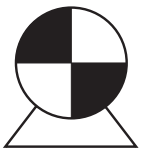
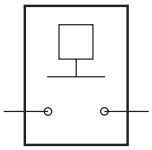
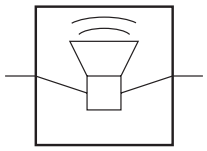
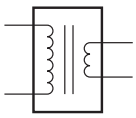
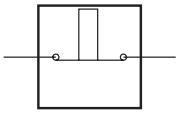
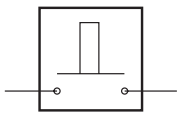
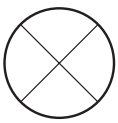
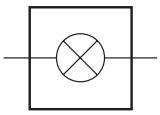
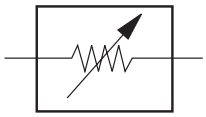
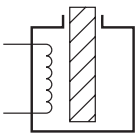
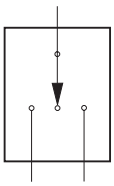
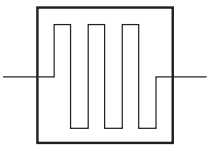
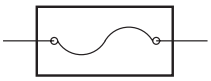
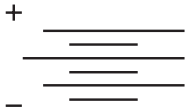
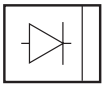
AREA	LOCATION
1	Front of engine compartment
2	Magneto
3	Carburetors
4	Near of intake silencer
5	Near driven pulley
6	Under console
7	Under hood
8	Near fuel tank
9	Rear of seat
10	Under engine
11	On injection oil reservoir

CONNECTOR LOCATION IN HOUSING




DEUTSCH
PACKARD
V01G0EV

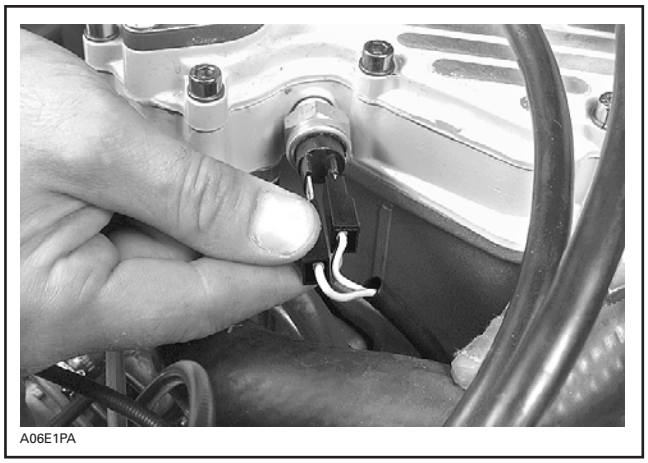
SYMBOLS DESCRIPTION

Beam and tail light 	Female terminal	Male terminal	Electronic module 
Meter 	Electric motor 	Low level sensor 	Buzzer 
Ignition coil 	Normally close switch 	Normally open switch 	Male terminal on instrument
Engine ground	Frame ground Frame	Spark plug	Meter movement
Bulb 	Pilot 	Analog sensor 	Solenoid valve 
Magneto (Delta)	3 position switch 	Heating element 	Fuse 
Trigger coil	Battery 	Diode 	Partially illustrated component

A00E55S

UNPLUGING CONNECTORS

Always unplug connectors by pulling on housing not on wire.

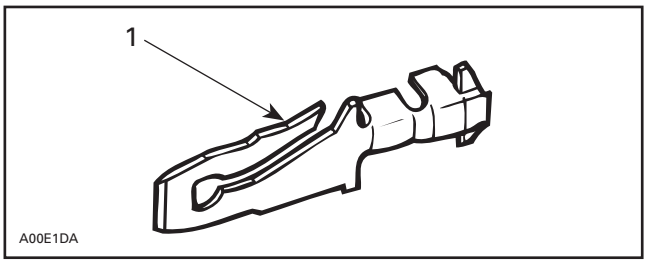

A06E1PA

TYPICAL

TAB AND RECEPTACLE CONNECTORS REMOVAL

Tab Connector

It is locked in its housing by a spring tab on its side. Removal is done by squeezing this tab.



A00E1DA

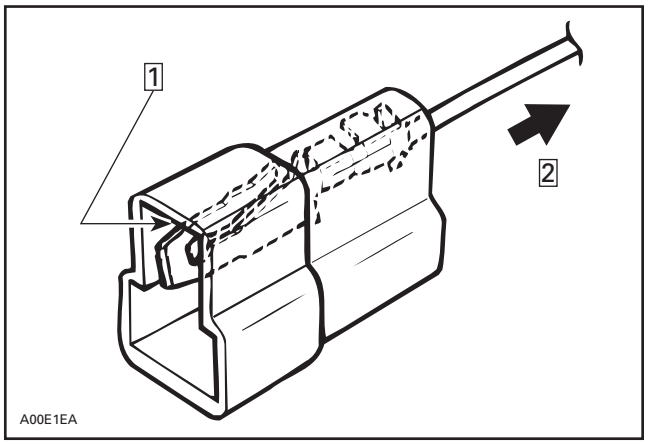
TAB CONNECTOR

1. Locking tab

To remove:

– Insert a screwdriver or Snap-on TT 600-5 from opposite side of wire and pry locking tab.

– While holding locking tab pried, pull connector toward wire side.



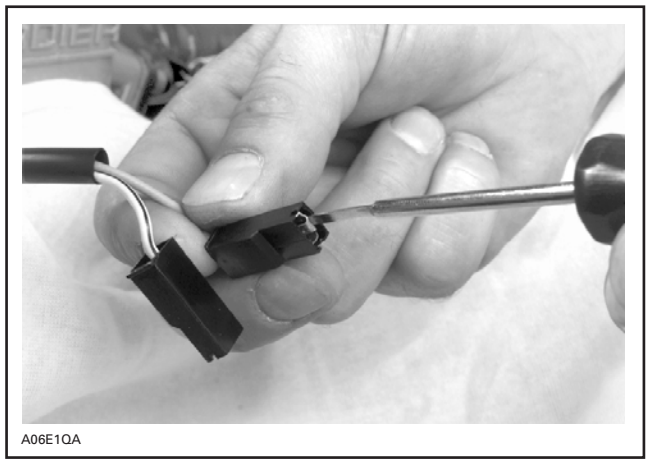
A00E1EA

Step 1: Insert screwdriver here
Step 2: Pull this side

Locking Receptacle Connector

To remove:

– Insert tool Snap-on TT 600-5 in access opening then pull housing toward wire side.

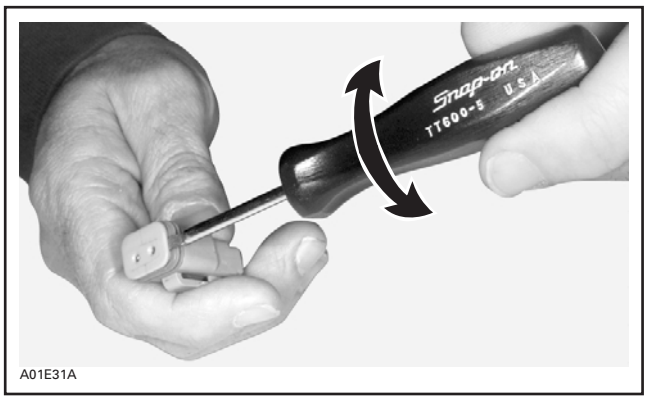

A06E1QA

Waterproof Connector Housing

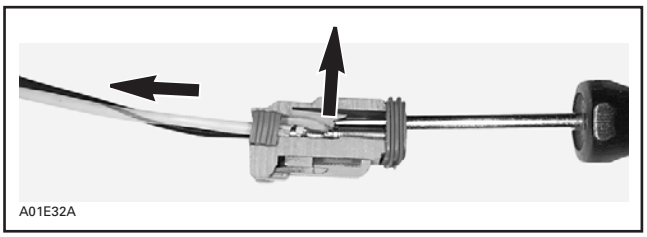
Female Connector Housing

To remove:

– Insert tool Snap-on TT 600-5 under lock and twist to lift it.



– Pry tab to free connector then pull wire out of housing.

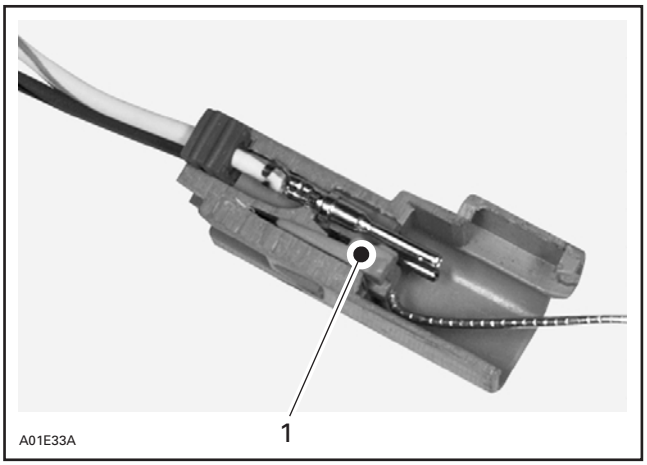


FEMALE CONNECTOR HOUSING — CUT-AWAY

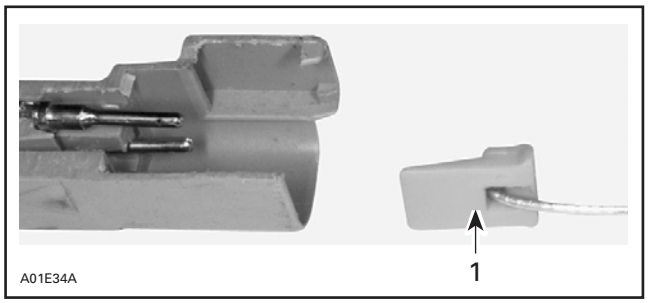
Male Connector Housing

To remove:

– Using a small hook, pull out the lock.

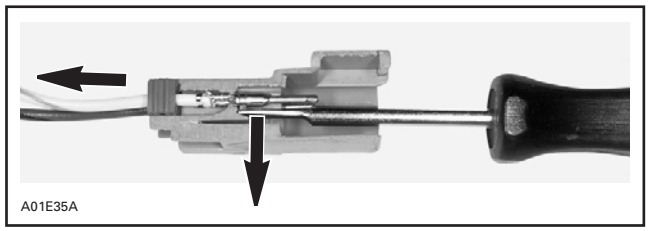


1. Lock



1. Lock

– Pry tab to free connector then pull wire out of housing.

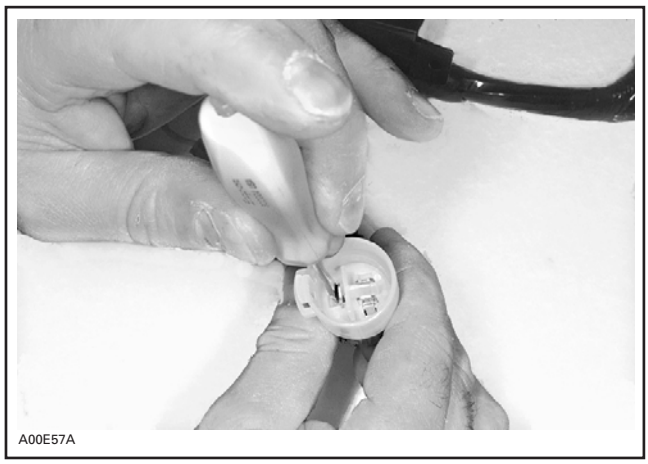


MALE CONNECTOR HOUSING — CUT-AWAY

Round Connector Housing

Female Connector Housing

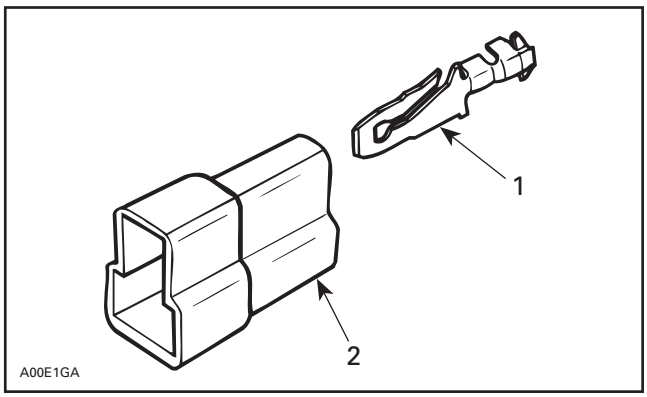
Male Connector Housing



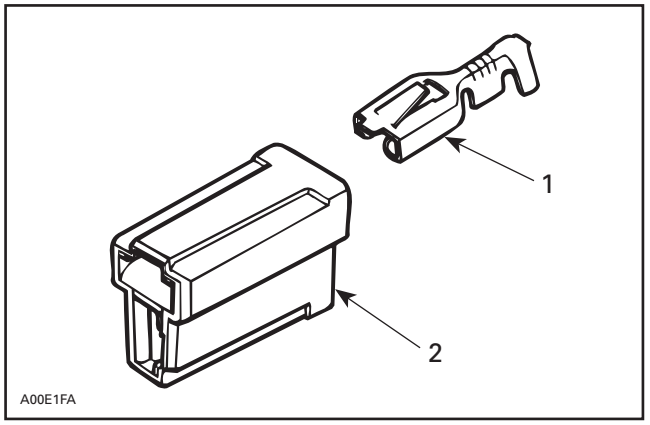
TAB AND RECEPTACLE CONNECTORS INSTALLATION

Prior to installing, make sure locking tab is sufficiently lifted to properly lock.

Insert tab and receptacle connectors in their respective housings as shown in following illustrations. Push sufficiently so that they snap. Try pulling wire to ensure they are properly locked.



1. Tab
2. Housing



TYPICAL
1. Receptacle
2. Housing

ACCESSORIES INSTALLATION

On all **electric start models:** The direct current (DC) utilizes the snowmobile frame as ground "wire" while all alternating current (AC) consumers (lights, heated grips, fuel gauge, etc.) utilize a separate ground wire.

Never interconnect AC and DC grounds as an AC voltage drop will result. When installing accessories on **any** snowmobile, connect their wires directly to the YELLOW and YELLOW/BLACK lighting coil wires.

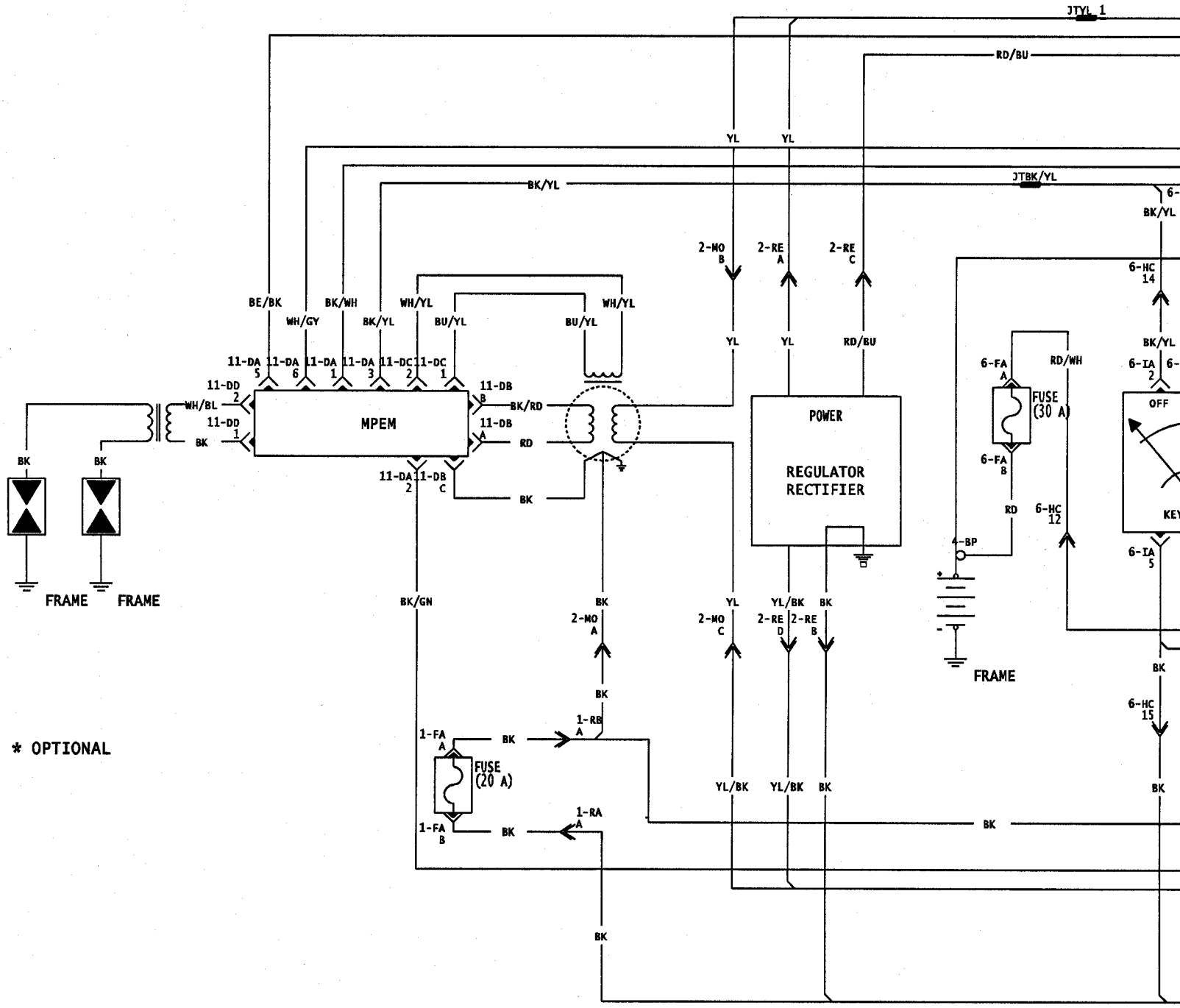
Even if **manual start models** have an AC ground to the chassis (on voltage regulator), all accessories utilize a ground wire isolated from chassis. When an electric starter kit is installed, the voltage regulator and its ground wire are replaced by a voltage rectifier/regulator unit permitting a completely isolated AC circuit.

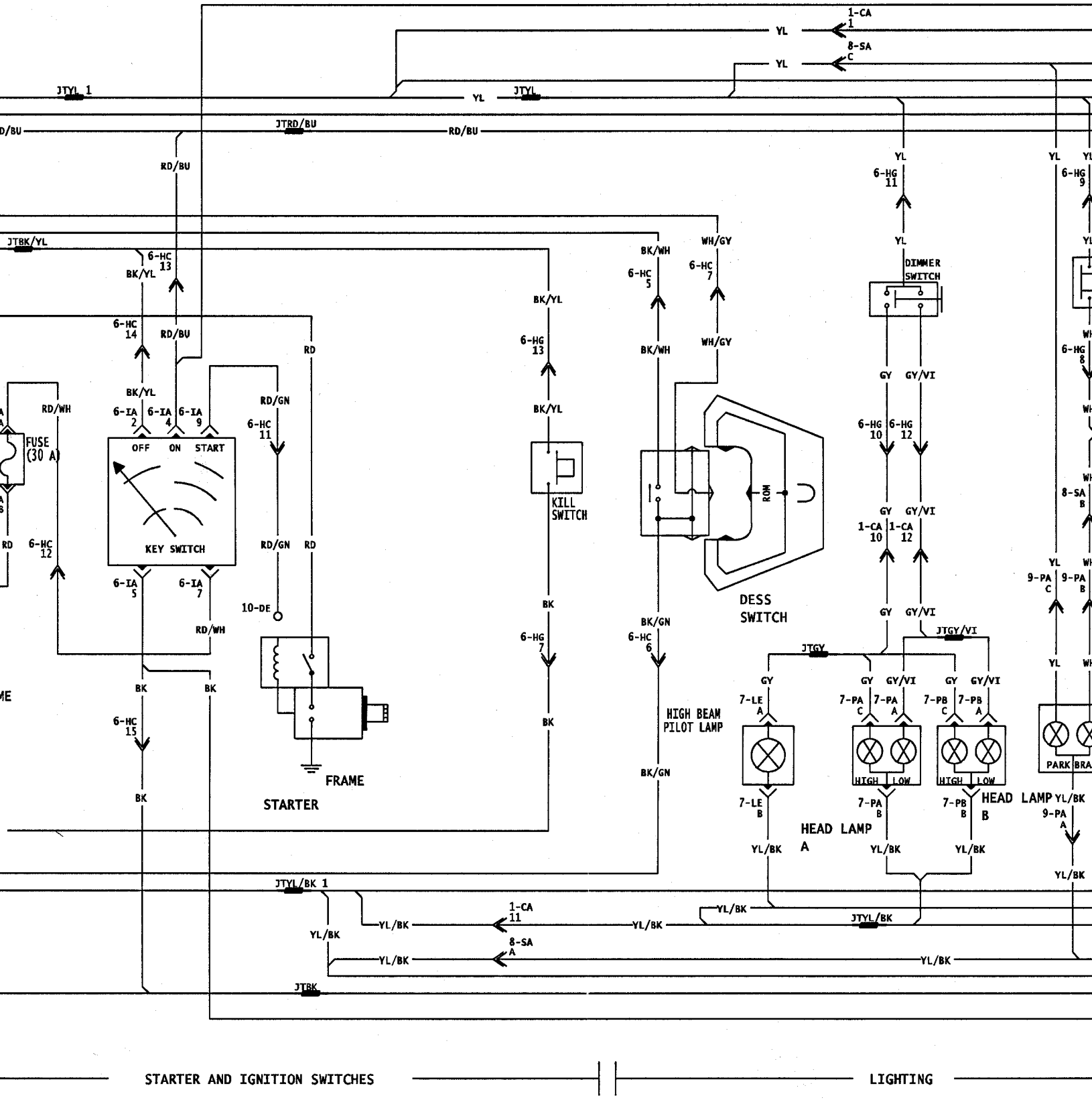
⚠ WARNING

Keep wires away from any rotating, moving, heating, vibrating or sharp edge. Use proper fastening devices as required.

ANNEX 1 GRAND TOURING 500/600

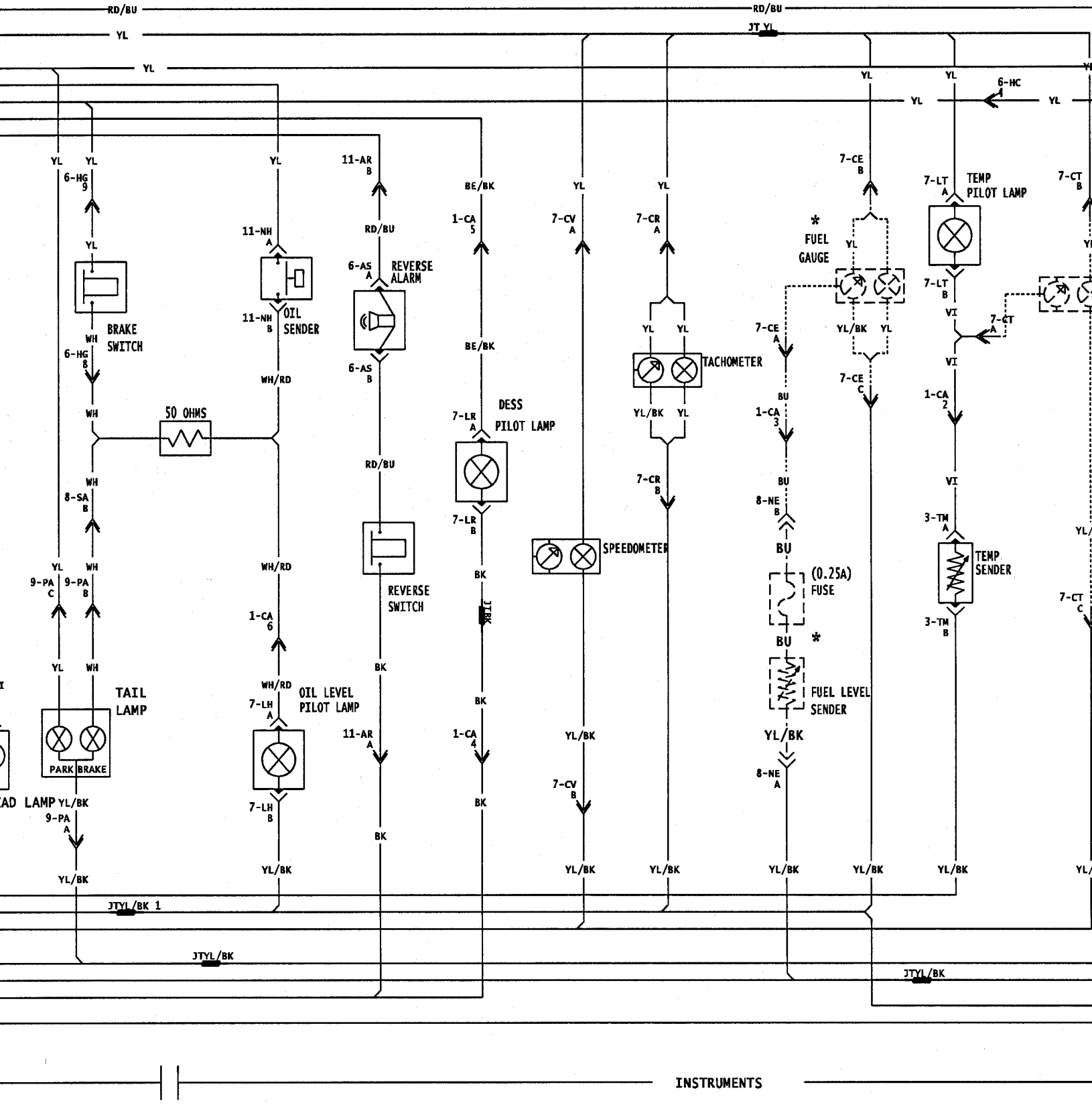
2001 GRAND TOURING 500/600

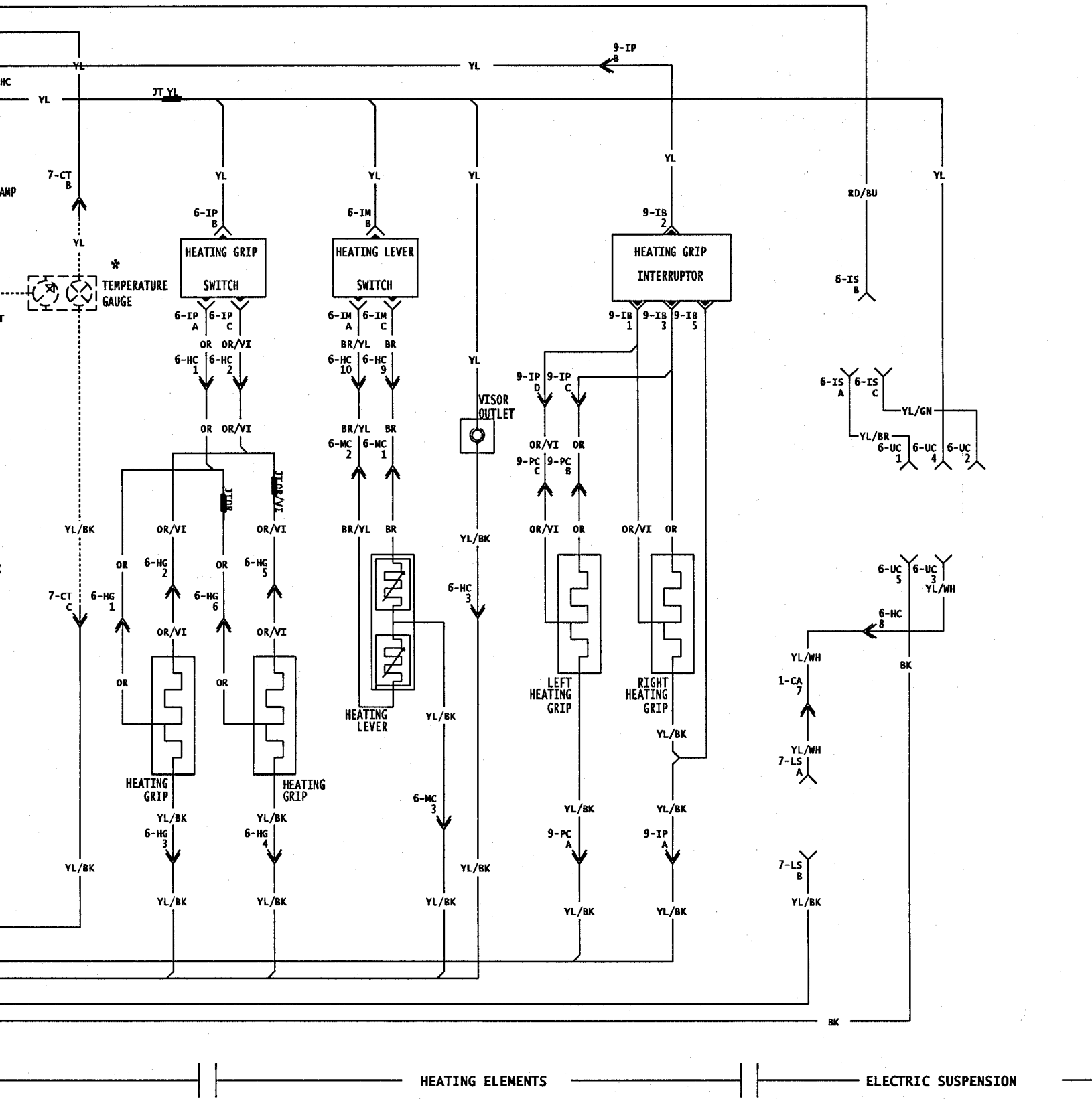




STARTER AND IGNITION SWITCHES

LIGHTING


RD/BU
YL
JT YL
6-HC
BRAKE SWITCH
50 OHMS
OIL SENDER
REVERSE ALARM
REVERSE SWITCH
DESS PILOT LAMP
SPEEDOMETER
TACHOMETER
FUEL GAUGE
(0.25A) FUSE
FUEL LEVEL SENDER
TEMP PILOT LAMP
TEMP SENDER
TAIL LAMP
PARK BRAKE
OIL LEVEL PILOT LAMP
JTYL/BK 1
JTYL/BK
INSTRUMENTS

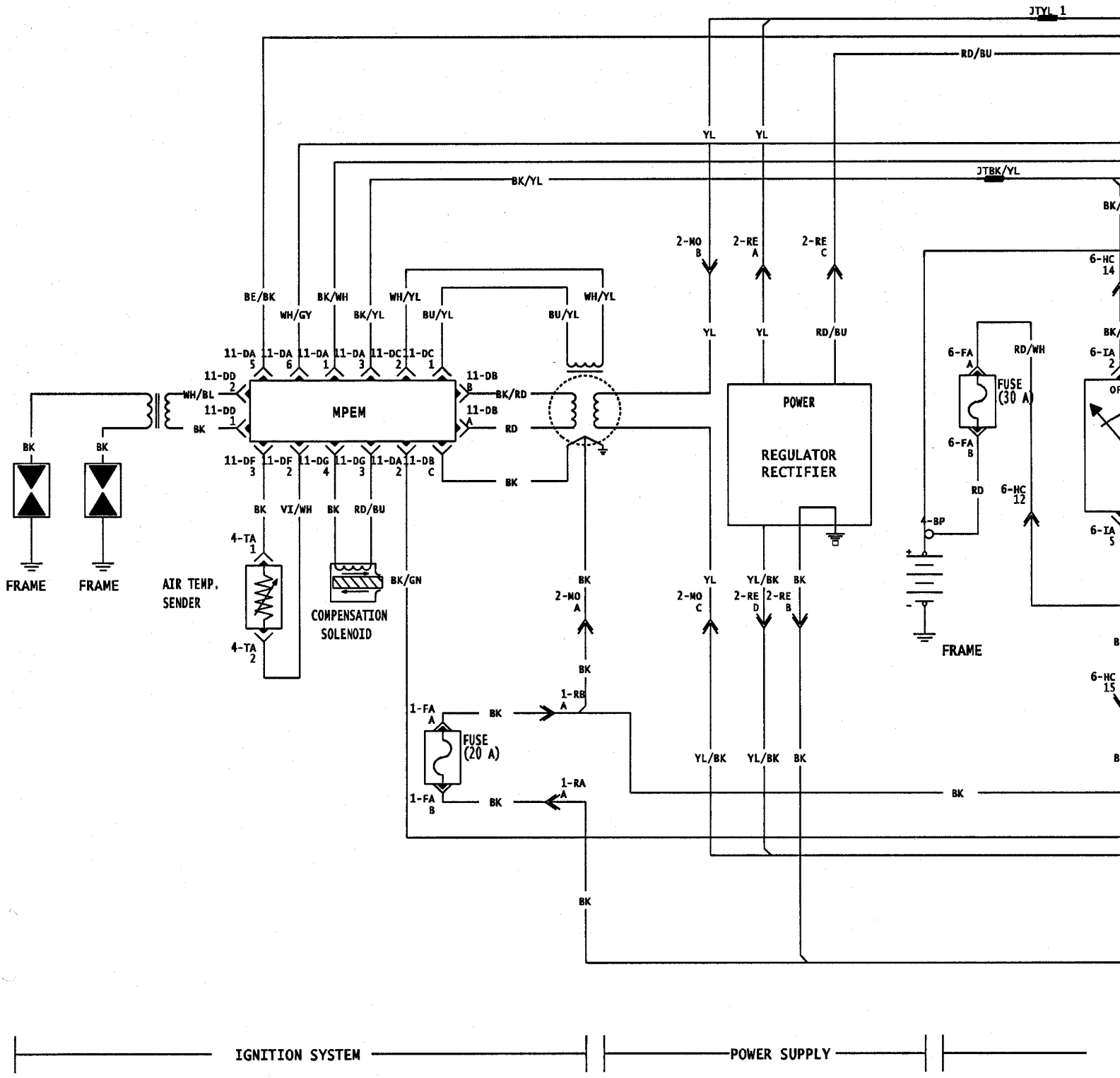


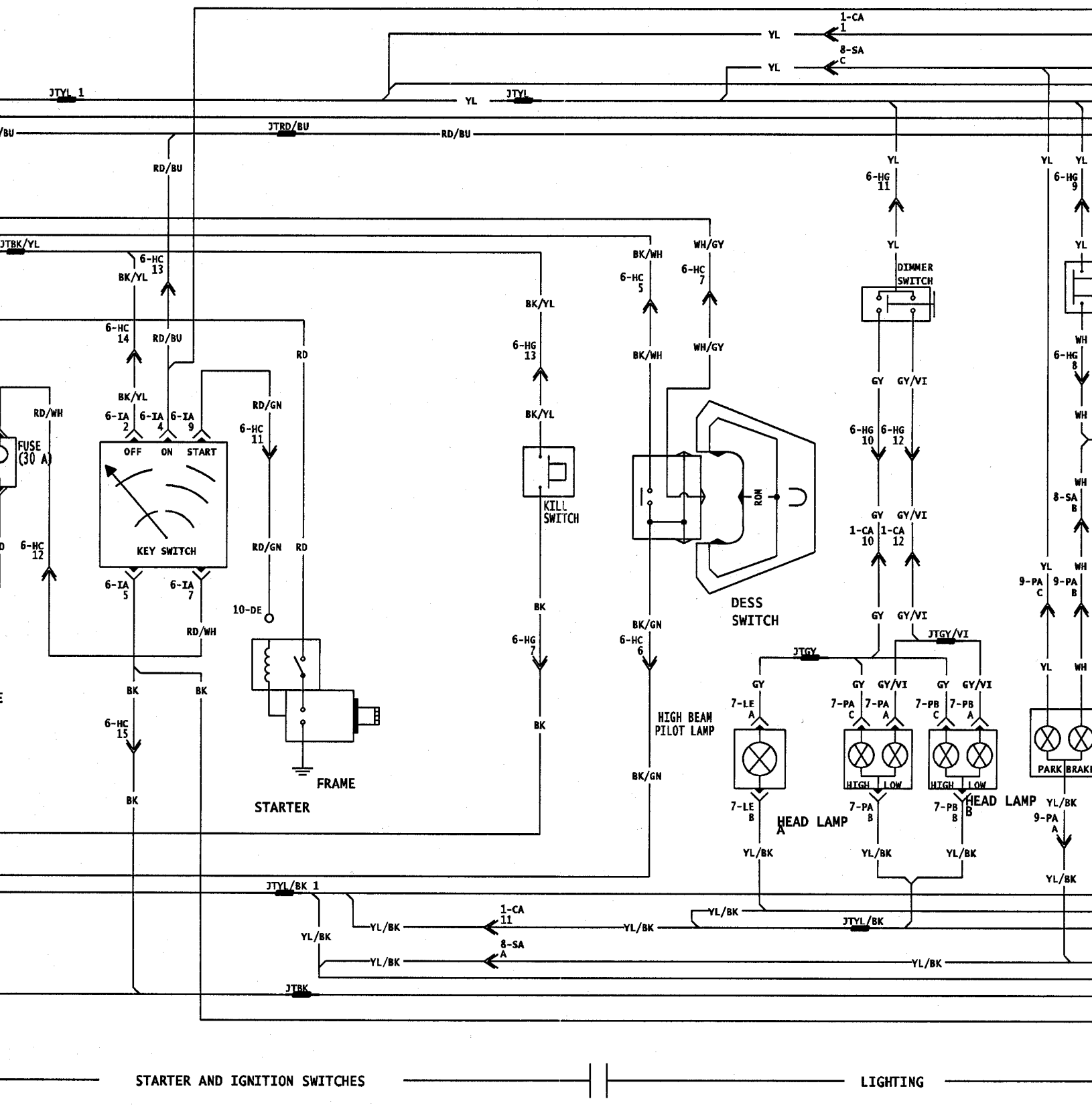
HEATING ELEMENTS

ELECTRIC SUSPENSION

ANNEX 2 GRAND TOURING 700

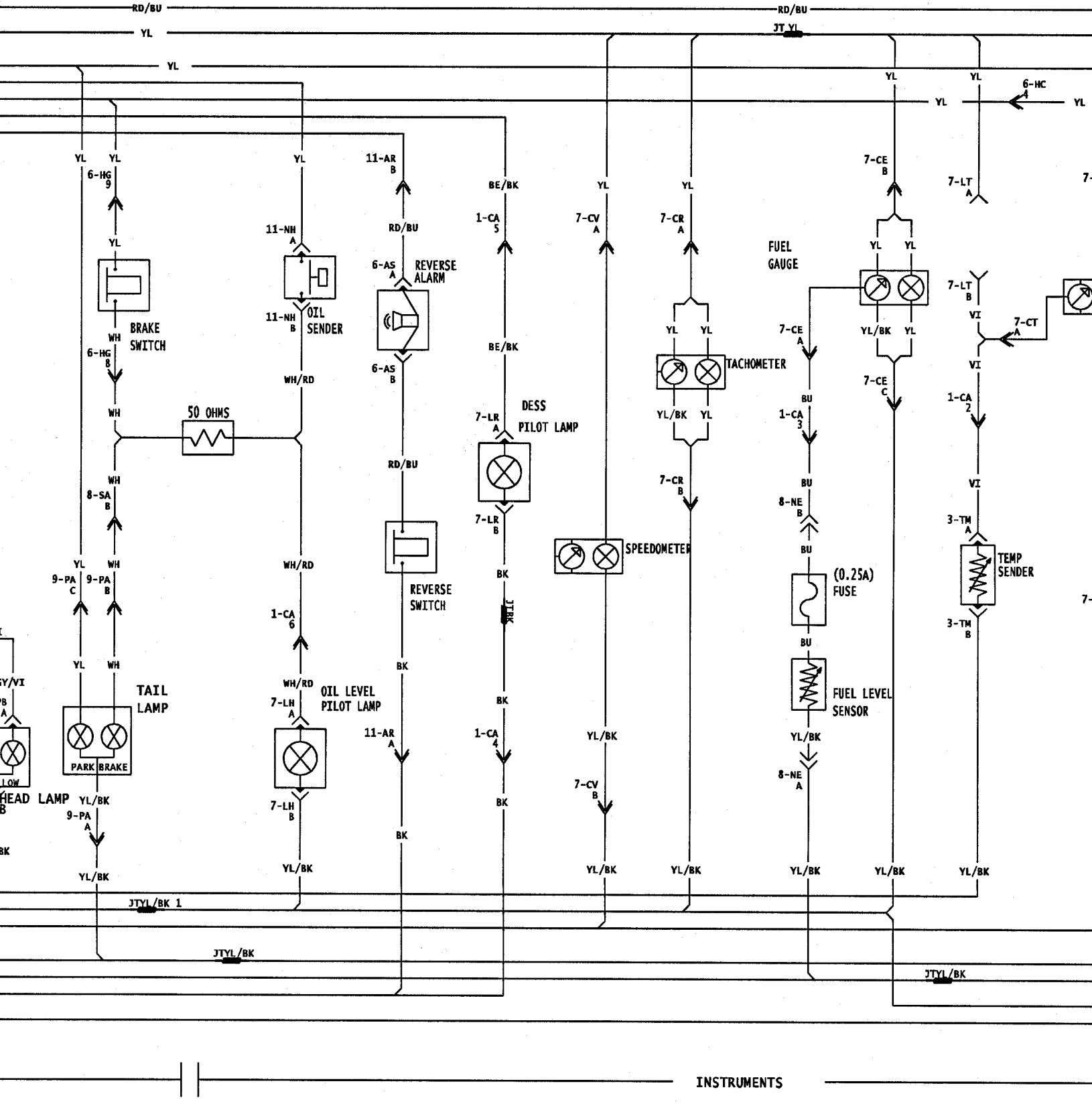
2001 GRAND TOURING 700

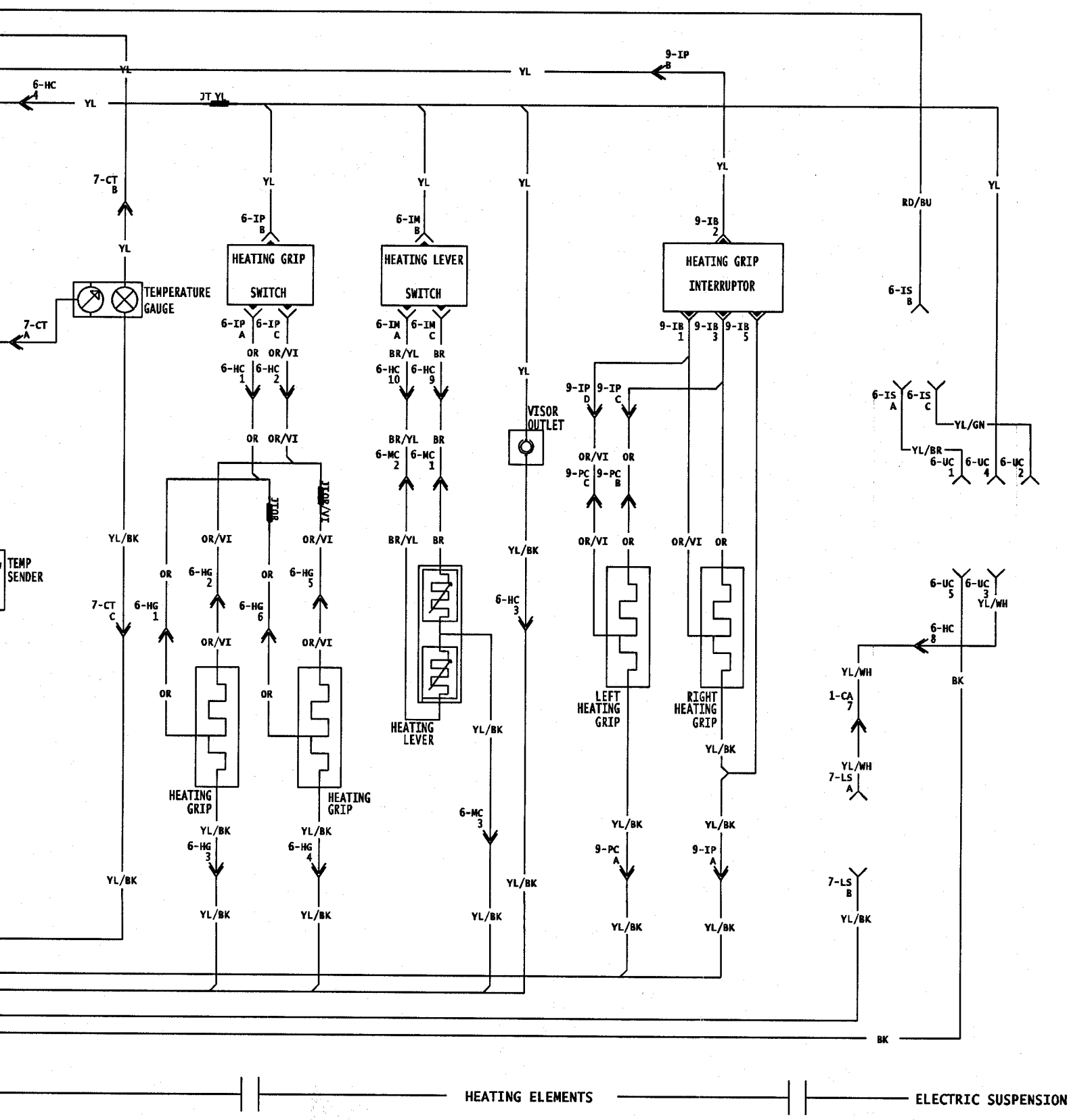




STARTER AND IGNITION SWITCHES

LIGHTING

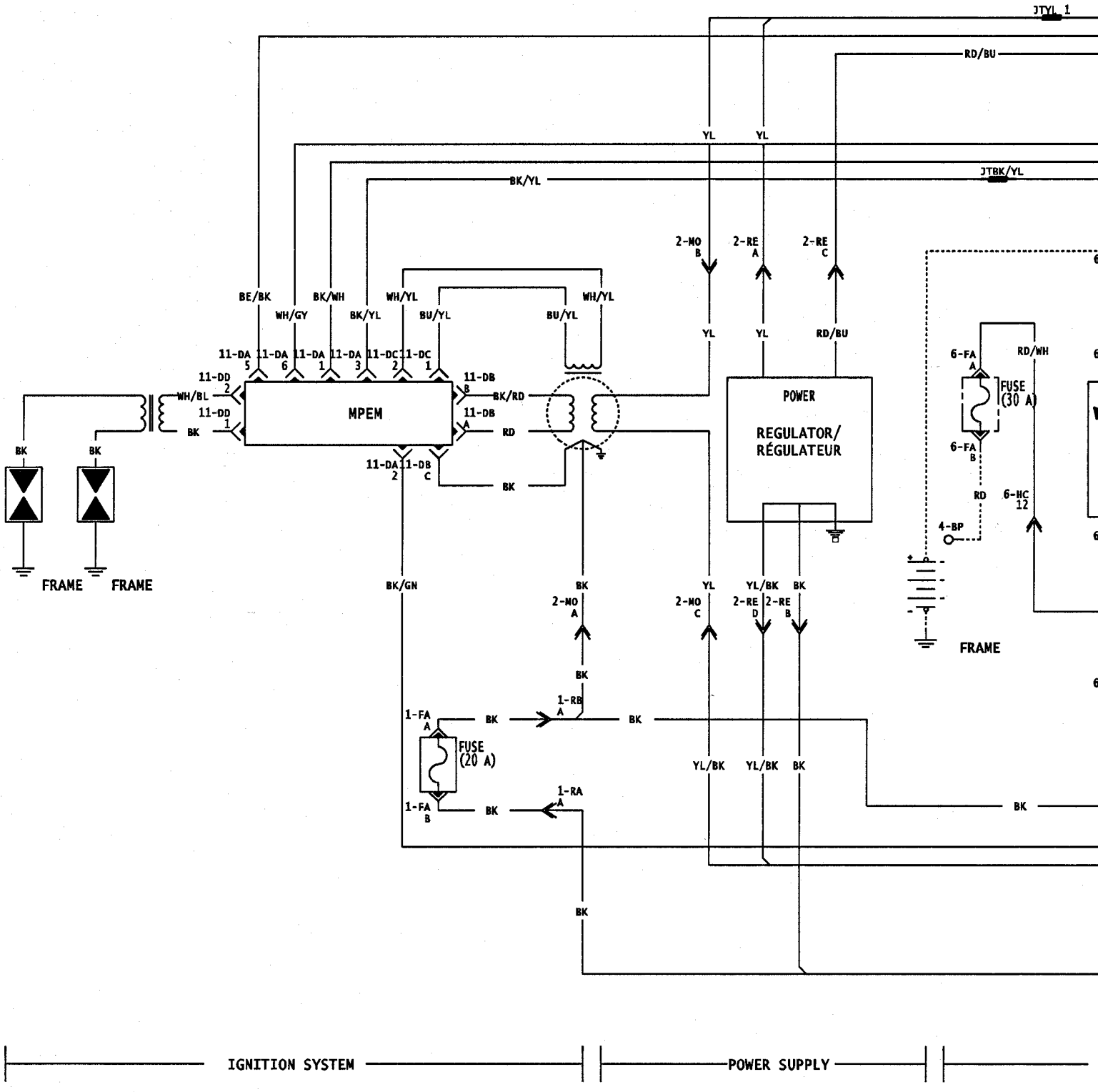

RD/BU
YL
YL
RD/BU
JT YL
YL
YL
6-HC 4
YL
YL
YL
YL
6-HG 9
YL
BRAKE SWITCH
WH
6-HG B
WH
50 OHMS
WH
8-SA B
YL
9-PA C
WH
9-PA B
YL
WH
TAIL LAMP
PARK
BRAKE
YL/BK
9-PA A
YL/BK
JTYL/BK 1
JTYL/BK
YL
11-NH A
11-NH B
OIL SENDER
WH/RD
WH/RD
1-CA 6
WH/RD
7-LH A
OIL LEVEL PILOT LAMP
7-LH B
YL/BK
11-AR B
RD/BU
6-AS A
REVERSE ALARM
6-AS B
RD/BU
REVERSE SWITCH
BK
11-AR A
BK
BE/BK
1-CA 5
BE/BK
7-LR A
DESS PILOT LAMP
7-LR B
BK
JTBK
BK
1-CA 4
BK
YL
7-CV A
YL/BK
7-CV B
YL/BK
YL
7-CR A
YL
YL
TACHOMETER
YL/BK
YL
7-CR B
YL/BK
SPEEDOMETER
YL
7-CE B
FUEL GAUGE
YL
YL
7-CE A
BU
1-CA 3
BU
8-NE B
BU
(0.25A) FUSE
BU
FUEL LEVEL SENSOR
YL/BK
8-NE A
YL/BK
YL/BK
YL
YL
YL/BK
YL
7-CE C
YL/BK
YL
7-LT A
7-LT B
VI
7-CT A
VI
1-CA 2
VI
3-TM A
TEMP SENDER
3-TM B
YL/BK
JTYL/BK
INSTRUMENTS

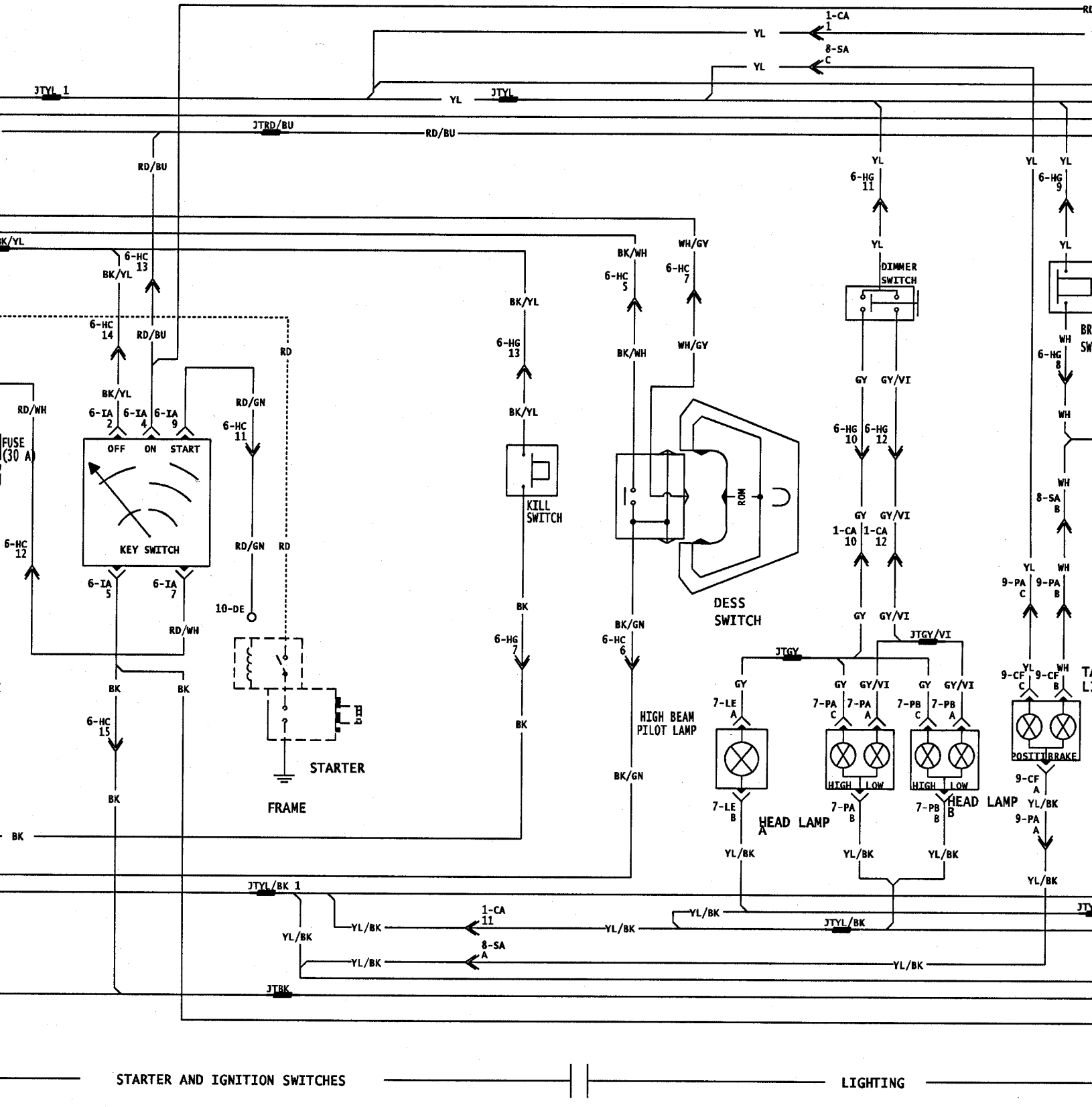

6-HC 4
YL
JT YL
9-IP B
7-CT B
6-IP B
6-IM B
9-IB 2
RD/BU
6-IS B
HEATING GRIP SWITCH
HEATING LEVER SWITCH
HEATING GRIP INTERRUPTOR
TEMPERATURE GAUGE
7-CT A
6-IP A
6-IP C
6-IM A
6-IM C
9-IB 1
9-IB 3
9-IB 5
OR
OR/VI
BR/YL
BR
6-HC 1
6-HC 2
6-HC 10
6-HC 9
VISOR OUTLET
9-IP D
9-IP C
6-IS A
6-IS C
YL/GN
YL/BR
6-UC 1
6-UC 4
6-UC 2
9-PC C
9-PC B
TEMP SENDER
YL/BK
6-HG 2
6-HG 5
6-HG 1
6-HG 6
7-CT C
6-MC 2
6-MC 1
6-HC 3
6-UC 5
6-UC 3
YL/WH
6-HC 8
BK
HEATING LEVER
LEFT HEATING GRIP
RIGHT HEATING GRIP
1-CA 7
7-LS A
7-LS B
6-HG 3
6-HG 4
6-MC 3
9-PC A
9-IP A
HEATING GRIP
HEATING ELEMENTS
ELECTRIC SUSPENSION

ANNEX 3

MX Z 500/600/ 700 STD/TRAIL

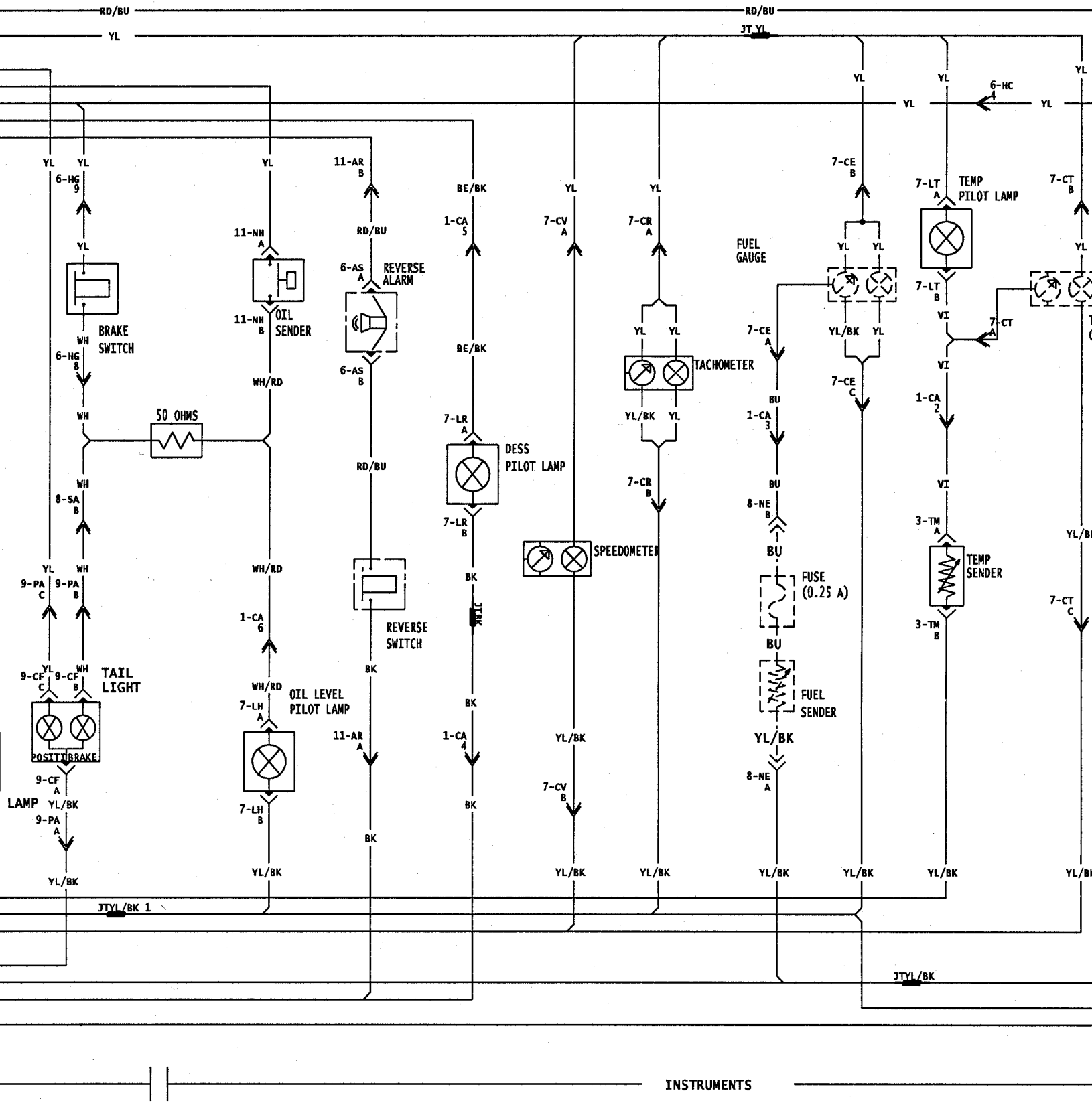
2001 MX Z 500/600/700 STD/TRAIL

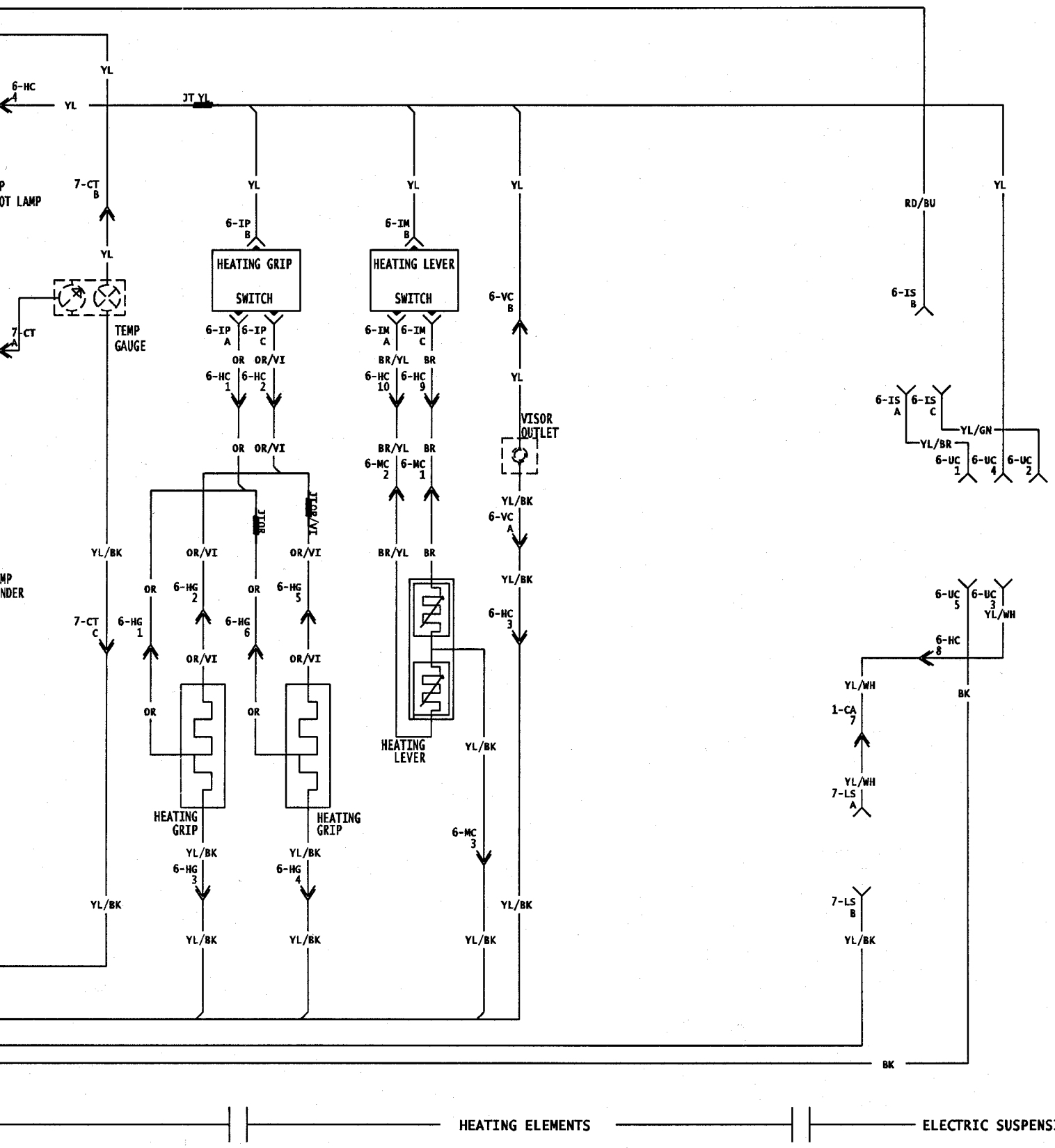




STARTER AND IGNITION SWITCHES

LIGHTING


RD/BU
YL
JT YL
6-HC
4
BRAKE SWITCH
50 OHMS
OIL SENDER
REVERSE ALARM
REVERSE SWITCH
DESS PILOT LAMP
SPEEDOMETER
TACHOMETER
FUEL GAUGE
FUSE (0.25 A)
FUEL SENDER
TEMP PILOT LAMP
TEMP SENDER
TAIL LIGHT
OIL LEVEL PILOT LAMP
POSITI BRAKE
LAMP
JTYL/BK 1
JTYL/BK
INSTRUMENTS

