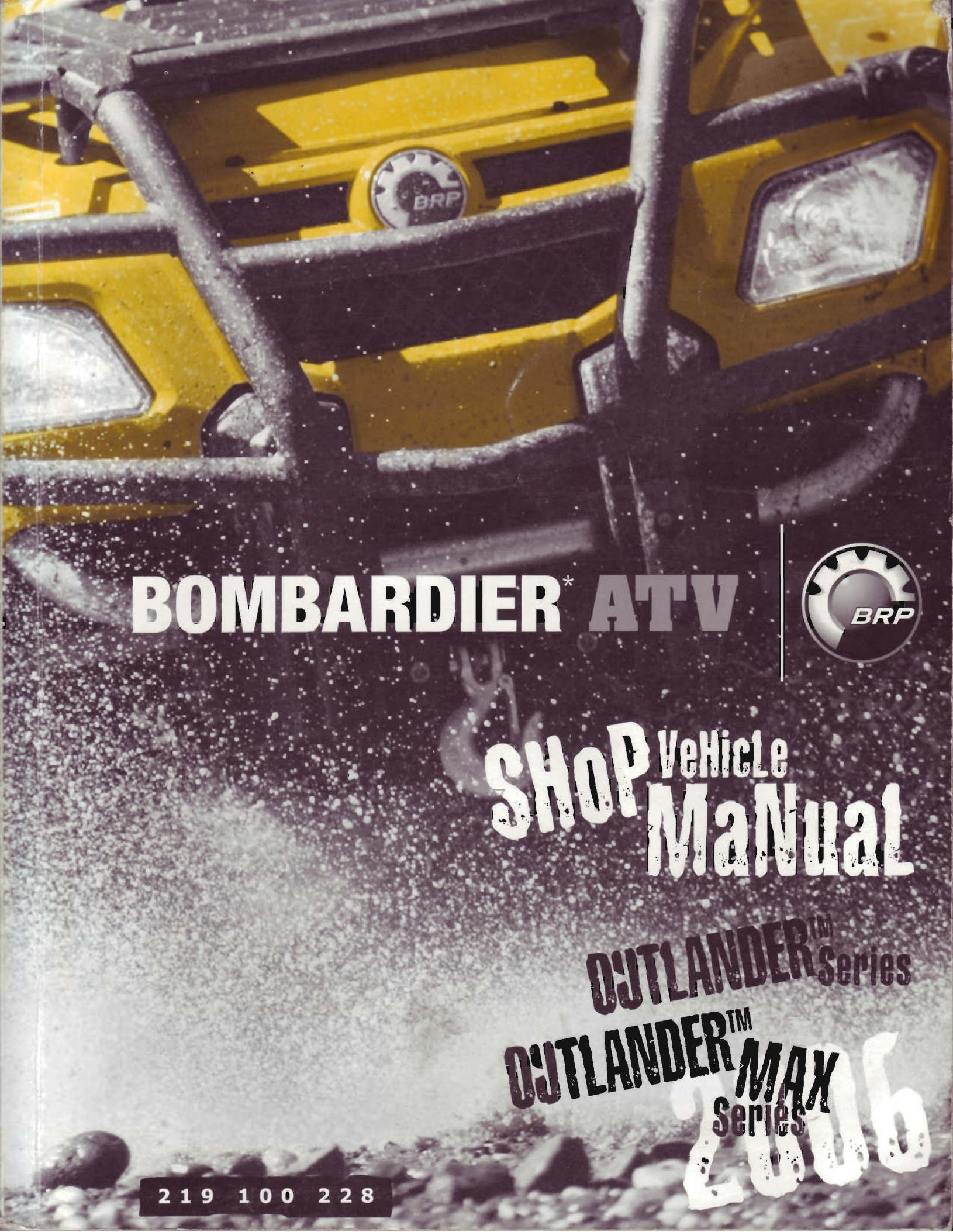


BOMBARDIER* ATV

SHOP VEHICLE MANUAL

OUTLANDER™ Series

OUTLANDER™ MAX Series

2006

219 100 228

2006
Vehicle Shop Manual

Outlander™ Series

BOMBARDIER® ATV

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SAFETY NOTICE

This manual has been prepared as a guide to correctly service and repair 2006 Outlander™ and Outlander™ MAX Series ATVs as describe in the model list in the *INTRODUCTION*.

This edition was primarily published to be used by mechanical technicians who are already familiar with all service procedures relating to BRP products. Mechanical technicians should attend training courses given by BRP Training Dept.

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

This Vehicle 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. It does not include dealer modifications, whether authorized or not by BRP, 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 BRP 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 for which it was designed.

⚠ WARNING

Unless otherwise specified, engine should be turned OFF and cold for all maintenance and repair procedures.

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.

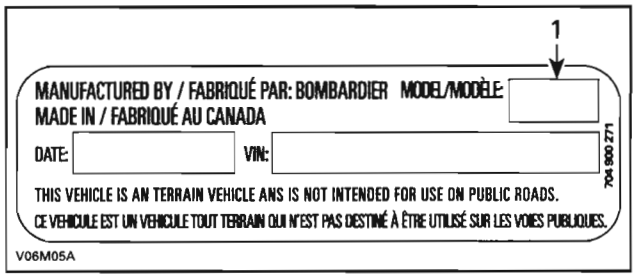
This information relates to the preparation and use of Bombardier ATV and has been utilized safely and effectively by BRP. However, BRP disclaims liability for all damages and/or injuries resulting from the improper use of the contents. We strongly recommend that any services be carried out and/or verified 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

GENERAL INFORMATION

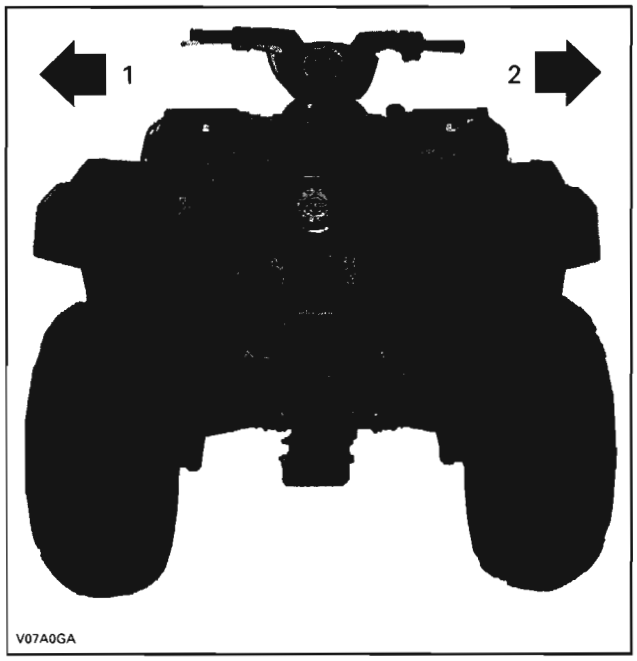
This Vehicle Shop Manual covers the following BRP made 2006 Outlander™ and Outlander™ MAX Series ATVs. It should be used in conjunction with the appropriate *ENGINE SHOP MANUAL*.

MODEL	MODEL NUMBER
Outlander ™ 400	All
Outlander™ XT 400	All
Outlander™ MAX 400	All
Outlander™ MAX XT 400	All
Outlander™ 800	All
Outlander™ XT 800	All
Outlander™ MAX 800	All
Outlander™ MAX XT 800	All



TYPICAL — VEHICLE SERIAL NUMBER LABEL
1. Model number

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



1. Left
2. Right

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

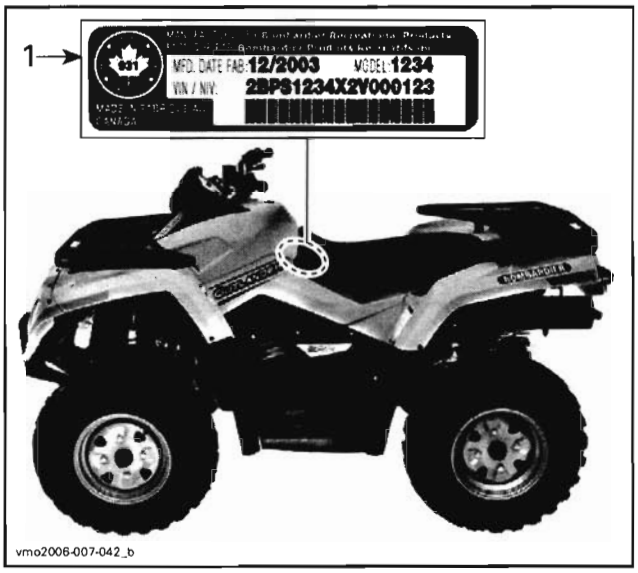
Due to late changes, there may be some differences between the manufactured product and the description and/or specifications in this document.

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

This Vehicle Shop Manual uses technical terms which may be different from the ones of the *PARTS CATALOGS*.

When ordering parts always refer to the specific model *PARTS CATALOGS*.

VEHICLE IDENTIFICATION NUMBER (V.I.N.)



TYPICAL
1. V.I.N. (Vehicle Identification Number)

ENGINE IDENTIFICATION NUMBER (E.I.N.)

Refer to the appropriate *ENGINE SHOP MANUAL*.

ARRANGEMENT OF THIS MANUAL, ILLUSTRATIONS AND PROCEDURES

The manual is divided into many major sections as you can see in the main table of contents at the beginning of the manual.

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

The illustrations 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.

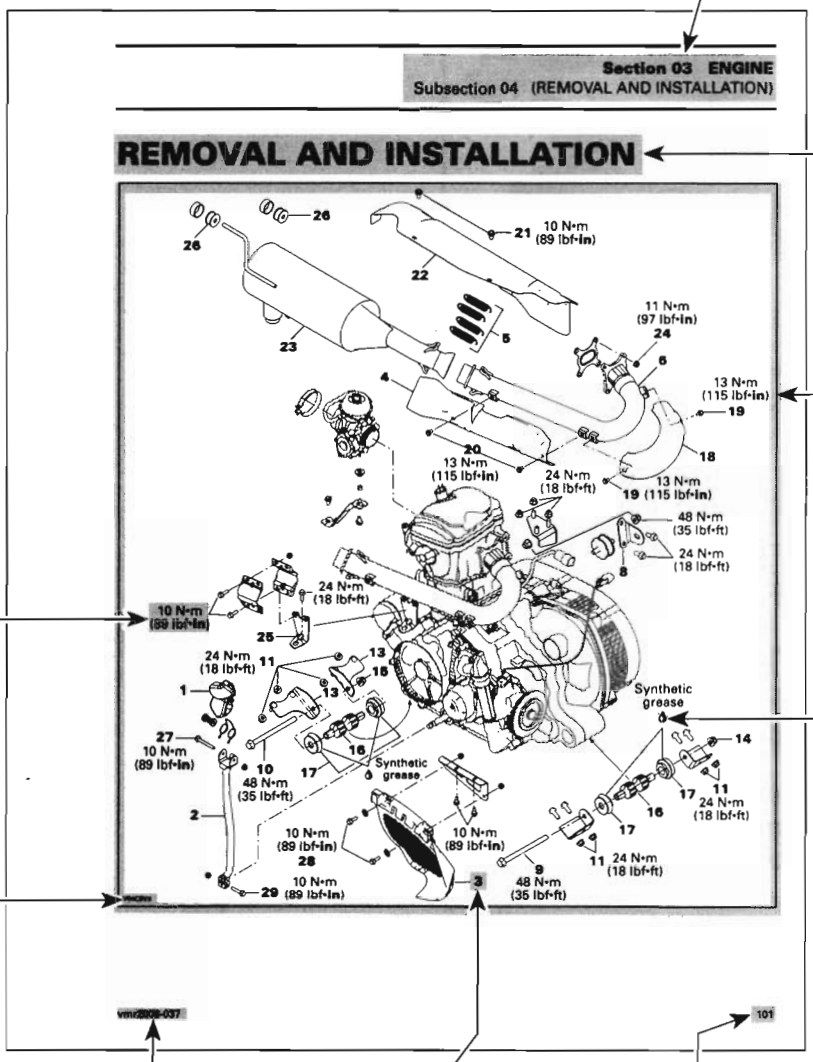
CAUTION: Most components in the vehicles are built with parts dimensioned in the metric system. Most fasteners are metric and must not be replaced by customary fasteners or vice-versa. Mismatched or incorrect fasteners could cause damage to the vehicle or possible personal injury.

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 starting any procedure, be sure that you have on hand all required tools, or approved equivalents.

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.

Exploded view assists you in identifying parts and related positions.

Tightening torque nearby fastener. In this case, nut must be torqued to 10 N•m or 89 lbf•**in**.

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

Drop represents a liquid product to be applied to a surface.

Illustration number for publishing process.

Document number for publishing process.

Bold face number indicates special procedure concerning this part.

Page number

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TYPICAL PAGE

Title indicates main procedure to be carried-out.

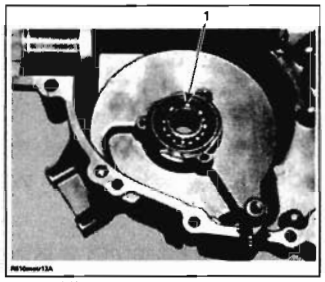
BEARING

Inspection

Ball bearing no. 10 must rotate freely. Othewise, replace it.

Removal

- Heat up the magneto housing cover to about 100°C (212°F) for an easy ball bearing removal.



Call-outs for above illustration.

Installation

For installation also heat the magneto housing up to about 100°C (212°F) to put ball bearing in place.

Place new ball bearing in freezer for 10 minutes approximately.

Reinstall other removed parts in the reverse order.

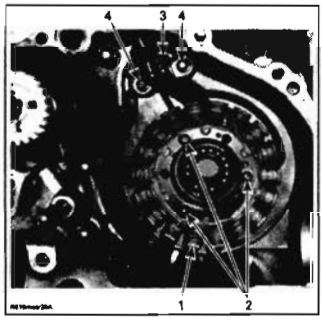
STATOR AND TRIGGER COIL

Removal

Remove.

- magneto housing cover
- screw no. 11 and 12
- stator with trigger coil no. 13.

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



1. Stator
2. Stator screws
3. Trigger coil
4. Trigger coil screws

Inspection

Check stator and trigger coil condition. If damaged replace the faulty part.

For electrical inspection, refer to CHARGING SYSTEM for the stator and for the trigger coil.

Reference to look up a certain section and subsection. In this case it concerns IGNITION SYSTEM.

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ENGINE EMISSIONS INFORMATION

Manufacturer's Responsibility

Manufacturers of ATVs engines must determine the exhaust emission levels for each engine horsepower family and certify these engines with the United States of America *ENVIRONMENTAL PROTECTION AGENCY (EPA).* An emissions control information label, showing emission levels and engine specifications, must be placed on each vehicle at the time of manufacture.

Dealer Responsibility

When performing service on ATVs that carry an emissions control information label, adjustments must be kept within published factory specifications.

Replacement or repair of any emission related component must be executed in a manner that maintains emission levels within the prescribed certification standards.

Dealers are not to modify the engine in any manner that would alter the horsepower or allow emission levels to exceed their predetermined factory specifications.

Exceptions include manufacturer's prescribed changes, such as altitude adjustments for example.

Owner Responsibility

The owner/operator is required to have engine maintenance performed to maintain emission levels within prescribed certification standards.

The owner/operator is not to, and should not allow anyone to modify the engine in any manner that would alter the horsepower or allow emissions levels to exceed their predetermined factory specifications.

EPA Emission Regulations

Some ATVs manufactured by BRP are certified to the EPA as conforming to the requirements of the regulations for the control of air pollution from new watercraft engines. This certification is contingent on certain adjustments being set to factory standards. For this reason, the factory procedure for servicing the product must be strictly followed and, whenever practicable, returned to the original intent of the design.

The responsibilities listed above are general and in no way a complete listing of the rules and regulations pertaining to the EPA requirements on exhaust emissions for ATVs products. For more detailed information on this subject, you may contact the following locations:

FOR ALL COURIER SERVICES:
U.S. Environmental Protection Agency
Office of Transportation and Air Quality
1310 L Street NW
Washington D.C. 20005

REGULAR US POSTAL MAIL:
1200 Pennsylvania Ave. NW
Mail Code 6403J
Washington D.C. 20460

INTERNET: http://www.epa.gov/otaq/

E-MAIL: otaqpublicweb@epa.gov

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.

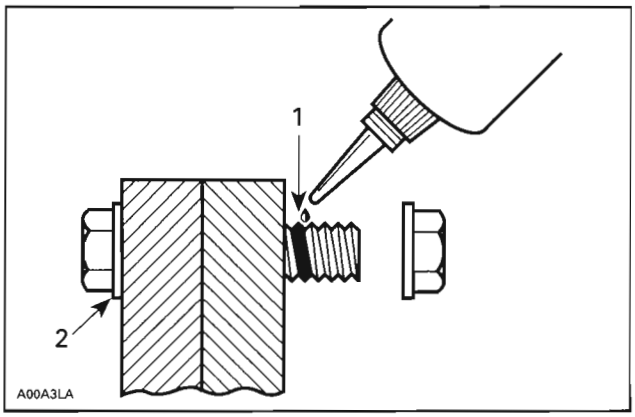
LOCTITE APPLICATION PROCEDURE

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

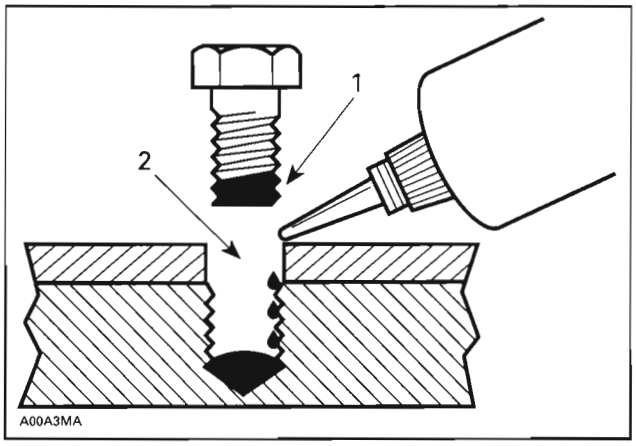
Uncovered Holes (bolts and nuts)



1. Apply here
2. Do not apply

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

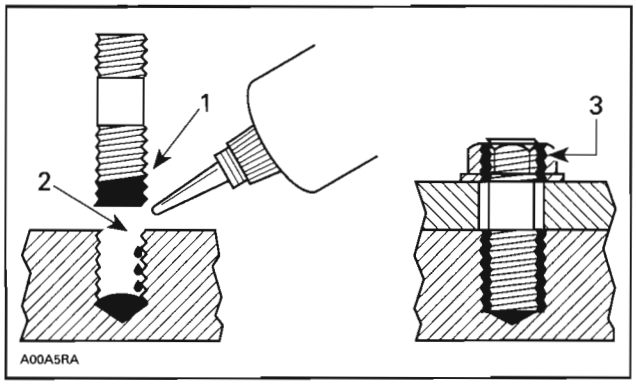
Blind Holes



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

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

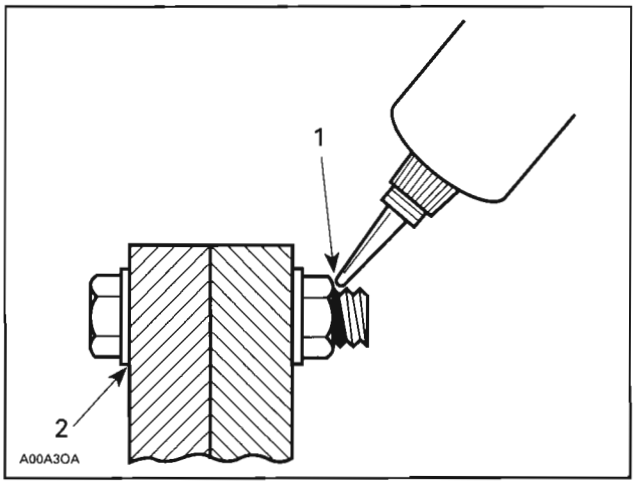
Stud in Blind Holes



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

- Clean threads (stud and hole) with solvent.
- Apply Loctite Primer N (P/N 293 800 041) on threads and allow to dry.
- Put several drops of proper strength Loctite threadlocker on female threads and in hole.
- Apply several drops of proper strength Loctite on stud threads.
- Install stud.
- Install cover, etc.
- Apply drops of proper strength Loctite on uncovered threads.
- Tighten nuts as required.

Preassembled Parts



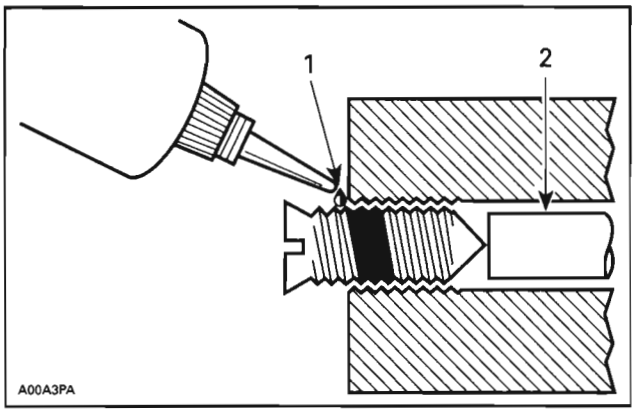
1. Apply here
2. Do not apply

- Clean bolts and nuts with solvent.
- Assemble components.
- Tighten nuts.
- Apply drops of proper strength Loctite on bolt/nut contact surfaces.

– 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

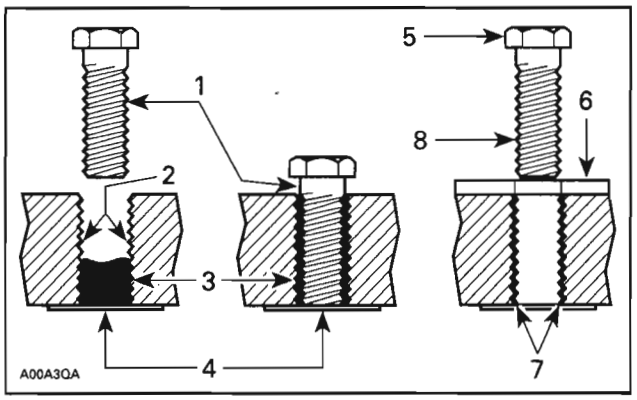


1. Apply here
2. Plunger

– Adjust screw to proper setting.
– Apply drops of proper strength Loctite threadlocker on screw/body contact surfaces.
– 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



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

Standard Thread Repair

– Follow instructions on Loctite FORM-A-THREAD 81668 package.
– 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.

– Twist bolt when inserting it to improve thread conformation.

NOTE: NOT intended for engine stud repairs.

Repair of Small Holes/Fine Threads

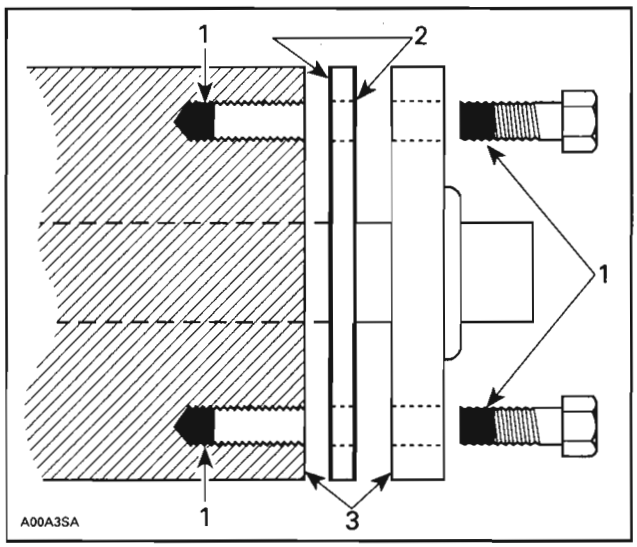
Option 1: Enlarge damaged hole, then follow *STANDARD THREAD REPAIR* procedure.

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

Permanent Stud Installation (light duty)

– Use a stud or thread on desired length.
– DO NOT apply release agent on stud.
– Do a STANDARD THREAD REPAIR.
– Allow to cure for 30 minutes.
– Assemble.

Gasket Compound



1. Proper strength Loctite
2. Loctite Primer N (P/N 293 800 041) and Gasket Eliminator 518 (P/N 293 800 038) on both sides of gasket
3. Loctite Primer N only

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

NOTE: Avoid grinding.

– Clean both mating surfaces with solvent.
– Spray Loctite Primer N on both mating surfaces and on both sides of gasket. Allow to dry 1 or 2 minutes.
– Apply GASKET ELIMINATOR 518 (P/N 293 800 038) on both sides of gasket, using a clean applicator.

– Place gasket on mating surfaces and assemble immediately.

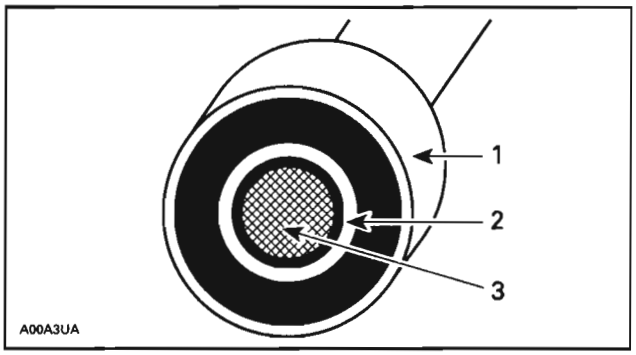
NOTE: If the cover is bolted to blind holes (above), apply proper strength Loctite in the hole and on threads. Tighten.

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

– Tighten as usual.

Mounting on Shaft

Mounting with a Press



1. Bearing
2. Proper strength Loctite
3. Shaft

– Clean shaft external part and element internal part.
– 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.

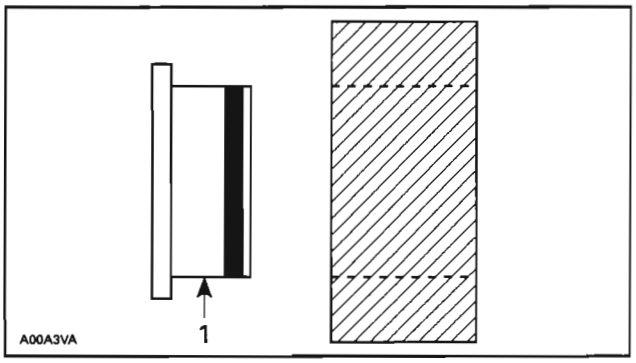
– DO NOT use anti-seize Loctite or any similar product.
– No curing period is required.

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

– Clean inner housing diameter and outer gasket diameter.
– Spray housing and gasket with Loctite Primer N (P/N 293 800 041).
– 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.

– Install according to standard procedure.
– Wipe off surplus.
– 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/or text, When they are not specified, refer to following table.

⚠ WARNING

Torque wrench tightening specifications must strictly be adhered to.
Locking devices (e.g.: locking tabs, elastic stop nuts, 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.

In order to avoid a poor assembling, tighten screws, bolts or nuts in accordance with the following procedure:

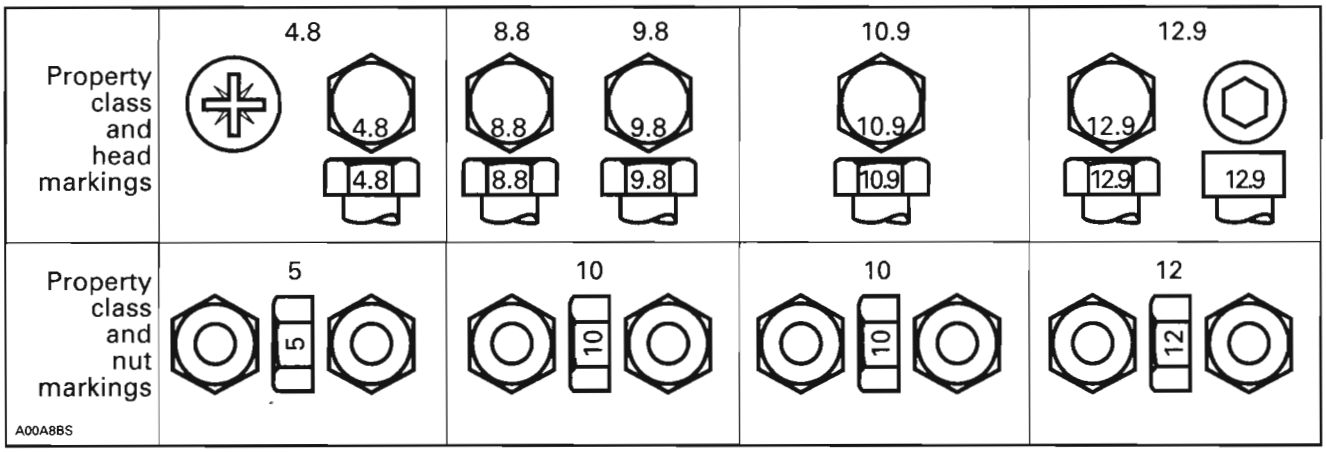
- Manually screw all screws, bolts and/or nuts.
- Apply the half of the recommended torque value.

CAUTION: Be sure to use the proper tightening torque for the proper strength grade.

NOTE: When possible, always apply torque on the nut.

- Torque to the recommended torque value.

NOTE: Always torque screws, bolts and/or nuts in a criss-cross sequence.



FASTENER SIZE	FASTENER GRADE/TORQUE			
	5.8 Grade	**8.8** Grade	**10.9** Grade	**12.9** Grade
M4	1.5 — 2 N•m (13 — 18 lbf•**in**)	2.5 — 3 N•m (22 — 27 lbf•**in**)	3.5 — 4 N•m (31 — 35 lbf•**in**)	4 — 5 N•m (35 — 44 lbf•**in**)
M5	3 — 3.5 N•m (27 — 31 lbf•**in**)	4.5 — 5.5 N•m (40 — 47 lbf•**in**)	7 — 8.5 N•m (62 — 75 lbf•**in**)	8 — 10 N•m (71 — 89 lbf•**in**)
M6	6.5 — 8.5 N•m (58 — 75 lbf•**in**)	8 — 12 N•m (71 — 106 lbf•**in**)	10.5 — 15 N•m (93 — 133 lbf•**in**)	16 N•m (142 lbf•**in**)
M8	15 N•m (11 lbf•ft)	24.5 N•m (18 lbf•ft)	31.5 N•m (23 lbf•ft)	40 N•m (30 lbf•ft)
M10	29 N•m (21 lbf•ft)	48 N•m (35 lbf•ft)	61 N•m (45 lbf•ft)	72.5 N•m (53 lbf•ft)
M12	52 N•m (38 lbf•ft)	85 N•m (63 lbf•ft)	105 N•m (77 lbf•ft)	127.5 N•m (94 lbf•ft)
M14	85 N•m (63 lbf•ft)	135 N•m (100 lbf•ft)	170 N•m (125 lbf•ft)	200 N•m (148 lbf•ft)

MAINTENANCE CHART

NOISE EMISSION CONTROL SYSTEM REGULATION

Tampering with noise control system is prohibited!

U.S. Federal law and Canadian provincial laws may prohibit the following acts or the causing there of:

1. The removal or rendering inoperative by any person other than for purposes of maintenance, repair or replacement of any device or element of design incorporated into any new vehicle for the purpose of noise control prior to its sale or delivery to the ultimate purchaser or while it is in use or,
2. The use of the vehicle after such device or element of design has been removed or rendered inoperative by any person.

Among those acts presumed to constitute tampering are the acts listed below:

1. Removal or alteration or the puncturing of the muffler or any engine component which conducts removal of engine exhaust gases.
2. Removal or alteration or the puncturing of any part of the intake system.
3. Replacing any moving parts of the vehicle or parts of the exhaust or intake system, with parts other than those specified by the manufacturer.
4. Lack of proper maintenance.

MAINTENANCE CHART

The schedule should be adjusted according to operating conditions and use.

NOTE: The chart gives an equivalence between number of hours and months/year. Perform the maintenance operation to whatever time comes first.

IMPORTANT: ATV rental operations or intensive use of ATV, will require greater frequency of inspection and maintenance.

Outlander 400 Series

OUTLANDER 400 SERIES						
A: ADJUST C: CLEAN I: INSPECT L: LUBRICATE R: REPLACE T: PROCEED WITH TASK	INITIAL INSPECTION 10 HOURS OR 300 KM (185 mi) (The initial maintenance is very important and must not be neglected.)	EVERY 25 HOURS OR 750 KM (470 mi)	EVERY 50 HOURS OR 1500 KM (930 mi)	EVERY 100 HOURS OR 3000 KM (1865 mi) OR 1 YEAR	EVERY 200 HOURS OR 6000 KM (3730 mi) OR 2 YEAR	
PART/TASK						**REFER TO**
ENGINE						
Engine/transmission oil and filter	R		R			*LUBRICATION*
Engine/transmission oil strainer cleaning					C	
Valve adjustment	I, A			I, A		*ENGINE SHOP MANUAL FOR ROTAX® 400*
Rewind starter rope condition				I		
Condition of engine seals	I			I		
Engine mount fasteners	I			I		*REMOVAL AND INSTALLATION*
Air filter (1)		C		R		*AIR INTAKE SILENCER*
Exhaust system	I			I		*EXHAUST SYSTEM*
Spark arrester				C		
Coolant	I			I (2)	R	*COOLING SYSTEM*
Radiator cap/cooling system pressure test	T				T	
Radiator condition/cleanliness (radiator fins)	I		I			
FUEL SYSTEM						
Throttle cable	I, A		I, A, L			*CARBURETOR*
Carburetor	I			I, L		
Choke	I			I, A		
Fuel lines, connections and fuel tank pressure test (4)	I			I		*FUEL TANK AND FUEL PUMP*
Fuel tank strainers					R	
ELECTRICAL SYSTEM						
Spark plug (3) (4)	I			R		*IGNITION SYSTEM*
Battery connections	I		I			*CHARGING SYSTEM*
Wiring harness, cables and lines	I			I		*LIGHTS, INSTRUMENTS AND ACCESSORIES*
Condition of ignition switch, start button and engine stop switch	I			I		
Condition of lighting system (HI/LO intensity, brake light, beam aiming, etc.)	I			I		
Winch connections	Refer to *ATV WINCH OPERATOR'S MANUAL*					N.A.

OUTLANDER 400 SERIES						
A: ADJUST C: CLEAN I: INSPECT L: LUBRICATE R: REPLACE T: PROCEED WITH TASK	INITIAL INSPECTION 10 HOURS OR 300 KM (185 mi) (The initial maintenance is very important and must not be neglected.)	EVERY 25 HOURS OR 750 KM (470 mi)	EVERY 50 HOURS OR 1500 KM (930 mi)	EVERY 100 HOURS OR 3000 KM (1865 mi) OR 1 YEAR	EVERY 200 HOURS OR 6000 KM (3730 mi) OR 2 YEAR	REFER TO
TRANSMISSION						
Drive belt				I		*CVT*
Drive and driven pulleys				I, C		
One-way bearing inside CVT				I, L		
CVT air inlet	I		I, C			
DRIVE TRAIN						
4 x 4 coupling unit	I			I		*4 X 4 COUPLING UNIT*
Drive shaft boots and protectors	I	I				*FRONT DRIVE AND REAR DRIVE*
Rear propeller shaft joints (1)	I		I, L			
Drive shaft joints			I			
Wheel bearings				I		
Wheel nuts/studs	I		I			
Tire wear and pressure	Every inspection					
Front and rear differentials oil level, seals and vents	I		I		R	
STEERING SYSTEM						
Handlebar fastener				I		*STEERING SYSTEM*
Steering system mechanism (1)	I			I		
Tie rod ends			I			
Front wheel alignment	I			I, A		
SUSPENSION						
Trailing arms				I		*REAR SUSPENSION*
Trailing arm bearings					I	
Shock absorbers			I			
A-arms			I			*FRONT SUSPENSION*
McPherson struts			I			
Ball joints		I				
BRAKES						
Brake fluid	I	I			R	*HYDRAULIC BRAKES*
Brake system (discs, hoses, etc.)				I		
Brake pads		I				

OUTLANDER 400 SERIES						
A: ADJUST C: CLEAN I: INSPECT L: LUBRICATE R: REPLACE T: PROCEED WITH TASK	**INITIAL INSPECTION 10 HOURS OR 300 KM (185 mi) (The initial maintenance is very important and must not be neglected.)**	**EVERY 25 HOURS OR 750 KM (470 mi)**	**EVERY 50 HOURS OR 1500 KM (930 mi)**	**EVERY 100 HOURS OR 3000 KM (1865 mi) OR 1 YEAR**	**EVERY 200 HOURS OR 6000 KM (3730 mi) OR 2 YEAR**	
PART/TASK						**REFER TO**
BODY/FRAME						
Frame fastener			I			*BODY AND FRAME*
Hitch/trailer ball condition (if installed)	I		I			
Seat fasteners			I			
Frame				I		
Vehicle cleaning and protection	Every inspection					
Storage cover latches	Every inspection					
Grab handles	Every inspection					
Backrest	Every inspection					

(1) More often under severe use such as dusty area, sand, snow, wet or muddy conditions.

(2) Every 100 hours, check coolant strength.

(3) Make sure that the spark plug gap is correct.

(4) Emission-related component.

N.A.: Not Applicable.

Outlander 800 Series

OUTLANDER 800 SERIES						
A: ADJUST C: CLEAN I: INSPECT L: LUBRICATE R: REPLACE T: PROCEED WITH TASK	**INITIAL INSPECTION 10 HOURS OR 300 KM (185 mi)** **(The initial maintenance is very important and must not be neglected.)**					
		EVERY 25 HOURS OR 750 KM (470 mi				
			EVERY 50 HOURS OR 1500 KM (930 mi)			
				EVERY 100 HOURS OR 3000 KM (1865 mi) OR 1 YEAR		
					EVERY 200 HOURS OR 6000 KM (3730 mi) OR 2 YEAR	
PART/TASK						**REFER TO**
Engine						
Engine oil and filter	R			R		*LUBRICATION*
Engine oil strainer					C	
Valve adjustment	I, A			I, A		*ENGINE SHOP MANUAL FOR ROTAX® V-810*
Condition of engine seals	I			I		
Engine mount fasteners	I			I		*REMOVAL AND INSTALLATION*
Air filter (1)		C	R			*AIR INTAKE SILENCER*
Exhaust system	I			I		*EXHAUST SYSTEM*
Spark arrester				C		
Coolant	I			I (2)	R	*COOLING SYSTEM*
Radiator cap/cooling system pressure test	T				T	
Radiator condition/cleanliness (radiator fins)	I		I			
ENGINE MANAGEMENT SYSTEM						
Sensors (4)	I			I		*ENGINE MANAGEMENT*
Fault code reading (4)				I		
FUEL SYSTEM						
Throttle body	I			I,L		*ENGINE MANAGEMENT*
Throttle cable	I, A		I, A, L			
Fuel lines, fuel rail, connections, check valves and fuel tank pressure test (4)	I				I	*FUEL TANK AND FUEL PUMP*
In-line fuel filter				R		
Fuel pump pressure test				T		
ELECTRICAL SYSTEM						
Spark plug (3) (4)	I				R	*IGNITION SYSTEM*
Battery connections	I		I			*CHARGING SYSTEM*
ECM connectors				I		*ELECTRICAL CONNECTORS*
Electrical connections and fastening (ignition system, starting system, fuel injectors etc.)	I			I		
Digitally Encoded Security System	I			I		*DIGITALLY ENCODED SECURITY SYSTEM*
Condition of start button and engine stop switch	I			I		*LIGHTS, INSTRUMENTS AND ACCESSORIES*
Condition of lighting system (HI/LO intensity, brake light, beam aiming, etc.)	I			I		
Winch connections	Refer to *ATV WINCH OPERATOR'S MANUAL*					N.A.

OUTLANDER 800 SERIES						
A: ADJUST C: CLEAN I: INSPECT L: LUBRICATE R: REPLACE T: PROCEED WITH TASK	INITIAL INSPECTION 10 HOURS OR 300 KM (185 mi) (The initial maintenance is very important and must not be neglected.)	EVERY 25 HOURS OR 750 KM (470 mi	EVERY 50 HOURS OR 1500 KM (930 mi)	EVERY 100 HOURS OR 3000 KM (1865 mi) OR 1 YEAR	EVERY 200 HOURS OR 6000 KM (3730 mi) OR 2 YEAR	
PART/TASK						**REFER TO**
TRANSMISSION						
Drive belt				I		*CVT*
Drive and driven pulleys				I, C		
One-way bearing inside CVT				I, L		
CVT air inlet	I		I, C			
Gearbox oil (1)	R			I	R	*GEARBOX*
4 x 4 coupling unit	I			I		
DRIVE TRAIN						
Drive shaft boots and protectors	I	I				*FRONT DRIVE AND REAR DRIVE*
Rear propeller shaft joints (1)	I		I, L			
Drive shaft joints			I			
Wheel bearings				I		
Wheel nuts/studs	I		I			
Tire wear and pressure	Every inspection					
Front and rear differentials oil level, seals and vents	I		I		R	
STEERING SYSTEM						
Handlebar fastener				I		*STEERING SYSTEM*
Steering system mechanism (2)	I			I		
Tie rod ends			I			
Front wheel alignment	I			I, A		
SUSPENSION						
Trailing arms				I		*REAR SUSPENSION*
Trailing arm bearings					I	
Shock absorbers			I			*FRONT AND REAR SUSPENSION*
A-arms			I			*FRONT SUSPENSION*
Ball joints		I				
BRAKES						
Brake fluid	I	I			R	*HYDRAULIC BRAKES*
Brake system (discs, hoses, etc.)				I		
Brake pads		I				

OUTLANDER 800 SERIES						
A: ADJUST C: CLEAN I: INSPECT L: LUBRICATE R: REPLACE T: PROCEED WITH TASK	**INITIAL INSPECTION 10 HOURS OR 300 KM (185 mi)** **(The initial maintenance is very important and must not be neglected.)**	**EVERY 25 HOURS OR 750 KM (470 mi**	**EVERY 50 HOURS OR 1500 KM (930 mi)**	**EVERY 100 HOURS OR 3000 KM (1865 mi) OR 1 YEAR**	**EVERY 200 HOURS OR 6000 KM (3730 mi) OR 2 YEAR**	
PART/TASK						**REFER TO**
BODY/FRAME						
Frame fastener			I			*BODY AND FRAME*
Hitch/trailer ball condition (if installed)	I		I			
Seat fasteners			I			
Frame				I		
Vehicle cleaning and protection	Every inspection					
Storage cover latches	Every inspection					
Grab handles	Every inspection					
Backrest	Every inspection					

(1) More often under severe use such as dusty area, sand, snow, wet or muddy conditions.

(2) Every 100 hours, check coolant strength.

(3) Make sure that the spark plug gap is correct.

(4) Emission-related component.

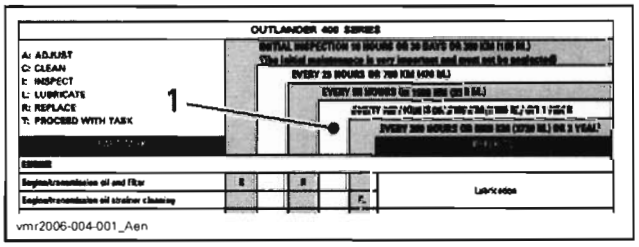
N.A.: Not Applicable.

PRESEASON PREPARATION

Prior to use vehicle, proper vehicle preparation is required if vehicle was not used for more than four consecutive months or after performing the storage procedure.

Any worn, broken or damaged parts found during the storage procedure should have been replaced. If not, proceed with the replacement.

Using the maintenance chart, performed items in the column indicated: EVERY 100 HOURS OR 3000 KM (1865 MI) OR 1 YEAR.



1. Use this column

Furthermore, proceed with the following:

Vehicles Prepared as per Storage Procedure

- Remove rags from: CVT inlet and outlet hoses, engine air intake and muffler.
- Test drive vehicle to confirm proper operation.

Vehicles Not Prepared as per Storage Procedure

- Replace engine oil and filter.
- Drain fuel tank and fill with fresh fuel.
- Test drive vehicle to confirm proper operation.

STORAGE PROCEDURES

SERVICE PRODUCTS

Description	Part Number	Page
Bombardier Cleaner (4 L)	293 110 002	11
Bombardier Cleaner (400 g)	293 110 001	11
BOMBARDIER LUBE	293 600 016	11, 13
Bombardier Vinyl & Plastic Cleaner	413 711 200	11
fuel stabilizer	413 408 600	11
storage oil (US)	413 711 900	11–12
storage oil	413 711 600	11–12

If the ATV is to be stored for an extended period of time, more than 1 month, be sure to thoroughly check the vehicle for repairs and have them performed.

VEHICLE CLEANING

To facilitate the inspection and ensure adequate lubrication of components, it is recommended to clean the entire vehicle.

Wash and dry the vehicle.

CAUTION: Never use a high pressure washer to clean the vehicle. USE LOW PRESSURE ONLY (like a garden hose). The high pressure can cause electrical or mechanical damages.

Remove any dirt or rust.

To clean the vinyl or plastic parts, use only flannel clothes with Bombardier Vinyl & Plastic Cleaner (P/N 413 711 200).

CAUTION: It is necessary to use flannel cloths on plastic parts to avoid damaging surfaces. Never clean plastic parts with strong detergent, degreasing agent, paint thinner, acetone, products containing chlorine, etc.

To clean the entire vehicle, including metallic parts use Bombardier Cleaner (400 g) (P/N 293 110 001) or Bombardier Cleaner (4 L) (P/N 293 110 002).

Inspect the vehicle 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).

FUEL STABILIZER

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

CAUTION: Fuel stabilizer should be added prior to engine lubrication to protect fuel components (carburetor or injectors) against varnish deposits.

Pour fuel stabilizer in fuel tank. Fill up fuel tank.

Do not drain fuel system.

ENGINE LUBRICATION

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

⚠ WARNING

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

Proceed as follows:

- Start the engine and allow it to run at idle speed until the engine reaches its operating temperature.
- Stop the engine.
- Change engine oil and filter. Refer to *LUBRICATION SYSTEM*.

Outlander 400 Series

- Remove air box cover and air filter to spray storage oil (P/N 413 711 600) into carburetor bore.

NOTE: For US citizens, use storage oil (US) (P/N 413 711 900) only.

- 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 a quarter of can).
- Remove spark plug(s) and spray storage oil into cylinder. Press start button, 1 or 2 seconds maximum, to lubricate cylinder.

- Stop the engine and remove the battery. Store it in dry and cool place out of the sun, refer to *BATTERY* in *CHARGING SYSTEM*.
- Reinstall the spark plug(s), air filter and air box cover.
- Turn the fuel valve to OFF and drain carburetor.

Outlander 800 EFI Series

- Remove spark plugs and spray storage oil (P/N 413 711 600) into each cylinder.

NOTE: For US citizens, use storage oil (US) (P/N 413 711 900) only.

CAUTION: Do not inject storage oil into throttle body bore to avoid blocking idle bypass valve.

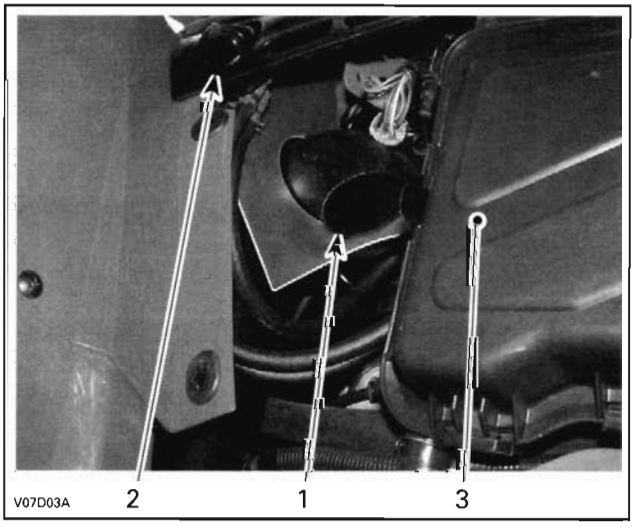
- Press start button, 1 or 2 seconds maximum, to lubricate cylinders.
- Reinstall the spark plugs.
- Remove the battery. Store it in dry and cool place out of the sun, refer to *BATTERY* in *CHARGING SYSTEM*.

RAGS INSTALLATION

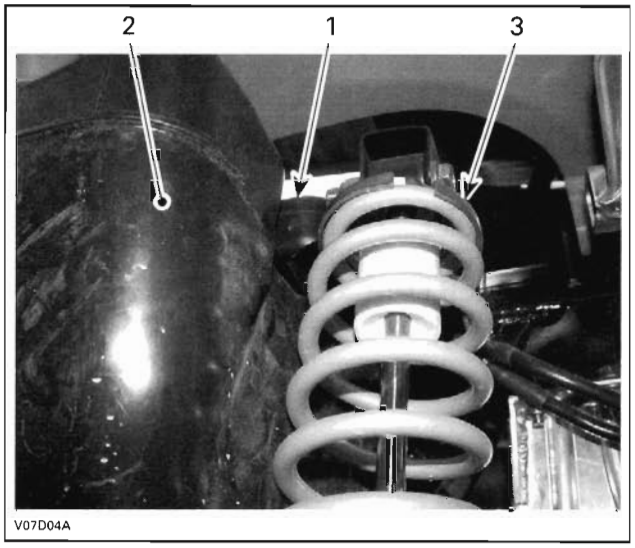
Using cleans rags, block the following locations: CVT inlet and outlet hoses, air intake inlet and muffler. The rags will prevent the intrusion of small animals, leaves or other debris.

CAUTION: Do not forget, these rags must be removed during preseason preparation before starting the vehicle.

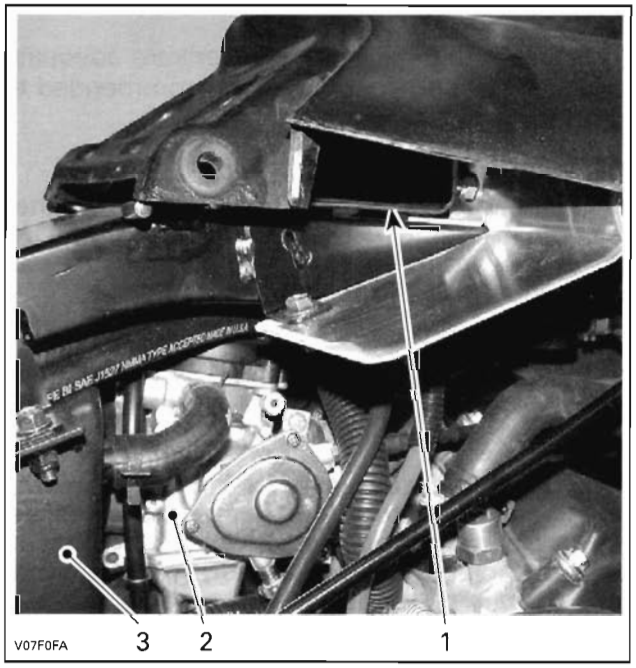
Outlander 400 Series



CVT INLET HOSE
1. *CVT inlet hose*
2. *Fuel valve*
3. *Air filter box cover*



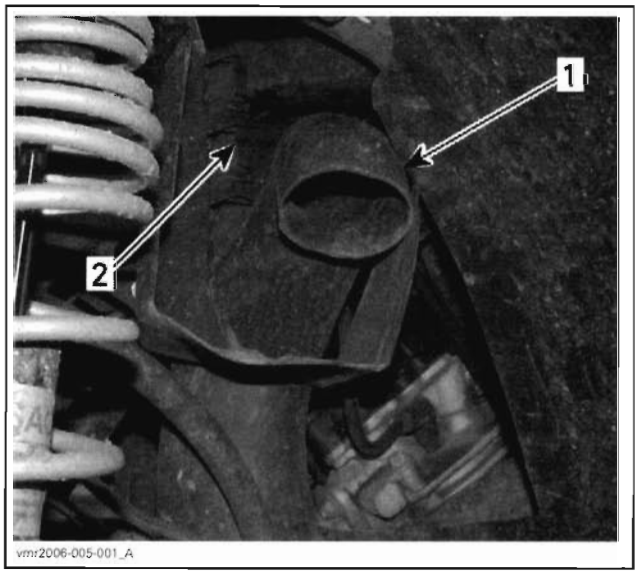
CVT OUTLET HOSE
1. *CVT outlet hose*
2. *Fuel tank*
3. *LH rear shock absorber*



AIR INTAKE INLET
1. *Air intake inlet*
2. *Carburetor*
3. *Air filter box*

Outlander 800 EFI Series

To reach the CVT inlet hose and the air intake inlet, remove the front inner fender on the left side of vehicle.



1. CVT inlet hose
2. Air intake inlet

The CVT outlet hose is located at the rear of engine, against vertical frame beam. The removal of the left side panel is necessary to reach the hose.

COOLANT DENSITY

Test coolant density using an antifreeze hydrometer.

NOTE: Follow manufacturer's instructions for proper use.

A 50/50 mixture of antifreeze and distilled water will provide the optimum cooling, corrosion protection and antifreeze protection.

CAUTION: Do not use tap water, straight antifreeze or straight water in the system. Tap water contains minerals and impurities which build up in the system. Straight water will cause the system to freeze while straight antifreeze will cause system temperature problems.

Change coolant if necessary. Refer to *COOLING SYSTEM*.

DRIVE AND DRIVEN PULLEYS PROTECTION

Remove drive belt from pulleys.

Inspect and clean pulleys then spray BOMBARDIER LUBE (P/N 293 600 016) on pulley faces.

Do not reinstall drive belt. Close CVT cover.

VEHICLE PROTECTION

Protect the vehicle with a cover to prevent dust accumulation during storage.

CAUTION: The vehicle 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.

SPECIAL PROCEDURES

SERVICE PRODUCTS

Description	Part Number	Page
BOMBARDIER LUBE	293 600 016	15–16

TURN OVER

If the oil pressure light (**Outlander 400 Series**) or the check engine indicator light (**Outlander 800 EFI Series**) stays ON after starting engine and the engine oil level is good, check the following:

- Oil filter for contamination.
  - Replace oil filter and oil.
- Oil pressure regulator valve stays open in the crankcase due to contamination (metallic particles).
  - Clean and/or replace the valve.
- Valve piston stuck in the oil pump housing.
  - Repair valve piston.
- Oil pressure switch for damages.
  - Replace it if necessary.
- Oil pump cleanliness and working.
  - Clean and/or replace oil pump if necessary.
- Oil strainer cleanliness and damages.
  - Clean and/or replace oil strainer.

ATV IMMERSION

ATV Submerged for a Long Time (over one hour)

Disassemble engine and transmission to clean the internal parts and check if there is no rust or corrosion on any internal parts. Refer to the specific *ENGINE SHOP MANUAL*.

Drain air box then clean and dry air filter.

Remove muffler and empty it. Let muffler dry then reinstall it on the vehicle.

Flush fuel tank and refill with new gas.

Clean carburetor (**Outlander 400 Series**) or lubricate throttle body (**Outlander 800 EFI Series**). Refer to *CARBURETOR* or *ENGINE MANAGEMENT*.

Look for water in:

- brake system (replace brake fluid)
- differentials (drain oil and check internal parts for rust or corrosion then refill).

Lubricate all cables. Check if the cables operate properly.

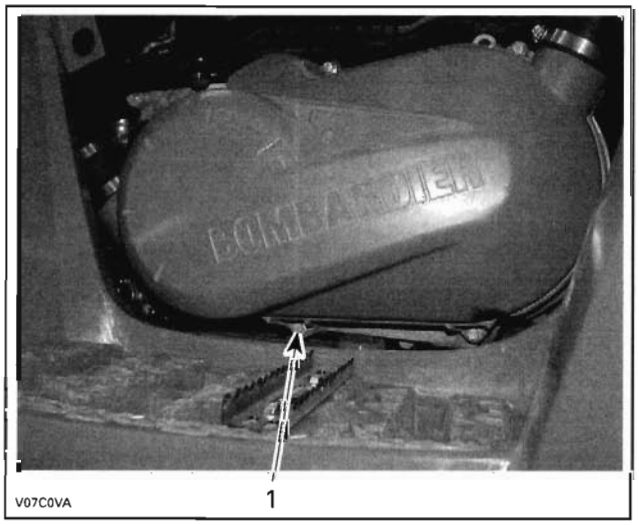
Spray all metal parts with BOMBARDIER LUBE (P/N 293 600 016).

Test drive to confirm all is working well (electrical and mechanical components).

ATV Submerged for a Short Time (fewer one hour)

Check if engine oil is contaminated (oil will be milky). If so, perform the following instructions.

- Drain engine oil.
- Drain air box then clean and dry air filter.
- Look for water in fuel tank, in doubt, flush fuel tank and refill with new gas.
- Drain the CVT housing. Remove the CVT cover then clean and check all parts of CVT. Refer to *CVT*.



OUTLANDER 400 SHOWN
1. CVT cover drain plug

- Lubricate all cables. Check if the cables operate properly.
- Remove spark plug(s) then crank engine slowly several times.

- Add a small quantity of engine oil in cylinder(s) (approximately 2 teaspoonfuls). Do not reinstall spark plug(s) at this moment.
- Refill engine at the proper level with the recommended oil. Crank engine several times.
- Check condition of spark plug. If spark plug appears good reinstall it, if not install a new one. On **Outlander 800 EFI Series**, check both spark plugs.
- Start the engine and allow it to run at idle speed until the engine reaches its operating temperature.
- Stop the engine.
- Change engine oil and filter.

NOTE: Change oil as many times as necessary, until there is no white appearance in engine oil.

Spray all metal parts with BOMBARDIER LUBE (P/N 293 600 016).

Test drive to confirm all is working well (electrical and mechanical components).

TROUBLESHOOTING CHART

OUTLANDER 400 SERIES

The following charts are provided to help in diagnosing the probable source of troubles. It should be used as a guideline. This section pertains to engine mechanical components only. Some related problems can come from other systems such as ignition system, fuel system, etc. and have an impact on the engine. Ensure to check the other systems prior to concluding that the engine is in fault.

COOLING SYSTEM

SYMPTOM	HIGH ENGINE OPERATING TEMPERATURE.
CONDITION	NORMAL USE.
Test/Inspection	1. Check coolant level. a. Coolant less than recommended level. Refill.
	2. Check temperature sensor for electrical/mechanical failure. a. Temperature sensor defective. Replace.
	3. Check thermostat. a. Thermostat defective. Replace.
	4. Check gasket(s) underneath water pump cover. a. Leakage in water pump cover area. Retighten screws and/or replace gasket.
	5. Check leak indicator hole (water pump housing area MAG side) if coolant leaks. a. Coolant leaking from leak indicator hole means a damaged rotary seal inside magneto cover. Replace both rotary seal and oil seal (refer to *COOLING SYSTEM* and *MAGNETO SYSTEM*).
	6. Check coolant bleeding screw on thermostat housing. a. Screw is loosed/missing and/or gasket ring is missing/broken. Retighten/add screw and replace gasket ring.
	7. Check condition of hoses and hose clamps fixation. a. Hoses are brittle and/or hard. Replace. b. Hose clamps are loose. Retighten clamps.
	8. Check condition of impeller located on the water pump shaft. a. Impeller wings broken and/or impeller thread is damaged. Replace.
	9. Check coolant drain screw on water pump housing MAG side (marked "Drain"). a. Copper ring on drain screw leaks. Retighten screw and/or replace copper gasket ring.

SYMPTOM	HIGH ENGINE OPERATING TEMPERATURE.
CONDITION	NORMAL USE.
	10. Check cooling fan and connection. a. Fan motor faulty. Replace. b. Wire harness is brittle or hard (no connection). Replace.
	11. Check cylinder head and/or cylinder base gasket. a. Worn out gasket(s) is (are) causing water leakage. Replace gasket(s) and refill with coolant and oil (refer to *COOLING/LUBRICATION SYSTEM* and *TECHNICAL DATA*).
	12. Check intermediate gear(s) behind magneto cover. a. Worn out and/or broken gear(s) is (are) causing less coolant supply. Replace worn out and/or broken gear(s) (refer to *LUBRICATION/MAGNETO SYSTEM*).
	13. Check radiator fan switch and fuse 20 A. a. Faulty fan switch and/or faulty fuse. Replace defective part(s).
	14. Check radiator condition for leakage. a. Radiator cracked or deformed. Replace radiator.
	15. Check mud/dust in radiator fins. a. Radiator fin obstructed, hard air cooling. Clean radiator fins.
	16. Check if water pump shaft is seized. a. Water pump shaft does not turn. Replace defective part(s).

MAGNETO SYSTEM

SYMPTOM	NO SPARK.
CONDITION	NORMAL USE.
Test/Inspection	1. Check engine stop switch position. a. Engine stop switch is in OFF position. Place engine stop switch to RUN position.
	2. Check battery. a. Battery shows less power. Reload battery. b. Battery has electrical failure. Replace battery.
	3. Check condition of fuse(s). a. Faulty fuse(s). Replace.

SYMPTOM	NO SPARK.
CONDITION	NORMAL USE.
	4. Check spark plug electrode condition. a. Gap is too big. Readjust gap (refer to *TECHNICAL DATA*). b. Spark plug condition is bad. Diagnose spark plug condition and replace it (refer to *IGNITION SYSTEM*).
	5. Check spark plug cable and ignition wire. a. Cable and/or ignition wire is (are) damaged and/or shows electrical failure. Replace damaged part(s).
	6. Check ignition coil for damage and/or electrical failure. a. Ignition coil damaged and/or resistance value out of specification (refer to *TECHNICAL DATA*). Replace ignition coil. b. Connector is corroded or ignition coil shows electrical failure. Clean connector area and/or replace ignition coil. c. Wire harness is brittle or hard (no connection). Replace.
	7. Check CPS (crankshaft position sensor) for damage and/or electrical failure. a. Sensor shows electrical failure and/or damages. Replace CPS. b. Connector is corroded. Clean and reconnect. c. Resistance value is out of specification (refer to *TECHNICAL DATA*). Replace CPS.
	8. Check wire harness for cracks or other damages. a. Harness shows electrical failure and/or other damages. Replace wire harness and/or damaged wire section.
	9. Check magneto for damage and/or electrical failure. a. Radial position of rotor wrong due to a broken Woodruff key. Replace Woodruff key. b. Connector on magneto is damaged and/or has electrical failure. Repair and clean contacts of connector. c. Coating on stator winding is damaged. Replace magneto. d. Resistance value is out of specification (refer to *TECHNICAL DATA*). Replace magneto.
	10. Check electronic module. a. Module shows electrical failure or damages. Replace electronic module. b. Connectors are corroded. Clean and reconnect. c. Electronic module has bad ground to the vehicle frame. Clean metal surface for good ground.

LUBRICATION

SYMPTOM	LOW OR NO OIL PRESSURE/HIGH OIL CONSUMPTION.
CONDITION	NORMAL USE.
Test/Inspection	1. Check oil level and search for leakage on crankcase and/or defective seals. a. Crankcase is leaking due to damage. Rebuild engine with new crankcase and gasket parts. Use a high quality oil (refer to *TECHNICAL DATA*). b. Crankcase is leaking due to loose screws. Retighten screws with recommended torque. c. Sealing rings, O-rings and/or gaskets are brittle and/or hard or damaged. Replace damaged parts. d. Piston rings worn out (blue-colored engine exhaust emission). Replace piston rings (refer to *CYLINDER AND HEAD*). e. Piston rings are broken (low compression and blue-colored engine exhaust emission). Replace piston rings (refer to *CYLINDER AND HEAD*). f. Valve stem seal damaged and/or sealing lip is hard and/or brittle. Replace all valve stem seals.
	2. Check oil filter for contamination. a. Oil filter clogged. Replace oil filter and oil at the same time. Use a high quality oil (refer to *TECHNICAL DATA*).
	3. Check oil pressure regulator valve (spring) function. a. Valve spring damaged (valve always open). Replace spring. b. Valve stays open in crankcase PTO due to contamination (metallic particles). Clean and/or repair valve piston.
	4. Check oil drain plug on engine bottom. a. Plug is loosed and/or gasket ring is missing. Retighten the plug and/or place gasket ring.
	5. Check oil strainer on engine bottom. a. Screw(s) is (are) loosed and/or gasket is damaged, brittle or hard. Retighten screw and/or replace gasket. b. Oil strainer is clogged due to contamination. Clean or replace strainer and diagnose causes. Replace possible damaged parts. Use high quality oil (refer to *TECHNICAL DATA*).
	6. Check leak indicator hole for oil leaks (water pump housing area MAG side). a. Oil leaking from leak indicator hole means a damaged oil seal inside magneto cover on water pump shaft. Replace both rotary seal and oil seal (refer to *COOLING SYSTEM* and *MAGNETO SYSTEM*).
	7. Check oil pressure switch function. a. Oil pressure switch damaged. Replace oil pressure switch.
	8. Check oil orifice(s) on the oil pump suction side. a. Oil orifice(s) is (are) clogged. Clean from contamination. Replace oil and oil filter if necessary (refer to *MAINTENANCE* or *LUBRICATION*).

SYMPTOM	LOW OR NO OIL PRESSURE/HIGH OIL CONSUMPTION.
CONDITION	NORMAL USE.
	9. Check oil pump operation. a. Oil pump rotor is out of wear limit. Replace oil pump shaft (refer to *LUBRICATION*). b. Oil pump seized due to oil leakage and/or air inclusion. Replace oil pump (refer to *LUBRICATION*). c. Gears driving oil pump are broken or damaged. Replace gears. d. Incorrect oil being used. Use a high quality oil (refer to *TECHNICAL DATA*).
	10. Check plain bearings in crankcase for heavy wear. a. Plain bearings out of specification (increased clearance). Replace all plain bearings at the same time (refer to *CRANKSHAFT*).

SYMPTOM	OIL CONTAMINATION (white appearance).
CONDITION	NORMAL USE.
Test/Inspection	1. Check leak indicator hole (water pump housing area MAG side) if water and oil leaks. a. Leakage of oil/water mixture from leak indicator hole means damaged oil seal and rotary seal inside magneto cover on water pump shaft. Replace both rotary seal and oil seal and refill with recommended oil and/or coolant (refer to *COOLING SYSTEM* and *MAGNETO SYSTEM*).
	2. Check cylinder head and/or cylinder base gasket. a. Gasket damaged or leaking. Retighten cylinder head with recommended torque and/or replace gasket.
	3. Check screws for torque. a. Screws not fixed. Retighten screws with recommended torque and/or replace oil.
	4. Check oil for particles (may indicate possible damages inside the engine). a. Oil contamination due to metal or plastic particles. Replace possibly damaged parts. Use a high quality oil (refer to *TECHNICAL DATA*).

CYLINDER AND HEAD

SYMPTOM	UNUSUAL ENGINE NOISE AND/OR VIBRATION IN IDLE SPEED.
CONDITION	NORMAL USE.
Test/Inspection	1. Check operation of decompressor located on camshaft. a. Decompressor shaft sticks and/or torsion spring is damaged. Replace spring and/or decompressor mechanism. b. Loose camshaft gear. Retighten camshaft gear (refer to *CYLINDER AND HEAD*).
	2. Check chain tensioner operation. a. Faulty chain tensioner. Replace spring and/or mechanism.
	3. Check valve adjustment. a. Intake and/or exhaust valves not adjusted correctly. Adjust valves.

SYMPTOM	UNUSUAL ENGINE NOISE AND/OR VIBRATION WHILE OPERATING.
CONDITION	NORMAL USE.
Test/Inspection	1. Check items 1 and 2 of *UNUSUAL ENGINE NOISE AND/OR VIBRATION IN IDLE SPEED.*
	2. Check noise coming from cylinder head area. a. Check valve clearance. Readjust valve clearance and/or replace defective part(s). b. Chain guide worn out. Replace chain guide. c. Stretched chain and/or worn out sprocket. Replace chain and sprocket at the same time. d. Sprocket screw got loose. Retighten screw with recommended torque. e. Rocker arm(s) is (are) worn out (valve adjustment). Readjust valve clearance and/or replace rocker arm(s). f. Thrust washer(s) on rocker arm shaft is (are) missing. Fit thrust washer(s) (refer to *CYLINDER AND HEAD*).

SYMPTOM	OIL CONTAMINATION ON CYLINDER AND/OR HEAD.
CONDITION	NORMAL USE.
Test/Inspection	1. Check screws for torque. a. Loose screws. Retighten screws with recommended torque. b. Gaskets are brittle, hard, worn out or damaged. Replace damaged gasket(s).

CRANKSHAFT AND BALANCER SHAFT

SYMPTOM	UNUSUAL ENGINE NOISE AND/OR VIBRATIONS.
CONDITION	NORMAL USE.
Test/Inspection	1. Check for possible plain bearing failure. a. Oil pressure is out of specified values. Replace damaged parts (refer to *LUBRICATION*). b. Connecting rod small end bearing is damaged and/or out of specification. Replace damaged and/or worn out part(s). c. Connecting rod big end clearance is out of specification. Replace damaged and/or worn out part(s). d. Crankshaft plain bearing MAG/PTO side is damaged and/or out of specification. Replace crankshaft and plain bearing MAG/PTO at the same time (refer to *CRANKSHAFT*).
	2. Check ball bearing(s) on balancer shaft end(s). a. Ball bearing(s) do(es) not move freely. Replace bearing(s).
	3. Check that mark on balancer shaft is aligned with crankshaft position mark. a. Mark on balancer shaft and crankshaft are not aligned. Readjust position of balancer shaft and crankshaft (refer to *CRANKSHAFT/BALANCER SHAFT*).

GEARBOX

SYMPTOM	UNUSUAL ENGINE NOISE AND/OR VIBRATIONS.
CONDITION	NORMAL USE.
Test/Inspection	1. Check oil level in engine. a. Oil leakage from engine. Replace damaged gasket(s) and/or oil seal(s), torque screws and refill with oil up to specified level (refer to *TECHNICAL DATA*).
	2. Check bearings in the gearbox for free movement. a. Bearing(s) do(es) not move freely. Replace bearing(s).
	3. Check for knocking noise. a. Tooth of gears are damaged and/or worn. Replace respective gears.

SYMPTOM	GEAR INDICATION FAILS.
CONDITION	NORMAL USE.
Test/Inspection	1. Check wire harness connector pins (gear indicator) and/or electronical system. a. Connector pins are corroded and/or damaged. Clean connector and/or replace wire harness if damaged. b. Electronical system failed and/or damaged. Repair and/or replace damaged part(s).
	2. Check contact screws on PTO side (behind CVT driven pulley) for damage and/or wear. a. Shifting indicator switch(es) pin(s) is (are) worn and/or damaged. Replace shifting indicator switch(es). b. Contact(s) is (are) corroded and/or contact screw for wire harness got loose. Clean contact surface and retighten contact screw(s) with recommended torque. c. Wire harness has broken cables. Replace wire harness.

SYMPTOM	GEAR(S) IS (ARE) HARD TO SHIFT.
CONDITION	NORMAL USE.
Test/Inspection	1. Check shift shaft spline and/or shift forks for wear and/or damages. a. Shift shaft is worn out and/or shows damaged splines. Replace shift shaft. b. Shift drum track(s) and/or splines is (are) worn out or damaged. Replace shift drum and damaged part(s). c. Shift fork(s) is (are) worn out and/or engagement pins are damaged. Replace shift fork(s). d. Shift fork(s) is (are) worn out and/or fork(s) is (are) damaged. Replace shift fork(s). e. Shift gear(s) is (are) worn out. Replace shift gear(s). f. Shifting indicator switch(es) pin(s) is (are) worn out (no roundings on top of pin). Replace shifting indicator switch(es).
	2. Check engine idle speed (choke in use). a. Idle speed is too high (CVT starts to work). Adjust idle speed. b. Choke is in use and increases the engine RPM. Release choke.
	3. Check CVT one way clutch on drive pulley. a. CVT one way clutch was not lubricated correctly. Lubricate CVT one way clutch (refer to *CVT*). b. CVT one way clutch is worn out or damaged. Replace defective part(s) (refer to *CVT*).
	4. Check transmission lever and connecting rod. a. Ball joint and/or ball joint nut is (are) loose. Retighten or replace the ball joint.
	5. Check spring on shifter plate. a. Broken spring. Replace the spring.
	6. Check for any mud intrusions. a. CVT parts dirty. Clean all CVT parts.

REWIND STARTER

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

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

CVT

SYMPTOM	THE ATV 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 (refer to *CVT* and/or *TECHNICAL DATA*).
	2. Check roller(s) on governor cup and/or lever condition on drive pulley sliding half. a. Roller(s) is (are) worn and/or damaged (refer to *CVT*). Replace governor cup assembly. b. Lever(s) on drive pulley sliding half is (are) worn and/or damaged (refer to *CVT*). Replace all levers at the same time (lever kit).
	3. Check drive pulley sliding half for free axial movement. a. Sliding half is stuck (refer to *CVT*). Replace damaged part(s).
	4. Check condition of drive/driven pulley spring. a. Drive pulley spring tension is too smooth and/or damaged (refer to *CVT*). Replace spring. b. Driven pulley spring tension is too stiff (refer to *CVT*). Replace spring.
	5. Check carburetor adjustment and/or high altitude calibration. a. Carburetor is not adjusted according to specified values and/or high altitude calibration. Readjust carburetor.
	6. Check engine condition. a. Low engine compression. Replace defective part(s).
	7. Check ignition condition. a. Faulty spark plug. Install new spark plug(s).
	8. Check valve adjustment. a. Intake and/or exhaust valves are not adjusted correctly. Adjust valves.
	9. Check differentials operation. a. Vehicle on Neutral is hard to move. Repair or replace defective part(s).

SYMPTOM	ENGINE MAXIMUM RPM IS TOO HIGH AND TOP SPEED IS NOT REACHED.
CONDITION	NORMAL USE.
Test/Inspection	1. Check items 1 to 3 of *THE ATV ACCELERATES SLOWLY, ESPECIALLY WHEN IT IS STOPPED.*
	2. Check drive/driven pulley spring tension. a. Drive pulley spring tension is too stiff. Replace spring (recommended Bombardier spring). b. Driven pulley spring tension is too smooth and/or damaged (refer to *CVT*). Replace spring.
	3. Check drive/driven pulley area for contamination and/or water intrusion. a. CVT area is contaminated with water, dirt or oil. Clean CVT system and replace damaged part(s).

SYMPTOM	DRIVE PULLEY NOISE IN IDLE SPEED.
CONDITION	NORMAL USE.
Test/Inspection	1. Check slider shoes (drive pulley). a. Worn slider shoes (increased clearance between governor cup and drive pulley sliding half). Replace all slider shoes at the same time (slider shoes kit).
	2. Check driven pulley sliding mechanism (between driven pulley outer and inner half). a. Mechanism is stuck and/or damaged. Replace driven pulley assembly.
	3. Check roller(s) and/or levers for wear (located on sliding half of drive pulley). a. Roller(s) on governor cup is (are) worn out and/or damaged (refer to *CVT*). Replace governor cup assembly. b. Lever(s) on drive pulley sliding half is (are) worn out and/or damaged (refer to *CVT*). Replace all levers at the same time (lever kit).
	4. Check drive pulley screw for torque. a. Loose screw. Retighten screw with recommended torque.
	5. Check one-way clutch condition on drive pulley sliding half. a. Bearing(s) do(es) not move freely. Replace damaged part(s) and lubricate inside of one-way clutch (refer to *CVT*). b. Spring sleeve(s) inside one-way clutch is (are) worn out. Replace both sleeves and springs and lubricate inside of one-way clutch (refer to *CVT*). c. Spring(s) inside one-way clutch is (are) worn out. Replace both pins and springs and lubricate inside of one-way clutch (refer to *CVT*).

SYMPTOM	DRIVE PULLEY NOISE WHEN ACCELERATING/DECELERATING.
CONDITION	NORMAL USE.
Test/Inspection	1. Check items 1 to 5 of drive pulley noise in idle speed.
	2. Check if belt runs in dry conditions. a. Drive pulley area is wet/contaminated due to water/dirt intrusion. Clean driven pulley area and/or drain water out of CVT cover.
	3. Check drive/driven pulley screw for torque. a. Loose screw on drive and/or driven pulley. Retighten screw with recommended torque.
	4. Check cam and driven pulley fixed half for wear. a. Cam and/or drive pulley fixed half out of wear limit and/or damaged. Replace damaged part(s).
	5. Check torque gear fixed in driven pulley sliding half for wear. a. Torque gear out of wear limit and/or damaged. Replace torque gear (refer to *CVT*).
	6. Check for foreign particles in CVT area (stones, dirt, etc.). a. Small particles damaged belt and/or pulley surface(s). Clean system and replace damaged parts (refer to *CVT*).

SYMPTOM	VIBRATIONS ORIGINATING FROM DRIVE PULLEY.
CONDITION	NORMAL USE.
Test/Inspection	1. Check tightening torque of drive pulley nut. a. Moving sliding half. Retighten nut.
	2. Check fixed half bushings. a. Excessive gap between bushings and fixed half shaft, thus restraining sliding half movements. Replace fixed half assembly.
	3. Check starter ring gear condition. a. Starter ring gear loosened. Retighten ring gear and/or mount it in original position (balanced system).
	4. Check if slider shoes are present and/or placed in correct position. a. Slider shoe(s) is (are) missing and/or damaged. Replace all slider shoes at the same time (slider shoes kit).

SYMPTOM	VIBRATIONS ORIGINATING FROM DRIVEN PULLEY.
CONDITION	NORMAL USE.
Test/Inspection	1. Check fixed and sliding half bushings on driven pulley. a. Excessive gap between bushings and CVT shaft, thus restraining sliding half movements. Replace fixed and/or sliding half of driven pulley, polish CVT shaft area with fine emery cloth and wipe clean with a cloth.

SYMPTOM	PULLEYS DO NOT DOWN/UP SHIFT PROPERLY.
CONDITION	NORMAL USE.
Test/Inspection	1. Check drive pulley bushings (cleanliness, wear, etc.). a. Bushings stick to fixed half pulley shaft. Clean or replace. b. Spring seat sticks to sliding half pulley bushing. Clean system and/or replace sliding half pulley. c. One-way clutch does not operate properly. Clean system and/or replace damaged part(s).
	2. Check driven pulley spring tension. a. Driven pulley spring tension is too weak and/or broken. Replace. b. Driven pulley cam is worn or damaged. Replace.

SYMPTOM	BELT GLAZED EXCESSIVELY OR HAVING BAKED APPEARANCE.
CONDITION	NORMAL USE.
Test/Inspection	1. Check if CVT air intake and/or outlet is clogged. a. CVT area heats up due to contamination. Clean air intake and/or outlet from contamination. b. Fans located on drive pulley fixed half (underneath ring gear) are clogged. Clean from contamination.
	2. Check if pulley halves are clean. a. Oil on pulley surfaces. Clean pulley halves and replace belt. b. Water intrusion in CVT area. Find root cause and repair. Drain water and replace belt.

SYMPTOM	BELT WORN EXCESSIVELY IN TOP WIDTH.
CONDITION	NORMAL USE.
Test/Inspection	1. Check drive belt width. a. Considerable wear. Replace belt if narrower than specified (refer to *CVT* or *TECHNICAL DATA*).
	2. Check drive belt identification number. a. Improper belt angle (wrong type of belt). Replace belt with an appropriate drive belt.
	3. Check for localized belt wear caused by belt slippage. a. Localized wear. Replace belt.

SYMPTOM	BELT DISINTEGRATION.
CONDITION	NORMAL USE.
Test/Inspection	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 Pulley Flange Cleaner (P/N 413 711 809) and a cloth. b. Drive/driven pulley halves are damaged through stones inside CVT area. Clean pulley surfaces with fine emery cloth, wipe clean with a cloth or replace drive/driven pulley halves and belt.

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

ENGINE GENERAL

SYMPTOM	ENGINE BACKFIRES.
CONDITION	NORMAL USE.
Test/Inspection	1. Check spark plug and/or electrical system. a. Carbon accumulation caused by defective spark plug. Clean carbon accumulation and replace spark plug. b. Electrical system has failure. Replace defective part(s).
	2. Check leakage on intake manifold. a. Air leak on intake system. Retighten screws and/or replace intake manifold.
	3. Check exhaust air leaking. a. Exhaust gasket is leaking. Retighten screws and/or replace exhaust gasket.
	4. Check intake valve(s) for leaking. a. Intake valve(s) is (are) leaking. Repair or replace valve(s).
	5. Check if fuel supply is insufficient at high RPM. a. Fuel line is contaminated and/or bent (engine gets lean). Clean and/or replace defective part(s).
	6. Check carburetion. a. Faulty carburetor settings. Adjust carburetor.

SYMPTOM	ENGINE SUDDENLY TURNS OFF.
CONDITION	NORMAL USE.
Test/Inspection	1. Check spark plug cap contact and/or cable. a. Spark plug cap loose. Replug cap. b. Spark plug cable melted and/or damaged. Replace spark plug cable.
	2. Check condition of spark plug (blue spark ideal). a. Red, jumping spark means a damaged spark plug. Replace spark plug with appropriate heat range (refer to *TECHNICAL DATA*). b. Condition of spark plug. Readjust carburetor and/or replace spark plug.
	3. Check fuel supply to engine intake. a. Fuel valve is switched off. Turn on fuel valve. b. Run out of fuel. Turn fuel valve to "RES" position and refill. c. Poor quality and/or wrong fuel. Clean from contamination and use appropriate fuel (refer to *TECHNICAL DATA*). d. Carburetor contaminated. Clean jets and carburetor float chamber from contamination. e. Fuel line clogged and/or bent. Clean fuel supply from contamination and/or replace defective part(s). f. Fuel supply insufficient at high RPM. Clean fuel supply from contamination.
	4. Perform engine leak test. Refer to *ENGINE LEAK TEST* procedure. Check for possible piston seizure. a. Damaged head gasket and/or seal and/or leaking inlet/exhaust valve(s). Replace and/or repair defective parts.
	5. Piston seizure (piston ring(s) damaged and/or cylinder shows grooves). a. Spark plug heat range is too low. Replace damaged parts and install spark plug with appropriate heat range (refer to *TECHNICAL DATA*). b. Compression ratio is too high. Install genuine parts. c. Poor oil quality. Use a high quality oil. d. Leaks at air intake manifold (engine gets too lean). Retighten screws or replace air intake manifold. e. Contamination (like sand) through engine intake. Replace defective part(s) and use new air filter.
	6. Melted and/or perforated piston dome; melted section at ring end gap. a. Spark plug heat range is too low. Install recommended spark plug (refer to *TECHNICAL DATA*). b. Coolant less than recommended level (engine gets too hot). Repair cooling circuit and/or refill with recommended liquid.
	7. Cracked or broken piston. a. Cracked or broken piston due to excessive piston/cylinder clearance or engine overreving. Replace piston. Check piston/cylinder clearance (refer to *CYLINDER AND HEAD*).

SYMPTOM	ENGINE SUDDENLY TURNS OFF.
CONDITION	NORMAL USE.
Test/Inspection	8. Check connecting rod, crankshaft, rocker arm rollers movement. a. Connecting rod failure due to lack of oil. Repair and replace defective parts and use a high quality oil. b. Crankshaft failure due to lack of oil. Repair and replace defective parts and use a high quality oil. c. Oil contamination due to clogged oil filter. Replace oil filter and oil at the same time, replace defective part(s) (refer to *MAINTENANCE CHART*).
	9. Check valve springs exhaust/inlet. a. Broken valve spring damages the cylinder head, valve(s), rocker arm(s)/piston. Replace defective part(s) and do the valve adjustment.
	10. Check for water intrusion through intake system into combustion chamber. a. Water in intake system and/or combustion chamber. Replace defective part(s).

SYMPTOM	ENGINE TURNS OVER BUT FAILS TO START.
CONDITION	NORMAL USE.
Test/Inspection	1. Check items of engine does not start — no spark at spark plug.
	2. Check spark plug. a. Inspect spark plug (no spark) or wrong spark plug gap. Readjust gap and clean spark plug or replace.
	3. Check for fuel on spark plug. a. Flooded engine (spark plug wet when removed). Do not overchoke. Remove wet spark plug, turn ignition switch to OFF and crank engine several times. Install clean dry spark plug. Start engine following usual starting procedure.
	4. Check engine compression. a. Insufficient engine compression. Replace defective part(s) (ex.: piston, ring(s), etc.). b. Valve seat worn and/or damaged. Repair by performing valve guide procedure (refer to *CYLINDER AND HEAD*). Readjust valve clearance.

SYMPTOM	ENGINE DOES NOT OFFER MAXIMUM POWER AND/OR DOES NOT REACH MAXIMUM OPERATING RPM.
CONDITION	NORMAL USE.
Test/Inspection	1. Check items of engine suddenly turns off.
	2. Check air intake system. a. Air filter is clogged due to contamination. Replace air filter.
	3. Check spark plug condition and/or gap. a. Fouled spark plug or wrong spark plug gap. Readjust gap and clean spark plug or replace.
	4. Check spark plug type. a. Improper spark plug heat range. Install recommended spark plug (refer to *TECHNICAL DATA*).
	5. Check engine compression and perform engine leak test. Refer to *ENGINE LEAK TEST* procedure. Check for possible piston seizure. a. Damaged head gasket and/or seal and/or leaking inlet/exhaust valve(s). Replace and/or repair defective parts. b. Worn piston and/or piston ring(s). Replace (refer to *CYLINDER AND HEAD*).
	6. Check for water in fuel (wrong fuel). a. There is water in fuel or wrong fuel. Drain fuel system, search for leakage and refill it with appropriate fuel.
	7. Check drive belt/CVT condition. a. Worn belt. Replace belt if width is less than specified (refer to *CVT*).

SYMPTOM	HIGH ENGINE OPERATING TEMPERATURE.
CONDITION	NORMAL USE.
Test/Inspection	1. Check if cooling system shows any failure (see *COOLING SYSTEM*). a. System is leaking. Repair and/or replace damaged part(s).
	2. Check condition and heat range of spark plug. a. Melted spark plug tip or inadequate heat range. Install recommended spark plug (refer to *TECHNICAL DATA*).
	3. Check air inlet and outlet of the CVT cover. a. Air circulation is clogged (overheating). Clean air circulation from contamination. b. Drive belt worn and/or damaged. Replace belt with an appropriate drive belt (refer to *TECHNICAL DATA*).

SYMPTOM	STARTER TURNS, BUT ENGINE DOES NOT CRANK.
CONDITION	NORMAL USE.
Test/Inspection	1. Check gear condition on electric starter. a. Worn and/or damaged starter gear. Replace electric starter and/or starter drive.
	2. Check condition of starter pinion gear. a. Worn and/or damaged starter pinion and/or ring gear. Replace starter drive and/or drive pulley fixed half.
	3. Check splines on starter drive. a. Poor movement of pinion gear on splines. Clean and/or replace starter drive.

SYMPTOM	ENGINE DOES NOT START — NO SPARK AT SPARK PLUG (see *MAGNETO SYSTEM*).
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 condition of ignition coil and resistance with an ohmmeter. a. Mechanically damaged part. Vibration problem. Electrically damaged part. Replace ignition coil.
	3. Verify condition of CPS and resistance with an ohmmeter and connector condition. a. Defective CPS. Corroded connector terminal. Replace CPS. Clean terminals and apply silicone dielectric grease. b. Mechanically damaged part. Vibration problem. Electrically damaged part. Replace CPS and/or tighten mounting screw(s). c. Metallic particles caused a short circuit between the soldered connections. Clean CPS from metallic dust.
	4. Check magneto for damage and/or electrical failure. a. Windings of stator have electrical failure (no charging causes an empty battery). Replace magneto.

TROUBLESHOOTING CHART

OUTLANDER 800 SERIES

The following charts are provided to help in diagnosing the probable source of troubles. It should be used as a guideline. This section pertains to engine mechanical components only. Some related problems can come from other systems such as ignition system, fuel system etc. and have an impact on the engine. Ensure to check the other systems before concluding that the engine is faulty.

COOLING SYSTEM

SYMPTOM	**HIGH ENGINE OPERATING TEMPERATURE.**
CONDITION	NORMAL USE.
Test/Inspection	1. Check coolant level. a. Coolant level lower than recommended. Refill (refer to *COOLING SYSTEM*).
	2. Check for air bubbles in cooling system. a. Air in cooling system. Refill and bleed cooling system (refer to *COOLING SYSTEM*).
	3. Check temperature sensor for electrical/mechanical failure. a. Temperature sensor defective. Replace.
	4. Check thermostat. a. Thermostat defective (does not open when engine gets hot). Replace (refer to *COOLING SYSTEM*).
	5. Check leak indicator hole (in crankcase MAG side-water pump housing area) if coolant leaks. a. Coolant leaking from indicator hole means a damaged water pump rotary seal. Replace rotary seal (refer to *COOLING SYSTEM*).
	6. Check condition of hoses and hose clamps fixation. a. Hoses are brittle and/or hard. Replace. b. Hose clamps are loose. Retighten clamps.
	7. Check condition of impeller located on the water pump shaft. a. Impeller wings broken and/or impeller threads are damaged. Replace (refer to *COOLING SYSTEM*).
	8. Check gasket on water pump housing. a. Gasket on water pump housing leaks. Retighten screws and/or replace gasket.
	9. Check cylinder head and/or cylinder base gasket. a. Worn out gasket(s) is (are) causing coolant leakage. Replace.
	10. Check coolant drain screw on water pump housing MAG side (marked "DRAIN"). a. Copper ring on drain screw leaks. Retighten screw and/or replace copper ring.

SYMPTOM	HIGH ENGINE OPERATING TEMPERATURE.
CONDITION	NORMAL USE.
	11. Check intermediate gear(s) behind of PTO cover. a. Worn out and/or broken gear(s) is/are causing less coolant supply. Replace worn out and/or broken gear(s) (refer to *BOTTOM END*).
	12. Check if water pump shaft is seized. a. Water pump shaft does not turn. Replace defective part(s).

MAGNETO SYSTEM

SYMPTOM	NOT CHARGING AT ALL OR CHARGING VOLTAGE INADEQUATE.
CONDITION	NORMAL USE.
Test/Inspection	1. Check magneto for damage and/or electrical failure. a. Radial position of rotor wrong due to broken Woodruff key. Replace Woodruff key. b. Coating on stator winding is damaged. Replace magneto. c. Resistance value is out of specification (refer to *TECHNICAL DATA*). Replace magneto. d. Connector on magneto is damaged and/or has electrical failure. Repair and clean contacts of connector.
	2. Check wiring harness for cracks or other damages. a. Harness shows electrical failure and/or other damages. Replace/repair wiring harness.
	3. Check battery. a. Battery has electrical failure. Replace.

LUBRICATION

SYMPTOM	LOW OR NO OIL PRESSURE/HIGH OIL CONSUMPTION.
CONDITION	NORMAL USE.
Test/Inspection	1. Check oil level and search for leakage on crankcase and/or sealing parts. a. Crankcase is leaking due to damage. Rebuild engine with new crankcase and gasket parts. Use high quality oil (refer to *TECHNICAL DATA*). b. Crankcase is leaking due to loose screws. Retighten screws with recommended torque. c. Sealing rings, O-rings and/or gaskets are brittle, hard or damaged. Replace damaged parts. d. Piston rings worn out (blue colored engine exhaust emission). Replace piston rings (refer to *CYLINDER AND HEAD*). e. Piston rings are broken (low compression). Replace piston rings (refer to *CYLINDER AND HEAD*). f. Valve stem seal damaged and/or sealing lip is hard and/or brittle. Replace all valve stem seals.
	2. Check oil filter for contamination. a. Oil filter clogged. Replace oil and oil filter at the same time. Use high quality oil (refer to *TECHNICAL DATA*).
	3. Check oil drain plug on engine bottom. a. Plug is loose and/or gasket ring is missing. Retighten the plug and/or place gasket ring.
	4. Check leak indicator hole if oil leaks (in crankcase MAG side-water pump housing area). a. Oil leaking from leak indicator hole means a damaged oil seal on water pump shaft. Replace oil seal (refer to *COOLING SYSTEM*).
	5. Check oil pressure switch function. a. Oil pressure switch damaged. Replace oil pressure switch.

SYMPTOM	LOW OR NO OIL PRESSURE/HIGH OIL CONSUMPTION.
CONDITION	NORMAL USE.
Test/Inspection	6. Check oil orifice(s) on the oil pump suction side. a. Oil orifice(s) is (are) clogged. Clean from contamination. Replace oil and oil filter if necessary (refer to *MAINTENANCE* or *LUBRICATION SYSTEM*).
	7. Check oil pump function. a. Oil pump rotor is out of wear limit. Replace oil pump (refer to *LUBRICATION SYSTEM*). b. Oil pump seized due to oil leakage and/or air inclusion. Replace oil pump (refer to *LUBRICATION SYSTEM*). c. Gears driving oil pump are broken or otherwise damaged. Replace gears. d. Incorrect oil being used. Use high quality oil (refer to *TECHNICAL DATA*).
	8. Check oil pressure regulator valve (spring) function. a. Valve spring damaged (valve always open). Replace spring. b. Valve piston is worn or broken. Replace valve piston (refer to *LUBRICATION SYSTEM*). c. Valve piston stays open due to contamination. Clean or repair valve piston.
	9. Check plain bearings in crankcase for heavy wear. a. Plain bearings out of specification (increased clearance). Replace plain bearings (refer to *BOTTOM END*).
	10. Check engine oil strainer in crankcase. a. Oil strainer is clogged due to contamination. Clean or replace strainer and diagnose causes. Replace possible damaged parts (refer to *BOTTOM END*).

SYMPTOM	OIL CONTAMINATION (white appearance).
CONDITION	NORMAL USE.
Test/Inspection	1. Check leak indicator hole (in crankcase MAG side-water pump housing area) if water and oil leaks. a. Leakage of oil/water mixture from indicator bore means damaged water pump seal ring and rotary seal. Replace sealing ring, rotary seal and change oil, oil filter and/or coolant (refer to *LUBRICATION SYSTEM, COOLING SYSTEM* and *BOTTOM END*).
	2. Check cylinder head and/or cylinder base gasket. a. Gasket damaged or leaking. Retighten cylinder head with recommended torque and/or replace gasket.
	3. Check tightening torque of cylinder head screws. a. Screws not properly tightened. Retighten screws to recommended torque and replace oil.
	4. Check oil for particles (may indicate possible engine internal damages). a. Oil contamination due to metal or plastic particles. Replace possibly damaged part(s) including oil and oil filter. Use high quality oil (refer to *TECHNICAL DATA*).

CYLINDER AND HEAD

SYMPTOM	UNUSUAL ENGINE NOISE AND/OR VIBRATION.
CONDITION	NORMAL USE.
Test/Inspection	1. Check noise coming from cylinder head area. a. Improper valve clearance adjustment. Readjust valve clearance and/or replace defective part(s). b. Faulty chain tensioner. Replace spring and/or mechanism. c. Chain guide worn out. Replace chain guide. d. Stretched chain and/or worn out sprockets. Replace chain and sprockets. e. Sprocket screws got loose. Retighten screws with recommended torque. f. Rocker arm(s) is (are) worn out (valve adjustment). Readjust valve clearance and/or replace rocker arm(s). g. Incorrect camshaft timing adjustment. Replace damaged components and readjust camshaft timing (refer to *CYLINDER AND HEAD*).

SYMPTOM	OIL CONTAMINATION ON CYLINDER AND/OR HEAD.
CONDITION	NORMAL USE.
Test/Inspection	1. Check screws for torque. a. Loose screws. Retighten screws with recommended torque. b. Gaskets are brittle, hard, worn out or otherwise damaged. Replace damaged gaskets, O-rings or the V-ring on breather.

CRANKSHAFT

SYMPTOM	UNUSUAL ENGINE NOISE AND/OR VIBRATIONS.
CONDITION	NORMAL USE.
Test/Inspection	1. Check noise coming from crankshaft area. a. Crankshaft plain bearings are damaged. Replace crankshaft plain bearings (refer to *BOTTOM END*). b. Connecting rod plain bearings are damaged. Replace connecting rod plain bearings (refer to *BOTTOM END*). c. Magneto rotor got loose. Replace damaged components and retighten rotor retaining screw with recommended torque (refer to *MAGNETO SYSTEM*).

GEARBOX

SYMPTOM	UNUSUAL GEARBOX NOISE AND/OR VIBRATIONS.
CONDITION	NORMAL USE.
Test/Inspection	1. Check oil level in gearbox. a. Oil leakage from gearbox. Replace damaged gasket(s) and/or oil seal(s), torque screws and refill with oil up to specified level (refer to *TECHNICAL DATA* and *GEARBOX*).
	2. Check bearings in the gearbox for free movement. a. Bearing(s) do(es) not move freely. Replace bearing(s).
	3. Check for knocking noise. a. Tooth of gears are damaged and/or worn. Replace respective gears.

SYMPTOM	GEAR INDICATION FAILS.
CONDITION	NORMAL USE.
Test/Inspection	1. Check contact screws on gear housing center. a. Check contact screw outside for contamination and wetness. Clean contact screw and screw for wiring harness. b. Contact(s) is (are) corroded and/or contact screw for wiring harness got loose. Clean contact surface and retighten contact screw(s) with recommended torque. c. Wiring harness has broken cables. Replace wiring harness. d. Shifting indicator switch(es) pin(s) is (are) worn and/or damaged. Replace shifting indicator switch(es).

SYMPTOM	GEAR(S) IS (ARE) HARD TO SHIFT.
CONDITION	NORMAL USE.
Test/Inspection	1. Check shift shaft spline and/or shift forks for wear and/or damages. a. Shift shaft is worn out and/or shows damaged splines. Replace shift shaft. b. Shift drum track(s) and/or splines is (are) worn out or damaged. Replace shift drum and damaged part(s). c. Shift fork(s) is (are) worn out and/or engagement pins are damaged. Replace shift fork(s). d. Shift fork(s) is (are) worn out and/or fork(s) is (are) damaged. Replace shift fork(s). e. Shift gear(s) is (are) worn out. Replace shift gear(s). f. Shifting indicator switch(es) pin(s) is (are) worn out (no roundings on top of pin). Replace shifting indicator switch(es).
	2. Check engine idle speed. a. Check throttle cable and throttle adjustment. b. Check bypass idle valve and connectors.
	3. Check CVT one way clutch on drive pulley. a. CVT one way clutch was not lubricated correctly. Lubricate CVT one way clutch (refer to *CVT*). b. CVT one way clutch is worn out or damaged. Replace defective part(s) (refer to *CVT*). c. Check if friction washer at one way clutch is worn. Replace friction washer (refer to *CVT*).
	4. Check transmission lever and connecting rod. a. Ball joint and/or ball joint nut is (are) loose. Retighten or replace the ball joint.
	5. Check spring on shift shaft in gearbox. a. Broken spring. Replace the spring (refer to *GEARBOX).*
	6. Check for any mud intrusions. a. CVT parts dirty. Clean all CVT parts.

DISCONNECT UNIT

SYMPTOM	4 WHEEL DRIVE INDICATION FAILS.
CONDITION	NORMAL USE.
Test/Inspection	1. Check contact screw on gear housing right side for damage and/or wear. a. Shifting indicator switch pin is worn and/or damaged. Replace shifting indicator switch (refer to *GEARBOX*). b. Contact is corroded and/or contact screw for wiring harness got loose. Clean contact surface and retighten contact screw with recommended torque. c. Wiring harness has broken cable. Replace wiring harness.

SYMPTOM	4 WHEEL DRIVE DOES NOT ENGAGE OR DISENGAGE.
CONDITION	NORMAL USE.
Test/Inspection	1. Check actuator and/or actuator shifting fork for wear and/or damages. a. Check if selector works properly. If so, check actuator, see point c) and d) below. b. If selector is out of specifications, check wires, connectors and/or replace selector. c. Actuator shifting fork is worn out and/or damaged. Replace shifting fork of actuator. d. Check function of actuator. Replace if actuator is not turning, refer to *GEARBOX*.
	2. Check shifting sleeve spline and/or shifting fork for wear and/or damages. a. Shifting sleeve shows damaged splines. Replace shifting sleeve (refer to *GEARBOX*). b. Shifting fork is worn out and/or engagement pin is damaged. Replace shifting fork.

CVT

SYMPTOM	UNUSUAL ACCELERATION BEHAVIOR.
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 (refer to *CVT* and/or *TECHNICAL DATA*).
	2. Check lever condition on drive pulley sliding half and/or roller(s) on governor cup. a. Lever(s) on drive pulley sliding half is (are) worn and/or damaged (refer to *CVT*). Replace all levers at the same time (lever kit). b. Roller(s) is (are) worn and/or damaged (refer to *CVT*). Replace governor cup assembly.
	3. Check drive/driven pulley sliding half for free axial movement. a. Sliding half is stuck (refer to *CVT*). Replace damaged part(s).
	4. Check condition of drive/driven pulley spring. a. Drive pulley spring tension is too smooth and/or damaged (refer to *CVT*). Replace spring. b. Driven pulley spring tension is too stiff (refer to *CVT*). Replace spring.
	5. Check if cam of driven pulley is worn. Replace if out of specifications; refer to *CVT*.
	6. Check surface of fixed and sliding halves (drive and driven pulley) for grooves or other damages; refer to *CVT*.
	7. Check with B.U.D.S. at diagnostic communication port for failure

SYMPTOM	UNUSUAL ACCELERATION BEHAVIOR.
CONDITION	NORMAL USE.
	8. Check valve adjustment. a. Intake and/or exhaust valves are not adjusted correctly. Adjust valves.
	9. Check engine condition. a. Low engine compression; refer to *LEAK TEST*.
	10. Check ignition condition. a. Faulty spark plug. Install new spark plug(s).
	11. Check differentials operation. a. Vehicle on Neutral is hard to move. Repair or replace defective part(s).

SYMPTOM	ENGINE MAXIMUM RPM IS TOO HIGH AND TOP SPEED IS NOT REACHED.
CONDITION	NORMAL USE.
Test/Inspection	1. Check drive/driven pulley area for contamination and/or water intrusion. a. CVT area is contaminated with water, dirt or oil. Clean CVT system and replace damaged part(s).
	2. Check items 1 to 3 of *UNUSUAL ACCELERATION BEHAVIOR*.
	3. Check drive/driven pulley spring tension. a. Drive pulley spring tension is too stiff. Replace spring (recommended Bombardier spring). b. Driven pulley spring tension is too smooth and/or damaged (refer to *CVT*). Replace spring.

SYMPTOM	DRIVE PULLEY NOISE IN IDLE SPEED.
CONDITION	NORMAL USE.
Test/Inspection	1. Check slider shoes (drive pulley). a. Worn slider shoes (increased clearance between governor cup and drive pulley sliding half). Replace all slider shoes at the same time (slider shoes kit).
	2. Check driven pulley sliding mechanism (between driven pulley outer and inner half). a. Mechanism is stuck and/or damaged. Replace driven pulley assembly.
	3. Check roller(s) and/or levers for wear (located on sliding half of drive pulley). a. Roller(s) on governor cup is (are) worn out and/or damaged (refer to *CVT*). Replace governor cup assembly. b. Lever(s) on drive pulley sliding half is (are) worn out and/or damaged (refer to *CVT*). Replace all levers at the same time (lever kit).

SYMPTOM	DRIVE PULLEY NOISE IN IDLE SPEED.
CONDITION	NORMAL USE.
	4. Check drive pulley screw for torque. a. Loose screw. Retighten screw with recommended torque.
	5. Check one-way clutch condition on drive pulley sliding half. a. Bearing(s) do(es) not move freely. Replace damaged part(s) and lubricate inside of one-way clutch (refer to *CVT*). b. Spring sleeve(s) inside one-way clutch is (are) worn out. Replace both sleeves and springs and lubricate inside of one-way clutch (refer to *CVT*). c. Spring(s) inside one-way clutch is (are) worn out. Replace both pins and springs and lubricate inside of one-way clutch (refer to CVT).

SYMPTOM	DRIVE PULLEY NOISE WHEN ACCELERATING/DECELERATING.
CONDITION	NORMAL USE.
Test/Inspection	1. Check items 1 to 5 of drive pulley noise in idle speed.
	2. Check if belt runs in dry conditions. a. Drive pulley area is wet/contaminated due to water/dirt intrusion. Clean driven pulley area and/or drain water out of CVT cover.
	3. Check drive/driven pulley screw for torque. a. Loose screw on drive and/or driven pulley. Retighten screw with recommended torque.
	4. Check cam and driven pulley fixed half for wear. a. Cam and/or drive pulley fixed half out of wear limit and/or damaged. Replace damaged part(s).
	5. Check torque gear fixed in driven pulley sliding half for wear. a. Torque gear out of wear limit and/or damaged. Replace torque gear (refer to *CVT*).
	6. Check for foreign particles in CVT area (stones, dirt, etc.). a. Small particles damaged belt and/or pulley surface(s). Clean system and replace damaged parts (refer to *CVT*).

SYMPTOM	VIBRATIONS ORIGINATING FROM DRIVE PULLEY.
CONDITION	NORMAL USE.
Test/Inspection	1. Check tightening torque of drive pulley screw. a. Moving sliding half. Retighten screw.
	2. Check fixed half bushings. a. Excessive gap between bushings and fixed half shaft, thus restraining sliding half movements. Replace fixed half assembly.
	3. Check if slider shoes are present and/or placed in correct position. a. Slider shoe(s) is (are) missing and/or damaged. Replace all slider shoes at the same time (slider shoes kit).

SYMPTOM	VIBRATIONS ORIGINATING FROM DRIVEN PULLEY.
CONDITION	NORMAL USE.
Test/Inspection	1. Check fixed and sliding half bushings on driven pulley. a. Excessive gap between bushings and CVT shaft, thus restraining sliding half movements. Replace fixed and/or sliding half of driven pulley, polish CVT shaft area with fine emery cloth and wipe clean with a cloth.

SYMPTOM	PULLEYS DO NOT DOWN/UP SHIFT PROPERLY.
CONDITION	NORMAL USE.
Test/Inspection	1. Check drive pulley bushings (cleanliness, wear, etc.). a. Check items 1 and 2 of *UNUSUAL ACCELERATION BEHAVIOR*. b. Bushings stick to fixed half pulley shaft. Clean or replace. c. Spring seat sticks to sliding half pulley bushing. Clean system and/or replace sliding half pulley. d. One-way clutch does not operate properly. Clean system and/or replace damaged part(s).
	2. Check driven pulley spring tension. a. Driven pulley spring tension is too weak and/or broken. Replace. b. Driven pulley cam is worn or damaged. Replace.

SYMPTOM	BELT GLAZED EXCESSIVELY OR HAVING BAKED APPEARANCE.
CONDITION	NORMAL USE.
Test/Inspection	1. Check if CVT air intake and/or outlet is clogged. a. CVT area heats up due to contamination. Clean air intake and/or outlet from contamination. b. Fans located on drive pulley fixed half are clogged. Clean from contamination.
	2. Check if pulley halves are clean. a. Oil on pulley surfaces. Clean pulley halves and replace belt. b. Water intrusion in CVT area. Find root cause and repair. Drain water and replace belt.

SYMPTOM	BELT WORN EXCESSIVELY IN TOP WIDTH.
CONDITION	NORMAL USE.
Test/Inspection	1. Check drive belt width. a. Considerable wear. Replace belt if narrower than specified (refer to *CVT* or *TECHNICAL DATA*).
	2. Check drive belt identification number. a. Wrong type of belt. Replace belt with an appropriate drive belt.
	3. Check for localized belt wear caused by belt slippage. a. Localized wear. Replace belt.

SYMPTOM	BELT DISINTEGRATION.
CONDITION	NORMAL USE.
Test/Inspection	1. Check drive belt lifetime is exceeded. a. Clean CVT system and rebuild with a new drive belt.
	2. 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*).
	3. Check if pulley halves are clean. a. Oil on pulley surfaces. Clean pulley surfaces with fine emery cloth and wipe clean using Pulley Flange Cleaner (P/N 413 711 809) and a cloth. b. Drive/driven pulley halves are damaged through stones inside CVT area. Clean pulley surfaces with fine emery cloth, wipe clean with a cloth or replace drive/driven pulley halves and belt.

SYMPTOM	CRACKS BETWEEN COGS.
CONDITION	NORMAL USE.
Test/Inspection	1. Check drive belt condition. a. Considerable use, belt wearing out. Replace. b. Brittle belt condition through aging. Replace belt.

ENGINE GENERAL

SYMPTOM	ENGINE DOES NOT CRANK — STARTER DOES NOT TURN.
CONDITION	NORMAL USE.
Test/Inspection	Refer to *STARTING SYSTEM*.

SYMPTOM	ENGINE DOES NOT CRANK — STARTER TURNS.
CONDITION	NORMAL USE.
Test/Inspection	Refer to *STARTING SYSTEM*.

SYMPTOM	ENGINE CRANKS BUT FAILS TO START.
CONDITION	NORMAL USE.
Test/Inspection	1. Check if spark plug connector fits on spark plug (refer to *IGNITION SYSTEM*).
	2. Check spark plug. a. Define spark plug (no spark) or wrong spark plug gap. Readjust gap and clean spark plug or replace.
	3. Check for fuel on spark plug. a. Flooded engine (spark plug wet when removed). Activate engine drowned mode and crank engine with rags over the spark plug holes (refer to *OVERVIEW* in EMS system).
	4. Check battery voltage. a. Battery is discharged and starter works not properly. Charge battery.
	5. Check fuel level in fuel tank and fuel pressure. Ensure fuel pump was not disabled by B.U.D.S. a. Low or no fuel pressure. Replace defective part(s) (refer to *FUEL TANK AND FUEL PUMP*).
	6. Check fuel injectors. a. Plugged or faulty injector(s). Replace defective part(s) (refer to *ENGINE MANAGEMENT*).
	7. Check idle bypass valve. a. Stuck or defective. Refer to *ENGINE MANAGEMENT.*
	8. Check encoder wheel. a. Bent tooth. Refer to *MAGNETO SYSTEM.*
	9. Check engine compression. a. Insufficient engine compression. Replace defective part(s) (refer to *LEAK TEST*).
	10. Check fault codes in B.U.D.S system. a. Check if electrical actuator(s) is/are defective. Replace defective part(s) (refer to *COMPONENT INSPECTION AND ADJUSTMENT*).

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 plug.
	2. Check ignition coil (refer to *IGNITION SYSTEM*). a. Defective part. Replace ignition coil.
	3. Check crankshaft position sensor (refer to *COMPONENT INSPECTION AND ADJUSTMENT*). a. Defective crankshaft position sensor. Corroded connector terminals. Replace crankshaft position sensor. Clean terminals and apply silicone dielectric grease.
	4. Check condition of wiring harness and connectors. a. Cables and/or connectors are damaged and/or corroded. Replace connectors or complete wiring harness (refer to *COMPONENT INSPECTION AND ADJUSTMENT*). Clean terminals and apply silicone dielectric grease.
	5. Check fault codes in B.U.D.S. system. a. Check if electrical actuator(s) is/are defective. Replace defective part(s) (refer to *COMPONENT INSPECTION AND ADJUSTMENT*).

SYMPTOM	ENGINE HARD TO START.
CONDITION	NORMAL USE.
Test/Inspection	1. Check idle bypass valve. a. Stuck or defective. Refer to *ENGINE MANAGEMENT*.
	2. Check closed throttle and idle actuator with B.U.D.S. a. Wrong TPS zero setting/idle bypass valve reset. Refer to *ENGINE MANAGEMENT*.
	3. Check throttle cable adjustment. a. Wrong adjustment (likely too tight). Refer to *ENGINE MANAGEMENT*.
	4. Check engine compression. a. Insufficient engine compression. Replace defective part(s) (refer to *LEAK TEST*).
	5. Verify spark plug condition. a. Defective, improperly set, worn out, fouled. Identify source of problem and correct. Replace spark plug.
	6. Check fuel level in fuel tank and fuel pressure. a. Low or no fuel pressure. Replace defective part(s) (refer to *FUEL TANK AND FUEL PUMP*).
	7. Check CAPS (camshaft position sensor). a. Defective sensor/wiring. Refer to *ENGINE MANAGEMENT*.

SYMPTOM	ENGINE SUDDENLY TURNS OFF.
CONDITION	NORMAL USE.
Test/Inspection	1. Perform engine leak test. Refer to *ENGINE LEAK TEST* procedure. Check for possible piston seizure. a. Damaged head gasket and/or seal and/or leaking inlet/exhaust valve(s). Replace and/or repair defective parts.
	2. Check spark plug condition and/or gap. a. Fouled spark plug or wrong spark plug gap. Readjust gap and clean spark plug or replace spark plug.
	3. Piston seizure. a. Spark plug heat range is too hot. Install spark plug with appropriate heat range (refer to *TECHNICAL DATA*). b. Compression ratio is too high. Install genuine parts. c. Poor oil quality. Use high quality oil. d. Leaks at air intake manifold (engine gets too lean). Retighten screws or replace air intake manifold gasket. e. Snow/water intrusion through intake system into combustion chamber. Clean intake system and replace defective part(s).
	4. Melted and/or perforated piston dome; melted section at ring end gap. a. Spark plug heat range is too hot. Install recommended spark plug (refer to *TECHNICAL DATA*). b. Coolant less than recommended level (engine gets too hot). Repair cooling circuit and/or refill with recommended liquid. c. Poor quality and/or wrong fuel. Clean from contamination and use appropriate fuel (refer to *TECHNICAL DATA*).
	5. 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. Replace damaged parts.
	6. Cracked or broken piston. a. Cracked or broken piston due to excessive piston/cylinder clearance or engine overreving. Replace piston. Check piston/cylinder clearance (refer to *CYLINDER AND HEAD*).

SYMPTOM	ENGINE SUDDENLY TURNS OFF.
CONDITION	NORMAL USE.
Test/Inspection	7. Check piston rings and cylinder surface for grooves. a. Poor oil quality. Use high quality oil. b. Contamination through engine intake. Replace defective part(s) and use new air filter.
	8. Check crankshaft, rocker arms movement. a. Oil pump failure due to lack of oil. Repair and replace defective parts and use high quality oil. b. Oil contamination due to clogged oil filter/oil strainer. Replace oil and oil filter at the same time, replace defective part(s) (refer to *MAINTENANCE CHART* and *LUBRICATION SYSTEM*).
	9. Check valve springs exhaust/intake. a. Broken valve spring damages the cylinder head, valve(s), rocker arm(s), piston, piston rings and connecting rod. Replace defective part(s).
	10. Check if fuel supply is sufficient. a. Low fuel level. b. Clogged fuel filter or fuel injector filter. c. Fuel line is contaminated and/or bent. Clean and/or replace defective part(s).
	11. Check fault codes in B.U.D.S. system. a. Check if electrical actuator(s) is/are defective. Replace defective part(s) (refer to *COMPONENT INSPECTION AND ADJUSTMENT*).

SYMPTOM	ENGINE BACKFIRES.
CONDITION	NORMAL USE.
Test/Inspection	1. Check spark plug. a. Carbon accumulation caused by defective spark plug. Replace spark plug.
	2. Check leakage on intake manifold. a. Air leak on intake system. Retighten screws and/or replace intake manifold gasket.
	3. Check exhaust air leaking. a. Exhaust gasket is leaking. Retighten screws and/or replace exhaust gasket.
	4. Check intake valve(s) for leaking. a. Intake valve(s) is (are) leaking. Repair or replace valve(s).
	5. Check if fuel supply is sufficient. a. Fuel line is contaminated and/or bent (engine gets lean). Clean and/or replace defective part(s).
	6. Check engine ground. a. Poor engine ground. Clean.
	7. Check fault codes in B.U.D.S. system. a. Check if electrical actuator(s) is/are defective. Replace defective part(s) (refer to *COMPONENT INSPECTION AND ADJUSTMENT*).

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/or gap. a. Fouled spark plug or wrong spark plug gap. Readjust gap and clean spark plug or replace.
	2. Check spark plug type. a. Improper spark plug heat range. Install recommended spark plug (refer to *TECHNICAL DATA*).
	3. Perform engine leak test. Refer to *ENGINE LEAK TEST* procedure. Check for possible piston seizure. a. Damaged head gasket and/or seal and/or leaking intake/exhaust valve(s). Replace and/or repair defective parts.
	4. Check for water in fuel (wrong fuel). a. There is water in fuel or wrong fuel. Drain fuel system, search for leakage and refill it with appropriate fuel.
	5. Check engine compression. a. Worn piston(s) and/or piston ring(s). Replace defective part(s) (refer to *CYLINDER AND HEAD* and *LEAK TEST*).
	6. Check fuel pressure. a. Low fuel pressure. Perform fuel pressure test (refer to *FUEL SYSTEM*).
	7. Check air intake system. a. Air filter is clogged due to contamination. Replace air filter.
	8. Check if EMS (engine management system) is in limp home mode. Check fault codes in B.U.D.S system. a. Check if electrical actuator(s) is/are defective. Replace defective part(s) (refer to *COMPONENT INSPECTION AND ADJUSTMENT*).
	9. Check drive belt. a. Worn Replace belt if its width is less than specified (refer to *CVT*).

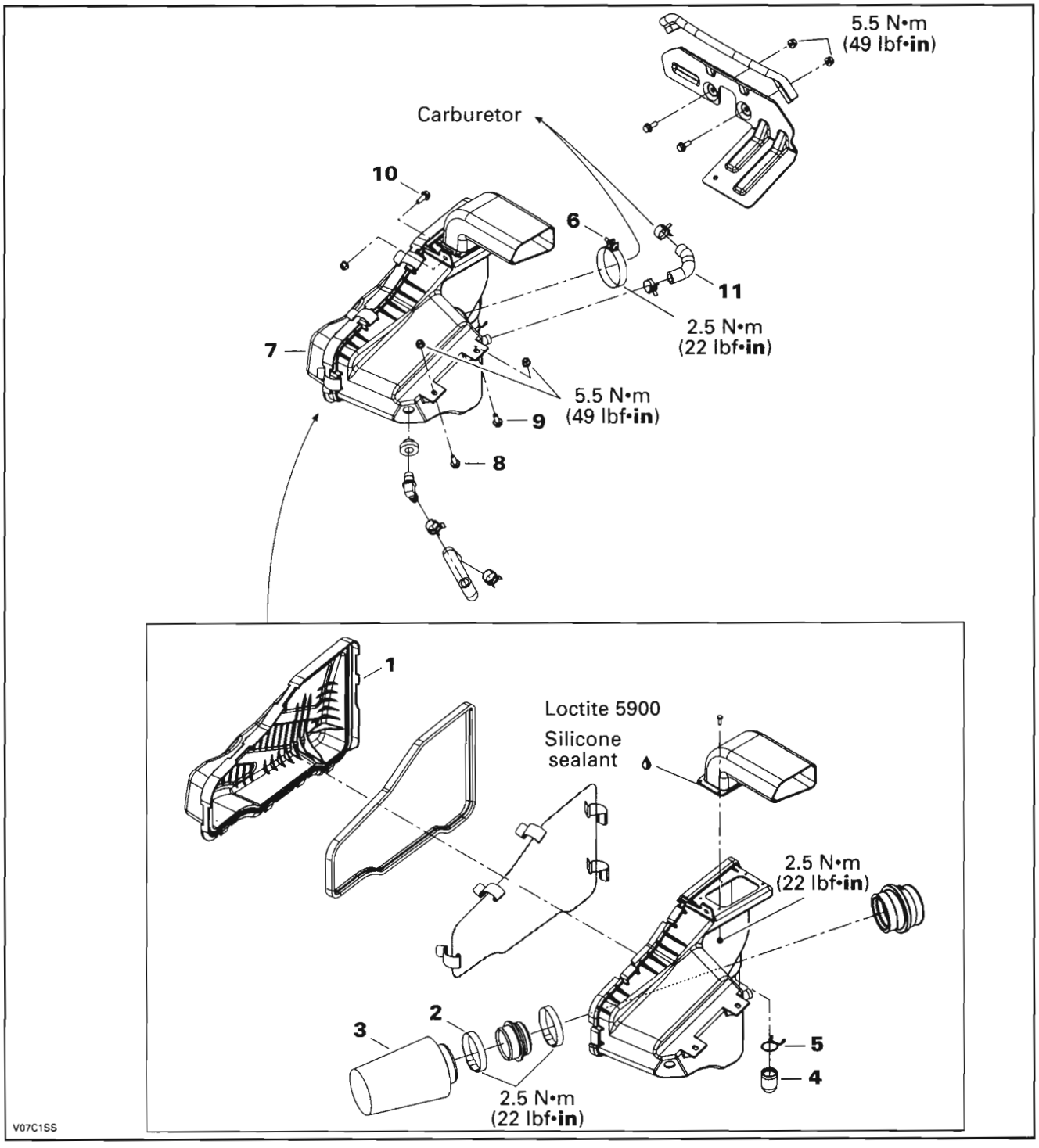
SYMPTOM	HIGH ENGINE OPERATING TEMPERATURE.
CONDITION	NORMAL USE.
Test/Inspection	1. Check if cooling system shows any failure (see *COOLING SYSTEM*). a. System is leaking. Repair and/or replace damaged part(s).
	2. Check function of lubrication system (see *LUBRICATION SYSTEM*). a. Lubrication is not working properly. Repair and/or replace damaged part(s).
	3. Check condition and heat range of spark plug. a. Melted spark plug tip or inadequate heat range. Replace.
	4. Check air leakage on engine intake. a. Leakage causes overheating. Replace/repair damaged part(s).
	5. Check air inlet and outlet of the CVT cover. a. Air circulation is clogged (overheating). Clean air circulation from contamination. b. Drive belt worn and/or damaged. Replace belt with an appropriate drive belt (refer to *TECHNICAL DATA*).

AIR INTAKE SILENCER

SERVICE PRODUCTS

Description	Part Number	Page
air filter cleaning solution	219 700 341	58, 61
air filter oil	219 700 340	58
Loctite 5910	293 800 081	63

OUTLANDER 400 SERIES



GENERAL

During assembly/installation, use the torque values and service products as in the exploded views.

Clean threads before applying a threadlocker. Refer to *SELF-LOCKING FASTENERS* and *LOCTITE APPLICATION* at the beginning of this manual for complete procedure.

⚠ WARNING

Torque wrench tightening specifications must strictly be adhered to.
Locking devices (e.g.: locking tabs, elastic stop nuts, 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.

PROCEDURES

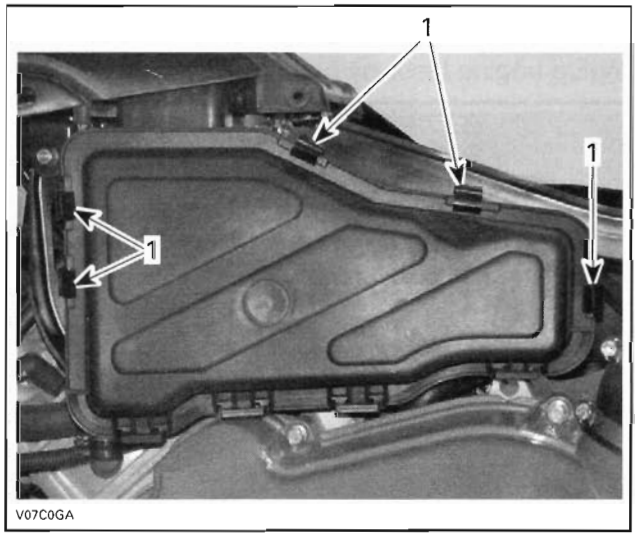
AIR FILTER

Removal

CAUTION: Never remove or modify any component in the air box. The engine carburetion is calibrated to operate specifically with these components. Otherwise, engine performance degradation or damage can occur.

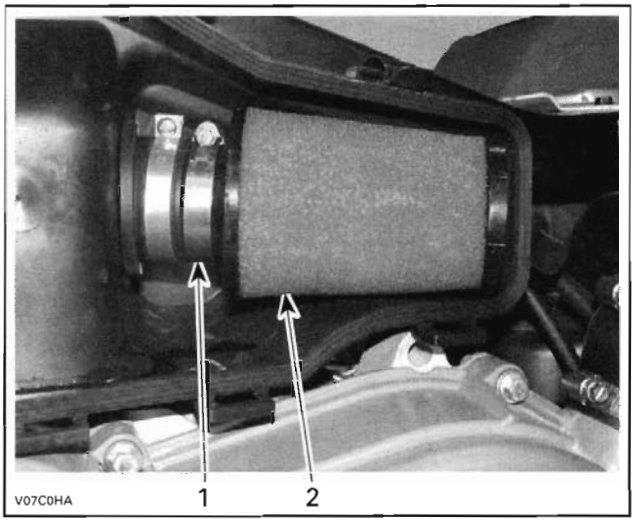
Remove seat and LH side panel.

Release clamps and remove air filter box cover no. 1.



1. Release clamps

Loosen clamp no. 2 and remove air filter no. 3.



TYPICAL
1. Clamp
2. Air filter

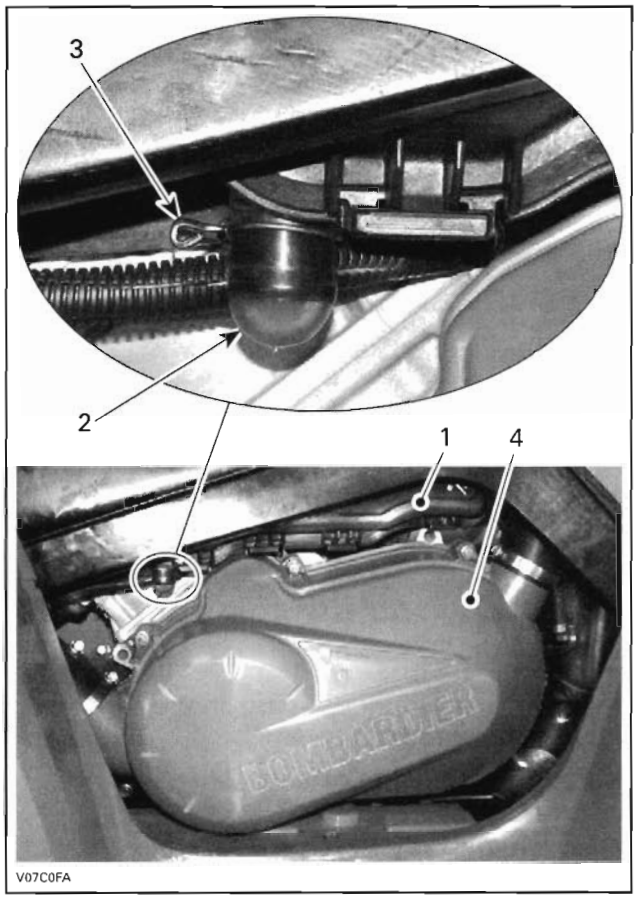
Installation

Properly reinstall removed parts in the reverse order of their removal.

NOTE: Apply air filter oil on air filter.

AIR FILTER BOX CLEANING/DRAINING

Periodically inspect air filter box drain tube no. 4 for liquid or deposits.



1. *Air filter box*
2. *Drain tube*
3. *Clamp*
4. *CVT cover*

NOTE: If vehicle is used in dusty area, inspect more frequently than specified in maintenance chart.

If liquid/deposits are found, squeeze and remove the clamp **no. 5**. Pull drain tube **no. 4** out and empty it.

CAUTION: Do not start engine if liquid or deposit are found in the drain tube. If there is oil in the air box, check engine oil level. Maybe oil level is too high.

NOTE: After air filter installation, you can find a small quantity of air filter oil in the drain tube.

Remove air filter.

NOTE: When liquid/deposits are found, the air filter must be inspected/dried/replaced depending on its condition.

Pour air filter cleaning solution (P/N 219 700 341) or an equivalent into a bucket. Put the filter in to soak.

While filter soaks, clean inside of air box.

Rinse filter with warm water and let it dry completely.

When the filter is dried, re-oil with air filter oil (P/N 219 700 340) or an equivalent.

AIR FILTER BOX

Removal

Remove seat and console (refer to *BODY*).

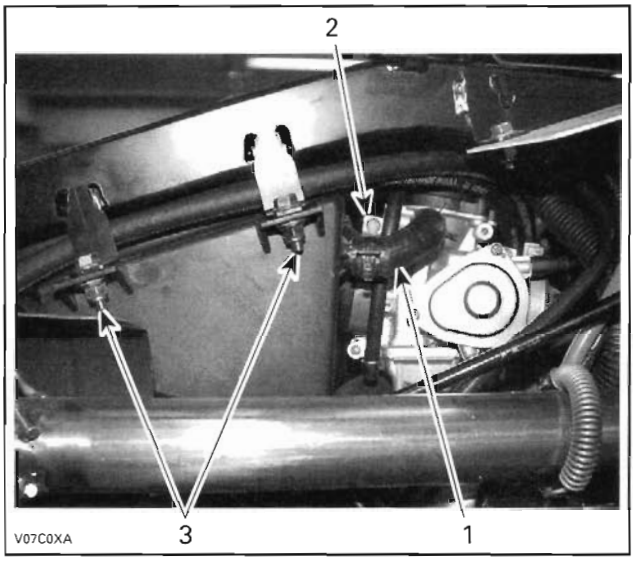
On right side of vehicle, perform the following:

Remove the RH side panel.

Unplug the carburetor vent hose.

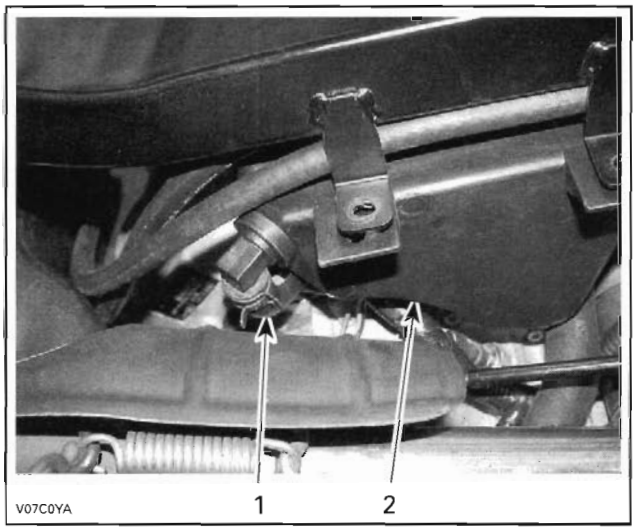
Unscrew:

- carburetor clamp **no. 6** on air filter box **no. 7**
- air filter box screws **no. 8** and **no. 9**.



1. *Carburetor vent hose*
2. *Carburetor clamp*
3. *Air filter box screws*

Unplug engine blow-by hose **no. 11** from air box.

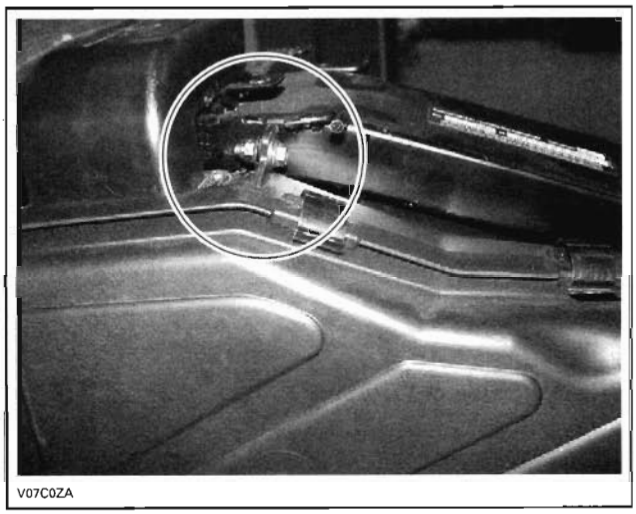


1. *Engine blow-by hose*
2. *Air box*

On LH side of vehicle, do the following:

Remove the LH side panel.

Unscrew air filter box screw **no. 10**.



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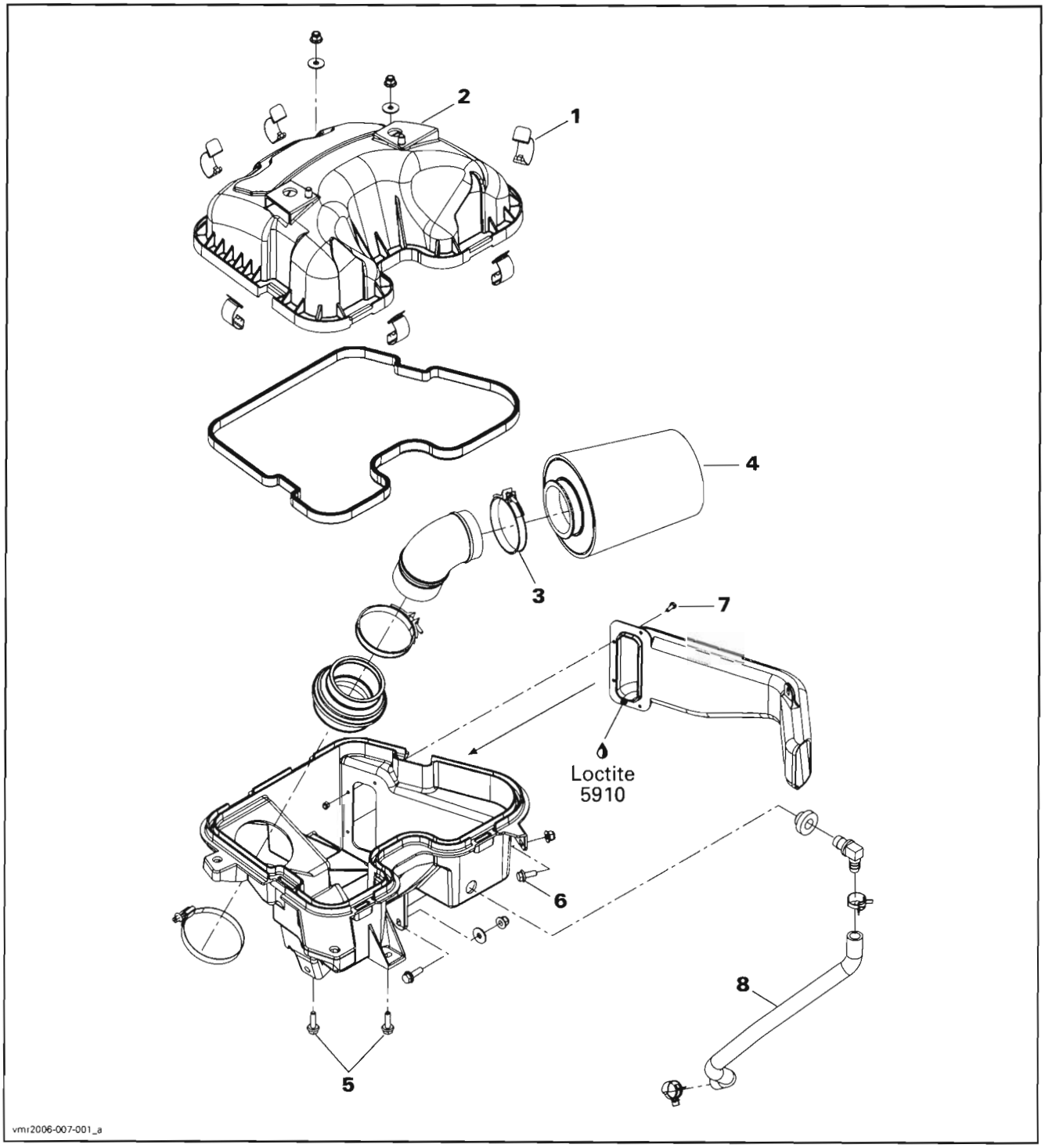
Pull out air filter box.

Installation

For installation, reverse the removal procedure.

CAUTION: Pay attention to fuel hoses and fittings on fuel tank.

OUTLANDER 800 SERIES



GENERAL

During assembly/installation, use the torque values and service products as in the exploded views.

Clean threads before applying a threadlocker. Refer to *SELF-LOCKING FASTENERS* and *LOCTITE APPLICATION* at the beginning of this manual for complete procedure.

⚠ WARNING

Torque wrench tightening specifications must strictly be adhered to.
Locking devices (e.g.: locking tabs, elastic stop nuts, 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.

PROCEDURES

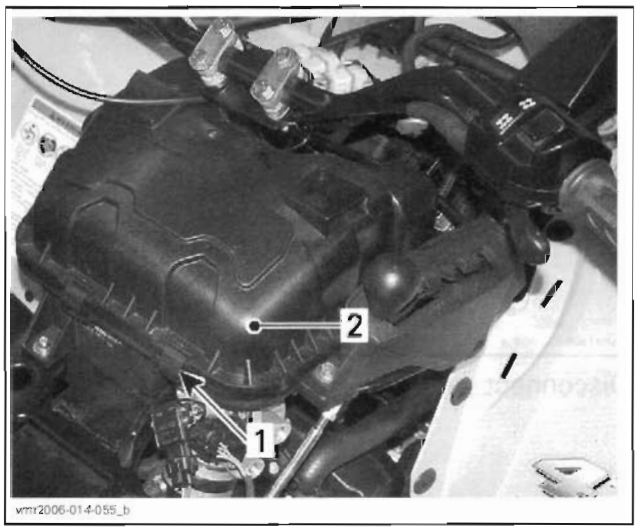
AIR FILTER

Removal

CAUTION: Never remove or modify any component in the air box. The engine management system is calibrated to operate specifically with these components. Otherwise, engine performance degradation or damage can occur.

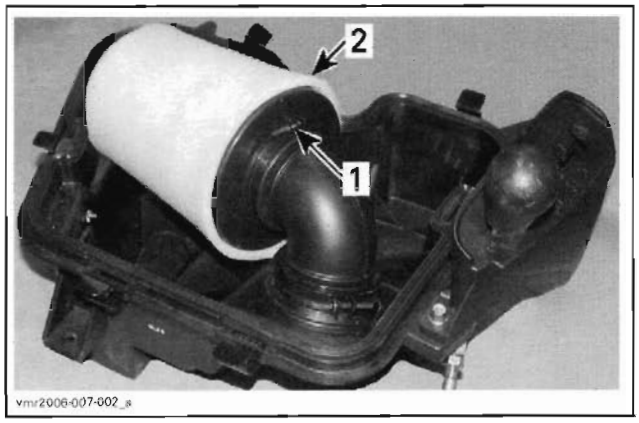
Remove seat, side panels, center console and dashboard. Refer to *BODY*.

Release clamps no. 1 and remove air filter box cover no. 2.



1. *Clamps*
2. *Cover*

Loosen clamp no. 3 and remove air filter no. 4.



1. *Clamp*
2. *Air filter*

NOTE: If vehicle is used in dusty area, inspect more frequently than specified in maintenance chart.

If liquid/deposits are found, squeeze and dry the foam filter. Replace filter element if damaged.

CAUTION: Do not start engine if liquid or deposit are found. If there is oil in the air box, check engine oil level. Oil level may be too high.

Pour air filter cleaning solution (P/N 219 700 341) or an equivalent into a bucket. Put the foam filter in to soak. Do not wash filter element.

While filter soaks, clean inside of air box.

Rinse foam filter with warm water and let it dry completely.

Blow low pressure compressed air on filter element to clean it.

Installation

Properly reinstall removed parts in the reverse order of their removal.

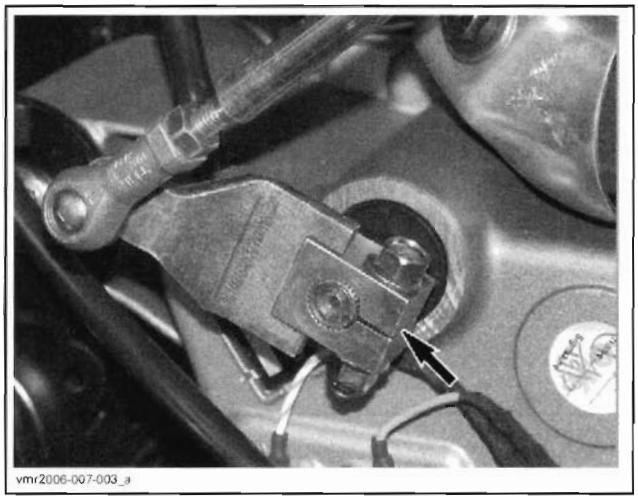
AIR FILTER BOX

Removal

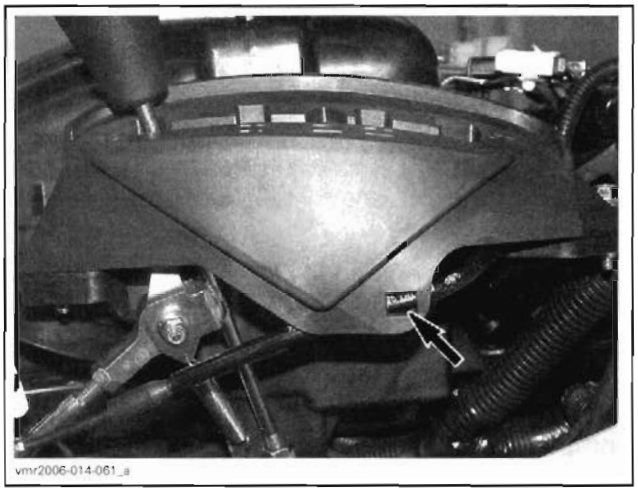
Remove seat, side panels, center console and dashboard. Refer to *BODY*.

Set shifter lever to PARK.

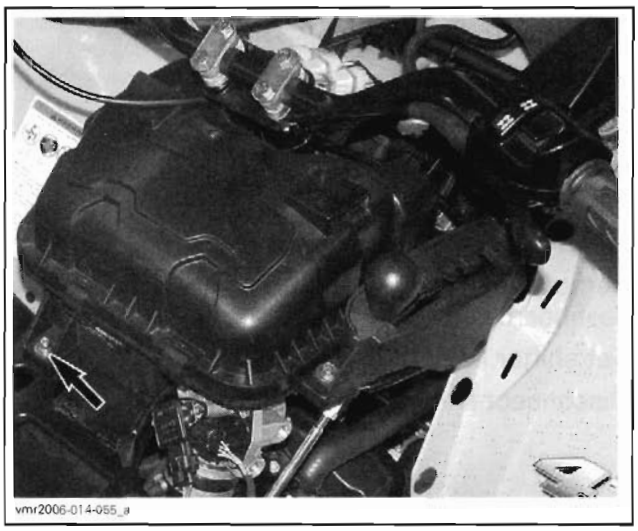
Disconnect shifter from transmission shaft.

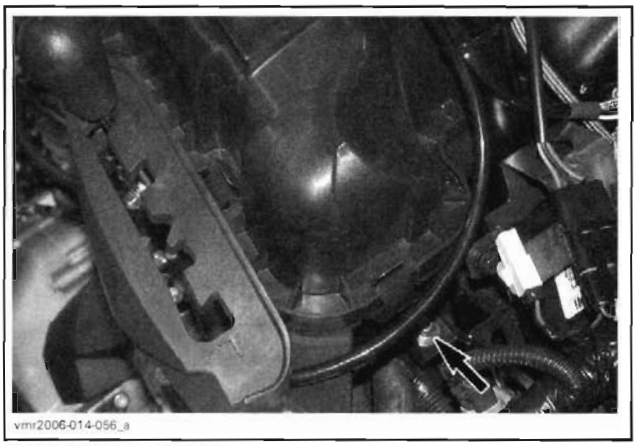


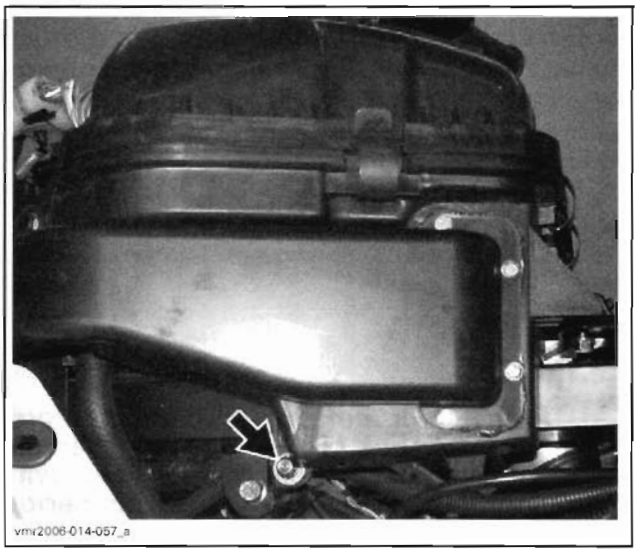
Detach throttle cable from shifter panel.



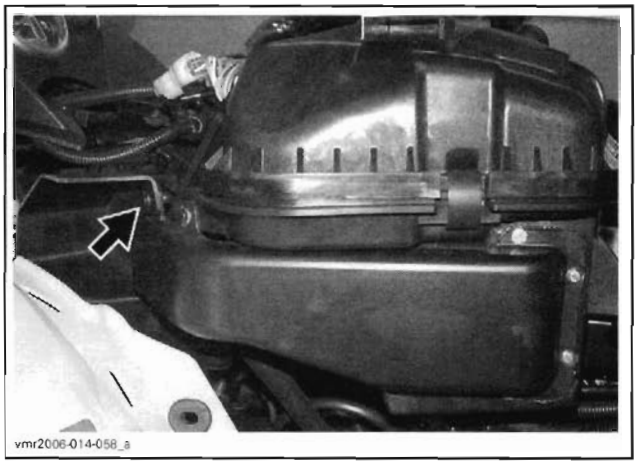
Remove retaining fasteners **no. 5** and **no. 6**.



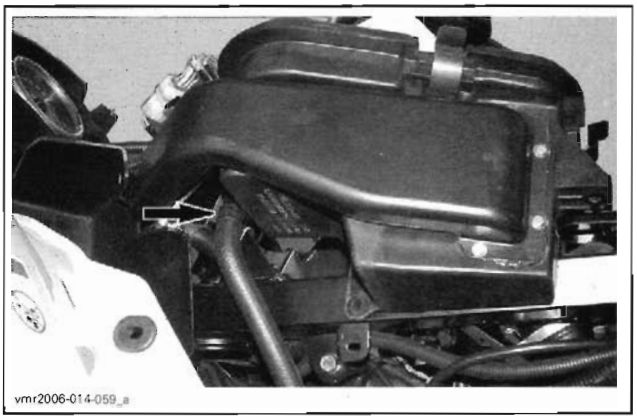




Remove dart **no. 7**.



Disconnect vent tube **no. 8**.



Pull air box out.

Installation

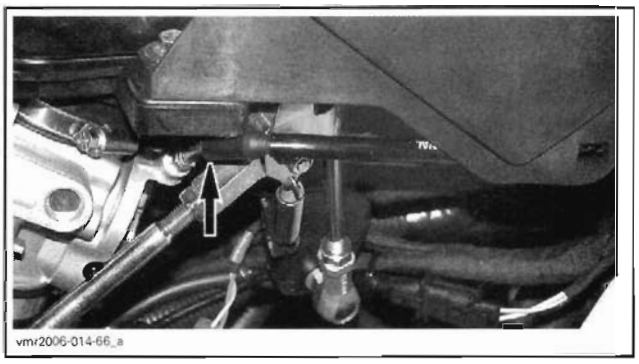
For installation, reverse the removal procedure but pay attention to the following.

If the baffle is removed, reseal it with Loctite 5910 (P/N 293 800 081) and replace rivets by screws (M4 x 12 mm) and elastic stop nuts.

Set shifter lever to PARK then reinstall shifter to transmission shaft. Check its operation and adjust as necessary. Refer to *GEARBOX*.

Secure throttle cable to shifter panel.

Gently pull throttle cable toward rear to have a gap between cable and shifter mechanism.



GAP HERE

⚠ WARNING

Ensure shifter mechanism does not touch throttle cable. Depress throttle lever several times to ensure it properly returns.

LUBRICATION SYSTEM

OUTLANDER 400 SERIES

GENERAL

Prior to change the oil, ensure vehicle is on a level surface.

Oil and oil filter must be replaced at the same time. Oil change and oil filter replacement should be done with a warm engine.

⚠ WARNING

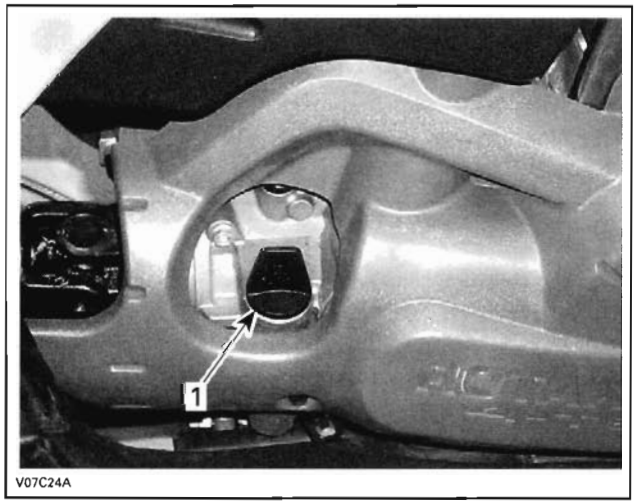
The engine oil can be very hot. Wait until engine oil is warm.

Dispose oil and filter as per your local environmental regulations.

PROCEDURES

OIL LEVEL CHECK

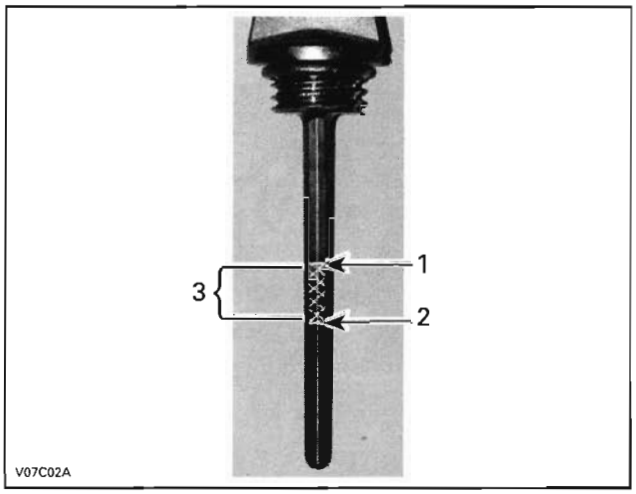
CAUTION: Check level frequently and refill if necessary. Do not overfill. Operating the engine/transmission with an improper level may severely damage engine/transmission. Wipe off any spillage.



RH SIDE OF ENGINE
1. Dipstick

With vehicle on a level surface and engine cold, not running, check the oil level as follows:

1. Unscrew dipstick then remove it and wipe clean.
2. Reinstall dipstick, screw in it completely.
3. Remove and check oil level. It should be near or equal to the upper mark.



TYPICAL
1. Full
2. Add
3. Operating range

To add oil, remove the dipstick. Place a funnel into the dipstick tube to avoid spillage.

Add a small amount of recommended oil and recheck oil level.

Repeat the above procedures until oil level reaches the dipstick's upper mark. **Do not overfill.**

Properly tighten dipstick.

OIL CHANGE

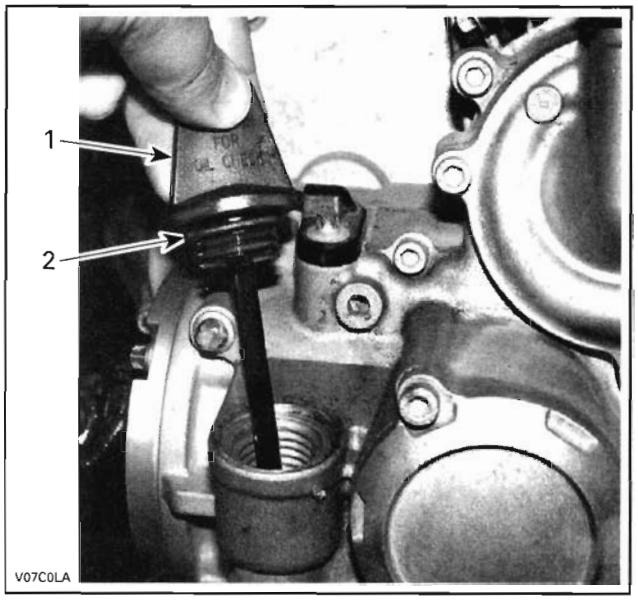
Removal

Place a drain pan under the engine magnetic drain plug area.

Clean the magnetic drain plug area.

Unscrew magnetic drain plug then remove dipstick.

CAUTION: Pay attention not to lose the O-ring on dipstick.



1. Dipstick
2. O-ring

Wait a while to allow oil to flow out of oil filter.

Inspection

Oil condition gives information about the engine condition. See *TROUBLESHOOTING* section.

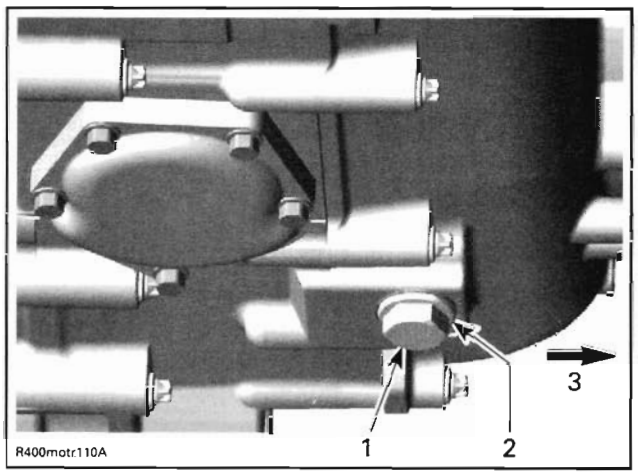
Clean the magnetic drain plug from metal shavings and dirt. Presence of debris gives an indication of failure inside the engine. Check engine to correct the problem.

Change gasket ring on magnetic drain plug if damaged.

Installation

The installation is the reverse of removal procedure.

CAUTION: Never use the gasket ring a second time. Always replace by a new one.



1. Magnetic drain plug
2. Gasket ring
3. Engine MAG side

System Capacity

Oil change with filter: 3 L (3.17 qt).

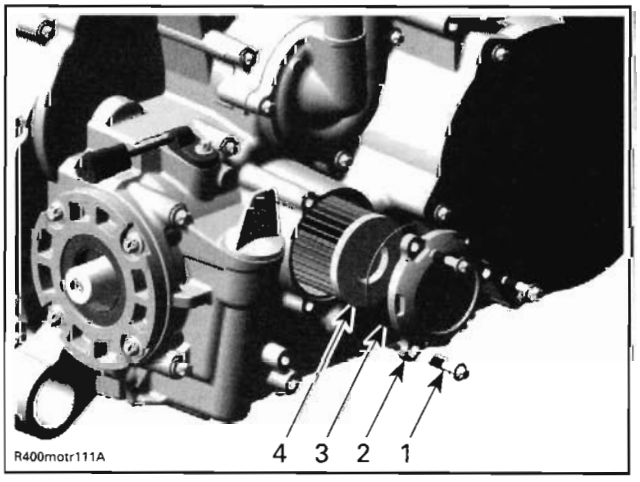
After filling, check the oil level with the dipstick. Refer to *OIL LEVEL CHECK* above.

NOTE: Run engine to ensure oil filter and drain plug areas are not leaking.

OIL FILTER

Removal

Remove:
- engine oil (refer to *OIL CHANGE*)
- oil filter screws
- oil filter cover
- oil filter.

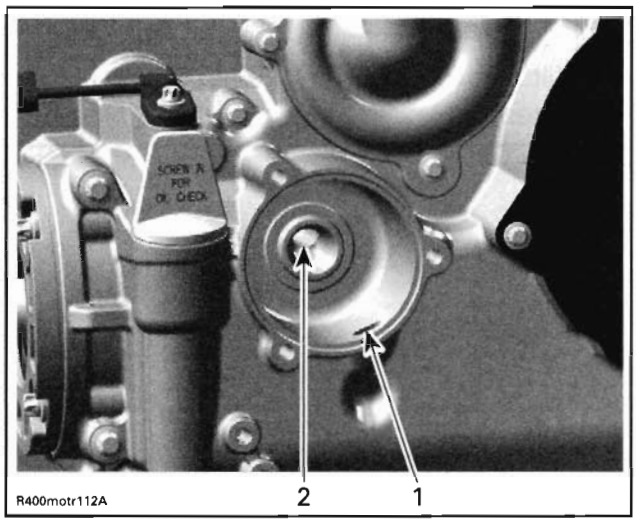


1. Oil filter screws
2. Oil filter cover
3. O-ring
4. Oil filter

Inspection

Check oil filter cover O-ring, change it if necessary.

Check and clean the oil filter inlet and outlet area for dirt and other contaminations.



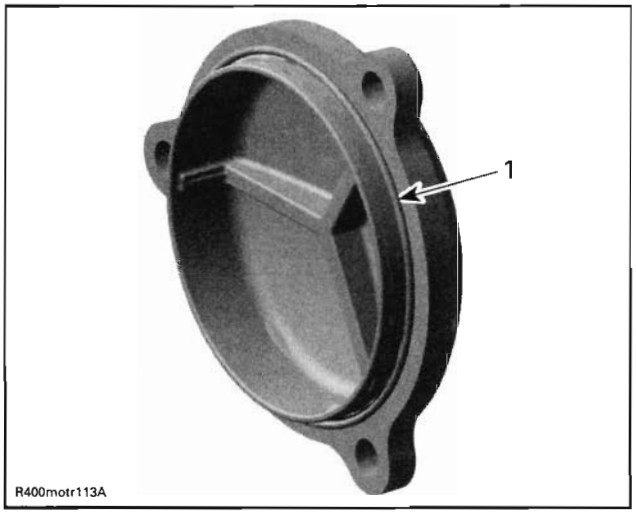
1. *Inlet bore from the oil pump to the oil filter*
2. *Outlet bore to the engine oil providing system*

Installation

The installation is the opposite of the removal procedure. Pay attention to the following details.

Apply oil on rubber seal of oil filter to ensure proper installation.

Install O-ring on oil filter cover.



1. *O-ring in place*

OUTLANDER 800 SERIES

GENERAL

Prior to change the oil, ensure vehicle is on a level surface.

Oil and oil filter must be replaced at the same time. Oil change and oil filter replacement should be done with a warm engine.

⚠ WARNING

The engine oil can be very hot. Wait until engine oil is warm.

Dispose oil and filter as per your local environmental regulations.

PROCEDURES

OIL LEVEL CHECK

NOTE: Strictly follow this procedure, otherwise wrong oil level may be indicated.

Ensure vehicle is on a level surface.

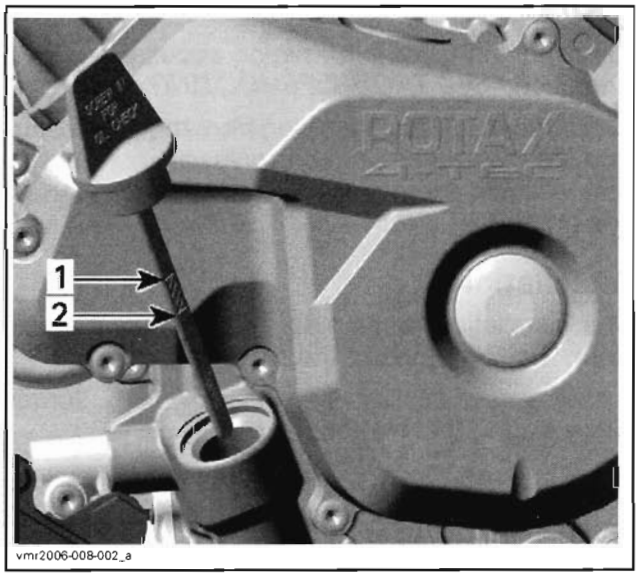
Start engine and let idle for a few minutes.

Stop engine. Wait a few minutes to allow oil to flow down to crankcase then check oil level.

Fully screw in dipstick to check oil level.

Remove dipstick and read oil level.

Oil level must be between minimum and maximum marks on dipstick.



TYPICAL — FULLY SCREW DIPSTICK TO CHECK OIL LEVEL
1. *Maximum*
2. *Minimum*

There is a capacity of 300 mL (10 U.S. oz) between the two marks.

Refill oil as necessary. Do not overfill.

Reinstall dipstick.

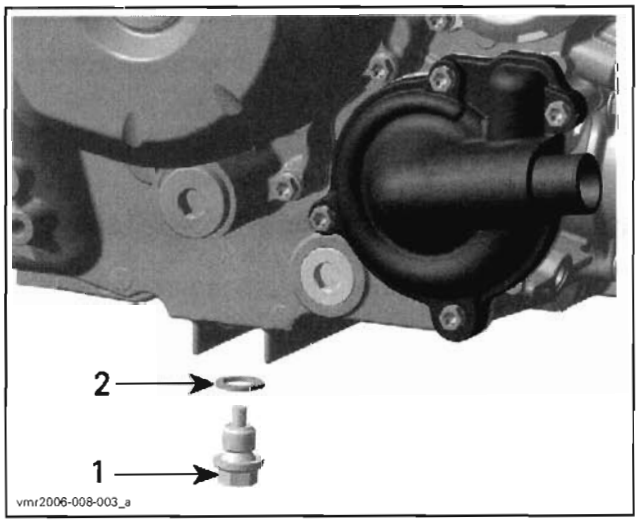
OIL CHANGE

Removal

Place a drain pan under the engine drain plug area.

Clean the magnetic drain plug area.

Unscrew drain plug then remove dipstick.



1. Drain plug
2. Gasket ring

Wait a while to allow oil to flow out of oil filter.

Inspection

Oil condition gives information about the engine condition. See *TROUBLESHOOTING* section.

Clean the magnetic drain plug from metal shavings and dirt. Presence of debris gives an indication of failure inside the engine. Check engine to correct the problem.

Installation

The installation is the reverse of removal procedure. Pay attention to the following details.

Install a new gasket ring on drain plug. Torque drain plug to 20 N•m(15 lbf•ft).

System Capacity

Oil change with filter: 1.7 - 2 L (1.8 - 2.11 qt).

After filling, check the oil level with the dipstick. Refer to *OIL LEVEL CHECK* above.

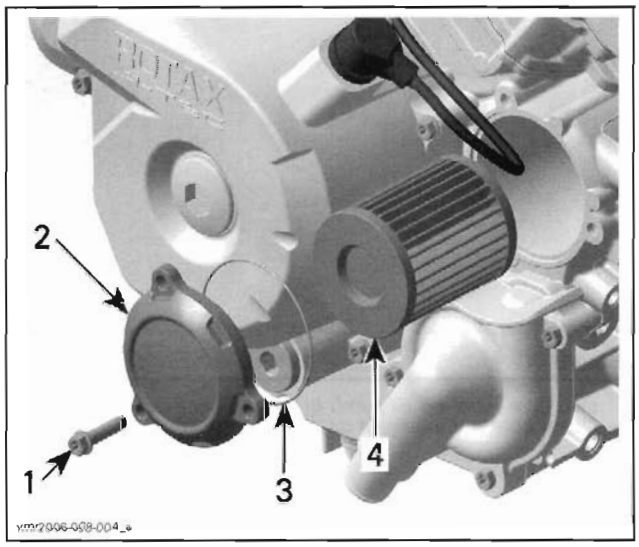
NOTE: Run engine to ensure oil filter and drain plug areas are not leaking.

OIL FILTER

Removal

Remove:

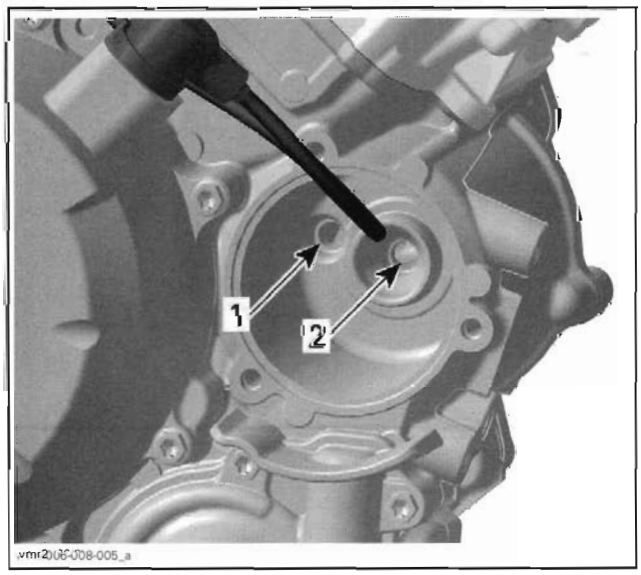
- engine oil (refer to *OIL CHANGE*)
- oil filter screws
- oil filter cover
- oil filter.



1. Oil filter screw
2. Oil filter cover
3. O-ring
4. Oil filter

Inspection

Check and clean the oil filter inlet and outlet area for dirt and other contaminations.



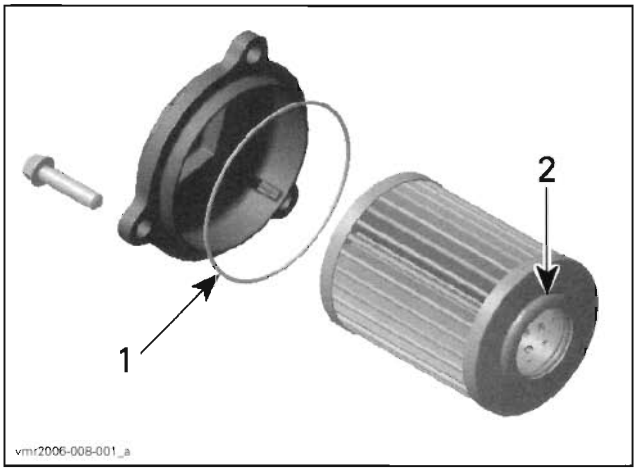
1. Inlet bore from the oil pump to the oil filter
2. Outlet bore to the engine oil providing system

Installation

The installation is the reverse of the removal procedure. Pay attention to the following details.

Install a new gasket on oil filter cover.

To ease assembly and prevent displacement of the gasket during installation, refer to following illustration.



1. *Slightly oil*
2. *Slightly grease*

COOLING SYSTEM

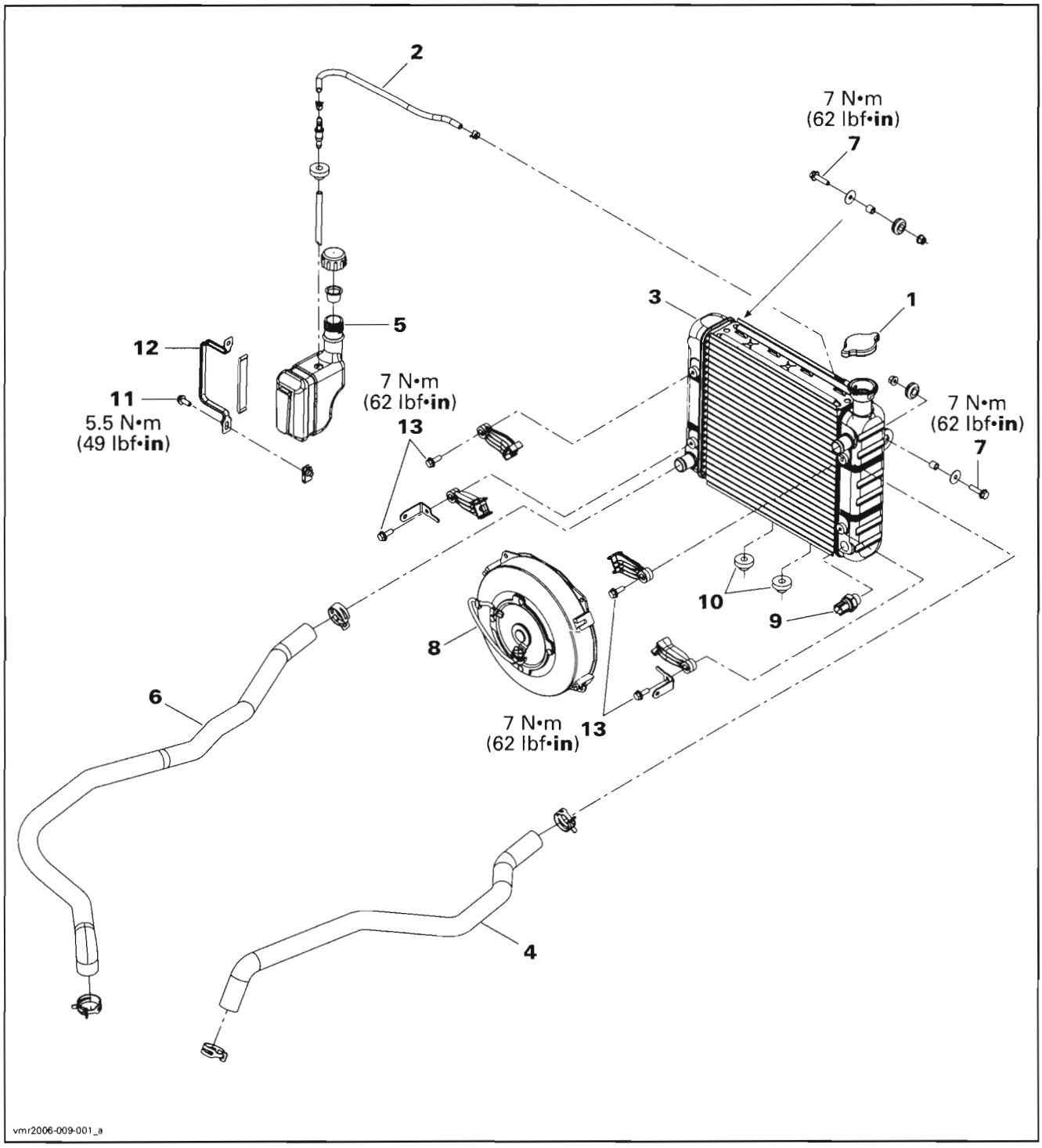
SERVICE TOOLS

Description	Part Number	Page
large hose pincher	529 032 500	76, 81
multimeter FLUKE 111	529 035 868	81–82
pressure/vacuum pump	529 021 800	74
small hose pincher	295 000 076	74
test cap	529 035 991	74

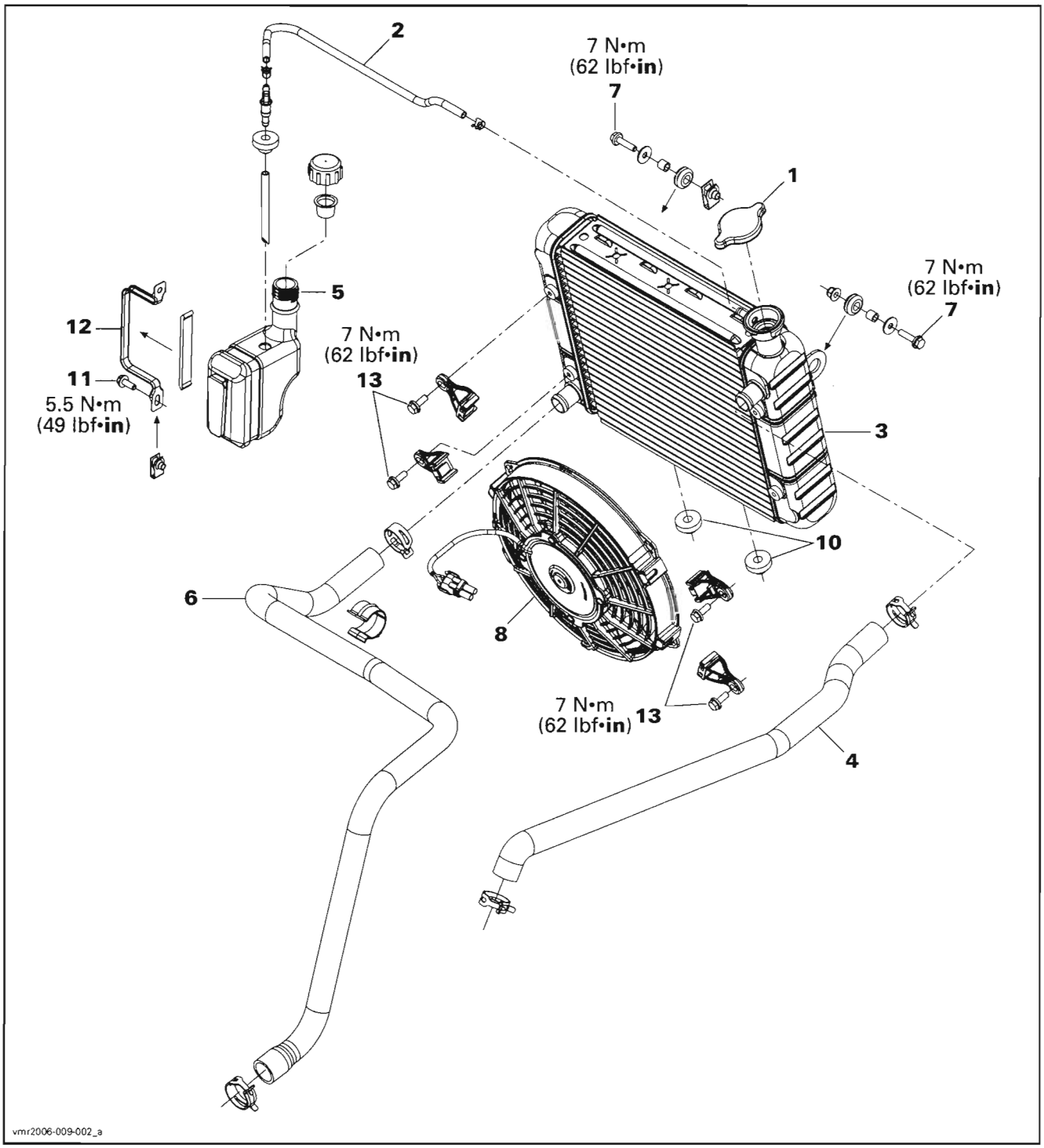
SERVICE PRODUCTS

Description	Part Number	Page
Bombardier premixed coolant	219 700 362	75

Outlander 400 Series



Outlander 800 Series



GENERAL

⚠ WARNING

Never start engine without coolant. Engine parts and ceramic seal on water pump shaft can be damaged.

During assembly/installation, use the torque values and service products as in the exploded views.

Clean threads before applying a threadlocker. Refer to *SELF-LOCKING FASTENERS* and *LOCTITE APPLICATION* at the beginning of this manual for complete procedure.

⚠ WARNING

Torque wrench tightening specifications must strictly be adhered to.
Locking devices (e.g.: locking tabs, elastic stop nuts, 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.

PROCEDURES

COOLING SYSTEM LEAK TEST

⚠ WARNING

To avoid potential burns, do not remove the radiator cap or loosen the cooling drain plug if the engine is hot.

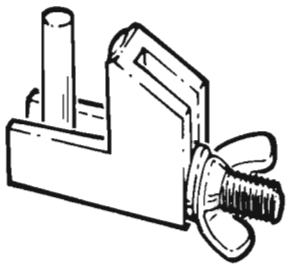
Open the access panel and remove the radiator cap **no. 1**.

Install the test cap (P/N 529 035 991) and a small hose pincher (P/N 295 000 076) on overflow hose **no. 2**.

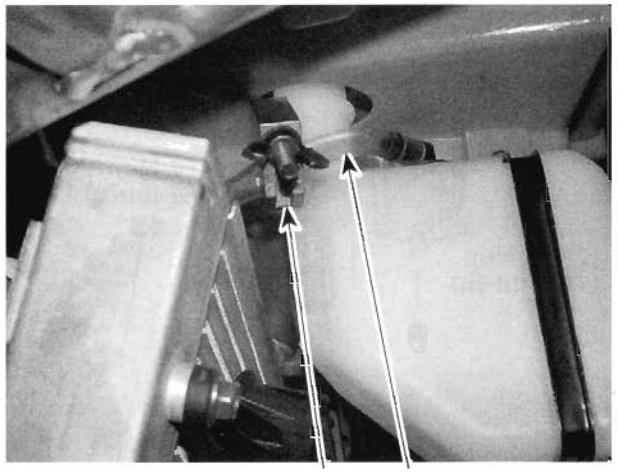
Using pressure/vacuum pump (P/N 529 021 800), pressurize system to 103 kPa (15 PSI).



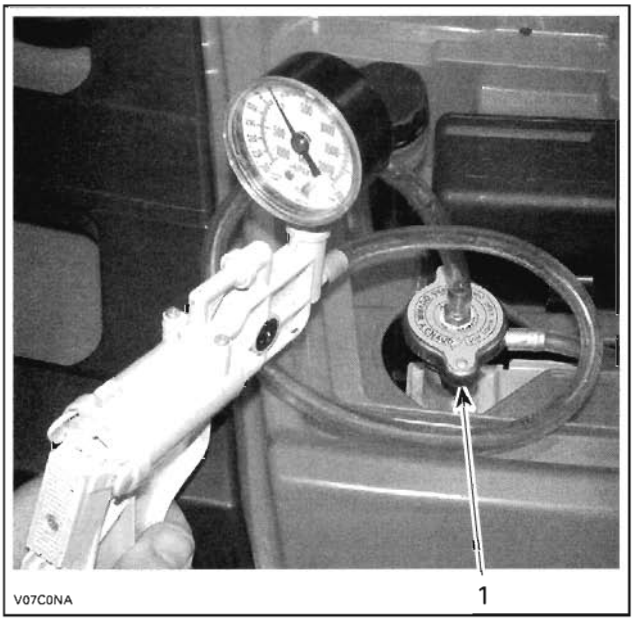
529 035 991



295 000 076



1. Hose pincher
2. Overflow hose



TYPICAL
1. Special radiator cap

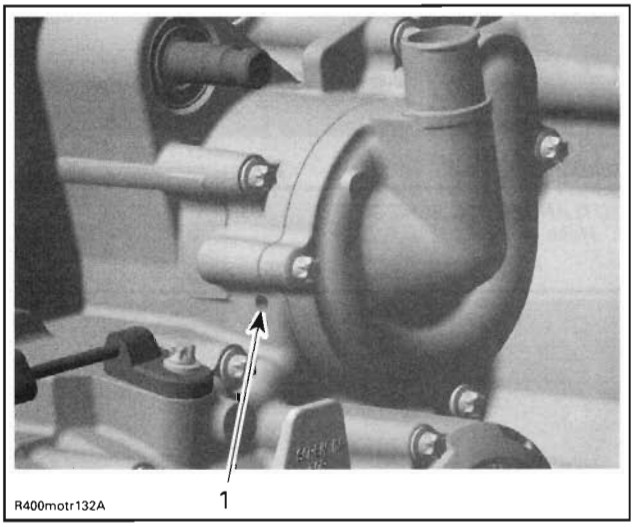
Check all hoses, radiator **no. 3** and cylinder(s)/base for coolant leaks or air bubbles.

Inspection

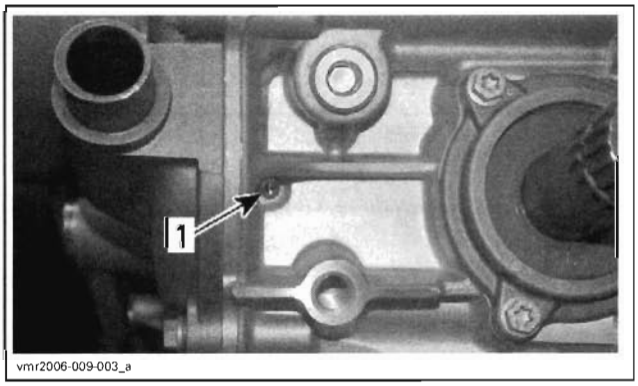
Check general condition of hoses and clamps tightness.

Check the leak indicator hole if there is oil or coolant.

NOTE: Flowing coolant indicates a damaged rotary seal. Oil indicates a non working oil seal. Refer to appropriate *ENGINE SHOP MANUAL* for repair procedure.

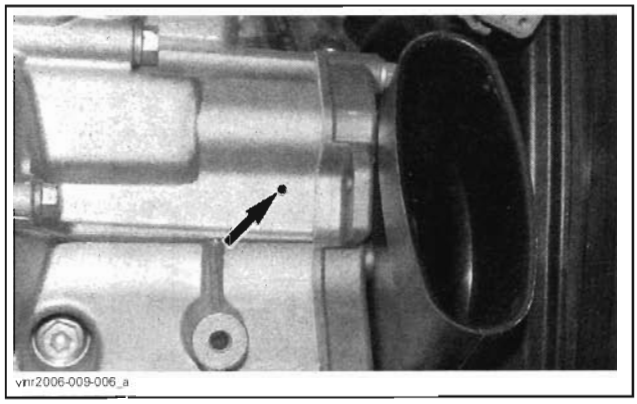


OUTLANDER 400 SERIES
1. Leak indicator hole



OUTLANDER 800 SERIES
1. Leak indicator hole

On **Outlander 800 Series**, an other leak indicator hole is visible on the PTO side. It indicate if the PTO gasket is in good condition. If a liquid leaks by this hole, the PTO gasket replacement is necessary.



Refer to the appropriate *ENGINE SHOP MANUAL* to repair the leak.

COOLANT REPLACEMENT

⚠ WARNING

To avoid potential burns, do not remove the radiator cap or loosen the cooling drain plug if the engine is hot.

Recommended Coolant

Use Bombardier premixed coolant (P/N 219 700 362) or a blend of 50% antifreeze with 50% water.

To prevent antifreeze deterioration, always use the same brand. Never mix different brands unless cooling system is completely flushed and refilled.

CAUTION: To prevent rust formation or freezing condition, always replenish the system with the Bombardier premixed coolant or with 50% antifreeze and 50% water. Do not use tap water, straight antifreeze or straight water in the system. Tap water contains minerals and impurities which build up in the system. During cold weather, straight water causes the system to freeze while straight antifreeze thickens and does not have the same efficiency. Always use ethylene glycol antifreeze containing corrosion inhibitors specifically recommended for aluminum engines.

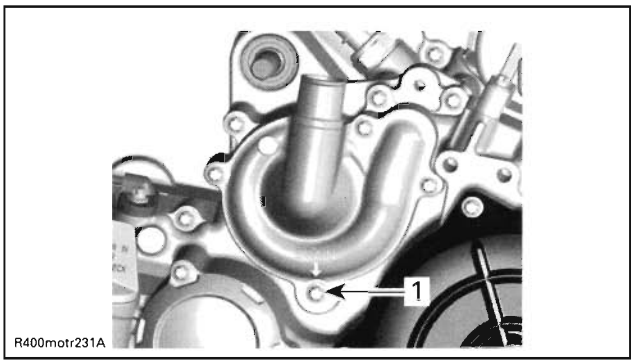
Draining the System

⚠ WARNING

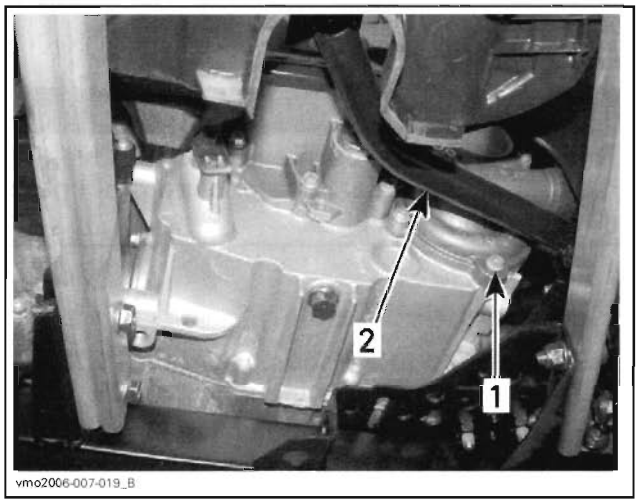
Never drain or refill cooling system when engine is hot.

Remove radiator cap **no. 1**.

Partially unscrew cooling drain plug located below coolant pump housing.



OUTLANDER 400 SERIES
1. Cooling drain plug



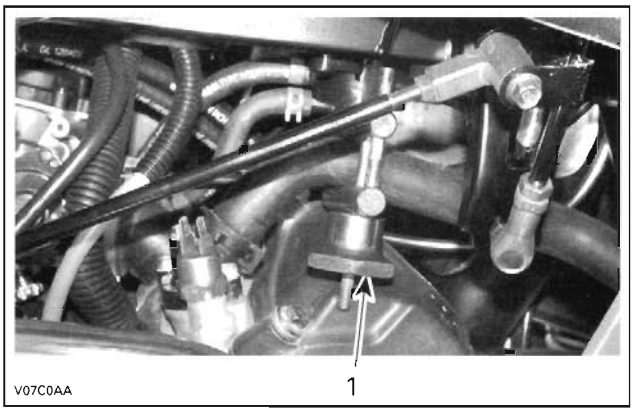
OUTLANDER 800 SERIES — UNDER RH FOOTREST
1. Cooling drain plug
2. Brake pedal

When cooling system is drained completely, remove cooling drain plug completely and install a new gasket ring. Screw the cooling drain plug and torque it to 10 N•m (89 lbf•**in**).

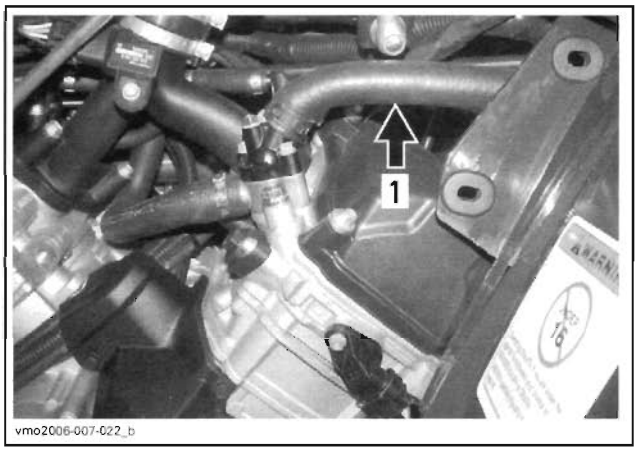
Refilling the System

Remove the RH side panel.

Pinch radiator inlet hose **no. 4** between radiator and thermostat housing with a large hose pincher (P/N 529 032 500).

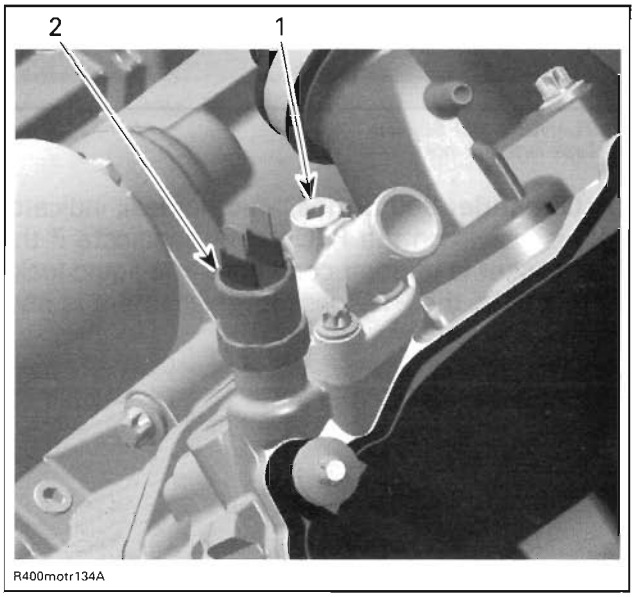


OUTLANDER 400 SERIES
1. Hose pincher

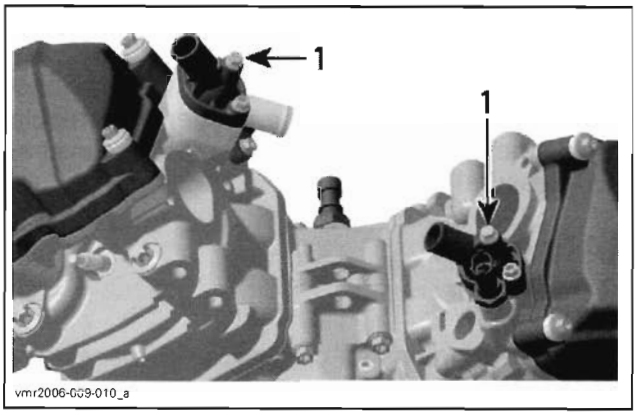


OUTLANDER 800 SERIES
1. Place hose pincher here

Unscrew bleeding screw(s) on top of thermostat housing.



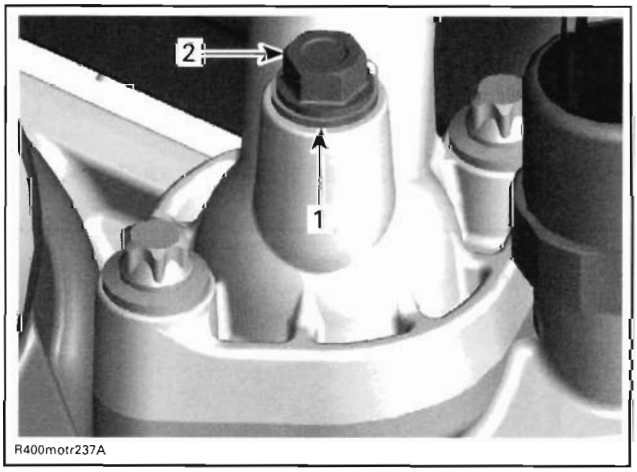
OUTLANDER 400 SERIES
1. Bleeding screw area
2. Coolant temperature sensor



OUTLANDER 800 SERIES
1. Bleeding screws

NOTE: On the **V-810 engine**, both cylinders must be bled.

With vehicle on a flat surface, engine cold, refill radiator **no. 3**. When the coolant comes out by the thermostat housing hole, install the bleeding screw with its gasket ring and torque to 5 N•m (44 lbf•**in**).



TYPICAL
1. Gasket ring
2. Bleeding screw

Remove hose pincher, fill up the radiator then install radiator cap.

Refill coolant tank **no. 5** up to cold level mark. Install the coolant tank cap. Run engine until thermostat opens then stop engine.

When engine has completely cooled down, recheck coolant level in radiator and coolant tank and top up if necessary. The level in the coolant tank should be between MIN. and MAX. marks.

NOTE: Each year or every 100 hours or when vehicle reaches 3000 km (1865 mi), check coolant concentration (freezing point) with proper tester.

THERMOSTAT

The thermostat is a single action type.

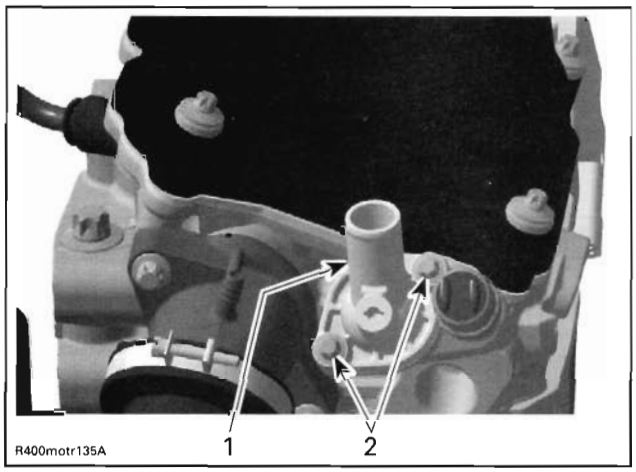
Removal

NOTE: The thermostat is located on the top of cylinder head, on intake side (front cylinder on the Outlander 800 Series).

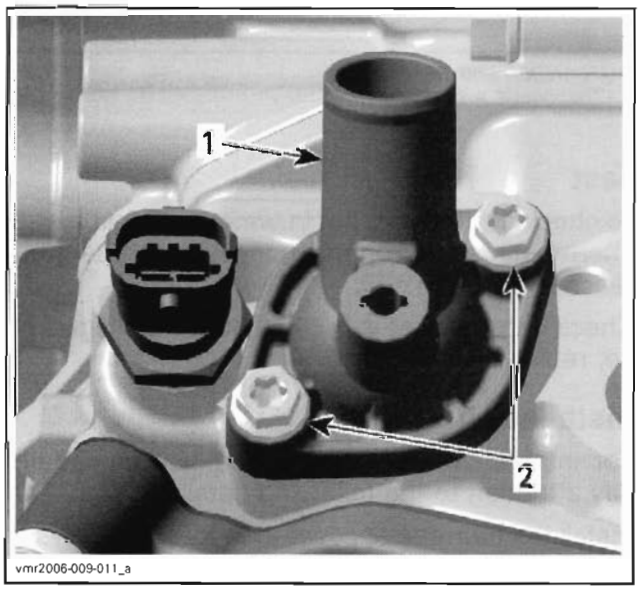
Install a hose pincher on both radiator hoses.

Remove:

- thermostat housing screws and pull thermostat cover

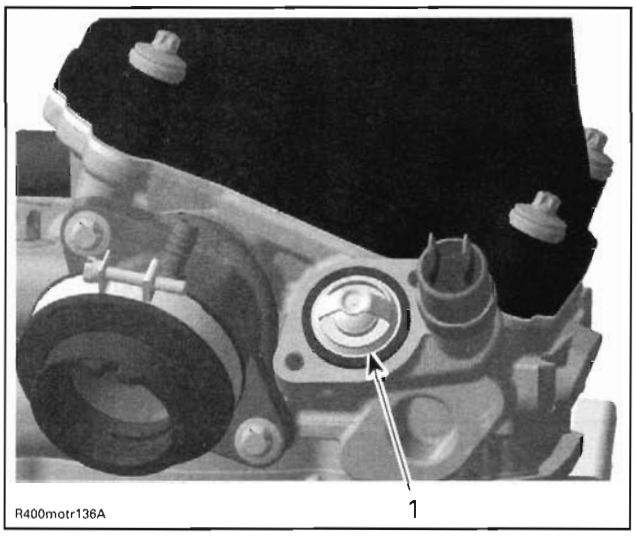


OUTLANDER 400 SERIES
1. Thermostat cover
2. Screws

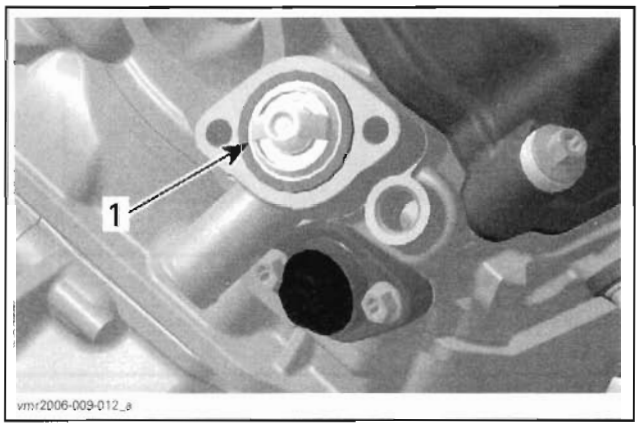


OUTLANDER 800 SERIES
1. Thermostat cover
2. Screws

- thermostat with gasket out of the hole.



OUTLANDER 400 SERIES
1. Thermostat with gasket



OUTLANDER 800 SERIES
1. Thermostat with gasket

Test

To check thermostat, put in water and heat water. Thermostat should open when water temperature reaches 65°C (149°F).

Check if the gasket is brittle, hard or damaged. If so, replace gasket.

Installation

For installation, reverse the removal procedure, pay attention to the following details.

Install the thermostat cover then torque screws to 6 N•m (53 lbf•**in**).

Check coolant level in radiator and coolant tank and top up if necessary.

CAUTION: Do not forget to bleed the cooling system. Refer to *COOLANT REPLACEMENT* above.

RADIATOR CAP

Using a pressure cap tester, check the efficiency of radiator cap **no. 1**. If the efficiency is feeble, install a new 110 kPa (16 PSI) cap (do not exceed this pressure).

RADIATOR

Inspection

Check radiating fins for clogging or damage.

Remove insects, mud or other obstructions with compressed air or low pressure water.

Removal

Drain cooling system.

Outlander 400 Series

Remove front fascia and both inner fenders, refer to *BODY*.

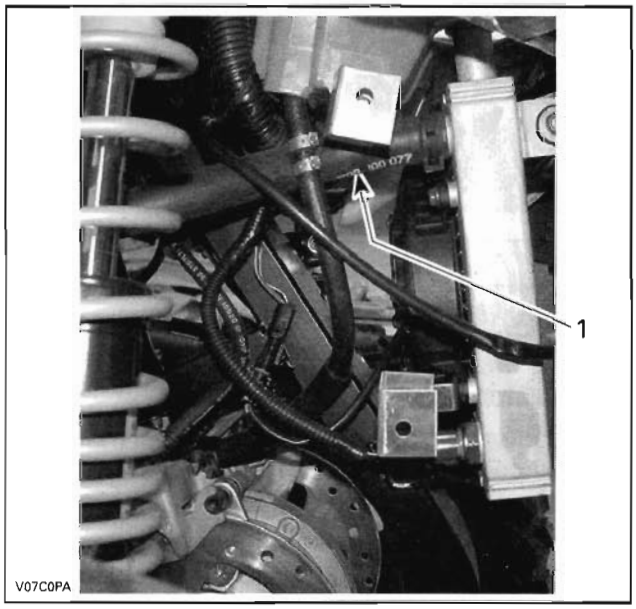
Outlander 800 Series

Remove front fascia and radiator shroud, refer to *BODY*.

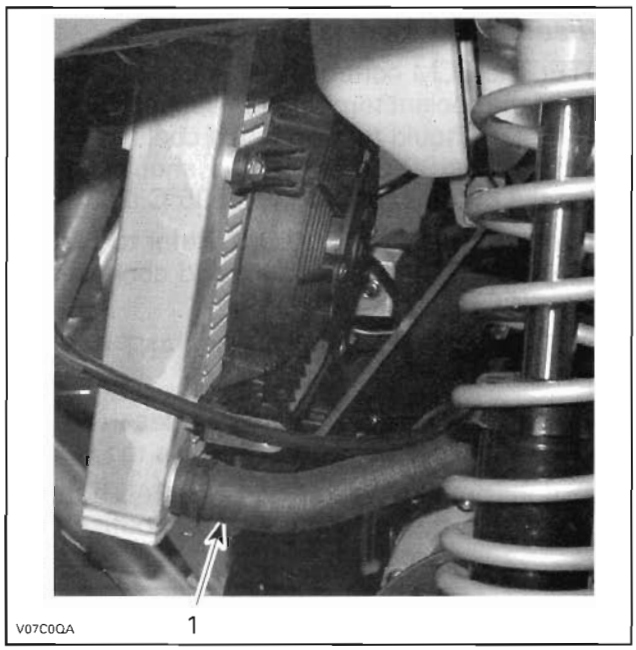
All Models

Remove:

- radiator inlet **no. 4** and radiator outlet **no. 6** hoses



TYPICAL — OUTLANDER 400 SHOWN
1. Radiator inlet hose



TYPICAL — OUTLANDER 400 SHOWN
1. Radiator outlet hose

- overflow hose **no. 2**
- mounting bolts **no. 7**.



TYPICAL
1. Radiator mounting bolts

Unplug radiator fan **no. 8**.

On **Outlander 400 Series**, unplug the fan activation switch **no. 9**.

Remove radiator **no. 3**.

Installation

For installation, reverse the removal procedure. Pay attention to the following detail.

Install rubber bushings **no. 10** between the bottom of radiator and radiator supports.

Fill up the radiator. Refer to *COOLANT REPLACEMENT*, above in this section.

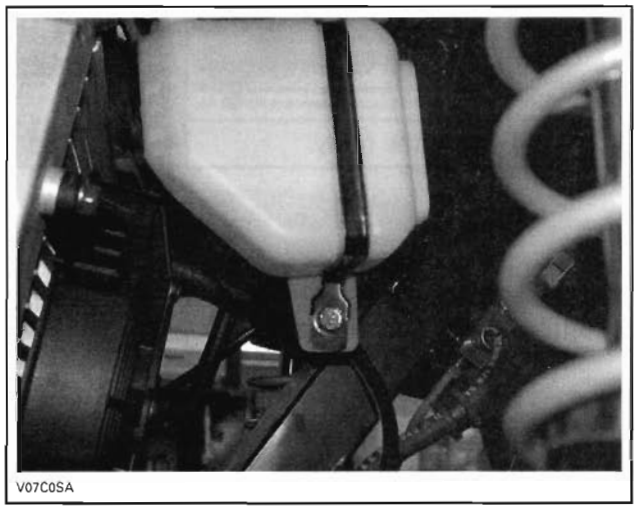
Check for any coolant leakage from radiator and hoses.

COOLANT TANK

The coolant expands as the temperature (up to 100 - 110°C (212 - 230°F)) and pressure rise in the system. If the limiting system working pressure cap is reached 110 kPa (16 PSI), the pressure relief valve in the pressure cap is lifted from its seat and allows coolant to flow through the overflow hose into the overflow coolant tank **no. 5**.

Removal

Remove:
- LH inner fender (refer to *BODY*)
- coolant tank support bolt **no. 11**



TYPICAL

- overflow hose **no. 2**
- support **no. 12** and coolant tank **no. 5**.

Empty coolant tank.

Installation

The installation is the reverse of the removal procedure.

RADIATOR FAN

Test

Outlander 400 Series

NOTE: It is not required to turn the ignition key to ON for this test.

Unplug the fan activation switch connector.

Install a jumper wire end in connector. Replace the radiator fan no. 8 if it does not work.

If radiator fan works well, check the fan activation switch. Refer to the end of this section.

If necessary, check wiring harness and connector.

Outlander 800 Models

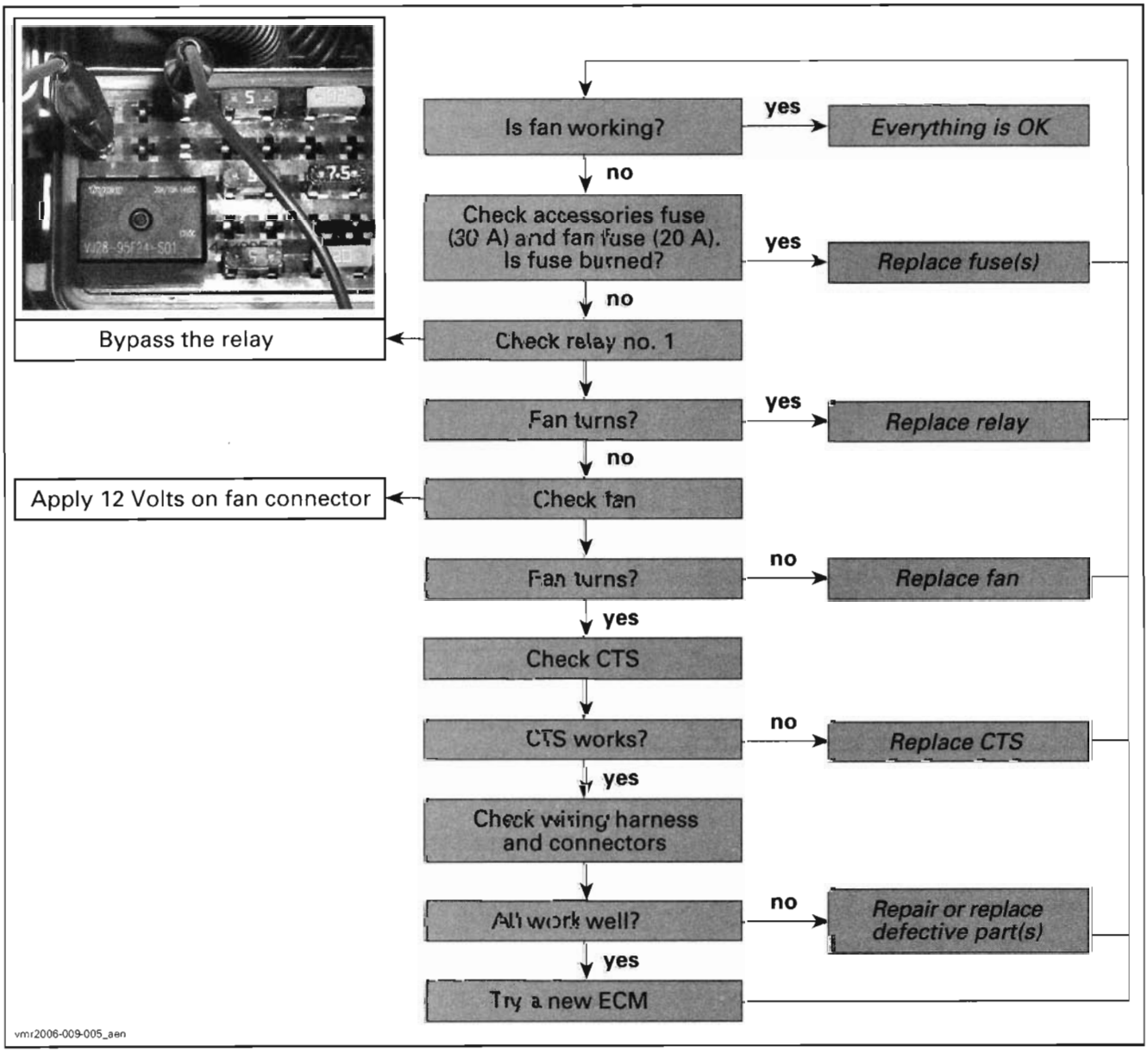
NOTE: The ECM controls the radiator fan via the input of the coolant temperature sensor (CTS). The radiator fan should turn on when coolant temperature reaches 98°C (208°F) and should turn off when the coolant cools down at 95°C (203°F).

Connect the vehicle to B.U.D.S. Refer to *ENGINE MANAGEMENT* for procedure and connector location.

In ACTIVATION folder, press COOLANT FAN button.

If fan turns, check CTS, wiring harness and connectors. If all parts are good, replace the ECM.

If fan does not turn when COOLANT FAN button is pressed, use the following troubleshooting chart to resolve the problem.



Removal

Outlander 400 Series

Remove both inner fenders. Refer to *BODY*.

Unplug radiator fan connector.

Remove bolts **no. 13**.

Remove the radiator fan.

Outlander 800 Series

Remove radiator shroud.

Remove bolts **no. 13**.

Remove the radiator fan.

Installation

For the installation, reverse the removal procedure.

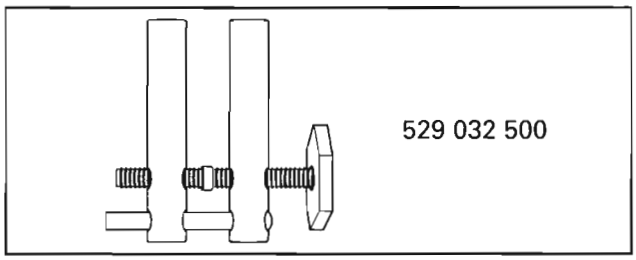
COOLANT TEMPERATURE SENSOR (CTS)

Outlander 400 Series

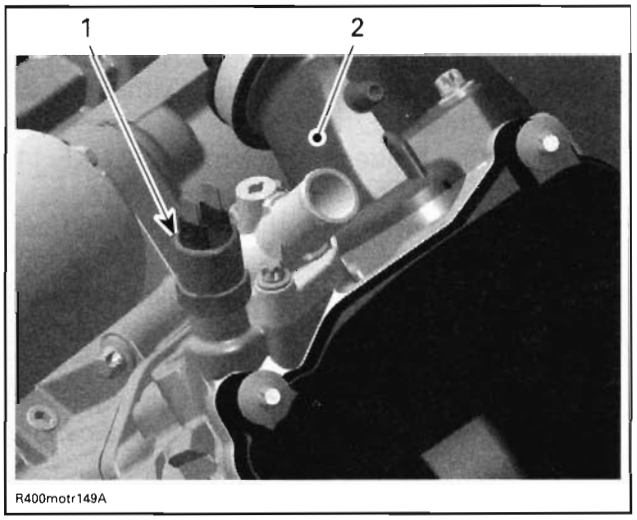
Removal

NOTE: The CTS is located on the top of cylinder head, on intake side.

Install a large hose pincher (P/N 529 032 500) on both radiator hoses.



Unplug the CTS then remove it.



1. CTS
2. Intake port

Test

To check CTS, do the following:

- Pour coolant in a small container.
- Place the CTS end in the coolant (without touching the container).
- Connect the probes of multimeter FLUKE 111 (P/N 529 035 868) on CTS connectors.
- Place a thermometer in the container and heat coolant.
- The CTS should operate when coolant temperature reaches 115°C (239°F).

Replace CTS if necessary.

Installation

For installation, reverse the removal procedure.

CAUTION: Never use the gasket ring a second time. Always install a new one.

Torque temperature switch to 16 N•m (142 lbf•**in**).

Check coolant level in radiator and coolant tank and top up if necessary.

Outlander 800 Series

Refer to *ENGINE MANAGEMENT* section for testing and replacement procedures of the coolant temperature sensor (CTS).

FAN ACTIVATION SWITCH (FAS)

Outlander 400 Series Only

Test

Remove FAS **no. 9**, see below for procedure.

To check FAS, do the following:
- Pour water in a small container.
- Place the FAS end in the water (without touching the container).
- Connect the probes of multimeter FLUKE 111 (P/N 529 035 868) on FAS connectors.
- Place a thermometer in the container and heat water.
- The FAS should closed when coolant temperature reaches 95°C (203°F) and reopened when the coolant cools down around 90°C (194°F).

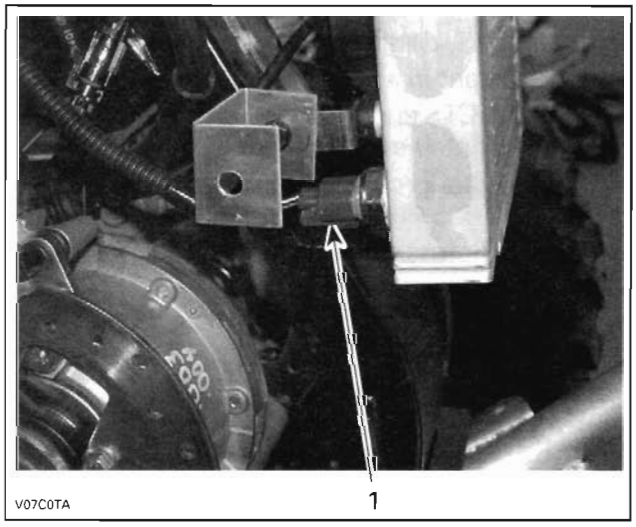
Change FAS if resistance does not change when water temperature is equal or over specification.

Removal

Drain coolant.

Remove the RH inner fender (refer to *BODY*).

Unplug FAS connector.



1. FAS connector

Unscrew FAS **no. 9**.

Installation

The installation is the reverse of the removal procedure, pay attention to the following details.

Check O-ring and change if necessary.

CAUTION: Do not apply any product on the threads or on the O-ring.

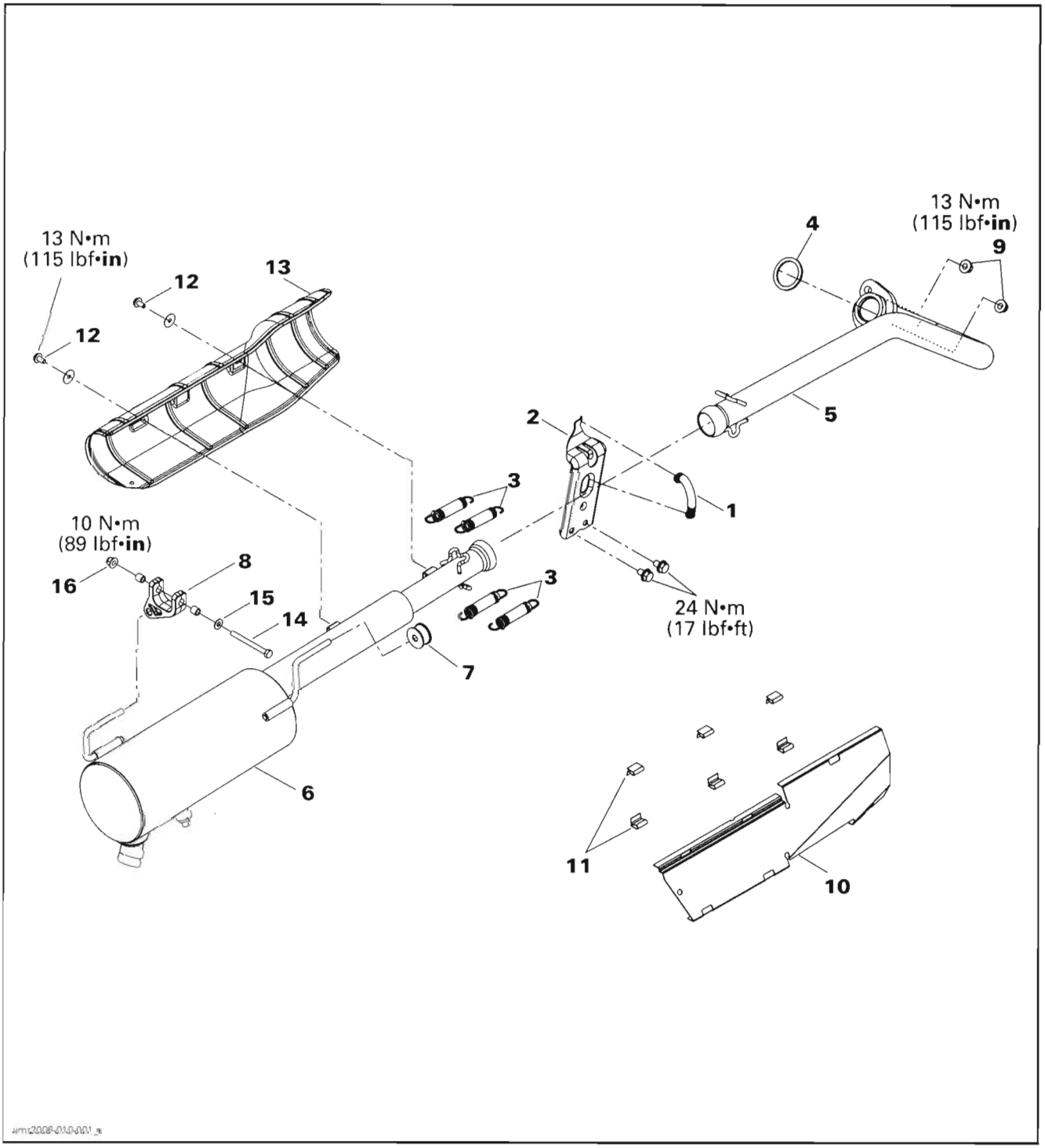
Torque FAS to 11 N•m (97 lbf•**in**).

EXHAUST SYSTEM

SERVICE TOOLS

Description	Part Number	Page
exhaust spring tool	529 035 983	85–86, 90–91

OUTLANDER 400 SERIES



GENERAL

⚠ WARNING

To avoid potential burns, never touch exhaust system components immediately after the engine has been run because these components are very hot. Let engine and exhaust system cool down before performing any servicing.

During assembly/installation, use the torque values and service products as in the exploded views.

Clean threads before applying a threadlocker. Refer to *SELF-LOCKING FASTENERS* and *LOCTITE APPLICATION* at the beginning of this manual for complete procedure.

⚠ WARNING

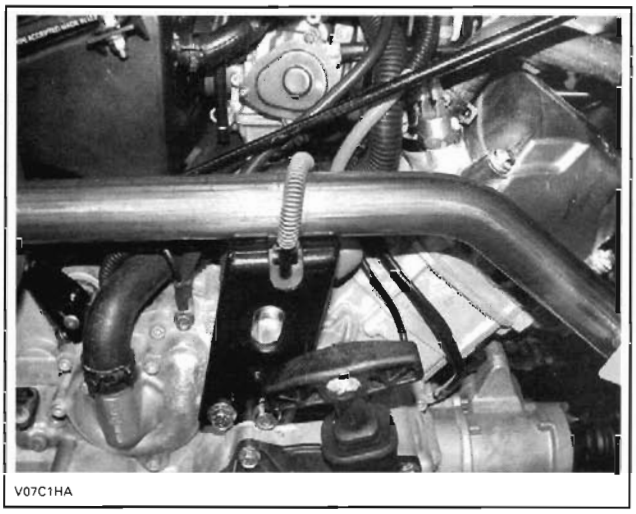
Torque wrench tightening specifications must strictly be adhered to.
Locking devices (e.g.: locking tabs, elastic stop nuts, self-locking fasteners, cotter pin, etc.) must be installed or replaced with new ones where specified. If the efficiency of a locking device is impaired, it must be renewed.

PROCEDURES

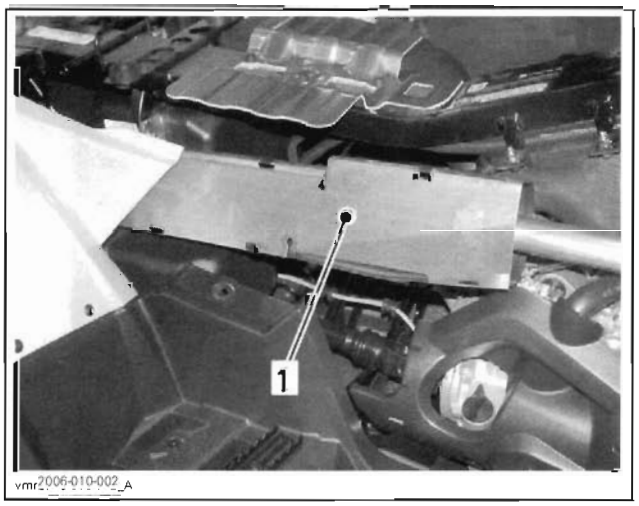
EXHAUST PIPE

Removal

Remove:
- RH side panel
- retaining spring **no. 1** from exhaust pipe support **no. 2**


V07C1HA

- external heat shield

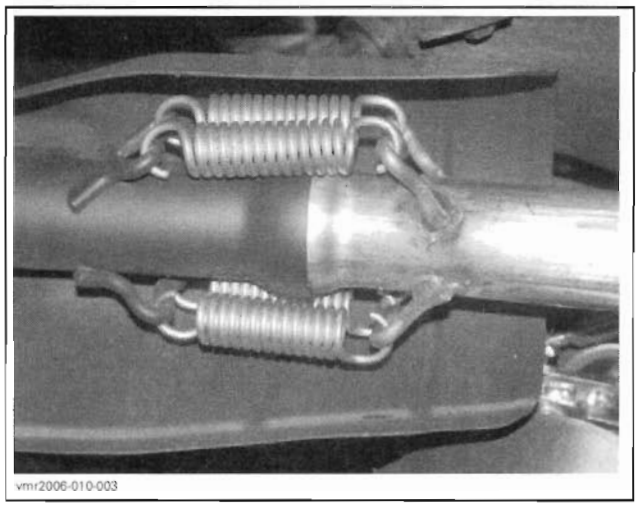


vmr2006-010-002_A

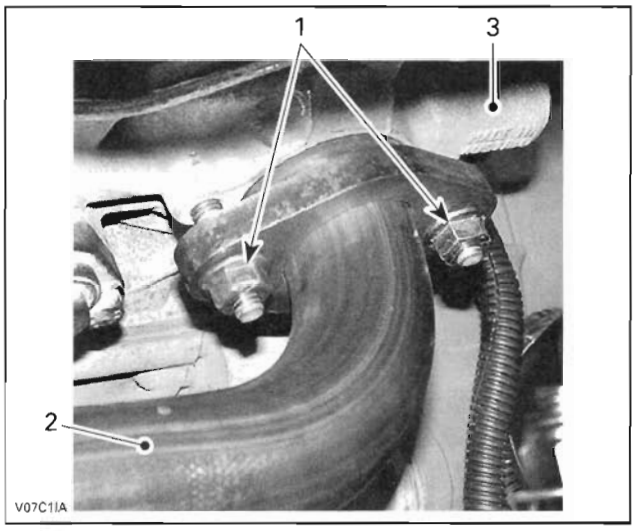
1. External heat shield

- exhaust springs **no. 3**, use exhaust spring tool (P/N 529 035 983)





– the exhaust pipe nuts.



1. Nut
2. Exhaust pipe
3. Cylinder head

Push the exhaust pipe forward then remove it.

Remove the exhaust gasket **no. 4** from engine exhaust port.

Inspection

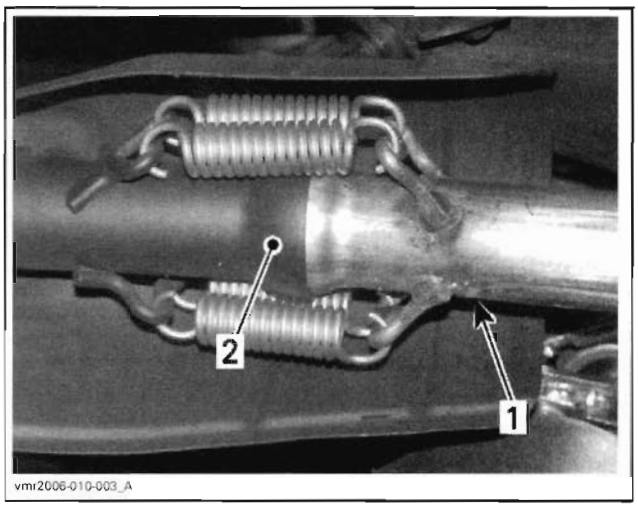
Check exhaust pipe **no. 5** for cracks, bending or other damages. Replace if necessary.

Installation

Install a new exhaust gasket **no. 4** on exhaust pipe end (cylinder head side).

With muffler **no. 6** secured in its rubber mounts **no. 7** and **no. 8**, secure exhaust pipe on cylinder head with exhaust nuts **no. 9**.

Tighten nuts, making sure exhaust pipe is properly aligned inside muffler ball socket then install exhaust springs **no. 3** after pushing muffler forward over exhaust pipe.



1. Exhaust pipe
2. Muffler ball socket

Install the retaining spring **no. 1**.

MUFFLER

Removal

Remove external heat shield **no. 10** then the exhaust springs **no. 3**. Use the exhaust spring tool (P/N 529 035 983).

Pull muffler **no. 6** backward to remove muffler rods from rubber bushing **no. 7** and muffler support **no. 8**.

Inspection

Check muffler and retaining rods for cracks or other damages. Replace if necessary.

Installation

For the installation, reverse the removal procedure.

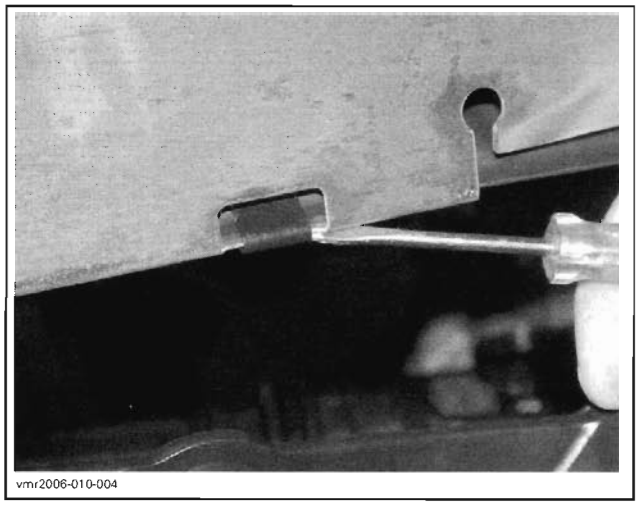
HEAT SHIELD

Removal

External Heat Shield

Remove RH side panel.

Using a small screwdriver, remove heat shield clips **no. 11**.

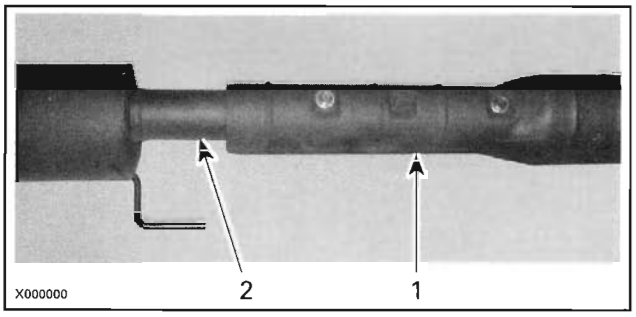


Remove external heat shield **no. 10**.

Formed Heat Shield

Remove the muffler **no. 6**.

Unscrew bolts **no. 12** retaining formed heat shield **no. 13** to muffler tube.



TYPICAL
1. Formed heat shield
2. Muffler tube

Inspection

Check if the heat shields are cracked or damaged. Replace it if necessary.

Installation

The installation is the reverse of the removal procedure.

MUFFLER SUPPORT

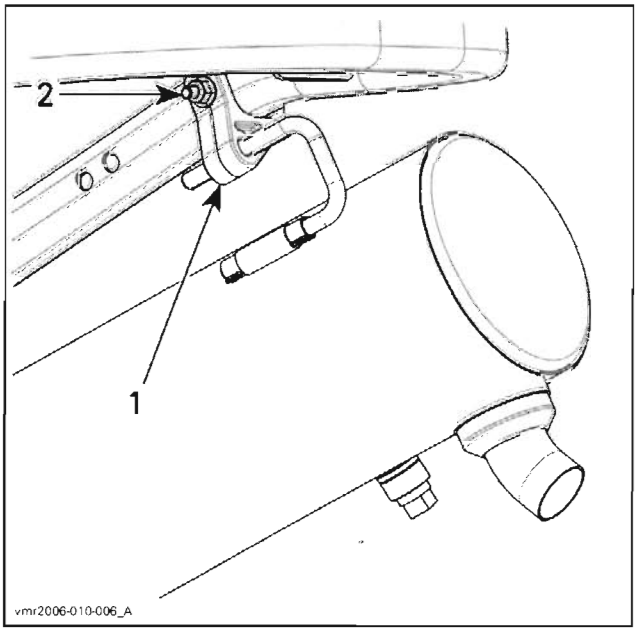
Inspection

Check muffler support condition. If cracked or otherwise damaged, replace it.

Removal

Attach muffler **no. 6** to frame with a rope or an elastic tie before removing muffler support **no. 8**.

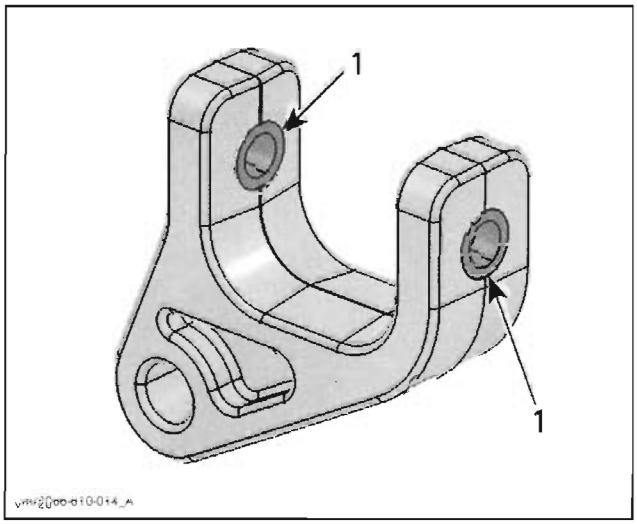
Remove bolt **no. 14** and its flat washer **no. 15** holding the muffler support to the frame.



TYPICAL
1. Muffler support
2. Bolt

Slide the muffler support **no. 8** on the muffler rod to remove it.

NOTE: Two sleeves (one of each side) are inserted into muffler support arms. Pay attention not to loose them.



TYPICAL
1. Sleeves

Installation

The installation is the reverse of the removal procedure.

Torque the muffler support nut **no. 16** to 8 N•m (71 lbf•**in**).

RUBBER BUSHING

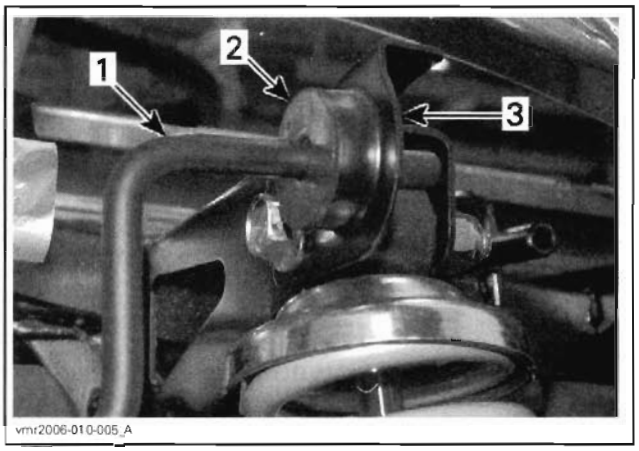
Inspection

Check the rubber bushing condition. If hard, brittle or damaged, replace it.

Removal

Remove muffler **no. 6** from vehicle. See above for the procedure.

Push the rubber bushing **no. 7** out of its bracket.

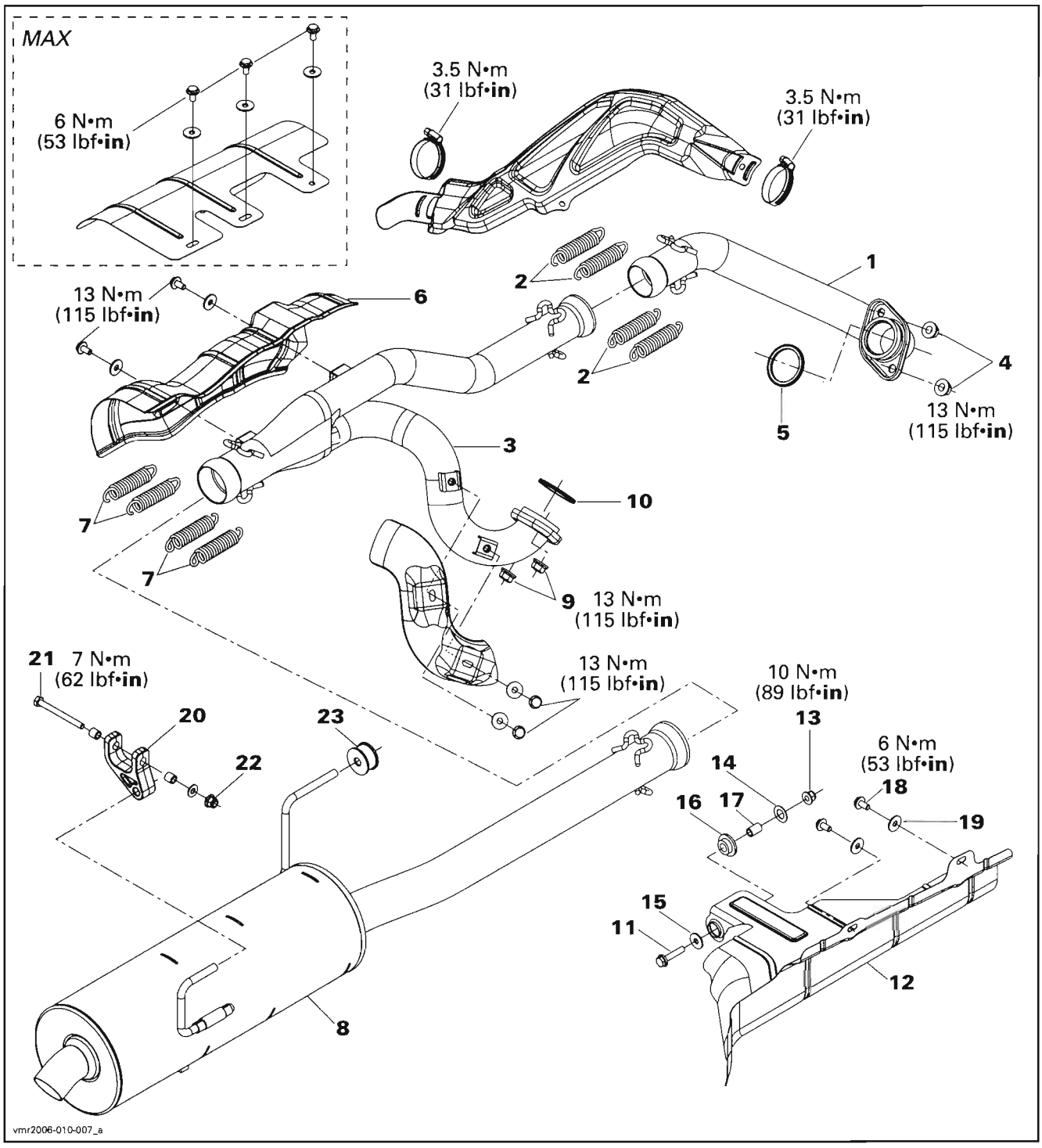


TYPICAL
1. *Muffler rod*
2. *Rubber bushing*
3. *Bushing bracket*

Installation

The installation is the reverse of the removal procedure.

OUTLANDER 800 SERIES



GENERAL

⚠ WARNING

To avoid potential burns, never touch exhaust system components immediately after the engine has been run because these components are very hot. Let engine and exhaust system cool down before performing any servicing.

During assembly/installation, use the torque values and service products as in the exploded views.

Clean threads before applying a threadlocker. Refer to *SELF-LOCKING FASTENERS* and *LOCTITE APPLICATION* at the beginning of this manual for complete procedure.

⚠ WARNING

Torque wrench tightening specifications must strictly be adhered to.
Locking devices (e.g.: locking tabs, elastic stop nuts, self-locking fasteners, cotter pin, etc.) must be installed or replaced with new ones where specified. If the efficiency of a locking device is impaired, it must be renewed.

PROCEDURES

FRONT EXHAUST PIPE

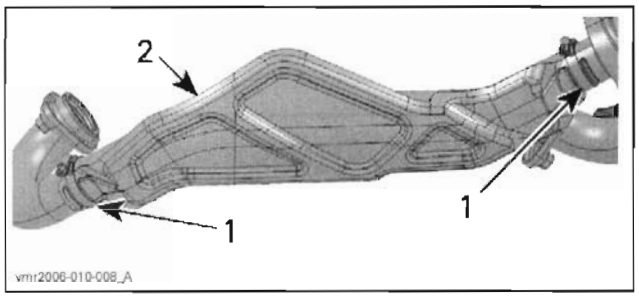
Inspection

Check for cracks, bending or other damages. Replace if necessary.

Removal

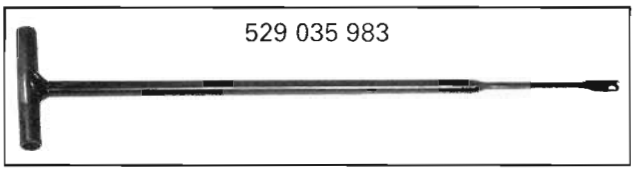
Remove LH side panel.

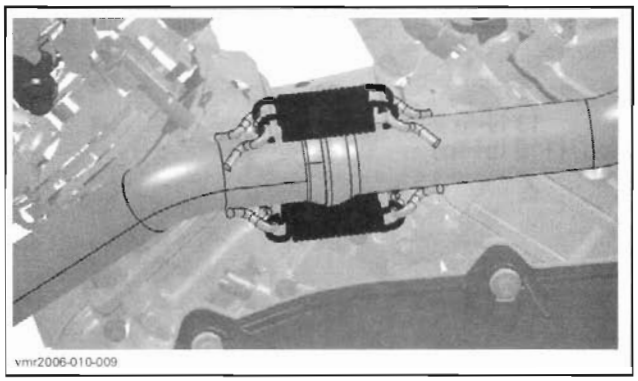
Unscrew both clamps that attach heat shield to front exhaust pipe no. 1.



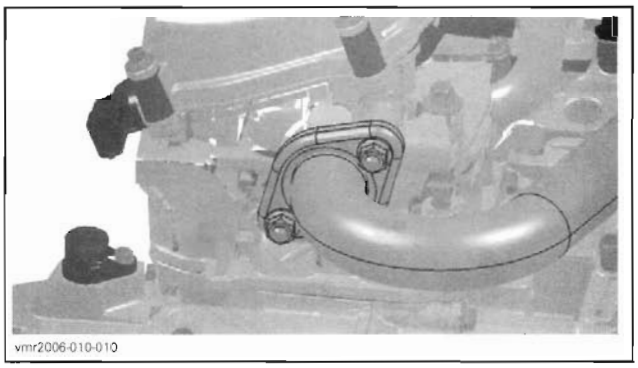
1. Heat shield clamps
2. Heat shield of front exhaust pipe

Using the exhaust spring tool (P/N 529 035 983), remove exhaust springs no. 2 holding front exhaust pipe no. 1 to "Y" exhaust pipe no. 3.





Unscrew exhaust pipe nuts no. 4.



Move front exhaust pipe forward then remove it.

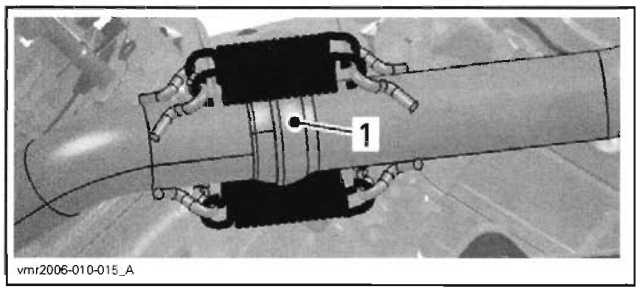
Remove exhaust gasket no. 5 from engine exhaust port.

Installation

Install a new exhaust gasket on front exhaust pipe end.

Secure front exhaust pipe on cylinder head with exhaust nuts. Do not torque yet.

Make sure front exhaust pipe end is properly aligned inside ball socket of "Y" exhaust pipe. Install exhaust springs.



1. Y exhaust pipe ball socket

Torque exhaust nuts to 13 N•m (115 lbf•**in**).

Install all other removed parts.

"Y" EXHAUST PIPE

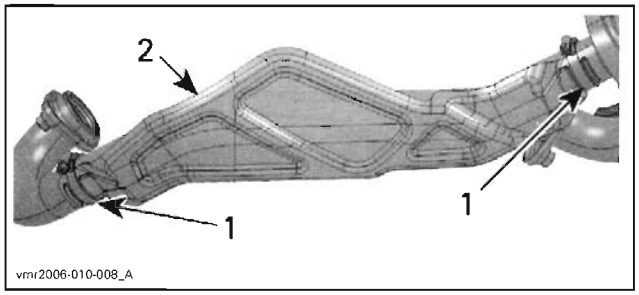
Inspection

Check for cracks, bending or other damages. Replace if necessary.

Removal

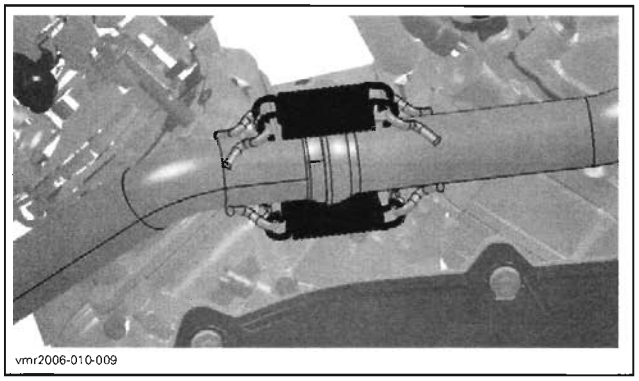
Remove muffler **no. 8**.

Unscrew both clamps that attach heat shield to front exhaust pipe **no. 1**.



1. Heat shield clamps
2. Heat shield of front exhaust pipe

Using the exhaust spring tool (P/N 529 035 983), remove exhaust springs **no. 7** that attach "Y" exhaust pipe **no. 3** to front exhaust pipe **no. 8**.



MAX MODELS SHOWN

Unscrew exhaust nuts **no. 9** then remove "Y" exhaust pipe.

Remove exhaust gasket **no. 10** from engine exhaust port.

Installation

Install a new exhaust gasket on "Y" exhaust pipe end.

Secure "Y" exhaust pipe on cylinder head with exhaust nuts. Do not torque yet.

Make sure "Y" exhaust pipe end is properly aligned with the end of front exhaust pipe. Install exhaust springs.

Torque exhaust nuts to 13 N•m (115 lbf•**in**).

Install muffler and all other removed parts.

FUEL TANK PROTECTOR

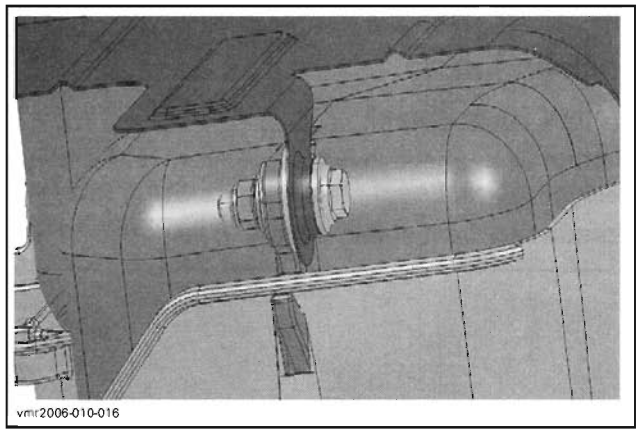
Inspection

Check for wear, cracks or other damages. Replace if necessary.

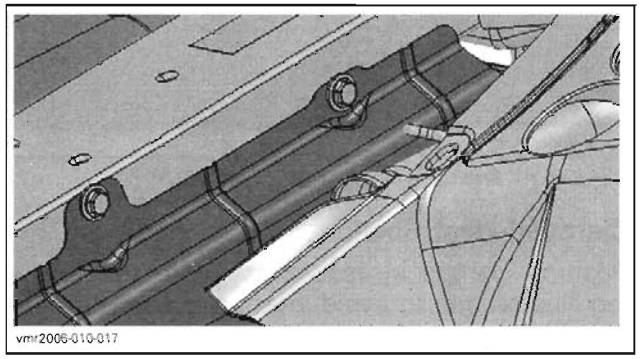
Removal

Remove muffler.

Unscrew bolt **no. 11** that attach fuel tank protector **no. 12** to fuel tank. Keep nut **no. 13**, washers **no. 14** and **no. 15**, bushing **no. 16** and sleeve **no. 17**.



Unscrew upper bolts **no. 18** retaining the fuel tank protector to frame. Keep washers **no. 19**.



Remove fuel tank protector.

Installation

The installation is the reverse of the removal procedure.

Install all bolts before applying the torque. Tighten nut **no. 13** to 10 N•m (89 lbf•**in**) then upper bolts **no. 18** to 6 N•m (53 lbf•**in**).

HEAT SHIELD

NOTE: On **800 EFI engines models**, 2 types of heat shield are installed, with bolts and with clamps. The following instructions are generic. Body parts removal can be necessary to reach heat shields.

Inspection

Check for wear, cracks or other damages. Replace if necessary.

Removal

Bolted Heat Shield

Remove heat shield bolts and flat washers.

Then remove heat shield.

Clamped Heat Shield

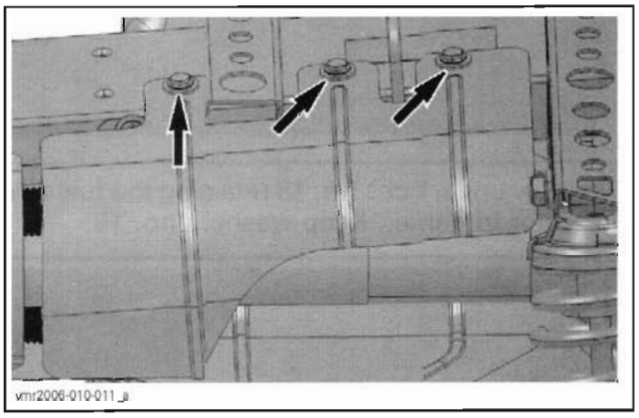
Loosen clamps then remove heat shield.

Installation

Bolted Heat Shield

Torque all heat shield bolts to 13 N•m (115 lbf•**in**) except the rear heat shield on the **MAX models**.

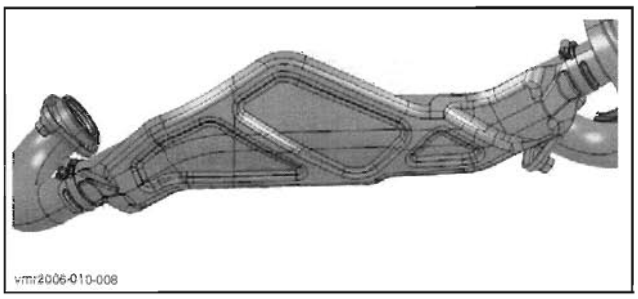
Torque rear heat shield bolts to 6 N•m (53 lbf•**in**).



REAR HEAT SHIELD — MAX/MAX XT MODELS

Clamped Heat Shield

Position clamps in accordance with the following illustrations to avoid interferences with other parts.



FRONT HEAT SHIELD

Torque all heat shield clamps to 3.5 N•m (31 lbf•**in**).

MUFFLER SUPPORT

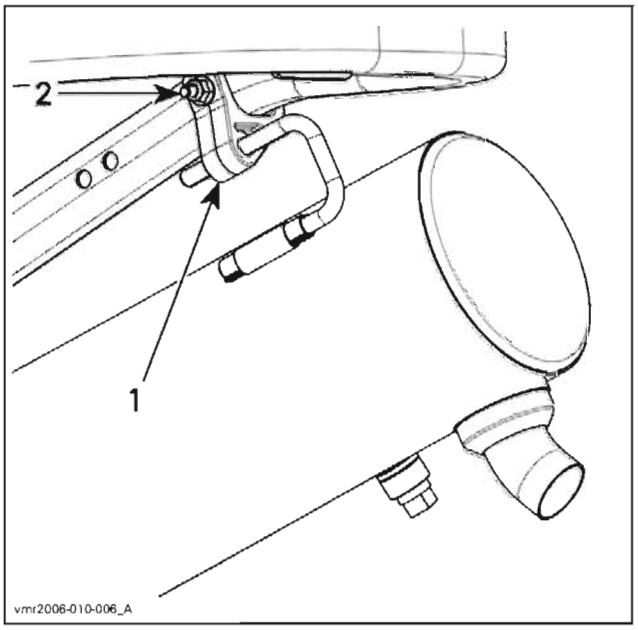
Inspection

Check muffler support condition. If crack or otherwise damaged, replace it.

Removal

Attach muffler **no. 8** to frame with a rope or an elastic tie before removing muffler support **no. 20**.

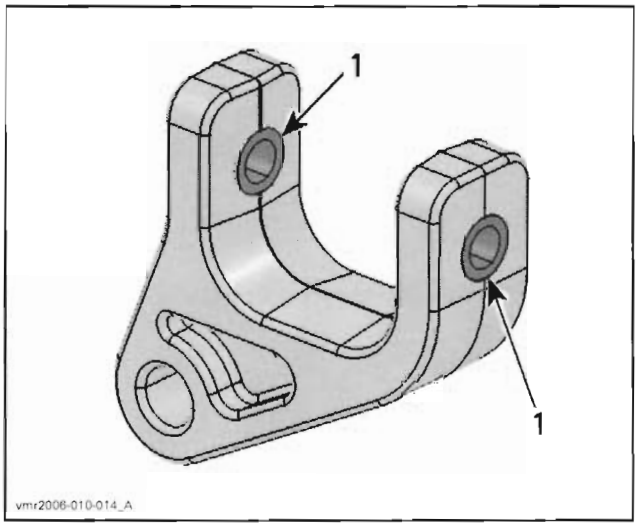
Remove bolt **no. 21** holding the muffler support to the frame.



TYPICAL
1. *Muffler support*
2. *Bolt*

Slide the muffler support **no. 20** on the muffler rod to remove it.

NOTE: Two sleeves (one of each side) are inserted into muffler support arms. Pay attention not to lose them.



TYPICAL
1. Sleeves

Installation

The installation is the reverse of the removal procedure.

Torque the muffler support nut **no. 22** to 8 N•m (71 lbf•**in**).

RUBBER BUSHING

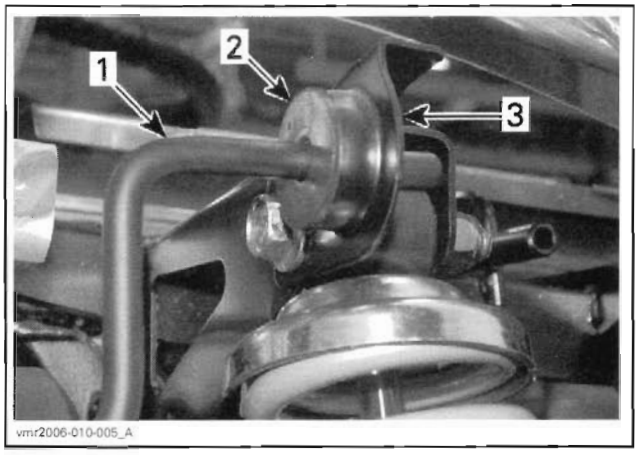
Inspection

Check the rubber bushing condition. If hard, brittle or damaged, replace it.

Removal

Remove muffler **no. 8** from vehicle. See above for the procedure.

Push the rubber bushing **no. 23** out of its bracket.



TYPICAL
1. Muffler rod
2. Rubber bushing
3. Bushing bracket

Installation

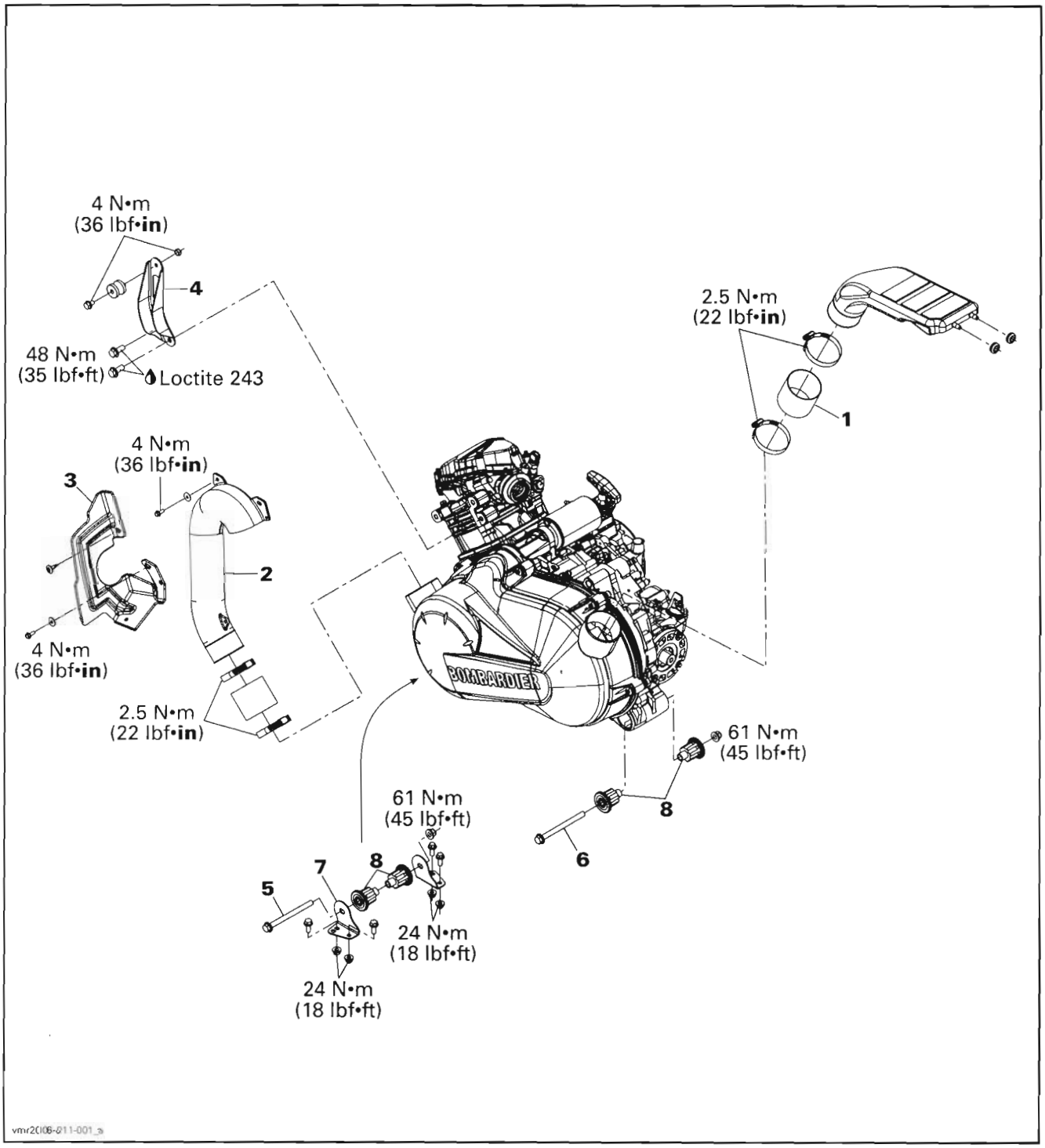
The installation is the reverse of the removal procedure.

ENGINE REMOVAL AND INSTALLATION

SERVICE TOOLS

Description	Part Number	Page
engine lifting tool	529 035 898	101
engine lifting tool	529 036 022	109
lifting tool	529 035 619	101
small hose pincher	295 000 076	100

OUTLANDER 400 SERIES



GENERAL

⚠ WARNING

To avoid potential burns, let engine and exhaust system cool down before performing any servicing.

During assembly/installation, use the torque values and service products as in the exploded view.

Clean threads before applying a threadlocker. Refer to *SELF-LOCKING FASTENERS* and *LOCTITE APPLICATION* at the beginning of this manual for complete procedure.

⚠ WARNING

Torque wrench tightening specifications must strictly be adhered to.
Locking devices (e.g.: locking tabs, elastic stop nuts, self-locking fasteners, cotter pin, etc.) must be installed or replaced with new ones where specified. If the efficiency of a locking device is impaired, it must be renewed.

PROCEDURES

ENGINE REMOVAL

Vehicle and Engine Preparation

Place the vehicle on a workstation that will have access to an engine-lifting hoist. Then start with initial preparation of vehicle by doing the following.

Place the transmission lever on P position.

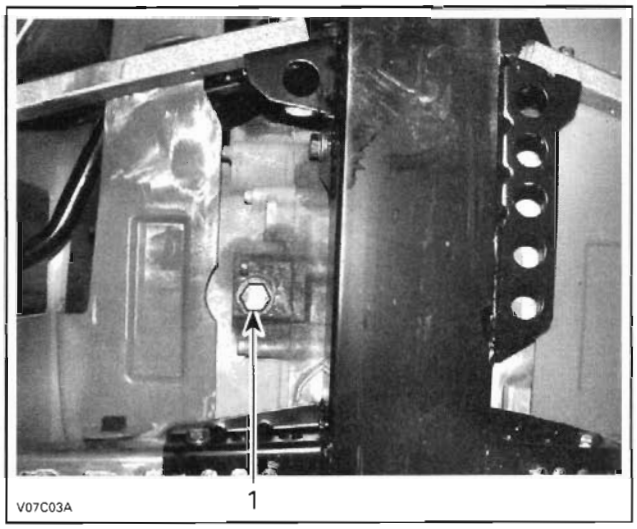
Turn fuel valve OFF.

Disconnect BLACK (-) cable from battery, then RED (+) cable.

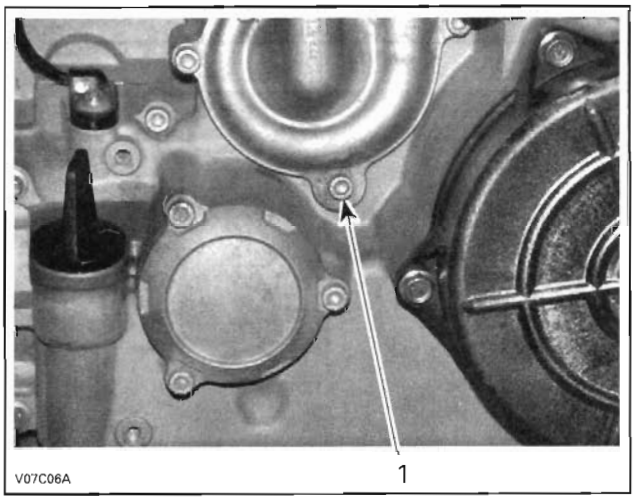
⚠ WARNING

Always disconnect battery or starter cables exactly in the specified order, BLACK (-) cable first. It is recommended to disconnect electrical connections prior to disconnecting fuel lines.

Drain engine oil and engine coolant.



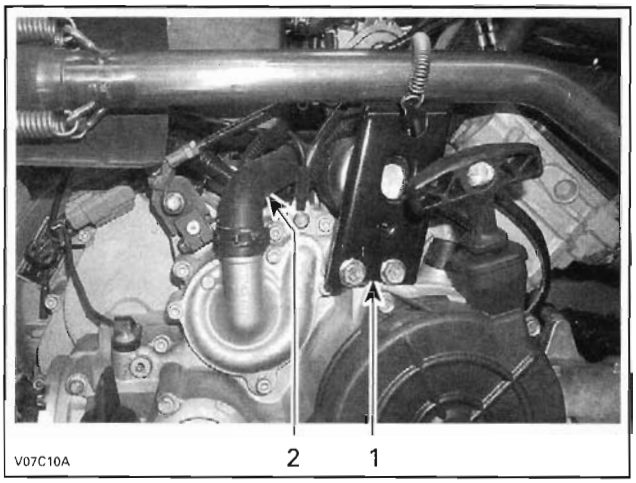
1. Oil drain plug



1. Cooling drain plug

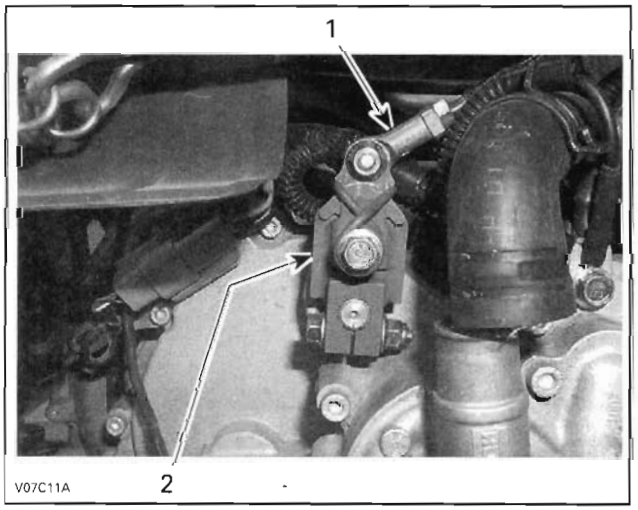
To remove the following parts refer to *BODY*:
- seat
- LH and RH side panels
- LH and RH footrests
- console screws.

On right side of vehicle, remove or disconnect the following:
- engine cover
- exhaust pipe support
- radiator outlet hose



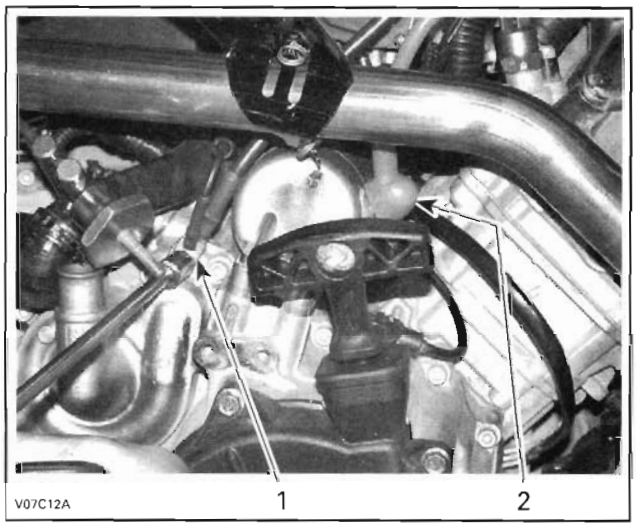
1. Exhaust pipe support
2. Radiator outlet hose

– link rod from shifting plate



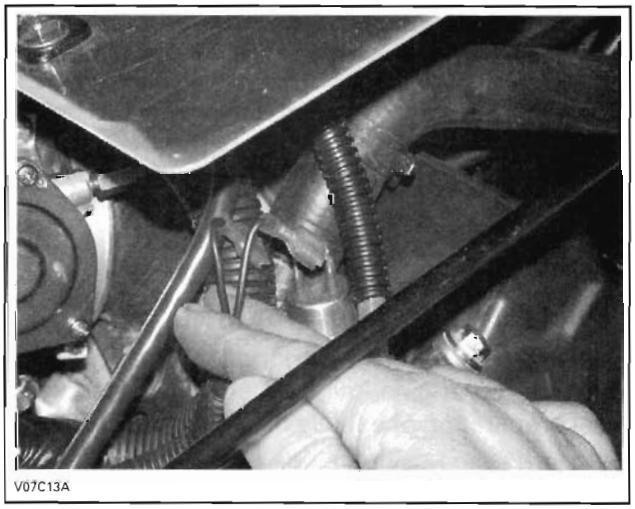
1. Link rod
2. Shifting plate

– engine ground cables
– RED starter cable

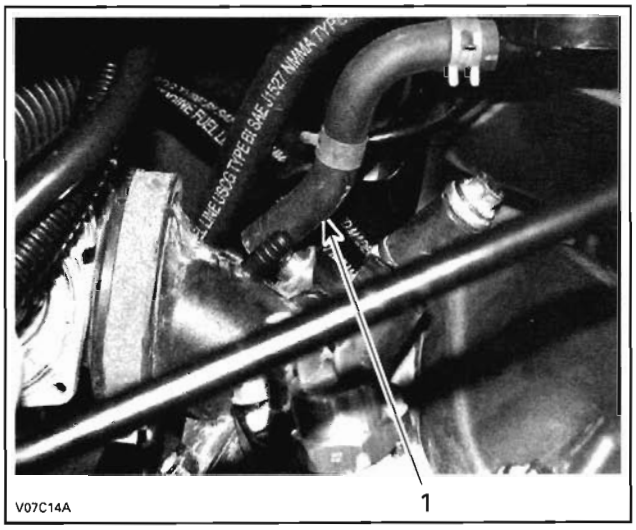


1. Engine ground cables
2. Starter cable

– temperature switch connectors

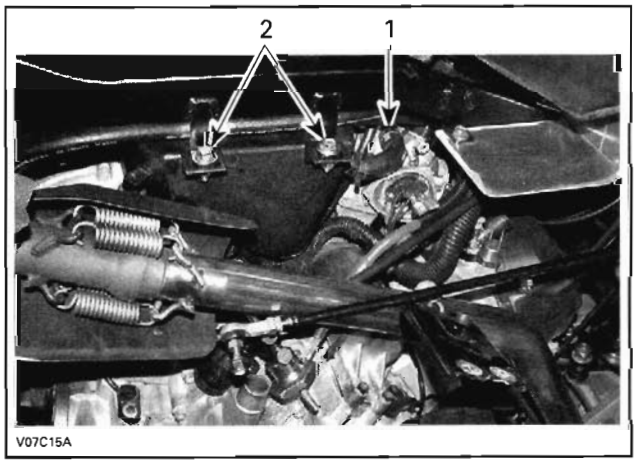


– throttle cable from carburetor
– radiator inlet hose
– impulse line



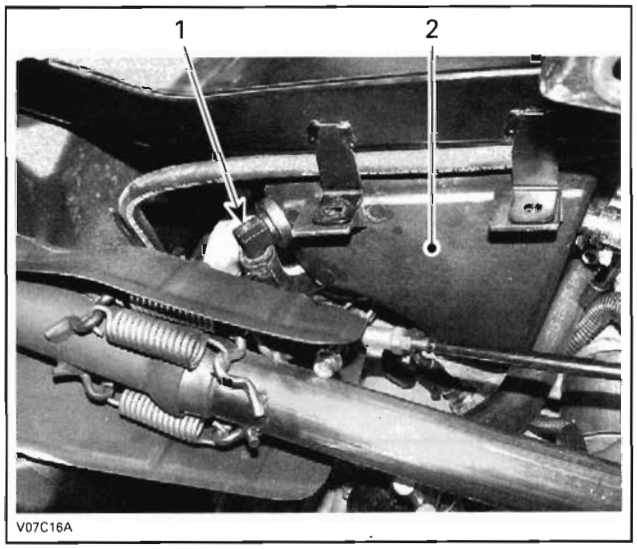
1. Impulse line

– carburetor clamp (air box side)
– carburetor vent hose
– air box screws



1. Carburetor vent hose
2. Air box screws

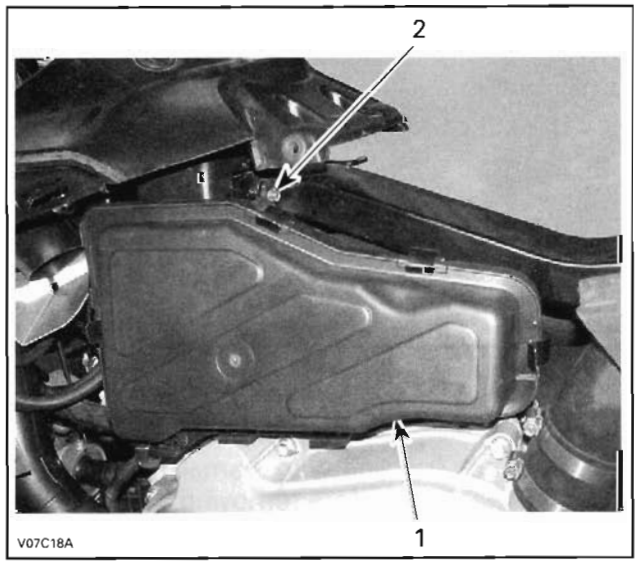
– engine blow-by hose from air box



1. Engine blow-by hose
2. Air box

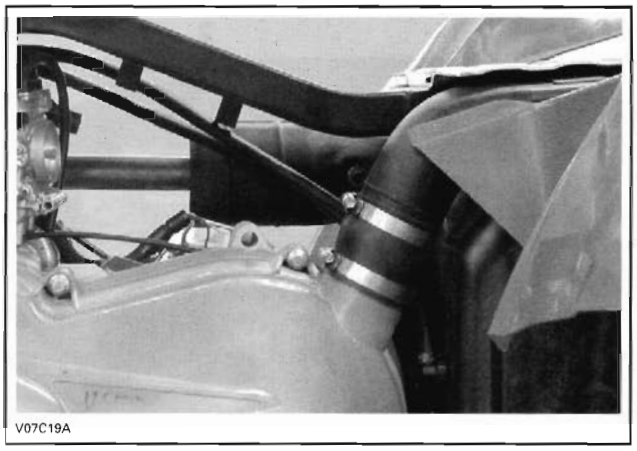
– rear propeller shaft bolt
– disconnect unit bolts from engine.

On left side of vehicle, remove the following:
– inner fender (refer to *BODY*)
– air box bolt then air box

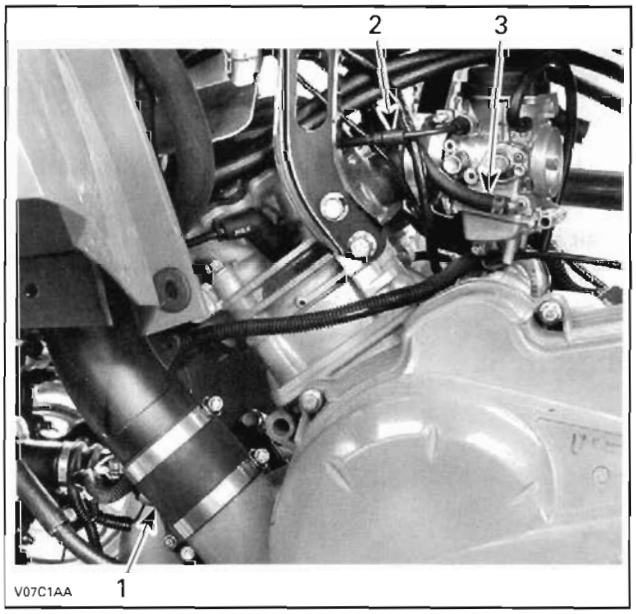


1. Air box
2. Air box bolt

– CVT outlet hose no. 1


V07C19A

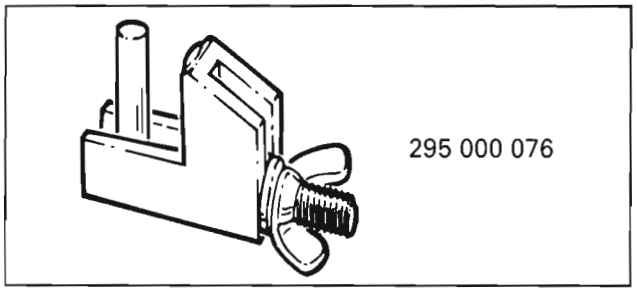
- CVT inlet hose **no. 2** with its deflector **no. 3**
- choke cable from carburetor
- carburetor fuel line



V07C1AA

1. CVT inlet hose
2. Choke cable
3. Carburetor fuel line

NOTE: Pinch fuel line with a small hose pincher (P/N 295 000 076) before removing it from carburetor.



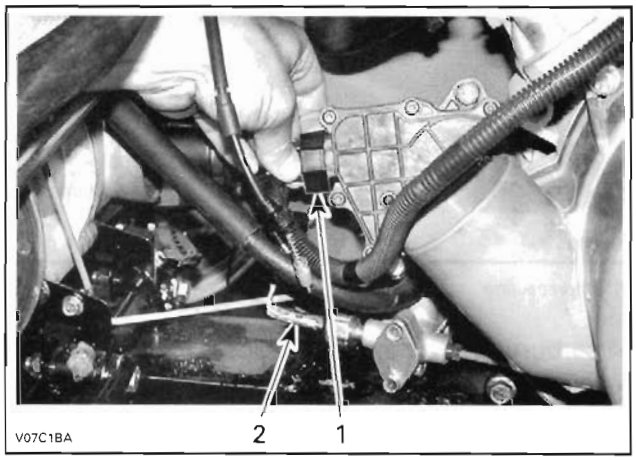
- carburetor
- exhaust pipe nuts
- upper engine support **no. 4**.

From top side, disconnect the following:

- magneto
- crankshaft position sensor (CPS)

NOTE: The magneto and CPS connectors are located under the console, on top of the frame.

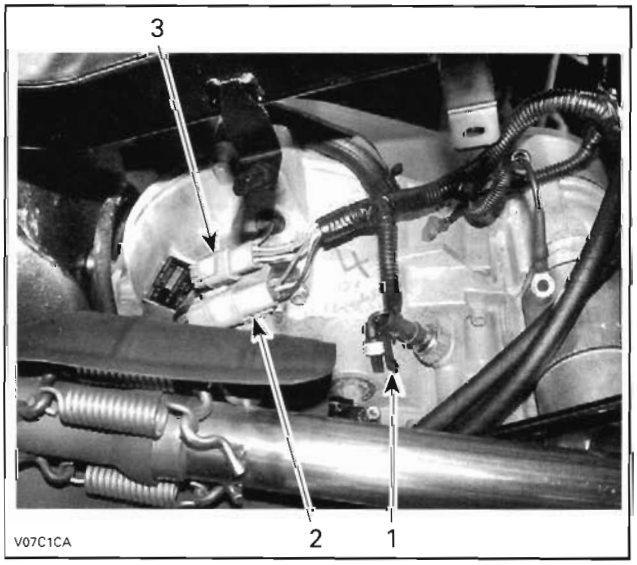
- coupling unit and 2WD/4WD switch connectors
- brake switch connectors



V07C1BA

1. Disconnect unit connector
2. Brake switch connectors

- spark plug cable
- engine pressure switch
- vehicle speed sensor (VSS)
- indicator switches.



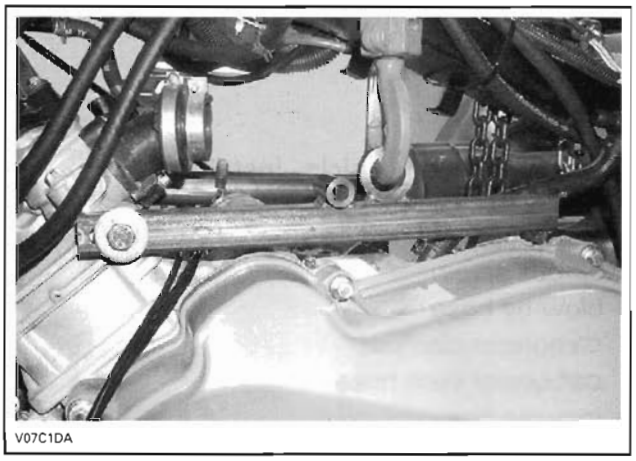
V07C1CA

1. Engine pressure switch
2. VSS connector
3. Indicator switches connector

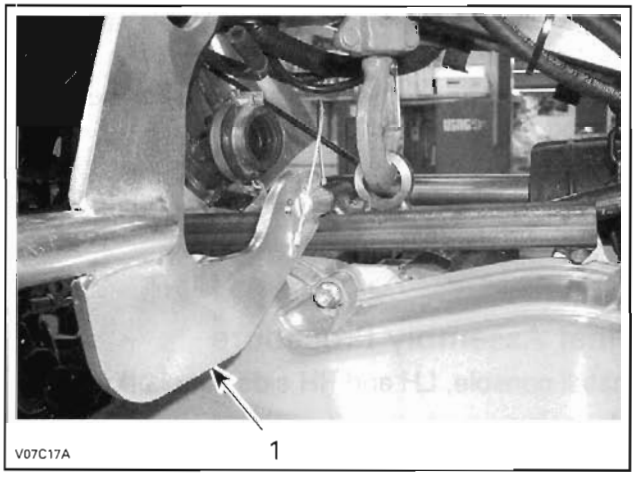
Temporarily, attach all cables, wires and hoses on the frame.

Lifting Engine

Install the engine lifting tool (P/N 529 035 898) in lifting location.



Install the lifting tool (P/N 529 035 619) to tilt engine.

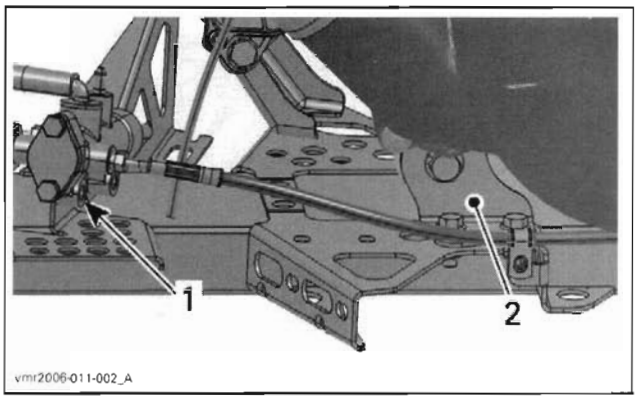


1. Lifting tool

From bottom side, do the following:

Remove front and rear engine mounting bolts **no. 5** and **no. 6**.

Remove front engine mounting bracket **no. 7**.



1. Front engine mounting bracket
2. Master cylinder

Lift engine approximately 25.4 to 38 mm (1 to 1-1/2 in).

Disconnect the rear propeller shaft from engine.

Lift engine a little more to clear rear mounting bracket from frame.

Turn the rear of engine toward left side to disengage the front propeller shaft from the coupling unit.

⚠ WARNING

Do not hit the fuel tank or fuel tank fittings.

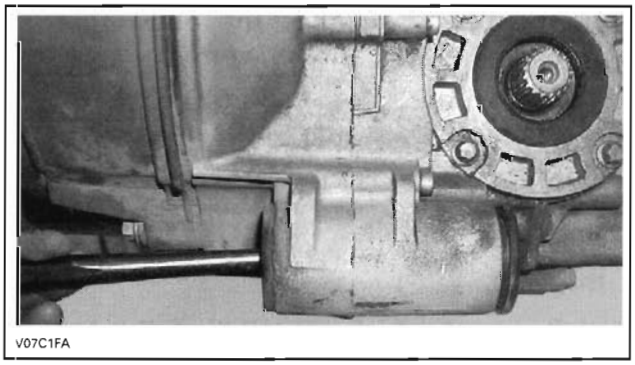
Take the engine out of the frame.

ENGINE MOUNT REPLACEMENT

NOTE: Use the same procedure for the front and rear engine mounts.

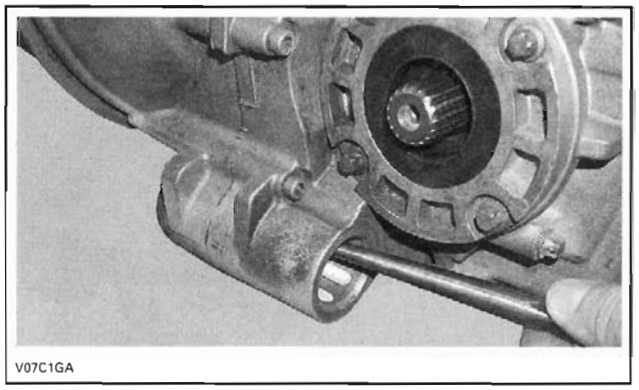
Removal

Insert a punch in hole of engine mount bushing **no. 8** and push the other bushing out of the housing.



TYPICAL

Use punch to remove the other bushing.


V07C1GA

TYPICAL

Installation

The installation is the reverse of the removal procedure.

ENGINE INSTALLATION

NOTE: Prior to install engine, inspect condition of engine mounts.

Lift engine and move it into the frame (cylinder head first).

Insert the front output shaft end into the coupling unit.

Move the rear side of engine into the frame and install the rear propeller shaft.

Install the front engine mounting bracket **no. 7**.

Lower engine into place.

Install front engine mounting bolt **no. 5**. Do not torque yet.

Install rear engine mounting bolt **no. 6** and torque both bolts.

Remove the engine lifting tool.

From the top side, connect the following:
- indicator switches
- VSS
- engine pressure switch
- brake switch
- coupling unit
- CPS
- magneto.

On left side of vehicle, install the following:
- upper engine support
- exhaust pipe nut

NOTE: Install a new gasket before screwing the exhaust pipe.
- carburetor
- carburetor fuel line
- choke cable
- CVT inlet and outlet hoses
- radiator outlet hose
- air box
- inner fender
- footrest.

On right side of vehicle, install or connect the following:
- rear propeller shaft bolt
- air box screw
- blow-by hose
- carburetor clamps
- carburetor vent hose
- impulse line
- radiator inlet hose
- throttle cable
- temperature switch connector
- RED starter cable
- engine ground cables

NOTE: Do not forget the star washer between ground cable connectors and frame.
- link rod

NOTE: The transmission lever must be on PARK.
- exhaust pipe support
- engine cover.

Final Assembly Procedure

Install console, LH and RH side panels then seat.

Make sure coolant and oil drain plugs are reinstalled and tight.

Fill cooling system. Refer to *COOLING SYSTEM*.

Fill engine with the right amount of oil. Put oil of appropriate viscosity.

Reconnect battery.

⚠ WARNING

Connect RED (+) cable then BLACK (-) cable. Always connect RED (+) cable in first.

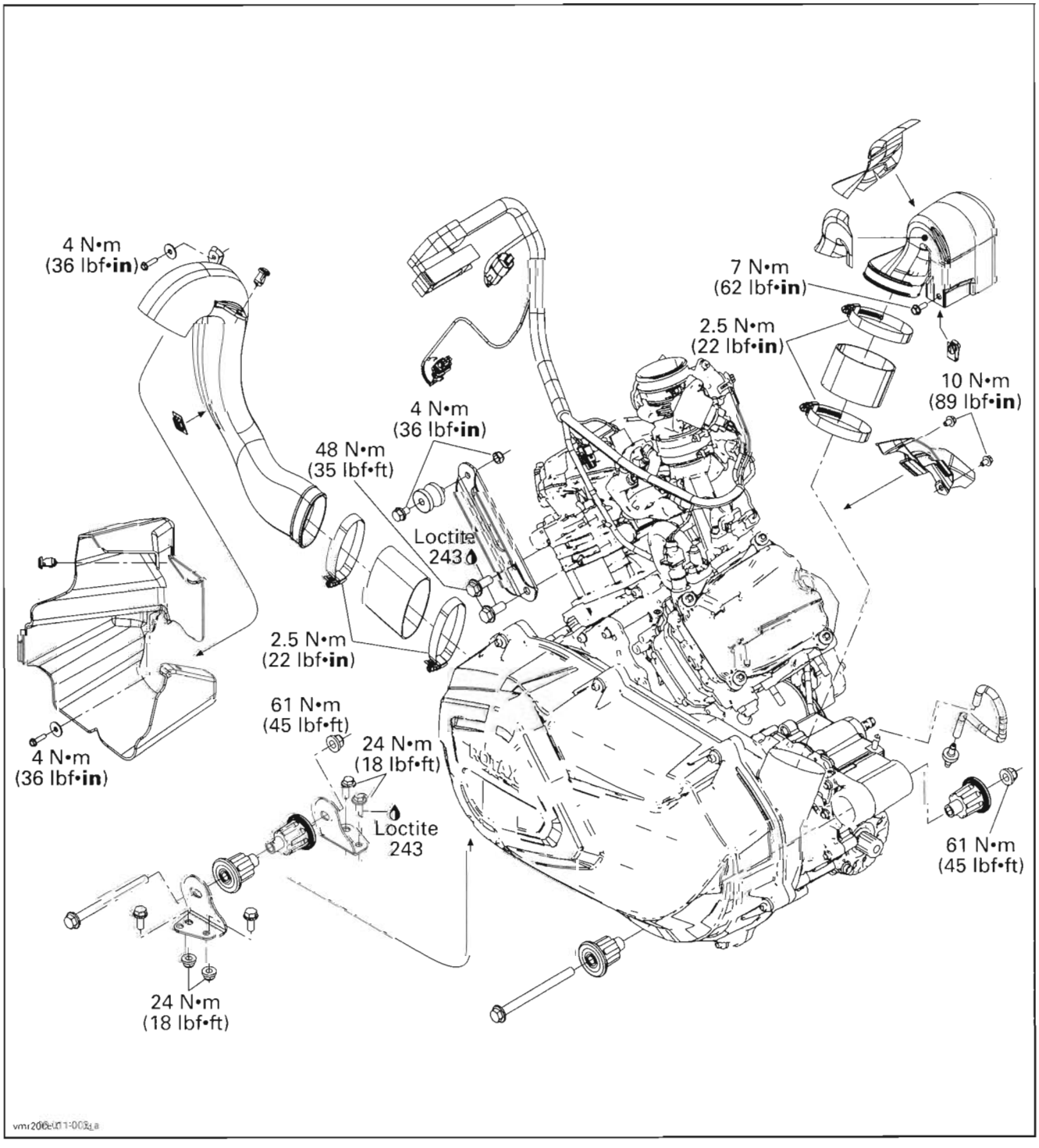
Start vehicle.

Set carburetor.

Stop engine and check if coolant and oil levels are correct.

Test drive vehicle to confirm proper operation.

OUTLANDER 800 SERIES



GENERAL

⚠ WARNING

To avoid potential burns, let engine and exhaust system cool down before performing any servicing.

During assembly/installation, use the torque values and service products as in the exploded view.

Clean threads before applying a threadlocker. Refer to *SELF-LOCKING FASTENERS* and *LOCTITE APPLICATION* at the beginning of this manual for complete procedure.

⚠ WARNING

Torque wrench tightening specifications must strictly be adhered to.
Locking devices (e.g.: locking tabs, elastic stop nuts, self-locking fasteners, cotter pin, etc.) must be installed or replaced with new one where specified. If the efficiency of a locking device is impaired, it must be renewed.

PROCEDURE

ENGINE REMOVAL

Vehicle and Engine Preparation

Place vehicle on a work station that will have access to an engine-lifting hoist. Then start with initial preparation of vehicle by doing the following.

Select 4WD position then place transmission lever to PARK.

Using B.U.D.S., remove fuel pressure in the fuel system. Refer to *ENGINE MANAGEMENT*.

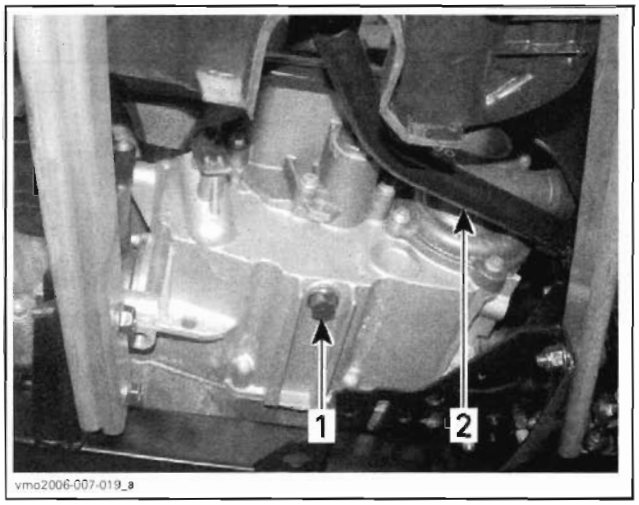
Disconnect the BLACK (-) cable from battery, then the RED (+) cable.

⚠ WARNING

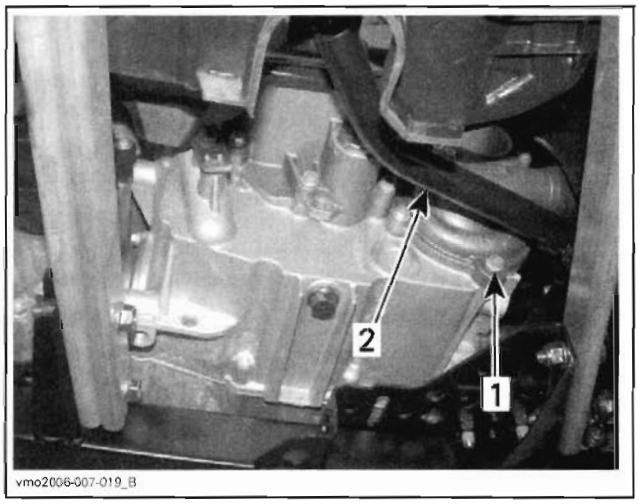
Always disconnect battery cables exactly in the specified order, the BLACK (-) cable first. It is recommended to disconnect electrical connections prior to disconnecting fuel lines.

Drain oil and coolant from engine.

NOTE: Drain engine oil only if engine overhaul is necessary. To work on gearbox the engine removal is necessary but do not drain engine oil.



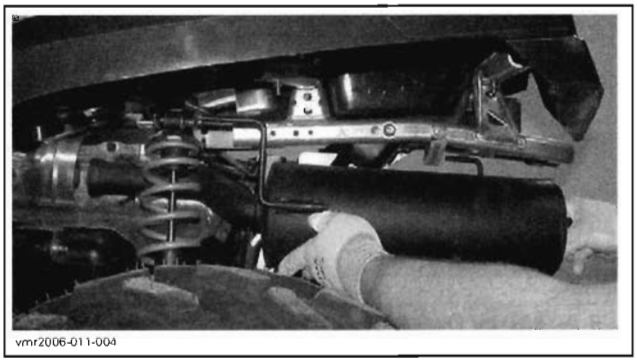
1. Oil drain plug
2. Brake pedal



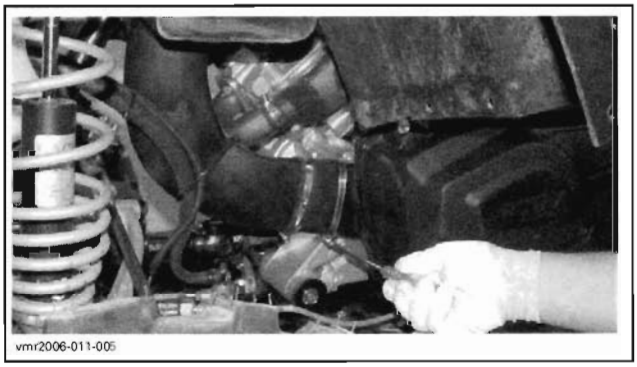
1. Cooling drain plug
2. Brake pedal

Remove:
- seat
- both side panels
- both footrests
- central panel
- air intake silencer cover.