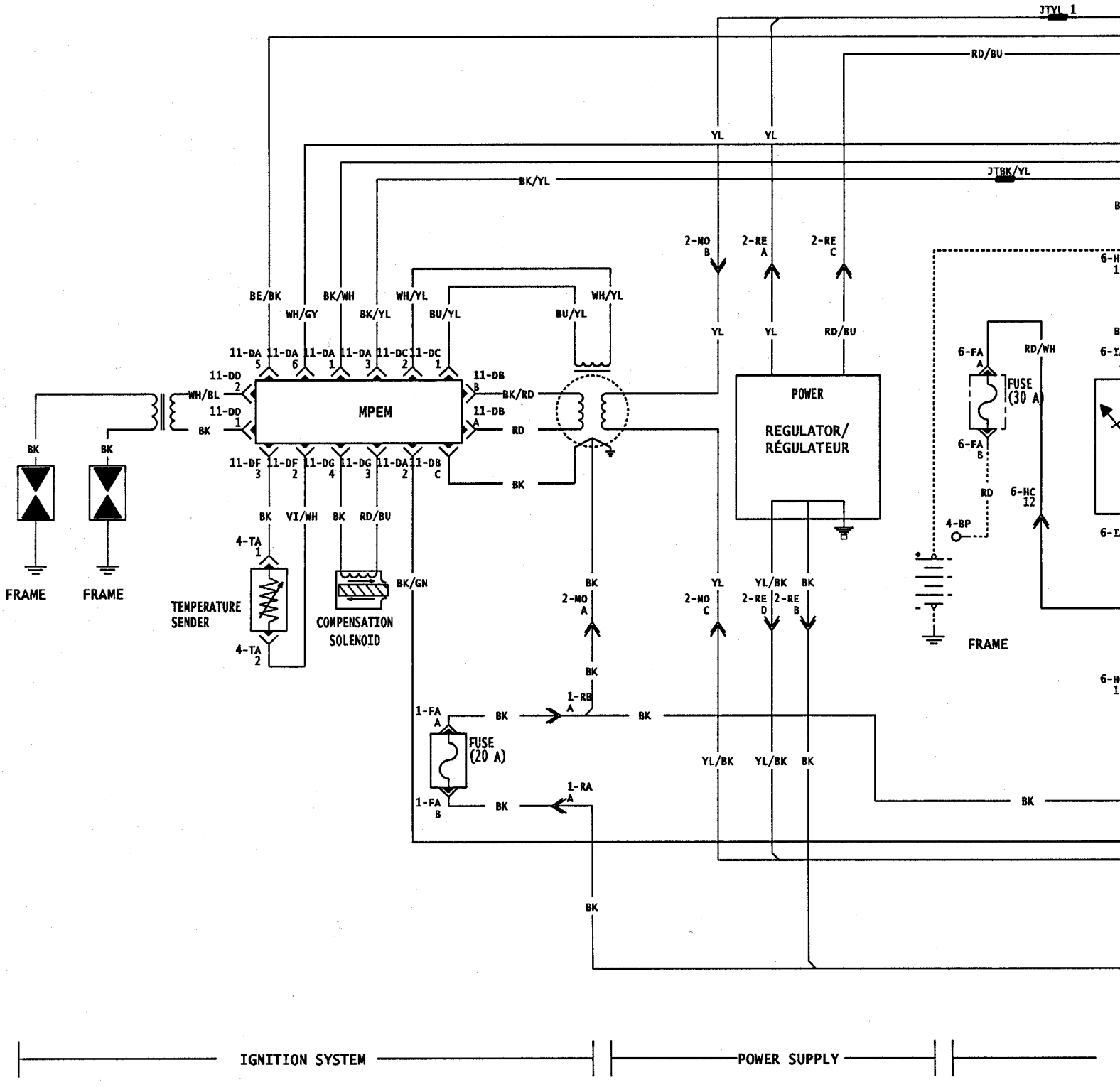


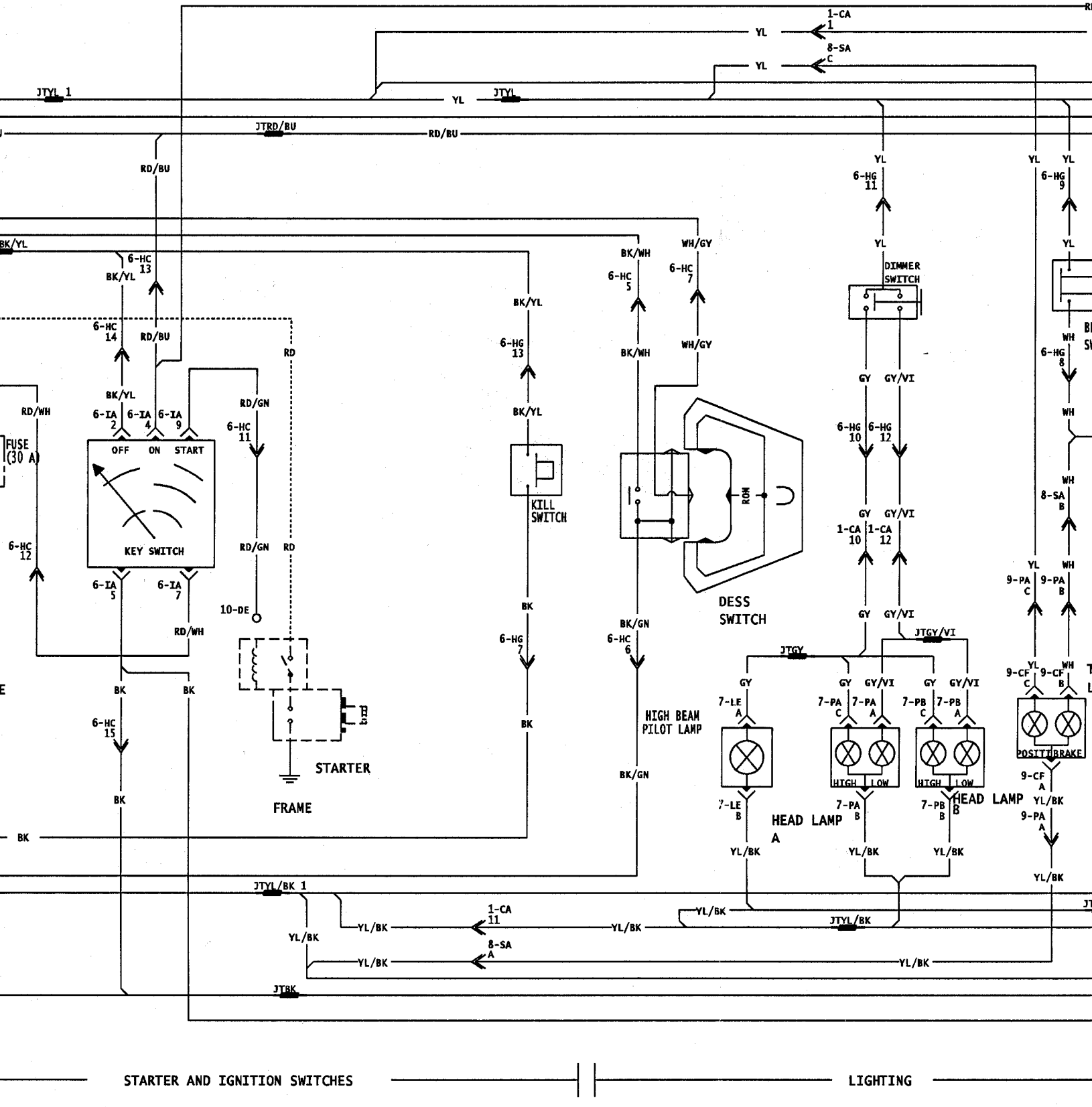
HEATING ELEMENTS — ELECTRIC SUSPENSION

ANNEX 4

MX Z X/ADRENALINE/ 600/700/800

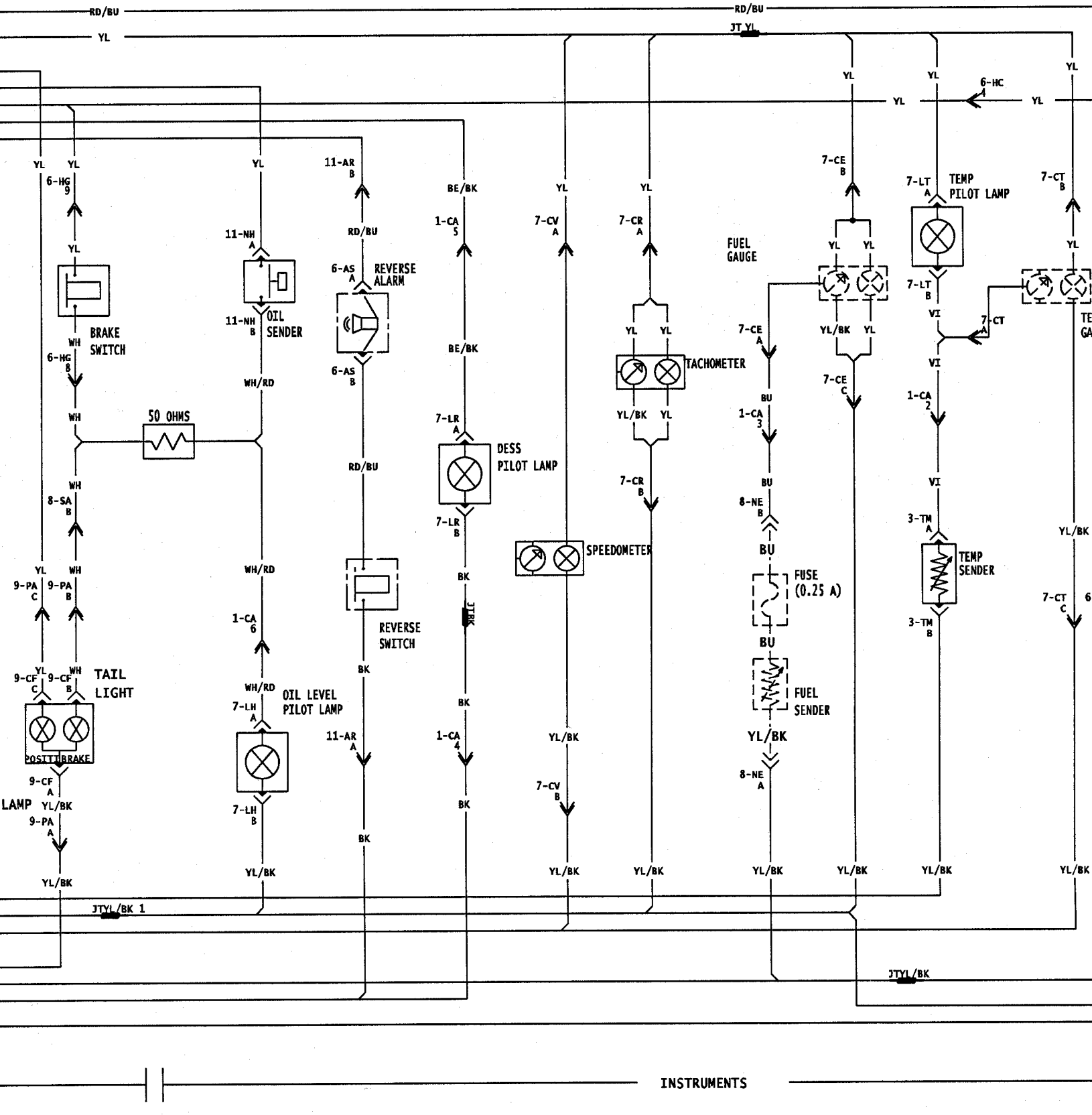
2001 MX Z X/ADRENALINE/600/700/800



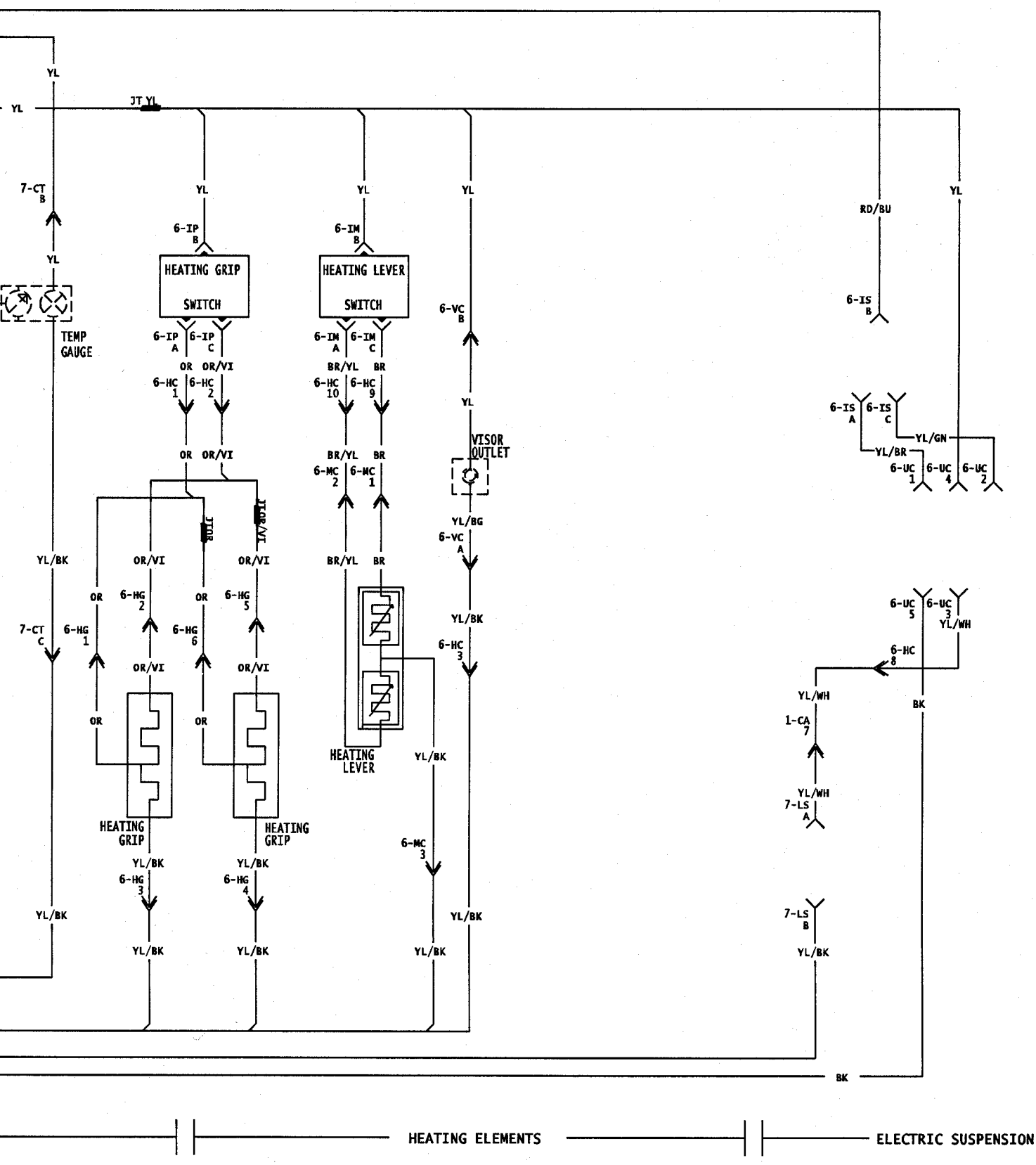


STARTER AND IGNITION SWITCHES

LIGHTING



INSTRUMENTS



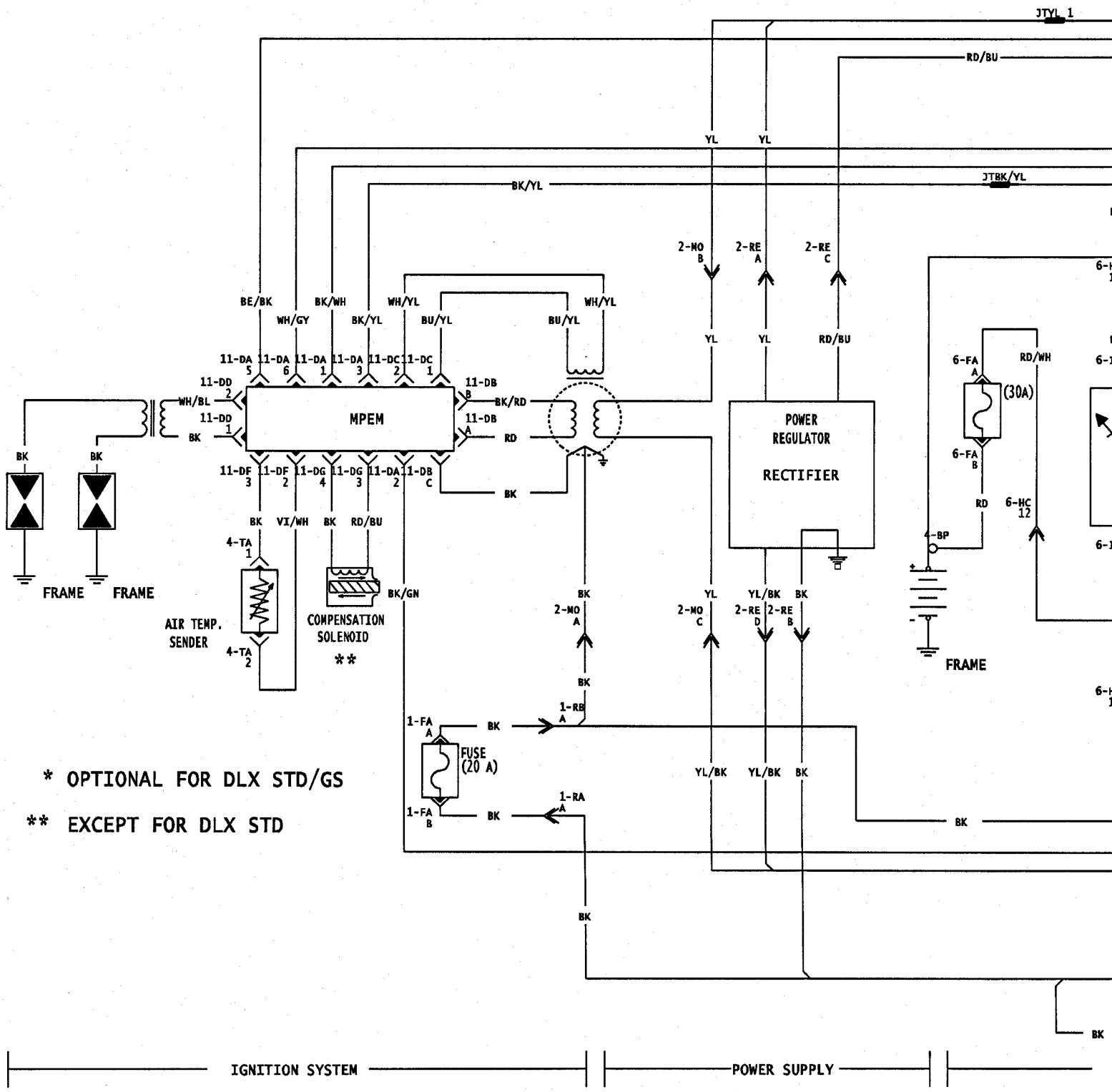
HEATING ELEMENTS

ELECTRIC SUSPENSION

ANNEX 5

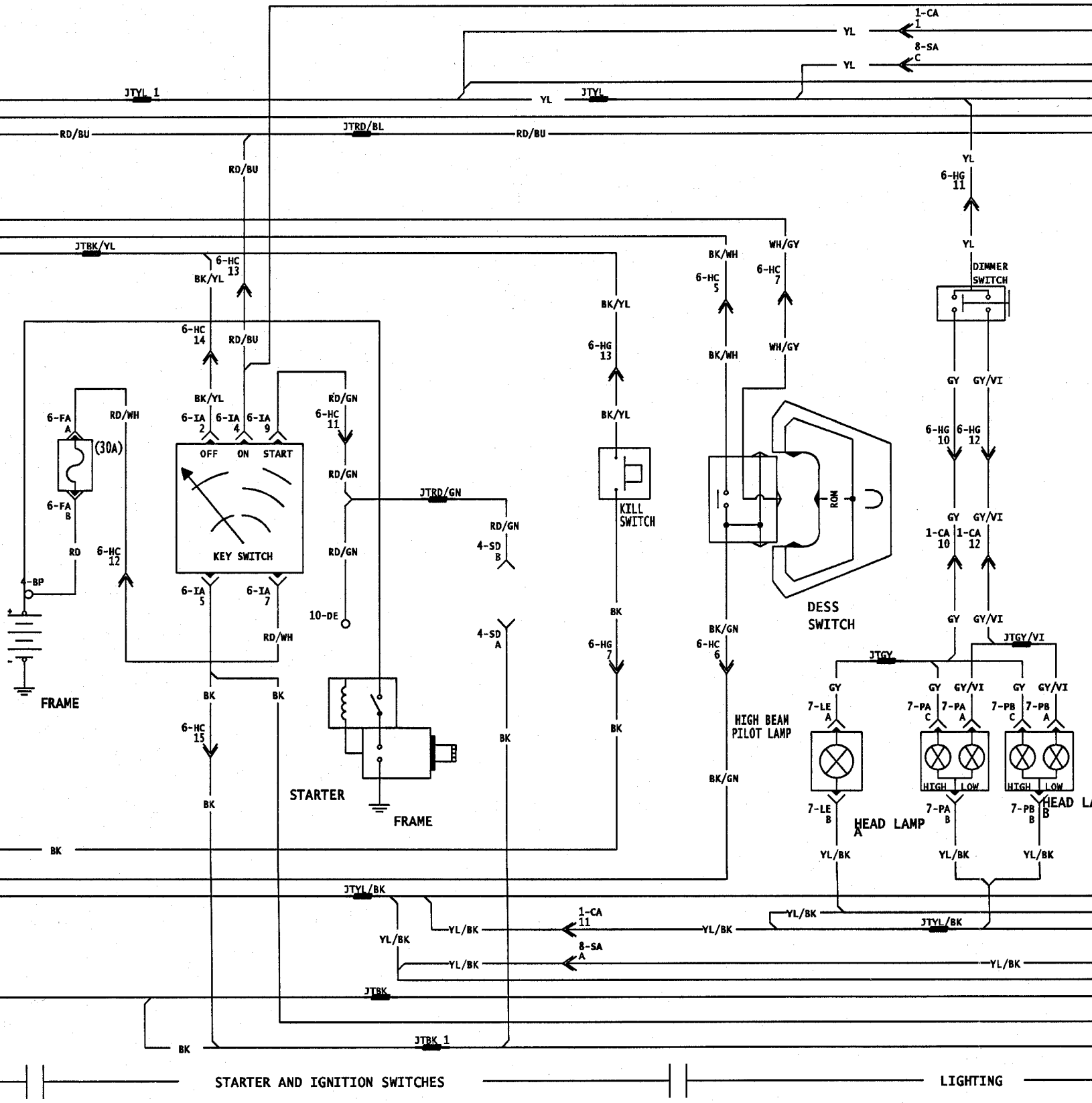
FORMULA DLX/STD/ GS/GSE 600/700

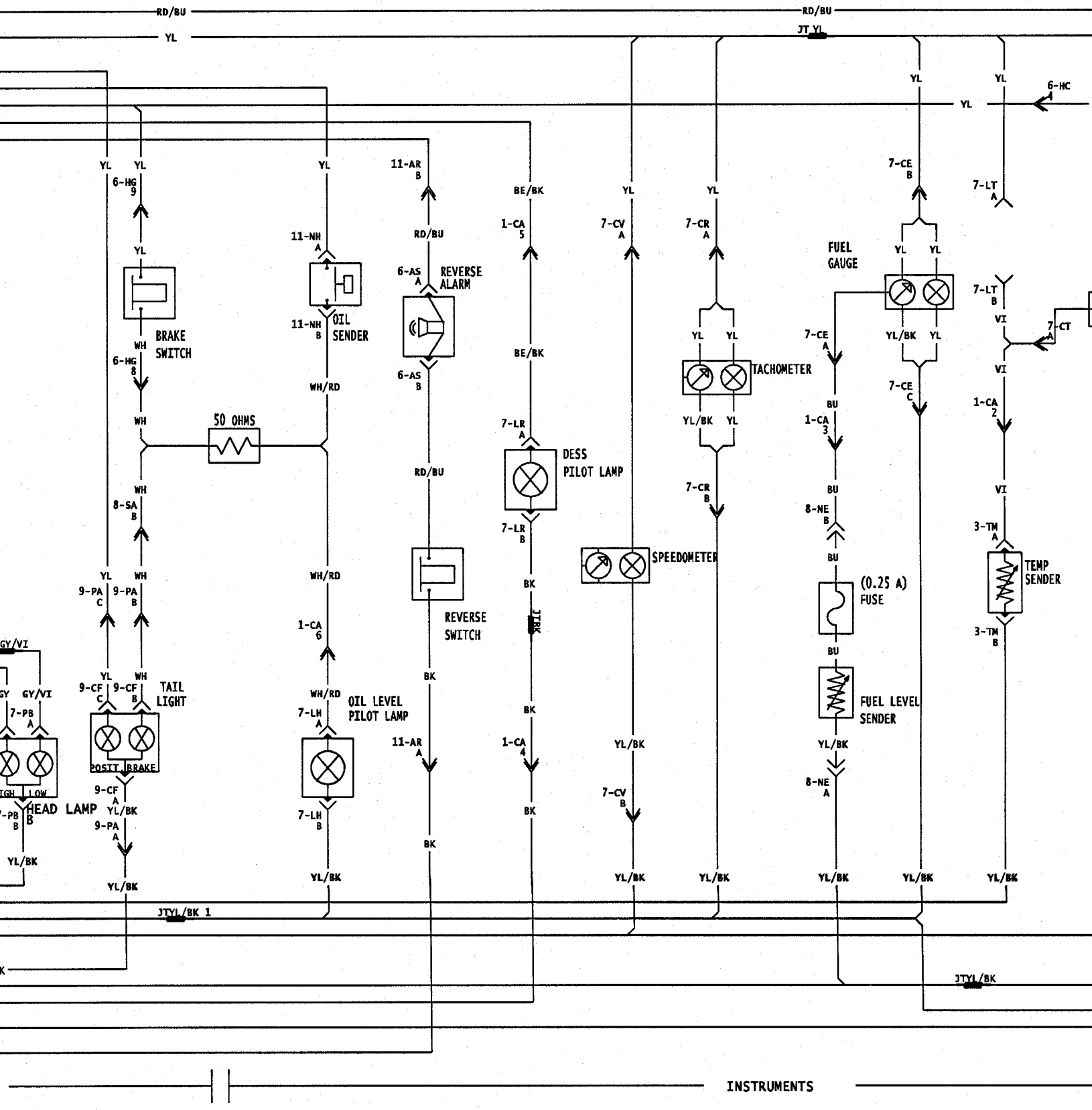
2001 FORMULA DLX STD/GS/GSE 600/700



* OPTIONAL FOR DLX STD/GS

** EXCEPT FOR DLX STD


1-CA 1
YL
8-SA C
YL
JTYL 1
YL
JTYL
RD/BU
JTRD/BL
RD/BU
RD/BU
YL
6-HG 11
YL
JTBK/YL
6-HC 13
BK/YL
BK/WH
6-HC 5
WH/GY
6-HC 7
DIMMER SWITCH
6-HC 14
RD/BU
BK/YL
6-HG 13
BK/YL
WH/GY
GY
GY/VI
6-FA A
RD/WH
6-IA 2
6-IA 4
6-IA 9
RD/GN
6-HC 11
6-HG 10
6-HG 12
(30A)
OFF
ON
START
RD/GN
JTRD/GN
KILL SWITCH
RON
GY
GY/VI
6-FA B
RD
6-HC 12
KEY SWITCH
RD/GN
RD/GN
4-SD B
1-CA 10
1-CA 12
4-BP
6-IA 5
6-IA 7
10-DE
4-SD A
BK
6-HG 7
BK/GN
6-HC 6
DESS SWITCH
GY
GY/VI
JTGY/VI
JTGY
RD/WH
FRAME
BK
BK
GY
GY/VI
GY
GY/VI
7-LE A
7-PA C
7-PA A
7-PB C
7-PB A
6-HC 15
HIGH BEAM PILOT LAMP
BK/GN
BK
STARTER
FRAME
HIGH
LOW
HIGH
LOW
7-LE B
7-PA B
7-PB B
HEAD LAMP A
HEAD LA
BK
YL/BK
YL/BK
YL/BK
JTYL/BK
JTYL/BK
YL/BK
1-CA 11
YL/BK
YL/BK
YL/BK
8-SA A
YL/BK
JTBK
BK
JTBK 1
STARTER AND IGNITION SWITCHES
LIGHTING


RD/BU
YL
JT YL
6-HC 4
BRAKE SWITCH
50 OHMS
OIL SENDER
REVERSE ALARM
REVERSE SWITCH
DESS PILOT LAMP
SPEEDOMETER
TACHOMETER
FUEL GAUGE
(0.25 A) FUSE
FUEL LEVEL SENDER
TEMP SENDER
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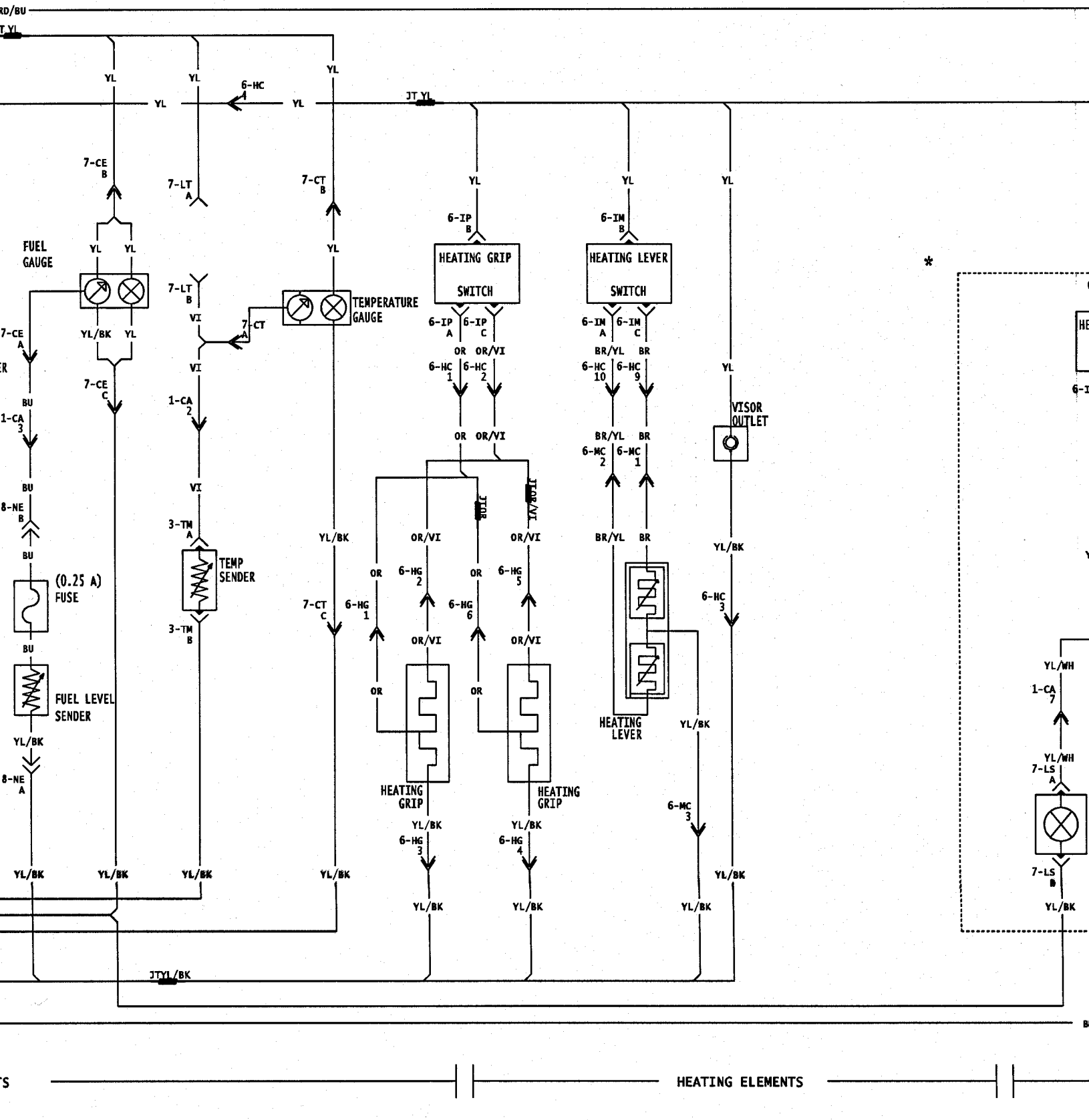
HEAD LAMP
POSIT BRAKE
JTYL/BK 1
JTYL/BK
INSTRUMENTS


RD/BU
T YL
YL
YL
6-HC 4
YL
YL
JT YL
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7-LT A
7-CT B
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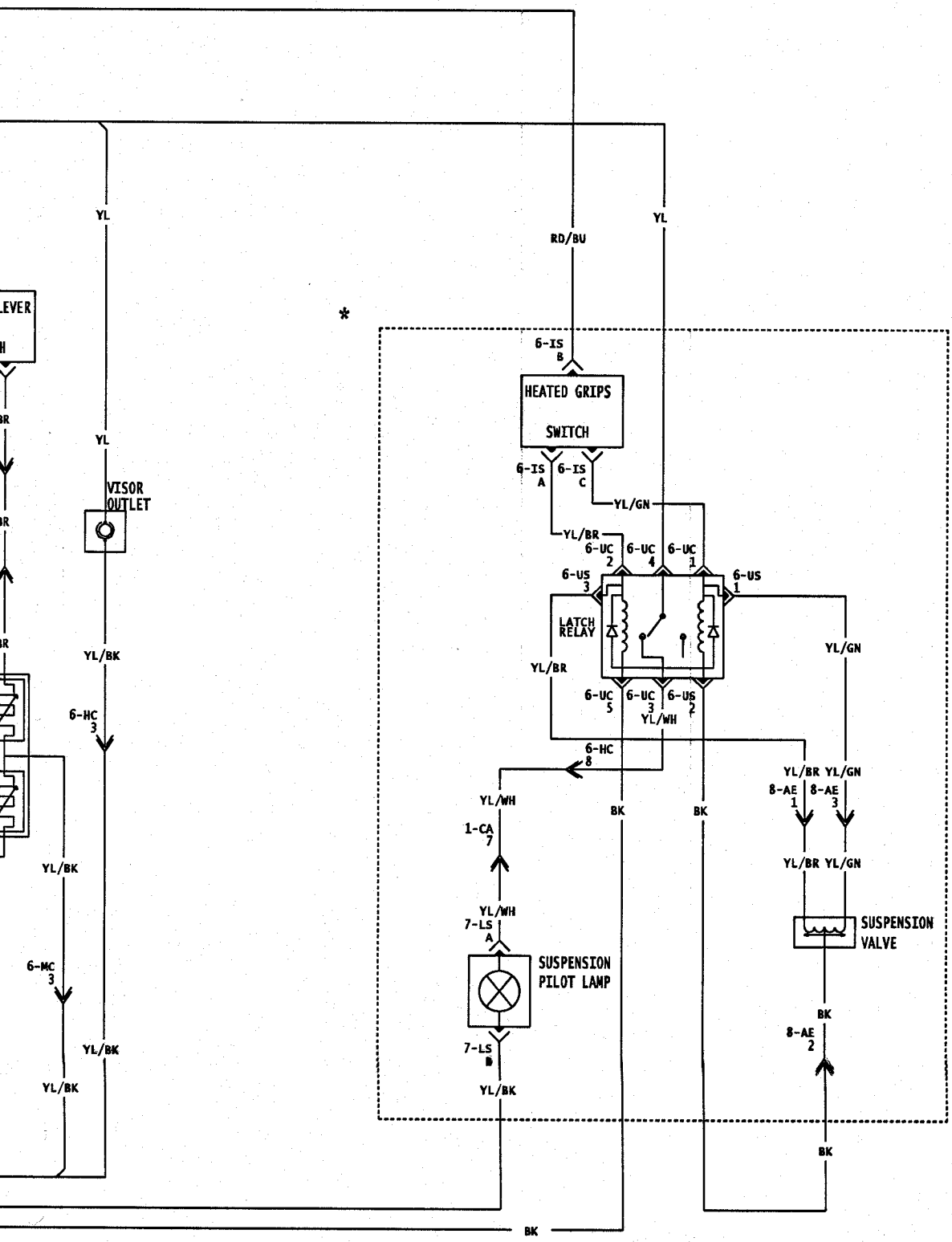
YL
YL
7-LT B
VI
7-CT A
TEMPERATURE GAUGE
7-CE A
YL/BK
YL
7-CE C
VI
1-CA 2
VI
BU
1-CA 3
BU
8-NE B
BU
(0.25 A) FUSE
BU
FUEL LEVEL SENDER
YL/BK
8-NE A
3-TM A
TEMP SENDER
3-TM B
YL/BK
YL/BK
YL/BK
YL/BK
7-CT C
6-IP B
HEATING GRIP SWITCH
6-IP A
6-IP C
OR
OR/VI
6-HC 1
6-HC 2
OR
OR/VI
OR
OR/VI
OR/VI
OR
6-HG 2
OR
6-HG 5
6-HG 1
6-HG 6
OR/VI
OR/VI
OR
OR
HEATING GRIP
HEATING GRIP
YL/BK
YL/BK
6-HG 3
6-HG 4
YL/BK
YL/BK
6-IM B
HEATING LEVER SWITCH
6-IM A
6-IM C
BR/YL
BR
6-HC 10
6-HC 9
BR/YL
BR
6-MC 2
6-MC 1
BR/YL
BR
HEATING LEVER
YL/BK
6-MC 3
YL/BK
YL
VISOR OUTLET
YL/BK
6-HC 3
YL/BK
YL/BK
JTYL/BK
*
YL/WH
1-CA 7
YL/WH
7-LS A
7-LS B
YL/BK
HEATING ELEMENTS



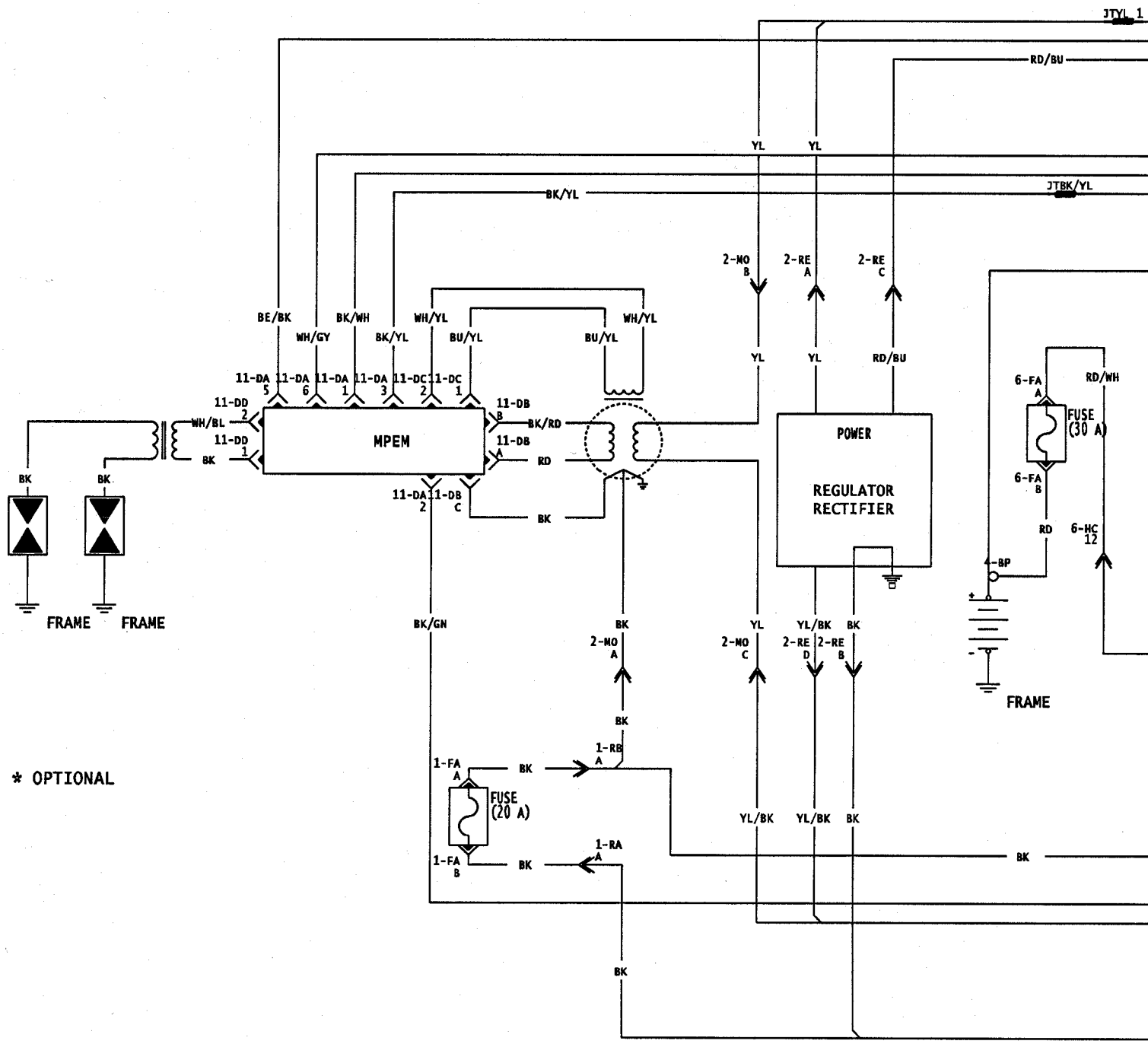
HEATING ELEMENTS

ELECTRIC SUSPENSION

ANNEX 6

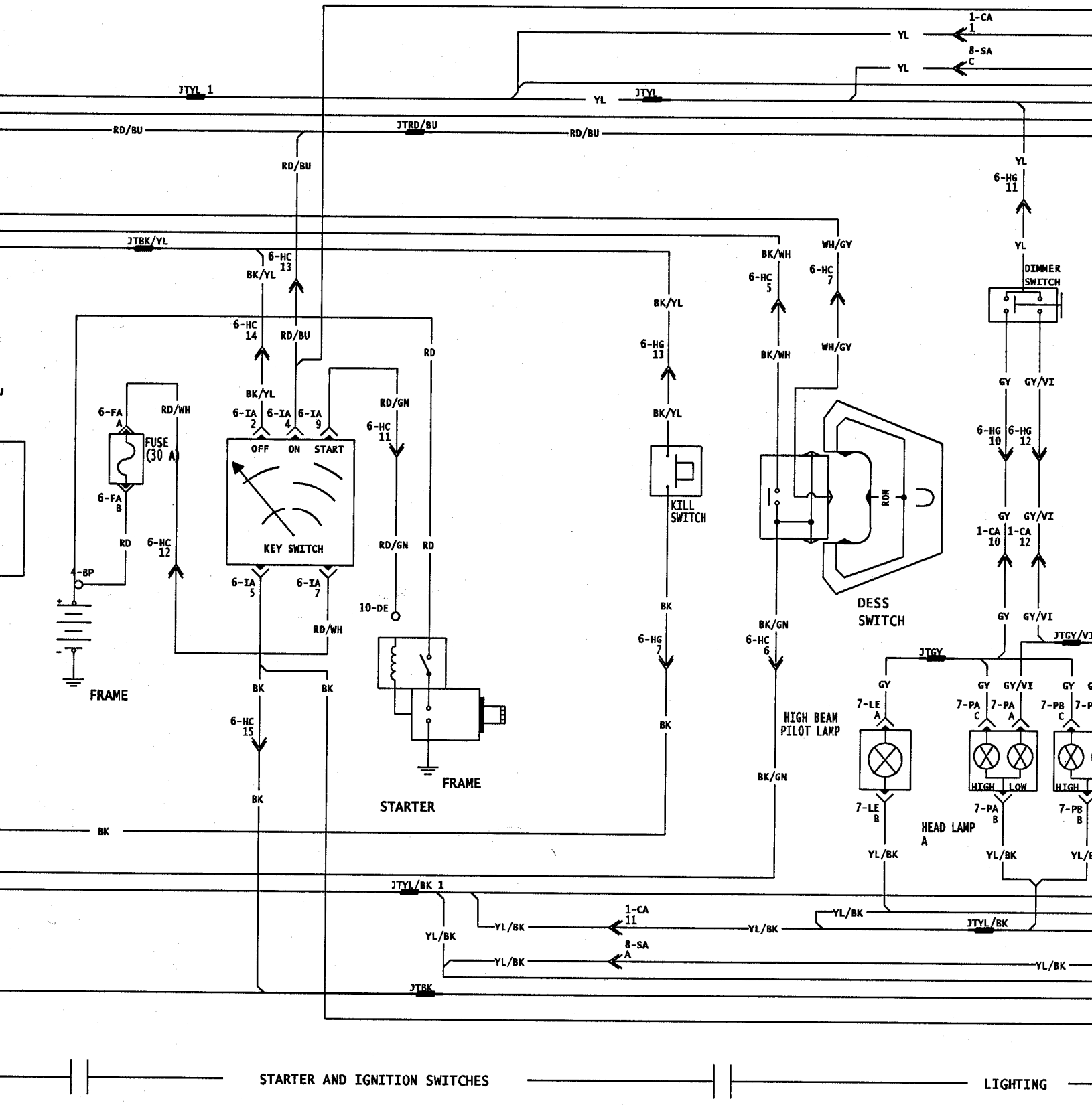
FORMULA DLX STD 500/ 600

2001 FORMULA DLX/STD 500/600



* OPTIONAL

IGNITION SYSTEM | POWER SUPPLY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YL
8-SA C
YL
JTYL 1
YL
JTYL
RD/BU
JTRD/BU
RD/BU
RD/BU
YL
6-HG 11
YL
DIMMER SWITCH
JTBK/YL
6-HC 13
BK/YL
BK/WH
6-HC 5
WH/GY
6-HC 7
BK/YL
6-HG 13
BK/YL
BK/WH
WH/GY
6-HC 14
RD/BU
RD
GY
GY/VI
6-HG 10
6-HG 12
6-FA A
RD/WH
6-IA 2
6-IA 4
6-IA 9
RD/GN
6-HC 11
FUSE (30 A)
OFF
ON
START
6-FA B
RD
6-HC 12
KEY SWITCH
RD/GN
RD
GY
GY/VI
1-CA 10
1-CA 12
4-BP
6-IA 5
6-IA 7
10-DE
RD/WH
KILL SWITCH
BK
6-HG 7
BK/GN
6-HC 6
DESS SWITCH
GY
GY/VI
JTGY/VI
JTGY
FRAME
BK
BK
GY
7-LE A
GY
7-PA C
GY/VI
7-PA A
GY
7-PB C
6-HC 15
HIGH BEAM PILOT LAMP
BK
BK/GN
HIGH
LOW
HIGH
BK
7-LE B
7-PA B
7-PB B
HEAD LAMP A
FRAME
STARTER
YL/BK
YL/BK
YL/BK
JTYL/BK 1
1-CA 11
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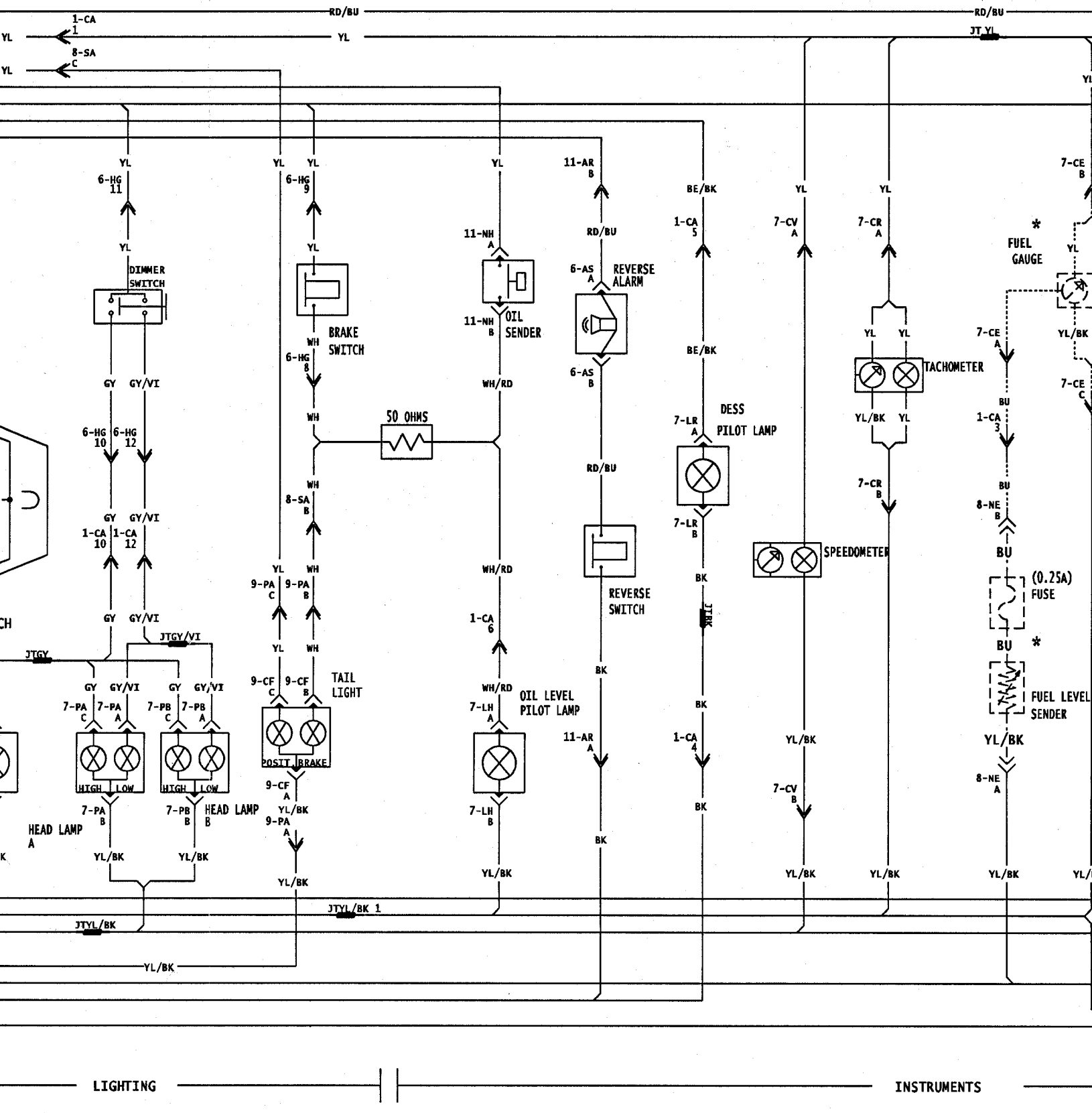
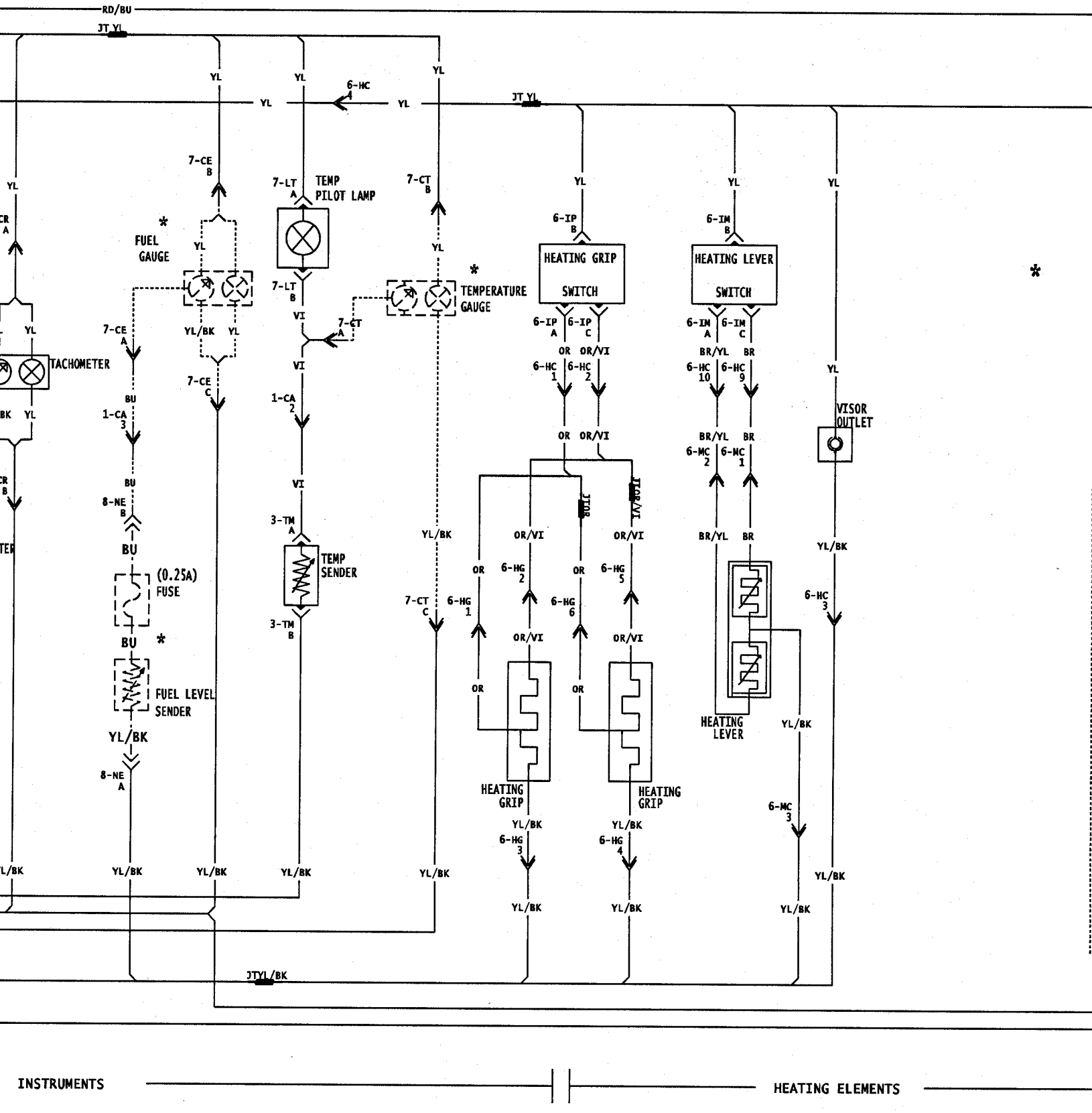
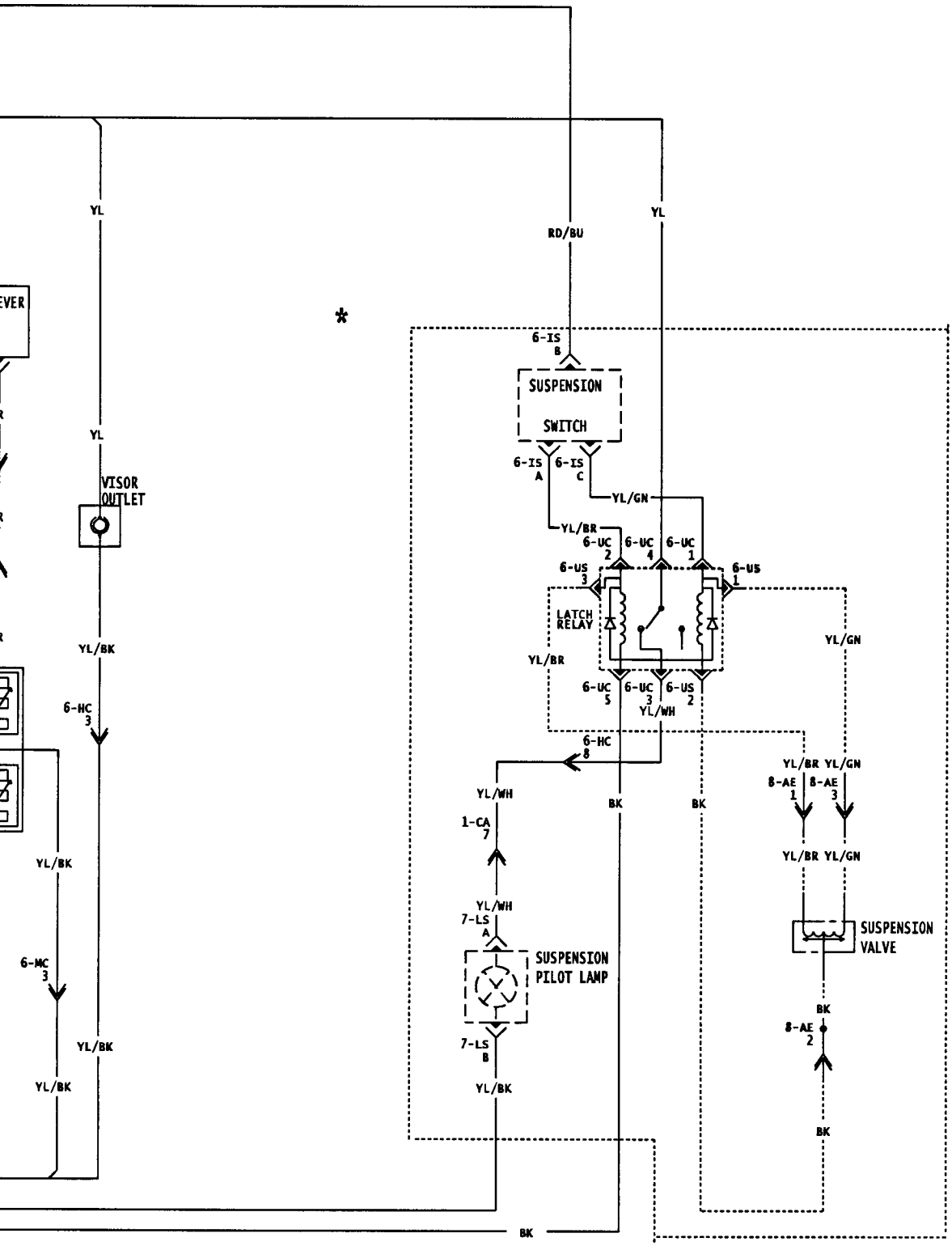
8-SA A
YL/BK
JTBK
STARTER AND IGNITION SWITCHES
LIGHTING

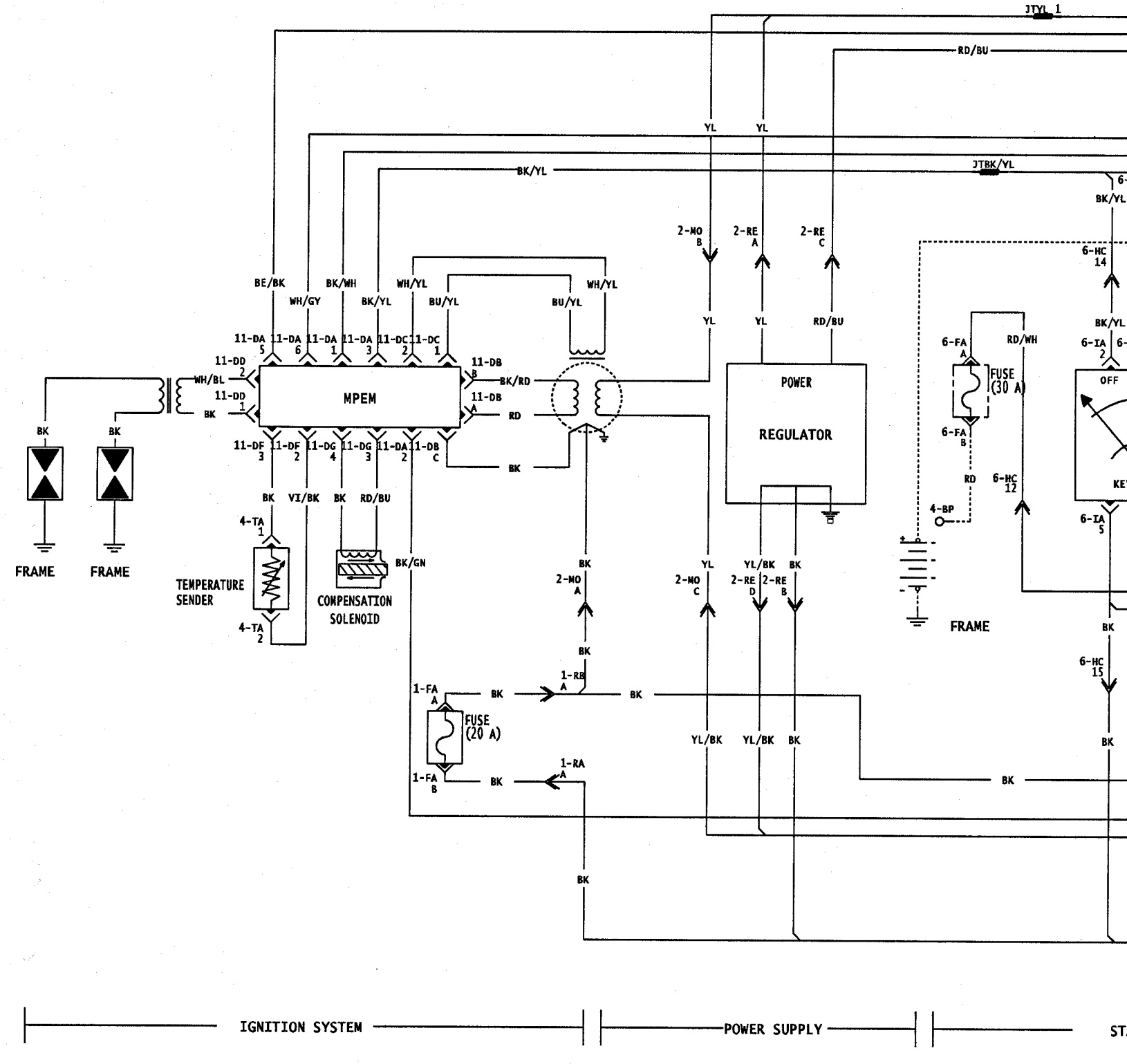

RD/BU
1-CA 1
YL
8-SA C
6-HG 11
DIMMER SWITCH
GY
GY/VI
6-HG 10
6-HG 12
1-CA 10
1-CA 12
JTGY
JTGY/VI
7-PA C
7-PA A
7-PB C
7-PB A
HIGH
LOW
7-PA B
7-PB B
HEAD LAMP A
HEAD LAMP B
YL/BK
6-HG 9
BRAKE SWITCH
WH
6-HG 8
50 OHMS
8-SA B
9-PA C
9-PA B
9-CF C
9-CF B
TAIL LIGHT
POSIT BRAKE
9-CF A
9-PA A
11-NH A
11-NH B
OIL SENDER
WH/RD
1-CA 6
7-LH A
7-LH B
OIL LEVEL PILOT LAMP
11-AR B
6-AS A
REVERSE ALARM
6-AS B
REVERSE SWITCH
11-AR A
BE/BK
1-CA 5
7-LR A
DESS PILOT LAMP
7-LR B
BK
1-CA 4
7-CV A
7-CV B
SPEEDOMETER
7-CR A
7-CR B
TACHOMETER
FUEL GAUGE
7-CE A
7-CE B
7-CE C
1-CA 3
8-NE B
8-NE A
BU
(0.25A) FUSE
FUEL LEVEL SENDER
YL/BK
JTYL/BK 1
JTYL/BK
YL/BK
LIGHTING
INSTRUMENTS

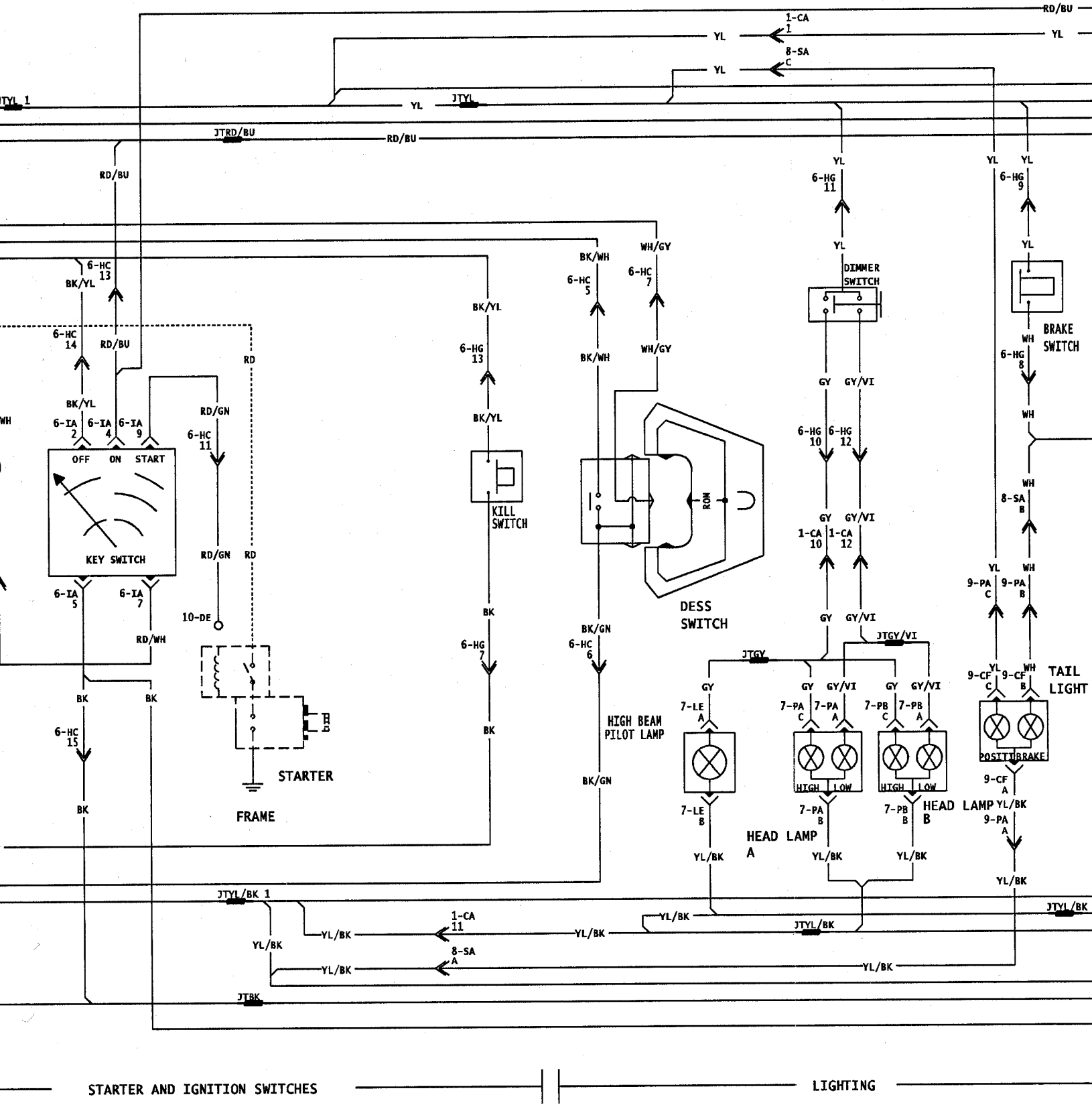

RD/BU
JT YL
YL
6-HC 4
7-CE B
7-LT A
TEMP PILOT LAMP
7-CT B
6-IP B
HEATING GRIP SWITCH
6-IM B
HEATING LEVER SWITCH
VISOR OUTLET
FUEL GAUGE
TACHOMETER
TEMPERATURE GAUGE
7-CE A
YL/BK
7-CE C
7-LT B
VI
7-CT A
1-CA 2
1-CA 3
BU
8-NE B
(0.25A) FUSE
8-NE A
FUEL LEVEL SENDER
3-TM A
TEMP SENDER
3-TM B
6-IP A
6-IP C
OR
OR/VI
6-HC 1
6-HC 2
6-IM A
6-IM C
BR/YL
BR
6-HC 10
6-HC 9
6-MC 2
6-MC 1
6-HC 3
6-HG 1
6-HG 2
6-HG 5
6-HG 6
7-CT C
JT OR/VI
HEATING GRIP
HEATING LEVER
6-HG 3
6-HG 4
6-MC 3
JTYL/BK
INSTRUMENTS
HEATING ELEMENTS


YL
YL
RD/BU
YL
VISOR
OUTLET
YL/BK
6-HC
3
YL/BK
6-MC
3
YL/BK
YL/BK
6-IS
B
SUSPENSION
SWITCH
6-IS
A
6-IS
C
YL/GN
YL/BR
6-UC
2
6-UC
4
6-UC
1
6-US
3
6-US
1
LATCH
RELAY
YL/BR
YL/GN
6-UC
5
6-UC
3
6-US
2
YL/WH
6-HC
8
YL/WH
1-CA
7
BK
BK
YL/BR YL/GN
8-AE
1
8-AE
3
YL/BR YL/GN
YL/WH
7-LS
A
SUSPENSION
PILOT LAMP
SUSPENSION
VALVE
BK
8-AE
2
7-LS
B
YL/BK
BK
BK
HEATING ELEMENTS
ELECTRIC SUSPENSION

ANNEX 7 SUMMIT 600/700/800

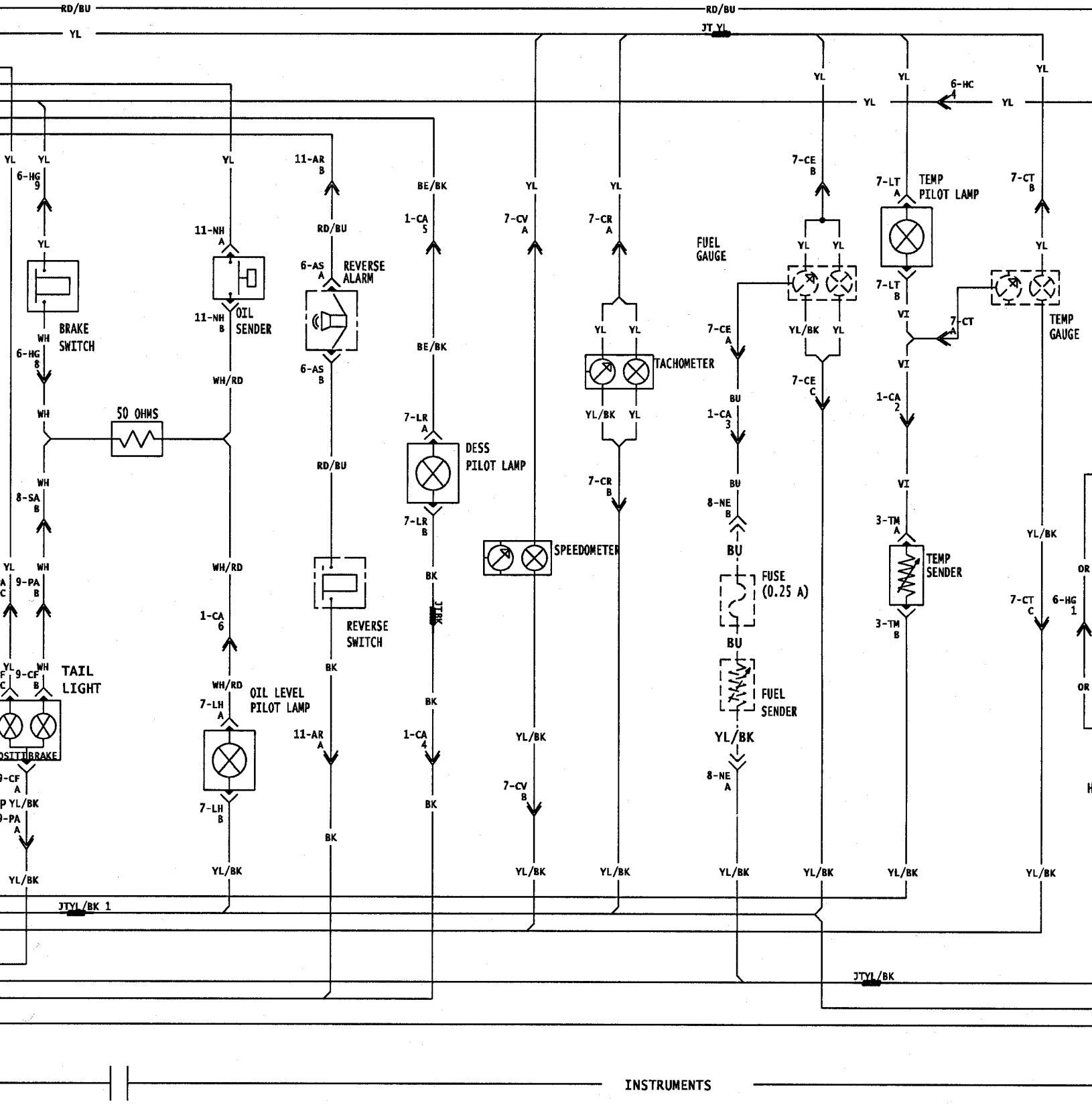
2001 SUMMIT 600/700/800



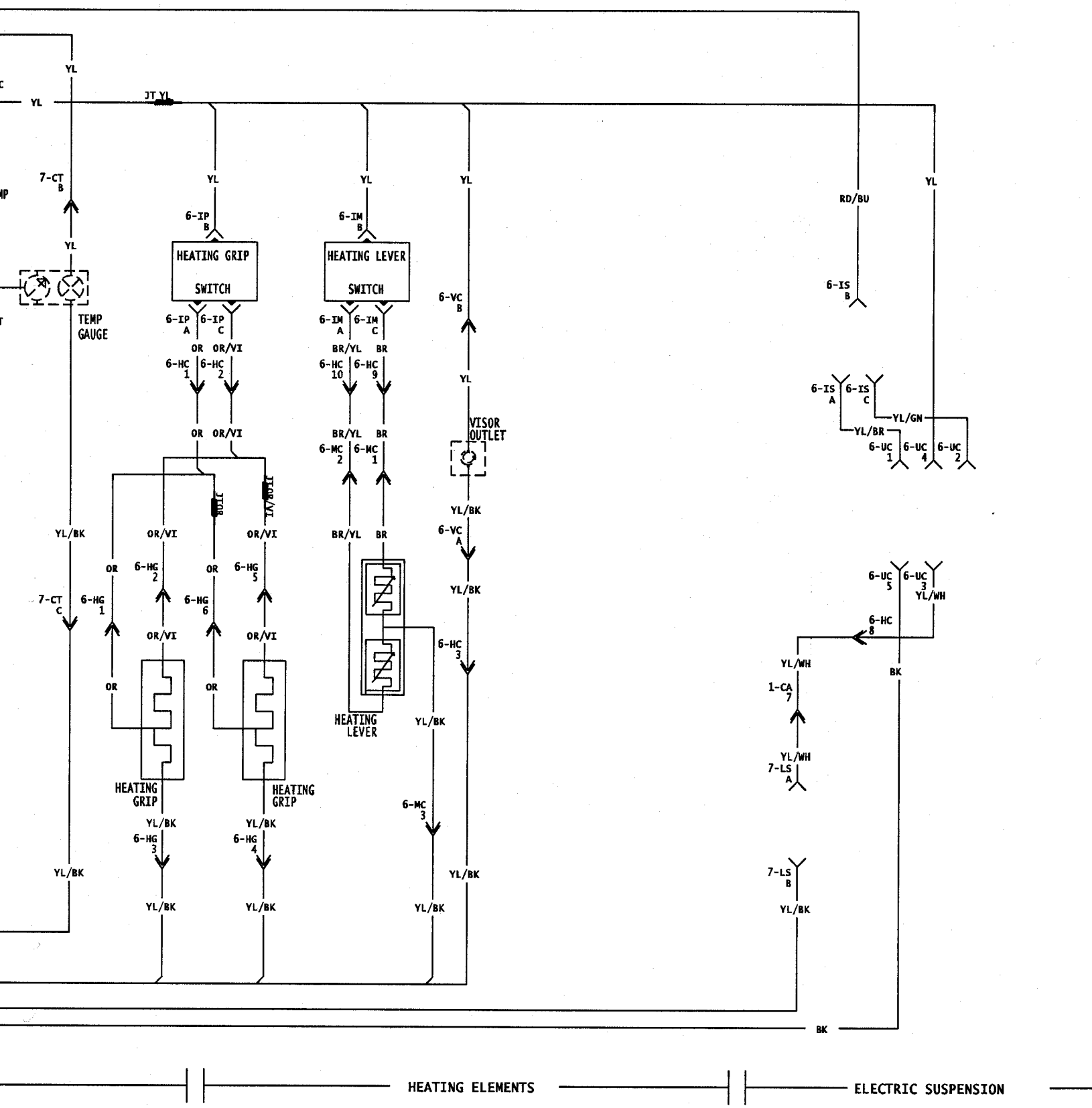


STARTER AND IGNITION SWITCHES

LIGHTING



INSTRUMENTS



HEATING ELEMENTS

ELECTRIC SUSPENSION

ski-doo

ski-doo®

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RECREATIONAL PRODUCTS

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Version française également disponible

Shop Manual

Mini Z

ski-doo

484 200 017

Shop Manual

MINI Z

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RECREATIONAL PRODUCTS

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SAFETY NOTICE

This manual has been prepared as a guide to correctly service and repair Ski-Doo Mini Z snowmobile.