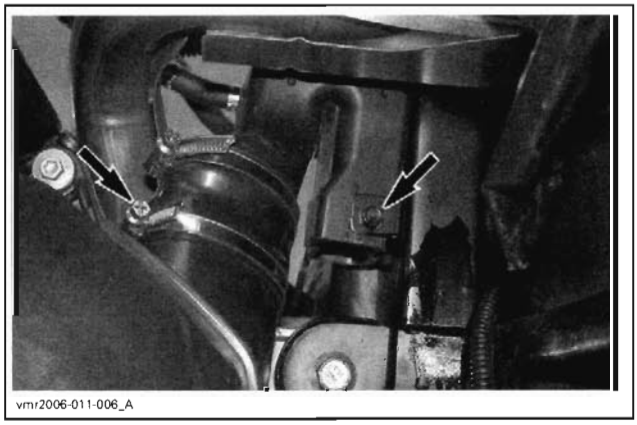
On left side of vehicle, remove the following parts:



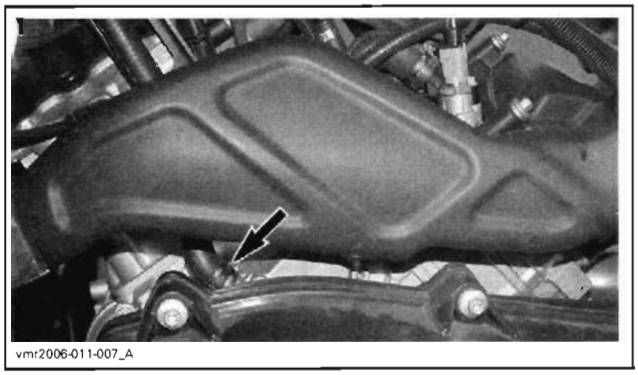
MUFFLER



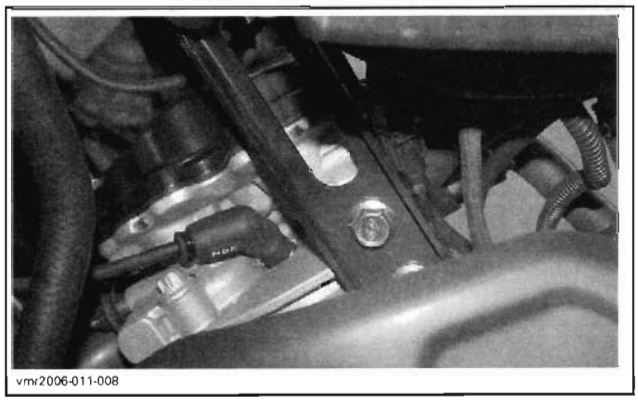
CVT INLET HOSE CLAMP



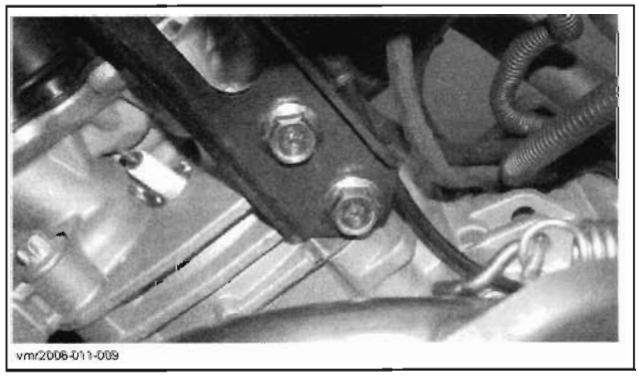
CVT OUTLET HOSE (UNSCREW BOTTOM CLAMP AND BOLT)



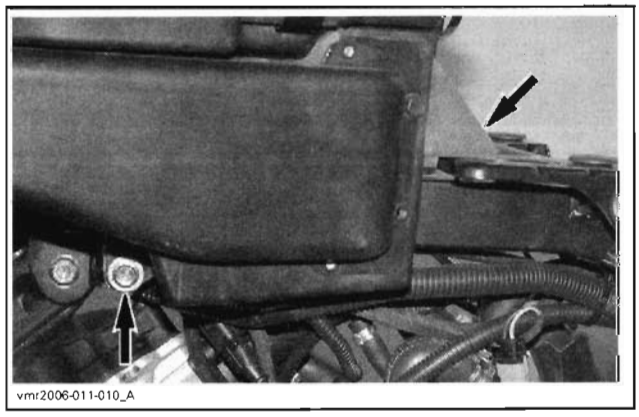
CRANKCASE VENT TUBE FROM ENGINE



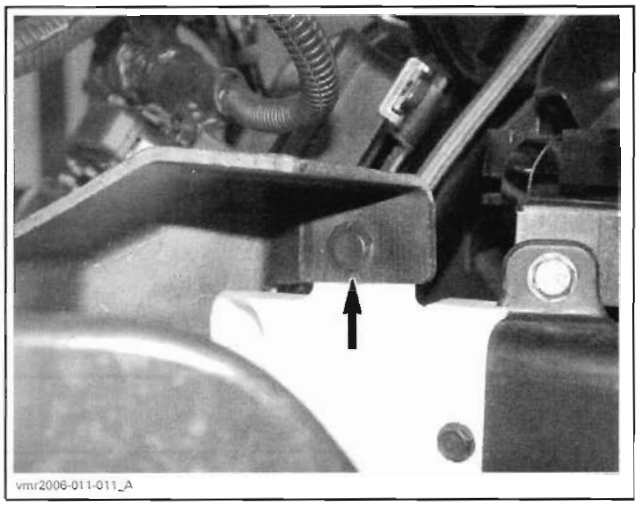
FRONT SPARK PLUG CABLE



LOWER BOLTS FROM UPPER ENGINE SUPPORT

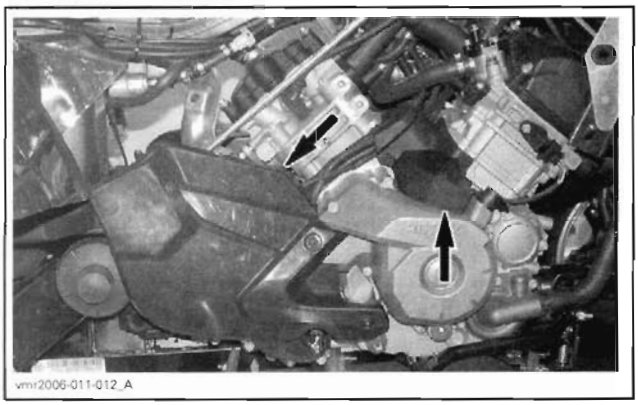


BOLTS RETAINING AIR INTAKE SILENCER

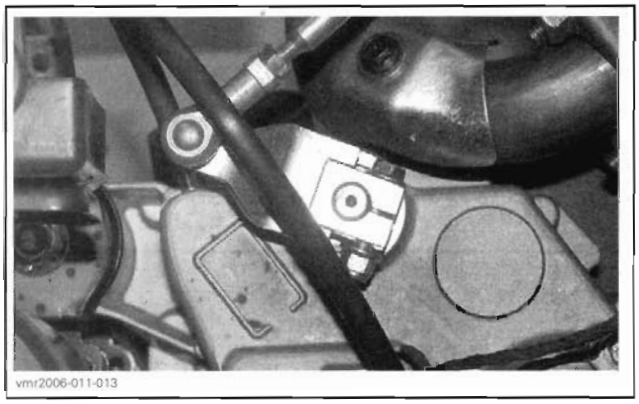


DART HOLDING AIR INTAKE INLET

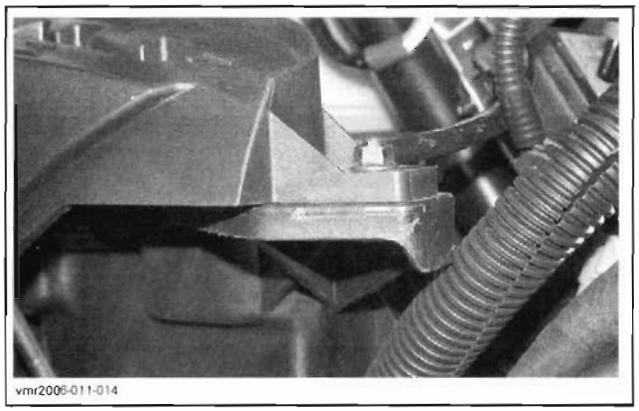
On right side of vehicle, remove or disconnect the following:



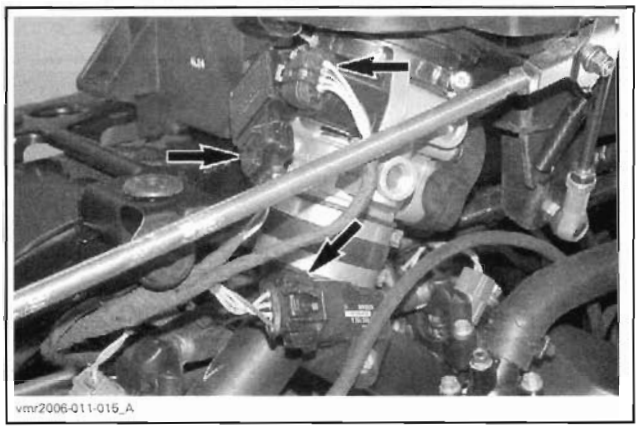
FRONT AND REAR ENGINE COVERS



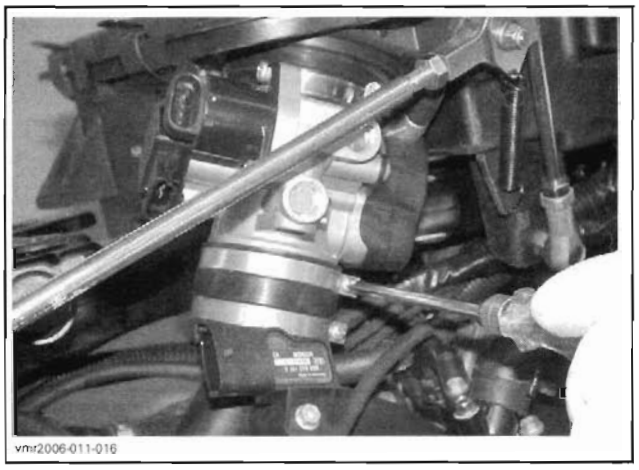
SHIFTING PLATE (UNSCREW BOLT TO REMOVE SHIFTING PLATE)



AIR INTAKE SILENCER BOLT



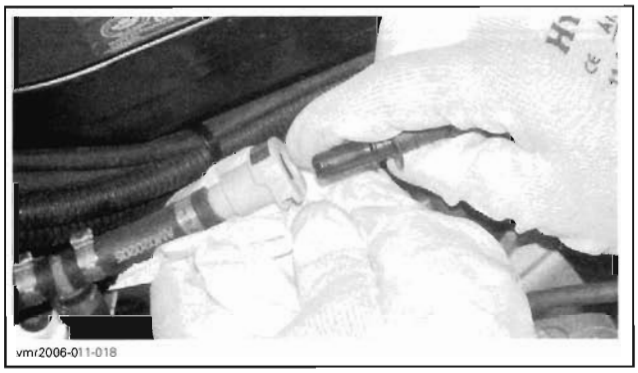
CONNECTORS FROM THROTTLE BODY AND INTAKE MANIFOLD



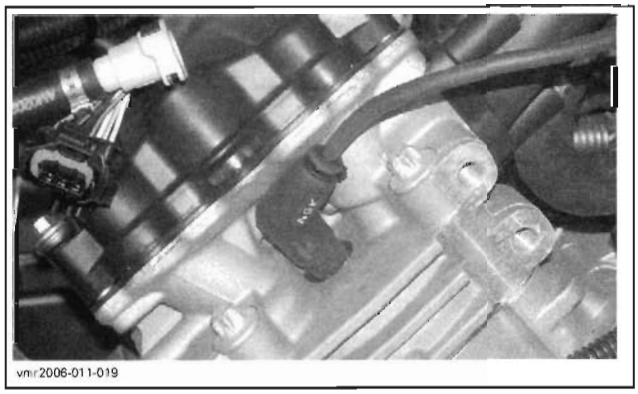
UPPER THROTTLE BODY CLAMP



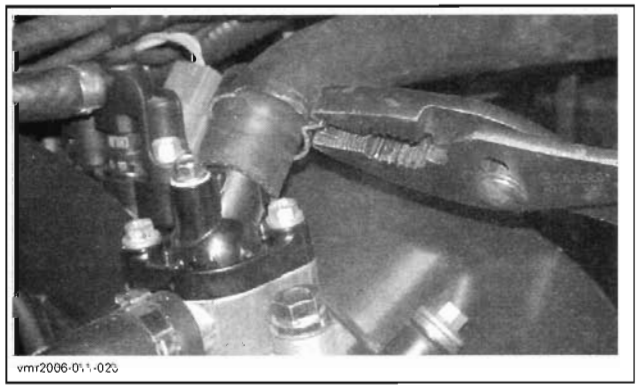
THE AIR INTAKE SILENCER AND PLACE IT ON FRONT RACK



FUEL SUPPLY LINE



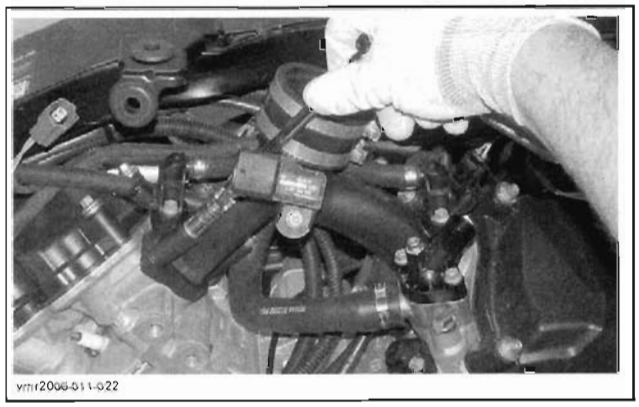
THE OTHER SPARK PLUG CABLE



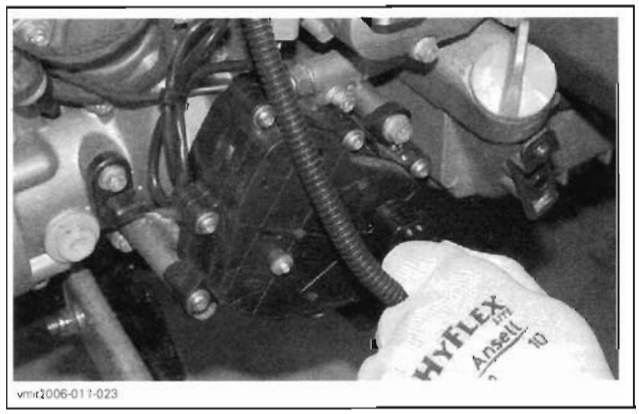
OUTLET ENGINE COOLANT HOSE



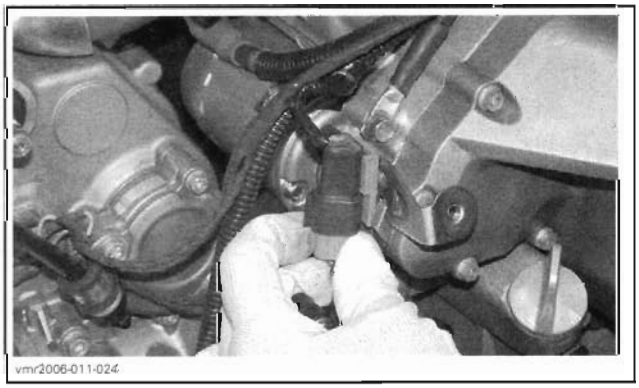
FUEL INJECTOR CONNECTORS



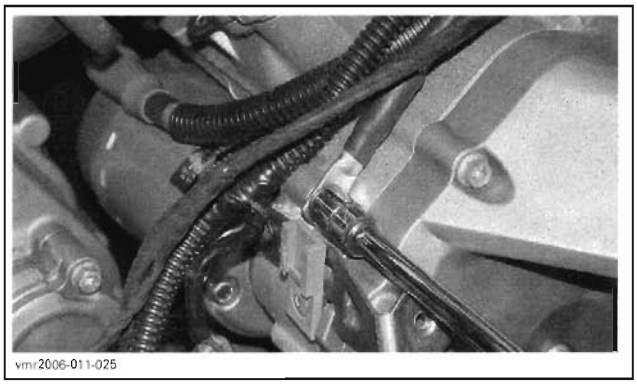
INTAKE MANIFOLD



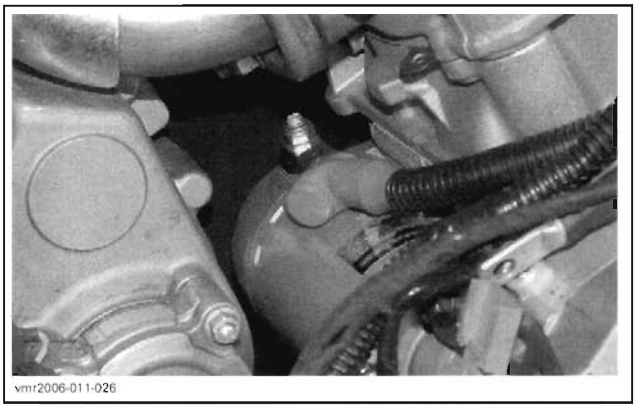
COUPLING UNIT CONNECTOR



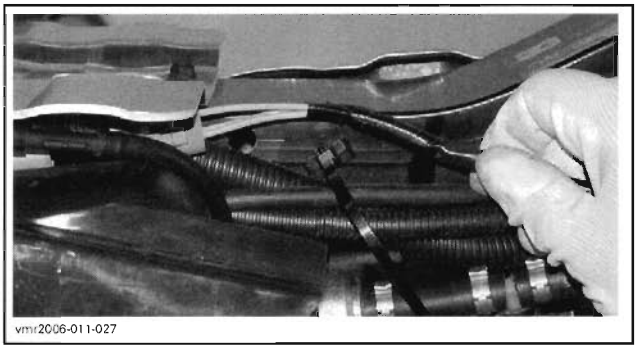
2WD/4WD SWITCH CONNECTOR THEN REMOVE HOUSING FROM BRACKET



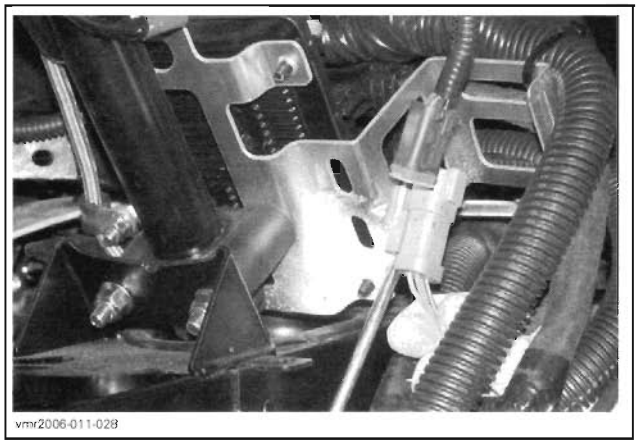
ENGINE GROUND



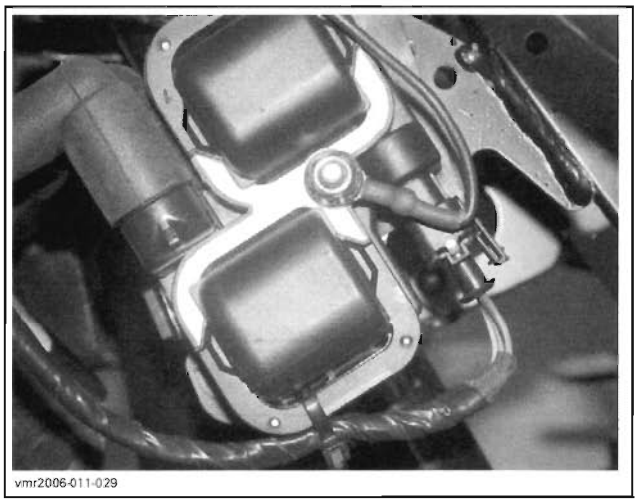
STARTER CABLE



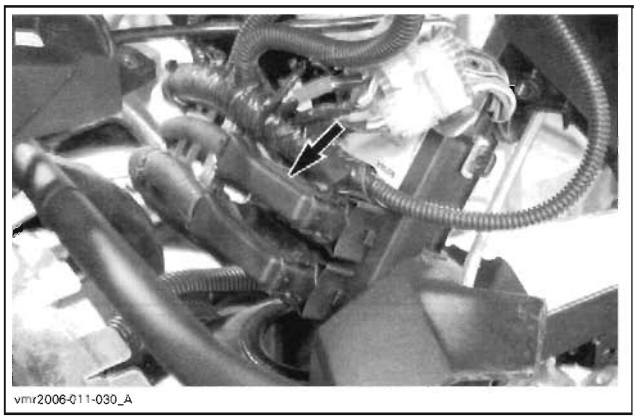
MAGNETO CONNECTOR



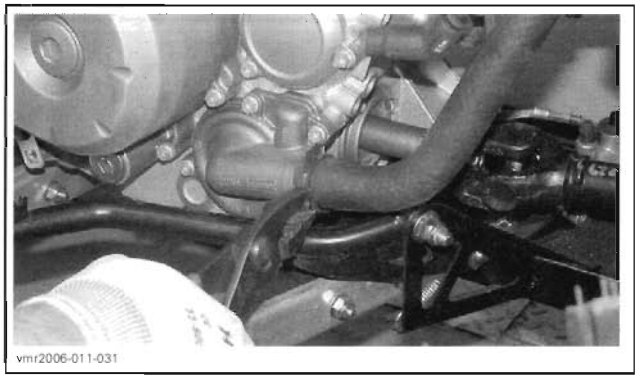
B.U.D.S. CONNECTOR THEN REMOVE HOUSING FROM BRACKET



IGNITION COIL CONNECTOR THEN CUT THE LOCKING TIE



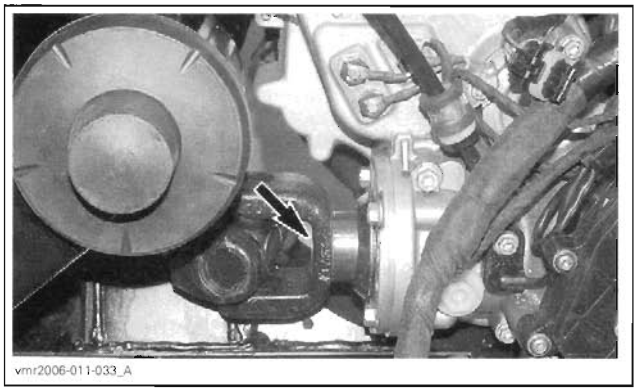
CONNECTOR A FROM ECM



INLET ENGINE COOLANT HOSE

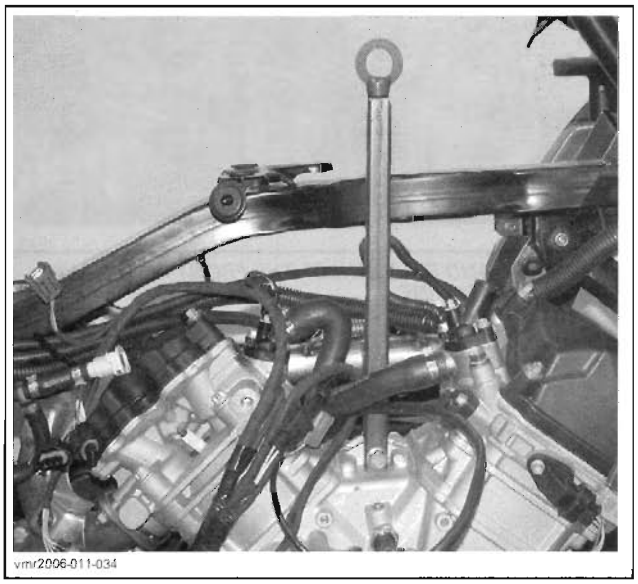


FRONT PROPELLER BOLT

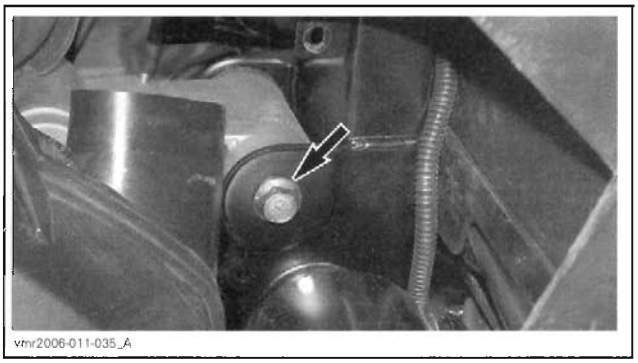


REAR PROPELLER BOLT

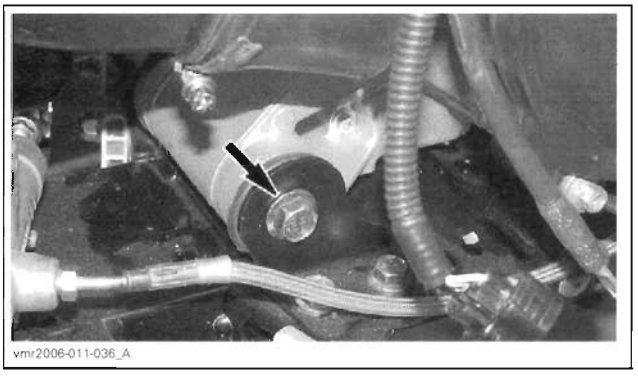
Lifting Engine



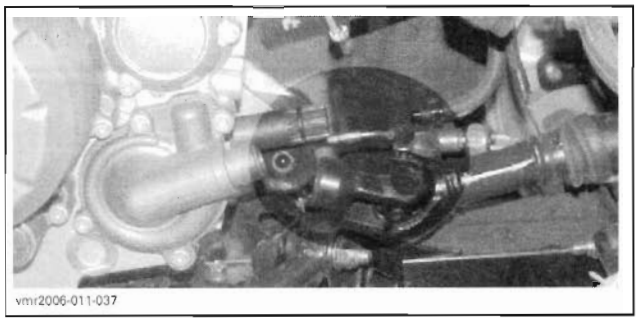
INSTALL THE ENGINE LIFTING TOOL (P/N 529 036 022)



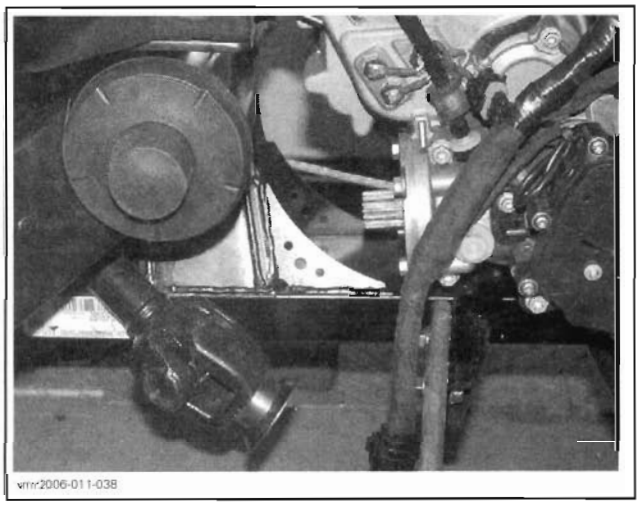
REMOVE THE REAR ENGINE MOUNTING BOLT



THEN THE FRONT ENGINE MOUNTING BOLT



LIFT ENGINE AND DISCONNECT THE FRONT PROPELLER SHAFT FROM ENGINE



MOVE ENGINE FORWARD AND DISCONNECT REAR PROPELLER SHAFT

Lift engine to clear mounting brackets.

Turn engine 90°, cylinder head towards right side of vehicle.

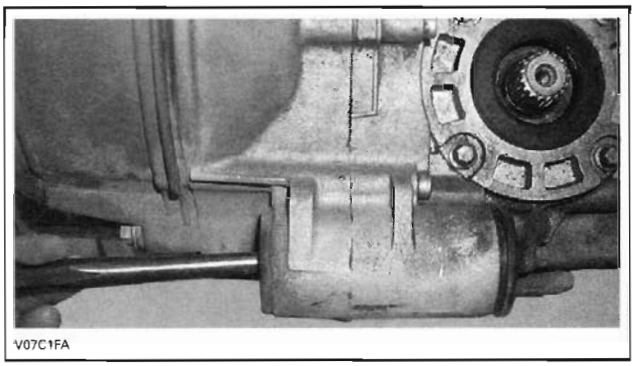
Remove engine from vehicle.

ENGINE MOUNT REPLACEMENT

NOTE: Use the same procedure for the front and rear engine mounts.

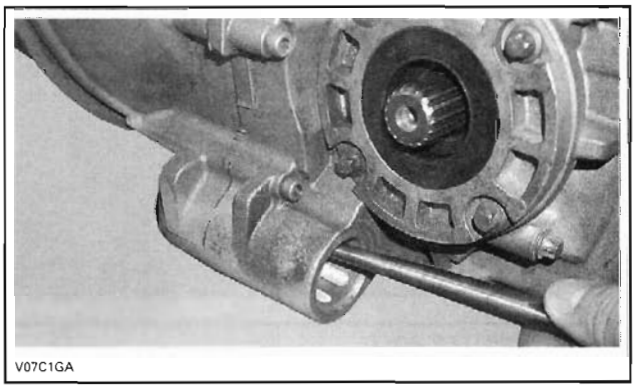
Removal

Insert a punch in hole of engine mount bushing and push the other bushing out of the housing.



TYPICAL

Use punch to remove the other bushing.



TYPICAL

Installation

The installation is the reverse of the removal procedure.

ENGINE INSTALLATION

The installation is the reverse of the removal procedure. However, pay attention to the following.

NOTE: Prior to install engine, inspect condition of engine mounts.

Install the rear engine mounting bolt. Do not torque yet.

Install the rear propeller shaft onto engine output shaft.

Connect the front propeller shaft to engine output shaft while lowering engine.

Install front engine mounting bolt then torque all mounting bolts.

Final Assembly Procedure

Make sure coolant and oil drain plugs are reinstalled and tight.

Fill cooling system. Refer to *COOLING SYSTEM*.

Fill engine with the right amount of oil. Put oil of appropriate viscosity.

Reconnect battery.

⚠ WARNING

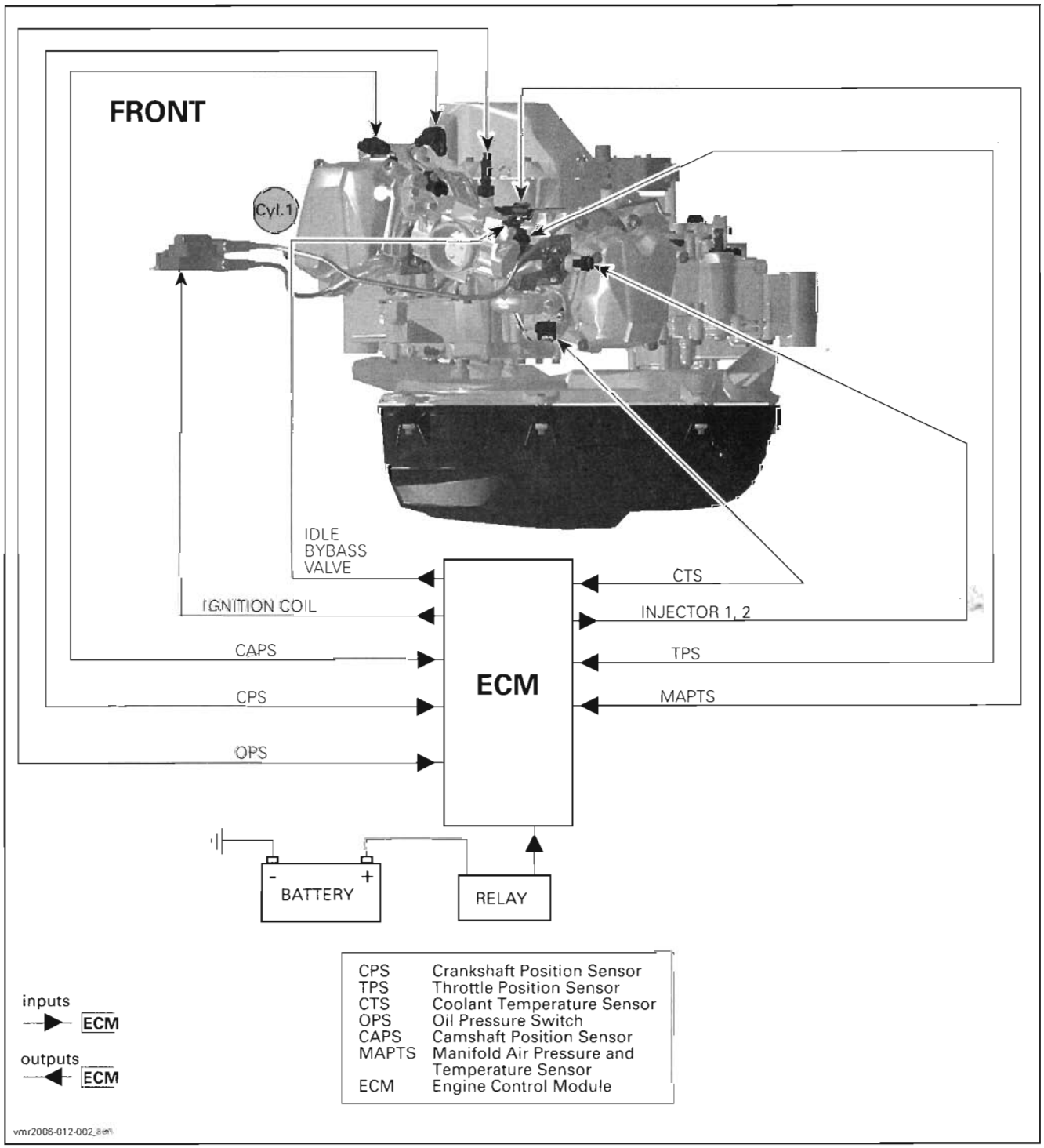
Connect RED (+) cable then BLACK (-) cable. Always connect RED (+) cable in first.

Start vehicle. Let engine reaches the operating temperature.

Stop engine and check if coolant and oil levels are correct. Refill as necessary.

Test drive vehicle to confirm proper operation.

OVERVIEW



ENGINE MANAGEMENT SYSTEM OVERVIEW — V-810 ENGINE

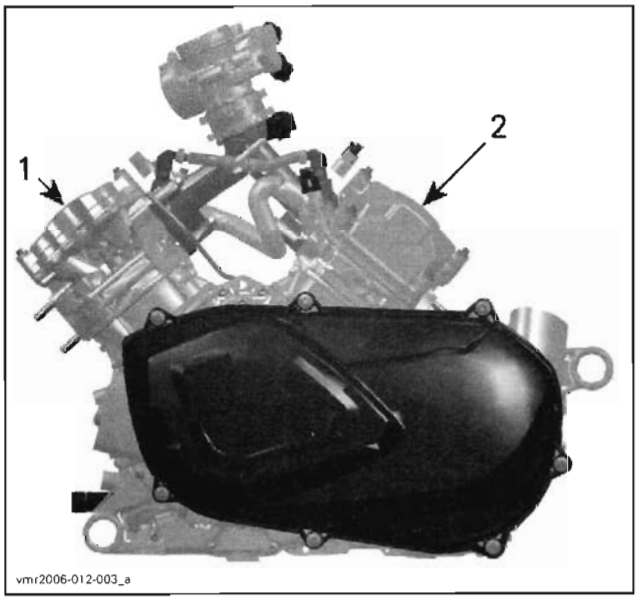
OPERATING PRINCIPLE

A highly advanced engine management system (EMS) has been used to ensure a high power output with cleaner combustion.

There are 3 main systems in interaction with the engine management system (EMS):

1. air induction
2. fuel system
3. electrical system.

NOTE: On the V-810 engine, the cylinders are referenced as 1 (front) and 2 (rear).



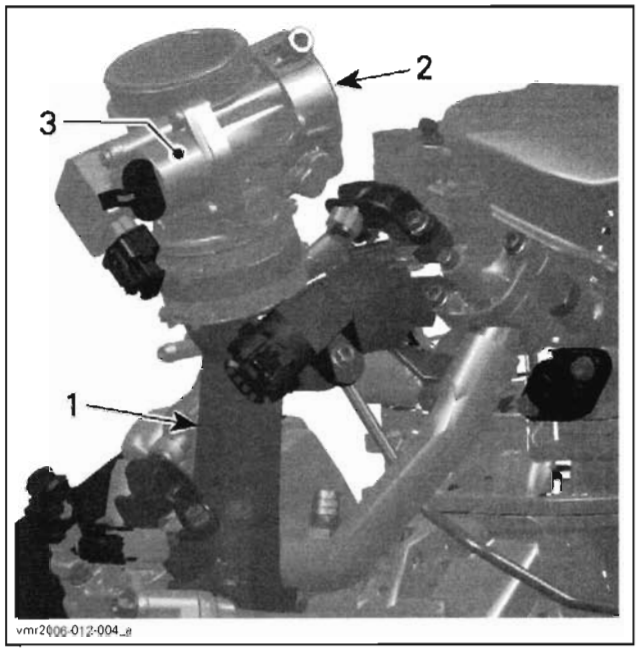
1. Cylinder 1 (front)
2. Cylinder 2

AIR INDUCTION

Air flows through air silencer, air filter, throttle body, intake manifold and then goes into combustion chamber.

Throttle Body

The 46 mm throttle body is mounted on top of intake manifold. Fitted on the throttle body, there is the TPS and the idle bypass valve which allows the ECM to control the idle speed while the throttle plate is closed.



1. Intake manifold
2. Throttle body
3. Idle bypass valve

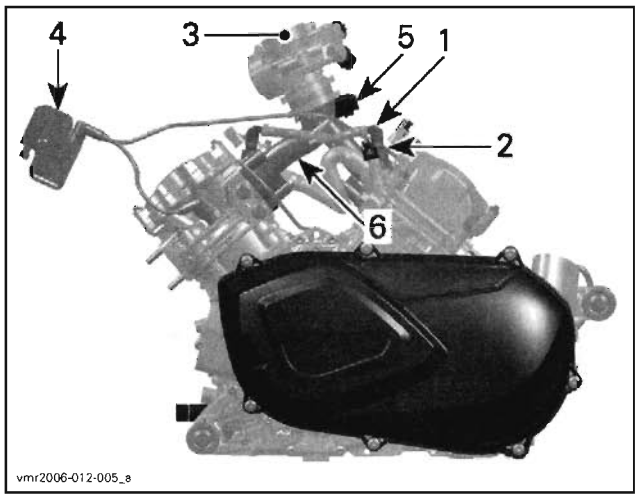
Intake Manifold

The intake manifold is mounted on the top of the engine on both cylinder heads. It provides support for the throttle body, fuel injectors, the fuel rails and the MAPTS (manifold air pressure and temperature sensor).

The air intake manifold is a resonator between the throttle body and the air intake at the cylinder heads.

FUEL SYSTEM

When the intake valve reaches the correct position, the ECM (engine control module) opens the fuel injector and fuel is discharged into the intake port at the air intake manifold by the high fuel pressure inside the fuel rail. The air/fuel mixture enters then the combustion chamber through the open intake valve. This mixture is then ignited by the spark plug.



1. *Fuel rail (2)*
2. *Injector (2)*
3. *Throttle body*
4. *Ignition coil*
5. *Manifold air pressure and temperature sensor (MAPTS)*
6. *Intake manifold*

Fuel Rail

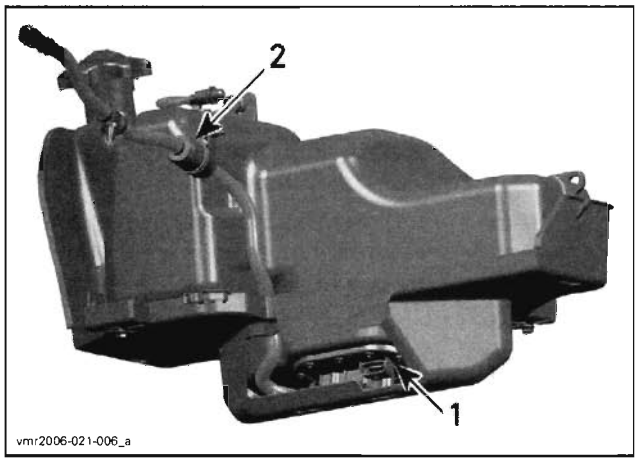
Two fuel rails, one for each injector, are mounted on the intake manifold. The fuel rails ensure all the time, that enough fuel can be delivered to the fuel injectors. The fuel rails are fed by the fuel pump with the properly regulated fuel pressure.

Fuel Injector

Two fuel injectors (one per cylinder) are used to inject fuel into the intake port of the cylinder head.

Fuel Pump Module

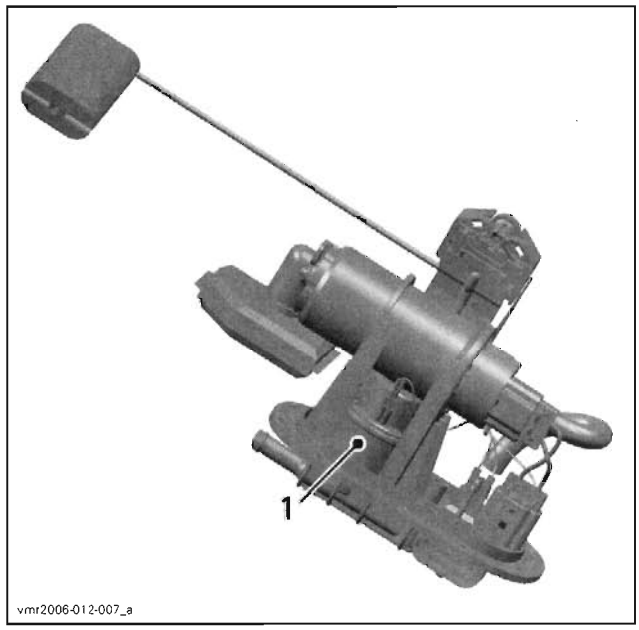
The fuel pump module is underneath fuel tank. The module includes fuel pump, fuel pressure regulator and fuel level sensor. Refer to *FUEL SYSTEM*.



1. *Fuel pump module*
2. *In-line fuel filter*

FUEL PRESSURE REGULATOR

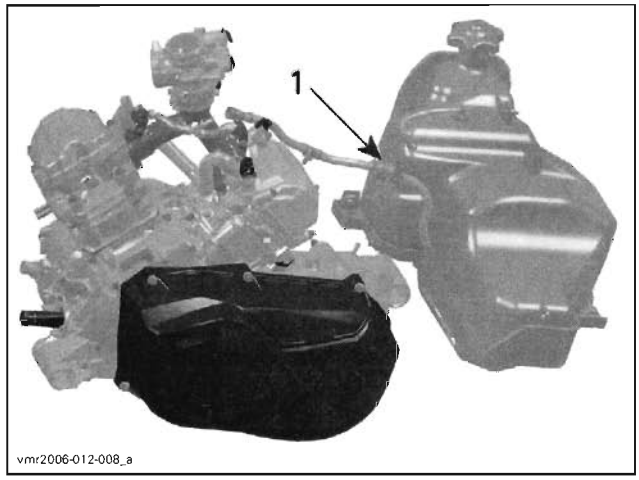
A fuel pressure regulator controls the pressure in the system and allows excess fuel to return to the fuel tank. Refer to *FUEL SYSTEM*.



1. *Fuel pressure regulator*

In-Line Fuel Filter

The in-line fuel filter is located between engine and fuel tank. Refer to *FUEL SYSTEM*.



1. *In-line fuel filter*

ELECTRICAL SYSTEM

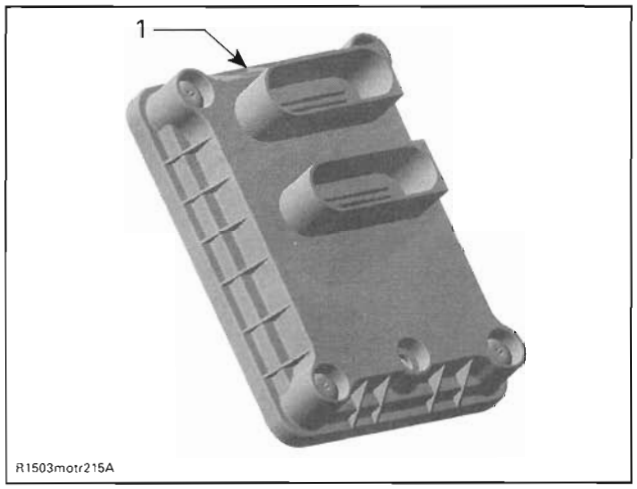
A communication link (CAN lines) is used to communicate between the ECM and the multi-function speedometer. CAN lines consist of a pair of wires (WHITE/TAN and TAN/GREEN).

The speedometer multi-function display can show fault codes. Refer to *DIAGNOSTIC PROCEDURE*.

The communication link is also used to communicate with the VCK (vehicle communication kit) or MPI-2 interface card. Refer to *DIAGNOSTIC PROCEDURES*.

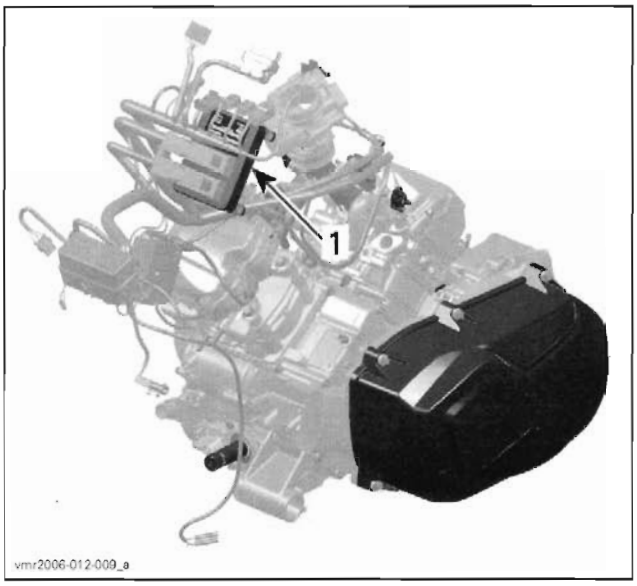
Engine Control Module (ECM)

The ECM controls the electrical system.



TYPICAL
1. ECM

The ECM is located in front of steering column.



1. ECM location

The ECM features a permanent memory that will keep the programmed ignition key(s) active, fault codes, customer information and other engine information, even when the battery is removed from the vehicle.

The ECM features a self-diagnostic mode when ignition key is turned on. However, some components need the engine to be running so that they can be monitored. Some problems will turn on a warning lamp or will set the engine in limp home mode. Refer to *DIAGNOSTIC PROCEDURES* section for more information.

The ECM is powered by the battery through a relay.

⚠ WARNING

Some components are continuously powered by the VFB when ignition key is turned on and engine stop switch is in RUN position. The ECM switches the circuit to the ground to complete the electrical circuits it controls. Take this into account when troubleshooting. Always disconnect the battery prior to disconnecting any electric or electronic parts.

The ECM is responsible for the following electrical functions:

Digitally Encoded Security System (DESS)

This anti-start system allows engine starting only with a programmed key. Refer to *DIGITALLY ENCODED SECURITY SYSTEM (DESS)* subsection.

Engine Starting

If the ECM recognizes a valid key, it allows engine to start. Other conditions are also required to allow engine starting. Refer to *STARTING SYSTEM* subsection.

Engine RPM Limiter

The ECM will limit the maximum engine speed when vehicle shifter is in:

- forward position (Hi and LO individually)
- neutral position
- park position
- reverse position.

The ECM uses the CPS and the GBPS (gearbox position sensor) for this function.

An override switch, on the handlebar, allows the engine speed to run higher than the RPM limiter when more power is needed in reverse operation. Refer to *INSTRUMENTS AND ACCESSORIES*.

Vehicle Speed Limiter

The ECM will limit the maximum vehicle speed both in 2WD and in 4WD. For this purpose, the ECM uses the VSS (vehicle speed sensor) and the GBPS (gearbox position sensor).

Cooling Fan

The ECM controls the cooling fan. Whenever coolant temperature reaches a certain treshold, the ECM triggers the fan relay to start the fan. When temperature cools down to a certain treshold, the ECM stops the fan.

Brake Monitoring

The ECM monitors the brakes through the brake switch. If parking brake is activated or the driver inadvertently keeps the brake depressed for more than 15 seconds (either when vehicle moves or not), the ECM sends out a signal to the multi-function speedometer.

NOTE: PARK BRAKE will be displayed in the multifunction speedometer.

Shutdown Mode

When engine stop switch is turned OFF or ignition key is turned OFF position, speedometer will turn off within 15 seconds. All the electrical system is cut-off.

Engine not running: When engine stop switch if ON and ignition key is left in the ON position, the accessories are powered. After 15 minutes, the ECM shuts down all functions except multi-function speedometer. ECM and mutlifunction speedometer will draw power.

NOTE: If engine starting is desired at this point, it is required to turn ignition key OFF, wait until speedometer turns OFF then, turn key back ON.

To prevent battery drain, always turn OFF either ignition key or engine stop switch.

Drowned Mode (Flooded Engine)

If engine is fuel-flooded and does not start, this special mode can be activated to prevent fuel injection and ignition while cranking. Proceed as follows to activate it.

With ignition key in ignition switch while engine is stopped, press and HOLD throttle lever at WOT position.

Press the start button. The mode is now on.

Releasing throttle lever will bring back the normal mode.

If engine does not start, it may be necessary to remove spark plugs and crank engine with rags over spark plug holes. Refer to *COMPONENT INSPECTION AND ADJUSTMENT* subsection.

⚠ WARNING

When disconnecting coil from spark plug, always disconnect coil from main harness first. Never check for engine ignition spark from an open coil and/or spark plug in the engine compartment as spark may cause fuel vapor to ignite.

Diagnostic Mode

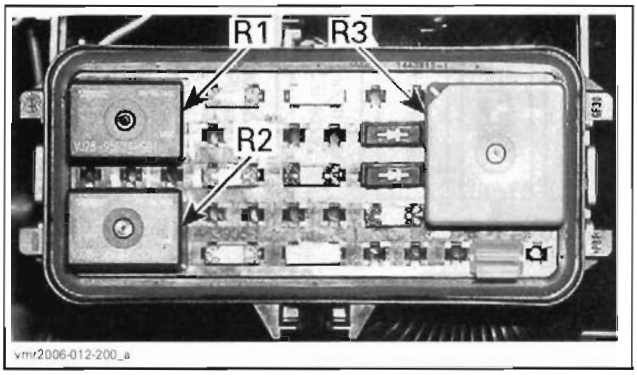
The fault codes are recorded in the memory of the ECM. They can be checked by using the software B.U.D.S. with the VCK (Vehicle Communication Kit) or the MPI-2 interface card.

Refer to the *DIAGNOSTIC PROCEDURES* subsection.

Relays

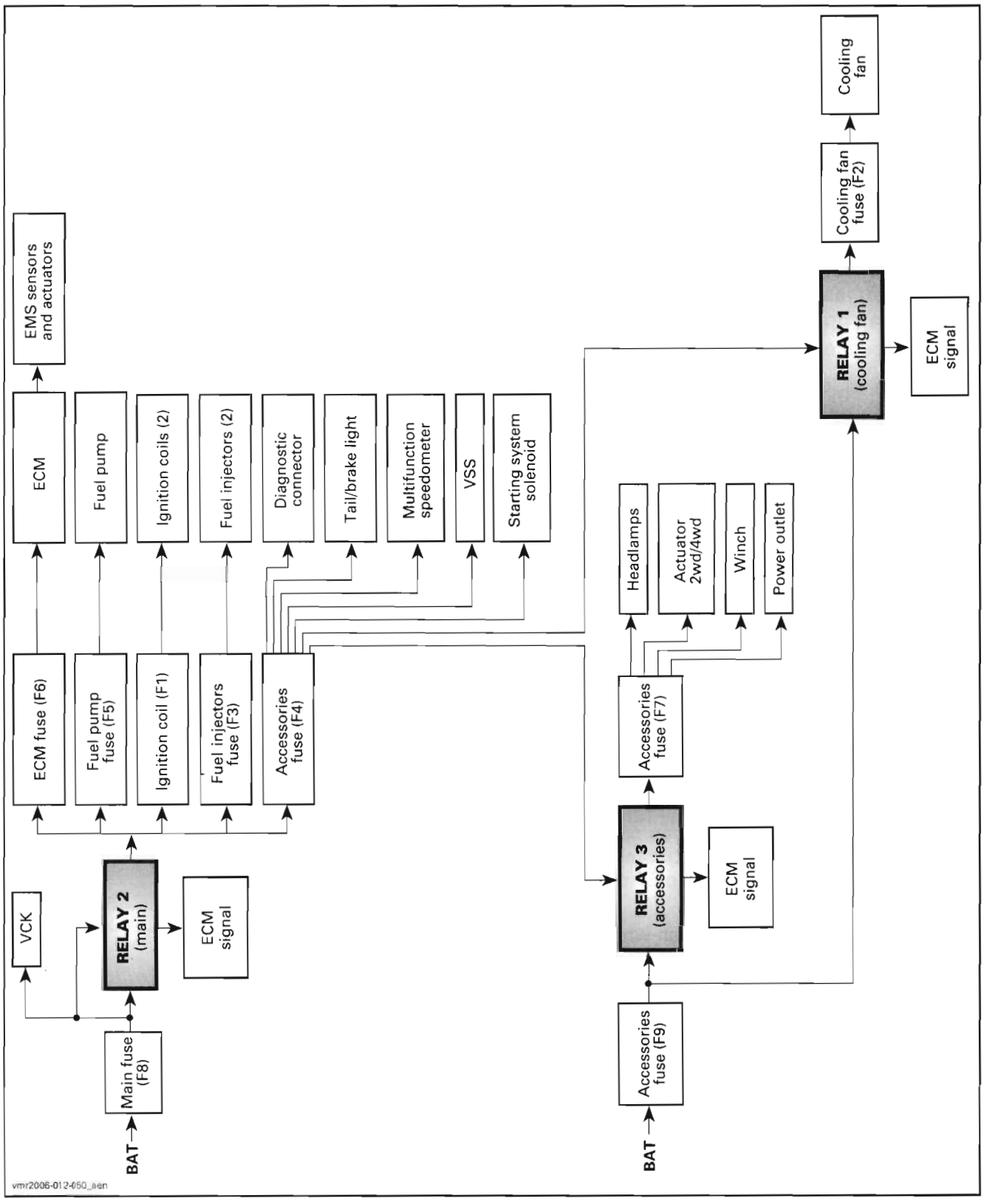
Three relays are used to distribute power to different components. When ignition key is turned ON and engine stop switch is in RUN position, relay 2 is energized and in turn, it supplies the windings of relay 1 and relay 3. The ECM provides the trigger signal to activate each relay individually. Refer to the following diagram.

When starting engine, relay 1 and 3 are temporary disabled to make all power available for the starter, the fuel pump and the EMS.

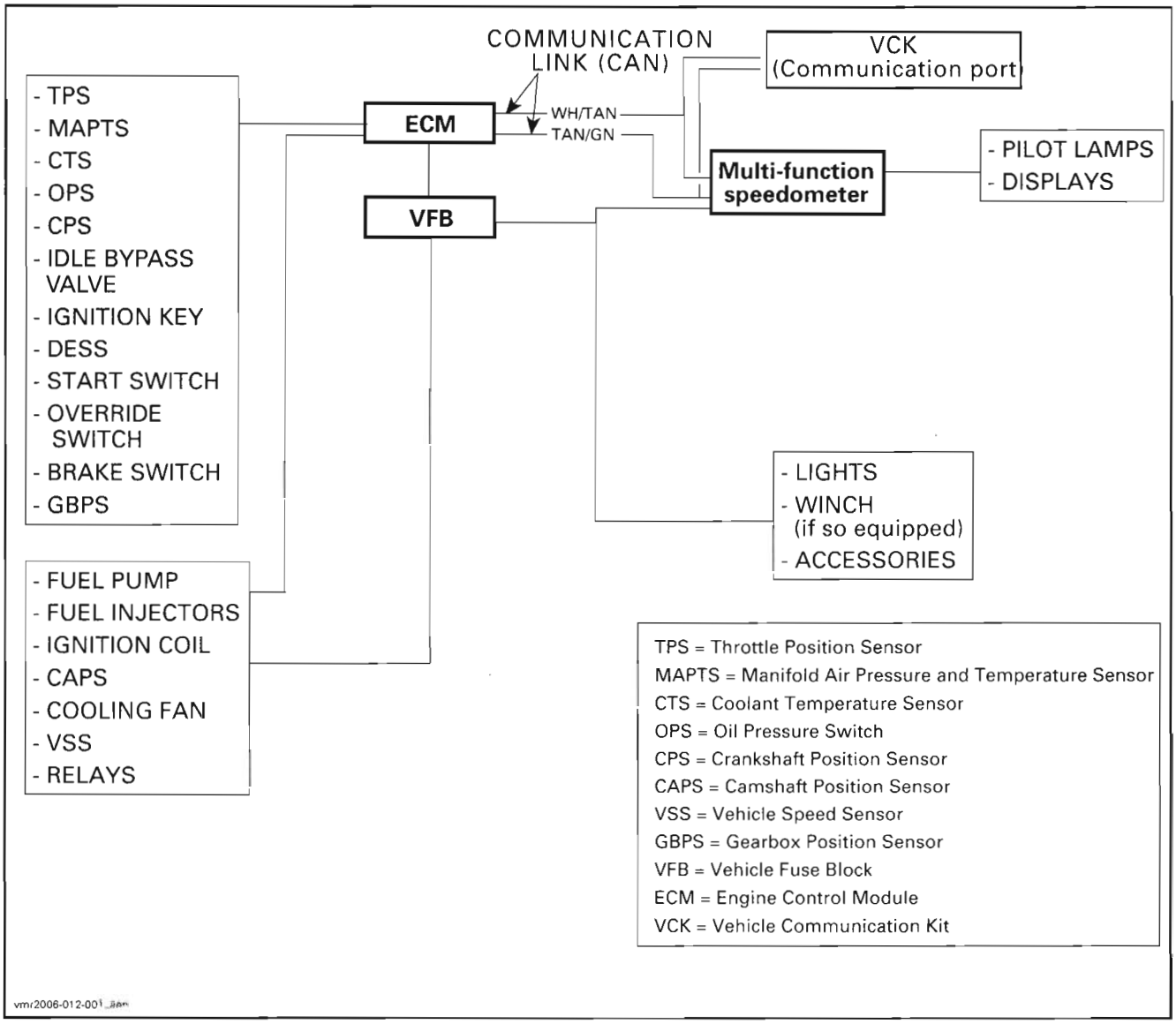


R1: Cooling fan
R2: Main
R3: Accessories

Power Distribution



ECM and VFB Interaction with the Electrical System



NOTE: For VFB and fuses identification, refer to *ELECTRICAL CONNECTORS*.

NOTE: 2 diodes are used in the electrical system. Reversed installation or failure will prevent engine starting or may bring problem to VSS (vehicle speed sensor) or 2/4WD actuator. They are located in VFB. Refer to *STARTING SYSTEM* and *INSTRUMENTS AND ACCESSORIES*.

ENGINE MANAGEMENT SYSTEM

The EMS calculates the proper air/fuel mixture and ignition timing for each cylinder separately.

The ECM is the central point of the engine management system. It reads the inputs, makes computations, uses pre-determined parameters and sends the proper signals to the outputs for proper engine management.

ELECTRONIC FUEL INJECTION

The ECM reads the signals from different sensors which indicate engine operating conditions at millisecond intervals.

Signals from sensors are used by the ECM to determine the injection parameters (fuel maps) required for optimum air-fuel ratio.

The CPS, the MAPTS and the TPS are the primary sensors used to control the injection and ignition timing. Other sensors (like temperature sensors, etc.) are used for secondary input.

IGNITION

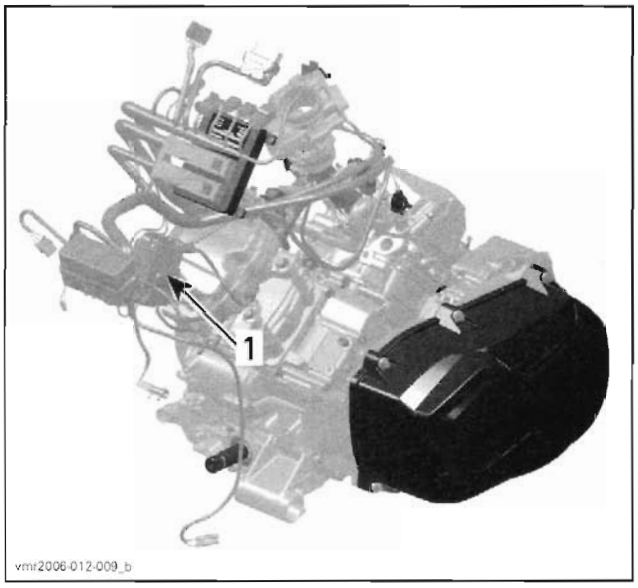
The ignition system is fully managed by the ECM which controls the ignition system parameters, such as spark timing, duration and firing order to achieve the proper engine requirements.

Ignition Coil

A double ignition coil induces voltage to a high level in the secondary winding to produce a spark at each spark plug independently.

The ignition coil receives input from the ECM.

Ignition coil is located in front of engine.



1. Ignition coil location

Ignition Timing

The ECM is programmed with data (it contains ignition mappings) for optimum ignition timing under all operating conditions. Using engine operating conditions provided by the sensors, the ECM controls the ignition timing for optimum engine operation. There is no adjustment to perform.

OTHER ENGINE MANAGEMENT FUNCTIONS

Limp Home Mode

Besides the signals seen above, the ECM may automatically set default parameters to the engine management to ensure the adequate operation of the engine if a component of the fuel injection system is not operating properly. The engine will operate with reduced performance to protect the engine. In more severe cases, the engine RPM will be limited, also to protect the engine.

These performance-reduced modes allow the rider to go back home which would not be otherwise possible without this advanced system. Refer to the *DIAGNOSTIC PROCEDURES* for a complete chart.

When a sensor failure occurs,the ECM will send out a signal to the multi-function speedometer to warn the operator.

NOTE: LIMP MODE will be displayed in the multifucntion speedometer and check engine light will flash. Refer to *INSTRUMENTS AND ACCESSORIES*.

When minor fault occurs, the fault and message in the multi-function speedometer may disappear automatically when the ignition key is turned off and kept off until lights turn off in multi-function speedometer, then turned back on.

Monitoring System

The ECM monitors the electronic components of the fuel injection system and also parts of the electrical system. When a fault occurs, the ECM sends out signals to the multi-function speedometer to inform you of a particular condition. Refer to the *DIAGNOSTIC PROCEDURES* for the fault codes chart.

Battery Voltage Warning Device

When the battery voltage is either too low or too high, the ECM sends out a signal to the multi-function speedometer.

NOTE: Either LO BATT or HI BATT will be displayed in the multifucntion speedometer and check engine light will flash. Limp home will be set.

Low Oil Pressure Warning Device

When the engine oil pressure falls under a certain level, the ECM sends out a signal to the multi-function speedometer.

NOTE: LOW OIL will be displayed in the multifucntion speedometer and check engine light will flash. Limp home will be set.

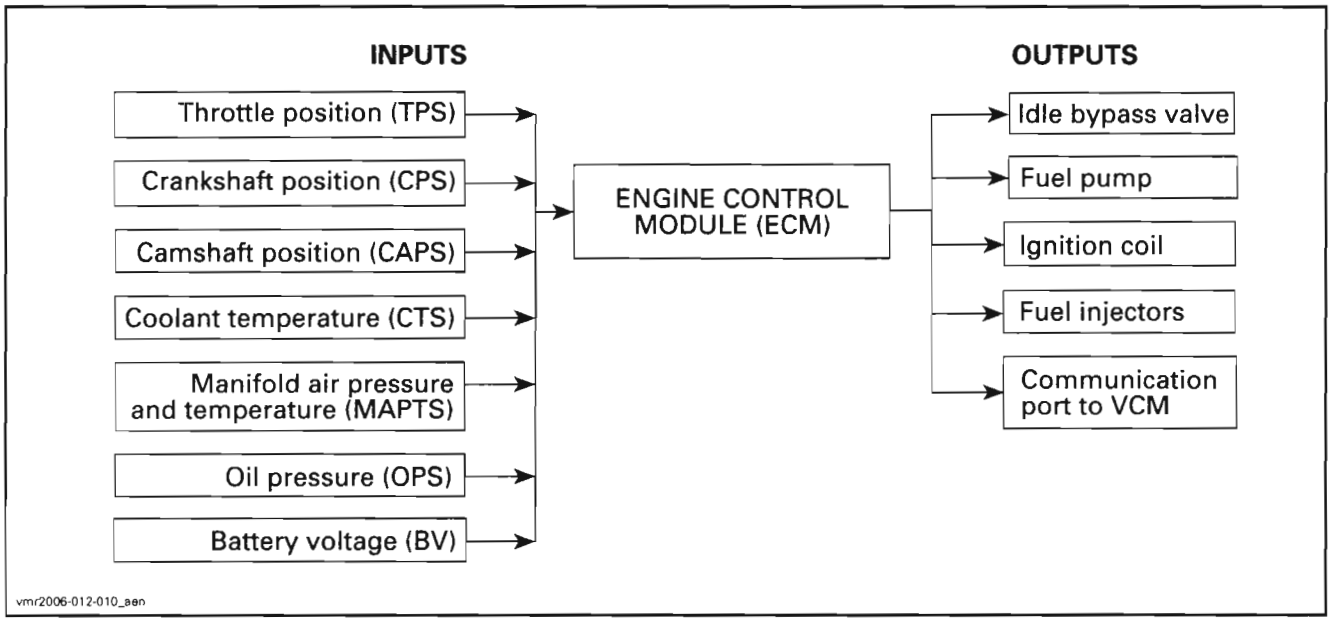
High Coolant Temperature Warning Device

When the engine coolant temperature is getting to high, the ECM sends out a signal to the multi-function speedometer.

NOTE: HI TEMP will be displayed in the multifucntion speedometer and check engine light will flash. Limp home will be set.

In overheat condition, the ECM starts the cooling fan and enriches the fuel mixture. If overheat keeps on, the ECM will set the limp home mode.

ENGINE MANAGEMENT SYSTEM FLOW CHART



DIAGNOSTIC PROCEDURE

GENERAL

Here is the basic order suggested to diagnose a suspected engine management or fuel injection related problem:

- Check the chart in the *TROUBLESHOOTING* section to have an overview of problems and suggested solutions.
- Check if the engine management system (EMS) pilot lamp is ON or blinks. If so, use the B.U.D.S. software and look for fault codes to diagnose the trouble.

NOTE: When a fault code is present, the EMS pilot lamp will turn on. When EMS is in limp home mode, the lamp will blink.

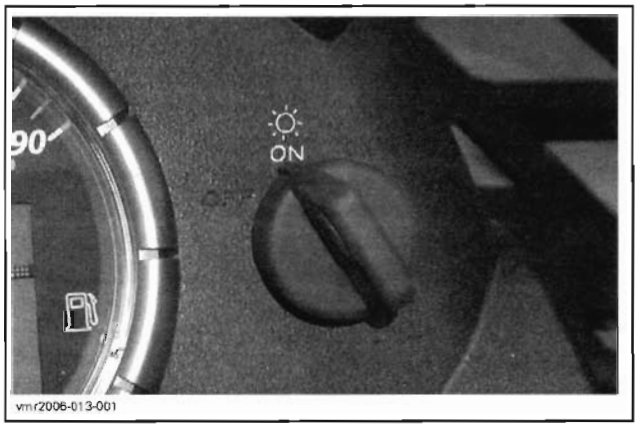
- Check all fuses.
- Check relay(s).
- Check fuel pressure.
- Check spark plugs condition.
- Check all connections of the wiring harness.
- Refer to *COMPONENT INSPECTION AND ADJUSTMENT* section for procedures.

On-Board Diagnostic

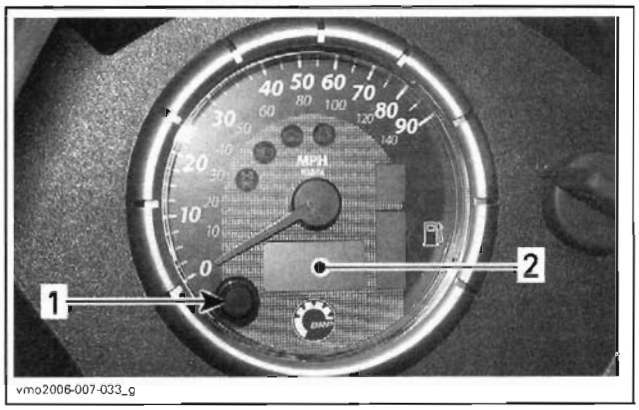
Fault codes starting with the letter P followed by 4 digits (P-1234) can be displayed in the multi-function speedometer for troubleshooting.

Proceed as follows:

- Turn ignition key ON with lights ON.

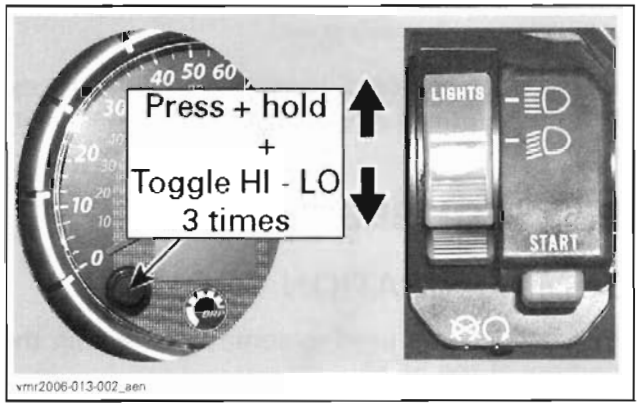


- Set multi-function speedometer in "Engine hour".



1. Repeatedly press selector button
2. Engine hour

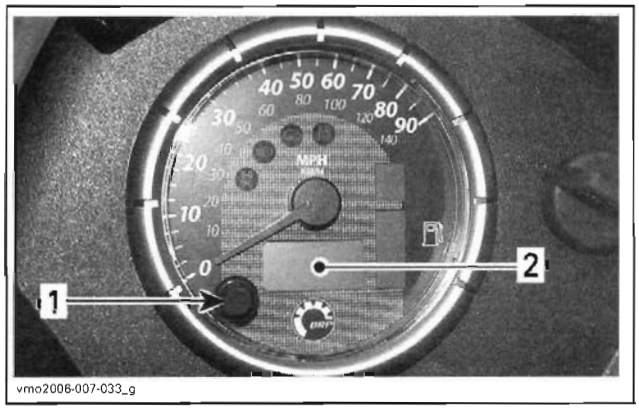
- Press and HOLD selector button while QUICKLY toggling HI - LO beam 3 times in a row



- On-board diagnostic mode is now on. "Active P-code" will show up on display.

NOTE: If it does not work, start over the procedure and toggle light switch faster. Toggling must be done within 2 seconds.

Press selector button to scroll fault codes (if more than one).

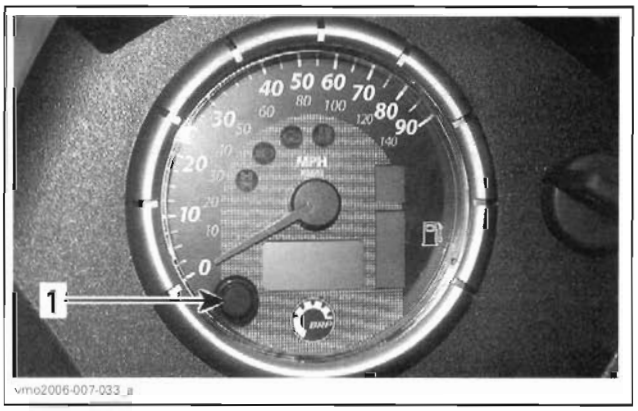


1. Press selector button
2. Scroll fault codes

END will appear when all fault codes have been displayed.

NOTE: If no button is depressed, the fault codes will automatically scroll down (if more than one) until END is reached.

To exit on-board diagnostic mode, press selector button and HOLD 2 seconds.



1. Press and hold 2 seconds to exit

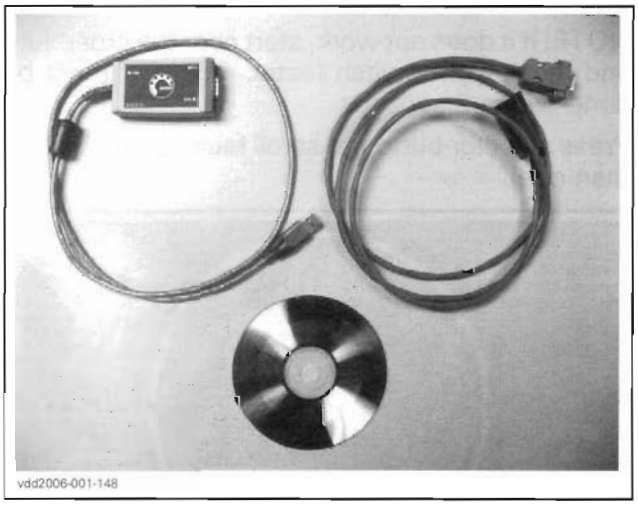
NOTE: If the on-board diagnostic mode is not exited, it will remain in function even if ignition key is turned off.

PROCEDURES

COMMUNICATION TOOLS

Two tools can be used to communicate with the memory of the ECM.

MPI-2 Interface Card



- 529 036 018: MPI-2 interface card
- 710 000 851: diagnostic cable
- 529 035 886: B.U.D.S. – 2 software CD

VCK (Vehicle Communication Kit)

The VCK (Vehicle Communication Kit) (P/N 529 035 981).



- 529 035 677: Multi Protocol Interface (MPI) with four AA-1.5 VDC alkaline batteries
- 529 035 807: Diagnostic cable
- 529 035 679: 6-pin adapter
- 529 035 697: DB9 female to DB9 male serial cable.

SOFTWARE

Ensure to use the latest B.U.D.S. version 2.3.2 or above available on BOSSWeb.

B.U.D.S. (Bombardier Utility and Diagnostic Software) is designed to allow actuators, sensors and electronic equipments inspection, diagnostic options and reset such as the closed throttle and idle actuator.

For more information pertaining to the use of the B.U.D.S. software, use its help which contains detailed information on its functions.

⚠ WARNING

If the computer you are using is connected to the power outlet, there is a potential risk of electrocution when working in contact with water. Be careful not to touch water while working with the VCK.

ELECTRICAL CONNECTIONS

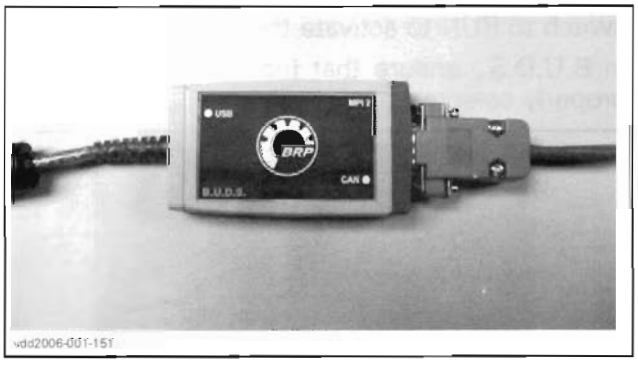
MPI-2 Interface Card

Connect the USB connector of the MPI-2 card to the USB port of your computer.



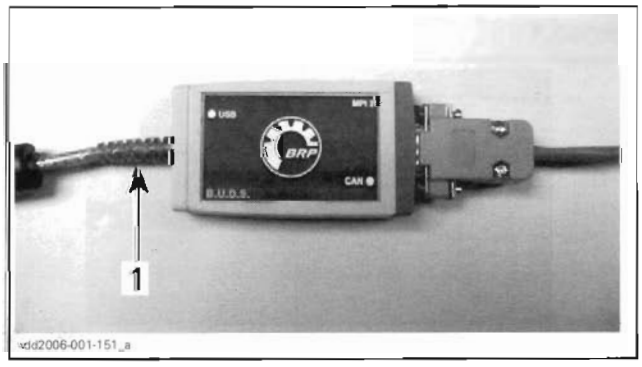
TYPICAL

Connect the diagnostic cable to the MPI-2 card.



MPI-2 Power Supply

The MPI-2 card uses the computer power through the USB port for its supply.



1. Power from USB cable

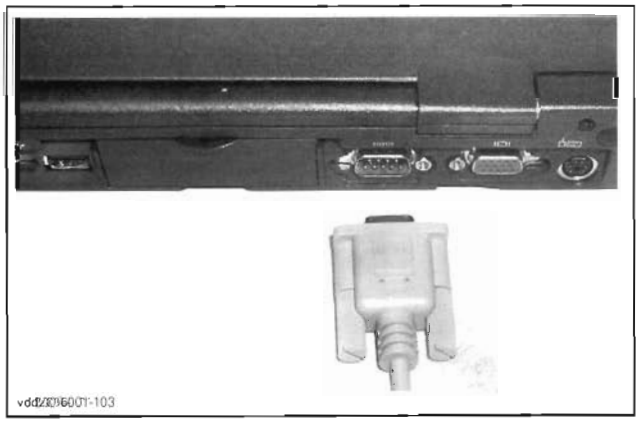
VCK (Vehicle Communication Kit)

Connect the DB9 serial cable to the MPI serial port.

Connect the HDDB-15 male connector of the diagnostic cable to the MPI diagnostic port (engine icon).

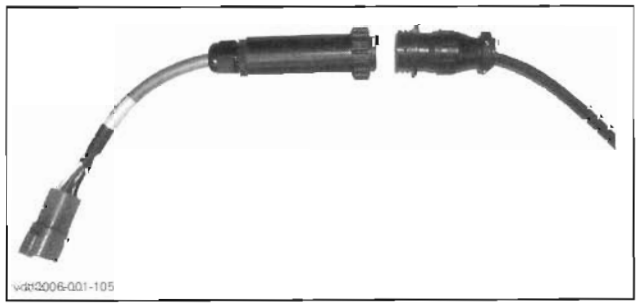


Connect the other end of the serial cable to your computer serial port. You may use the DB9 to DB25 serial adapter in the eventuality that your computer has only a 25-pin serial connector.



TYPICAL

Connect the other end of the diagnostic cable to the 6-pin adapter. You can optionally use a diagnostic extension cable between the diagnostic cable and the 6-pin adapter.



MPI Power Supply

The MPI box needs power to work. Four AA batteries or an AC/DC power supply need to be used. Make sure to respect MPI specification if a power supply is used.



1. DC supply jack

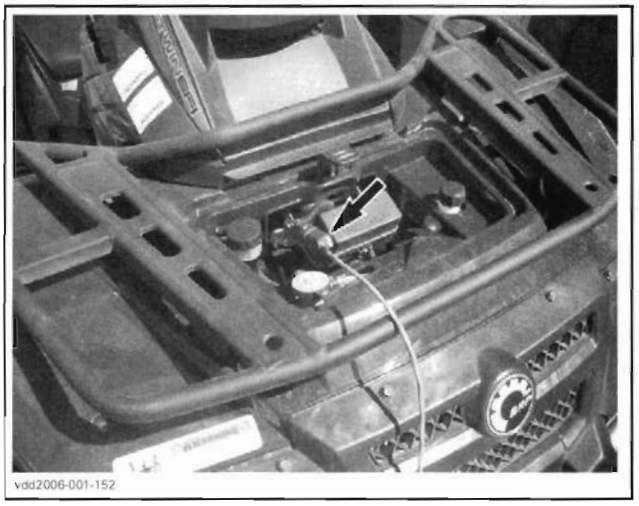
Vehicle Communication Connector

Open service compartment cover and locate communication connector.



1. Open

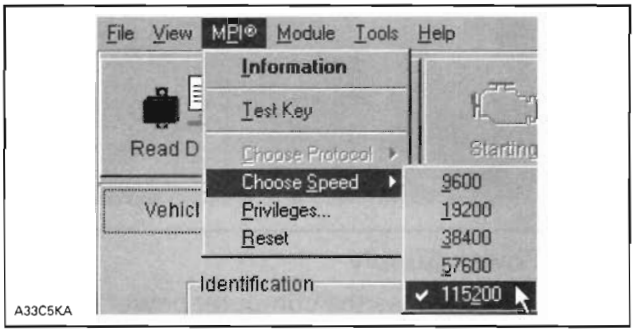
Unplug communication connector and plug the VCK or MPI-2 connector.



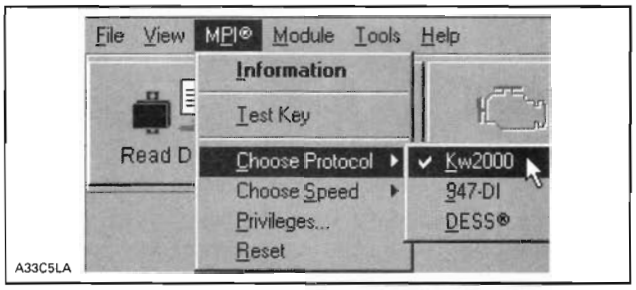
COMMUNICATION PROCEDURES

Turn ignition switch ON and set engine stop switch to RUN to activate the communication.

In B.U.D.S., ensure that the speed "115200" is properly selected.

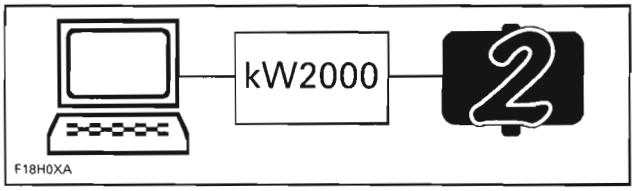


Ensure that the protocol "kW2000" is properly selected.



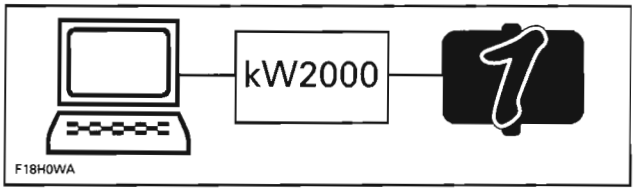
Ensure the status bar shows KW2000 and number 2 to the right.

Number 2 means that 2 "ECUs" are connected.



ECM AND MULTI-FUNCTION SPEEDOMETER ARE CONNECTED

Number 1 means that only one "ECU" is connected (either ECM or multi-function speedometer). Therefore, there is a problem. Check fuses and connections.



ONLY ONE "ECU" IS WORKING. THERE IS A PROBLEM

If an "X" is shown, this means that no communication between MPI and ECM/multi-function speedometer takes place. Possible causes are:

- multi-function speedometer is not powered-up
- ECM is not powered-up
- wrong protocol is used
- bad connection between MPI and ECM.

Changes in ECM

Anytime a change is brought in ECM through B.U.D.S., there will be a message that will say "Remove key from vehicle". When this occurs, remove ignition key from switch then wait until the message disappears (approximately 15 seconds after).

FAULT CODES

General

The faults saved in the ECM (Engine Control Module) are kept even if the battery is disconnected.

IMPORTANT: After a problem has been solved, ensure to clear the fault(s) in the ECM using the VCK. This will properly reset the appropriate counter(s) and will also record that the problem has been fixed in the ECM memory.

Many fault codes at the same time is likely to be burnt fuse(s) or a faulty relay.

For more information pertaining to the fault codes (state, count, first, etc.) and report, refer to B.U.D.S. online help.

TPS (Throttle Position Sensor) Faults

Faults which are reported in B.U.D.S. fall into two groups: TPS faults and adaptation faults. These are displayed on the B.U.D.S. system as TPS OUT OF RANGE and TPS ADAPTATION FAILURE.

TPS "OUT OF RANGE" Fault

It is caused by the sensor reading going out of its allowable range. This fault can occur during the whole range of movement of the throttle.

To diagnose this fully, it is recommended to operate the throttle through its full range. It is also recommended to release the throttle quickly as this may also reveal a fault that is intermittent.

POSSIBLE CAUSES	ACTION
Check if connector is disconnected from TPS	Fix.
Check if sensor is loose	Tighten and reset **Closed Throttle and Idle Actuator**.
Inspect sensor for damage or corrosion	Replace and reset **Closed Throttle and Idle Actuator**.
Inspect wiring (voltage test)	Repair.
Inspect wiring and sensor (resistance test)	If bad wiring, repair. If bad TPS, replace and reset **Closed Throttle and Idle Actuator**.
Test sensor operation (wear test)	Replace and reset **Closed Throttle and Idle Actuator**.

TPS "ADAPTATION FAILURE" Fault

It is caused by the idle position moving out of an acceptable range.

Following problems can be caused by a TPS "Adaptation Failure":

- Idle speed is out of range.
- Engine stops when throttle is released quickly.
- Engine runs inconsistent in low partload or low RPM.

POSSIBLE CAUSES	ACTION
Sensor has been replaced and TPS closed position not reset	Reset **Closed Throttle and Idle Actuator**.
Throttle body has been replaced and TPS closed position not reset	Reset **Closed Throttle and Idle Actuator**.
ECM has been replaced and TPS closed position not reset	Reset **Closed Throttle and Idle Actuator**.
Throttle cable too tight	Tighten and reset **Closed Throttle and Idle Actuator**.
Sensor is loose	Tighten and reset **Closed Throttle and Idle Actuator**.
Throttle bracket is loose	Tighten and reset **Closed Throttle and Idle Actuator**.
Idle speed screw (tamper proof) worn or loose	Change throttle body.
Idle bypass valve replaced but not reset	Reset **Closed Throttle and Idle Actuator** using B.U.D.S.

Supplemental Information

When using the service action suggested in the Fault section of B.U.D.S., the system circuits are referred to as 2-A-41, which means connector "A" on the ECM and pin 41. The first digit (2) indicates connector location in vehicle such as shown in the wiring diagram.

FAULT CODE TABLE

P-CODE	DESCRIPTION	CAUSE	ACTION	GAUGE	ENGINE REACTION	DESCRIPTION OF LIMP HOME EFFECT
P0106	Air pressure sensor voltage out of range	Sensing port dirty or blocked. Sensor failure or unexpected reading at idle. Sensor fallen out of intake manifold.	Make sure sensor's connector is fully inserted. Check for approximately 5 volts between sensor connector pins 1 and 3. Check system circuits 2-A-12, 2-A-28 and 2-A-40.	Engine pilot lamp/check engine and limp home	Limp home	No rev limit but air pressure is set to a default value
P0107	Air pressure sensor voltage too low	Damaged circuit wires, damaged or disconnected sensor, sensor shorted to ground.	Make sure sensor's connector is fully inserted. Check for approximately 5 volts between sensor connector pins 1 and 3. Check system circuits 2-A-12, 2-A-28 and 2-A-40.	Engine pilot lamp/check engine and limp home after a few seconds	Limp home	No rev limit but air pressure is set to a default value
P0108	Air pressure sensor voltage too high	Damaged circuit wires, damaged or disconnected sensor, sensor shorted to a supply.	Make sure sensor's connector is fully inserted. Check for approximately 5 volts between sensor connector pins 1 and 3. Check system circuits 2-A-12, 2-A-28 and 2-A-40.	Engine pilot lamp/check engine and limp home	Limp home	No rev limit but air pressure is set to a default value
P0111	Air temperature sensor functional problem	Intermittent air temperature sensor reading or circuit wires shorted to ground.	Check system circuits 2-A-7 and 2-A-21. Replace the sensor if necessary.	Engine pilot lamp/check engine and limp home	Limp home	No rev limit but air temperature is set to a default value
P0112	Air temperature sensor voltage too low	Air temperature sensor or circuit wires shorted to ground.	Disconnect the sensor and check for a change in the fault code. If the fault code stays the same, look for a short circuit on the harness. If the fault code is different, replace the sensor. Check system circuits 2-A-7 and 2-A-21.	Engine pilot lamp/check engine and limp home	Limp home	No rev limit but air temperature is set to a default value
P0113	Air temperature sensor voltage too high	Disconnected sensor or sensor's resistance too high.	Check for disconnected air temperature sensor on the intake. Check the air temperature sensor for approximately 2000 to 4200 ohms at 10 to 25°C (50 to 77°F). Replace the sensor if necessary. Check system circuits 2-A-7 and 2-A-21.	Engine pilot lamp/check engine and limp home	Limp home	No rev limit but air temperature is set to a default value
P0116	Engine temperature sensor functional problem	Intermittent engine temperature sensor reading or circuit wires shorted to ground.	Check system circuits 2-A-11 and 2-A-27. Replace the sensor if necessary.	Engine pilot lamp/check engine and limp home	No effect	No rev limit but engine temperature is set to a default value

P-CODE	DESCRIPTION	CAUSE	ACTION	GAUGE	ENGINE REACTION	DESCRIPTION OF LIMP HOME EFFECT
P0117	Engine temperature sensor voltage too low	Engine temperature sensor or circuit wires shorted to ground.	Disconnect the sensor and check for a change in the fault code. If the fault code stays the same, look for a short circuit on the harness. If the fault code is different, replace the sensor. Check for leakage between sensor's connection and ground. Check system circuits 2-A-11 and 2-A-27.	Engine pilot lamp/check engine and limp home	No effect	No rev limit but engine temperature is set to a default value
P0118	Engine temperature sensor voltage too high	Disconnected sensor or sensor's resistance too high.	Check for disconnected engine temperature sensor. Check the engine temperature sensor for approximately 2280 to 2736 ohms at 19 to 21°C (66 to 70°F). Replace the sensor if necessary. Check system circuits 2-A-11 and 2-A-27.	Engine pilot lamp/check engine and limp home	No effect	No rev limit but engine temperature is set to a default value
P0122	Throttle position sensor voltage too low	Damaged circuit wires, damaged throttle position sensor or damaged ECM pins.	Check system circuits 2-A-24, 2-A-25 and 2-A-39. Refer to the *SERVICE MANUAL* for complete throttle position sensor testing procedure.	Engine pilot lamp and check engine	Engine will not start	
P0123	Throttle position sensor voltage too high	Damaged circuit wires, damaged throttle position sensor or damaged ECM pins.	Check system circuits 2-A-24, 2-A-25 and 2-A-40. Refer to the *SERVICE MANUAL* for complete throttle position sensor testing procedure.	Engine pilot lamp and check engine	Engine will not start	
P0231	Fuel pump open circuit or shorted to ground	Damaged or disconnected fuel pump, damaged circuit wires, damaged connectors or damaged ECM output pins.	Check for damaged or disconnected connector on fuel pump. Check for approximately 1 ohm between pins 5-FP-3 and 5-FP-4 of the fuel pump connector. Check for approximately 1 ohm between pins F5 and 2-B-29.	Engine pilot lamp and check engine	Will not run	
P0232	Fuel pump shorted to battery	Damaged fuel pump, damaged circuit wires, damaged connectors or damaged ECM output pins.	Check for approximately 1 ohm between pins 5-FP-3 and 5-FP-4 of the fuel pump connector. Check for approximately 1 ohm between pins F5 and 2-B-29. Check if system circuit 2-B-29 is shorted to 12 V.	Engine pilot lamp and check engine	Will not run long	

P-CODE	DESCRIPTION	CAUSE	ACTION	GAUGE	ENGINE REACTION	DESCRIPTION OF LIMP HOME EFFECT
P0261	Cylinder #1 injector open circuit or shorted to ground	Blown fuse, damaged or disconnected injector, damaged or disconnected circuit wires, damaged ECM output pins.	Check fuse F1. Check connections on injector. Check for approximately 14.5 ohms on injector. Check system circuit 2-A-15. Check connector CJ connecting the two harnesses together.	Engine pilot lamp/check engine and limp home	Engine pilot lamp/check engine and limp home	No rev but cylinder 1 will not work properly
P0262	Cylinder #1 injector shorted to battery	Damaged injector, damaged circuit wires, damaged connector or damaged ECM output pins.	Check for approximately 14.5 ohms on injector. Check if system circuit 2-A-15 is shorted to 12 V.	Engine pilot lamp/check engine and limp home	Engine pilot lamp/check engine and limp home	No rev but cylinder 1 will not work properly
P0264	Cylinder #2 injector open circuit or shorted to ground	Blown fuse, damaged or disconnected injector, damaged or disconnected circuit wires, damaged ECM output pins.	Check fuse F1. Check connections on injector. Check for approximately 14.5 ohms on injector. Check system circuit 2-A-33. Check connector CJ connecting the two harnesses together.	Engine pilot lamp/check engine and limp home	Engine pilot lamp/check engine and limp home	No rev but cylinder 2 will not work properly
P0265	Cylinder #2 injector shorted to battery	Damaged injector, damaged circuit wires, damaged connector or damaged ECM output pins.	Check for approximately 14.5 ohms on injector. Check if system circuit 2-A-33 is shorted to 12 V.	Engine pilot lamp/check engine and limp home	Engine pilot lamp/check engine and limp home	No rev but cylinder 2 will not work properly
P0336	High engine RPM detected	CPS signal not plausible, damaged circuit wires, damaged connector or damaged tooth wheel.	Check for metal deposit on sensor. Check circuit between 2-A-5, 2-A-19 and 4-CPS-1, 4-CPS-2. Replace sensor if necessary.	Engine pilot lamp and check engine	Erratic engine behavior	
P0337	No crankshaft signal detected	Damaged circuit wires, damaged CPS or damaged tooth wheel.	Check for metal deposit on sensor. Check circuit between 2-A-5, 2-A-19 and 4-CPS-1, 4-CPS-2. Replace sensor if necessary.	Engine pilot lamp and check engine	No start	
P0339	Crankshaft signal fault	CPS signal not plausible, damaged circuit wires, damaged connector or damaged tooth wheel.	Check for metal deposit on sensor. Check circuit between 2-A-5, 2-A-19 and 4-CPS-1, 4-CPS-2. Replace sensor if necessary.	Engine pilot lamp and check engine	Will not run	
P0344	Cam phase sensor signal missing	Blown fuse, damaged circuit wires or damaged sensor.	Check fuse F4. Check for 12 volts between sensor's connector pins 1 and 3. Check system circuits 2-A-20, 2-A-34 and F4.	Engine pilot lamp and check engine	Limp home	No rev but calculation of RPM will be less precise. Cold start will take more time.

P-CODE	DESCRIPTION	CAUSE	ACTION	GAUGE	ENGINE REACTION	DESCRIPTION OF LIMP HOME EFFECT
P0351	No ignition output stage cylinder #1	Blown fuse, damaged circuit wires, damaged connector or damaged ignition coil.	Check fuse F3. Check for 2.2 ± 0.3 ohm between ignition coil pins. Check connector HIC connecting the two harnesses together. Check system circuit 2-A-1.	Engine pilot lamp/check engine and limp home	Limp home	No rev but cylinder 1 will not work properly
P0352	No ignition output stage cylinder #2	Blown fuse, damaged circuit wires, damaged connector or damaged ignition coil.	Check fuse F3. Check for 2.2 ± 0.3 ohm between ignition coil pins. Check connector HIC connecting the two harnesses together. Check system circuit 2-A-1.	Engine pilot lamp/check engine and limp home	Limp home	No rev but cylinder 2 will not work properly
P0480	Engine fan short-circuit to battery	Blown fuse, damaged fan relay, damaged circuit wires, damaged pins or damaged ECM output pin.	Check fuse F4. Check for approximately 12 volts between 3-PF-1D and engine ground. Check system circuit 2-B-3.	Engine pilot lamp and check engine	No effect	
P0480	Engine fan short-circuit to ground or open	Blown fuse, damaged fan relay, damaged circuit wires, damaged or disconnected pins or damaged ECM output pin.	Check fuse F4. Check for disconnected relay or pin 3-PF-1 D and 3-PF-1E. Check for approximately 12 volts between 3-PF-1D and engine ground. Check system circuit 2-B-3.	Engine pilot lamp and check engine	No effect	
P0505	Idle air control valve output stage cutoff memory difference	Damaged actuator, damaged circuit wires, damaged connector or damaged ECM output pins.	Check for approximately 50 ohms between pins A and D and also between pins B and C of the idle air control valve. Check for damaged circuit wires. Check system circuits 2-A-35, 2-A-36, 2-A-37 and 2-A-38. Check for damaged connector or damaged ECM output pins.	Engine pilot lamp and check engine	Erratic engine behavior	
P0505	Idle air control valve output stage fault	Damaged actuator, damaged circuit wires, damaged connector or damaged ECM output pins.	Check for approximately 50 ohms between pins A and D and also between pins B and C of the idle air control valve. Check for damaged circuit wires. Check system circuits 2-A-35, 2-A-36, 2-A-37 and 2-A-38. Check for damaged connector or damaged ECM output pins.	Engine pilot lamp and check engine	Erratic engine behavior	
P0513	Incorrect DESS® key	DESS key not programmed. Wrong DESS key used. Bad contact on the DESS key. DESS key failure.	Clean DESS key. Program the DESS key.	Check engine/ incorrect DESS	Will not start	

P-CODE	DESCRIPTION	CAUSE	ACTION	GAUGE	ENGINE REACTION	DESCRIPTION OF LIMP HOME EFFECT
P0520	Oil pressure switch functional problem	Low oil level, engine leak, oil pump failure, damaged sensor, damaged or shorted circuit wires.	Check oil level. Check oil pressure switch resistance. With engine stopped, the resistance should be less than 1 ohm. With engine running, the resistance of oil switch should be infinitely high (O.L.). Check system circuit 2-A-10 to engine ground.	Engine pilot lamp and check engine	No effect	
P0562	Battery voltage too low	Battery failure, damaged circuit wires, damaged or disconnected magneto and regulator.	Check battery voltage for 12 to 13 volts with engine stopped. Check battery voltage for 13.8 to 15.0 volts with engine idling. Check connections on magneto and regulator.	Engine pilot lamp/check engine/low batt and limp home	Limp home	Rev at 5000
P0563	Battery voltage too high	Bad battery, damaged circuit wires or damaged regulator. An external battery charger may have been used.	Check battery voltage for 13.8 to 15.0 volts with engine idling. Check connections on battery. Replace regulator if necessary.	Engine pilot lamp/check engine/hi batt and limp home	Limp home	Rev at 7000
P0600	CAN Bus Off	Communication error between cluster and ECM and/or B.U.D.S.	Check for damaged circuit between 1-CI-23, 4-B-29 and 2-DB-1. Check for damaged circuit between 1-CI-24, 4-B-27 and 2-DB-2. Replace cluster if necessary.	No ECU communi-cation	No effect	
P0600	CAN ID 514 missing	Communication error between cluster and ECM and/or B.U.D.S.	Check system circuits 2-B-27 and 2-A-28 with 1-CI-23 and 1-CI-24. Refer to the *SERVICE MANUAL* for more details.	No ECU communi-cation	No effect	
P0601	Throttle position sensor adaptation failure	Wrong throttle body mechanical position during reset of closed TPS or no initialization after ECM replacement.	Check cable adjustment. Check idle stop for wear. Make sure throttle plate is against throttle stop. Reset closed TPS.	Engine pilot lamp/check engine		
P0601	Module call monitoring	Damaged ECM or faulty programming.	Try updating the ECM. If the problem persists, replace the ECM.	Engine pilot lamp/check engine		
P0602	ECM not coded	Damaged ECM or faulty programming.	Try updating the ECM. If the problem persists, replace the ECM.	Engine pilot lamp/check engine	Will not start	
P0604	RAM fault	Damaged ECM or faulty programming.	Try updating the ECM. If the problem persists, replace the ECM.	Engine pilot lamp/check engine		

P-CODE	DESCRIPTION	CAUSE	ACTION	GAUGE	ENGINE REACTION	DESCRIPTION OF LIMP HOME EFFECT
P0605	EEPROM fault	Damaged ECM or faulty programming.	Try updating the ECM. If the problem persists, replace the ECM.	Engine pilot lamp/check engine		
P0605	EEPROM checksum fault	Damaged ECM or faulty programming.	Try updating the ECM. If the problem persists, replace the ECM.	Engine pilot lamp/check engine		
P0605	Coding ID checksum fault	Damaged ECM or faulty programming.	Try updating the ECM. If the problem persists, replace the ECM.	Engine pilot lamp/check engine		
P0605	Coding checksum fault	Damaged ECM or faulty programming.	Try updating the ECM. If the problem persists, replace the ECM.	Engine pilot lamp/check engine		
P0605	Programming checksum fault	Damaged ECM or faulty programming.	Try updating the ECM. If the problem persists, replace the ECM.	Engine pilot lamp/check engine		
P0608	Sensor's power supply voltage too low	Inverted connectors between air pressure sensor and TPS. Damaged circuit wires, shorted air pressure sensor or shorted TPS.	Check system circuits 2-A-12, 2-A-28, 2-A-40, 2-A-24, 2-A-25 and 2-A-39.	Engine pilot lamp/check engine	Limp home	No rev but all associated sensors will be set to a default value
P0608	Sensor's power supply voltage too high	Damaged circuit wires, TPS or air pressure sensor shorted to a supply.	Check system circuits 2-A-12, 2-A-28, 2-A-40, 2-A-24, 2-A-25 and 2-A-39.	Engine pilot lamp/check engine	Limp home	No rev but all associated sensors will be set to a default value
P0616	Starter relay open circuit or shorted to ground	Blown fuse, damaged or disconnected starter relay, damaged circuit wires, damaged connectors or damaged ECM output pins.	Check fuse F4. Disconnect the starter relay and check for approximately 7.3 ohms between the small starter relay terminals. Check for approximately 12 volts between starter relay OR/GN wire and ground. Check system circuit 2-B-31.	Engine pilot lamp/check engine	Will not start	
P0617	Starter relay shorted to battery	Damaged solenoid, damaged circuit wires, damaged connector or damaged ECM output pins.	Disconnect the starter relay and check for approximately 7.3 ohms between the small starter relay terminals. Check if system circuit 2-B-31 is shorted to 12 V.	Engine pilot lamp/check engine	Will not start	
P0705	Transmission range sensor circuit malfunction (PRNHL)	Improbable combination of transmission switches.	Check for disconnected or damaged transmission contact. Check circuit 2-A-2, 2-A-6 and 2-A-31. Refer to B.U.D.S. transmission switch diagnostic. Refer to *SERVICE MANUAL* for transmission service.	Check engine/"E" is displayed	Limp home	No rev but engine will react as if the gear were in high

P-CODE	DESCRIPTION	CAUSE	ACTION	GAUGE	ENGINE REACTION	DESCRIPTION OF LIMP HOME EFFECT
P1102	Throttle position sensor adaptation failure	Wrong throttle body mechanical position during reset of closed TPS or no initialization after ECM replacement.	Check cable adjustment. Check idle stop for wear. Make sure throttle plate is against throttle stop. Reset closed TPS.	Engine pilot lamp/check engine		
P1104	Throttle position sensor adaptation failure	Wrong throttle body mechanical position during reset of closed TPS or no initialization after ECM replacement.	Check cable adjustment. Check idle stop for wear. Make sure throttle plate is against throttle stop. Reset closed TPS.	Engine pilot lamp/check engine		
P1116	High temp	High temperature of the cooling liquid.	Refer to *SERVICE MANUAL* for high engine temperature.	Check engine/hi temp	Limp home	Rev at 4050
P1148	Safety fuel cut off detected	TPS adaptation failure, TPS failure, damaged ECM memory or battery voltage out of range.	Check cable adjustment. Check idle stop for wear. Make sure throttle plate is against throttle stop. Reset closed TPS.	Engine pilot lamp/check engine	Limp home	Rev at 5000
P1202	Oil pressure switch still closed	Low oil level, engine leak, oil pump failure, damaged sensor, damaged or shorted circuit wires.	Check oil level. Check oil pressure switch resistance. With engine stopped, the resistance should be less than 1 ohm. With engine running, the resistance of oil switch should be infinitely high (O.L.). Check system circuit 2-A-10 to engine ground.	Engine pilot lamp/check engine	No effect	
P1203	Oil pressure switch leakage	Low oil level, engine leak, oil pump failure, damaged sensor, damaged or shorted circuit wires.	Check oil level. Check oil pressure switch resistance. With engine stopped, the resistance should be less than 1 ohm. With engine running, the resistance of oil switch should be infinitely high (O.L.). Check system circuit 2-A-10 to engine ground.	Engine pilot lamp/check engine	No effect	
P1520	Low oil	Low oil detected in engine	Refer to *SERVICE MANUAL* for low oil service.	Check engine/low oil	Limp home	Rev at 4000
P1655	DESS® line shorted to battery	Damaged circuit wires or mixed up connection pins.	Check system circuits 2-B-38, and 2-B-39 with 1-CC-C and 1-CC-D.	Check engine/ incorrect DESS	Will not start	
P1656	DESS® line shorted to ground	Damaged circuit wires or mixed up connection pins.	Check system circuits 2-B-38, and 2-B-39 with 1-CC-C and 1-CC-D.	Check engine/ incorrect DESS	Will not start	

P-CODE	DESCRIPTION	CAUSE	ACTION	GAUGE	ENGINE REACTION	DESCRIPTION OF LIMP HOME EFFECT
P1675	Relay 2 shorted to battery	Damaged relay, damaged circuit wires, damaged connector or damaged ECM output pins.	Check for approximately 100 ohms between relay pins 85 and 86. Check if system circuit 2-B-14 is shorted to 12 V.	Engine pilot lamp/check engine	ECM will not do memory tracking sequence	
P1676	Relay 2 open circuit or shorted to ground	Blown fuse, damaged or disconnected relay, damaged or disconnected circuit wires, damaged ECM output pins.	Check fuse F4. Check for approximately 100 ohms between relay pins 85 and 86. Check system circuit 2-B-14.	Engine pilot lamp/check engine	ECM will not do memory tracking sequence	
P1683	CAN RAM Fault	Communication error between cluster and ECM and/or B.U.D.S.	Check for damaged circuit between 1-CI-23, 4-B-29 and 2-DB-1. Check for damaged circuit between 1-CI-24, 4-B-27 and 2-DB-2. Replace cluster if necessary.	Engine pilot lamp/check engine	No effect	
P2119	ECU wrong	Incorrect ECU or cluster for engine.	Install proper recommended ECU or gauge for vehicle.	Engine pilot lamp/check engine	Will not start	

COMPONENT INSPECTION, REPLACEMENT AND ADJUSTMENT

SERVICE TOOLS

Description	Part Number	Page
ECM adapter	420 277 010	140
Fluke 111	529 035 868	138
pliers	295 000 070	146
tachometer	529 014 500	141

SERVICE PRODUCTS

Description	Part Number	Page
Loctite 243	293 800 060	154, 158, 160

GENERAL

Engine problems are not necessarily related to the electronic fuel injection system.

It is important to ensure that the mechanical integrity of the engine/propulsion system is present:
- good transmission system operation
- good engine compression and properly operating mechanical components, no leaks etc.
- fuel pump connection and fuel lines without leaks.

Check the chart in *TROUBLESHOOTING* section to have an overview of problems and suggested solutions.

When replacing a component, always check its operation after installation.

FUEL SYSTEM

⚠ WARNING

The fuel system of a fuel injection system holds much more pressure than on a carbureted ATV. Prior to disconnecting a hose or to removing a component from the fuel system, follow the recommendation described here. Pay attention that some hoses may have more than one clamp at their ends. Ensure to reinstall the same quantity of clamps at assembly.

- Use the VCK (Vehicle Communication Kit) to release the fuel pressure in the system (refer to *DIAGNOSTIC PROCEDURES*). Look in the *ACTIVATION* section of the software B.U.D.S.

⚠ WARNING

Fuel lines remain under pressure at all times. Always proceed with care and use appropriate safety equipment when working on pressurized fuel system. Wear safety glasses and work in a well ventilated area. Do not allow fuel to spill on hot engine parts and/or on electrical connectors. Proceed with care when removing/installing pressure test equipment or disconnecting fuel line connections. Use the VCK (Vehicle Communication Kit) to release fuel pressure prior to removing a hose. Cover the fuel line connection with an absorbent shop rag. Slowly disconnect the fuel hose to minimize spilling. Wipe off any fuel spillage in the engine compartment. Fuel is flammable and explosive under certain conditions. Always work in a well ventilated area. Always disconnect battery prior to working on the fuel system. After performing a pressure test, use the valve on the fuel pressure gauge to release the pressure (if so equipped).

- Always disconnect battery properly prior to working on the fuel system. Refer to *BATTERY* section.

When the job is done, ensure that hoses from fuel rail going to fuel pump are properly secured in their supports. Then, pressurize the fuel system. Perform the pressure test as explained in this section and pressurize the fuel tank and fuel lines as explained in *FUEL SYSTEM* section.

Properly reconnect the battery.

⚠ WARNING

Ensure to verify fuel line connections for damage and that NO fuel line is disconnected prior to turning the ignition key ON and setting engine stop switch to RUN. Always perform the pressure test if any component has been removed. A pressure test must be done before turning the ignition key ON and setting engine stop switch to RUN. The fuel pump is started for a short period each time the ignition key is turned ON and engine stop switch is set to RUN and it builds pressure very quickly.

To check fuel rails for leaks, first pressurize the system then spray soapy water on all hose connections, regulators and injectors. Air bubbles will show the leaking area. Check also for leaking fuel or fuel odor.

⚠ WARNING

Never use a hose pincher on injection system high pressure hoses.

ELECTRICAL SYSTEM

It is important to check that the electrical system is functioning properly:

- battery
- fuses
- relay(s)
- diode
- DESS
- ignition (spark)
- ground connections
- wiring connectors
- multi-function speedometer.

It is possible that a component seems to operate in static condition but in fact, it is defective. In this case, the best way to solve this problem is to remove the original part and replace it with one which is in good condition.

Never use a battery charger to substitute temporarily the battery, as it may cause the ECM (engine control module) to work erratically or not to work at all. Check related-circuit fuse solidity and condition with an ohmmeter. Visual inspection could lead to false results.

⚠ WARNING

Some EMS components are continuously powered by the VFB (Vehicle Fuse Block) when ignition key is turned on and engine stop switch is set in RUN position. The ECM switches the circuit to the ground to complete the electrical circuits it controls. Take this into account when troubleshooting. Always disconnect the battery prior to disconnecting any electric or electronic parts.

To perform verifications, a good quality multimeter such as Fluke 111 (P/N 529 035 868) should be used.



529 035 868

Pay particular attention to ensure that pins are not out of their connectors or out of shape. The troubleshooting procedures cover problems not resulting from one of these causes.

⚠ WARNING

Ensure all terminals are properly crimped on wires and connector housings are properly fastened.

Before replacing an ECM, always check electrical connections. Make sure connectors are properly crimped on wires and fastened in housing, and that they are free of corrosion. Check if wiring harness shows any signs of scoring. Ensure proper electrical connection. Particularly check ECM ground connections. Ensure that contacts are good and clean. A "defective module" could possibly be repaired simply by unplugging and re-plugging the ECM. The voltage and current might be too weak to go through dirty wire pins. Check carefully if pins show signs of moisture, corrosion or if they look dull. Clean pins properly and pay attention to the following. prior to assembling.

- ECM connectors: Do not apply dielectric grease or any other lubricant.
- Other connectors: Apply a silicon-based dielectric grease or other appropriate lubricant.

Ensure that all electronic components are genuine – any modification on the wiring harness may lead to generate fault codes or bad operation.

NOTE: For diagnostics purposes, use Vehicle Communication Kit (VCK). See *DIAGNOSTIC PROCEDURES* subsection.

After a problem has been solved, ensure to clear the fault(s) in the ECM using the VCK. Refer to *DIAGNOSTIC PROCEDURES* subsection.

Resistance Measurement

When measuring the resistance with an ohmmeter, all values are given for a temperature of 20°C (68°F). The resistance value of a resistance varies with the temperature. The resistance value for usual resistor or windings (such as injectors) **increases** as the temperature increases. However, our temperature sensors are NTC types (Negative Temperature Coefficient) and work the opposite which means that the resistance value **decreases** as the temperature increases. Take it into account when measuring at temperatures different from 20°C (68°F). Use this table for resistance variation relative to temperature for **temperature** sensors.

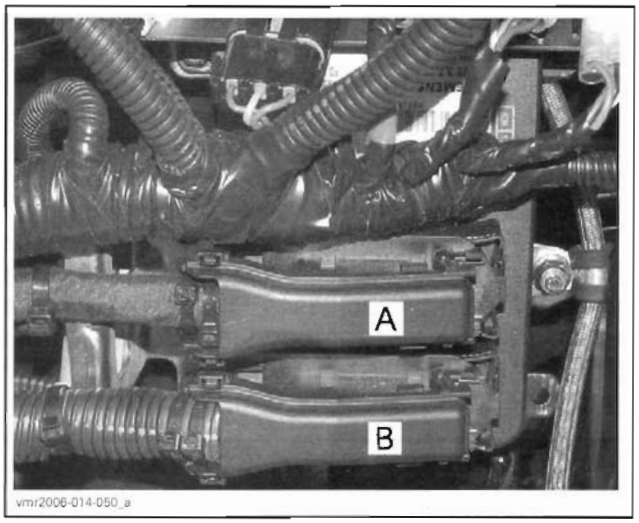
TEMPERATURE SENSOR TABLE			
TEMPERATURE		RESISTANCE (ohms)	
°C	°F	MAPTS	CTS
- 40	- 40	—	45000
- 30	- 22	28000	28000
- 20	- 4	14500	15000
0	32	5500	5750
20	68	2500	2600
40	104	1200	1200
60	140	600	600
80	176	320	320
100	212	180	180
130	266	90	90

CONVERSION CHART FOR TEMPERATURE SENSORS

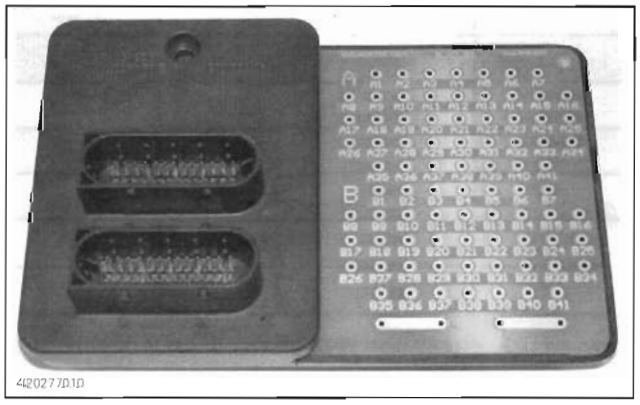
The resistance value of a temperature sensor may test good at a certain temperature but it might be defective at other temperatures. If in doubt, try a new sensor.

Also remember this validates the operation of the sensor at room temperature. It does not validate the over temperature functionality. To test it, the sensor could be removed from the engine and heated with a heat gun while it is still connected to the harness to see if the ECM will detect the high temperature condition and generate a fault code.

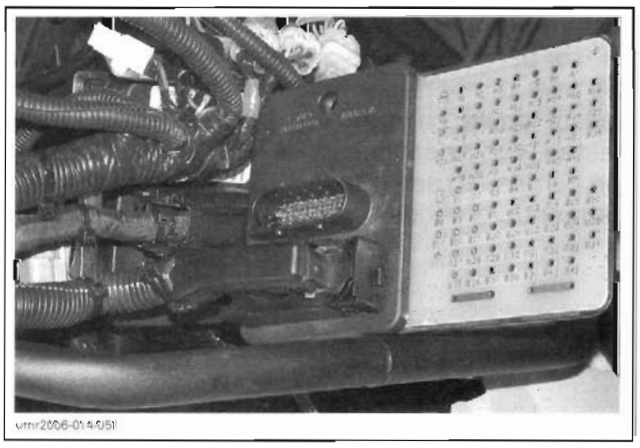
ECM Connectors



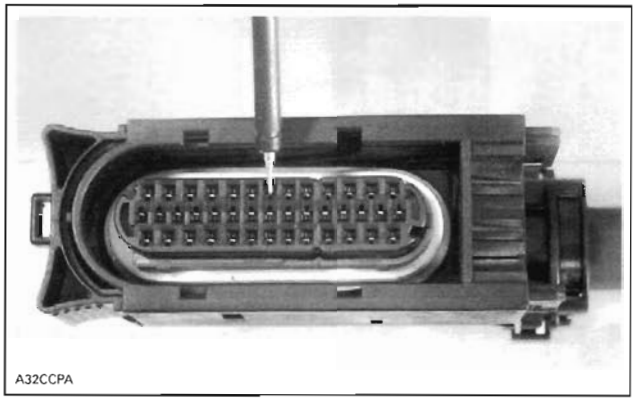
The most recommended and safest method to probe ECM connector terminals is to use the ECM adapter (P/N 420 277 010). This tool will prevent deforming or enlarging terminals which would lead to bad ECM terminal contact creating intermittent or permanent problems.



Disconnect the desired connector from ECM and reconnect on the tool connector. Probe required terminals directly in the tool holes.

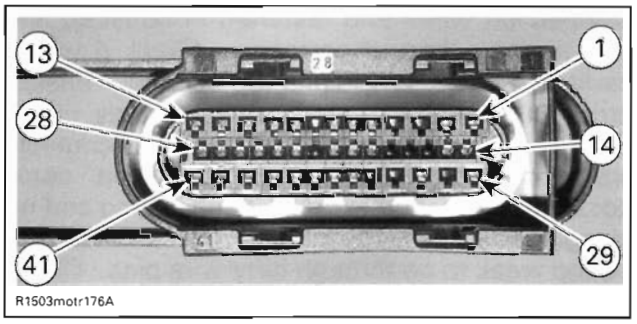


CAUTION: If not using the ECM adapter, probe on top of terminal only. Do not try to probe inside terminal or to use a paper clip to probe inside terminal, it will damage the square-shaped terminal and this could lead to improper function of the engine management system.



PROBE ONLY TOP OF TERMINAL

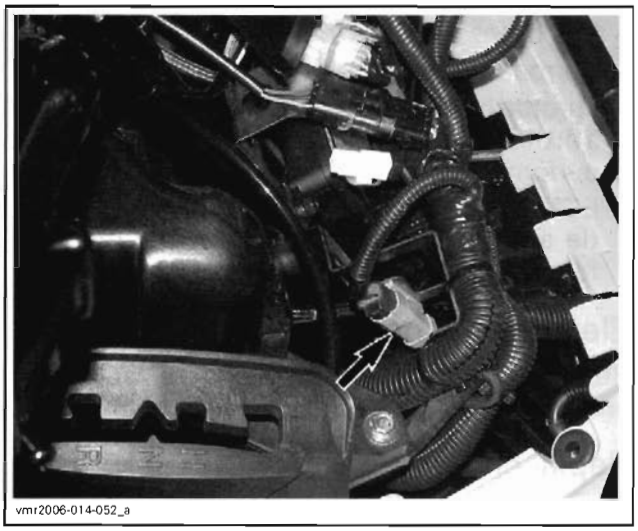
Use this diagram to locate the pin numbers on the ECM connector A of the wiring harness when performing tests.

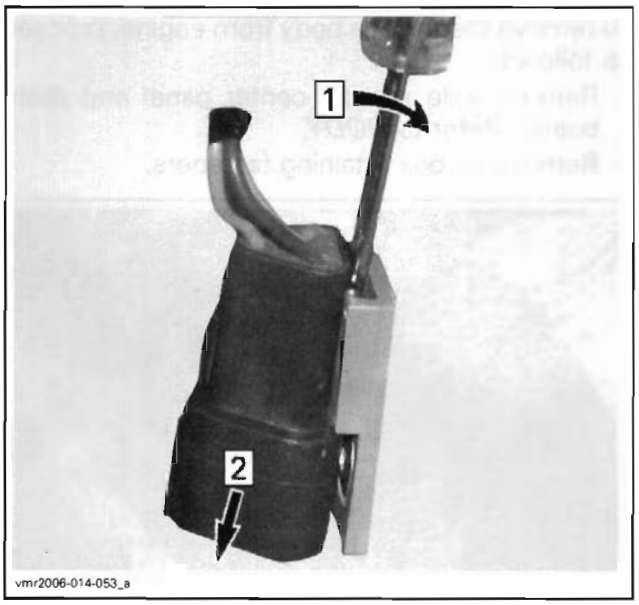


ECM CONNECTOR PIN-OUT (WIRING HARNESS SIDE)

Engine Connector

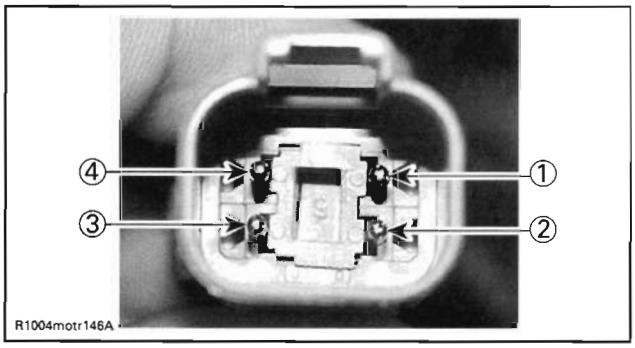
Remove center panel and dashboard. Refer to *BODY*.





TYPICAL — CONNECTOR REMOVAL

Use this diagram to locate the pin numbers on the Engine connector of the wiring harness when performing tests.



ENGINE CONNECTOR PIN-OUT (ENGINE SIDE)

PROCEDURES

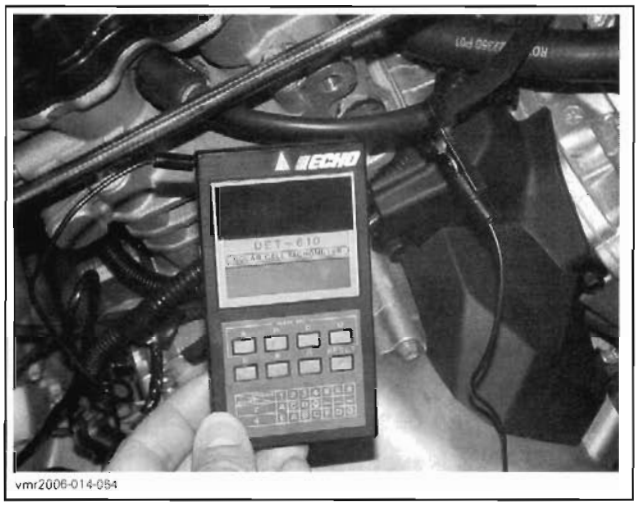
IDLE SPEED

The idle speed is not adjustable. The ECM controls the idle speed of the engine.

CAUTION: Never attempt to adjust the sealed idle stop screw. It is calibrated at the factory. If the screw adjustment is changed, the throttle body must be replaced.

If desired, the engine RPM can be verified with the tachometer (P/N 529 014 500).

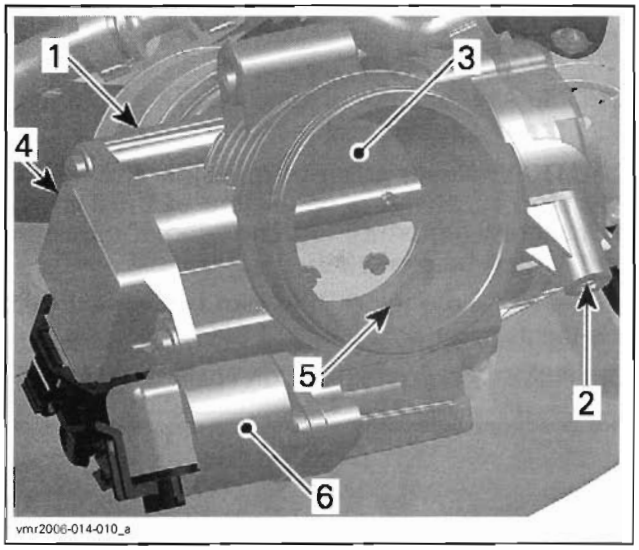
Install the tachometer wire on spark plug cable.



IGNITION TIMING

The ignition timing is not adjustable.

THROTTLE BODY

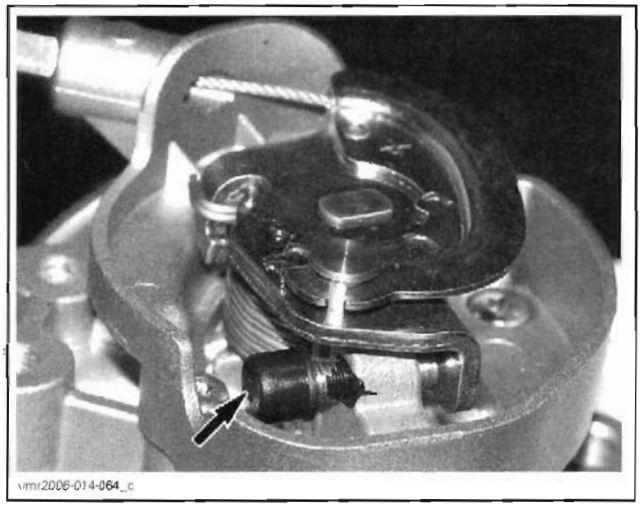


1. *Throttle body*
2. *Throttle cable attachment*
3. *Throttle plate*
4. *TPS*
5. *Idle bypass channel*
6. *Idle bypass valve*

Mechanical Inspection

Check that the throttle plate moves freely and smoothly when depressing throttle lever.

IMPORTANT: Never attempt to adjust the sealed idle stop screw. It is calibrated at the factory. If the screw adjustment is changed, the throttle body must be replaced.



Before replacing any part, check the following as these could be causing the fault. Perform the test while the engine is off.

- Throttle cable adjustment too tight. Not returning fully to idle stop.
- Throttle body idle set screw is loose or worn.
- TPS is loose.
- Idle bypass valve is loose.
- Corroded or damaged wiring or connectors.
- Throttle body has been replaced and the **Closed Throttle and Idle Actuator** reset has not been performed.
- ECM has been replaced and the **Closed Throttle and Idle Actuator** reset has not been performed.

Electrical Inspection

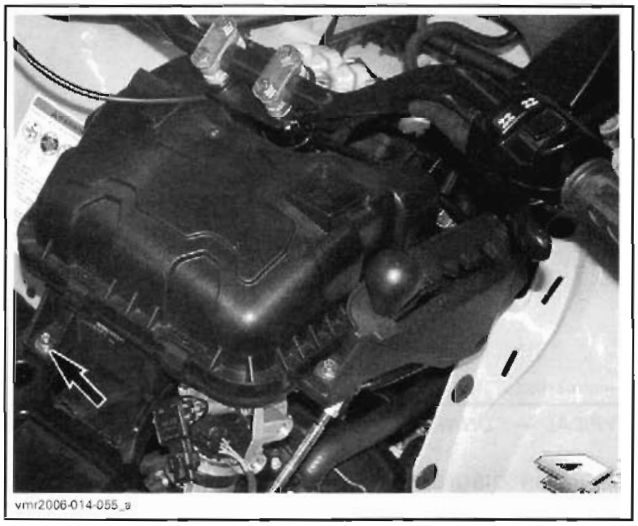
Refer to *THROTTLE POSITION SENSOR (TPS)* and *IDLE BYPASS VALVE* in this section.

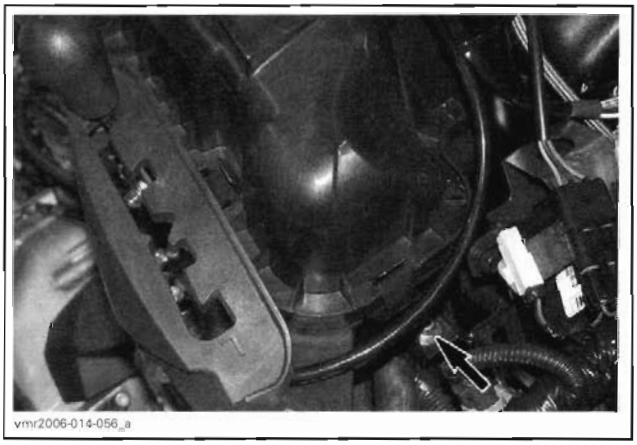
Replacement

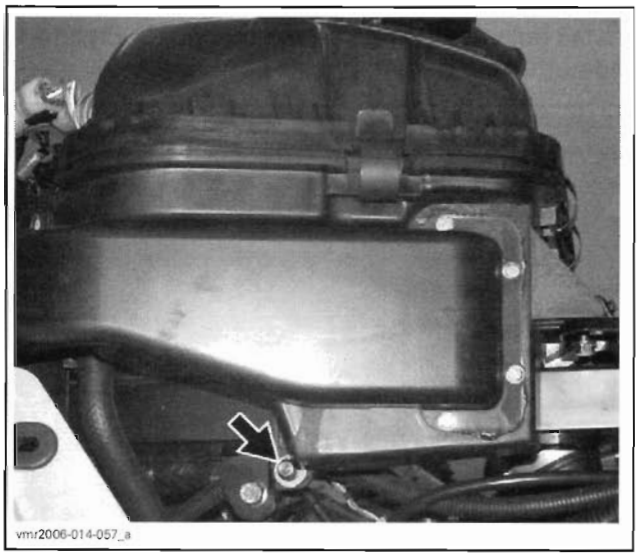
Removal

To remove the throttle body from engine, proceed as follows:

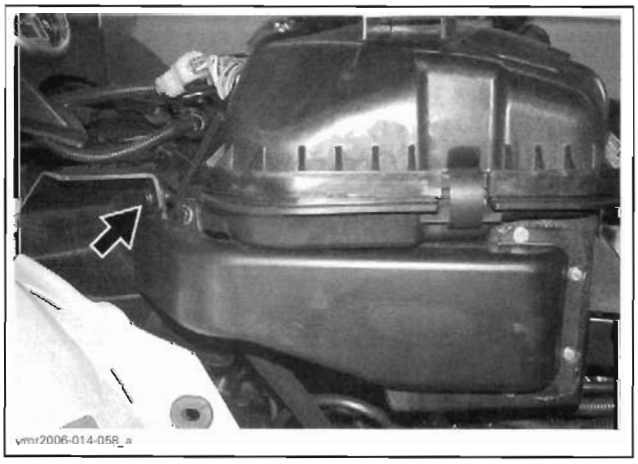
- Remove side panels, center panel and dashboard. Refer to *BODY*.
- Remove air box retaining fasteners.



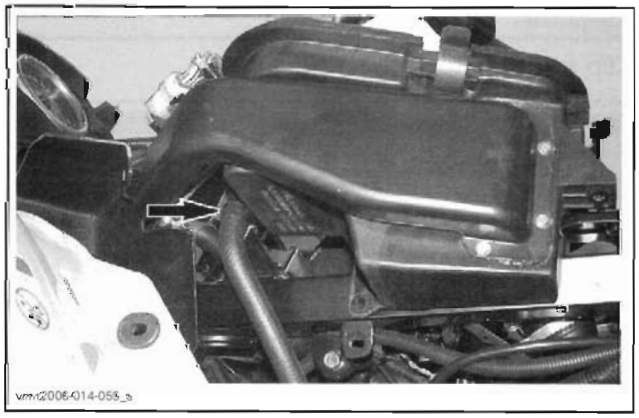




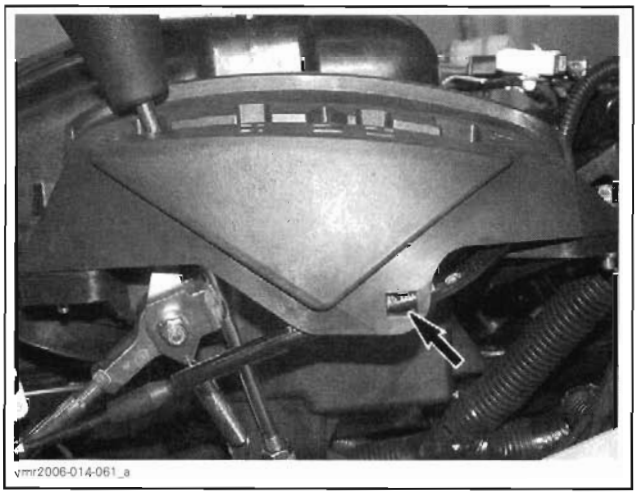
– Remove dart.



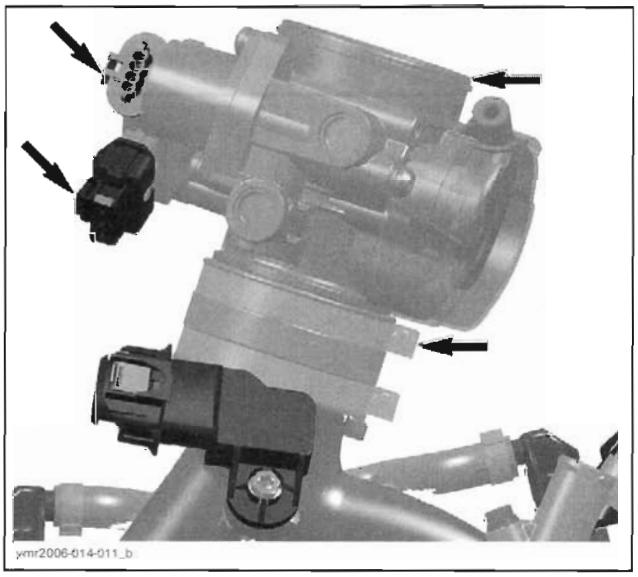
– Disconnect vent hose.



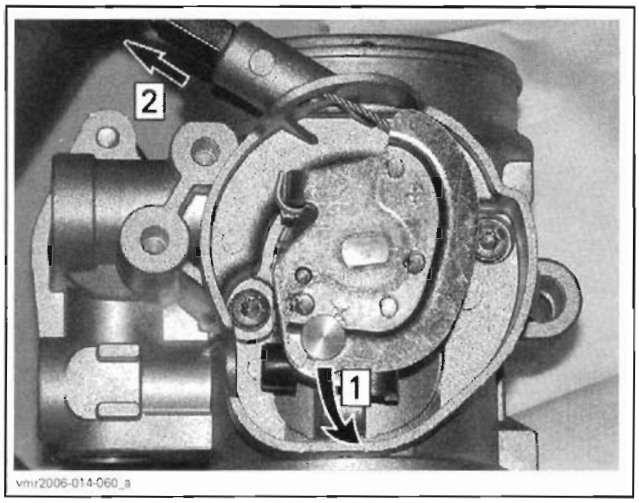
– Detach throttle cable from shifter panel.



– Disconnect TPS and idle bypass valve connectors.
– Detach throttle body from engine/air silencer.



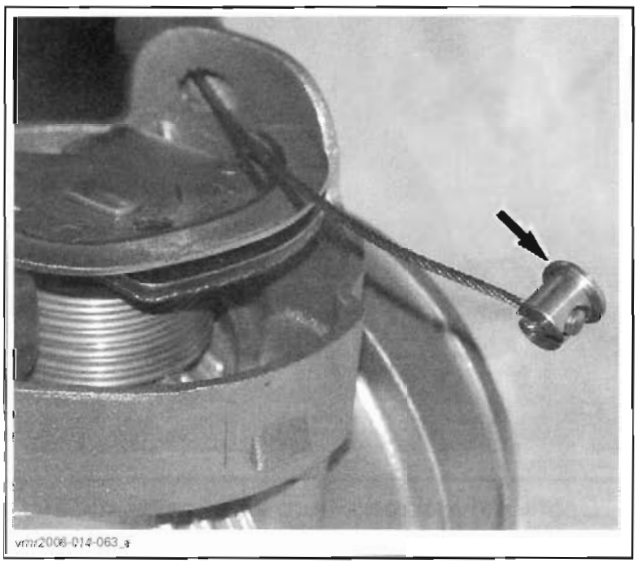
– Gently move throttle body away to detach throttle cable.
– Remove throttle body cover.
– Detach throttle cable.

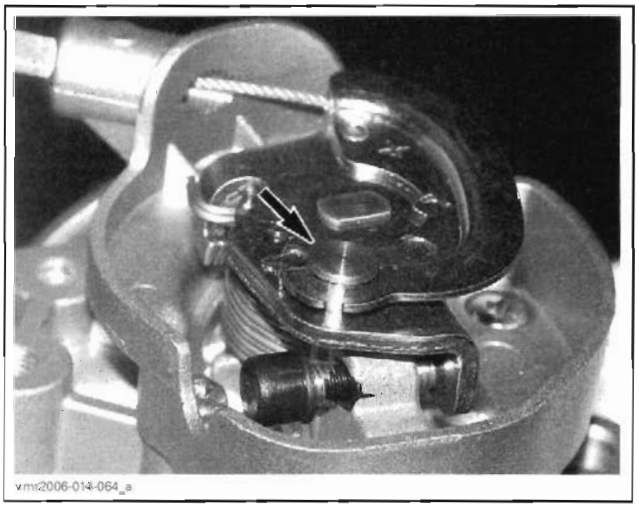


Installation

Installation of the new throttle body is the reverse of the removal procedure. Pay attention for the following details.

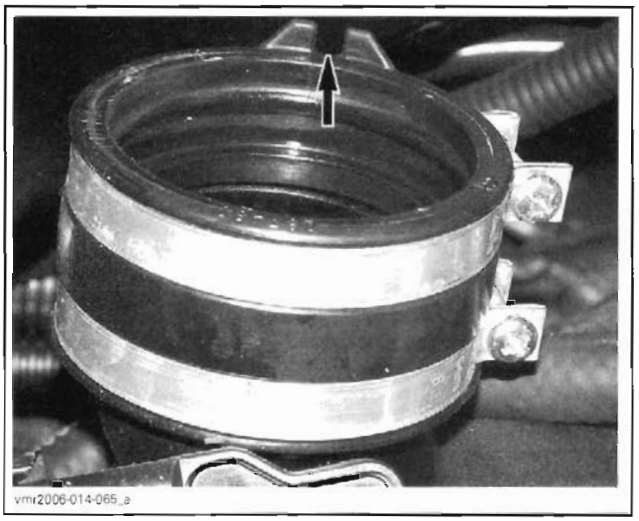
Properly install cable guide to throttle cable end.





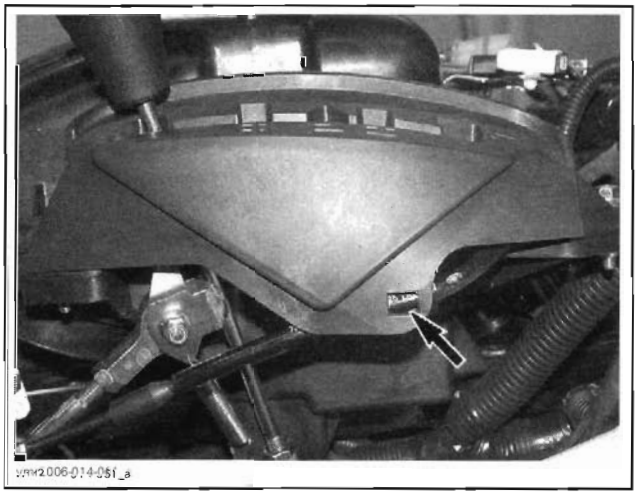
Do not reinstall cover yet.

Install throttle body on intake manifold. Ensure to index throttle body tab with boot notch.

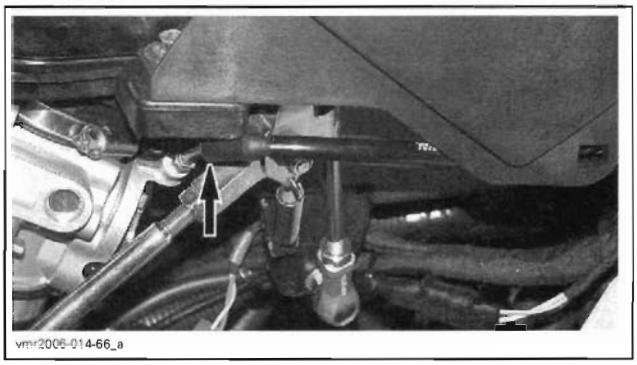




Clip throttle cable to shifter panel.



Gently pull throttle cable toward rear to have a gap between cable and shifter mechanism.



GAP HERE

⚠ WARNING

Ensure shifter mechanism does not touch throttle cable. Depress throttle lever several times to ensure it properly returns.

For TPS and idle bypass valve replacement procedures, refer to the respective paragraph in this section.

Adjustment

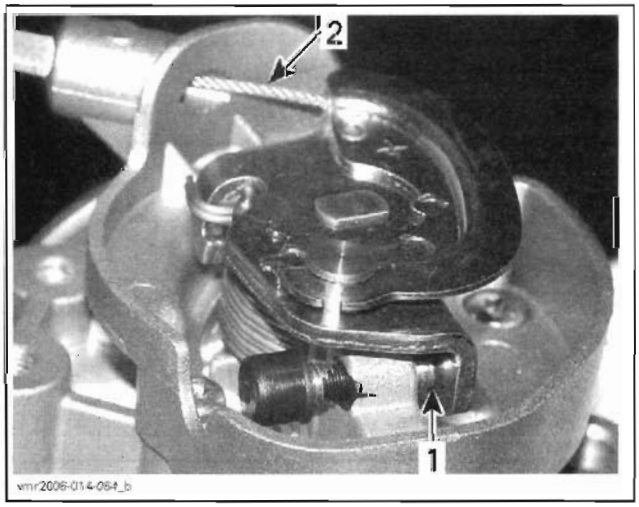
When the throttle body has been replaced, perform throttle cable adjustment (see below) and then the Closed Throttle and Idle Actuator reset. Refer to *THROTTLE POSITION SENSOR (TPS)* in this section.

Throttle Cable Adjustment

Mechanically adjust the throttle cable as follows.

Handlebar and throttle cable must be at their normal position. Throttle cable routing must have been performed before adjusting cable.

Activate throttle lever a few times. Make sure throttle cam of throttle body rests against set screw without any tension in the cable.



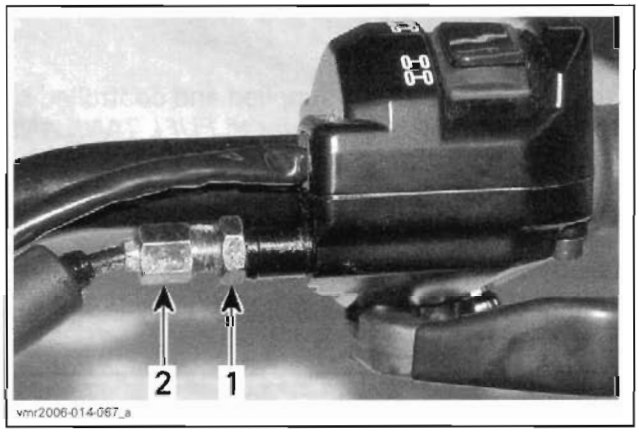
1. *Contact here*
2. *Free-play here*

CAUTION: If there is no free-play at idle position, it may cause poor idling and startability problems. Improper cable adjustment will cause strain on cable and/or damage cable bracket or throttle lever at handlebar.

⚠ WARNING

Make sure idle speed stopper contacts throttle cam when throttle lever is fully released at handlebar.

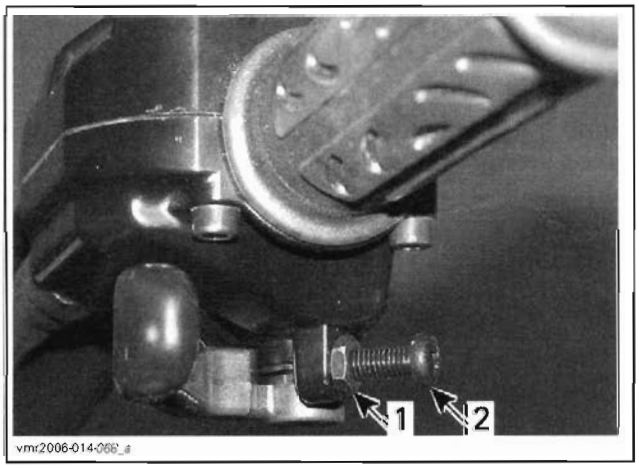
If adjustment is needed, proceed with adjuster at handlebar. Adjust to have 2 mm (.078 in) free-play. When done, slide back cable protector over adjuster.



1. *Adjuster lock nut*
2. *Adjuster*

Turn handlebar side to side and ensure there is still free-play in each position.

To ensure there is no strain in the cable at wide open position:



1. *Adjuster lock nut*
2. *Adjuster*

– Fully depress throttle lever and hold.

- Slacken adjuster lock nut/adjuster until it just releases lever.
- Turn adjuster clockwise until it touches lever again.
- From there, tighten adjuster 1/2 turn (to remove strain in cable).
- Tighten lock nut.
- Release throttle lever.

Reinstall throttle body cover.

Closed Throttle and Idle Actuator Reset

Perform the **Closed Throttle and Idle Actuator** reset as described in *THROTTLE POSITION SENSOR (TPS)* in this section.

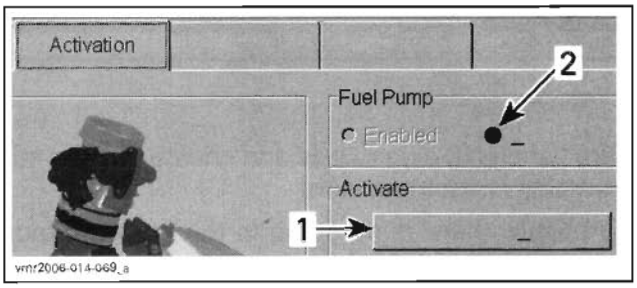
FUEL RAIL

Pressure at fuel rails is supplied and controlled by the fuel pump module. Refer to *FUEL TANK AND FUEL PUMP* for pressure test.

Replacement

Removal

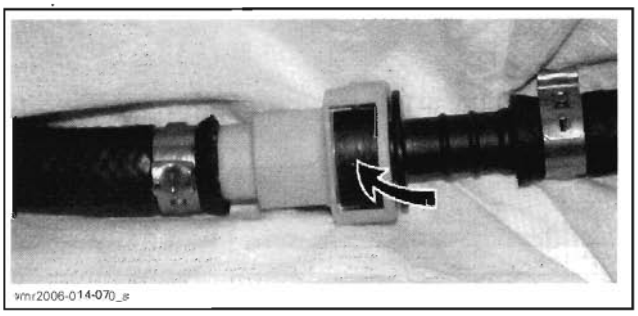
Disable fuel pump using B.U.D.S. Look in the **Activation** tab.