This edition was primarily published to be used by snowmobile mechanics who are already familiar with all service procedures relating to Bombardier made snowmobiles.

Please note that the instructions will apply only if proper hand tools and special service tools are used.

This *Shop Manual* uses technical terms which may be slightly different from the ones used in *Parts Catalog*.

It is understood that this manual may be translated into another language. In the event of any discrepancy, the english version shall prevail.

The content depicts parts and/or procedures applicable to the particular product at its time of manufacture. It does not include dealer modifications, whether authorized or not by Bombardier, after manufacturing the product.

In addition, the sole purpose of the illustrations throughout the manual, is to assist identification of the general configuration of the parts. They are not to be interpreted as technical drawings or exact replicas of the parts.

The use of Bombardier parts is most strongly recommended when considering replacement of any component. Dealer and/or distributor assistance should be sought in case of doubt.

The engine and the corresponding components identified in this document should not be utilized on product(s) other than those mentioned in this document.

Torque wrench tightening specifications must be strictly adhered to. Locking devices (ex.: locking tab, self-locking fasteners, etc.) must be installed or replaced with new ones, where specified. If the efficiency of a locking device is impaired, it must be renewed.

This manual emphasizes particular information denoted by the wording and symbols:

⚠ WARNING

Identifies an instruction which, if not followed, could cause serious personal injury including possibility of death.

CAUTION: Denotes an instruction which, if not followed, could severely damage vehicle components.

NOTE: Indicates supplementary information needed to fully complete an instruction.

Although the mere reading of such information does not eliminate the hazard, your understanding of the information will promote its correct use. Always use common shop safety practice.

This information relates to the preparation and use of Bombardier snowmobiles and has been utilized safely and effectively by Bombardier Inc. However, Bombardier Inc. disclaims liability for all damages and/or injuries resulting from the improper use of the contents. We strongly recommend that any services be carried out and/or verified by a highly skilled professional mechanic. It is understood that certain modifications may render use of the vehicle illegal under existing federal, provincial and state regulations.

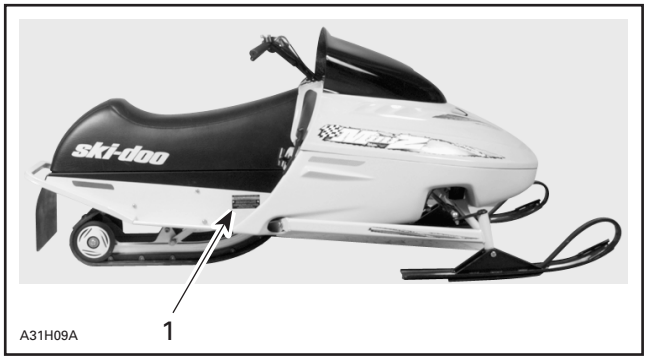
INTRODUCTION

This *Shop Manual* covers the Ski-Doo Mini Z* snowmobile.

* Trademark of Bombardier Inc.

VEHICLE IDENTIFICATION NUMBER

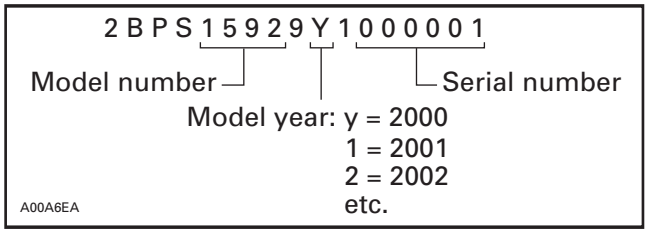
Vehicle Identification Number Location



TYPICAL

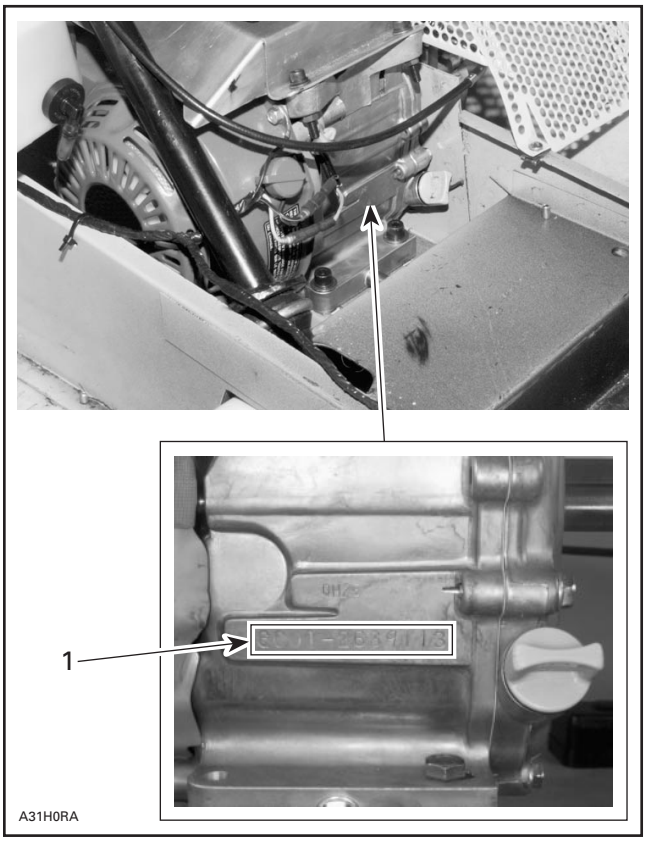
1. Vehicle identification number

Vehicle Identification Number Meaning



ENGINE SERIAL NUMBER

Engine Serial Number Location



1. Engine serial number

ARRANGEMENT OF THE MANUAL

The manual is divided into 11 major sections:

01 SERVICE TOOLS AND SERVICE PRODUCTS
02 LUBRICATION AND MAINTENANCE
03 TROUBLESHOOTING
04 ENGINE
05 TRANSMISSION
06 ELECTRICAL
07 REAR SUSPENSION
08 STEERING/FRONT SUSPENSION
09 BODY/FRAME
10 TECHNICAL DATA
11 WIRING DIAGRAM

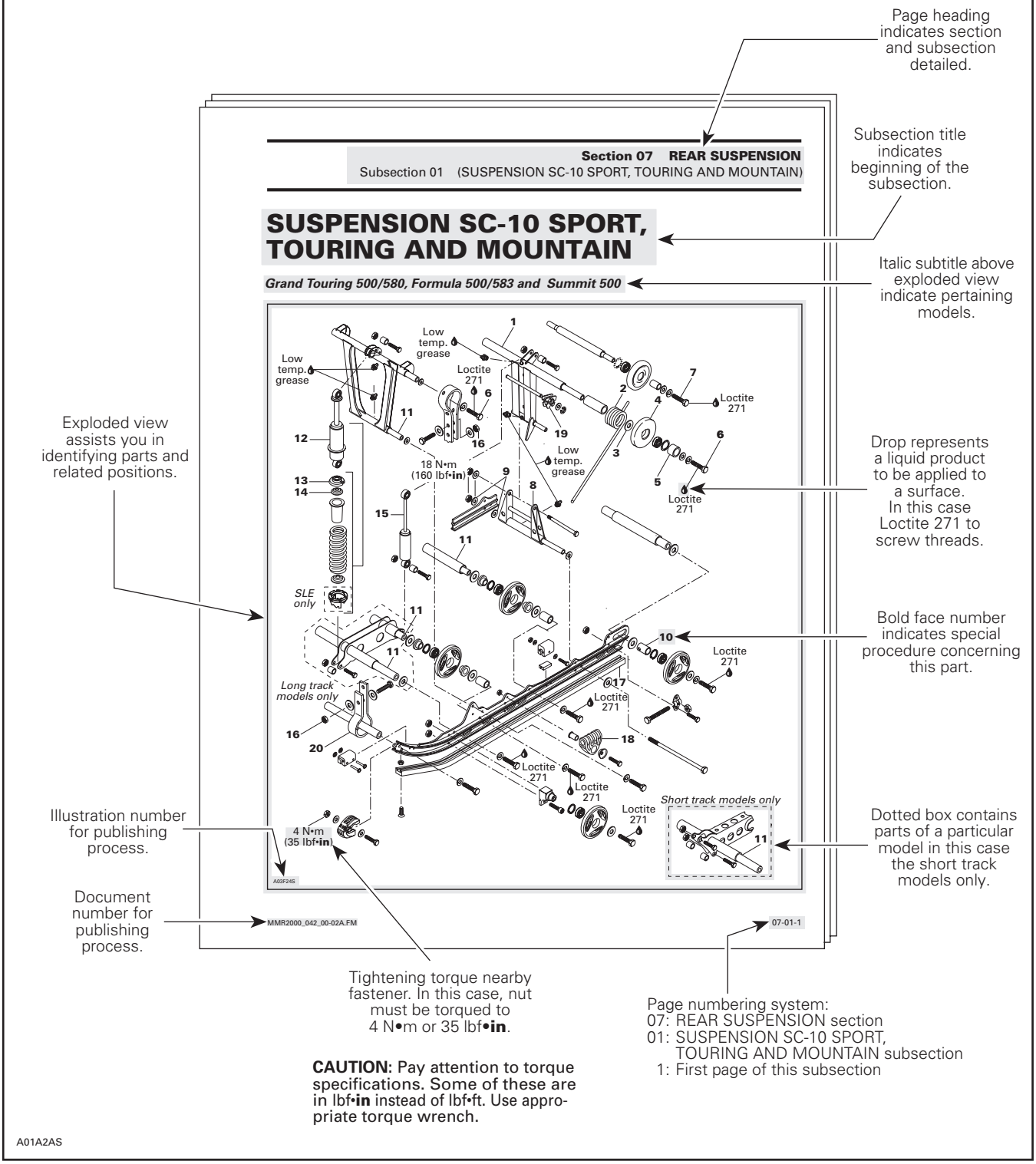
Each section is divided in various subsections, and again, each subsection has one or more division.

LIST OF ABBREVIATIONS USED IN THIS MANUAL

A	ampere
amp	ampere
A•h	ampere-hour
AC	alternate current
°C	degree Celsius
CCW	counterclockwise
cm	centimeter
cm²	square centimeter
cm³	cubic centimeter
DC	direct current
°F	degree Fahrenheit
FC	fan cooled
fl. oz	fluid ounce
ft	foot
GRD	ground
imp. oz	imperial ounce
in	inch
in²	square inch
in³	cubic inch
k	kilo (thousand)
kg	kilogram
km/h	kilometer per hour
kPa	kilopascal
L	liter
lb	pound
lbf	pound (force)
lbf/in²	pound per square inch
LH	left hand
m	meter
MAG	magneto
Max.	maximum
Min.	minimum
mL	milliliter
mm	millimeter
MPH	mile per hour
N	newton
N.A.	not applicable
no.	number
00.0	continuity
0.L	overload (open circuit)
O.D.	outside diameter
OPT	optional
oz	ounce
P/N	part number
PSI	pound per square inch
PTO	power take off
R	rectangular
RPM	revolution per minute
TDC	top dead center
U.S. oz	ounce (United States)
V	volt
Vac	volt (alternative current)

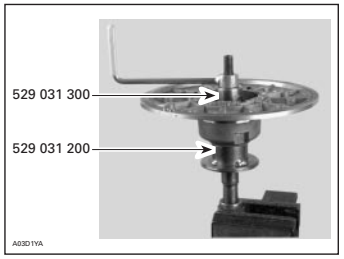
This *Shop Manual* uses technical terms wich may be slightly different from the ones in the parts catalog.

TYPICAL PAGE



TYPICAL PAGE

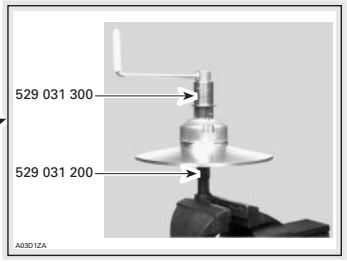
Turn puller handle and sliding half at once to extract the bushing.



IMPORTANT: Large bushing retaining screws and washers must be removed before small bushing installation.

Coat bushing outside diameter with Loctite 609 (P/N 413 703 100).

Install bushing as following photo.



ASSEMBLY

Came Slider Shoe

When replacing slider shoes **no. 4**, always install a new set (3 shoes) to maintain equal pressure on the cam.

Assemble driven pulley components by reversing the disassembly procedure.

Cam

Coat cam **no. 18** interior with anti-seize lubricant.

INSTALLATION

Countershaft

CAUTION: Always apply anti-seize lubricant (P/N 413 701 000) on the countershaft before final pulley installation.

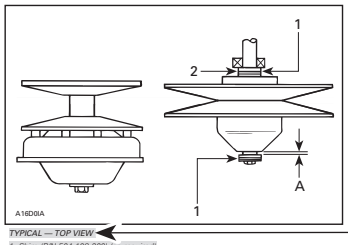
A-Series and B-Series Only

Should installation procedure be required, refer to BRAKE 05-05 then look for **Brake Disc and Countershaft Bearing Adjustment**.

Reinstall the pulley on the countershaft by reversing the removal procedure.

All Models

Check end play of driven pulley on countershaft by pushing pulley towards outer housing so that the inner shims (P/N 504 108 200) contact it. Measure end play at the mounting screw end between shim(s) and puley. See illustration.



TYPICAL — TOP VIEW.
1. Shim (P/N 504 108 200) (as required)
2. Contact
A. 0 to 1 mm (0 to 3/64 in)

Torque retaining screw **no. 13** to 25 N•m (18 lbf•ft).

ADJUSTMENT

Refer to PULLEY DISTANCE AND ALIGNMENT 05-04 to adjust pulley distance. Adjust drive belt height between pulley halves to obtain specified belt deflection.

Title indicates main procedure to be carried-out.

Italic bold face type setting indicates a particular procedure concerning a model.

Italic bold face setting in this case indicates that particular procedure for A and B-Series is finished, so from this point, all models are concerned.

"TYPICAL" caption indicates a general view which does not represent full detail. "TOP VIEW" caption helps you in understanding illustration.

Illustration always follows text to which it pertains.

Call-outs for above illustration.

Reference to look up a certain section and subsection. In this case it concerns pulleys adjustment.

Subtitle indicates a particular procedure for the named part.

Bold face number following part name refers to exploded view at beginning of subsection.

A01A2BS

GENERAL INFORMATION

The information and component/system descriptions contained in this manual are correct at time of publication. Bombardier Inc. however, maintains a policy of continuous improvement of its products without imposing upon itself any obligation to install them on products previously manufactured.

Due to late changes, it may have some differences between the manufactured product and the description and/or specifications in this document.

Bombardier Inc. reserves the right at any time to discontinue or change specifications, designs, features, models or equipment without incurring obligation.

USEFUL PUBLICATIONS

Refer to *Parts Catalogs* to order the right parts.

Use *Specification Booklet* to find rapidly the right specs.

ILLUSTRATIONS AND PROCEDURES

Illustrations and photos show the typical construction of the different assemblies and, in all cases, may not reproduce the full detail or exact shape of the parts shown, however, they represent parts which have the same or a similar function.

CAUTION: Most components of those vehicles are built with parts dimensioned in the metric system. Most fasteners are metric and must not be replaced by customary fasteners or vice-versa. Mismatched or incorrect fasteners could cause damage to the vehicle or possible personal injury.

As many of the procedures in this manual are interrelated, we suggest, that before undertaking any task, you read and thoroughly understand the entire section or subsection in which the procedure is contained.

A number of procedures throughout the book require the use of special tools. Before commencing any procedure, be sure that you have on hand all the tools required, or approved equivalents.

The use of RIGHT and LEFT indications in the text, always refers to driving position (when sitting on vehicle).

TYPICAL

1. *Left*
2. *Right*

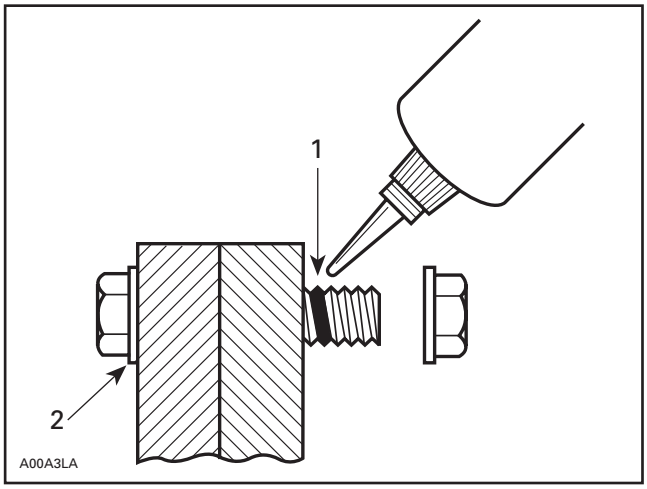
LOCTITE APPLICATION PROCEDURE

The following describes the most common application procedures when working with Loctite products.

NOTE: Always use proper strength Loctite product as recommended in this *Shop Manual*.

THREADLOCKER

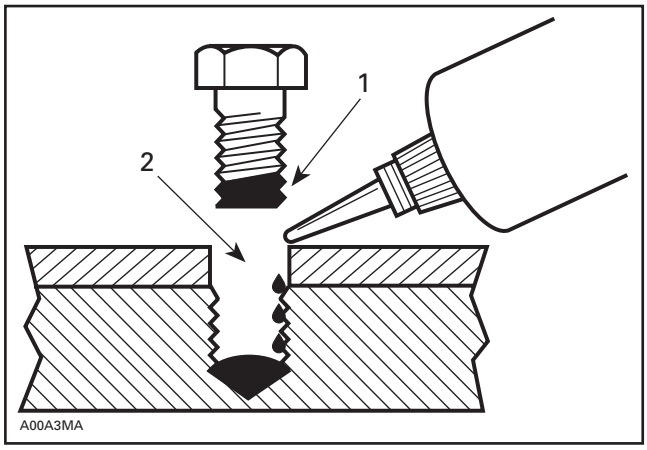
Uncovered Holes (bolts and nuts)



1. Apply here
2. Do not apply

1. Clean threads (bolt and nut) with solvent.
2. Apply Loctite Primer N (P/N 293 800 041) on threads and allow to dry.
3. Choose proper strength Loctite threadlocker.
4. Fit bolt in the hole.
5. Apply a few drops of threadlocker at proposed tightened nut engagement area.
6. Position nut and tighten as required.

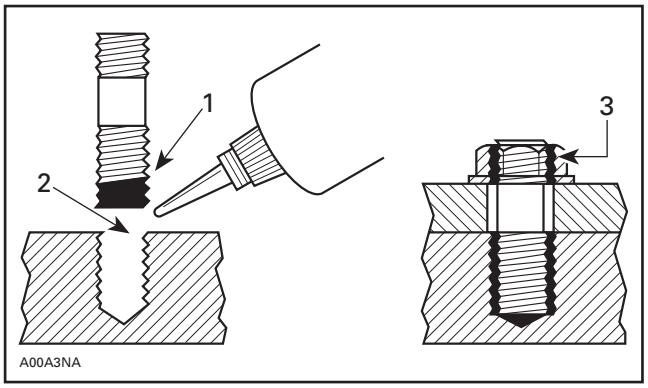
Blind Holes



1. On threads
2. On threads and at the bottom of hole

1. Clean threads (bolt and hole) with solvent.
2. Apply Loctite Primer N (P/N 293 800 041) on threads (bolt and nut) and allow to dry for 30 seconds.
3. Choose proper strength Loctite threadlocker.
4. Apply several drops along the threaded hole and at the bottom of the hole.
5. Apply several drops on bolt threads.
6. Tighten as required.

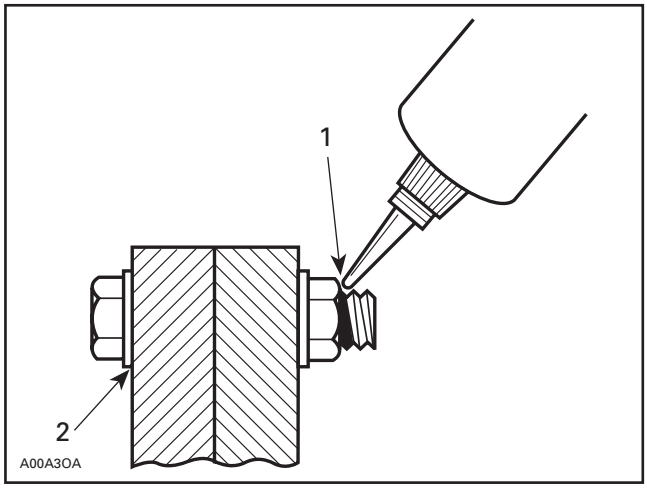
Blind Holes



1. On threads
2. On threads and in the hole
3. Onto nut threads

1. Clean threads (bolt and hole) with solvent.
2. Apply Loctite Primer N (P/N 293 800 041) on threads and allow to dry.
3. Put several drops of proper strength Loctite threadlocker on female threads and in hole.
4. Apply several drops of proper strength Loctite on stud threads.
5. Install stud.
6. Install cover, etc.
7. Apply drops of proper strength Loctite on uncovered threads.
8. Tighten nuts as required.

Preassembled Parts

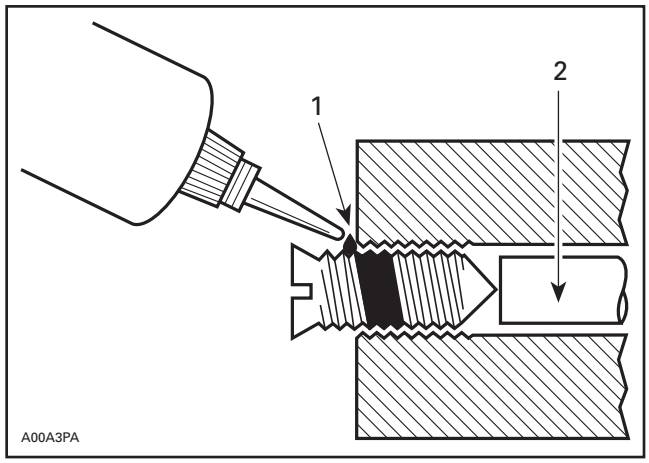


1. Apply here
2. Do not apply

1. Clean bolts and nuts with solvent.
2. Assemble components.
3. Tighten nuts.
4. Apply drops of proper strength Loctite on bolt/nut contact surfaces.
5. Avoid touching metal with tip of flask.

NOTE: For preventive maintenance on existing equipment, retighten nuts and apply proper strength Loctite on bolt/nut contact surfaces.

Adjusting Screw



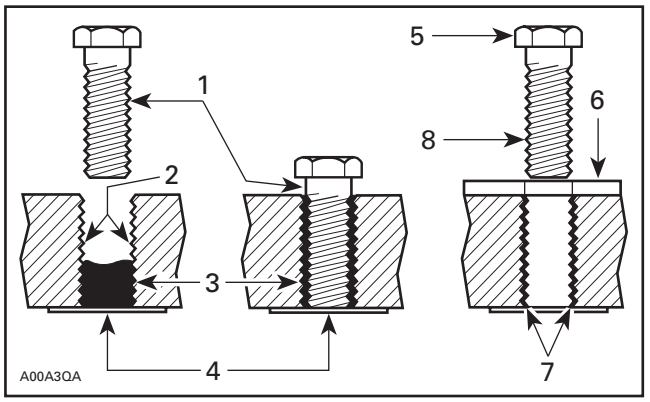
1. Apply here
2. Plunger

1. Adjust screw to proper setting.
2. Apply drops of proper strength Loctite threadlocker on screw/body contact surfaces.
3. Avoid touching metal with tip of flask.

NOTE: If it is difficult to readjust, heat screw with a soldering iron (232°C (450°F)).

STRIPPED THREAD REPAIR

Stripped Threads



1. Release agent
2. Stripped threads
3. Form-A-Thread
4. Tape
5. Cleaned bolt
6. Plate
7. New threads
8. Threadlocker

Standard Thread Repair

1. Follow instructions on Loctite FORM-A-THREAD (P/N 413 708 600) package.
2. If a plate is used to align bolt:
   a. Apply release agent on mating surfaces.
   b. Put waxed paper or similar film on the surfaces.
3. Twist bolt when inserting it to improve thread conformation.

NOTE: NOT intended for engine stud repairs.

Repair of Small Holes/Fine Threads

Option 1: Enlarge damaged hole, then follow **Standard Thread Repair** procedure.

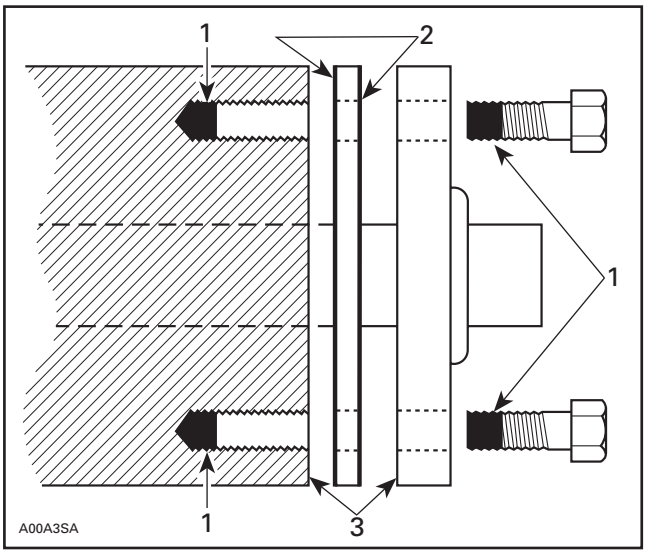
Option 2: Apply FORM-A-THREAD on the screw and insert in damaged hole.

Permanent Stud Installation (light duty)

1. Use a stud or thread on desired length.
2. DO NOT apply release agent on stud.
3. Do a **Standard Thread Repair**.
4. Allow to cure for 30 minutes.
5. Assemble.

GASKET COMPOUND

All Parts



1. Proper strength Loctite
2. Loctite Primer N (P/N 413 708 100) and Gasket Eliminator 515 (P/N 413 702 700) on both sides of gasket
3. Loctite Primer N only

1. Remove old gasket and other contaminants with Loctite Chisel remover (P/N 413 708 500). Use a mechanical mean if necessary.

NOTE: Avoid grinding.

2. Clean both mating surfaces with solvent.
3. Spray Loctite Primer N on both mating surfaces and on both sides of gasket. Allow to dry 1 or 2 minutes.
4. Apply GASKET ELIMINATOR 515 (P/N 413 702 700) on both sides of gasket, using a clean applicator.
5. Place gasket on mating surfaces and assemble immediately.

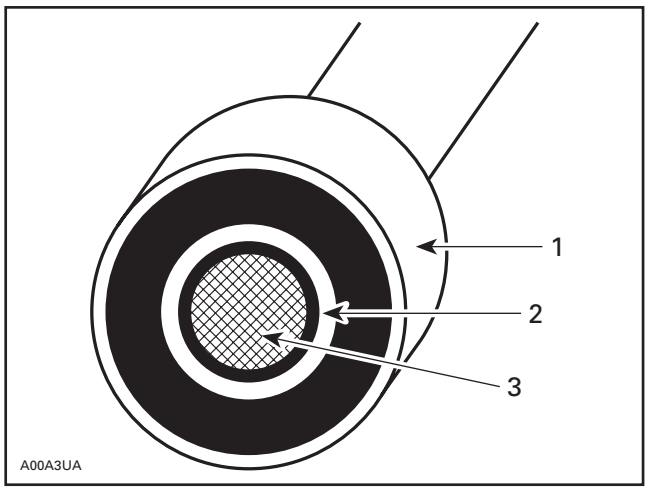
NOTE: If the cover is bolted to blind holes (above), apply proper strength Loctite in the hole and on threads. Tighten.

If holes are sunken, apply proper strength Loctite on bolt threads.

6. Tighten as usual.

MOUNTING ON SHAFT

Mounting with a Press



1. Bearing
2. Proper strength Loctite
3. Shaft

Standard

1. Clean shaft external part and element internal part.
2. Apply a strip of proper strength Loctite on shaft circumference at insert or engagement point.

NOTE: Retaining compound is always forced out when applied on shaft.

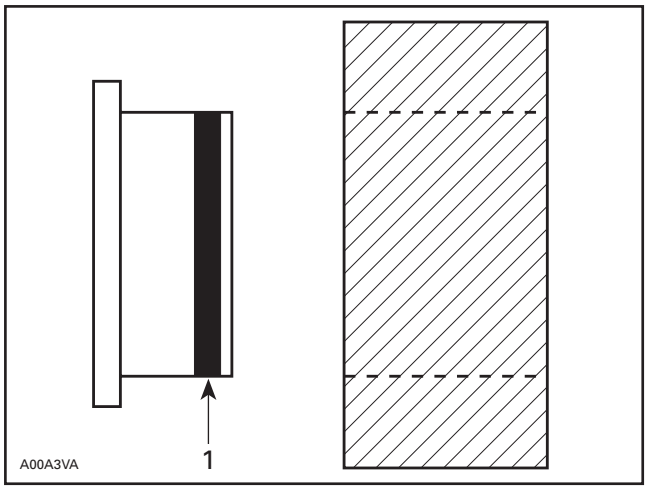
3. DO NOT use anti-seize Loctite or any similar product.
4. No curing period is required.

Mounting in Tandem

1. Apply retaining compound on internal element bore.
2. Continue to assemble as shown above.

CASE-IN COMPONENTS

Metallic Gaskets



1. Proper strength Loctite

1. Clean inner housing diameter and outer gasket diameter.
2. Spray housing and gasket with Loctite Primer N (P/N 293 800 041).
3. Apply a strip of proper strength Loctite on leading edge of outer metallic gasket diameter.

NOTE: Any Loctite product can be used here. A low strength liquid is recommended as normal strength and gap are required.

4. Install according to standard procedure.
5. Wipe off surplus.
6. Allow it to cure for 30 minutes.

NOTE: Normally used on worn-out housings to prevent leaking or sliding.

It is generally not necessary to remove gasket compound applied on outer gasket diameter.

TIGHTENING TORQUES

Tighten fasteners to torque mentioned in exploded views and text. When they are not specified refer to following table. All torques apply to 8.8 grade fasteners. Bold face size (e.g. **M4**) indicates nominal value (mean value).

N•m	FASTENER SIZE (8.8 GRADE)	Lbf•**in**
2	**M4**	18
3	M4	27
4	**M5**	35
8	M6	71
9	M6	80
10	**M6**	89
11	**M6**	97
12	**M6**	106

N•m	FASTENER SIZE (8.8 GRADE)	Lbf•ft
21	M8	15
22	M8	16
23	**M8**	17
24	M8	18
25	M8	18
43	M10	32
44	M10	32
45	M10	33
46	M10	34
47	M10	35
48	**M10**	35
49	M10	36
50	M10	37
51	M10	38
52	M10	38
53	M10	39
76	M12	56
77	M12	57
78	M12	58
79	M12	58
80	**M12**	59
81	M12	60
82	M12	60
83	M12	61
84	M12	62
121	M14	89
122	M14	90
123	M14	91
124	M14	91
125	M14	92
126	M14	93
127	M14	94
128	M14	94
129	M14	95
130	M14	96
131	M14	97
132	M14	97
133	M14	98
134	M14	99
135	**M14**	100
136	M14	100
137	M14	101
138	M14	102
139	M14	103
140	M14	103
141	M14	104
142	M14	105
143	M14	105
144	M14	106
145	M14	107
146	M14	108
147	M14	108
148	M14	109
149	M14	110
150	M14	111

TIGHTENING TORQUES FOR 8.8 GRADE BOLTS AND NUTS

We would be pleased if you could communicate to Bombardier any suggestions you may have concerning our publications.

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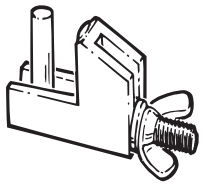
SERVICE TOOLS

This is a list of tools to properly service Ski-Doo snowmobile models specified on cover page. The list includes both the mandatory tools and the optional tools that are ordered separately. The list of Service Products, both mandatory and optional, are not part of any kit and must all be ordered separately. If you need to replace or add to your tool inventory these items can be ordered through the regular parts channel.

ENGINE — MANDATORY SERVICE TOOLS

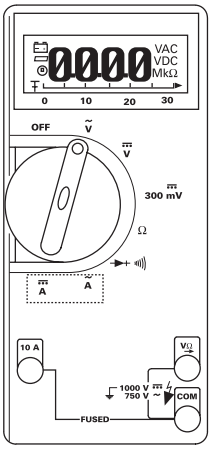
Hose pincher (2)
(P/N 295 000 076)



A01B2I4

APPLICATION
All vehicles.

Fluke multimeter
(P/N 529 022 000)



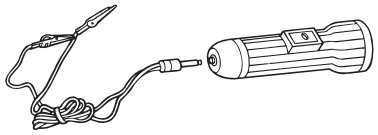
F01B1O4

APPLICATION
All models.

ENGINE (continued) — RECOMMENDED SERVICE TOOLS

The following tools are highly recommended to optimize your basic tool kit and reduce repair time.

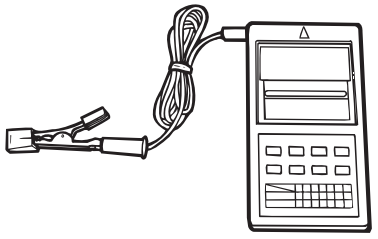
Circuit tester
(continuity light)
(P/N 414 012 200)



A00C214

APPLICATION
All models.

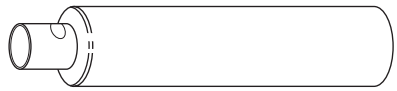
Digital/induction type
tachometer
(P/N 529 014 500)



F01B1G4

APPLICATION
All engines.

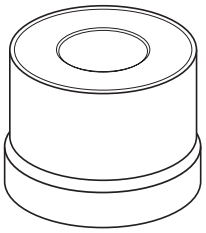
Driver tool
(P/N 529 035 521)



A00B4O4

APPLICATION
Crankcase bearings.

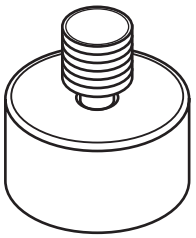
Attachment
(P/N 529 035 522)



A00B4P4

APPLICATION
Crankcase bearings.

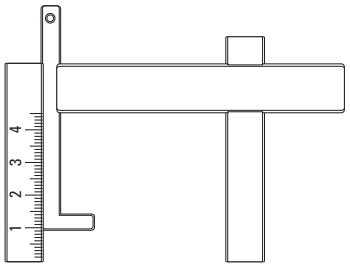
Pilot 22 mm
(P/N 529 035 523)



A00B4Q4

APPLICATION
Crankcase bearings.

Float level gauge
(P/N 529 035 520)



A00B4N4

APPLICATION
All models.

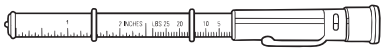
TRANSMISSION — MANDATORY SERVICE TOOLS

Clutch holder
(P/N 529 006 400)

A01B154

APPLICATION
All TRA drive pulleys and Mini Z flywheel.

Tension tester
(P/N 414 348 200)



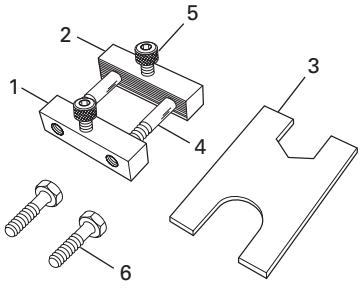
A03D1T4

APPLICATION
All models.

TRANSMISSION (continued) — RECOMMENDED SERVICE TOOLS

The following tools are highly recommended to optimize your basic tool kit and reduce repair time.

Drive axle sprocket adjuster
(P/N 861 725 700)



A01B2O4

APPLICATION
All vehicles.

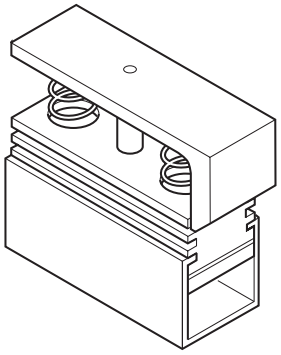
Parts included in the kit:

1) Block with threads
   (P/N 529 010 700)
2) Block without threads
   (P/N 529 010 800)
3) Plate
   (P/N 529 010 600)
4) Bolt M10 (2)
   (P/N 222 007 565)
5) Allen screw M8 (2)
   (P/N 222 983 065)
6) Screw M8 (2)
   (P/N 222 082 565)

NOTE: When the tool is to be use between tunnel and sprocket use screw M8.

SUSPENSION — RECOMMENDED SERVICE TOOLS

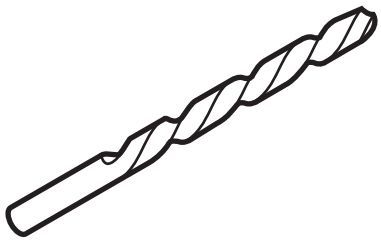
Track tension gauge
(P/N 529 021 500)



A00B3X4

APPLICATION
All models.

Drill bit
(P/N 529 031 800)



A01B564

APPLICATION
All 3/16 in rivets.

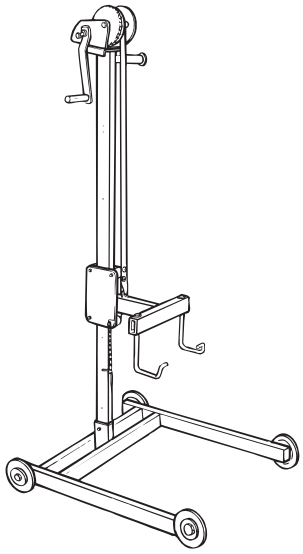
VEHICLES — RECOMMENDED SERVICE TOOLS

Protective mat
(P/N 529 030 600)

A01B45W

APPLICATION
All models.

Snowmobile jack
(P/N 529 020 000)



A01A1JJ

APPLICATION
All models.

SERVICE PRODUCTS

MANDATORY SERVICE PRODUCTS

Loctite® is a trademarks of Loctite Corporation.

Dow Corning® is a trademarks of Dow Corning Corporation.

Retaining compound
(P/N 413 703 100)
Loctite® RC/609:
Retaining compound (10 mL) (green)

A00B2S4

APPLICATION

Used for retaining bushings, bearings in slightly worn housing or on shaft.

Sealing compound
(P/N 420 297 905)

A00B564

APPLICATION

To seal crankcase on all ZX series engines.

Paste gasket
(P/N 413 702 700)
Loctite® 515:
Gasket eliminator (50 mL)

A00B2T4

APPLICATION

Crankcase halves and gearbox mating surfaces.

Paste gasket
(P/N 293 800 038)
Loctite® 518:
Gasket eliminator (50 mL)

F01B124

APPLICATION

Crankcase halves and gearbox mating surfaces.

Medium-strength threadlocker
(P/N 293 800 015)
Loctite® 242:
Threadlocker (10 mL)
(blue, medium strength)

A00B324

APPLICATION

Flywheel nut, crankcase studs, etc.

NOTE: Loctite 242 will be replaced by Loctite 243 (P/N 293 800 060).

High strength threadlocker
(P/N 293 800 005)
Loctite® 271:
Threadlocker (10 mL)
(red, high strength)

A00B2U4

APPLICATION

Fasteners and studs up to 25 mm (1 in) diameter.

MANDATORY SERVICE PRODUCTS (continued)

Gasket/paint remover
(P/N 413 708 500)
Loctite® Chisel
510 g (18 oz)

A00B574

APPLICATION

Clean mating surfaces of cylinders and crankcase. Remove carbon in combustion chambers.

Loctite® primer
(P/N 293 800 041)
Primer N
170 g (6 oz)

A00B3N4

APPLICATION

To prepare mating surfaces before applying paste gasket, retaining compound or threadlockers.

NOTE: Only the P/N has been changed. This product is identical to the P/N 413 708 100.

Silicone compound
(P/N 293 550 004)
Dow Corning® MS4

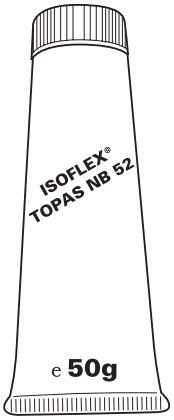
A00B3R4

APPLICATION

Lubricate pawl and pawl lock of rewind starter.

NOTE: Only the P/N has been changed. This product is identical to the P/N 420 897 061.

Grease Isoflex
(50 g)
(P/N 293 550 021)



A00B554

APPLICATION

To lubricate some bearings on 3-cylinder, 453, 493, 593 and 693 engines.

Petamo grease
(P/N 420 899 271)

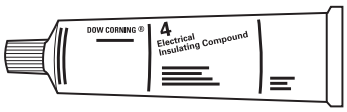
A00B584

APPLICATION

To lubricate lip of all ZX series engine crankshaft seals.

RECOMMENDED SERVICE PRODUCTS

Silicone dielectric grease
(3 oz)
(P/N 293 550 004)



A00B1X4

APPLICATION

On all electric connections. High tension coil and spark plug connections. Connector housings, etc.

NOTE: Only the P/N has been changed. This product is identical to the P/N 413 701 700.

Grease LMZ no. 1
(400 g)
(P/N 413 707 500)

A00B1Y4

APPLICATION

Mainly used between regulators or rectifiers and upper column to transfer the heat build-up and to assure a good ground.

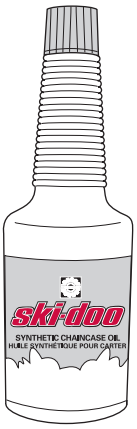
Chaincase oil
(16 x 250 mL)
(P/N 413 801 900)

A00B2R4

APPLICATION

Chaincase lubricant on all fan-cooled models except Skandic WT series.

Synthetic chaincase oil
(12 x 355 mL)
(P/N 413 803 300)



A01B4Q4

APPLICATION

Chaincase lubricant on all liquid-cooled models and Skandic WT series.

Blizzard oil
(12 x 500 mL)
(P/N 413 803 100)

TYPICAL

A00B2Q4

APPLICATION

All pre-mix models.

Injection oil
(P/N 413 802 900)
(12 x 1 liter)
(P/N 413 803 000)
(3 x 4 liter)
(P/N 413 803 200)
(205 liter)

F01B2H4

APPLICATION

All engines.

BOMBARDIER-ROTAX Formula XP-S synthetic injection oil
(P/N 413 710 500)
(12 x 1 liter)
(P/N 413 711 000)
(3 x 4 liter)
(P/N 413 710 700)
(205 liter)

F01B354

APPLICATION

All engines.

RECOMMENDED SERVICE PRODUCTS (continued)

Pipe sealant
(P/N 293 800 018)
Loctite 592 (50 mL)

A00B2W4

APPLICATION

Engine plugs and senders.

NOTE: Only the P/N has been changed. This product is identical to the P/N 413 702 300.

High temperature threadlocker
(P/N 413 711 400)
Loctite 648 (green) (5 mL)

A00B3D4

APPLICATION

To fasten oil injection nozzle to crankcase.

NOTE: Only the P/N has been changed. This product is identical to the P/N 420 899 788.

Anti-seize lubricant
(P/N 293 800 023)
Loctite anti-seize lubricant 454 g (16 oz)

A00B594

APPLICATION

Unpainted surfaces of driven pulley countershaft.

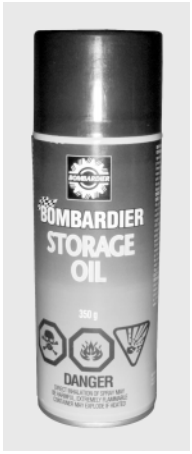
Synthetic grease
(400 g)
(P/N 413 711 500)

A01B574

APPLICATION

For front and rear suspension components and drive axle bearing.

Storage oil
(350 g spray can)
(12 x 350 g)
(P/N 413 711 600)



A02B054

APPLICATION

All models.

NOTE: Only the P/N has been changed. This product is identical to the P/N 496 014 100.

Degreaser
(P/N 413 708 400)
Permatex® 48 TA
433 g (15 oz)

A00B3K4

APPLICATION

Engine, chaincase and any greasy surfaces.

RECOMMENDED SERVICE PRODUCTS (continued)

Plastic & vinyl cleaner
(P/N 413 711 200)
6 x 1 L

A00B4V4

APPLICATION
Hood, bottom pan and seat.

Parts cleaner
(P/N 413 711 809)
320 g

A00B4X4

APPLICATION
Engine crankcase joining surfaces, pulleys and any greasy surfaces.

NOTE: This product replaces Loctite Safety solvent (P/N 413 708 200).

Gel instant adhesive
(P/N 413 708 300)
Loctite 454-40
20 g (.70 oz)

A00B3O4

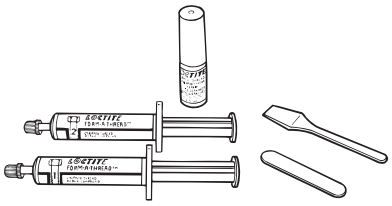
APPLICATION
Isolating foam and rubber strip.

Tough adhesive
(P/N 413 408 300)
Loctite Black Max
3 mL (.10 oz)

A00B3P4

APPLICATION
Shifter boot or grip.

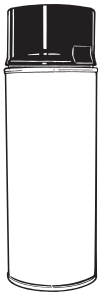
Stripped threads repair kit
(P/N 413 708 600)
Form-A-thread 81668



A00A1J4

APPLICATION
Repair damaged threads of grade 5 (SAE) or 8.8 (metric) maximum. Do not use in applications where temperatures will exceed 149°C (300°F) or on critical assemblies.

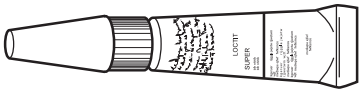
Paint for frame touch-up
(P/N 413 401 000)
Black semi-gloss
(spray can)



A00B3H4

APPLICATION
All models with a black frame.

General purpose instant adhesive
Loctite 495 (3 g)
(P/N 293 800 021)



A00B2V4

APPLICATION
Rubber to metal bonding and most hard plastic.

NOTE: Only the P/N has been changed. This product is identical to the P/N 413 703 200.

RECOMMENDED SERVICE PRODUCTS (continued)

High temperature RTV sealant
Ultra Copper
(P/N 413 710 300)
(80 mL)

A00B5A4

APPLICATION
All models.

Bombardier cleaner
(P/N 293 110 001) (400 g)
(P/N 293 110 002) (4 L)

F01B2J4

APPLICATION
All models.

Clear silicone
(P/N 293 800 033)

F01B1S4

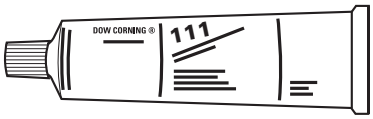
APPLICATION
All models to seal bottom pan.

Fuel stabilizer
(12 x 8 oz)
(P/N 413 408 600)

A00B3V4

APPLICATION
All models.

Molykote 111
(P/N 413 707 000)



A00B3W4

APPLICATION
Crankshaft seals on all engines except ZX series ones.

Shock oil
(32 oz)
(P/N 413 711 806)

A06F0P4

APPLICATION
T/A shocks.

Bombardier Lube
(12 x 14 oz)
(P/N 293 600 016)

A00B4W4

APPLICATION
Steering ball joints on all models.

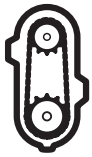
RECOMMENDED SERVICE PRODUCTS (continued)

Super Lube (grease)
(P/N 293 550 014)

A00B474

APPLICATION
Exhaust tail pipe grommet.

LUBRICATION AND MAINTENANCE CHART

SYSTEM	PART/TASK	10-HOUR INSPECTION (to be performed by dealer)	WEEKLY	MONTHLY	ONCE A YEAR	STORAGE (to be performed by dealer)	PRE-SEASON PREPARATION (to be performed by dealer)	REFER TO
	Rewind Starter Lubrication and Rope Condition						✔	Subsection 04-07
	Engine Head Nuts	✔			✔			Appropriate section: See TOP END
	Engine Mount Nuts	✔			✔			Appropriate section: See ENGINE REMOVAL
	Exhaust System	✔		✔			✔	Appropriate section: See ENGINE REMOVAL
	Engine Lubrication					✔		This section no. 3
	Cooling System Condition	✔			✔		✔	Subsection 04-06
	Valve Clearance				✔			Subsection 04-03
	Condition of Seals						✔	Subsection 04-04
	Oil Level	EACH USE						This section no. 1
	Oil Change	✔	6 MONTHS					This section no. 2
	Fuel Filter Replacement						✔	This section no. 5
	Fuel Strainer Cleaning						✔	This section no. 6
	Fuel Lines and Connections	✔					✔	Subsection 04-09
	Carburetor Adjustment	✔			✔		✔	Subsection 04-08
	Throttle Cable Inspection	✔			✔		✔	Subsection 04-09
	Condition of Drive and Driven Sprockets	✔		✔		✔	✔	Subsections 05-03 and 05-04
	Lubrication of Drive and Driven Sprockets	✔		✔		✔	✔	Subsections 05-03 and 05-04
	Retorquing of Clutch Screw	✔		✔		✔	✔	Subsection 05-02
	Brake Condition	✔	✔				✔	Subsection 05-03
	Brake Adjustment			✔			✔	Subsection 05-03
	Drive Chain Tension and Lubrication	✔		✔		✔	✔	Subsection 05-04
	Lubrication of Drive Axle Bearing	✔		✔		✔		Subsection 07-03
	Steering and Front Suspension Mechanism	✔		✔		✔	✔	Subsections 08-02 and 08-03
	Wear and Condition of Skis and Runners	✔	✔					Subsection 08-03

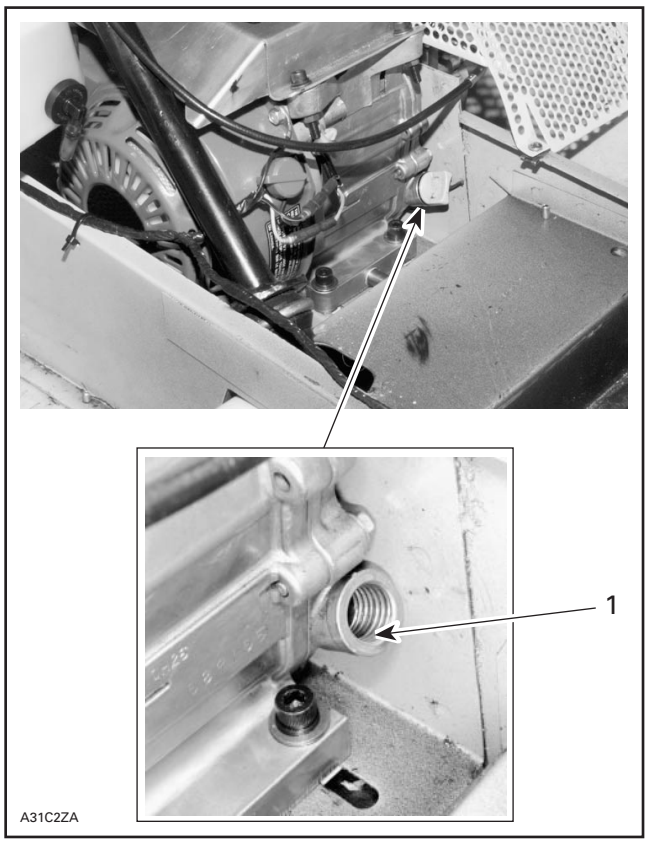
SYSTEM	PART/TASK	10-HOUR INSPECTION (to be performed by dealer)	WEEKLY	MONTHLY	ONCE A YEAR	STORAGE (to be performed by dealer)	PRE-SEASON PREPARATION (to be performed by dealer)	REFER TO
	Suspension Condition	✔			✔		✔	Section 07: See appropriate subsection
	Suspension Stopper Straps Condition				✔		✔	Section 07: See appropriate subsection
	Track Condition	✔		✔			✔	Subsection 07-04
	Track Tension and Alignment	✔	AS REQUIRED					Subsection 07-04
	Spark Plug *	✔		✔			✔	Subsection 06-03
	Headlight Beam Aiming				✔			Subsection 09-03
	Wiring Harnesses, Cables and Lines	✔		✔				Subsection 09-03
	Operation of Lighting System (headlight and taillight) Test Operation of Emergency Cut-Out Switch and Tether Cut-Out Switch	✔	✔			✔		*Operator's Guide*
	Rags in Air Intake and Exhaust System					✔	✔	This section no. 8
	Engine Compartment	✔		✔			✔	This section no. 9
	Vehicle Cleaning and Protection	✔		✔		✔		This section no. 10

* Before installing new spark plug at pre-season preparation, it is suggested to burn excess storage oil by starting the engine with the old spark plug. Only perform this operation in a well ventilated area.

NO. 1 – ENGINE OIL LEVEL

With snowmobile on a level surface, check the oil level by removing dipstick at engine base.

Oil level must be to the top of the oil filler neck. If not, refill up to oil filler neck using SAE 5W/30 recommended oil. Refer to TECHNICAL DATA.



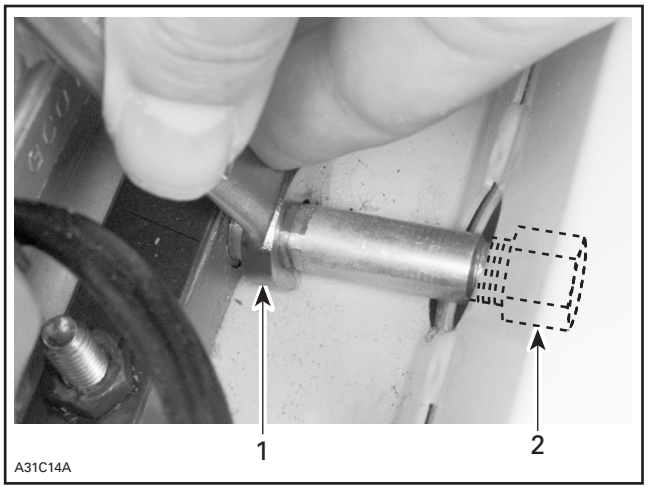
ADD OIL UNTIL IT REACHES THE TOP OF THE OIL FILLER NECK
1. Top of the oil filler neck

NO. 2 – ENGINE OIL CHANGE

Refer to LUBRICATION AND MAINTENANCE CHART 02-01.

To drain oil from engine, **hold pipe** using a key then unscrew cap from underneath front of snowmobile. See next photo.

NOTE: To completely drain oil from engine, keep snowmobile leveled.



1. Hold pipe
2. Remove oil drain cap

NO. 3 – ENGINE LUBRICATION

Engine internal parts must be lubricated to protect them from possible rust formation during the storage period.

Proceed as follows:

Start the engine and allow it to run at idle speed until the engine reaches its operating temperature.

⚠ WARNING

Ensure the track is free of all particles which could be thrown out while it is rotating. Keep hands, tools, feet and clothing clear of track. Ensure no one is standing in close proximity to the vehicle.

Stop the engine.

Remove carburetor cap to spray storage oil into carburetor bore.

Restart engine and run at idle speed.

Inject storage oil until the engine stalls or until a sufficient quantity of oil has entered the engine (approximately half a can).

With the engine stopped, remove the spark plug and spray storage oil (P/N 496 014 100) into cylinder.

Crank slowly 2 or 3 revolutions to lubricate cylinder.

Reinstall the spark plug.

⚠ WARNING

This procedure must only be performed in a well ventilated area. Do not run engine during storage period.

NO. 4 – FUEL STABILIZER

A fuel stabilizer (P/N 413 408 600) can be added in fuel tank to prevent fuel deterioration and avoid draining fuel system for storage. Follow manufacturer's instructions for proper use.

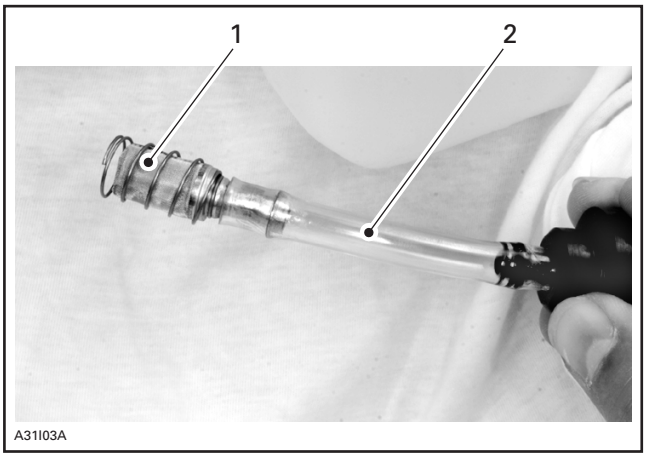
If above fuel stabilizer is not used, drain fuel system including fuel tank and carburetor.

CAUTION: Fuel stabilizer should be added prior the engine lubrication to ensure carburetor(s) protection against varnish deposit.

NO. 5 – FUEL FILTER REPLACEMENT

Drain fuel tank.

Remove fuel line grommet from fuel tank and pull out inlet fuel line from tank.