1. Click this button first
2. Ensure Disabled is turned ON

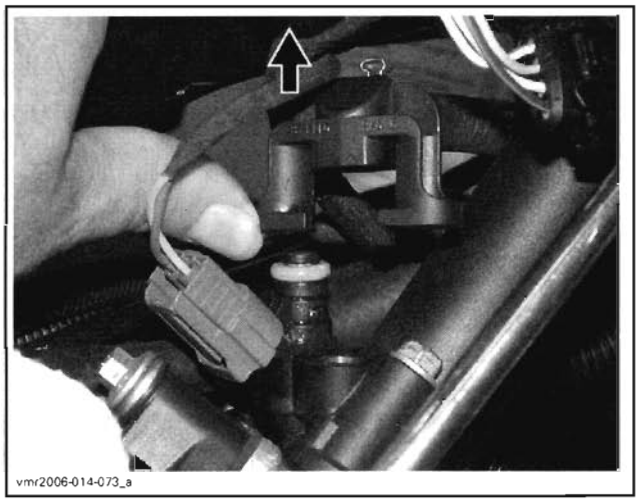
Turn ignition key off.

Wrap a rag around the inlet hose and release the quick fitting.



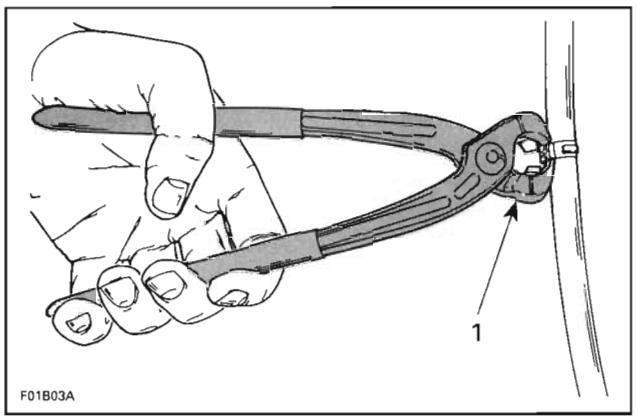
Unscrew rail retaining screws.

Gently pull rail up by hand.



NOTE: If fuel rail is removed purposely to access fuel injector, it is not necessary to cut hose clamp.

To cut clamps on fuel line, use pliers (P/N 295 000 070).



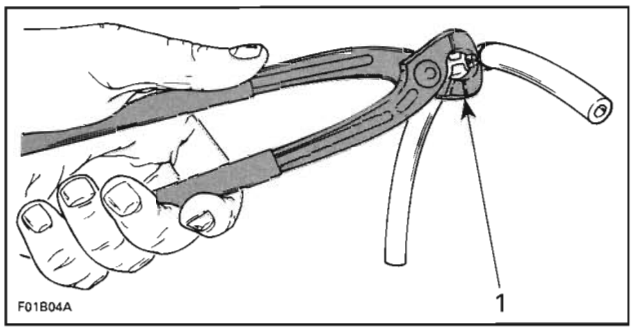
1. Cutting clamp

If necessary remove fuel injector as described below.

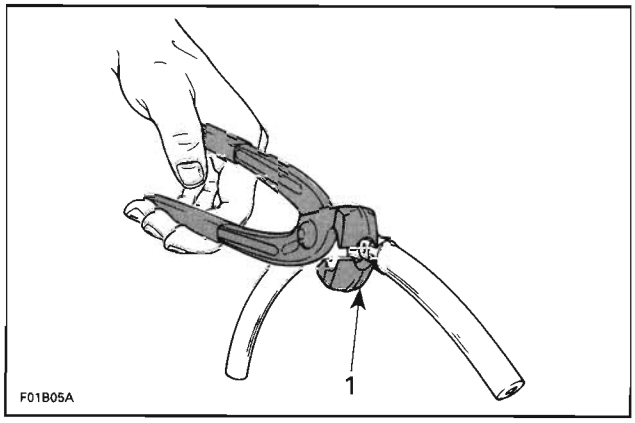
Installation

For installation, reverse the removal process but pay attention to the following.

Install new clamps using pliers.



1. Securing clamp



1. Securing clamp in limited access

A thin film of injection oil should be applied to O-rings of fuel injector to ease installation of fuel rail.

Instal new O-rings.

Install fuel rail and evenly tighten screws a little at a time each side.

Tightening torque of the rail retaining screws is 6 N•m (53 lbf•**in**).

After securing inlet hose at quick fitting, re-enable fuel pump using B.U.D.S.

⚠ WARNING

Perform a fuel pressure test and ensure that there is no leak. Refer to *FUEL TANK AND FUEL PUMP*. Run engine and check for leaks.

FUEL INJECTOR

Leakage Test

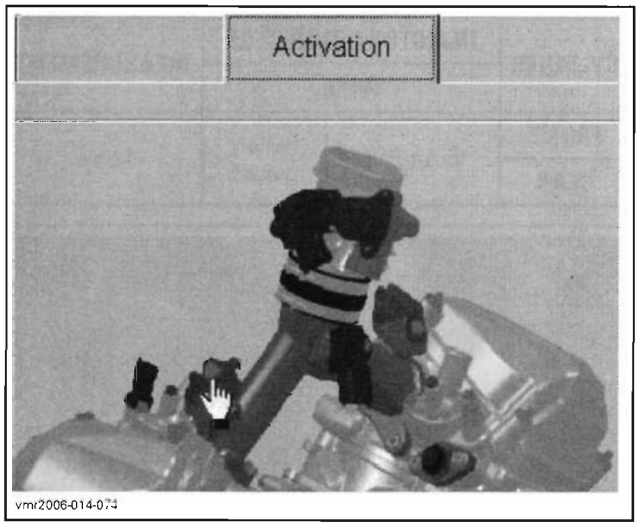
The leakage test is validated when performing the "fuel delivery system diagnostic flow chart" in *FUEL TANK AND FUEL PUMP*.

Electrical Test

Voltage Test

Turn ignition key ON and set engine stop switch to RUN.

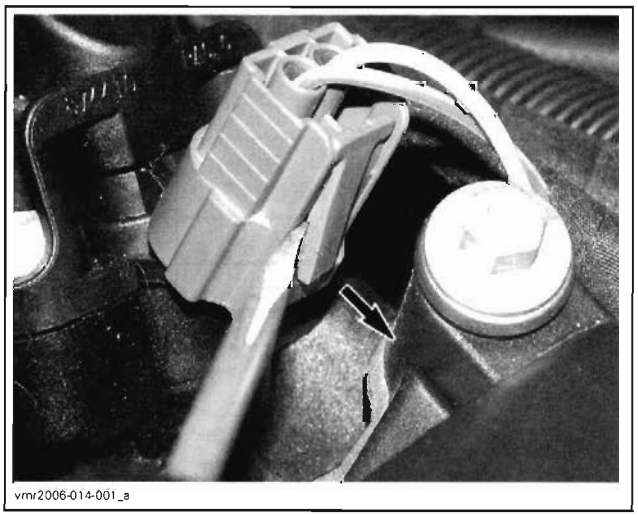
Using the Vehicle Communication Kit (VCK) with the B.U.D.S. software, energize the fuel injector from the **Activation** section.



You should hear the injector working.

If the injector does not work, disconnect the connector from the injector.

NOTE: If connector is hard to unlock, gently use a screwdriver to release connector.



Install a temporary connector to the injector with wires long enough to make the connection outside the engine compartment and apply voltage (12 V) to this test harness.

CAUTION: While doing fuel injector electrical test, do not apply continuous voltage to the connector for more than 10 seconds. This can damage the injector.

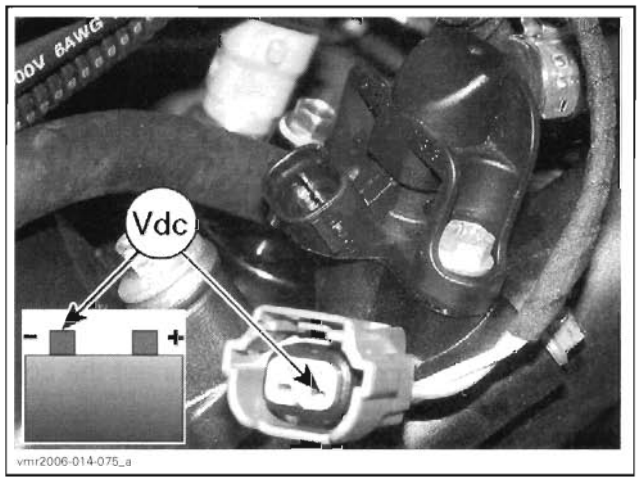
This will validate the injector mechanical and electrical operation.

If it does not work, replace it. If it works, continue procedure.

Using B.U.D.S., probe pins as shown.

NOTE: It is not necessary to activate the injector since it is continuously powered.

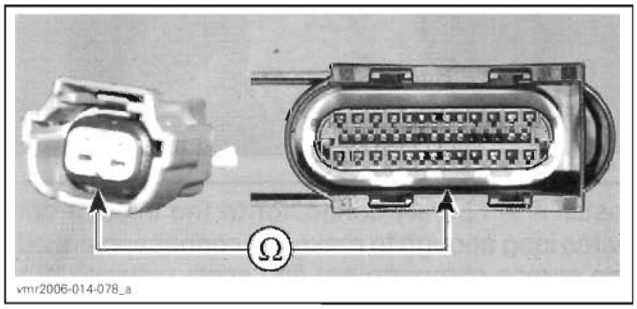
CYLINDER	INJECTOR CONNECTOR WIRE		MEASUREMENT
FRONT	Violet/Blue	Battery ground	12 Vdc
REAR			



vmr2006-014-075_a

If proper voltage is read, check continuity of wires between injector connector and ECM connector A as per table. If it is good, try a new ECM. Otherwise, repair/replace wiring/connector.

INJECTOR	INJECTOR CONNECTOR	ECM CONNECTOR	RESISTANCE @ 20°C (68°F)
FRONT	Brown/Red	A-15	Close to 0 Ω
REAR	Brown/Blue	A-33	



vmr2006-014-078_a

If there is no voltage:

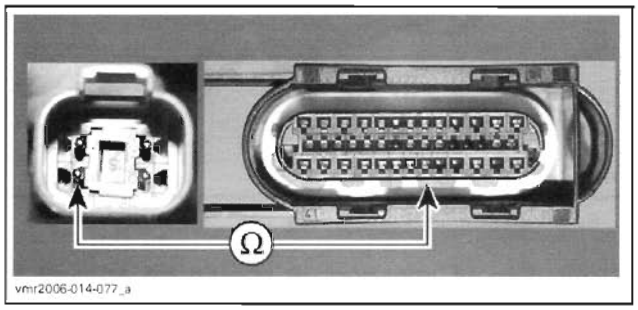
- check fuse F3
- If there is still no voltage to injector, check wiring/connectors from battery to injector. If it is good, try a new ECM.

Resistance Test

Reconnect the injector and disconnect the connector A from the ECM.

Using a multimeter, check resistance value between terminals as follows.

INJECTOR	ENGINE CONNECTOR PIN	ECM CONNECTOR "A"	RESISTANCE @ 20°C (68°F)
FRONT	3	A-15	13.8 - 15.2 Ω
REAR		A-33	



vmr2006-014-077_a

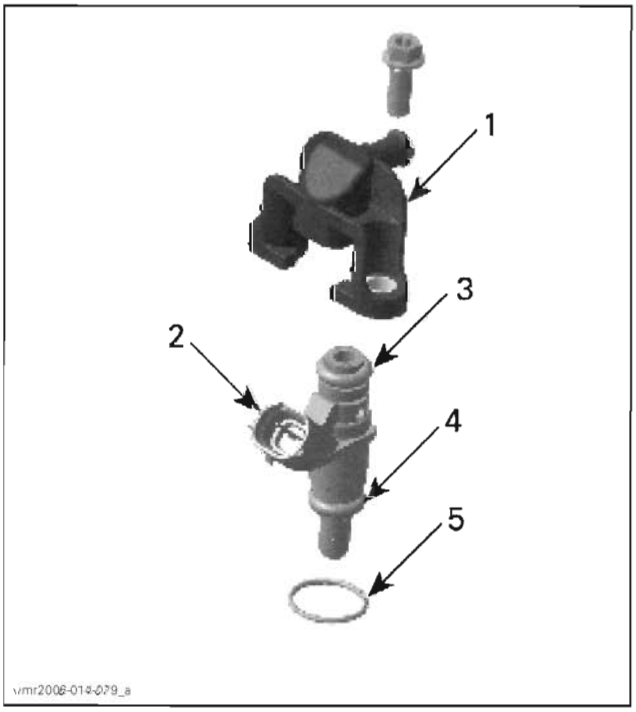
If resistance value is correct, try a new ECM.

If resistance value is incorrect, repair the wiring harness/connectors or replace the wiring harness between ECM plug connector and fuel injector.

Replacement

Removal

Before removing the injector, the fuel rail has to be removed from the engine. Refer to *REMOVAL* in *FUEL RAIL REPLACEMENT* for the procedure.



vmr2006-014-079_a

FUEL RAIL ASS'Y
1. *Fuel rail*
2. *Fuel injector*
3. *Injector top O-ring*
4. *Injector bottom O-ring*
5. *Manifold O-ring*

The fuel injector can be easily pulled out of the fuel rail.

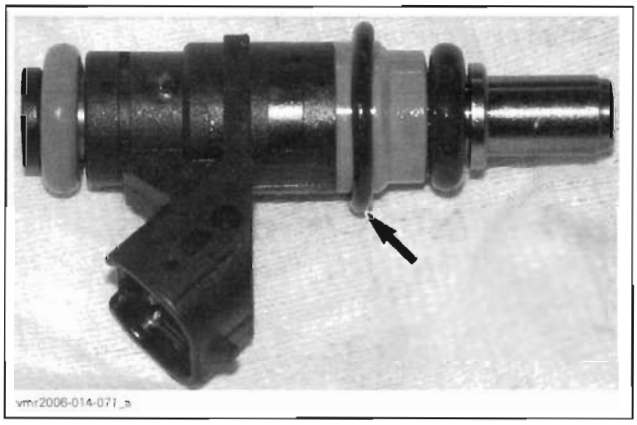
Installation

For the installation, reverse the removal procedure. Pay attention to the following details.

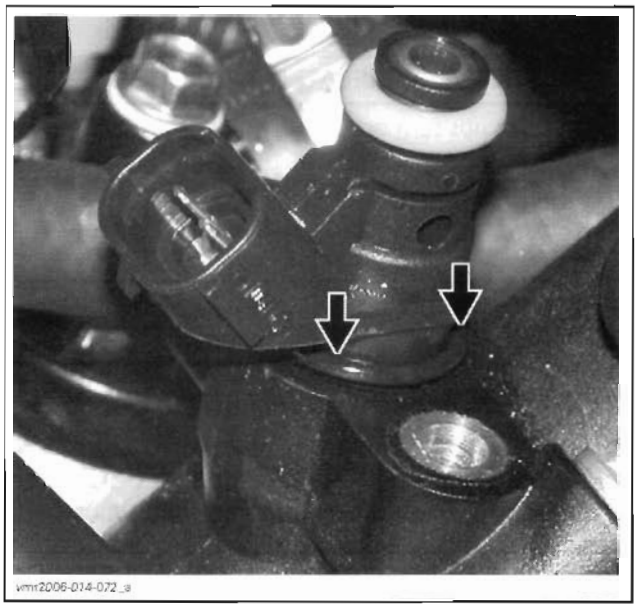
Apply a thin film of engine oil to O-rings to ease insertion in rail.

Install new O-rings, if you reinstall a used injector then insert the fuel injector in place with your hand. Do not use any tool.

Position the manifold O-ring as shown on injector.



Carefully insert injector in fuel rail paying attention to the manifold O-ring. Gently push in evenly all around while inserting injector. O-ring must be completely inserted and not visible, before finishing pushing injector.

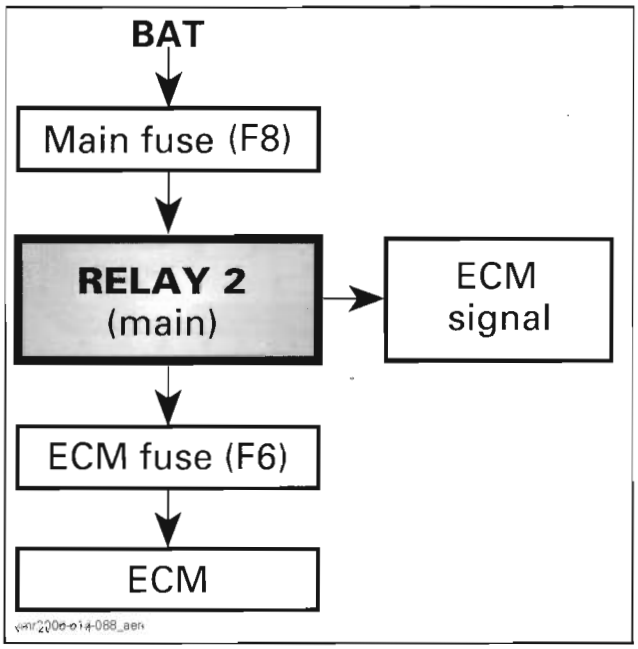


Firmly push injector until it bottoms.

Reinstall fuel rail. See above.

ENGINE CONTROL MODULE (ECM)

Power Supply



Quick indication that ECM is not working (assuming the component itself is working):

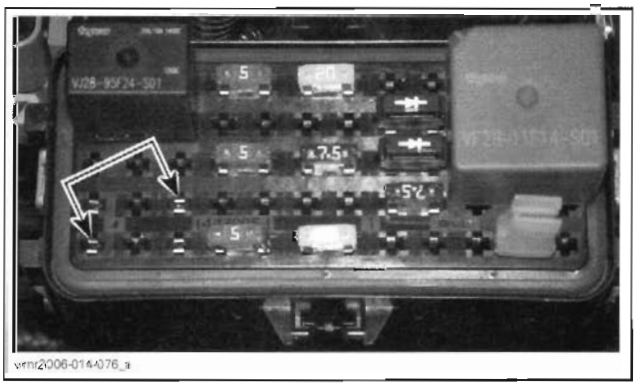
NOTE: Turn ignition key to ON **AND** set engine stop switch to RUN.

- multi-function speedometer does not turn on.
- Fuel pump does not turn on for approx. 2 seconds (when turning key on and setting engine stop switch RUN).
- Rear light does not turn on.
- Headlamp do not turn on (with ignition key at light position).

If ECM does not turn on, check the following.

Check fuses F8 and F4. If they test good, check relay R2.

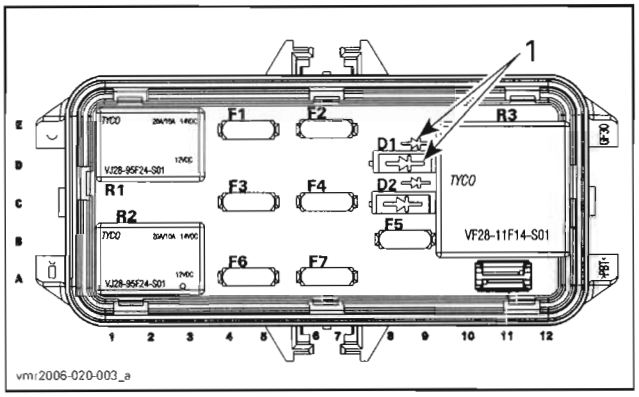
To check relay, remove relay and bypass it with a jumper between terminals as shown.



If ECM is now WORKING, replace relay.

If ECM is NOT working, check diode D1 as follows.

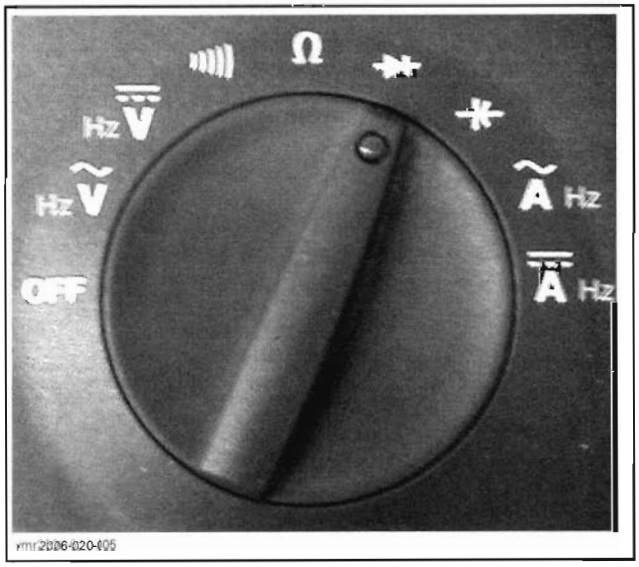
Check diode installation as shown.



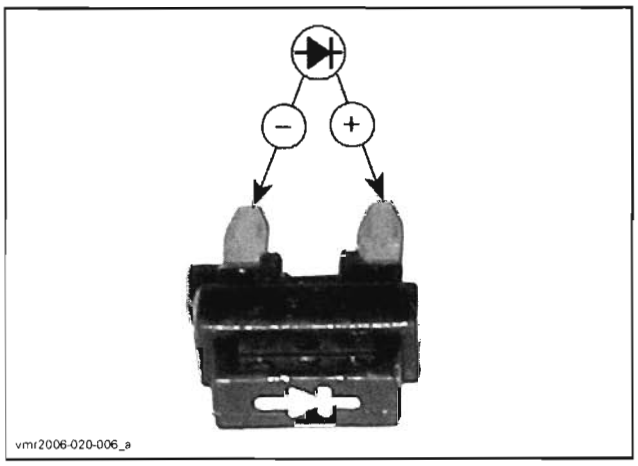
1. *Position symbol on diode in same direction as symbol on fuse holder*

Remove diode and lay down on a non-metallic table.

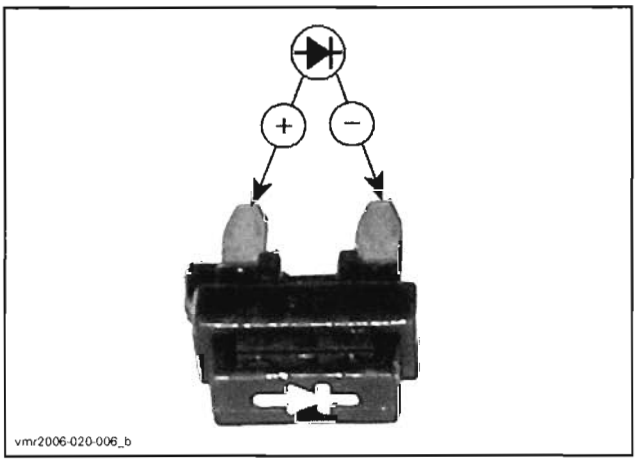
Set multimeter as shown.



Probe diode paying attention to proper polarity.



MUST BE OPEN CIRCUIT



MUST BE AROUND 0.5 V

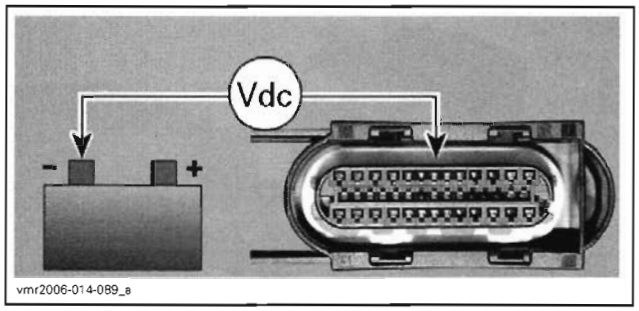
If diode fail any test, replace it.

PROBLEMS RELATED TO DIODE D1	
ECM does not turn on	– Missing diode – Inverted diode installation – Defective diode (open)
ECM does not turn off	– Defective diode (shorted)

Check ignition switch and engine stop switch. Refer to *IGNITION SYSTEM*.

If ECM still does not work, disconnect ECM connector B and measure voltage as follows.

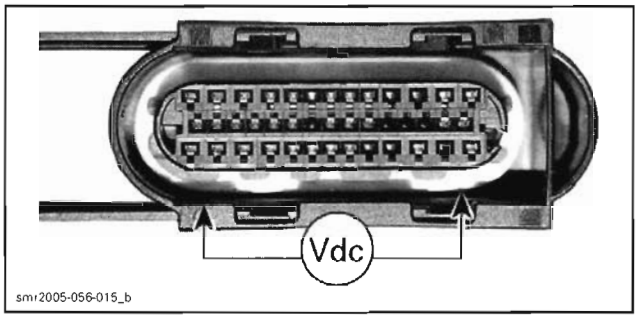
ECM B CONNECTOR		MEASUREMENT
PIN		VOLTAGE
B-11	Battery ground	12 Vdc



If voltage is not appropriate, check wiring/connectors from battery to ECM.

If voltage is adequate, measure voltage as follows.

ECM B CONNECTOR		MEASUREMENT
PIN		VOLTAGE
B-1	B-11	12 Vdc



If voltage is adequate, try a new ECM.

If voltage is not appropriate, check wiring continuity from ECM (B1) to battery ground.

Replacement

Prior to replacing a possibly faulty ECM, ensure that all the recommendations in the general introduction of this section have been carried out.

IMPORTANT: When the ECM is replaced, the ignition key(s) and the **Closed Throttle and Idle Actuator** must be reprogrammed/reset. Refer to their specific section for adjustment.

To allow transferring the previous recorded information from the old ECM to the new one, use the Vehicle Communication Kit (VCK) with the B.U.D.S. software. Use **Replace** ECM in the ECM menu. Follow instructions in its help system.

NOTE: If the old ECM still works, its information must be read by B.U.D.S. before being removed from the vehicle in order to transfer vehicle information and history to the new ECM.

Disconnect battery cables.

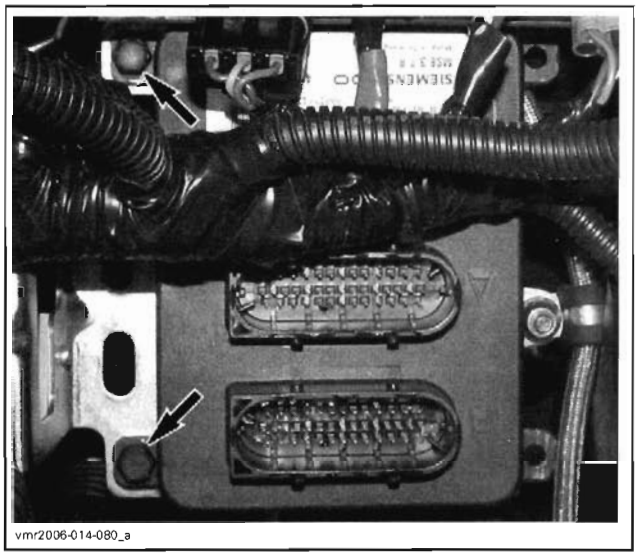
⚠ WARNING

Battery BLACK negative cable must always be disconnected first and connected last.

Remove center panel and dashboard. Refer to *BODY*.

Disconnect both connectors from ECM.

Unscrew retaining screws and remove the ECM from vehicle.

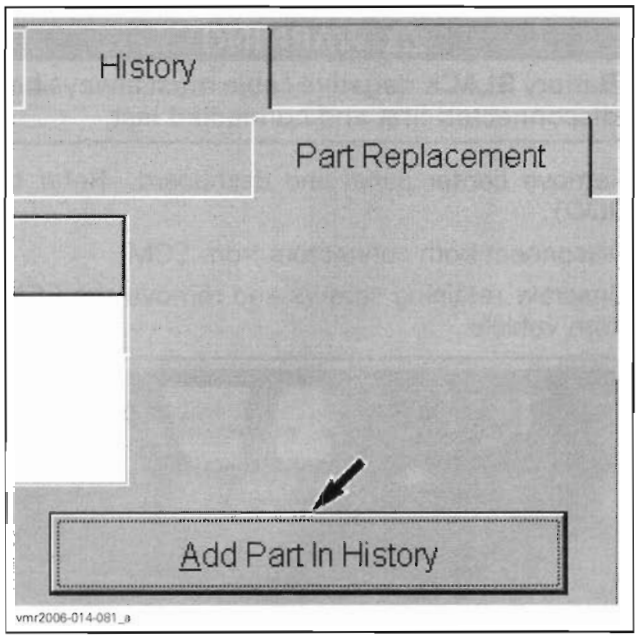


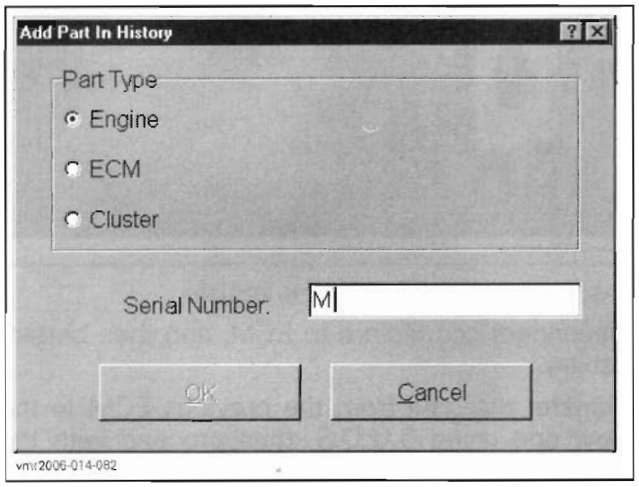
Install the new ECM to the vehicle.

Reconnect connectors to ECM, and then battery cables.

Transfer the data from the previous ECM to the new one using B.U.D.S. then proceed with the required resets and reprogram ignition key(s), if you were unable to transfer the data.

NOTE: If data cannot be transferred, manually enter information in **Vehicle** tab and **Engine serial number** in **History, Part replacement**.



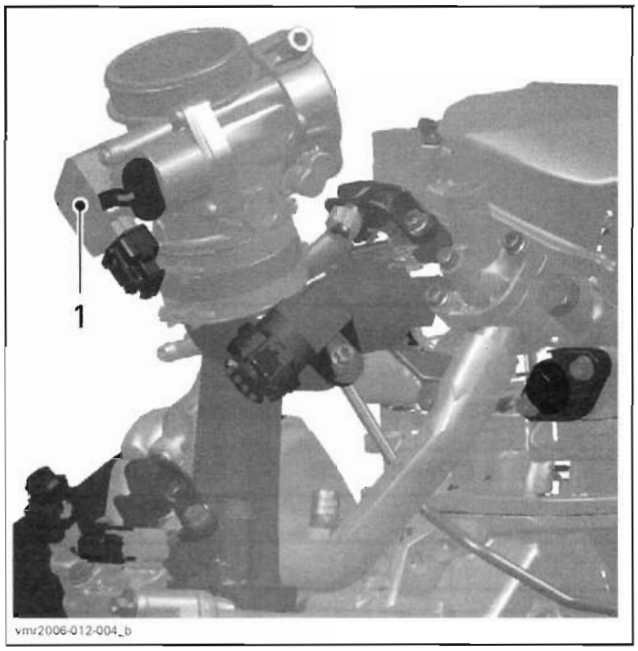


After performing the required resets, ensure to clear all faults from the newly replaced ECM.

THROTTLE POSITION SENSOR (TPS)

General

The throttle position sensor (TPS) is a potentiometer that sends a signal to the ECM which is proportional to the throttle shaft angle.



1. Throttle position sensor (TPS)

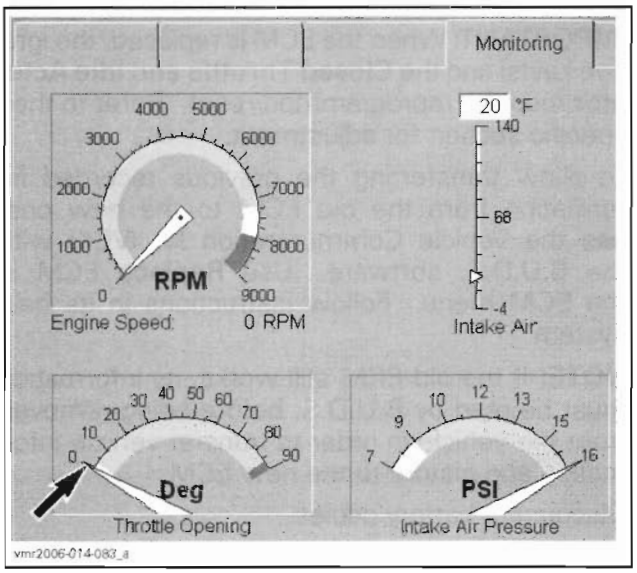
IMPORTANT: Prior to testing the TPS, ensure that mechanical components/adjustments of throttle body are adequate.

The EMS may generate several fault codes pertaining to the TPS. Refer to *DIAGNOSTIC PROCEDURES* section for more information.

Wear Test

While engine is not running, activate throttle and pay attention for smooth operation without physical stops of the cable.

Using the Vehicle Communication Kit (VCK) with the B.U.D.S. software, use the **Throttle Opening** display under **Monitoring**.



Slowly and regularly depress the throttle. Observe the needle movement. It must change gradually and regularly as you move the throttle. If the needle "sticks", bounces, suddenly drops or if any discrepancy between the throttle movement and the needle movement is noticed, it indicates that the TPS needs to be replaced or the computer used may be too slow to transfer data fast enough for real time display.

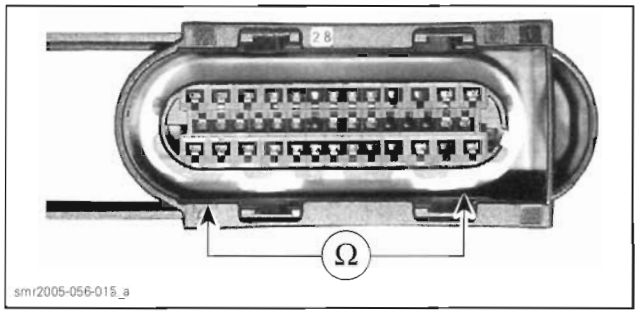
Resistance Test

Ensure TPS is connected to wiring harness.

Disconnect the A connector from the ECM.

Using a multimeter, check resistance values on ECM connector as per the following table.

ECM CONNECTOR		THROTTLE IDLE POSITION	WIDE OPEN THROTTLE POSITION
PIN		RESISTANCE Ω @ 20°C (68°F)	
A-24	A-25	710 - 1300	2600 - 2700
A-25	A-39	1600 - 2400	1600 - 2400
A-24	A-39	2600 - 2700	710 - 1300



NOTE: The resistance value should change smoothly and proportionally to throttle movement. Otherwise, replace TPS.

If resistance values are correct, perform the *VOLTAGE TEST* below.

If resistance values are incorrect, check wiring harness. If wiring is faulty, repair/replace. If wiring is good, replace TPS.

Reconnect ECM connector.

Voltage Test

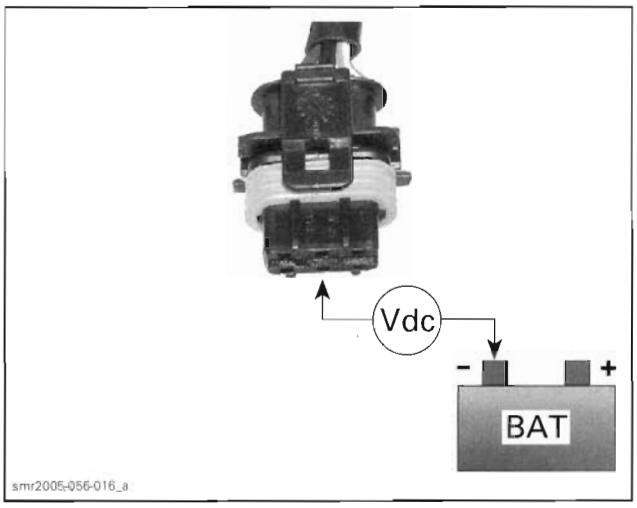
Check the ECM voltage output to the TPS.

Disconnect connector from TPS.

Turn ignition key ON and set engine stop switch to RUN.

Check the voltage readings from harness connector as follows.

CONNECTION	VOLTAGE
Pin 1 with battery ground	5.0 V
Pin 2 with battery ground	0 V
Pin 3 with battery ground	4.75 - 5 V



If voltage test is not good, check/repair wiring harness. If wiring tests good, try a new ECM.

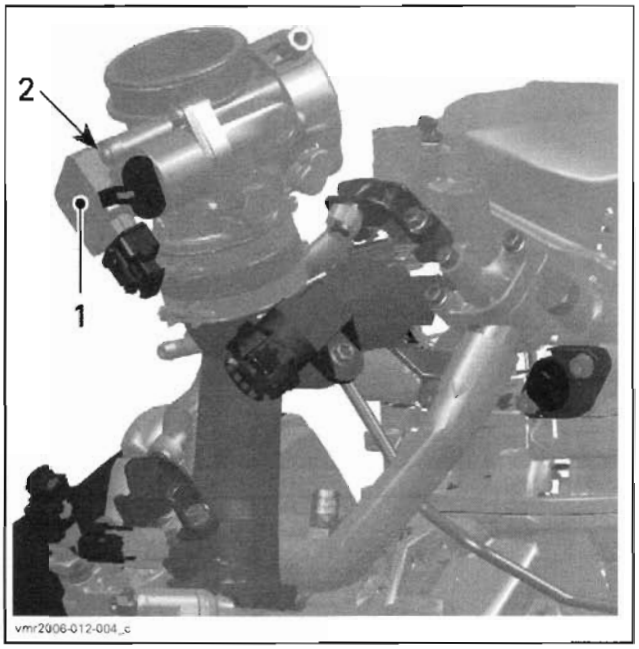
If voltage test is good, everything is in order (assuming resistance test was performed).

Replacement

Remove center panel and dashboard. Refer to *BODY*.

Loosen two screws retaining the TPS.

Remove TPS.



THROTTLE BODY
1. *Throttle position sensor (TPS)*
2. *Screws*

Install the new TPS.

Apply Loctite 243 (P/N 293 800 060) on the TPS retaining screws, then torque to 3 N•m (27 lbf•**in**).

Reinstall remaining removed parts.

Proceed with the *CLOSED THROTTLE AND IDLE ACTUATOR RESET*. See below.

Closed Throttle and Idle Actuator Reset

NOTE: This operation performs a reset of the values in the ECM.

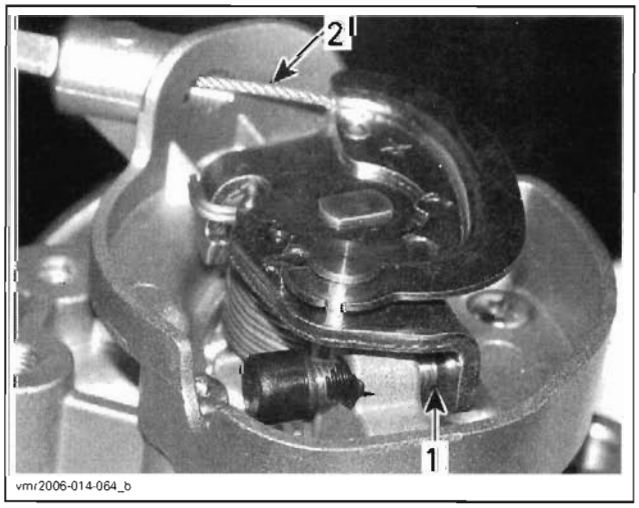
This reset is very important. The setting of the TPS will determine the basic parameters for all fuel mapping and several ECM calculations and the setting of the idle bypass valve will determine the basic parameters for the idle speed control of the engine.

NOTE: Reset must be done each time the throttle position sensor (TPS) is loosened or removed or throttle body is replaced or ECM is replaced.

CAUTION: An improperly set TPS or idle bypass valve may lead to poor engine performance and emission compliance could possibly be affected. In addition, improper idle bypass valve reset may lead to poor engine starting, improper idle (too low or too high) and engine stop on deceleration.

Use the Vehicle Communication Kit (VCK) with the B.U.D.S. software to perform this adjustment.

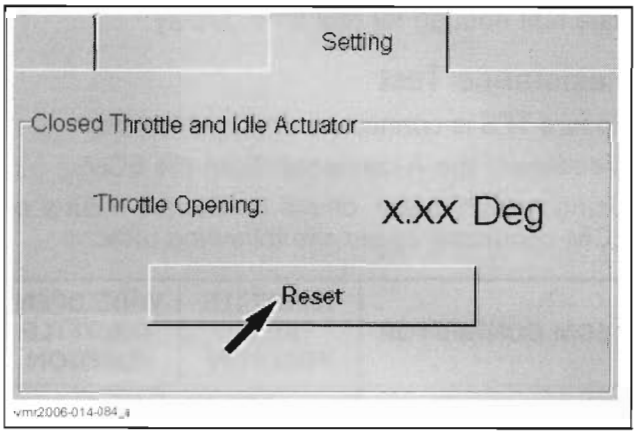
Remove throttle body cap and ensure the throttle cam of throttle body rests against set screw without any tension in the cable.



1. *Contact here*
2. *Free-play here*

Open throttle approximately one quarter then quickly release. Repeat 2 - 3 times to settle throttle plate. If stopper does not rest against its stop lever, perform throttle cable adjustment. Refer to *THROTTLE BODY* in this section.

To reset valve and TPS, click on the **Reset** button in the **Setting** section of B.U.D.S.



NOTE: No message will be displayed if operation is successful. If operation is wrong, an error message will be displayed.

NOTE: There is no idle speed adjustment to perform. The ECM takes care of that. If TPS is not within the allowed range while resetting the **Closed Throttle and Idle Actuator**, the ECM will generate a fault code and will not accept the setting.

Start engine and make sure it operates normally through its full engine RPM range. If fault codes appear, refer to *SYSTEM FAULT CODES* in the *DIAGNOSTIC PROCEDURES* section for more information.

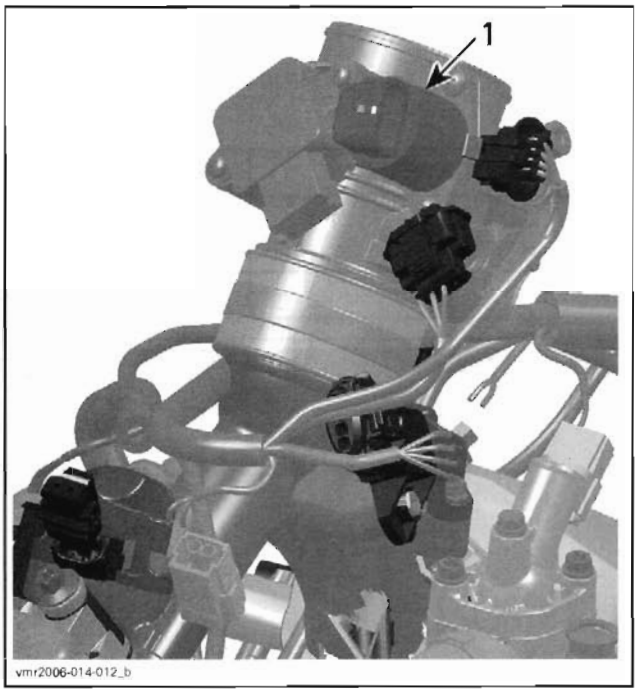
IDLE BYPASS VALVE

An idle bypass valve with good resistance measurement can still be faulty. It is also possible that a mechanical failure occurs which is not detectable without measuring the air flow. Replacing the idle bypass valve may be necessary as a test.

Resistance Test

Disconnect idle bypass valve from the wiring harness.

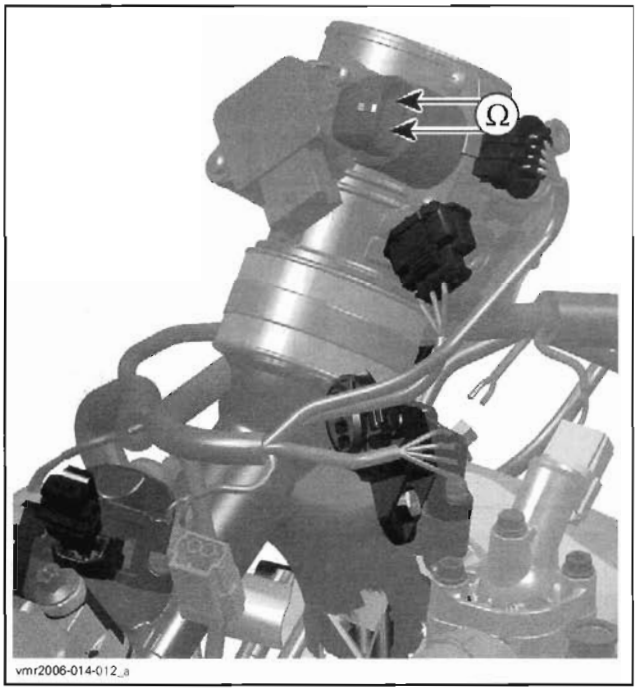
Using a multimeter, check the resistance in both windings.



1. Idle bypass valve

Check the resistance between pins as shown.

IDLE BYPASS VALVE		MEASUREMENT
PIN		RESISTANCE Ω @ 20°C (68°F)
1	4	50
2	3	



If the resistance of one or both windings is not good, replace the idle bypass valve.

If resistance test of valve windings is good, check continuity of circuits A-35, A-36, A-37, A-38. If not good, check/repair wiring/connectors.

Visual Inspection

NOTE: Make sure the ignition key is turned off during the following procedure.

Remove idle bypass valve from throttle body.

Check the piston and bypass channel for dirt/deposits which can cause a sticking piston.

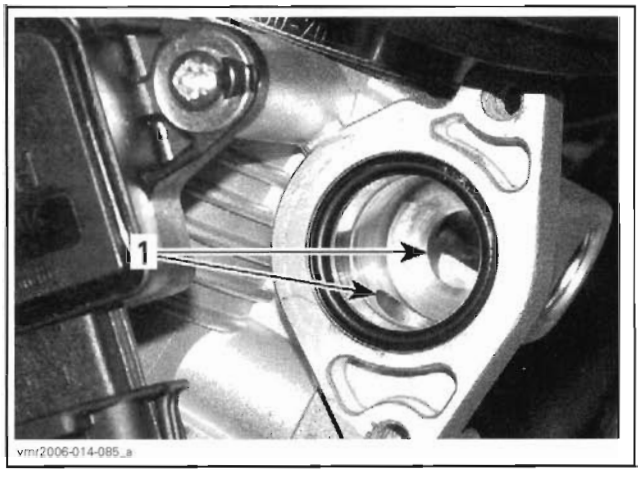
CAUTION: Always keep the ignition key turned OFF, while the idle bypass valve is removed.

CAUTION: Do not try to operate the piston of the idle bypass valve when it is dismounted. Also do not move the piston by hand. The drive screw is very sensitive and may be destroyed.

Using a part cleaner, clean idle bypass in throttle body from contamination then use an air gun to dry it.

⚠ WARNING

Always wear eye protector. Chemicals can cause a rash break out and injure your eyes.

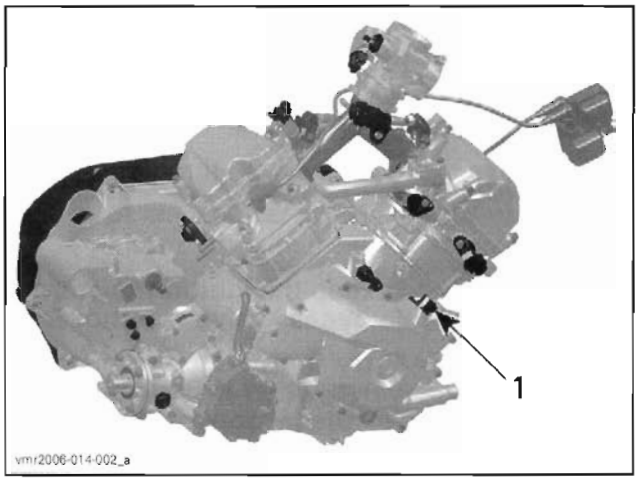


1. Clean bore from contamination

Clean all remaining parts and install the idle bypass valve on the throttle body.

Proceed with the *CLOSED THROTTLE AND IDLE ACTUATOR RESET*. See above.

CRANKSHAFT POSITION SENSOR (CPS)

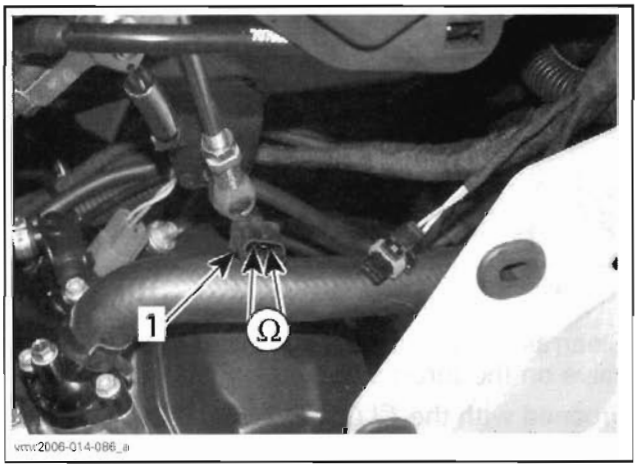


1. CPS connector

NOTE: Take into account that a CPS fault can be triggered by bent or missing encoder wheel teeth. First check fault codes (refer to *DIAGNOSTIC PROCEDURES*) then check the teeth condition if necessary (refer to *MAGNETO SYSTEM*).

Disconnect CPS wiring harness connector. Probe terminals while cranking, as shown.

CPS CONNECTOR		MEASUREMENT
PIN		VOLTAGE
1	2	2.3 Vac



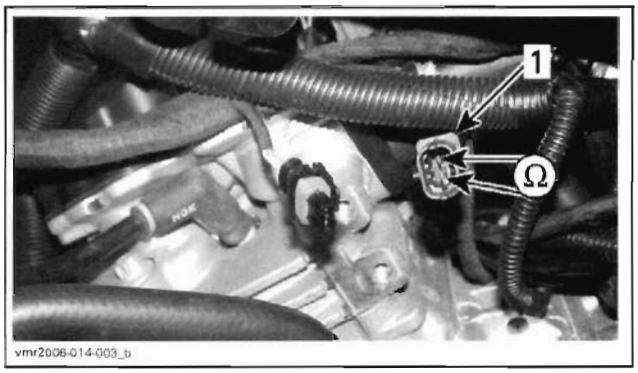
RH SIDE OF VEHICLE
1. CPS connector

If voltage is not within specifications, inspect wiring and replace CPS if wiring is good.

Resistance Test

Disconnect CPS wiring harness connector. Probe terminals as shown.

CPS CONNECTOR		MEASUREMENT
PIN		RESISTANCE Ω @ 20°C (68°F)
1	2	700 - 900 Ω



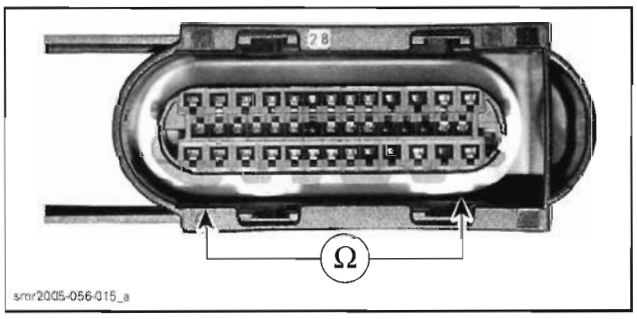
LH SIDE OF VEHICLE
1. CPS connector

If resistance is not within specifications, replace the CPS.

If resistance tests good, **reconnect** the CPS connector and disconnect the connector A on the ECM.

Using a multimeter, recheck resistance as per table.

ECM CONNECTOR		MEASUREMENT
PIN		RESISTANCE Ω @ 20°C (68°F)
A-5	A-19	700 - 900 Ω

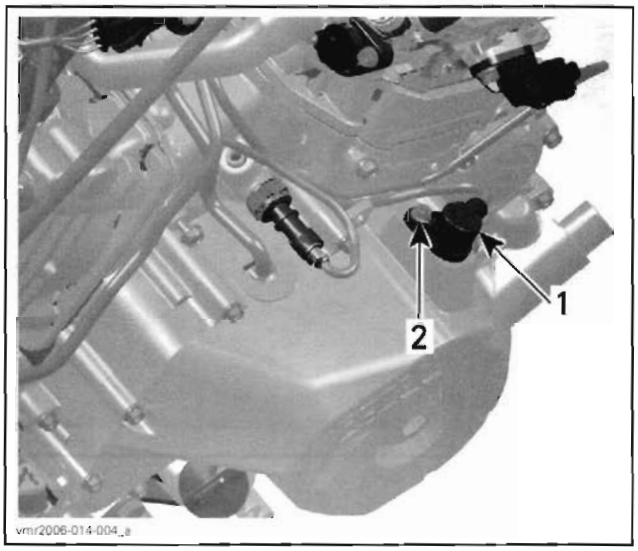


If resistance value is correct, try a new ECM. Refer to *ECM REPLACEMENT* procedures elsewhere in this section.

If resistance value is incorrect, repair the connectors or replace the wiring harness between ECM connector and the CPS.

Replacement

Unplug connector and remove CPS.

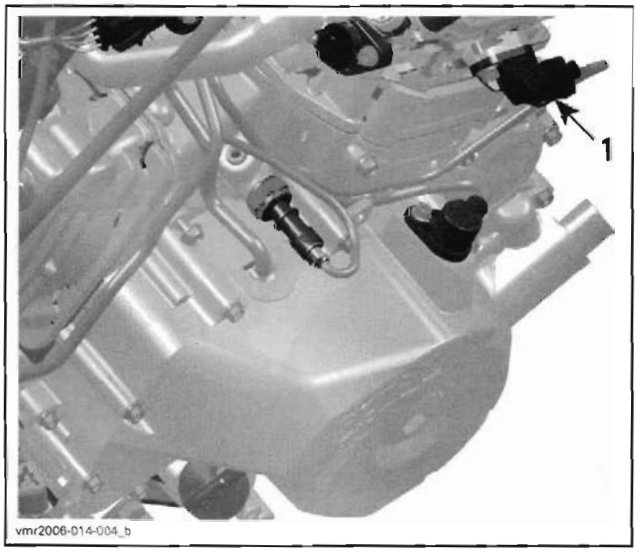


1. CPS
2. Retaining screw

Install new CPS and secure harness with a locking tie.

Tightening torque of the CPS retaining screws is 10 N•m (89 lbf•**in**).

CAMSHAFT POSITION SENSOR (CAPS)



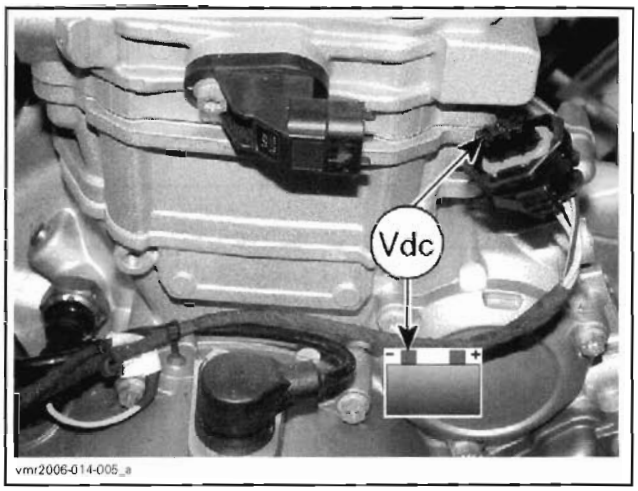
1. CAPS

Voltage Test

Turn ignition key ON and set engine stop switch to RUN.

Disconnect CAPS wiring harness connector. Probe terminals as shown.

CAPS CONNECTOR		MEASUREMENT
PIN		VOLTAGE
3	Battery ground	12 Vdc

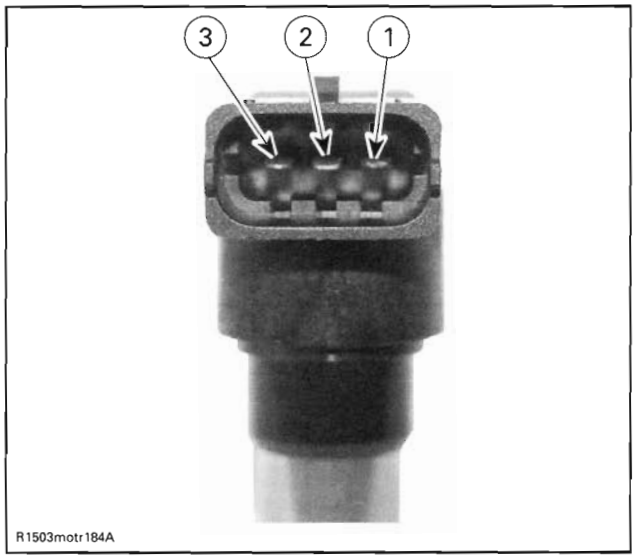


- If proper voltage is read, check continuity of circuits A-20 and A-34.
- If circuits test is good, perform the CAPS voltage test as explained below. If CAPS tests good, try a new ECM.
- If proper voltage is not read, check supply circuit (pin 3 of CAPS connector) fuse (F4), relay and wiring condition. If it still does not work, try a new ECM.

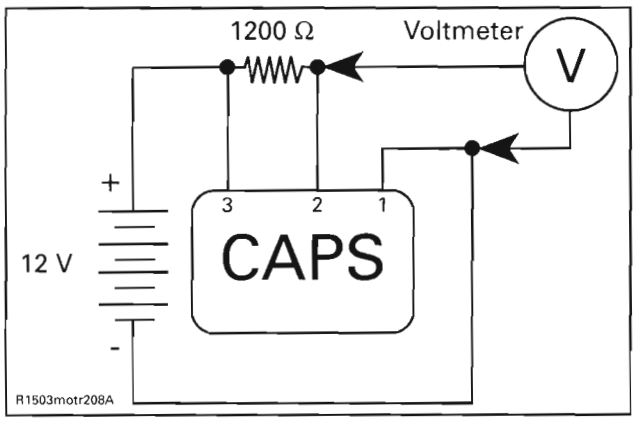
CAPS Test Setup

Remove the CAPS from the cylinder head.

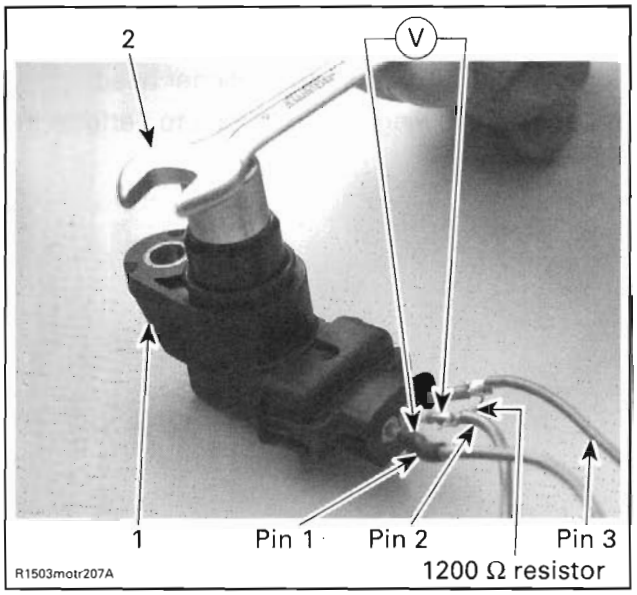
Set up the following electric circuit to perform the voltage test.



CAPS PIN-OUT



Touch the CAPS with a conductor (ex.: screwdriver) and look if the voltage at the multimeter switches from 12 V to less than 1 V.

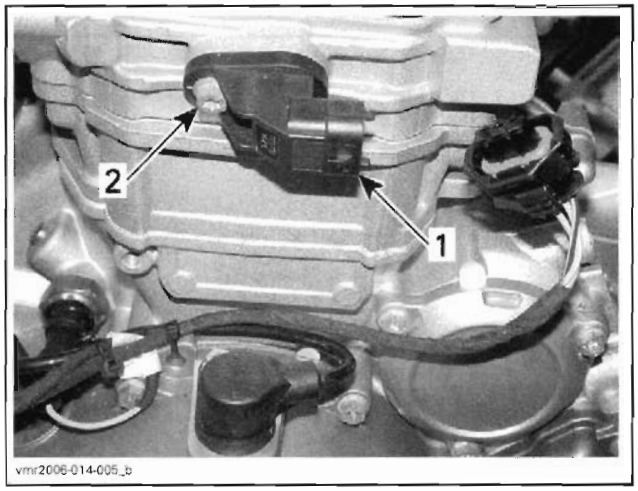


1. CAPS
2. Conductor

If the voltage is not good, replace the CAPS.

Replacement

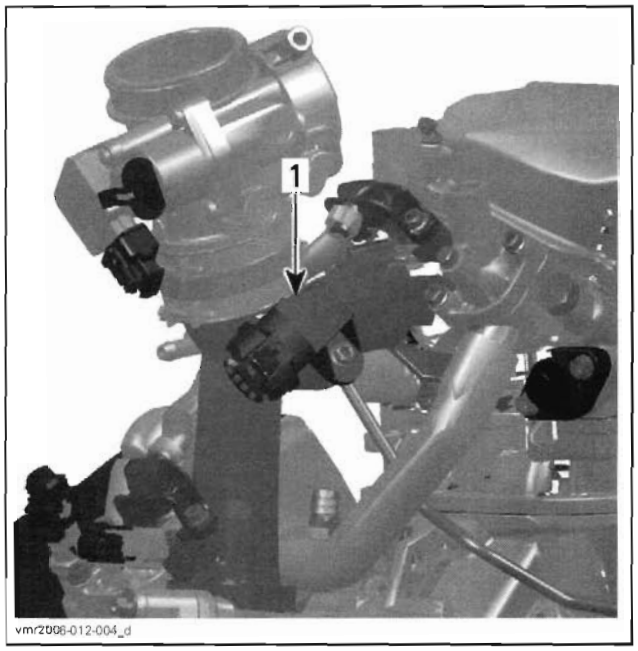
Unscrew the retaining screw and replace the CAPS. Ensure to reinstall O-ring.



1. CAPS
2. Retaining screw

Apply Loctite 243 (P/N 293 800 060) on thread and torque to 10 N•m (89 lbf•**in**).

MANIFOLD AIR PRESSURE AND TEMPERATURE SENSOR (MAPTS)



1. Manifold air pressure and temperature sensor (MAPTS)

NOTE: This sensor is a multi-function device.

Pressure Sensor Function

When engine is started and it runs at idle speed, the sensor takes the atmospheric pressure and stores it in the ECM. Thereafter, it takes the manifold air pressure at operating RPMs.

Ensure sensor is correctly installed on intake manifold. Otherwise, the MAPTS could generate a fault code for an unexpected sensor range at idle when it reads the atmospheric pressure. Remove sensor and check for oil or dirt on its end and if problem persists, check throttle plate condition/position and the wiring harness. Perform the following tests.

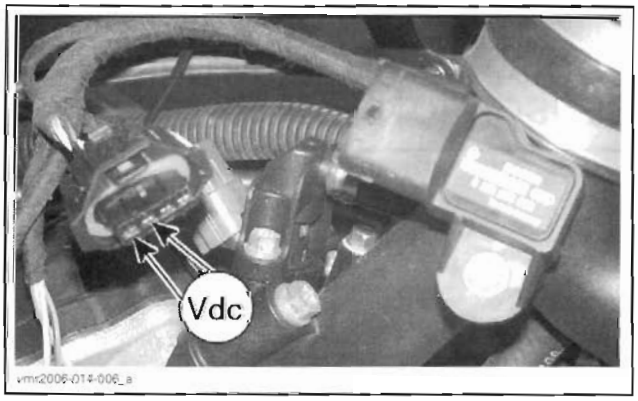
Voltage Test

Check the voltage output from ECM to the pressure sensor.

Turn ignition key ON and set engine stop switch to RUN.

Disconnect plug connector from MAPTS and connect a voltmeter as shown.

MAPTS CONNECTOR		MEASUREMENT
PIN		VOLTAGE
1	3	5 Vdc



If voltage test is good, replace the MAPTS.

If voltage test is not good, check the continuity of the MAPTS circuit. See below.

Resistance Test

Disconnect the connector A from the ECM.

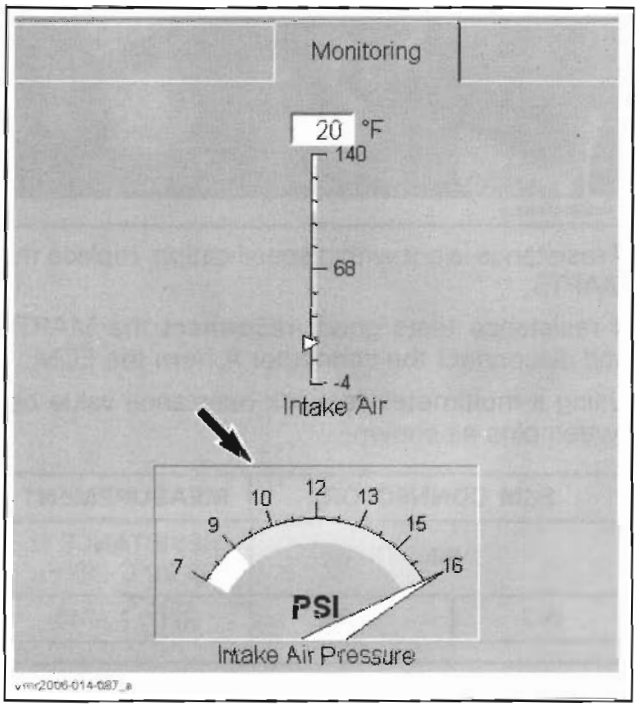
Using a multimeter, check continuity of circuits 12, 28 and 40.

If wiring harness is good, try a new ECM. Refer to *ECM REPLACEMENT* procedures elsewhere in this section.

Otherwise, repair the connectors or replace the wiring harness between ECM connector and the MAPTS.

Quick Test

Using VCK, look the MAPTS from the *MONITORING* section and read out the pressure value while engine is stopped.



Perform the same test with a new MAPTS and compare both readings.

Values have to be within ± 3.4 kPa (0.5 PSI).

If old MAPTS's value is out of this range, replace it.

Temperature Sensor Function

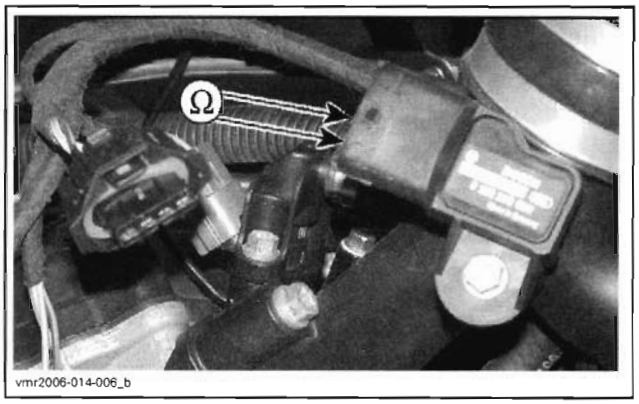
The sensor also monitors the temperature at manifold.

Resistance Test

Disconnect the connector from the MAPTS.

Using a multimeter, check the resistance of the sensor itself as shown.

MAPTS		MEASUREMENT
PIN		RESISTANCE Ω @ 20°C (68°F)
1	2	2280 - 2740

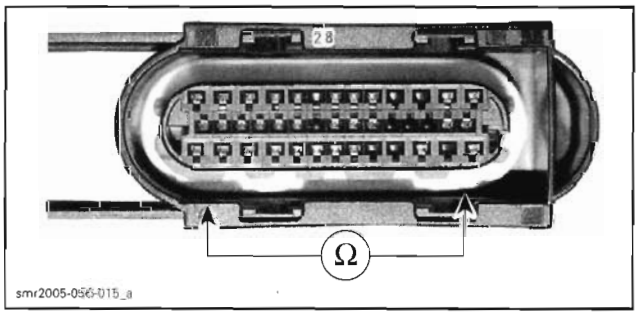


If resistance is not within specification, replace the MAPTS.

If resistance tests good, **reconnect** the MAPTS and disconnect the connector A from the ECM.

Using a multimeter, recheck resistance value between pins as shown.

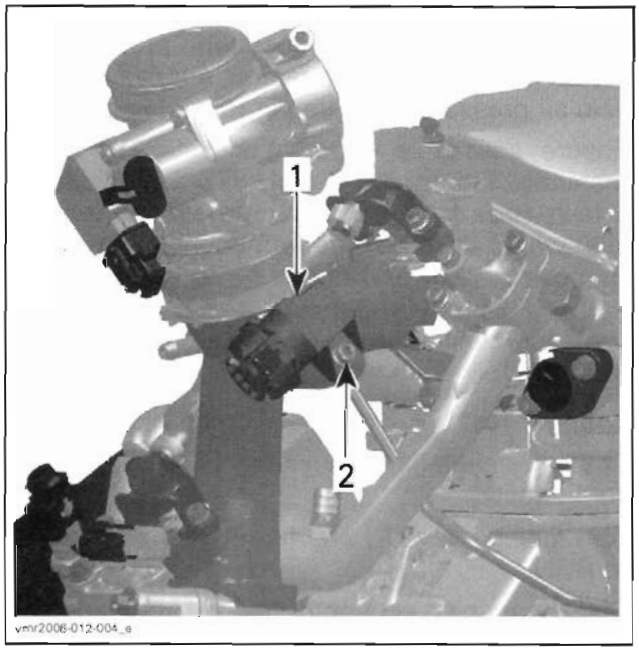
ECM CONNECTOR		MEASUREMENT
PIN		RESISTANCE Ω @ 20°C (68°F)
A-7	A-28	2280 - 2740



If resistance value is correct, try a new ECM. Refer to *ECM REPLACEMENT* procedures elsewhere in this section.

If resistance value is incorrect, inspect/repair/replace wiring harness between ECM connector and the MAPTS.

Replacement

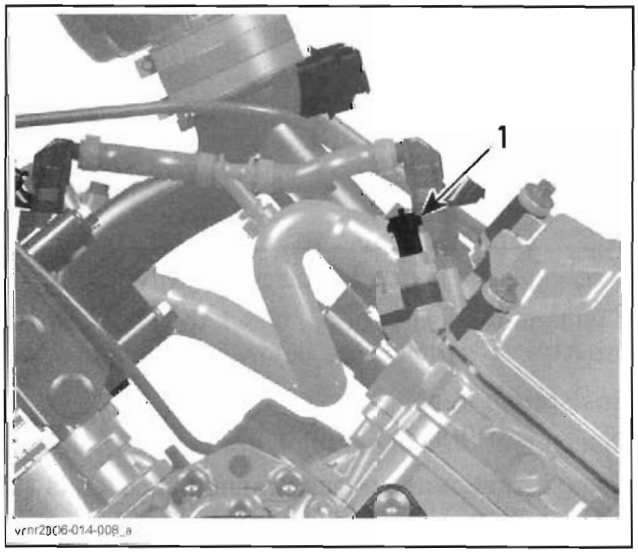


1. MAPTS
2. Retaining screw

Disconnect MAPTS connector and remove the MAPTS.

Apply Loctite 243 (P/N 293 800 060) on screw then torque to 6 N•m (53 lbf•**in**).

COOLANT TEMPERATURE SENSOR (CTS)

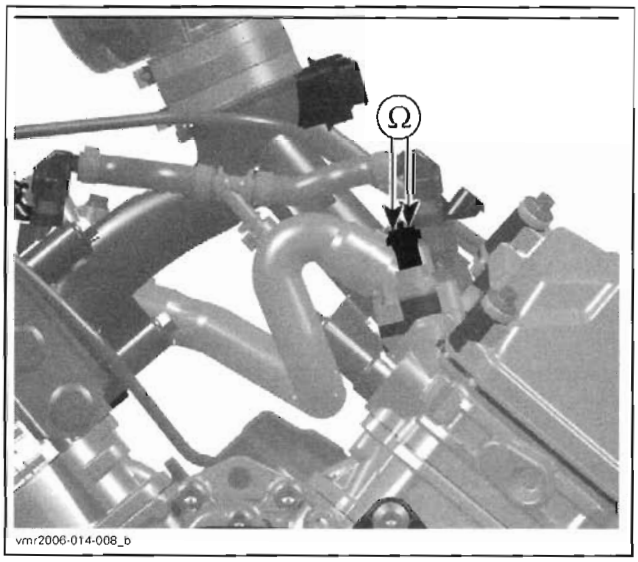


1. Coolant temperature sensor (CTS)

Resistance Test

Disconnect the plug connector from the CTS and check the resistance of the sensor itself.

CTS SENSOR		MEASUREMENT
PIN		RESISTANCE Ω @ 20°C (68°F)
1	2	2280 - 2740

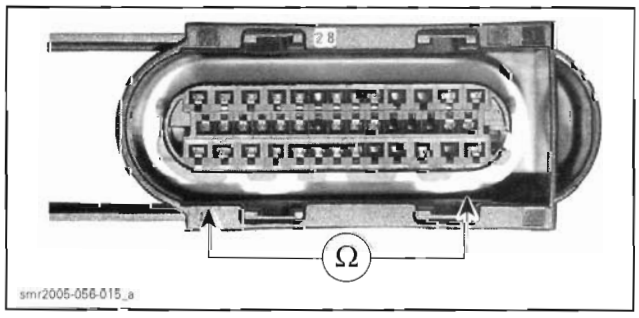


If resistance is out of specification, replace the CTS.

If resistance tests good,**reconnect** the CTS and disconnect the ECM connector A from the ECM.

Using a multimeter, recheck resistance on the ECM connector as per table.

ECM CONNECTOR		MEASUREMENT
PIN		RESISTANCE Ω @ 20°C (68°F)
A–11	A-27	2280 - 2736



If resistance value is correct, try a new ECM. Refer to *ECM REPLACEMENT* procedures elsewhere in this section.

If resistance value is incorrect, repair the connectors or replace the wiring harness between ECM connector and the CTS.

Replacement

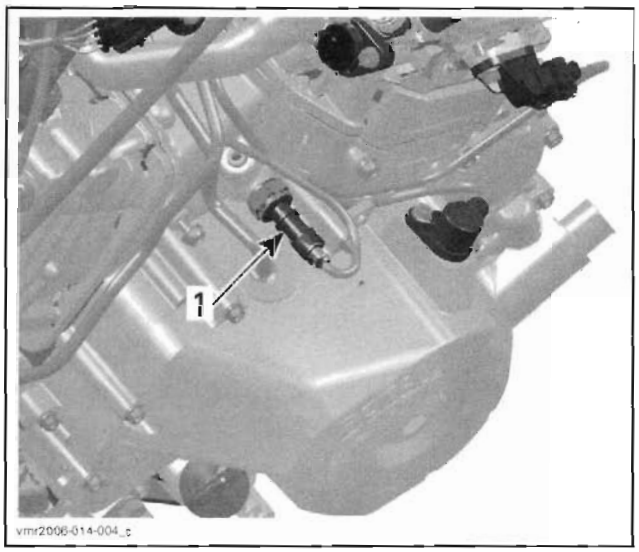
Disconnect CTS connector and remove CTS.

Install the new CTS and torque to 16 N•m (141 lbf•**in**).

Reinstall remaining removed parts.

Refill and bleed the cooling system, refer to *COOLING SYSTEM* subsection.

OIL PRESSURE SWITCH (OPS)



1. OPS

Oil Pressure Test

To check the function of the oil pressure switch, an oil pressure test has to be performed. Refer to *OIL PRESSURE TEST* in *LUBRICATION SYSTEM* section.

If the engine oil pressure is out of specifications, check the points described in *TROUBLESHOOTING* section.

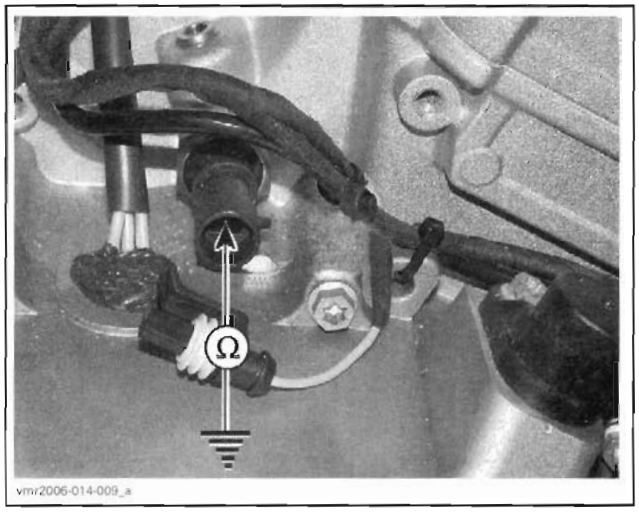
If the engine oil pressure is good, check the resistance of the OPS while engine is off and while engine is running.

Resistance Test

Disconnect the connector from the OPS.

Use a multimeter to check the resistance between as shown.

OPS CONNECTOR		ENGINE NOT RUNNING	ENGINE RUNNING
PIN		RESISTANCE (Ω)	
1	Engine ground	Close to 0 Ω (normally closed switch)	Infinitely high when pressure reaches 20 - 40 kPa (2.9 - 5.8 PSI)



If resistance values are incorrect, replace OPS.

If the values are correct, check the continuity of the wiring harness.

Disconnect the connector A from the ECM and check continuity of circuit 10.

If wiring harness is good, try a new ECM. Refer to *ECM REPLACEMENT* procedures elsewhere in this section.

Otherwise, repair the connector or replace the wiring harness between ECM connector and OPS.

FUEL TANK AND FUEL PUMP

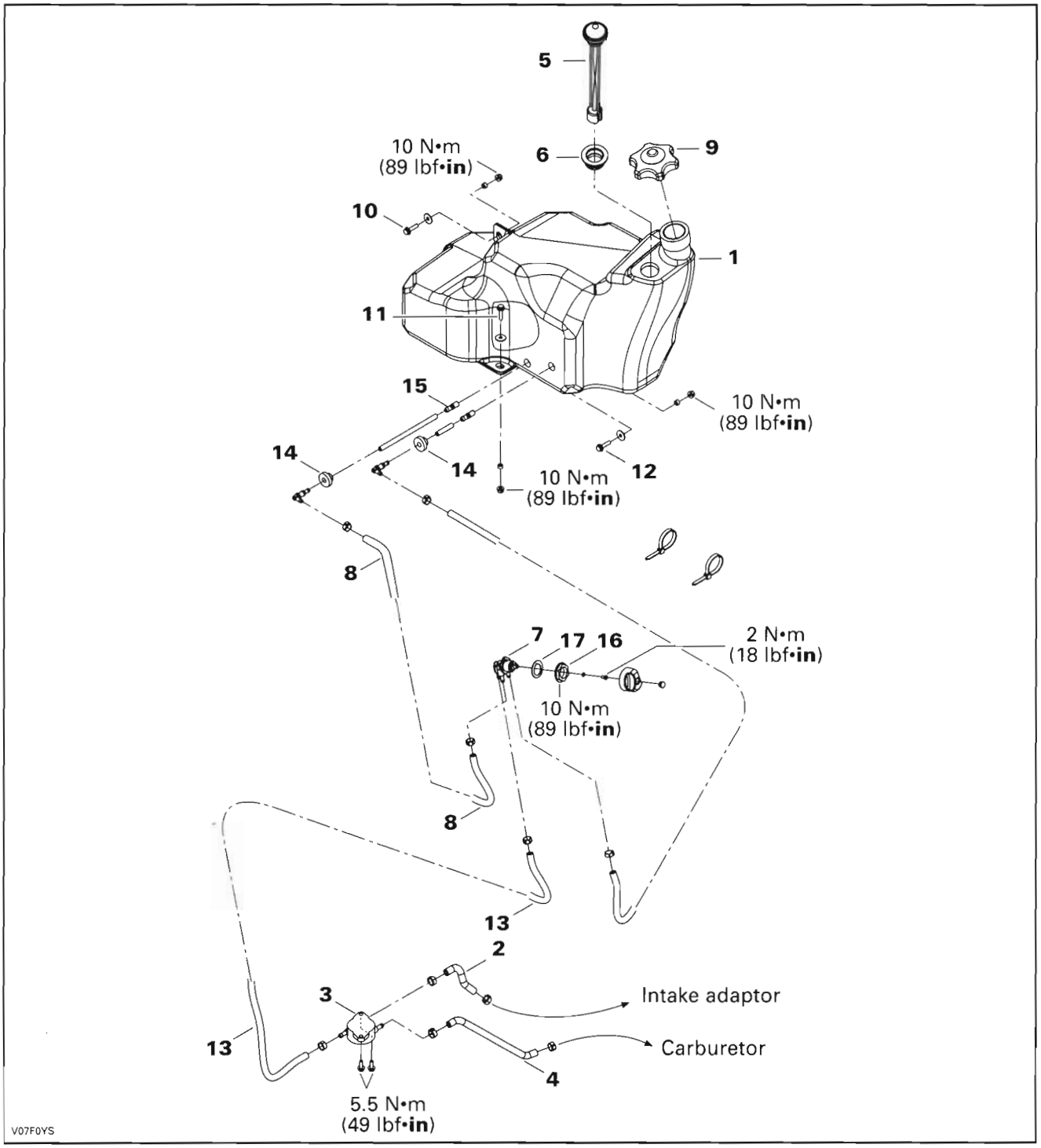
SERVICE TOOLS

Description	Part Number	Page
hose pincher	295 000 076	165
leak testing kit	529 033 100	165
pliers	295 000 070	176
pressure gauge	529 035 591	181
small hose pincher	295 000 076	165, 168, 171, 176
T-fitting	529 036 023	181
vacuum/pressure pump	529 021 800	165, 171, 176
VCK (Vehicle Communication Kit)	529 035 981	182

SERVICE PRODUCTS

Description	Part Number	Page
BOMBARDIER LUBE	293 600 016	169

OUTLANDER 400 SERIES



GENERAL

⚠ WARNING

Always disconnect battery exactly in the specified order, BLACK (-) cable first. It is recommended to disconnect electrical connections prior to disconnecting fuel lines.
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.

During assembly/installation, use the torque values and service products as in the exploded views.

Clean threads before applying a threadlocker. Refer to *SELF-LOCKING FASTENERS* and *LOCTITE APPLICATION* at the beginning of this manual for complete procedure.

⚠ WARNING

Torque wrench tightening specifications must strictly be adhered to.
Locking devices (e.g.: locking tabs, elastic stop nuts, self-locking fasteners, cotter pin, etc.) must be installed or replaced with new ones where specified. If the efficiency of a locking device is impaired, it must be renewed.

Fuel Lines

⚠ WARNING

Whenever working on fuel system, always verify for water or dust infiltration in reservoir. Replace any damaged, leaking or deteriorated fuel lines.

When replacing fuel lines, be sure to use hoses as available from Bombardier parts department. This will ensure continued proper and safe operation.

⚠ WARNING

Use of improper fuel lines could compromise fuel system integrity.

PROCEDURES

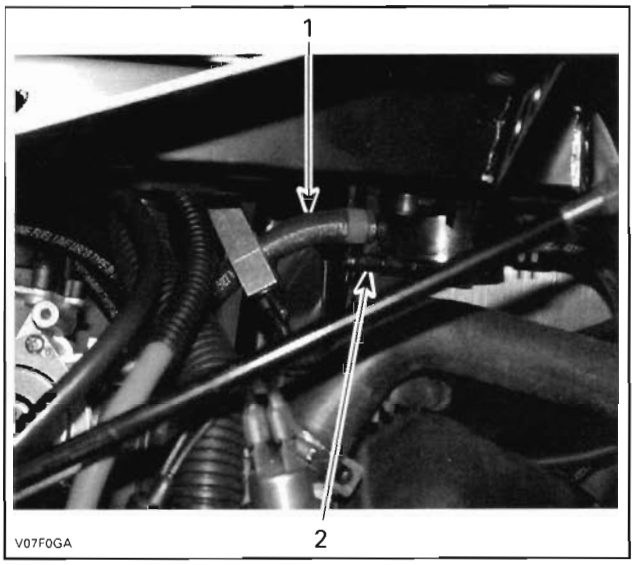
FUEL TANK PRESSURIZATION

Fill up fuel tank **no. 1**.

Remove the RH side panel.

Unplug the impulse line **no. 2** from fuel pump **no. 3**.

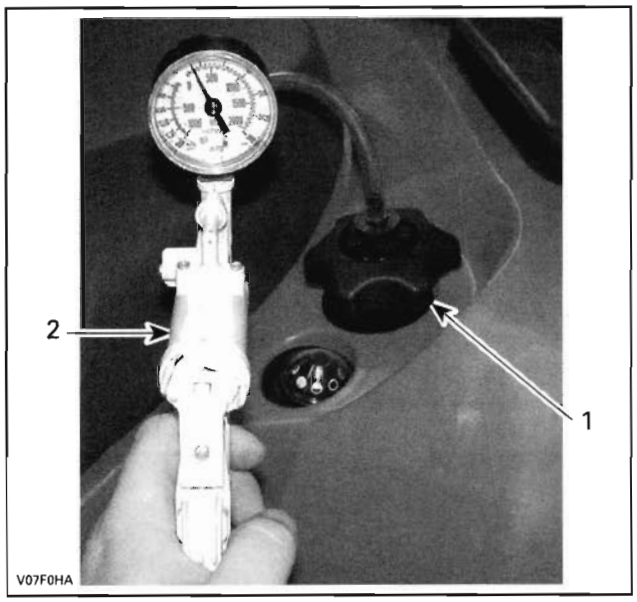
Install a small hose pincher (P/N 295 000 076) on fuel pump outlet hose **no. 4** at carburetor, as shown in the following photo.



1. *Install hose pincher on this hose*
2. *Impulse line location*

Install on fuel tank, the special cap of leak testing kit (P/N 529 033 100).

Using thevacuum/pressure pump (P/N 529 021 800) inject air into fuel tank. See next photo.



1. Special cap on tank
2. Air pump

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

If pressure drops, locate fuel leak(s) and repair and/or replace leaking component(s).

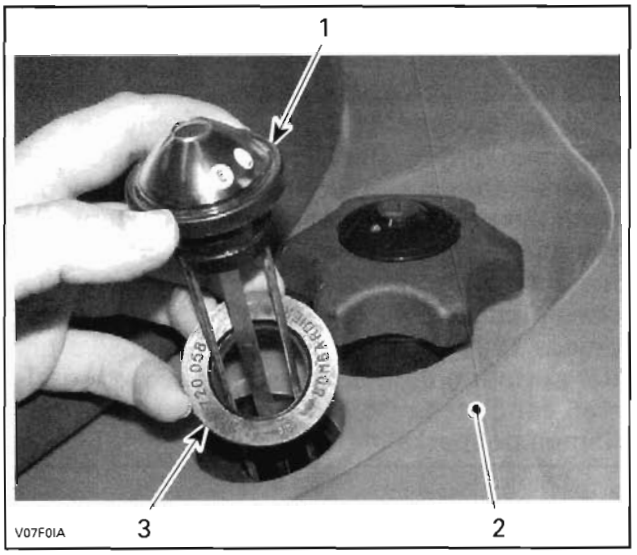
To ease locating leak(s) at fuel tank vent fitting, fuel gauge or fuel cap spray soapy water on components; bubbles will indicate leak location(s).

FUEL GAUGE

NOTE: The fuel gauge **no. 5** shows an approximate amount of the fuel in tank.

Removal

Pull out fuel gauge **no. 5** from fuel tank. At the same time, remove the fuel gauge gasket **no. 6**.



1. Fuel gauge
2. Rear fender
3. Fuel gauge gasket

Inspection

Check if fuel gauge gasket is brittle, hard or cracked. Replace if necessary.

Check if the float moves freely between its supports.

Installation

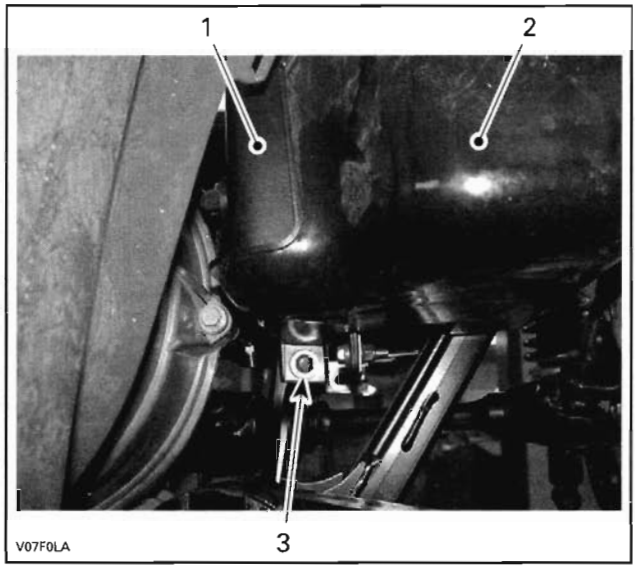
The installation is the reverse of the removal procedure.

FUEL TANK PROTECTORS

Removal

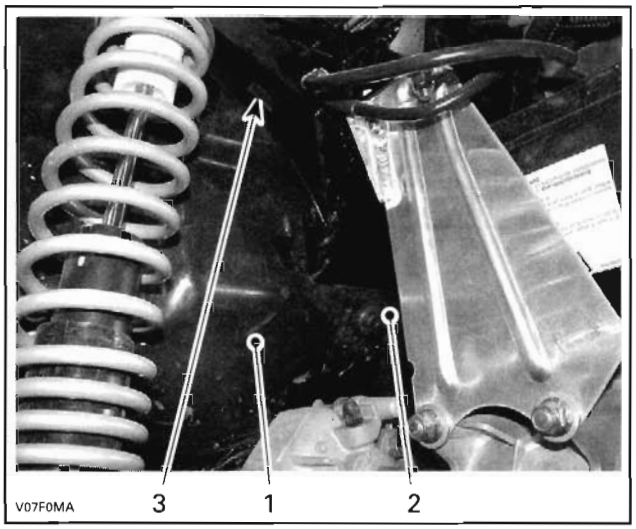
LH Fuel Tank Protector

Remove screw under LH fuel tank protector.



1. *Fuel tank*
2. *Fuel tank protector*
3. *Remove this screw*

Remove screw retaining both protectors then lift up the LH protector to unlatch the upper tab.

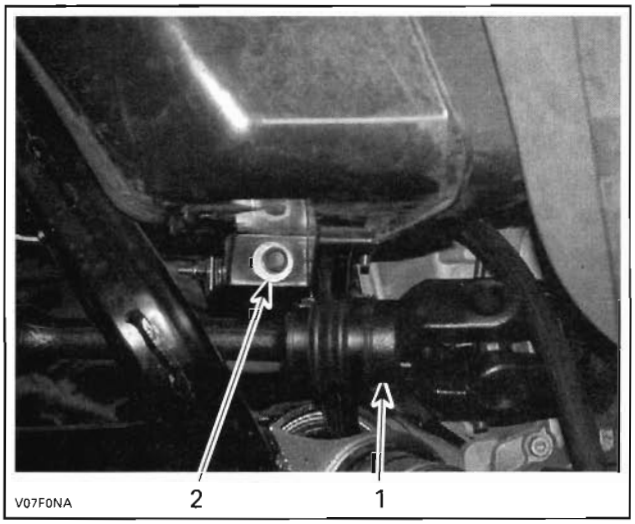


1. *LH protector*
2. *RH protector*
3. *Tab*

Pull the protector out through the left hand side of vehicle.

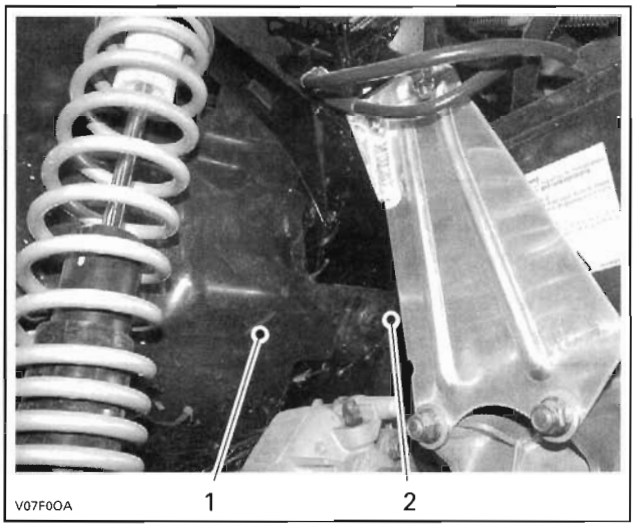
RH Fuel Tank Protector

Remove screw under RH fuel tank protector.



1. *Rear propeller shaft*
2. *Remove this screw*

Remove screw retaining both protectors to the frame.



1. *LH protector*
2. *RH protector*

Pull the protector out through the right hand side of vehicle.

Installation

To install protectors, reverse the removal procedure.

FUEL TANK

Draining

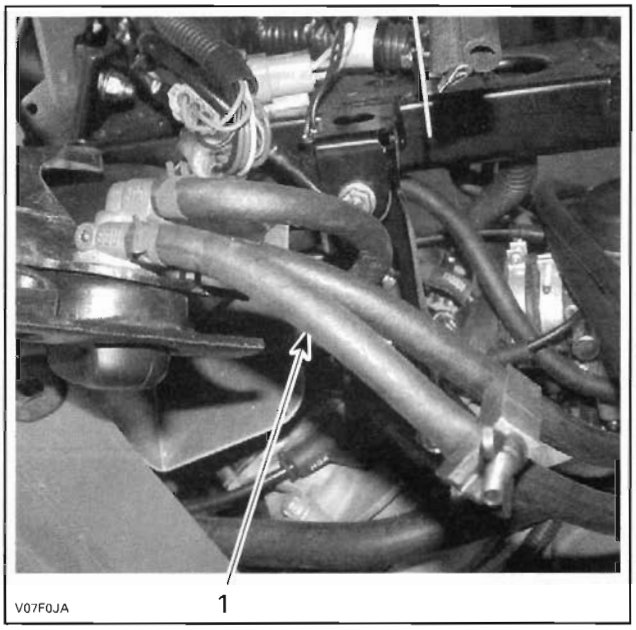
⚠ WARNING

Never perform this operation when the engine and/or the exhaust system is/are hot.

Turn fuel valve **no. 7** OFF.

Remove:
- seat, RH side panel and console (refer to *BODY*)
- air box (refer to *AIR INTAKE SILENCER*).

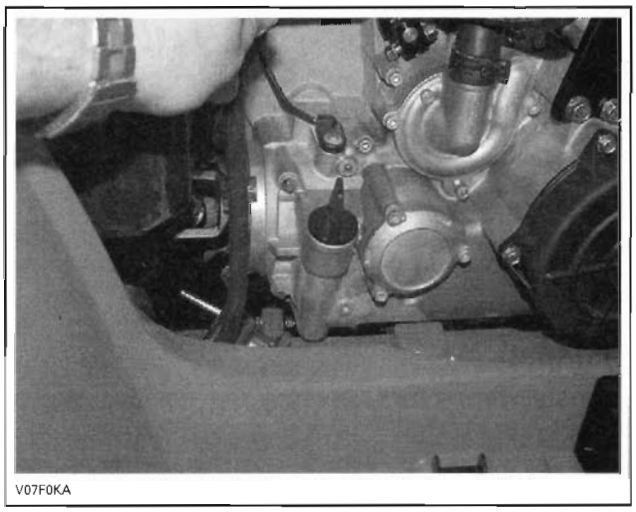
Install a small hose pincher (P/N 295 000 076) on reserve fuel hose **no. 8**.



1. Reserve fuel hose

Disconnect the reserve fuel hose from fuel valve.

Bring the reserve fuel hose on the right side of engine and put it between footrest and frame.



Place an approved fuel container under engine then bring the reserve fuel hose into the container.

Remove the hose pincher to drain the fuel tank.

NOTE: To accelerate fuel tank draining and ensure complete draining, remove cap **no. 9**.

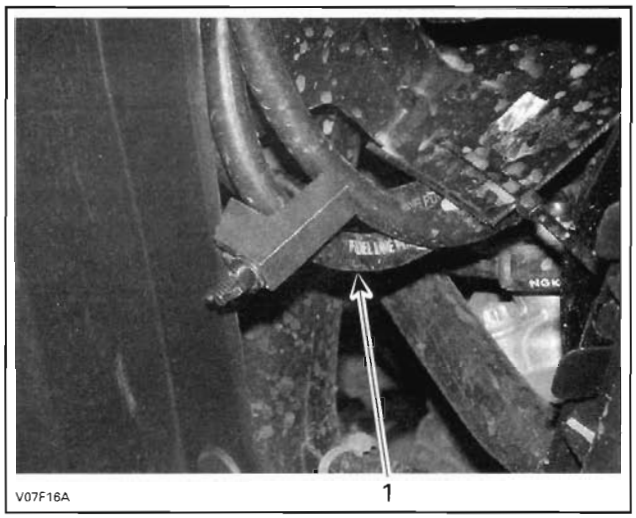
Removal

NOTE: To ease reinstallation, mark all hoses before removing them.

Drain fuel tank **no. 1** (see the procedure above).

Remove:
- rear fender (refer to *BODY*)
- CVT outlet deflector (refer to *CVT*)
- LH fuel tank protector
- screws **no. 10**, **no. 11** and **no. 12**
- LH side panel.

Pinch and unplug the main fuel hose **no. 13** from fuel valve **no. 7**.



1. Fuel hose

Pull out the fuel tank through the LH side of vehicle.

⚠ WARNING

During fuel tank removal, do not pull main and reserve grommets and/or fittings out of fuel tank because a small amount of gas is still contained in the fuel tank.

Inspection

Visual

Inspect fuel tank for any damage or cracks which may result in fuel leaks. If so, replace tank with new one.

Pressure Test

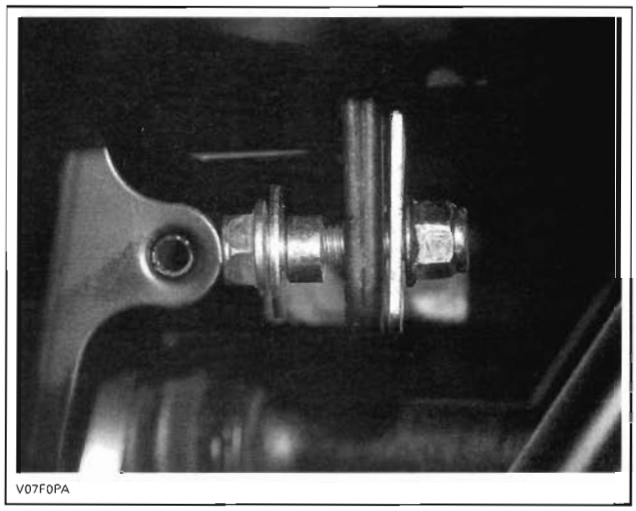
Refer to *FUEL SYSTEM PRESSURIZATION* for complete detailed procedure.

Installation

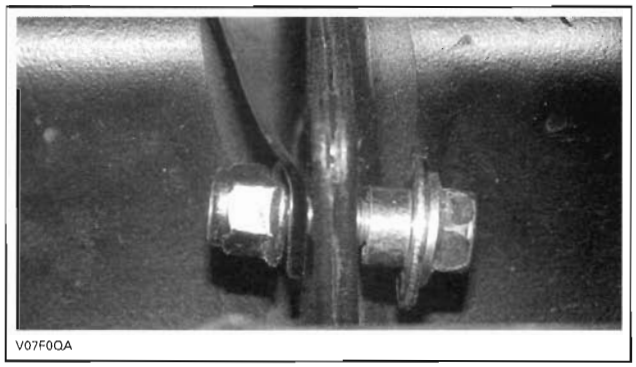
Insert the fuel tank into the frame.

Install screw **no. 11** (behind the engine) with a spacer, a washer and an elastic nut. Do not torque yet.

Install the LH bottom screw **no. 12** with a spacer, a washer and an elastic lock nut. Do not torque yet.


V07F0PA

On right side of vehicle, install the last screw **no. 10** with a washer, a spacer and an elastic nut.


V07F0QA

Torque all fuel tank screws.

Install all removed parts in accordance with the proper instructions described in each sections.

Refuel tank and ensure there are no leaks by performing fuel system pressurization as described in the *FUEL SYSTEM PRESURIZATION* section.

FUEL TANK STRAINER

NOTE: The fuel tank has two fuel hose strainers. Use the following procedure for both fuel lines.

Removal

Drain and remove fuel tank; see above for the proper procedures.

Manually pull grommet **no. 14** out of fuel tank.

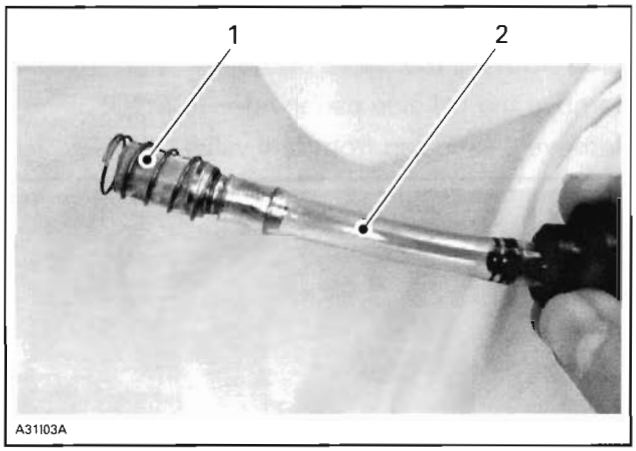
NOTE: In the case that grommet is too tight, use a flat screwdriver and carefully pull out grommet, as shown in the next photo.


V01N02A

TYPICAL — USE SCREWDRIVER ONLY IF GROMMET IS TOO TIGHT

Inspection

Ensure that fuel tank strainer **no. 15** and fuel line are clean and not damaged, as per following photo.



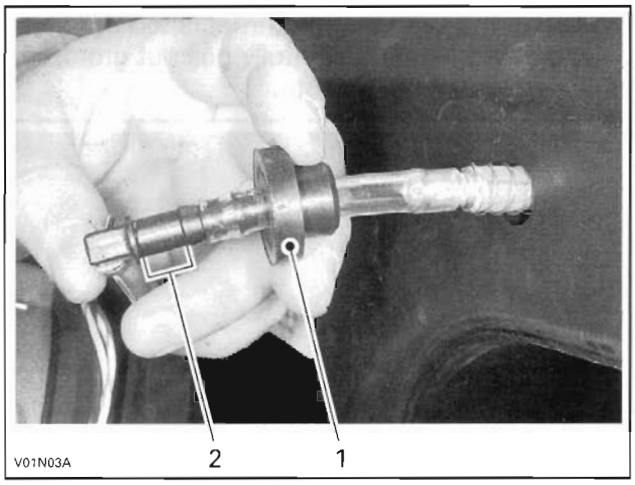
A31I03A

TYPICAL
1. *Fuel tank strainer*
2. *Fuel line*

Installation

NOTE: To ease grommet insertion, apply BOMBARDIER LUBE (P/N 293 600 016).

Position grommet on fuel line as shown in the next photo then insert grommet in tank hole.



TYPICAL
1. *Grommet properly positioned for tank insertion*
2. *Fitting recess*

Once grommet is inserted in tank hole, push fitting until its recess properly sits in grommet.

Refuel tank and ensure there are no leaks.

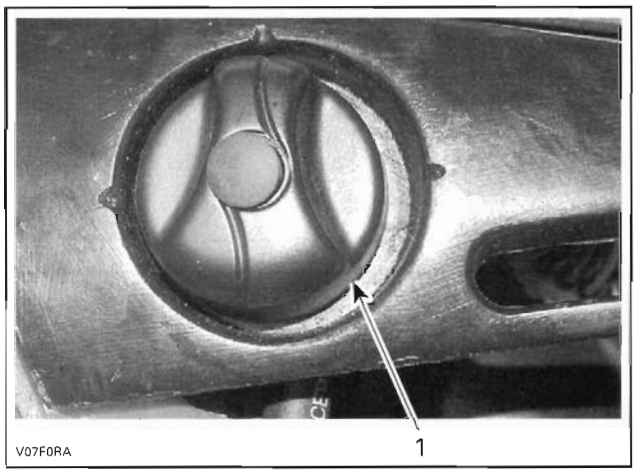
FUEL VALVE

Removal

NOTE: To ease reinstallation, mark all hoses before removing fuel valve no. 7.

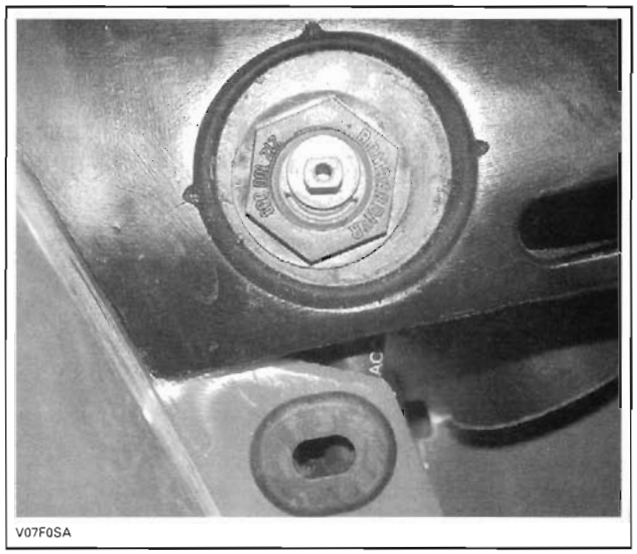
Remove the LH side panel; refer to *BODY*.

Remove plastic cap from fuel valve.



1. *Plastic cap*

Unscrew valve nut no. 16.



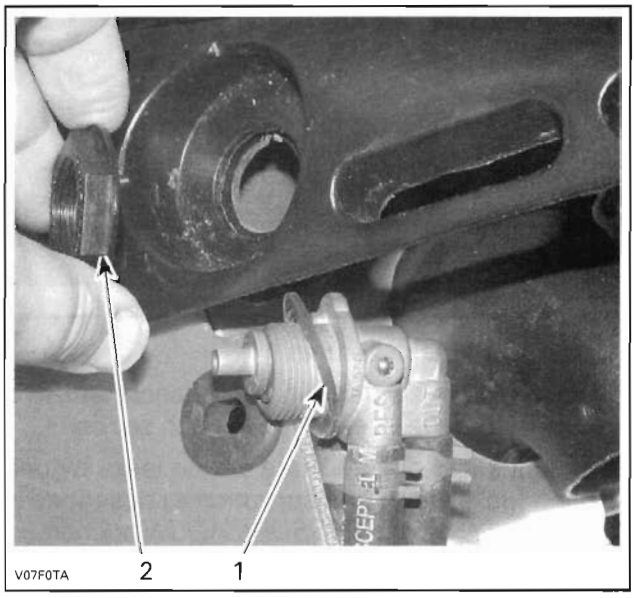
UNSCREW VALVE NUT

Unplug all hoses from fuel valve.

Remove fuel valve.

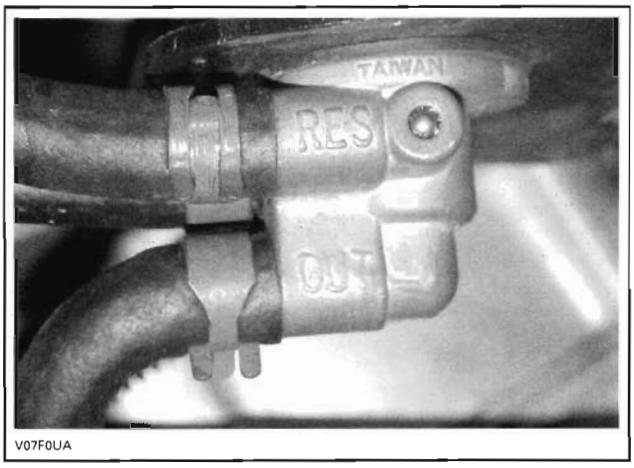
Installation

Reinstall fuel valve by positioning rubber washer no. 17 inside and nut outside vehicle. See next photo.



1. *Rubber washer*
2. *Fuel valve nut*

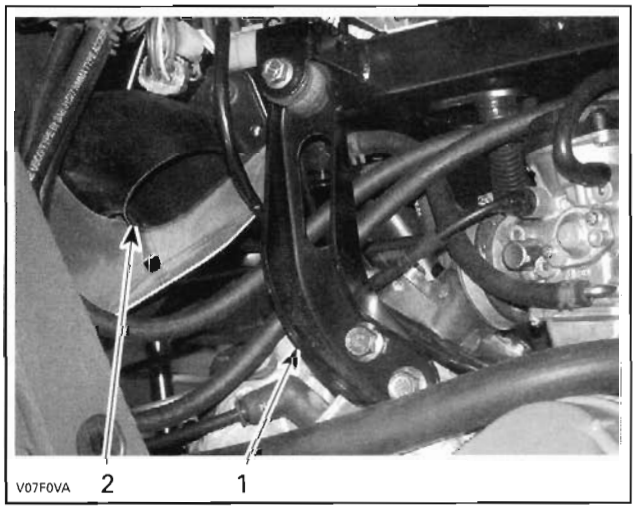
Plug all hoses at the proper position; check on fuel valve for location.



FUEL PUMP

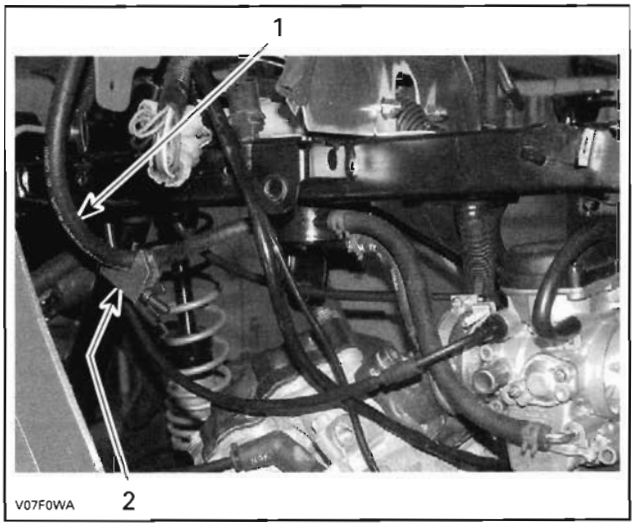
Removal

Remove CVT inlet hose.



1. Upper engine support
2. CVT inlet hose

Install a small hose pincher (P/N 295 000 076) on main fuel line **no. 13**.



1. Main fuel line from fuel valve
2. Hose pincher

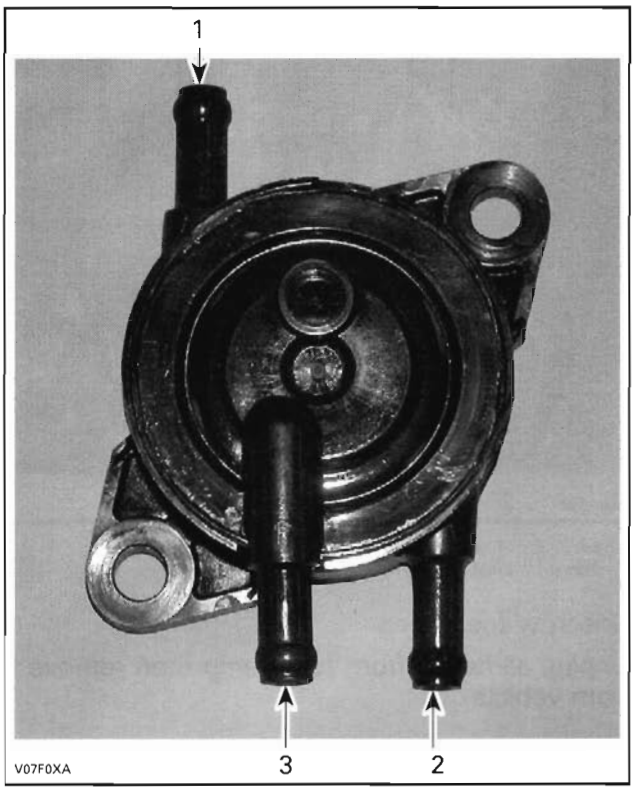
Unscrew fuel pump.

Unplug all hoses from fuel pump then remove it from vehicle.

Inspection

Check fuel pump operation as follows:

- Connect a clean plastic tubing to the fuel inlet nipple. Using the vacuum/pressure pump (P/N 529 021 800), apply pressure and vacuum. The inlet valve should release with pressure and hold under vacuum.
- Repeat the same procedure at the fuel outlet nipple. This time the outlet valve should hold with pressure and release under vacuum.
- Connect a clean plastic tubing to the impulse nipple. Repeat the previous procedure at the impulse nipple. This time the outlet valve should hold pressure and vacuum.

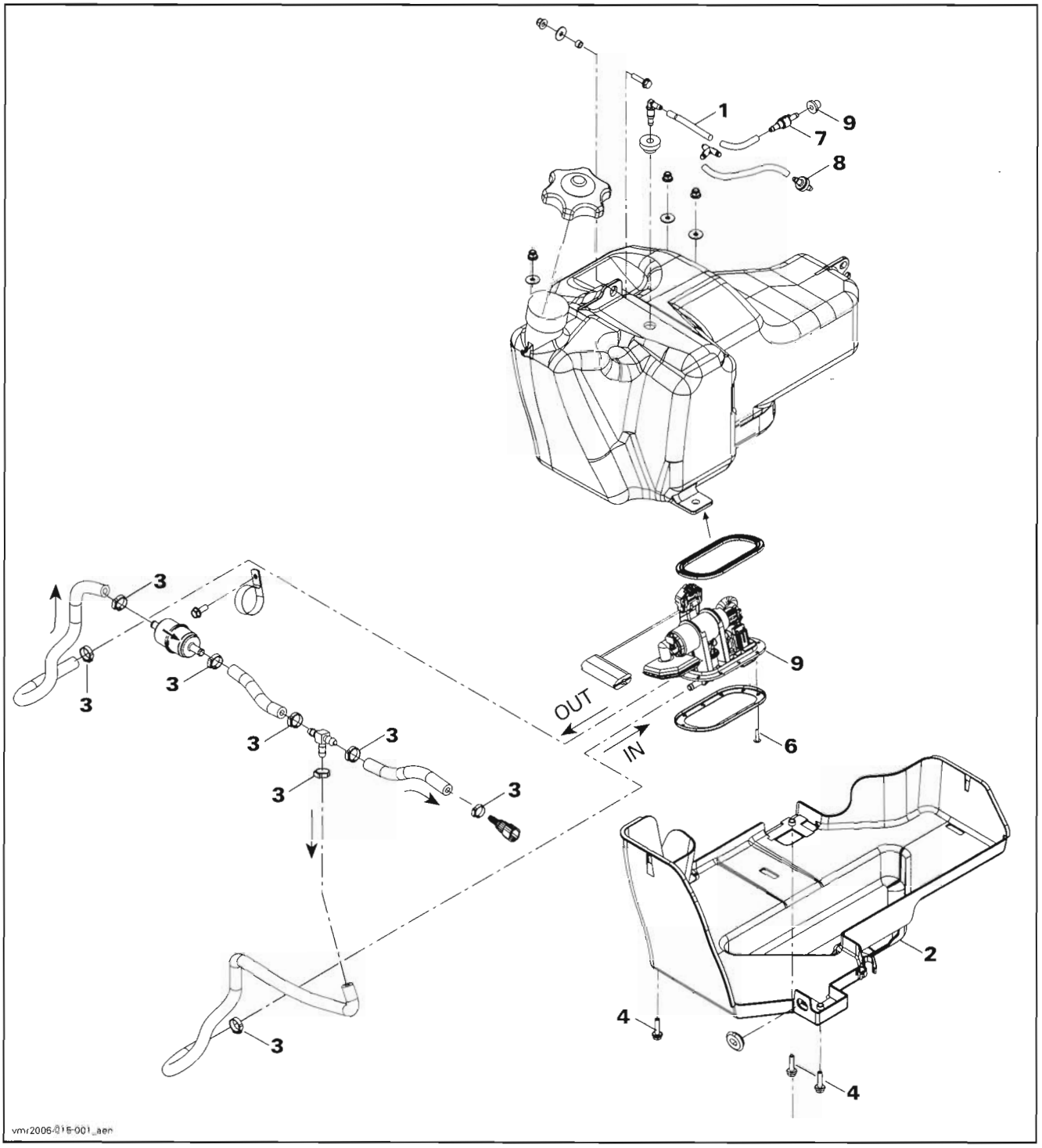


1. Fuel inlet nipple
2. Fuel outlet nipple
3. Impulse line location

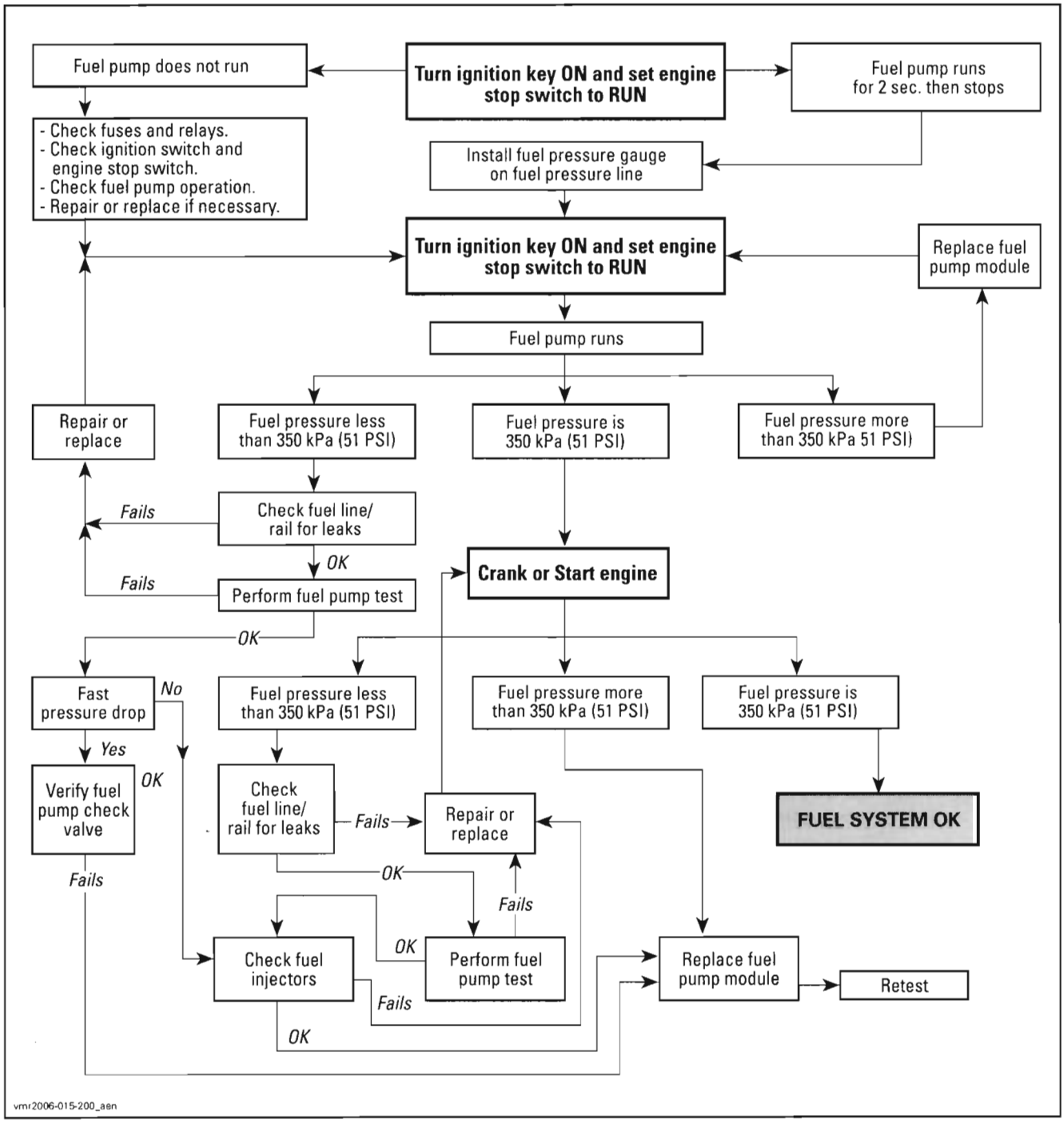
Installation

The installation is the reverse of removal procedure.

OUTLANDER 800 SERIES



FUEL DELIVERY SYSTEM DIAGNOSTIC FLOW CHART



GENERAL

⚠ WARNING

Always disconnect battery exactly in the specified order, BLACK (-) cable first. It is recommended to disconnect electrical connections prior to disconnecting fuel lines.
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. Never use a hose pincher on injection system high pressure hoses.

During assembly/installation, use the torque values and service products as in the exploded views.

Clean threads before applying a threadlocker. Refer to *SELF-LOCKING FASTENERS* and *LOCTITE APPLICATION* at the beginning of this manual for complete procedure.

⚠ WARNING

Torque wrench tightening specifications must strictly be adhered to.
Locking devices (e.g.: locking tabs, elastic stop nuts, self-locking fasteners, cotter pin, etc.) must be installed or replaced with new ones where specified. If the efficiency of a locking device is impaired, it must be renewed.

⚠ WARNING

The fuel system of a fuel injection system holds much more pressure than on a carbureted ATV. Prior to disconnecting a hose or to removing a component from the fuel system, follow the recommendation described here.

- Use the VCK (Vehicle Communication Kit) to release the fuel pressure in the system. Look in the **Activation** section of the B.U.D.S. software.

⚠ WARNING

Fuel lines remain under pressure at all times. Always proceed with care and use appropriate safety equipment when working on pressurized fuel system. Wear safety glasses and work in a well ventilated area. Do not allow fuel to spill on hot engine parts and/or on electrical connectors. Proceed with care when removing/installing pressure test equipment or disconnecting fuel line connections. Use the VCK (Vehicle Communication Kit) to release fuel pressure prior to removing a hose. Cover the fuel line connection with an absorbent shop rag. Slowly disconnect the fuel hose to minimize spilling. Wipe off any fuel spillage in the engine compartment. Fuel is flammable and explosive under certain conditions. Always work in a well ventilated area. Always disconnect battery prior to working on the fuel system. After performing a pressure test, use the valve on the fuel pressure gauge to release the pressure (if so equipped).

- Always disconnect battery properly prior to working on the fuel system. Refer to *BATTERY* section.

When the job is done, ensure that hoses from fuel rail going to fuel pump are properly secured in their supports. Then, pressurize the fuel system. Perform the pressure test and pressurize the fuel tank and fuel lines as explained in this section.

Properly reconnect the battery.

⚠ WARNING

Ensure to verify fuel line connections for damage and that NO fuel line is disconnected prior to installing the ignition key. Always perform the pressure test if any component has been removed. A pressure test must be done before turning the ignition key ON and setting the engine stop switch to RUN. The fuel pump is started each time the ignition key is turned ON and engine stop switch is set to RUN and it builds pressure very quickly.

To check fuel rails for leaks, first pressurize the system then spray soapy water on all hose connections and injectors. Air bubbles will show the leaking area. Check also for leaking fuel or fuel odor.

Fuel Lines

⚠ WARNING

Whenever working on fuel system, always verify for water or dust infiltration in reservoir. Replace any damaged, leaking or deteriorated fuel lines.

When replacing fuel lines, be sure to use hoses and clamps as available from Bombardier parts department. This will ensure continued proper and safe operation.

⚠ WARNING

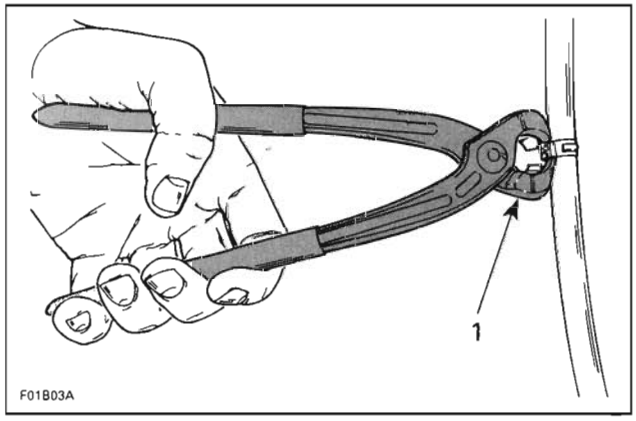
Use of improper fuel lines could compromise fuel system integrity.

⚠ WARNING

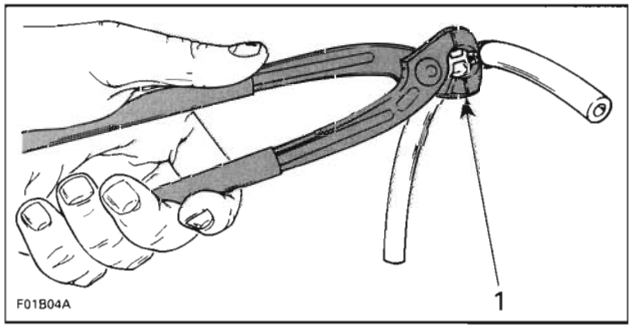
Whenever removing a hose in the fuel system, always use new Oetiker clamps at assembly. Then, validate fuel tightness by performing a pump pressure test as described below.

Oetiker Clamps

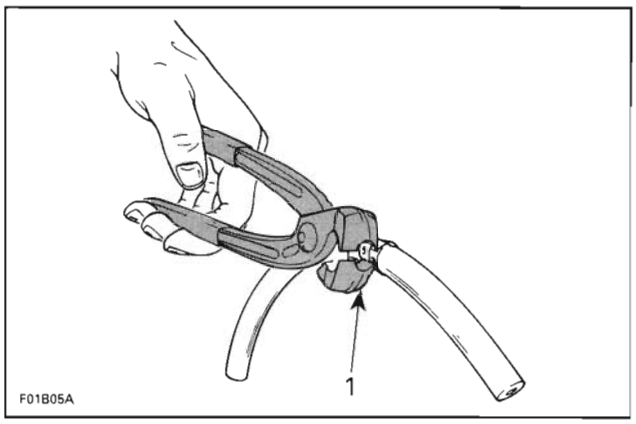
To secure or cut Oetiker clamps **no. 3** on fuel lines, use pliers (P/N 295 000 070).



1. Cutting clamp



1. Securing clamp



1. Securing clamp in limited access

PROCEDURES

FUEL TANK PRESSURIZATION

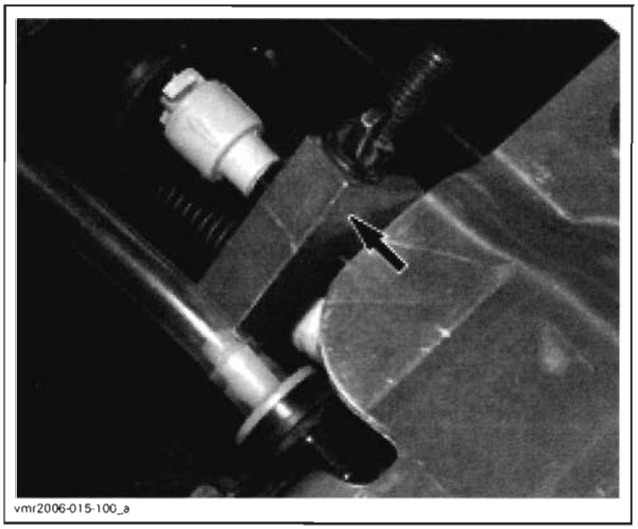
⚠ WARNING

Ensure to also perform the fuel pump pressure test. See elsewhere in this section.

Fill up fuel tank.

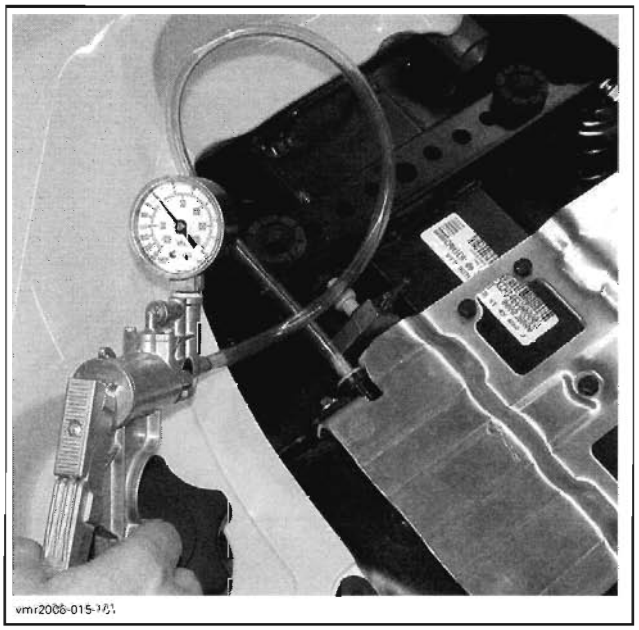
Remove the RH side panel. Refer to *BODY*.

Install a small hose pincher (P/N 295 000 076) on vent line (OUTLET side) **no. 1**.



PINCHER ON OUTLET SIDE

Using the vacuum/pressure pump (P/N 529 021 800), pressurize fuel tank through vent line (INLET side).



PUMP ON INLET SIDE

Pressurize fuel tank as follows.

PRESSURE	TIME WITHOUT PRESSURE DROP
21 kPa (3 PSI)	3 minutes

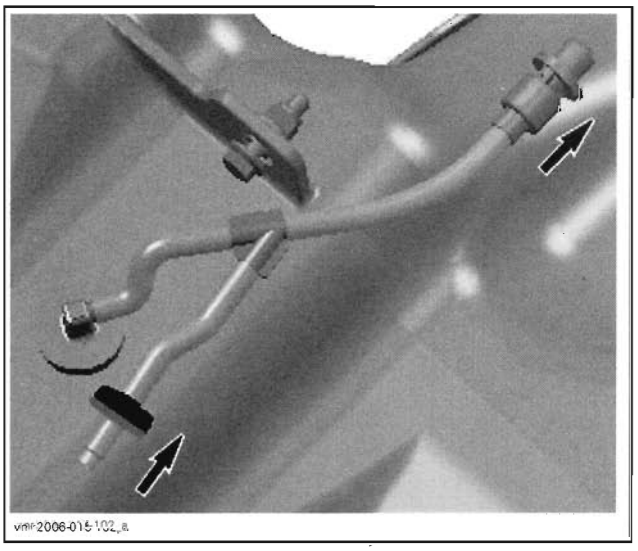
If pressure drops, locate fuel leak(s) and repair/replace leaking component(s).

To ease locating leak(s), spray soapy water on components; bubbles will indicate leak location(s).

Check Valve and Pressure Relief Valve

Air can enter fuel tank at all times through INLET side. The **check valve** prevents fuel to flow out. Air cannot goes out (unless pressure increases). Always reinstall valve with the black side as shown.

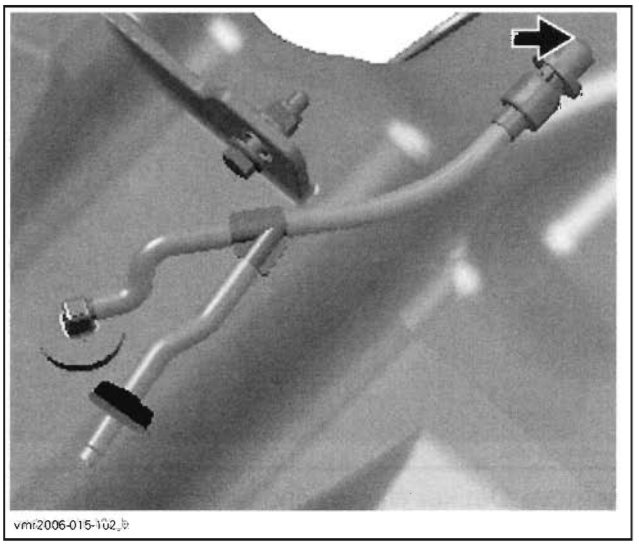
If pressure in fuel tank builds up and exceeds 2.5 - 7.6 kPa (.36 - 1.1 PSI), **pressure relief valve** opens and let excess pressure evacuate through OUTLET side. Always reinstall valve according to arrow on valve as shown.



Test

While tank is still pressurized in the above test, do the following:

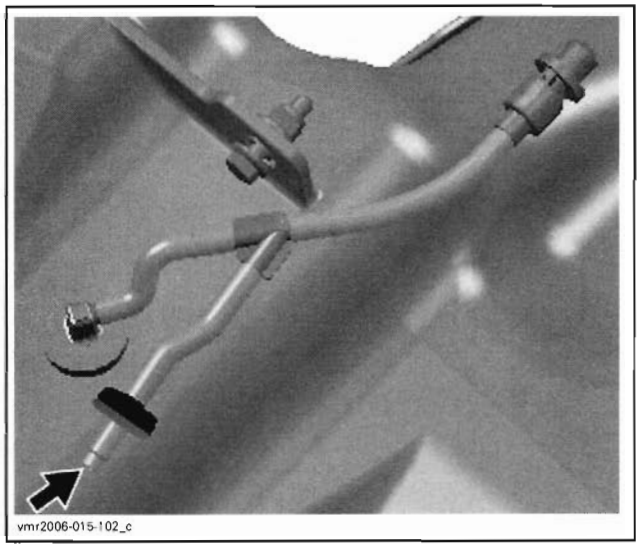
When removing hose pincher, alternately touch and release end of pressure relief valve **no. 7**. You should feel pressurized air flowing out indicating relief valve is working.



Ensure grommet **no. 9** is not plugged.

Remove fuel tank cap.

With your mouth, blow air from outlet nipple. Air must freely flows towards fuel tank neck.



IN-LINE FUEL FILTER

Replace fuel filter as per maintenance chart schedule. Refer to *MAINTENANCE*.

Removal

Detach filter from body.



Remove Oetiker clamps and pull hoses off.

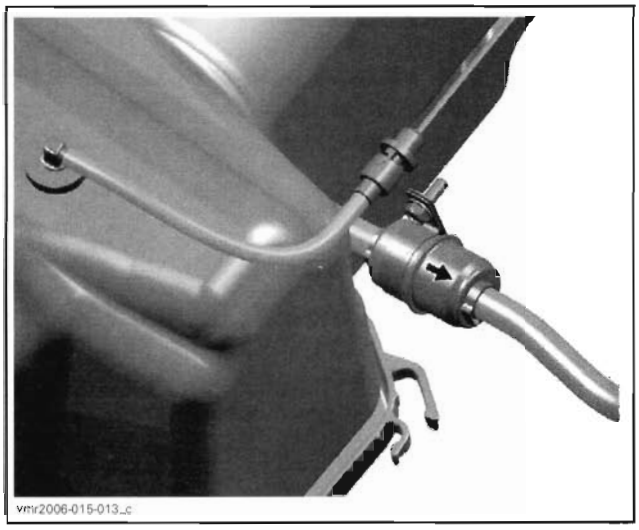
Inspection

If fuel filter is suspected to be clogged, it may be checked as follows.

Using low compressed air, check if fuel filter is clogged. Air should flow easily through filter. In doubt, install a new filter.

Installation

Use arrow on filter to position it according to fuel flow.



TYPICAL

FUEL TANK

Draining

⚠ WARNING

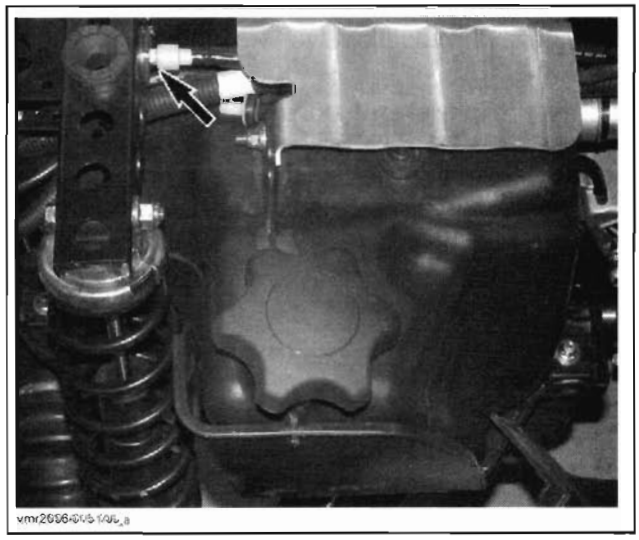
Never perform this operation when the engine and/or the exhaust system is/are hot. Never use a hose pincher on injection system high pressure hoses.

Remove fuel tank cap and siphon gas in an approved fuel container.

Removal

Remove side panels (refer to *BODY*).

Disconnect vent line (OUTLET side) **no. 7** from body.



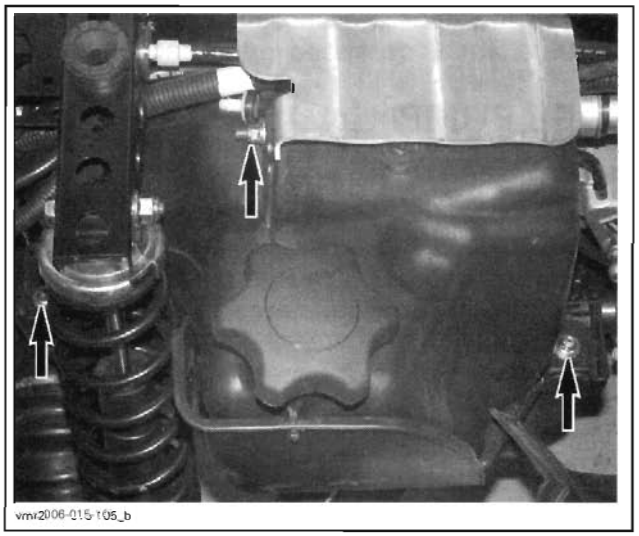
FENDER REMOVED FOR CLARITY

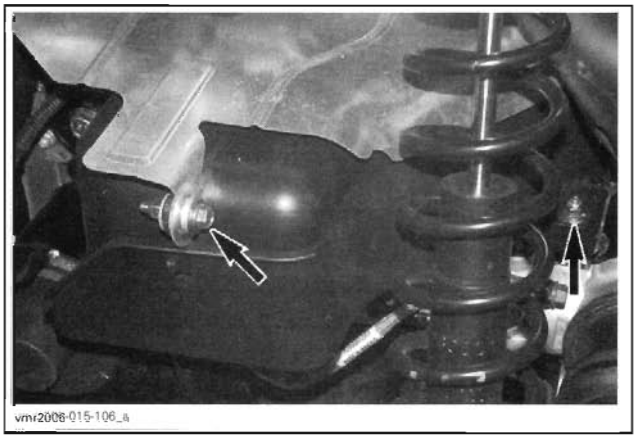
Disconnect fuel line **no. 5** at quick connect. See *FUEL PUMP MODULE* below.

Detach in-line fuel filter from body.

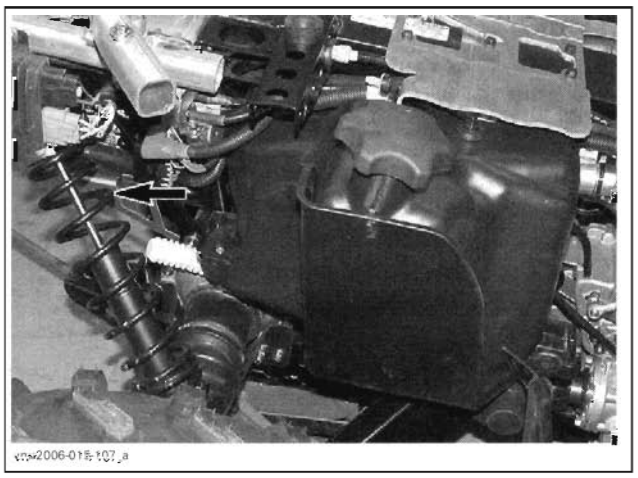


Remove retaining screws **no. 4**.





Lift frame just enough to extend RH rear shock absorber. Remove upper screw and move shock absorber away.



FENDER REMOVED FOR CLARITY

Bend fender then pull out the fuel tank through the RH side of vehicle. Pull enough to reach fuel pump connector and unplug it.

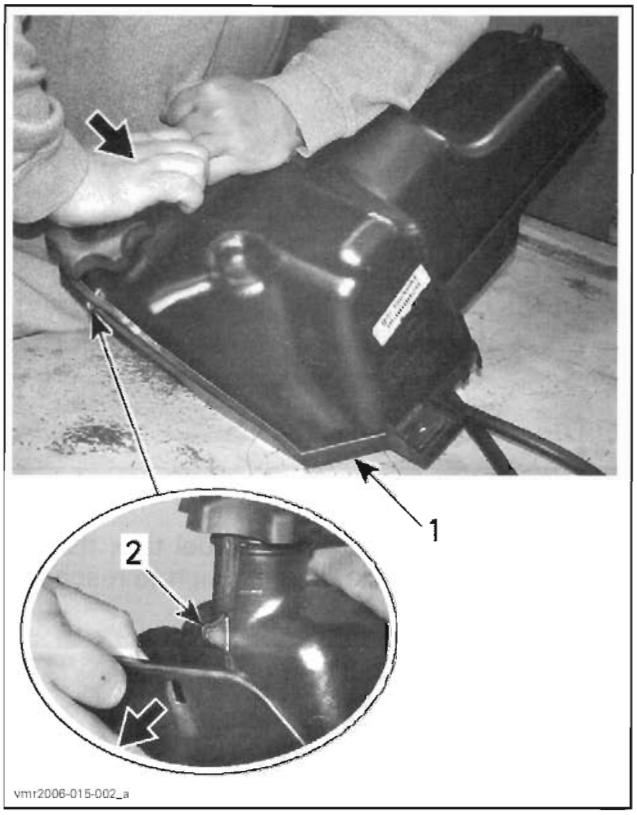


Fuel Tank Protector

To release protector **no. 2** from tank:

NOTE: This procedure should be done with parts at room temperature.

- work on a stable table
- lay down front of fuel tank on table
- firmly push on top of fuel tank and hold
- pull out protector from tank tab



1. *Tank protector*
2. *Tank tab*

– completely remove protector.

Inspection

Visual

Inspect fuel tank for any damage or cracks which may result in fuel leaks. If so, replace tank with a new one. Inspect tank and protector attachment points for damage. Inspect protector for damage.

Pressure Test

Refer to *FUEL TANK PRESSURIZATION* for complete detailed procedure.

Installation

NOTE: Removing top plate from frame to ease routing hoses and wiring.

Secure tank into protector. Reverse removal procedure.

Reconnect fuel pump connector.

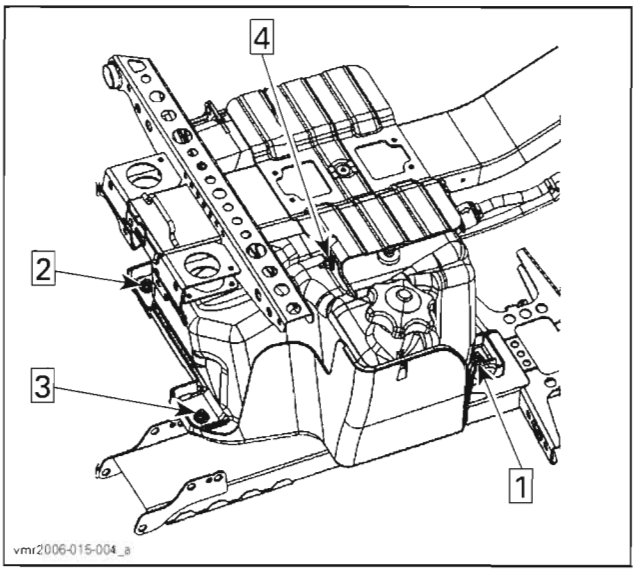
Insert the fuel tank into the frame.

Reconnect hoses.

Tighten retaining screws as per following sequence.

⚠ WARNING

Ensure wiring is on the top of fuel tank.



Install gearbox vent tube in its hook on fuel tank protector.

Refuel tank and ensure there are no leaks by performing fuel tank pressurization and fuel pump pressure test as described in this section.

FUEL PUMP

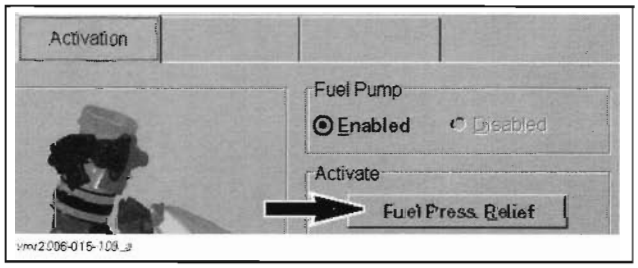
Fuel Pressure Test

⚠ WARNING

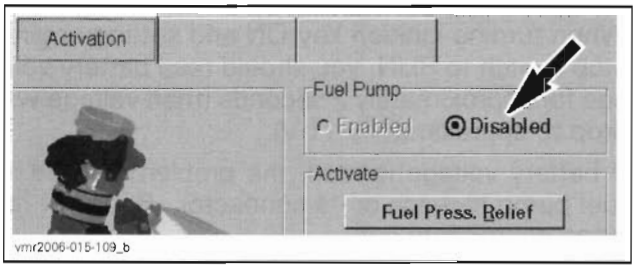
Ensure to also perform the fuel tank pressurization test. See elsewhere in this section.