1. Fuel filter
2. Fuel hose

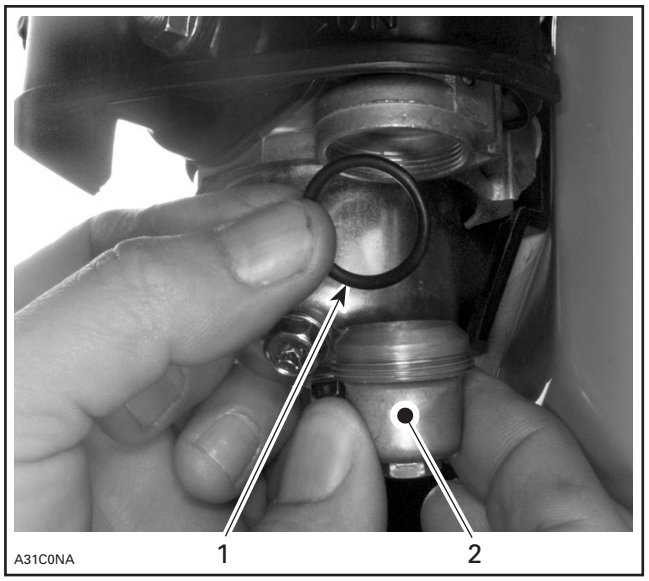
Replace fuel filter.

NO. 6 – FUEL STRAINER

Turn off fuel valve.

FUEL VALVE TO "OFF" POSITION

Remove the strainer cup, as shown in the next photo.



REMOVE STRAINER CUP

1. O-ring
2. Strainer cup

Clean the strainer cup with cleaning solvent (P/N 413 708 200).

Reinstall strainer cup with O-ring and tighten to 4 N•m (36 lbf•**in**).

NO. 7 – DRIVE CHAIN CONDITION

Visually inspect the chain for cracked, damaged or missing link rollers.

Check for defective bearings, sprockets and worn chain tensioner components.

Lubricate drive chain as per lubrication chart.

Use BOMBARDIER LUBE (P/N 293 600 000).

CAUTION: Always lubricate drive chain slightly. Oil must not contact brake pad.

NO. 8 – RAGS IN AIR INTAKE AND EXHAUST SYSTEM

At storage preparation, block air intake hole and exhaust system hole using clean rags.

Remove those rags at pre-season preparation.

NO. 9 – ENGINE COMPARTMENT

Keep clean of grass, twigs, cloth, etc. These are combustible under certain conditions.

NO. 10 – VEHICLE CLEANING AND PROTECTION

Remove any dirt or rust.

To clean the entire vehicle, use only flannel clothes or Kimtowels® wipers no. 58-380 from Kimberly-Clark.

CAUTION: It is necessary to use flannel cloths or Kimtowels wipers on windshield and hood to avoid damaging further surfaces to clean.

To clean the entire vehicle, including metallic parts with a **thick** coat of grease, use Endust® imported by Bristol Myers, available at hardware stores or supermarkets.

For bottom pan cleaning, use Bombardier Cleaner (P/N 293 110 001 (spray can 400 g) and P/N 293 110 002 (4 L)).

CAUTION: Do not use Bombardier Cleaner on decals or vinyl.

To clean the entire vehicle, including metallic parts with a **thin** coat of grease, use Simple Green® from Sunshine Makers Inc., available at hardware stores or at automotive parts retailer.

For vinyl and plastic parts, use Vinyl & Plastic Cleaner (P/N 413 711 200 (6 x 1 L)).

To remove scratches on windshield or hood: Start with "Slip Streamer Motorcycle Windshield Heavy Duty Scratch, Remover". Finish with "Slip Streamer Motorcycle Cleaner and Polish".

NOTE: The latest product may be use alone if only light scratches are noticeable.

CAUTION: Never clean plastic parts or hood with strong detergent, degreasing agent, paint thinner, acetone, products containing chlorine, etc.

Inspect the hood and repair any damage. Touch up all metal spots where paint has been scratched off. Spray all metal parts with BOMBARDIER LUBE (P/N 293 600 016). Wax the hood and the painted portion of the frame for better protection.

NOTE: Apply wax on glossy finish only. Protect the vehicle with a cover to prevent dust accumulation during storage.

CAUTION: The snowmobile has to be stored in a cool and dry place and covered with an opaque tarpaulin. This will prevent sun rays and grime from affecting plastic components and vehicle finish.

Lift rear of vehicle until track is clear of the ground. Install on a snowmobile mechanical stand.

NOTE: Do not release track tension.

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ENGINE

The following chart is provided to help in diagnosing the probable source of troubles. It should be used as a guideline.

SYMPTOM	**ENGINE BACKFIRES.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check spark plug.** a. Carbon accumulation caused by defective spark plug. *Clean carbon accumulation and replace spark plug.*
	2. Check ignition timing. a. Timing is fixed but ensure that woodruff key holding flywheel is in place.

SYMPTOM	**ENGINE DOES NOT OFFER MAXIMUM POWER AND/OR DOES NOT REACH MAXIMUM OPERATING RPM.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check spark plug condition.** a. Fouled spark plug(s). *Replace.*
	2. Check if there is water in fuel. a. There is water in fuel. *Drain fuel system, then fill it with appropriate fuel.*
	3. Check governor adjustment. a. Governor out of adjustment. *Readjust.*
	4. Check carburetor adjustments and cleanliness. a. Inadequate carburetor adjustments or dirt accumulation. *Adjust according to specifications (refer to TECHNICAL DATA 10) or clean.*
	5. Check valve clearance. a. Valve clearance incorrect. *Readjust.*
	6. Check valve condition. a. Valve or valve seat worn or damaged. *Inspect and correct.*
	7. Check track adjustment. a. Too much tension and/or improper alignment. *Align track and adjust its tension to specifications (refer to TECHNICAL DATA 10).*

	8. Check exhaust system. a. Restriction. *Replace.*
	9. Check ignition system. a. Decrease in power due to incorrect ignition. *Check spark plug and ignition coil operation.*
	10. Check engine compression. a. Worn piston(s) and ring(s). *Replace (refer to TECHNICAL DATA 10 for specification).*

SYMPTOM	**ENGINE DETONATION AT MAXIMUM RPM.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check which type of fuel is used.** a. Octane number is too low and/or alcohol level is too high. *Use recommended fuel type.*
	2. Check spark plug type. a. Improper spark plug heat range. *Install recommended spark plug(s) (refer to TECHNICAL DATA 10).*
	3. Check exhaust system. a. Too much restriction. *Replace.*
	4. Check ignition system. a. Incorrect ignition. *Check spark plug and ignition coil operation.*
	5. Check carburetion. a. Fouled and/or improper carburetor components. *Clean or replace according to specification (refer to TECHNICAL DATA 10).*

SYMPTOM	ENGINE TURNS OVER BUT FAILS TO START.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check switches.** a. Ignition switch, emergency cut-out switch or tether switch is in the OFF position. *Place all switches in the RUN or ON position.*
	2. Check fuel level. a. Mixture not rich enough to start cold engine. *Check fuel tank level and use choke.*
	3. Check spark plug. a. Defective spark plug (no spark). *Replace spark plug.*
	4. Check amount of fuel on spark plug. a. Spark plug wet (flooded engine). *Clean and dry spark plug. Reinstall spark plug and start engine taking care not to use choke. If flooding is severe, check carburetor float valve, then change engine oil.* b. Spark plug dry (no fuel to the engine). *Check fuel tank level; check if fuel valve is opened: check fuel strainer, clean if clogged; check condition of fuel lines and their connections.* *Check carburetor main jet and nozzle.*
	5. Check the ignition system. a. No spark or weak spark. *Replace parts as indicated in section electrical system.*
	6. Check engine compression. a. Insufficient engine compression. *Check valve clearance; carbon accumulation; defective cylinder head gasket, valves or valve seats; Check for worn piston rings, piston or cylinder. Replace defective part(s) (ex. : piston(s), ring(s), etc.).*
	7. Verify check valve on top of fuel tank. a. Improperly installed or obstructed. *Install with vented side toward atmosphere or replace.*

SYMPTOM	**IRREGULAR ENGINE IDLE.**
CONDITION	NORMAL USE AFTER ENGINE WARM UP.
Test/Inspection	**1. Check choke.** a. Choke plate may be partially closed. *Readjust.*
	2. Check pilot screw position. a. Inadequate fuel/air mixture. *Adjust according to specifications (refer to TECHNICAL DATA 10).*
	3. Check ignition system coil air gap. a. Air gap is too large. *Adjust according to specifications (refer to TECHNICAL DATA 10).*
	4. Check dimension of main jet. a. Inadequate fuel/air mixture. *Adjust according to specifications (refer to TECHNICAL DATA 10).*
	5. Check engine compression. a. Insufficient engine compression. *Check valve clearance; carbon accumulation; defective cylinder head gasket, valves or valve seats.* *Check for worn piston rings, piston or cylinder. Replace defective part(s) (ex.: piston(s), ring(s), etc.).*

SYMPTOM	**HIGH ENGINE OPERATING TEMPERATURE.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check cooling fins of engine.** a. Dirt accumulation between engine fins. *Clean thoroughly.*
	2. Check carburetion. a. Improperly adjusted or inadequate carburetor components. *Adjust according to specifications (refer to TECHNICAL DATA 10) or replace inadequate component(s).*
	3. Check cylinder head gasket. a. Worn gasket. *Replace.*
	4. Check condition and heat range of spark plug. a. Melted spark plug tip or inadequate heat range. *Replace.*
	5. Check exhaust condition. a. Carbon deposit. *Clean.*

SYMPTOM	**REWIND STARTER ROPE DOES NOT REWIND.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check rewind spring.** a. Broken spring. *Replace spring.*

SYMPTOM	**REWIND STARTER RATCHET DOES NOT ENGAGE.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check ratchet and ratchet guide.** a. Ratchet and ratchet guide have stuck together because of dirt or heat. *Clean or replace.*
	2. Check ratchet and rope sheave. a. Ratchet and rope sheave have stuck together because of heat. *Replace.*

SYMPTOM	**ENGINE PINGING.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check fuel lines.** a. Bent fuel lines (preventing fuel from flowing through). *Relocate or replace fuel lines.*
	2. Check if carburetor is clean. a. Dirt prevents fuel from flowing through. *Clean.*

FUEL AND OIL SYSTEMS

The following chart is provided to help in diagnosing the probable source of troubles. It should be used as a guideline.

SYMPTOM	**HIGH FUEL CONSUMPTION OR RICH MIXTURE.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check fuel tank.** a. Perforated fuel tank. *Replace fuel tank.*
	2. Check carburetor fittings. a. Leaking fittings. *Replace defective part.*
	3. Check float height in carburetor(s). a. Fuel level is too high in float bowl. *Adjust according to specifications (refer to TECHNICAL DATA 10).*

SYMPTOM	**ENGINE LACKS POWER OR STALLS AT HIGH RPM.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check fuel filter or strainer.** a. Clogged filter or strainer. *Clean.*
	2. Check fuel lines. a. Kinked or clogged lines. *Relocate or replace.*
	3. Check if carburetor is clean. a. Varnish. *Clean.*
	4. Verify check valve on top of fuel tank. a. Improperly installed or obstructed. *Install with vented side toward atmosphere or replace.*

SYMPTOM	**ENGINE RUNS OUT OF FUEL (OR LEAN MIXTURE).**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check fuel filter or strainer.** a. Clogged filter or strainer. *Clean.*
	2. Check if lines are perforated or kinked and make sure they do not leak at fittings. a. Lines are too big for their fittings or are improperly rooted. *Replace or properly relocate lines.*
	3. Check main jet. a. Dirt (varnish, foreign particle) accumulation at main jet. *Clean.*
	4. Check float height in carburetor bowl. a. Running out of fuel at high speed because float height is too low. *Adjust float lever height according to specification.*

TRANSMISSION AND BRAKE SYSTEMS

The following charts are provided to help in diagnosing the probable source of troubles. It should be used as a guideline.

TRANSMISSION

SYMPTOM	**LOOSENESS IS FELT IN DRIVE SYSTEM WHEN ACCELERATING/DECELERATING.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check drive chain tension.** a. Drive chain automatic tensioner is too loose. *Replace tensioner.* b. Drive chain is worn out. *Replace drive chain with new one.*

SYMPTOM	**VIBRATIONS ORIGINATING FROM DRIVEN SPROCKET.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check driven sprocket hub fit with drive axle.** a. Driven sprocket is loosened on drive axle. *Replace driven sprocket or drive axle.*
	2. Check drive chain. a. Drive chain is worn out. It rubs on frame. *Replace drive chain.*

SYMPTOM	**VIBRATIONS ORIGINATING FROM DRIVE SPROCKET.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check tightening torque of drive sprocket screw.** a. Moving drive sprocket. *Retighten screw.* b. Worn key way. *Replace parts.*

SYMPTOM	**CLUTCH DO NOT OPERATE PROPERLY.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Replace clutch with new one.**

SYMPTOM	**EXCESSIVE NOISE WITH DRIVE CHAIN.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check drive chain lubrication.** a. Drive chain is dry. *Lubricate drive chain.*
	2. Check drive chain condition. a. Chain is cracked, damaged or some link rollers are missing. *Replace drive chain.*
	3. Check sprockets. a. Excessive wear at sprocket teeth. *Replace sprockets.*
	4. Check drive chain. a. Drive chain is worn out. It rubs on frame. *Replace drive chain.*

BRAKE SYSTEM

MECHANICAL BRAKE

SYMPTOM	**BRAKE HANDLE DOES NOT RETURN COMPLETELY.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check brake return spring.** a. Broken return spring. *Replace.*
	2. Check if brake cable moves freely in its housing. a. Brake cable movement is limited due to oxidation or dirt accumulation. *Replace.*
	3. Check distance between brake lever and caliper. a. Distance is too wide. *Adjust according to specifications (refer to TRANSMISSION 05).*

SYMPTOM	**BRAKE SYSTEM IS NOISY.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check brake pad thickness.** a. Pad is worn up to wear limit. *Replace.*
	2. Check brake attachment. a. Attachment is loose or cracked. *Tighten or replace.*
	3. Check brake pad alignment. a. Brake pad is not properly aligned with clutch. *Rotate brake pad 180° or replace with new one.*

ELECTRICAL SYSTEM

The following chart is provided to help in diagnosing the probable source of troubles. It should be used as a guideline.

SYMPTOM	**HEADLAMP NOT LIGHTING.**
CONDITION	WHITE BULB.
Test/Inspection	**1. Check bulb.** a. Burnt bulb. *Replace bulb.*
CONDITION	BROKEN ELEMENT.
Test/Inspection	**1. Check for loose headlamp housing and bulb socket.** a. Vibration problem. *Tighten headlamp mounting screws. Lock bulb in socket. Replace bulb.*
CONDITION	MELTED FILAMENT (ENDS OF ELEMENT HOLDER) AND BLACK BULB.
Test/Inspection	**1. Check voltage at headlamp at different speeds. It must not be above 15 Vac.** a. Excessive voltage in lighting circuit. *Ensure proper wire connections and grounding. Retest.*

SYMPTOM	**HEADLAMP DIMING.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check voltage at headlamp at different speeds. It must not be below 11 Vac.** a. Insufficient voltage in lighting circuit. *Replace voltage regulator and retest.* b. Wires are worn or loose. *Ensure proper wire connections and grounding. Retest.*
	2. Visually inspect wiring harness for damaged and/or melted wires and/or bad wire terminal crimping and/or connections. a. Heating, rotating or sharp part in contact with harness. Improper harness routing. *Repair/replace damaged wires and/or terminals. Reroute harness where necessary.*

SYMPTOM	ENGINES DOES NOT START — NO SPARK AT SPARK PLUG.
CONDITION	AT ENGINE CRANKING.
Test/Inspection	**1. Verify spark plug condition.** a. Defective, improperly set, worn-out, fouled. *Identify source of problem and correct. Replace spark plug.*
	2. Verify spark plug cap resistance with an ohmmeter. a. Defective part. *Replace cap.*
	3. Verify if problem originated from electrical system wiring harness and/or accessories and/or ignition cut-out switches. Check condition of connectors. a. Heating, rotating or sharp part in contact with harness. Improper harness routing. Defective switch(es). Corroded connector terminals. *Replace or repair damaged wires. Reroute where necessary. Replace defective switch(es). Clean terminals and apply silicone dielectric grease.*
	4. Verify ignition coil resistance with an ohmmeter and connector condition. a. Defective coil. Corroded connector terminals. *Replace defective coil. Clean terminals and apply silicone dielectric grease.*
	5. Verify condition of ignition coil. a. Mechanically damaged part. Vibration problem. Electrically damaged part. *Tighten mounting screws. Replace ignition coil.*
	6. Verify condition of ignition generator coils. a. Mechanically damaged part. Vibration problem. Electrically damaged part. *Tighten mounting screws. Replace coils.*

SYMPTOM	ENGINE STALLS.
CONDITION	AT LOW SPEED.
Test/Inspection	**1. Verify items 4, 5 and 6 above.**

SYMPTOM	IRREGULAR ENGINE SPEED.
CONDITION	AT HIGH SPEED.
Test/Inspection	**1. Verify items 3, 4, 5 and 6 above.**
CONDITION	AT LOW SPEED.
Test/Inspection	**1. Verify items 3, 4 and 5 above and ignition coil/flywheel protrusion air-gap.** a. Air-gap too large. *Readjust air-gap.*

SYMPTOM	**ENGINE IS MISFIRING — ERRATIC SPARK AT SPARK PLUG.**
CONDITION	RIDING ON WET SNOW.
Test/Inspection	**1. Verify if spark plug wires and/or spark plug cap seals are sealing-out moisture.** a. Defective wires and/or seals. *Replace defective part.*
	2. Verify if ignition system wiring harness connectors are in good condition and/or are sealing-out moisture. a. Loose connectors, corroded terminals or defective parts. *Clean terminals and apply silicone dielectric grease. Replace defective parts.*
CONDITION	RIDING IN DEEP AND THICK SNOW.
Test/Inspection	**1. Perform all verifications outlined under "Engine does not start — no spark at spark plug".**
	2. Verify spark plug. Proceed with spark plug analysis in order to identify source of problem. a. Defective and/or worn spark plug(s) and/or cable(s) and/or cap(s). *Replace defective part(s). Proceed with ignition system testing procedures. Perform engine analysis.*

SYMPTOM	**FOULED (BLACK) SPARK PLUG TIP.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check carburetor.** a. Carburation is too rich. *Adjust according to specifications (refer to TECHNICAL DATA 10).*
	2. Check engine compression. a. Leaking piston ring(s). *Replace.*

SYMPTOM	**SPARK PLUG TIP IS LIGHT GREY.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Refer to "Engine slows down or stops at high RPM" and check items listed.**
	2. Check spark plug heat range. a. Spark plug heat range is too high. *Replace by Bombardier's recommended spark plug (refer to ELECTRICAL 06).*
	3. Check carburetor gasket. a. Cracked or deformed gasket. *Replace.*

SYMPTOM	**REAR LIGHT BULB FLASHES.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check if rear light is properly connected.** a. Connector housing is partially connected. *Install connector housing properly.*
	2. Check continuity of wires. a. Corroded terminals and/or broken wires. *Replace terminal(s) or crimp defective wires.*

SUSPENSION AND TRACK

The following chart is provided to help in diagnosing the probable source of troubles. It should be used as a guideline.

SYMPTOM	**REAR SUSPENSION BOTTOMS OUT.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check rear spring preload.** a. Spring tension is too low. *Replace spring or add a shim under torsion spring leg on each side.*

SYMPTOM	**SLIDER SHOES WEAR OUT PREMATURELY.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check track tension.** a. Pressure is too great on slider shoes. *Adjust according to specifications (refer to TECHNICAL DATA 10). Replace defective parts.*

SYMPTOM	**PREMATURE WEAR ON TRACK GUIDES.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check track tension.** a. Pressure is too great on guides. *Adjust according to specifications (refer to TECHNICAL DATA 10).*
	2. Check slider shoes and/or suspension retaining screws. a. Worn slider shoes or lost retaining screws. *Replace defective parts and/or tighten loose screws.*

SYMPTOM	NOISE OR VIBRATIONS ORIGINATING FROM THE TRACK.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check slide suspension retaining bolts.** a. Missing bolt(s) allowing movement of certain components which in turn interfere with track rotation. *Replace missing bolt(s).*
	2. Check condition of idler wheel(s). a. Idler wheel rubber is damaged. *Replace.*
	3. Check sprockets. a. One or various teeth of drive shaft sprockets are broken. *Replace sprocket(s).*
	4. Check track internal traction teeth. a. One or various track teeth are broken. *Replace track.*
	5. Check stopper strap. a. Stopper strap is worn out. *Replace stopper strap.*

SYMPTOM	DERAILING TRACK.
CONDITION	NORMAL USE.
Test/Inspection	**1. Check track tension.** a. Track is too loose. *Adjust.*
	2. Check if track and slider shoes are properly aligned. a. Improper alignment. *Adjust.*
	3. Check slide suspension retaining bolts. a. Missing bolt(s) allowing movement of certain components which in turn interfere with track rotation. *Replace missing bolt(s).*

SYMPTOM	**REAR SUSPENSION IS LOW OR TOO STIFF.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check track tension.** a. Track is too tight. *Adjust.*
	2. Check condition of cushion between shaft and front arm. a. Damaged cushion and shaft. *Replace cushion and shaft.*
	3. Check rear spring preload. a. Insufficient preload. *Replace rear spring.*

SYMPTOM	**WHEN HANDLEBAR IS TURNED, SNOWMOBILE UNDERSTEERS.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check ski runner condition.** a. Worn ski runners. *Replace.*
	2. Check if front arm stopper strap is too long. a. Insufficient ski pressure on the ground. *Replace front arm stopper strap.*

SYMPTOM	**HANDLE BAR IS DIFFICULT TO TURN.**
CONDITION	NORMAL USE.
Test/Inspection	**1. Check condition of ball joints.** a. Corrosion restrains movement. *Lubricate or replace.*
	2. Check U-clamp and retaining support a. Torque on screws are too high. *Refer to STEERING/FRONT SUSPENSION 08.* b. Grease missing. *Apply lithium grease on steering column bushings.*

SYMPTOM	THE SNOWMOBILE IS UNSTABLE (IT MOVES FROM LEFT TO RIGHT AND VICE VERSA).
CONDITION	NORMAL USE.
Test/Inspection	**1. Check ski runner condition.** a. Worn or bent ski runners. *Replace ski runners.*
	2. Check ski alignment. a. Improper ski alignment. *Align skis in order to obtain proper toe-out (opening) (to adjust, refer to STEERING/FRONT SUSPENSION 08).*
	3. Check if bushings are too loose in steering system. a. Bushings are too loose. *Replace.*

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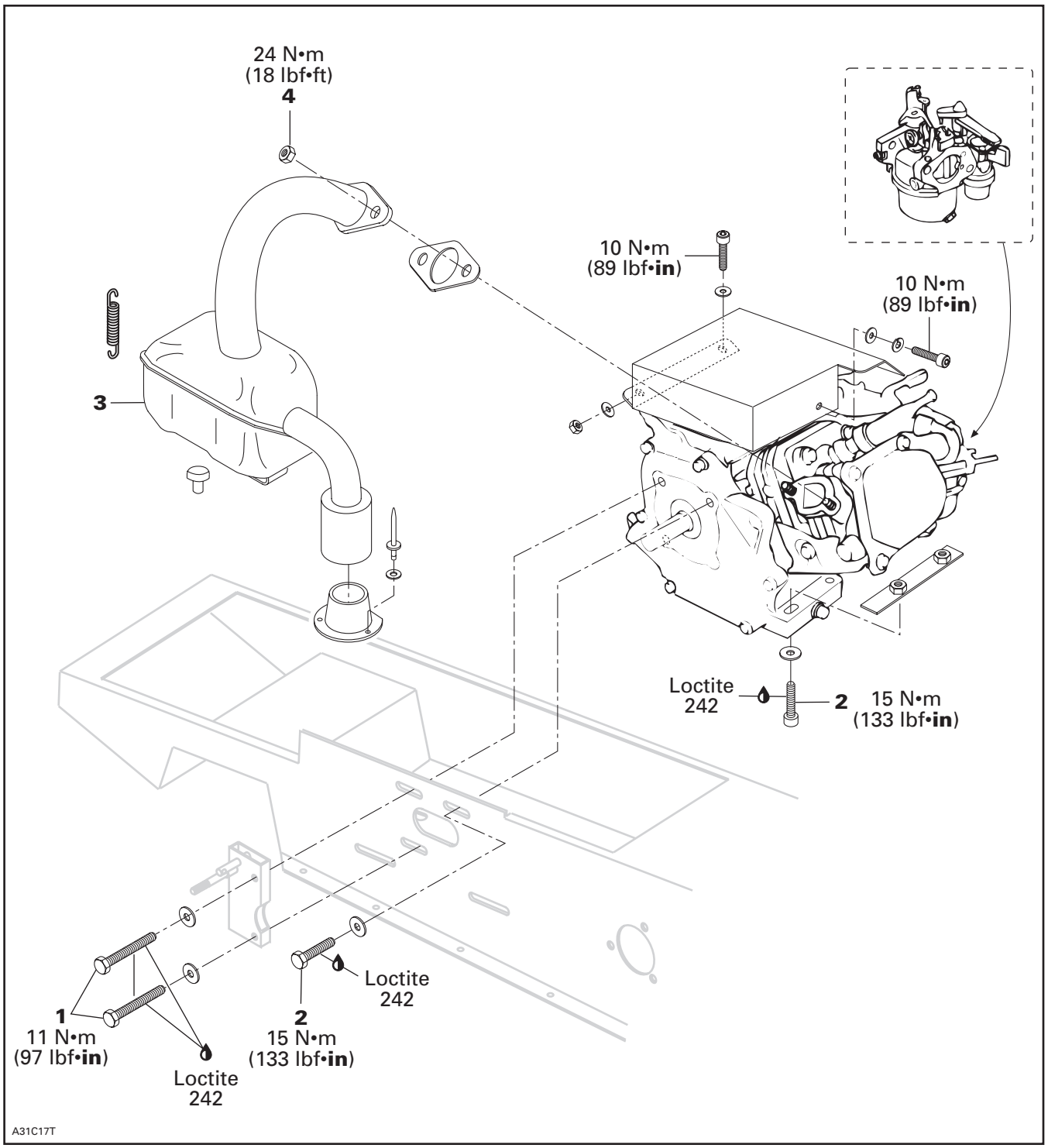
ENGINE REMOVAL AND INSTALLATION



REMOVAL FROM VEHICLE

Remove or disconnect the following then lift engine from vehicle:

– chain guard
– drive chain
– drive sprocket (clutch)
– muffler no. 3
– engine protector no. 5
– throttle cable
– choke cable
– fuel line
– electrical connectors
– engine mount screws no. 2
– brake support screws no. 1

ENGINE AND MUFFLER DISASSEMBLY AND ASSEMBLY

Torque the muffler nuts no. 4 to 24 N•m (18 lbf•ft).

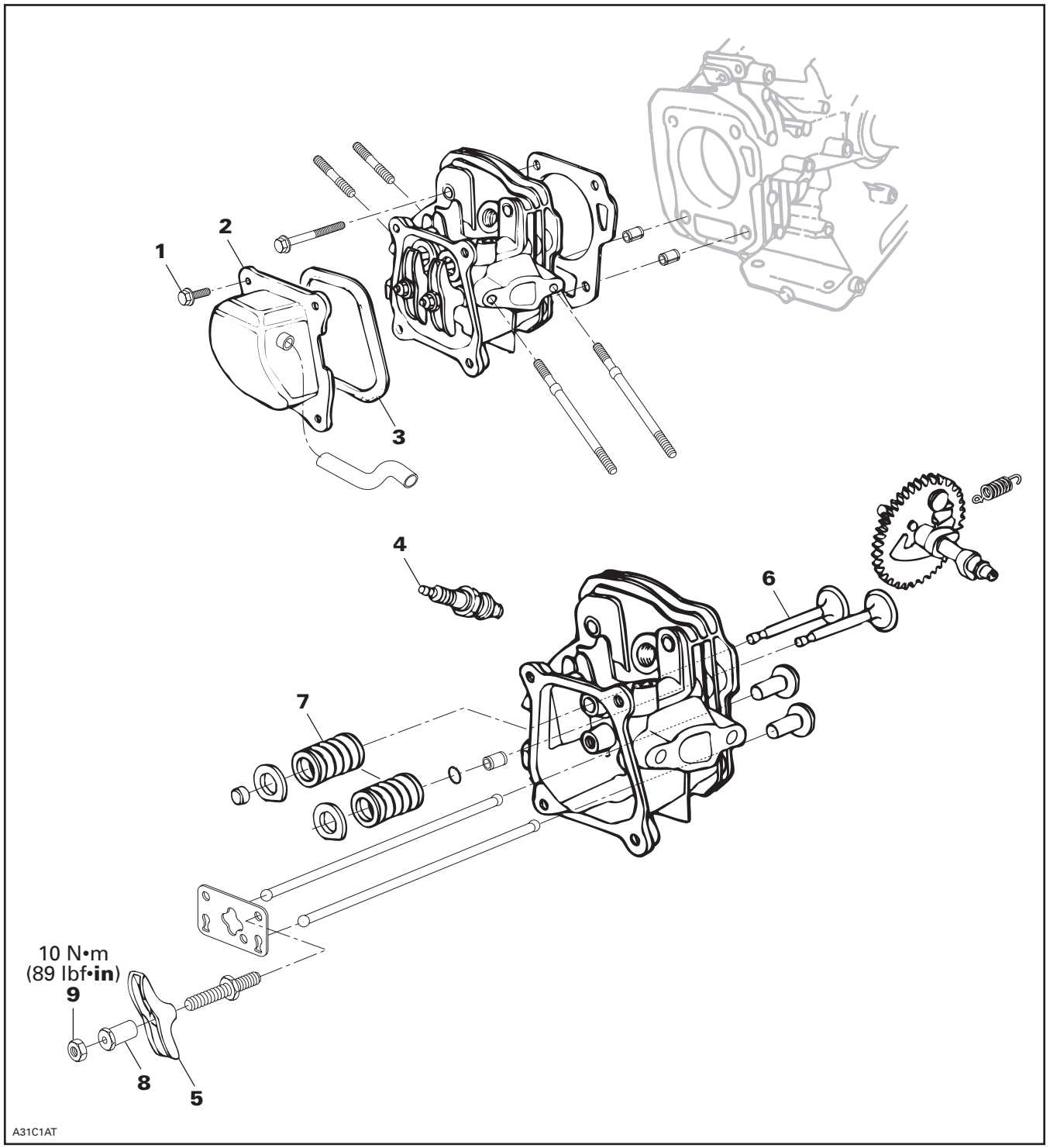
Torque both brake support screws no. 1 to 11 N•m (97 lbf•**in**) and 5 engine mount screws no. 2 to 15 N•m (133 lbf•**in**).

INSTALLATION ON VEHICLE

To install engine on vehicle, reverse removal procedure. However, pay attention to the following:

– Check tightness of engine mount screws, and clutch screw.
– After throttle cable and choke installation, check for proper operation.
– Check drive chain automatic tensioner for proper operation.

VALVE ADJUSTMENT



VALVE ADJUSTMENT

NOTE: Valve clearance inspection and adjustment must be performed with the engine cold.

Preparation

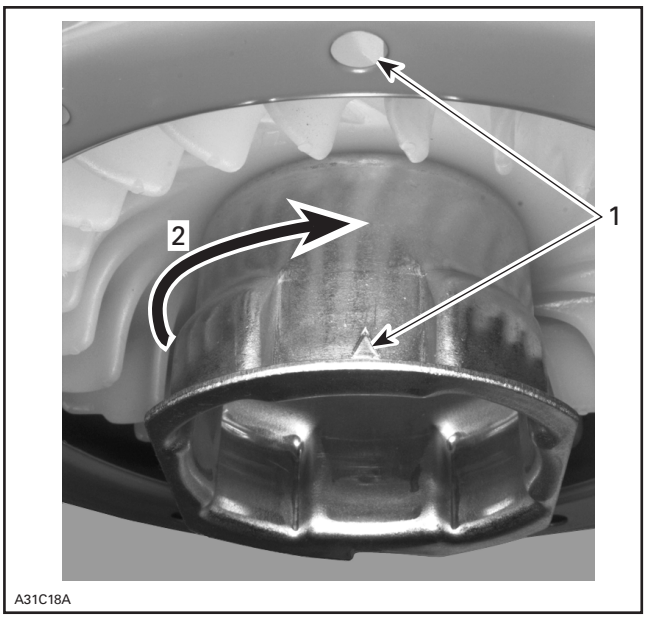
Remove cylinder head cover bolts **no. 1**, cylinder head cover **no. 2** and gasket **no. 3**.

Set the piston at TDC (Top Dead Center) of the **compression** stroke, as shown in the following procedure.

COMPRESSION STROKE TDC POSITIONING

Remove spark plug **no. 4**.

Turn engine clockwise (PTO side) by hand so that triangular mark on starter pulley align with the top hole on the fan cover.



REWIND STARTER HAS BEEN REMOVED

1. *Triangular mark aligned with fan cover top hole*
2. *Rotate clockwise to position engine at TDC of compression stroke*

CAUTION: The triangular mark on the starter pulley will align with the top hole on the fan cover when the piston is at top dead center of the compression or exhaust stroke. Ensure that piston is at TDC of the **compression** stroke. At compression stroke both valves are fully closed.

Valve Clearance Inspection

Insert a feeler gauge between rocker arm **no. 5** and valve **no. 6**. Refer to the following table for valve clearance.

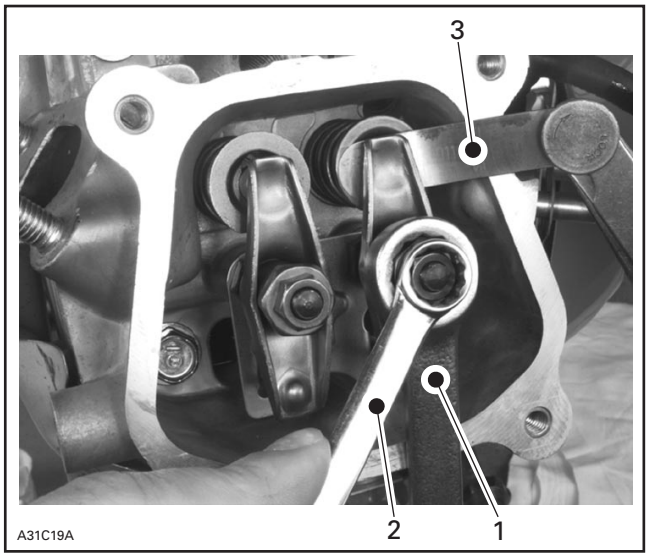
STANDARD VALVE CLEARANCE	
Intake valve	0.15 ± 0.02 mm (0.006 ± 0.001 in)
Exhaust valve	0.20 ± 0.02 mm (0.008 ± 0.001 in)

NOTE: When inspecting clearance, ensure that feeler gauge does not compress valve springs **no. 7**. Valve springs have low compression rates.

If valve clearance is not according to the above table, perform valve clearance adjustment as described in the following procedure.

Valve Clearance Adjustment

Hold rocker arm pivot **no. 8** and loosen rocker arm pivot lock nut **no. 9**, as shown in the next photo.



1. *Tool retaining rocker arm pivot*
2. *Tool loosening lock nut of rocker arm pivot*
3. *Feeler gauge*

Turn rocker arm pivot to obtain the specified clearance.

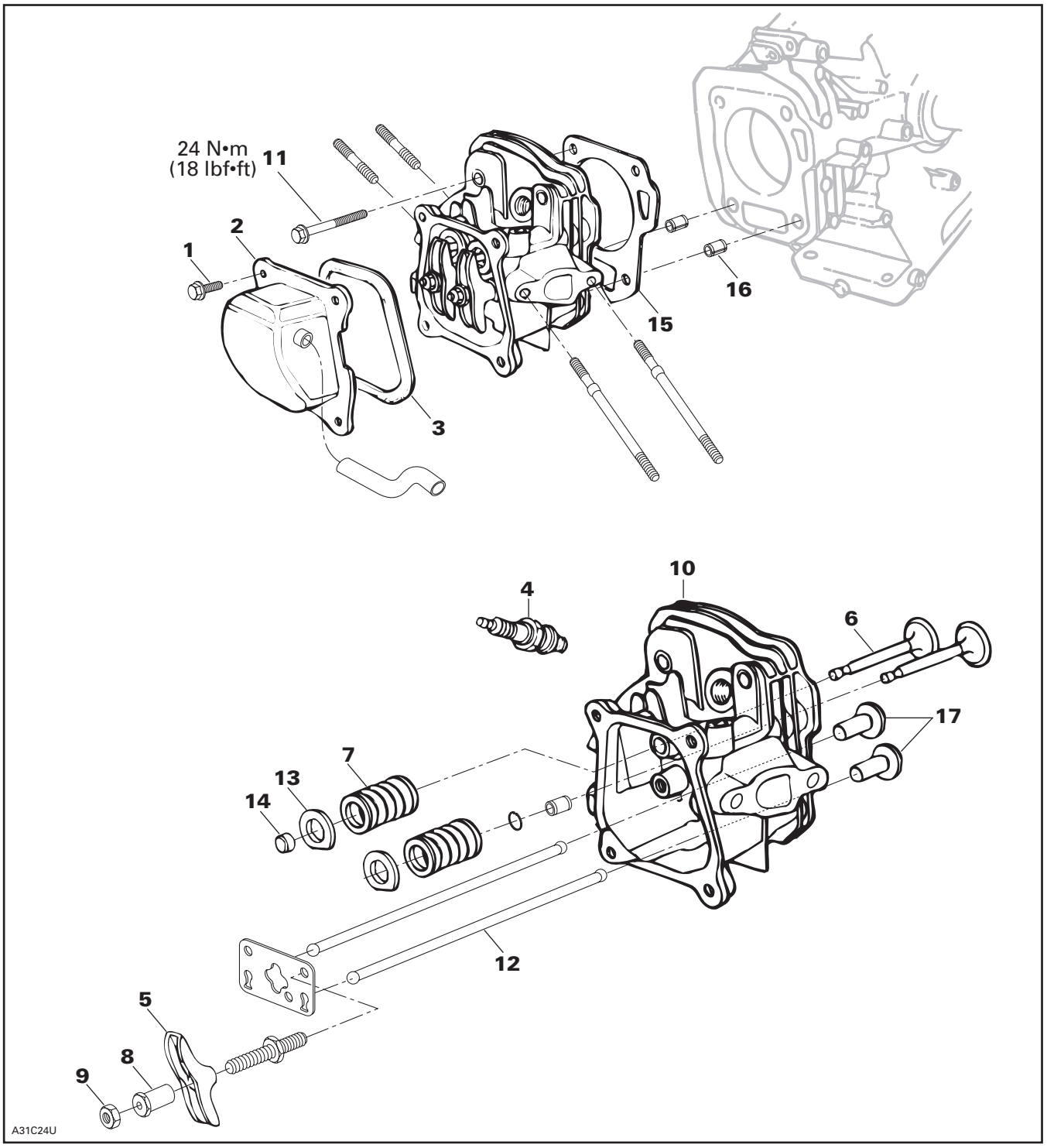
Retighten the rocker arm pivot lock nut while holding the rocker arm pivot.

Recheck valve clearance after tightening the rocker arm pivot lock nut.

Reinstall cylinder head cover with gasket then secure with cylinder head cover bolts tightened in a crisscross sequence.

DISASSEMBLY/ASSEMBLY

TOP END

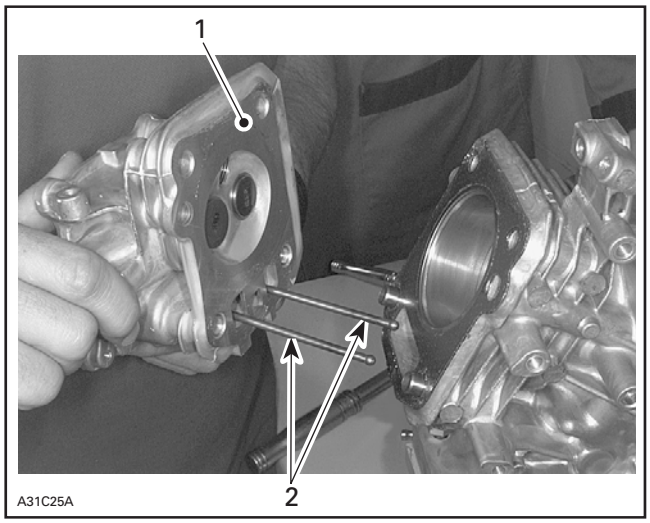


TOP END REMOVAL

Remove the following then lift cylinder head **no. 10**:

– carburetor
– exhaust system
– spark plug **no. 4**
– cylinder head cover **no. 2**
– cylinder head nuts **no. 11**

NOTE: When removing cylinder head, mark both push rods **no. 12** for reassembly.



TYPICAL — MECHANIC REMOVING CYLINDER HEAD

1. *Cylinder head*
2. *Mark both push rods for reassembly*

Pull out push rods.

CLEANING

Discard all gaskets.

Clean all metal components in a non-ferrous metal cleaner.

Scrape off carbon formation from cylinder exhaust port, cylinder head, valves **no. 6** and piston dome using a wooden spatula.

NOTE: The triangular mark on the piston dome must be visible after cleaning.

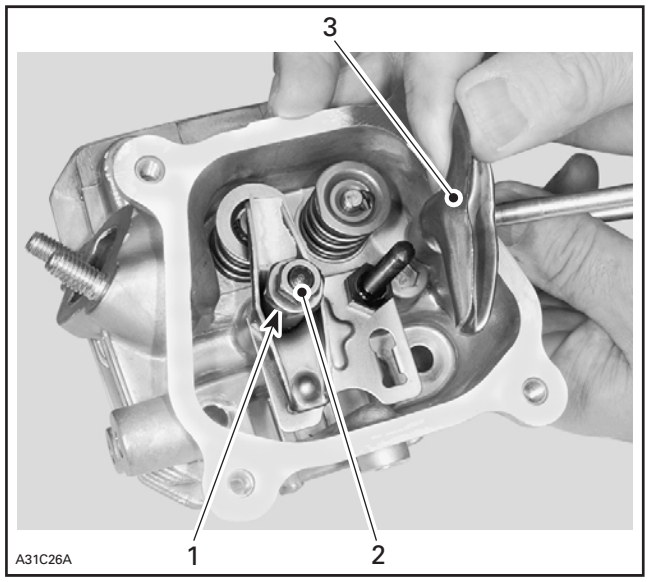
Clean the piston ring grooves with a groove cleaner tool, or with a piece of broken ring.

DISASSEMBLY

NOTE: Before disassembling, mark valve springs **no. 7**, valves **no. 6** and rocker arms **no. 5**. This will ensure that parts will not be inverse at reassembly.

Unscrew rocker arm pivot lock nuts **no. 9** and rocker arm pivots **no. 8**. Remove them.

Remove both rocker arms **no. 5**.



TYPICAL — MECHANIC REMOVING ROCKER ARM OF INTAKE VALVE

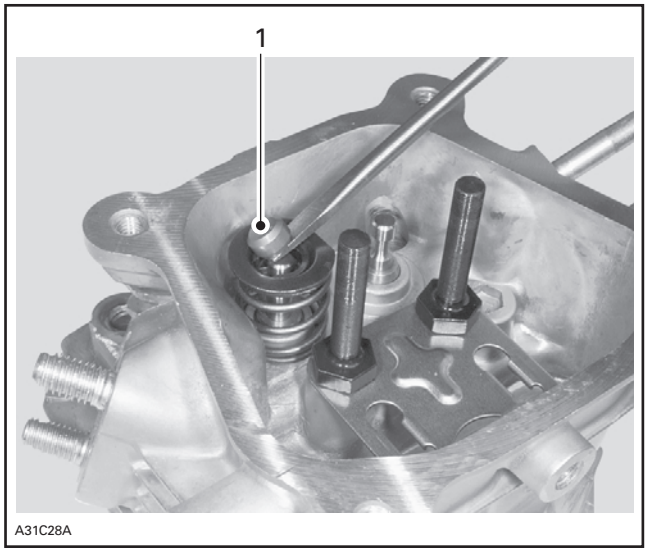
1. *Rocker arm pivot*
2. *Rocker arm pivot lock nut*
3. *Rocker arm*

Push down and slide the spring retainer **no. 13** to the side, so the valve stem slips through the hole, as shown in the next photo.

TYPICAL — PUSH DOWN AND SLIDE RETAINER TO THE SIDE

Put apart valve spring retainer and spring.

Repeat procedure for exhaust valve but ensure that valve rotator **no. 14** is removed first. Refer to the following photo.



1. On exhaust valve only, remove valve rotator then remove valve spring retainer

Pull out both valves from cylinder head.

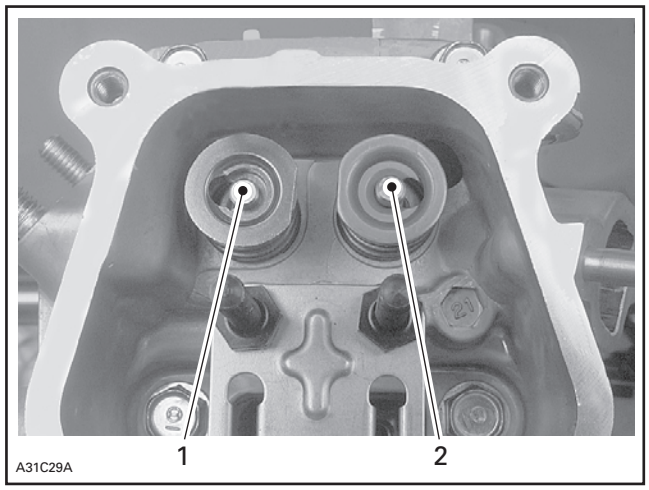
INSPECTION

Refer to COMPRESSION TEST AND ENGINE DIMENSIONS MEASUREMENT 04-05.

ASSEMBLY

Slide exhaust valve (small diameter) into exhaust valve guide, then slide intake valve (large diameter) into intake guide. See next photo.

Install springs and secure with valve spring retainers.

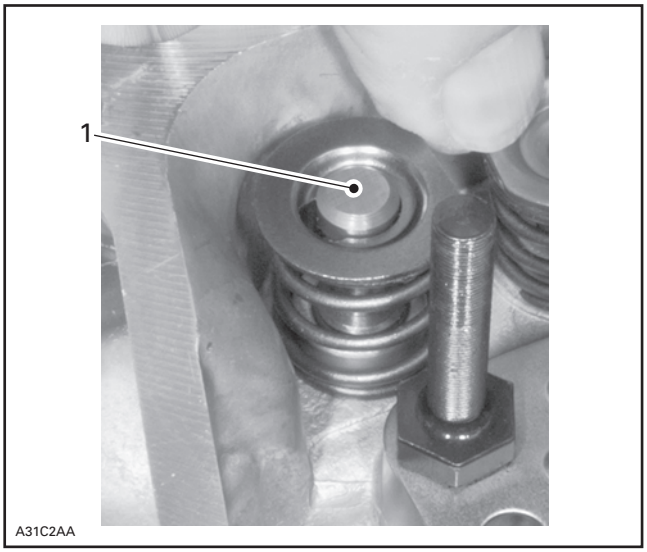


EXHAUST AND INTAKE VALVES SECURED IN PLACE

1. Exhaust valve (small diameter) location
2. Intake valve (large diameter) location

Install valve rotator on exhaust valve.

CAUTION: To avoid engine damage, ensure that exhaust valve rotator is properly installed on exhaust valve, as shown in the next photo.

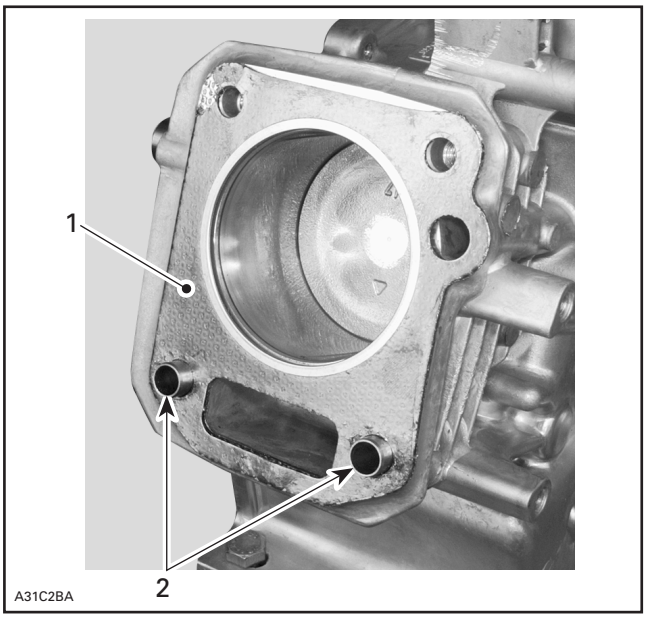


EXHAUST VALVE SHOWN

1. Exhaust valve rotator in place

TOP END INSTALLATION

Install cylinder head gasket **no. 15** and check that both locating pins **no. 16** are in place, as shown in the next photo.



1. Cylinder head gasket
2. Locating pin

Check push rods **no. 12** on both ends for wear. Check also push rods for straightness.

Install push rod ends into lifters **no. 17**.

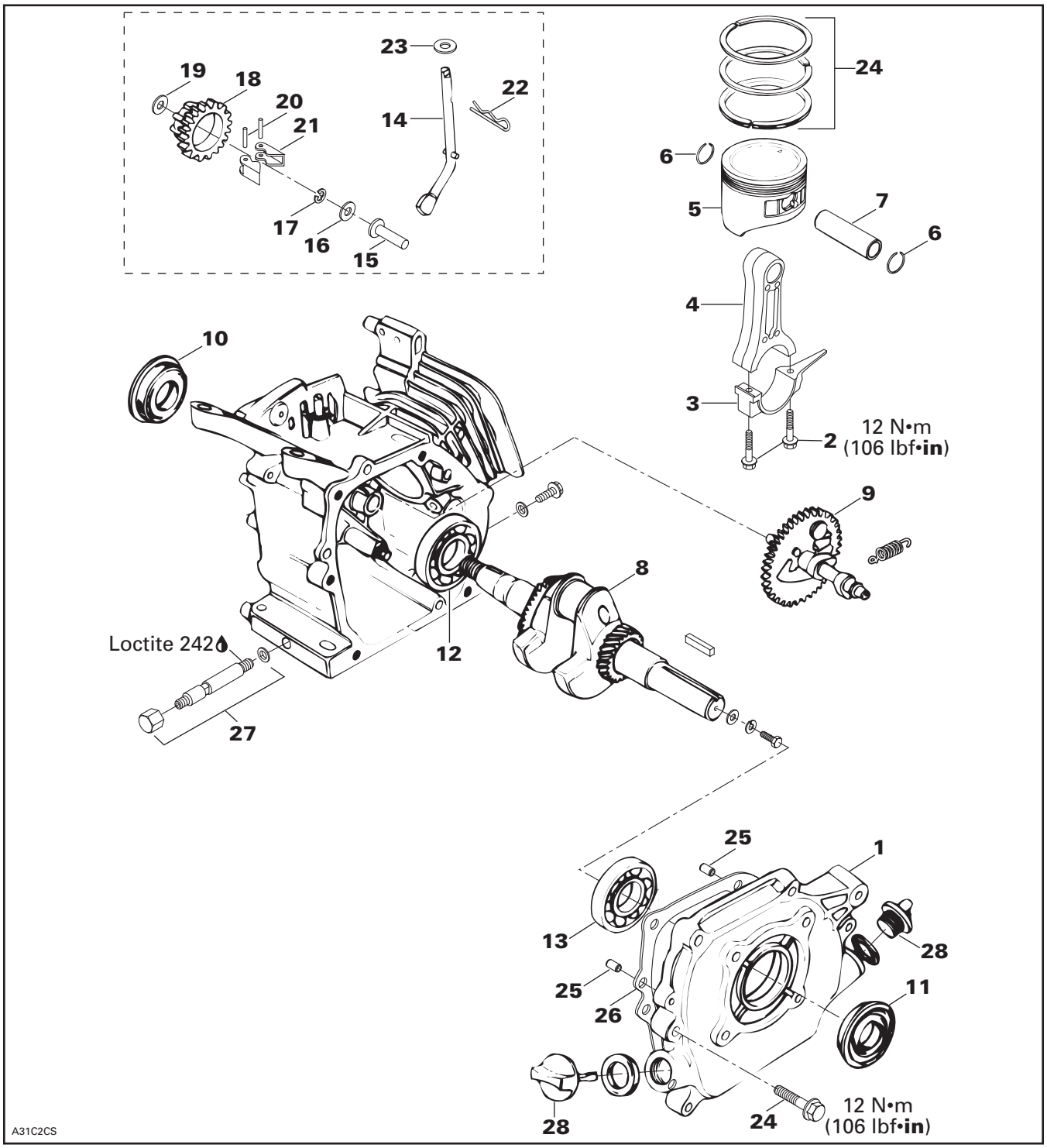
Reinstall cylinder head.

CAUTION: Ensure that push rods are properly inserted into push rod guides and firmly seated in the lifters.

Secure cylinder head with screws.

Reinstall cylinder head cover.

BOTTOM END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19
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16
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6
4
10
3
12 N•m
(106 lbf•in)
2
9
8
Loctite 242
12
27
25
1
13
28
25
26
11
28
24
12 N•m
(106 lbf•in)
A31C2CS

NOTE: Engine must be removed from chassis to perform the following procedures.

CLEANING

Discard all oil seals and gaskets.

Clean all metal components in a non-ferrous metal cleaner.

DISASSEMBLY

General

To remove clutch, refer to CLUTCH 05-02.

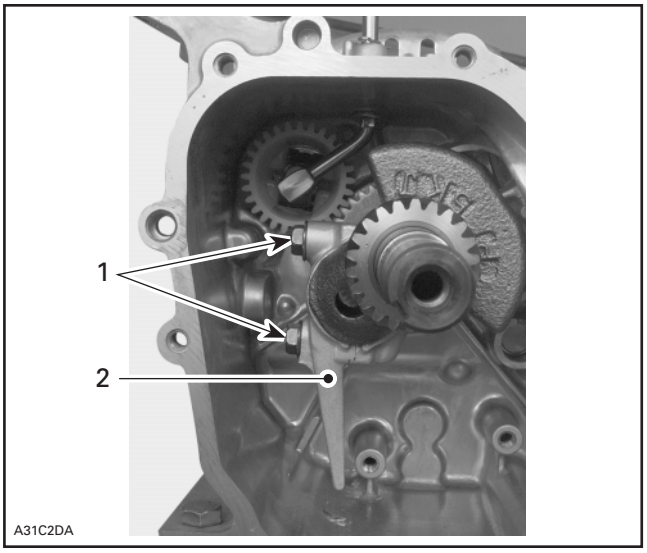
To remove magneto, refer to TRANSISTORIZED MAGNETO IGNITION 04-06.

Crankcase

Drain all oil from engine base.

Remove crankcase cover **no. 1** on PTO side.

From inside crankcase, loosen both connecting rod screws **no. 2** then remove connecting rod cap **no. 3**.



1. Connecting rod screws
2. Connecting rod cap

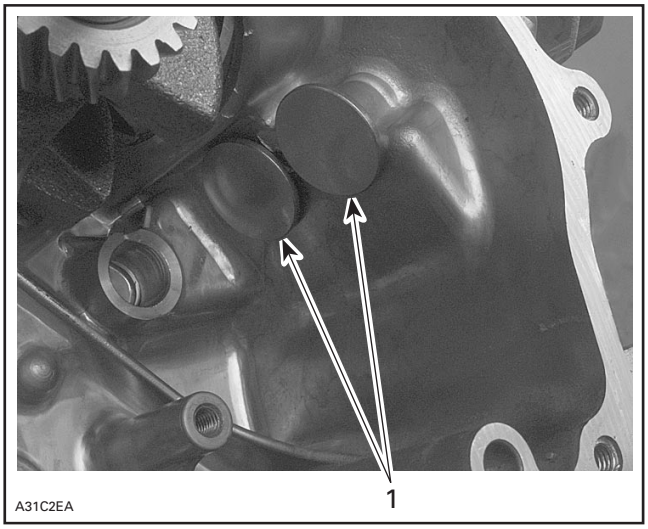
Push on connecting rod **no. 4** and pull out piston **no. 5**.

Remove both piston pin circlips **no. 6** and push out piston pin **no. 7**.

Detach piston from connecting rod.

Remove crankshaft **no. 8** and camshaft ass'y **no. 9**.

Mark both valve lifters and remove them. This will ensure that lifters will not be inverse at reassembly.



MARK BOTH VALVE LIFTERS FOR REASSEMBLY
1. Valve lifters

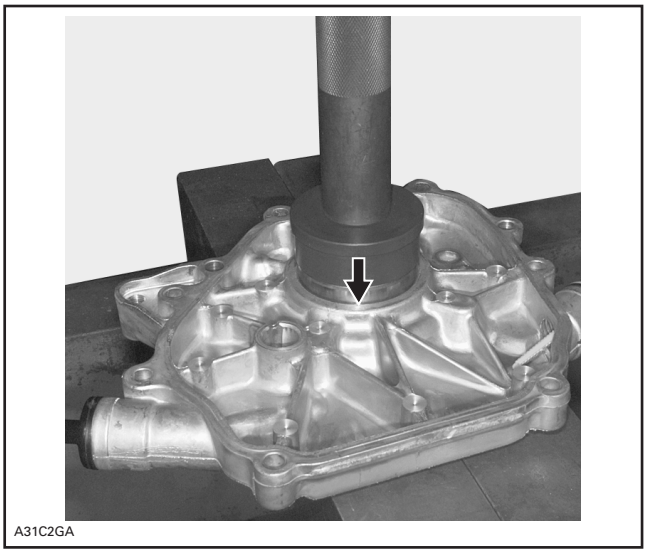
Seals and Bearings

To remove seals **nos. 10** and **11**, push from inside crankcase towards the outside.

To remove bearings **nos. 12** and **13**, use a press with all 3 following tools:

– driver (P/N 529 035 521)
– attachment (P/N 529 035 522)
– pilot (P/N 529 035 523)

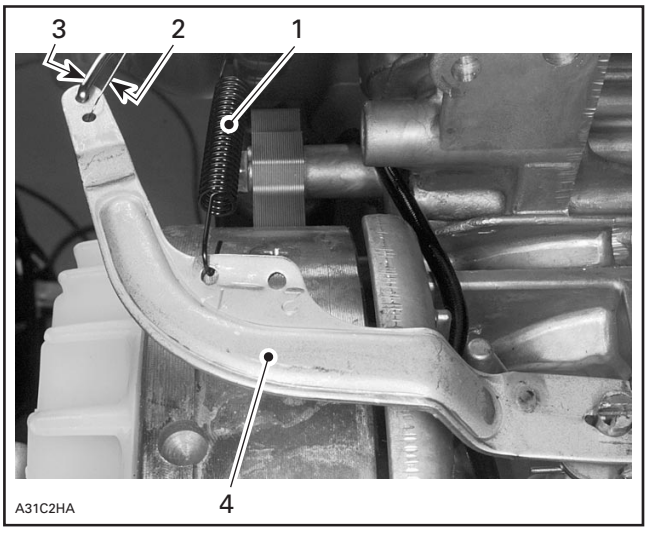
To reinstall bearings, reverse housing and use same tools as for bearings removal, as shown in the next photo.



TO INSTALL BEARING

Governor System

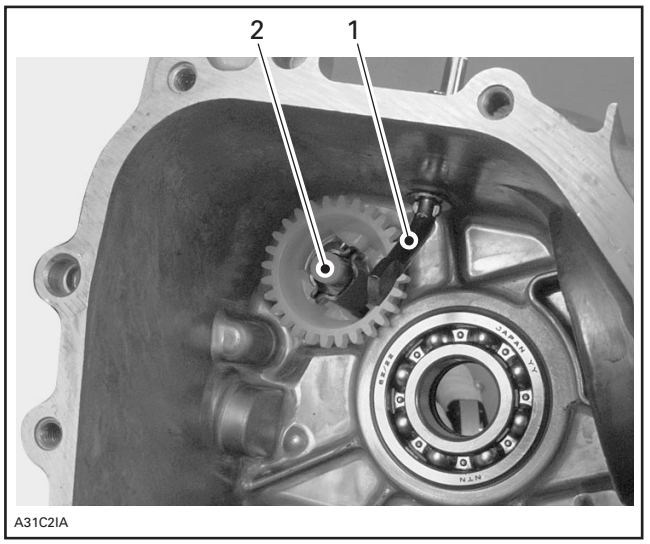
Detach governor spring (black), throttle return spring and governor rod from governor arm. See next photo.



1. *Governor spring (black)*
2. *Throttle return spring*
3. *Governor rod*
4. *Governor arm*

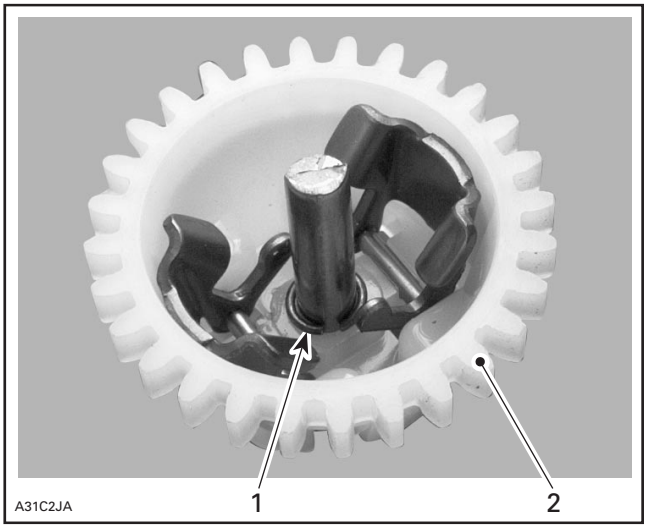
Loosen governor arm screw then remove governor arm.

From inside crankcase, rotate governor arm shaft **no. 14** then pull out governor slider **no. 15** and washer **no. 16**.



1. *Rotate governor arm shaft*
2. *Remove governor slider with washer (not shown)*

Using a small flat screwdriver, remove clip **no. 17** from governor weight holder **no. 18**.



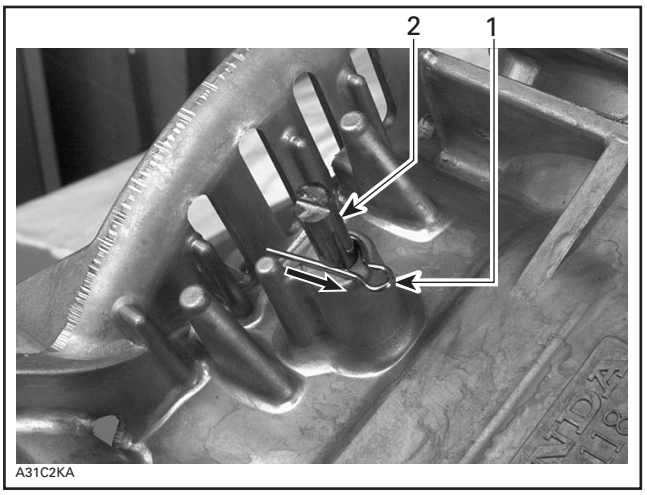
GOVERNOR ASS'Y HAS BEEN REMOVED TO SHOW CLIP

1. *Clip*
2. *Governor weight holder*

Pull out governor weight holder and washer **no. 19**.

Remove pins **no. 20** from governor weights **no. 21** then remove governor weights.

From outside crankcase, remove lock pin **no. 22** from governor arm shaft, as shown in the next photo. Remove governor arm shaft **no. 14** with washer **no. 23**.



REMOVE LOCK PIN

1. *Lock pin*
2. *Governor arm shaft*

INSPECTION

Piston, Crankshaft and Camshaft

Inspect camshaft decompressor. If there is any problems, replace camshaft assembly with new one.

Refer to COMPRESSION TEST AND ENGINE DIMENSION MEASUREMENT 04-05.

Governor System

Check for wear or damage on governor weight holder.

Check that governor weights move freely inside governor weight holder.

ASSEMBLY

Seals and Bearings

Using a press, install bearings **nos. 12** and **13** so that they lean on crankcase flange.

Governor System

Reinstall governor weights **no. 21** with pins **no. 20**.

Install governor weight holder washer **no. 19** then install governor weight holder **no. 18** on shaft.

Secure governor weight holder with clip **no. 17**.

CAUTION: Ensure that clip is properly inserted into shaft groove.

Spread governor weights **no. 21** then install governor slider washer **no. 16** and governor slider **no. 15**.

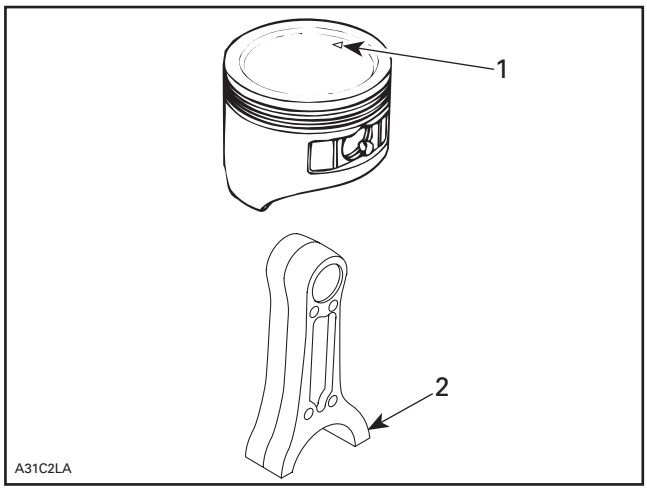
Check that governor slider moves smoothly.

Reinstall governor arm shaft **no. 14** with washer **no. 23** inside crankcase. Secure with lock pin **no. 22**.

CAUTION: The lock pin must be installed on the governor arm shaft with the straight side of the pin against the groove in the shaft.

Piston and Rings

Align piston mark with connecting rod long end and install piston on connecting rod. See the next illustration.