Before proceeding to the pressure test ensure the battery is fully charged. Battery voltage must be over 12 volts.

Disable the fuel pump using B.U.D.S. Look in the **Activation** tab and click **Fuel Press. Relief** button.



Then, ensure **Disabled** is in function. This validates fuel pump is deactivated.



⚠ WARNING

This does not release fuel pressure. It prevents fuel pump to run until reactivated.

⚠ WARNING

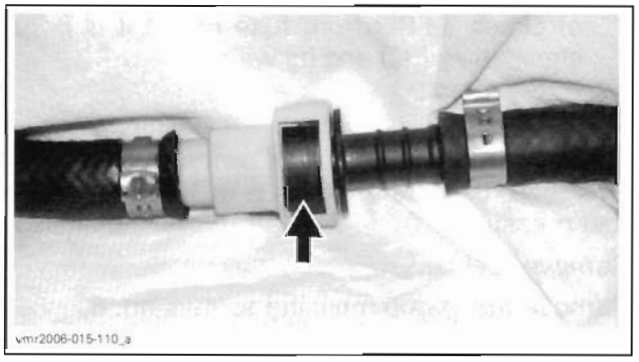
The fuel hose is under pressure. Cover the fuel line connection with an absorbent shop rag. Slowly disconnect the fuel hose to release the pressure. Wipe off any fuel spillage inside engine compartment.

The pressure test will show the available pressure at the fuel pump outlet. It validates the pressure regulator, the fuel pump and leaks in the system.

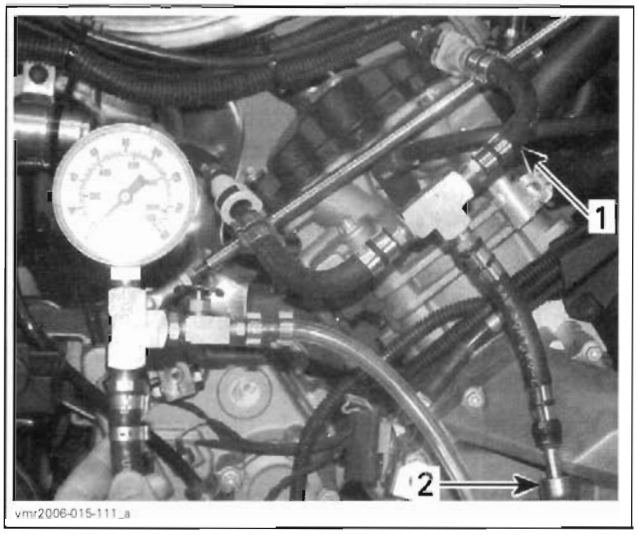
Ensure there is no leak from hoses and fittings. Repair any leak.

Ensure there is enough gas in fuel tank.

Disconnect outlet hose.



Install fuel pressure gauge (P/N 529 035 591) and T-fitting (P/N 529 036 023) between disconnected hoses (in-line installation).



1. T-fitting — In-line installation
2. Fuel pressure gauge connection

Turn ignition key ON and set engine stop switch to RUN and observe fuel pressure. Turn ignition key off then back on. Repeat the test.

FUEL PRESSURE	350 kPa (51 PSI)

Start engine and observe fuel pressure. The fuel pressure should be the same as above.

If pressure is within limits, fuel pump and pressure regulator are working adequately.

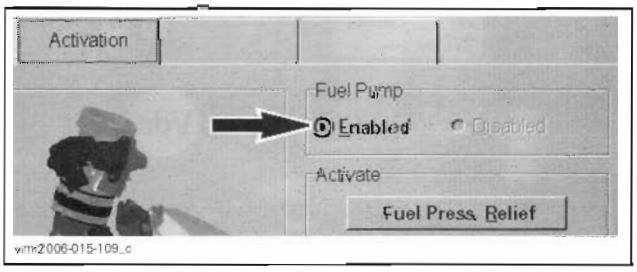
A rapid pressure drop indicates leakage either from the fuel rail or from the fuel pump check valve. Check fuel rail for leaks. If it is not leaking then replace fuel pump.

A slow pressure drop indicates leakage either from the fuel injector or from the fuel pressure regulator. Check fuel injector for leaks (see below). If it is not leaking then replace fuel pump module.

Release fuel pressure in the system using B.U.D.S. Look in the **Activation** tab.

Remove pressure gauge from inlet hose. Reconnect inlet hose.

Using B.U.D.S., reactivate fuel pump by pressing **Fuel Press. Relief** button.



⚠ WARNING

Wipe off any fuel spillage. Fuel is flammable and explosive under certain conditions. Always work in a well ventilated area.

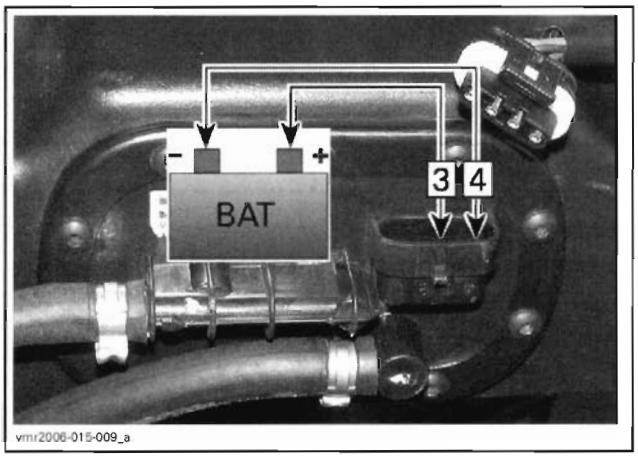
Reinstall removed parts.

Electrical Test

When turning ignition key ON and setting engine stop switch to RUN, the fuel pump should run for 2 seconds to build up the pressure in the system.

If the pump does not work, disconnect the connector from the fuel pump.

Install a temporary connector to the fuel pump connector. Apply 12 V to this test harness as shown.

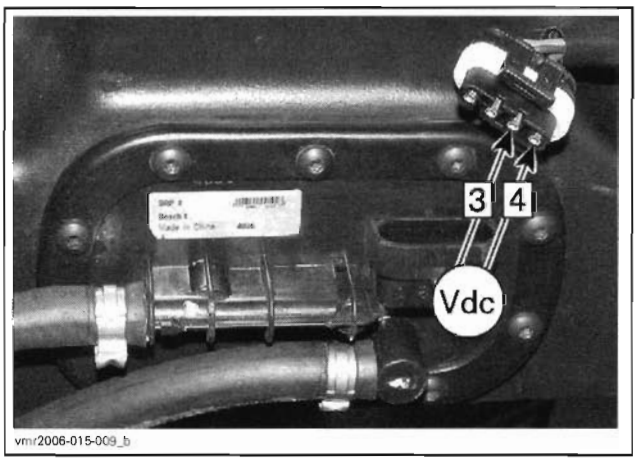


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CAUTION: Running pump a few minutes with reverse polarity can damage the pump.

If pump does not run, replace the fuel pump module.

Otherwise, check fuse F5 and if good, probe terminals of fuel pump connector on vehicle harness side as shown.

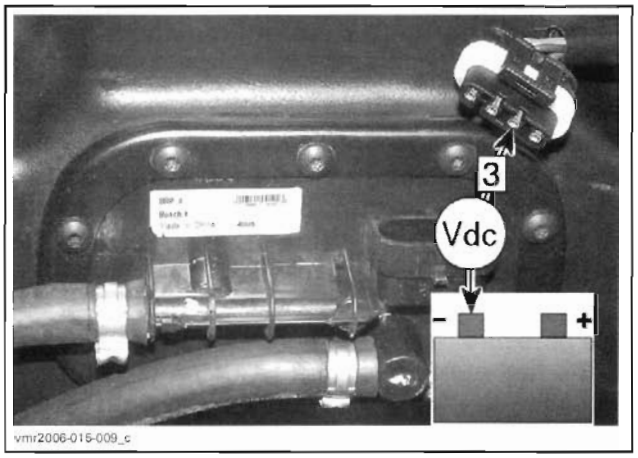


vmr2006-015-009_b

When turning ignition key ON and setting engine stop switch to RUN, you should read battery voltage for approximately 2 seconds (then voltage will drop to approximately 11 V).

If battery voltage is read, the problem can be in fuel pump harness or its connector. Repair or replace appropriate part.

If battery voltage is not read, probe terminals as shown.



vmr2006-015-009_c

a. If battery voltage is read, check continuity of circuit going towards ECM. If it is good, try a new ECM.
b. If battery voltage is not read, check continuity of circuit 5-FP-3 from fuse F5. If it is good, check relay (R2) and its wirings.

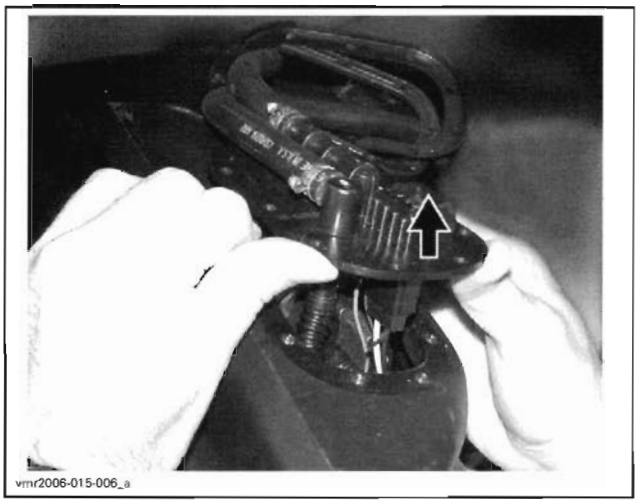
Removal

Connect VCK (Vehicle Communication Kit) (P/N 529 035 981). Use B.U.D.S. to release fuel pressure.

Remove fuel tank.

Remove fuel pump retaining screws **no. 6**.

Gently push pump up as shown.



GASKET AND FLANGE NOT SHOWN FOR CLARITY PURPOSES ONLY

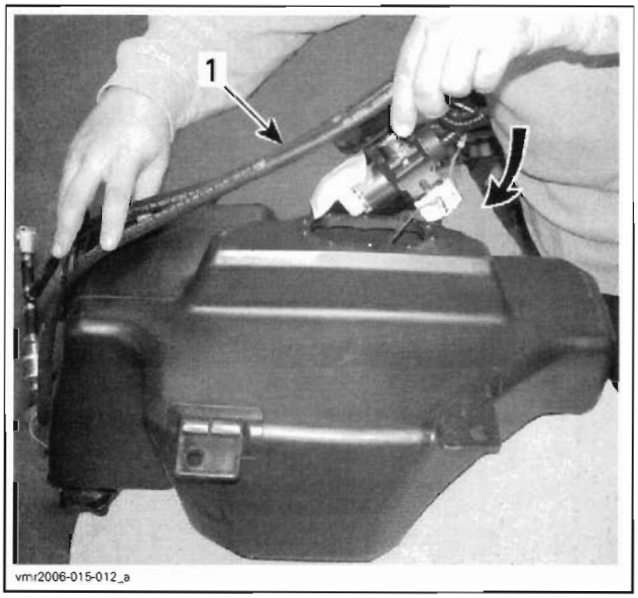
CAUTION: While pulling out the fuel pump, pay attention to fuel sensor float arm. Float arm can get stuck and bend which can reduce the fuel sensor capabilities.

Installation

For installation, reverse the removal process but pay attention to the following.

Install a new gasket.

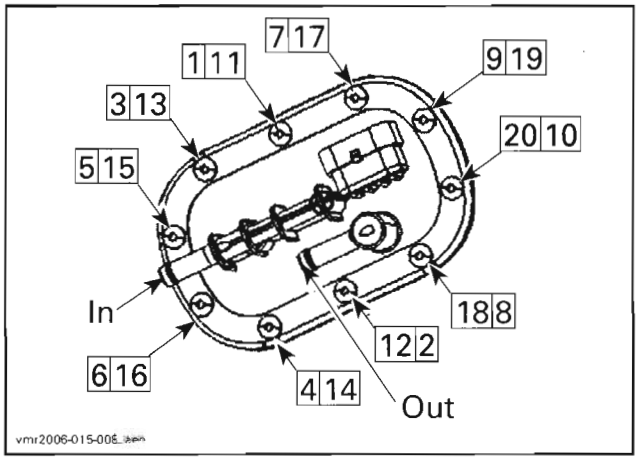
Pay attention to pump orientation as shown.



GASKET AND FLANGE NOT SHOWN FOR CLARITY PURPOSES ONLY
1. Fuel line on this side

Tighten retaining screws as per illustrated sequence. For the first sequence from 1 to 10, turn screws only to make a contact between parts, do not tighten yet. Properly torque for sequence from 11 to 19.

Install hoses properly on IN and OUT nipples.



FUEL LEVEL SENDER

Refer to *ACCESSORIES AND INSTRUMENTS*.

CARBURETOR

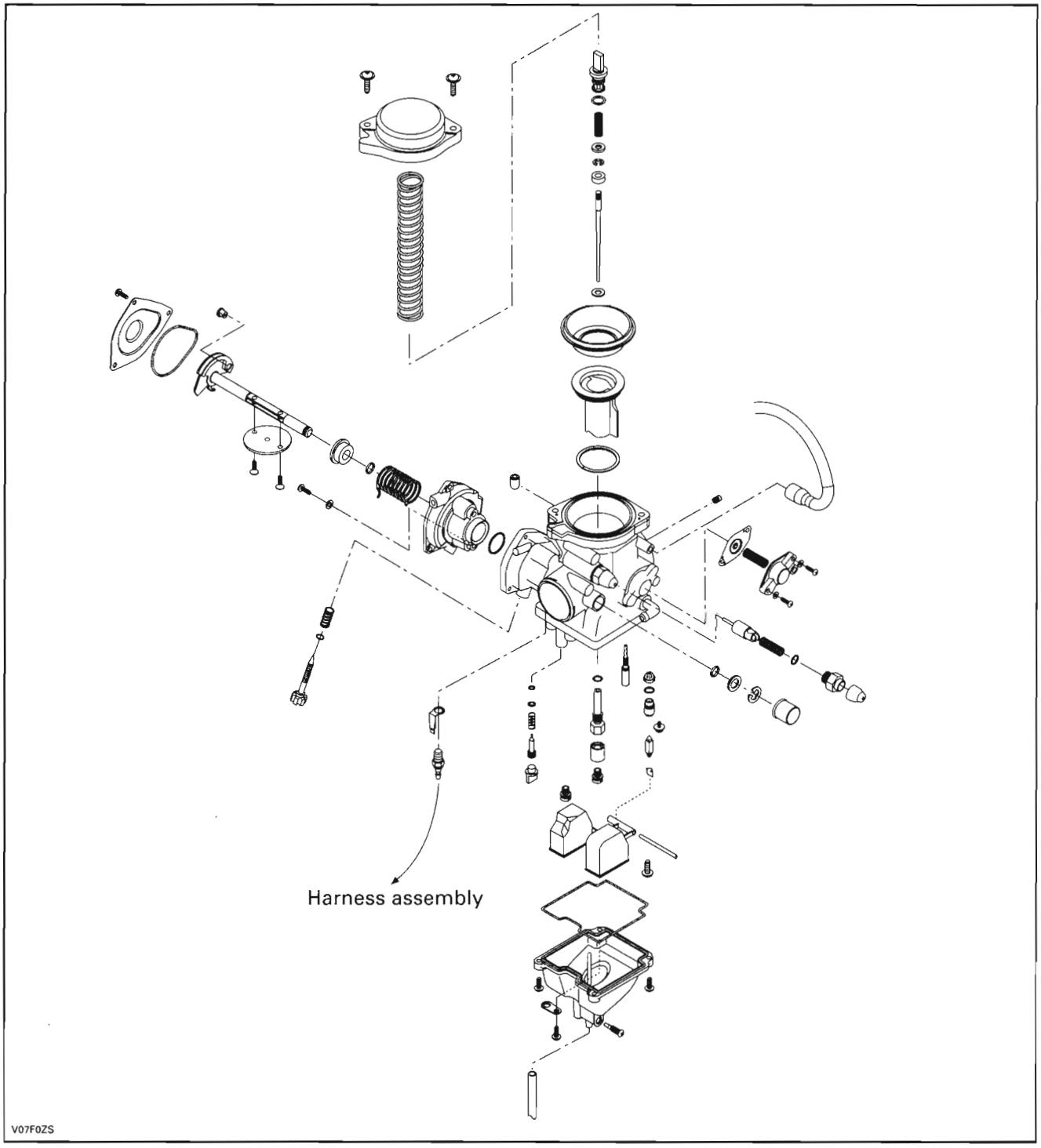
SERVICE TOOLS

Description	Part Number	Page
digital induction tachometer	529 014 500	189
float level gauge	529 035 520	187
small hose pincher	295 000 076	187

SERVICE PRODUCTS

Description	Part Number	Page
cable lubricant	293 600 041	191

OUTLANDER 400 SERIES



GENERAL

Before performing any job on the fuel system, always turn fuel valve to OFF position and disconnect BLACK (-) cable from battery.

⚠ WARNING

Always disconnect battery exactly in the specified order, BLACK (-) cable first. It is recommended to disconnect electrical connections prior to disconnecting fuel lines.

PROCEDURES

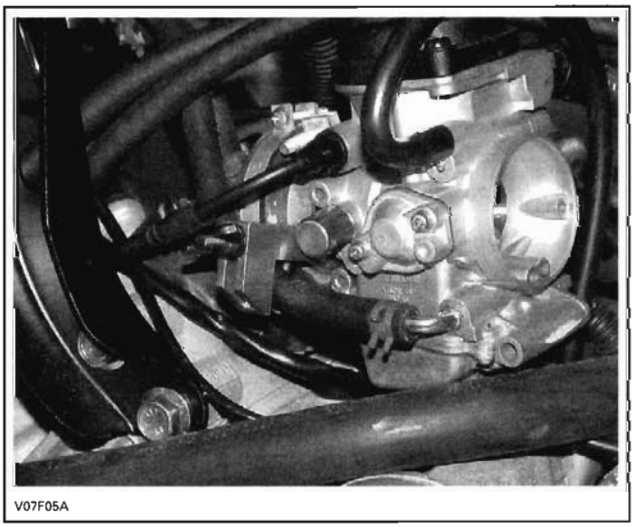
CARBURETOR

CAUTION: Although some jets can be replaced by other jets from other carburetors, such modifications should not be performed. They can greatly affect engine calibration and can cause severe damage to engine. Use only recommended jetting specific for this carburetor.

Removal

Remove air filter box (refer to *AIR INTAKE SILENCER*).

Install a small hose pincher (P/N 295 000 076) on fuel pump outlet hose at carburetor.



V07F05A

Drain carburetor by unscrewing the drain screw underneath.

Unplug all hoses from carburetor.

NOTE: To ease reinstallation, mark all hoses before unplugging.

Unscrew choke cable then remove the choke plunger from the throttle body.

NOTE: Take care not to drop the choke plunger. If so, check plunger for damages and replace if necessary.

On the RH side of vehicle, remove the throttle cable from carburetor. See *THROTTLE CABLE* further in this section.

Unscrew clamp retaining carburetor to the intake adaptor.

Pull out 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, benzene, etc., should not be used as they are flammable and explosive.

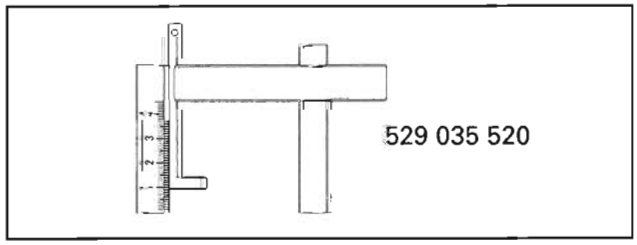
Carburetor Float Level Adjustment

Correct fuel level in float chamber is vital toward maximum engine efficiency. To check for correct float level proceed as follows:

- Remove float bowl and gasket from carburetor.
- Make sure that float arm is symmetric, not distorted.

With carburetor chamber upside down:

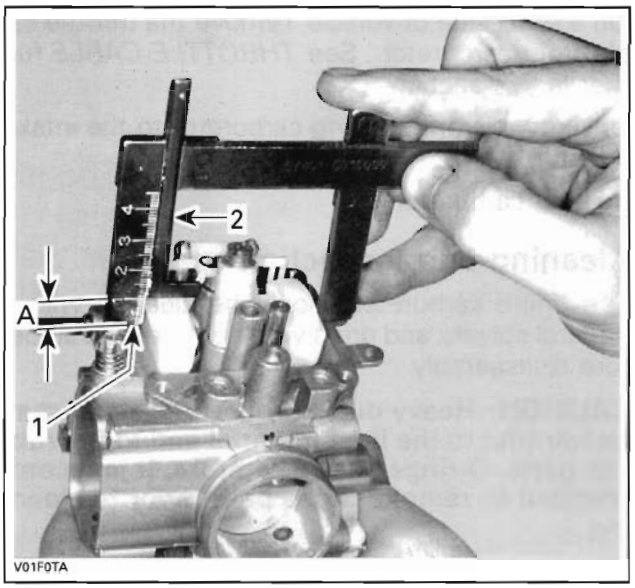
- Measure height between bowl seat and the top edge of float arm. Use the float level gauge (P/N 529 035 520).



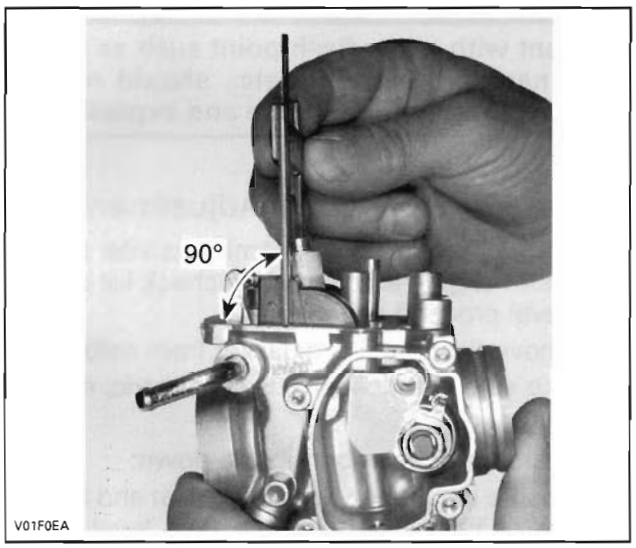
- Keep float level gauge perfectly vertical and in line with main jet hole.

Ensure that both float level gauge tips are properly positioned on carburetor body and that "L" arm is leaning on float while compressing valve spring.

Refer to following photos for proper float level gauge positioning and adjust float level to 10 mm ± 0.5 mm (.39 in ± .02 in).



1. Gauge tips
2. "L" arm
A. Height



GAUGE ALIGNED WITH MAIN JET

To adjust height, bend the contact tab of float arm until the specified height is reached.

CAUTION: When adjusting lever, do not pry it. This will apply pressure on needle and damage valve seat/needle.

Installation

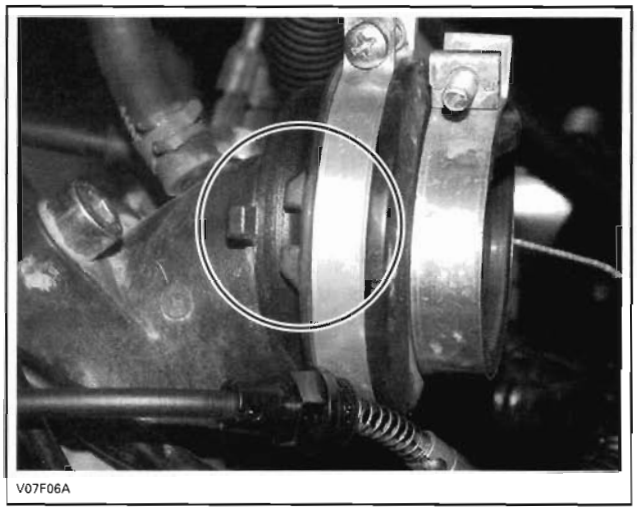
To install carburetor on engine, inverse removal procedure. Pay attention to the following details:

- Inspect throttle and choke cable housing prior to installation.
- Reinstall throttle and choke cables, at the same time adjust the throttle cable, then install the side cover. Refer to *CARBURETOR ADJUSTMENTS* below in this section.
- Reinstall carburetor on vehicle.

When reinstalling carburetor on vehicle, pay attention to the following:

CAUTION: The rubber flanges must be checked for cracks and/or damage. At assembly, the rubber flanges must be perfectly matched with the air box, carburetor and engine or severe engine damage will occur. Do not use screwdriver or other tool to install the rubber flanges.

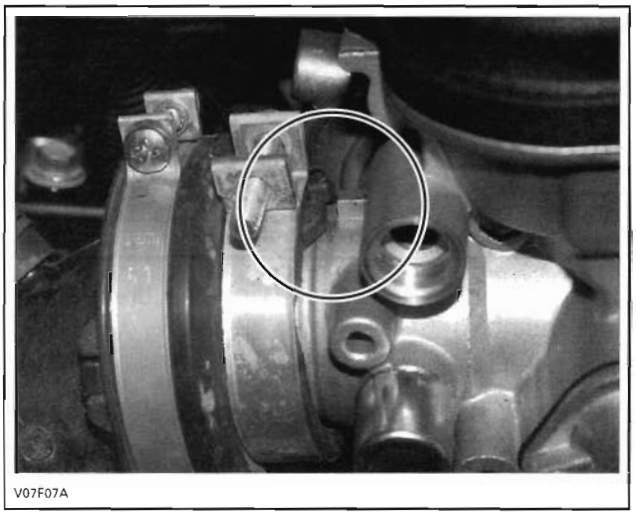
Make sure rubber flange recess is aligned with intake adaptor notch.



TYPICAL

Install clamps so that their tightening bolts are staggered — not aligned.

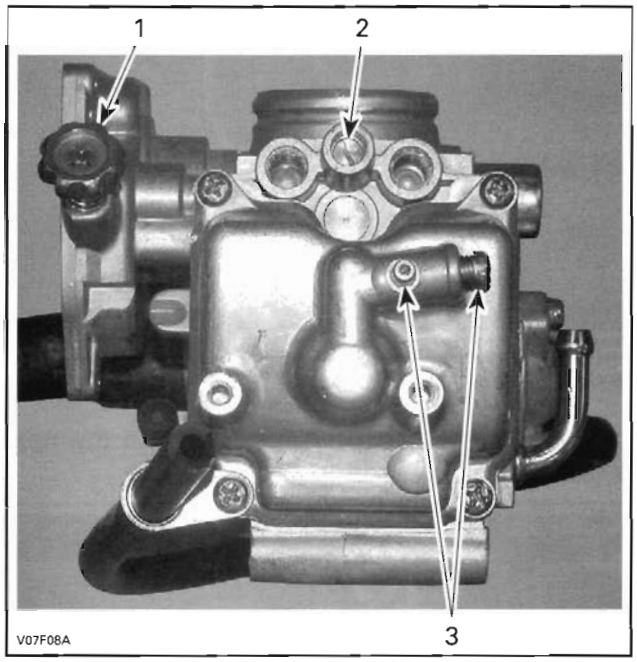
Align carburetor notch with the flange recess.



TYPICAL — CARBURETOR NOTCH ALIGNED WITH THE FLANGE RECESS

Install air filter box.

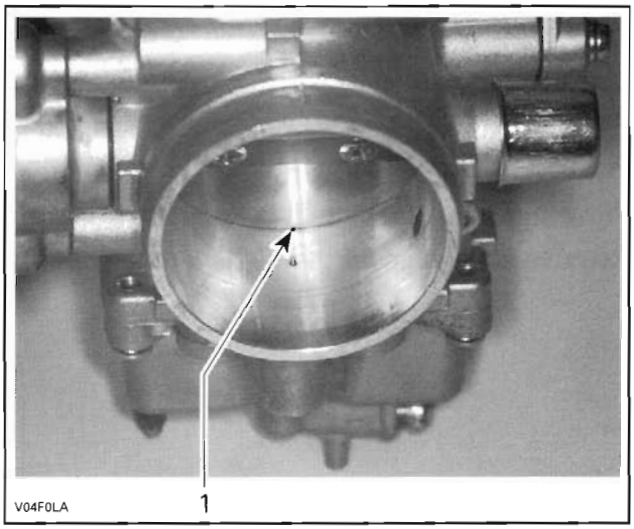
Carburetor Adjustments



BOTTOM VIEW
1. *Idle speed screw*
2. *Pilot screw*
3. *Drain plug and screw*

Idle Speed Preliminary Adjustment

Adjust throttle screw to 1-1/2 turn or so that throttle valve closes bypass hole by half, as shown in the next photo.

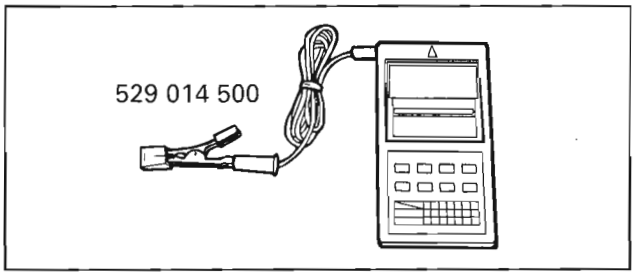


1. *Bypass hole closes to halfway*

Idle Speed Adjustment

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: Use the digital induction tachometer (P/N 529 014 500). Turn tachometer wire around spark plug wire, about 4 or 5 turns, for the best measure.



CAUTION: Do not attempt to set the idle speed by using the pilot screw.

The idle speed should be adjusted to 1300 ± 50 RPM.

Pilot Screw Adjustment

NOTE: The pilot screw is factory preset. Warm the engine to operating temperature.

Turn the pilot screw clockwise until you hear the engine missing or decreasing idle speed, then turn counterclockwise until the engine again misses or decreases idle speed.

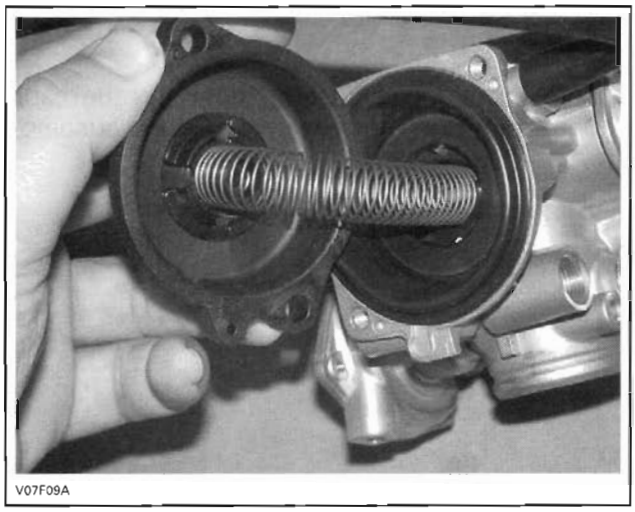
Center the pilot screw exactly between these two extreme positions then unscrew the pilot screw of 3/8 turn.

If idle speed changes after adjustment of the pilot screw, readjust the idle speed screw.

Diaphragm Installation

Carefully replace diaphragm in its original position.

Make sure spring is located properly in carburetor cover before screwing.



THROTTLE CABLE

Removal

Carburetor Side

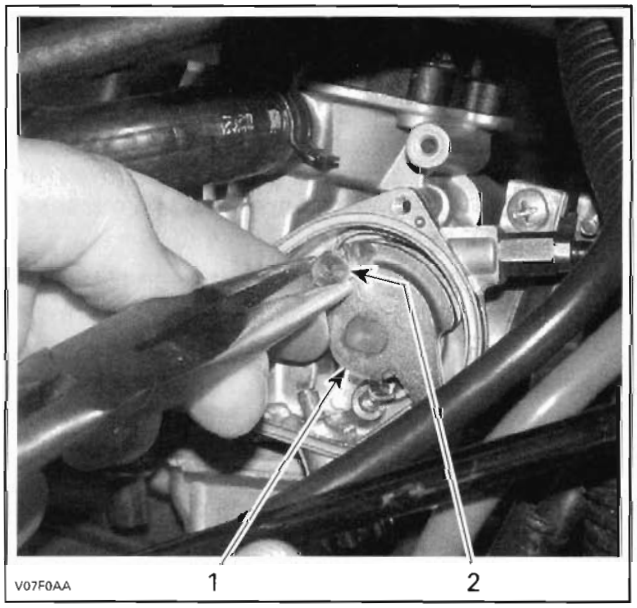
⚠ WARNING

Ensure the key is turned OFF, prior to performing the throttle cable adjustment.

NOTE: To ease reinstallation, take note the cable routing.

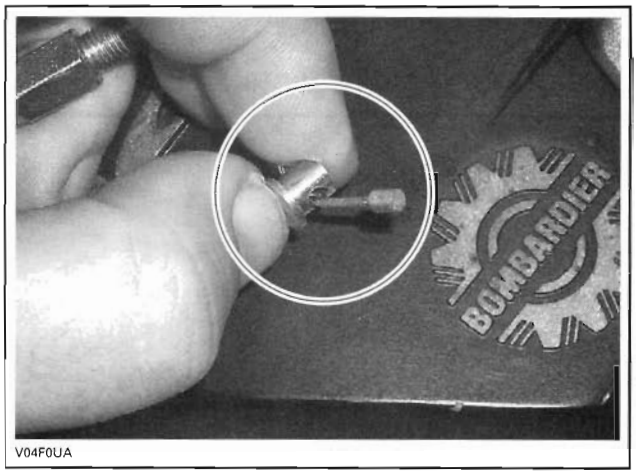
Remove carburetor side cover.

Using thumb, release tension on throttle lever. With long nose pliers, rotate cable end bushing so that cable aligns with throttle lever recess, then lift cable end. See next photo.



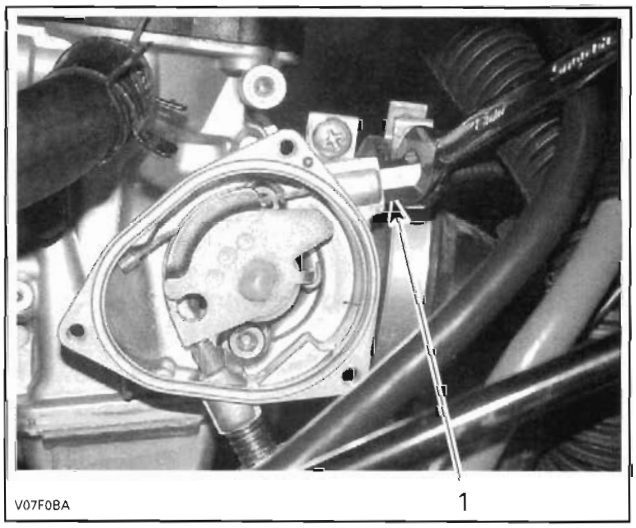
1. *Release tension on throttle lever*
2. *Cable end bushing*

Separate cable end bushing from throttle cable end, as shown in the next photo. Keep bushing.



REMOVE CABLE END BUSHING

Loosen throttle cable nut, as shown in the next photo.

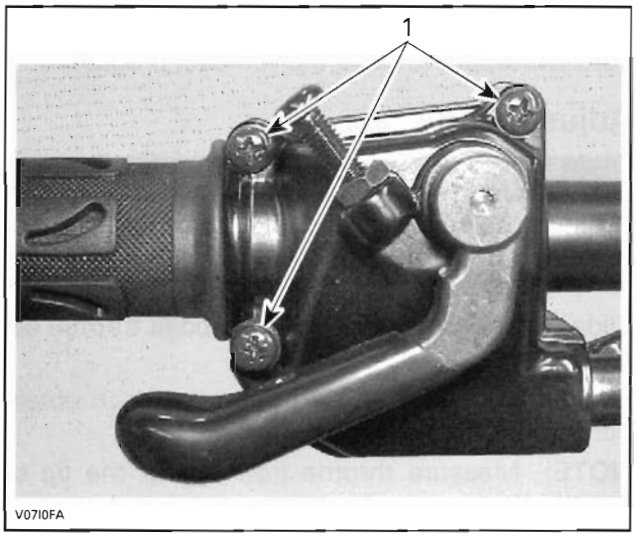


1. *Loosen this nut*

Pull cable out from carburetor.

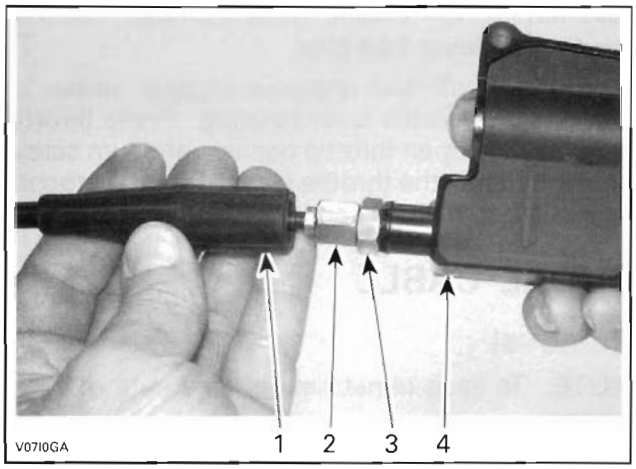
Throttle Lever Side

Remove screws under throttle lever then open it.



1. Remove these screws

Separate housing. Slide rubber protector back to expose throttle cable adjuster.

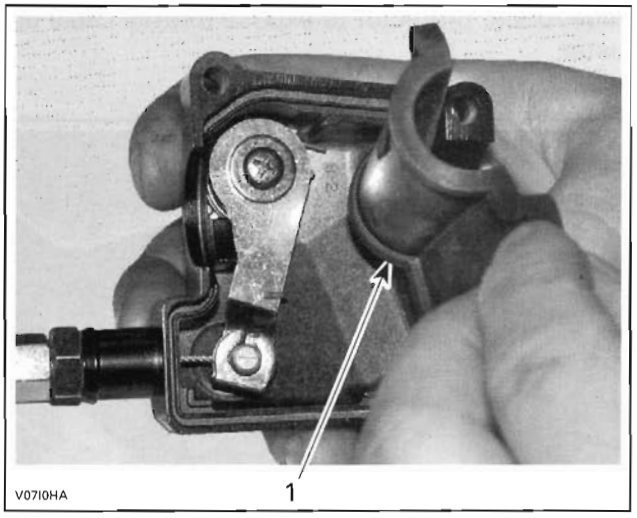


1. Cable protector
2. Throttle cable adjuster
3. Lock nut
4. Throttle lever housing

Screw in the throttle cable adjuster.

Remove:

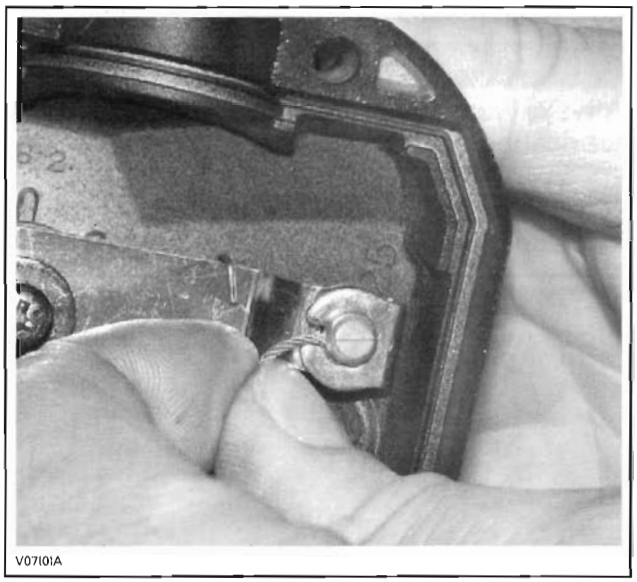
– inner housing protector



1. Inner housing protector

– throttle cable from housing.

Slide cable in clip slot and remove the end of cable from clip.



Lubrication

The throttle cable must be lubricated with the cable lubricant (P/N 293 600 041) or with another silicone cable lubricant.

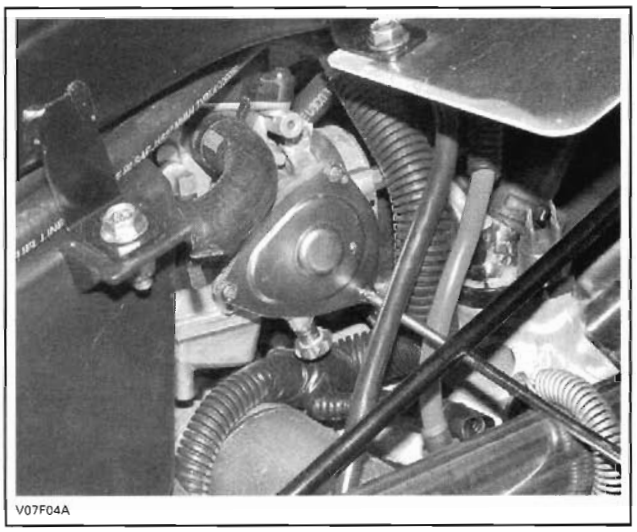
⚠ WARNING

Always use a silicone-based lubricant. Using another lubricant (like a water-based lubricant) could cause the throttle lever/cable sticking or stiffness.

To lubricate the throttle cable, remove cable from throttle lever side.

Slide rubber protector to expose throttle cable adjuster.

Remove carburetor side cover.

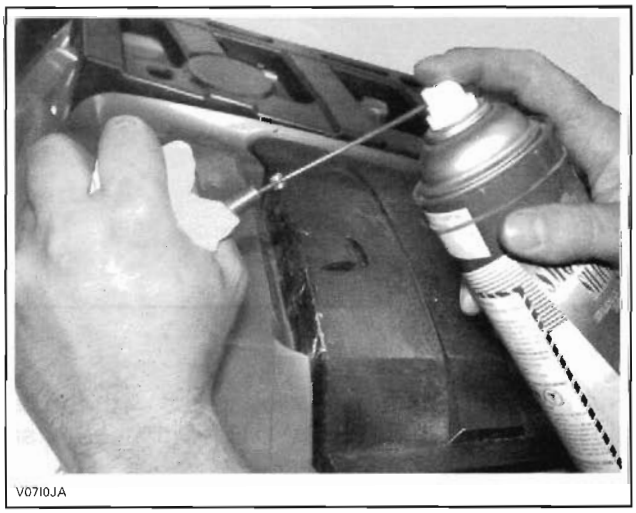

V07F04A

Insert the needle of lubricant can in the end of throttle cable adjuster.

⚠ WARNING

Always wear eye protection and gloves when lubricating cables.

NOTE: Place a rag around cable adjuster to prevent lubricant splash.


V0710JA

TYPICAL

Put lubricant until it passes through the cable.

Clean lubricant surplus in carburetor housing.

Spray lubricant inside throttle housing.

Reinstall carburetor cover and cable in throttle housing.

Adjust cable; see below.

Installation

For installation, reverse the removal procedure.

Adjustment

⚠ WARNING

Ensure the key is turned OFF, prior to perform the throttle cable adjustment.

Slide rubber protector back to expose throttle cable adjuster.

Loosen lock nut then turn the adjuster to obtain correct throttle lever free play.

NOTE: Measure throttle free play at the tip of throttle lever.

Tighten lock nut and reinstall protector.

With the transmission lever on PARK position, start engine. Check if the throttle cable is adjusted correctly by turning handlebar fully right then fully left. If the engine RPM increase, readjust the throttle lever free play.

Turn engine off and unscrew stopper screw located under throttle lever housing. Press throttle lever at wide open throttle position and turn screw until it touches the throttle lever. Turn the stopper screw 1/2 turn again and lock it with the lock nut.

CHOKE CABLE

Removal

NOTE: To ease reinstallation, take note of cable routing.

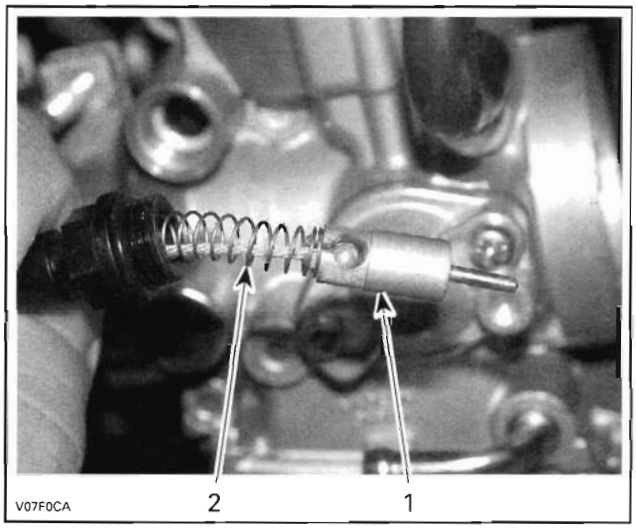
Carburetor Side

Remove the LH side panel and the air filter box.

Unscrew choke plastic nut from carburetor.

Pull choke cable to remove choke plunger from carburetor.

Remove the choke plunger and its spring.

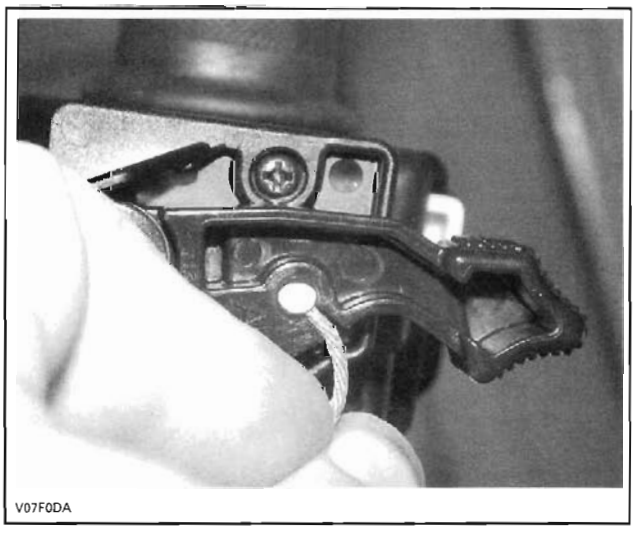


1. Choke plunger
2. Choke plunger spring

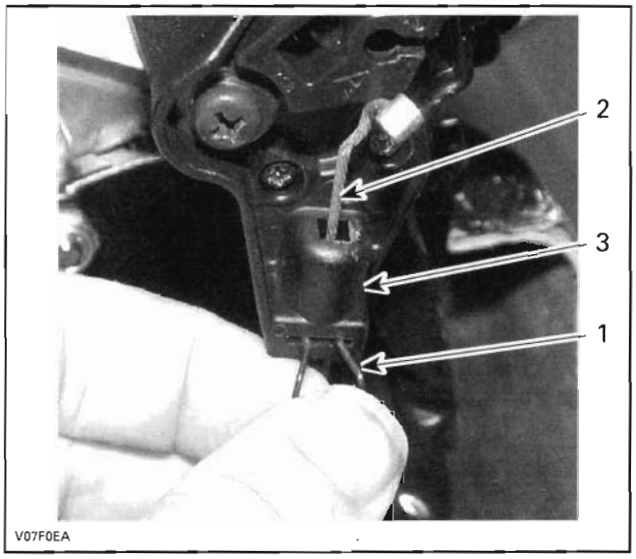
Handlebar Side

Push the choke lever on FULL position.

Underneath multi-function switch, align the choke cable end with the lever slot then remove the cable.



Remove the retaining spring to remove the choke cable from housing.



1. Retaining spring
2. Choke cable
3. Choke cable housing

Installation

The installation is the reverse of removal procedure.

CHARGING SYSTEM

SERVICE TOOLS

Description	Part Number	Page
4-pin magneto harness adapter	529 036 021	198–201
multimeter Fluke 111	529 035 868	196

SERVICE PRODUCTS

Description	Part Number	Page
dielectric grease	293 550 004	203

GENERAL

The purpose of the charging system is to keep the battery at a full state of charge.

NOTE: For an overview of the vehicle electrical system, refer to *ENGINE MANAGEMENT*.

Magneto

The magneto is the primary source of electrical energy. It transforms magnetic field into electric current (AC).

The magneto has a 3 phase series stator.



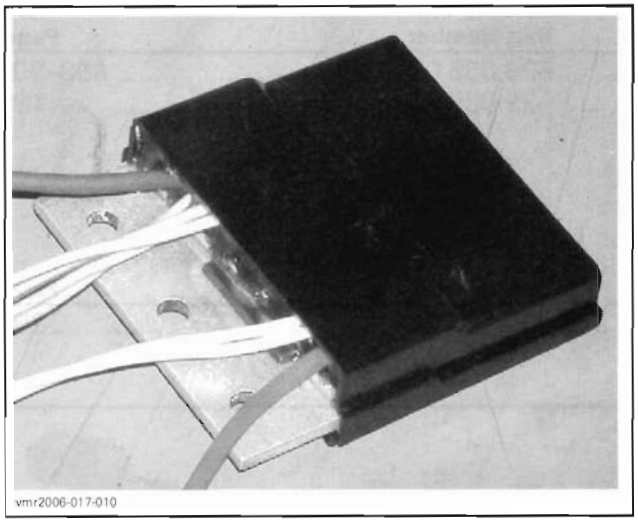
TYPICAL

Voltage Regulator/Rectifier

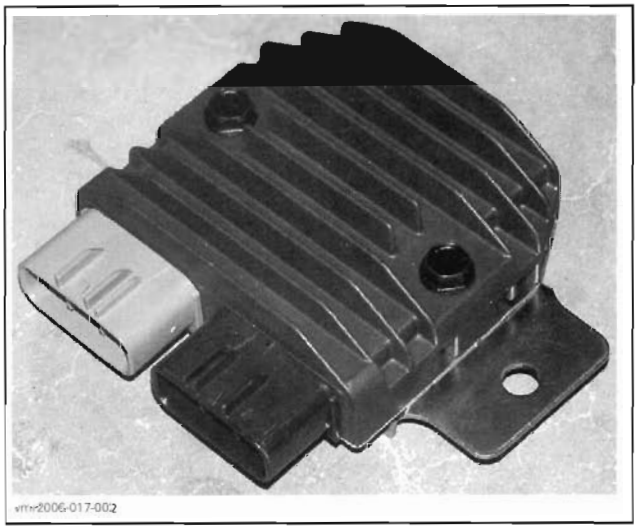
The rectifier receives AC current from the magneto and transforms it into direct current (DC).

The voltage regulator, included in the same unit, limits voltage as follows to prevent any damage to electrical components.

MODEL	VOLTAGE, Vdc
Outlander 400 series	15.1
Outlander 800 series	14.8



OUTLANDER 400 SERIES



OUTLANDER 800 SERIES

Battery

The battery is the DC source for the electric starter, the ECM and all accessories.

Parts Replacement

Before replacing any part, always ensure wiring/connectors are in good condition. Check for continuity or short circuits.

PROCEDURES

NOTE: First, ensure that battery is in good condition prior to performing the following test using a current inductive ammeter such as Snap-on MT 110.

For best results, use the multimeter Fluke 111 (P/N 529 035 868).



529 035 868

If the battery is regularly discharged, check battery and solenoid terminals.

VOLTAGE REGULATOR/RECTIFIER

Outlander 400 Series

Static Test: Continuity

Due to internal circuitry, there is no static test available.

Dynamic Test: DC Current

Proceed as follows:

- Start engine.
- Lay an inductive ammeter on positive cable of battery.
- Bring engine to approximately 4000 RPM.

Depending on battery charge, current reading should be approximately 3 - 7 amperes. If not, check magneto output prior to concluding that voltage regulator/rectifier is faulty.

Dynamic Test: Voltage

Proceed as follows:

- Start engine.
- Connect a multimeter to battery posts. Set multimeter to Vdc scale.
- Bring engine to approximately 4000 RPM.

If multimeter reads over 15.1 ± 0.5 volts, voltage regulator/rectifier is defective. Replace it.

NOTE: Whatever the voltmeter type used (peak voltage or RMS), the voltage must not exceed 15 V. A faulty voltage regulator/rectifier will allow voltage to exceed 15 V as engine speed is increased.

NOTE: If voltage exceeds 19 Vdc, speedometer will display "FAIL". Replace voltage regulator/rectifier by a new one.

NOTE: If the battery will not stay charged, the problem can be any of the charging circuit components. If these all check good, you would be accurate in assuming the problem to be in the voltage regulator/rectifier.

If there is no charging at the battery with the preceding voltage test, the following test can also be performed.

NOTE: If the voltage regulator/rectifier is within the specification, the wiring harness between the voltage regulator/rectifier and battery is defective. If the voltage regulator/rectifier is out of specification and the stator tests good, the voltage regulator/rectifier is defective.

Outlander 800 Series

⚠ WARNING

In the following tests:
- Pay attention not to touch chassis with any tool when disconnecting/connecting wires.
- Pay attention so that battery positive post does not touch chassis when moving battery.

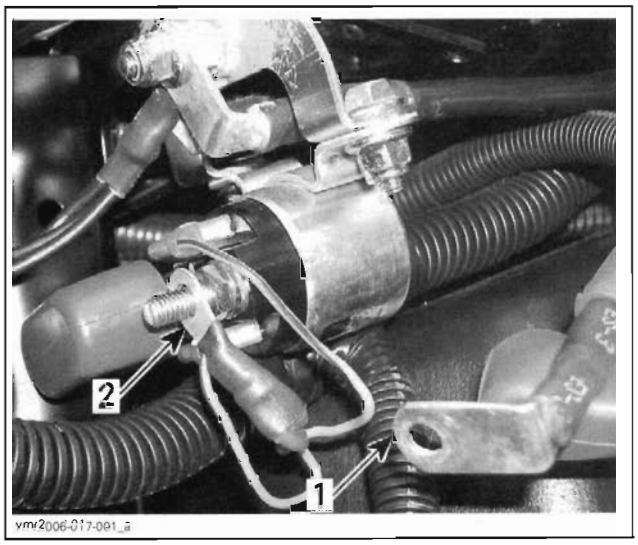
Static Test: Continuity

Due to internal circuitry, there is no static test available to check continuity.

Dynamic Test: DC Current

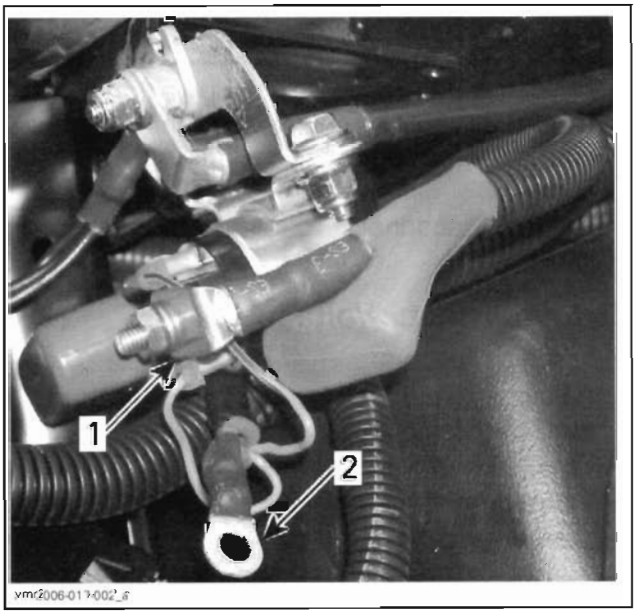
Proceed as follows:

- Disconnect voltage regulator/rectifier wire from solenoid.



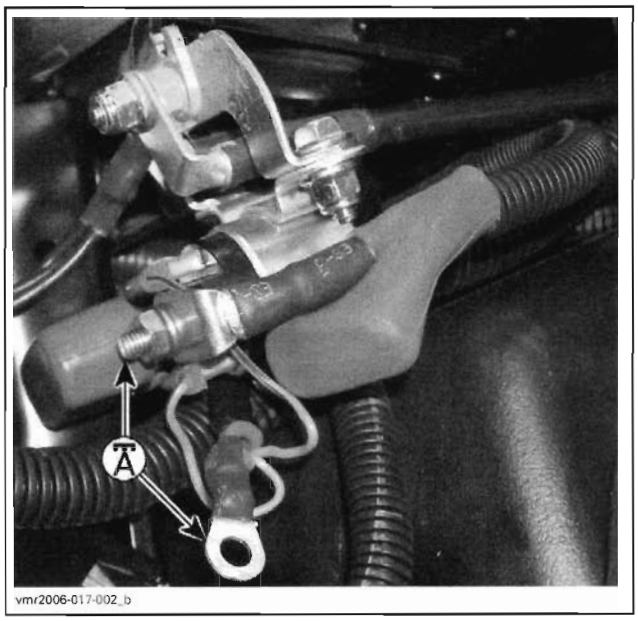
1. Move battery cable away to remove wire underneath
2. Remove this wire

- Reconnect battery cable.



1. Battery cable installed
2. Voltage regulator/rectifier wire disconnected

- Set multimeter to Adc.
- Start engine.
- Connect multimeter probes between voltage regulator/rectifier wire and solenoid post.



vmr2006-017-002_b

TEST ENGINE SPEED	CURRENT
4000 RPM	approx. 3 - 7 A

- Read current.
- If current is below specification, check magneto (stator) output prior to concluding that rectifier is faulty.
- Properly reconnect voltage regulator/rectifier wire.

Dynamic Test: Voltage

Proceed as follows:

- Release battery strap. Pull back battery to reach battery posts.
- Set multimeter to Vdc scale.
- Connect multimeter to battery posts.
- Start engine.

TEST ENGINE SPEED	VOLTAGE
4000 RPM	Max. 14.8 Vdc

- Read voltage.



vmr2006-017-003_a

- If voltage is above specification, replace voltage regulator/rectifier.
- If voltage is below specification, check wiring and connections.
- Properly secure battery.

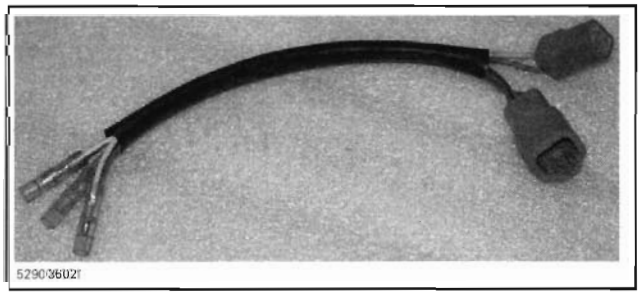
NOTE: If the battery will not stay charged, the problem can be any of the charging system components. If these all check good, try a new voltage regulator/rectifier.

STATOR

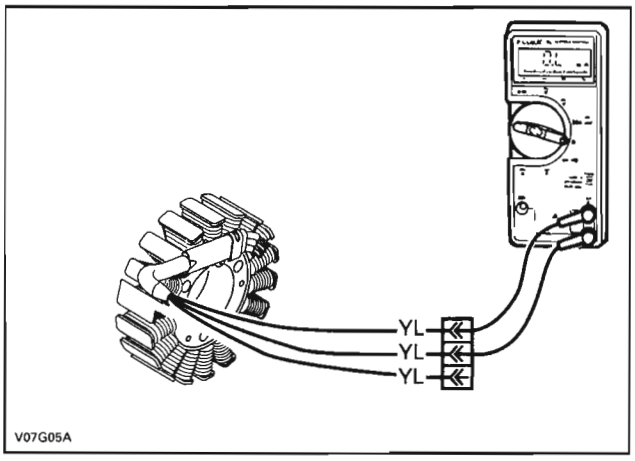
Outlander 400 Series

Static Test: Continuity

- Disconnect the magneto wiring harness connector.
- Install the 4-pin magneto harness adapter (P/N 529 036 021) on magneto connector. Leave the other connector unplugged.

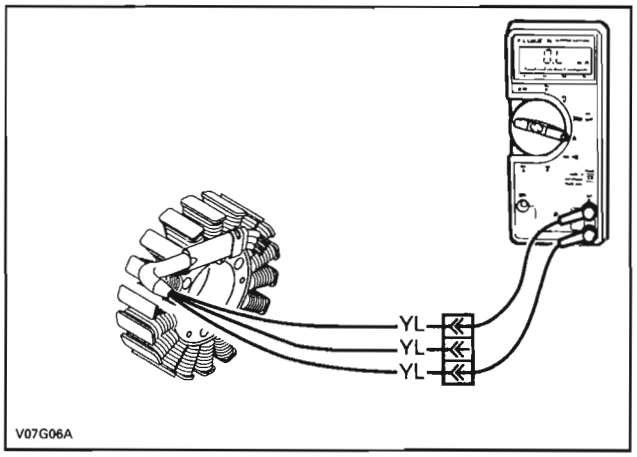


- With the recommended multimeter, place the 2 meter test probes onto the stator wire leads AC-1 and AC-2 of the stator. The resistance should be between 0.1 Ω and 1.0 Ω.



TYPICAL

– Place either meter test probe into the remaining stator lead (AC-3) and note the resistance. If the readings are out of specification, the stator will need to be replaced.

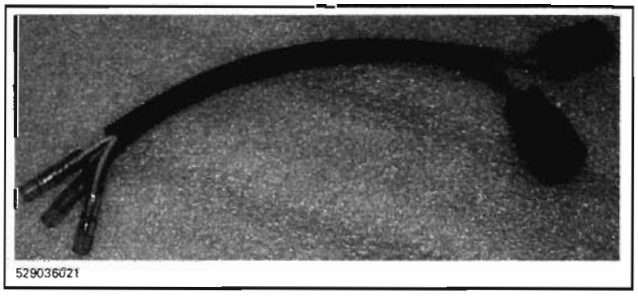


TYPICAL

Static Test: Insulation

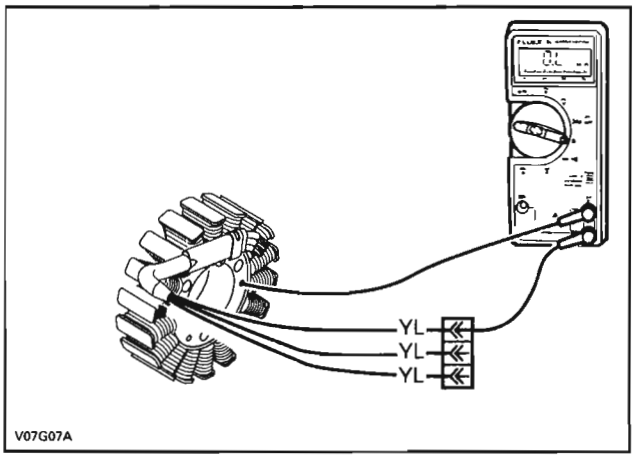
Disconnect the magneto wiring harness connector.

Install the 4-pin magneto harness adapter (P/N 529 036 021) to the magneto wiring harness.



IMPORTANT: Leave wiring harness side disconnected.

Insert either meter test probe onto AC-1 and ground the other meter test probe to the engine or the stator iron core and note the reading. There should be no continuity (infinity) between the stator insulated coils and ground. If there is a reading, the stator coils and/or the wiring from the coils is grounded and needs to be replaced/repaired respectively.



TYPICAL

Dynamic Test: AC Voltage

1. Unplug magneto wiring harness connector.
2. On magneto side, connect test probes of the multimeter to two of the YELLOW wires.
3. Set multimeter to Vac scale.
4. Start engine and bring to 4000 RPM. The obtained value should be between 10 and 13 Vac.
5. Repeat operation 3 times with each wire (to check each phase).
6. If the stator is out of specification, replace it.

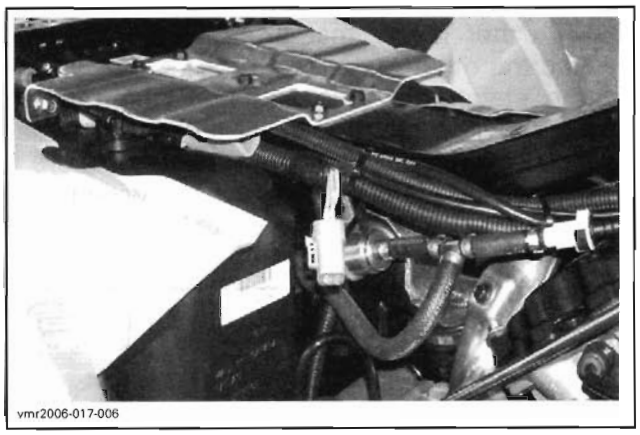
Outlander 800 Series

Remove seat and RH side panel.

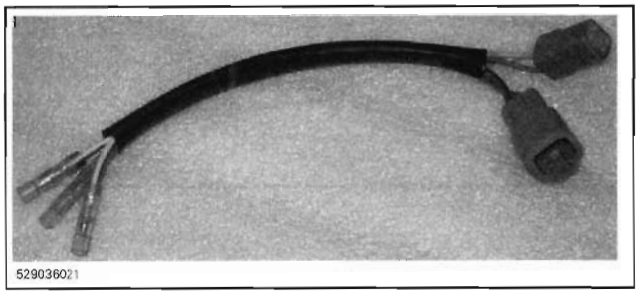
Static Test: Continuity

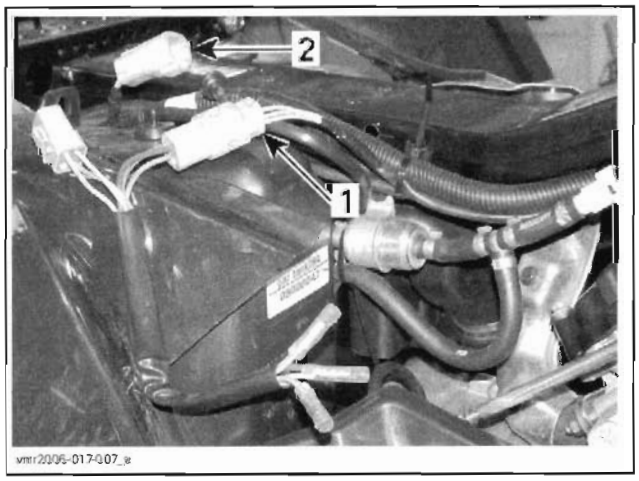
Proceed as follows:

– Remove protective plate as necessary.
– Disconnect the magneto wiring harness connector.



– Install the 4-pin magneto harness adapter (P/N 529 036 021) on magneto connector. Leave the other connector unplugged.



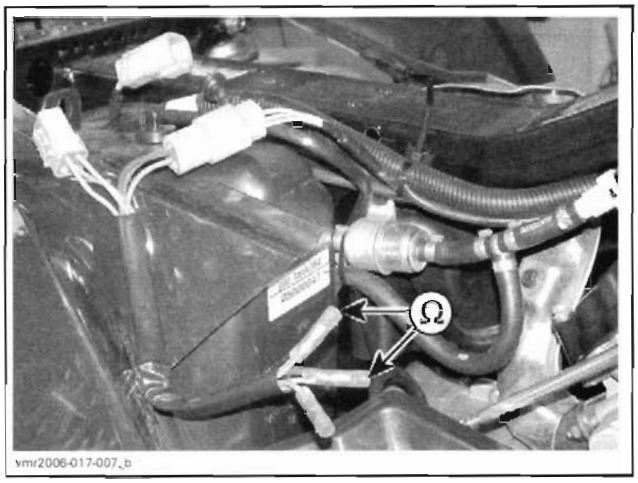


1. *Magneto connector*
2. *Leave unplugged*

– Set multimeter to Ω.
– Connect multimeter between YELLOW wires.

TERMINAL	RESISTANCE @ 20°C (69°F)
1 and 2	0.1 - 1 Ω
1 and 3	
2 and 3	

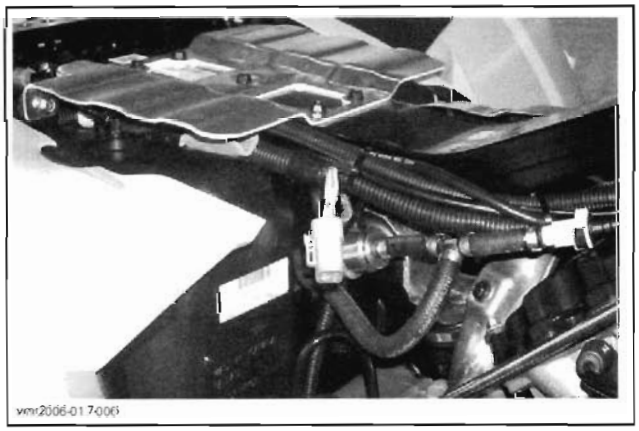
– Read resistance.



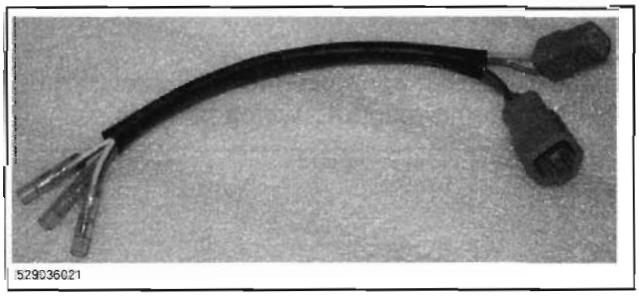
– If any result is out of specification, replace stator.
– Replug connectors properly.

Static Test: Insulation

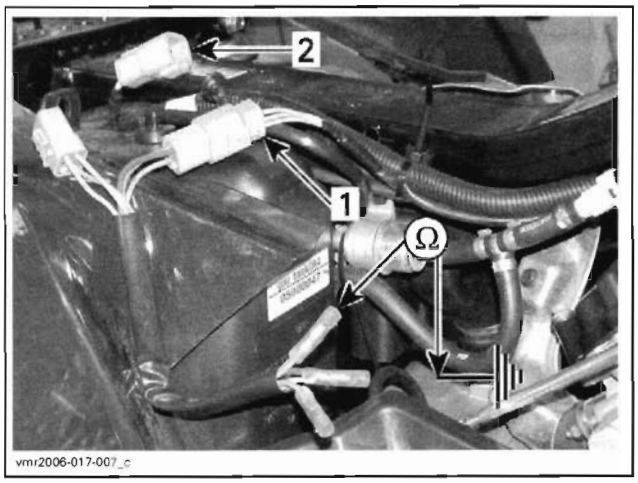
– Disconnect the magneto wiring harness connector.



– Install the 4-pin magneto harness adapter (P/N 529 036 021) to the magneto wiring harness.



IMPORTANT: Leave wiring harness side disconnected.



1. Magneto connector
2. Leave unplugged

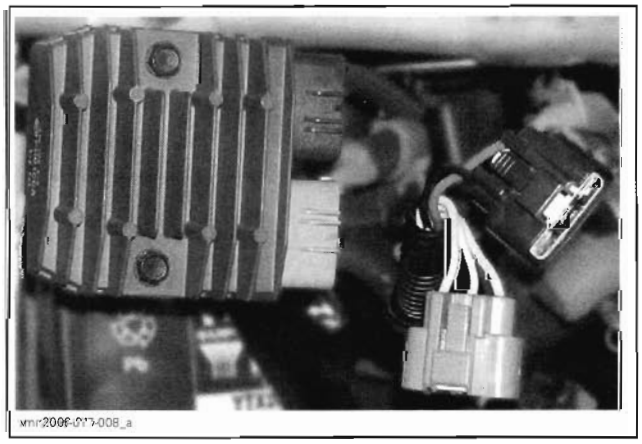
- Set multimeter to Ω.
- Connect multimeter between YELLOW wires.

TERMINAL	RESIGTANCE @ 20°C (69°F)
Any YELLOW wire and engine ground	Infinity (open circuit)

- Read resistance.
- If there is a resistance or continuity, the stator coils and/or the wiring is grounded and needs to be repaired or replaced.
- Replug connectors properly.

Dynamic Test: AC Voltage

- Disconnect the voltage regulator/rectifier connectors.

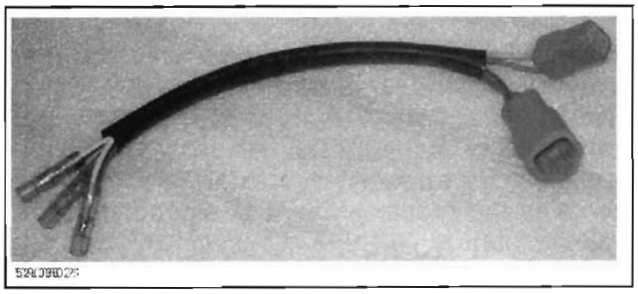


- Disconnect the magneto wiring harness connector.

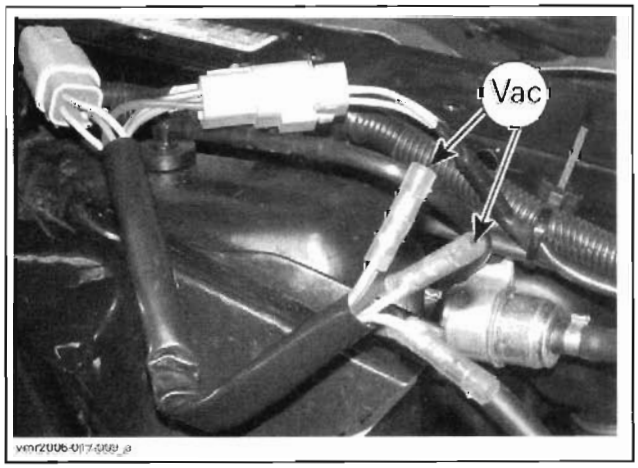


- Install the 4-pin magneto harness adapter (P/N 529 036 021) between unplugged connectors.

NOTE: Both connectors must be plugged.



TYPICAL



- Set multimeter to Vac scale.
- Start engine.
- Connect multimeter between YELLOW wires.

TEST ENGINE SPEED	TERMINAL	VOLTAGE
4000 RPM	1 and 2	Approx. 25 Vac
	1 and 3	
	2 and 3	

- Read voltage.
- If voltage is lower than specification, replace stator.
- Replug connectors properly.

BATTERY

Battery Information

These vehicles are equipped with a VRLA battery (Valve Regulated Lead Acid). It is a maintenance-free type battery.

When filling a new battery, **use only the electrolyte container that comes with the battery.** Sealed VRLA battery electrolyte is a higher concentration of sulfuric acid. All sealed VRLA battery electrolyte containers are not the same. Each contains the proper amount of electrolyte for its specific battery.

NOTE: NEVER REMOVE THE SEALING STRIP AFTER CHARGING IS COMPLETED.

Refer to battery manufacturer's instructions for proper filling, activation and routine charging procedures.

Troubleshooting

DISCHARGED OR WEAK BATTERY

- battery posts and/or cable terminal oxidized
- loose or bad connections
- faulty battery (does not keep a full charge)
- main system fuse burnt, faulty voltage regulator/rectifier or stator.

Unload Test

NOTE: An unloaded test is made on a battery without discharging current. It is the simplest and most commonly used. However, be aware that the voltage test can be good, while the battery does not have enough power to crank the engine. A load test gives a more accurate condition of the battery.

Check the 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 minimum.

Load Test

This is the best test of the batteries condition. Use a load testing device that has an adjustable load.

Apply a load of 3 times the ampere-hour rating of the battery. At 14 seconds into the test, check battery voltage; if battery is in good condition, it will have at least 10.5 Vdc.

Removal

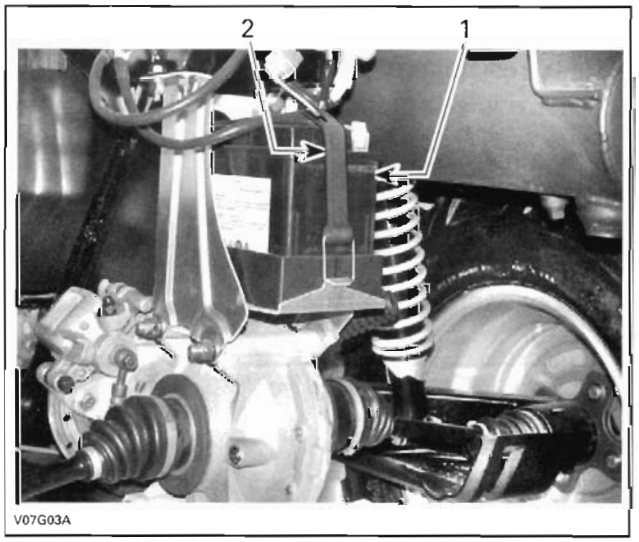
Outlander 400 Series

Disconnect BLACK (-) cable first, then the RED (+) cable.

⚠ WARNING

Always respect this order for disassembly; disconnect BLACK (-) cable first. Electrolyte or fuel vapors can be present and a spark may ignite them and possibly cause personal injuries.

Remove holding strap retaining battery to rack.



TYPICAL
1. Battery
2. Holding strap

Outlander 800 Series

Release battery strap.



1. Strap

Pull back battery to reach battery posts.



Disconnect BLACK (-) cable first, then the RED (+) cable.

⚠ WARNING

Always respect this order for disassembly; disconnect BLACK (-) cable first. Electrolyte or fuel vapors can be present and a spark may ignite them and possibly cause personal injuries.

Remove battery.

Cleaning

Clean the battery rack, cables and battery posts using a solution of baking soda and water.

Remove corrosion (if so) from battery cable terminals and battery posts using a firm wire brush. Rinse with clear water and dry well.

Inspection

Visually inspect battery casing for cracks or other damage. If casing is damaged, replace battery and thoroughly clean battery rack with water and baking soda.

Inspect battery posts condition, battery rack mounting, straps and strap attachment points.

Storage

If the battery is in storage or used infrequently, disconnect the battery cables to eliminate drain from electrical equipment.

For extended storage, remove the battery from vehicle.

Clean battery terminals and cable connections using a wire brush. Apply a light coat of dielectric grease (P/N 293 550 004) on terminals.

Clean battery casing using a solution of baking soda and water. Rinse battery with clear water and dry well using a clean cloth.

Regularly charge battery as per manufacturer's recommendations.

For other recommendations during storage, refer to battery manufacturer's instructions.

⚠ WARNING

Ensure to store battery in a safe place, out of reach for children.

Installation

Outlander 400 Series

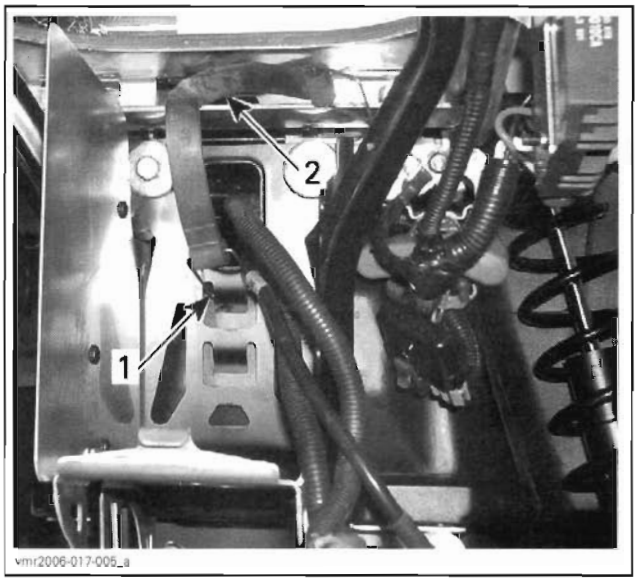
Reinstall battery in vehicle. Install the holding strap.

⚠ WARNING

Always connect RED (+) cable first then BLACK (-) cable.

Outlander 800 Series

Temporary hook battery strap as shown.



1. Hook at bottom
2. Temporary squeeze strap here

Temporary put battery in rack.

Connect battery cables.

⚠ WARNING

Always connect RED (+) cable first then BLACK (-) cable.

Properly position battery with positive post towards front, then secure with strap.



1. Secured strap

IGNITION SYSTEM

SERVICE TOOLS

Description	Part Number	Page
ECM adapter	420 277 010	215
multimeter Fluke 111	529 035 868	212

OUTLANDER 400 SERIES

GENERAL

Ignition Problems

When dealing with ignition problems, the following items should be checked in this order. After one item has been checked and it is found not to be the problem, continue with the next item:

1. main fuse condition
2. spark occurrence
3. battery condition
4. ignition switch
5. CPS (Crankshaft Position Sensor)
6. ignition coil
7. electronic module.

Intermittent Ignition Problems

In dealing with intermittent problems there is no easy diagnosis. For example, problems that occur only at normal engine operating temperature have to be tested under similar conditions.

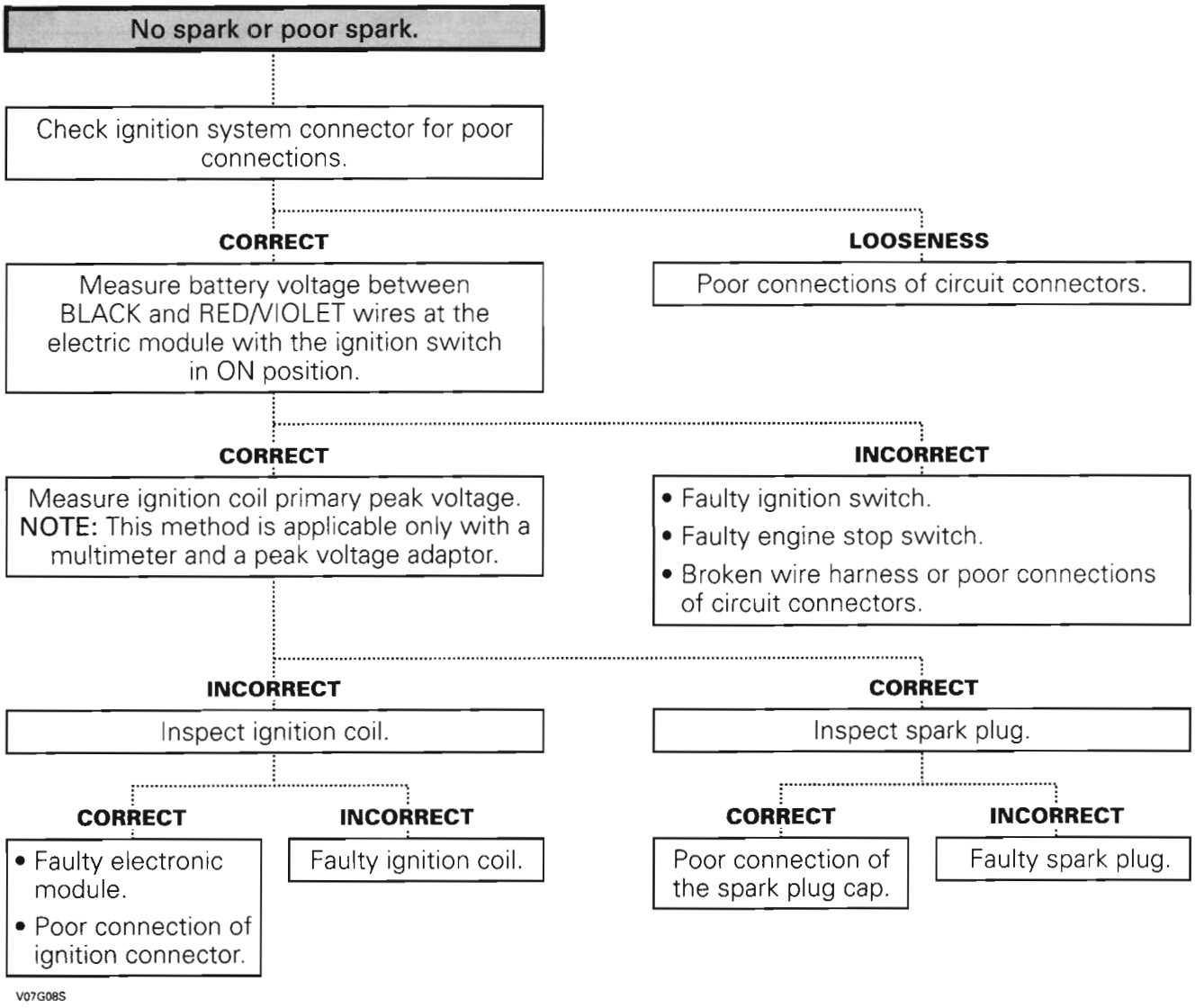
In most cases of temperature and/or vibration failure, only parts replacement might solve the problem as most of these failures return to normal when engine is not running.

Multiple Problems

There is always the possibility of more than one faulty part. If after a component has been replaced, the problem still persists, carefully repeat the complete test procedure to find the other faulty part.

TROUBLESHOOTING

NOTE: Check that the transmission is in PARK or NEUTRAL position and the engine stop switch is in "RUN" position. Check that main fuse is not burned and if battery is fully-charged before diagnosing.



PROCEDURES

Safety Precautions

⚠ WARNING

To prevent powerful electric shocks while cranking engine, neither touch any electronic ignition components (ignition coil, wire harness, etc.) nor tester lead clips. Also make sure that tester leads do not touch any metallic object.

MAIN FUSE CONDITION

Check main fuse (20 A) condition. Replace burnt fuse as necessary.

CAUTION: Do not use higher rated fuse as this can cause severe damage.

SPARK OCCURRENCE

Remove spark plug and connect to the ignition coil. While holding the spark plug against a metallic part of the engine, crank the engine. Look for a spark at the spark plug tip. Replace defective spark plug.

NOTE: Make sure that the engine stop switch is in the run position.

Keep in mind that a spark plug might test good this way while not being able to work properly under combustion chamber mixture and pressure.

If known good spark plug does not work, continue the other tests.

BATTERY CONDITION

A battery must be present in the vehicle to allow the ignition system to work. Also, at least 8 V is required for proper operation. Check battery voltage.

IGNITION SWITCH

A quick test to verify if it is working properly. Turn the ignition switch ON. If the headlamps turn on, the ignition switch is good.

Test

Remove console and disconnect ignition switch.

Measure voltage between RED supply wire and the battery ground. If voltage is lower than battery voltage, test the wiring. If voltage is good, test switch.

Use a multimeter and measure the resistance between the following wires.

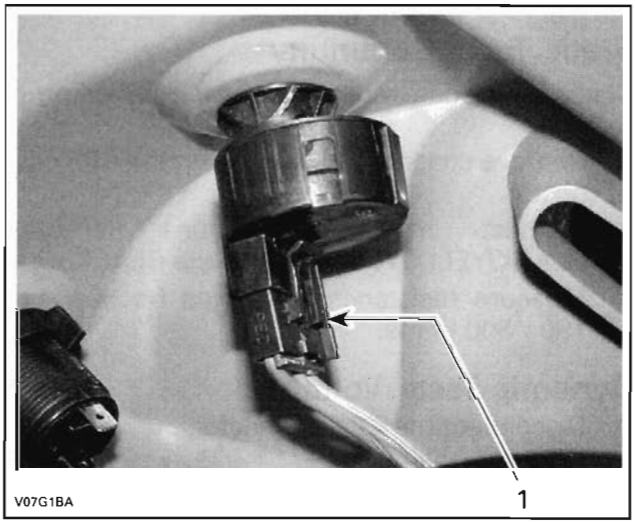
POSITION	WIRE	RESISTANCE
OFF	RED and RED/YELLOW	Infinite (O.L)
OFF	RED and RED/VIOLET	Infinite (O.L)
ON (w/lights)	RED and RED/YELLOW	0.2 ± 0.2 Ω max.
ON (w/lights)	RED and RED/VIOLET	0.2 ± 0.2 Ω max.
ON (w/o lights)	RED and RED/YELLOW	Infinite (O.L)
ON (w/o lights)	RED and RED/VIOLET	0.2 ± 0.2 Ω max.

Replace switch if defective.

If switch is good, continue the other tests.

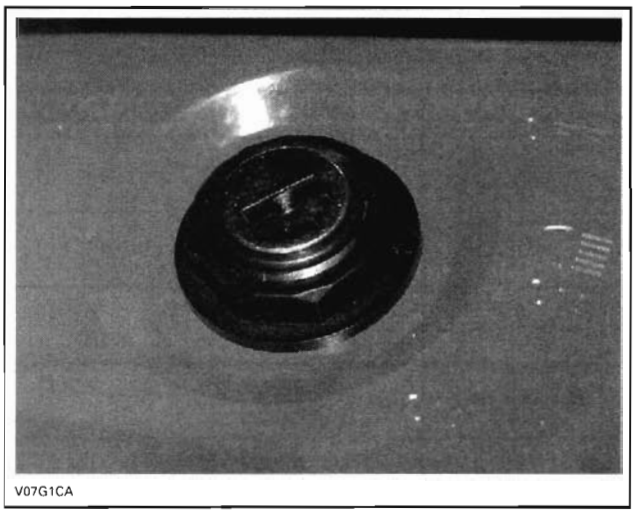
Removal

Lift the console and unplug the switch connector.



1. Switch connector

Unscrew the ignition switch nut.


V07G1CA

Installation

For the installation, reverse the removal procedure.

CRANKSHAFT POSITION SENSOR

NOTE: The CPS is not adjustable.

Static Test: Continuity

Check resistance with a high-sensitivity ohmmeter.

1. Remove console and disconnect the CPS connector.
2. Connect multimeter probes to the BLACK/YELLOW wire and to the BLACK wire.
3. Measure resistance; it should be between 190 - 300 ohms.

Dynamic Test: Voltage

1. Disconnect the CPS connector.
2. Connect multimeter probes to the BLACK/YELLOW wire and to the BLACK wire, then bring selector switch to Vac and scale to 00.0 Vac.
3. Press START button, note result. The obtained value should be between 0.4 and 0.7 Vac. Repeat operation 3 times.
4. If the CPS is out of specification, replace it. If it tests good continue the other tests.

IGNITION COIL

Ignition coil is mounted on frame along steering column, in front of engine.

NOTE: An ignition coil with good resistance measurement can still be faulty. Voltage leak can occur at high voltage level which is not detectable with an ohmmeter. Replacing the ignition coil may be necessary as a test.

Static Test

Primary Winding

Disconnect the wire connector on the primary side of the ignition coil.

Using a multimeter, check the resistance between the terminal and the ignition coil body ground.

The resistance should be between 0.8 and 1.2 Ω at 20°C (68°F).

If not within specification, replace the ignition coil.

If the ignition coil test good, check the power supply on the electronic module.

There should be 12 Vdc between the RED/VIOLET and WHITE/GREEN wires.

If there is no voltage, either the electronic module or the wiring harness is defective.

Secondary Winding

The output voltage should not be less than 12 kV (12 000 V).

The ignition coil outlet caps and the spark plug caps include a resistance. They should be checked prior to replacing a suspected ignition coil.

Measure resistance between ignition coil terminals and spark plug caps. The obtained value should be between 9 and 14 KΩ. If resistance is good, continue check. If not, change spark plug wires.

Dynamic Test

An ignition coil tester available from aftermarket tool/equipment suppliers can be used.

CAUTION: Do NOT use coil tester on metal work bench. Follow manufacturer instructions.

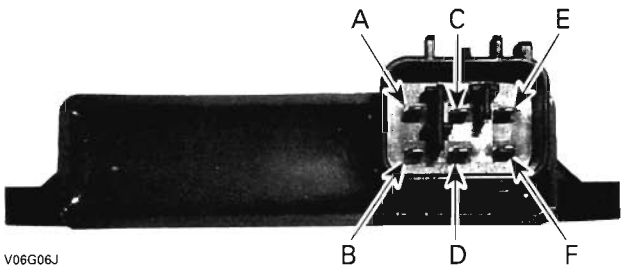
If the ignition coil is out of specification, replace it. If it tests good ensure the wiring and connectors are in good condition then continue the next tests.

ELECTRONIC MODULE (CDI)

Test

NOTE: On the multimeter, set measuring range from 1 MΩ – 10 MΩ. Make sure that positive and negative tester probes are installed on the appropriate wires.

If a fault is detected, the electronic module must be replaced.



V06G06J

		NEGATIVE (-) TESTER LINE					
		A	B	C	D	E	F
POSITIVE (+) TESTER LINE	A		O.L.	2.97 KΩ	2.356 MΩ	2.447 MΩ	UP to ∞
	B	2.460 MΩ		2.464 MΩ	5.92 MΩ	6.07 MΩ	O.L.
	C	2.976 KΩ	O.L.		2.356 MΩ	2.451 KΩ	UP to ∞
	D	O.L.	O.L.	O.L.		O.L.	O.L.
	E	O.L.	O.L.	O.L.	O.L.		O.L.
	F	2.304 MΩ	O.L.	2.304 MΩ	5.65 MΩ	5.79 MΩ	

When every other components above have been tested and are good, the electronic module can be suspected. Ensure wiring and connectors are in good condition prior to replacing the electronic module.

Removal

The electronic module is located under service compartment. Remove the front fender.

To remove, unscrew both bolts retaining electronic module to frame and unplug the connector.

Installation

For the installation, reverse the removal procedure.

NOTE: Do not forget the rubber bushings between electronic module and frame.

IGNITION TIMING

Ignition timing is not adjustable.

SPARK PLUG

Disassembly

Unplug the spark plug cable.

Unscrew the spark plug one turn.

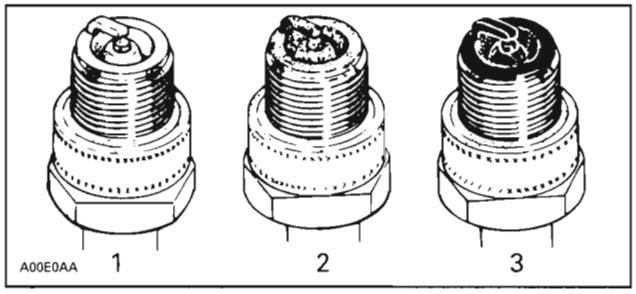
Clean the spark plug and cylinder head with pressurized air.

Unscrew spark plug completely then remove it.

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 low-speed riding, or running on a too rich mixture due to abuse of choke, a clogged air filter, a faulty carburetor adjustment, incorrect fuel, defective ignition system, incorrect ignition timing, incorrect spark plug gap, lubricating oil entering the combustion chamber, or too cold spark plug. The plug face of a fouled spark plug has either a wet black deposit or a black carbon fouling. Such coatings form a conductive connection between the center electrode and ground.

Analysis



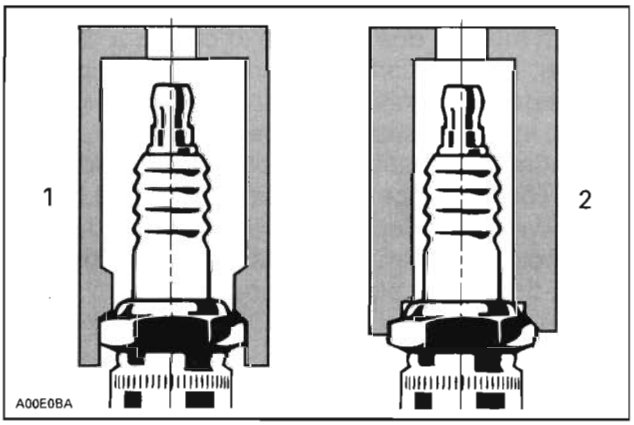
TYPICAL
1. *Overheated (light grey, white)*
2. *Normal (light brown, brown)*
3. *Fouled (black, wet or dry, dark deposits, grey, melted coating)*

The plug face reveals 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 face (i.e. the part of the plug projecting into the combustion chamber).

Installation

Prior to installation make sure that contact surfaces of the cylinder head and spark plug are free of grime.

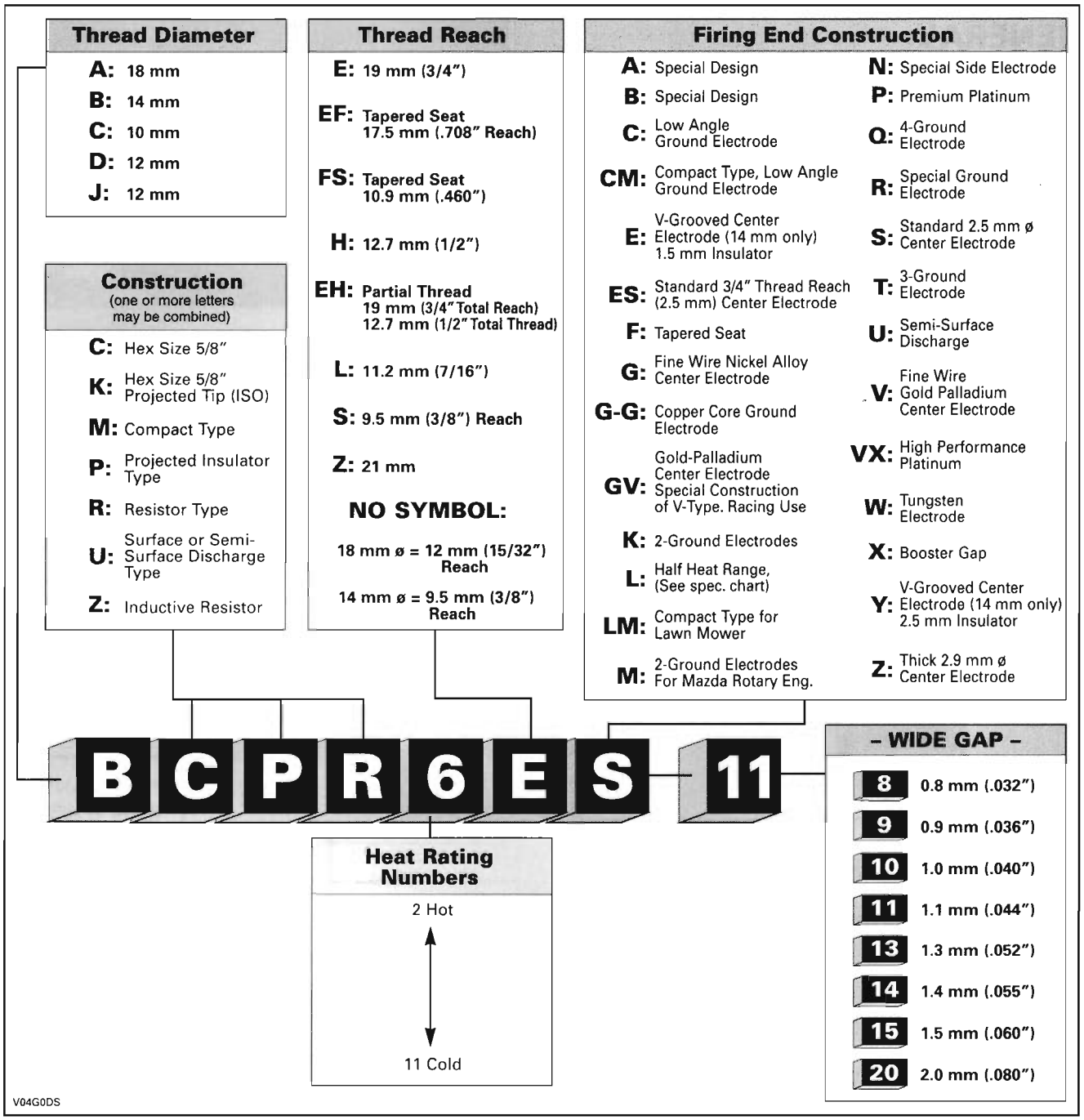
- Using a wire feeler gauge, set electrode gap to 0.65 mm (.026 in).
- Apply antiseize lubricant over the spark plug threads to prevent possible seizure.
- Hand screw spark plug into cylinder head and tighten with a torque wrench and a proper socket.



1. *Proper socket*
2. *Improper socket*

- Torque spark plug to 20 N•m (15 lbf•ft).

NGK Spark Plug Symbol Explanation



OUTLANDER 800 SERIES

GENERAL

The EMS controls the ignition system. For more information, refer to *ENGINE MANAGEMENT*.

The ECM (Engine Control Module) energizes the primary side of ignition coil individually while the ECM completes the circuit for each cylinder by switching it to the ground at the right moment. The ECM can detect open and short circuit in the primary winding but it does not check the secondary winding.

⚠ WARNING

Never check for engine ignition spark from an open coil and/or spark plug as spark may cause potential fuel vapor to ignite.

For best electrical measurement results, use the multimeter Fluke 111 (P/N 529 035 868).



529 035 868

PROCEDURES

IGNITION SWITCH

Ignition function

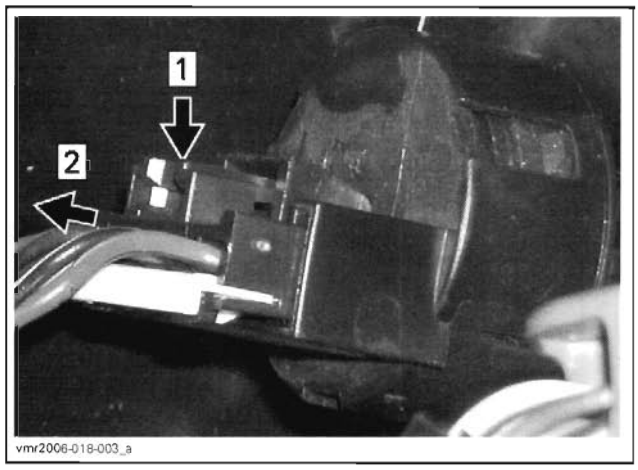
First ensure multi-function switch is in RUN position.

As a quick test to check if ignition key functions properly, turn it to the ON position. If multi-function speedometer turns on (assuming it works), the ignition switch is good. Otherwise, perform the following tests.

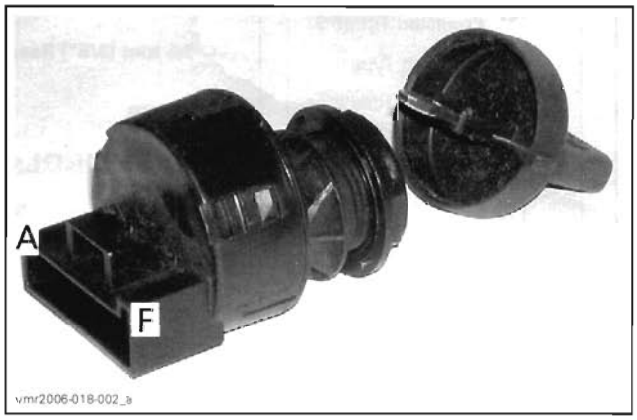
If "INVALID KEY" is seen in speedometer display, ensure key is programmed for the vehicle. Refer to *DESS SYSTEM*.

Remove center panel and dashboard. Refer to *BODY*.

Unplug ignition switch connector.



Using a multimeter, test switch as follows.



PINOUT

IGNITION SWITCH POSITION	PIN		RESISTANCE @ 20°C (68°F)
OFF	B	E	Infinite (O.L)
ON with lights			1 Ω max.
ON without lights			

If switch is out of specification, replace with a new one.

If switch tests good, continue testing.

DESS function

If DESS key is not recognized by the ECM, key is defective or there is a wiring problem, CHECK ENGINE light will turn on and a message will be displayed in the multi-function speedometer.

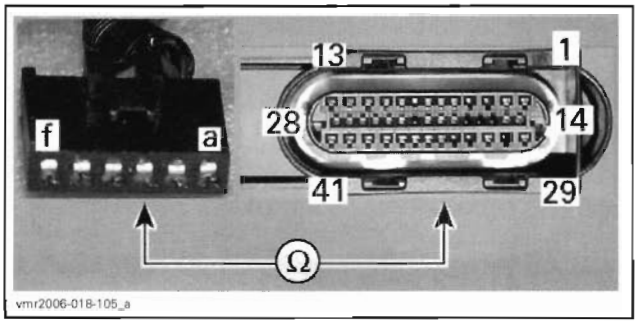
Ensure DESS wiring is not reverted (BLACK/GREEN and ORANGE/RED).

Check wiring and multi-function switch as follows.

Remove ignition key and disconnect connector B from ECM.

Check continuity of wiring between ignition switch and ECM as follows.

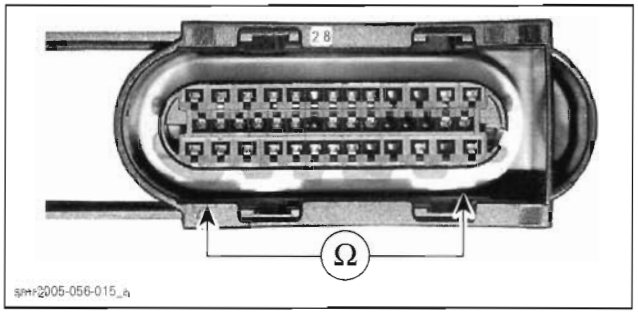
IGNITION SWITCH HARNESS PIN	ECM CONNECTOR PIN	RESISTANCE @ 20°C (68°F)
C	B-39	Close to 0 Ω
D	B-38	



If any test fails, repair wiring/connector.

Check multi-function switch (RUN/STOP) as follows.

MULTI-FUNCTION SWITCH POSITION	ECM CONNECTOR PIN		RESISTANCE @ 20°C (68°F)
STOP	B-38	B-39	Close to 0 Ω
RUN			Infinite (O.L)

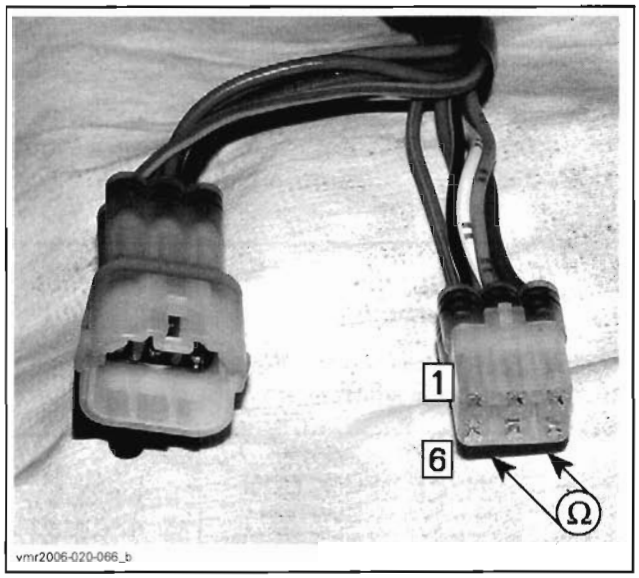


If any test fails, check continuity of wiring/connectors. If they test good, replace switch.

MULTI-FUNCTION SWITCH (RUN/STOP)

Using a multimeter, test switch as follows.

POSITION	MULTI-FUNCTION SWITCH CONNECTOR (MG1) (run/stop)		RESISTANCE @ 20°C (68°F)
RUN	1	2	1 Ω MAX.
STOP			Infinite (O.L)



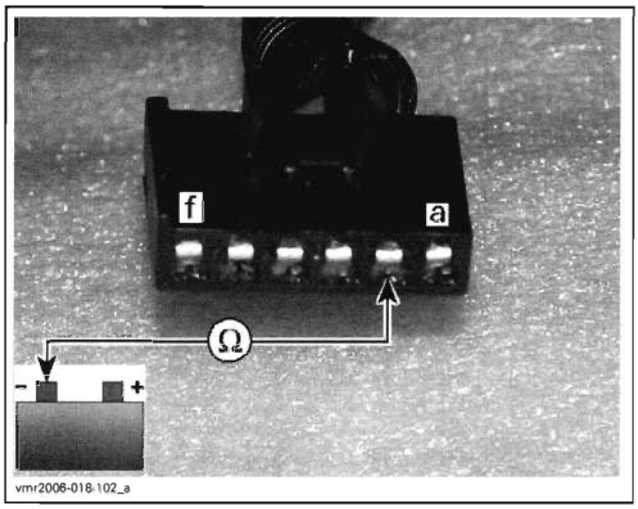
If switch is out of specification, replace with a new one.

If switch tests good, continue testing.

Wiring Tests (wiring related to ignition/multi-function switches)

Wiring Test between Ignition Switch and Battery Ground

IGNITION SWITCH HARNESS PIN		RESISTANCE @ 20°C (68°F)
B	Battery ground	Close to 0 Ω

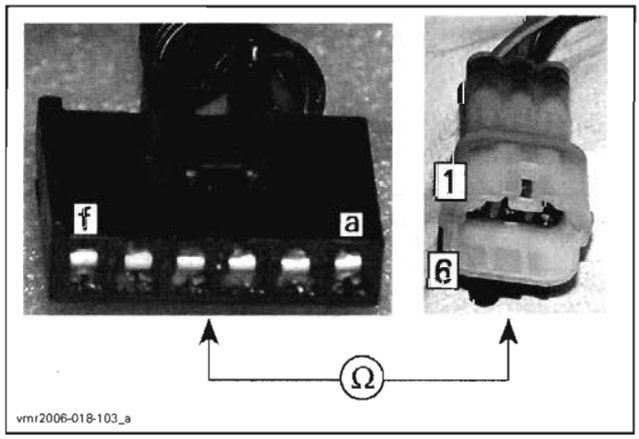


If out of specification, repair wiring/connector.

If as per specification, continue testing.

Wiring Test between Ignition Switch and multi-function Switch (Run/Stop)

IGNITION SWITCH HARNESS PIN	MULTI-FUNCTION SWITCH HARNESS PIN (MG1)	RESISTANCE @ 20°C (68°F)
E	2	Close to 0 Ω

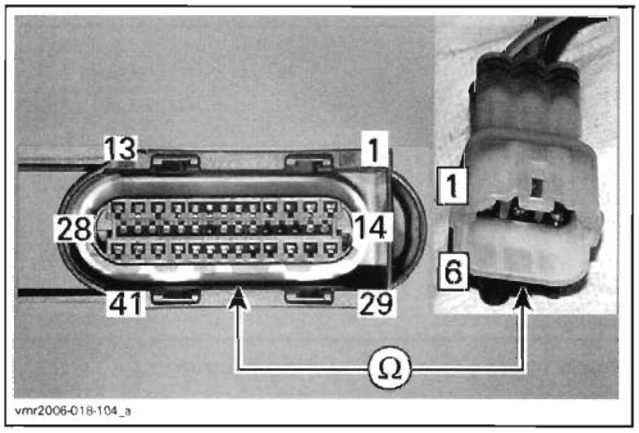


If out of specification, repair wiring/connector.

If as per specification, continue testing.

Wiring Test between multi-function Switch (Run/Stop) and ECM

ECM CONNECTOR PIN	MULTI-FUNCTION SWITCH HARNESS PIN	RESISTANCE @ 20°C (68°F)
B-26	1	Close to 0 Ω

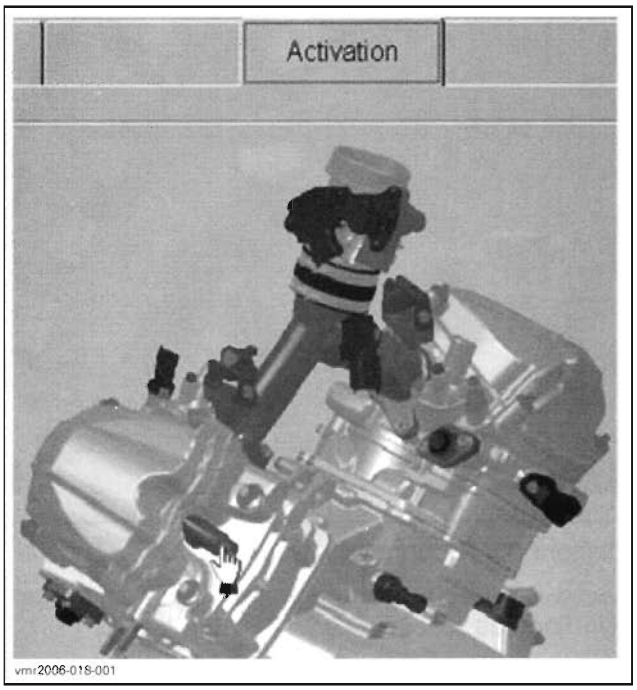


IGNITION COIL



Quick Test with B.U.D.S.

Using the vehicle communication kit (VCK) with the B.U.D.S. software, energize the ignition coil for each spark plug.



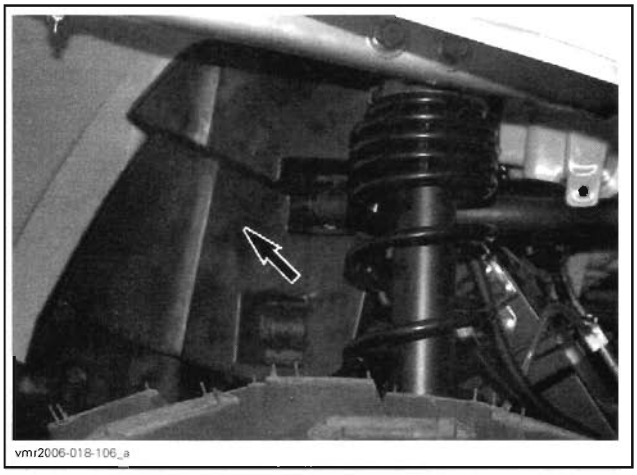
You should hear the spark occurring. In doubt, use an inductive spark tester. If there is no spark, perform the following checks.

NOTE: Keep in mind that even if there is a spark during this static test, voltage requirement is higher to produce a spark in the combustion chamber when engine is running. Ignition coil could be not working in real operation. Replacing ignition coil may be necessary as a test.

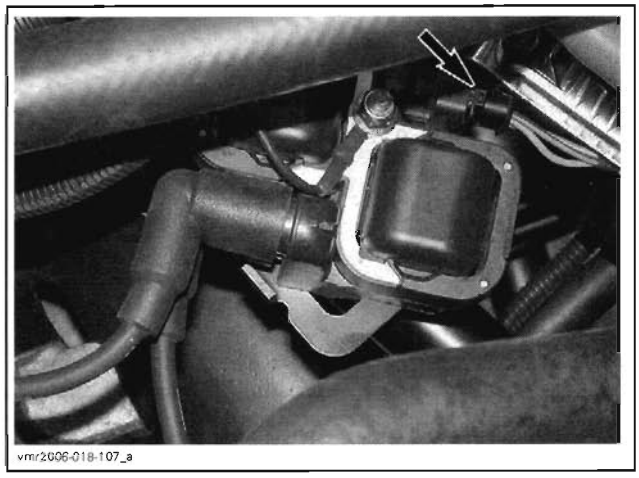
NOTE: Ensure spark plug cable is on the appropriate cylinder.

Voltage Test

Remove RH inner fender. Refer to *BODY*.



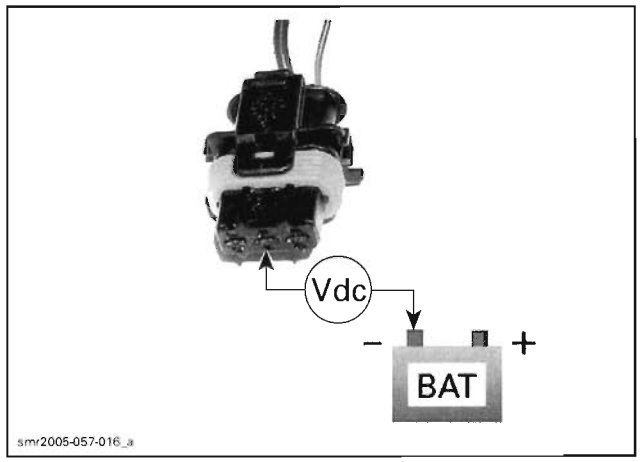
Disconnect the 3-pin connector from the ignition coil and check the voltage supplied by the main relay.



Turn ignition switch to ON and set engine stop switch to RUN.

Using a multimeter, read voltage.

IGNITION COIL CONNECTOR	VOLTAGE
Pin 2 with battery ground	12 V



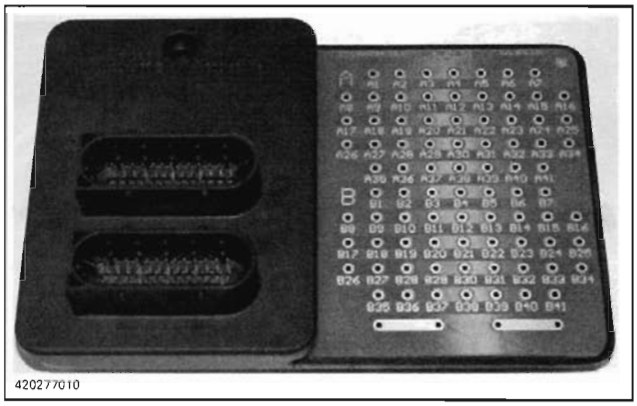
TYPICAL

The voltage should be 12 V.

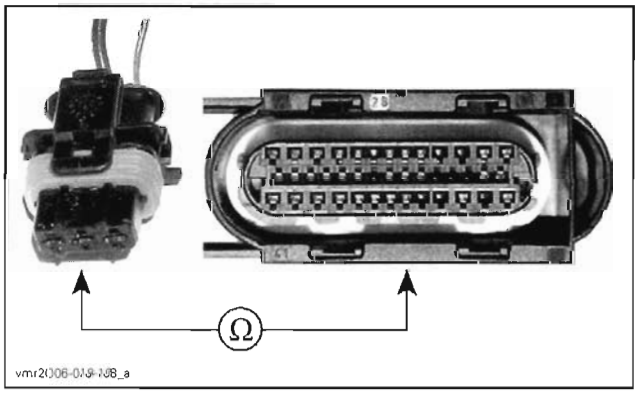
If 12 V is NOT read, check continuity of ignition coil supply circuit.

If 12 V is read, disconnect the ECM connector A and check the continuity of appropriate circuit.

NOTE: For this test, use the ECM adapter (P/N 420 277 010) to probe ECM connector. Refer to *ENGINE MANAGEMENT* for more information.



COMPONENT	CIRCUIT NUMBER (ignition coil connector)	CIRCUIT NUMBER (ECM connector)
Cylinder 1 (front)	1	A-1
Cylinder 2 (rear)	3	A-41



If wiring harness is defective, repair the connector or replace the wiring harness between ECM connector and the ignition coil.

If wiring harness is good, try a new ECM.

Resistance Test

An ignition coil with good resistance measurement can still be faulty. Voltage leak can occur at high voltage level which is not detectable with an ohmmeter. Replacing the ignition coil may be necessary as a test.

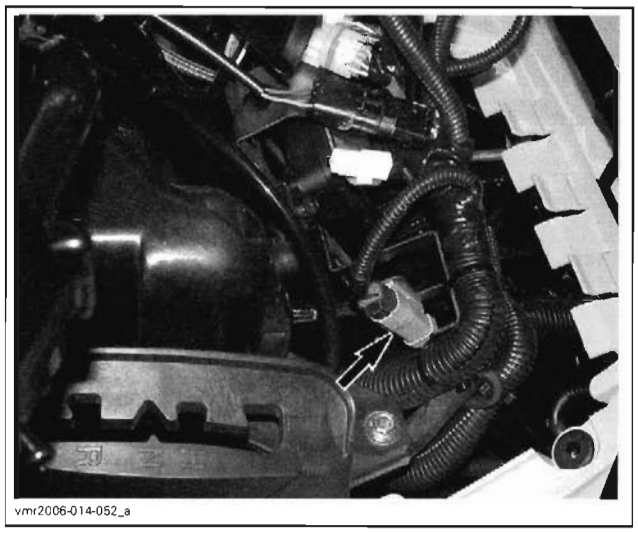
Disconnect ignition cable from spark plug.

Primary Windings

Reconnect connector to ignition coil.

Remove center panel and dashboard. Refer to *BODY*.

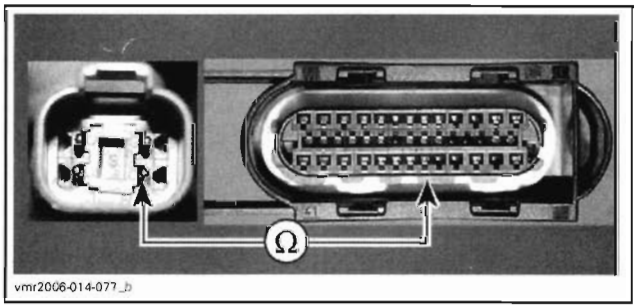
Disconnect engine connector.



Disconnect A connector from ECM.

Using a multimeter, check resistance in primary windings as follows.

PRIMARY CIRCUIT	ENGINE CONNECTOR PIN	ECM CONNECTOR "A"	RESISTANCE @ 20°C (68°F)
Front	2	A-1	.3 - .6 Ω
Rear		A-41	



If any resistance is not good, replace ignition coil.

If the windings test good, check wiring/connectors and if adequate, try a new ECM.

Secondary Windings

Due to the integrated diode, it is not possible to take any resistance measurement of the secondary winding.

IGNITION TIMING

Ignition timing is not adjustable.

SPARK PLUG

Refer to *OUTLANDER 400* in this section.

STARTING SYSTEM

SERVICE TOOLS

Description	Part Number	Page
ECM adapter	420 277 010	223
multimeter Fluke 111	529 035 868	219, 223

SERVICE PRODUCTS

Description	Part Number	Page
dielectric grease	293 550 004	220, 228

OUTLANDER 400 SERIES

STARTING SYSTEM TROUBLESHOOTING

Symptom: **STARTER DOES NOT TURN.**

1. **Ignition switch is in the OFF position.**
   - *Turn switch to the ON position.*
2. **Burnt fuse.**
   - *Check main fuse and wiring condition.*
3. **Transmission is not set to Park or Neutral position.**
   - *Set transmission to PARK or Neutral or squeeze the brake lever or press on brake pedal.*
4. **Poor contact of battery terminal(s) or ground cable connections.**
   - *Clean and tighten terminal(s).*
5. **Weak battery.**
   - *Recharge battery.*
6. **Poor contact or open circuit of: start button, engine stop switch, ignition switch or starting solenoid.**
   - *Check and replace defective part.*
7. **Park and/or Neutral switch(es) is(are) defective.**
   - *Check park and/or neutral switch(es) and wiring condition.*
8. **Engine mechanical problem (ensure that other electric components are good).**
   - *Check and replace defective part.*

Symptom: **STARTER TURNS, BUT DOES NOT CRANK THE ENGINE.**

1. **Poor contact of battery terminal(s).**
   - *Clean and tighten terminal(s).*
2. **Poor battery ground cable connection.**
   - *Clean and tighten.*
3. **Burnt or poor contact of solenoid switch contact disc.**
   - *Replace starting solenoid.*

Symptom: **STARTER TURNS, BUT DOES NOT CRANK THE ENGINE.** (cont'd)

4. **Poor contact of brush.**
   - *Clean, verify or straighten commutator and brush or replace electric starter.*
5. **Burnt commutator.**
   - *Turn commutator in a lathe or replace electric starter.*
6. **Worn commutator segments.**
   - *Undercut mica or replace electric starter.*
7. **Shorted armature.**
   - *Replace electric starter.*
8. **Weak brush spring tension.**
   - *Replace electric starter.*
9. **Weak magnet.**
   - *Replace electric starter.*
10. **Worn bushings.**
    - *Replace electric starter.*
11. **Weak battery.**
    - *Recharge or replace battery.*

Symptom: **STARTER TURNS, BUT OVERRUNNING CLUTCH PINION DOES NOT MESH WITH RING GEAR.**

1. **Worn clutch pinion gear.**
   - *Replace electric starter.*
2. **Defective clutch.**
   - *Replace electric starter.*
3. **Poor movement of clutch on splines.**
   - *Replace electric starter.*
4. **Worn clutch bushing.**
   - *Replace electric starter.*
5. **Worn ring gear.**
   - *Replace ring gear.*

Symptom: **STARTER MOTOR KEEPS RUNNING.**

1. **Shorted starting solenoid switch winding.**
   - *Replace starter solenoid.*
2. **Melted solenoid contacts.**
   - *Replace starter solenoid.*
3. **Sticking or defective starter clutch.**
   - *Lubricate or replace electric starter.*
4. **Start button stock.**
   - *Fix or remove mud/ice/dirt or replace it.*

GENERAL

First ensure the problem is not related to engine mechanical components. If not, test the starting system.

Causes of problems are not necessarily related to starter but may be due to a burnt fuse, faulty battery, start button, ignition switch, engine stop switch, starting solenoid, electrical cables, connections or the electronic module.

Check these components before removing starter. Consult the *STARTING SYSTEM TROUBLESHOOTING* table above for a general view of possible problems.

⚠ WARNING

To avoid the possibility of a short circuit while working on the starter, always disconnect the battery.

Tool

For best electrical measurement results, use the multimeter Fluke 111 (P/N 529 035 868).



529 035 868

TEST

FUSES

Make sure the main fuse (20 amp) is in good condition. If the fuse tests good, continue with the next tests.

BATTERY

To check battery condition, refer to *BATTERY* above. If it tests good, continue with the next tests.

IGNITION SWITCH

A quick test to check if it is functioning properly. Turn the ignition switch to the ON position. If the headlamps turn on, the ignition switch is good. Otherwise, refer to *IGNITION SYSTEM* for testing procedure. If it tests good, continue the next tests.

ENGINE STOP SWITCH

If engine does not crank when placing engine stop switch to RUN and pressing the start button, test the engine stop switch as follows.

Remove the console (refer to *BODY*) and unplug the multi-function switch connector.

Using a multimeter, measure the resistance between the following wires.

POSITION	WIRE	RESISTANCE
Switch to OFF	BLACK and BLACK/WHITE	1 Ω max.
Switch to RUN		Infinite (O.L)

Replace multi-function switch if defective.

If switch and wiring test is good, continue the next tests.

START SWITCH

If engine does not turn when pressing the start button, test the switch as follows.

Remove the front fascia and unplug the multi-function switch connector.

Using a multimeter, measure the resistance between the following wires.

POSITION	WIRE	RESISTANCE
Switch released	RED/VIOLET and YELLOW/RED	Infinite (O.L)
Switch depressed and held		0.6 Ω max.

Replace multi-function switch if defective.

If switch tests good, check wiring going to electronic module. If the wiring tests good, continue the next tests.

STARTING SOLENOID

NOTE: Solenoid is located on the frame, behind battery rack.

Ensure the solenoid receives electric current as follows. Using a multimeter, measure the voltage between the YELLOW/RED and WHITE/RED wires when pressing the start button with the ignition key turned ON.

NOTE: Disconnect wires from solenoid.

If solenoid does not properly receive current, the electronic module can be suspected. See *ELECTRONIC MODULE* section below.

If solenoid receives current, test the solenoid as follows.

Disconnect large cables from solenoid.

Inspect connections and clean as necessary. Solenoid condition can be checked with an ohmmeter. Install test probes on large connectors of solenoid. Measure resistance when current is applied to small connectors; if it is more than a few ohms, replace solenoid.

If solenoid test good, check the electric starter. If starter test good, the electronic module can be suspected. See *ELECTRONIC MODULE* below.

ELECTRICAL CABLES OR CONNECTIONS

Check all connections, cables and wires. Tighten any loose connections. Replace any chafed wires/cables.

If wiring and connectors are good, check the electric starter. See below.

ELECTRIC STARTER

Using booster cables, carefully supply current from the battery directly to the starter. Connect the BLACK (-) cable first. Then connect the remaining jumper cable from the battery then to the starter.

If starter turns ensure the cables/connections from battery to solenoid and to starter are in good condition. If they test good, the electronic module can be suspected. See *ELECTRONIC MODULE* below.

If starter does not turn, check for mechanical problems in the starter.

ELECTRONIC MODULE

When other components have been tested above and are good, the electronic module can be suspected. Ensure wiring and connectors are in good condition prior to replacing the electronic module.

PART REPLACEMENT

ELECTRIC STARTER

Removal

Turn OFF ignition switch.

Disconnect BLACK (-) cable from battery.

⚠ WARNING

Always disconnect BLACK (-) cable first and reconnect last.

Remove the RH side cover and the engine cover (refer to *BODY*).

Disconnect RED (+) cable from starter.

Clean starter area.

Remove starter mount screws.

Pull starter out.

Installation

Installation is the reverse of removal procedure. However, pay particular attention to the following.

Make sure that starter and engine mating surfaces are free of debris. Serious problem may arise if the starter is not properly aligned.

Torque starter screws to 10 N•m (89 lbf•**in**).

Connect the RED (+) cable to the starter and torque nut to 6 N•m (53 lbf•**in**). Apply dielectric grease (P/N 293 550 004) on terminal and nut.

First connect RED (+) cable to battery then connect the BLACK (-) cable.

⚠ WARNING

Always connect RED (+) cable first then BLACK (-) cable last. Whenever connecting the RED (+) cable to the starter motor, make sure the battery cables are disconnected to prevent electric shock.

Test starter operation.

OUTLANDER 800 SERIES

STARTING SYSTEM TROUBLESHOOTING

Symptom: STARTER DOES NOT TURN.

1. **Ignition switch is in the OFF position.**
   - *Turn switch to the ON position.*
2. **Engine stop switch is in the OFF position.**
   - *Turn switch to the RUN position.*
3. **DESS key not programmed for the vehicle.**
   - *Refer to DESS SYSTEM.*
4. **Defective DESS key or switch.**
   - *Check key and switch.*
5. **Burnt fuse.**
   - *Check main fuse and wiring condition.*
6. **Transmission is not set to Park or Neutral position or brake switch is not activated.**
   - *Set transmission to PARK or NEUTRAL position or squeeze the brake lever or press on brake pedal.*
7. **Poor contact of battery terminal(s) or ground cable connections.**
   - *Clean and tighten terminal(s).*
8. **Weak battery.**
   - *Recharge battery.*
9. **Poor contact or open circuit of: start button, engine stop switch, ignition switch or starting solenoid.**
   - *Check and replace defective part.*
10. **GBPS switch(es) is(are) defective.**
    - *Check GBPS switch(es) and wiring condition. Refer to GEARBOX.*
11. **Diode incorrectly installed or failure.**
    - *Check diode installation and condition.*
12. **Defective ECM.**
    - *Check. Refer to ENGINE MANAGEMENT.*
13. **multi-function speedometer replaced but not updated with proper coding.**
    - *Use B.U.D.S. and update ECM. Refer to INSTRUMENTS AND ACCESSORIES.*
14. **Defective brake switch.**
    - *Check brake switch and its connectors. Replace defective part.*
15. **Engine mechanical problem (ensure that other electric components are good).**
    - *Check and replace defective part.*

Symptom: STARTER TURNS, BUT DOES NOT CRANK THE ENGINE.

1. **Poor contact of battery terminal(s).**
   - *Clean and tighten terminal(s).*
2. **Poor battery ground cable connection.**
   - *Clean and tighten.*

Symptom: **STARTER TURNS, BUT DOES NOT CRANK THE ENGINE.** (cont'd)

3. **Weak battery.**
   - *Recharge or replace battery.*
4. **Burnt or poor contact of solenoid switch contact disc.**
   - *Replace starting solenoid.*
5. **Poor contact of brush.**
   - *Clean, verify or straighten commutator and brush or replace electric starter.*
6. **Burnt commutator.**
   - *Turn commutator in a lathe or replace electric starter.*
7. **Worn commutator segments.**
   - *Undercut mica or replace electric starter.*
8. **Shorted armature.**
   - *Replace electric starter.*
9. **Weak brush spring tension.**
   - *Replace electric starter.*
10. **Weak magnet.**
    - *Replace electric starter.*
11. **Worn bushings.**
    - *Replace electric starter.*

Symptom: **STARTER TURNS, BUT OVERRUNNING CLUTCH PINION DOES NOT MESH WITH RING GEAR.**

1. **Worn clutch pinion gear.**
   - *Replace electric starter.*
2. **Defective clutch.**
   - *Replace electric starter.*
3. **Poor movement of clutch on splines.**
   - *Replace electric starter.*
4. **Worn clutch bushing.**
   - *Replace electric starter.*
5. **Worn ring gear.**
   - *Replace ring gear.*

Symptom: **STARTER MOTOR KEEPS RUNNING.**

1. **Shorted starting solenoid switch winding.**
   - *Replace starter solenoid.*
2. **Melted solenoid contacts.**
   - *Replace starter solenoid.*
3. **Sticking or defective starter clutch.**
   - *Lubricate or replace electric starter.*
4. **Start button stock.**
   - *Fix or remove mud/ice/dirt or replace it.*

GENERAL

First ensure the problem is not related to engine mechanical components. If not, test the starting system.

Causes of problems are not necessarily related to starter but may be due to a burnt fuse, faulty battery, relay, start button, ignition switch (DESS), engine stop switch, starting solenoid, electrical cables, connections or the ECM.

Check these components before removing starter. Consult the *STARTING SYSTEM TROUBLESHOOTING* table above for a general view of possible problems.

⚠ WARNING

To avoid the possibility of a short circuit while working on the starter, always disconnect the battery.

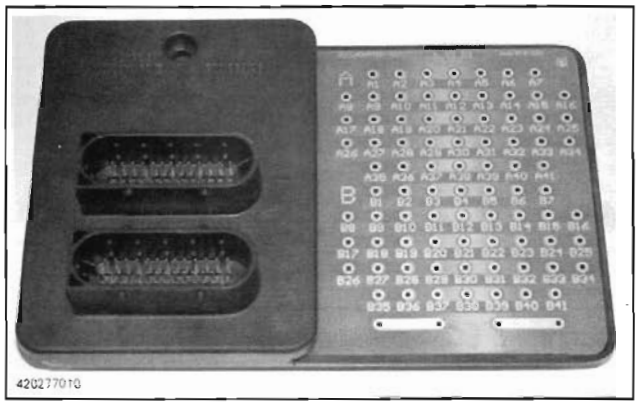
Tool

For best electrical measurement results, use the multimeter Fluke 111 (P/N 529 035 868).



529 035 868

For ECM pin testing, use the ECM adapter (P/N 420 277 010) to probe ECM connector. Refer to *ENGINE MANAGEMENT* for more information.



TEST

FUSES

Make sure the main fuse (F8) and the accessories fuse (F4) is(are) in good condition. If the fuses test good, continue with the next tests.

NOTE: The solenoid may be the cause of a burnt fuse. If the solenoid test good, one of the accessory may be defective.

BATTERY

To check battery condition, refer to *BATTERY*. If it tests good, continue with the next tests.

ELECTRICAL CABLES OR CONNECTIONS

Check all connections, cables and wires. Tighten any loose connections. Replace any chafed wires/cables.

If wiring and connectors are good, check the electric starter.

ECM INITIALIZATION

To validate ECM initializes (turns on), look speedometer display. It should turn on when ignition key is ON and engine stop switch is at RUN. Otherwise, refer to *ENGINE MANAGEMENT*.

If speedometer turns on, continue the next tests.

ELECTRIC STARTER

Using booster cables, carefully supply current from the battery directly to the starter. Connect the BLACK (-) cable first. Then connect the remaining jumper cable from the battery then to the starter.

If starter turns ensure the cables/connections from solenoid to starter are in good condition.

If starter does not turn, replace starter.

IGNITION SWITCH

First ensure engine stop switch is in RUN position.

As a quick test to check if ignition key functions properly, turn it to the ON position. If multi-function speedometer turns on (assuming it works), the ignition switch is good. Otherwise, refer to *IGNITION SYSTEM* for testing procedure.

If "INVALID KEY" is seen in speedometer display, ensure key is programmed for the vehicle. Refer to *DESS SYSTEM*. If problem persists, check DESS key, ignition switch and stop switch. Refer to *IGNITION SYSTEM*.

ENGINE STOP SWITCH

First ensure ignition switch is in ON position and engine stop switch is RUN position.

If engine does not crank when pressing the start button, try starting while using brake. If it is now working, test GBPS switch. Refer to *GEARBOX*. If GBPS switch tests good, check the brake switch. Refer to *IGNITION SYSTEM*.

START SWITCH

If engine does not turn when pressing the start button, test the switch as follows.

A quick operation test can be done using the vehicle communication kit (VCK) with the B.U.D.S. software, using the **Monitoring** tab. Press the vehicle's start button and look at the **Start button** LED.



It should turn on, indicating the starting system is working on the input side of the starting system (start button, ECM and wiring).

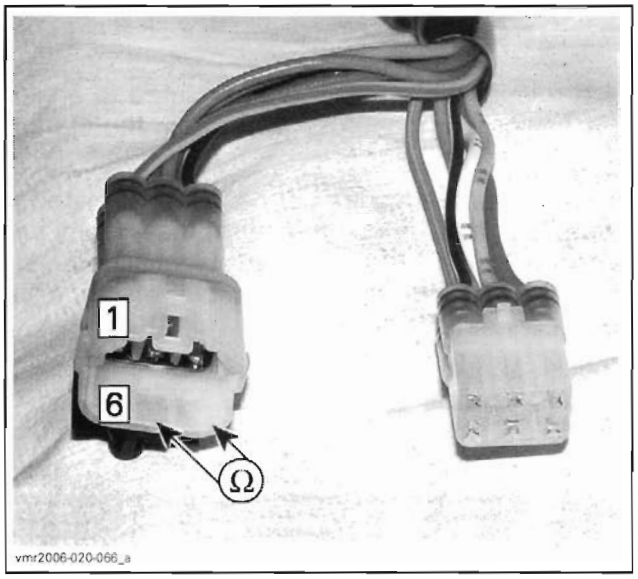
If it turns on, you are knowing now the problem is on the output side of the starting system (ECM output signal to starting solenoid, wiring harness going to the solenoid and starter motor).

If it does not turn on, check the input side (start switch) as follows.

Remove center panel and dashboard. Refer to *BODY*.

Using a multimeter, measure the resistance between the following wires.

POSITION	MULTI-FUNCTION SWITCH CONNECTOR (MG2) PIN (start)		RESISTANCE
Switch released	1	6	Infinite (O.L)
Switch depressed and held			0.6 Ω max.

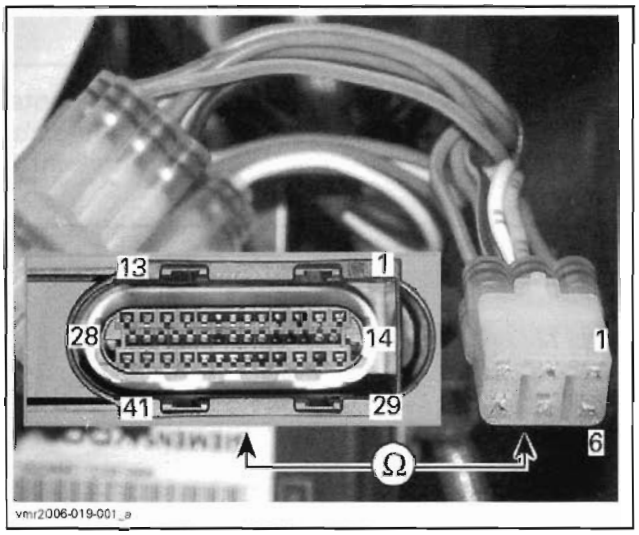


Replace multi-function switch if defective.

If switch tests good, disconnect ECM connector B.

Test continuity of wiring between start switch connector and ECM connector as follows.

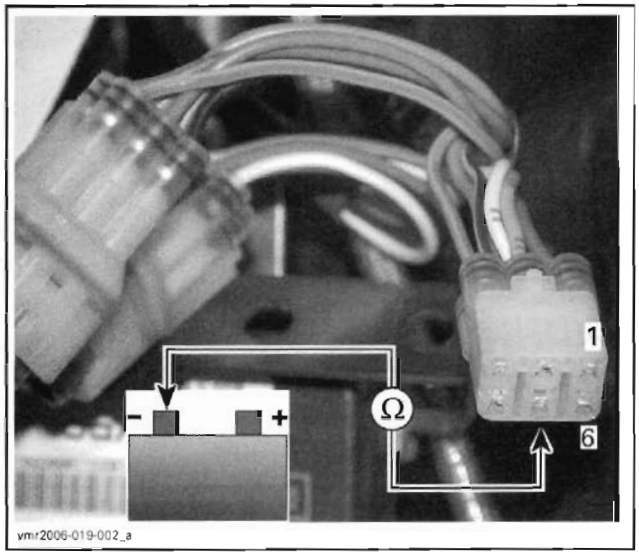
CONNECTOR		RESISTANCE @ 20°C (68°F)
ECM	MULTI-FUNCTION SWITCH (MG2) PIN (harness side) (start)	
PIN		
B-21	1	1 Ω max.



Reconnect ECM connector B.

If switch tests good, test continuity of wiring between start switch connector and battery ground as follows.

CONNECTOR		RESISTANCE @ 20°C (68°F)
MULTI-FUNCTION SWITCH (MG2) (start)	BATTERY	
PIN		
6	Battery ground	1 Ω max.



If wiring is faulty, repair/replace harness and/or connectors. If it tests good, continue the next tests.

STARTING SOLENOID

NOTE: Solenoid is located on the frame, besides battery rack.



Inspect connections and clean as necessary.

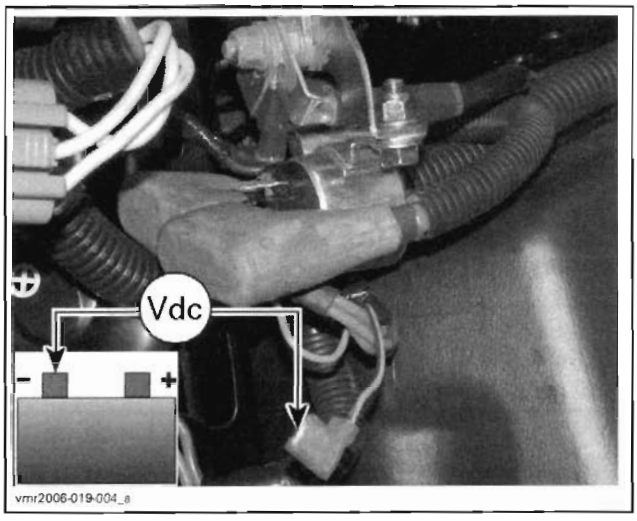
Solenoid Winding Supply

Disconnect connector with ORANGE/GREEN wire from solenoid and check voltage as follows.

Turn ignition key ON and set engine stop switch to RUN.

Read voltage (do not press start switch).

SOLENOID CONNECTOR (harness side)	VOLTAGE
ORANGE/GREEN with battery ground	12 Vdc



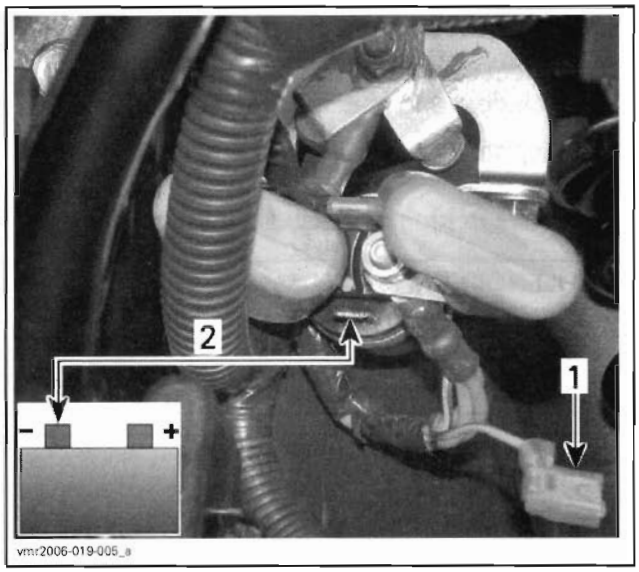
If voltage is not adequate, check accessories fuse (F4). If fuse is good, test continuity of wiring between solenoid and fuse F4.

If voltage is adequate, do the following test.

Reconnect ORANGE/GREEN terminal to solenoid.

Disconnect ORANGE/BROWN terminal from solenoid.

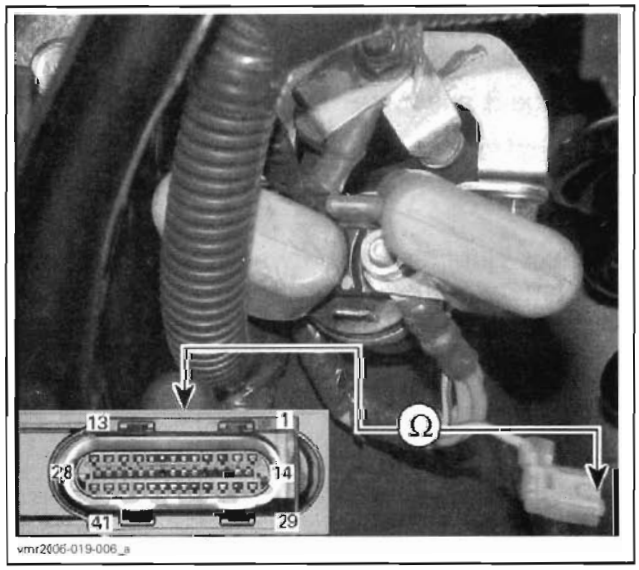
Connect a jumper wire between solenoid terminal and battery ground.



1. Disconnect ORANGE/BROWN terminal
2. Jumper to battery ground

If solenoid works, check wiring/connectors for continuity as follows.