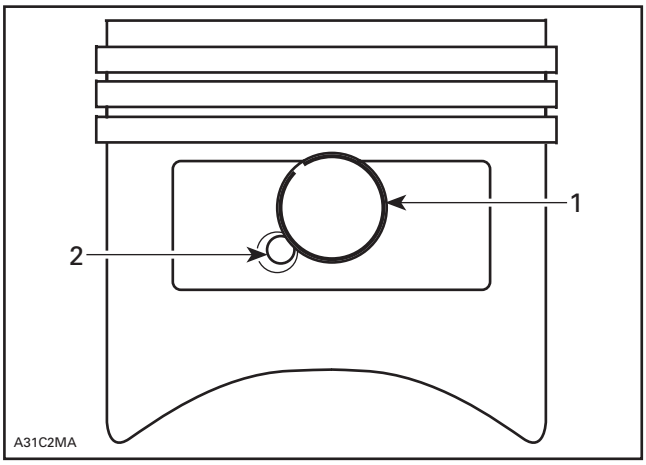


1. *Piston mark*
2. *Connecting rod long end*

Insert piston pin **no. 7** into piston **no. 5** and connecting rod **no. 4**.

Secure piston pin with both piston pin circlips **no. 6**.

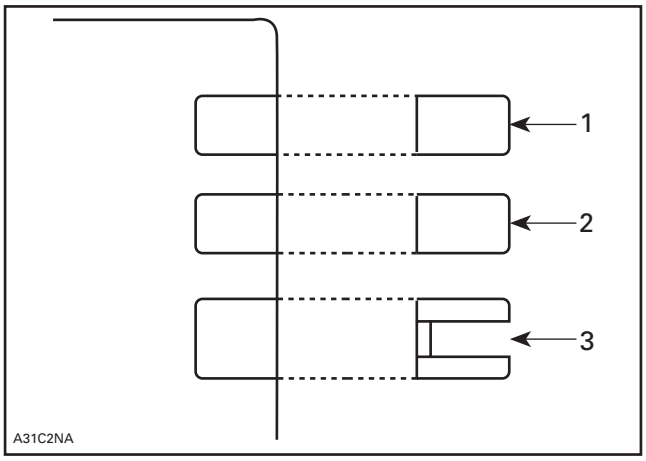
NOTE: Do not align the end gap of the piston pin circlips with the cutout in the piston bore.



1. Piston pin circlip
2. Cutout

Install all rings **no. 24** with the markings facing upward.

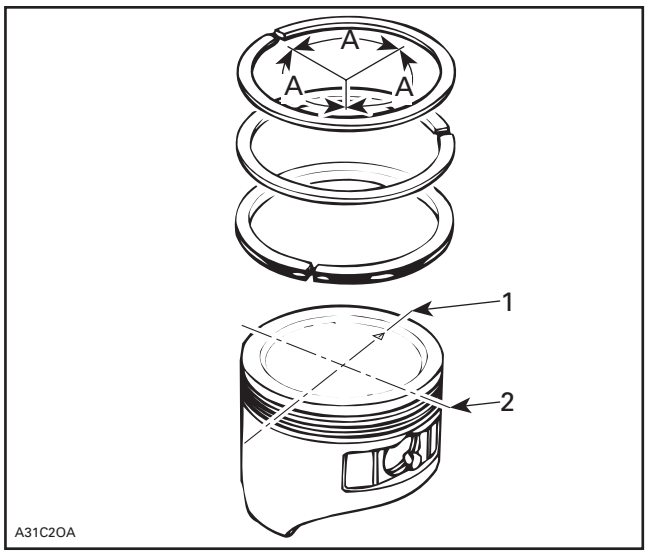
Ensure that top and second rings are not interchanged.



1. Top ring (chrome plated)
2. Second ring
3. Oil ring

Check that rings rotate smoothly after installation.

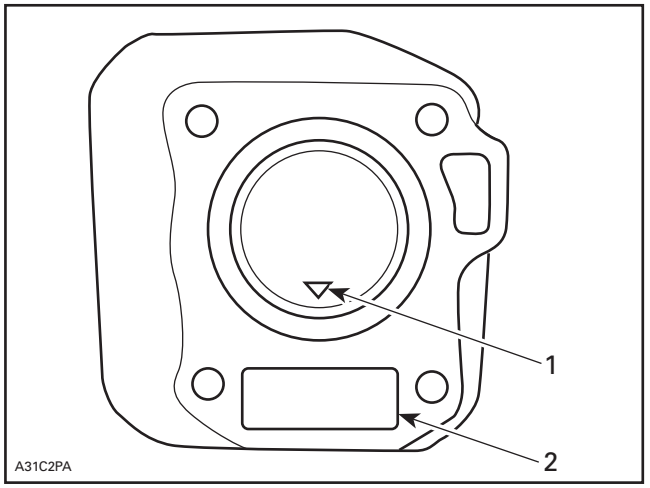
Space the piston ring end gaps 120° apart and do not align the gaps with the piston pin bore or the thrust side axis.



RING POSITIONING

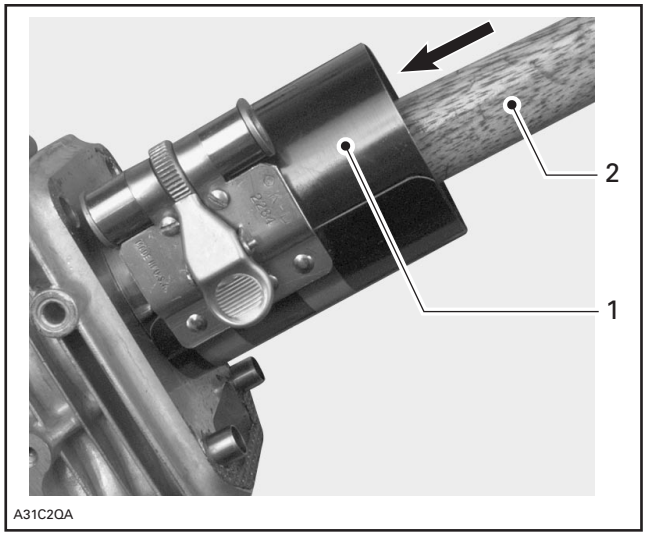
1. DO NOT align ring gap with piston trust side axis
2. DO NOT align ring gap with piston pin bore axis
A. 120°

Position piston ass'y with piston mark toward push rod hole, as shown in the following illustration.



1. Piston mark
2. Push rod hole

Using a ring compressor, slide piston into cylinder with a hammer handle, as shown in the next photo.



SLIDE PISTON INTO CYLINDER

1. *Ring compressor*
2. *Hammer handle*

Crankshaft

Apply oil on crankshaft connecting rod location, connecting rod cap and connecting rod before starting assembly.

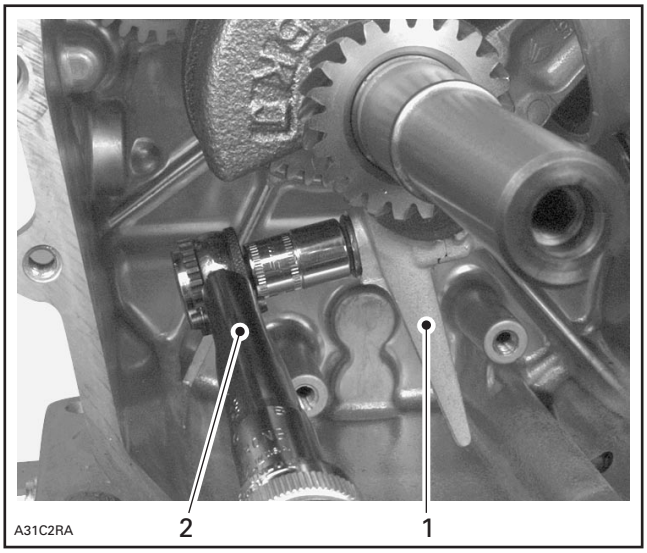
Install crankshaft into crankcase.

NOTE: To protect seal and ease crankcase cover installation, apply grease on crankcase cover seal.

Slide down piston so that connecting rod properly seats on crankshaft.

Secure connecting rod with connecting rod cap. Torque screws to 12 N•m (106 lbf•**in**).

CAUTION: Ensure that connecting rod cap is properly positioned, as shown in the next photo.



1. *Connecting rod cap*
2. *Torque wrench*

Camshaft

Install exhaust and intake valve lifters inside crankcase.

With the crankshaft in place, align the timing punch mark of the cam gear with the punch mark of the crankshaft drive gear. Refer to the following photo.

ALIGN BOTH MARKS

Crankcase

Verify that locating sleeves **no. 25** are in place.

Install gasket **no. 26** on crankcase.

Finalize crankcase assembling with crankcase cover **no. 1**. Torque screws in a crisscross sequence to 12 N•m (106 lbf•**in**).

NOTE: To protect seal and ease crankcase cover installation, apply grease on crankcase cover seal.

Verify that oil drain bolt **no. 27** and both oil filler caps **no. 28** are in place.

COMPRESSION TEST AND ENGINE DIMENSION MEASUREMENT

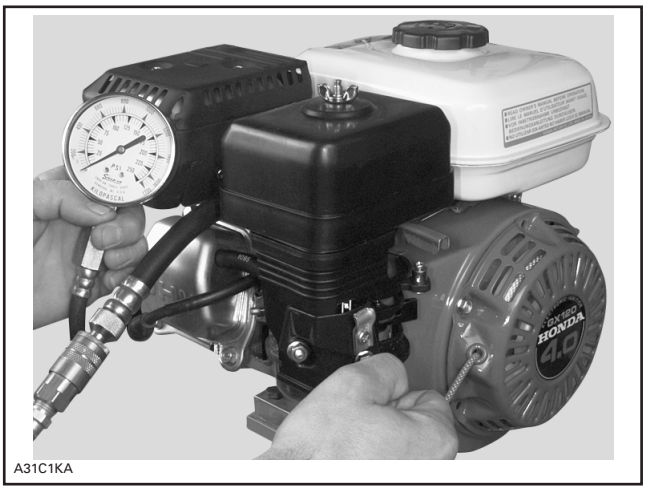
COMPRESSION TEST

Set ignition and emergency cut-out switches to the OFF position.

Disconnect spark plug cap, then remove spark plug.

Plug compression testing gauge into spark plug hole.

Hold compression testing gauge in one hand then pull starter handle 3 or 4 times with the other hand, as shown in the next photo.



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PULL STARTER HANDLE 3 OR 4 TIMES

Engine compression must be as described in the following table. If not, see subsection 04-03 VALVE ADJUSTMENT or subsection 04-04 DISASSEMBLY/ASSEMBLY.

STANDARD	SERVICE LIMIT
110 - 120 PSI	85 PSI

ENGINE DIMENSION MEASUREMENT

VALVE SPRING FREE LENGTH

STANDARD	SERVICE LIMIT
30.5 mm (1.20 in)	29.5 mm (1.16 in)

Measure valve springs free length with a caliper, as shown in the next photo.

NOTE: When measuring free length, ensure not to apply pressure onto spring.

A31C1LA

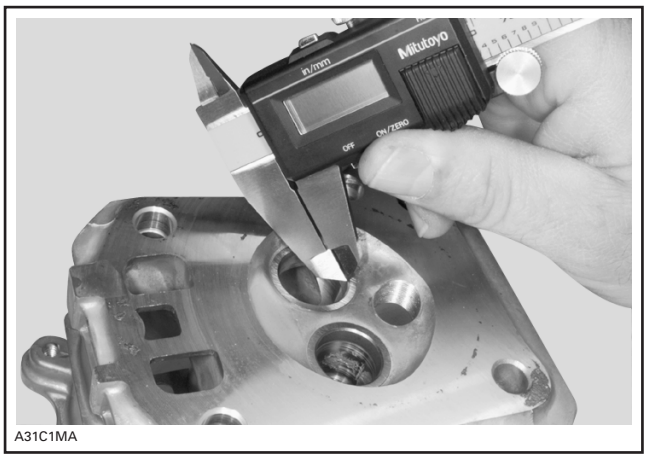
VALVE SPRING FREE LENGTH

If the springs are shorter than service limit value, replace with new one.

VALVE SEAT WIDTH

STANDARD	SERVICE LIMIT
0.8 mm (0.03 in)	2.0 mm (0.08 in)

Measure valve seat width using a caliper, as shown in the next photo.



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VALVE SEAT WIDTH

If valve seat width is under the standard or over the service limit value, replace cylinder head with new one.

VALVE STEM (outside diameter)

	STANDARD	SERVICE LIMIT
INTAKE	5.48 mm (0.216 in)	5.318 mm (0.2094 in)
EXHAUST	5.44 mm (0.214 in)	5.275 mm (0.2077 in)

Measure valve stem with a micrometer, as shown in the next photo.

A31C1NA

TYPICAL

Inspect valve surface, check for abnormal stem wear and bending. If so, replace valve with new one.

VALVE GUIDE (inside diameter)

STANDARD	SERVICE LIMIT
5.50 mm (0.217 in)	5.572 mm (0.2194 in)

Clean valve guides to remove carbon deposits before measuring.

Measure valve guide inside diameter using a small hole telescoping gauge and a micrometer.

Replace cylinder head if valve guides are over service limit value.

GUIDE-TO-STEM CLEARANCE

Subtract each valve stem outside diameter from the corresponding valve guide inside diameter to obtain the stem-to-guide clearance.

	STANDARD	SERVICE LIMIT
INTAKE	0.020 - 0.044 mm (0.0008 - 0.0017 in)	0.10 mm (0.004 in)
EXHAUST	0.006 - 0.087 mm (0.0024 - 0.0034 in)	0.12 mm (0.005 in)

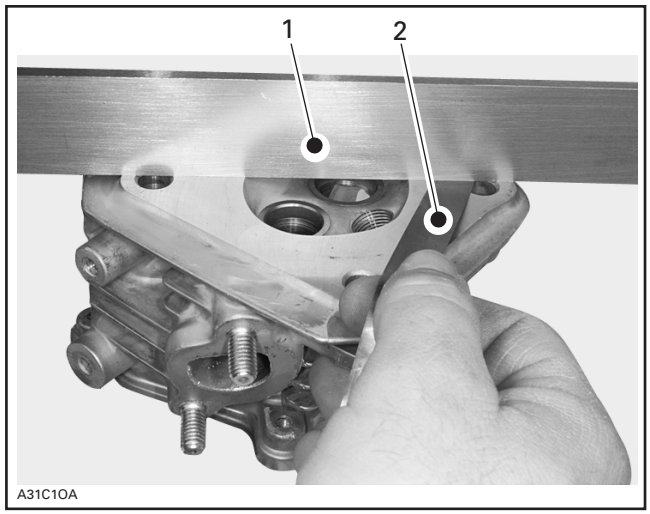
If the stem-to-guide clearance exceeds the service limit value, replace valve or cylinder head as needed.

CYLINDER HEAD SURFACE

SERVICE LIMIT	0.10 mm (0.004 in)

Clean cylinder head surface.

Check cylinder head flatness with a straight edge and a feeler gauge, as shown in the next photo.



1. Straight edge
2. Feeler gauge

If cylinder head flatness is over service limit value, replace cylinder head.

Cylinder Head Inspection

Remove carbon deposits from combustion chamber.

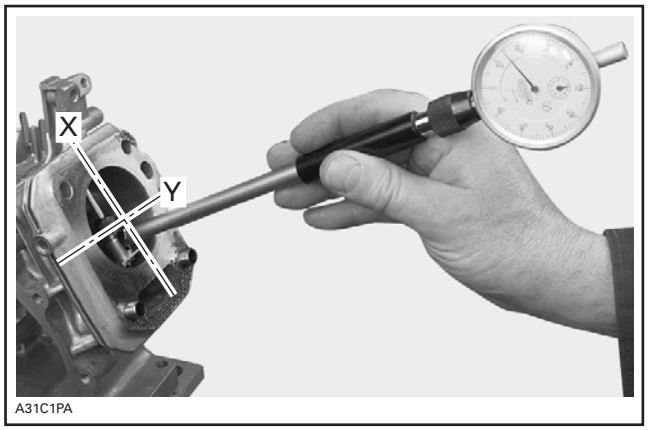
Check the spark plug hole and valve areas for cracks.

CYLINDER INSIDE DIAMETER

STANDARD	SERVICE LIMIT
60.0 mm (2.36 in)	60.165 mm (2.3687 in)

Compare cylinder inside diameter 16 mm (5/8 in) from top of cylinder, halfway and 12.7 mm (1/2 in) from bottom of cylinder.

Measure cylinder inside diameter in both X (perpendicular to crankshaft) and Y (parallel to crankshaft) axis. Take the maximum reading to determine cylinder wear.



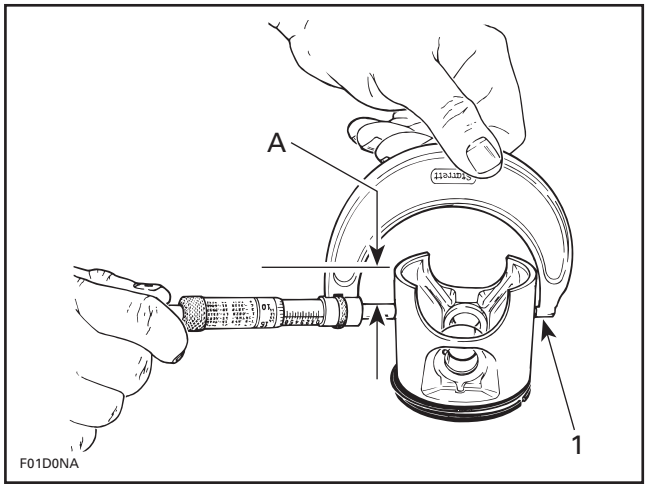
X: Axis (perpendicular to crankshaft axis)
Y: Axis (parallel to crankshaft axis)

If the difference exceeds the specified dimension the cylinder should be rebored and honed or should be replaced.

USED PISTON MEASUREMENT

STANDARD	SERVICE LIMIT
59.985 mm (2.3616 in)	59.845 mm (2.3561 in)

Using a micrometer, measure piston at 10 mm (25/64 in) perpendicularly (90°) to piston pin.



TYPICAL

1. *Measuring perpendicularly (90°) to piston pin axis*

A. 10 mm (25/64 in)

The measured dimension should be as described in the previous table. If not, install a new piston.

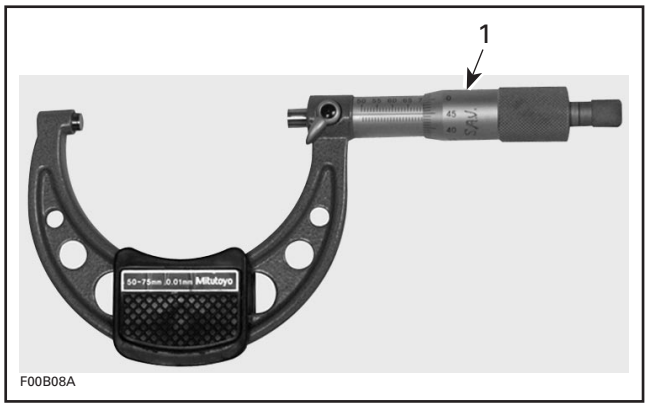
CYLINDER/PISTON CLEARANCE

STANDARD	SERVICE LIMIT
0.015 - 0.050 mm (0.0006 - 0.0020 in)	0.12 mm (0.005 in)

Used and New Pistons

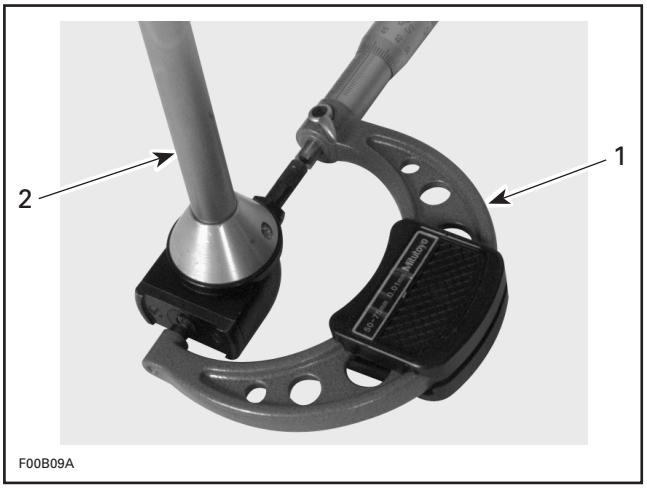
NOTE: Make sure used piston is not worn. See USED PISTON MEASUREMENT above.

Adjust and lock a micrometer to the piston dimension.

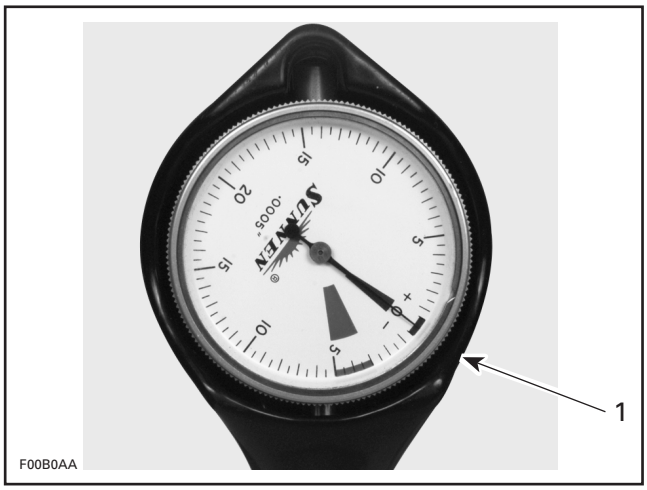


1. *Micrometer set to the piston dimension*

With the micrometer set to the piston dimension, adjust a cylinder bore gauge to the micrometer dimension and set the indicator to 0 (zero).



1. *Use the micrometer to set the cylinder bore gauge*
2. *Dial bore gauge*



TYPICAL

1. *Indicator set to 0 (zero)*

Position the dial bore gauge at 16 mm (5/8 in) below cylinder top edge, measuring perpendicularly (90°) to piston pin axis. See CYLINDER INSIDE DIAMETER above.

Read the measurement on the cylinder bore gauge. The result is the exact piston/cylinder wall clearance. If clearance exceeds specified tolerance, replace cylinder or rebore. See previous table.

NOTE: Make sure the cylinder bore gauge indicator is set exactly at the same position as with the micrometer, otherwise the reading will be false.

RING/PISTON GROOVE CLEARANCE

STANDARD	SERVICE LIMIT
0.015 - 0.045 mm (0.0006 - 0.0018 in)	0.15 mm (0.006 in)

NOTE: These clearances are applicable for 3 rings; top, second and oil ring.

Using a feeler gauge check clearance between ring and groove. Replace piston if clearance exceeds specified tolerance. See above table.

RING/PISTON GROOVE CLEARANCE

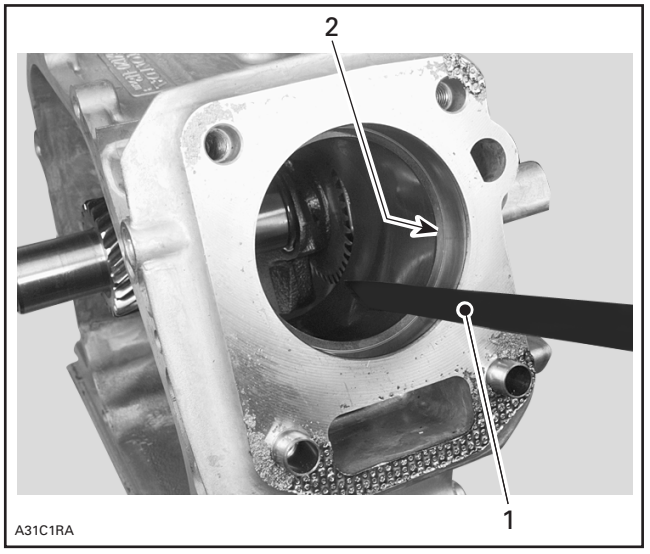
RING END GAP

	STANDARD	SERVICE LIMIT
TOP AND SECOND	0.2 - 0.4 mm (0.008 - 0.016 in)	1.0 mm (0.04 in)
OIL	0.15 - 0.35 mm (0.006 - 0.014 in)	1.0 mm (0.04 in)

Position ring 16 mm (5/8 in) from top of cylinder.

NOTE: In order to correctly position the ring in the cylinder, use piston as a pusher.

Using a feeler gauge, check ring end gap. Replace ring, if gap exceeds specified tolerance. See above table.

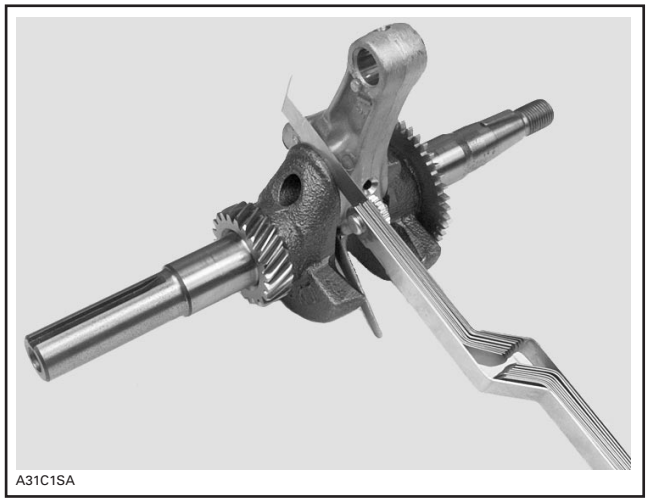


1. *Feeler gauge*
2. *Ring properly positioned in cylinder*

CONNECTING ROD BIG END SIDE CLEARANCE

STANDARD	SERVICE LIMIT
0.1 - 0.7 mm (0.004 - 0.028 in)	1.1 mm (0.043 in)

Using a feeler gauge, measure distance between connecting rod and crankshaft counterweight. If the distance exceeds specified tolerance, replace the crankshaft.



MEASURE SIDE CLEARANCE

PISTON PIN (outside diameter)

STANDARD	SERVICE LIMIT
13.0 mm (0.51 in)	12.954 mm (0.5100 in)

Mesure piston pin with a micrometer, as shown in the next photo.

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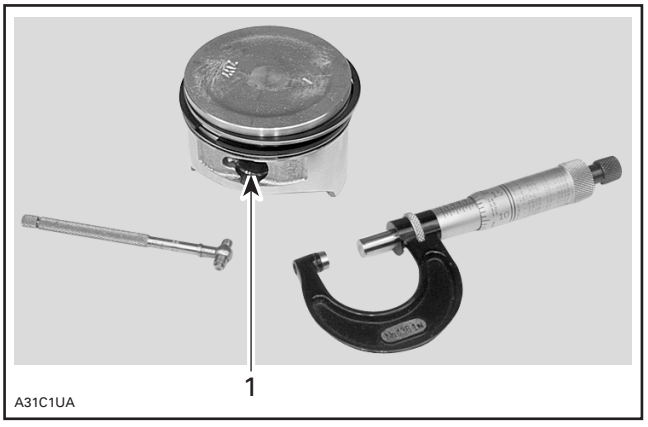
MEASURE PISTON PIN

PISTON PIN BORE (inside diameter)

STANDARD	SERVICE LIMIT
13.002 mm (0.5119 in)	13.048 mm (0.5137 in)

Measure piston pin bore with a telescoping gauge and a micrometer, as shown in the next photo.



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1. Piston pin bore

PISTON-TO-PISTON PIN BORE CLEARANCE

STANDARD	SERVICE LIMIT
0.002 - 0.014 mm (0.0001 - 0.0006 in)	0.08 mm (0.003 in)

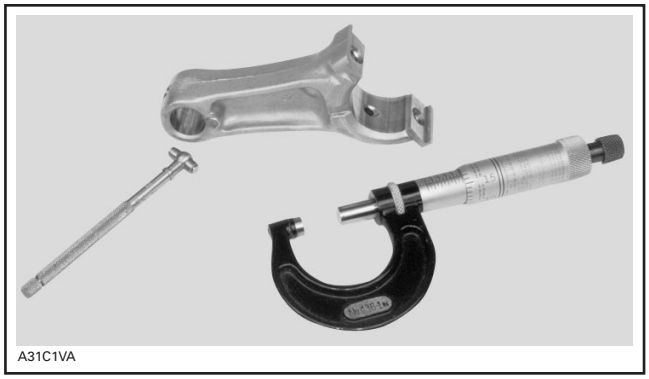
Compare both previously measured piston pin (outside diameter) and piston pin bore (inside diameter).

If clearance is out of service limit value, replace piston pin or piston as needed.

CONNECTING ROD SMALL END (inside diameter)

STANDARD	SERVICE LIMIT
13.005 mm (0.5120 in)	13.07 mm (0.515 in)

Measure connecting rod small end (inside diameter) with a telescoping gauge and a micrometer, as shown in the next photo.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MEASURE CONNECTING ROD SMALL END

CONNECTING ROD BIG END (inside diameter)

STANDARD	SERVICE LIMIT
26.02 mm (1.024 in)	26.066 mm (1.0262 in)

Measure connecting rod big end (inside diameter) with a telescoping gauge and a micrometer, as shown in the next photo.

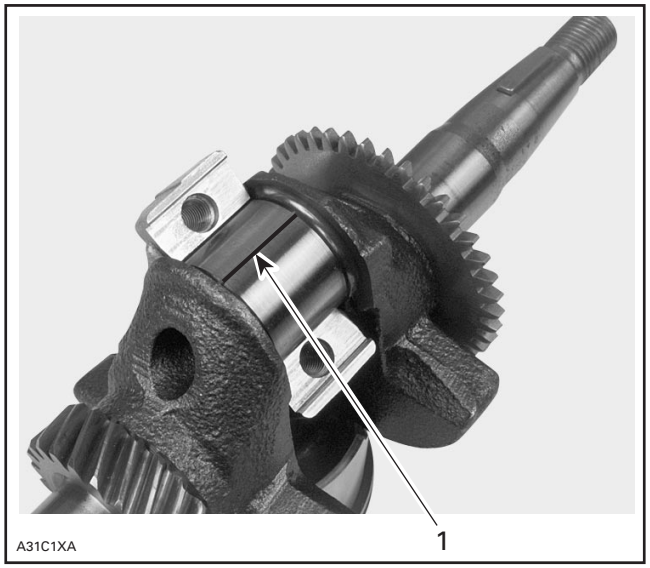
MEASURE CONNECTING ROD BIG END

CONNECTING ROD BIG END OIL CLEARANCE

STANDARD	SERVICE LIMIT
0.040 - 0.063 mm (0.0016 - 0.0025 in)	0.12 mm (0.005 in)

Clean all oil from crankpin and connecting rod big end surfaces.

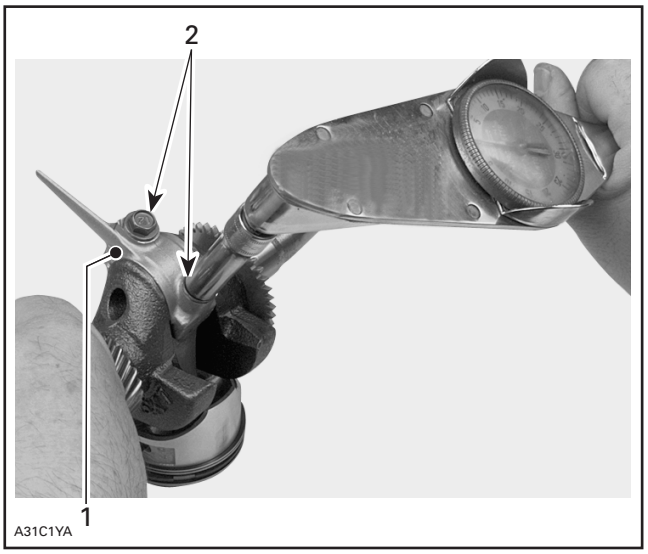
Position a piece of plastigauge on the crankpin, as shown on the next photo.



1. Plastigauge properly positioned

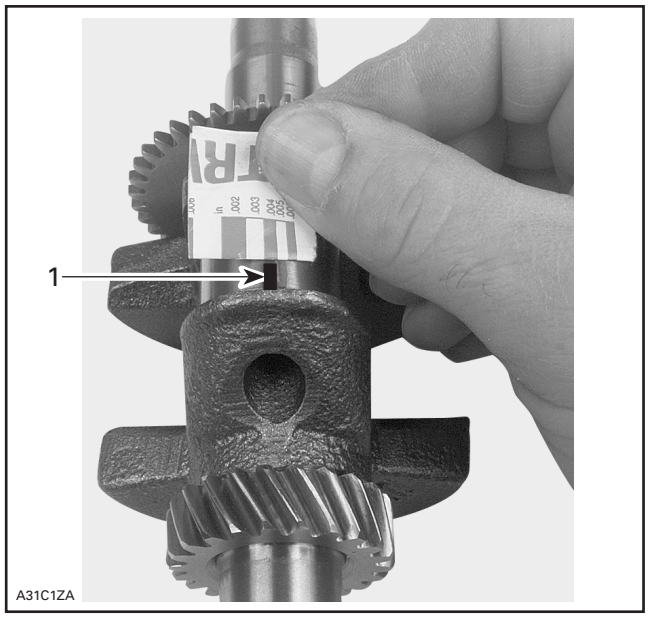
Reinstall connecting rod cap and torque screws to 12 N•m (109 lbf•**in**). See next photo.

NOTE: Do not rotate crankshaft while plastigauge is in place.



1. Connecting rod cap in place
2. Torque both screws

Remove connecting rod cap and measure the plastigauge, as shown in the next photo.



1. Plastigauge

If clearance exceeds the service limit, replace connecting rod and recheck clearance.

NOTE: Replacement connecting rods are available with standard and 0.25 mm (0.010 in) undersize bearing surfaces.

CRANKPIN (outside diameter)

STANDARD	SERVICE LIMIT
25.98 mm (1.023 in)	25.92 mm (1.020 in)

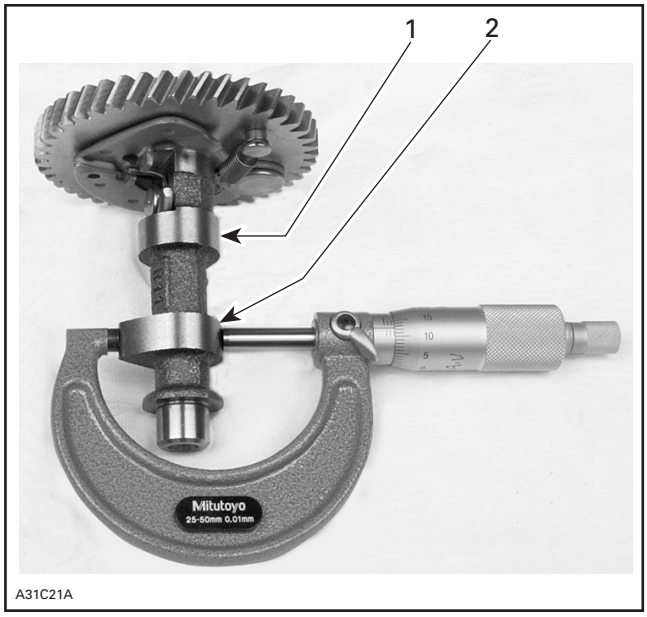
Measure crankpin outside diameter with a micrometer, as shown in the next photo.

MEASURE CRANKPIN

CAMSHAFT CAM HEIGHT

	STANDARD	SERVICE LIMIT
INTAKE	27.7 mm (1.09 in)	27.45 mm (1.081 in)
EXHAUST	27.75 mm (1.093 in)	27.50 mm (1.083 in)

Measure both camshaft cams with a micrometer, as shown in the next photo.



1. *Exhaust valve cam*
2. *Intake valve cam*

CAMSHAFT (outside diameter)

STANDARD	SERVICE LIMIT
13.984 mm (0.5506 in)	13.916 mm (0.5479 in)

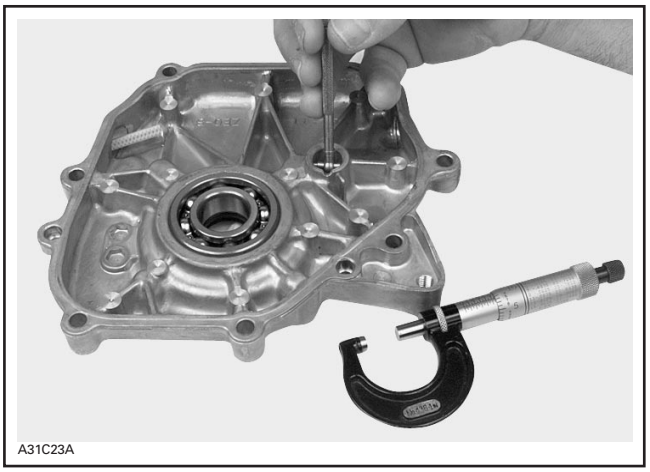
Measure camshaft outside diameter with a micrometer, as shown in the following photo.

MEASURE CAMSHAFT OUTSIDE DIAMETER

CAMSHAFT HOLDER (inside diameter)

STANDARD	SERVICE LIMIT
14.0 mm (0.55 in)	14.048 mm (0.5531 in)

Measure camshaft holder inside diameter with a telescoping gauge and a micrometer, as shown in the next photo.



MEASURE CAMSHAFT HOLDER INSIDE DIAMETER

CHECKING SURFACE FLATNESS

Crankcase cover can be checked for perfectly mating surfaces.

Lay part on a surface plate (marble, mirror or thick glass plate).

Holding down one end of part, try pushing down the other end.

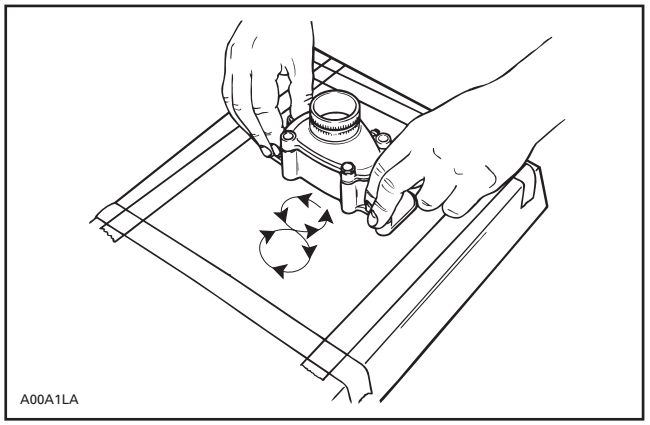
If any play is felt, part must be rectified.

RECTIFYING SURFACES

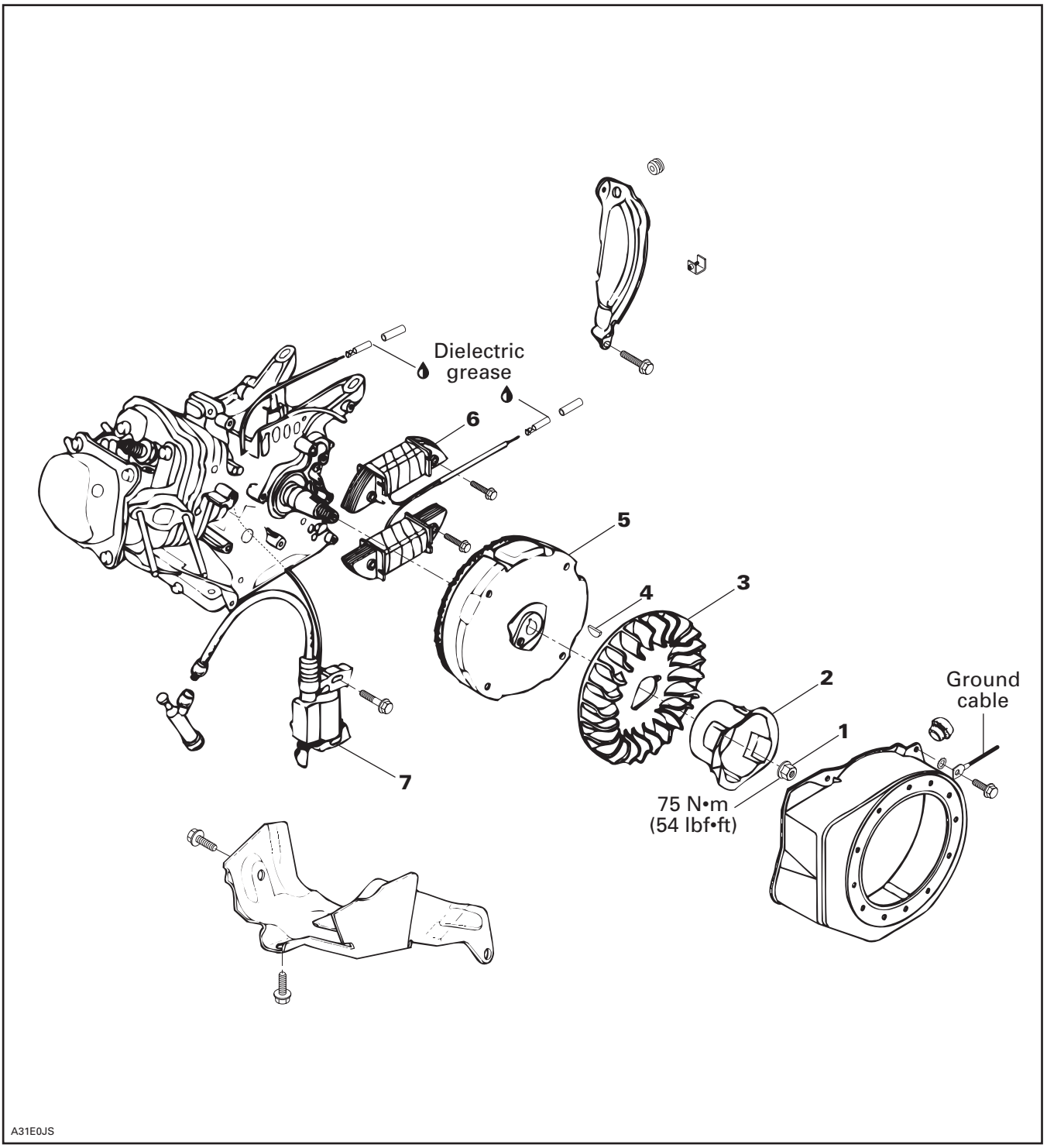
Stick a fine sand paper sheet on the surface plate then lightly oil the sand paper.

Rub manifold mating surface on sand paper using 8-figure movements.

Sand until mating surface is perfectly straight.



TRANSISTORIZED MAGNETO IGNITION



NOTE: Engine must be removed to perform the following procedures.

CLEANING

Clean all metal components in a non-ferrous metal cleaner.

CAUTION: Clean armature and magneto using only with a clean cloth.

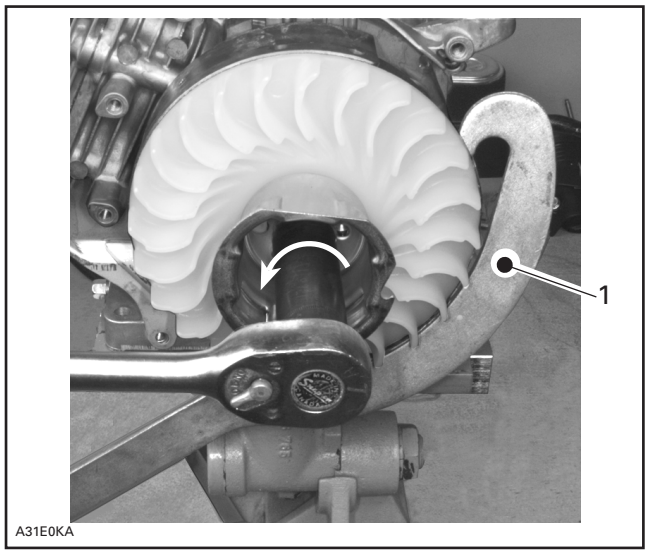
DISASSEMBLY

To gain access to magneto assembly, remove the following parts:

– chain guard
– drive chain
– clutch
– muffler
– disconnect fuel line
– engine
– rewind starter

Remove ignition coil no. 7.

To remove magneto flywheel retaining nut no. 1, use clutch holder tool (P/N 529 006 400), as shown in the next photo.



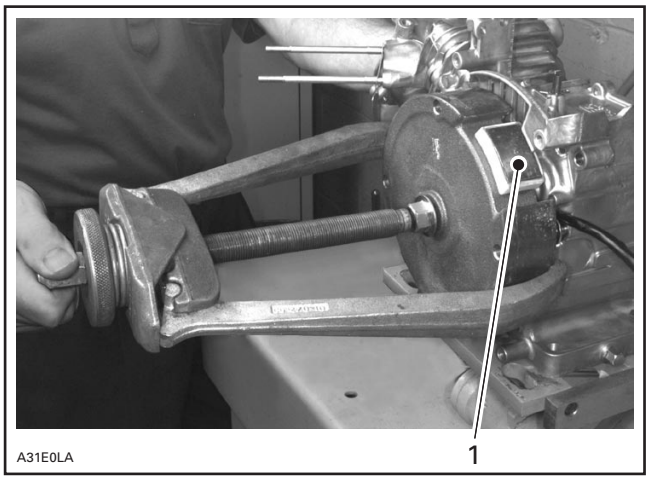
LOOSEN FLYWHEEL NUT

1. *Hold flywheel using clutch holder tool (P/N 529 006 400)*

Remove starter pulley no. 2 and fan no. 3.

Reinstall magneto flywheel nut then using puller, detach flywheel no. 5, as shown in the next photo.

CAUTION: Never hold flywheel using magnet section. Flywheel may be damaged.

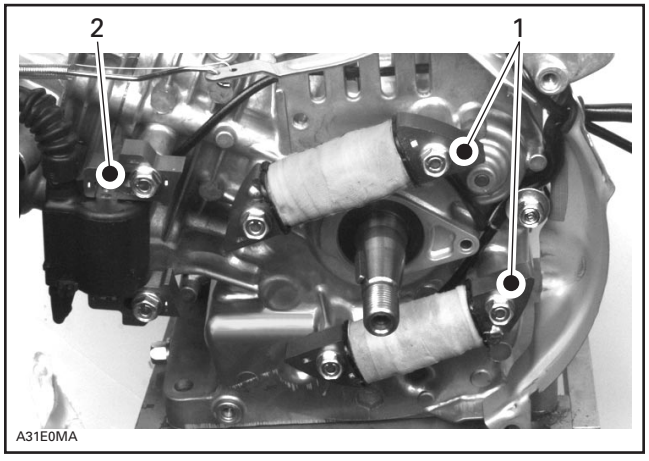


1. *Magnet section*

NOTE: Tighten puller bolt and at same time, tap on bolt head using a hammer to release magneto flywheel from its taper.

INSPECTION

Test ignition no. 7 and lamp no. 6 coils as described in TESTING PROCEDURE 06-03.



1. *Lamp coils*
2. *Ignition coil*

ASSEMBLY

Clean crankshaft extension (taper).

Position Woodruff key **no. 4** then reinstall flywheel with fan.

Install starter pulley, as shown in the next photo.

CAUTION: When installing starter pulley, ensure that locating pin is properly aligned with flywheel alignment hole.

1. Starter pulley locating pin must be aligned with flywheel hole

Torque flywheel nut to 75 N•m (54 lbf•ft).

At reassembly coat all electric connections with silicone dielectric grease (P/N 413 701 700) to prevent corrosion or moisture penetration.

CAUTION: Do not use silicone "sealant", this product will corrode contacts.

Ignition Coil Air Gap Adjustment

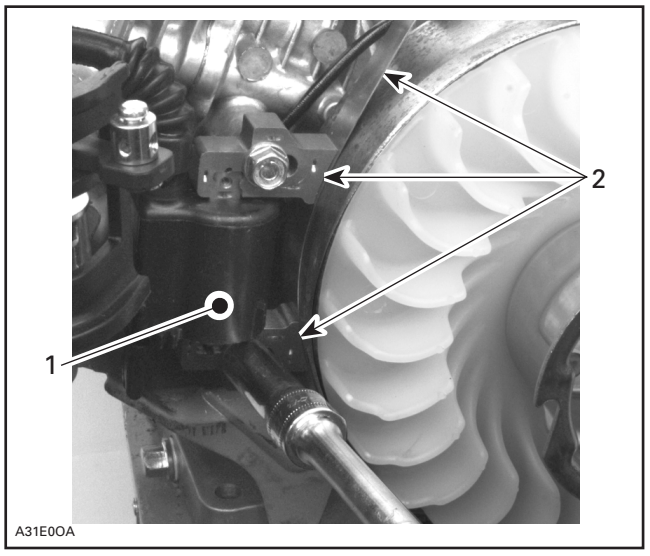
NOTE: To perform ignition coil air gap adjustment, flywheel must be tightened.

Loosen ignition coil screws.

Insert feeler gauge between flywheel and ignition coil. Adjust both gaps at the same time as shown in the next photo and according to the following table.

SPECIFIED CLEARANCE	0.4 ± 0.2 mm (0.016 ± 0.008 in)

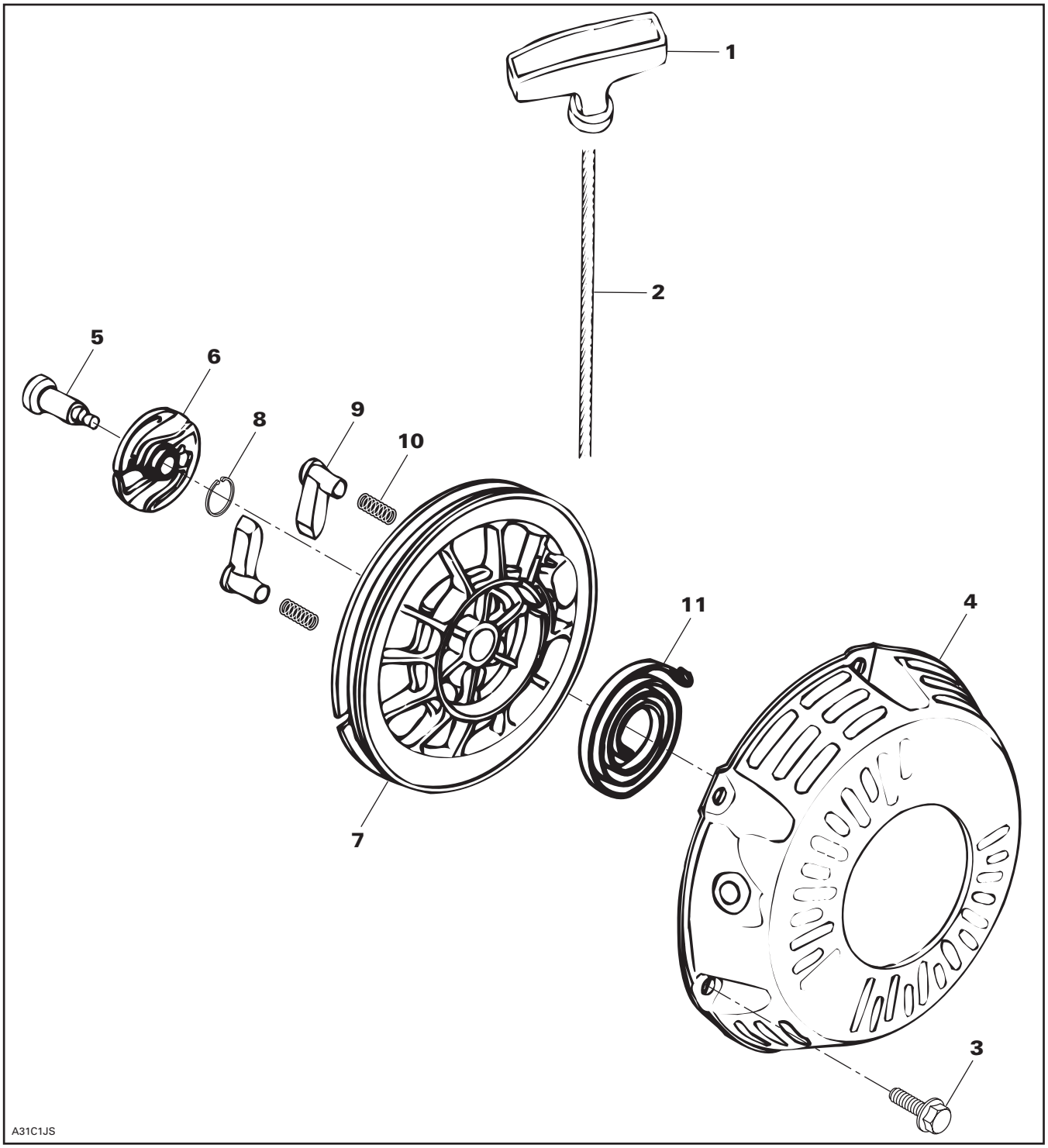
Push the ignition coil firmly toward flywheel and tighten screws.



1. Ignition coil
2. Feeler gauge filling both gaps

CAUTION: Do not adjust ignition coil air gap at magnet section on flywheel.

REWIND STARTER



REMOVAL

The following must be removed before rewind starter removal:

– chain guard
– drive chain
– clutch
– muffler
– disconnect fuel hose
– engine

Using a small screwdriver, extract rope knot from starter grip **no. 1**. Cut rope **no. 2** close to knot. Tie a knot near starter.

Mark rewind starter housing **no. 4** position for re-assembly.

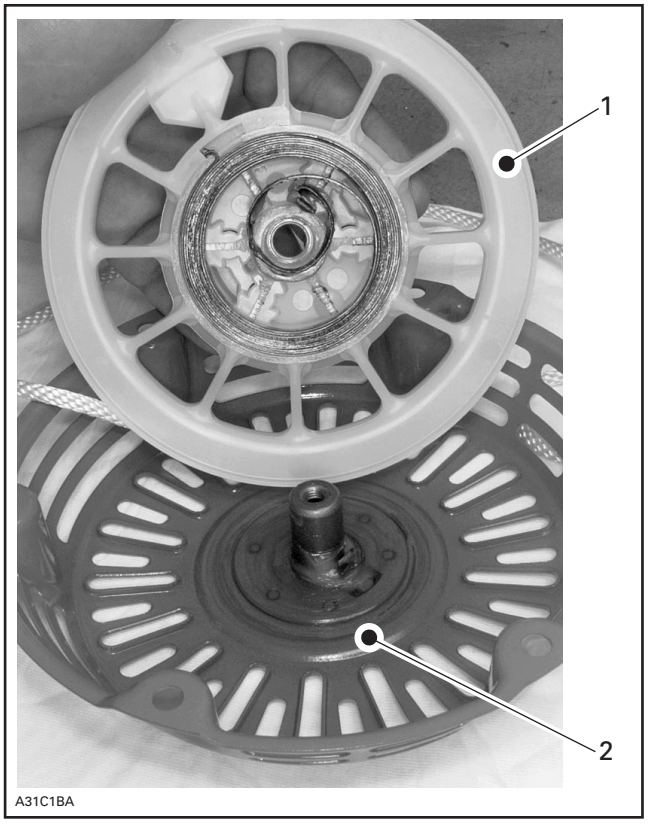
Remove screws **no. 3** securing rewind starter housing **no. 4** to engine then remove rewind starter ass'y.

DISASSEMBLY

To remove rope from rewind starter mechanism:

Place rewind starter ass'y on a bench.

– First remove screw **no. 5**, then ratchet guide **no. 6**.
– Remove friction spring **no. 8** and both ratchets **no. 9** with springs **no. 10**.
– Remove sheave **no. 7** from starter housing, as shown in the next illustration.



1. Sheave
2. Rewind starter housing

⚠ WARNING

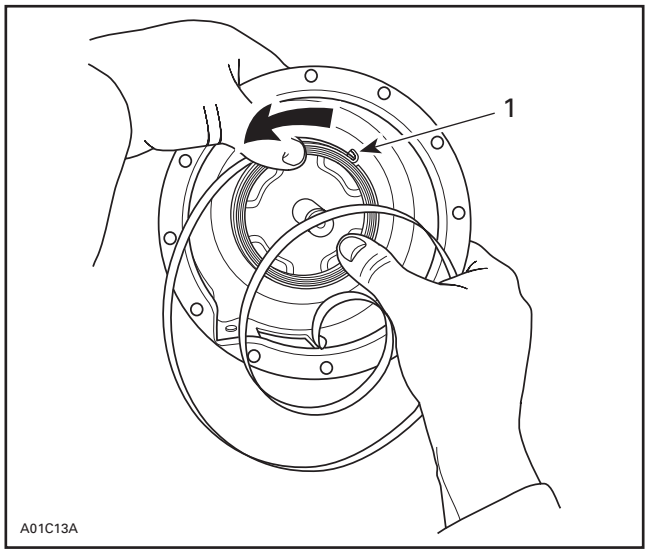
Since the spring is tightly wound inside the guide it may fly out when rewind is handled. Always handle with care.

INSPECTION

Check rope **no. 2** for fraying. Replace if so.

ASSEMBLY

At assembly, position spring **no. 11** outer end into spring guide notch then wind the spring counterclockwise into guide.



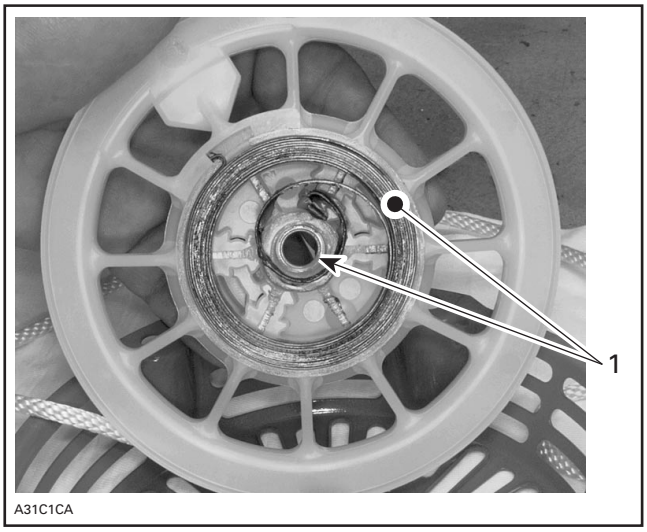
TYPICAL

1. Outer end into guide notch

NOTE: Due to dust accumulation, rewind starter must be periodically cleaned, inspected and relubricated.

CAUTION: It is of the utmost importance that the rewind starter spring be lubricated periodically using specific lubricants. Otherwise, rewind starter component life will be shortened and/or rewind starter will not operate properly under very cold temperatures.

Lubricate spring assembly with silicone compound grease (P/N 420 897 061) and position into starter housing as in the next photo.

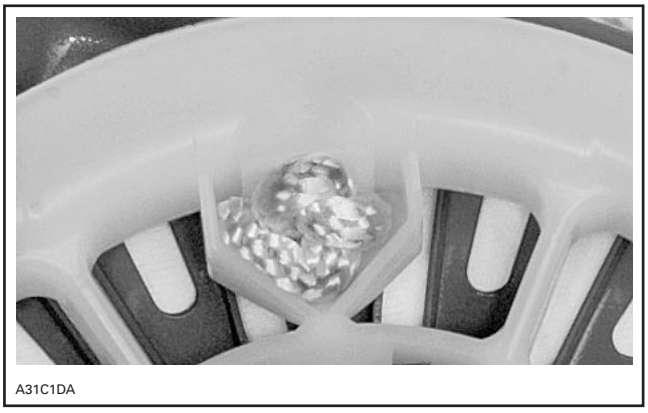


1. Grease inside spring guide and sheave hub

CAUTION: The use of standard multi-purpose grease could result in rewind starter malfunction.

To install a new rope:

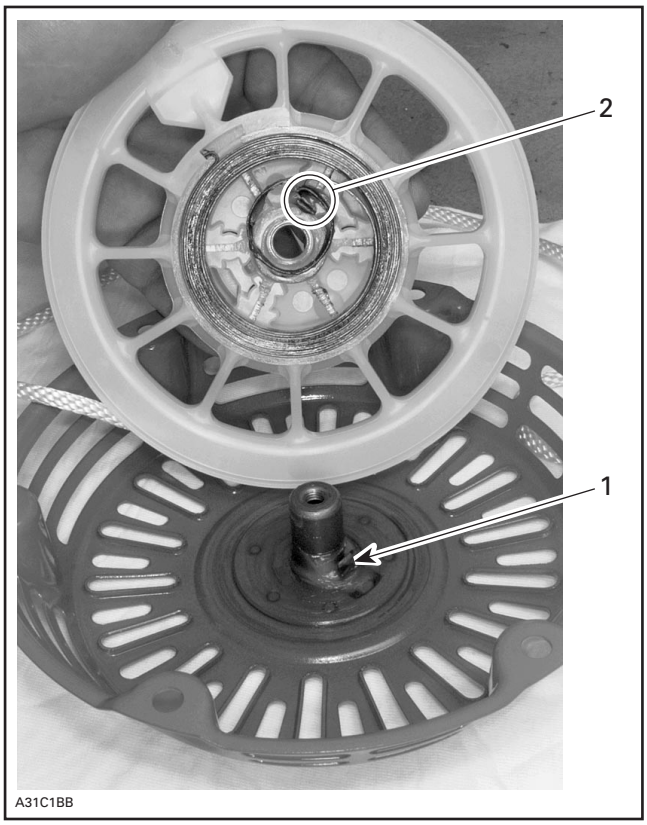
Insert rope into sheave orifice and lock it with a knot as illustrated.



ROPE KNOT INTO SHEAVE ORIFICE

To adjust rope tension:

Wind rope on sheave and place sheave into starter housing making sure that the sheave hub notch engages in the rewind spring hook. See the next photo.

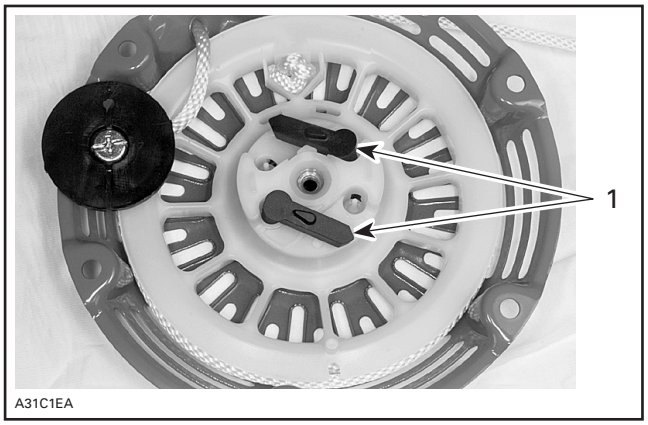


1. *Sheave hub notch*
2. *Rewind spring hook*

Rotate the sheave counterclockwise until rope end is accessible through starter housing orifice.

Pull the rope out of the starter housing and temporarily make a knot to hold it.

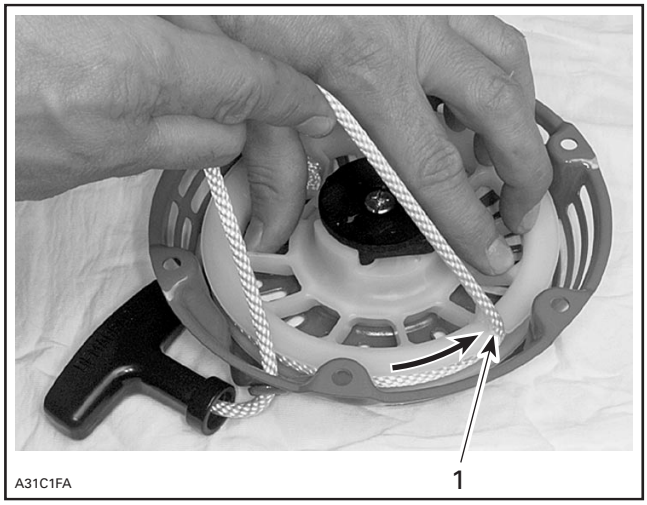
Position both ratchets (with springs), as shown in the next photo.



1. *Ratchet*

Finalize rewind starter assembly with friction spring **no. 8**, ratchet guide **no. 6** and screw **no. 5**.

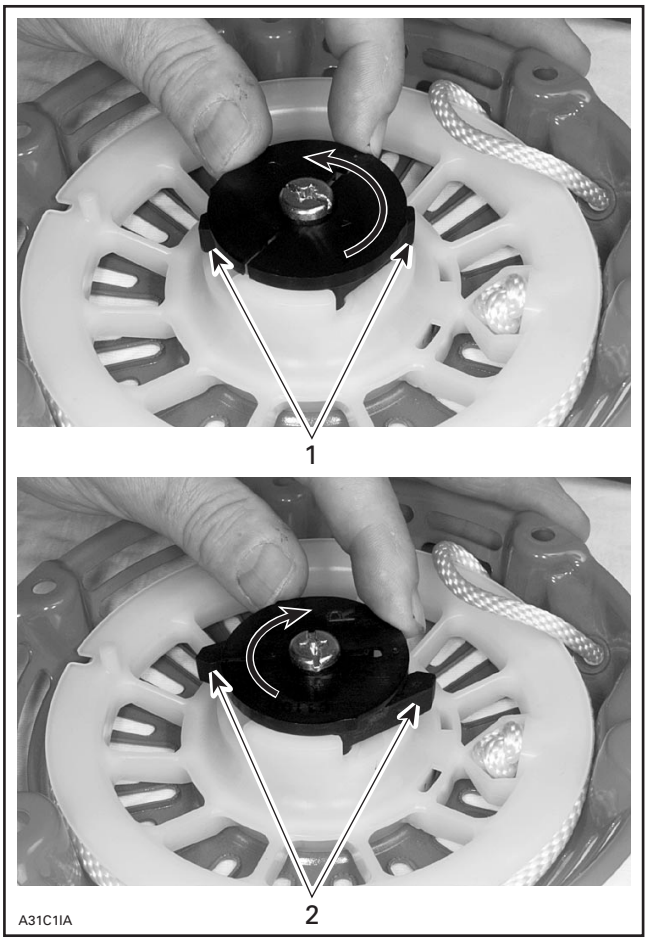
Attach rope to sheave notch then turn (2 turns) sheave counterclockwise, as shown in the next photo. One turn preload will give 7 turns of tension when fully extended.



2 TURNS COUNTERCLOCKWISE

1. *Sheave notch*

Check ratchet operation: when turning ratchet guide counterclockwise, ratchets must move in. When turning ratchet guide clockwise, ratchets must move out as shown in the next photo.