ECM CONNECTOR PIN	SOLENOID TERMINAL (harness side)	RESISTANCE @ 20°C (68°F)
B-31	ORANGE/BROWN	Close to 0 Ω



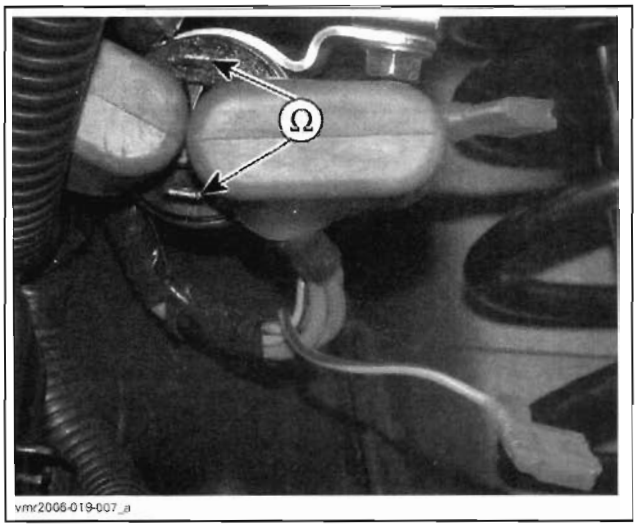
If solenoid does not work, test solenoid.

Static Test: Continuity

Disconnect terminals from solenoid.

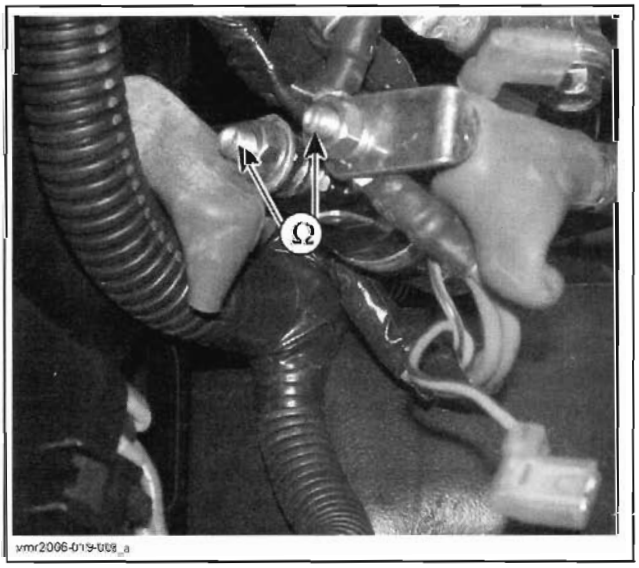
With a multimeter, check primary winding resistance as follows.

SOLENOID CONNECTOR		MEASUREMENT
TERMINAL		RESISTANCE @ 20°C (68°F)
A	B	Approximately 5 Ω



Check for stuck solenoid plunger.

SOLENOID CONNECTOR		MEASUREMENT
PIN		RESISTANCE @ 20°C (68°F)
Battery post	Starter post	Open circuit



If any measurement is out of specification, replace solenoid.

Dynamic Test

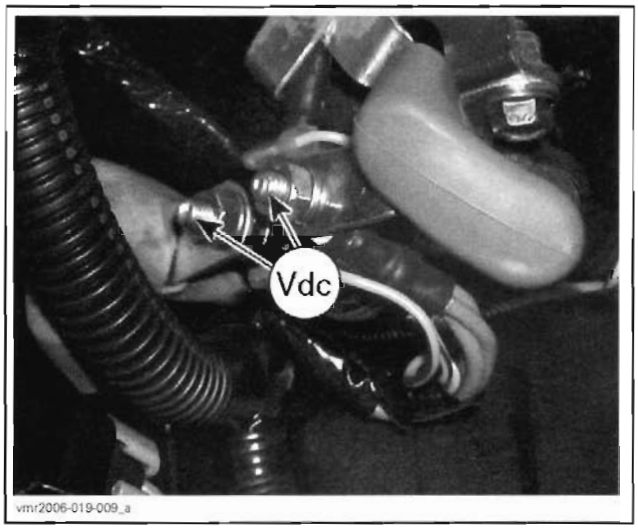
Turn ignition key ON and set engine stop switch to RUN.

For the following test, we do not want the engine to run. Set ECM in engine drowned mode as follows:

- Depress and hold throttle lever at full throttle position.
- Install a rubber band or some tape to maintain throttle lever in this position while testing.

Depress start button and while engine is cranking, measure the voltage drop as follows with a multimeter.

SOLENOID CONNECTOR		MEASUREMENT
PIN		VOLTAGE
Post coming from battery	Post going to starter	0.2 Vdc max.



⚠ WARNING

Remove any rubber band or tape from throttle lever to release it.

If voltage is out of specification, replace solenoid.

If solenoid tests good, check the electric starter.

ECM

When other components have been tested above and are good, the ECM can be suspected. Try a new ECM. Refer to *ENGINE MANAGEMENT*.

PART REPLACEMENT

ELECTRIC STARTER

Removal

Turn OFF ignition switch.

Disconnect BLACK (-) cable from battery.

⚠ WARNING

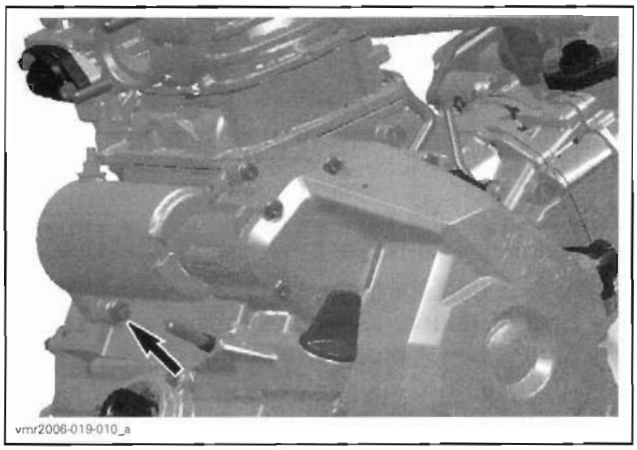
Always disconnect BLACK (-) cable first and reconnect last.

Remove the RH side cover and the engine cover (refer to *BODY*).

Disconnect RED (+) cable from starter.

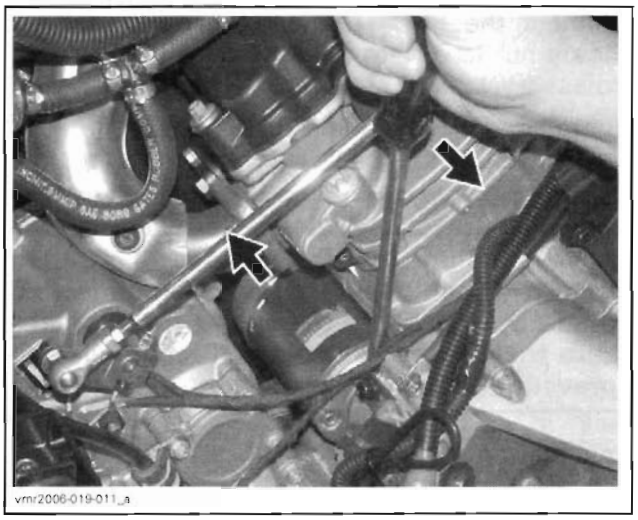
Clean starter area.

Remove starter mount screw.

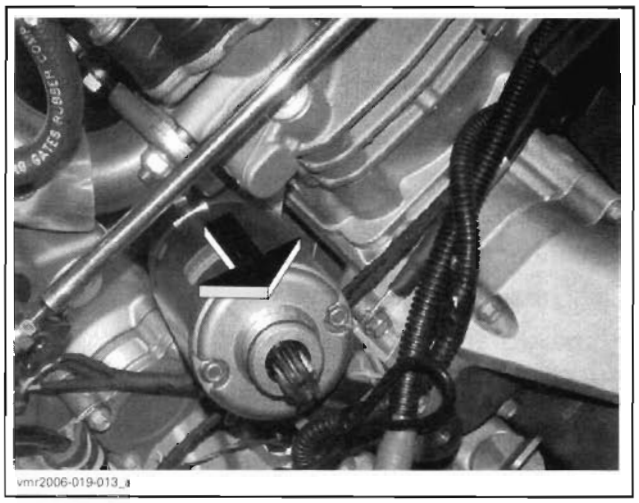


SOME PARTS REMOVED FOR CLARITY PURPOSE ONLY

Carefully pry starter out of its housing.



Pull starter out.



Installation

Installation is the reverse of removal procedure. However, pay particular attention to the following.

Make sure that starter and engine mating surfaces are free of debris. Serious problem may arise if the starter is not properly aligned.

Bring starter close to its location. Rotate it so that its mounting ear allows installation in engine housing. Push in place and align mounting ear to install screw.

Torque starter screw to 25 N•m (18 lbf•ft).

Connect the RED (+) cable to the starter and torque nut to 6 N•m (53 lbf•**in**). Apply dielectric grease (P/N 293 550 004) on terminal and nut.

First connect RED (+) cable to battery then connect the BLACK (-) cable.

⚠ WARNING

Always connect RED (+) cable first then BLACK (-) cable last. Whenever connecting the RED (+) cable to the starter motor, make sure the battery cables are disconnected to prevent electric shock.

Test starter operation.

DIGITALLY ENCODED SECURITY SYSTEM

SERVICE TOOLS

Description	Part Number	Page
B.U.D.S. software	529 036 024	229
diagnostic cable	710 000 851	229
MPI-2 interface card	529 036 018	229
Vehicle Communication Kit (VCK)	529 035 981	229

GENERAL

The ignition key contains a ROM chip with a unique digital code that is the equivalent of a unique teeth pattern on a conventional key.

When the ignition key is turned ON, the ECM is powered up as well as the multi-function speedometer and the accessories. Then, the ECM reads the ignition key and, if it is not recognized, no engine starting will be possible.

NOTE: When a key is not recognized by the ECM, INVALID KEY will be displayed in the multi-function speedometer.

To work on a particular DESS-equipped vehicle, the ignition key must have been programmed first.

NOTE: All ignition keys have the same teeth pattern. Therefore, they can be used and turned in the switch of any DESS-equipped vehicle. However, unless the DESS system recognizes (in the ECM) a valid programmed key, the engine starting will not be allowed.

NOTE: Actually, it is the memory of the ECM that is programmed to recognize the digital code of the ignition key.

The system is quite flexible. Up to 8 ignition keys may be programmed in the memory of the ECM. They can also be erased individually or all at once.

Note that the DESS circuitry is already activated on all new ECM.

KEY PROGRAMMING

Two tools can be used to communicate with the engine control module (ECM) of the vehicle to program a key:

- Vehicle Communication Kit (VCK) (P/N 529 035 981) or,
- MPI-2 interface card (P/N 529 036 018) with diagnostic cable (P/N 710 000 851).

NOTE: For more details on these tools, refer to *DIAGNOSTIC PROCEDURES* in the *ENGINE MANAGEMENT* section.

The B.U.D.S. software (P/N 529 036 024) is designed to allow, among other things, the programming of ignition key(s) and entering customer information.

NOTE: Always use the latest software version available on BRP Sales Exchange.

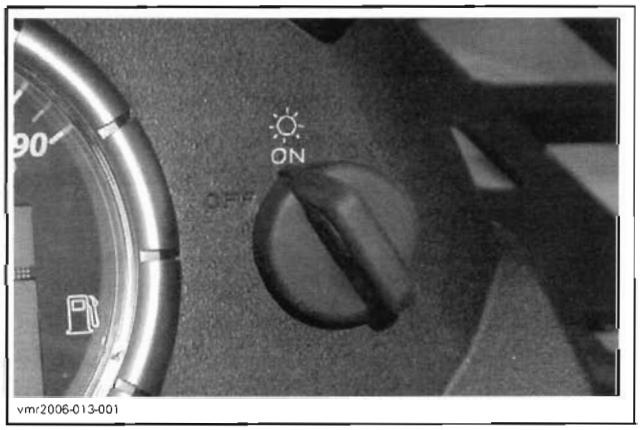
For more information pertaining to the use of the software B.U.D.S., use its help which contains detailed information on its functions.

⚠ WARNING

If the computer you are using is connected to the 110 Vac power outlet, there is a potential risk of electrocution when working in contact with water. Be careful not to touch water while working with the VCK.

Connect the VCK or the MPI-2 interface card as described in *DIAGNOSTIC PROCEDURES*.

Install key in ignition switch and turn it to ON.



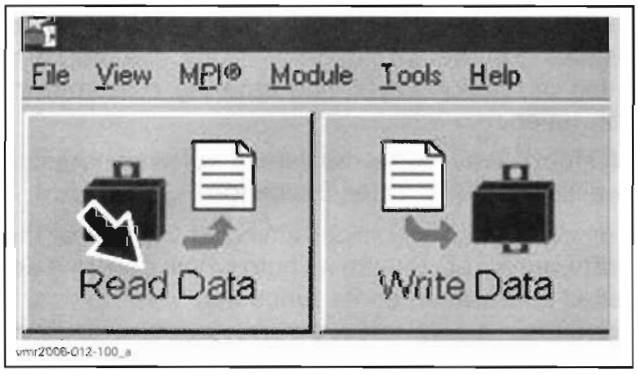
vmr2006-013-001

Ensure engine stop switch is in RUN position.



1. Run

Read ECM using READ DATA button.

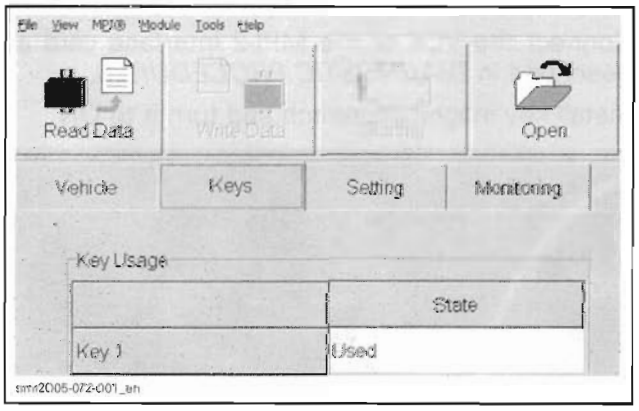


Turn ignition key OFF and remove key.

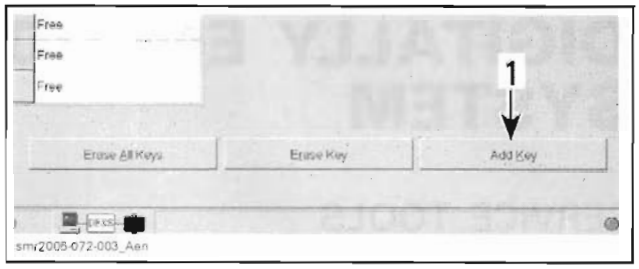
Install the new key to be programmed.

Turn ignition key ON.

Click on KEYS tab.



Click on ADD KEY button on bottom of screen.

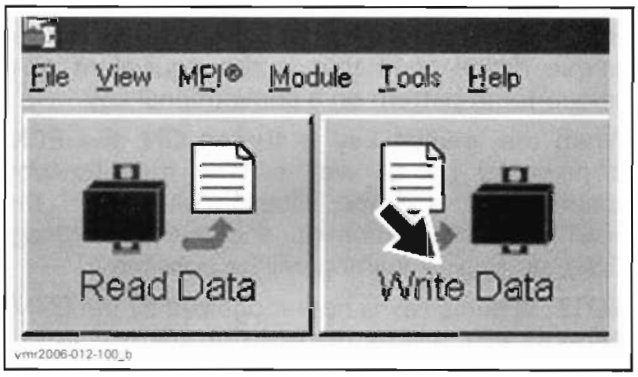


1. Click on this tab

A new key is now saved in the computer.

NOTE: To program other key(s), install a new key in ignition switch, turn it ON and click again on ADD KEY tab.

Ensure to save new data in ECM using WRITE DATA button.



LIGHTS, INSTRUMENTS AND ACCESSORIES

SERVICE TOOLS

Description	Part Number	Page
multimeter Fluke 111	529 035 868	231

GENERAL

NOTE: For a complete overview of the vehicle electrical system, refer to *ENGINE MANAGEMENT*.

⚠ WARNING

It is recommended to always disconnect the battery when replacing any electric or electronic parts. Always disconnect battery exactly in the specified order, BLACK (-) cable first. Do not place tools on battery.
During assembly/installation, use the torque values and service products as in the exploded views.
Clean threads before applying a threadlocker. Refer to *SELF-LOCKING FASTENERS* and *LOCTITE APPLICATION* at the beginning of this manual for complete procedure.
Torque wrench tightening specifications must strictly be adhered to.
Locking devices (e.g.: locking tabs, elastic stop nuts, 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.

The following gives general electrical-related problems. For specific system-related problems, refer to proper system section.

It is possible that a component seems to operate in static condition but in fact, it is defective. In this case, the best way to solve this problem is to remove the original part and replace it with a known good component.

IMPORTANT: When solving an electrical problem, the first thing to do is to check battery condition as well as its cables and connections. Also ensure the ignition switch is turned on and engine run/stop switch is set to RUN. Check solidity (close to battery) and related-circuit fuse condition with an ohmmeter (visual inspection could lead to false results). Also visually examine harness and connections.

For best results, use the multimeter Fluke 111 (P/N 529 035 868).



529 035 868

Pay particular attention to ensure that pins are not out of their connectors or damaged. The troubleshooting procedures cover problems not resulting from one of these causes.

CAUTION: Ensure all terminals are properly crimped on wires and connector housings are properly fastened. replacing any electric or electronic part(s), always check electrical connections. Make sure that they are tight and they make good contact and are corrosion-free. The voltage and current might be too weak to go through dirty wire pins. Check the posts for signs of moisture, corrosion or if they look dull. Clean pins properly and then coat them with silicon-based dielectric grease or other appropriate lubricant (except if otherwise specified) when reassembling them. See connectors information in *ELECTRICAL CONNECTORS*.

IMPORTANT: In an usual electric circuit, the battery supplies a switch which then supplies the electric component. Therefore the switch opens and closes the positive side of the circuit. In circuits controlled by the ECM, the battery supplies the electric component and the ECM works as a switch to complete the circuit to the ground. Take this into account when troubleshooting the electrical system.

Pay attention to ground wires.

Checking for Shorts Between 2 Wires

When checking continuity of a wire in a circuit, wires should be checked for short circuit as follows.

Make sure to isolate circuit by unplugging connectors.

Let's suppose that the circuit to be checked has a RED and a BLACK wire. Using an ohmmeter, measure the resistance between the RED and the BLACK wire. The resistance should be infinite (O.L). Otherwise, there is a short circuit between both wires. We must therefore identify and correct the fault.

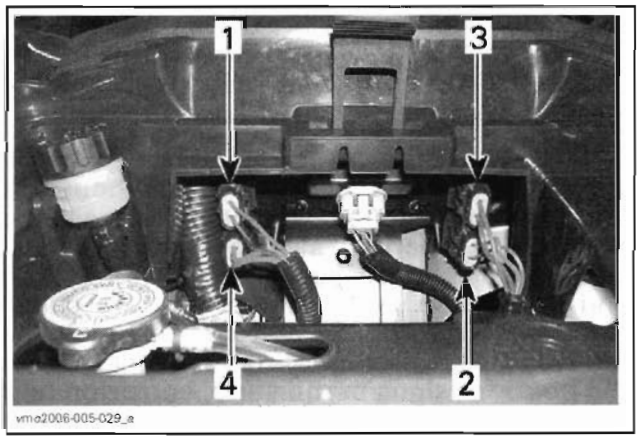
FUSES

If a fuse is damaged, replace it with one of the same rating.

CAUTION: Do not use a higher rated fuse as this can cause severe damage.

Outlander 400 Series

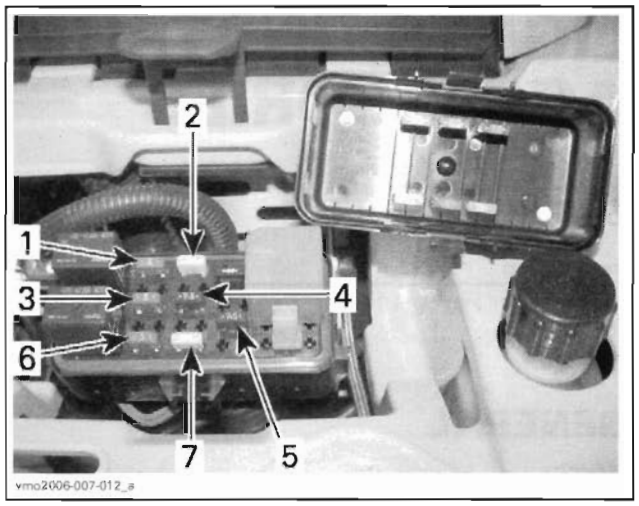
Fuses are located in the service compartment.



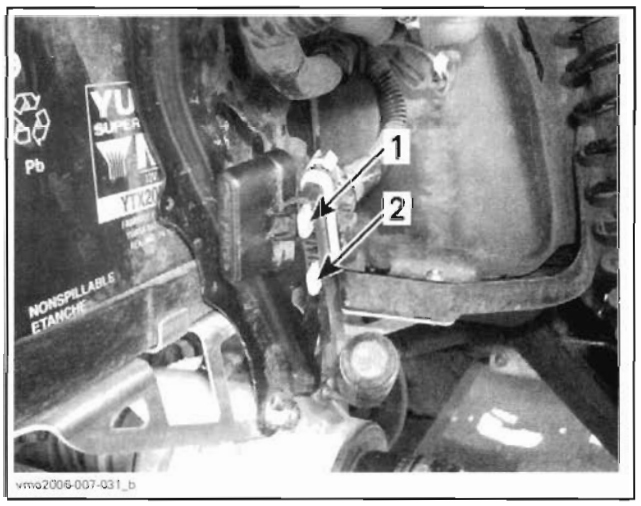
1. Accessories (power outlet and auxiliary supply)
2. Fan
3. Main
4. Charging system

Outlander 800 Series

Fuses are located in the front service compartment and at the back near battery.



FRONT — FUSES LOCATION
1. (F1) Ignition coils
2. (F2) Cooling fan
3. (F3) Fuel injectors
4. (F4) Accessories
5. (F5) Fuel pump
6. (F6) Engine Control Module (ECM)
7. (F7) Accessories



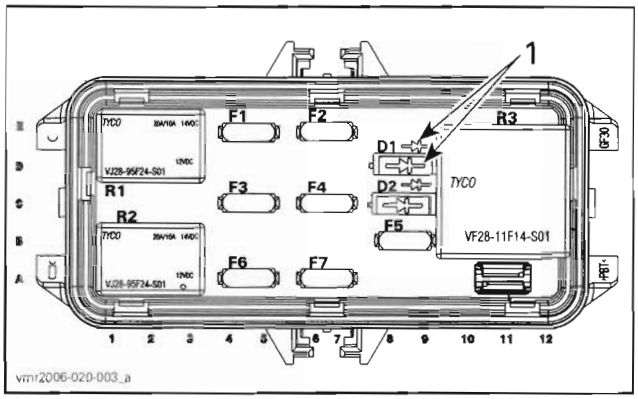
REAR — FUSES LOCATION
1. (F9) Accessories
2. (F8) Main

RELAY

Outlander 800 Series Only

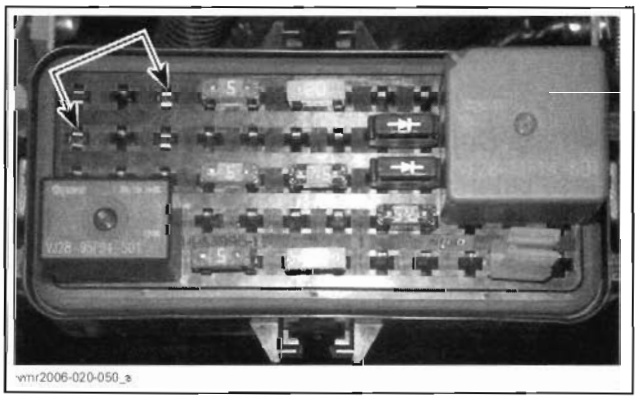
See illustration below for relays identification as used in this manual and the *WIRING DIAGRAM*.

NOTE: Relays may be inverted by 180° at installation and they will work correctly. Ensure to align tabs of relay with terminals of fuse holder at installation.

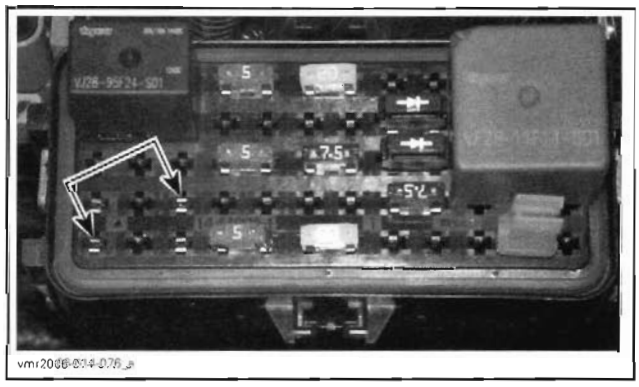


1. Position symbol on diode in same direction as symbol on fuse holder
R1: Cooling fan
R2: Main
R3: Accessories
D1: ECM diode
D2: Starter solenoid diode

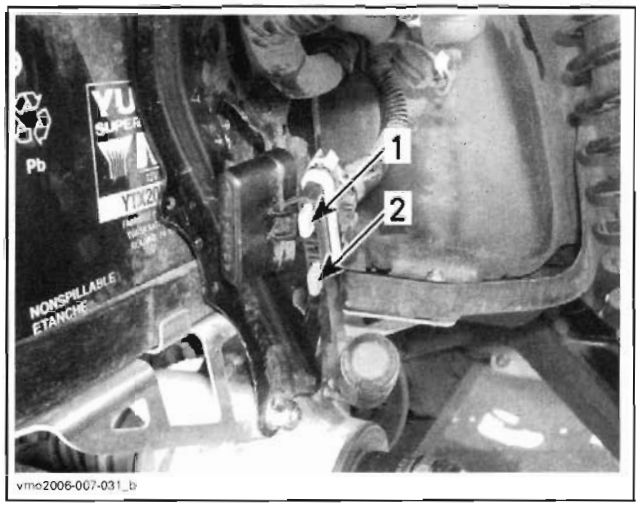
The easiest way to check a relay is to remove it and bypass it with a jumper. If the components then work, replace the relay. See illustration to find where to bypass the relays.



RELAY R1 (COOLING FAN)



RELAY R2 (MAIN)



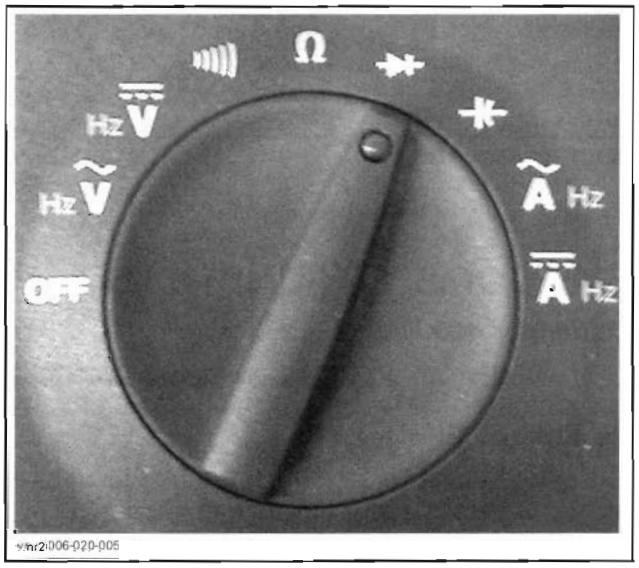
RELAY R3 (ACCESSORIES)

DIODE

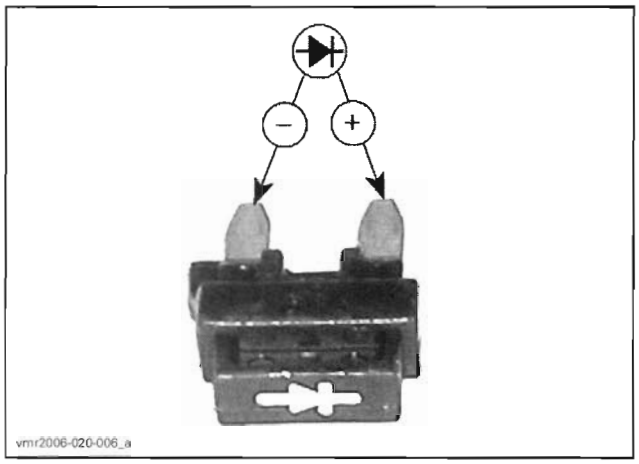
Whenever installing a diode, pay attention to the installation direction to allow proper operation.

Remove diode and lay down on a non-metallic table.

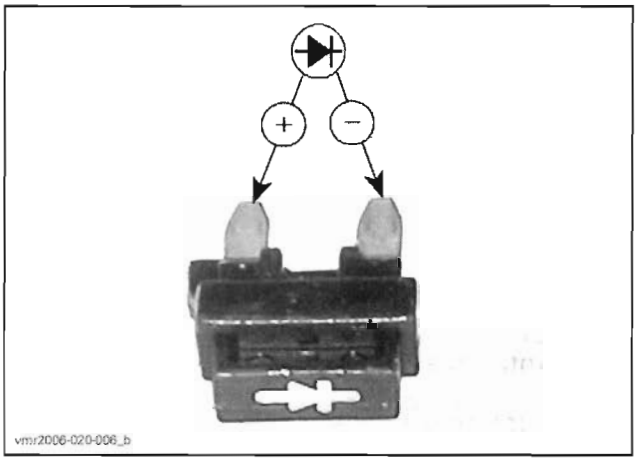
Set multimeter as shown.



Probe diode paying attention to proper polarity.



MUST BE OPEN CIRCUIT



MUST BE AROUND 0.5 V

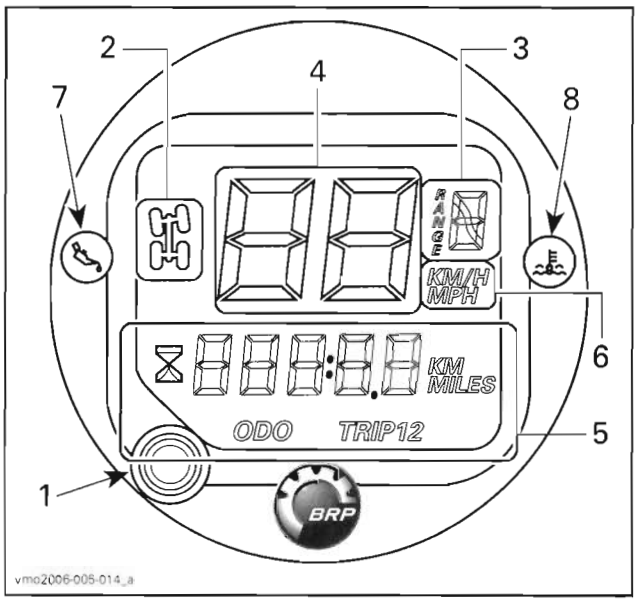
If diode fail any test, replace it.

SPEEDOMETER FUNCTIONS

Outlander 400 Series

This vehicle is equipped with an electronic speedometer. It indicates the speed of vehicle either in MPH or km/h.

The speedometer is located at the middle of cluster and it backlit every time the ignition switch is turned ON.

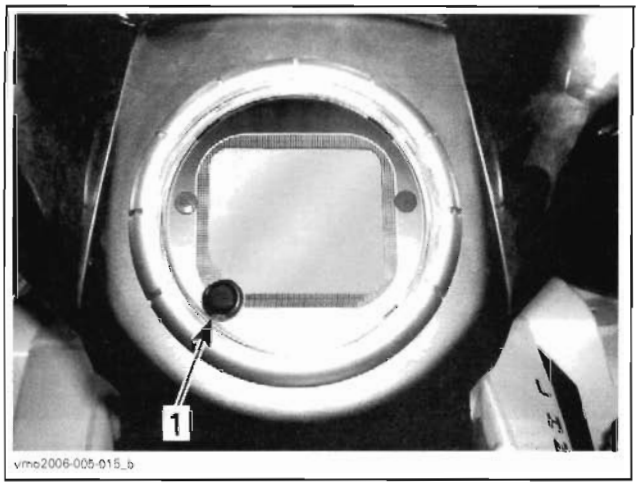


TYPICAL
1. *Display selector button*
2. *4WD system display*
3. *Transmission position display*
4. *Vehicle speed display*
5. *multi-function display*
6. *Unit display*
7. *Oil pressure indicator lamp*
8. *Engine temperature indicator lamp*

Display Selector Button

Use selector button to change speedometer display to the desired mode:

- hourmeter
- odometer
- trip meter 1
- trip meter 2.



1. *Selector button*

Change from One Unit to the Other

The speedometer is factory preset in miles but it is possible to change it to kilometer reading.

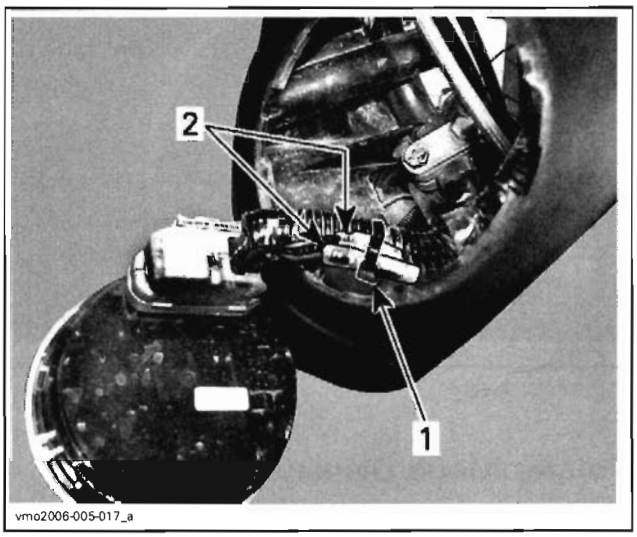
NOTE: The unit modification is applied to the speedometer, odometer and trip meter.

Turn ignition switch to OFF position.

Lift speedometer. Refer to *REMOVAL* further in this section.

Plug connectors to change units from miles to kilometers. Unplug to return to miles reading.

Fix the change wires to the harness with new locking tie.



1. *Locking tie*
2. *Connectors to change units*

Reinstall speedometer.

Multi-Function Display

Odometer (ODO)

Odometer records the total distance travelled either in miles or kilometers.

Trip Meter (TRIP 1/TRIP 2)

For your convenience, your speedometer is equipped with two separate trip meter.

The trip meter records distance travelled since it has been reset. Distance travelled is displayed either in miles or kilometers.

It can be used to establish a fuel tank range or distance between 2 way points for instance.

Push and HOLD display selection button for 2 seconds to reset the trip meter.

Hourmeter

The hourmeter records engine running time in hours and minutes.

Transmission Position (RANGE)

Indicates the transmission is in park position.

Indicates the transmission is in reverse position.

Indicates the transmission is in neutral position.

4-Wheel Drive System

When this indicator is ON, it indicates the 4WD system is activated.

Indicator Lamps

OIL PRESSURE (RED)

When this indicator light is ON, it indicates a low oil pressure condition of the engine.

CAUTION: If the light does not turn off right after engine starting, stop engine. Check engine oil level. Refill if necessary. Do not use the vehicle until repaired.

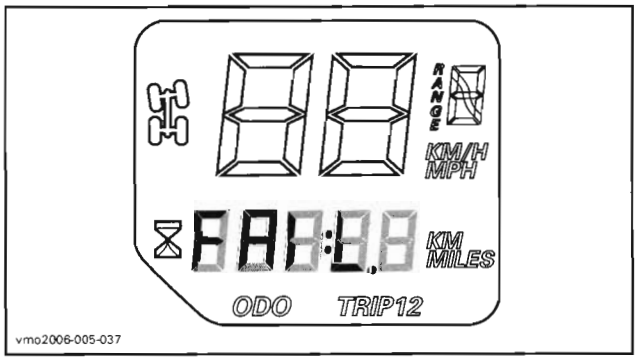
ENGINE TEMPERATURE (RED)

When this indicator light is ON, it indicates the engine is overheating.
If engine overheats, refer to *ENGINE OVERHEAT* in *TROUBLESHOOTING*.

CAUTION: If the light does not turn off right after engine starting, stop engine. Do not use the vehicle until repaired.

Speedometer Display Codes

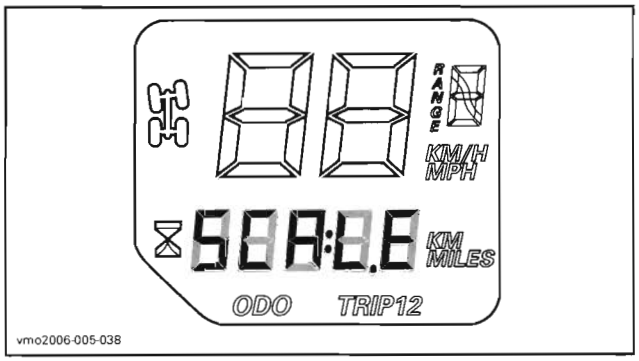
Speedometer Reads FAIL



If your speedometer shows FAIL in the multi-function display, it means that the speedometer as sensed 18 volts in the electrical system, caused by a disconnected or defective voltage regulator.

Check voltage regulator connection.

Speedometer Reads SCALE

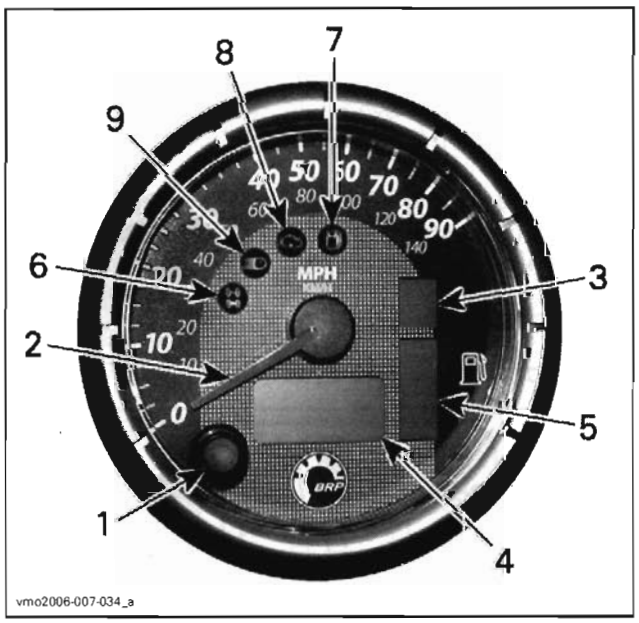


If your speedometer shows SCALE in the multi-function display, it means that the display selector button is stuck in the down position or depressed when the electrical system was activated.

Outlander 800 Series

This vehicle is equipped with an electronic multi-function speedometer.

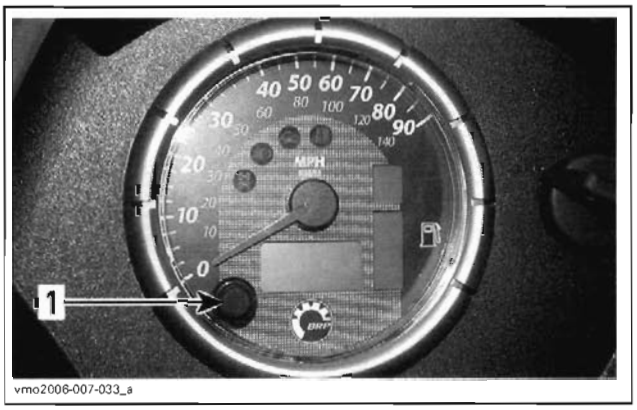
It is backlit every time the ignition switch is turned ON and engine run/stop switch is set to RUN.



TYPICAL
1. *Display selector button*
2. *Pointer mode display*
3. *Transmission position display*
4. *multi-function display*
5. *Fuel level display*
6. *4WD indicator lamp*
7. *Low fuel level indicator lamp*
8. *Check engine indicator lamp*
9. *High beam indicator lamp*

Display Selector Button

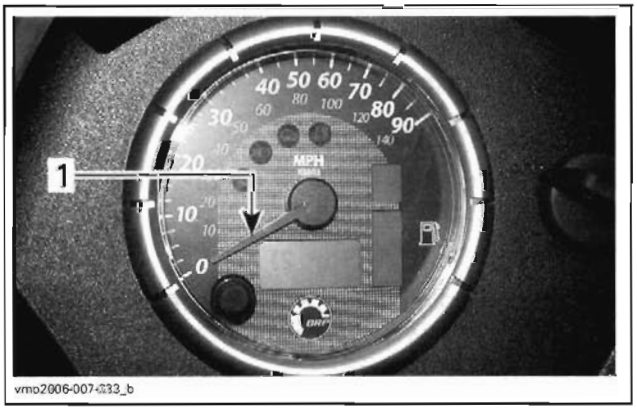
Use selector button to change speedometer multi-function display to the desired mode:
- odometer
- trip meter (resettable)
- hour meter (resettable)
- vehicle hour meter
- speed or RPM mode.



1. *Selector button*

Pointer Mode Display

The speedometer pointer has two modes, it can show vehicle speed or engine revolution per minute.



1. *Pointer*

To change pointer from one mode to the other do the following:
- change speedometer multi-function display to the odometer (ODO) mode
- push and HOLD display selector button for 2 seconds to change mode.

Speed Mode

In this mode, the pointer indicates the speed of the vehicle.

The speedometer measures speed from 0 to 140 km/h and 0 to 90 MPH.

RPM Mode

In this mode, the pointer indicates engine RPM.

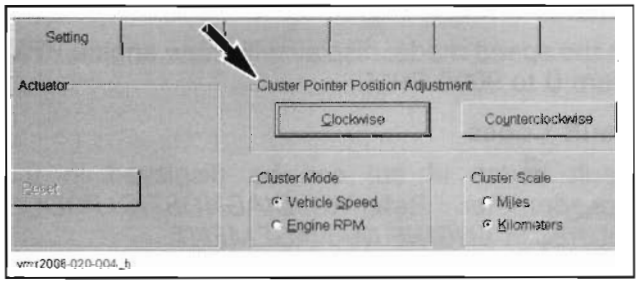
The speedometer measures engine RPM from 0 to 9000 RPM.

NOTE: In the RPM mode, the vehicle speed will be automatically displayed in the multi-function display once the vehicle moves over 10 km/h or 6 MPH.

Pointer Alignment

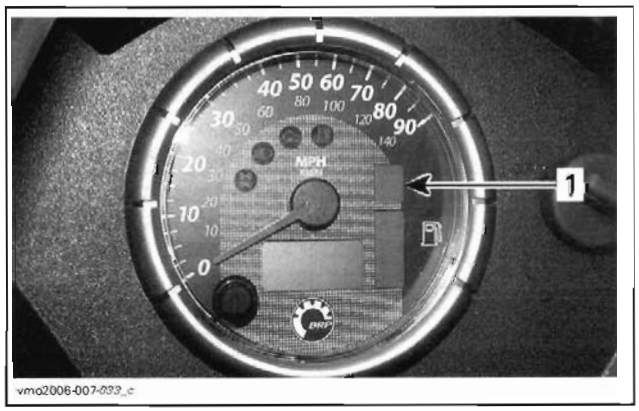
If for any reason, the speedometer pointer is not properly aligned with the 0 (zero) it can be set.

Connect the VCK (Vehicle Communication Kit) and use B.U.D.S. software. Go in **Setting** tab and use **Cluster Pointer Position Adjustment**.



Transmission Position Display

This display will show transmission position.



1. Transmission position

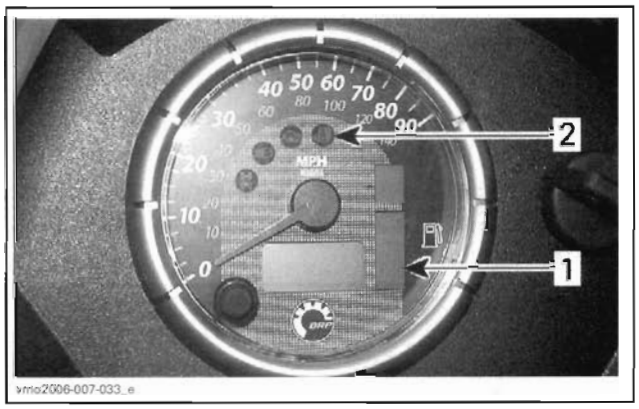
DISPLAY	FUNCTION
P	Park
N	Neutral
R	Reverse
H	High gear
L	Low gear

NOTE: If the letter "E" is displayed in the transmission position display, it means that there is a electrical communication error.

Fuel Level Display

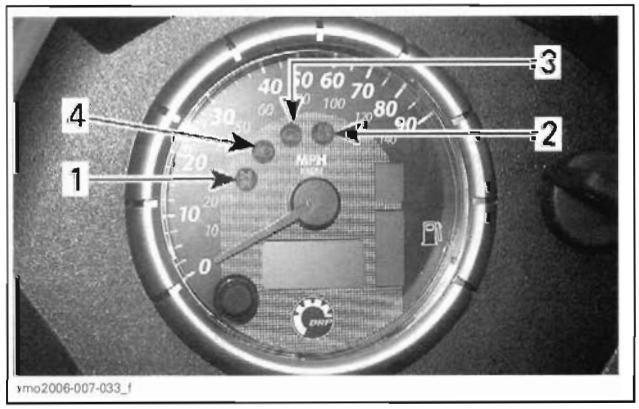
Bar gauge continuously indicates the amount of fuel in the fuel tank while riding.

When the low fuel indicator lamp is ON, it indicates that there is only 30% of fuel left in fuel tank, approximately 6 L (1.6 U.S. gal).



1. Fuel level display
2. Low fuel indicator lamp

Indicator Lamps



1. 4WD indicator lamp
2. Low fuel level indicator lamp
3. Check engine indicator lamp
4. High beam indicator lamp

When this indicator is ON, it indicates the 4WD system is activated.

When this indicator is ON, it indicates that there is only 30% of fuel left in fuel tank, approximately 6 L (1.6 U.S. gal).

When this indicator is ON, it indicates an engine fault code, look for message in multi-function display.
When this indicator blinks, it indicates that the LIMP HOME mode is activated, refer to *TROUBLESHOOTING* for more details.

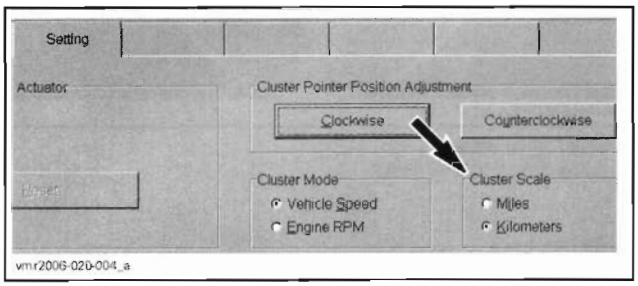
When this indicator is ON, it indicates high intensity is selected on the headlamps and ignition key is in LIGHTS position.

Unit Selection (MPH vs KM/H)

The speedometer is factory preset in miles but it is possible to change it to kilometer reading.

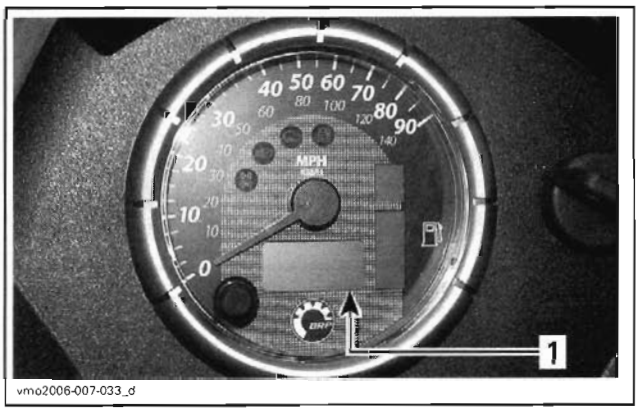
NOTE: The unit modification is applied to the odometer and trip meter.

Connect the VCK (Vehicle Communication Kit) and use B.U.D.S. software. Go in **Setting** tab and use **Cluster Scale**.



Multi-Function Display

NOTE: Use the selector button to change display to the desired mode.



1. multi-function display

Odometer (ODO)

Odometer records the total distance travelled either in miles or kilometers.

Trip Meter (TRIP)

The trip meter records distance travelled since it has been reset. Distance travelled is displayed either in miles or kilometers.

It can be used to establish a fuel tank range or distance between 2 way points for instance.

Push and HOLD display selection button for 2 seconds to reset the trip meter.

Hour Meter (TRIP TIME)

The hour meter records vehicle running time when the electrical system is activated. It can be used to establish traveling time between 2 way points for instance.

Push and HOLD display selection button for 2 seconds to reset the hour meter.

Hour Meter (ENGINE HOURS)

The hour meter records engine running time.

Speed/RPM

In the RPM mode, vehicle speed will be automatically displayed once the vehicle moves over 10 km/h or 6 MPH.

In the speed mode, display will show engine RPM from 0 to 9000 RPM.

Fault Codes

Fault codes (if so) can be displayed in the speedometer. Refer to *DIAGNOSTIC PROCEDURES* in *ENGINE MANAGEMENT*.

Messages

The following messages can also be viewed in the multi-function display:

MESSAGE	DESCRIPTION
X 100 RPM	When the speedometer is in SPEED MODE, multi-function display will show "X 100 RPM" if the RPM mode is selected.
INVALID KEY	Indicates that you have used the wrong ignition key, use the proper key for this vehicle. It is also possible that the ignition key has a bad contact, remove and clean key.
PARK BRAKE	Is displayed when parking brake is applied for more than 15 seconds.
LO BATT	Low battery voltage, check battery voltage and charging system.
HI BATT	High battery voltage, check battery voltage and charging system.
LOW OIL (1)	Engine low oil pressure, stop engine immediately and check oil level.

MESSAGE	DESCRIPTION
HI TEMP (2)	Engine is overheating, refer to *ENGINE OVERHEAT* in *TROUBLESHOOTING*.
LIMP HOME	Serious fault on the engine that can change the normal operation of the engine, check engine indicator lamp will also blink, refer to *TROUBLESHOOTING* for more details.
CHECK ENGINE	EMS fault, check engine indicator lamp will also be ON, refer to *DIAGNOSTIC PROCEDURES* for more details.
MAINTENANCE SOON	Periodic maintenance required.
NO ECM COMMUNICATION	Communication error between speedometer and engine control module (ECM).

CAUTION: (1) If the light does not turn off right after engine starting, stop engine. Check engine oil level. Refill if necessary. Do not use the vehicle until repaired.

CAUTION: (2) If the light does not turn off right after engine starting, stop engine. Do not use the vehicle until repaired.

PROCEDURES

SPEEDOMETER

Outlander 400 Series

Test

Using a multimeter, measure the voltage between both RED/VIOLET and BLACK wires.

Turn ignition switch to ON. The obtained value should be between 12 and 14.5 Vdc.

- No voltage on speedometer:
  - Check wiring condition and electronic module connector. If good, change electronic module.
- Voltage on speedometer:
  - If VSS (Vehicle Speed Sensor) voltage is good, change speedometer.
  - No voltage on VSS. Check VSS and wiring condition from VSS to electronic module MPEM.

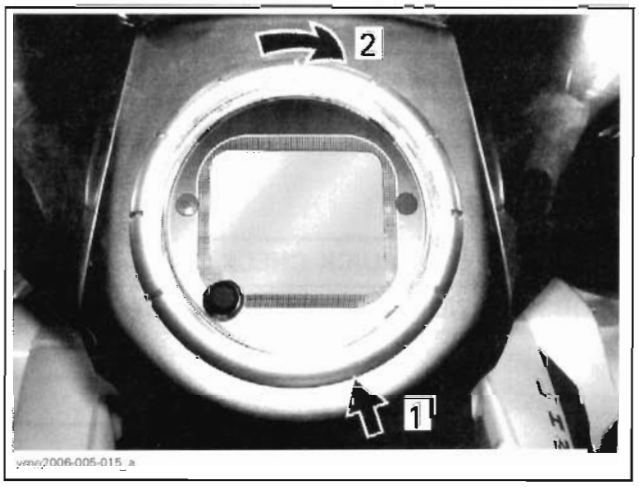
Bulbs Replacement

The speedometer is lighted with LEDs. If one LED burns, replace the speedometer. The LEDs are not available separately.

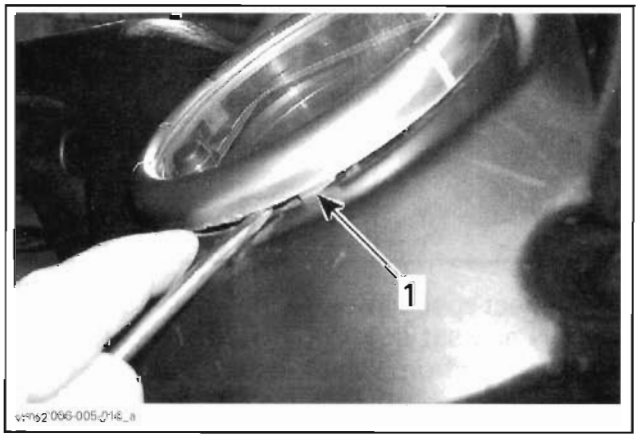
Removal

Slightly lift speedometer at the bottom using a small flat screwdriver until small locking tab is released from steering cover.

Turn speedometer clockwise until speedometer slightly pops-out from steering cover.



1. Lift to release locking tab
2. Turn clockwise to release speedometer



1. Locking tab

Unplug connector and remove speedometer.

Installation

For the installation, reverse the removal procedure.

Outlander 800 Series

Speedometer Pinout

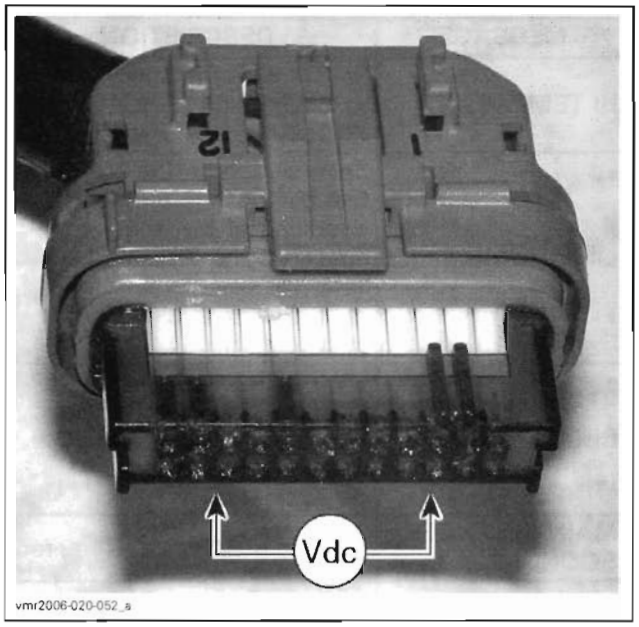
FUNCTION	PIN
Power 12 Vdc	8
Ground	11
CAN line	23
CAN line	24
Fuel level gauge supply	15
Fuel level gauge ground	12
2/4WD switch signal	17
HI beam signal	16

Voltage Test

QUICK CHECK	
OBSERVATION	POSSIBLE CAUSE
multi-function speedometer does not turn on	Burnt fuse (F8)
	Faulty relay (main)
	Burnt fuse (F4)
	ECM not powered: – burnt fuse (F6) – defective diode (D1) – defective ECM
	Defective multi-function speedometer
	Faulty multi-function switch or key
	Wiring/connectors

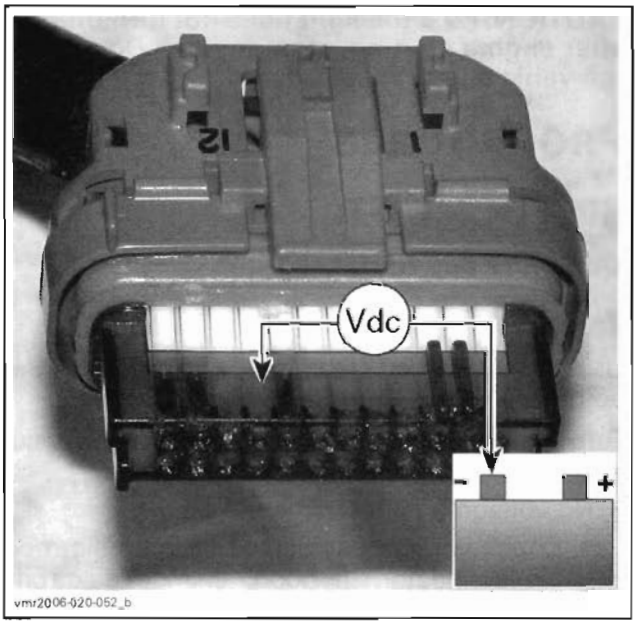
Disconnect speedometer connector. Turn ignition key ON and set engine run/stop switch to RUN. Read voltage from vehicle harness as follows.

SPEEDOMETER CONNECTOR (harness side)		VOLTAGE
Pin 8	Pin 11	Battery voltage



If there is no voltage, recheck voltage as follows.

SPEEDOMETER CONNECTOR (harness side)		VOLTAGE
Pin 8	Battery ground	Battery voltage



If voltage is not appropriate, check/repair wiring and/or connectors.

If battery voltage is good, check ground circuit (pin 11) wiring/connector. If they test good, temporarily connect pin 11 to battery ground. If multi-function speedometer turns on, try a new ECM.

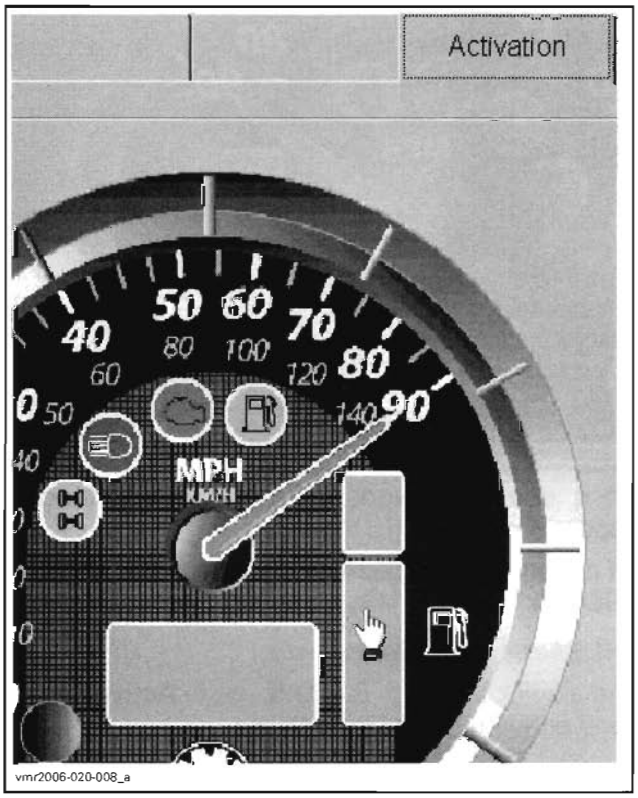
When everything else has been tested and multi-function still does not turn on, try a new one.

Function Display Problems

When the functions do not display, check for fault code(s). Refer to *DIAGNOSTIC PROCEDURES*. When a specific function does not work, proceed as follows.

Fuel Level

As a quick test with B.U.D.S., go in **Activation** tab and activate fuel level display area.

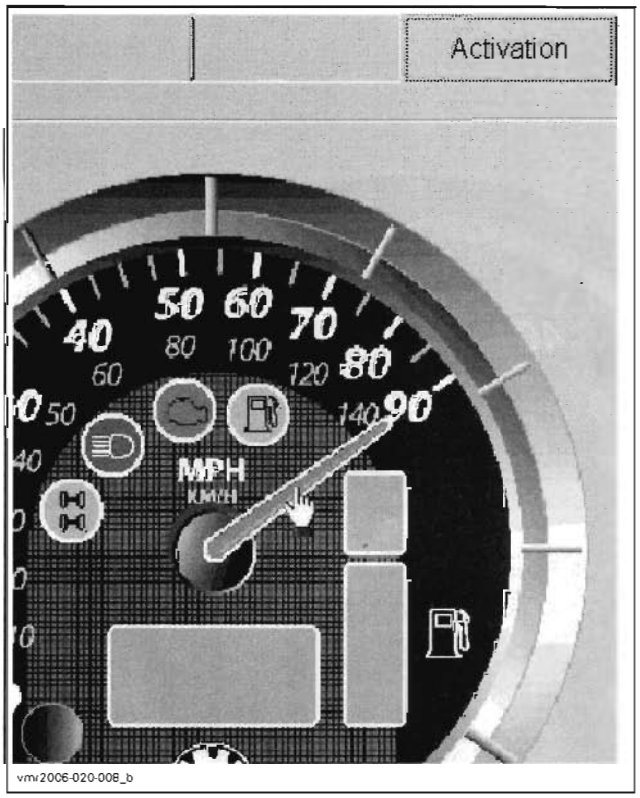


If it does not work, check wiring/connectors and if they are good, try a new multi-function speedometer.

If it works, check fuel level sender. Refer to procedure further in this section.

Speedometer Pointer

As a quick test with B.U.D.S., go in **Activation** tab and activate speedometer pointer. Hold mouse over pointer so that the pointer moves up to the maximum value.



If it does not work, try a new multi-function speedometer.

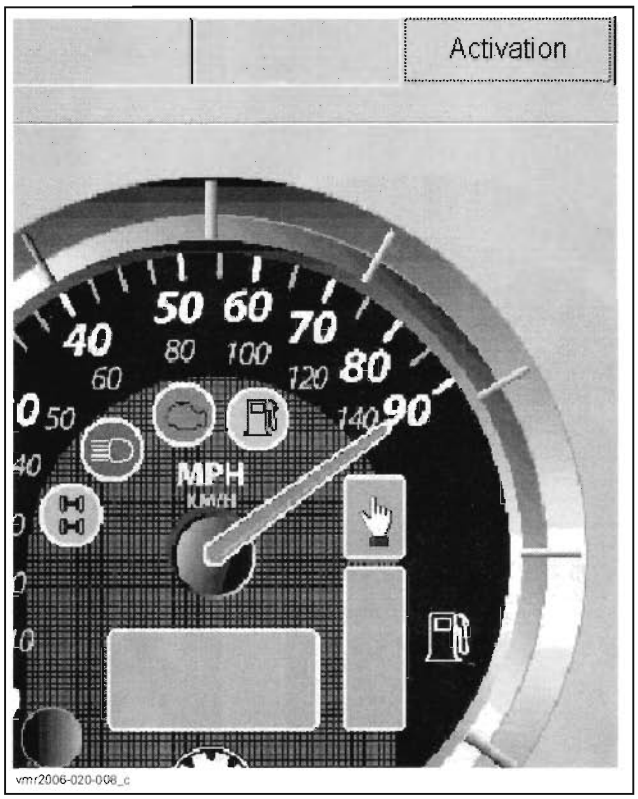
If it works, check speed sensor.

If speedometer pointer in speed mode is acting erratically, remove speed sensor and clean it.

Transmission Position Display

If the letter "E" is displayed in transmission position display, there is an electrical communication error. Refer to *GEARBOX*.

As a quick test with B.U.D.S., go in **Activation** tab and activate transmission position display area.

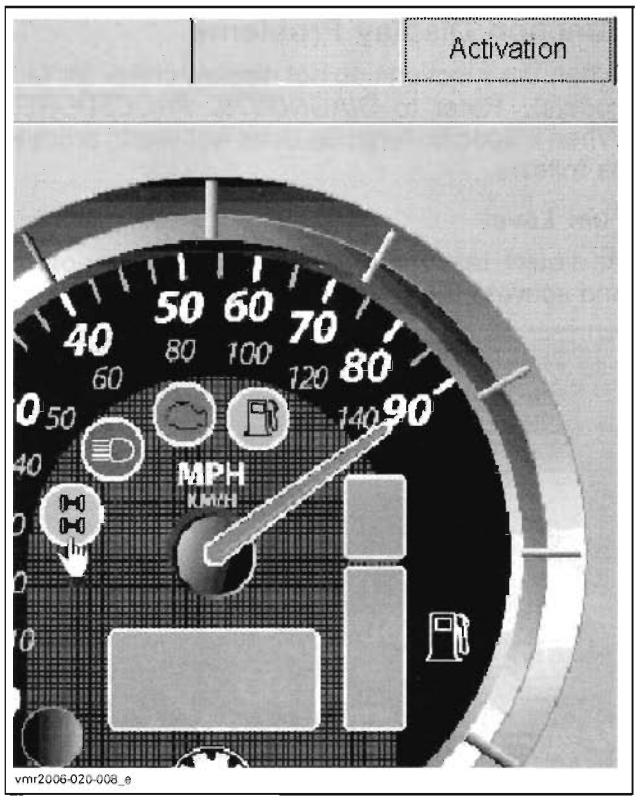


If it does not work, try a new multi-function speedometer.

If it works, check gearbox switches. Refer to *GEARBOX*.

2/4WD Pilot Lamp

As a quick test with B.U.D.S., go in **Activation** tab and activate 2/4WD lamp area.

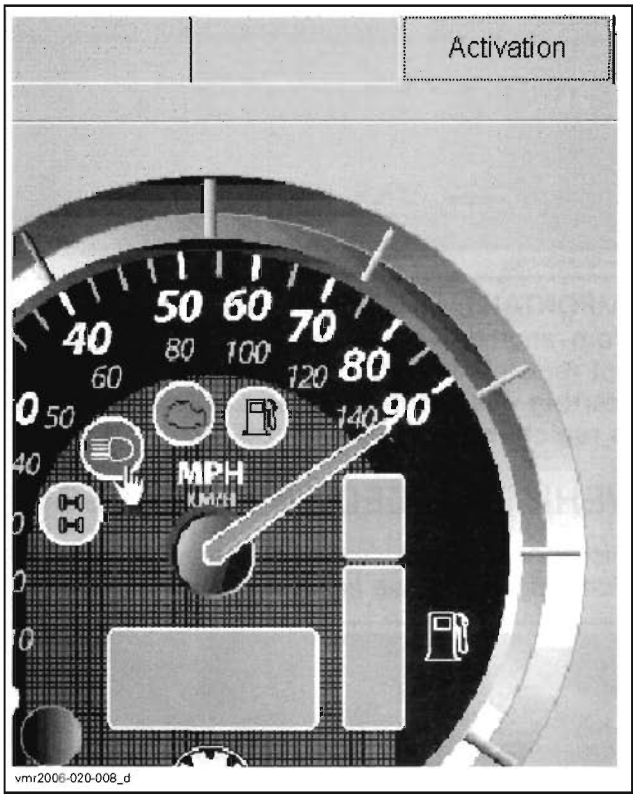


If it does not work, try a new multi-function speedometer.

If it works, check gearbox switch. Refer to *GEARBOX*.

HI Beam Pilot Lamp

As a quick test with B.U.D.S., go in **Activation** tab and activate HI beam lamp area.

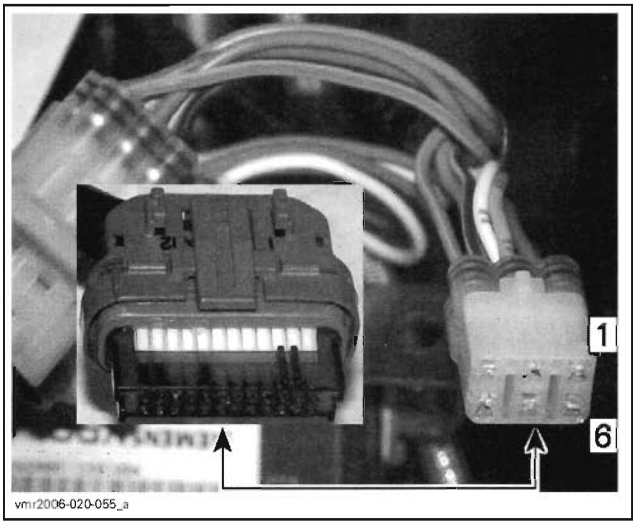


vmr2006-020-008_d

If it does not work, try a new multi-function speedometer.

If it works, check if headlamp work. If headlamp do not work, refer to *HEADLAMP*. If headlamp work, check wire/connectors between multi-function speedometer and low/hi beam switch.

WIRE CONTINUITY		
SPEEDOMETER CONNECTOR	MULTI-FUNCTION SWITCH CONNECTOR (MG2) (harness side)	RESISTANCE
Pin 16	Pin 5	Close to 0 Ω



vmr2006-020-055_a

If wire is faulty, replace/repair.

Removal

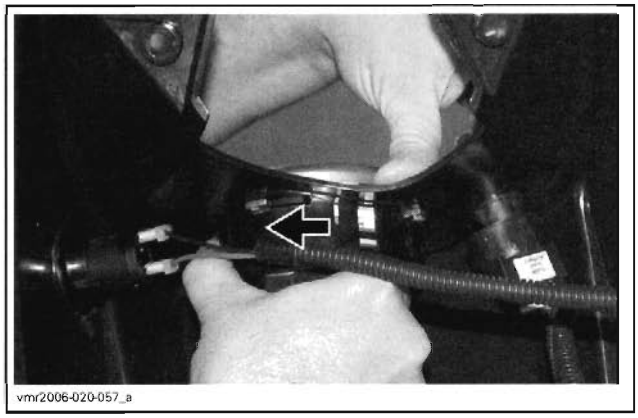
Remove center panel and dashboard. Refer to *BODY*.

Unplug speedometer connector.

Locate locking tab then push edge of dashboard to release tab.


vmr2006-020-056_a

While holding tab, rotate speedometer to unlock.


vmr2006-020-057_a

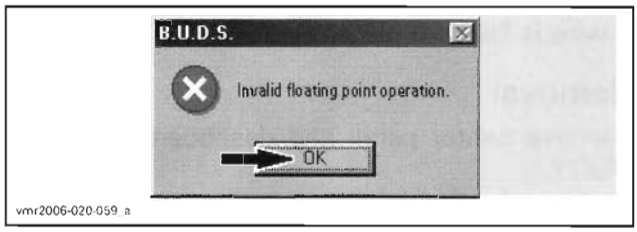
PULL SPEEDOMETER OUT
1. *Tabs*
2. *Notch*

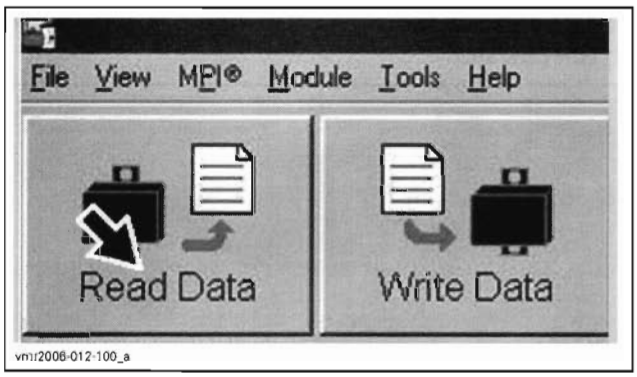
Installation

For the installation, reverse the removal procedure.

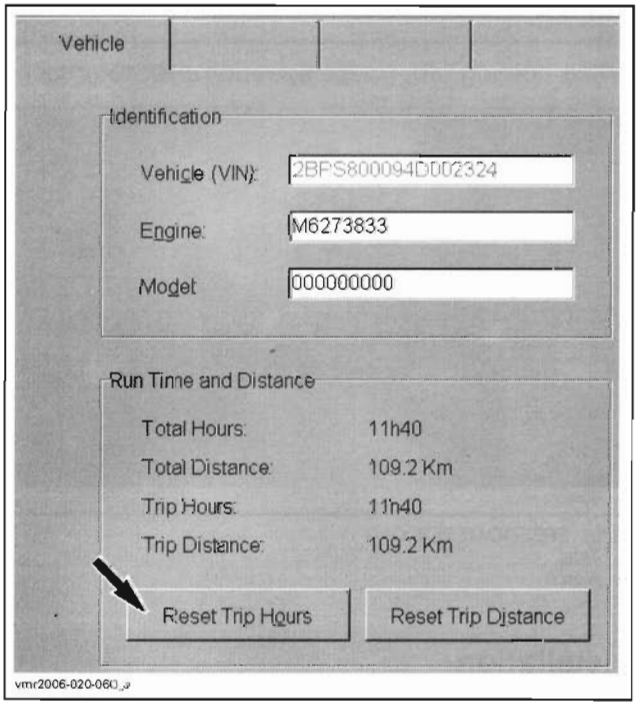
New Speedometer Registration (Cluster Coding)

NOTE: When a new speedometer is installed, the following message may appear when vehicle is connected to VCK and READ DATA is pressed. The computer will then stall there forever. If so, click OK then click read data again (even if there is an hourglass on the computer.

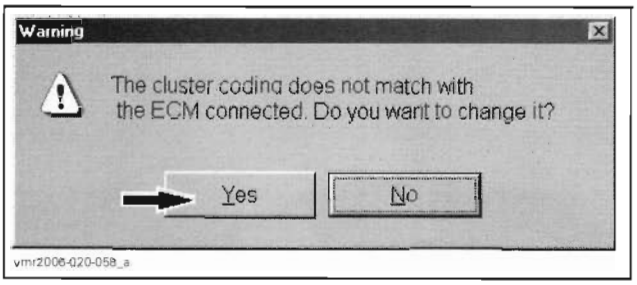




Then, computer and B.U.D.S. will be available as usual. Reset the **Trip hours** either from B.U.D.S. or on speedometer. The message will not appear anymore.



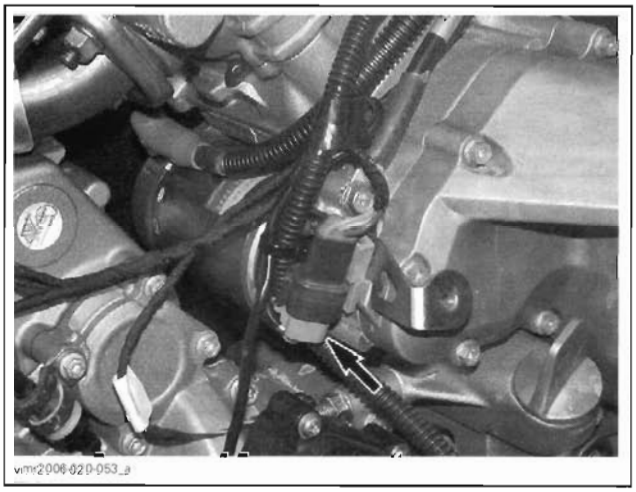
Whenever multi-function speedometer is replaced, it is required to use B.U.D.S. to register it in ECM. Simply click YES when the following message appears.



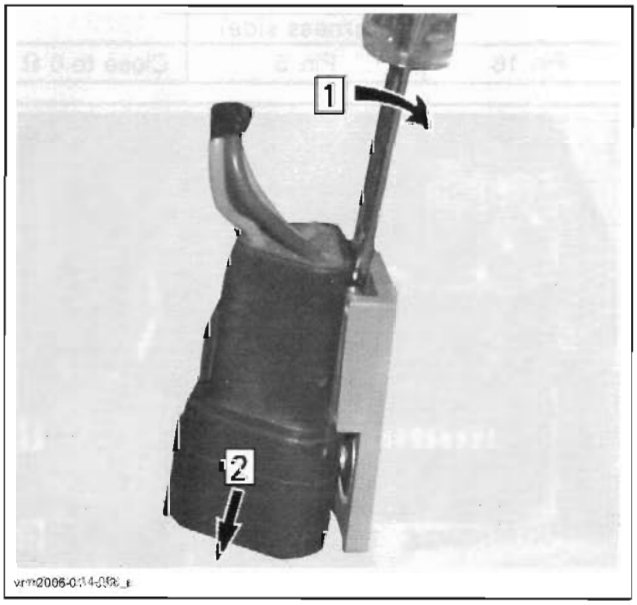
IMPORTANT: If a multi-function speedometer from another vehicle model is installed and is not registered in ECM through B.U.D.S., **engine starting will not be allowed until speedometer is registered with proper coding.**

VEHICLE SPEED SENSOR (VSS)

Disconnect speed sensor connector and detach from engine to ease access.

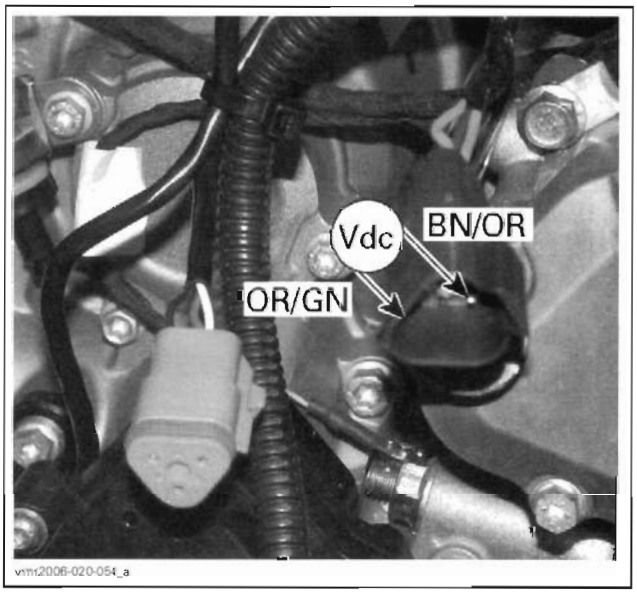


TYPICAL – V-810 ENGINE SHOWN



Turn ignition key ON and set engine run/stop switch to RUN. Read voltage from vehicle harness as follows.

SPEED SENSOR CONNECTOR (harness side)		VOLTAGE
ORANGE/ GREEN	BROWN/ ORANGE	Battery voltage



If voltage is not good, check/repair wiring/connectors.

If voltage is good, do the following test.

Reconnect speed sensor connector.

Lift rear of vehicle so that rear wheels are off the ground.

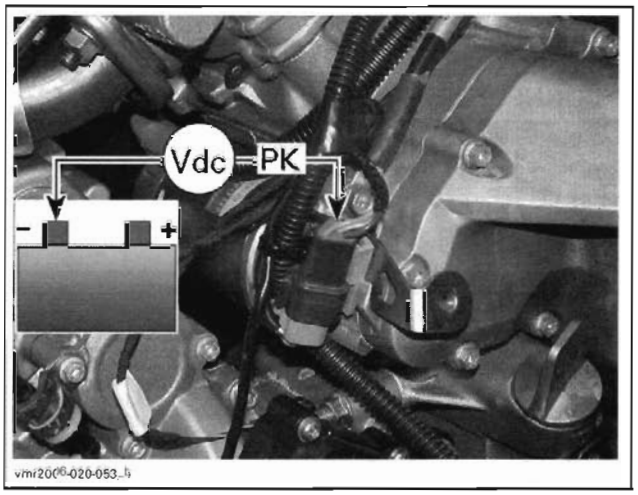
⚠ WARNING

Properly secure vehicle. Ensure to set transmission to 2WD.

Start engine and slowly depress throttle to make rear wheels turn at slow speed.

Probe wire and read voltage from vehicle harness as follows.

SPEED SENSOR CONNECTOR		VOLTAGE
PINK	Battery ground	From approx. 5 Vdc increasing as wheel speed increases



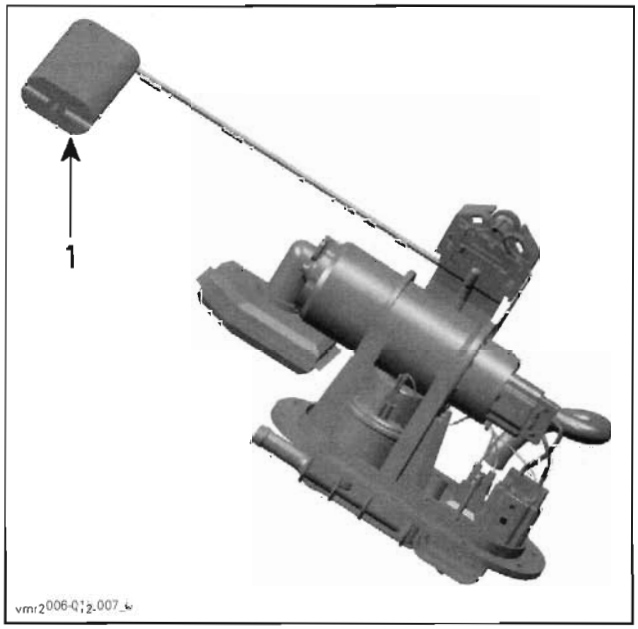
If voltage is appropriate, check/repair wiring/connector between sensor and ECM. If it is good, try a new ECM.

If voltage is wrong, try a new sensor.

FUEL LEVEL SENDER

Outlander 800 Series Only

The fuel level sender is part of the fuel pump module mounted inside the fuel reservoir.

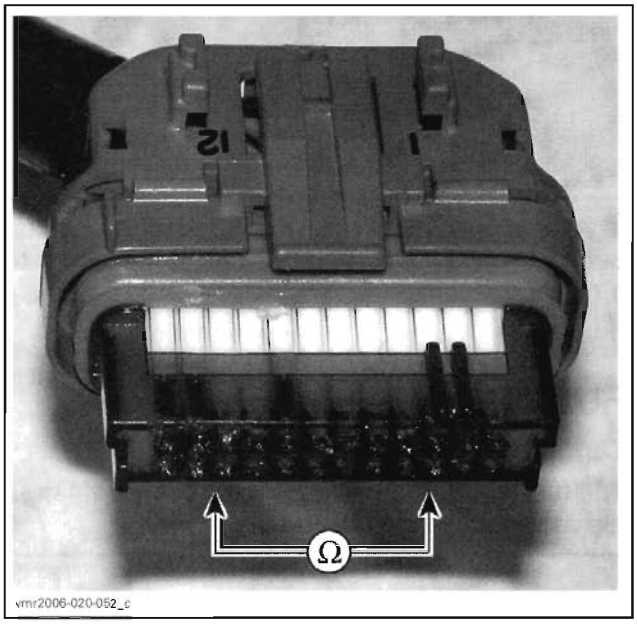


FUEL PUMP MODULE
1. Float and arm

Disconnect multi-function speedometer connector.

Measure resistance as per table.

FUEL LEVEL AT SPEEDOMETER CONNECTOR		FLOAT POSITION	RESISTANCE MEASUREMENT 20°C (68°F)
Pin 12	Pin 15	Float down (empty)	5 ± 2 Ω
		Float up (full)	100 ± 7 Ω



If resistance is not within empty and full values (depending on fuel quantity), check and repair wiring and/or connectors between multi-function speedometer and fuel level sender. If they test good, replace fuel pump module. Refer to *FUEL TANK AND FUEL PUMP*.

If fuel level sender and wiring/connectors are good, try a new multi-function speedometer.

MULTI-FUNCTION SWITCH

Apply parking brake, place transmission lever in NEUTRAL position and start engine.



1. Low/Hi beam switch
2. Start switch
3. Engine run/stop switch
4. Override switch

Outlander 400 Series

Low/Hi Beam Switch

Select low beam position on multi-function switch.

Using a multimeter, measure the voltage between GREEN and BLACK wires.

The obtained value should be between 12 and 14.5 Vdc.

Select high beam position on multi-function switch.

Measure the voltage between BLUE and BLACK wires. The obtained value should be between 12 and 14.5 Vdc.

- No voltage:
- Check wiring condition and low/hi beam switch.
- Voltage is good:
- Change headlamp bulb(s).

Using a multimeter, measure the resistance between the following wires.

POSITION	WIRE	RESISTANCE
Switch to LO	RED/YELLOW and GREEN	0.2 ± 0.2 Ω max.
Switch to HI	RED/YELLOW and BLUE	0.2 ± 0.2 Ω max.

Replace multi-function switch if defective.

Start Switch

Using a multimeter, measure the resistance between the following wires.

SWITCH	WIRE	RESISTANCE
Start switch released	RED/VIOLET and YELLOW/RED	Infinite (O.L)
Start switch pushed		0.2 ± 0.2 Ω max.

Replace multi-function switch if defective.

Engine Run/Stop Switch

Using a multimeter, measure the resistance between the following wires.

SWITCH	WIRE	RESISTANCE
STOP position	BLACK/WHITE and BLACK	0.2 ± 0.2 Ω max.
RUN position		Infinite (O.L)

Replace multi-function switch if defective.

Override Switch

Using a multimeter, measure the resistance between the following wires.

SWITCH	WIRE	RESISTANCE
Override switch pushed	VIOLET/GREY and VIOLET/GREY	Infinite (O.L)
Override switch released		0.2 ± 0.2 Ω max.

Replace multi-function switch if defective.

Outlander 800 Series

Start Switch

Refer to *STARTING SYSTEM*.

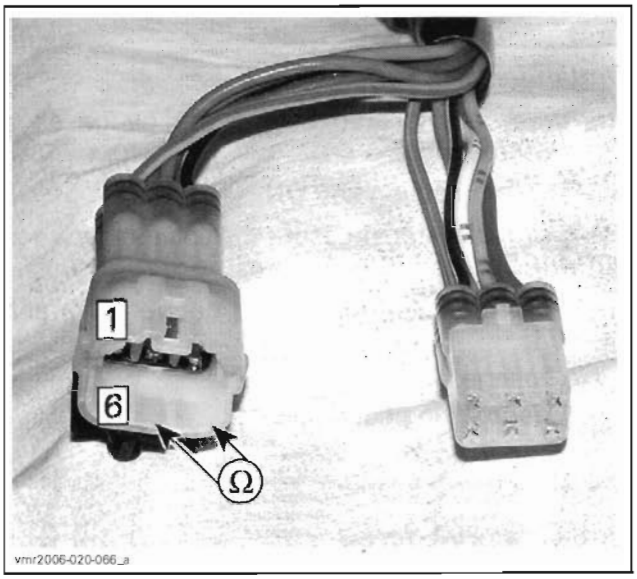
Engine Run/Stop Switch

Refer to *IGNITION SYSTEM*.

Low/Hi Beam Switch

Using a multimeter, measure the resistance as follows.

POSITION	MULTI-FUNCTION SWITCH CONNECTOR (MG2)		RESISTANCE @ 20°C (68°F)
Switch to LO	Pin 2	Pin 4	0.2 Ω max.
Switch to HI	Pin 5	Pin 4	

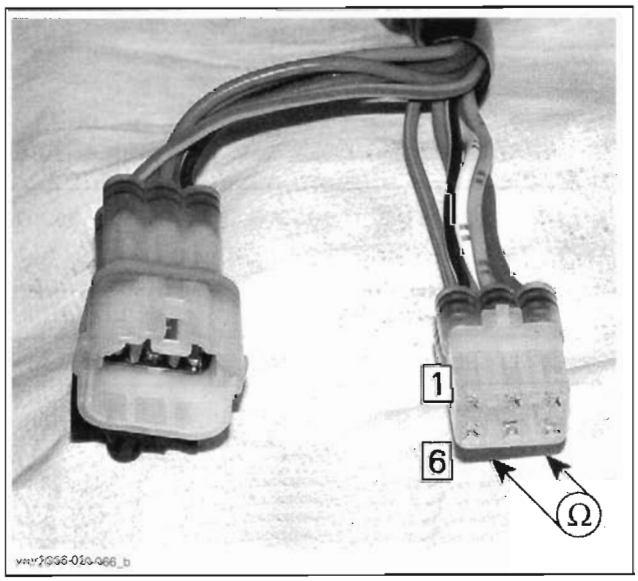


Replace multi-function switch if defective.

Override Switch

Using a multimeter, measure the resistance between the following wires.

SWITCH POSITION	MULTI-FUNCTION SWITCH CONNECTOR (MG1)		RESISTANCE @ 20°C (68°F)
Released	Pin 5	Pin 6	0.2 Ω max.
Pushed			Open (O.L)



Replace multi-function switch if defective.

12-VOLT AUXILIARY POWER OUTLET

The 12-volt auxiliary power outlet allows the installation of additional accessories.

Test

Outlander 400 Series

The wires are located behind the gauge on a 2-position connector.

NOTE: Turn ignition key ON.

Using a multimeter, measure the voltage between RED/VIOLET and BLACK wires.

The obtained value should be between 12 and 14.5 Vdc.

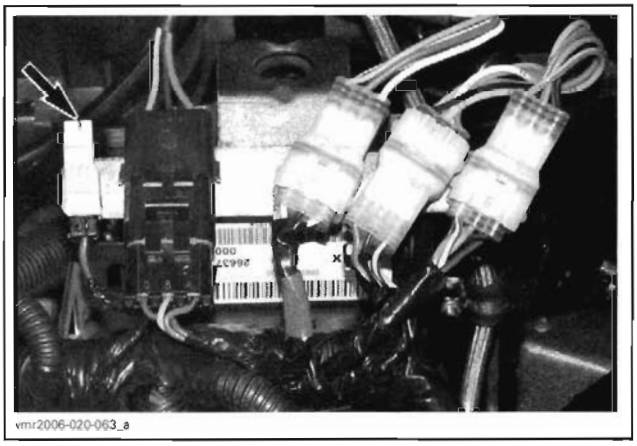
- No voltage:
  - Check wiring condition.
- Voltage is good:
  - Check accessories.

Outlander 800 Series

Remove center panel and dashboard. Refer to *BODY*.

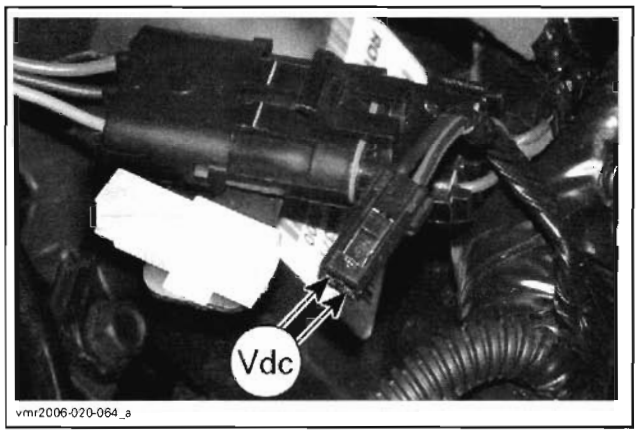
Turn ignition key on and set engine run/stop switch to RUN.

Unplug power outlet connector.



Using a multimeter, measure the voltage as follows.

WIRE COLOR		VOLTAGE
RED/BLACK	BLACK	12 - 14.5 Vdc



- No voltage:
  - Check fuses F4, F7, relay R3 (accessories) and wiring condition.
- Voltage is good:
  - Check accessories.

12-VOLT POWER OUTLET

Removal

Remove console. Refer to *BODY*.

Unplug the connectors of the power outlet.

Unscrew the retaining nut.

Installation

Reverse the removal procedure.

Test

Outlander 400 Series

NOTE: No key required.

Remove the console.

Unplug the power outlet connectors.

Using a multimeter, measure the voltage between RED/BLACK and BLACK wires.

The obtained value should be between 12 and 14.5 Vdc.

- No voltage:
  - Check accessories fuse (15 A) and wiring condition.
- Voltage is good:
  - Change power outlet.

Outlander 800 Series

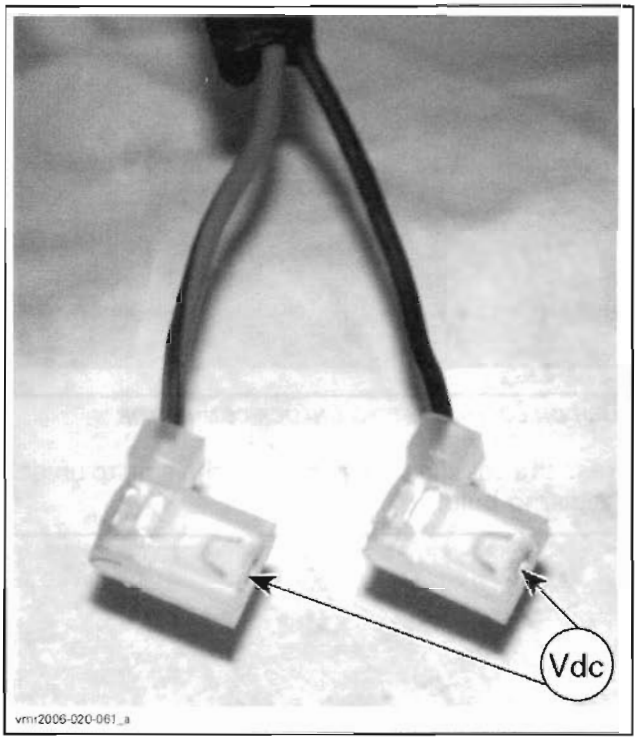
Remove center panel and dashboard. Refer to *BODY*.

Turn ignition key on and set engine run/stop switch to RUN.

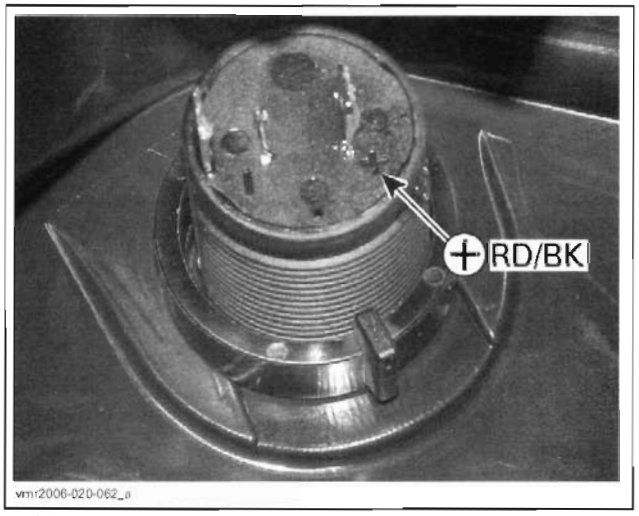
Unplug the power outlet connectors.

Using a multimeter, measure the voltage as follows.

WIRE COLOR		VOLTAGE
RED/BLACK	BLACK	12 - 14.5 Vdc



Ensure to reconnect RED/BLACK wire to positive terminal.



– No voltage:
  - Check fuses F4, F7, relay R3 (accessories) and wiring condition.

– Voltage is good:
  - Change power outlet.

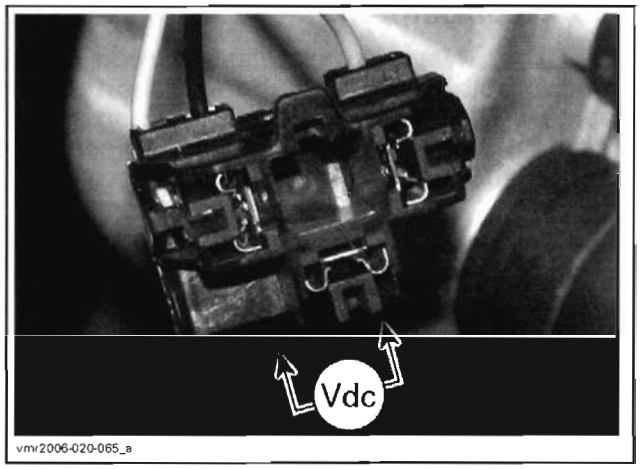
HEADLAMP

Test

Disconnect headlamp connector. Refer to *BULB REPLACEMENT*.

Using a multimeter, measure the voltage on headlamp connector as follows.

SWITCH POSITION	WIRE COLOR		VOLTAGE
LO beam	GREEN	BLACK	12 - 14.5 Vdc
HI beam	BLUE	BLACK	



– Voltage is good:
  - Change headlamp bulb(s).

– No voltage:

Outlander 400 Series

- Check wiring condition, ignition and low/hi beam switches.

NOTE: For ignition switch test, refer to *OUTLANDER 800 SERIES* below. For low/hi beam switch test, refer to *MULTI-FUNCTION SWITCH* elsewhere in this section.

Outlander 800 Series

- Check fuses F4, F7, relay R3 (accessories) and wiring condition.
- Check ignition switch as follows.

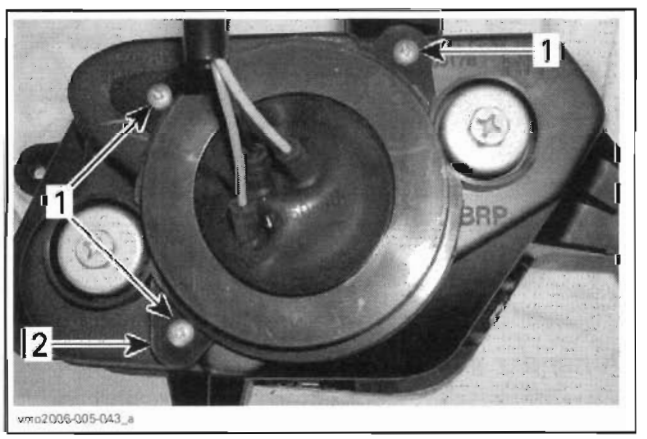
SWITCH POSITION	PIN		RESISTANCE @ 20°C (68°F)
OFF	A	F	Infinite (O.L)
ON with lights			1 Ω max.
ON without lights			Infinite (O.L)

- Check low/hi beam switch. refer to *MULTI-FUNCTION SWITCH* elsewhere in this section.

Bulb Replacement

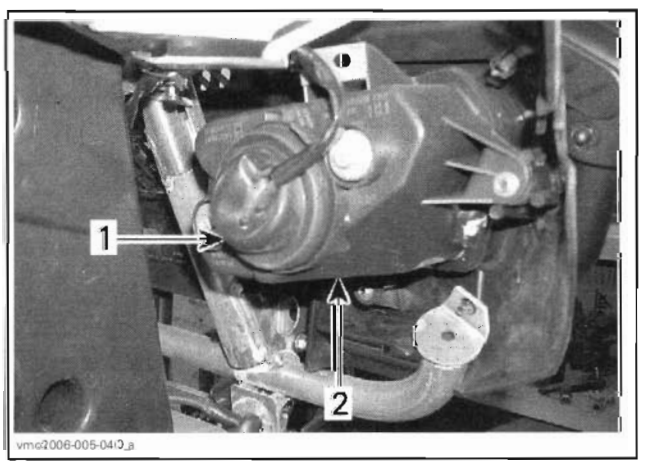
CAUTION: Never touch glass portion of an halogen bulb with bare fingers, it shortens its operating life. If glass is touched, clean it with isopropyl alcohol which will not leave a film on the bulb.

Remove cover screws.



1. Screws
2. Cover

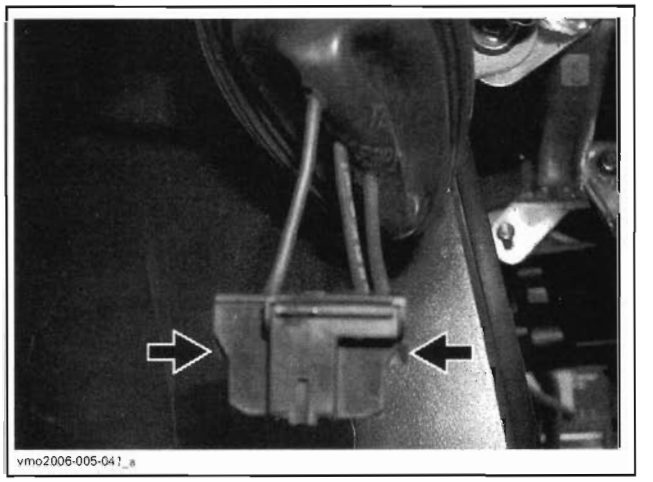
Remove rubber protector over headlamp housing.



1. Rubber protector
2. Headlamp housing

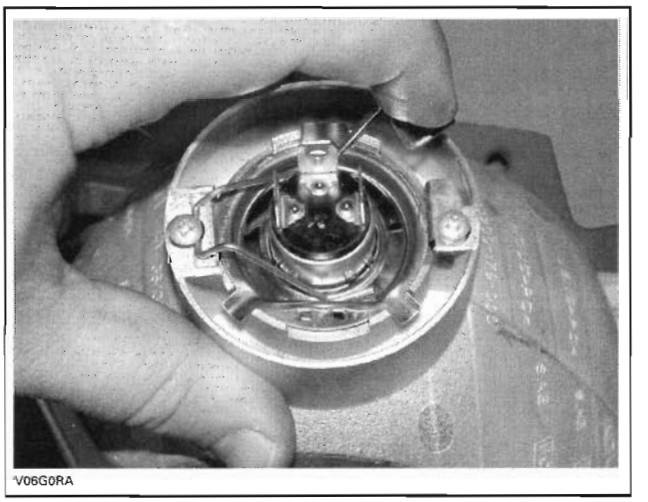
Unplug connector from headlamp.

NOTE: Use small locking tab to unlock connector then pull on connector.



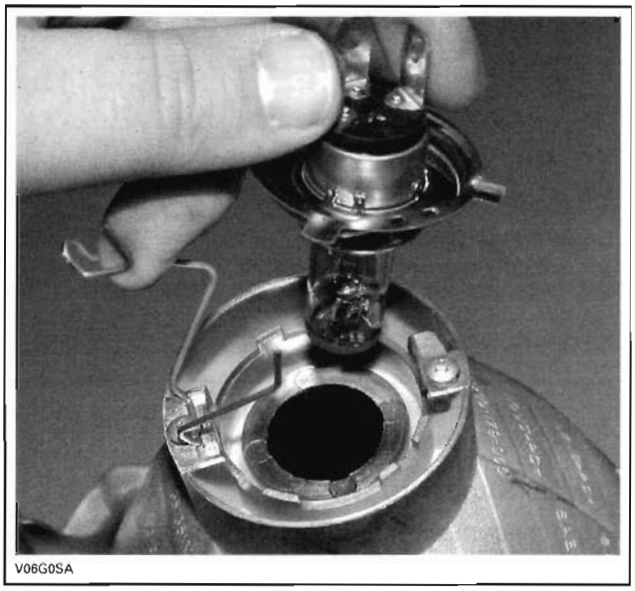
PUSH ON LOCKING TAB TO UNLOCK CONNECTOR

Press the spindle then push it on the side to unlock headlamp bulb.



TYPICAL

Lift and hold the spindle then remove the bulb.



TYPICAL

Properly reinstall removed parts in the reverse order of their removal.

Validate headlamp operation.

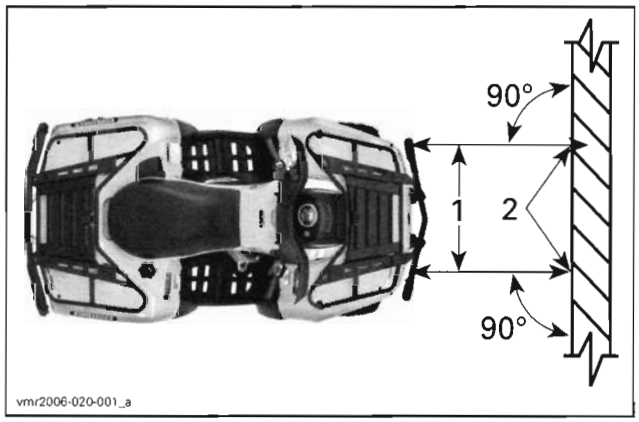
Headlamp Beam Aiming

Select high intensity.

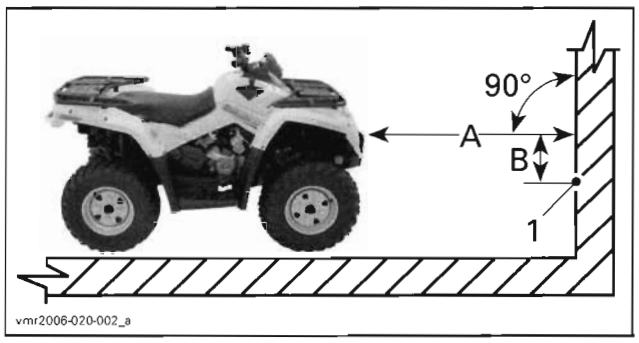
Beam aiming is correct when center of high beam is 131 mm (5 in) below the headlamp horizontal center line, scribed on a test surface, 5 m (17 ft) away.

NOTE: Sit down the driver or place the same weight on the vehicle.

Measure headlamp center distance from ground. Scribe a line at this height on test surface (wall or screen). Light beam center should be 131 mm (5 in) below scribed line.



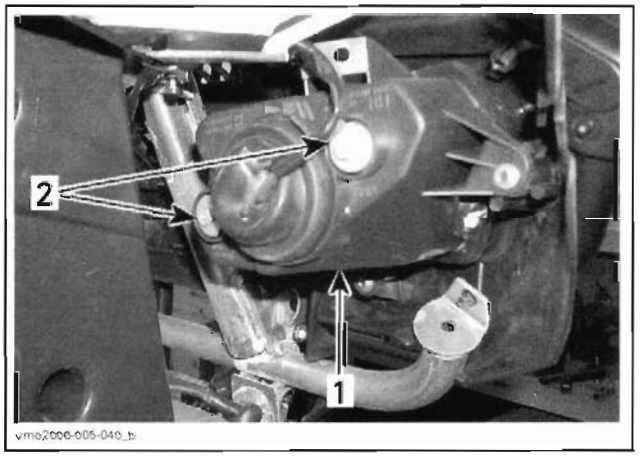
1. Headlamp center lines
2. Light beam center



1. Light beam center
A. 5 m (17 ft)
B. 131 mm (5 in)

Adjustment

Turn adjustment screws to adjust beam height and side orientation as described below. Adjust both headlamps evenly.

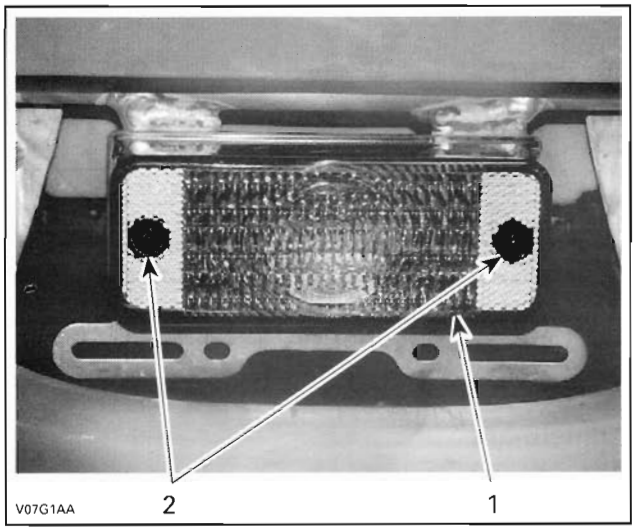


TYPICAL
1. Headlamp cover
2. Adjustment screws

TAILLIGHT

Bulb Replacement

Unscrew lens screws to expose bulb.



1. Lens
2. Screws

Push bulb in and hold while turning courterclockwise to release.

Install the new bulb by first pushing in while turning clockwise.

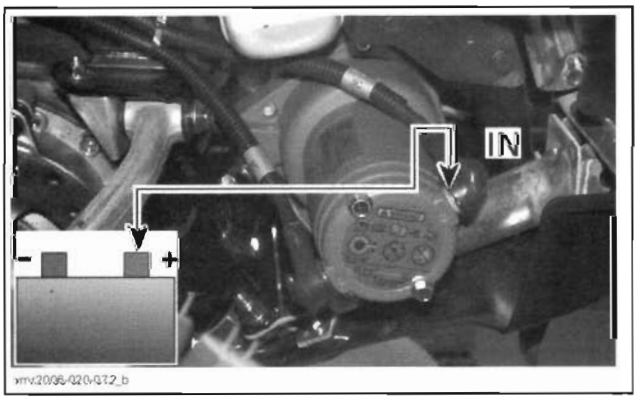
WINCH

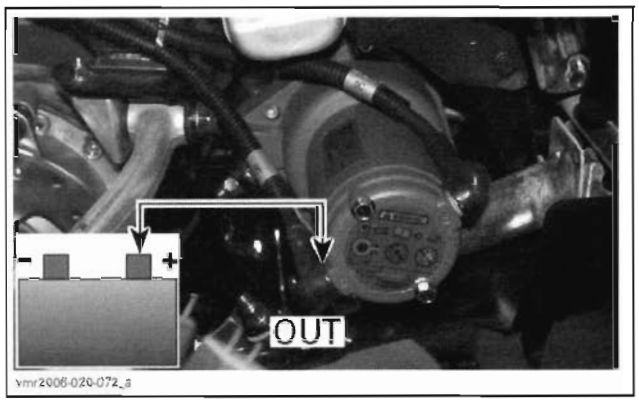
XT Models Only

Test

Winch Motor

Using boosting cables, connect battery power to IN post of winch then to OUT post.



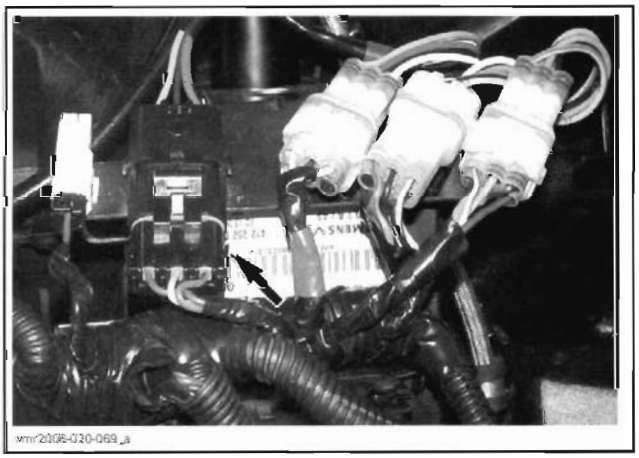


If motor does not turn in any test, replace motor. If it works, continue testing.

Voltage Supply to Switch

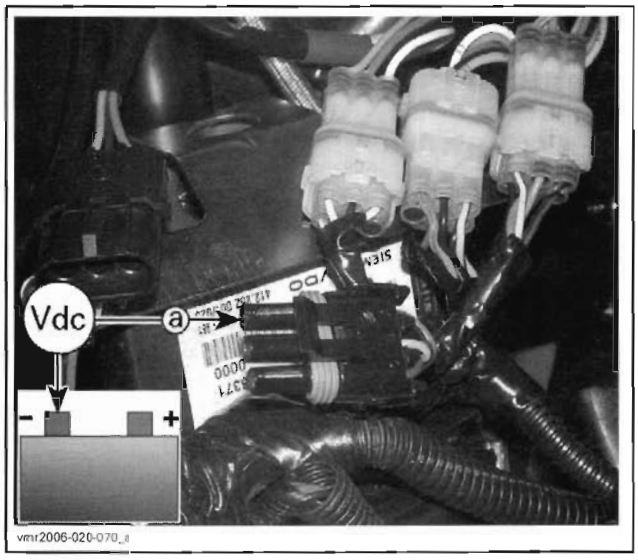
Remove center panel and dashboard. Refer to *BODY*.

Disconnect the winch control switch connector.



Using a multimeter, measure the resistance as follows.

WINCH SWITCH CONNECTOR (harness side)		VOLTAGE
Pin a	Battery ground	12 Vdc



If there is no voltage, check fuses F9, F7, relay R3 (accessories) and wiring condition.

If there is voltage, test switch as follows.

Winch Control Switch

Outlander 400 Series

Remove steering cover, refer to *BODY*.

Disconnect the winch control switch connector.

Using a multimeter, measure the resistance between the connector pin A (RED wire), B (BLACK wire) and C (GREEN wire).

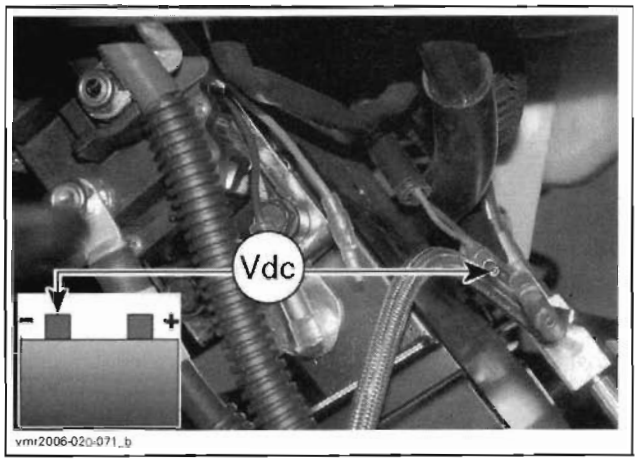
POSITION	CONNECTOR PIN	RESISTANCE
Switch to "IN"	A and C	< 5 Ω
Switch to "OUT"	A and B	< 5 Ω

If the resistance is above 5 Ω, replace the winch control switch.

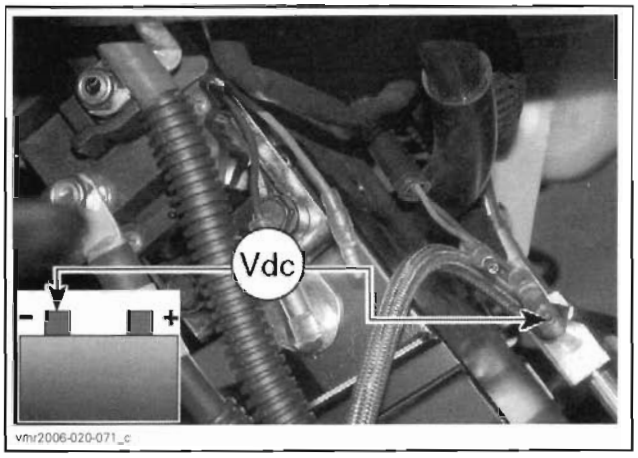
Outlander 800 Series

Disconnect terminals at winch relay.

POSITION	TERMINAL	VOLTAGE
Switch pressed to IN and held	LIGHT/BLUE and battery ground	12 Vdc



POSITION	TERMINAL	VOLTAGE
Switch pressed to OUT and held	GREEN/BLUE and battery ground	12 Vdc



If there is no voltage in either test, check wiring/connectors. If they are good, replace winch switch.

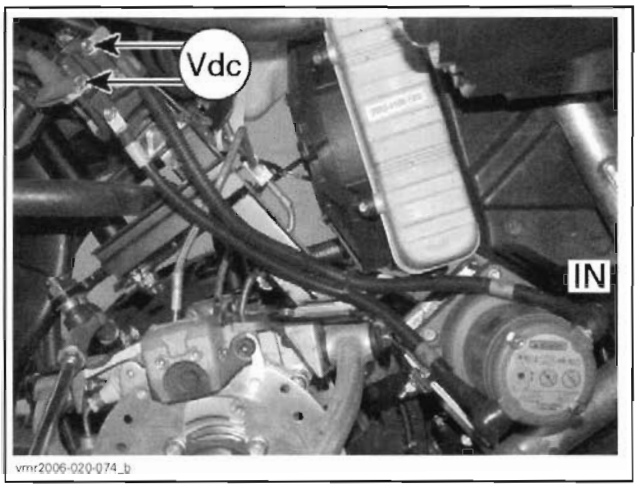
If there is voltage, test winch relay as follows.

Winch Relay

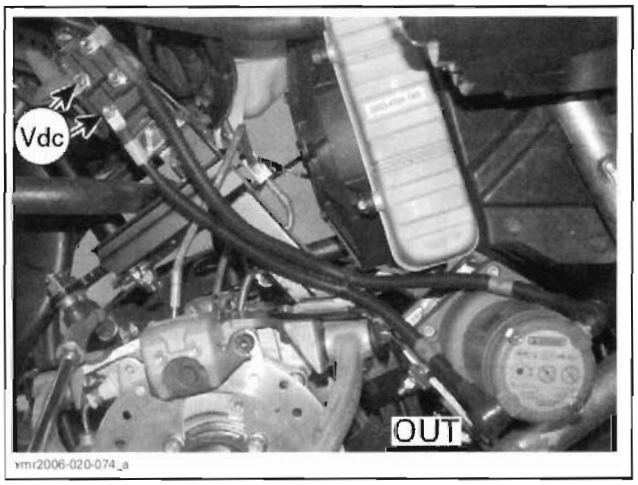
Reconnect terminals at winch relay.

Measure voltage drop between relay and motor as follows.

POSITION	RELAY TERMINAL	VOLTAGE DROP
Switch pressed to IN and held	Battery post and IN cable	0.2 Vdc max.



POSITION	RELAY TERMINAL	VOLTAGE DROP
Switch pressed to OUT and held	Battery post and OUT cable	0.2 Vdc max.



If voltage drop read is higher than specification in either test, check wiring/connectors. If they are good, replace winch relay.

If voltage read is battery voltage, the relay does not close. Replace with a new one.

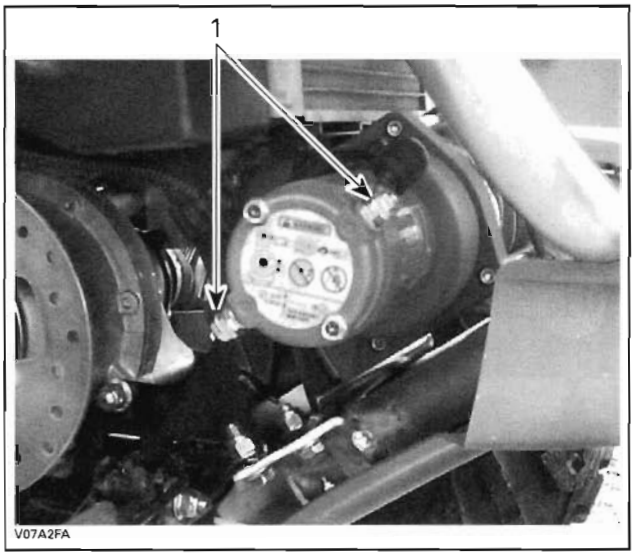
Removal

Disconnect, the battery BLACK (-) cable first, then the RED (+) cable.

⚠ WARNING

Always respect this order for disassembly; disconnect BLACK (-) cable first. Electrolyte or fuel vapors can be present in engine compartment and a spark may ignite them and possibly cause personal injuries.

Disconnect the winch power cables.

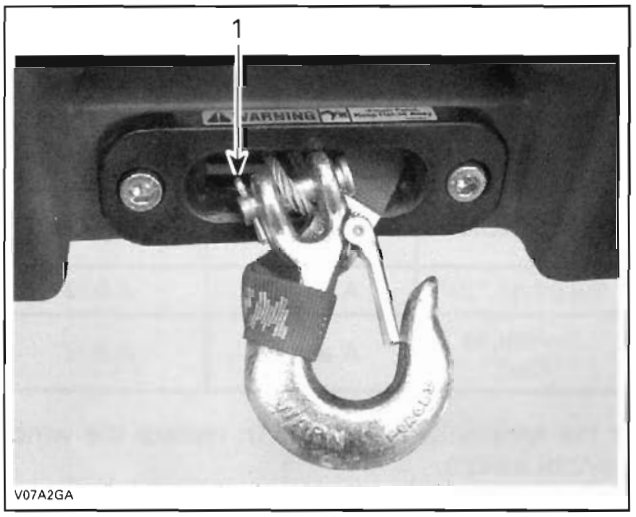


1. Power connections

NOTE: Note the position of the power cables for reinstallation.

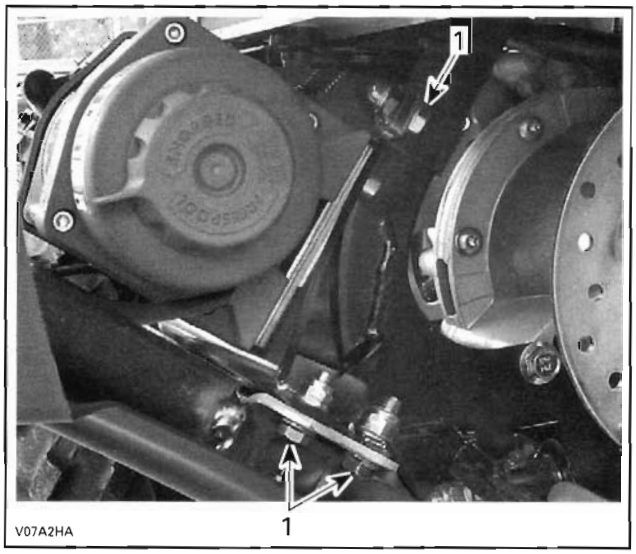
Remove:

- locking pin



1. Locking pin

- hook
- bolts retaining the winch from both LH and RH sides.



1. Bolts to be removed

Remove winch.

Installation

For the installation, reverse the removal procedure.

WINCH CONTROL SWITCH

Test

Refer to *WINCH* above.

Removal

Remove screws retaining winch control switch to handlebar.

Remove steering cover, refer to *BODY*.

Disconnect the winch control switch connector.

Installation

For the installation, reverse the removal procedure.

CONTINUOUSLY VARIABLE TRANSMISSION (CVT)

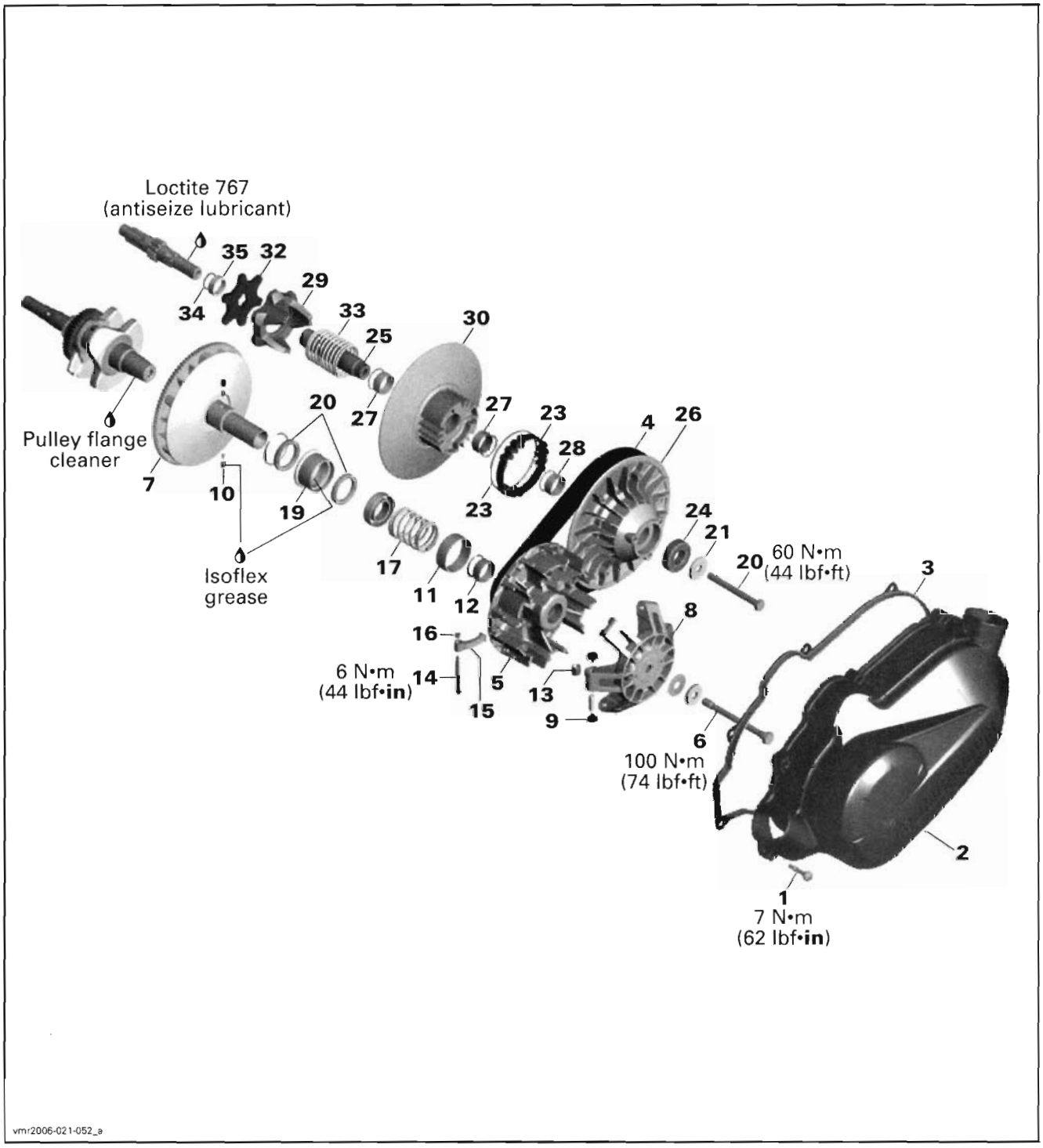
SERVICE TOOLS

Description	Part Number	Page
clutch holding tool	529 006 400	261, 266, 275
clutch holding tool	529 035 771	282
clutch puller	529 035 746	262
crankshaft locking bolt	529 035 617	261, 275
drive pulley puller	529 035 746	275
driven pulley expander	529 035 747	259, 273

SERVICE PRODUCTS

Description	Part Number	Page
Isoflex grease	293 550 021	266, 280–281
Loctite 5910	293 800 081	260
pulley flange cleaner	413 711 809	268, 277–278, 283

OUTLANDER 400 SERIES



GENERAL

NOTE: For a better understanding, the following illustrations are taken with engine out of vehicle. To perform the following instructions, it is not necessary to remove engine.

This CVT is lubrication free. Never lubricate any components except drive pulley one-way clutch.

During assembly/installation, use the torque values and service products as in the exploded views.

Clean threads before applying a threadlocker. Refer to *SELF-LOCKING FASTENERS* and *LOCTITE APPLICATION* at the beginning of this manual for complete procedure.

⚠ WARNING

Torque wrench tightening specifications must strictly be adhered to.
Locking devices (e.g.: locking tabs, elastic stop nuts, self-locking fasteners, cotter pin, etc.) must be installed or replaced with new ones where specified. If the efficiency of a locking device is impaired, it must be renewed.

⚠ WARNING

Never touch CVT while engine is running. Never drive vehicle when CVT cover is removed.

⚠ WARNING

Any drive pulley repairs must be performed by an authorized Bombardier ATV dealer. Subcomponent installation and assembly tolerances require strict adherence to procedures detailed.

⚠ WARNING

Never use any type of impact wrench at drive pulley removal and installation.

⚠ WARNING

The clutch assembly is a precisely balanced unit. Never replace parts with used parts from another clutch assembly.

CAUTION: These pulleys have metric threads. Do not use imperial thread puller. Always tighten puller by hand to ensure that the drive pulley has the same type of threads (metric vs imperial) before tightening completely.

PROCEDURES

DRIVE BELT

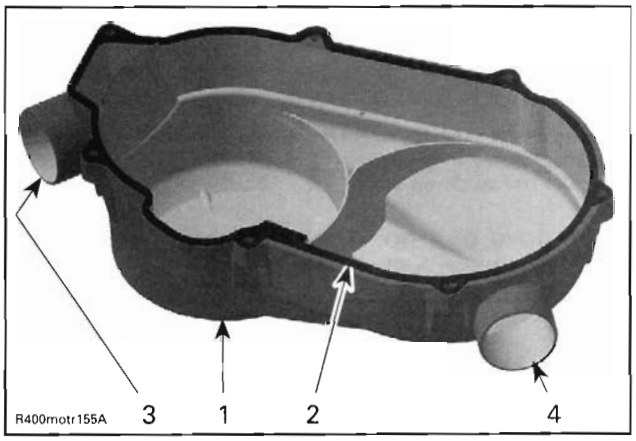
Removal

Remove:
- LH engine side panel
- LH footwell.

Unscrew clamps retaining CVT cover hoses.

Remove distance screws **no. 1**.

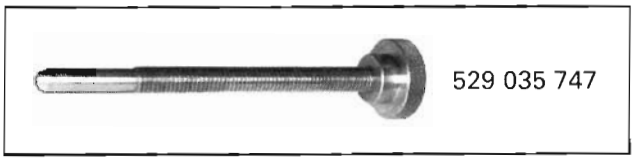
Remove CVT cover and its gasket.



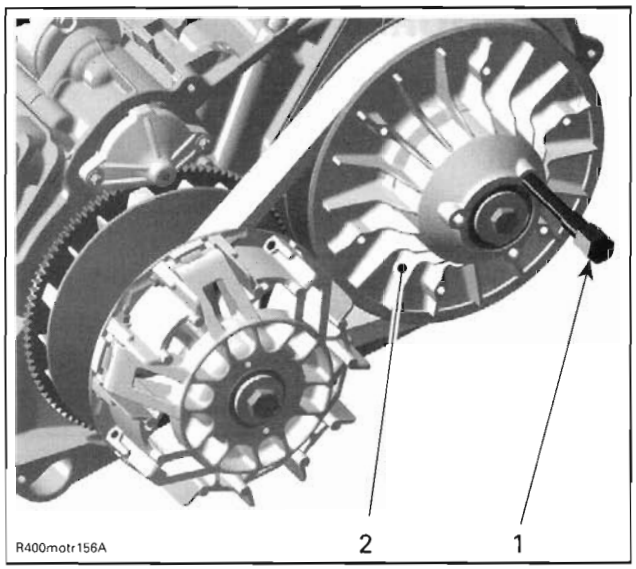
1. *CVT cover*
2. *Gasket*
3. *Intake for air cooling*
4. *Air outlet*

NOTE: Remove the center top screw last. This screw supports the cover **no. 2** during removal.

Open driven pulley with the driven pulley expander (P/N 529 035 747).

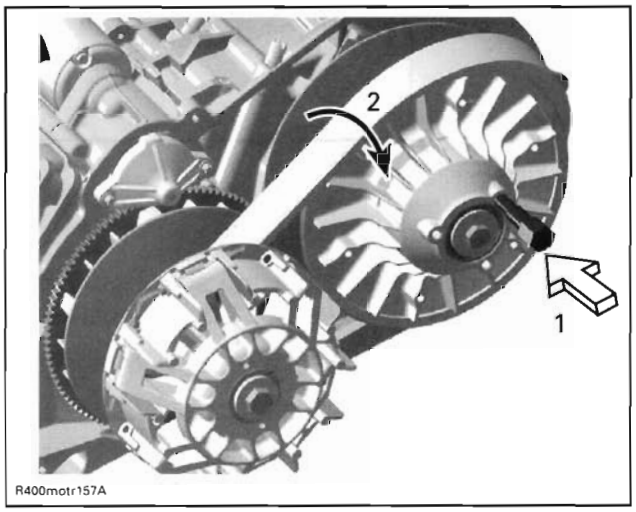


Screw tool in the threaded hole of driven pulley and tighten to open the pulley.



1. Driven pulley expander
2. Fixed half of driven pulley

To remove belt **no. 4**, slip the belt over the top edge of sliding half, as shown.



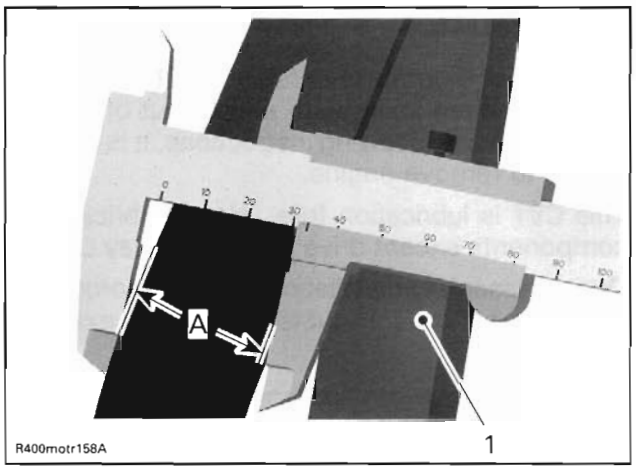
1. Screw in of driven pulley expander
2. Removal direction for belt

Inspection

Inspect belt for cracks, fraying or abnormal wear. Replace if necessary.

Check drive belt width at cord level. Replace if it is out of specification (see table below).

DRIVE BELT WIDTH	
SERVICE LIMIT	30.00 mm (1.181 in)



1. Drive belt
A. Belt width

Installation

For installation, reverse the removal procedure. Pay attention to following details.

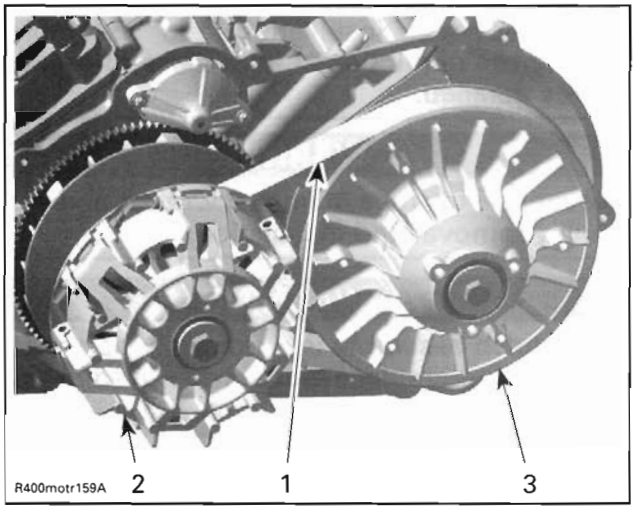
The maximum drive belt life span is obtained when the drive belt has the proper rotation direction. Install it so that the arrow printed on belt is pointing towards the back of the vehicle.

NOTE: Put a small amount of Loctite 5910 (P/N 293 800 081) in the groove of CVT cover to ease installation of CVT cover with gasket **no. 3**.

Install the center top screw of cover in first.

Install the other screws then torque them in a crisscross sequence.

DRIVE PULLEY



1. Belt
2. Drive pulley
3. Driven pulley

Removal

Remove belt no. 4.

NOTE: To remove drive pulley, two procedures can be followed.

⚠ WARNING

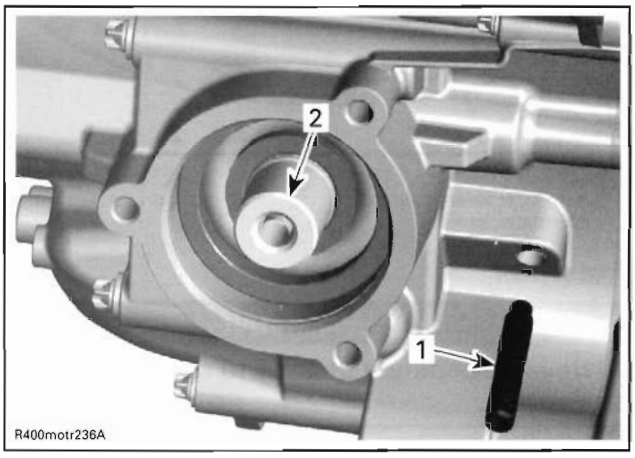
Drive pulley screw has a left-hand thread.

First possible procedure:

- Remove the spark plug.
- Put piston at TDC and lock crankshaft with the crankshaft locking bolt (P/N 529 035 617).

529 035 617





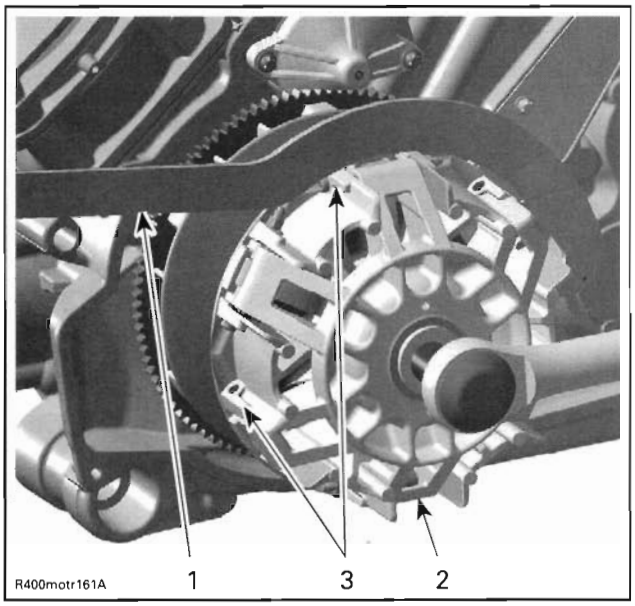
1. *Crankshaft locking bolt*
2. *Output shaft (front side)*

Second possible procedure:

- Block drive pulley with the clutch holding tool (P/N 529 006 400).

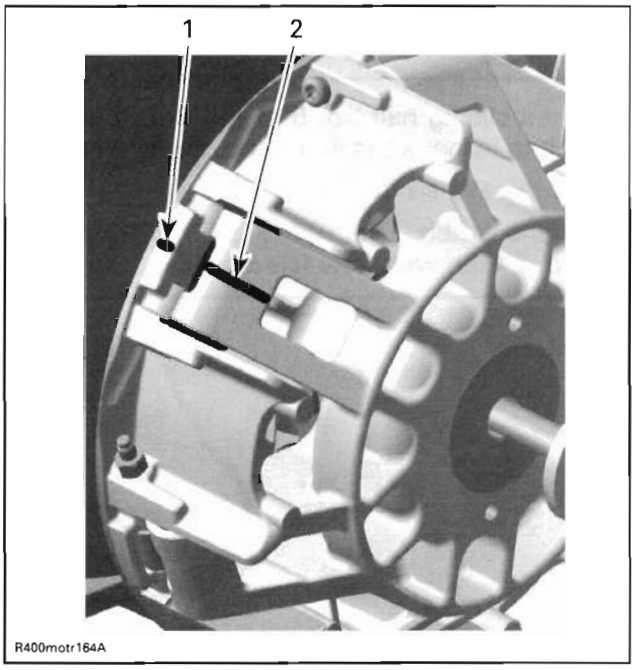
529 006 400





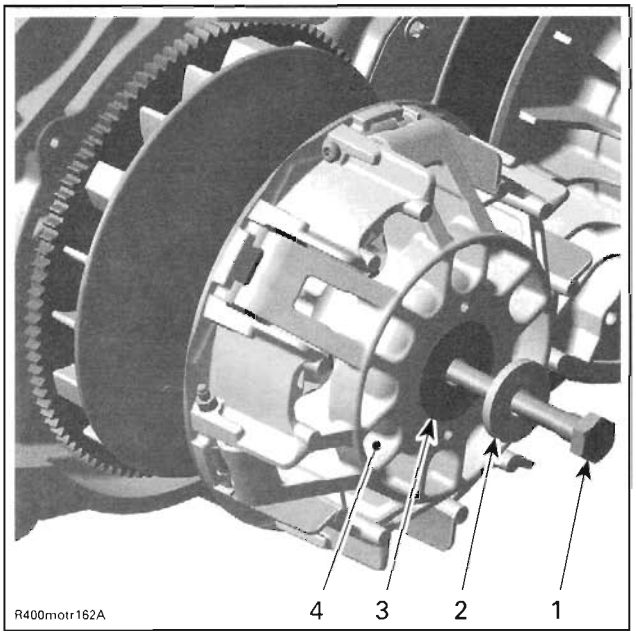
1. *Clutch holding tool*
2. *Drive pulley sliding half*
3. *Area to place holding tool hook*

CAUTION: Prior to removing the drive pulley, mark sliding half and governor cup together to ensure correct reinstallation. There are only 4 levers mounted out of 6 possible positions.



1. *Mark on drive pulley sliding half*
2. *Mark on governor cup*

Remove drive pulley screw, spring washer and thrust washer.



1. *Drive pulley screw*
2. *Spring washer*
3. *Thrust washer*
4. *Drive pulley sliding half*

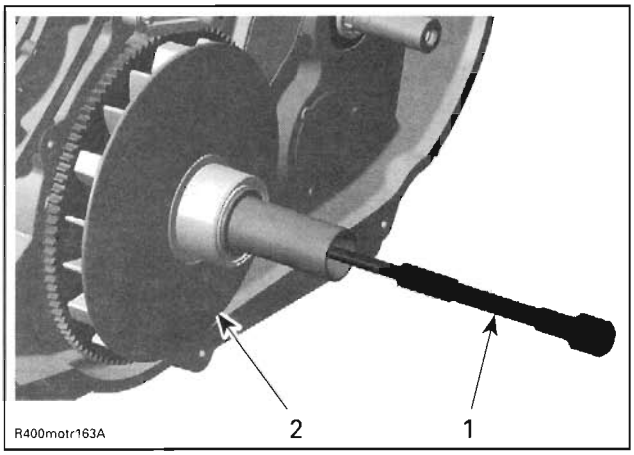
⚠ WARNING

Drive pulley screw has a left hand thread and the sliding half of drive pulley is spring loaded.

Push the sliding half **no. 5** of the drive pulley by hand then remove the screw **no. 6** completely.

Slowly release sliding half.

Screw the clutch puller (P/N 529 035 746) in fixed half **no. 7** then withdraw fixed pulley.



1. *Clutch puller*
2. *Fixed half*

Disassembly

Governor Cup

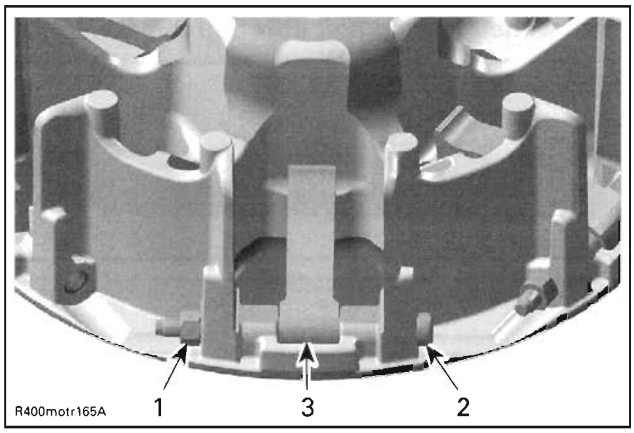
Carefully lift governor cup **no. 8** until slider shoes **no. 9** come at their highest position into guides.

Sliding Half

Unscrew lock nut and remove centrifugal lever pivot bolt.

NOTE: Outlander 400 shows 4 lever pivot bolts.

Remove centrifugal lever.



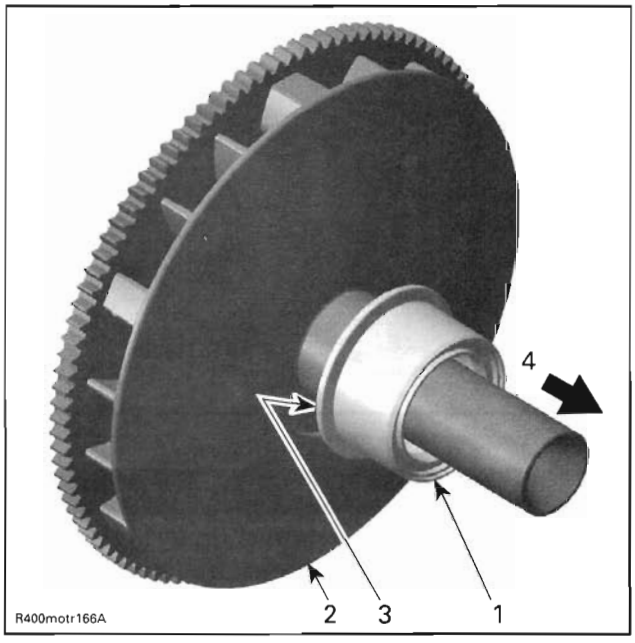
1. *Lock nut*
2. *Centrifugal lever pivot bolt*
3. *Centrifugal lever*

Fixed Half

⚠ WARNING

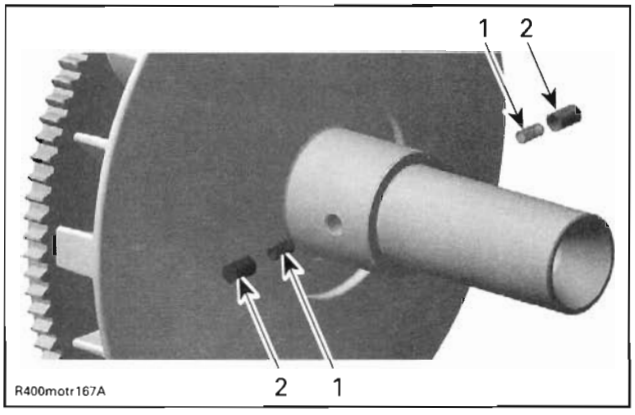
Always wear safety glasses to remove spring sleeves.

Pull one-way clutch slowly until the half of spring sleeves **no. 10** is visible.



1. One-way clutch
2. Fixed half
3. Spring sleeve area
4. Direction of removal

Hold both spring sleeves with fingers and release them when one-way clutch is out of engagement.



1. Spring
2. Spring sleeves

Cleaning

Clean pulley faces and shaft with fine steel wool and dry cloth.

Using a paper towel with cleaning solvent, clean crankshaft tapered end and the taper inside of the fixed half of the drive pulley, crankshaft threads and threads of drive pulley screw **no. 6**.

⚠ WARNING

This procedure must be performed in a well-ventilated area.