1. Turn counterclockwise (CCW) — ratchets in
2. Turn clockwise (CW) — ratchets out

INSTALLATION

Reinstall rewind starter ass'y on engine.

Reinstall engine in snowmobile.

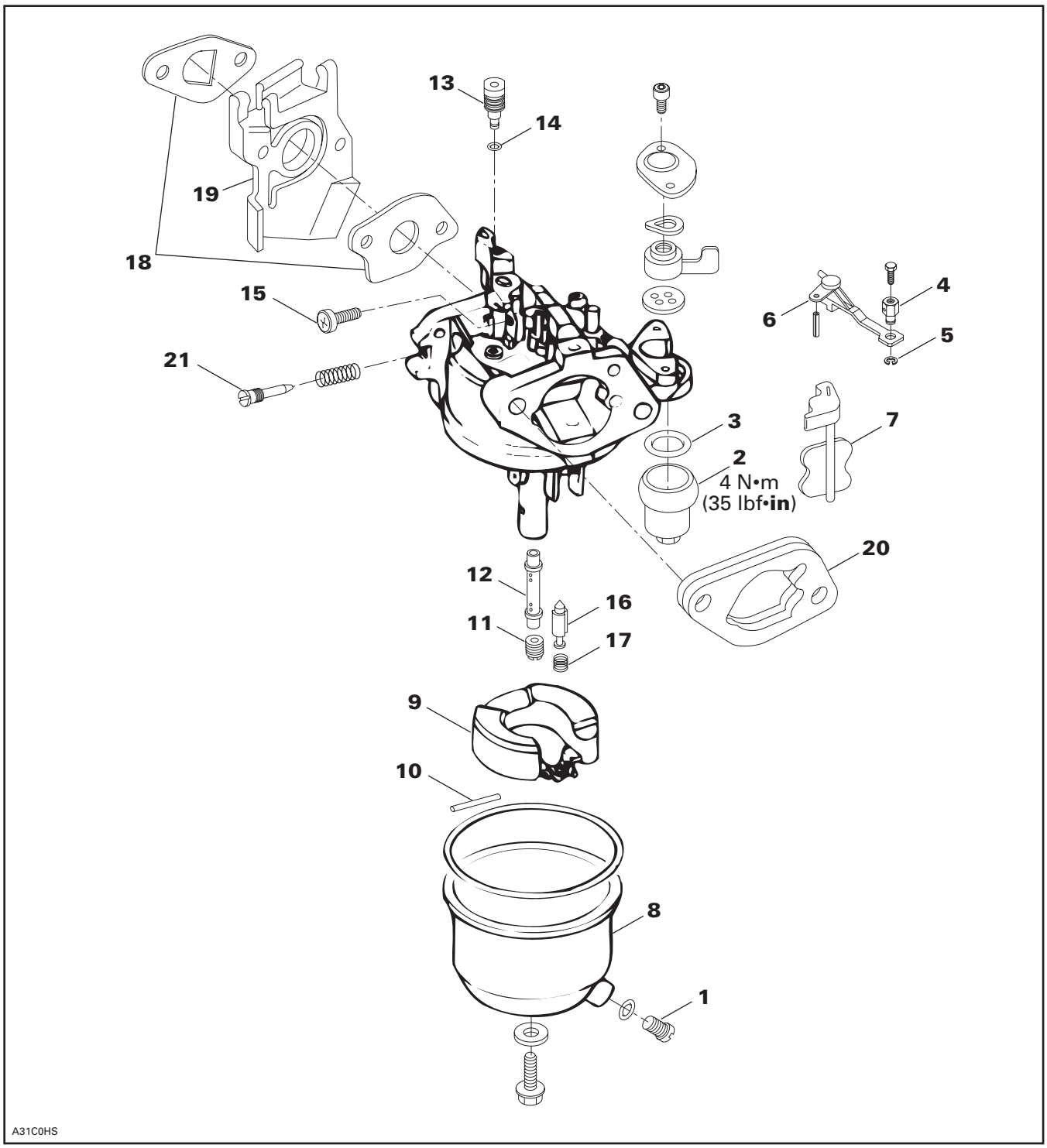
Prior to installing starter grip **no. 1** on new rope, it is first necessary to fuse the rope end with a lit match.

Pass rope through snowmobile fitting and starter grip and tie a knot in the rope end. Fuse the knot with a lit match then insert rope end down and pull the starter grip over the knot.

Reconnect fuel hose.

Reinstall clutch, drive chain, then chain guard.

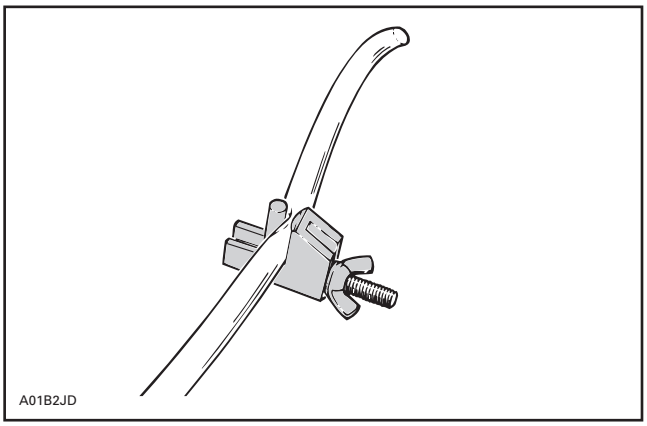
CARBURETOR


13
14
19
18
15
21
6
4
5
3
7
2
4 N•m
(35 lbf•in)
20
12
16
11
17
9
10
8
1
A31C0HS

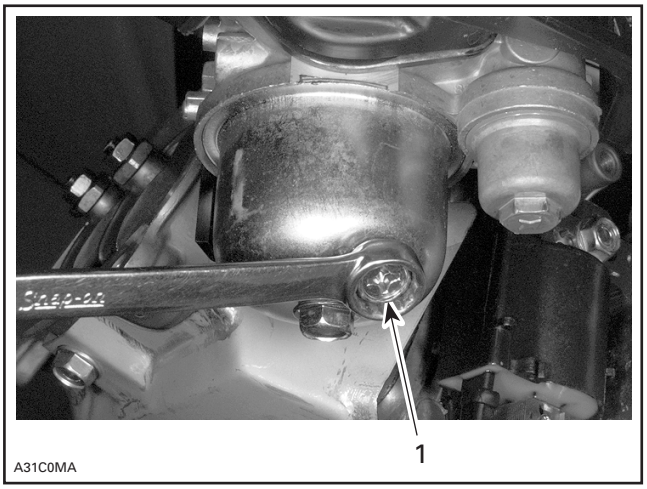
REMOVAL

Remove engine protective plate.

Obstruct fuel line with a hose pincher (P/N 295 000 076), as shown in the next photo.



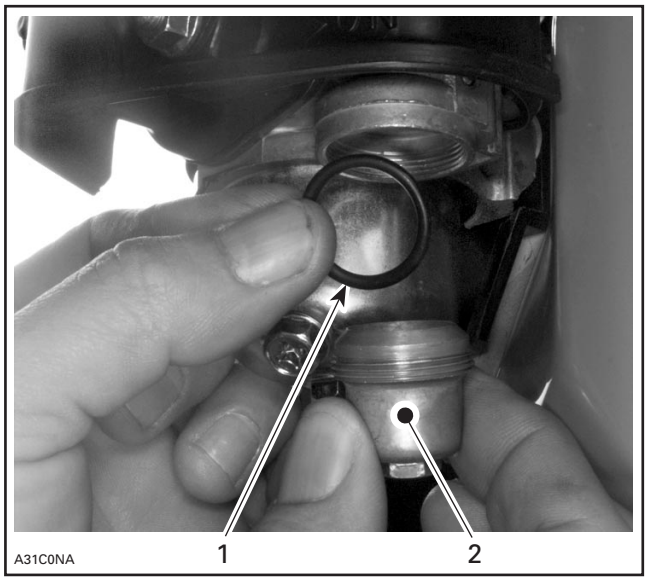
Drain fuel from carburetor by loosening screw **no. 1**, as shown in the next photo.



TO DRAIN CARBURETOR

1. Loosen this screw

Loosen fuel strainer cup **no. 2** and remove from carburetor. Keep O-ring **no. 3**, as shown in the next photo.



REMOVE FUEL STRAINER CUP

1. O-ring
2. Fuel strainer cup

Disconnect fuel inlet line from carburetor and drain fuel from tank.

⚠ WARNING

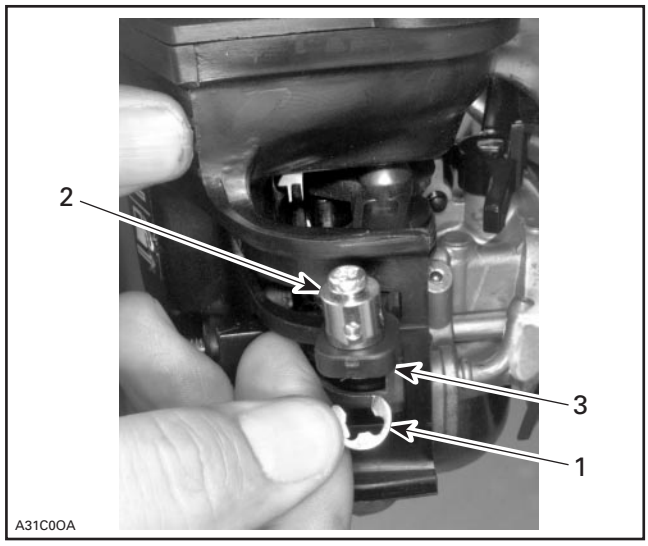
When draining a fuel tank or whenever a fuel line is disconnected, obstruct line with a hose pincher (P/N 295 000 076) or equivalent device. Fuel is flammable and explosive under certain conditions. Ensure work area is well ventilated. Do not smoke or allow open flames or sparks in the vicinity.

Remove fuel tank.

Remove carburetor cap.

Detach choke cable from choke cable attachment **no. 4**, located on carburetor choke lever **no. 6**.

Remove circlip **no. 5** then remove choke cable attachment from carburetor choke lever, as shown in the next photo.



1. *Circlip*
2. *Choke cable attachment*
3. *Carburetor choke lever*

Move carburetor choke lever to the left, as shown in the next photo.

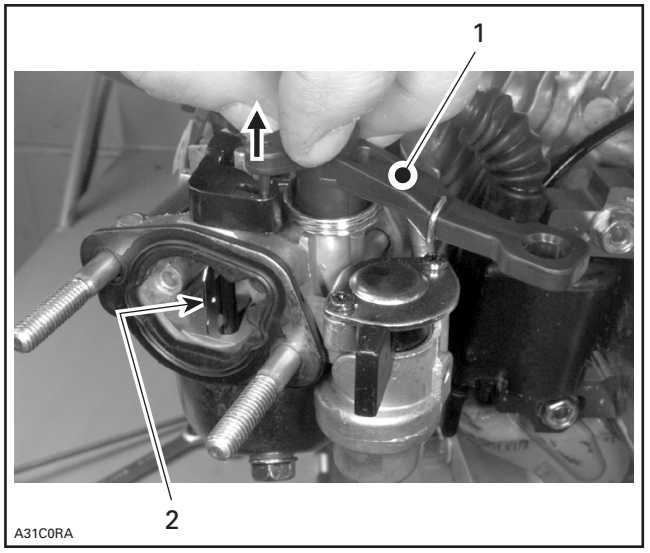
MOVE CARBURETOR CHOKE LEVER

Unscrew carburetor protector screws then remove carburetor nuts.

Remove carburetor protector, as shown in the next photo.

REMOVE CARBURETOR PROTECTOR

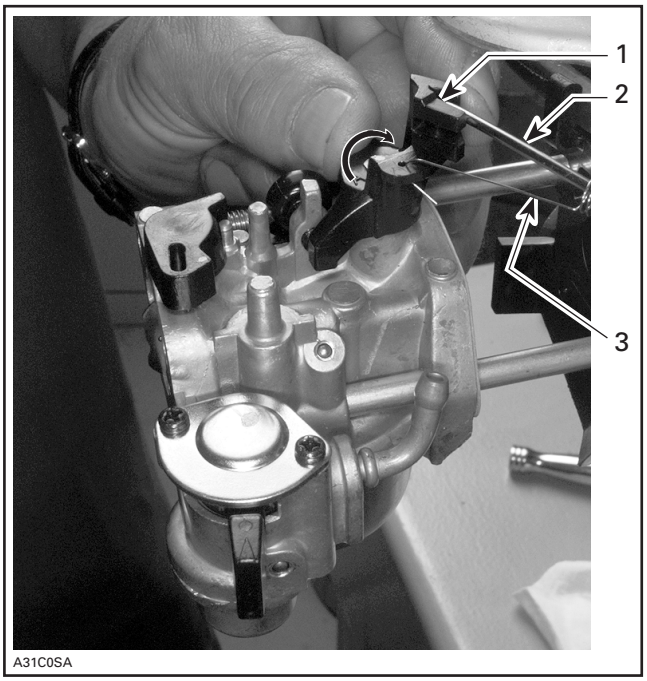
Lift up choke lever **no. 6** and detach from choke **no. 7**, as shown in the next photo.



LIFT UP CHOKE LEVER

1. *Choke lever*
2. *Choke*

Slide out carburetor and activate carburetor throttle lever so that groove aligns with governor rod, as shown in the next photo.



SLIDE OUT CARBURETOR AND ALIGN GROOVE

1. *Carburetor throttle lever groove aligned with governor rod*
2. *Governor rod*
3. *Throttle return spring*

Detach governor rod with throttle return spring.

Detach governor spring.

Remove carburetor.

NOTE: Carburetor can be removed without removing engine from vehicle, in that case remove left side stud.

CLEANING AND INSPECTION

The entire carburetor should be cleaned with a general solvent and dried with compressed air before disassembly.

CAUTION: Heavy duty carburetor cleaner may be harmful to the float material and to the rubber parts, O-rings, etc. Therefore, it is recommended to remove those parts prior to cleaning.

Carburetor body and jets should be cleaned in a carburetor cleaner following manufacturer's instructions.

⚠ WARNING

Solvent with a low flash point such as gasoline, naphtha, benzol, etc., should not be used as they are flammable and explosive.

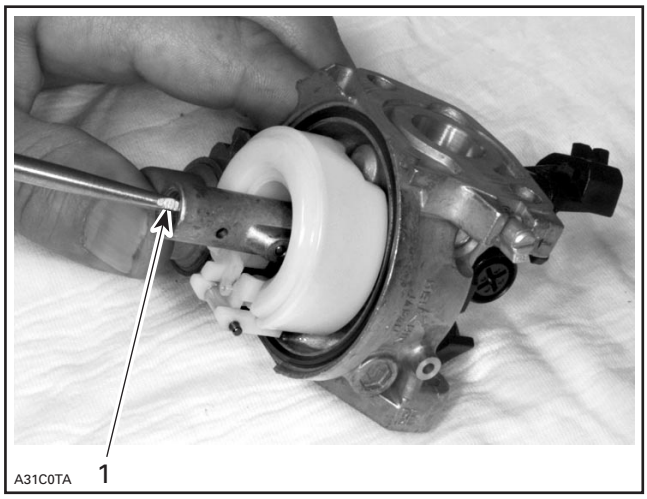
Check for fuel soaked into float no. 8. Replace as necessary.

Check float no. 9 and float pin no. 10 for cracks or other damages affecting free movement. Replace as necessary.

DISASSEMBLY AND ASSEMBLY

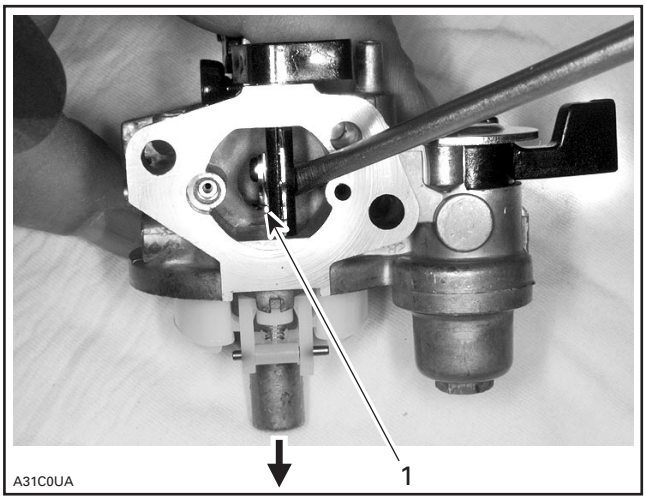
11,12, Main Jet and Nozzle

Place carburetor on a clean surface, then unscrew main jet no. 11 using a flat screwdriver, as shown in the next photo.



1. *Unscrew main jet using a flat screwdriver*

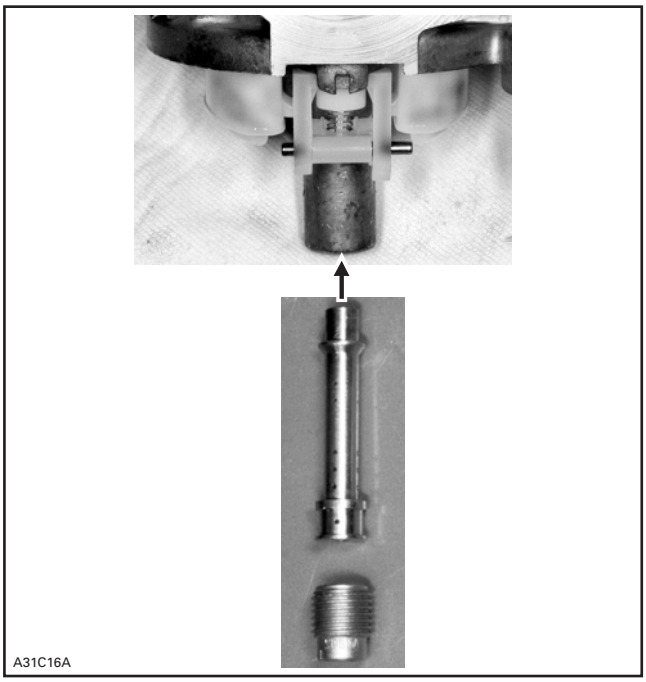
To remove nozzle **no. 12** use a flat screwdriver and push from inside carburetor, as shown in the following photo.



1. Push on nozzle to remove it

Clean main jet and nozzle thoroughly with compressed air.

Reinstall nozzle and main jet as shown in the next photo.

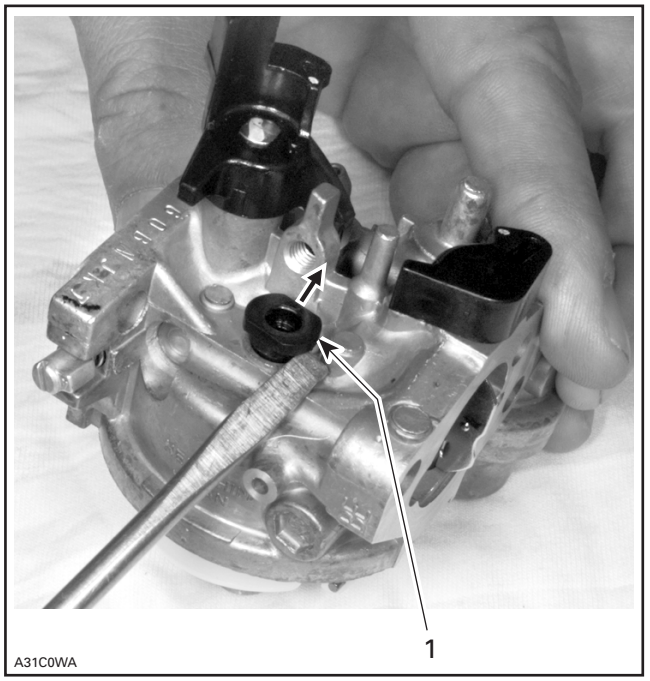


PROPER POSITION TO INSTALL NOZZLE AND MAIN JET

13,14, Pilot Jet

Remove stop screw **no. 15**.

Using a flat screwdriver remove pilot jet **no. 13**, as shown in the next photo.

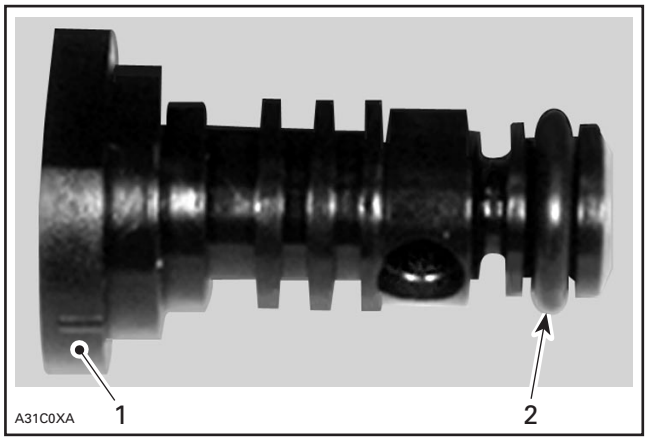


TO REMOVE, LIFT PILOT JET

1. Pilot jet

Clean pilot jet using compressed air.

Ensure that O-ring **no. 14** is not damaged. If so, replace with new one. See next photo.



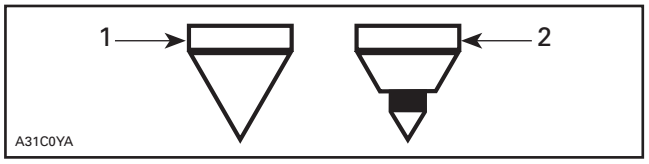
1. Pilot jet
2. O-ring

16,17, Float Valve

Remove float pin **no. 10** then remove float **no. 9** from carburetor.

Check for worn valve seat on float. Replace if so.

Check for weak float valve spring **no. 17** or worn float valve, as shown in the next photo.

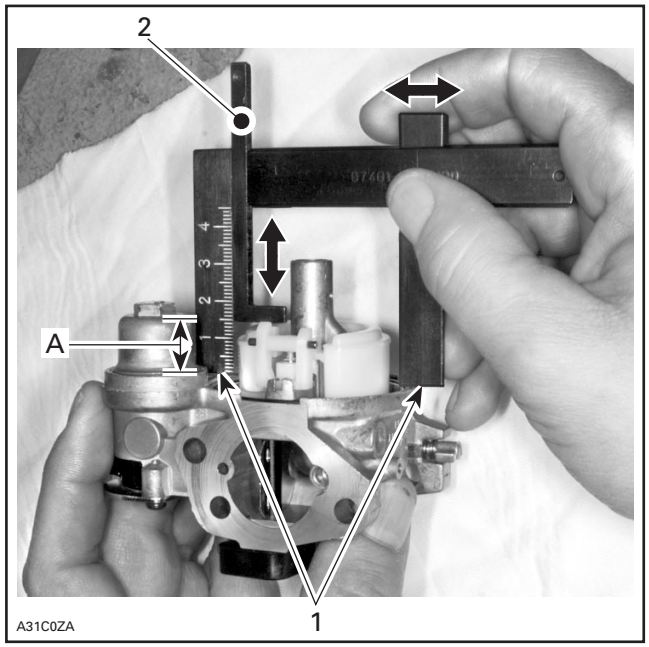


1. Float valve tip OK
2. Replace float valve

CARBURETOR FLOAT LEVEL

Correct fuel level in float chamber is vital toward maximum engine efficiency. To check for correct float level proceed as follows:

– Remove float bowl **no. 8** and gasket from carburetor.
– With carburetor leaned on a clean surface, measure float level height A using float level gauge (P/N 529 035 520), as shown in the next photo.
– Keep float level gauge perfectly vertical and in line with main jet hole.
– Ensure that both float level gauge tips are properly positioned on carburetor body and that "L" arm is leaning on float without compressing valve spring.



1. Float level gauge tips properly leaned on carburetor body
2. Lean "L" arm to carburetor to measure float level height
A. Float level height

STANDARD FLOAT HEIGHT	13.7 mm (0.54 in)

If float height is not according to specifications on above table, replace float and/or float valve.

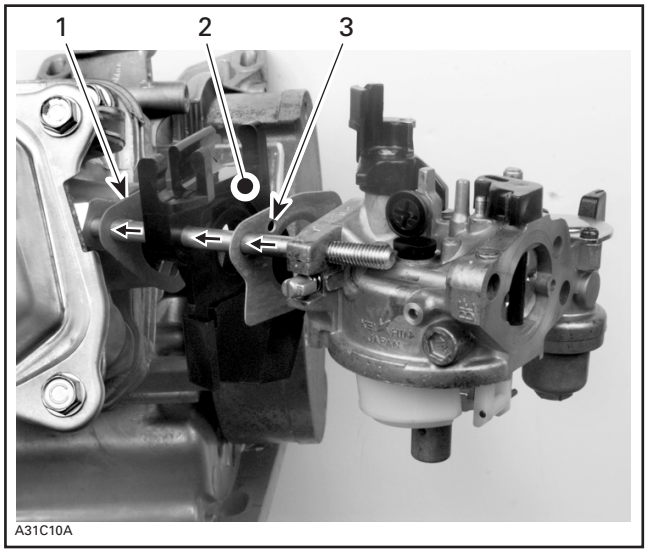
Recheck float level height.

INSTALLATION

To install carburetor on engine, inverse removal procedure.

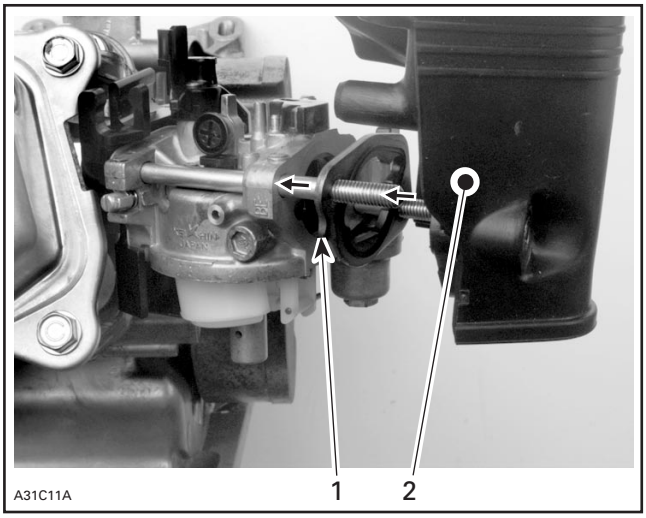
However, pay attention to the following:

– Inspect throttle cable and housing prior to installation.
– Ensure that both packings **no. 18** and insulator **no. 19** are properly positioned between cylinder head and carburetor, as shown in the next photo.



1. Packing
2. Insulator
3. Note packing hole position

– Ensure that spacer **no. 20** is properly positioned between carburetor and air cleaner elbow ass'y, as shown in the following photo.



1. Spacer
2. Air cleaner elbow ass'y

CARBURETOR ADJUSTMENTS

Preliminary Idle Speed Adjustment

21, Pilot Screw

Start engine and allow it to warm.

Adjust idle speed by turning pilot screw **no. 21** clockwise or counterclockwise until highest idle RPM is attained.

Idle Speed Final Adjustment

15, Throttle Stop Screw

After the pilot screw is correctly adjusted, turn throttle stop screw **no. 15** to obtain the standard idle speed.

STANDARD IDLE SPEED	1400 ± 200 RPM

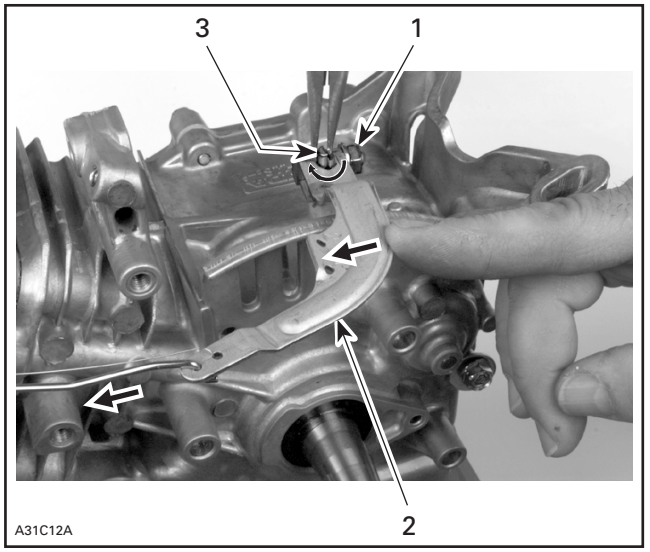
GOVERNOR ADJUSTMENT

Loosen governor arm nut.

Turn governor arm clockwise until carburetor throttle is fully opened. Hold governor arm in this position.

Using pliers, turn governor arm shaft clockwise until it stops.

At this point tighten governor arm nut. See the next photo.



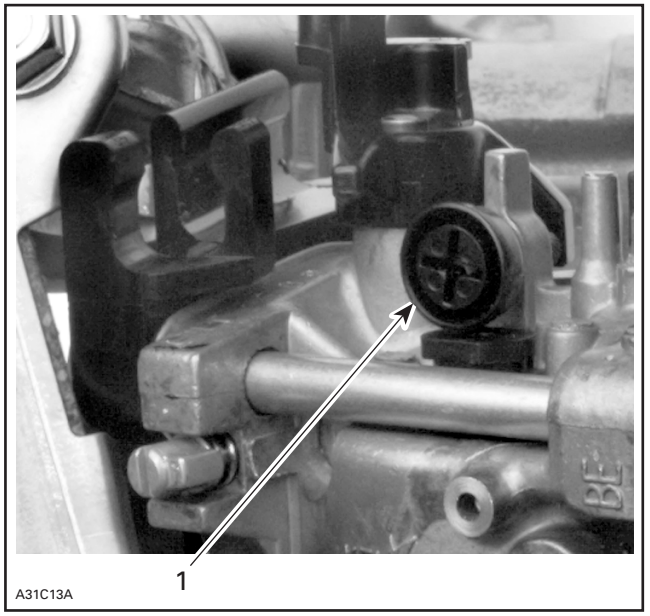
1. Governor arm nut
2. Turn governor arm to fully open throttle
3. Turn governor arm shaft

Lift rear of snowmobile.

Start engine and allow to warm up to normal temperature.

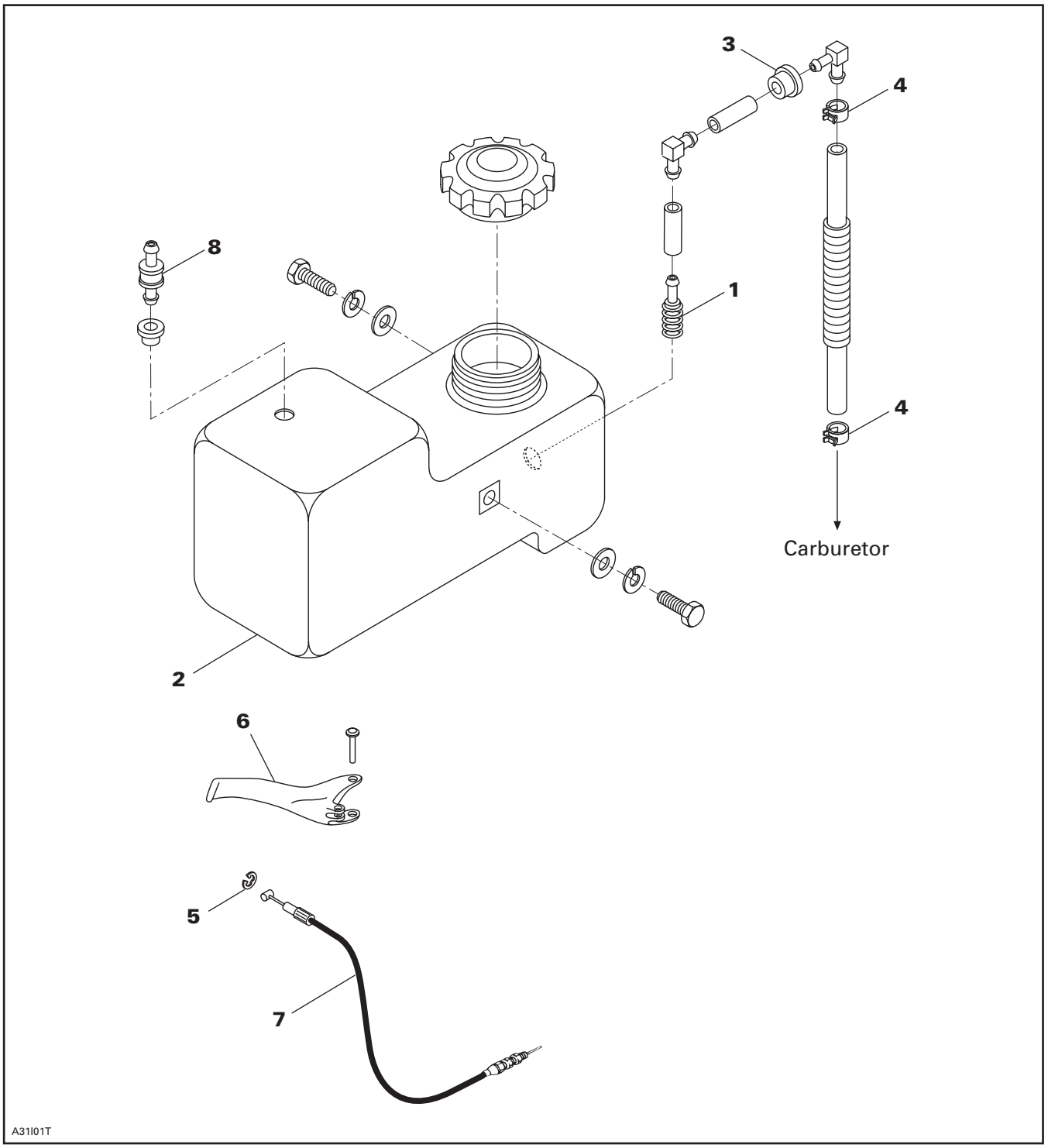
Activate throttle lever so that engine revs to maximum standard speed.

Adjust throttle lever stop screw so that engine will not rev over maximum standard speed. Refer to TECHNICAL DATA 10-02.



1. Adjust throttle lever stop screw

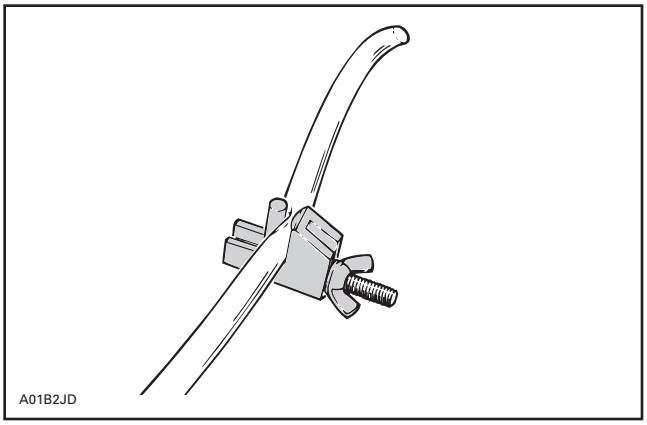
FUEL TANK AND THROTTLE CABLE



Fuel Tank Lines

⚠ WARNING

When draining a fuel tank or whenever a fuel line is disconnected, obstruct line with a hose pincher (P/N 295 000 076) or equivalent device. Fuel is flammable and explosive under certain conditions. Ensure work area is well ventilated. Do not smoke or allow open flames or sparks in the vicinity.



8, Check Valve

Check valve **no. 8** must be installed with its black side (stamped VAC) facing toward fuel tank.

To check proper operation of check valve, apply vacuum to nipple of black side (stamped VAC). There must be no air flow restriction.

With 35 kPa (5 PSI) applied to nipple of black side (stamped VAC) the check valve should not lose more than 2 bubbles per minute at either nipple or at the weld joint while submersed in water.

Replace if check valve doesn't meet above mentionned specifications.

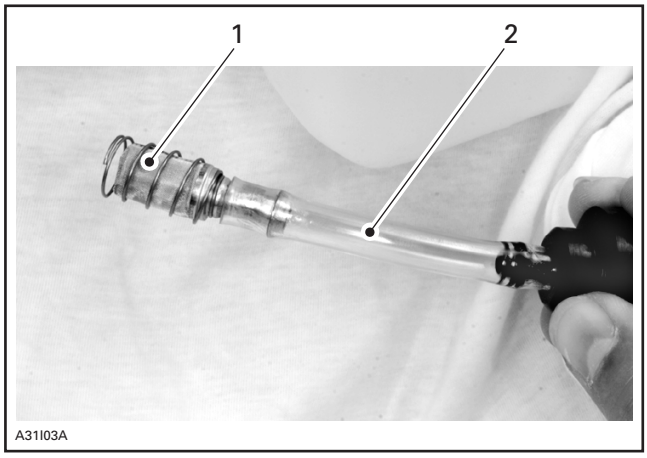
Fuel Filter

To remove fuel filter **no. 1** from fuel tank **no. 2**, first drain fuel tank.

Using a flat screwdriver, carefully pull out fuel filter by removing grommet **no. 3**, as shown in the next photo.

REMOVE GROMMET

Ensure that fuel filter and fuel line are clean and not damaged, as per following photo.



1. *Fuel filter*
2. *Fuel line*

Reinstall fuel filter with grommet.

Refuel tank and ensure there are no leaks.

Fuel Line Spring Clips

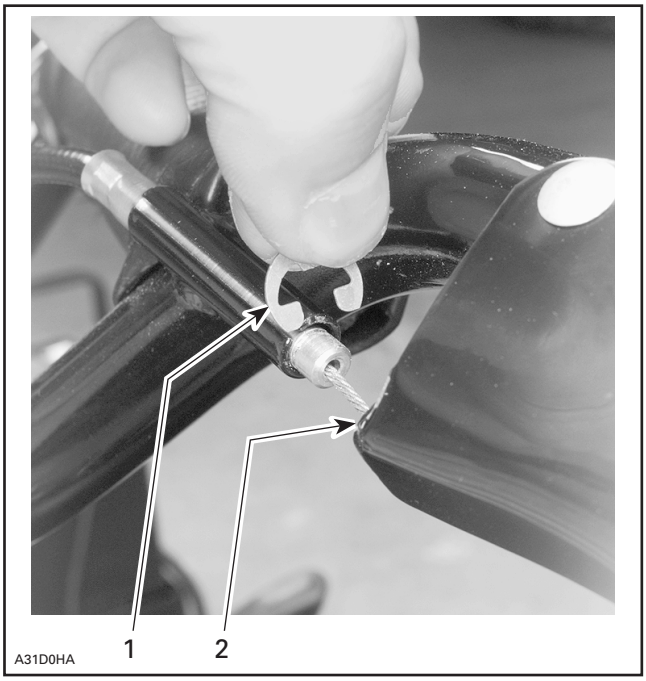
Always reposition spring clips **no. 4** after any repair to prevent possible leaks.

Throttle Cable Circlip at Handlebar

Put silicone grease (P/N 413 701 700) around cable barrel of throttle cable **no. 7**. Locate circlip **no. 5** as per following photo.

⚠ WARNING

If this procedure is disregarded, throttle lever **no. 6** might be half-open at normally closed position and the engine will speed up when starting.



TYPICAL — BRAKE SIDE SHOWN, IDENTICAL FOR THROTTLE SIDE

1. *Circlip*
2. *Detach throttle cable from throttle lever*

Throttle Cable Routing

CAUTION: Check that throttle cable is routed away from sharp edges, hot or vibrating parts. When turning steering while engine is running, idle speed must not vary.

Throttle Cable Adjustment

Loosen throttle cable at carburetor.

While holding handlebar throttle lever and carburetor lever at full throttle, tighten throttle cable to this position.

⚠ WARNING

Ensure that engine is not running when adjusting throttle cable.

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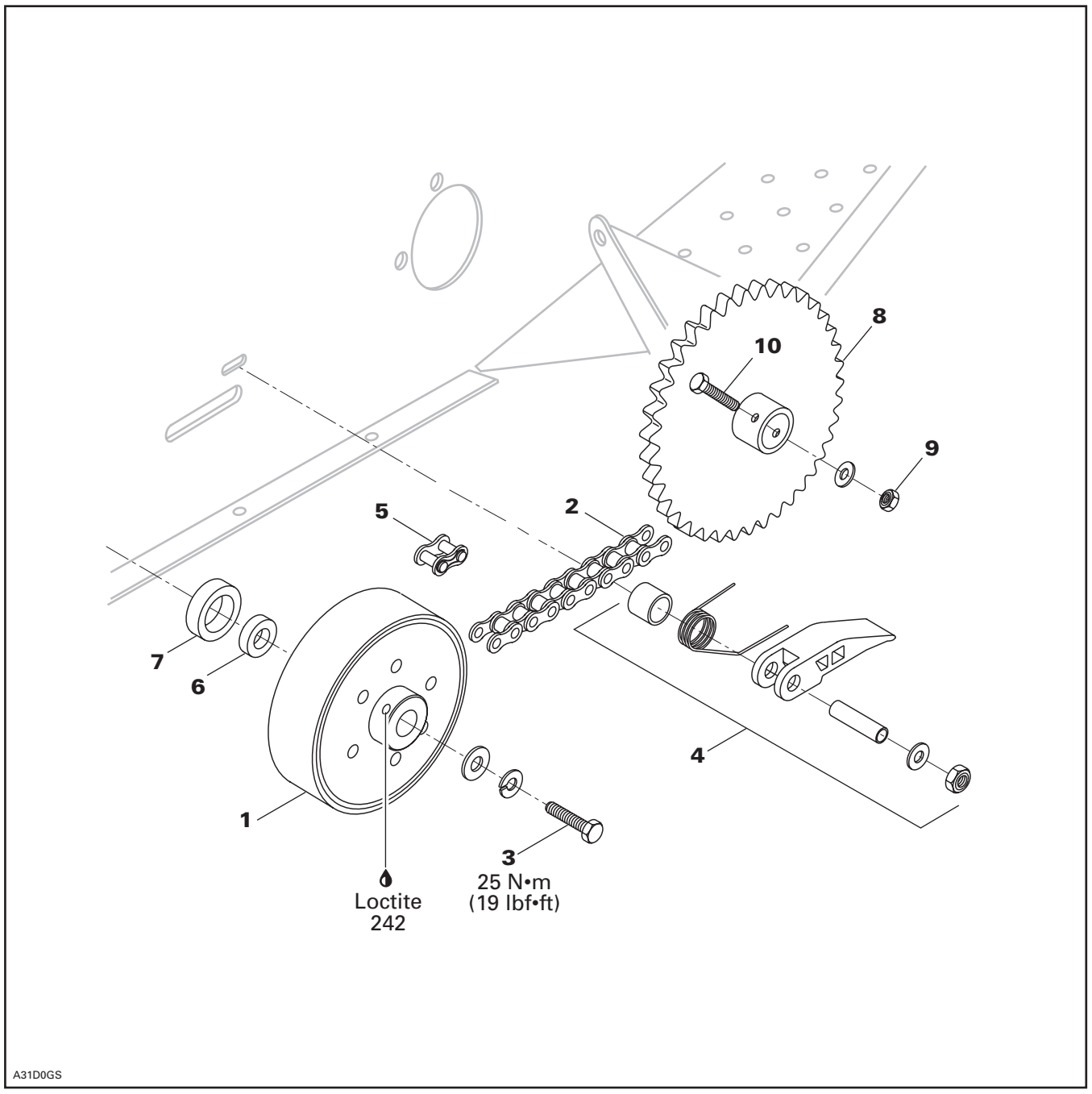
CLUTCH



NOTE: Parts are not available separately. If clutch **no. 1** is damaged, replace clutch assembly.

REMOVAL

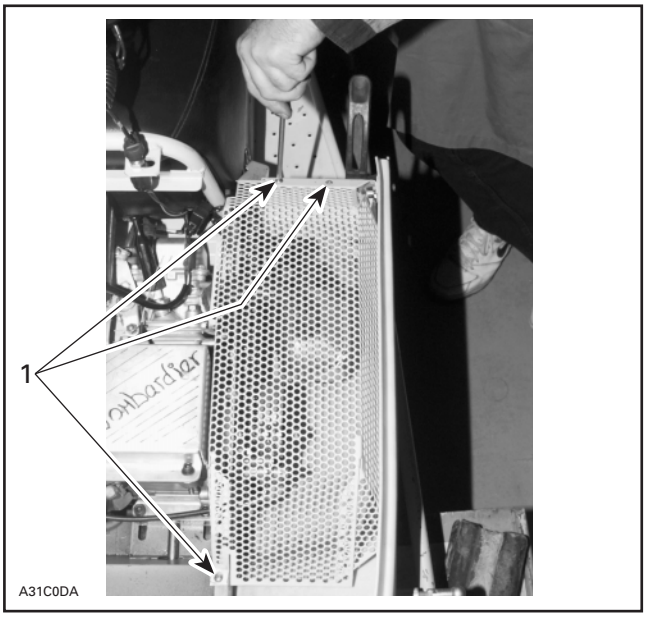
NOTE: Clutch can be removed without removing brake. In that case drive chain **no. 2** must be separated and removed first.

Lift hood.

Remove chain guard retaining screws as shown in the following photo and lift off guard.

⚠ WARNING

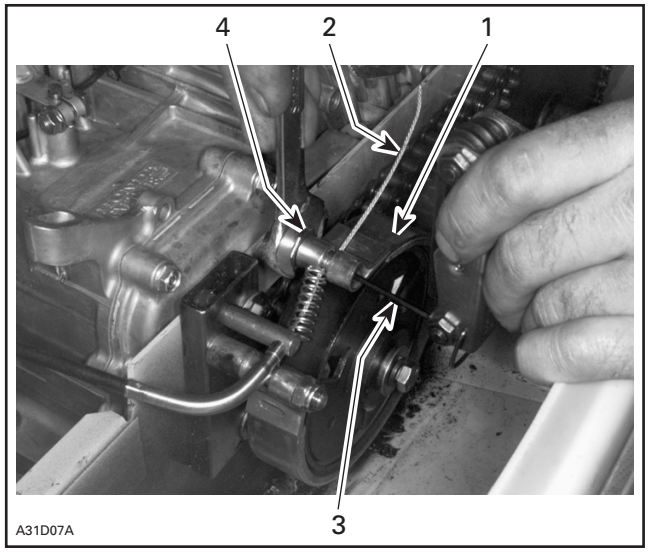
When removing chain guard, ensure that engine is not running. Serious injuries may occur.



1. Using a screwdriver, remove 3 screws

Brake Pad Removal

Using Allen key, unlock brake cable from brake pad, as shown in the next photo.

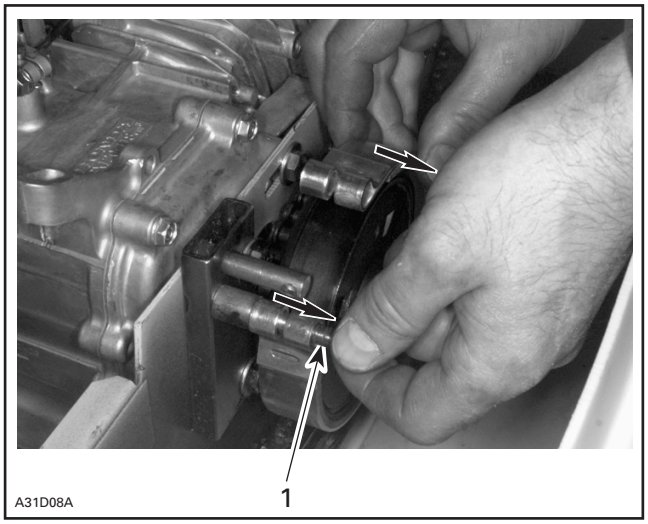


UNLOCK BRAKE CABLE FROM BRAKE PAD

1. Brake pad
2. Brake cable
3. Unlock brake cable using Allen key
4. Hold screw head

Pull out brake cable from brake pad.

Remove elastic nut from pivot screw, then pull out brake pad.

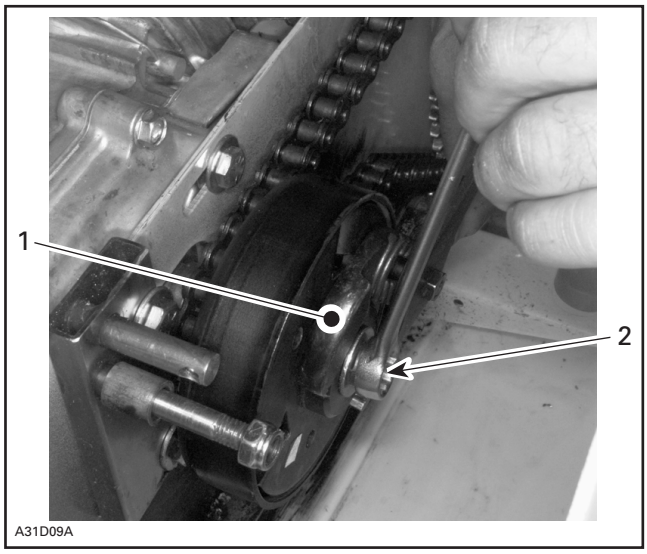


REMOVE BRAKE PAD

1. Pivot screw

1, Clutch Removal

Holding clutch with a wrench, loosen clutch retaining screw **no. 3**.



LOOSEN CLUTCH SCREW

1. *Wrench*
2. *Clutch retaining screw*

Remove drive chain automatic tensioner ass'y **no. 4**.

Remove drive chain from drive sprocket.

NOTE: To ease drive chain removal, chain can be separated by removing connecting link **no. 5**, as described in subsection 04 DRIVE CHAIN.

Remove clutch with extension **no. 6** and spacer **no. 7**.

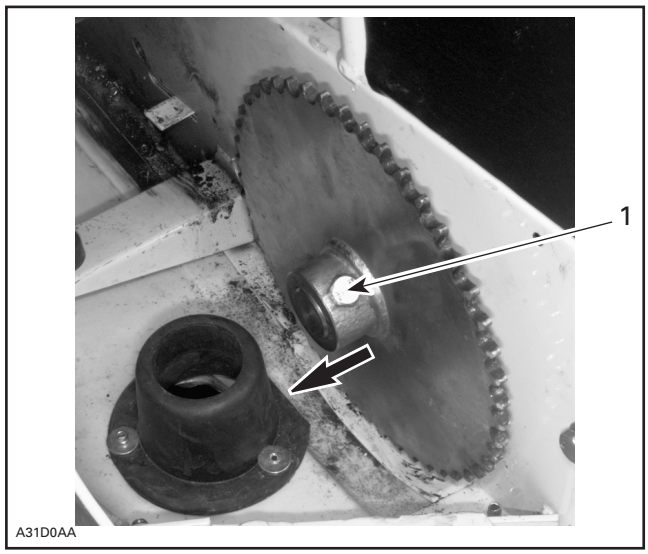
8, Driven Sprocket Removal

NOTE: To ease drive chain and driven sprocket **no. 8** removal and installation, it may be useful to remove footrest.

Remove drive chain from driven sprocket.

Loosen driven sprocket locking nut **no. 9**, then remove driven sprocket screw **no. 10**.

Pull out driven sprocket from drive axle.



REMOVE DRIVEN SPROCKET

1. *Loosen driven sprocket locking screw*

DISASSEMBLY

Parts are not available separately. If clutch is damaged, replace clutch assembly.

CLEANING

Clean all metal components in a general purpose solvent. Thoroughly dry all components before assembling.

INSPECTION

Inspect drive sprocket for wear. If sprocket is worn, replace clutch ass'y with new one.

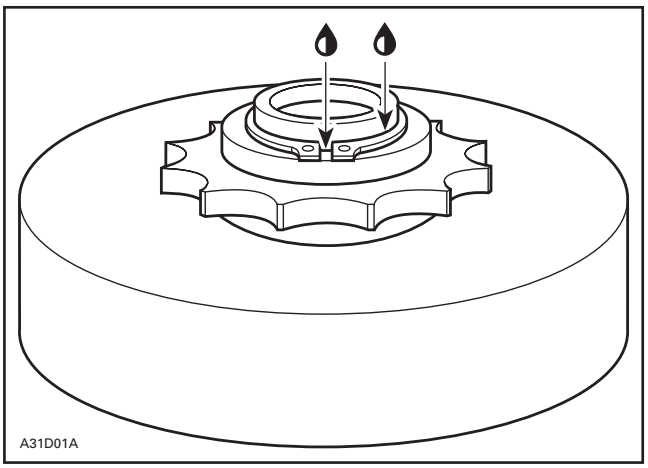
If so check if clutch components are loose. If so, replace clutch ass'y with new one.

INSTALLATION

To install clutch, reverse removal procedure paying attention to the following.

Pour a few drops of oil into clutch sleeves, as shown in the next illustration.

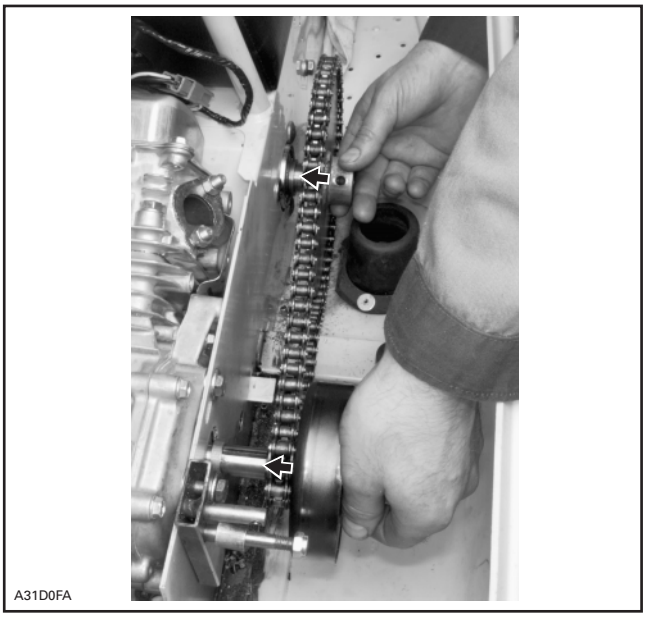
CAUTION: Pour a few drops of oil on clutch axle only. Do not spill oil into clutch mechanism or on clutch cover (braking surface).



DRIP A FEW DROPS OF OIL ON CLUTCH AXLE

To ease sprocket and clutch installation, first install drive chain on both sprockets. Slide clutch and driven sprocket on shafts, as per following photo.

CAUTION: Ensure that keyway is properly positioned when sliding clutch on shaft.

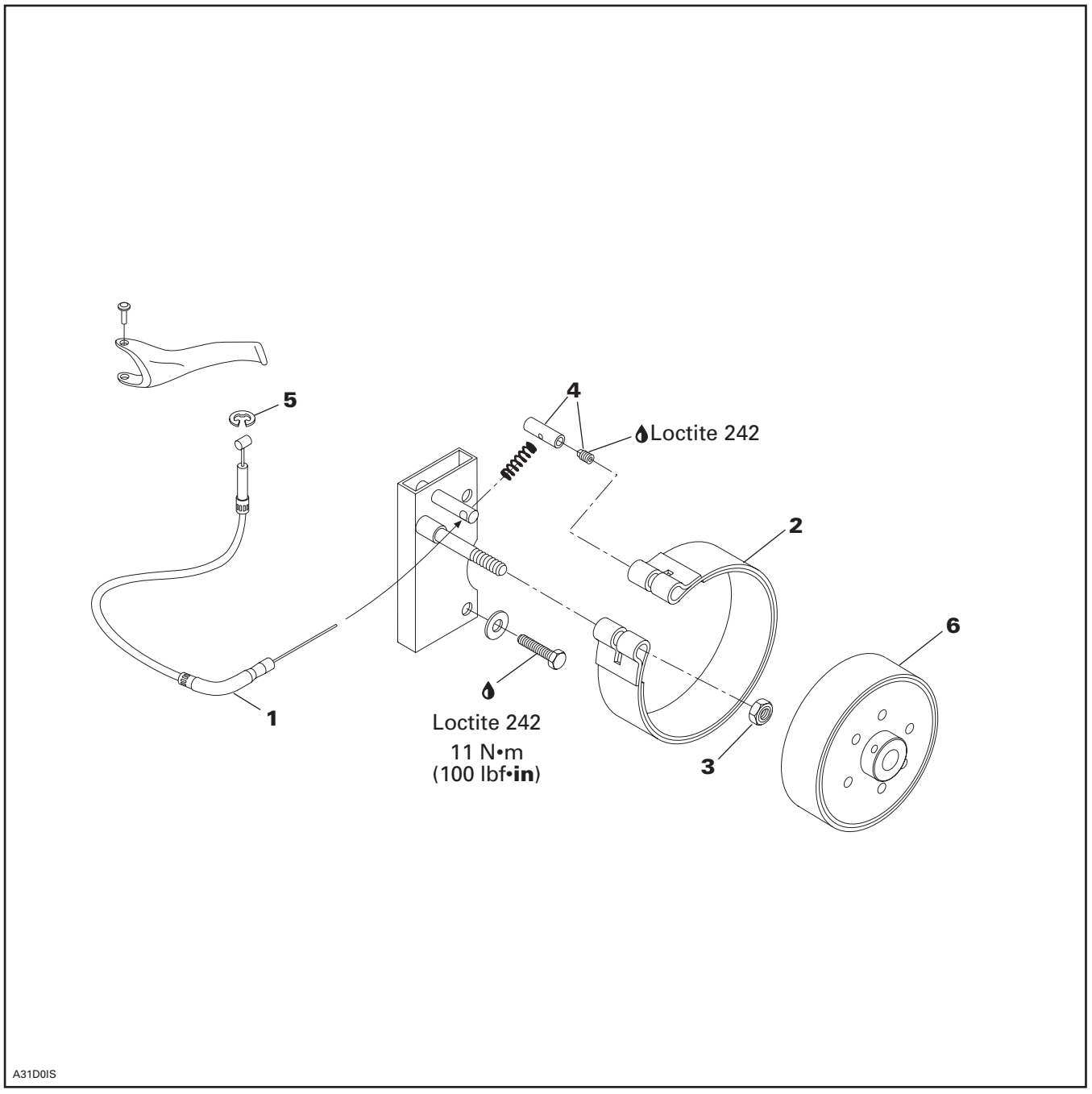


SLIDE CLUTCH AND DRIVEN SPROCKET

Secure clutch and driven sprocket.

Reinstall automatic drive chain tensioner.

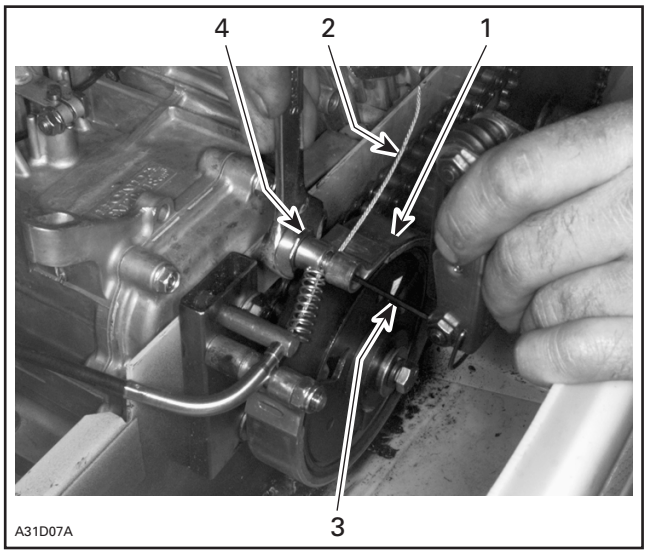
BRAKE



REMOVAL

2, Brake Pad Removal

Using Allen key, unlock brake cable **no. 1** from cable lock **no. 4**, as shown in the next photo.

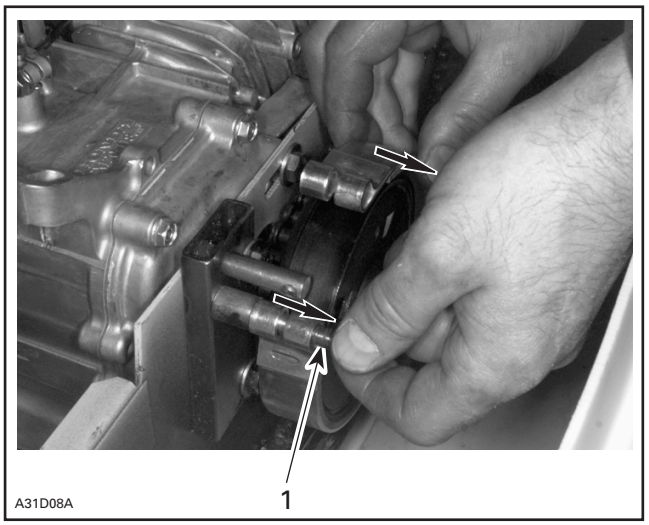


UNLOCK BRAKE CABLE FROM BRAKE PAD

1. *Brake pad*
2. *Brake cable*
3. *Unlock brake cable using Allen key*
4. *Hold screw head*

Pull out brake cable from cable lock.

Remove elastic nut **no. 3** from pivot screw, then pull out brake pad **no. 2**.

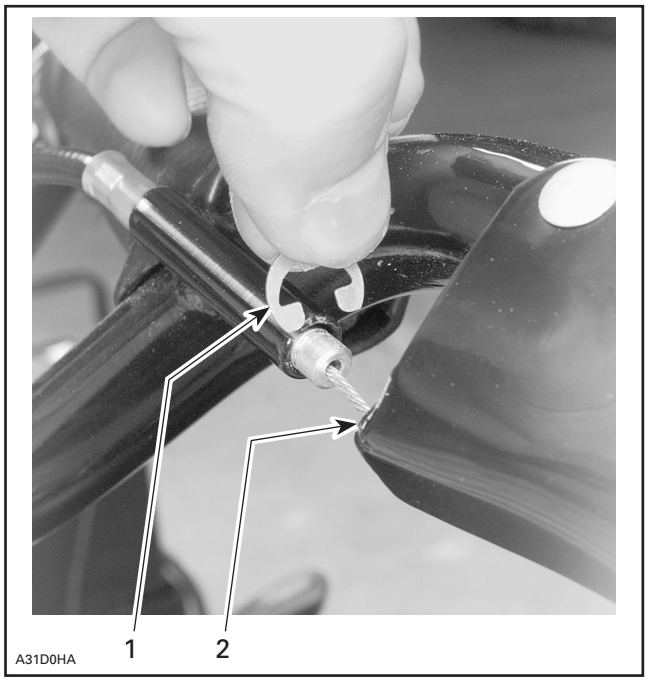


REMOVE BRAKE PAD

1. *Pivot screw*

Brake Cable Replacement

Remove circlip **no. 5** from brake cable at brake lever location, as shown in the next photo.



1. *Circlip*
2. *Detach brake cable from brake lever*

Detach brake cable from brake lever.

Remove cable and replace with new one.

DISASSEMBLY

Only brake pad **no. 2** is available as spare part. If clutch cover braking surface is damaged or worn, replace clutch ass'y **no. 6**.

CLEANING

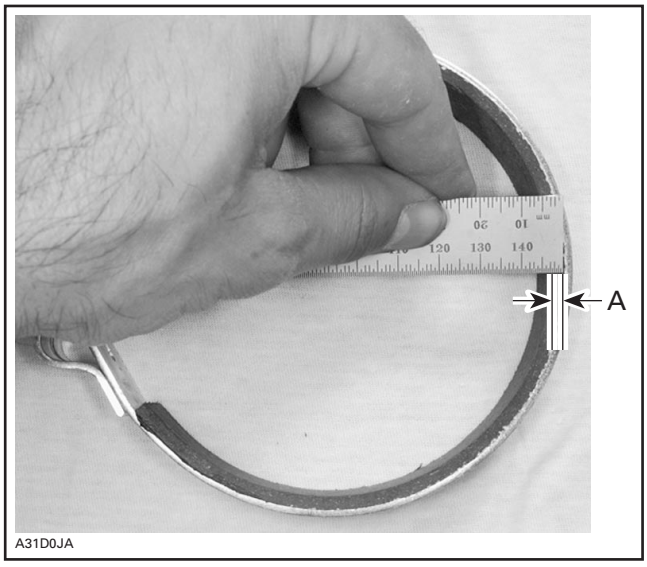
Clean all metal components in a general purpose solvent. Thoroughly dry all components before assembling.

CAUTION: Do not clean brake pad in solvent. Soiled brake pad must be replaced by new one.

INSPECTION

2, Brake Pad

Brake pad must be replaced when lining is 1 mm (1/32 in) thick or less.



A. 1 mm (1/32 in) minimum

6, Brake Drum (clutch cover)

Inspect brake drum surface in clutch cover for scoring, wear or cracking.

If brake drum needs to be replaced, replace clutch assembly with new one.

INSTALLATION

To install brake pad, reverse removal procedure paying attention to the following.

When securing brake pad with elastic nut **no. 3**. Stop tightening when nut leans against brake pad. This will avoid brake pad damage.

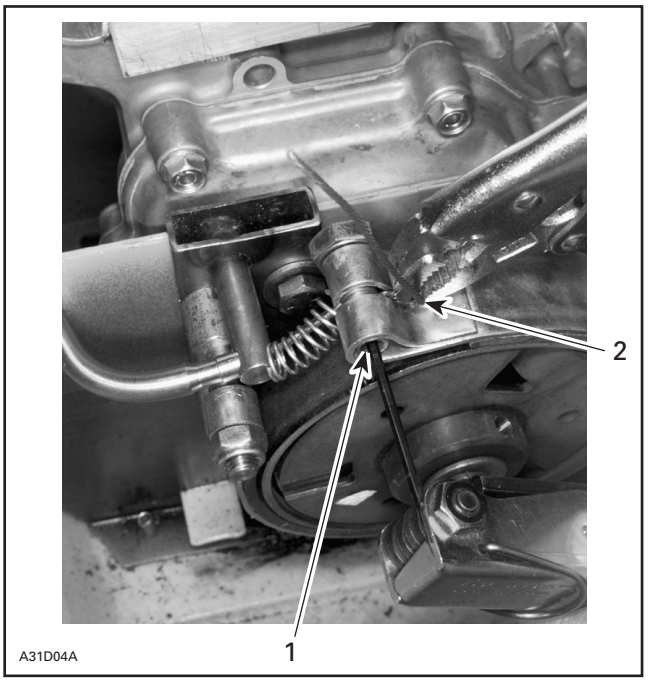
⚠ WARNING

Avoid getting oil on brake pad.