CAUTION: To avoid damage, make sure cleaner does not contact the crankshaft seal.

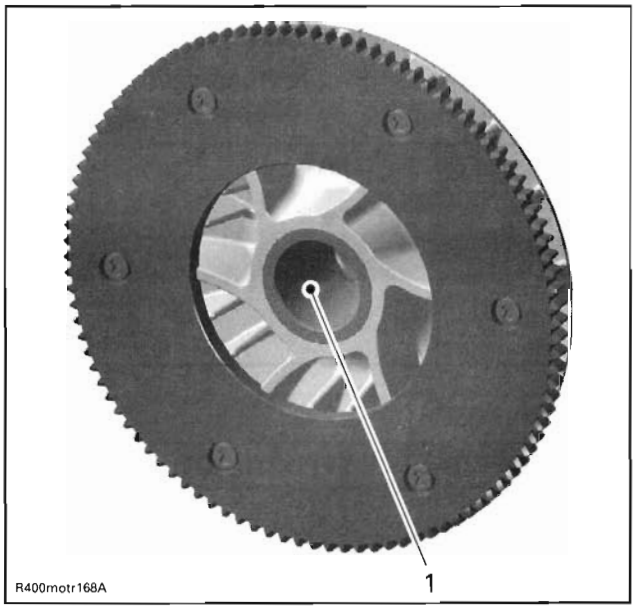
Remove all hardened oil deposits that have baked on crankshaft and pulley tapered surfaces with coarse or medium steel wool and/or sand paper no. 600.

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.



1. Taper of fixed half

Only use petrol base cleaner when cleaning bushings **no. 11** and **no. 12**.

CAUTION: Do not use acetone to clean bushing.

Inspection

Drive Pulley

Drive pulley should be inspected annually.

Governor Cup

Check governor cup **no. 8** for cracks or other visible damages. Replace if necessary.

Roller

Check each roller **no. 13** for roundness of external diameter.

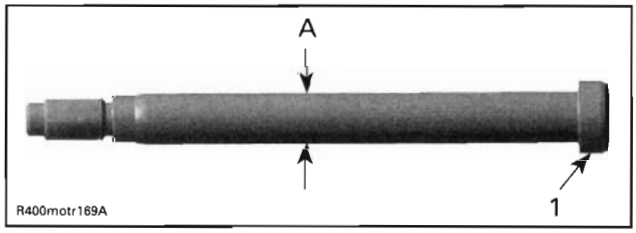
NOTE: Replace governor cup if the roller does not move freely.

Measure the roller diameter. If a roller is out of specification, replace all rollers.

ROLLER OUTER DIAMETER	
NOMINAL	13.70 to 13.90 mm (.539 to .547 in)
SERVICE LIMIT	13.20 mm (.519 in)
ROLLER INNER DIAMETER	
NOMINAL	8.05 to 8.15 mm (.317 to .321 in)
SERVICE LIMIT	9.00 mm (.354 in)

Centrifugal Lever Pivot Bolt

Measure diameter of centrifugal lever pivot bolt **no. 14**, replace if it is out of specification.



1. Centrifugal lever pivot bolt
A. Measure diameter here

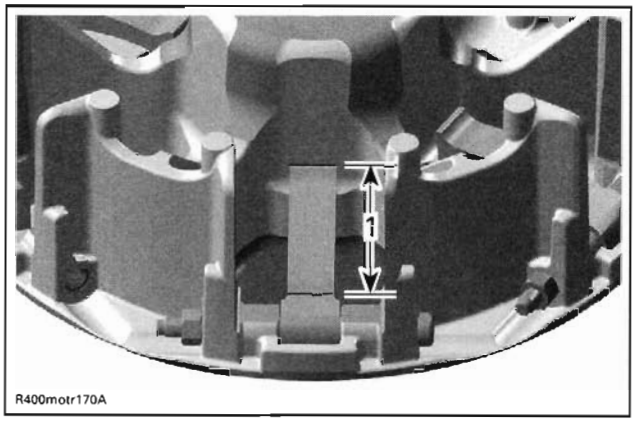
CENTRIFUGAL LEVER PIVOT BOLT DIAMETER	
NOMINAL	6.078 to 6.100 mm (.239 to .240 in)
SERVICE LIMIT	6.00 mm (.236 in)

Centrifugal Lever

Check bushing diameter in the centrifugal lever **no. 15** for wear. If a centrifugal lever must be replaced, replace all levers at the same time.

CENTRIFUGAL LEVER BORE DIAMETER	
NOMINAL	6.035 to 6.078 mm (.238 to .239 in)
SERVICE LIMIT	6.200 mm (.244 in)

Replace centrifugal lever **no. 15** with pivot bolts **no. 14** and lock nuts **no. 16** if the contact surfaces show heavy visible wear.



1. Contact surface to the roller

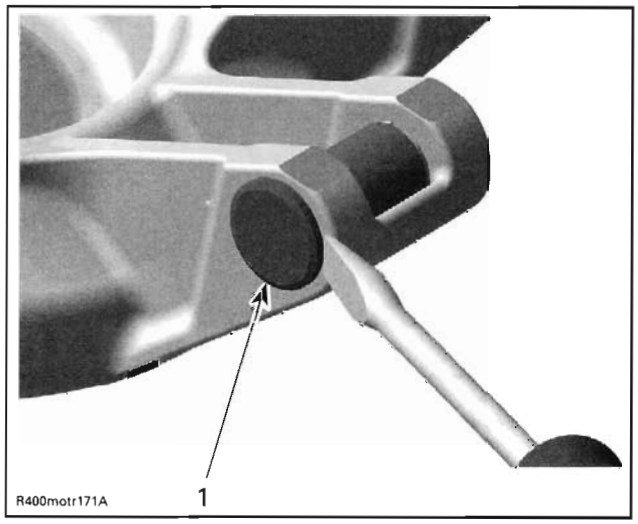
⚠ WARNING

Whenever replacing centrifugal levers, always replace all levers at the same time. Otherwise, the drive pulley will be unbalanced (because of lever differences).

Slider Shoe

Check slider shoes for visible wear and replace if damaged.

NOTE: If necessary, use a screwdriver to remove slider shoes.

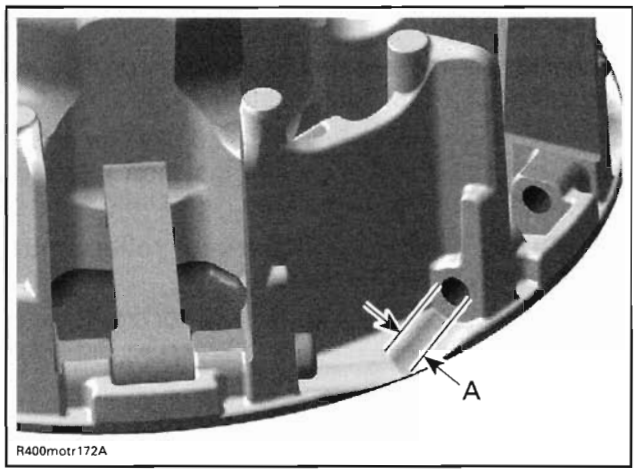


1. Slider shoe

Sliding Half

Check sliding half **no. 5** for cracks and sliding contact surface for excessive wear. Replace sliding half if necessary.

Measure centrifugal lever pivot bolt bores. Replace sliding half if bores are out of specification or damaged.

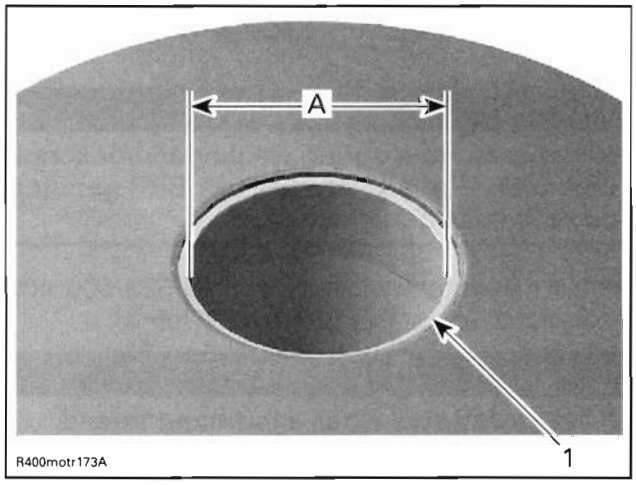


A. Centrifugal lever pivot bolt bore diameter

CENTRIFUGAL LEVER PIVOT BORE DIAMETER	
NOMINAL	6.113 to 6.171 mm (.241 to .243 in)
SERVICE LIMIT	6.300 mm (.248 in)

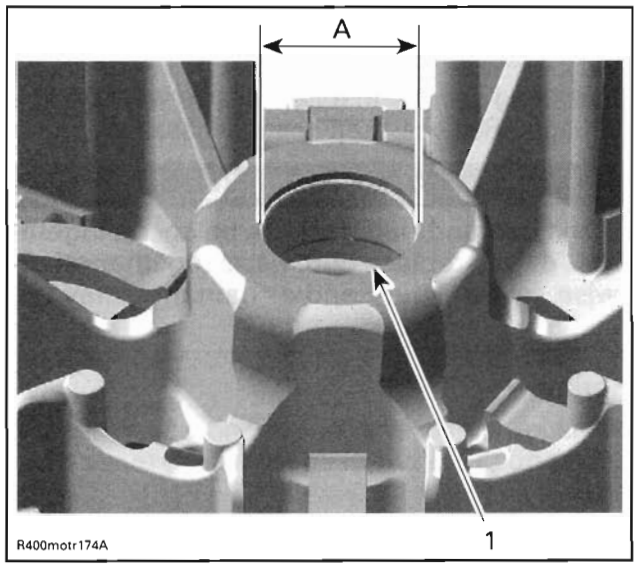
Measure bushing diameters of sliding half.

Use a dial bore gauge to measure bushing diameter. Measuring point must be at least 5 mm (1/4 in) from bushing edge.



1. Bushing on fixed half side
A. Bore diameter of bushing

SLIDING HALF LARGE BUSHING	
NOMINAL	55.000 to 55.020 mm (2.165 to 2.166 in)
SERVICE LIMIT	55.200 mm (2.173 in)



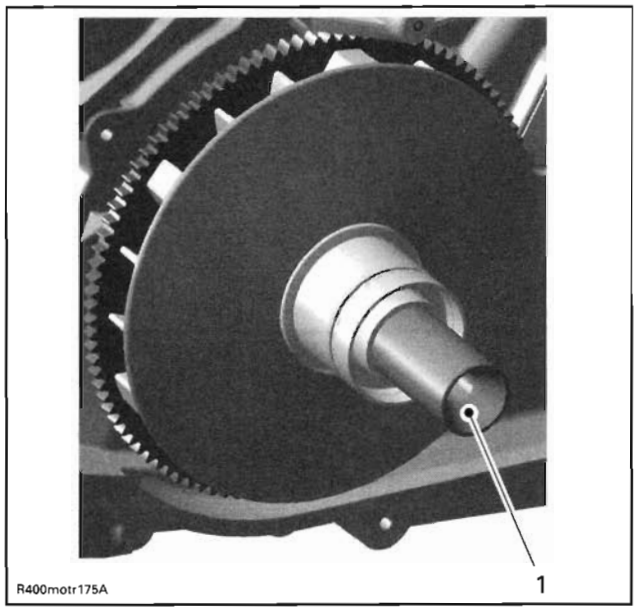
1. Bushing on governor cup side
A. Bore diameter of bushing

SLIDING HALF SMALL BUSHING	
NOMINAL	30.000 to 30.020 mm (1.181 to 1.182 in)
SERVICE LIMIT	30.200 mm (1.189 in)

Replace sliding half if bushings **no. 11** and/or **no. 12** is(are) out of specification. Visually inspect coatings.

Fixed Half

Check fixed half contact surface to the governor cup for scoring and other damages. If so, replace fixed half **no. 7**.



1. Visually check here

Check for any marks on fixed half plate. Replace if necessary.

Check ring gear teeth for excessive wear or other damage. Replace fixed half if necessary.

⚠ WARNING

Fixed half and ring gear are balanced together. Always replace both parts together otherwise severe injury and/or damages may occur.

Spring

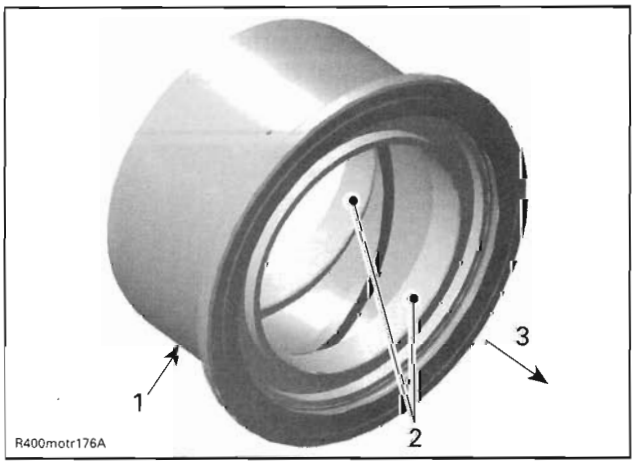
Measure spring free length and squareness. If spring no. 17 is out of specification, replace by a new.

SPRING FREE LENGTH	
SERVICE LIMIT	75 mm (2.953 in)
CLUTCH SPRING SQUARENESS	
SERVICE LIMIT	4 mm (.157 in)

One-Way Clutch

Check bearings no. 18 for excessive play and smooth operation. Replace one-way clutch no. 19 if necessary.

CAUTION: Be careful not to damage the inside of one-way clutch during bearing removal.



1. *One-way clutch*
2. *Bearings*
3. *Drive pulley sliding half side*

Measure length of spring sleeve no. 10 and check if edges on top of the spring sleeve are excessively worn. If out of specifications, replace both spring sleeves and springs at the same time.

SPRING SLEEVE LENGTH	
SERVICE LIMIT	9 mm (.276 in)

Assembly

For assembly, reverse the disassembly procedure. Pay attention to following details.

Apply Isoflex grease (P/N 293 550 021) on spring sleeves no. 10 and their springs then between one-way clutch bearings.

CAUTION: Centrifugal lever and rollers must move easily after installation.

Insert slider shoes no. 9 into governor cup to properly slide in guides.

Installation

For installation, reverse the removal procedure. Pay attention to the following details.

⚠ WARNING

Do not apply antiseize or any lubricant on crankshaft and drive pulley tapers.
Never use any type of impact wrench at drive pulley removal and installation.

Clean mounting surfaces as described in *CLEANING* above.

Install drive pulley on crankshaft extension.

Install spring washer with its concave side towards drive pulley then install drive pulley screw no. 6.

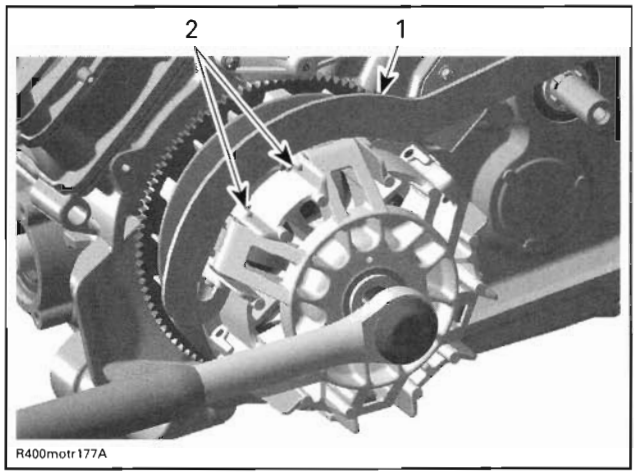
⚠ WARNING

Never substitute spring washer and/or screw with jobber ones. Always use BRP genuine parts for this particular case.

Install the clutch holding tool (P/N 529 006 400) and torque screw to 100 N•m (74 lbf•ft).

⚠ WARNING

Drive pulley screw has a left-hand thread.

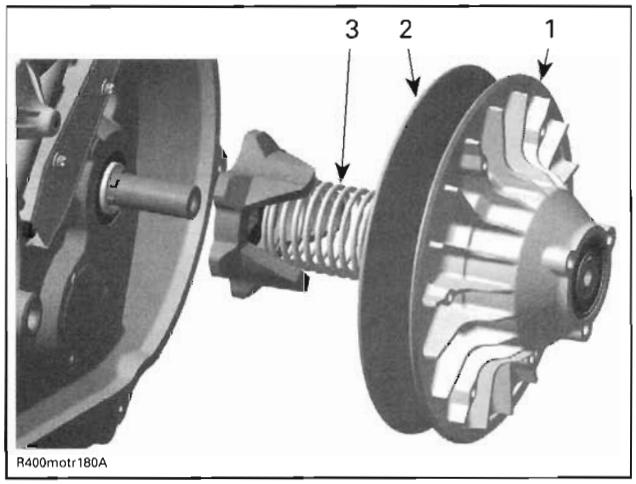


1. Clutch holding tool
2. Drive pulley removal/installation area

DRIVEN PULLEY

Removal

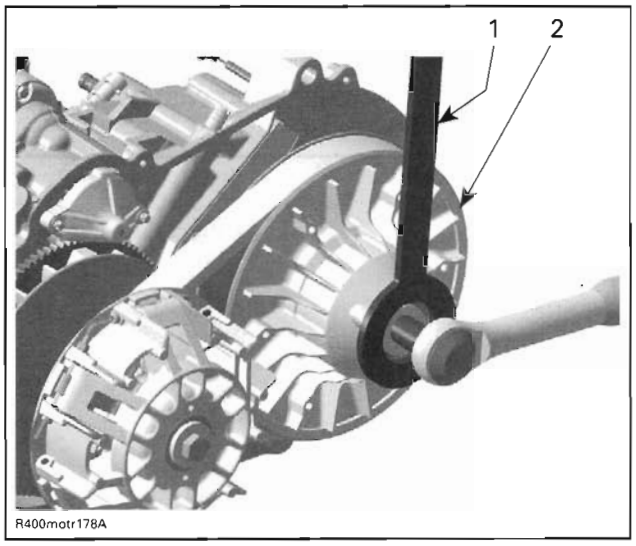
Remove:
- belt **no. 4** (see *DRIVE BELT* above)
- driven pulley.



1. Fixed half of driven pulley
2. Sliding half of driven pulley
3. Spring

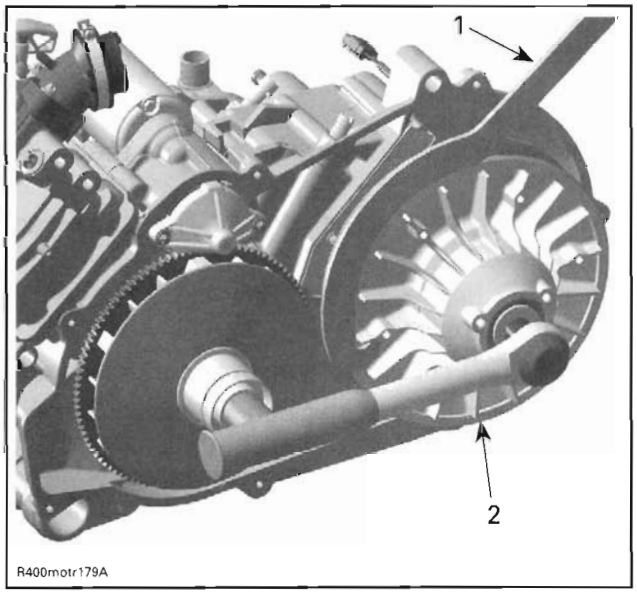
NOTE: Two procedures can be carried out to remove driven pulley.

First possible procedure:
- Block driven pulley fixed half with clutch holding tool (P/N 529 035 771) then remove the driven pulley bolt **no. 20** and the washer **no. 21**.



1. Clutch holding tool
2. Driven pulley fixed half

Second possible procedure:
- Block driven pulley with clutch holding tool (P/N 529 006 400) then remove the driven pulley bolt **no. 20** and the washer **no. 21**.



1. Clutch holding tool
2. Driven pulley fixed half

Disassembly

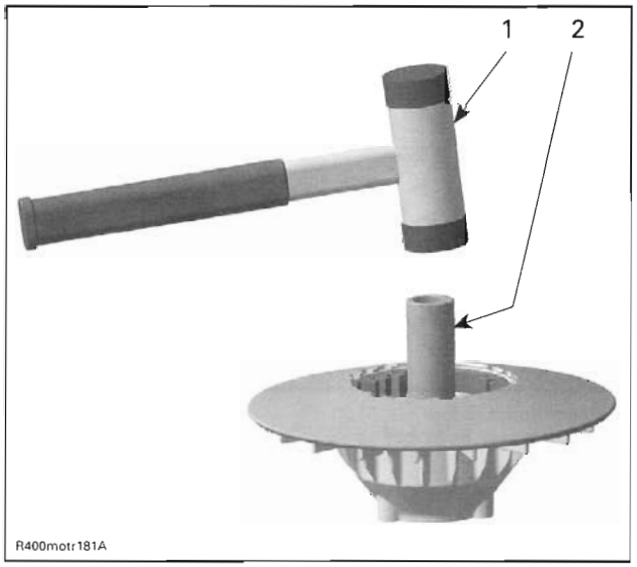
Fixed Half

Remove retaining ring **no. 22** and lift torque gear **no. 23**.

NOTE: The following procedure is not necessary except if ball bearing **no. 24** or shaft **no. 25** must be removed. Refer to *INSPECTION* before proceeding.

Heat ball bearing area up to 100°C (212°F) before removing ball bearing.

Use a soft hammer to push shaft with bearing out of fixed half **no. 26**.



1. Soft hammer
2. Shaft

Remove shaft from ball bearing.

Cleaning

To remove a dust deposit from cam or shaft, use a dry cloth.

Clean pulley faces and shaft with fine steel wool and dry cloth.

Use pulley flange cleaner (P/N 413 711 809) to clean driven pulley.

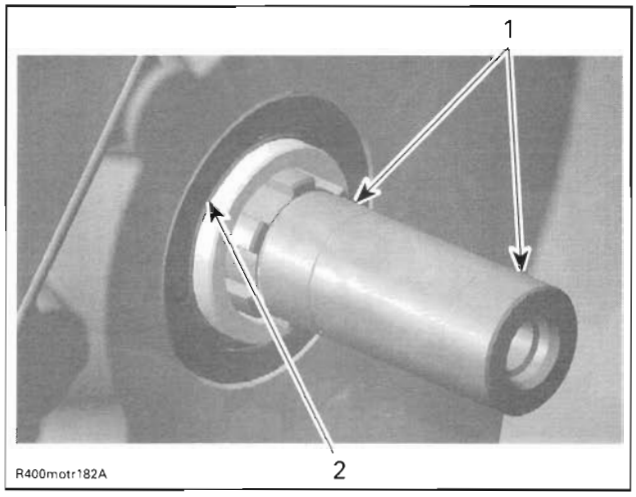
Clean the CVT crankcase area from contamination.

Using a paper towel with cleaning solvent to clean main shaft end and the inside of the shaft **no. 25**.

⚠ WARNING

This procedure must be performed in a well-ventilated area.

CAUTION: To avoid damage, make sure cleaner does not contact the countershaft seal.



1. Main shaft supports
2. Sealing lip of countershaft oil seal

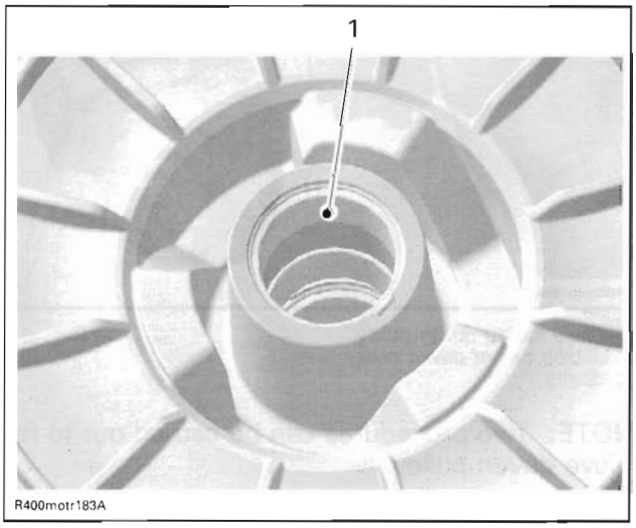
Inspection

Sliding Half

Check bushings **no. 27** for cracks, scratch and for free movement when assembled to sliding half.

Using a dial bore gauge, measure bushing diameters. Measuring point must be at least 5 mm (1/4 in) from bushing edges.

These bushings are not replaceable. Replace sliding half if bushings are out of specification. Visually inspect coatings.



1. Bushing

BUSHINGS BORE DIAMETER	
NOMINAL	30.000 to 30.020 mm (1.181 to 1.182 in)
SERVICE LIMIT	30.200 mm (1.189 in)

Fixed Half

Check ball bearing **no. 24** for free play and smooth operation. Replace if necessary.

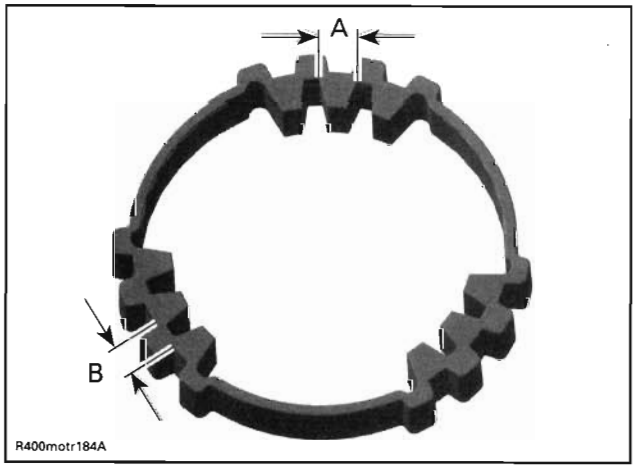
Check shaft **no. 25** for heavy wear or visible damage. Replace if necessary.

If the shaft is removed, measure bushing diameter with a dial bore gauge. Measuring point must be at least 5 mm (1/4 in) from bushing edge.

This bushing is not replaceable. Replace fixed half if bushing **no. 28** is out of specification. Visually inspect coatings.

BUSHING BORE DIAMETER	
NOMIAL	30.000 to 30.020 mm (1.181 to 1.182 in)
SERVICE LIMIT	30.200 mm (1.189 in)

Check torque gear **no. 23** for visible damage and wear limit with a caliper.

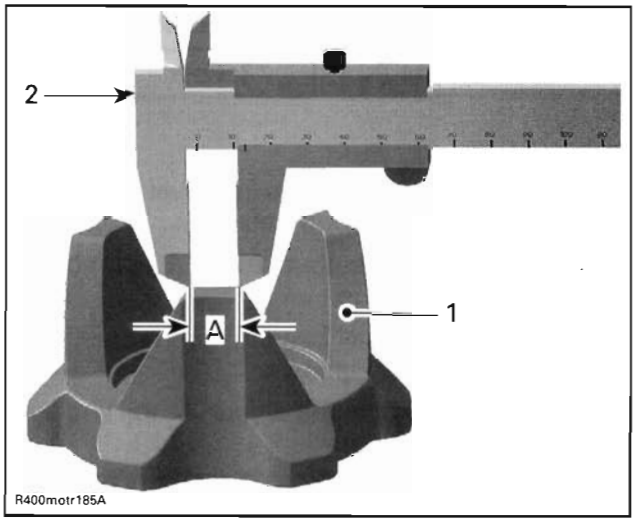


A. Measurement inside
B. Measurement outside

WEAR ON TEETH BOTH SIDES	
SERVICE LIMIT	7.500 mm (.295 in)

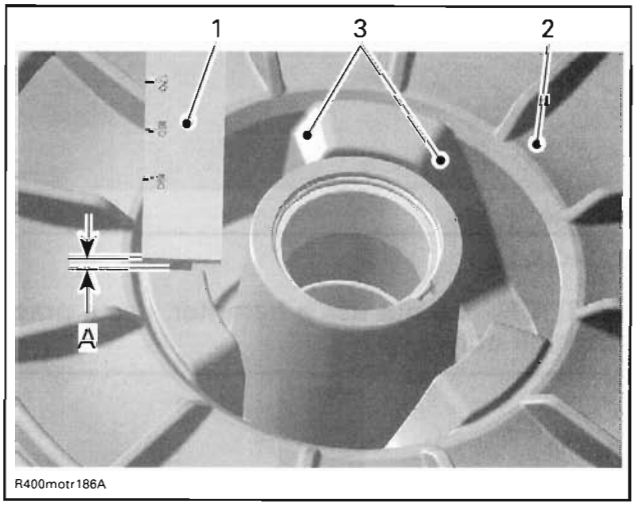
Cam

Check cam **no. 29** for visible damage and wear limit with a caliper.



1. Contact surfaces for power train
2. Caliper
A. Width to be measured due to wear on contact surface

WIDTH ON TOP SURFACE	
SERVICE LIMIT	6.000 mm (.236 in)



1. Caliper
2. Sliding half
3. Contact surface
A. Wear to be measured

WEAR ON CONTACT SURFACE	
SERVICE LIMIT	2.000 mm (.079 in)

Spring

Measure spring free length and squareness. If spring **no. 33** is out of specification, replace by a new.

SPRING FREE LENGTH	
SERVICE LIMIT	164 mm (6.457 in)

CLUTCH SPRING SQUARENESS	
SERVICE LIMIT	3.8 mm (.150 in)

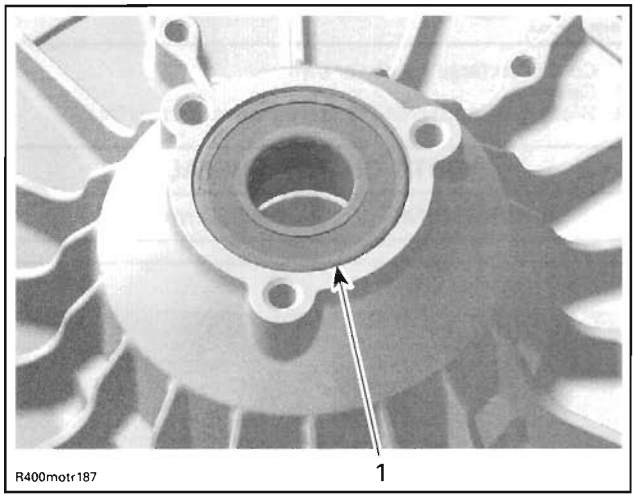
Assembly

For installation, reverse the removal procedure. Pay attention to following details.

Heat ball bearing area up to 100°C (212°F) before ball bearing installation.

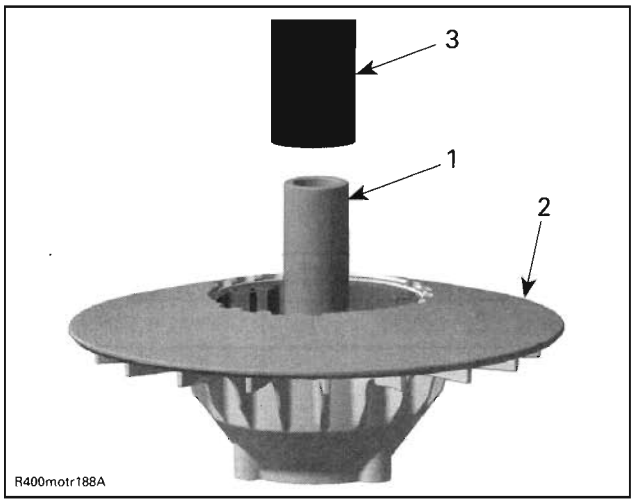
NOTE: Place new ball bearing in a freezer for 10 minutes before installation.

Install ball bearing with the writing on top and push only on the outer ring.



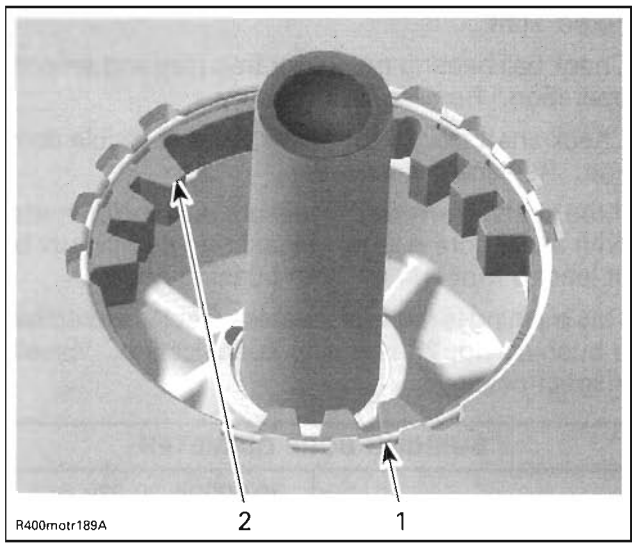
1. Ball bearing

CAUTION: Do not use a hammer, use a press machine only.



1. Shaft
2. Fixed half
3. Press machine

Install torque gear then secure it with retaining ring.



1. Retaining ring
2. Torque gear

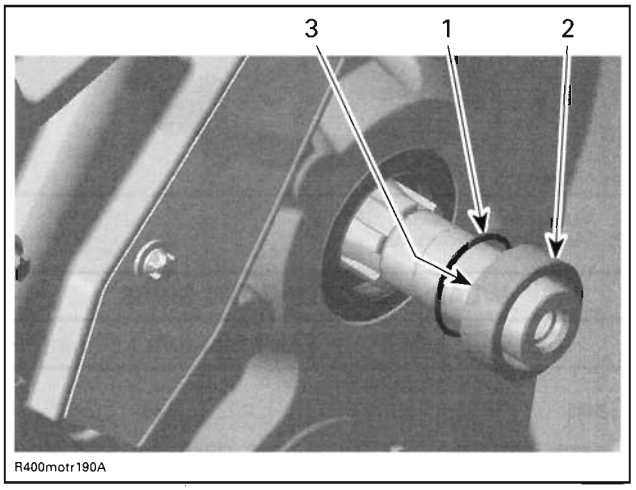
Installation

For installation, reverse the removal procedure. Pay attention to the following details.

Install sliding half **no. 30** into fixed half **no. 26**.

Place O-ring **no. 34** on main shaft splines and move it with spacer **no. 35** in end position.

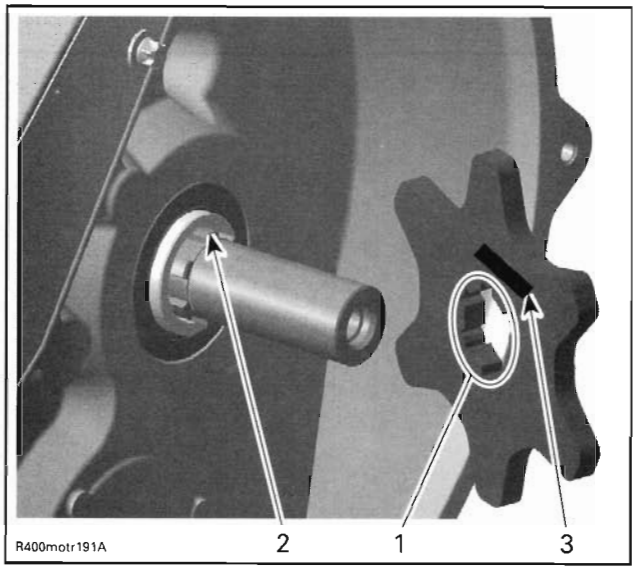
CAUTION: Chamfer on inside diameter of the spacer must face engine side.



1. O-ring
2. Distance sleeve
3. Chamfered area of distance sleeve

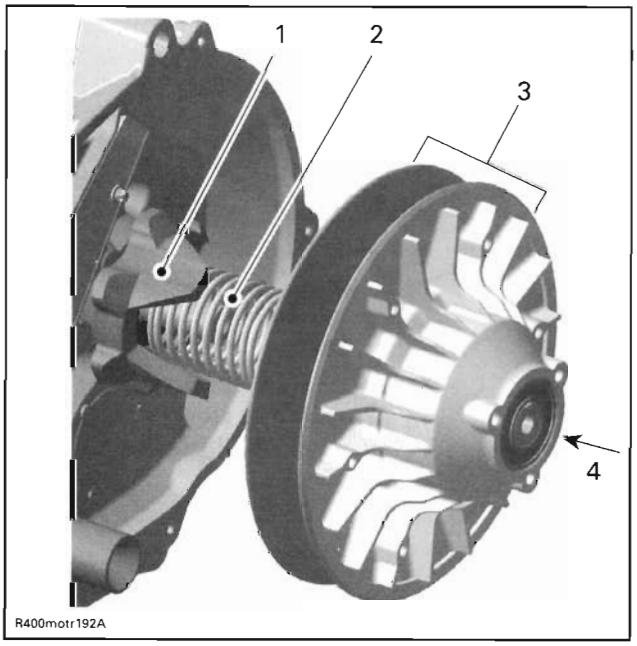
Install cam retainer **no. 32** on main shaft end the right way then install cam **no. 29**.

NOTE: Place cam retainer **no. 32** with printed mark ENGINE SIDE towards the engine.



1. *Sharp edge of cam retainer to engine side*
2. *Main shaft spline*
3. *Inscription*

Place spring behind sliding half then align driven pulley with cam.



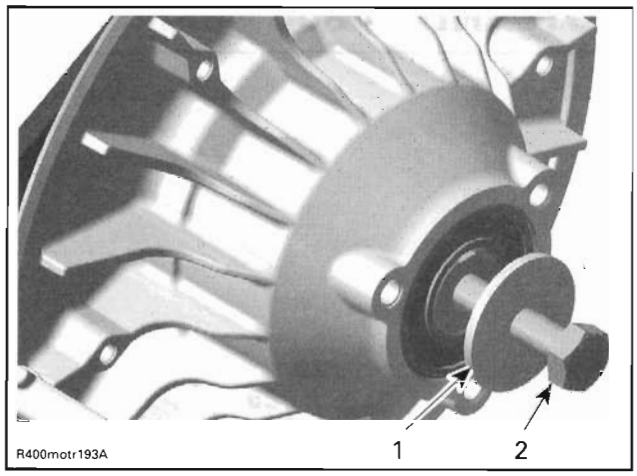
1. *Cam*
2. *Spring*
3. *Driven pulley*
4. *Location for pushing during screw installation*

Push the driven pulley by hand. Install the driven pulley screw **no. 20** and its washer **no. 21**.

⚠ WARNING

Driven pulley is a spring loaded system.

CAUTION: Always place washer at the time of driven pulley installation.

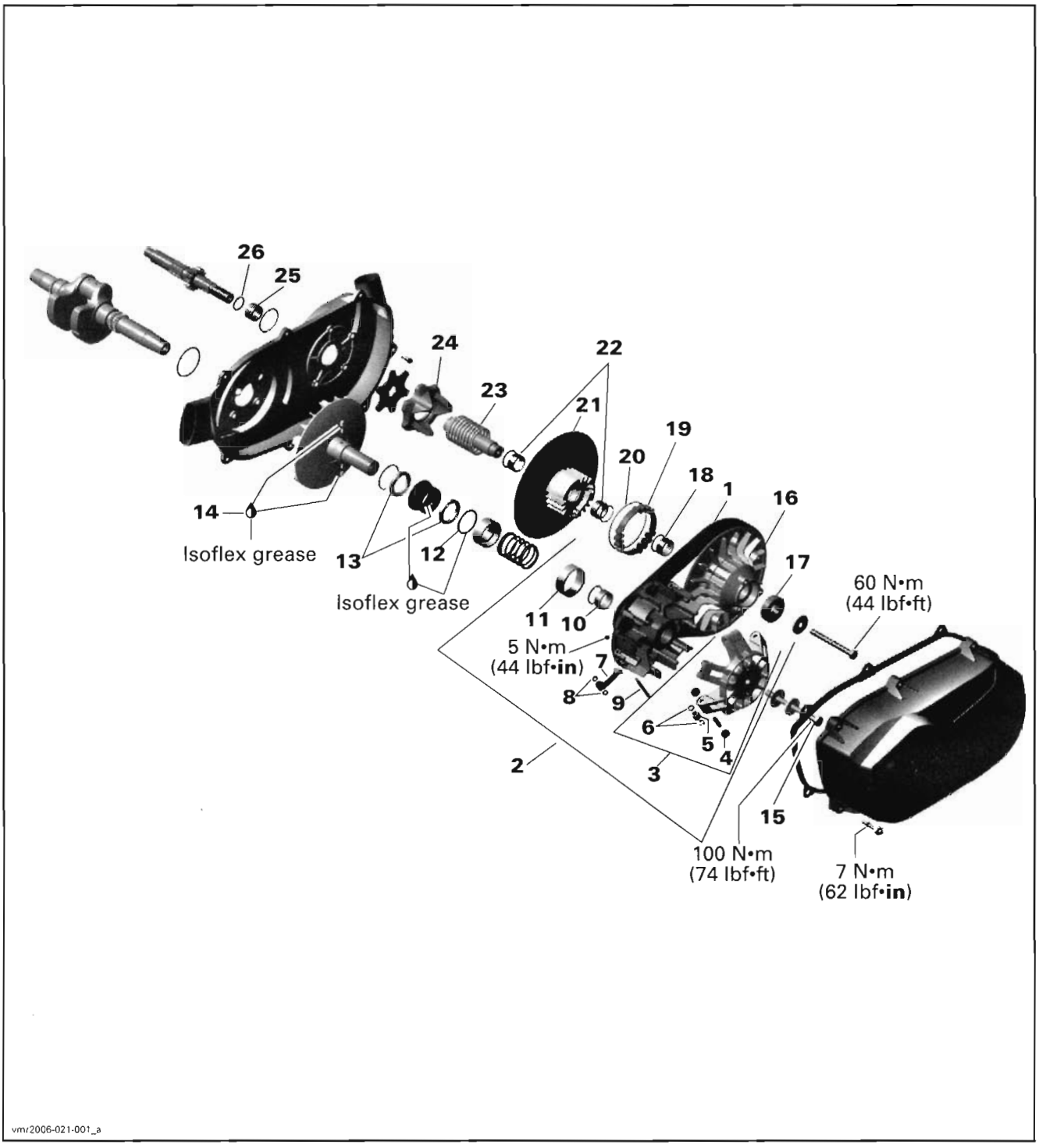


1. *Washer*
2. *Driven pulley screw*

NOTE: Driven pulley end-play is 0 (zero).

Torque driven pulley screw.

OUTLANDER 800 SERIES



GENERAL

NOTE: For a better understanding, the following illustrations are taken with engine out of vehicle. To perform the following instructions, it is not necessary to remove engine.

This CVT is lubrication free. Never lubricate any components except drive pulley one-way clutch and friction washer.

During assembly/installation, use the torque values and service products as in the exploded views.

Clean threads before applying a threadlocker. Refer to *SELF-LOCKING FASTENERS* and *LOCTITE APPLICATION* at the beginning of this manual for complete procedure.

⚠ WARNING

Torque wrench tightening specifications must strictly be adhered to.
Locking devices (e.g.: locking tabs, elastic stop nuts, self-locking fasteners, cotter pin, etc.) must be installed or replaced with new ones where specified. If the efficiency of a locking device is impaired, it must be renewed.

⚠ WARNING

Never touch CVT while engine is running. Never drive vehicle when CVT cover is removed.

⚠ WARNING

Any drive pulley repairs must be performed by an authorized Bombardier ATV dealer. Subcomponent installation and assembly tolerances require strict adherence to procedures detailed.

⚠ WARNING

Never use any type of impact wrench at drive pulley removal and installation.

⚠ WARNING

The clutch assembly is a precisely balanced unit. Never replace parts with used parts from another clutch assembly.

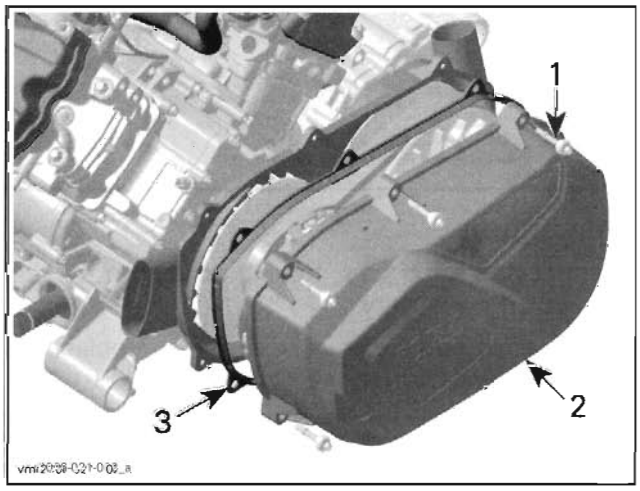
CAUTION: These pulleys have metric threads. Do not use SAE threads puller. Always tighten puller by hand to ensure that the drive pulley has the same type of threads (metric vs SAE) prior to fully tightening.

PROCEDURES

DRIVE BELT

Removal

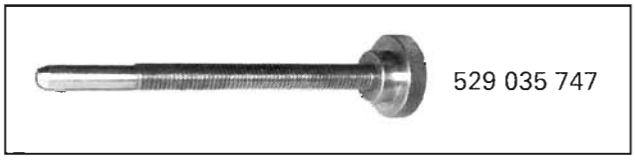
Remove:
- distance screws
- CVT cover and gasket.



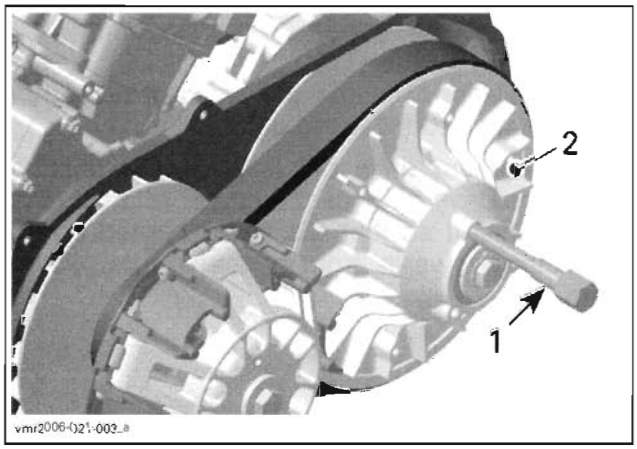
1. *Distance screw*
2. *CVT cover*
3. *Gasket*

NOTE: Remove the center top screw last. This screw allows to support the cover during removal.

Open driven pulley with the driven pulley expander (P/N 529 035 747).

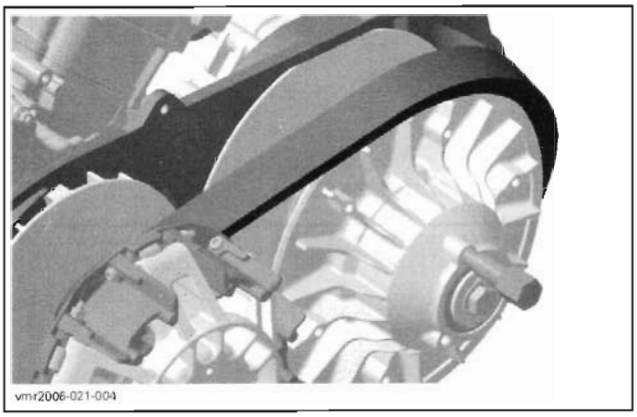


Screw tool in the threaded hole of driven pulley and tighten to open the pulley.



1. *Driven pulley expander*
2. *Fixed half of driven pulley*

To remove belt, slip the belt over the top edge of fixed half, as shown.

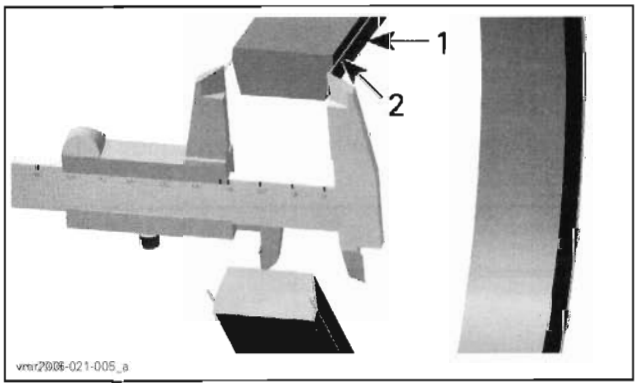


Inspection

Inspect belt for cracks, fraying or abnormal wear. Replace if necessary.

Check drive belt width at cord level. Replace if it is out of specification (see table below).

DRIVE BELT WIDTH	
SERVICE LIMIT	30.00 mm (1.181 in)

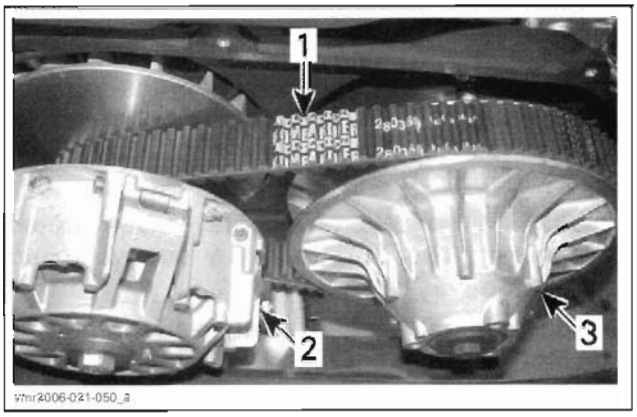


1. Drive belt
2. Cord in drive belt

Installation

For installation, reverse the removal procedure. Pay attention to following details.

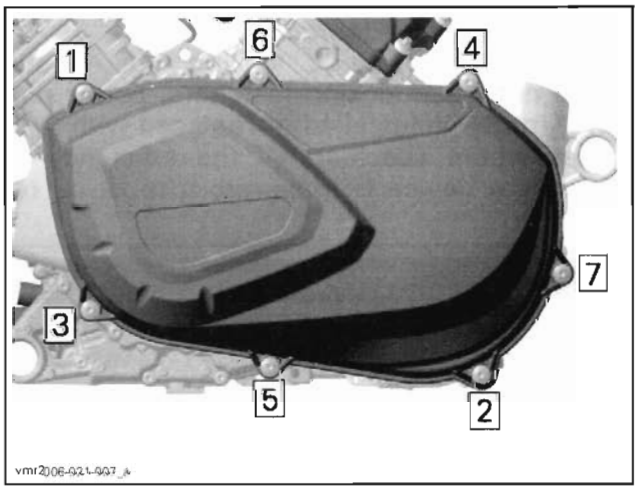
The maximum drive belt life span is obtained when the drive belt has the proper rotation direction. Install it so that the arrow printed on belt is pointing towards front of the vehicle, viewed from top.



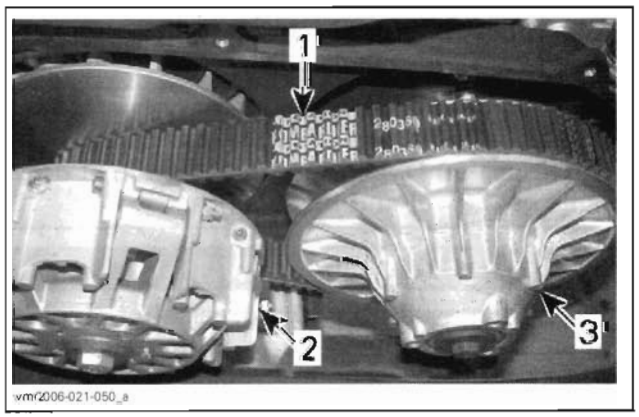
1. Arrow printed on belt
2. Drive pulley (front)
3. Driven pulley (rear)

Install the center top screw of cover in first.

Tighten the distance screws as per following sequence.



DRIVE PULLEY



1. Belt
2. Drive pulley
3. Driven pulley

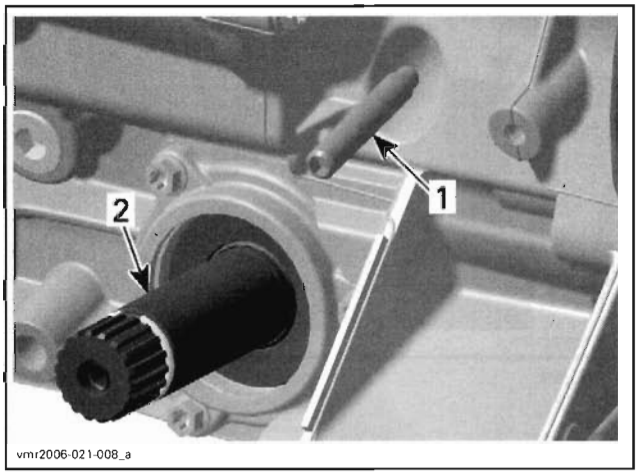
Removal

Remove belt no. 1.

Block the drive pulley. To do this, two procedures can be followed.

First Possible Procedure:

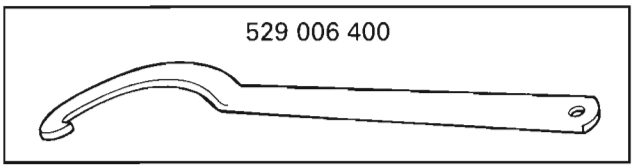
- Remove spark plugs.
- Lock crankshaft at TDC position with crankshaft locking bolt (P/N 529 035 617). Refer to *CYLINDER AND HEAD* section.

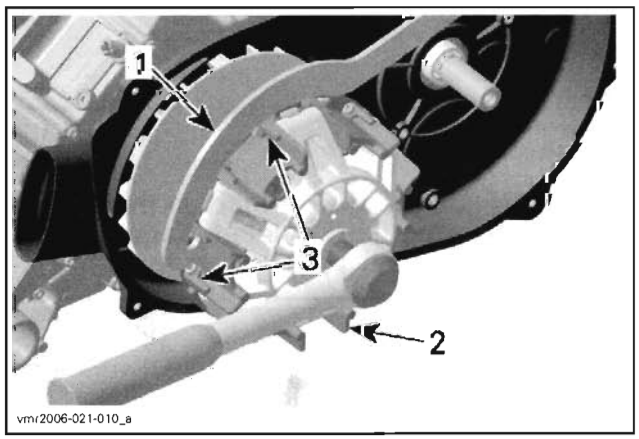


1. *Crankshaft locking bolt*
2. *Engine drive shaft (front side)*

Second Possible Procedure:

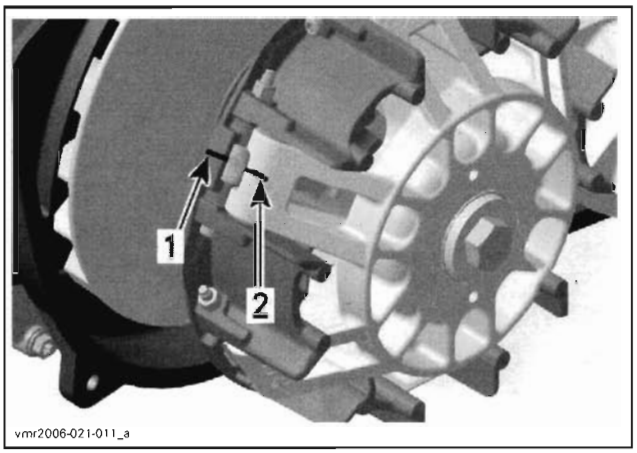
- Block drive pulley with the clutch holding tool (P/N 529 006 400).





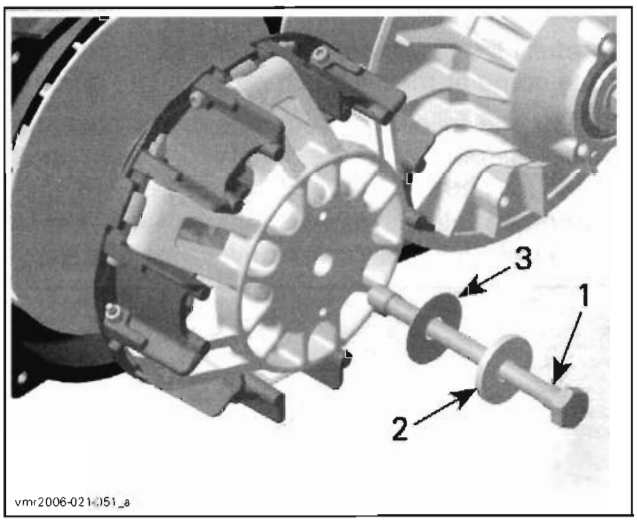
1. *Clutch holding tool*
2. *Drive pulley sliding half*
3. *Area to place holding tool hook*

When the drive pulley is blocked, mark sliding half and governor cup to ensure correct reinstallation.



1. *Mark on drive pulley sliding half*
2. *Mark on governor cup*

Unscrew the drive pulley screw, then remove it as well as the conical spring washer and thrust washer.



1. *Drive pulley screw*
2. *Conical spring washer*
3. *Thrust washer*

⚠ WARNING

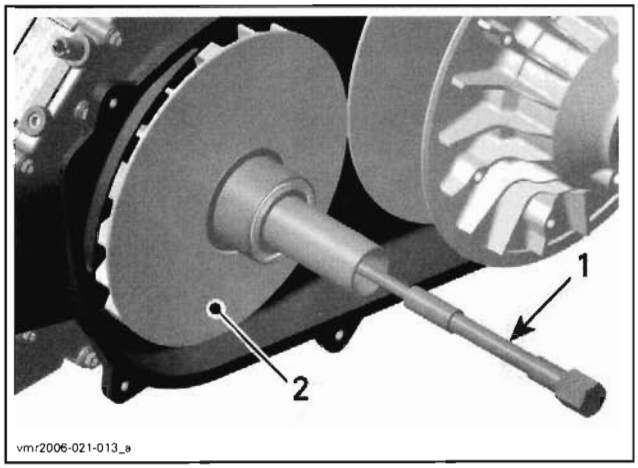
Sliding half of drive pulley is spring loaded.

Push with your hand the sliding half **no. 2** of the drive pulley then remove the screw completely.

Slowly release sliding half.

Screw drive pulley puller (P/N 529 035 746) in fixed half and remove fixed pulley.





1. Drive pulley puller
2. Fixed half

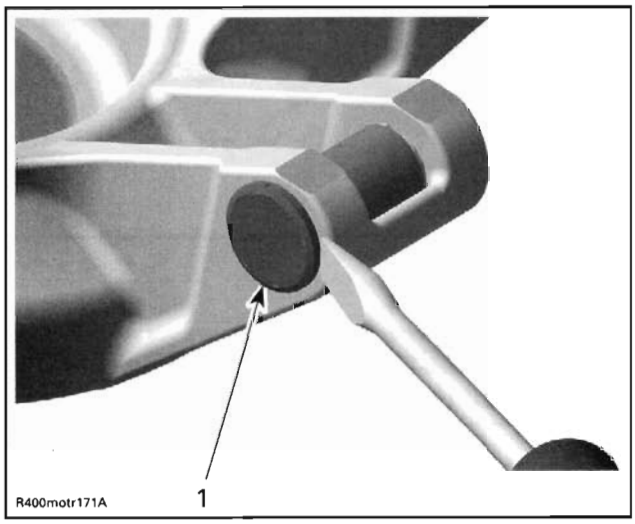
Disassembly

Governor Cup

Carefully lift governor cup **no. 3** until slider shoes **no. 4** come at their highest position into guides.

NOTE: The following procedure is not necessary except if roller must be removed. Refer to *INSPECTION* before proceeding.

– Remove slider shoes out of each bearing sleeve. Use a flat screwdriver if necessary.



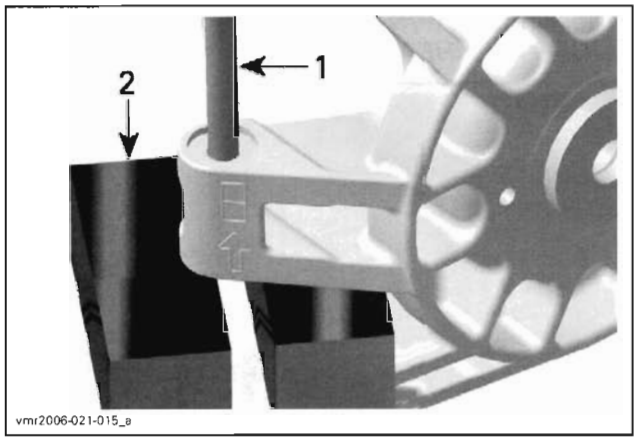
1. Slider shoe

– Put governor cup on a vice to push out bearing sleeve of roller in the foreseen direction (against arrow). Use an appropriate punch (diameter of punch must be smaller than the bearing sleeve diameter).

CAUTION: Do not clamp the governor cup in the vice to push out bearing sleeve. Governor cup will be damaged.

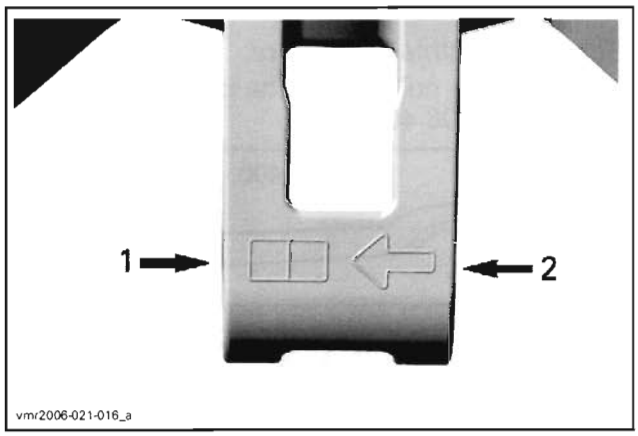
NOTE: Use protection plates to avoid marks and/or damages to the governor cup.

CAUTION: Always replace all rollers at the same time. Partly worn rollers may cause damage to the CVT system.



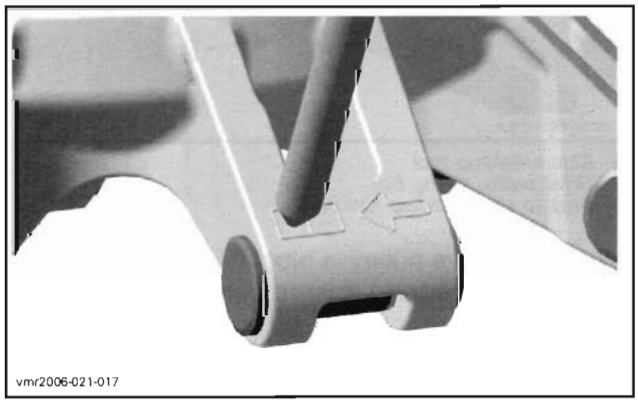
1. Punch
2. Vice

– Each time when replacing the bearing sleeves sign the foreseen box with a punch.

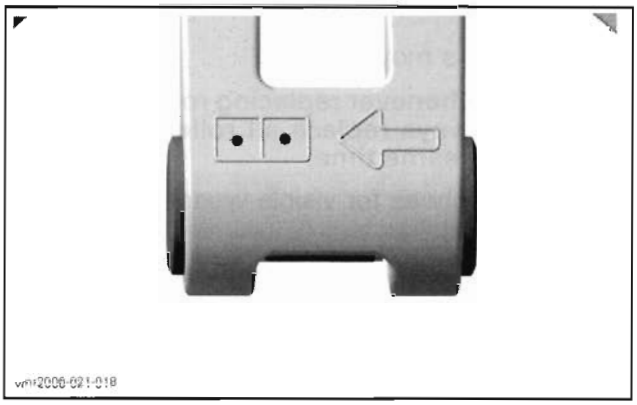


1. Removal direction
2. Assembly direction

CAUTION: Make a visible mark in the box, but do not push too hard. Violent damage of the governor cup may appear.



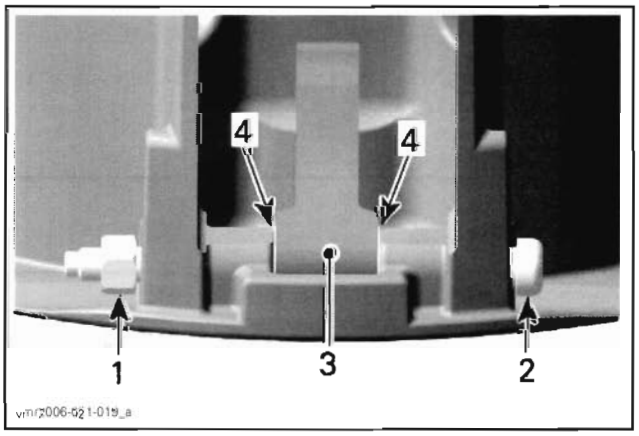
NOTE: Whenever removing a governor cup with already two marked boxes replace it by a new one.



Sliding Half

Unscrew lock nut and remove centrifugal lever pivot bolt. This drive pulley is equipped with 6 levers.

Remove centrifugal lever no. 7 and both thrust washers no. 8.



1. *Lock nut*
2. *Centrifugal lever pivot bolt*
3. *Centrifugal lever*
4. *Thrust washers*

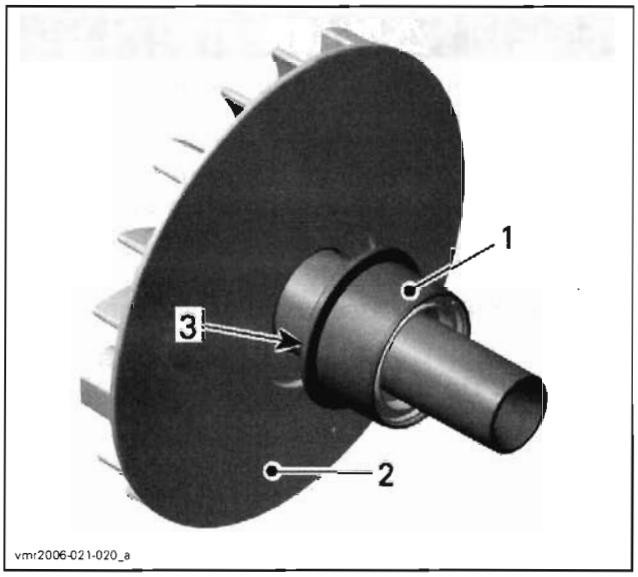
Fixed Half

Remove friction washer no. 12.

⚠ WARNING

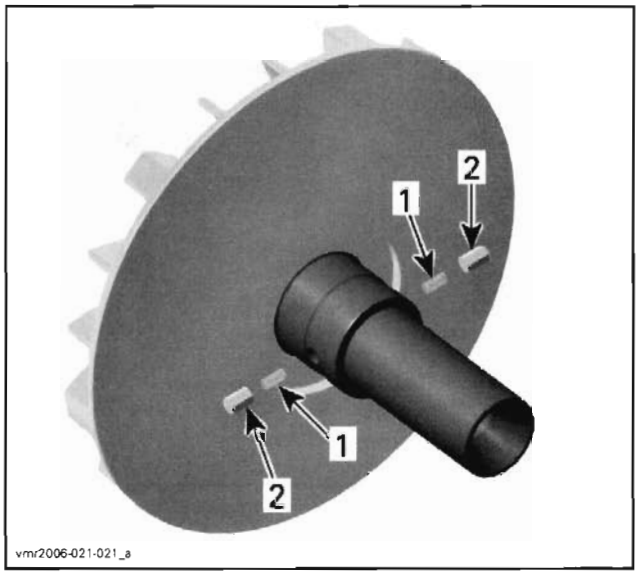
Always wear safety glasses to remove spring sleeves.

Pull and rotate one-way clutch slowly until the half of spring sleeves are visible.



1. *One-way clutch*
2. *Fixed half*
3. *Spring sleeve area*

Hold both spring sleeves with fingers and release when one-way clutch is disengaged.



1. *Springs*
2. *Spring sleeves*

Cleaning

Clean pulley faces and shaft with fine steel wool and dry cloth.

Using a paper towel with pulley flange cleaner (P/N 413 711 809) cleaning solvent, clean crankshaft tapered end and the taper inside the fixed half of the drive pulley, crankshaft threads and threads of drive pulley screw no. 15.

⚠ WARNING

This procedure must be performed in a well-ventilated area.

CAUTION: Avoid contact between cleaner and crankshaft seal because damage may occur.

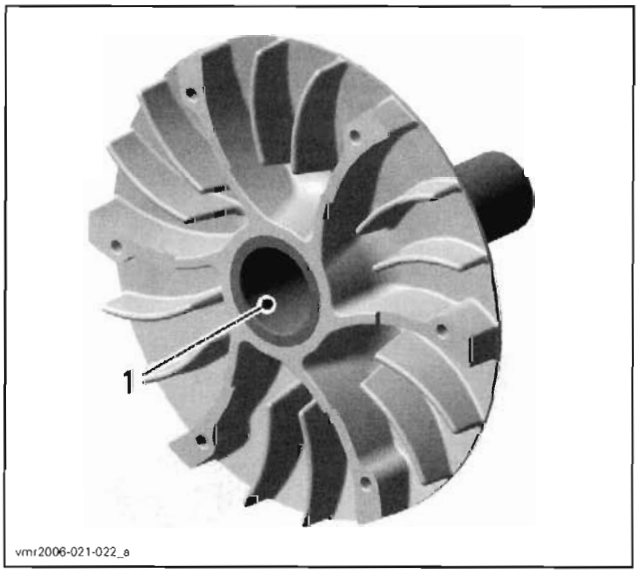
Remove all hardened oil deposits that have baked on crankshaft and pulley tapered surfaces with coarse or medium steel wool and/or sand paper no. 600.

CAUTION: Do not use any other type of abrasive.

Reclean mounting surfaces with paper towel and pulley flange cleaner (P/N 413 711 809).

Wipe off the mounting surfaces with a clean, dry paper towel.

CAUTION: Mounting surfaces must be free of any oil, cleaner or towel residue.



1. Taper of fixed half

Only use petrol base cleaner when cleaning bushings no. 10 and no. 11.

CAUTION: Do not use acetone to clean bushing.

Inspection

Drive Pulley

Drive pulley should be inspected annually.

Governor Cup

Check governor cup for cracks or other visible damages. Replace if necessary.

Roller and Slider Shoe

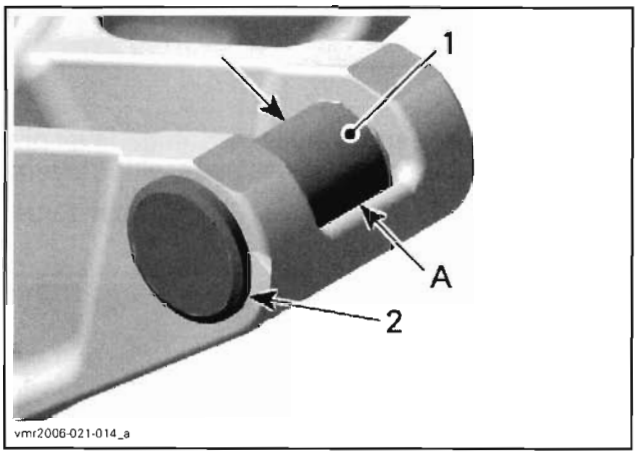
Check each roller for roundness of external diameter.

Check if rollers move freely.

CAUTION: Whenever replacing rollers and slider shoes, always replace all rollers and slider shoes at the same time.

Check slider shoes for visible wear and replace if damaged.

NOTE: If necessary, use a screwdriver to remove slider shoes.

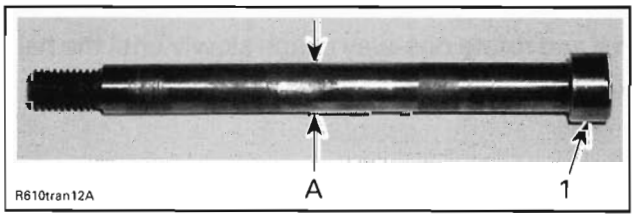


1. Roller
2. Slider shoe
A. Roller outer diameter

ROLLER OUTER DIAMETER	
NEW	13.70 to 13.80 mm (.539 to .543 in)
SERVICE LIMIT	13.20 mm (.519 in)
ROLLER INNER DIAMETER	
NEW	8.05 to 8.15 mm (.317 to .321 in)
SERVICE LIMIT	9.00 mm (.354 in)

Centrifugal Lever Pivot Bolt

Measure diameter of centrifugal lever pivot bolt no. 9, replace if it is out of specification.



1. Centrifugal lever pivot bolt
A. Measure diameter here

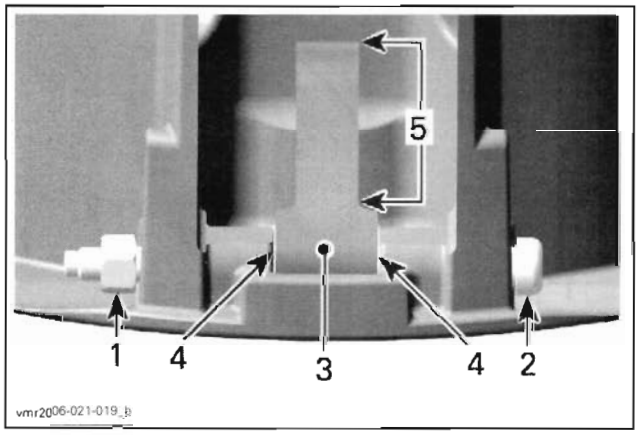
CENTRIFUGAL LEVER PIVOT BOLT DIAMETER	
NOMINAL	6.078 to 6.100 mm (.239 to .240 in)
SERVICE LIMIT	6.00 mm (.236 in)

Centrifugal Lever

Check bushing diameter in the centrifugal lever no. 7 for wear. Replace centrifugal lever if necessary.

CENTRIFUGAL LEVER BORE DIAMETER	
NOMINAL	6.035 to 6.078 mm (.238 to .239 in)
SERVICE LIMIT	6.200 mm (.244 in)

Replace centrifugal lever with thrust washers, screws and lock nuts if the contact surfaces show heavy visible wear.



1. *Lock nut*
2. *Centrifugal lever pivot bolt*
3. *Centrifugal lever*
4. *Thrust washers*
5. *Contact surface to the roller*

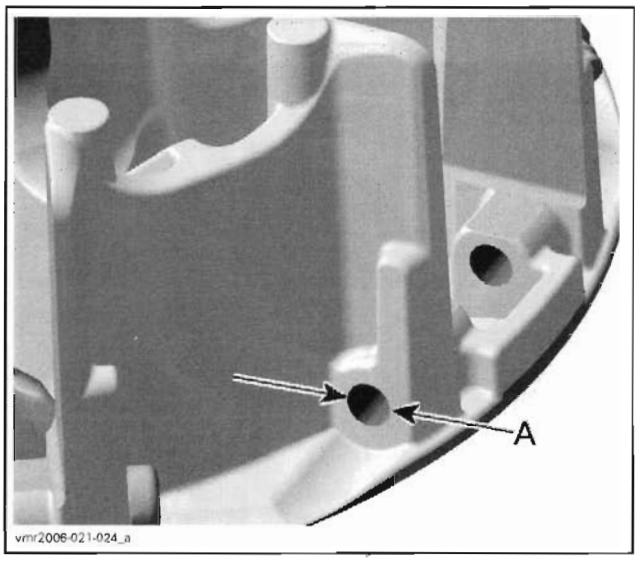
⚠ WARNING

Whenever replacing centrifugal levers, always replace all lever at the same time. Otherwise, drive pulley misbalancing will occur because of levers difference.

Sliding Half

Check sliding half for cracks and sliding contact surface for excessive wear. Replace sliding half if necessary.

Measure centrifugal lever pivot bolt bores. Replace sliding half if bores are out of specification or otherwise damaged.

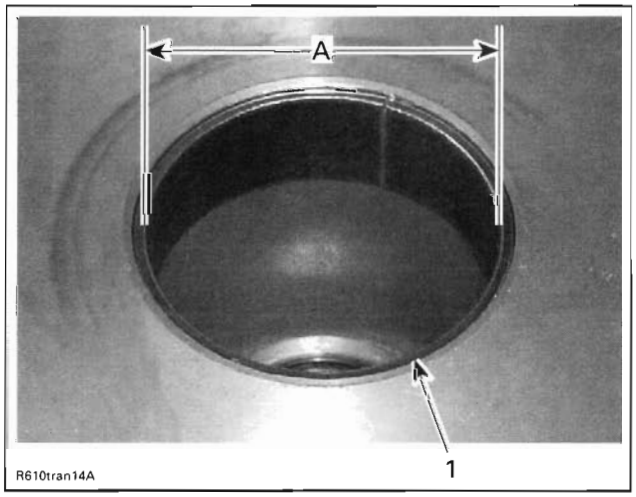


A. Centrifugal lever pivot bolt bore diameter

CENTRIFUGAL LEVER PIVOT BOLT BORE DIAMETER	
NOMINAL	6.113 to 6.171 mm (.241 to .243 in)
SERVICE LIMIT	6.300 mm (.248 in)

Measure bushing diameters of sliding half.

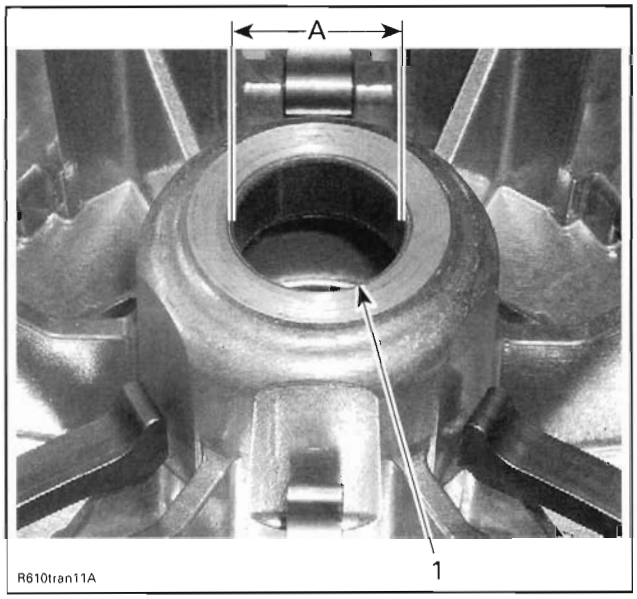
Use a dial bore gauge to measure bushing diameter. Measuring point must be at least 5 mm (1/4 in) from bushing edge.



1. *Bushing on fixed half side*

A. Bore diameter of bushing

SLIDING HALF LARGE BUSHING	
NOMINAL	55.000 to 55.040 mm (2.165 to 2.167 in)
SERVICE LIMIT	55.200 mm (2.173 in)



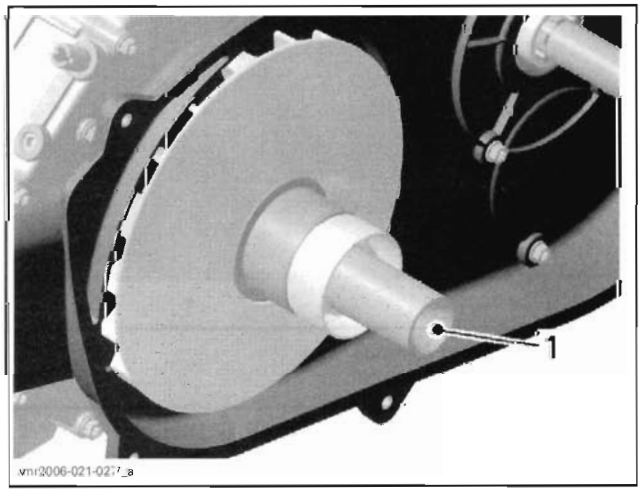
1. Bushing on governor cup side
A. Bore diameter of bushing

SLIDING HALF SMALL BUSHING	
NOMINAL	30.000 to 30.040 mm (1.181 to 1.183 in)
SERVICE LIMIT	30.200 mm (1.189 in)

Replace sliding half if bushings **no. 10** and/or **no. 11** is (are) out of specification. Visually inspect coatings.

Fixed Half

Check fixed half contact surface to the governor cup for scorings and other damages. If so, replace fixed half.



1. Visually check here

Check for any marks on fixed half plate. Replace if necessary.

Spring

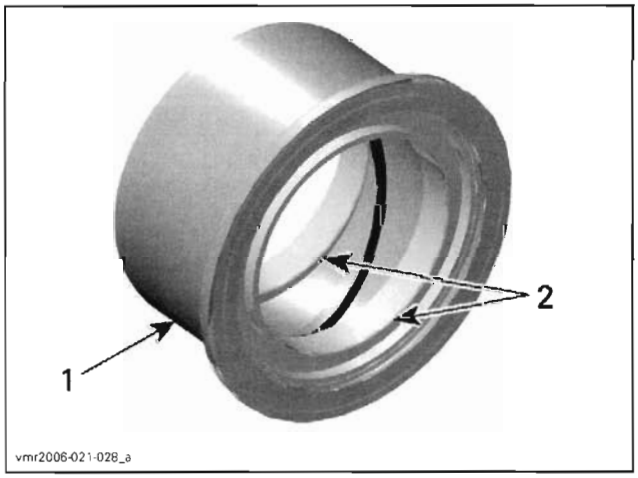
Measure spring free length and squareness. If spring is out of specification, replace by a new one.

SPRING FREE LENGTH	
SERVICE LIMIT	85 mm (3.347 in)
CLUTCH SPRING SQUARENESS	
SERVICE LIMIT	4 mm (.157 in)

One-Way Clutch

Check bearings for excessive play and smooth operation. Replace one-way clutch if necessary.

CAUTION: Be careful not to damage the inside of one-way clutch during bearing removal.



1. One-way clutch
2. Bearings

Measure length of spring sleeve **no. 14** and check if edges on top of the spring sleeve are excessively worn. If they out of specifications, replace both spring sleeve at the same time.

SPRING SLEEVE LENGTH	
NOMINAL	9.2 to 9.4 mm (.362 to .370 in)
SERVICE LIMIT	9 mm (.276 in)

Assembly

For assembly, reverse the disassembly procedure. Pay attention to following details.

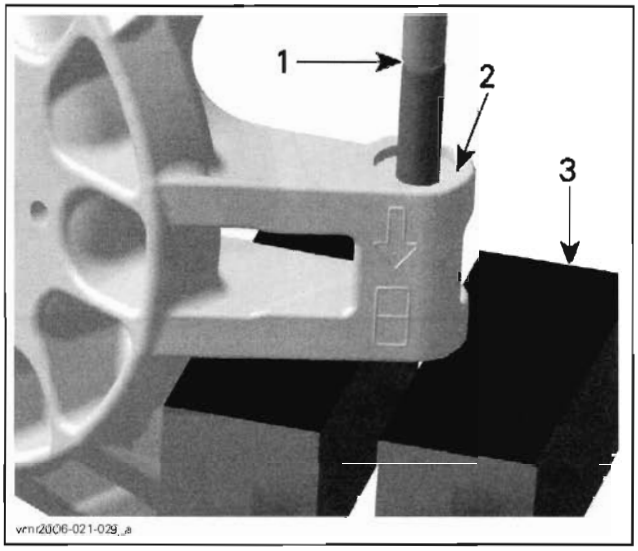
NOTE: Using Isoflex grease (P/N 293 550 021), lubricate spring and spring sleeve **no. 14** and between one way clutch bearings **no. 13**.

NOTE: Apply Isoflex grease (P/N 293 550 021) on both sides of friction washer no. 12.

CAUTION: Centrifugal levers no. 7 must move easily after installation.

Rebuild governor cup with new bearing sleeves, thrust washers no. 6, rollers and slider shoes.

CAUTION: Final position has to be aligned with the contact surface of the slider shoes (no protrusion).



1. *Top edge of bearing sleeve*
2. *Mating surface of slider shoes*
3. *Vice*

CAUTION: Rollers must move easily after installation.

Insert slider shoes into governor cup to properly slide in guides.

Installation

For installation, reverse the removal procedure. Pay attention to the following details.

⚠ WARNING

Do not apply antiseize or any lubricant on crankshaft and drive pulley tapers.

⚠ WARNING

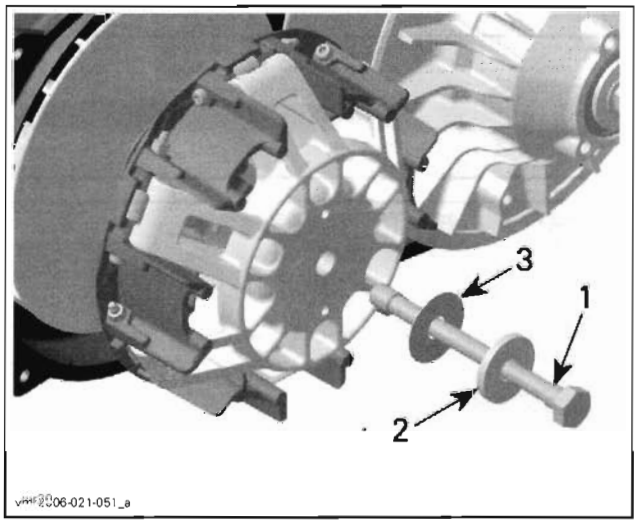
Never use any type of impact wrench at drive pulley removal and installation.

Clean mounting surfaces as described in *CLEANING* above.

Install drive pulley on crankshaft extension.

CAUTION: Do not forget to place thrust washer prior to install conical spring washer.

Install conical spring washer with its concave side towards drive pulley then install drive pulley screw.



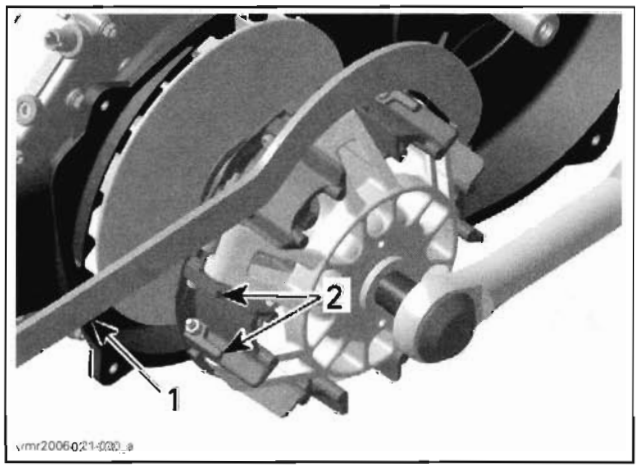
1. *Drive pulley screw*
2. *Conical spring washer*
3. *Thrust washer*

⚠ WARNING

Never substitute conical spring washer and/or screw with jobber ones. Always use BRP genuine parts for this particular case.

To torque the drive pulley screw, block the drive pulley. Refer at the beginning of this section for the two possible procedures.

When the drive pulley is blocked, torque screw to 100 N•m (74 lbf•ft).



1. *Clutch holding tool (P/N 529 006 400)*
2. *Drive pulley removal/installation area*

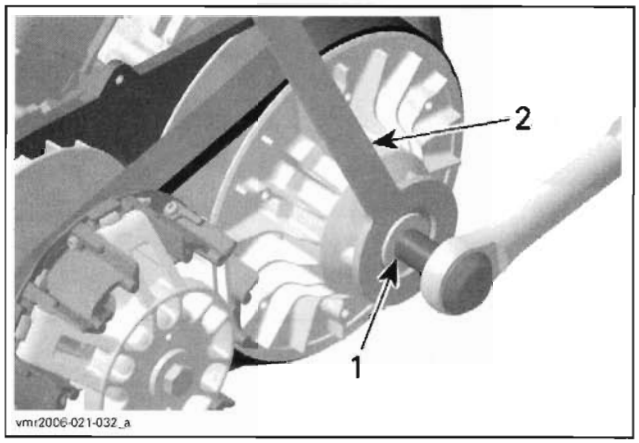
DRIVEN PULLEY

Removal

Remove drive belt (see *DRIVE BELT* above).

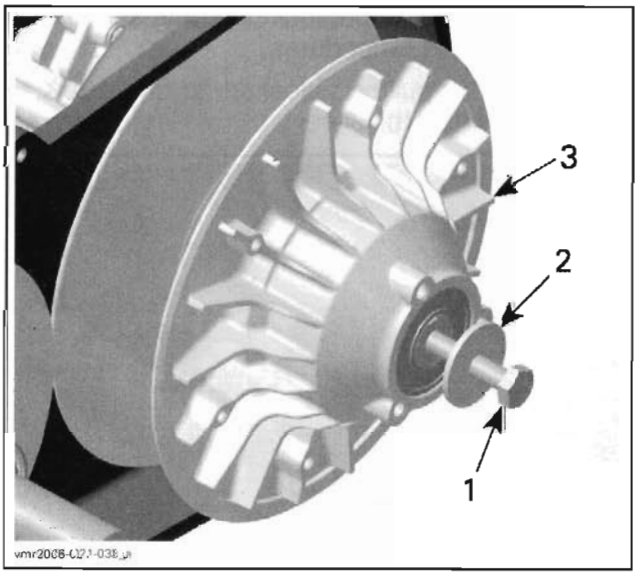
Using the clutch holding tool (P/N 529 035 771), hold the driven pulley during the removal of the driven pulley screw. **Do not remove screw completely.**





1. *Driven pulley screw*
2. *Clutch holding tool*

Push the driven pulley and maintain it in this position during the removal of screw. Remove driven pulley screw and washer.

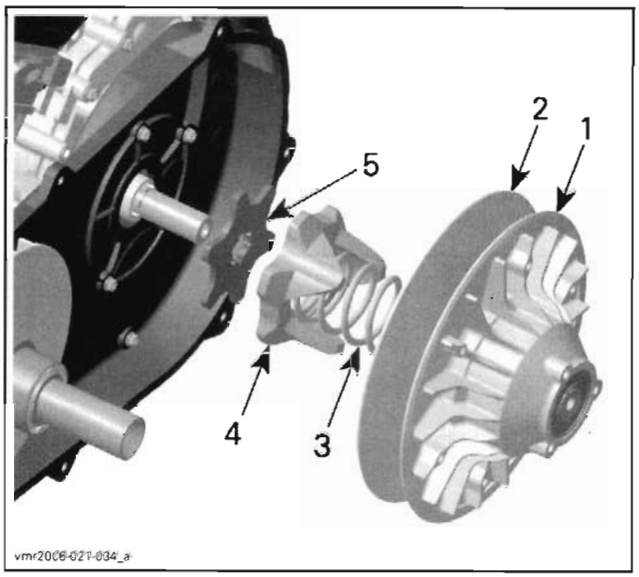


1. *Driven pulley screw*
2. *Thrust washer*
3. *Driven pulley fixed half*

⚠ WARNING

Driven pulley is spring loaded. Hold driven clutch pulley tight and slowly remove the driven pulley screw to release spring tension.

Remove the driven pulley with the spring, cam and the plate.

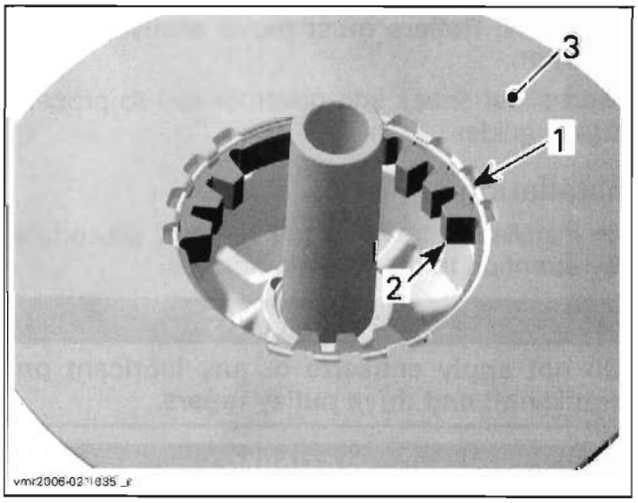


1. *Fixed half of driven pulley*
2. *Sliding half of driven pulley*
3. *Spring*
4. *Cam*
5. *Plate*

Disassembly

Fixed Half

Remove retaining ring and lift torque gear.

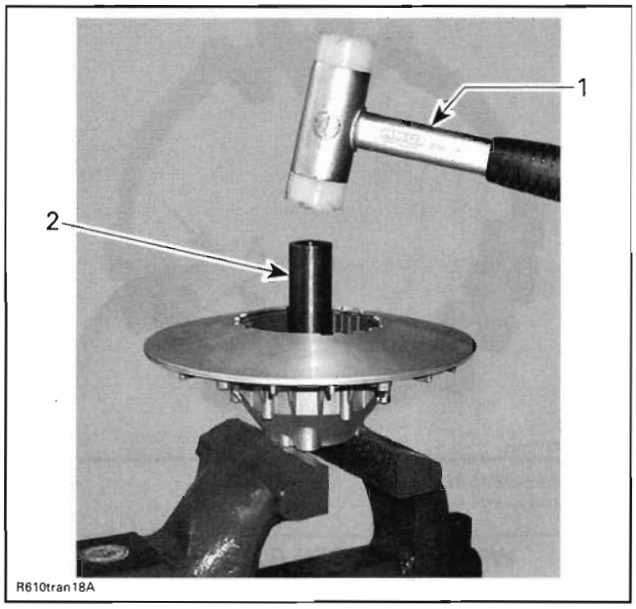


1. *Retaining ring*
2. *Torque gear*

NOTE: The following procedure is not necessary except if ball bearing or shaft must be removed. Refer to *INSPECTION* before proceeding.

Heat ball bearing area up to 100°C (212°F) before removing ball bearing.

Use a soft hammer to push shaft with bearing **no. 17** out of fixed half.

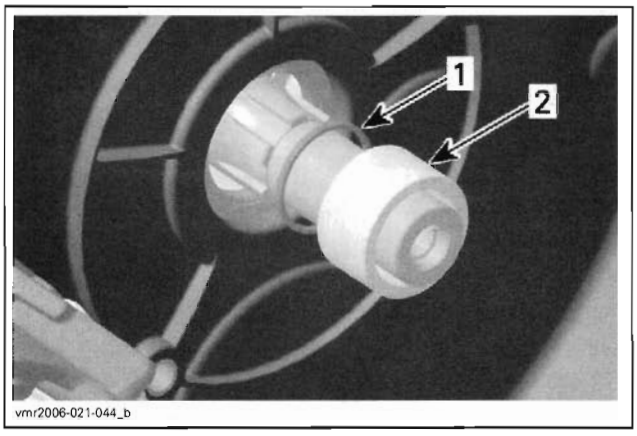


1. Soft hammer
2. Shaft

Remove shaft from ball bearing.

Remove distance sleeve and O-ring **no. 26** from countershaft.

Replace O-ring if brittle, hard or damaged.



1. O-ring
2. Distance sleeve

Cleaning

When a dust deposit has to be removed from the cam or the shaft, use dry cloth.

Clean pulley faces and shaft with fine steel wool and dry cloth.

Use pulley flange cleaner (P/N 413 711 809) to clean driven pulley.

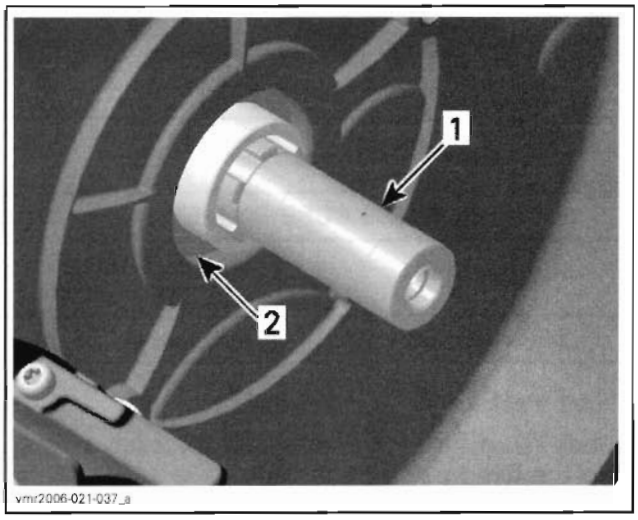
Clean the CVT air guide area from contamination.

Using a paper towel with pulley flange cleaner (P/N 413 711 809) to clean countershaft end and the inside of the shaft **no. 23**.

⚠ WARNING

This procedure must be performed in a well-ventilated area.

CAUTION: To avoid damage, make sure cleaner does not contact the countershaft oil seal.



1. Countershaft support
2. Countershaft oil seal

Inspection

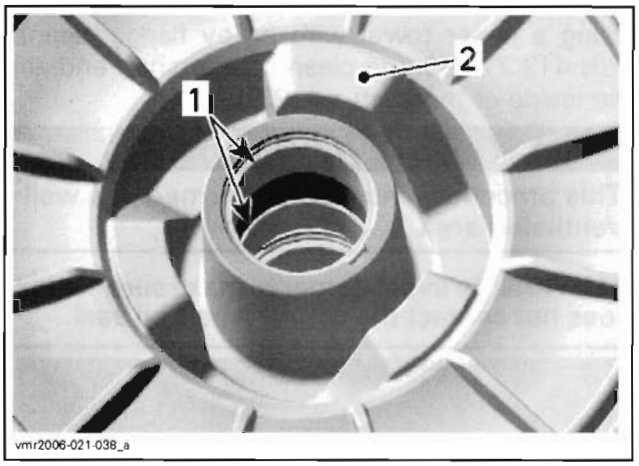
Sliding Half

Check sliding half for cracks and sliding contact surface for excessive wear. Replace sliding half if necessary.

Check bushings **no. 22** for cracks, scratch and for free movement when assembled to sliding half.

Using a dial bore gauge measure bushing diameter. Measuring point must be at least 5 mm (1/4 in) from bushing edge.

This bushing can not be replaced. Replace sliding half if bushings **no. 22** are out of specification. Visually inspect coatings.



1. Bushings
2. Backside of sliding half of driven pulley

BUSHINGS BORE DIAMETER	
NOMINAL	30.060 to 30.100 mm (1.183 to 1.185 in)
SERVICE LIMIT	30.200 mm (1.189 in)

Fixed Half

Check fixed half for cracks and excessive wear. Replace fixed half if necessary.

Check ball bearing for free play and smooth operation. Replace if necessary.

Check shaft for heavy wear or visible damage. Replace if necessary.

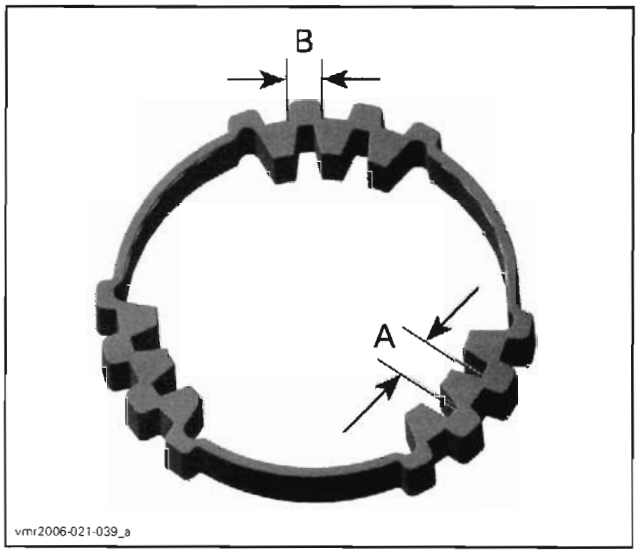
If the shaft is removed, using a dial bore gauge, measure bushing diameter. Measuring point must be at least 5 mm (1/4 in) from bushing edge.

This bushing can not be replaced. Replace fixed half if bushing no. 18 is out of specification. Visually inspect coatings.

BUSHING BORE DIAMETER	
NOMINAL	30.060 to 30.100 mm (1.183 to 1.185 in)
SERVICE LIMIT	30.200 mm (1.189 in)

Check torque gear for visible damage and cracks.

Measure wear limit with a caliper.

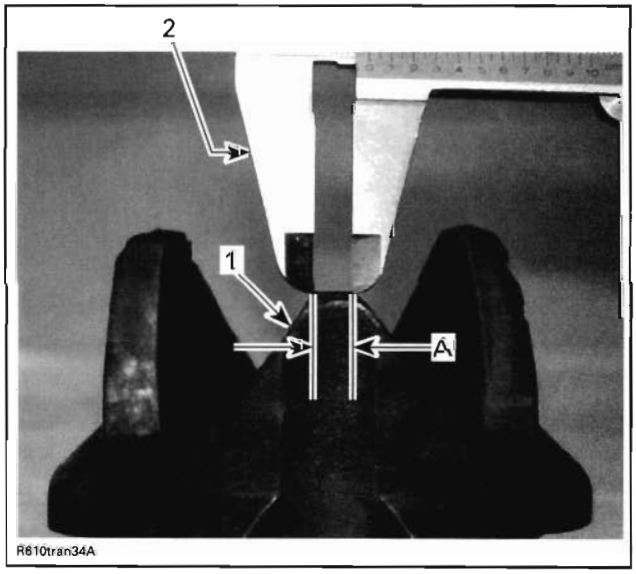


A. Measurement inside
B. Measurement outside

WEAR ON TEETH BOTH SIDES	
SERVICE LIMIT	7.500 mm (.295 in)

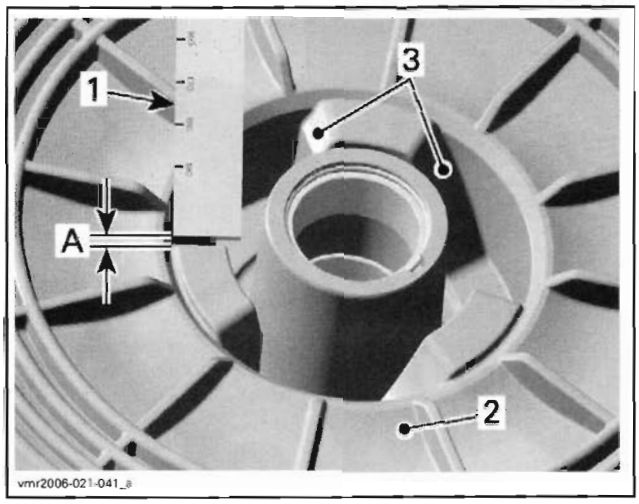
Cam

Check cam for visible damage and wear limit with a caliper.



1. Contact surface
2. Caliper
A. Width to be measured due to wear on contact surface

WIDTH ON TOP SURFACE	
SERVICE LIMIT	9.00 mm (.354 in)



1. Caliper
2. Sliding half
3. Contact surface
A. Wear to be measured

WEAR ON CONTACT SURFACE	
SERVICE LIMIT	1.00 mm (.039 in)

Spring

Measure spring free length and squareness. If spring is out of specification, replace by a new.

SPRING FREE LENGTH	
SERVICE LIMIT	125 mm (4.921 in)
CLUTCH SPRING SQUARENESS	
SERVICE LIMIT	3.8 mm (.150 in)

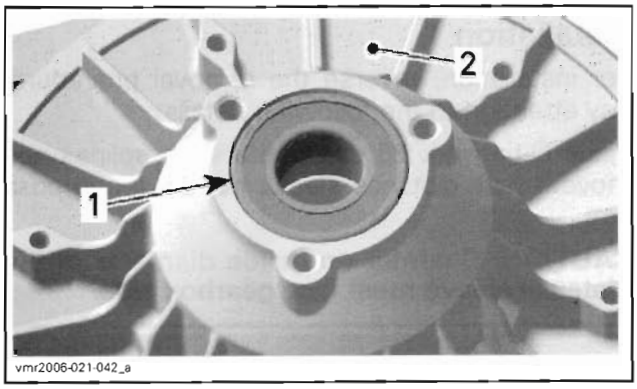
Assembly

For installation, reverse the removal procedure. Pay attention to following details

Heat ball bearing area up to 100°C (212°F) before ball bearing installation.

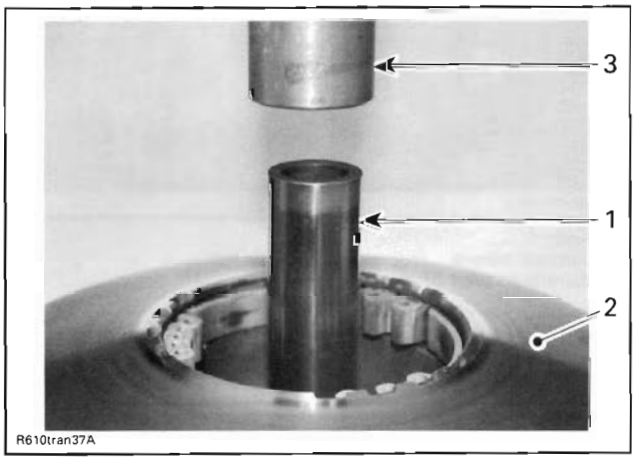
NOTE: Place new ball bearing in a freezer for 10 minutes before installation.

Install ball bearing with the writing on top and push only on the outer ring.



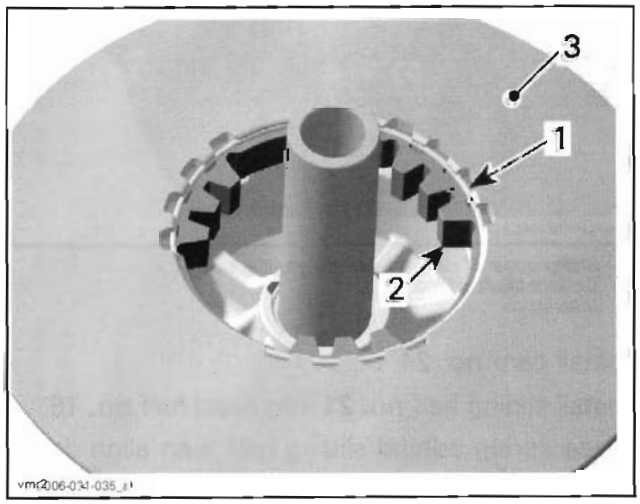
1. Ball bearing
2. Fixed half of driven pulley

CAUTION: Do not use hammer, use press machine only.



1. Shaft
2. Fixed half
3. Press machine

Install torque gear then secure it with retaining ring.



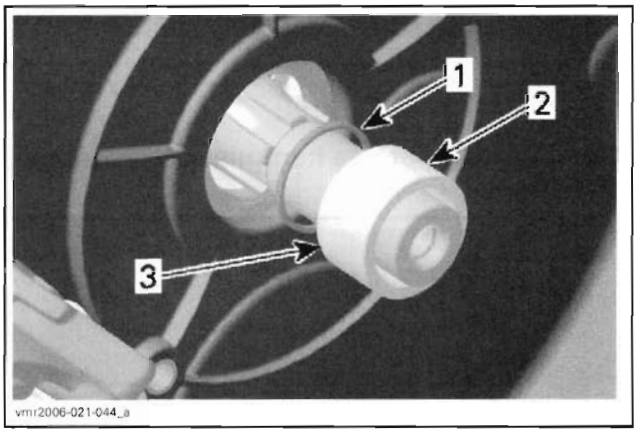
1. Retaining ring
2. Torque gear
3. Fixed half of driven pulley

Installation

For installation, reverse the removal procedure. Pay attention to the following details.

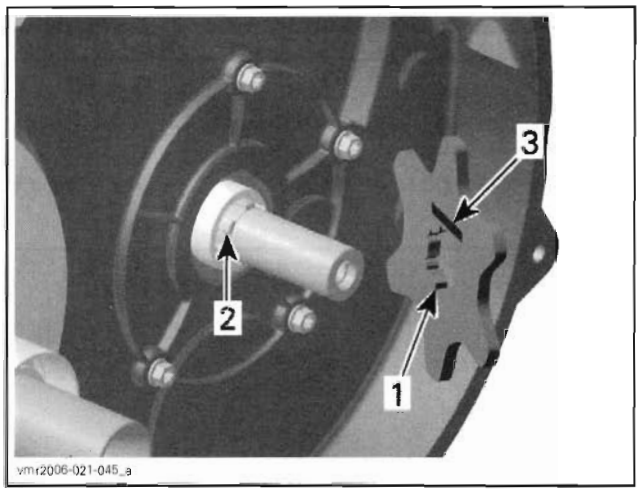
Place O-ring **no. 26** on countershaft splines and move it with distance sleeve **no. 25** in end position.

CAUTION: Chamfer on inside diameter of the distance sleeve must face gearbox side.



1. *O-ring*
2. *Distance sleeve*
3. *Chamfered area of distance sleeve*

Install cam retainer on countershaft end the right way.

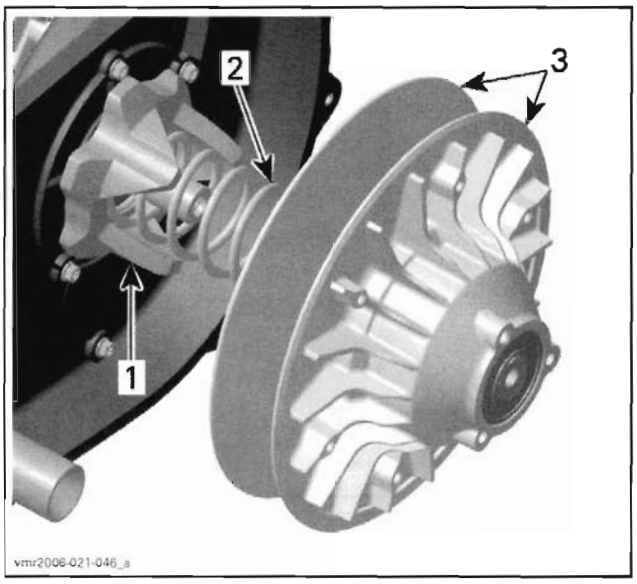


1. *Sharp edge of cam retainer to engine side*
2. *Countershaft spline*
3. *Inscription*

Install cam **no. 24**.

Install sliding half **no. 21** into fixed half **no. 16**.

Place spring behind sliding half then align driven pulley with cam.

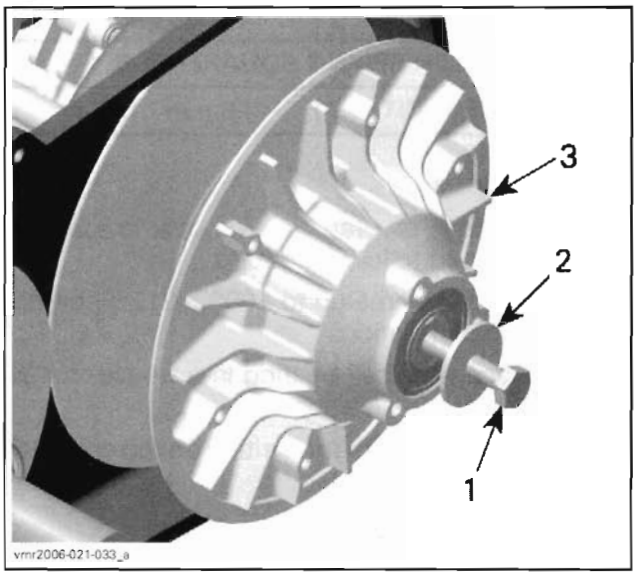


1. *Cam*
2. *Spring*
3. *Driven pulley*

With your hand, push the driven pulley on the shaft to compress the spring. Install the driven pulley screw and thrust washer.

⚠ WARNING

Driven pulley is a spring loaded system.



1. *Driven pulley screw*
2. *Thrust washer*
3. *Driven pulley fixed half*

NOTE: Driven pulley end-play is 0 (zero).

Torque driven pulley screw.

CVT AIR GUIDE

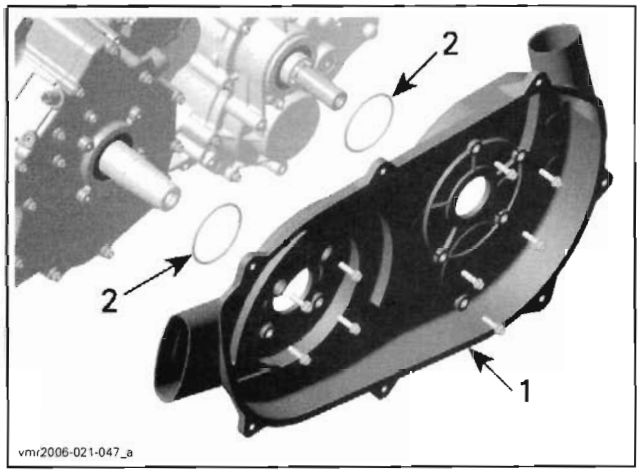
Removal:

Remove
- CVT cover
- drive belt
- drive pulley
- driven pulley
- unscrew the clamps retaining the CVT air hoses
- remove CVT air guide.

Inspection

Clean CVT air guide from contamination

Check O-rings if brittle, hard or damaged. Replace if necessary.



1. CVT air guide
2. O-rings

Installation

For installation reverse the removal procedure.

GEARBOX AND 4X4 COUPLING UNIT

SERVICE TOOLS

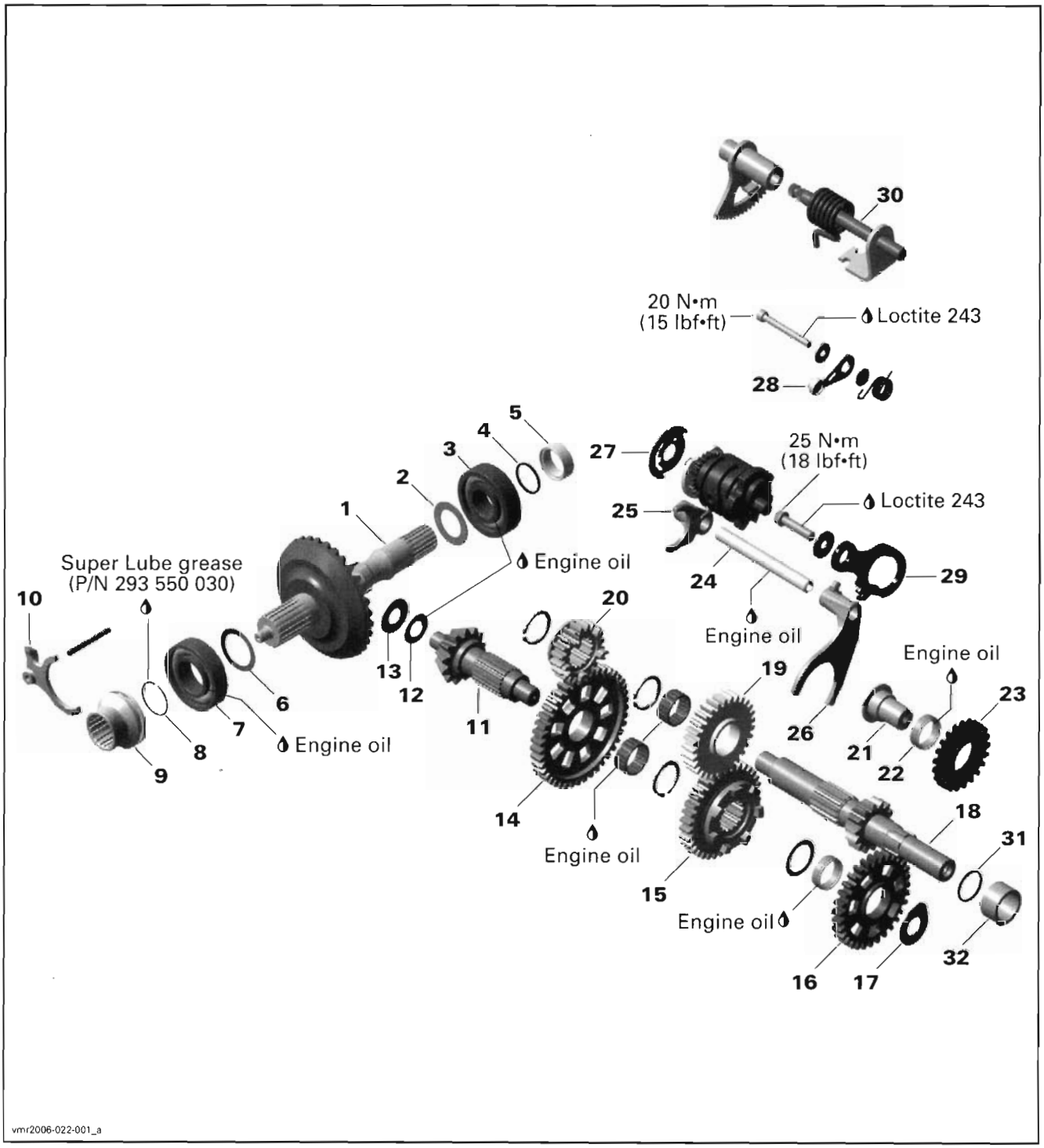
Description	Part Number	Page
backlash measurement tool	529 036 030	302
backlash measurement tool	529 036 030	299
bevel gear needle bearing installer	529 035 763	315
installer handle	420 877 650	297, 315
main shaft needle bearing installer	529 035 762	315
multimeter FLUKE 111	529 035 868	297
oil seal installer	529 035 758	297
oil seal installer	529 036 028	296, 318
oil seal protection sleeve	529 036 029	318

SERVICE PRODUCTS

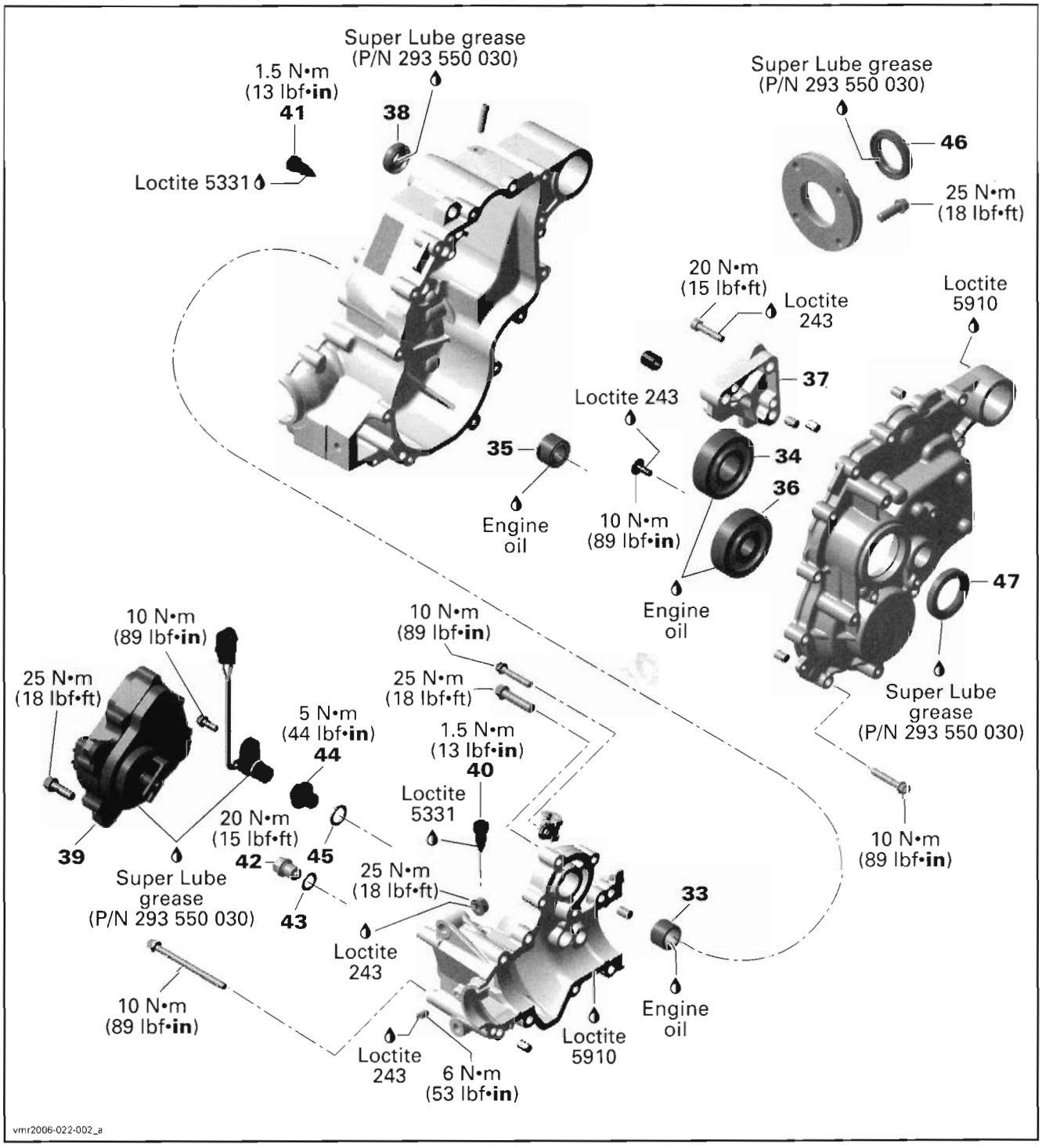
Description	Part Number	Page
Loctite 5910	293 800 081	303–304, 317
Loctite chisel	413 708 500	303, 311, 317
Super Lube grease	293 550 030	298, 304
XP-S chaincase oil	413 801 900	294
XP-S synthetic chaincase oil	413 803 300	294

OUTLANDER 800 SERIES

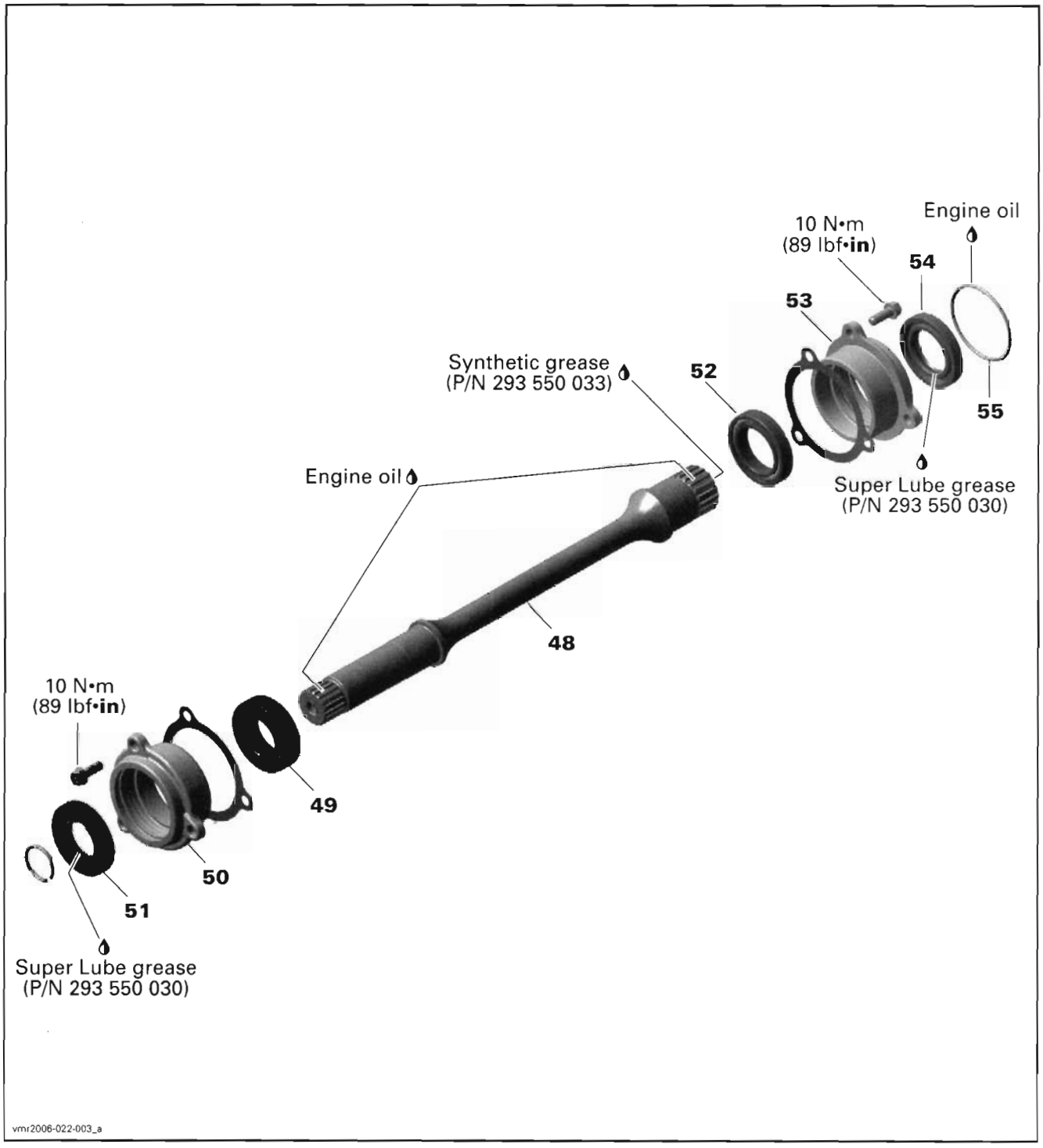
GEARBOX COMPONENTS AND 4X4 COUPLING MECHANISM



GEARBOX HOUSING AND 4X4 ACTUATOR UNIT



ENGINE DRIVE SHAFT



GENERAL

During assembly/installation, use the torque values and service products as in the exploded views.

Clean threads before applying a threadlocker. Refer to *SELF-LOCKING FASTENERS* and *LOCTITE APPLICATION* at the beginning of this manual for complete procedure.

⚠ WARNING

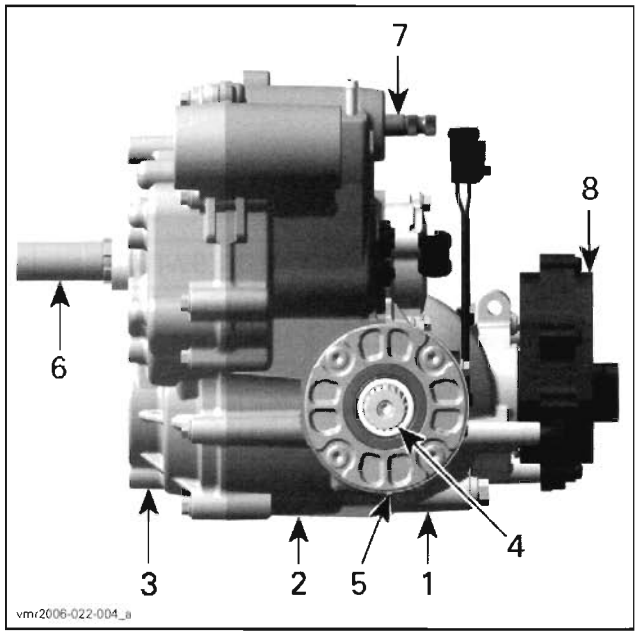
Torque wrench tightening specifications must strictly be adhered to.
Locking devices (e.g.: locking tabs, elastic stop nuts, self-locking fasteners, etc.) must be installed or replaced with new ones where specified. If the efficiency of a locking device is impaired, it must be renewed.

Always drain the gearbox before working on it.

To remove gearbox, the engine removal is necessary. Refer to *REMOVAL AND INSTALLATION*.

Remove drive and driven CVT and CVT air guide, refer to *CVT*.

Overview



1. *Right housing*
2. *Center housing*
3. *Left housing*
4. *Output shaft*
5. *Bearing cover*
6. *Countershaft*
7. *Shift shaft*
8. *Actuator*

MAINTENANCE

OIL CHANGE

Draining Procedure

Prior to change the oil, ensure vehicle is on a level surface.

Oil change should be done with a warm engine.

⚠ WARNING

The gearbox oil can be very hot.

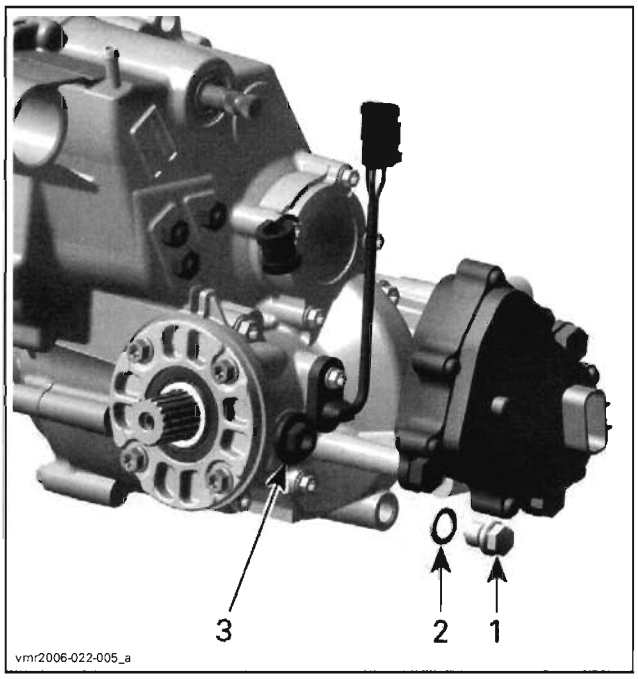
Place a drain pan under the gearbox drain plug area.

Clean drain plug area and remove magnetic drain plug **no. 42** with its sealing ring **no. 43** to drain gearbox oil.

Remove oil filler screw **no. 44** including its O-ring **no. 45**.

CAUTION: Pay attention not to loose O-ring on drain plug screw.

Wait a while to allow oil flow out of gearbox.



1. *Magnetic drain plug*
2. *Sealing ring*
3. *Oil filler screw*

Dispose gearbox oil as per your local environmental regulations.

Inspection

Oil condition gives information about the teeth condition inside the gearbox. See *TROUBLESHOOTING* section.

Clean the magnetic drain plug from metal shavings and dirt. Presence of debris gives an indication of failure inside the gearbox. Check *GEARBOX* to correct the problem.

Change gasket ring **no. 43** on the magnetic drain plug if damaged.

Replace O-ring **no. 45** if brittle, hard or otherwise damaged.

Filling Procedure

Make sure that magnetic drain plug **no. 42** is reinstalled and tight.

With the vehicle on a level surface, fill the gearbox through the oil filler hole with XP-S chaincase oil (P/N 413 801 900) or XP-S synthetic chaincase oil (P/N 413 803 300) or with an equivalent product (ISO VG 100) until the oil reaches the lower threads of the oil filler hole (around 400 mL (13.5 oz U.S.)).

PROCEDURES

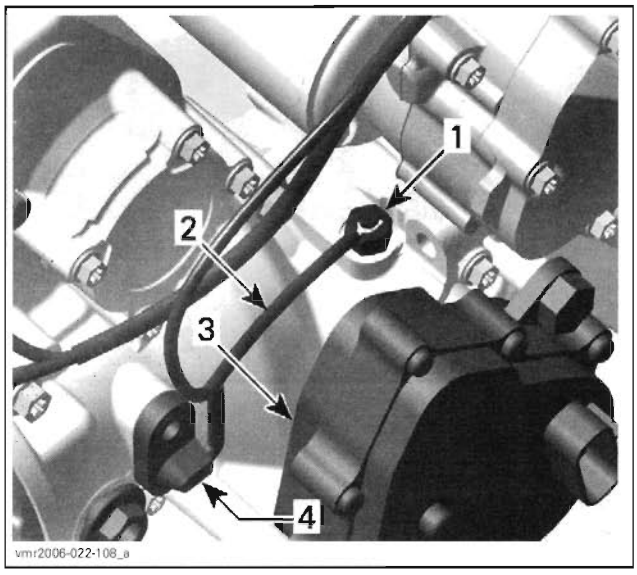
SHIFTING INDICATOR SWITCH

NOTE: The gearbox removal is not necessary to reach the shifting indicator switches.

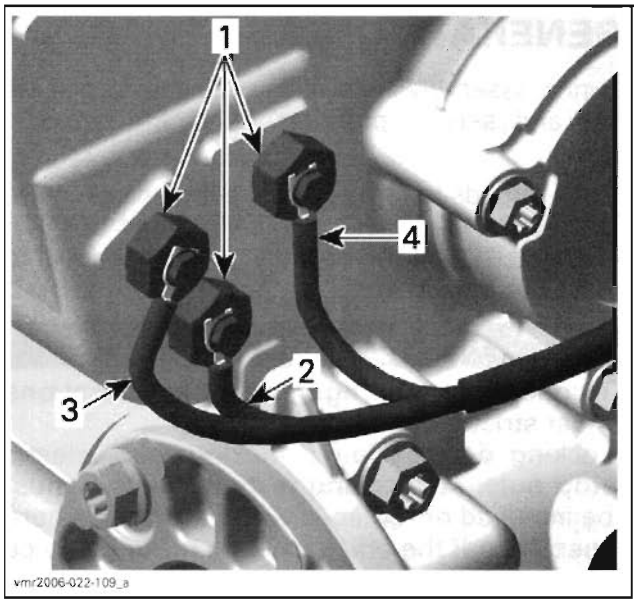
Removal

To reach the shifting indicator switches **no. 41**, remove the rear engine cover.

Remove screw retaining shifting indicator switch wire of the wiring harness.



1. *Indicator switch*
2. *BLACK/YELLOW wire for contact to 2WD*
3. *Actuator*
4. *Speed sensor*



1. *Indicator switches*
2. *BROWN/GREY wire*
3. *WHITE/GREY wire*
4. *ORANGE/GREY wire*

Test

Check if shifting indicator switches work properly as per following procedure:

- Put vehicle in park, reverse, neutral, high or low position.
- Use a multimeter to measure the electric passage from specific shifting indicator switch to engine ground.

Indicator switches are in contact as per following table:

	INDICATOR SWITCH		
	BROWN/ GREY	WHITE/ GREY	ORANGE/ GREY
Low	X		X
High			X
Neutral		X	X
Park	X		
Reverse	X	X	

- Shift to 2WD position and measure the electric passage from specific shifting indicator switch (BLACK/YELLOW wire) to engine ground.

If the resistance is infinite (O.L.), replace the shifting indicator switch.

NOTE: Remove the shifting indicator switches one at a time.

If the shifting indicator switch is good, check the vehicle harness and/or indicator lights.

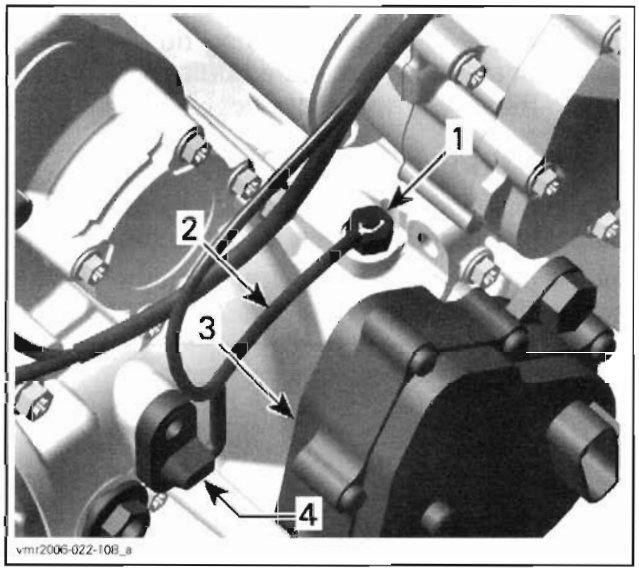
Installation

For installation, reverse the removal procedure. Pay attention to the following details.

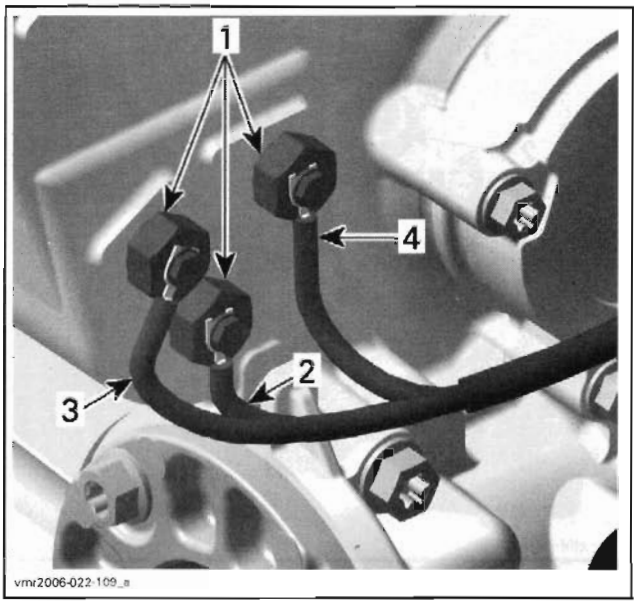
Take care do not damage shifting indicator switches threads during installation.

Apply Loctite 5331 on threads of shifting indicator switches.

If all switches are removed, make sure to put the wires back in the right location.



1. Indicator switch
2. BLACK/YELLOW wire for contact to 2WD
3. Actuator
4. Speed sensor



1. Indicator switches
2. BROWN/GREY wire
3. WHITE/GREY wire
4. ORANGE/GREY wire

OIL SEALS

Removal

Replace oil seals if they are brittle, hard or damaged.

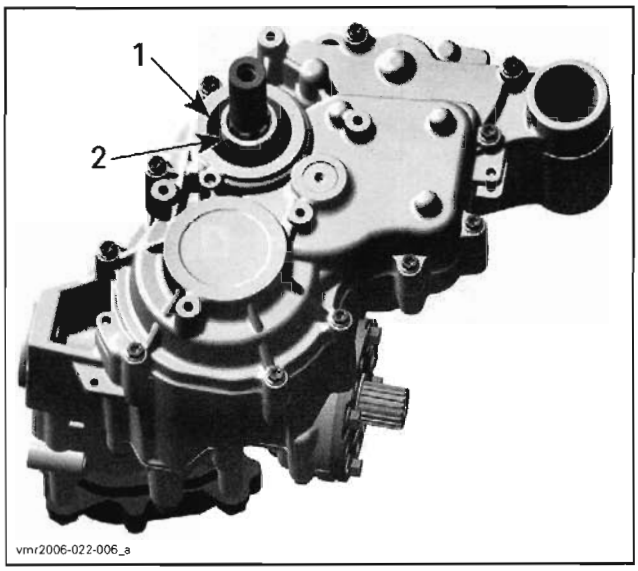
A small flat screwdriver can be used to remove most of these oil seals.

CAUTION: Avoid scoring housings, bearing cover, shift shaft, distance sleeve of countershaft or output shaft during oil seal removal.

Countershaft Oil Seal

The countershaft oil seal **no. 47** can be removed without removing gearbox from vehicle. Remove drive and driven pulley and CVT air guide.

NOTE: When oil seal is removed also inspect O-ring **no. 31**.



1. Countershaft oil seal
2. Distance sleeve

Shift Shaft Oil Seal

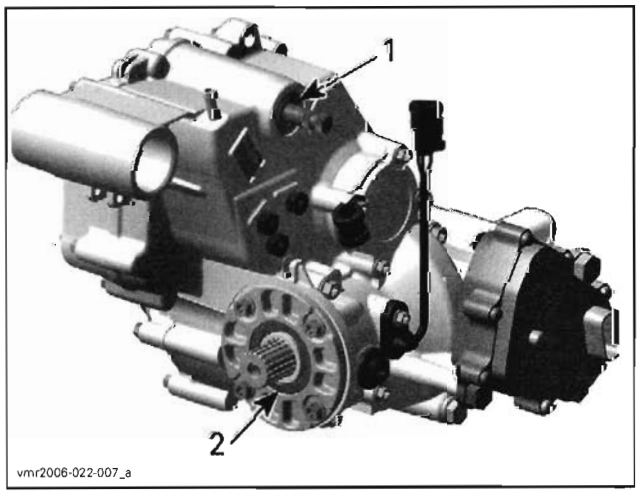
The shift shaft oil seal **no. 38** can be removed without removing the gearbox from the vehicle.

Remove side panel and the shifting plate from shift shaft to reach the oil seal.

Output Shaft Oil Seal

Removal of output shaft oil seal **no. 46** requires that the rear propeller shaft is separated from the output shaft (refer to *DRIVE TRAIN* section). The removal of the gearbox or bearing cover is not necessary.

NOTE: When oil seal is removed also inspect O-ring **no. 4**.



1. Shift shaft oil seal
2. Output shaft oil seal

Engine Drive Shaft Oil Seal

To remove the front oil seal **no. 51**, no need to remove the engine. Lift the front of vehicle to avoid engine oil spillage. Separate the front propeller shaft from engine (refer to *FRONT DRIVE*).

For the rear oil seal **no. 54**, the gearbox removal is necessary.

Inspection

Check bearings behind each oil seal for contamination and/or metal shavings.

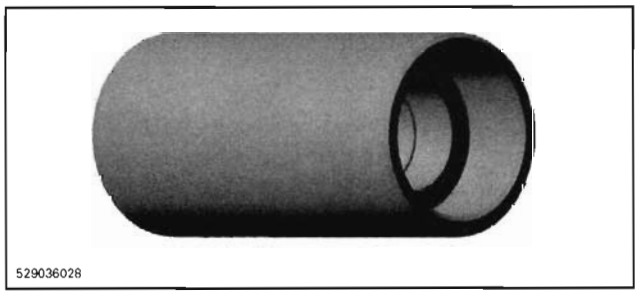
Check oil seal running surfaces for scratches. Replace if necessary (see *GEARBOX* below).

Check if the countershaft O-ring **no. 31** and the output shaft O-ring **no. 4** are brittle, hard or damaged. Replace if necessary.

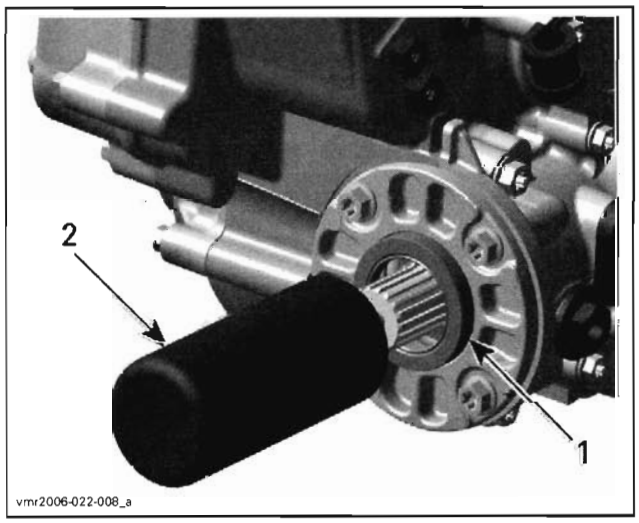
Installation

The installation is the reverse of removal procedure. Pay attention to the following details.

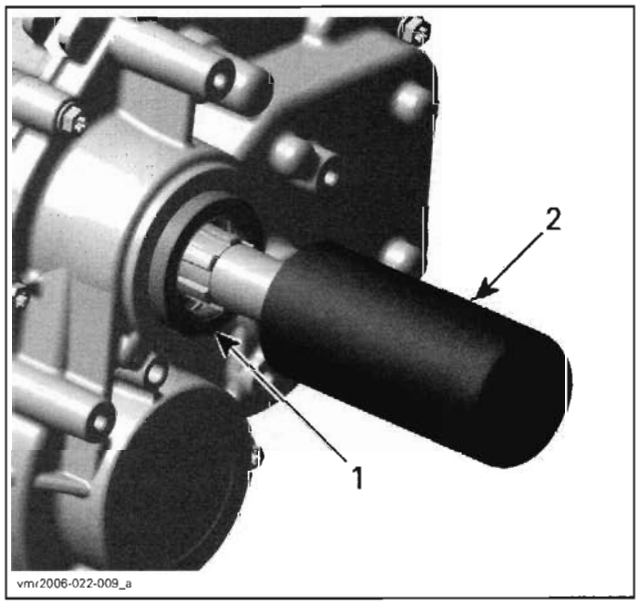
Install output shaft oil seal and countershaft oil seal with the oil seal installer (P/N 529 036 028).



OIL SEAL INSTALLER



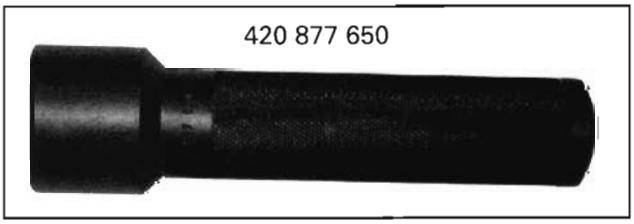
1. Output shaft oil seal
2. Oil seal installer



1. Countershaft oil seal
2. Oil seal installer

Install shift shaft oil seal with oil seal installer (P/N 529 035 758) and installer handle (P/N 420 877 650).





CAUTION: Oil seal must be installed with sealing lip toward gearbox.

ACTUATOR

Test

Remove the rear engine cover.

Unplug actuator connector.

Using the multimeter FLUKE 111 (P/N 529 035 868), check if the 2WD/4WD switch works properly.



- Turn ignition key ON.
- Select 2WD position, install the RED probe to the WHITE wire connector and the BLACK probe to the WHITE/BLACK wire connector. The obtained value should be 12 Vdc.
- Select 4WD position, install the RED probe to the WHITE/BLUE wire connector and the BLACK probe to the WHITE wire connector. The obtained value should be 12 Vdc.

If the selector is out of specifications, check wires, connectors and replace the selector if necessary.

If the selector is good, check the vehicle harness.

If the vehicle harness is good, replace the actuator no. 39.