Check that brake lever is set to normal position (no play), as shown in the next photo.

1. No play here

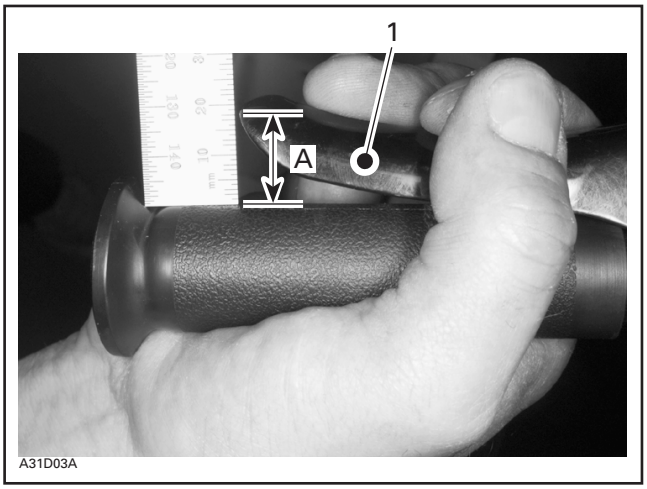
Using pliers, secure brake cable so that brake pad slightly rests on clutch cover.



1. Tighten Allen screw
2. Pull brake cable with pliers

ADJUSTMENT

Fully apply brake with brake lever. If brake lever is not within 15 mm (19/32 in) to 20 mm (25/32 in) of the handlebar, readjust brake. Refer to the following photo.



1. Brake lever
A. If measurement is not within 15 mm (19/32 in) to 20 mm (25/32 in), readjust brake

To adjust brake, loosen Allen screw then pull or push on brake cable.

Retighten cable lock Allen screw.

Finally check brake adjustment.

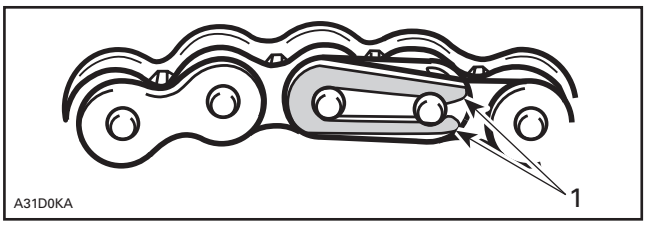
DRIVE CHAIN

REMOVAL

NOTE: To ease drive chain removal, remove drive chain automatic tensioner first.

Rotate drive chain to locate connecting link circlip.

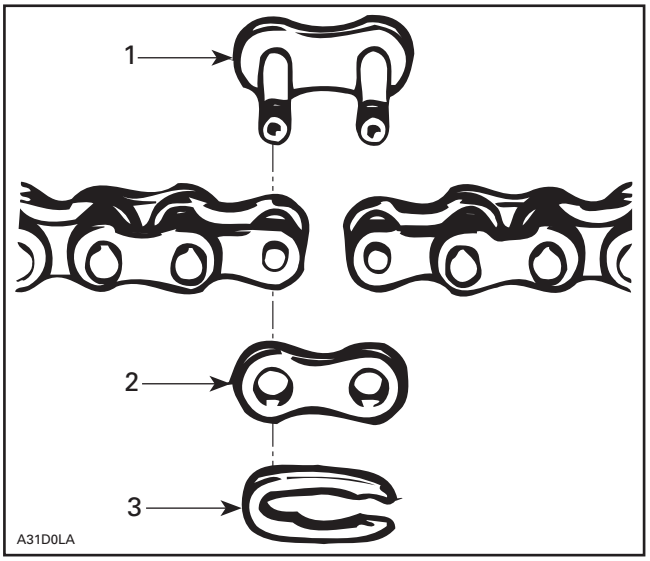
Using a flat screwdriver push on both ends of circlip to remove it.



REMOVE CIRCLIP
1. *Using a screwdriver, push circlip here*

Remove outer link.

Detach drive chain by removing connecting link.



1. *Connecting link*
2. *Outer link*
3. *Circlip*

Keep circlip, outer link and connecting link.

INSPECTION

Check that chain is not stretched.

CAUTION: On a stretched chain, pitch has changed (increased) and will not properly match the sprockets pitch, causing premature wear. For that reason, a stretched chain must never be shortened.

Visually inspect chain for cracked, damaged or missing links.

Check for worn or defective bearings, sprockets and chain tensioner components.

INSTALLATION

Reinstall drive chain on both sprockets.

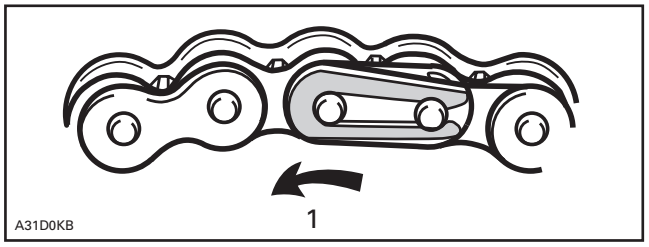
Join both drive chain ends using connecting link.

Secure connecting link using outer link and circlip.

Install circlip so that open end is positioned opposite side of drive chain rotation. See the following illustration.

⚠ WARNING

Always ensure that connecting link, outer link and circlip are in good condition. Ensure that circlip is properly secured.



TYPICAL
1. *Rotation*

Reinstall drive chain automatic tensioner.

LUBRICATION

Lubricate drive chain as per lubrication chart.

Use BOMBARDIER LUBE (P/N 293 600 016).

CAUTION: Always lubricate drive chain slightly. Oil must not contact brake pad.

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SPARK PLUGS

NGK SPARK PLUG

NGK SPARK PLUG NUMBERING SYSTEM

Bombardier uses the NGK spark plug brand on all its snowmobile models.

The heat range identification system is:

Low number ——————► hot plug

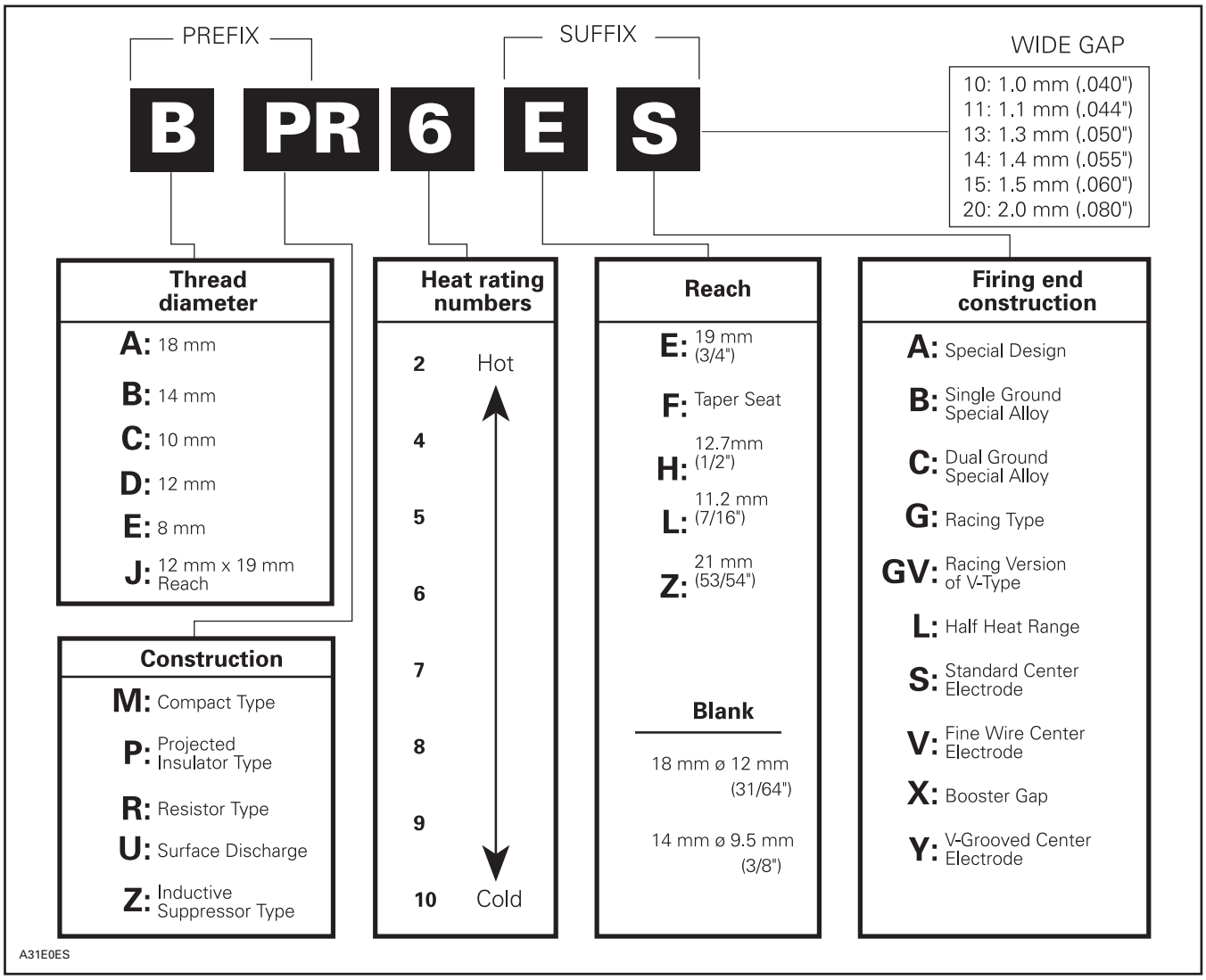
High number ——————► cold plug

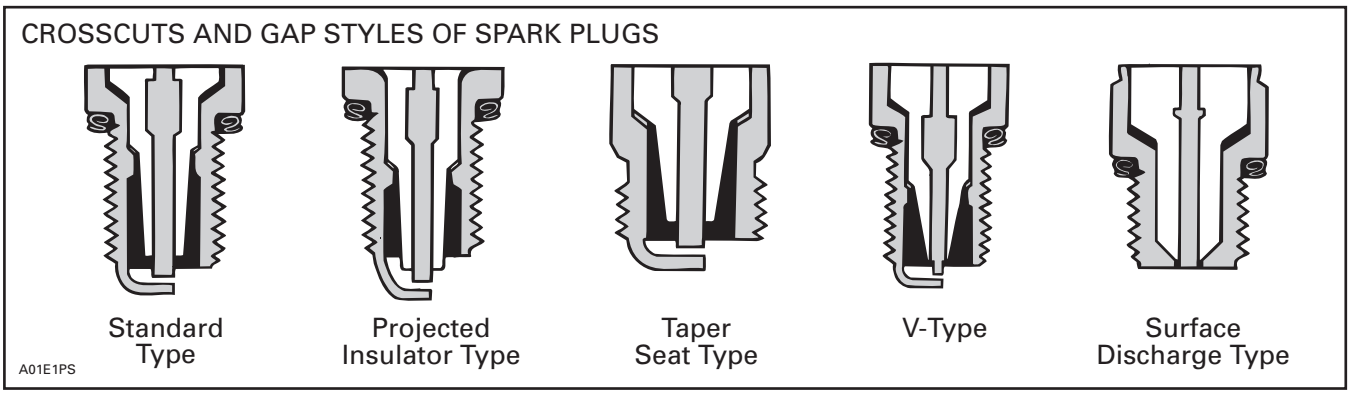
REFERENCE CHART

NGK spark plug used on Bombardier Mini Z snowmobile is covered in this manual:

– BPR6 ES

DESIGN SYMBOLS USED IN NGK SPARK PLUGS





DISASSEMBLY

First unscrew the spark plug 1 turn.

Clean the spark plug and cylinder head with pressurized air, then completely unscrew.

⚠ WARNING

Whenever using compressed air, always wear protective eye wear.

HEAT RANGE

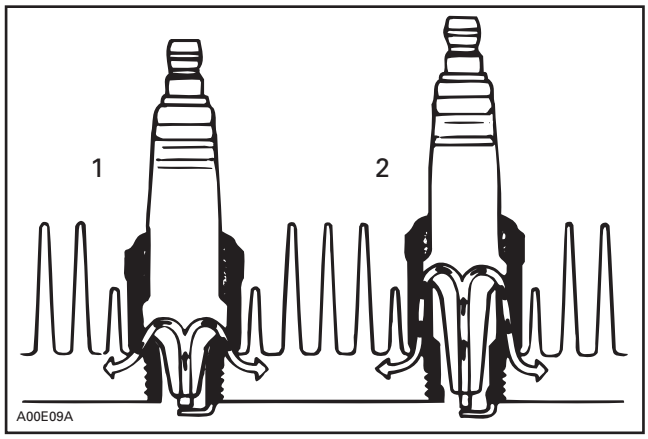
The proper operating temperature or heat range of the spark plugs is determined by the spark plug ability to dissipate the heat generated by combustion.

The longer the heat path between the electrode tip to the plug shell, the hotter the spark plug operating temperature will be — and inversely, the shorter the heat path, the colder the operating temperature will be.

A "cold" type plug has a relatively short insulator nose and transfers heat very rapidly into the cylinder head.

Such a plug is used in heavy duty or continuous high speed operation to avoid overheating.

The "hot" type plug has a longer insulator nose and transfers heat more slowly away from its firing end. It runs hotter and burns off combustion deposits which might tend to foul the plug during prolonged idle or low speed operation.



1. Cold
2. Hot

CAUTION: Severe engine damage might occur if a wrong heat range plug is used.

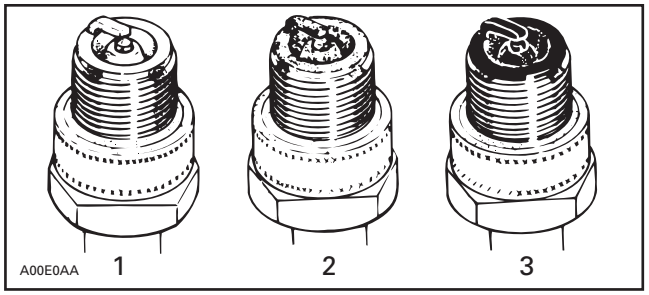
A too "hot" plug will result in overheating and pre-ignition, etc.

A too "cold" plug will result in fouling (shorting the spark plug) or may create carbon build up which can heat up red-hot and cause pre-ignition or detonation.

FOULING

Fouling of the spark plug is indicated by irregular running of the engine, decreased engine speed due to misfiring, reduced performance, and increased fuel consumption. This is due to a loss of compression. Other possible causes are: prolonged idling, or running on a too rich mixture due to a faulty carburetor adjustment or incorrect fuel and/or fuel mixing. The plug face of a fouled spark plug has either a dry coating of soot or an oily, glossy coating given by an excess either of oil or of oil with soot. Such coatings form a conductive connection between the center electrode and ground.

SPARK PLUG ANALYSIS



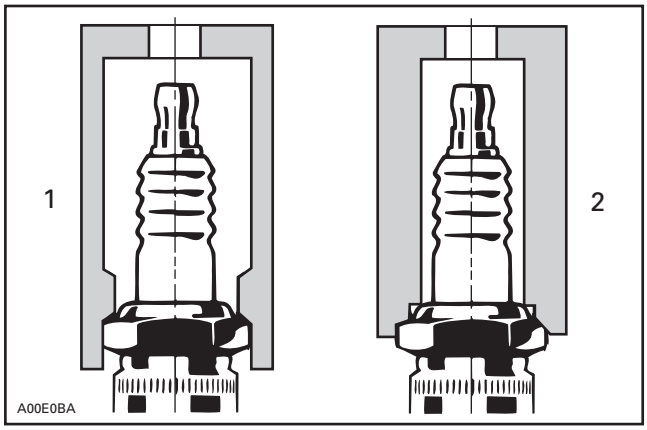
1. Overheated (light grey)
2. Normal (brownish)
3. Fouled (black)

The plug electrode and piston dome reveal the condition of the engine, operating condition, method of driving and fuel mixture. For this reason it is advisable to inspect the spark plug at regular intervals, examining the plug electrode and the piston dome.

SPARK PLUG INSTALLATION

Prior to installation make sure that contact surfaces of the cylinder head and spark plug are free of grime.

1. Using a wire feeler gauge, set electrode gap according to TECHNICAL DATA 10.
2. Apply anti-seize lubricant (P/N 413 701 000) over the spark plug threads to prevent possible seizure.
3. Hand screw spark plug into cylinder head and tighten with a torque wrench and a proper socket.



1. Proper socket
2. Improper socket

SPARK PLUG TIGHTENING TORQUE

MODELS	SPARK PLUGS	TORQUE N•m (lbf•ft)
All models	NGK	27 (20)

TESTING PROCEDURE

IGNITION SYSTEM TESTING SEQUENCE

In the case of ignition problems, check the following in the prescribed order until the problem can be solved.

1. Sparking/spark plug condition
2. Electrical connectors
3. Ignition switches, tether cord cap switch and emergency switch
4. Ignition coil resistance

LIGHTING SYSTEM TESTING SEQUENCE

1. Electrical connectors
2. Lamp coil resistance

Analysis of Readings

Resistance Readings

Place multimeter selector switch to Ω in order to measure resistance. Readings must be within the indicated range. Otherwise, the part is considered to be defective and must be replaced.

CAUTION: When taking measurements, it is useless to try to start the vehicle since readings would then be distorted.

Intermittent Ignition Problems

It is difficult to make a diagnostic in the case of intermittent ignition problems. Thus, problems occurring only when the engine operating temperature is normal must be checked in similar conditions.

In most cases when problems are caused by temperature or vibrations, these can only be solved by replacing parts. Most problems cannot be detected when the engine is stopped.

Multiple Problems

As a matter of fact, more than one component can be defective. As a result, if the problem remains although a part was replaced, start over the whole verification from the beginning in order to identify the other defective component.

1. SPARKING

During this operation, it is important to use the snowmobile spark plug and not a new one. Bring the plug in contact with the engine. If no spark is produced, replace the spark plug with a new one and do the test again.

2. ELECTRICAL CONNECTOR TESTING

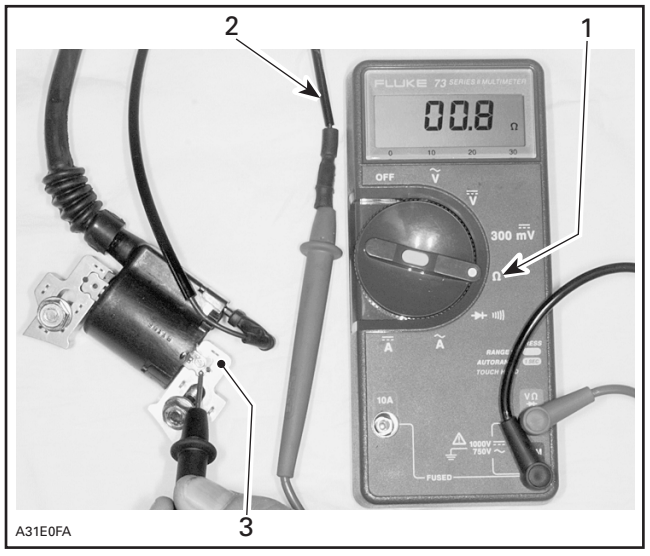
Make sure that none of the connectors are disconnected.

3. IGNITION COIL TESTING

Primary Side

Bring multimeter selector switch to Ω position.

Connect first multimeter probe to ignition coil primary black wire then second probe to ignition coil iron core, as shown in the next photo.



PRIMARY SIDE TESTING

1. *Multimeter to Ω position*
2. *Ignition coil primary black wire*
3. *Ignition coil iron core*

The measured resistance should be according to the following table. If not, replace ignition coil.

PRIMARY SIDE RESISTANCE VALUE	0.8 - 1.0 Ω

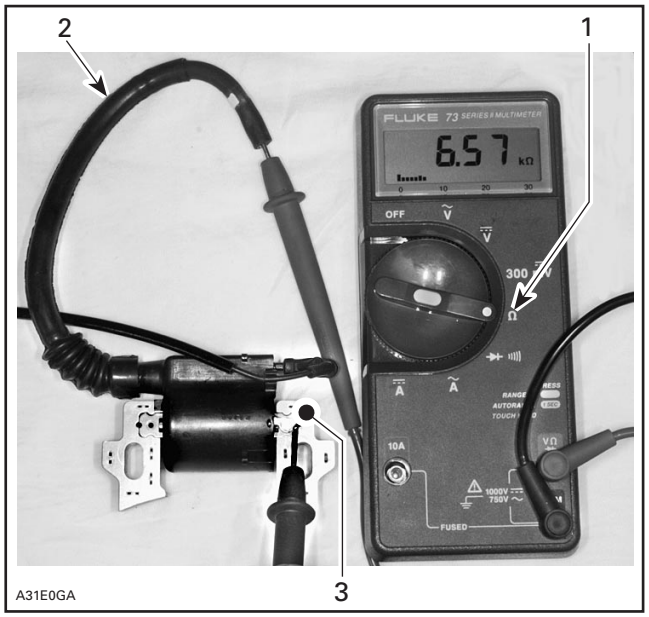
Secondary Side

Bring multimeter selector switch to Ω position.

Remove spark plug cap by unscrewing cap from cable.

NOTE: A false resistance reading will result if spark plug cap is not removed.

Connect first multimeter probe to spark plug lead wire then second probe to ignition coil iron core, as shown in the next photo.



SECONDARY SIDE TESTING

1. *Multimeter to Ω position*
2. *Spark plug lead wire*
3. *Ignition coil iron core*

The measured resistance should be according to the following table. If not, replace ignition coil.

SECONDARY SIDE RESISTANCE VALUE	5.9 - 7.1 kΩ

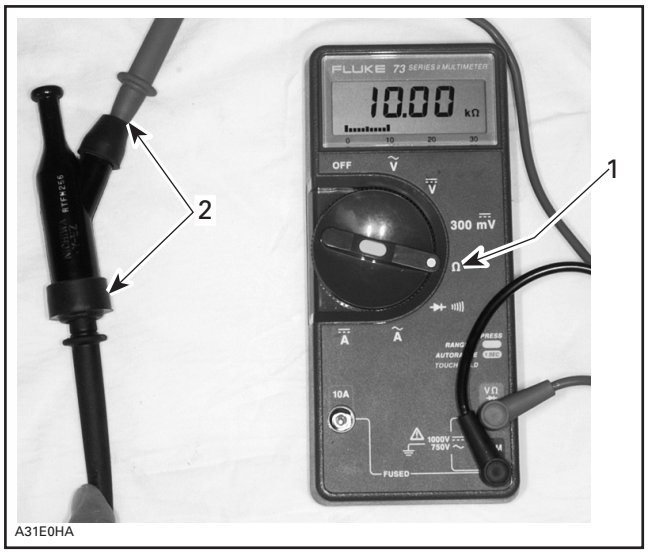
4. SPARK PLUG CAP TESTING

Remove spark plug cap by unscrewing cap from cable.

NOTE: A false resistance reading will result if spark plug cap is not removed.

Bring multimeter selector switch to Ω position.

Connect first multimeter probe to one end of the spark plug cap then second probe to the other end as shown in the next photo.



SPARK PLUG CAP TESTING

1. *Multimeter to Ω position*
2. *Spark plug cap end*

The measured resistance should be according to the following table. If not, replace spark plug cap.

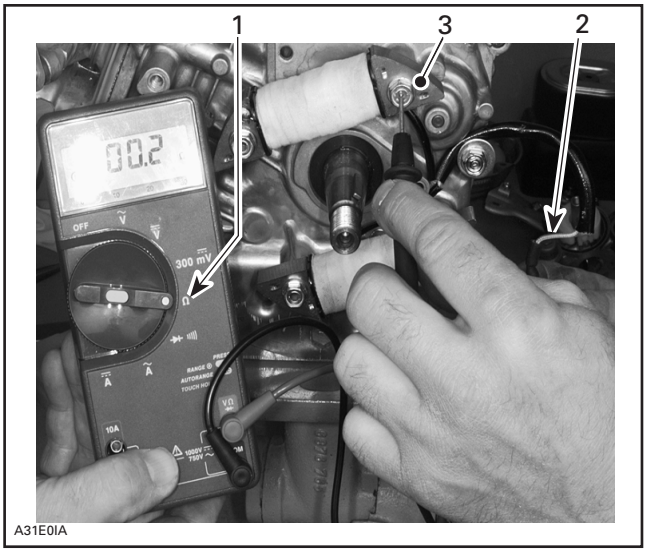
RESISTANCE	7.5 - 12.5 kΩ

5. LAMP COIL TESTING

NOTE: Lamp coil is parallel 2 coils type.

Bring multimeter selector switch to Ω position.

Connect first multimeter probe to pink wire then second probe to lamp coil iron core, as shown in the next photo.



LAMP COIL TESTING

1. *Multimeter to Ω position*
2. *Pink wire*
3. *Lamp coil iron core*

The measured resistance should be according to the following table. If not, replace lamp coil.

RESISTANCE	0.18 - 0.23 Ω

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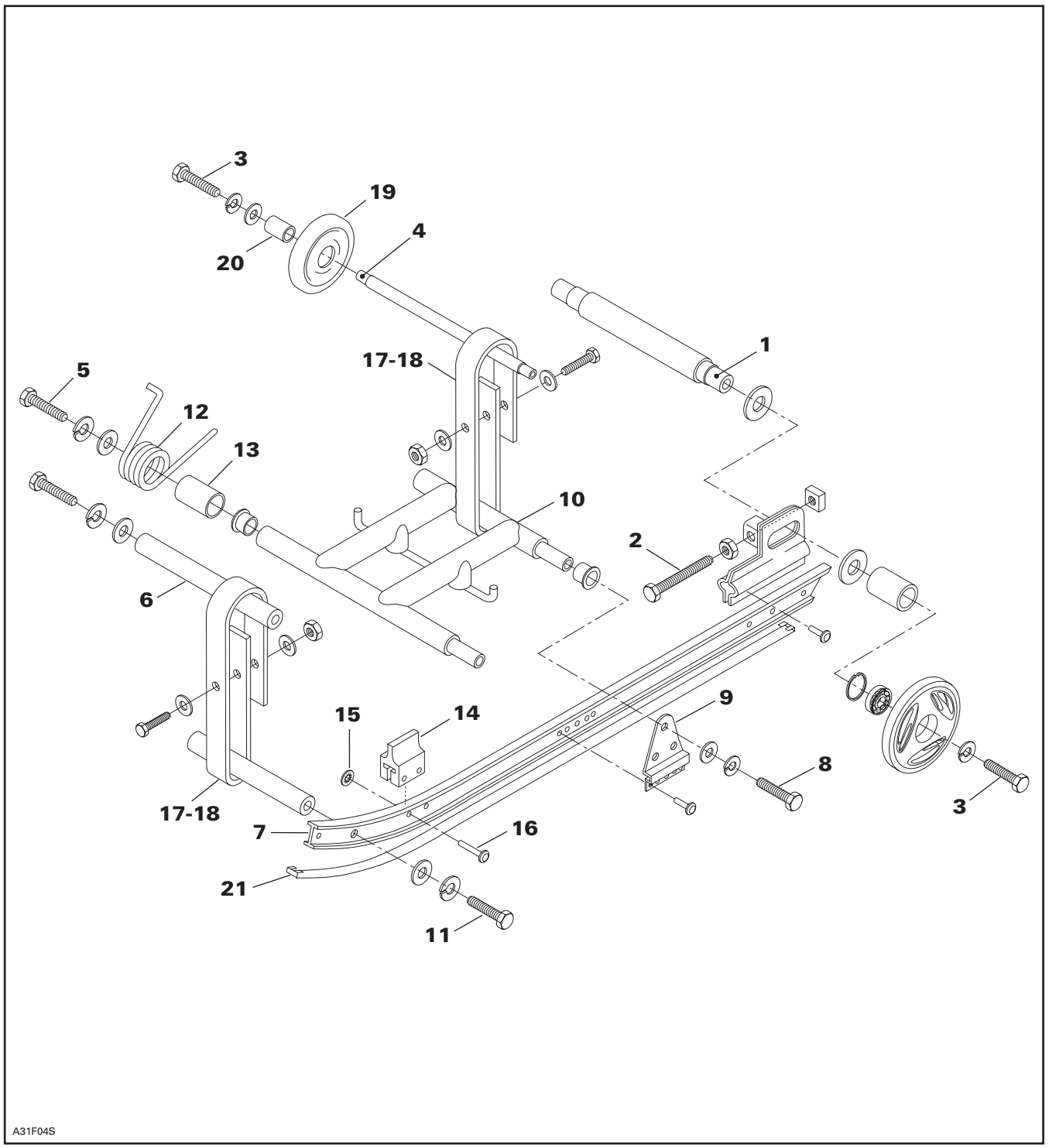
REAR SUSPENSION



NOTE: The following is the complete procedure to remove rear suspension ass'y. However some suspension components can be removed without removing suspension ass'y. See DISASSEMBLY AND ASSEMBLY procedure.

REMOVAL

Lift rear of snowmobile and support it off the ground.

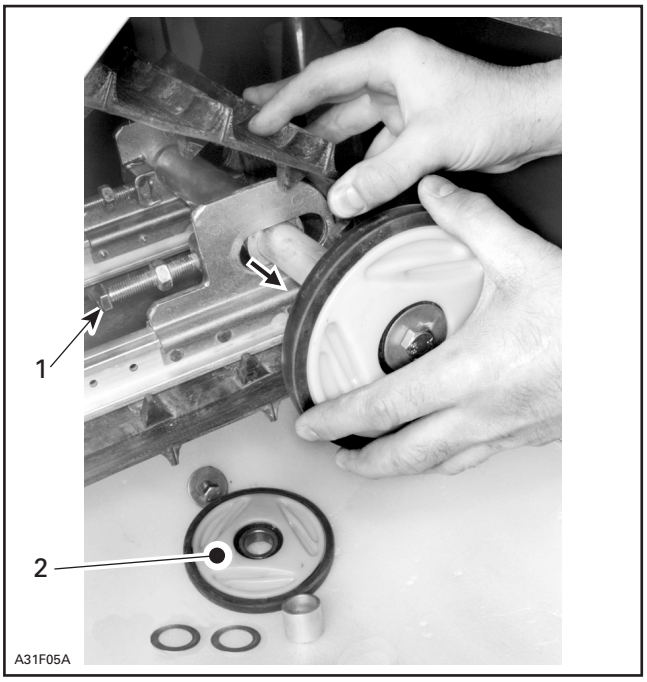
1, Rear Axle

NOTE: Removing rear axle first will ease rear suspension ass'y removal.

Completely release track tension by loosening adjustment screws **no. 2**.

Unscrew one rear idler wheel screw **no. 3**.

Pull out rear axle **no. 1** from opposite side of offset inner wheel.



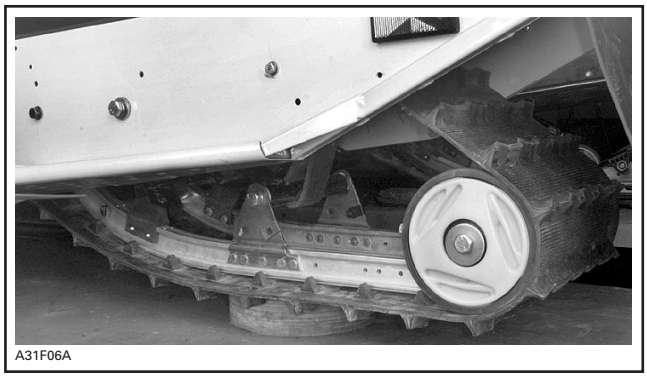
PULL OUT REAR AXLE

1. *Loosen this adjustment screw on both sides to release track tension*
2. *Idler wheel previously removed*

Rear Suspension

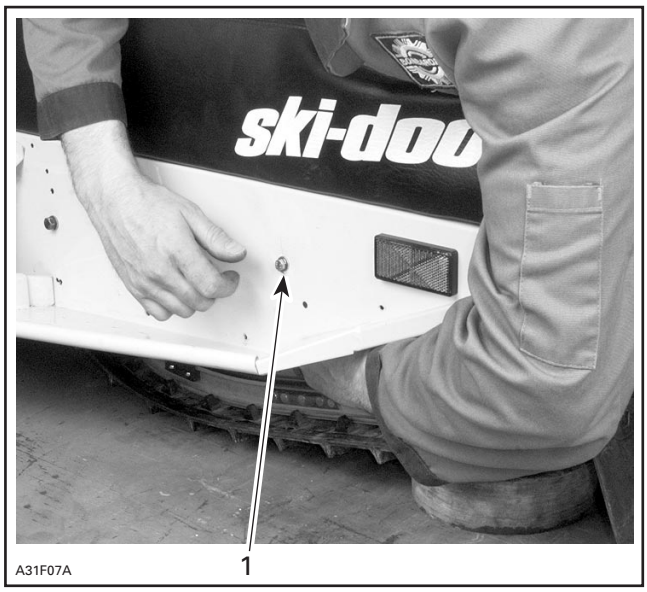
Position a small block below track.

Lower snowmobile so that track sits on block.



POSITION A SMALL BLOCK BELOW TRACK

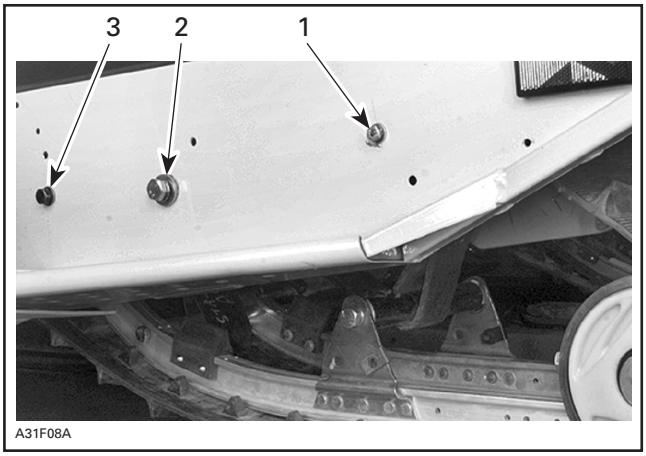
Lean on snowmobile seat then unscrew upper idler wheel axle **no. 4** from tunnel.



1. *Unscrew upper idler wheel axle*

Remove both screws **no. 5** retaining front arm to tunnel.

Unscrew front retainer axle **no. 6** (retaining front strap) from tunnel. See the following photo.



A31F08A

1. Upper idler wheel screw
2. Front arm screw
3. Front retainer axle screw

Lift rear of snowmobile.

Pull out suspension ass'y.

DISASSEMBLY AND ASSEMBLY

Inspect track thoroughly before reinstalling suspension. Refer to TRACK 07-04.

7, Runner

NOTE: Runner **no. 7** can be removed without removing suspension assembly, as described in the following procedure.

Lift rear of snowmobile.

Completely release track tension.

Remove rear axle **no. 1** with idler wheels.

Remove screws **no. 8** retaining runner support **no. 9** to front arm **no. 10**, as shown in the following photo.

A31F09A

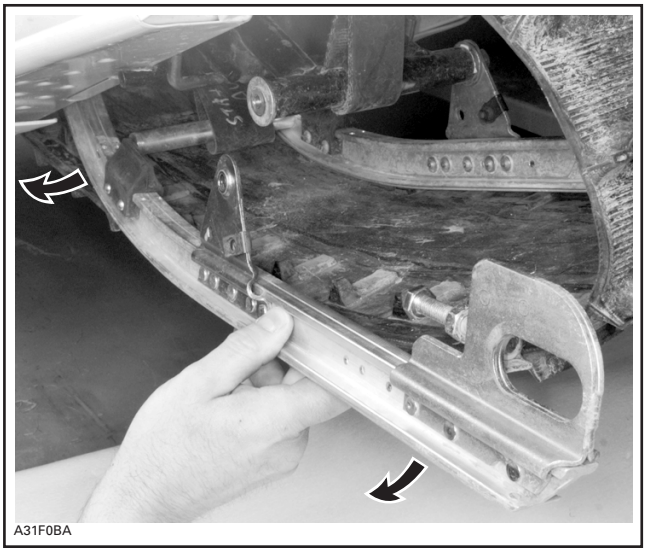
REMOVE SCREW

Remove front axle screw **no. 11**, as shown in the following photo.

A31F0AA

REMOVE SCREW

Pull out runner from track, as shown in the next photo.



PULL OUT RUNNER

To reinstall runner, reverse removal procedure.

12, Torsion Spring

NOTE: Torsion springs can be replaced without completely removing rear suspension ass'y, as described in the following procedure.

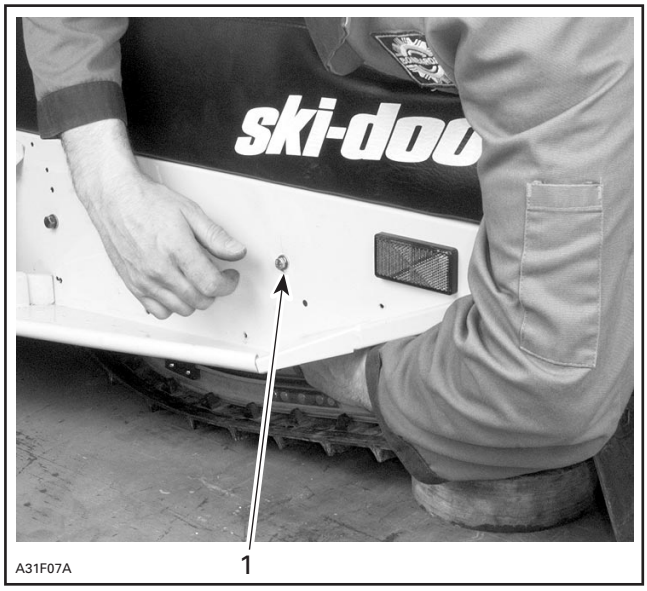
Lift rear of snowmobile.

Completely release track tension.

Remove rear axle **no. 1** with idler wheels.

Lower snowmobile.

Lean on snowmobile seat then unscrew upper idler wheel axle **no. 4** from tunnel.



1. Unscrew upper idler wheel axle

Remove both screws **no. 5** retaining front arm to tunnel.

Lift rear of snowmobile so that rear suspension ass'y comes out of tunnel.

Remove torsion spring **no. 12**, as shown in the next photo.

REMOVE TORSION SPRING

Remove bushing **no. 13**, as shown in the next photo. Clean all surfaces and check for excessive wear.

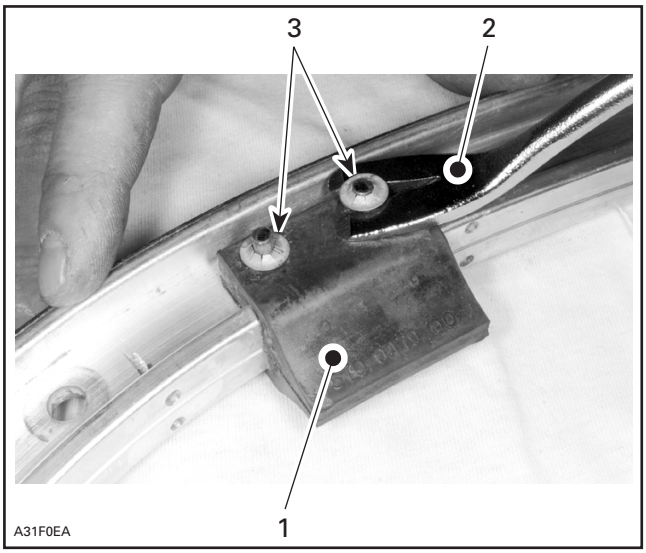
REMOVE AND CLEAN BUSHING

To reinstall, reverse removal procedure.

14,15,16, Rubber Stopper

NOTE: Rubber stopper **no. 14** can be replaced with runner and suspension ass'y in place.

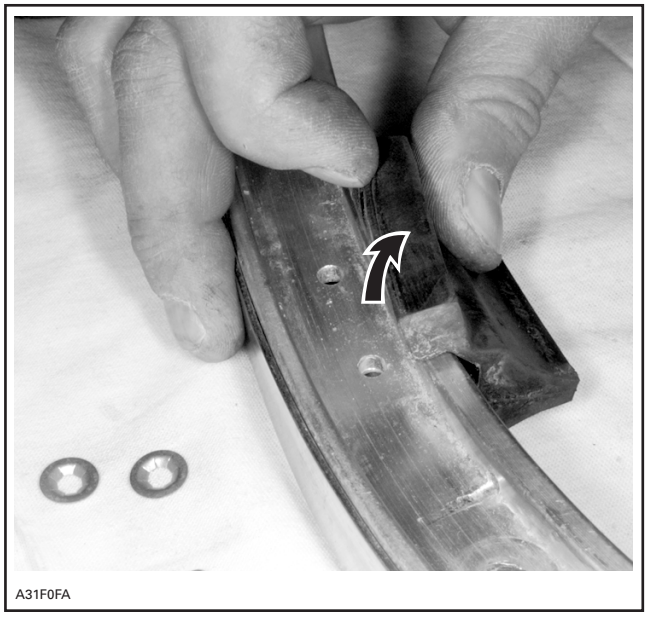
Using special tool Snap-on A161B, remove push nuts **no. 15** as shown in the next photo.



1. *Rubber stopper*
2. *Special tool Snap-on A161B*
3. *Push nuts*

Remove retaining pins **no. 16**.

Lift rubber stopper tab and remove it.



REMOVE RUBBER STOPPER

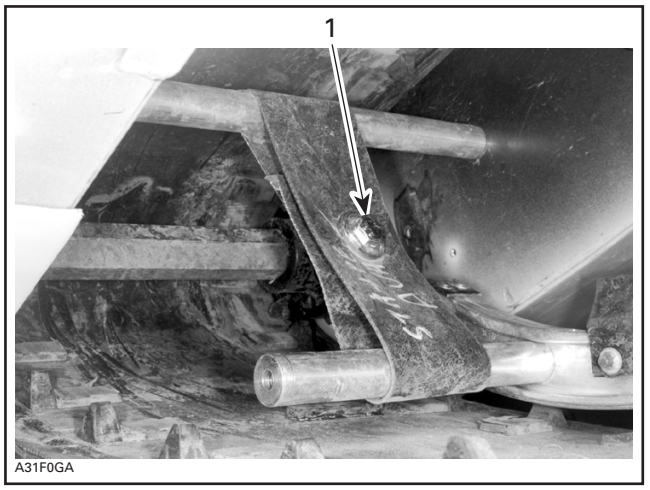
Reinstall rubber stopper **no. 14** with retaining pins **no. 16** and push nuts **no. 15**.

CAUTION: When reusing original push nuts, ensure that they are in good condition. If not, replace with new push nuts.

INSPECTION

17,18, Stopper Straps

Inspect straps for wear or cracks, bolts and nuts for tightness. If nuts are loose, inspect hole for deformation. Replace as required.



TYPICAL — FRONT STRAP SHOWN

1. *Inspect bolts and nuts for tightness*

19,20, Upper Idler Wheels

Remove bushing no. 20 and idler wheel no. 19 from shaft no. 4, as shown in the next photo.

Clean parts and check for wear and bearing condition.

CHECK BUSHING, WHEEL AND SHAFT CONDITION

21, Slider Shoe

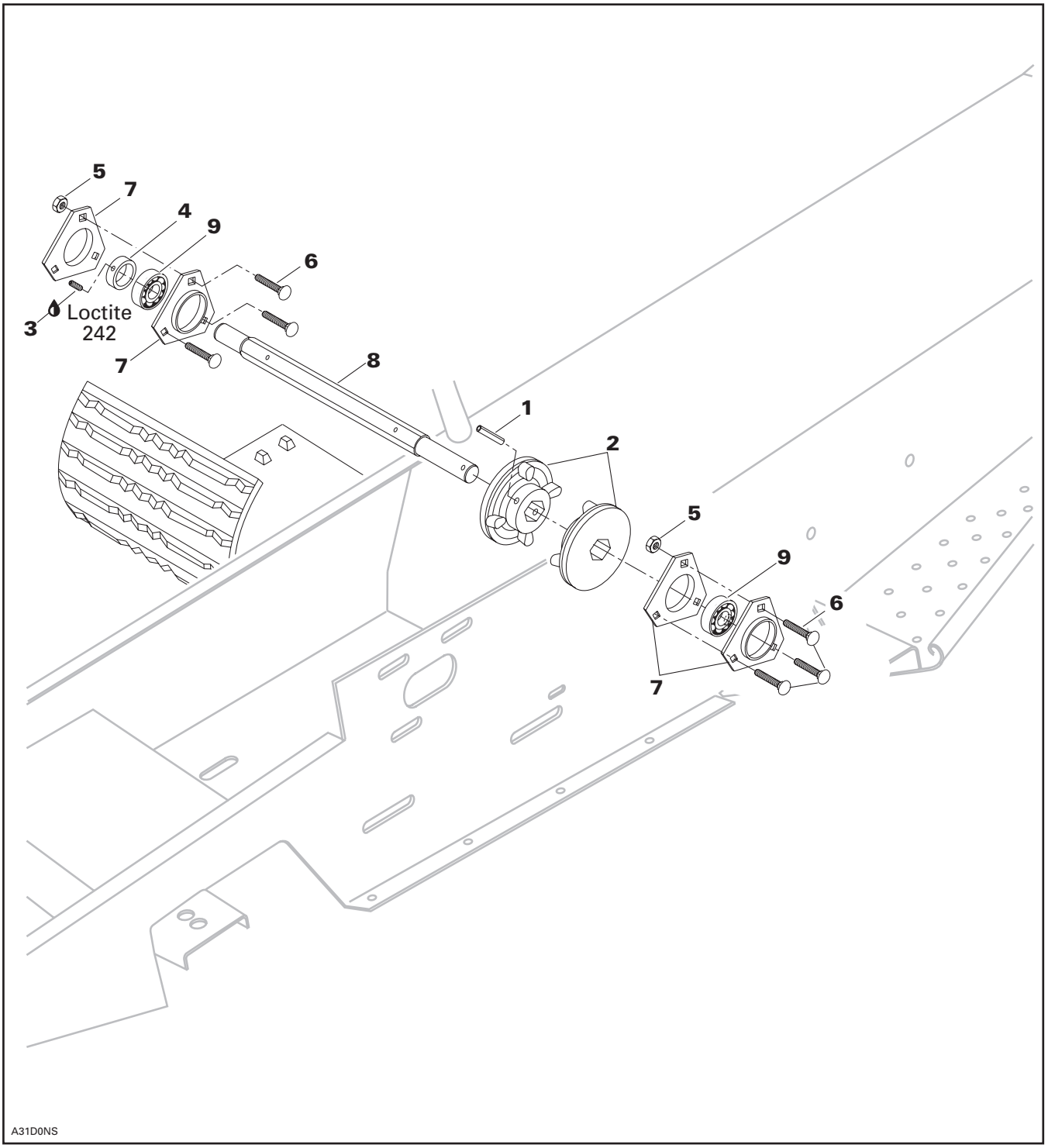
Inspect slider shoes no. 21 for wear.

CAUTION: Even if only one slider shoe needs to be replaced, always replace both ones. Slider shoes must always be replace in pairs.

To replace slider shoes:

– Remove left side runner.
– Bend tabs from used slider shoe then remove it.
– Install new slider shoe on one end of the runner, then clip second end.
– Secure slider shoe by bending tabs onto runner.
– Repeat procedure on right side.

DRIVE AXLE



REMOVAL

Remove chain guard.

Remove drive chain then remove driven sprocket.

NOTE: To ease driven sprocket and drive axle removal, it may be useful to remove left side footrest.

Remove rear suspension. Refer to REAR SUSPENSION 07-02 of this manual.

Sprocket

From inside tunnel, remove spring pin **no. 1** from right side sprocket using a hammer and a punch, as shown.

REMOVE SPRING PIN

Using a prybar and a piece of wood (to protect tunnel), slide right side sprocket **no. 2** (38 mm (1-1/2 in)). See the next photo.

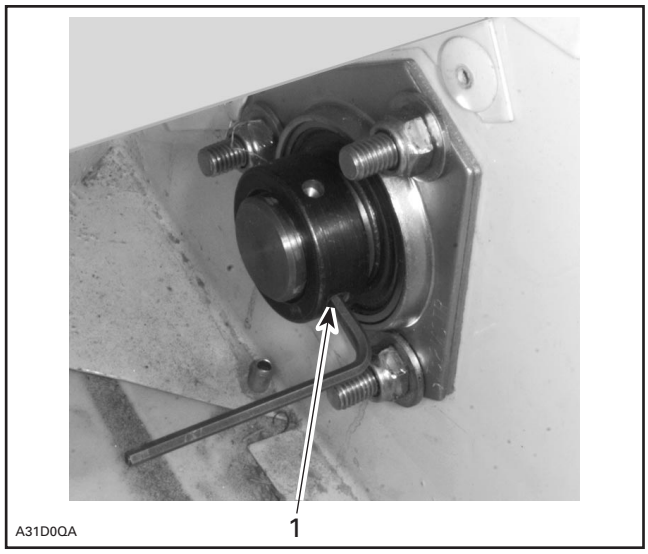
NOTE: Apply BOMBARDIER LUBE (P/N 293 600 016 — 12 x 14 oz) on drive axle to ease sliding sprocket.

CAUTION: When using prybar, ensure not to apply too much pressure on tunnel wall in order to avoid damaging tunnel.

SLIDE RIGHT SIDE SPROCKET INSIDE

Bearing Holder

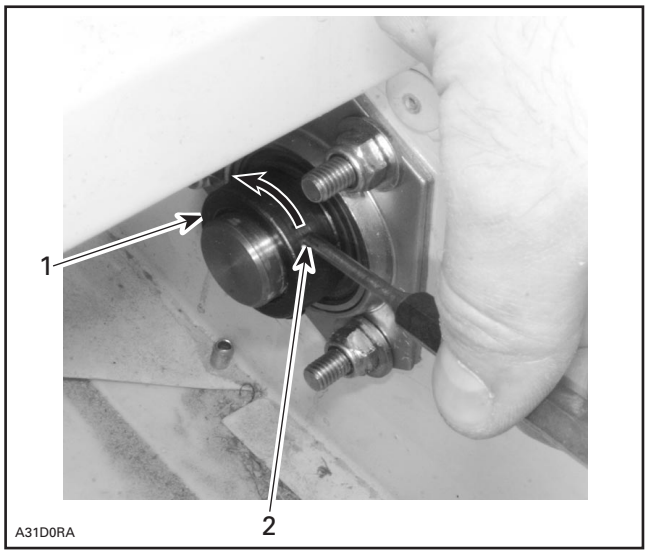
Using Allen key loosen set screw **no. 3** from bearing lock sleeve **no. 4**, as shown in the next photo.



RIGHT SIDE SHOWN

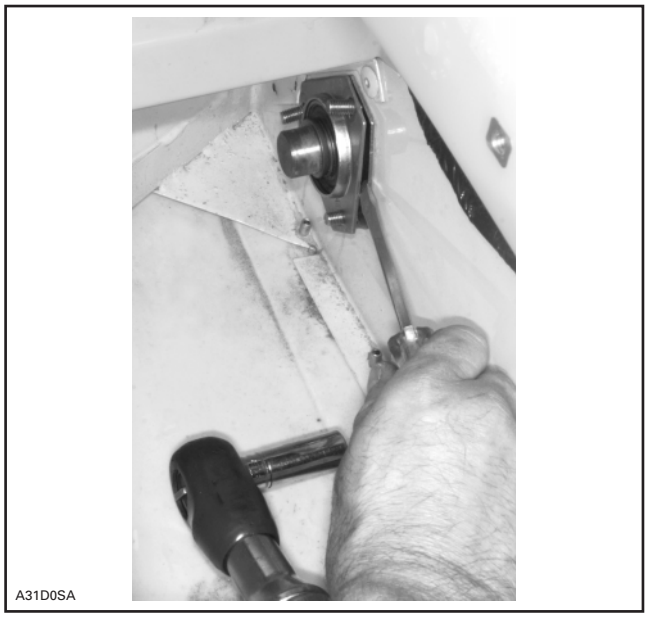
1. Loosen set screw

Using a hammer and a punch, turn CCW to unlock bearing lock sleeve as shown.



1. Lock sleeve
2. Position punch in this hole

Remove 3 bearing holder nuts **no. 5** and screws **no. 6** then detach both halves **no. 7** using a flat screwdriver. See the following photo.

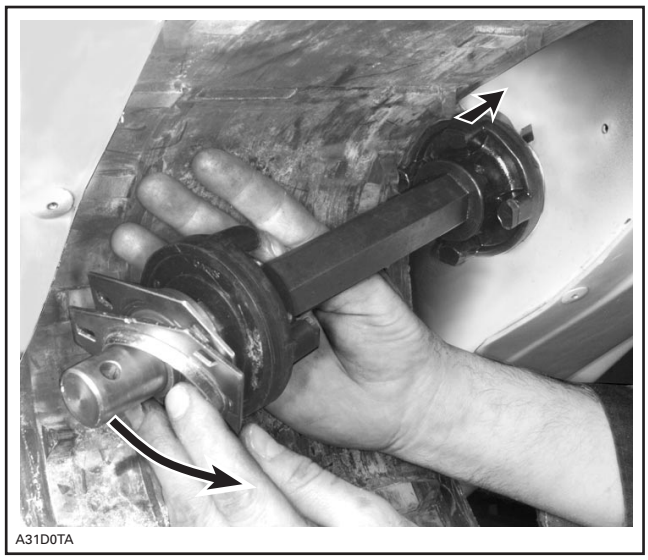


DETACH BEARING HOLDER HALVES

Repeat procedure for left side bearing, except for lock sleeve.

Drive Axle Ass'y

Pull out drive axle ass'y **no. 8**, as shown in the next photo.



PULL OUT DRIVE AXLE ASS'Y

DISASSEMBLY AND ASSEMBLY

Bearing and Sprocket

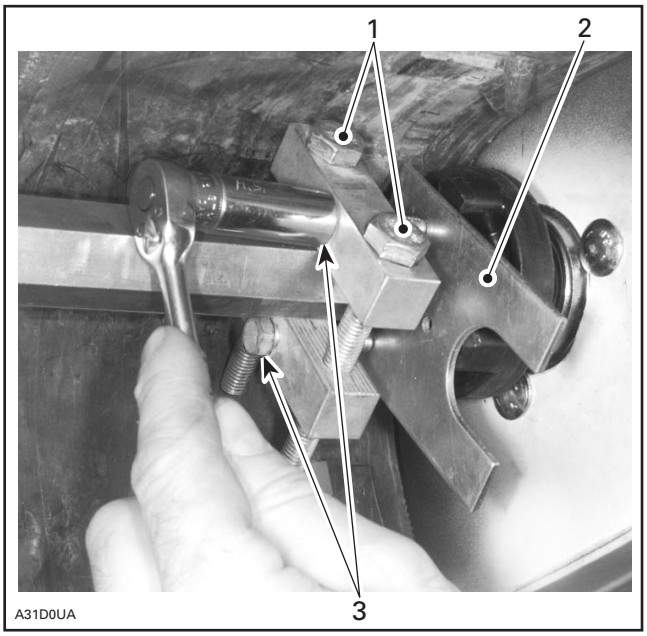
To remove or to install bearings **no. 9** and sprockets **no. 2**, use a press.

CAUTION: Ensure that bearings and sprockets are properly supported near hub and that spring pins have been removed from sprockets, before removal.

INSTALLATION

Reverse the removal procedure and pay a special attention to the following points.

Sprockets can be positioned with drive axle in place. In that case use drive axle sprocket adjuster (P/N 861 725 700), as shown in the following photo.



1. Tighten tool on drive axle with these screws
2. Install plate to protect sprocket
3. Use these screws to move sprocket

Reinstall spring pins as shown in the next photo.

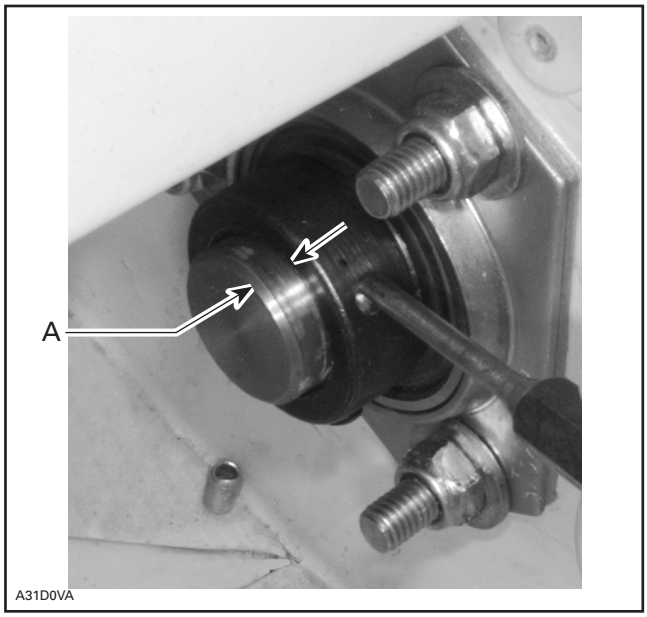
CAUTION: Ensure that drive axle spring pin hole is properly aligned with sprocket hole.

REINSTALL SPRING PIN

Drive Axle Alignment

To ensure that drive axle sprockets are properly aligned with track guides, measure right side drive axle end.

Drive axle must exceed bearing locking sleeve by 4 mm (5/32 in), as shown in the next photo. If not, realign drive axle.



A. 4 mm (5/32 in)

Tighten (clockwise) bearing lock sleeve and secure with set screw. Apply Loctite 242 on set screw threads.

TRACK

GENERAL

This section gives guidelines for track removal. Some components require more detailed disassembly procedures. In these particular cases, refer to the pertaining section in this manual.

INSPECTION

Visually inspect track for:

– cuts and abnormal wear
– missing or defective inserts or guides

If track is damaged, replace track.

⚠ WARNING

Do not operate a snowmobile with a cut, torn or damaged track.

REMOVAL

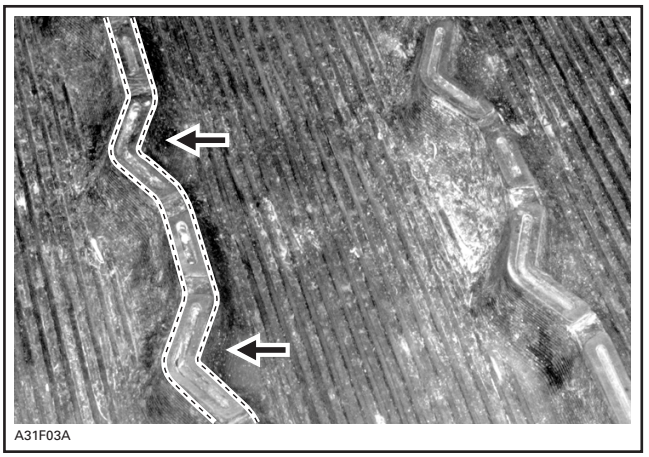
Remove the following items:

– chainguard
– drive chain and driven sprocket
– rear suspension
– end bearing housing
– drive axle
– track

INSTALLATION

Reverse the removal procedure.

NOTE: When installing the track, respect rotation direction indicated by shaped arrows on track thread.



TRACK ROTATION

Track Tension and Alignment

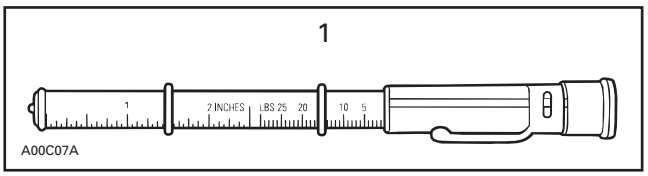
Track tension and alignment are interrelated. Do not adjust one without checking the other. Track tension procedure must be carried out prior to track alignment.

Tension

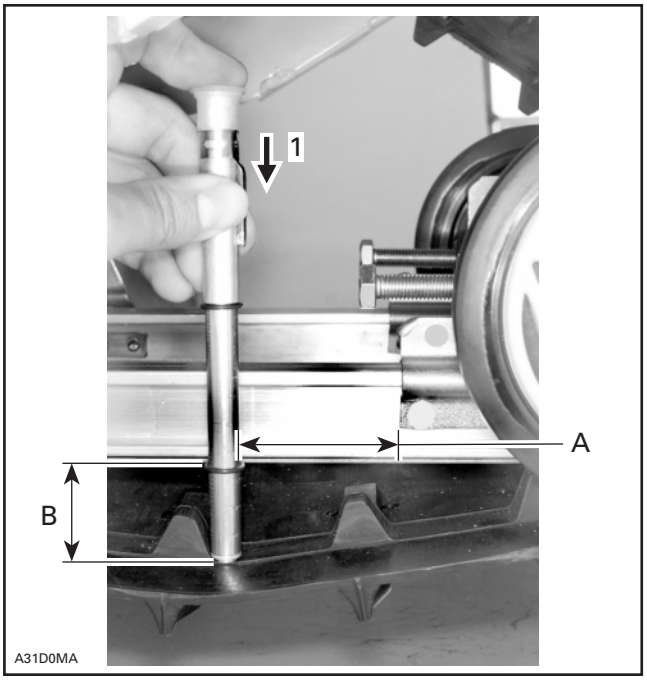
Lift the rear of vehicle and support with a mechanical stand. Allow the suspension to extend normally. Check the gap 60 mm (2-3/8 in) from rear idler wheel bracket.

Deflection should be 35 mm (1-3/8 in) between slider shoe and bottom inside of track, when exerting a downward force of 7.3 kg (16 lb).

Use tension tester (P/N 414 348 200) to measure deflection as well as force applied.



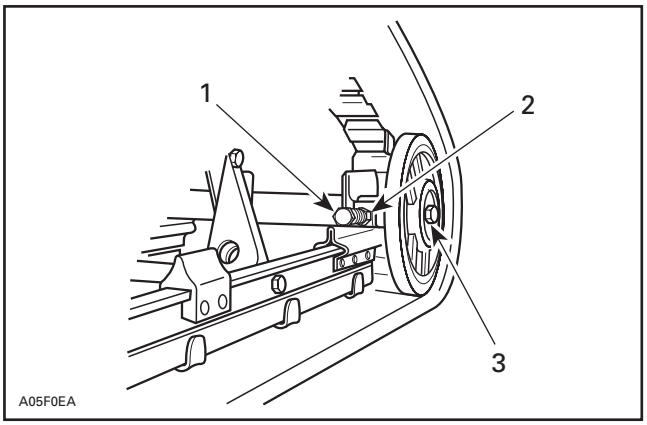
1. Belt tension tester



1. 7.3 kg (16 lb)
A. 60 mm (2-3/8 in)
B. 35 mm (1-3/8 in)

CAUTION: Too much tension will result in power loss and excessive stress on suspension components. If too loose, the track will have a tendency to thump.

To adjust, loosen the rear idler wheel retaining screws and the adjustment screw lock nuts; then loosen or tighten the adjustment screws located on the inner side of the rear idler wheels.



TYPICAL
1. Adjustment screw
2. Lock nut
3. Retaining screw

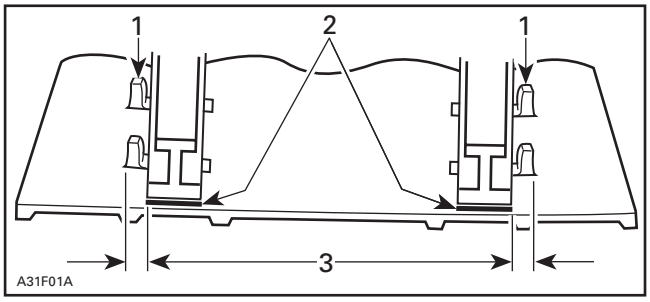
Alignment

⚠ WARNING

Before checking track tension, ensure that the track is free of all particles which could be thrown out while it is rotating. Keep hands, tools, feet and clothing clear of track. Ensure no one is standing in close proximity to the vehicle.

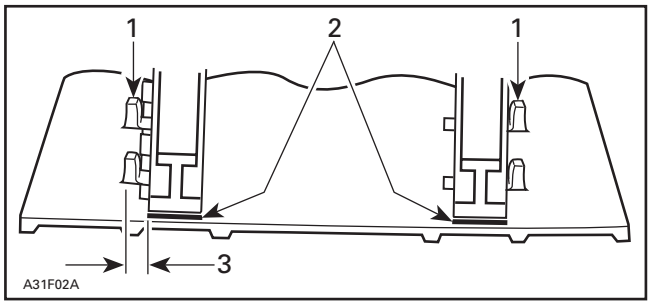
With rear of vehicle supported off the ground, start engine and allow the track to rotate **slowly**.

Check that the track is well centered; equal distance on both sides between edges of track guides and slider shoes.



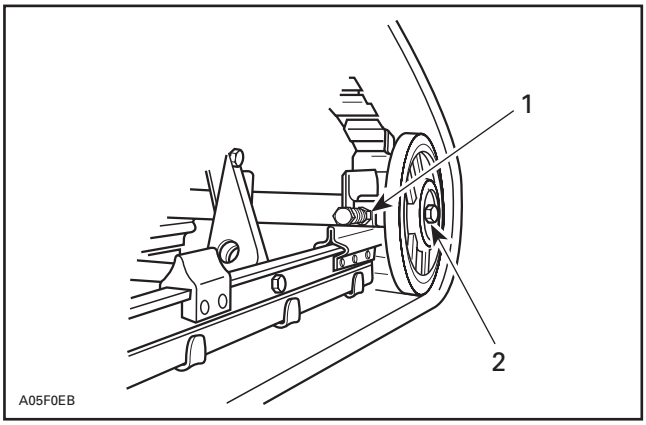
1. Guides
2. Slider shoes
3. Equal distance

To correct, stop engine then loosen the lock nuts and tighten the adjustment screw on side where guides are farthest to runner. Tighten lock nuts and recheck alignment.



1. Guides
2. Slider shoes
3. Tighten on this side

Tighten lock nuts and the idler wheel retaining screws.



TYPICAL

1. *Retighten lock nuts*
2. *Retighten rear idler wheel retaining screws*

Restart engine, rotate track **slowly** and recheck alignment.

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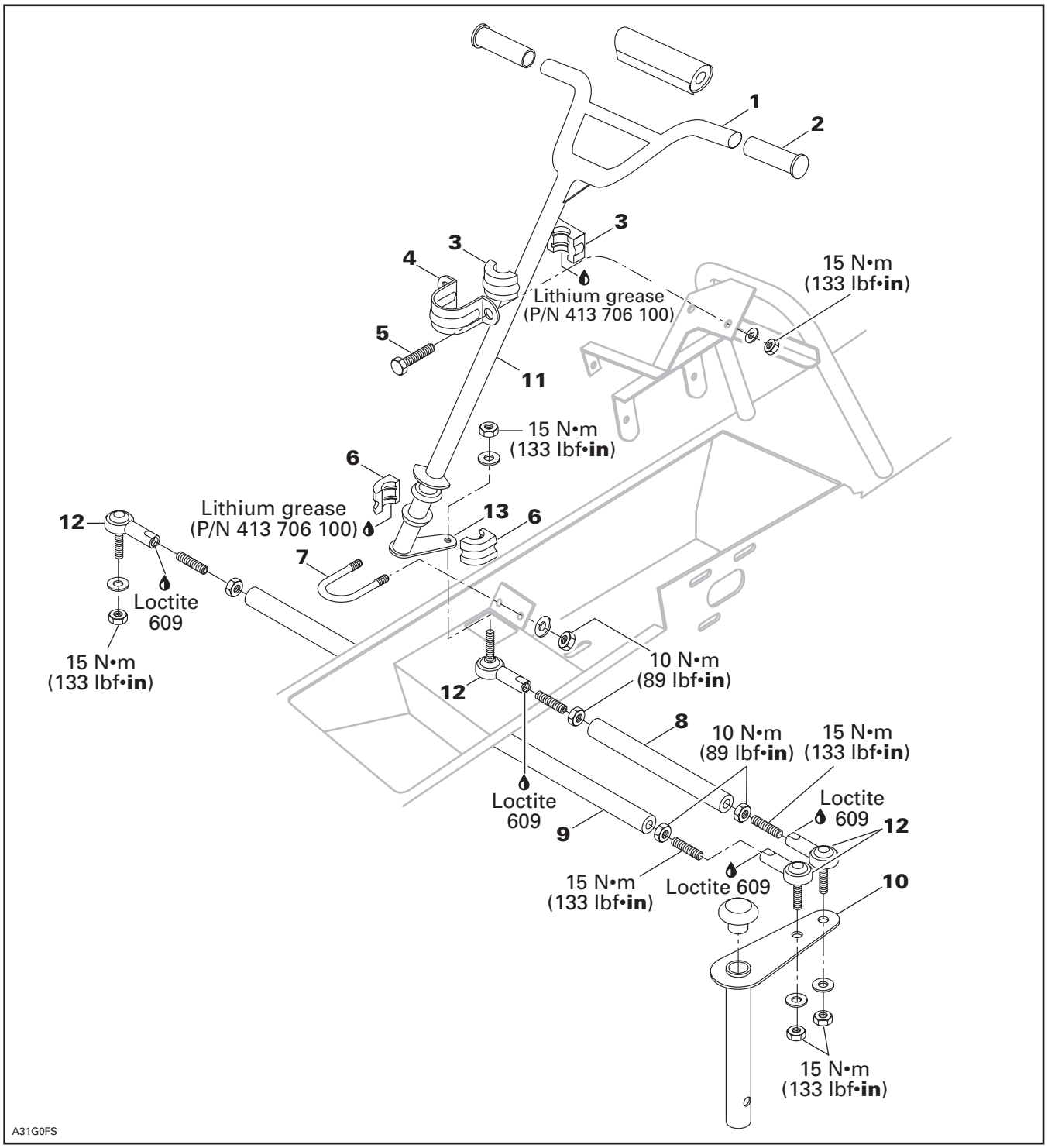
STEERING SYSTEM



INSPECTION

Check skis and runner shoes for wear, replace as necessary. Refer to SUSPENSION AND SKI SYSTEM 08-03.

Steering System

Check general condition of steering system.

Check general condition of steering system components for wear and replace if necessary.

DISASSEMBLY AND ASSEMBLY

2, Grip

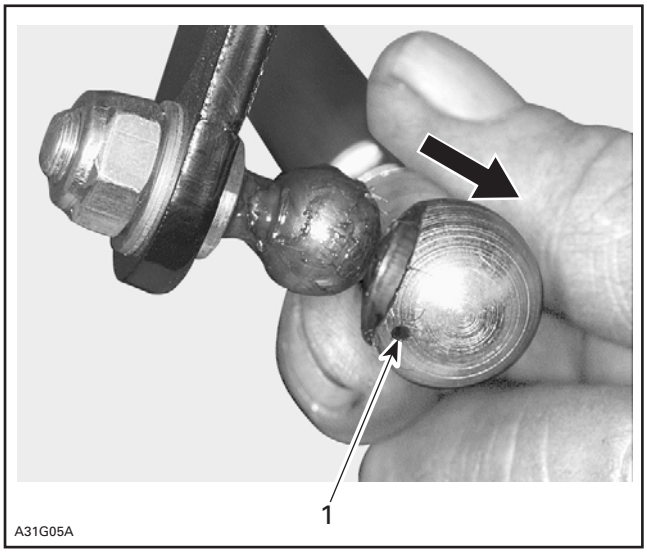
Grips can be removed and installed without any damage by injecting compressed air into the handlebar or by heating them with a heat gun.

11, Steering Column

From underneath bottom pan, remove tie rod clip.

Refer to STEERING ADJUSTMENT (skis) for clip removal.

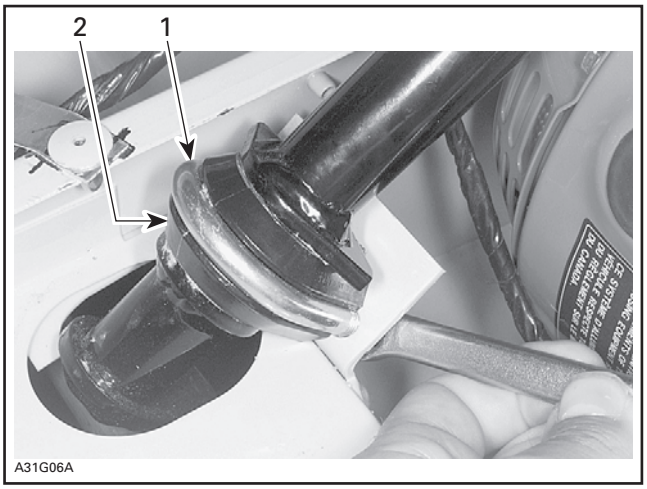
Detach short tie rod **no. 8** from steering column **no. 11**, as shown in the next photo.



DETACH TIE ROD

1. Clip removed

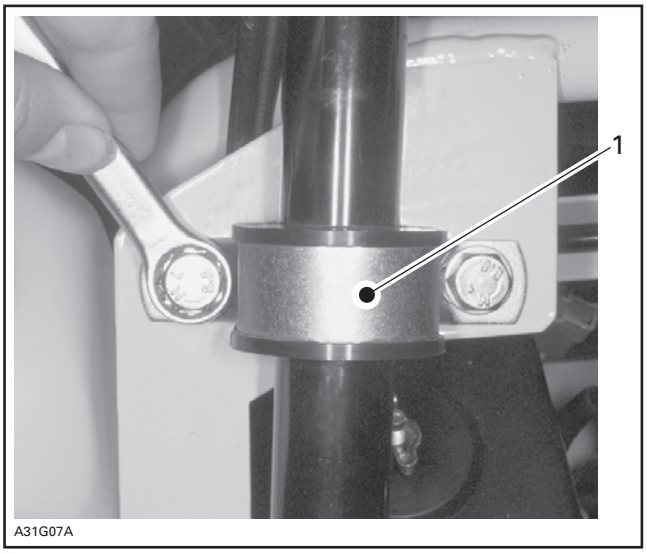
Remove U-clamp **no. 7** with both half bushings, **no. 6** as shown in the following photo.



REMOVE U-CLAMP

1. U-clamp
2. Bushing

Remove retaining support **no. 4** with both half bushings **no. 3**, as shown in the following photo.



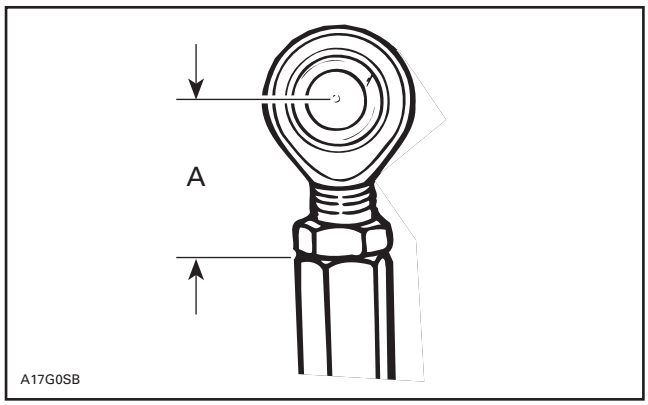
1. Retaining support

INSPECTION

12, Ball Joint

Inspect ball joint ends for wear or looseness, if excessive, replace.

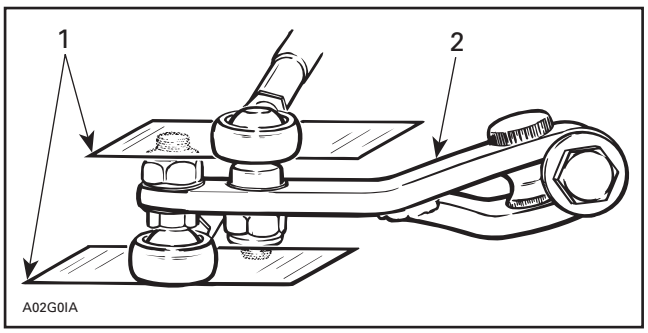
If stud loosened apply Loctite 609 in ball joint threaded hole and torque stud to 15 N•m (133 lbf•**in**). Mount lock nut on exposed portion of stud. Screw exposed portion of stud into tie rod. Torque lock nut to 10 N•m (89 lbf•**in**). The maximum length for ball joint center to tie rod end must not exceed the value A in the following chart:



TYPICAL

MODEL	A	
	MM	(IN)
Mini Z	47	(1-27/32)

The cut-off section of the tie rod end must run parallel with the horizontal line of the steering arm when assembled on vehicle. The ball joint should be restrained when tightening tie rod end lock nut. For torque specifications see specific exploded view.



TYPICAL

1. *Parallel with steering arm*
2. *Steering arm*

⚠ WARNING

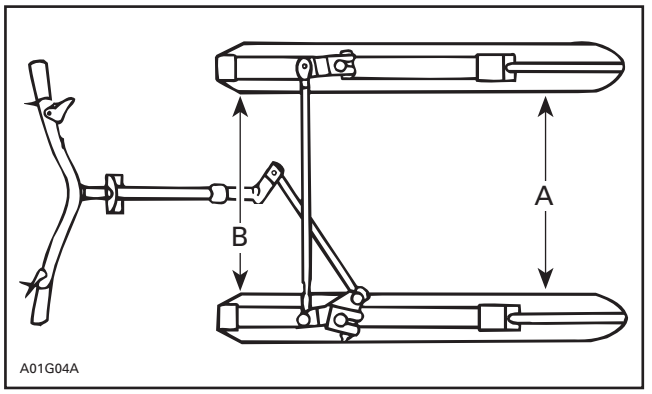
The cut off section of the ball joint must run parallel with the steering arm. When tightening lock nuts, restrain ball joint with appropriate size wrench. Ensure not too many threads are kept outside of the tie rod according to the thread length chart.

STEERING ADJUSTMENT (skis)

Definitions

TOE-OUT:

Difference in measurement between front edge A and rear edge B of skis as viewed from top side of suspension system. It is adjustable.



CAMBER:

A specific inward or outward tilt angle of ski leg compared to a vertical line when viewing vehicle from front. **This angle is not adjustable on Mini Z.**

Adjustments

Adjustments should be performed following this sequence:

– Pivot arm centering/horizontal handlebar.

– Set toe-out.

PIVOT ARM CENTERING/HORIZONTAL HANDLEBAR

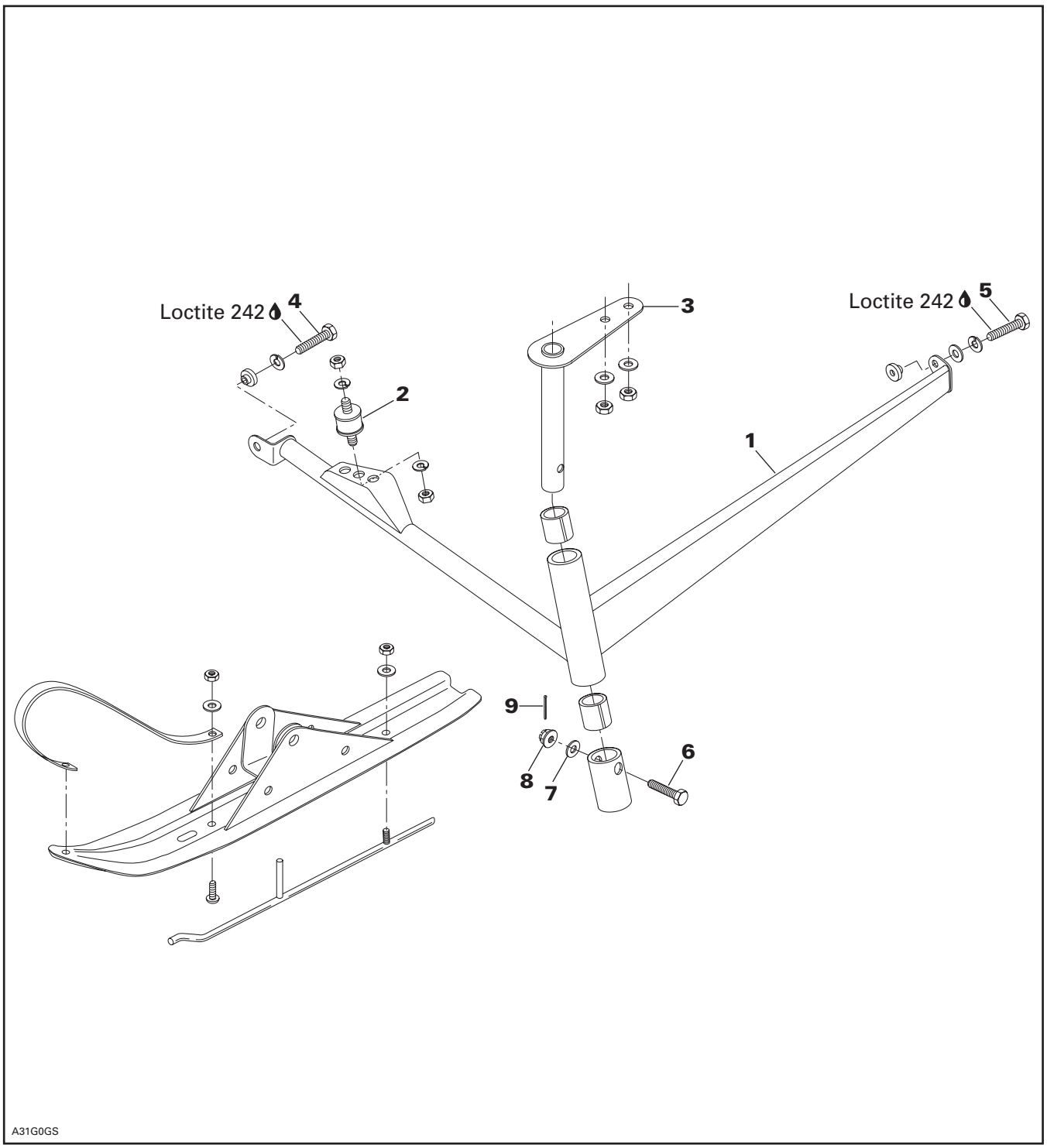
Turn handlebar **no. 1** until pivot arm **no. 13** is well centered.

Check if handlebar is horizontal and skis aligned with track. If not, adjust as per following procedure:

Loosen lock nut of short tie rod end.

Using a flat screwdriver, remove clip on short tie rod end, as shown in the next photo.

SUSPENSION AND SKI SYSTEM



TO REMOVE CLIP — LIFT THEN PULL OUT

Detach short tie rod end from steering arm **no. 10**.

Check that handlebar is horizontal and that skis are aligned with track.

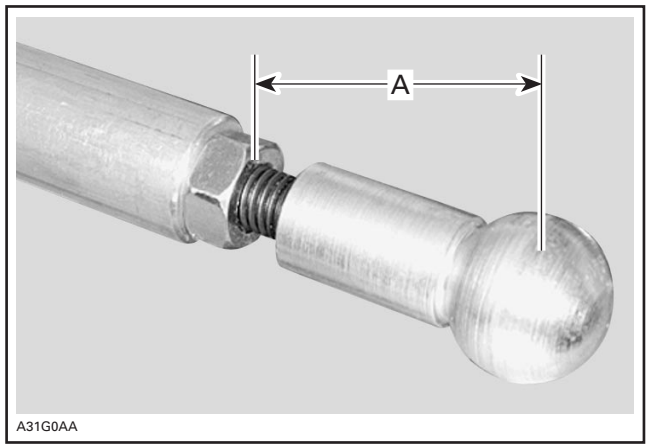
Rotate tie rod end CW or CCW until proper alignment with steering arm is attain. See next photo.

DETACH TIE ROD END AND ROTATE CW OR CCW TO ADJUST

Re-attach tie rod end to steering arm.

⚠ WARNING

Maximum length for ball joint center to tie rod end must not exceed 47 mm (1-27/32 in). Torque lock nut to 15 N•m (133 lbf•in).



A. 47 mm (1-27/32 in) maximum

Restrain tie rod while firmly retighten nuts so that ball joint sockets run parallel with steering arm and pivot arm.

⚠ WARNING

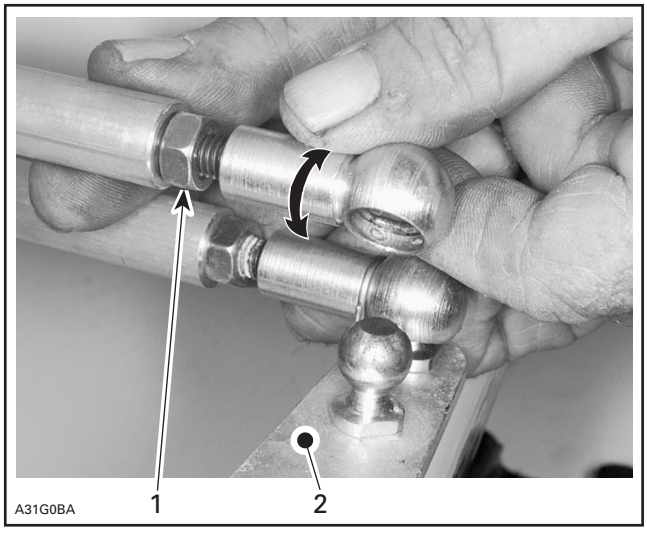
Ball joint sockets must run parallel with steering arm and pivot arm. Tie rod must be restrained when tightening lock nuts.

Ensure that pivot arm **no. 13** is still centered and check ski toe-out.

TOE-OUT

Loosen lock nuts of long tie rod end **no. 9** and detach tie rod end from steering arm **no. 10**.

Turn each tie rod end to adjust toe-out. See next photo.



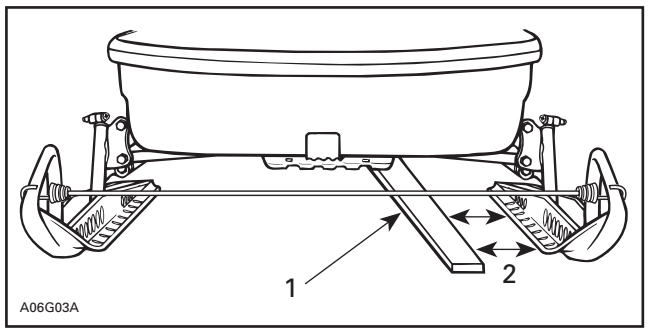
TO ADJUST — ROTATE TIE ROD END

1. *Loosen lock nut*
2. *Steering arm*

Re-attach tie rod end to steering arm then secure with clip.

NOTE: A rubber cord must be hooked in front of skis to keep them closed.

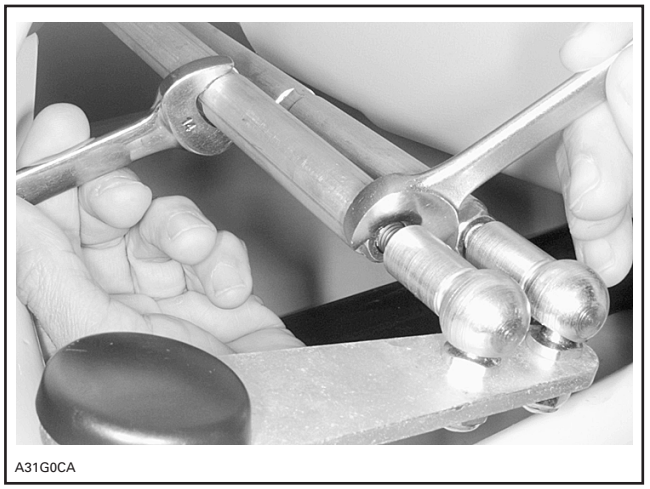
NOTE: To measure toe-out, place a straight edge against pre-adjusted track and measure distance between front and rear of skis and straight edge. Distances should be equal. After ski toe-out adjustment, distance at front of ski must be 0 to 3.0 mm (0 to 1/8 in) more than at rear on both sides for a total toe-out of 0 to 6 mm (0 to 1/4 in).



TYPICAL

1. *Straight edge*
2. *0 to 3.0 mm (0 to 1/8 in) more at front than at rear*

Check external threaded length not engaged and firmly retighten lock nuts, as shown in the next photo.



HOLD TIE ROD THEN TIGHTEN LOCK NUT

LUBRICATION

⚠ WARNING

Do not lubricate throttle and/or brake cable, housing and spring coupler bolts.

Steering Column

Use lithium grease (P/N 413 706 100) at U-clamp and retaining support location on steering column.

Ball Joints

Lightly grease ball joints with bearing grease (P/N 413 706 100).

DISASSEMBLY

2, Rubber Mount

Lift front of vehicle and support it off the ground.

Note rubber mount position.

Remove lower nut then upper nut of rubber mount.

1, Swing Arm

Lift front of vehicle and support it off the ground.

Unbolt ski.

Unbolt lower end of rubber mount from swing arm **no. 1**.

Remove nuts and washers then detach tie rod end from steering arm **no. 3**.

Remove swing arm front screw **no. 4** from frame.

Remove swing arm rear screw **no. 5** from frame.

Pull swing arm off the vehicle.

INSPECTION

Check both rubber mounts for looseness and wear. If so, replace with new one.

Check all rubber cushions for crack and wear. Replace as required.

Check for straightness of swing arm. Replace as required.

Check skis and runners for wear, replace as necessary.

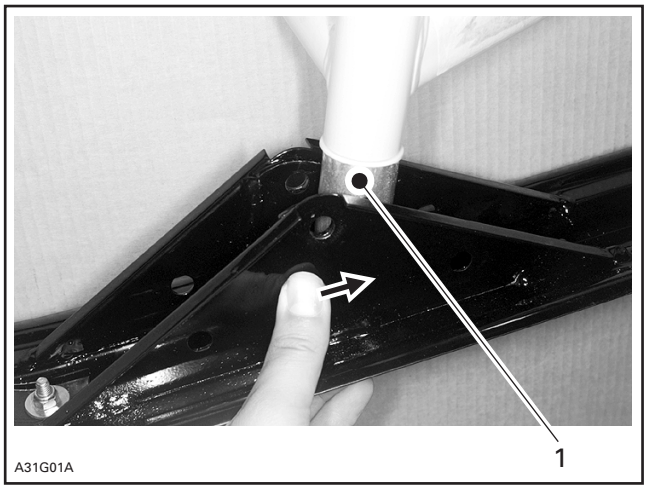
INSTALLATION

For assembly, reverse the disassembly procedure. However, pay attention to the following.

Tighten nuts and screws to proper torque and apply Loctite 242 where specified, as mentioned in exploded view.

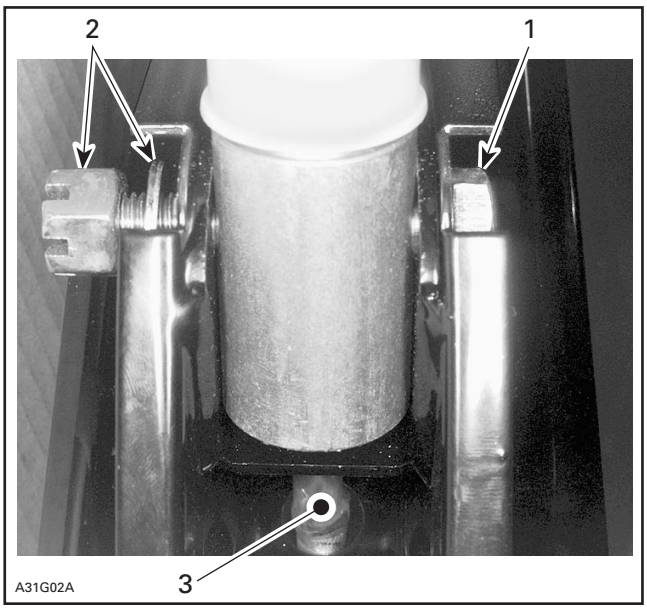
Ski

Slide ski on ski leg as shown in the next photo.



SLIDE SKI
1. Ski leg spacer

Secure ski with screw **no. 6**, washer **no. 7**, nut **no. 8** and cotter pin **no. 9**, then ensure that ski pin is properly centered into ski leg, as shown in the following photo.



1. Bolt head toward OUTSIDE of vehicle
2. Washer, nut and cotter pin (not shown) toward inside of vehicle
3. Ski pin centered into ski leg

⚠ WARNING

Always use new cotter pin when reinstalling skis.

Tie Rod

Position tie rods horizontally before tightening nuts.

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REPAIR 09-02-5

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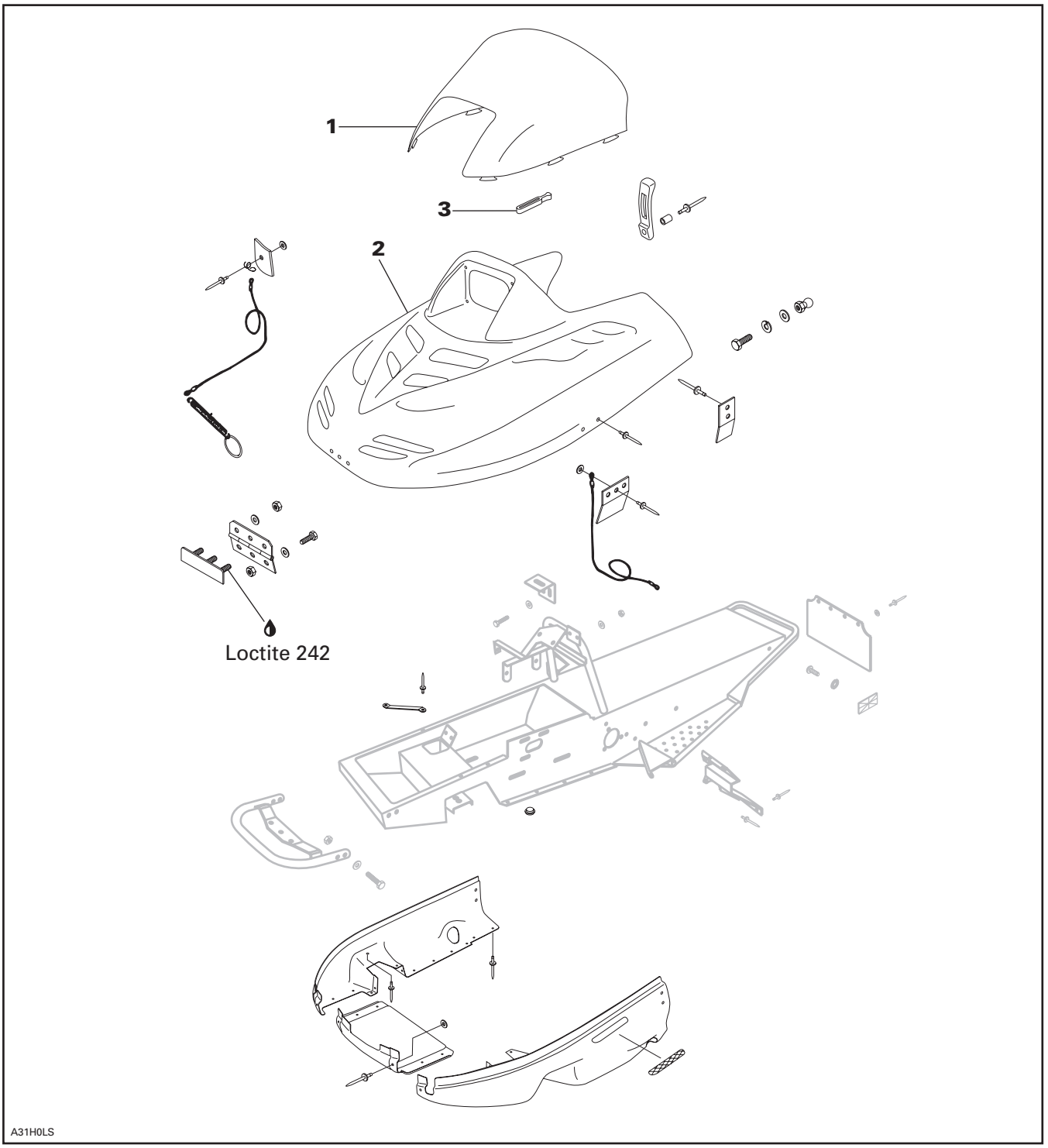
BODY

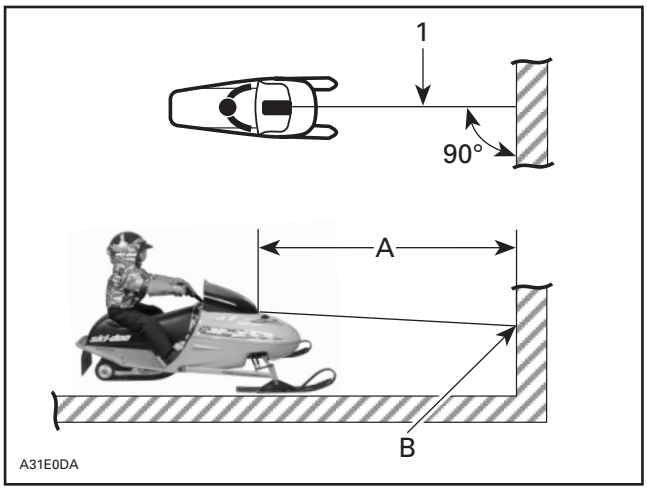


INSTALLATION AND ADJUSTMENT

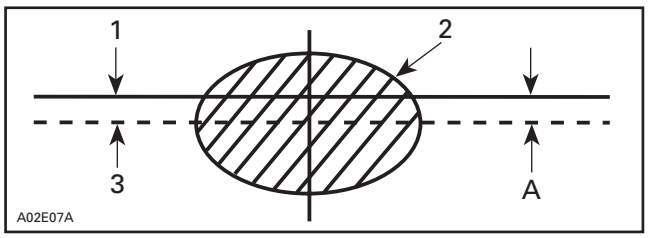
HEADLAMP BEAM AIMING

Beam aiming is correct when center of high beam is 25 mm (1 in) below the headlamp horizontal center line, scribed on a test surface, 381 cm (12 ft 6 in) away.

Measure headlamp center distance from ground. Scribe a line at this height on test surface (wall or screen). Light beam center should be 25 mm (1 in) below scribed line.



1. Headlamp center line
A. 381 cm (12 ft 6 in)
B. 25 mm (1 in) below headlamp center



1. Headlamp horizontal center line
2. Light beam (high beam) (projected on the wall)
3. Light beam center
A. 25 mm (1 in)

Required Conditions

Place the vehicle on a flat surface perpendicular to test surface (wall or screen) and 381 cm (12 ft 6 in) away from it.

Rider or equivalent weight must be on the vehicle.

Adjustment

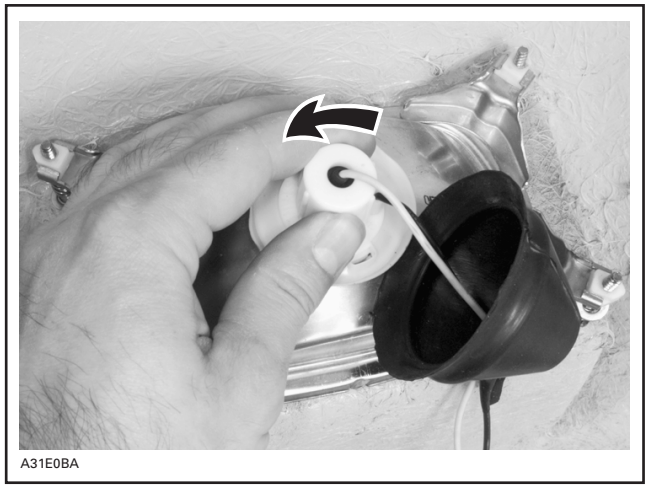
Remove headlamp screw caps. Turn screws accordingly at upper headlamp attachment.

BULB REPLACEMENT

Headlight

If headlamp bulb is burnt, tilt hood.

Remove the rubber boot and turn the bulb retainer ring counterclockwise.



REMOVE RUBBER BOOT AND BULB RETAINER RING

Pull off bulb retainer ring, detach the bulb and replace. Properly reinstall parts.

Taillight

Taillight is sealed, if it is burnt, replace taillight ass'y with new one.

To remove, unscrew the 2 lens screws.

Pull out taillight ass'y.

Unplug connector.

Install new taillight ass'y.

DECAL

To remove a decal; heat old decal with a heat gun and peel off slowly.

Using isopropyl alcohol, clean the surface and dry thoroughly.

Apply liquid soap to new decal and carefully position the decal. Using a sponge or a squeegee, remove the air bubbles and surplus water working from the center toward the edges. Allow to air dry.

CAUTION: Do not apply isopropyl alcohol or solvent directly on decals.

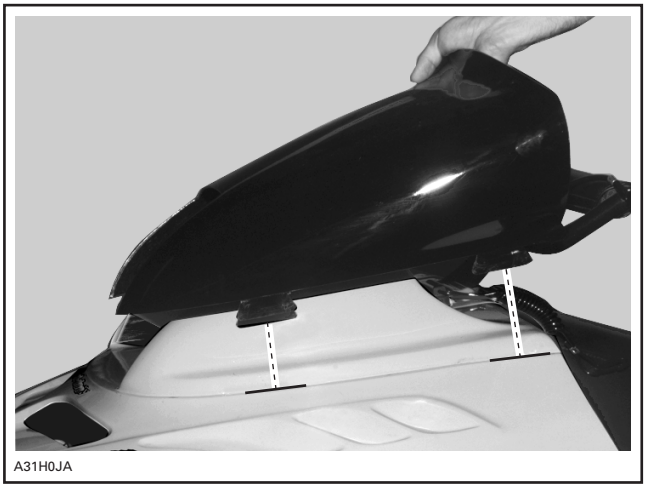
WINDSHIELD INSTALLATION

When peeling off the protective film some polyethylene particles may remain on the windshield no. 1. A soft clean cloth moistened with naphtha (camping equipment fuel) will easily remove the remaining particles.

⚠ WARNING

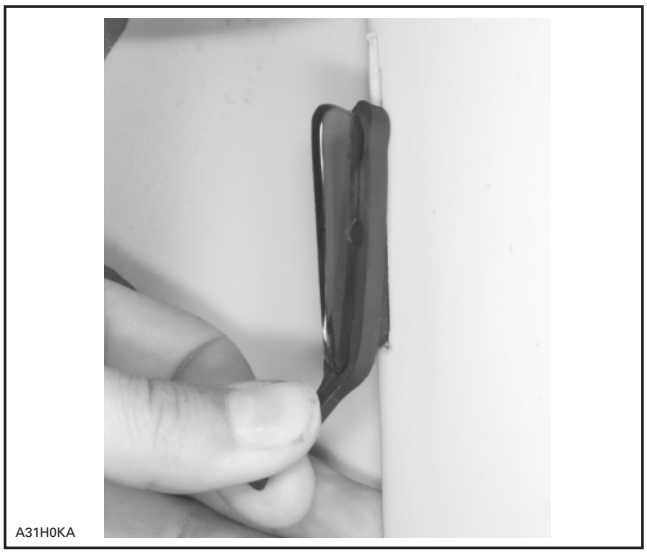
Naphtha is flammable and explosive under certain conditions. Always manipulate in a well ventilated area. Do not smoke or allow open flames or sparks in the vicinity.

Position the windshield no. 1 on the hood no. 2 then push it down until the tabs are fully inserted into the hood slots, as shown.



INSERT WINDSHIELD TABS INTO HOOD SLOTS

From inside hood, lock the windshield tabs in position using latches no. 3 as shown.



VIEW FROM INSIDE HOOD — LOCK WINDSHIELD TABS

CHAIN GUARD

Disassembly and Assembly

⚠ WARNING

Engine should be running only with chain guard well secured in place.

Inspection

Check chain guard mounting tabs and spring nuts for wear.

WIRING HARNESS

⚠ WARNING

Ensure all terminals are properly crimped on the wires and that all connector housings are properly fastened. Keep wires away from any rotating, moving, heating and vibrating parts. Use proper fastening devices as required.

CABLES

⚠ WARNING

Before installation, ensure that all cables are in perfect condition. Properly install the cable ends and secure them in place. Pay attention to route them properly, away from any rotating, moving, heating, or vibrating parts.

PIPING

⚠ WARNING

Always ensure that the fuel and vent lines are properly fixed to their connectors, that they are not perforated or kinked and that they are properly routed away from any rotating, moving, heating or vibrating parts. Also check for leaks. Replace if required.

NOTE: Refer to proper *Parts Catalog* to find suitable clip part numbers.

PLASTIC REPAIR

REPAIR

Two types of plastic material are used on Mini Z model, as described in the following table.

	MATERIAL
WINDSHIELD	Polycarbonate
HOOD	Polyethylene
BOTTOM PAN	Polyethylene

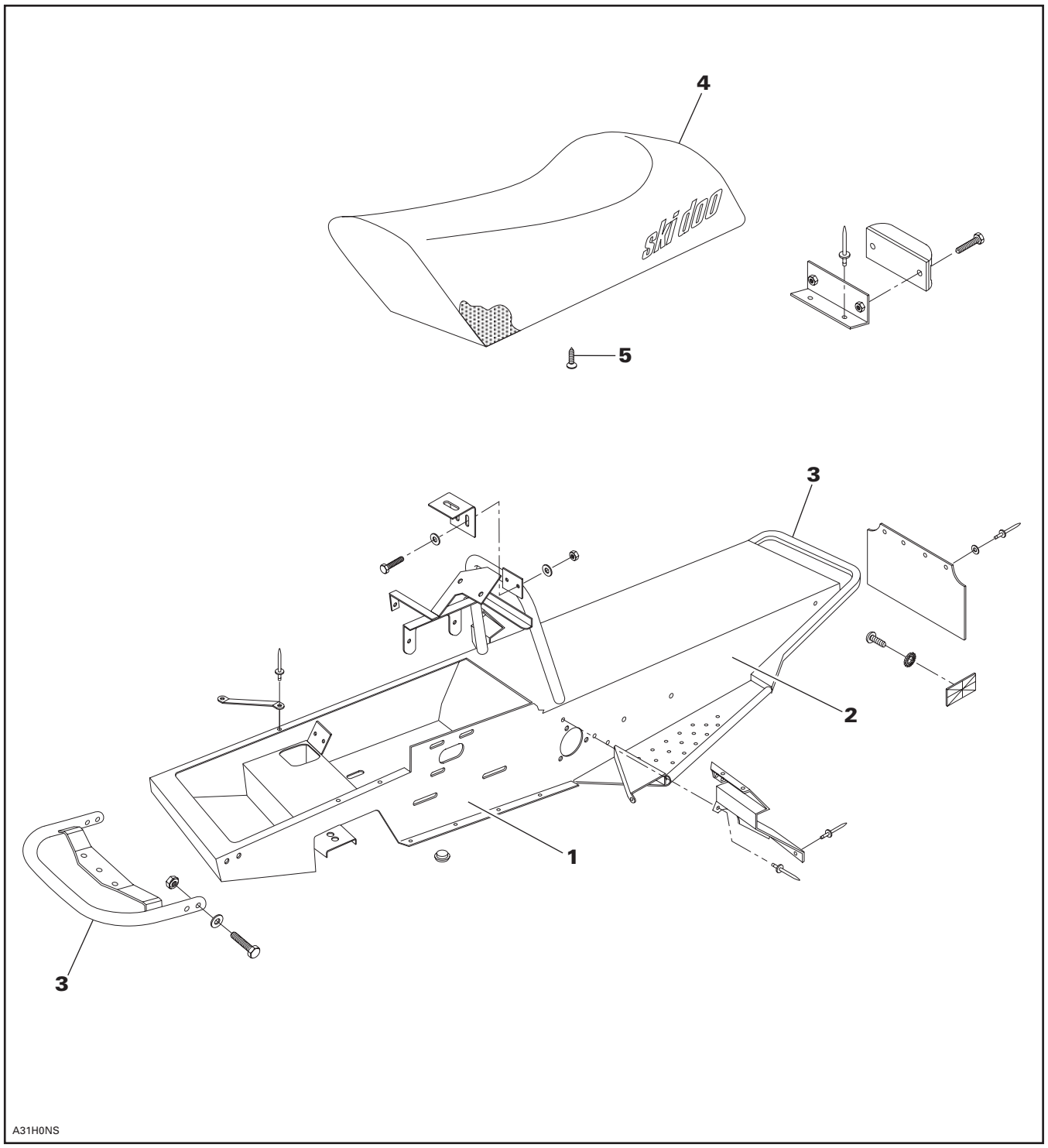
Both plastic materials are irreparable.

In the case that parts are broken or damaged, replace with new one.

⚠ WARNING

Polycarbonate windshields must **never** be repaired by welding or otherwise.

FRAME



FRAME CLEANING

Clean frame no. 1, tunnel no. 2 and bumpers no. 3 with appropriate cleaners and rinse with high pressure hose.

Touch up all metal spots where paint has been scratched off. Spray all bare metal parts of vehicle with metal protector.

Seat Removal/Replacement

Seat no. 4 is retained to tunnel with 4 wood screws no. 5. All screws must be removed from inside tunnel.

To remove both front wood screws no. 5, detach rear suspension from tunnel, as described in section 07 REAR SUSPENSION.

CAUTION: Ensure that 4 wood screws no. 5 have been removed before removing seat.

Seat Cleaning

It is recommend to clean the seat no. 4 with a solution of warm soapy water, using a soft clean cloth.

CAUTION: Avoid use of harsh detergents such as strong soaps, degreasing solvents, abrasive cleaners, paint thinners, etc. that may cause damage to the seat cover.

FRAME WELDING

Steel Frame:

– electric welding
– amperage: 70-110 A
– voltage: 20-24 V
– rod: E-7014 (3/32 in)

CAUTION: If welding is to be done near plastic material, it is recommended to either remove the part from the area or to protect it with aluminum foil to prevent damage.

FRAME COMPONENT REPLACEMENT

Drilling Procedure

For proper drilling instructions and to prevent premature wear, follow the procedure below.

Always use a variable speed electric drill.

Center the drill bit on the rivet hole and drill.

Maintain a slow to medium speed at all times when drilling. The proper speed is attained when a constant breaking chip is ejected.

NOTE: To increase bit life, use Bombardier synthetic chaincase oil (P/N 413 803 300) as a cutting oil.

CAUTION: High speed drilling will cause excessive heat which may destroy the cutting edge of the bit, therefore avoid using pneumatic drills.

TECHNICAL DATA

SI* METRIC INFORMATION GUIDE

BASE UNITS

DESCRIPTION	UNIT	SYMBOL
length	meter	m
mass	kilogram	kg
force	newton	N
liquid	liter	L
temperature	Celsius	°C
pressure	kilopascal	kPa
torque	newton•meter	N•m
speed	kilometer per hour	km/h

PREFIXES

PREFIX	SYMBOL	MEANING	VALUE
kilo	k	one thousand	1 000
centi	c	one hundredth	0.01
milli	m	one thousandth	0.001
micro	µ	one millionth	0.000001

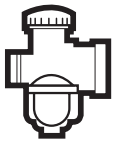
CONVERSION FACTORS

TO CONVERT	TO †	MULTIPLY BY
in	mm	25.4
in	cm	2.54
in^2	cm^2	6.45
in^3	cm^3	16.39
ft	m	0.3
oz	g	28.35
lb	kg	0.45
lbf	N	4.4
lbf•**in**	N•m	0.11
lbf•ft	N•m	1.36
lbf•ft	lbf•**in**	12
PSI (lbf/in^2)	kPa	6.89
imp. oz	U.S. oz	0.96
imp. oz	mL	28.41
imp. gal	U.S. gal	1.2
imp. gal	L	4.55
U.S. oz	mL	29.57
U.S. gal	L	3.79
MPH	km/h	1.61
Fahrenheit	Celsius	(°F - 32) ÷ 1.8
Celsius	Fahrenheit	(°C x 1.8) + 32

* The international system of units abbreviates SI in all languages.

† To obtain the inverse sequence, divide by the given factor. To convert ''mm'' to ''in'', divide by 25.4.

NOTE: Conversion factors are rounded off to 2 decimals for easier use.

	VEHICLE MODEL			**MINI Z**
	ENGINE TYPE			**4 Stroke Overhead Valves**
	Number of Cylinders			1
	Bore		mm (in)	60.00 (2.362)
	Stroke		mm (in)	42.00 (1.654)
	Displacement		cm^3 (in^3)	118.00 (7.20)
	Compression Ratio (corrected)			8.5: 1
	Maximum Power Engine Speed		± 100 RPM	4000
	Ring End Gap	Top/Second Oil (wear limit)	mm (in)	0.2 - 0.4 (.008 - .016) 0.15 - 0.35 (.006 - .014) 1.0 (.04)
	Ring/Piston Groove Clearance	(standard) (wear limit)	mm (in) mm (in)	.015 - .045 (.0006 - .0018) .15 (.006)
	Piston/Cylinder Wall Clearance	(standard) (wear limit)	mm (in) mm (in)	.015 - .05 (.0006 - .002) .12 (.005)
	Connecting Rod Big End Side Clearance	(standard) (wear limit)	mm (in) mm (in)	0.1 - 0.7 (.004 - .028) 1.1 (.043)
	Ignition Type			Transistorized
	Spark Plug Make and Type			NGK BPR6 ES
	Spark Plug Gap		mm (in)	0.7 - 0.8 (.028 - .031)
	Ignition Timing BTDC		mm (in)	25° (fixed)
	Lamp Coil ①			0.18 - 0.23
	Ignition Coil ①	Primary	Ω	0.8 - 1.0
		Secondary	Ω	5.9 - 7.1
	Carburetor Type			Horizontal Butterfly Valve
	Main Jet			60
	Float Height Adjustment		± 1 mm (± .040 in)	13.7 (.54)
	Pilot Screw Opening		± 1/16 turn	2 Turns Out
	Idle Speed RPM		± 200 RPM	1400
	Gas Type/Pump Octane Number			Unleaded/86
	Oil			SAE 5W/30
	Type			Radial Fan
	ENGINE COLD N•m (lb•ft)	Drive Sprocket Retaining Screw		25 (19)
		Exhaust Nuts		24 (18)
		Crankcase Screws	M6	12 (9)
		Cylinder Head Screws		24 (18)
		Axial Fan/Flywheel Nut		75 (55)

	VEHICLE MODEL				**MINI Z**
	ENGINE TYPE				**4 Stroke Overhead Valve**
	Drive Chain Ratio				10/48
	Drive Chain	Pitch		mm (in)	12.7 (.500)
		Type/Links		Qty	Single 40/78
	Drive Sprocket	Clutch Engagement			N.A.
	Driven Sprocket	Outside Diameter Pitch Diameter		mm (in) mm (in)	201.37 (7.93) 194.18 (7.65)
	Drive Chain Part Number (P/N)				412 107 500
	Drive Chain Adjustment		Deflection		Automatic Tensioner
	Track	Width		mm (in)	254.0 (10)
		Length		mm (in)	1748.8 (68.85)
		Profile Height		mm (in)	15.97 (.63)
		Adjustment	Deflection	mm (in)	35 (1-3/8)
			Force ①	kg (lbf)	7.3 (16)
	Suspension Type		Track		Mini Z
			Ski		Mini Z
	Length			mm (in)	1860.0 (73.2)
	Width			mm (in)	885.0 (34.8)
	Height			mm (in)	750.0 (29.5)
	Ski Stance			mm (in)	685.0 (27.0)
	Mass (dry)			kg (lb)	70 (154)
	Ground Contact Area			cm^2 (in^2)	2754.5 (426.9)
	Ground Contact Pressure			kPa (PSI)	2.49 (.361)
	Frame Material				Steel
	Bottom Pan Material				Polyethylene
	Hood Material				Polyethylene
	Battery			V (A•h)	N.A.
	Headlight			W	35
	Taillight			W	4.5
	Fuel Tank			L (U.S. gal)	1.8 (.5)
	Oil Capacity			L (U.S. oz)	0.6 (20.3)

ENGINE TECHNICAL DATA LEGEND

BTDC: Before Top Dead Center

K: Kilo (x 1000)

MAG: Magneto Side

N.A.: Not Applicable

PTO: Power Take Off Side

R: Rectangular

① All resistance measurements must be performed with parts at room temperature (approx. 20°C (68°F)). Temperature greatly affects resistance measurements.

VEHICLE TECHNICAL DATA LEGEND

N.A.: Not Applicable

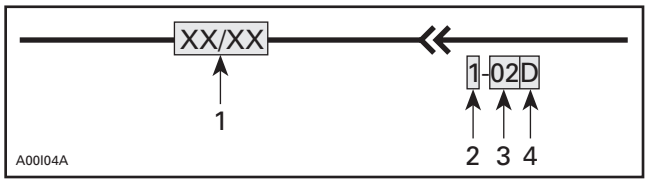
① Force or downward pull applied to track to obtain specified tension deflection.

WIRING DIAGRAM

WIRING DIAGRAM LEGEND

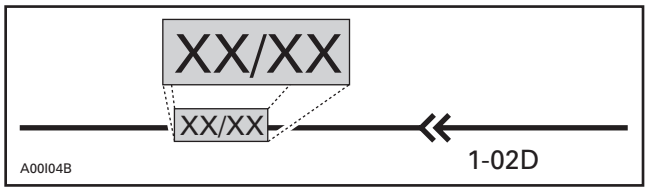
⚠ WARNING

Ensure all terminals are properly crimped on the wires and all connector housings are properly fastened.



1. *Wire colors*
2. *Housing area*
3. *Housing number per area*
4. *Wire connector location in housing*

WIRE COLORS AND CIRCUIT

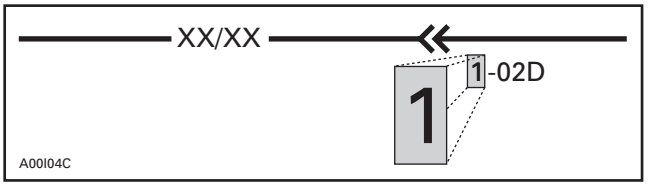


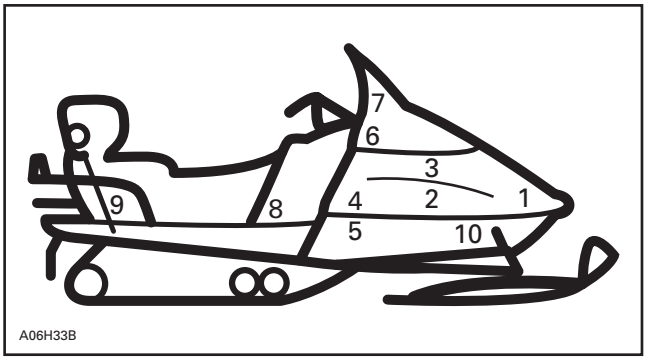
The first color of a wire is the main color, second color is the stripe.

Example: YL/BK is a YELLOW wire with a BLACK stripe.

COLOR CODE					
BK	–	BLACK	PK	–	PINK
BL	–	BLUE	RD	–	RED
BR	–	BROWN	VI	–	VIOLET
GN	–	GREEN	WH	–	WHITE
GY	–	GREY	YL	–	YELLOW
OR	–	ORANGE			

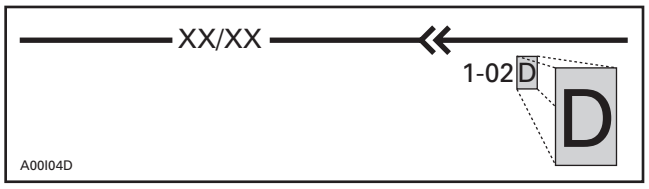
CONNECTOR HOUSING AREA

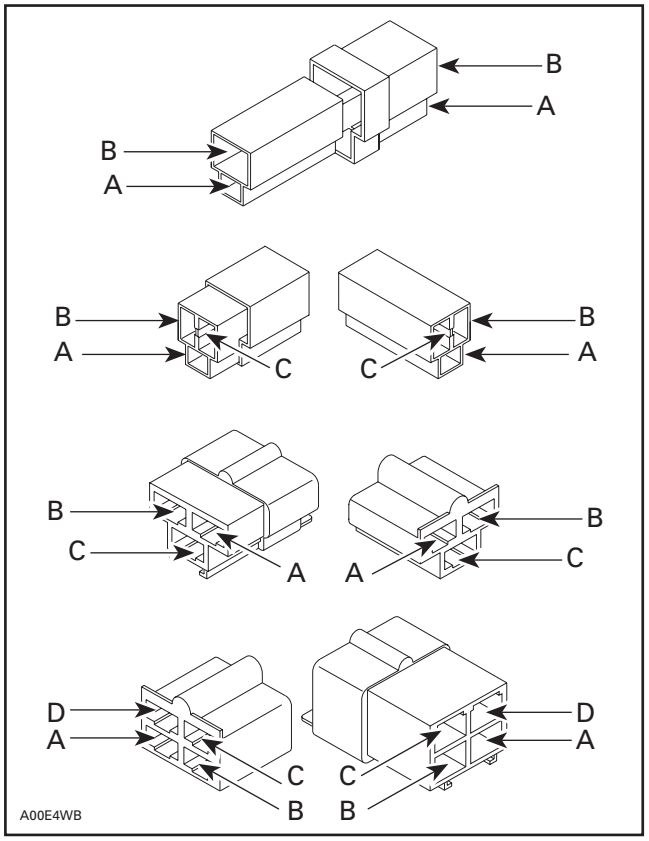




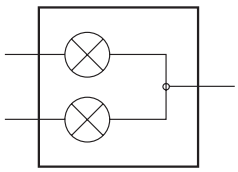
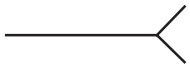
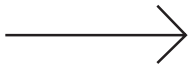
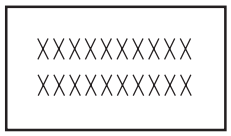
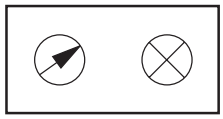
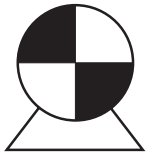
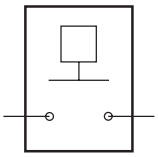
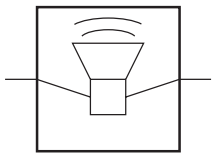
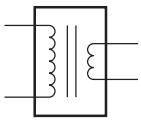
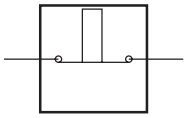
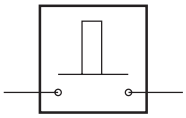
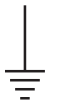
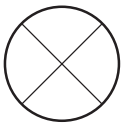
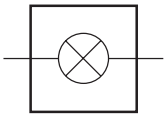
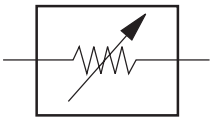
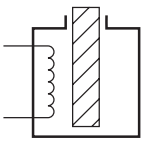
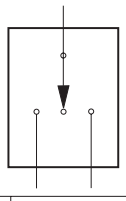
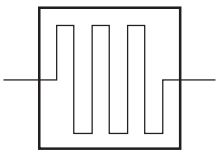
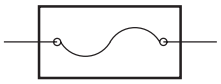
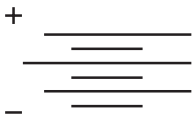
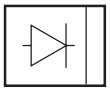
AREA	LOCATION
1	Front of engine compartment
2	Magneto
3	Carburetors
4	Near intake silencer
5	Near driven pulley
6	Under console
7	Under hood
8	Near fuel tank
9	Rear of seat
10	Under engine

CONNECTOR LOCATION IN HOUSING





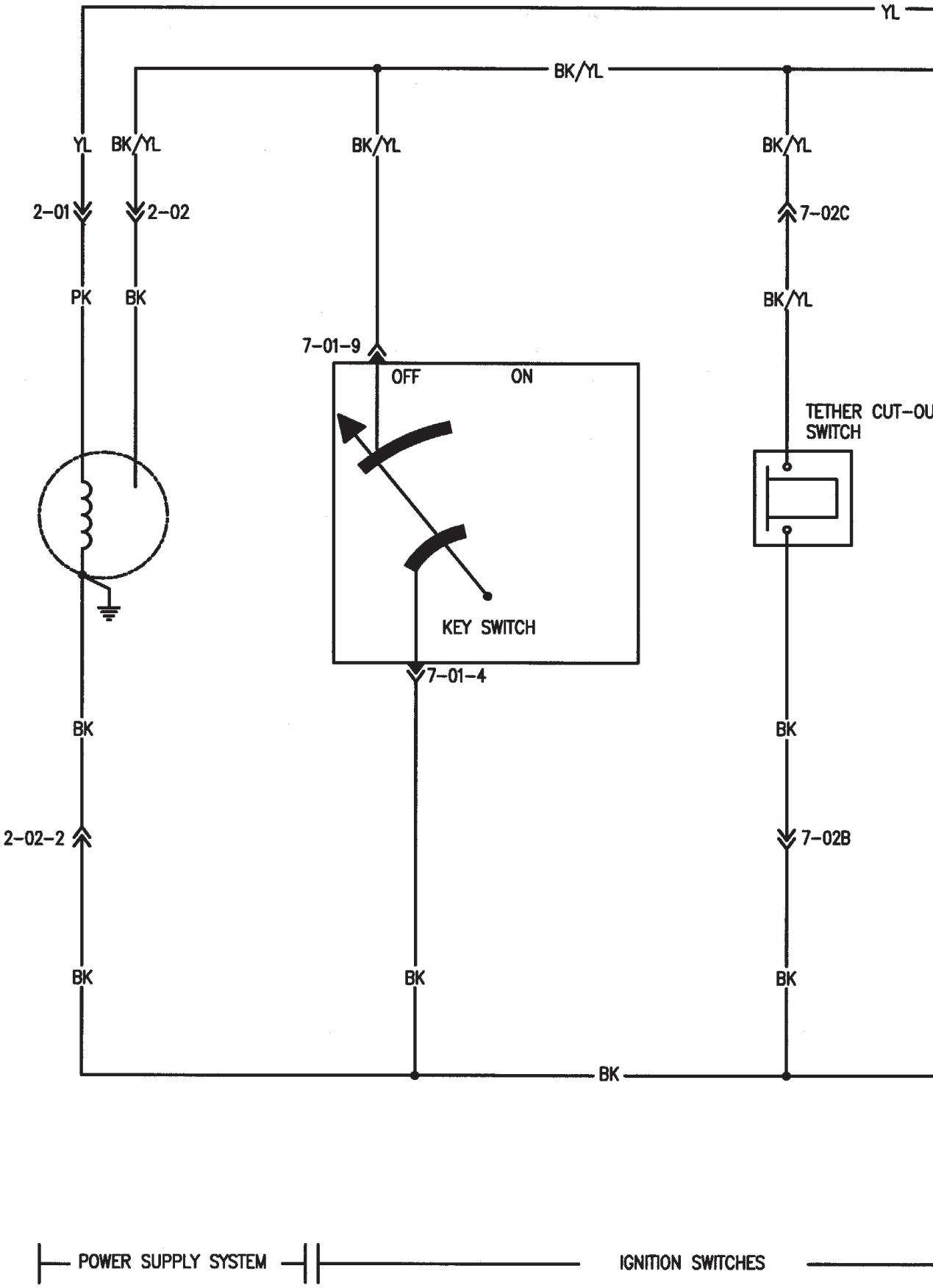
SYMBOLS DESCRIPTION

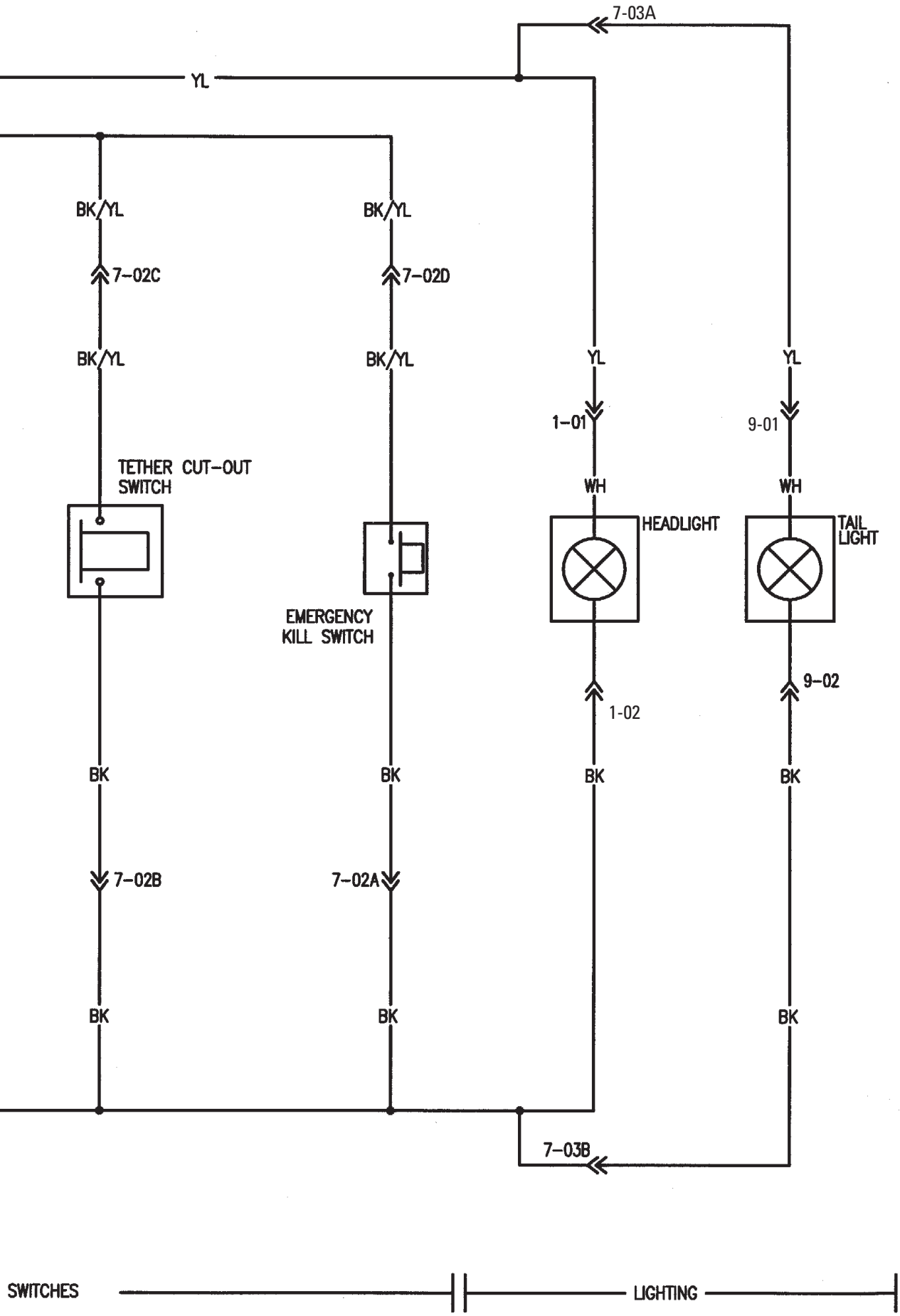
Beam and tail light 	Female terminal 	Male terminal 	Electronic module 
Meter 	Electric motor 	Low level sensor 	Buzzer 
Ignition coil 	Normally close switch 	Normally open switch 	Male terminal on instrument
Engine ground	Frame ground  Frame	Spark plug	Meter movement
Bulb 	Pilot lamp 	Analog sensor 	Solenoid valve 
Magneto (Delta)	3 position switch 	Heating element 	Fuse 
Trigger coil	Battery 	Diode 	

A00E52S

ANNEX 1 MINI Z

MINI Z


YL
BK/YL
YL
BK/YL
BK/YL
BK/YL
2-01
2-02
7-02C
PK
BK
BK/YL
7-01-9
OFF
ON
TETHER CUT-OU
SWITCH
KEY SWITCH
7-01-4
BK
BK
2-02-2
7-02B
BK
BK
BK
BK
POWER SUPPLY SYSTEM
IGNITION SWITCHES


7-03A
YL
BK/YL
7-02C
BK/YL
TETHER CUT-OUT SWITCH
BK
7-02B
BK
BK/YL
7-02D
BK/YL
EMERGENCY KILL SWITCH
BK
7-02A
BK
YL
1-01
WH
HEADLIGHT
1-02
BK
YL
9-01
WH
TAIL LIGHT
9-02
BK
BK
7-03B
SWITCHES
LIGHTING

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