Removal

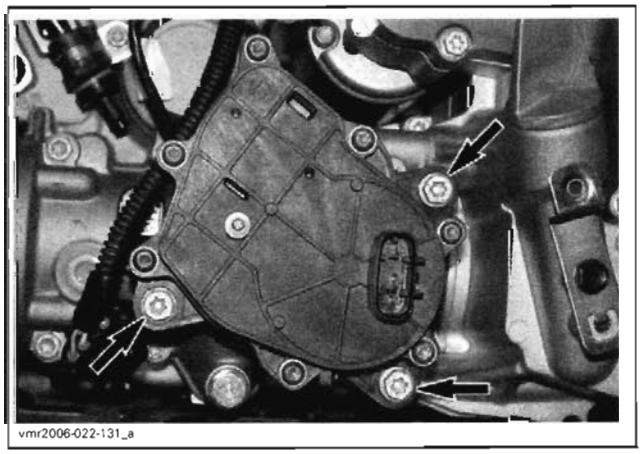
NOTE: Before beginning any servicing on the actuator, make sure the vehicle is in 4WD position. No need to remove engine from vehicle.

Remove the RH footrest and the rear engine cover. Refer to *BODY*

Unplug actuator connector.

Place a drain pan under actuator.

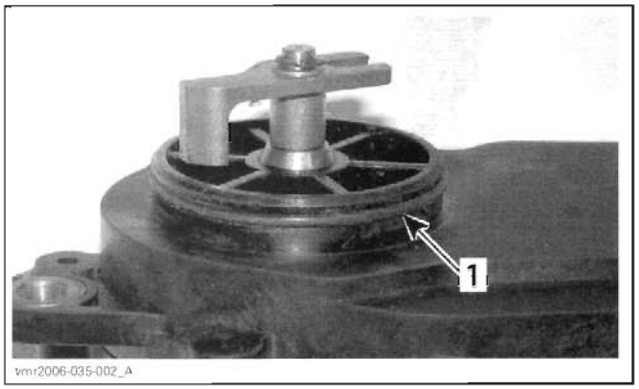
Unscrew actuator bolts.



When all actuator bolts are removed, pull the actuator out of housing.

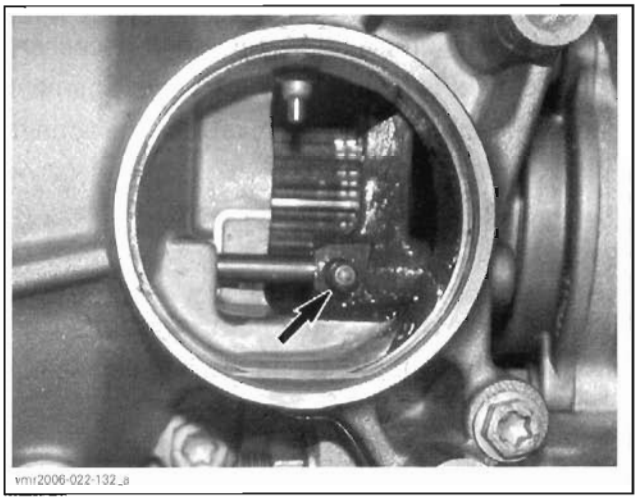
Installation

Apply a small amount of Super Lube grease (P/N 293 550 030) on actuator O-ring.

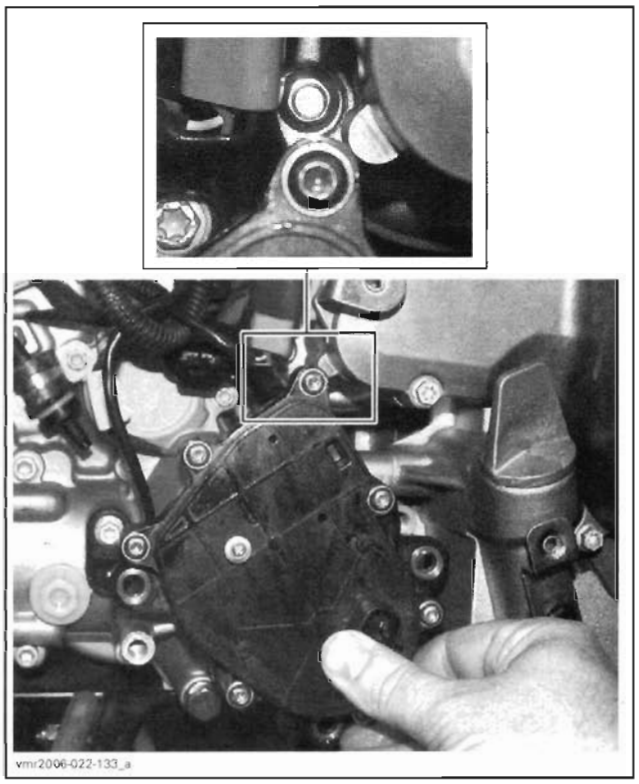


1. Actuator O-ring

Verify if shifting fork **no. 10** is in 4WD position. The shifting fork should be positioned toward the front of vehicle.



Align the actuator fork with the dog on shifting fork **no. 10** then push the actuator in the housing. See the following illustration to position the actuator correctly.



Rotate the actuator counterclockwise until it orients itself to mounting position.

CAUTION: Do not cut or break the actuator O-ring.

Install all actuator bolts then torque them to 25 N•m (18 lbf•**in**).

Connect actuator.

Lift the front of vehicle.

Turn front wheels. The front propeller shaft should not turn (the PARK position must be selected).

If the front propeller shaft turns, the actuator is not installed correctly. Remove actuator and reinstall it.

Place ignition switch to ON position and select the 2WD position.

Turn front wheel again. The front propeller shaft. The shaft should turn easily.

If the front propeller shaft does not turn, the actuator is not installed correctly. Remove actuator and reinstall it.

Install all other removed parts.

OUTPUT SHAFT AND COUPLING MECHANISM

Remove gearbox. Refer to *GEARBOX* further in this section.

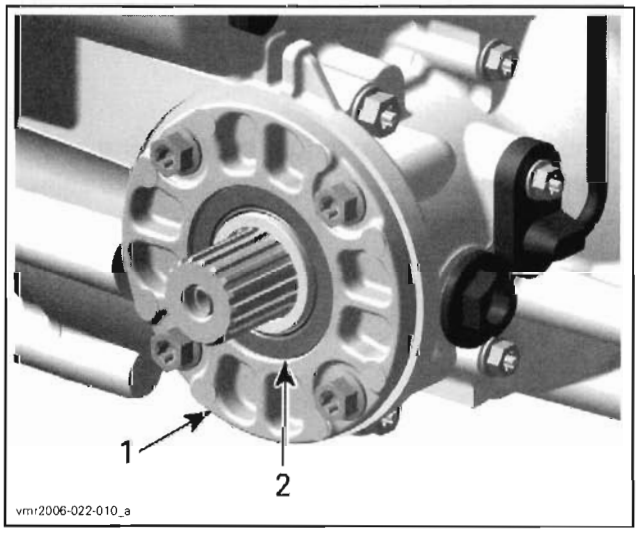
Before removing the right housing and output shaft **no. 1** measure the backlash on output shaft. This measure will indicate if output shaft adjustment is necessary.

Backlash Procedure

Engage PARK position on the gear shaft to block gearbox.

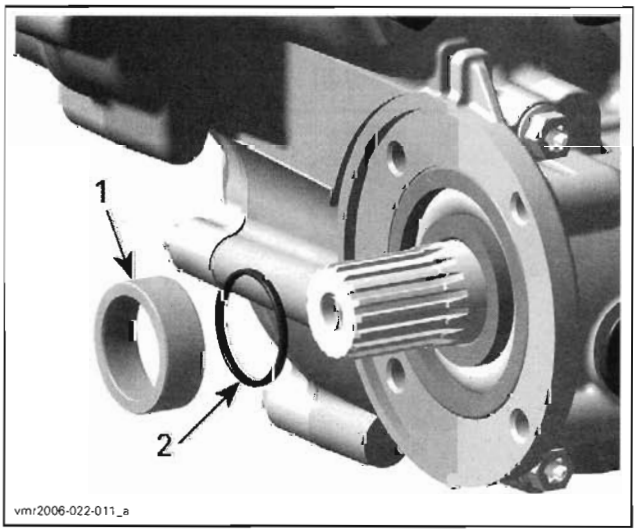
Remove:

- bearing cover with oil seal



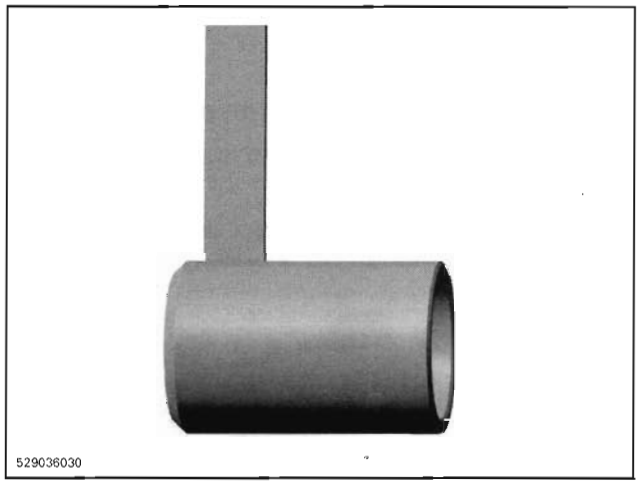
1. Bearing cover
2. Oil seal

- distance sleeve
- O-ring.

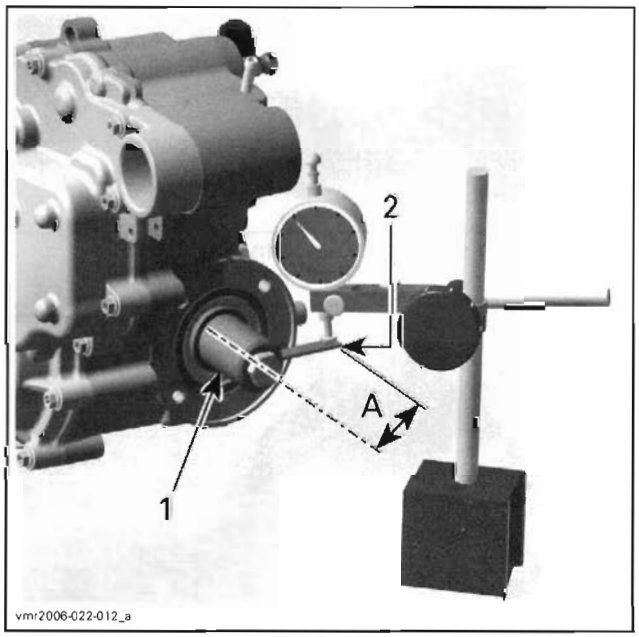


1. Distance sleeve
2. O-ring

Install the backlash measurement tool (P/N 529 036 030) at the end of output shaft.



From center of tool bolt, measure 47 mm (1.85 in) and place a mark on the tab.



1. Backlash measurement tool
2. Mark on tab
A. 47 mm (1.85 in)

Position the head of the dial indicator, against the tab at a 90° angle and on the line. Then, gently rotate the output shaft.

This reading gives the backlash measurement. Refer to the following table for backlash specifications.

OUTPUT SHAFT BACKLASH	
NEW	0.10 to 0.20 mm (.0039 to .0079 in)
SERVICE LIMIT	0.25 mm (.0098 in)

If the backlash is out of the specifications, perform an output shaft adjustment.

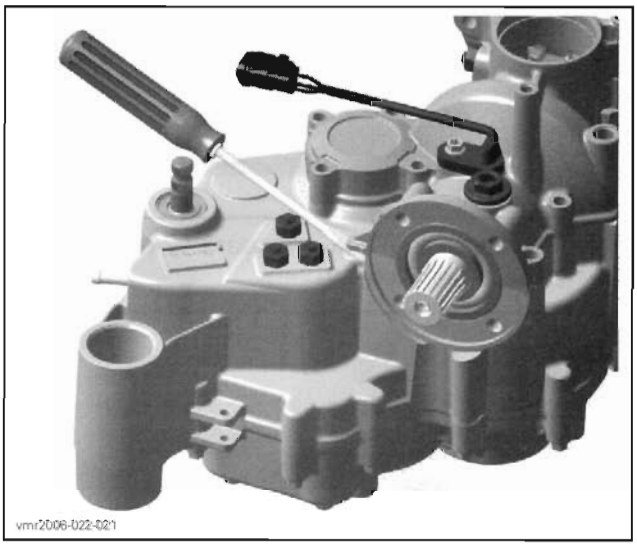
Removal

Remove actuator **no. 39**.

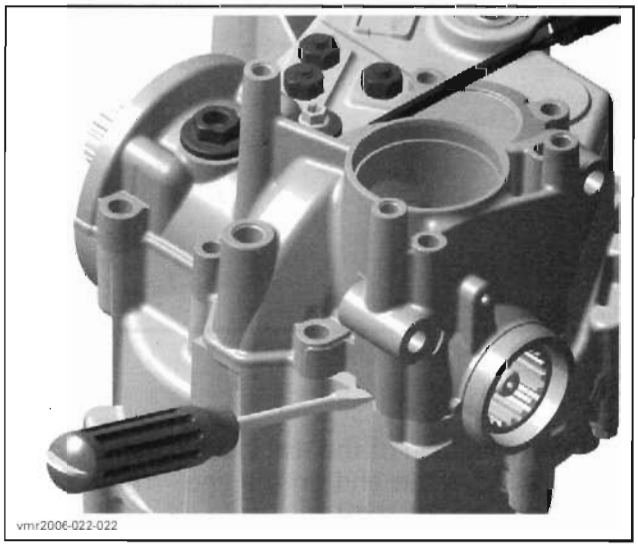
Remove the bearing cover with oil seal.

Unscrew all bolts retaining the right housing to the center housing.

To remove right housing, use 2 big screwdrivers.



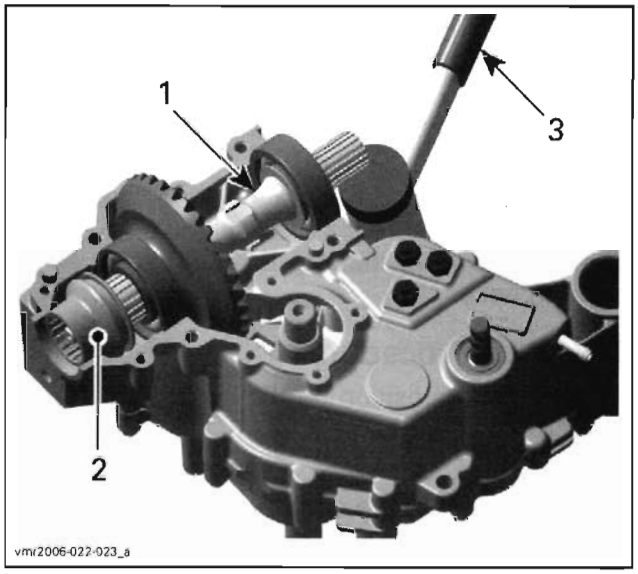
POSITION FOR BIG FLAT SCREWDRIVER



POSITION FOR BIG FLAT SCREWDRIVER

Remove output shaft.

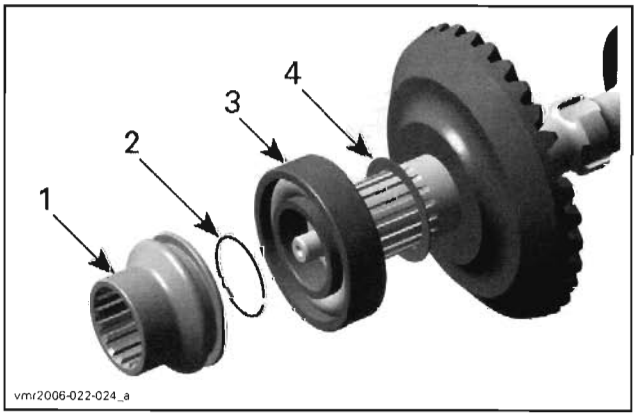
CAUTION: Use a soft hammer to remove output shaft from center housing.



1. *Output shaft*
2. *Shifting sleeve*
3. *Soft hammer*

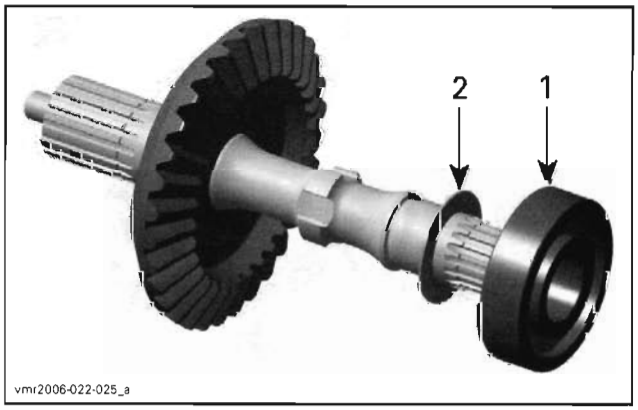
Continue removal procedure by removing:

- shifting sleeve, O-ring, ball bearing and shim.



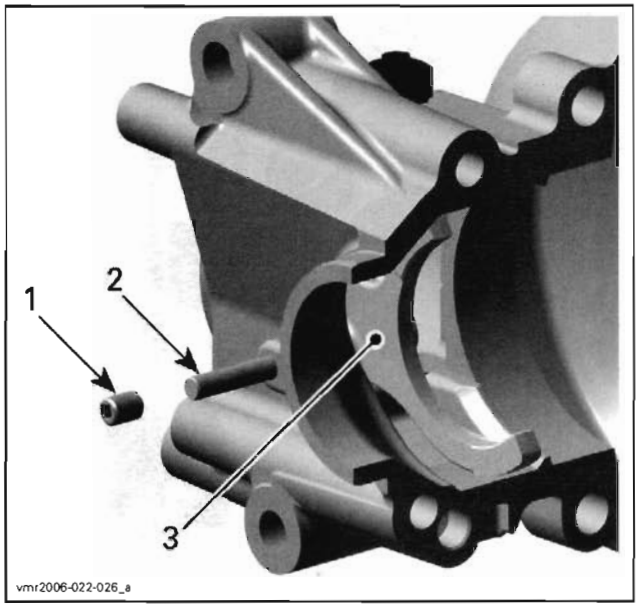
1. *Shifting sleeve*
2. *O-ring*
3. *Ball bearing*
4. *Shim*

- ball bearing and thrust washer



1. *Ball bearing*
2. *Thrust washer*

– set screw, pin and shifting fork.



1. Set screw
2. Pin
3. Shifting fork

Inspection

Check output shaft **no. 1** and its gear for cracks, bend, pitting or other visible damages.

Check output shaft splines for wear or other damages.

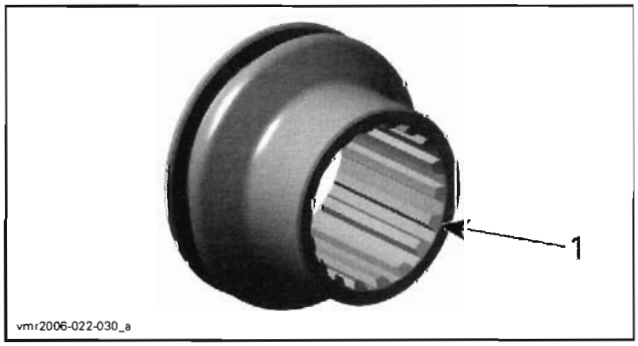
CAUTION: Always replace output shaft and bevel gear shaft at the same time. Proceed also with the *BEVEL GEAR ADJUSTMENT*.

Check if the output shaft bearings **no. 3** and **no. 7** turn freely and smoothly. Replace if necessary.

Replace oil seal **no. 46** if brittle, hard or damaged.

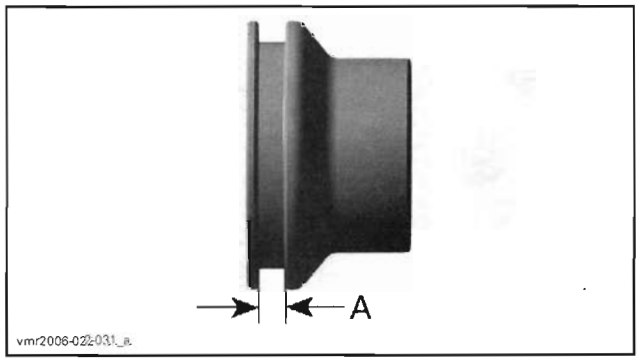
Replace O-rings **no. 4** and **no. 8** if brittle, hard or damaged.

Check splines of coupling sleeve **no. 9** for wear or other damages.



1. Inspect splines

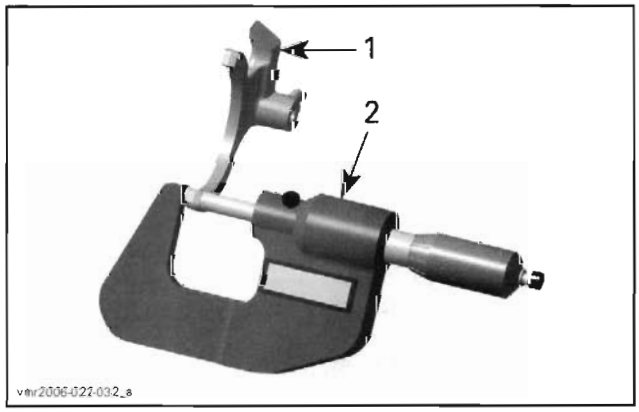
Measure the shifting sleeve groove width.



A. Groove width

SHIFTING SLEEVE GROOVE WIDTH	
NEW	5.25 to 5.35 mm (.207 to .211 in)
SERVICE LIMIT	5.50 mm (.217 in)

Check shifting fork claw thickness.



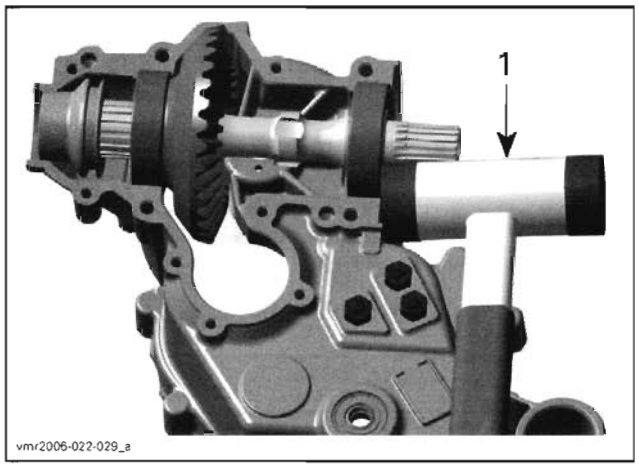
1. Shifting fork
2. Micrometer

SHIFTING FORK CLAW THICKNESS	
NEW	4.95 to 5.05 mm (.195 to .199 in)
SERVICE LIMIT	4.80 mm (.189 in)

Clean housing split surface and especially the bearing areas from metal particles or other contamination.

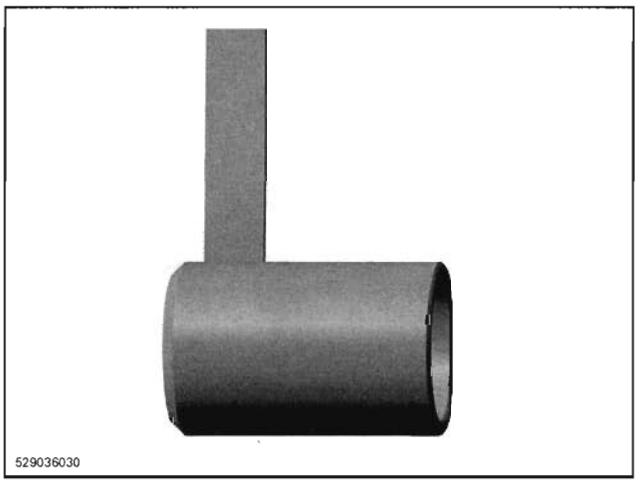
Installation

– Install shim **no. 6**, bearing **no. 7**, O-ring **no. 8** and shifting sleeve **no. 9** onto the output shaft
– Install thrust washer **no. 2** and ball bearing **no. 3**. O-ring **no. 4** and distance sleeve **no. 5** are not installed at this time.
– Place the output shaft into the center housing.
– Use soft hammer to put bearing exactly in place against center housing.



1. Soft hammer

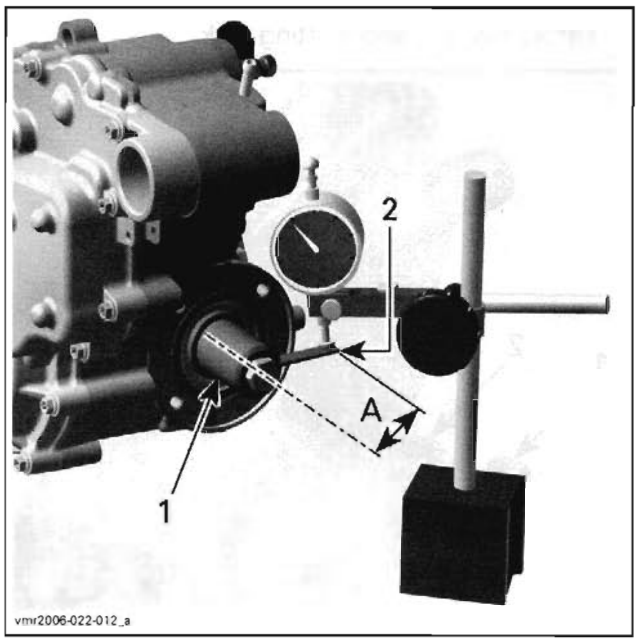
- Clean the bearing cover location then attach bearing cover with oil seal to the housing.
- Install the backlash measurement tool (P/N 529 036 030).



- Temporarily install the right housing with the four (4) M8 TORX screws beside bearing seats.

NOTE: Prior to tightening the TORX screws, tap on the gear end of output shaft with a soft hammer to take up all gear free play.

- Position the head of dial indicator against the tab at a 90° angle and on the line. Then, gently rotate the output shaft.



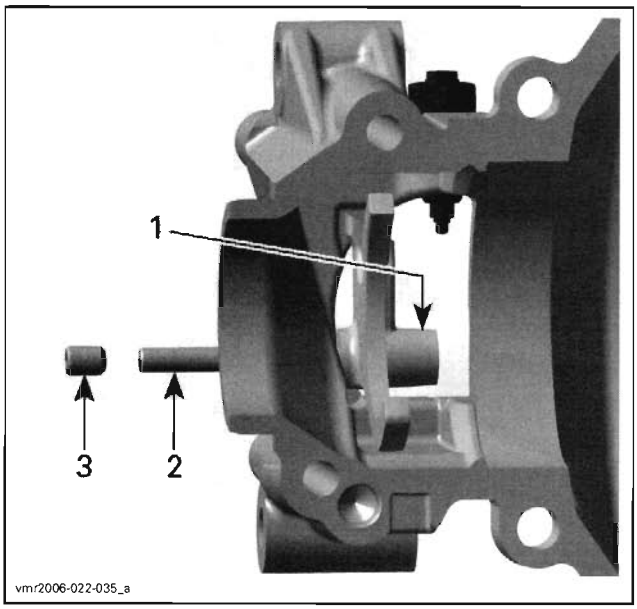
1. Backlash measurement tool
2. Mark on tab
A. 47 mm (1.85 in)

If backlash is not within the specification, remove the output shaft and select the next larger or smaller shim previously selected to "fine tune" the clearance to get closer to the specifications.

NOTE: Use next larger shim to increase backlash and next smaller shim to reduce backlash.

If backlash is within specifications, remove dial indicator, backlash measuring tool, bearing cover and right housing.

NOTE: Install shifting fork, pin and set screw in right housing before applying sealant to the mating surface.



1. *Shifting fork*
2. *Pin*
3. *Set screw*

Clean all metal components in a solvent.

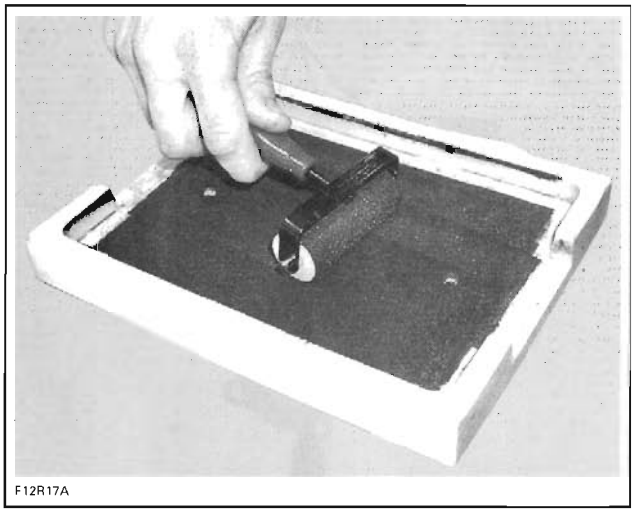
Housing mating surfaces are best cleaned using a combination of Loctite chisel (P/N 413 708 500) and a brass brush. Brush a first pass in one direction then make the final brushing perpendicularly (90°) to the first pass cross (hatch).

CAUTION: Do not wipe with rags. Use a new clean hand towel only.

IMPORTANT: When beginning the application of sealant, the assembly and the first torquing should be done within 10 minutes. It is suggested to have all you need on hand to save time.

Use Loctite 5910 (P/N 293 800 081) on mating surfaces.

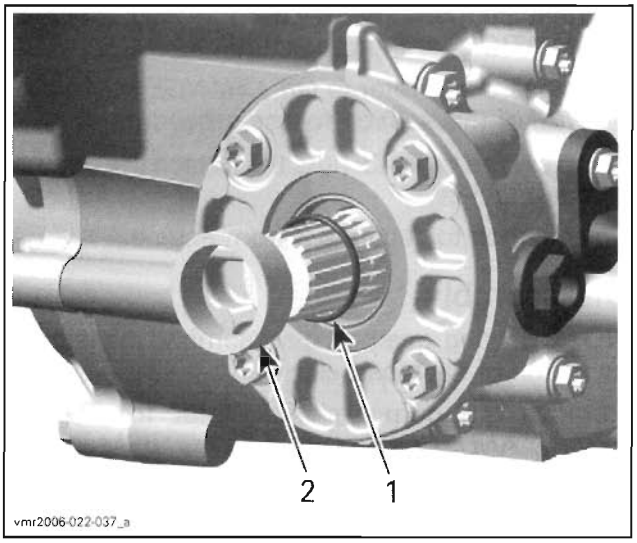
Use a plexiglass plate and apply some sealant on it. Use a soft rubber roller (50 - 75 mm (2 - 3 in)), available in arts products suppliers for printing, and roll the sealant to get a thin uniform coat on the plate (spread as necessary). When ready, apply the sealant on housing mating surfaces.



Do not apply in excess as it will spread out inside housings.

NOTE: It is recommended to apply this specific sealant as described here to get a uniform application without lumps. If you do not use the roller method, you may use your finger to uniformly distribute the sealant (using a finger will not affect the adhesion).

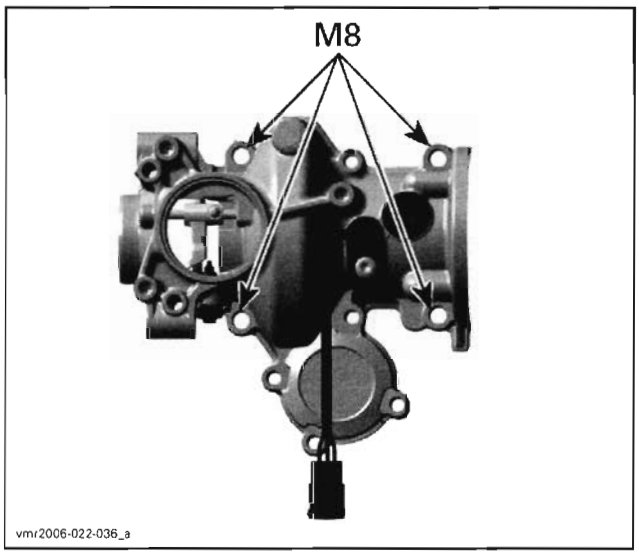
Install all other screws on right housing then the O-ring **no. 4** and the distance sleeve **no. 5** on end of output shaft. Chamfered bore of distance sleeve has to face the engine.



1. *O-ring*
2. *Distance sleeve*

NOTE: To install the right housing align the shifting fork **no. 10** with the groove in the shifting sleeve **no. 9**.

First, torque the four (4) M8 Torx screws in a criss-cross sequence by hand then retighten to 25 N•m (18 lbf•ft).



Tighten all M6 Torx screws to 10 N•m (89 lbf•**in**)

Before installing bearing cover, apply Loctite 5910 (P/N 293 800 081) on the housing and Super Lube grease (P/N 293 550 030) on seal.

Install the actuator, refer to *ACTUATOR*.

Once this is done, complete final assembly.

GEARBOX

Removal

Remove engine from vehicle and place it on footrest support. Refer to *REMOVAL AND INSTALLATION* for the procedure.

Drain gearbox. Refer to *OIL CHANGE* in *MAINTENANCE* of this section for the procedure.

Unscrew the three (3) nuts that attach the gearbox to the engine.

Pull gearbox to separate it from engine.

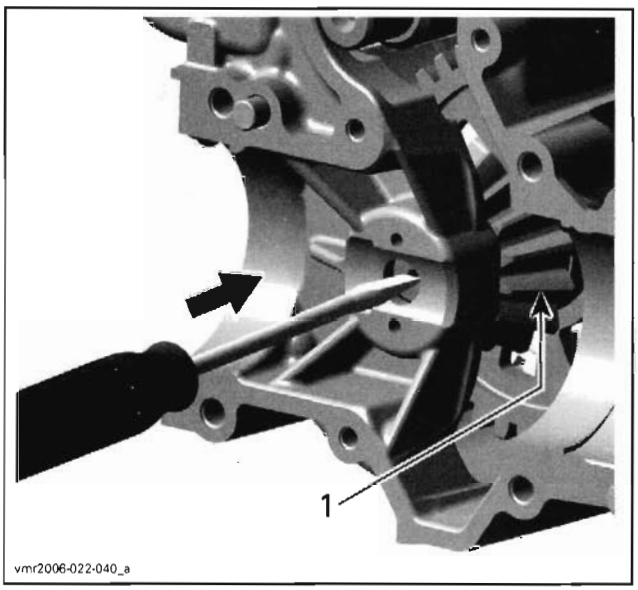
Disassembly

NOTE: During gearbox disassembly, inspect the condition of each part closely.

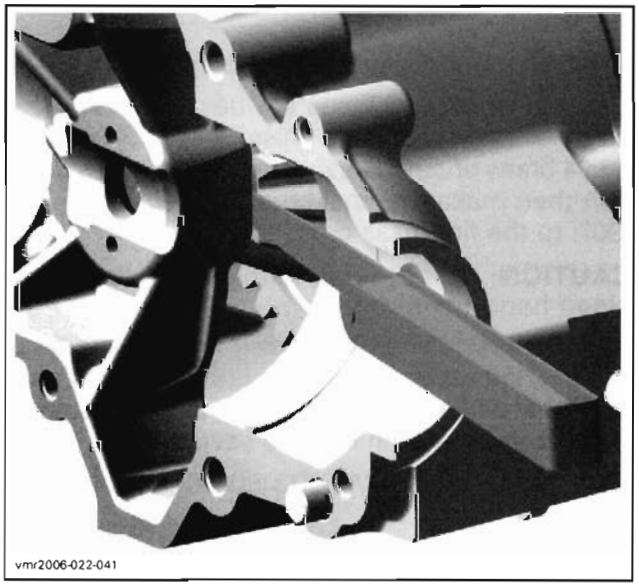
Remove the output shaft. Refer to *OUTPUT SHAFT AND COUPLING MECHANISM* in this section.

Push bevel gear **no. 11** with a pin slightly down and measure the axial clearance of bevel gear with a feeler gauge.

NOTE: Bevel gear axial clearance must be measured before center and left housings separation.



1. Bevel gear



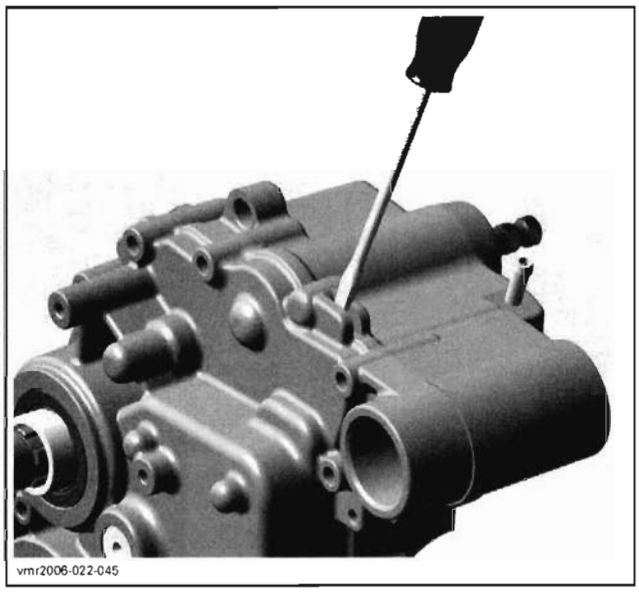
MEASURE AXIAL CLEARANCE OF BEVEL GEAR

BEVEL GEAR AXIAL CLEARANCE	
NEW	0.02 to 0.15 mm (.00079 to .0059 in)
SERVICE LIMIT	0.19 mm (.0075 in)

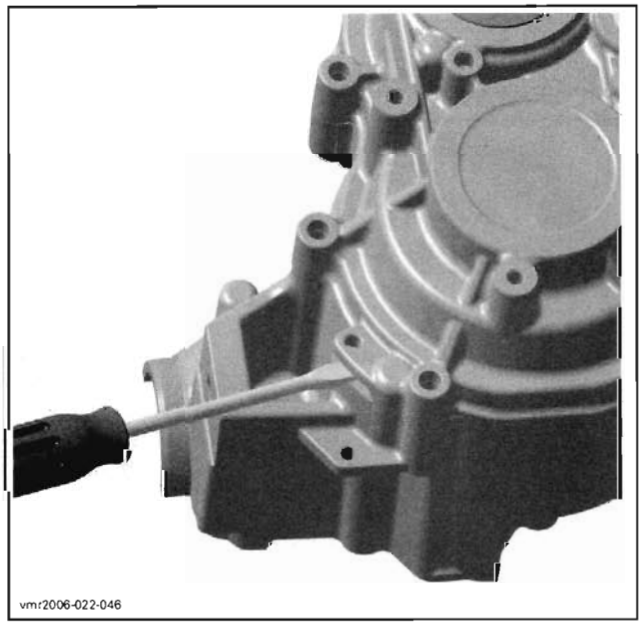
Unscrew the left housing screws.

Place the left housing on a wood stand, center housing pointing upwards.

Using 2 big flat screwdrivers, lift the center housing.



POSITION FOR BIG FLAT SCREWDRIVER

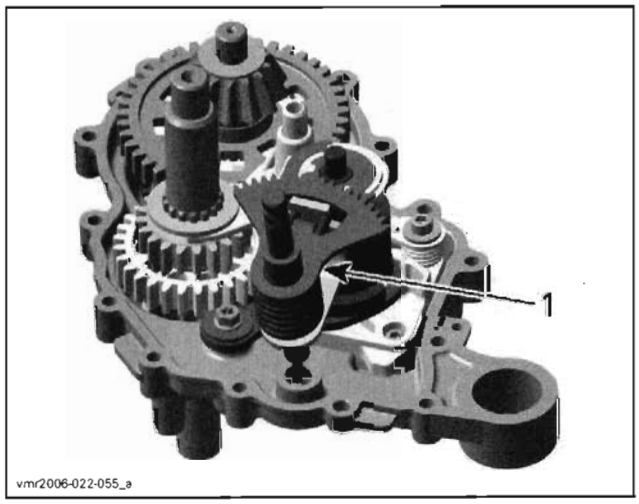


POSITION FOR BIG FLAT SCREWDRIVER

Remove center housing completely.

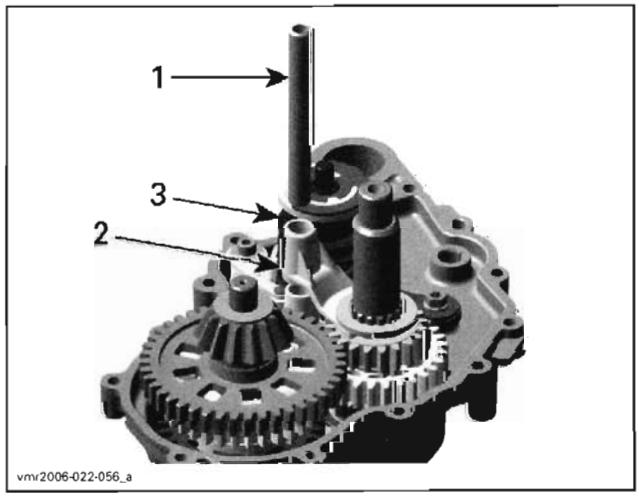
Remove:

- shift shaft assembly



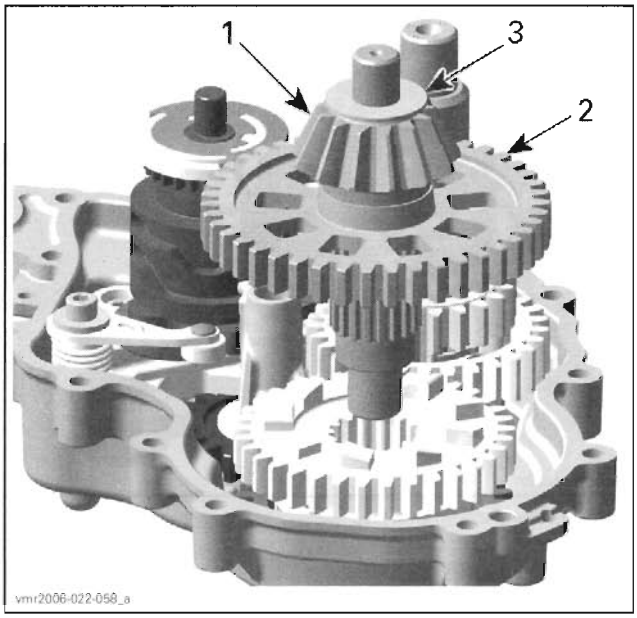
1. Shift shaft assembly

- shift fork shaft
- disengage shift fork from shift drum



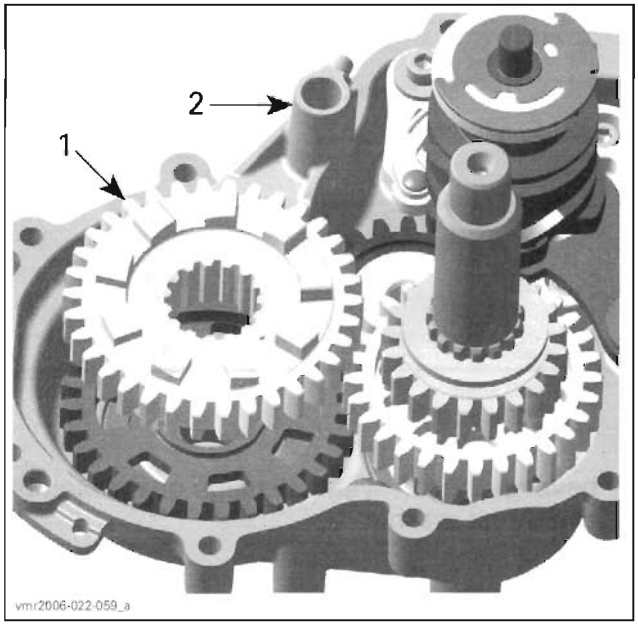
1. Shift fork shaft
2. Shift fork
3. Shift drum

- bevel gear shaft with low range gear assembly and thrust washer



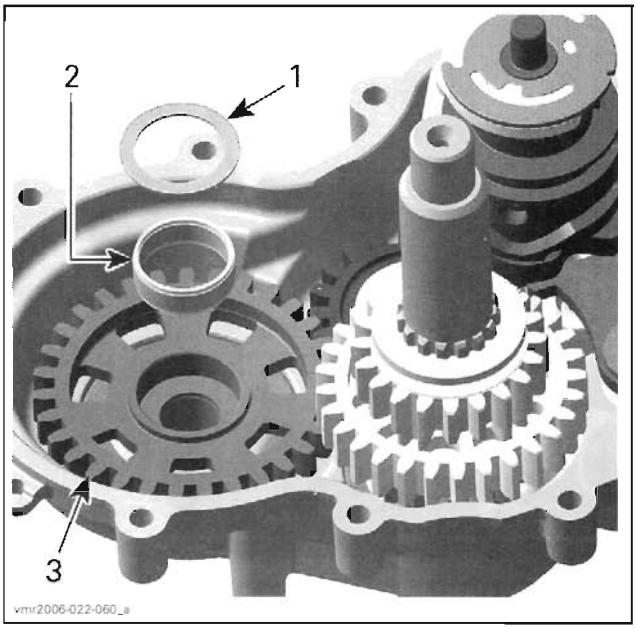
1. Bevel gear
2. Low range gear
3. Thrust washer

– sliding gear with shift fork



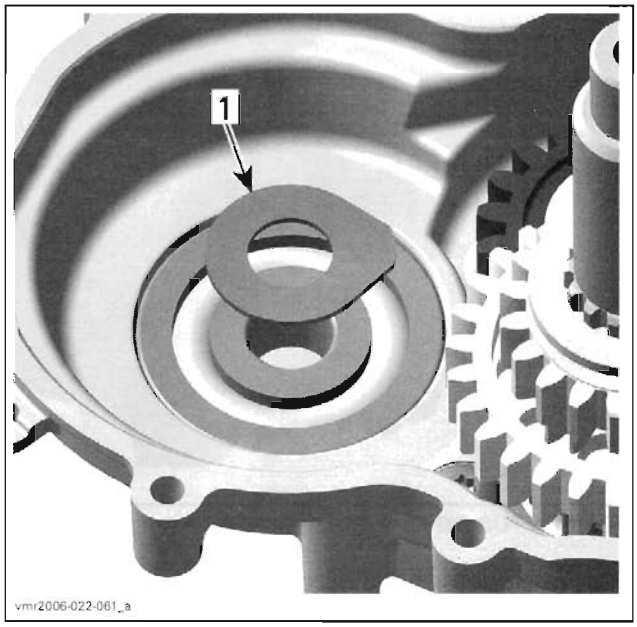
1. Sliding gear
2. Shift fork

– thrust washer, needle bearing and reverse gear



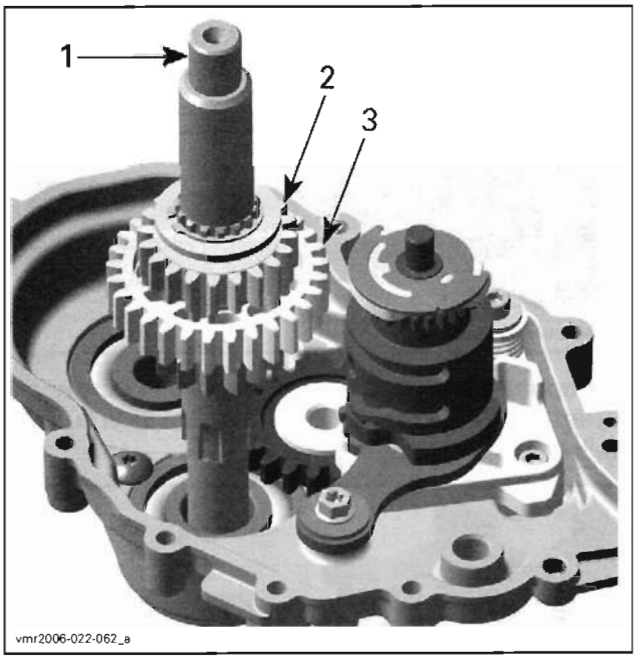
1. Thrust washer
2. Needle bearing
3. Reverse gear

– thrust washer CVT side



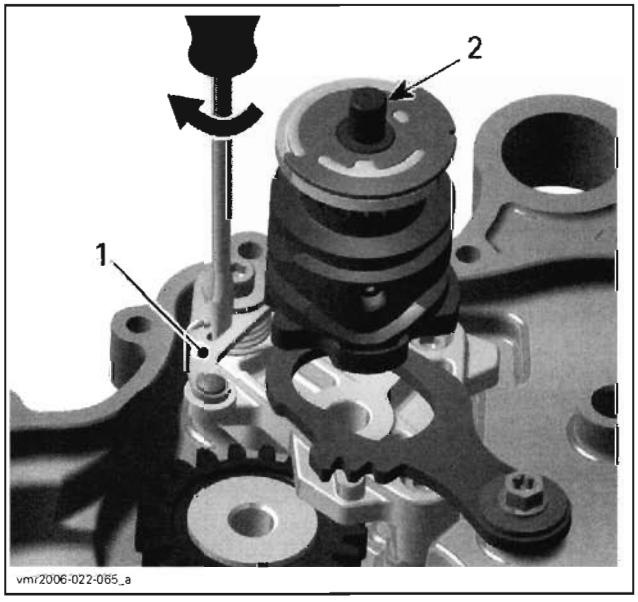
1. Thrust washer CVT side

– countershaft no. 18 with low range gear and high range gear assembly.



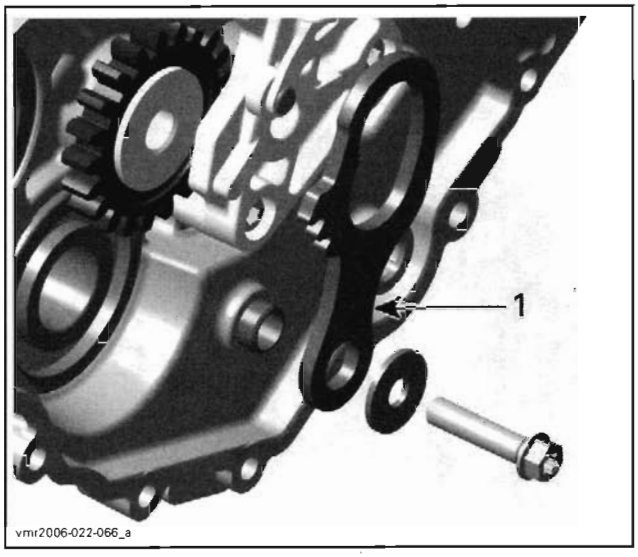
1. Countershaft
2. Low range gear
3. High range gear

Insert a flat screwdriver in the slot of index lever. Turn screwdriver clockwise and remove shift drum.



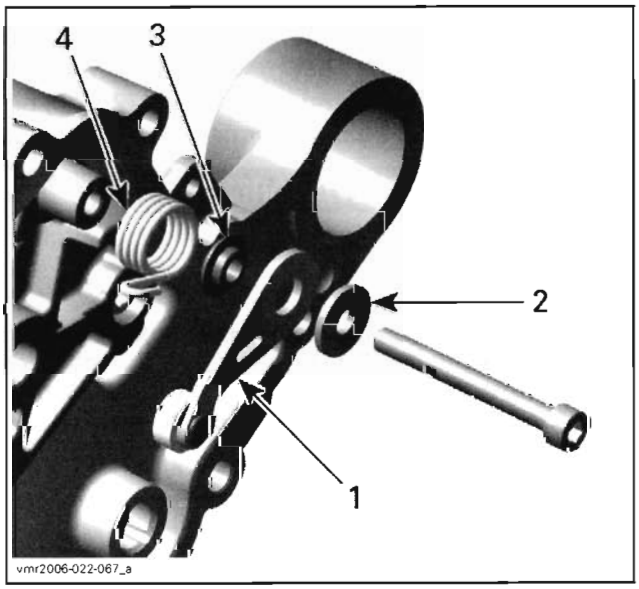
1. Index lever
2. Shift drum

Continue by removing the following;
– parking lock lever



1. Parking lock lever

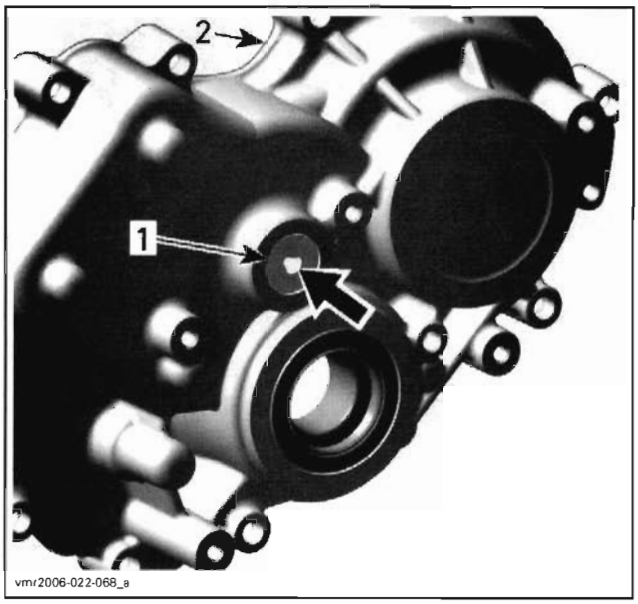
– index lever with washer, step ring and spring



1. Index lever
2. Washer
3. Step ring
4. Index spring

– support flange **no. 37**.

To remove intermediate gear **no. 23** and needle bearing **no. 22**, use a press bench to push out the intermediate gear shaft **no. 21**.



PRESS SHAFT IN THE DIRECTION AS SHOWN BY THE ARROW
1. *Intermediate gear shaft*
2. *Left housing*

Bearing Removal in Housing

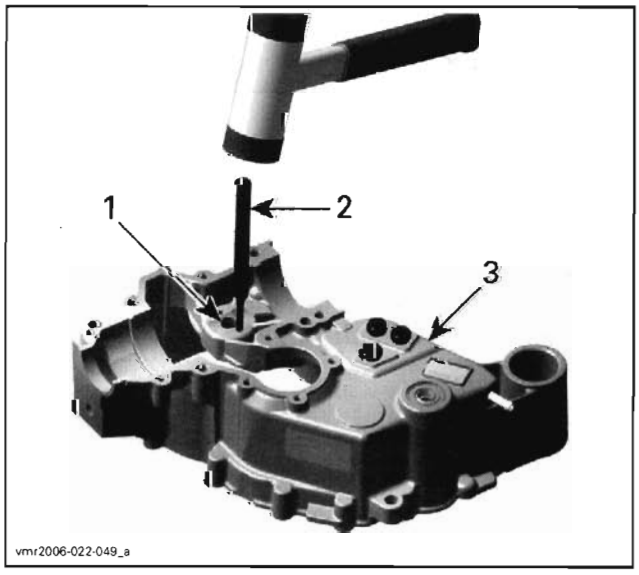
If necessary heat housing up to 100°C (212°F) before removing ball bearings or needle bearings.

⚠ WARNING

Clean oil, outside and inside, from housing before heating.

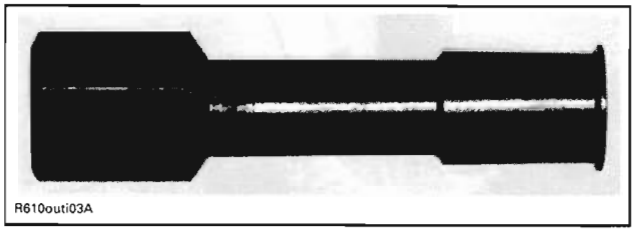
CAUTION: Always support gearbox housings properly when ball bearings or needle bearings are removed. Housing damages may occur if this procedure is not performed correctly.

To remove bevel gear needle bearing use a punch.

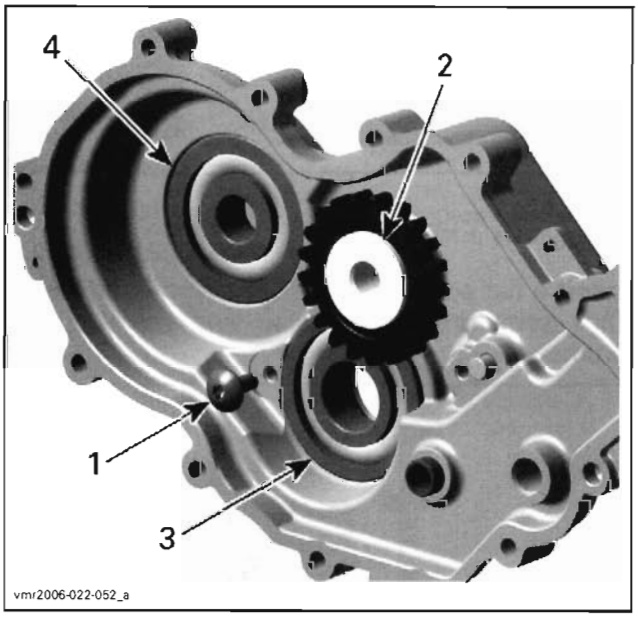


1. *Bevel gear needle bearing*
2. *Punch*
3. *Center housing*

To remove ball bearings of bevel gear **no. 36** and needle bearing of countershaft **no. 33**, use a blind hole bearing puller.



For countershaft ball bearing , remove screw and intermediate gear shaft, then push with a suitable puller from outside in.



1. *Screw*
2. *Intermediate gear shaft*
3. *Ball bearing counter shaft*
4. *Bevel gear ball bearing*

Inspection

Always verify for the following when inspecting gearbox components:

- gear teeth damage
- worn or scoured bearing surfaces
- worn or scoured shift fork
- worn or scoured shift fork shaft
- rounded engagement dogs and slots
- bent shift forks
- bent shift fork shaft
- worn shift fork engagement pins
- worn tracks on shift drum
- worn shift fork engagement groove
- worn splines on shafts and gears.

Bearings

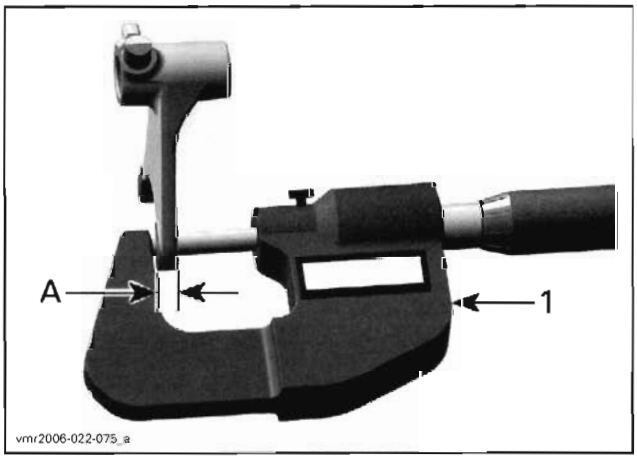
Check if bearings **no. 34** and **no. 36** as well as needle bearings **no. 33** and **no. 35** turn freely and smoothly.

Check all bearings, bearing points, tooth flanks, taper grooves and annular grooves. Annular grooves must have sharp edges.

Shift Forks

Check both shift forks for visible damage, wear or bent shift fork claws.

Measure the shift fork claw thickness.



1. Micrometer
A. Shift fork claw thickness

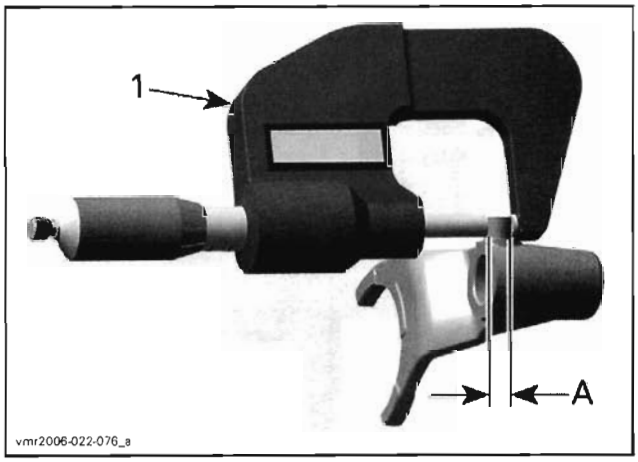
– Shift fork **no. 25** for high gear shifting.

SHIFT FORK CLAW THICKNESS (high gear shifting)	
NEW	4.80 to 4.90 mm (.189 to .193 in)
SERVICE LIMIT	4.70 mm (.185 in)

– Shift fork **no. 26** for low/reverse gear shifting.

SHIFT FORK CLAW THICKNESS (low/reverse gear shifting)	
NEW	5.10 to 5.20 mm (.200 to .205 in)
SERVICE LIMIT	5.00 mm (.197 in)

Measure shift fork pins.



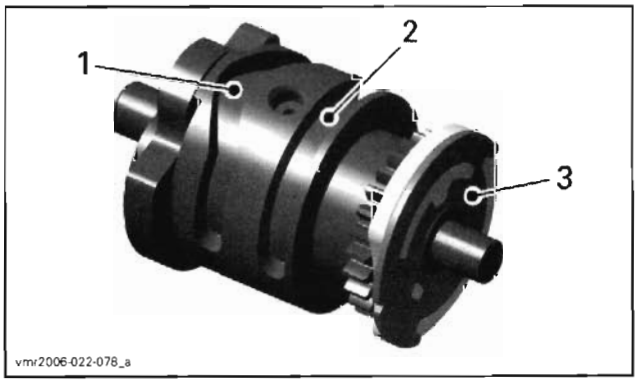
1. Micrometer
A. Shift fork pin diameter

SHIFT FORK PIN DIAMETER	
NEW	6.920 to 6.970 mm (.272 to .274 in)
SERVICE LIMIT	6.850 mm (.270 in)

Shift Drum

Check shift drum tracks for scouring or heavy wear, like rounded engagement slots.

Replace isolating washer **no. 27** if there are signs of wear or visible damages.



1. Track for the low/reverse gear shift fork
2. Track for the high gear shift fork
3. Isolating washer on the shift drum

Levers

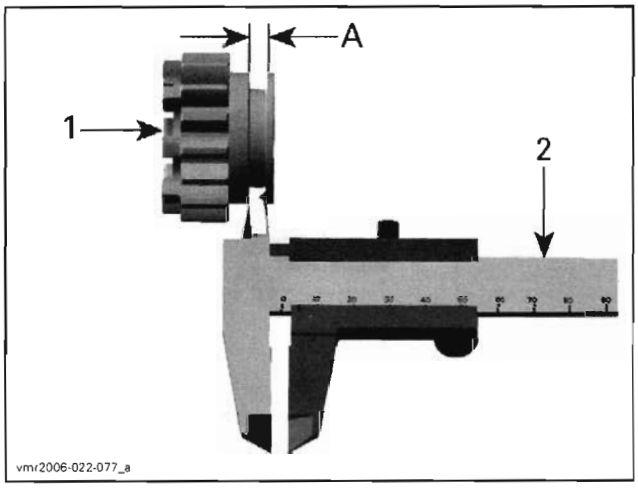
Check parking lever **no. 29** for cracks or other damages.

Index lever with roller **no. 28** must move freely.

Gears

NOTE: Replace gears only together with the corresponding meshing gears. Always replace circlips and use special pliers to install them.

Measure the width of shift fork engagement groove.



1. Main gear
2. Caliper
A. Width for engagement of shift fork

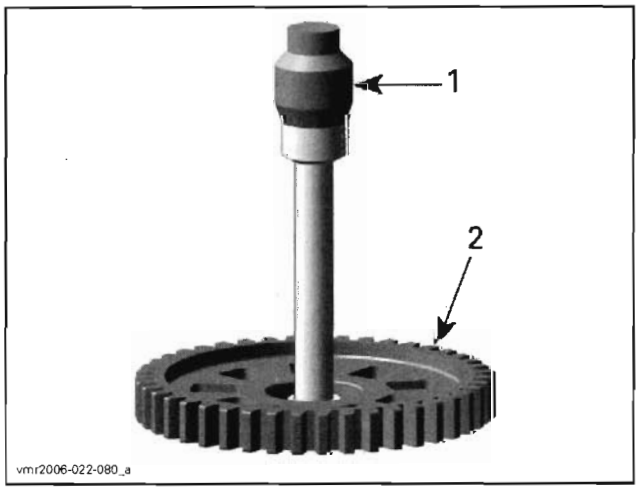
– Gear **no. 20** for high gear shifting.

WIDTH OF SHIFT FORK ENGAGEMENT GROOVE (high gear shifting)	
NEW	5.00 to 5.10 mm (.197 to .201 in)
SERVICE LIMIT	5.20 mm (.205 in)

– Gear **no. 15** for low/reverse gear shifting.

WIDTH OF SHIFT FORK ENGAGEMENT GROOVE (low/reverse gear shifting)	
NEW	5.30 to 5.40 mm (.209 to .213 in)
SERVICE LIMIT	5.50 mm (.217 in)

Check free pinions **no. 14**, **no. 16**, **no. 19** and **no. 23** for wear.



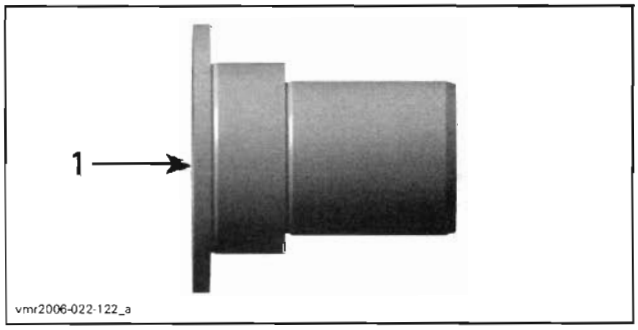
TYPICAL
1. Micrometer
2. Free pinion

DIAMETER FREE PINION	
NEW	29.000 to 29.013 mm (1.1417 to 1.1422 in)
SERVICE LIMIT	29.015 mm (1.1423 in)

Shafts

Check shift shaft **no. 30** for worn splines and gears.

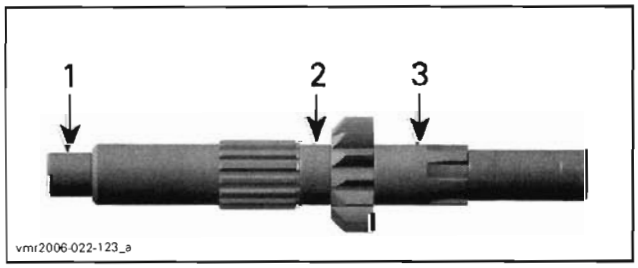
Check intermediate shaft for wear.



1. Intermediate gear bearing

INTERMEDIATE GEAR SHAFT	
NEW	24.979 to 25.000 mm (.9834 to .9842 in)
SERVICE LIMIT	24.977 mm (.9833 in)

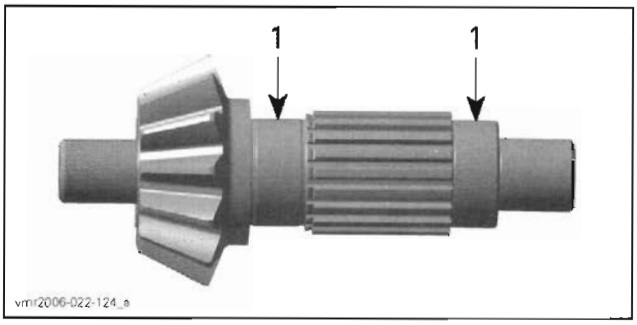
Check countershaft for wear.



1. MAG side
2. Free pinion bearing
3. CVT side

COUNTERSHAFT	
SERVICE LIMIT	
MAG side	17.990 mm (.708 in)
Free pinion bearing	24.970 mm (.983 in)
CVT side	24.970 mm (.983 in)

Check bevel gear shaft.

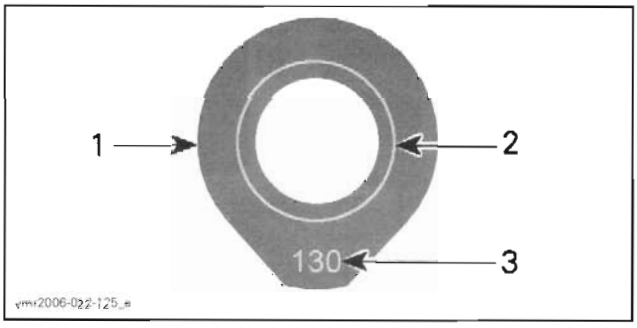


1. Free pinion bearings

BEVEL GEAR SHAFT	
SERVICE LIMIT	
Free pinion bearing	24.984 mm (.9836 in)

Shims

Always replace shim by a new one with the same thickness, when reassembling the gearbox with existing output shaft **no. 1** and bevel gear shaft **no. 11**.



1. Thrust washer for adjusting the bevel gear on center housing side
2. Area where wear signs appear
3. Thickness of the washer

If using a new output shaft **no. 1** and bevel gear shaft **no. 11**, proceed with the *BEVEL GEAR ADJUSTMENT* below to use shim of the proper thickness.

Adjustment

Bevel Gear Adjustment

Use following course of calculation to adjust bevel gear in place between center and left housings.

NOTE: Only necessary if the output shaft backlash and axial clearance of the bevel gear is out of specification or if parts are changed (output shaft, bevel gear shaft or housing).

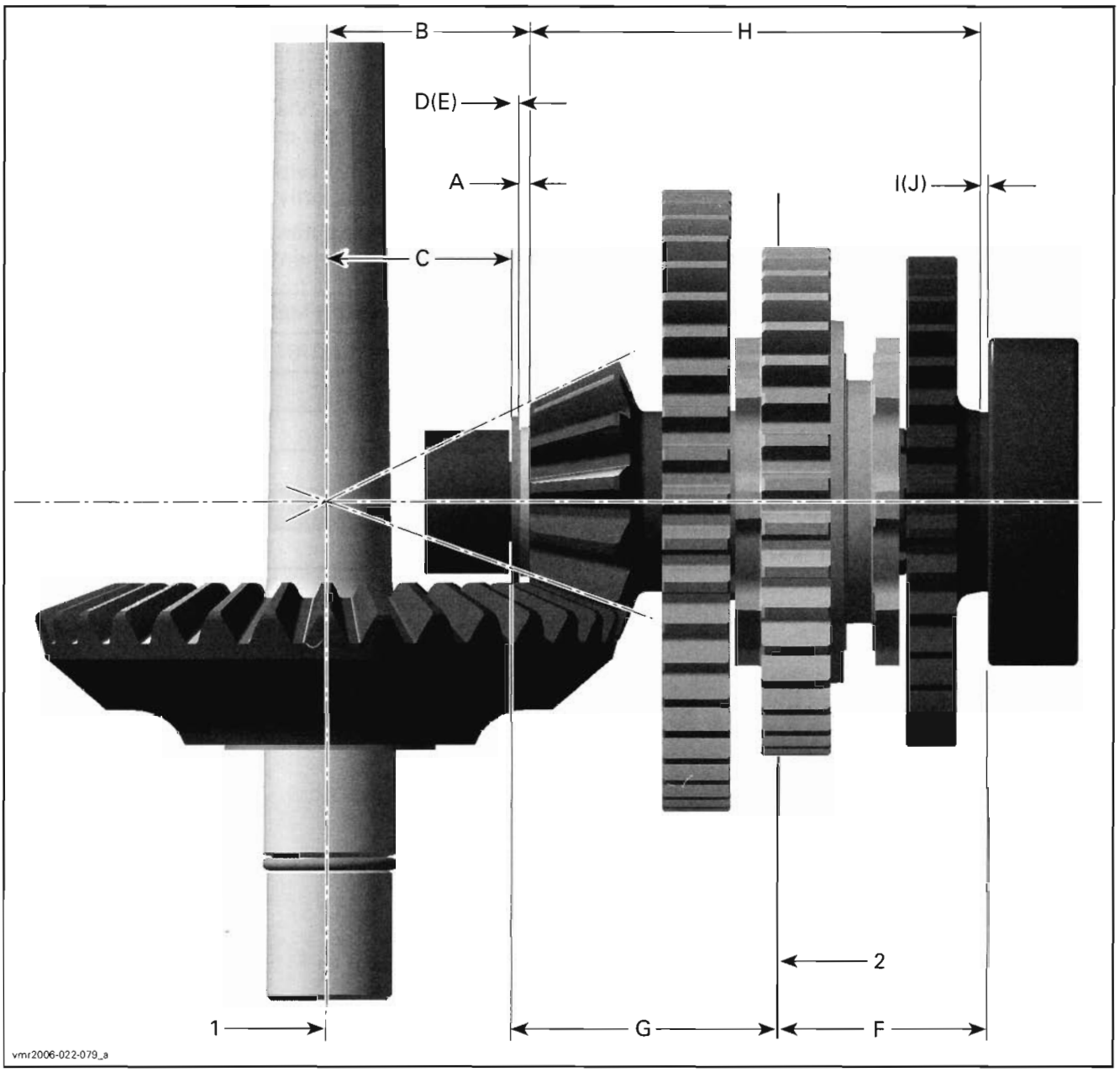
Clean all metal components in a solvent before beginning.

Housing mating surfaces are best cleaned using a combination of Loctite chisel (P/N 413 708 500) and a brass brush. Brush a first pass in one direction then make the final brushing perpendicularly (90°) to the first pass cross (hatch).

CAUTION: Do not wipe with rags. Use a new clean hand towel only.

Measure following items as per next illustration and enter measurement in the following list:

LETTER	MEASUREMENT 1	MEASUREMENT 2
A	2 mm (.0787 in)	2 mm (.0787 in)
B		
C		
D		
E		
F		
G		
H		
I		
J		

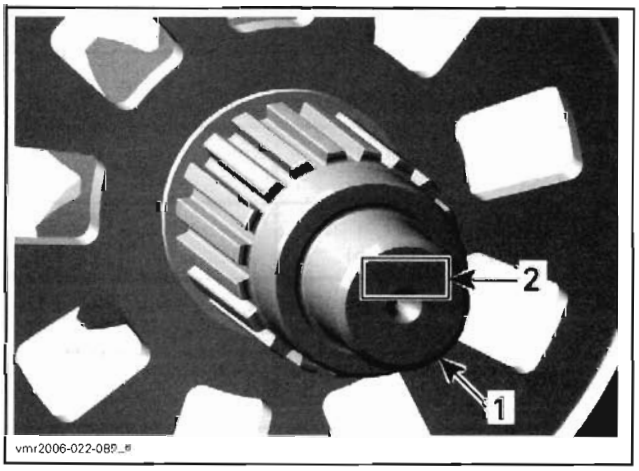


1. Mating surface — output shaft
2. Mating surface — left housing

To determine the shim thickness E on center housing:

- A = 2 mm (.0787 in) nominal thickness of axial needle bearing **no. 24**.
- B = The distance between the thrust surface of the bevel gear and the theoretical center of its taper. This is defined by manufacturer and is written on the bevel gear shaft.

This bevel gear reference number could be between - 10 and + 10.



1. *Bevel gear*
2. *Area of written value K to find out value B*

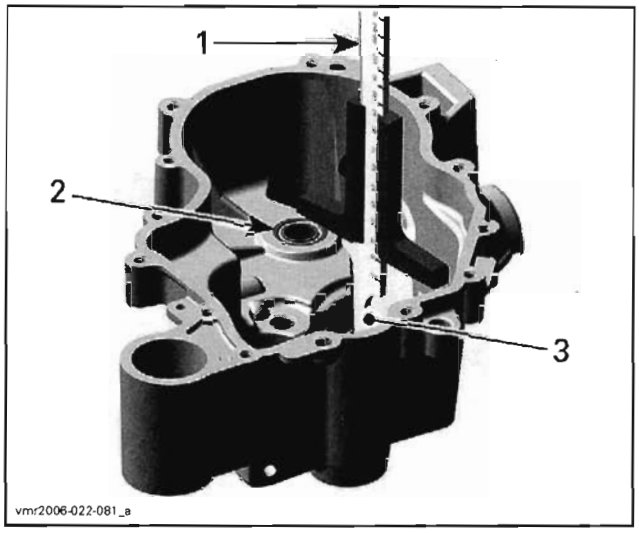
Use following formula to find out value B.

$$B = \left(\frac{\text{Bevel gear reference}}{100}\right) + 37.8$$

For example, bevel gear reference = -3 so -0.03 mm (-0.0012 in) to the nominal value of 37.8 mm (1.488 in).

B = (- 3/100) + 37.8 = 37.77

- C = Distance between the shim thrust surface in the center housing and the mating surface to left housing.



1. *Deep gauge — measurement C*
2. *Thrust washer surface in center housing*
3. *Mating surface to left housing*

- D = Theoretical shim thickness.

Use following course of calculation to get the theoretical thickness D for washer **no. 13**.

D = B - C - A

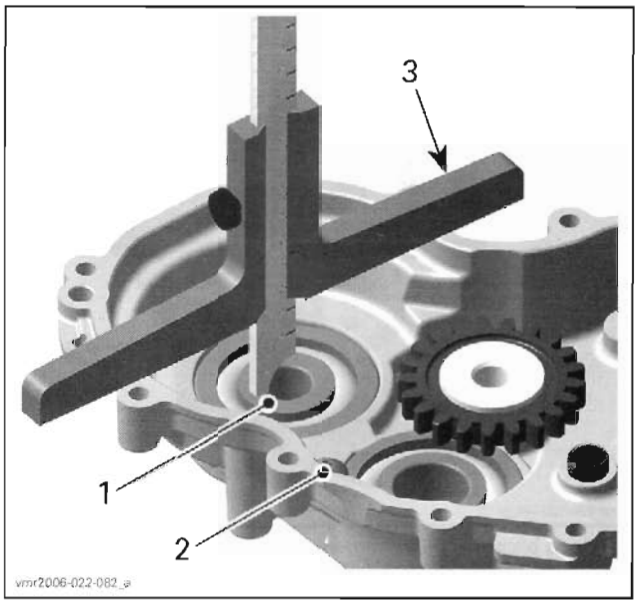
NOTE: Take theoretical value D and choose shim E (center housing shim) from the below table.

CALCULATED THICKNESS (D)	SHIM NUMBER (E)
1.20 mm to 1.29 mm (.0472 to .0508 in)	120
1.30 mm to 1.39 mm (.0512 to .0547 in)	130
1.40 mm to 1.49 mm (.0551 to .0587 in)	140
1.50 mm to 1.59 mm (.0591 to .0626 in)	150
1.60 mm to 1.69 mm (.0630 to .0665 in)	160
1.70 mm to 1.79 mm (.0669 to .0705 in)	170
1.80 mm to 1.89 mm (.0709 to .0744 in)	180

NOTE: For example, if the measured thickness is 1.53 mm (.0602 in), choose the shim 150. The shim number 150 represents a value equal to 1.50 mm (.0591 in).

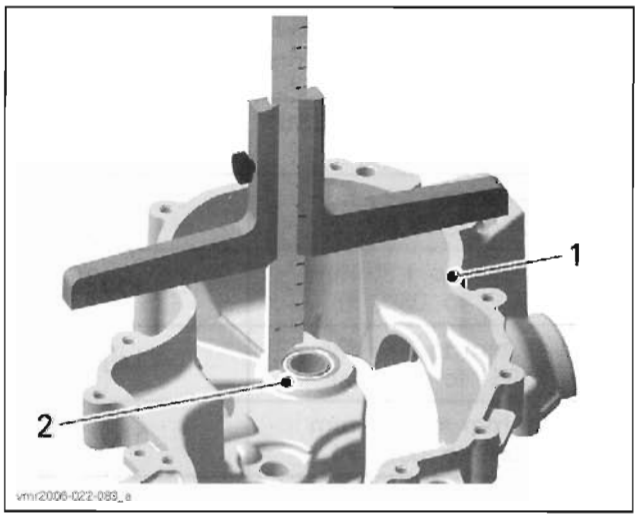
To determine the shim thickness on left housing:

- F = Distance between mating surface of left housing to ball bearing inner race.



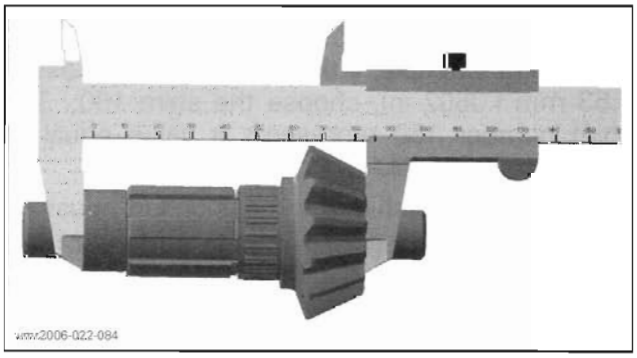
1. *Ball bearing inner race*
2. *Mating surface of left housing*
3. *Depth gauge*

- G = Distance between mating surface of center housing and thrust washer surface.



1. *Mating surface of center gear housing*
2. *Thrust washer surface*

- H = Distance between thrust surfaces of bevel gear shaft.



- I = Theoretical shim thickness.

Use following course of calculation to get the theoretical thickness I for washer **no. 17**.

I = F + G - H - A - E

NOTE: Take theoretical value I and choose shim J (CVT side shim) from the below table.

CALCULATED THICKNESS (I)	SHIM NUMBER (J)
1.22 mm to 1.31 mm (.0480 to .0516 in)	120
1.32 mm to 1.41 mm (.0519 to .0555 in)	130
1.42 mm to 1.51 mm (.0559 to .0594 in)	140
1.52 mm to 1.61 mm (.0598 to .0634 in)	150
1.62 mm to 1.71 mm (.0638 to .0673 in)	160
1.72 mm to 1.81 mm (0.677 to .0713 in)	170
1.82 mm to 1.91 mm (0.717 to .0752 in)	180

NOTE: For example, if the measured thickness is 1.53 mm (.0602 in), choose the shim 150.

NOTE: Bevel gear axial clearance of 0.02 to 0.11 mm (.00079 to .00433 in) is included in the above table.

EXAMPLE:

LETTER	MEASUREMENT 1
A	2 mm (.0787 in)
B	37.760 mm (1.487 in)
C	34.040 mm (1.340 in)
D	1.72 mm (.068 in)
E	170
F	51.800 mm (2.039 in)
G	39.080 mm (1.539 in)
H	85.680 mm (3.373 in)
I	1.500 mm (.059 in)
J	140

Shim on MAG side:

The measure A is 2 mm (.0787 in).

Note the measure indicates on bevel gear in the box B. Example: 37.760 mm (1.487 in).

Measure the distance C then indicates its value in the box C. Example: 34.040 mm (1.340 in).

B - C - A = D

(37.760 - 34.040 - 2 = 1.72 mm).

In accordance with the appropriate table, you need a shim number 170.

Shim on center housing:

Measure the distance F. Indicate this value in the box F. Example: 51.800 mm (2.039 in).

Measure the distance G. Note this value in the box G. Example: 39.080 mm (1.539 in).

Measure the distance between both butting surface of bevel gear shaft. This is the value H. Example: 85.680 mm (3.373 in).

F + G - H - A - E = I

(51.800 + 39.080 - 85.680 - 2 - 1.70 = 1.50 mm).

NOTE: The shim number 170 represents a value equal at 1.70 mm (.0669 in). If a shim 160 was required, its value would be 1.60 mm (.0630 in).

In accordance with the appropriate table, you need a shim number 140.

Assembly

The assembly of gearbox is essentially the reverse of disassembly procedure. However, pay attention to the following details.

Bearing Installation in Housing

Unless otherwise instructed, never use hammer to install ball bearings or needle bearings. Use press machine only.

If necessary heat housings up to 100°C (212°F) before installing ball bearings or needle bearings.

⚠ WARNING

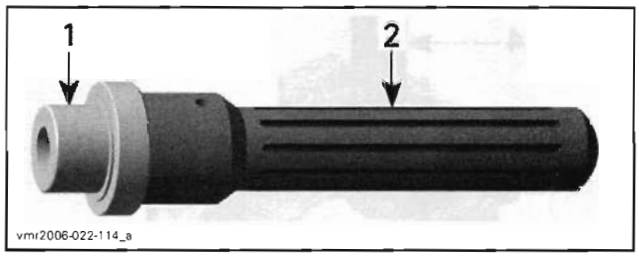
Clean oil, outside and inside, from housing before heating.

Place new bearing in freezer for 10 minutes before installation.

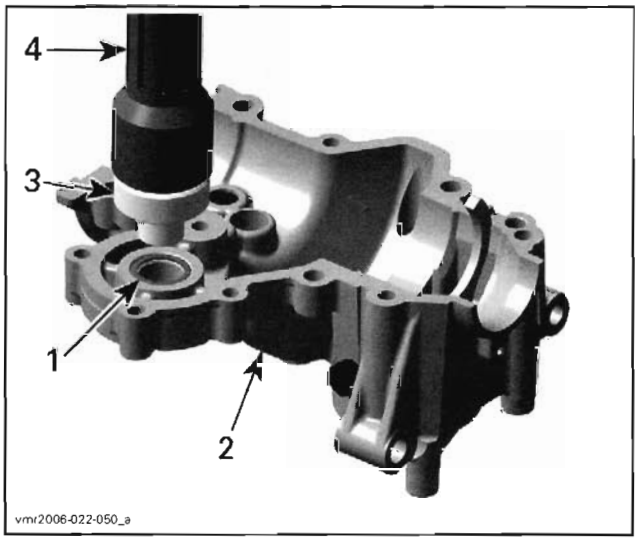
Use a suitable installer for installing ball bearings of countershaft and bevel gear.

NOTE: Place gearbox housings on a wood stand before installing bearings **no. 34** and **no. 36**.

Install countershaft needle bearing **no. 33** with the main shaft needle bearing installer (P/N 529 035 762) and the installer handle (P/N 420 877 650) in right housing.

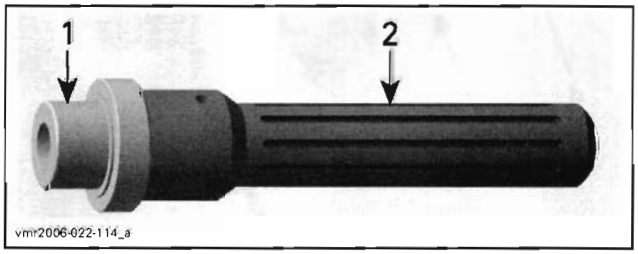


1. Needle bearing installer
2. Installer handle

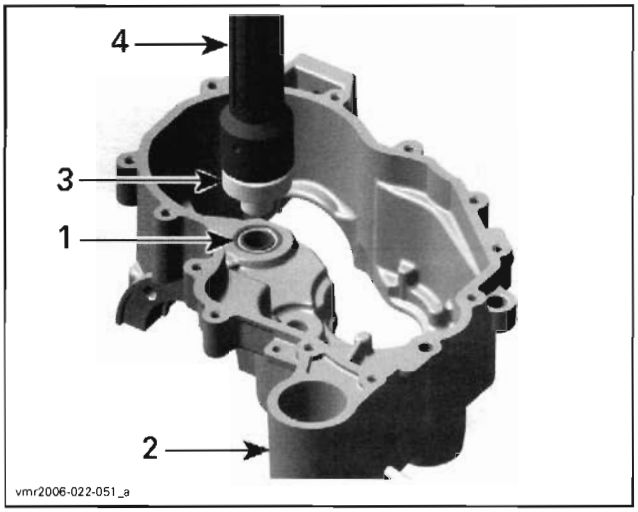


1. Countershaft needle bearing
2. Right housing
3. Needle bearing installer
4. Installer handle

Install bevel gear needle bearing **no. 35** using the bevel gear needle bearing installer (P/N 529 035 763) and the installer handle (P/N 420 877 650).



1. Needle bearing installer
2. Installer handle



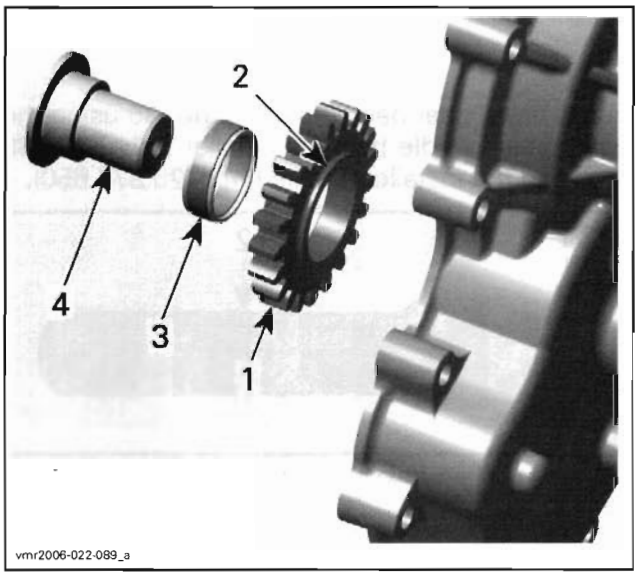
1. *Bevel gear needle bearing*
2. *Center housing*
3. *Needle bearing installer*
4. *Installer handle*

Install new oil seals with the proper installer (refer to *OIL SEALS* above).

Other Gearbox Components

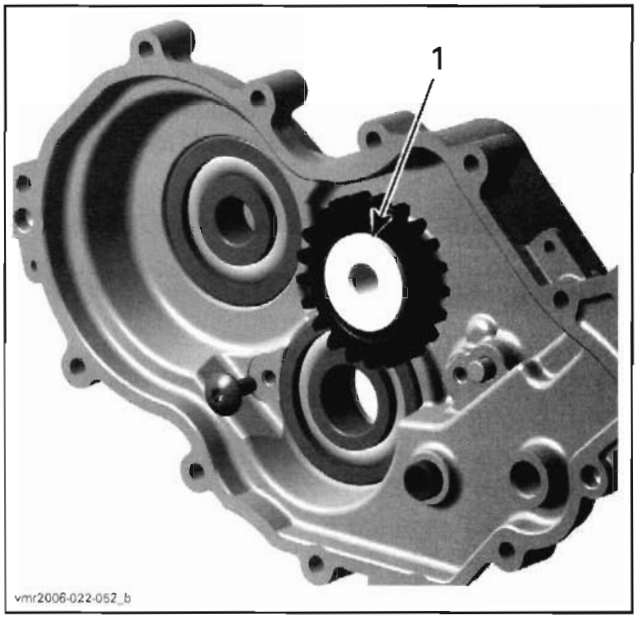
Fit intermediate gear **no. 23** with needle bearing **no. 22** on intermediate gear shaft **no. 21**.

NOTE: Fit gear with collar to housing side on the intermediate shaft.



1. *Intermediate gear*
2. *Collar facing housing*
3. *Needle bearing*
4. *Intermediate gear shaft*

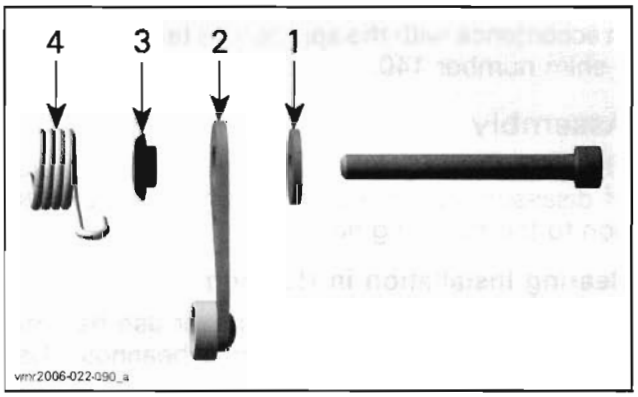
Press intermediate gear shaft in the left housing.



1. *Intermediate gear shaft*

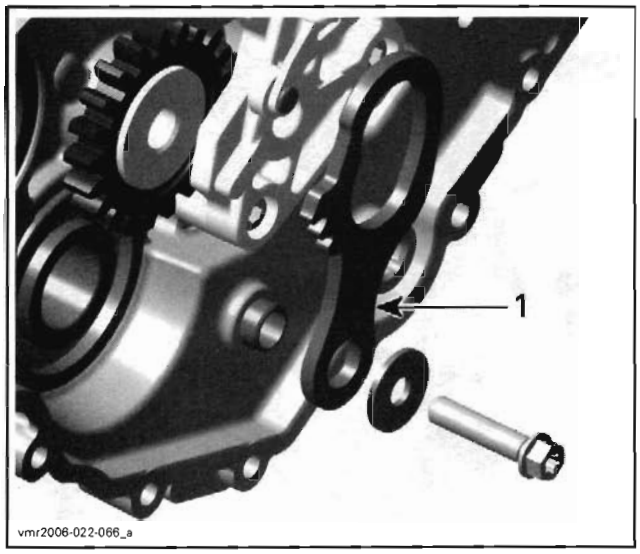
Fit support flange **no. 37** in the left housing and install index lever.

NOTE: Fit step ring into index lever.



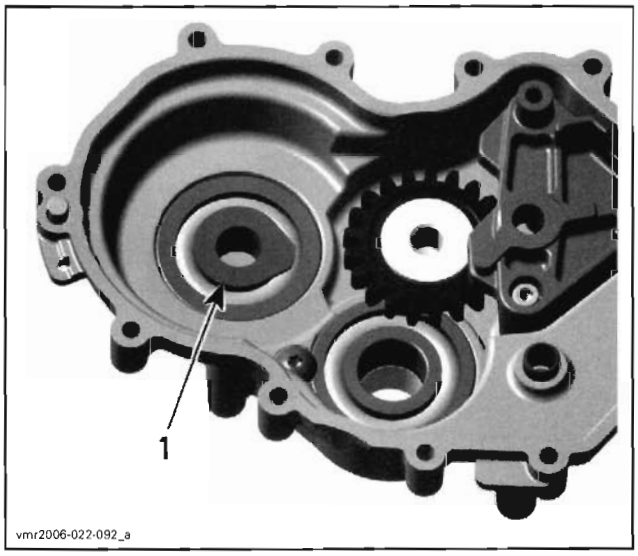
1. *Shim*
2. *Index lever*
3. *Step ring*
4. *Index spring*

Install parking lock lever, teeth showing to countershaft.



1. Parking lock lever

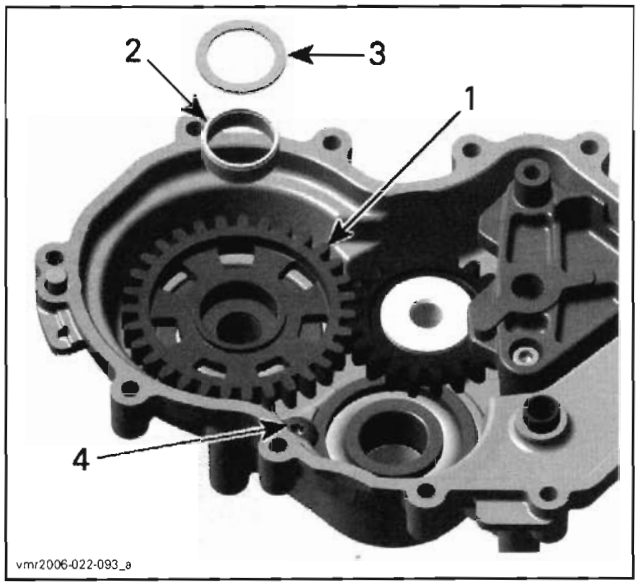
Place thrust washer CVT side on bearing.



1. Thrust washer CVT side

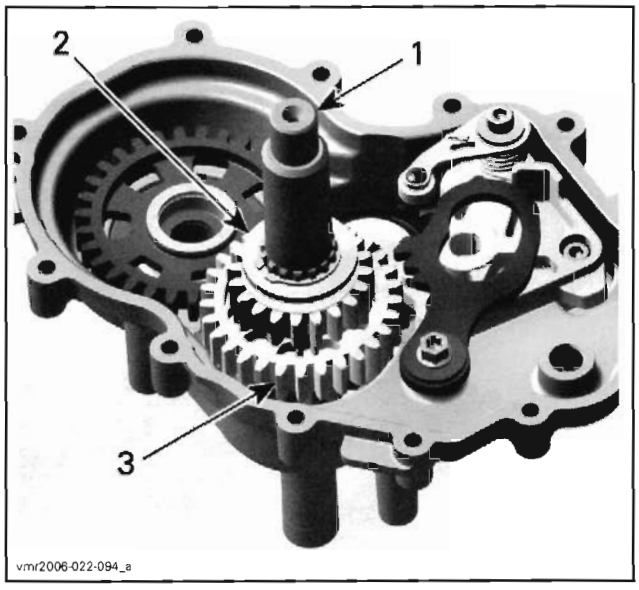
Place reverse gear with needle bearing and thrust washer.

NOTE: Check if the screw to secure countershaft bearing is installed.



1. Reverse gear
2. Needle bearing
3. Thrust washer
4. Countershaft bearing screw

Install countershaft with low gear and high gear assembly.

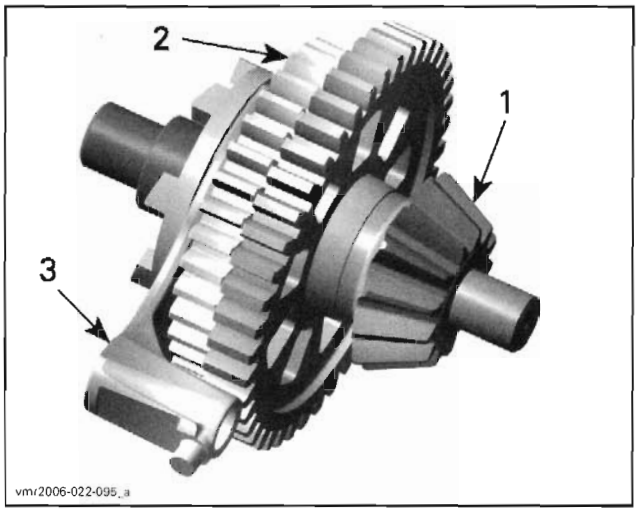


1. Countershaft
2. Low gear
3. High gear

Install a new shim **no. 17** onto bevel gear shaft, fork side.

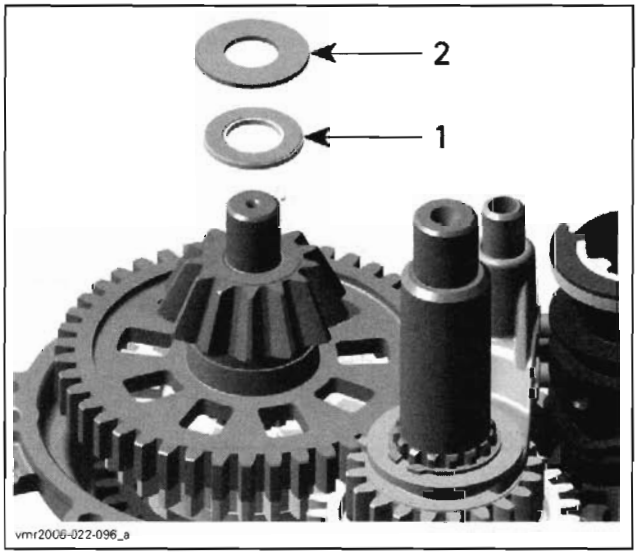
Install bevel gear with sliding gear assembly together with shift fork.

NOTE: If a new bevel gear and output shaft are used, it is necessary to verify the shim adjustment prior to finalize assembly. Refer to *BEVEL GEAR ADJUSTMENT* in *ADJUSTMENT*. If the existing bevel gear is used, it is mandatory to use a new shim **no. 17** with the same thickness, a new needle bearing **no. 12** and thrust washer **no. 13**.



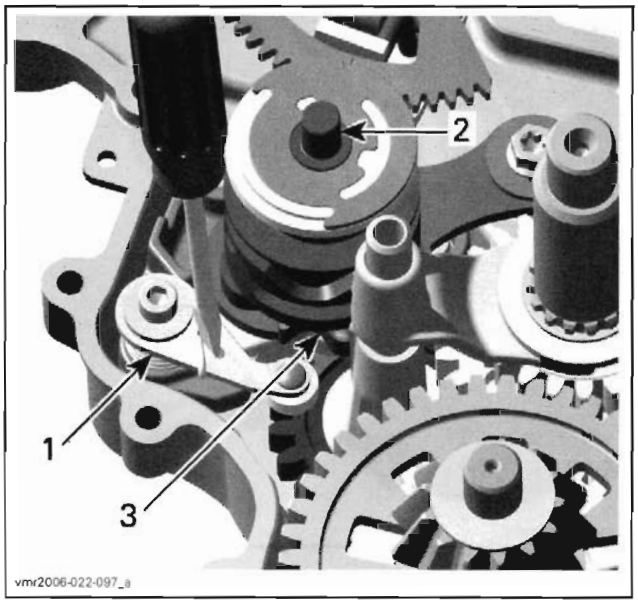
1. Bevel gear
2. Sliding gear
3. Shift fork

Install a new needle bearing and thrust washer.

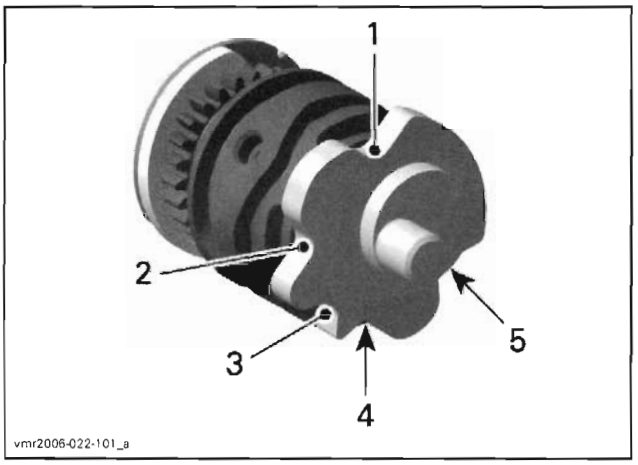


1. Needle bearing
2. Thrust washer

Insert a flat screwdriver in the slot of the index lever, turn screwdriver clockwise and install shift drum on neutral position as per following illustration.



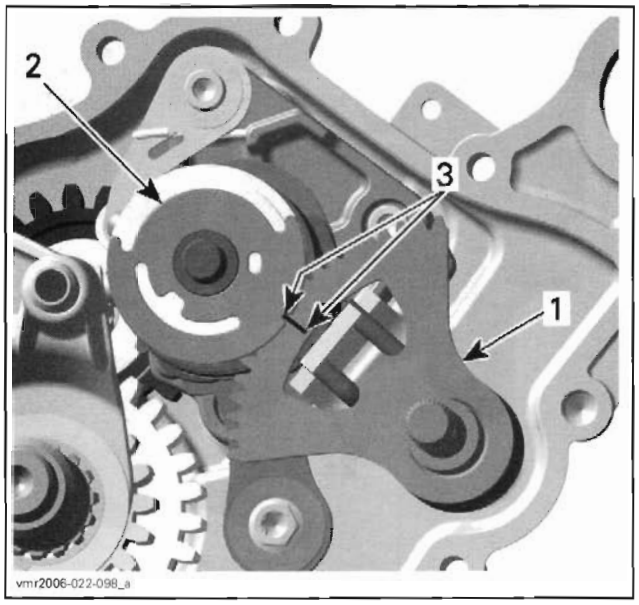
1. Index lever
2. Shift drum
3. Neutral position



1. Parking stop location
2. Reverse stop location
3. Neutral stop location
4. High gear stop location
5. Low gear stop location

Install shift shaft assembly.

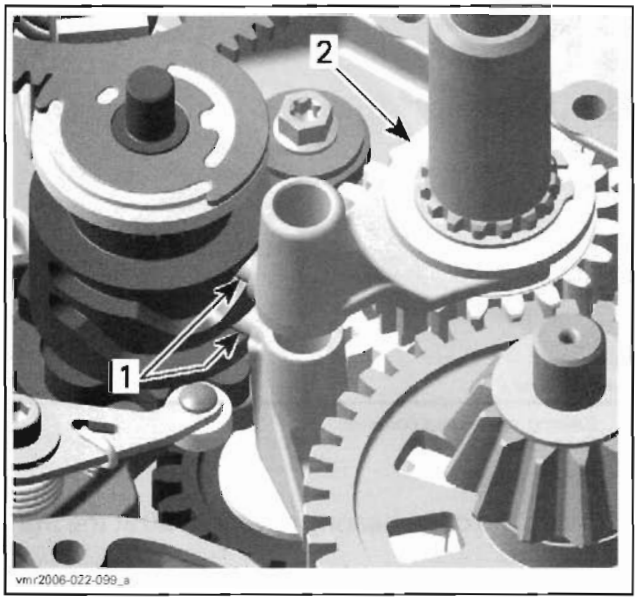
NOTE: Marks on shift drum/isolating washer and shift shaft must align.



1. Shift shaft assembly
2. Isolating washer
3. Marks

Install shift fork **no. 25** then engage both shift fork pins in their corresponding groove on the shift drum.

NOTE: Move sliding gears to facilitate engagement of pins inside grooves.



1. Shift fork pins
2. Sliding gear

Install shift fork shaft **no. 24**.

NOTE: Run all gears as a final function check before installing center housing.

Now, close the housings by doing the following:

Clean all metal components in a solvent.

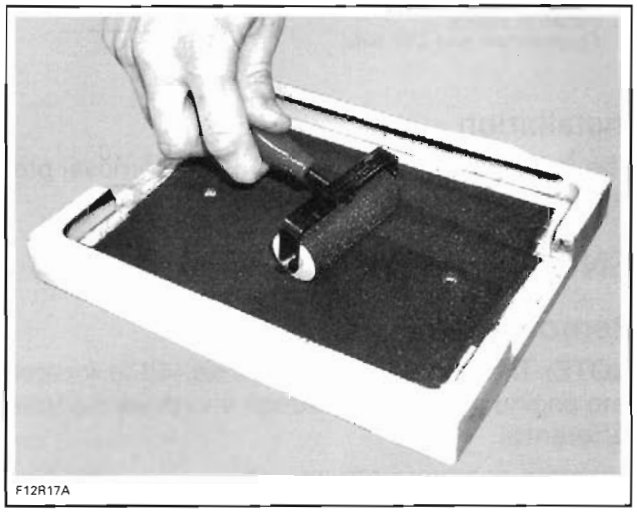
Gearbox housing mating surfaces are best cleaned using a combination of Loctite chisel (P/N 413 708 500) and a brass brush. Brush a first pass in one direction then make the final brushing perpendicularly (90°) to the first pass cross (hatch).

CAUTION: Do not wipe with rags. Use a new clean hand towel only.

IMPORTANT: When beginning the application of the gear housing sealant, the assembly and the first torquing should be done within 10 minutes. It is suggested to have all you need on hand to save time.

Use Loctite 5910 (P/N 293 800 081) on mating surfaces.

Use a plexiglass plate and apply some sealant on it. Use a soft rubber roller (50 - 75 mm (2 - 3 in)), available in arts products suppliers for printing, and roll the sealant to get a thin uniform coat on the plate (spread as necessary). When ready, apply the sealant on gear housing mating surfaces.



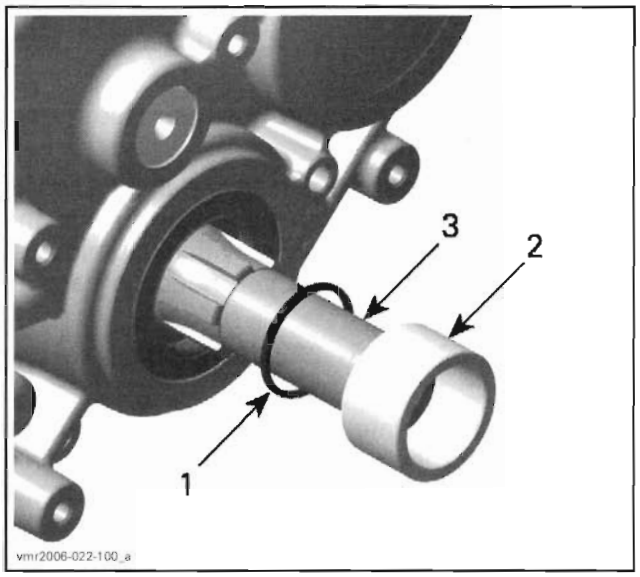
Do not apply in excess as it will spread out inside gear housing.

NOTE: It is recommended to apply this specific sealant as described here to get a uniform application without lumps. If you do not use the roller method, you may use your finger to uniformly distribute the sealant (using a finger will not affect the adhesion).

Hand-torqued gear housing screws in a crisscross sequence. Repeat procedure, retightening all screws to 10 N•m (89 lbf•**in**).

Install O-ring **no. 31** including distance sleeve **no. 32** on countershaft CVT side.

CAUTION: Place O-ring including distance sleeve right away. Chamfered bore of distance sleeve has to face the gearbox.



COUNTERSHAFT END CVT SIDE
1. *O-ring*
2. *Distance sleeve*
3. *Countershaft end CVT side*

Installation

The installation is the reverse of the removal procedure.

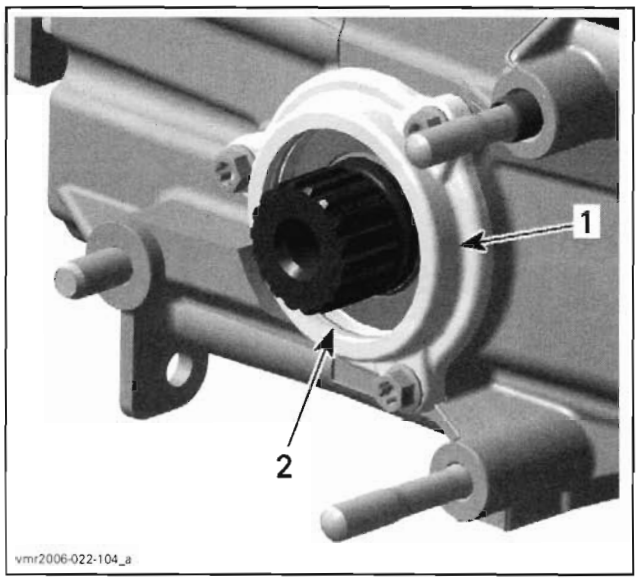
ENGINE DRIVE SHAFT

Removal

NOTE: The engine drive shaft **no. 48** is located into engine and comes through it to drive the front differential.

Separate gearbox from engine.

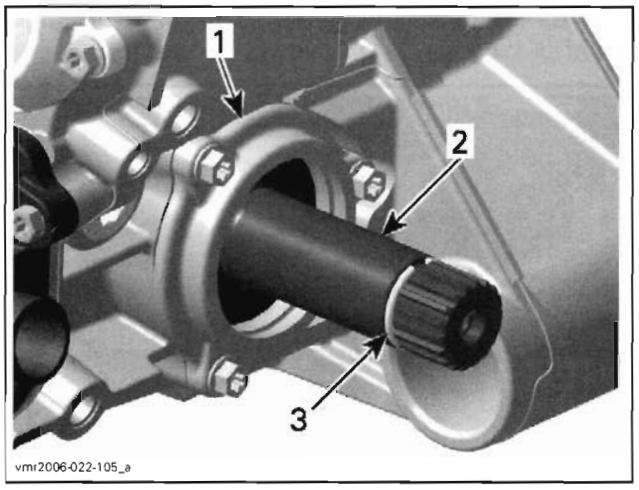
To the rear of engine, remove the bearing cover and its O-ring.



1. *Bearing cover*
2. *O-ring*

Pull out drive shaft **no. 48**.

CAUTION: Check ends of the circlip for sharp edges or burr before removing the drive shaft, to avoid damaging the oil seal.



1. *Bearing cover gearbox side*
2. *Drive shaft*
3. *Circlip*

Remove the other bearing cover **no. 50** at the front of engine.

Inspection

Replace oil seals **no. 51** and **no. 54** and/or O-ring **no. 55** if they are brittle, hard or damaged.

Check drive shaft bearings **no. 49** and **no. 52** behind each oil seal for contamination and/or metal shavings.

Check if drive shaft bearings turn freely and smoothly. Replace if necessary.

Check drive shaft for cracks, bend, pitting or other visible damages.

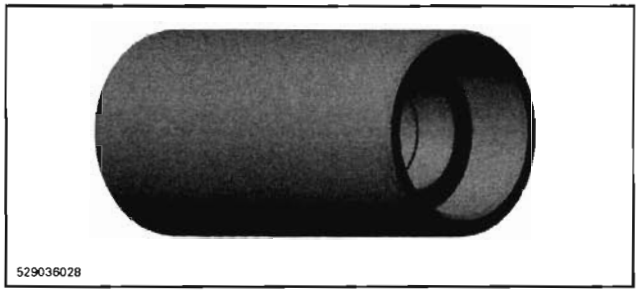
Check drive shaft splines for wear or damages.

Check oil seal running surface of the drive shaft for scratches. Replace if necessary.

Installation

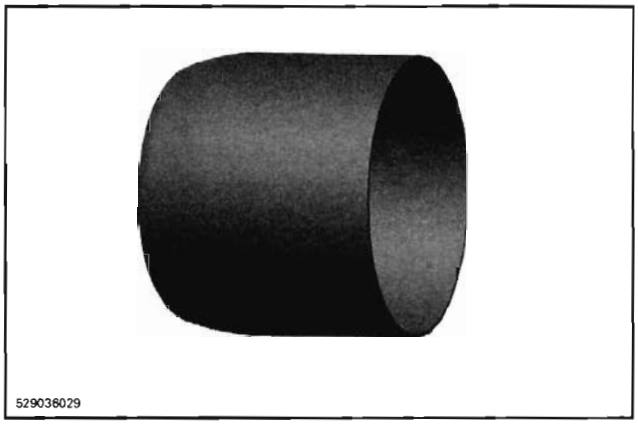
The installation is the reverse of removal procedure. Pay attention to the following details.

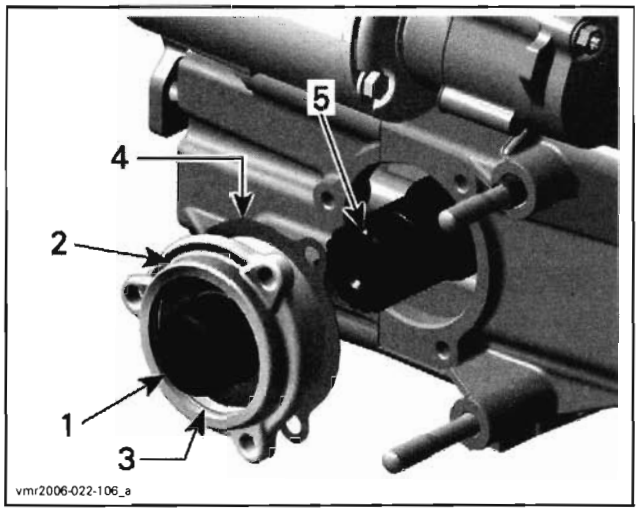
Install drive shaft oil seals **no. 51** and **no. 54** with the oil seal installer (P/N 529 036 028).



Use a suitable installer for installing bearings.

To install bearing cover **no. 53**, fit oil seal protection sleeve (P/N 529 036 029) into oil seal.





1. *Protection sleeve*
2. *Bearing cover*
3. *O-ring*
4. *Gasket*
5. *Drive shaft*

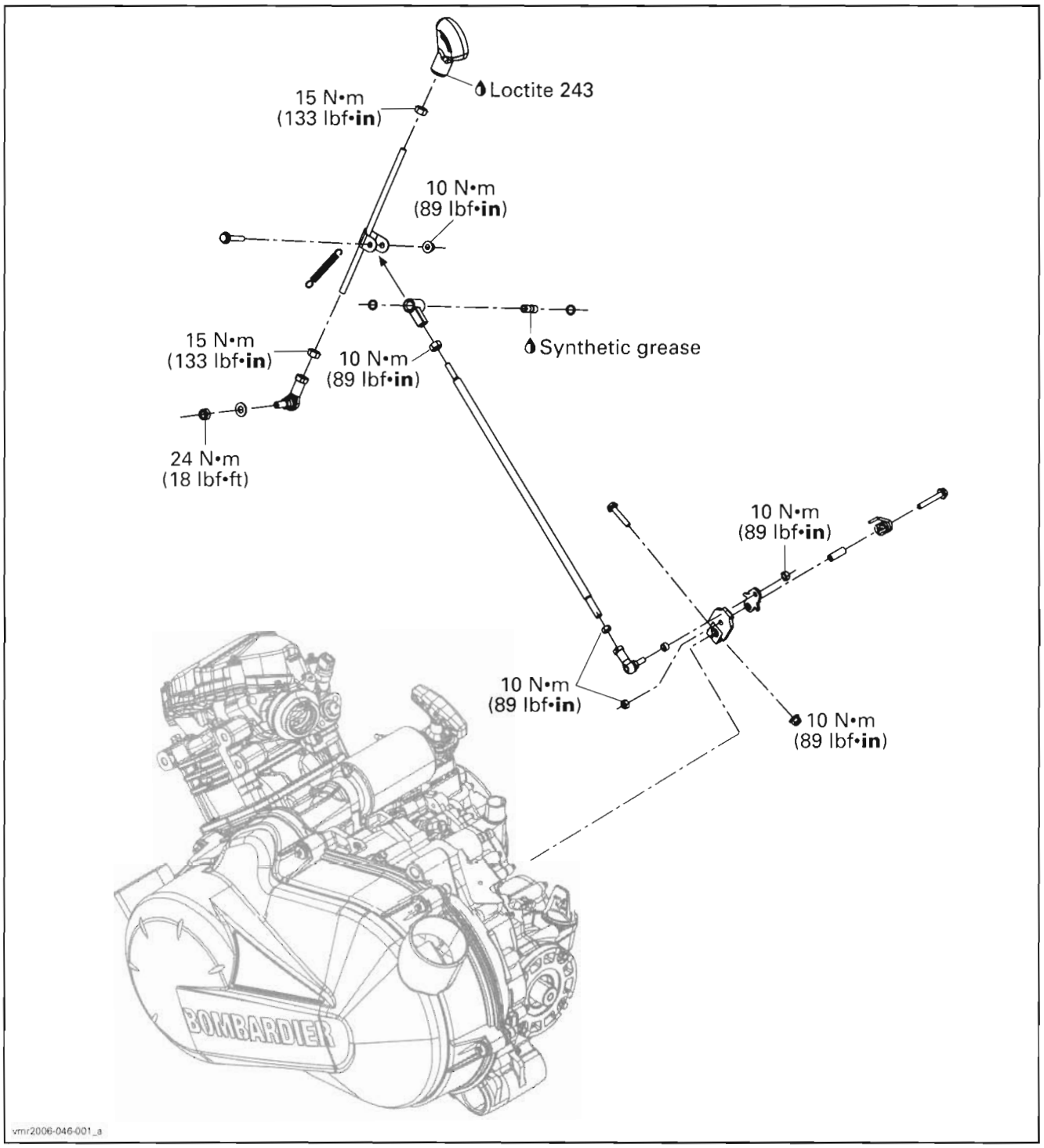
Install bearing cover then place the O-ring **no. 55** inside cover.

TRANSMISSION LINKAGE

SERVICE PRODUCTS

Description	Part Number	Page
Loctite 243 (blue)	293 800 060	325, 330
synthetic grease	293 550 010	326

OUTLANDER 400 SERIES



GENERAL

Before performing any servicing on the transmission linkage system, be sure the transmission lever is on NEUTRAL position and the parking brake is applied.

During assembly/installation, use the torque values and services products as in the exploded view.

Clean threads before applying a threadlocker. Refer to *SELF-LOCKING FASTENERS* and *LOCTITE APPLICATION* at the beginning of this manual for complete procedure.

⚠ WARNING

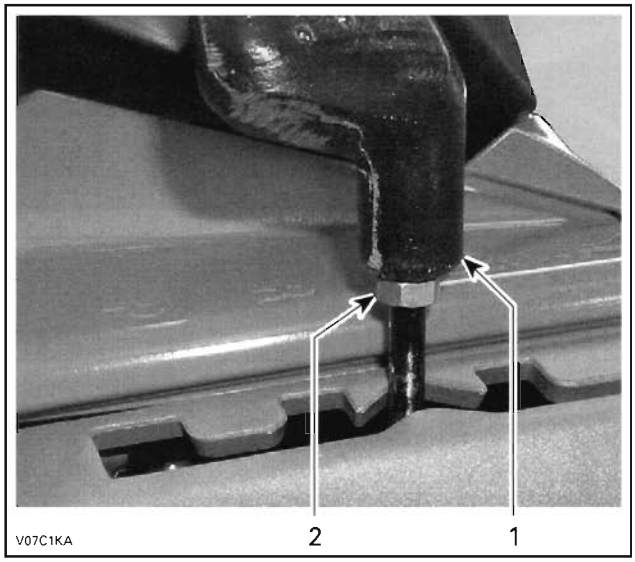
Torque wrench tightening specifications must strictly be adhered to.
Locking devices (e.g.: locking tabs, elastic stop nuts, self-locking fasteners, cotter pins, etc.) must be installed or replaced with new one where specified. If the efficiency of a locking device is impaired, it must be renewed.

PROCEDURES

TRANSMISSION LEVER HANDLE

Removal

Unscrew the nut under transmission lever handle.



1. *Transmission lever handle*
2. *Handle nut*

Unscrew transmission lever handle.

Installation

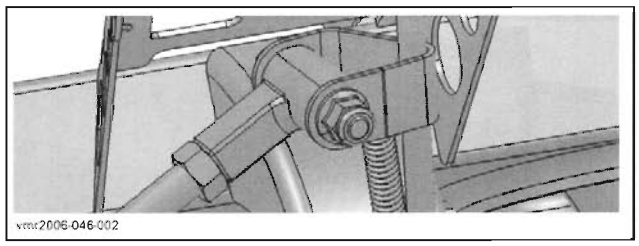
The installation is the reverse of removal procedure.

Apply Loctite 243 (blue) (P/N 293 800 060) on transmission lever threads then screw the transmission lever handle completely. Lock it by torquing the handle nut to 15 N•m (133 lbf•**in**).

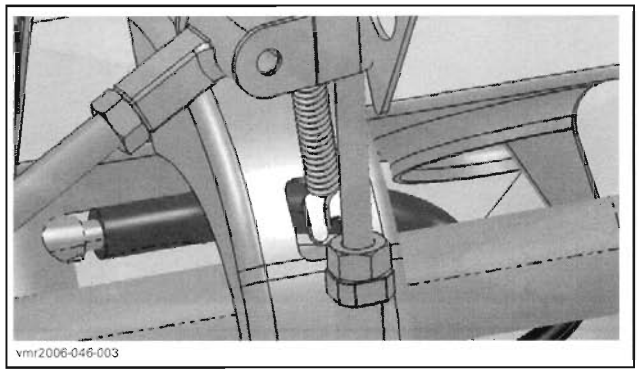
TRANSMISSION LEVER

Removal

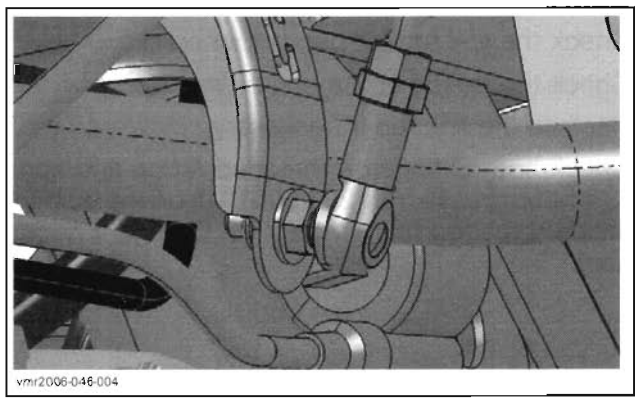
Remove:
- RH side panel (refer to *BODY*)
- transmission lever handle
- link rod bolt



- tension spring



- tie rod from bracket.



Then remove the transmission lever.

Inspection

Check the transmission lever for bending or cracks.

Check the tie-rod at the end of lever.

Replace the lever or the tie-rod if necessary.

Installation

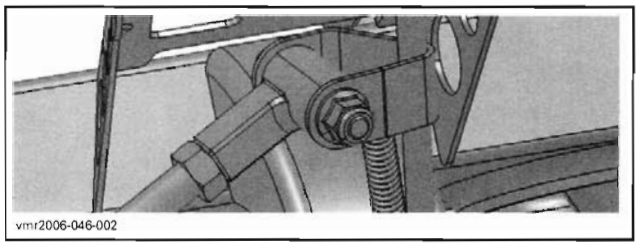
For installation, reverse the removal procedure.

LINK ROD

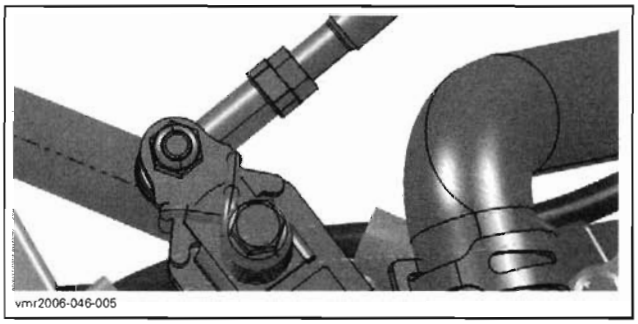
Removal

Remove:

- RH side panel (refer to *BODY*)
- link rod bolt



- link rod from shifting plate.



Remove the link rod.

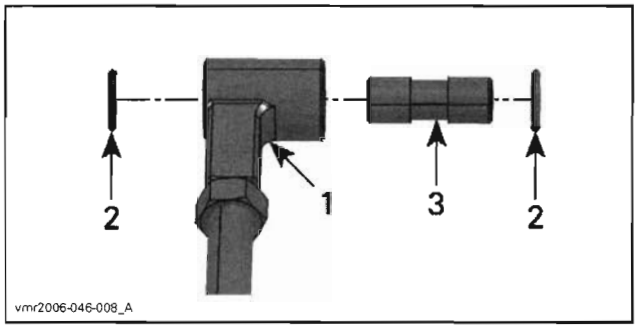
Inspection

Check the link rod for bending or cracks.

Check the tie-rod at the end of link rod.

Replace the link rod if necessary.

Check both O-rings on threaded fitting and apply synthetic grease (P/N 293 550 010) on the bushing inside threaded fitting. Replace O-rings if necessary.



1. Threaded fitting
2. O-rings
3. Bushing

Installation

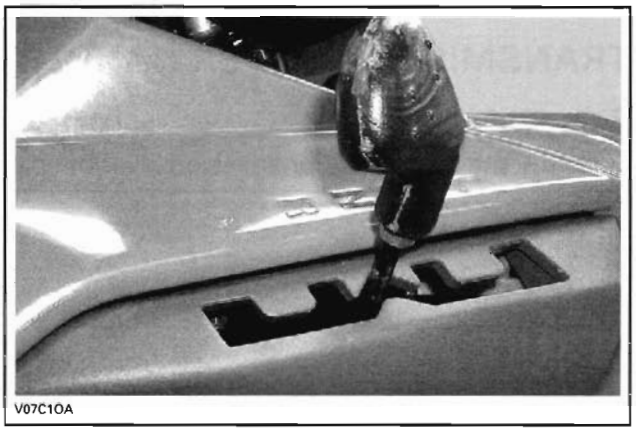
For installation, reverse the removal procedure. However, pay attention to the following details.

NOTE: The engine must be engaged on NEUTRAL before working on shifting system.

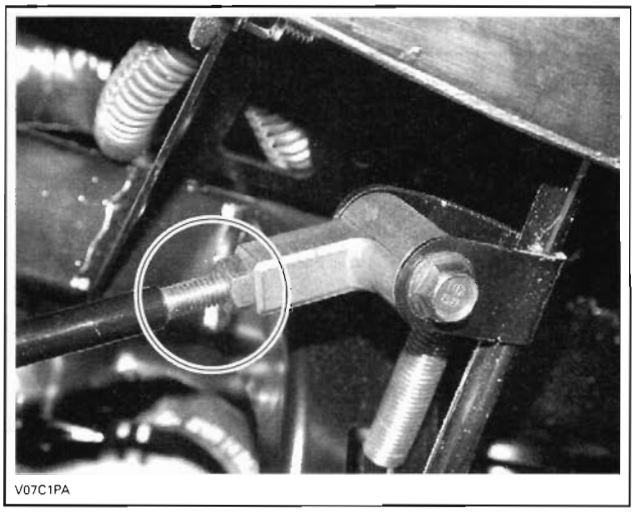
Place the transmission lever on NEUTRAL position.

Install link rod.

Adjust the link rod so that the transmission lever is located in the middle of NEUTRAL slot.



Torque jam nuts.



ONE NUT ON BOTH SIDES OF LINK ROD

Verify if the transmission lever moves into the PARK and LOW slots.

Install the side panel and test drive to confirm all is working well.

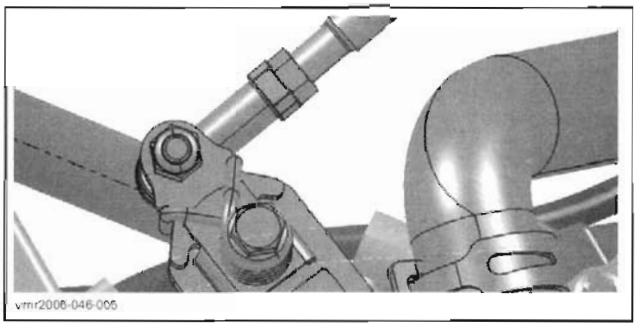
SHIFTING PLATE

Removal

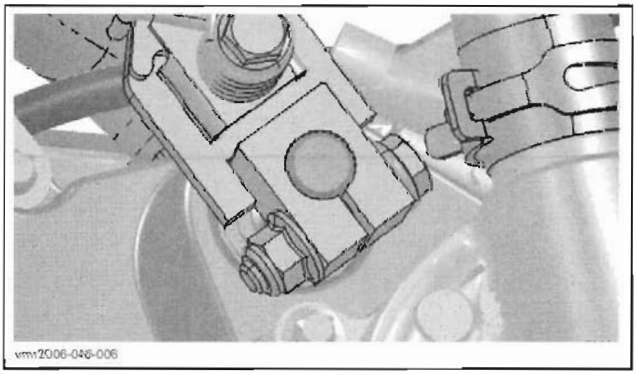
Remove the RH side panel (refer to *BODY*).

Remove the following:

– link rod from shifting plate



– shifting plate bolt.



Remove the shifting plate.

NOTE: Mark the location of shifting plate before removing it from shift shaft.

Inspection

Check shifting plate for cracks, bending or other damages. Replace if necessary.

Installation

Align shifting plate mark with shift shaft mark or if no marks are visible (new parts), turn ignition key ON and check if the NEUTRAL light is on.

NOTE: The engine must be engaged on NEUTRAL to perform the following procedure.

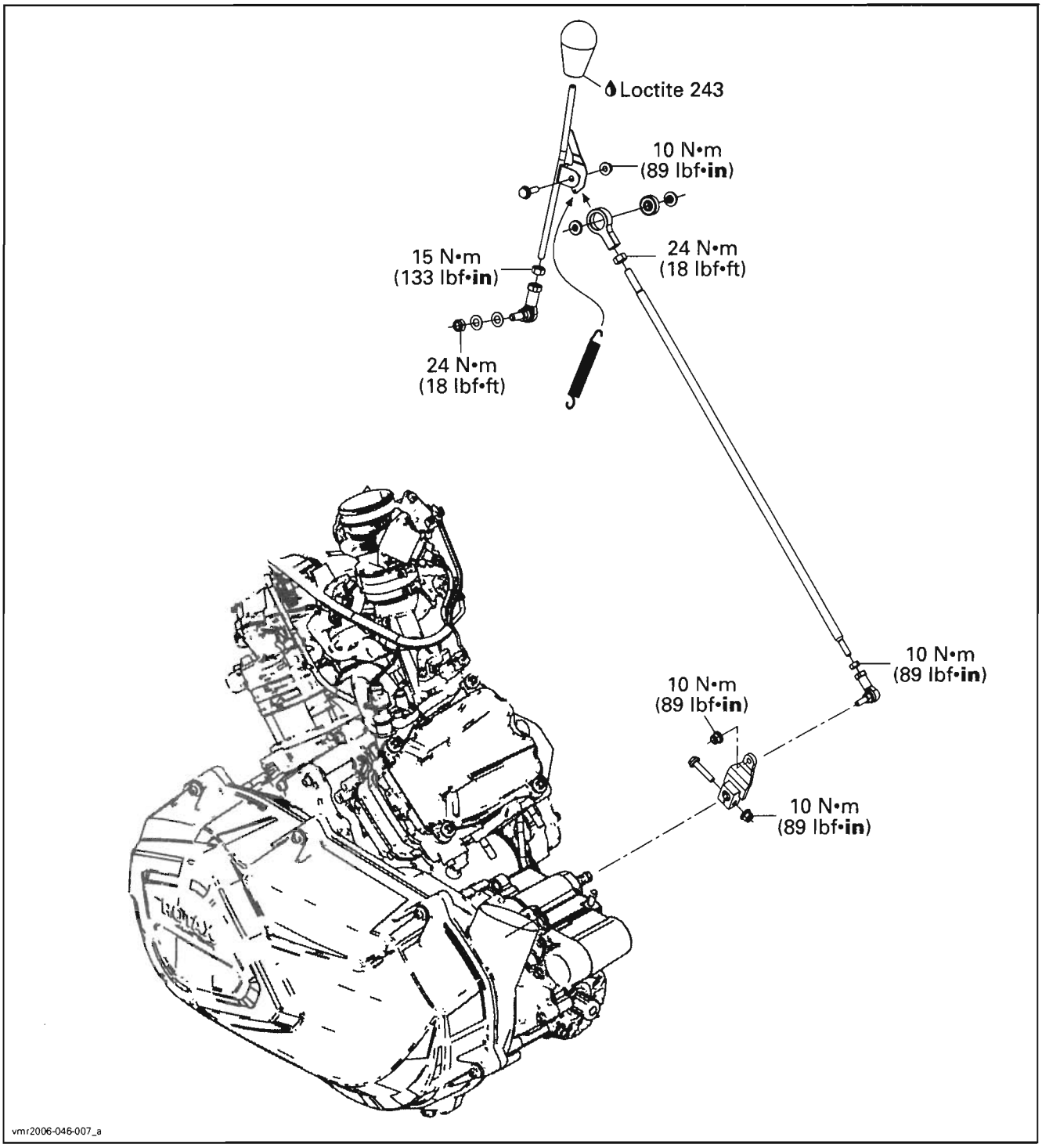
Align the shifting plate slot with the location without splines on shift shaft.

Install the shifting plate bolt.

Install link rod and adjust it (refer to *LINK ROD* above).

Install side panel and check if the system works well.

OUTLANDER 800 SERIES



GENERAL

Before performing any servicing on the transmission linkage system, be sure the transmission lever is on NEUTRAL position and the parking brake is applied.

During assembly/installation, use the torque values and services products as in the exploded view.

Clean threads before applying a threadlocker. Refer to *SELF-LOCKING FASTENERS* and *LOCTITE APPLICATION* at the beginning of this manual for complete procedure.

⚠ WARNING

Torque wrench tightening specifications must strictly be adhered to.
Locking devices (e.g.: locking tabs, elastic stop nuts, self-locking fasteners, cotter pins, etc.) must be installed or replaced with new one where specified. If the efficiency of a locking device is impaired, it must be renewed.

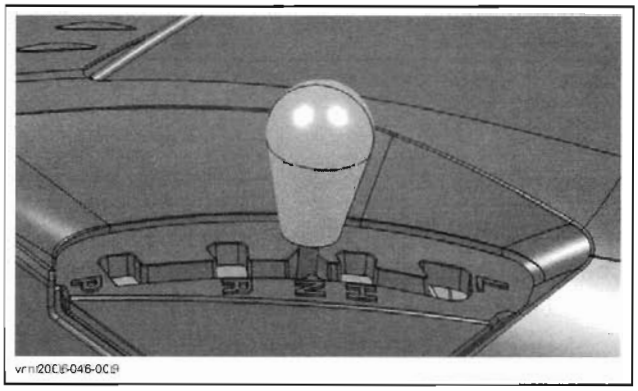
PROCEDURES

TRANSMISSION LEVER

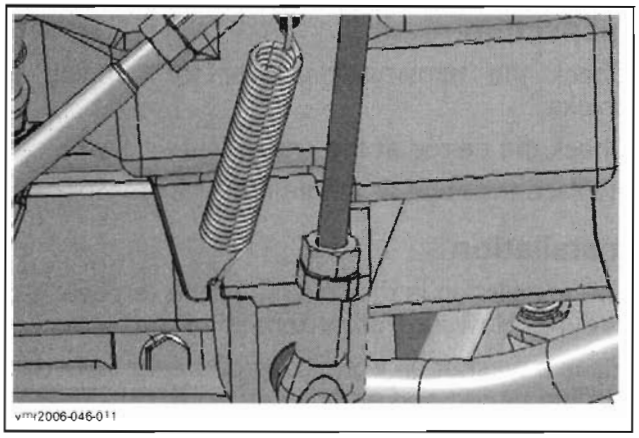
Removal

To remove the transmission lever, do the following:

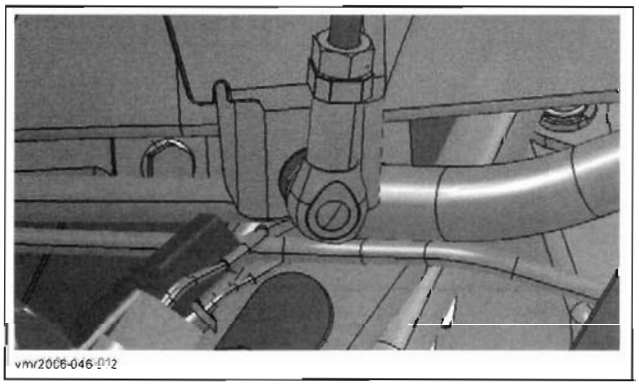
- Remove the RH side panel.
- Unscrew the transmission lever handle.



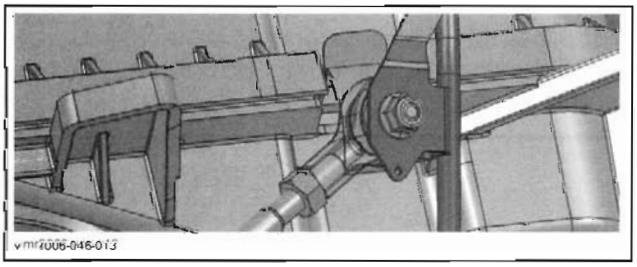
- Remove console.
- Detach tension spring from bracket.



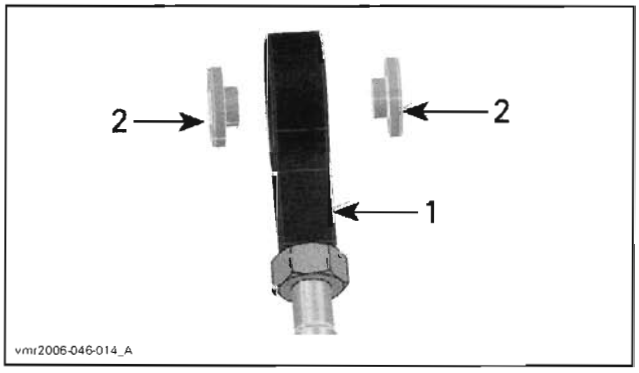
- Detach tie-rod end from bracket.



- Unscrew link rod bolt.



Pull link rod out of transmission lever bracket, pay attention not to loose bushings located each side of link rod anchor.



1. *Link rod anchor*
2. *Bushings*

Inspection

Check the transmission lever for bending or cracks.

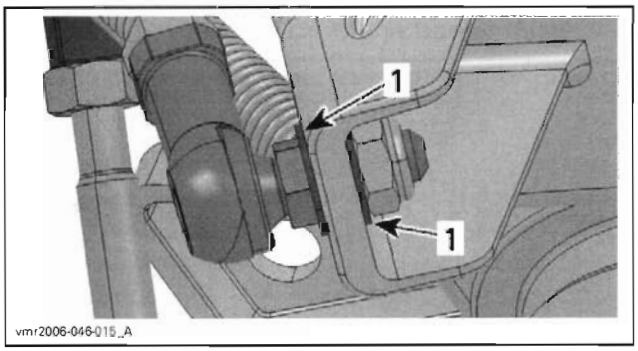
Check the tie-rod at the end of lever.

Replace the lever or the tie-rod if necessary.

Installation

The installation is the reverse of the removal procedure. However, pay attention to the following.

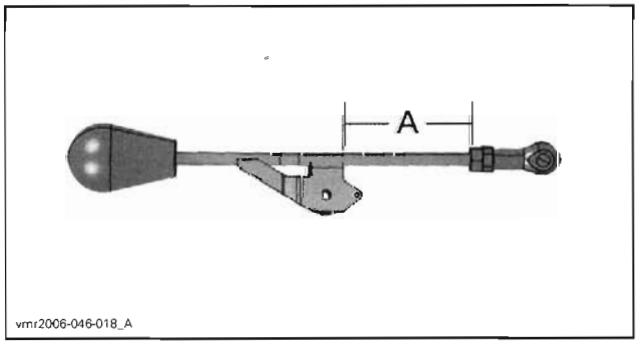
Place a washer on both sides of bracket when installing tie-rod end on bracket.



1. Washers

Apply Loctite 243 (blue) (P/N 293 800 060) on transmission lever threads before installing the handle.

If the tie-rod end replacement is necessary, use the following illustration to position the tie-rod properly.



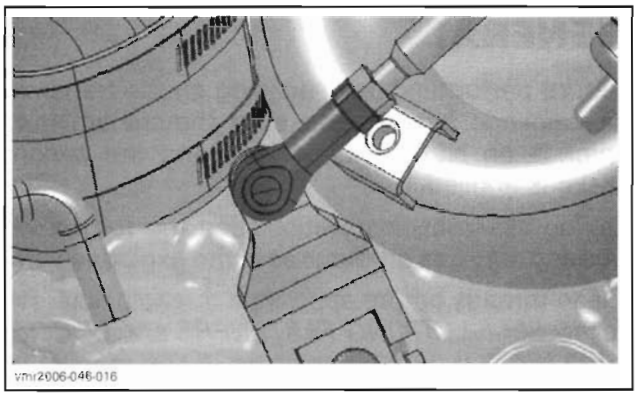
A. 75 mm ± 1 mm (2.95 in ± .039 in)

LINK ROD

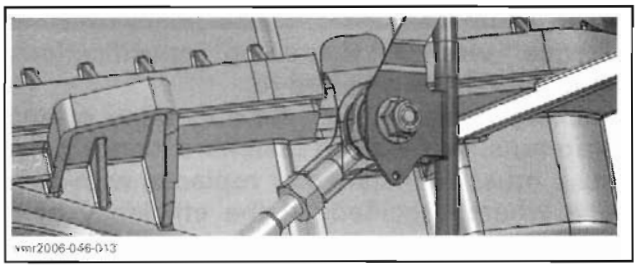
Removal

Remove RH side panel and rear engine cover.

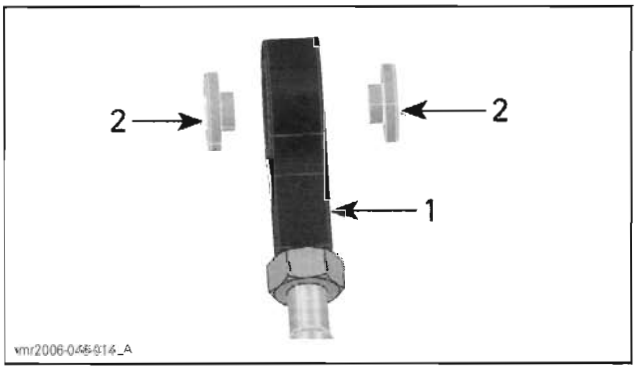
Remove link rod from shifting plate.



At the other end of link rod, unscrew link rod bolt.



Pull link rod out of transmission lever bracket, pay attention not to loose bushings located each side of link rod anchor.

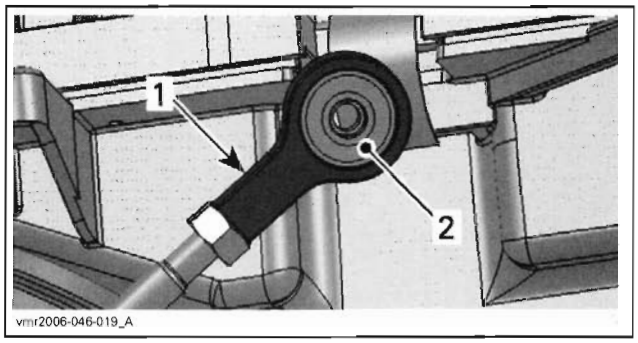


1. Link rod anchor
2. Bushings

Inspection

Check link rod for bending or cracks.

Check ball bearing in link rod anchor. The bearing should turn smoothly and freely.



1. Link rod anchor
2. Ball bearing

Check tie-rod end for wear and excessive play.

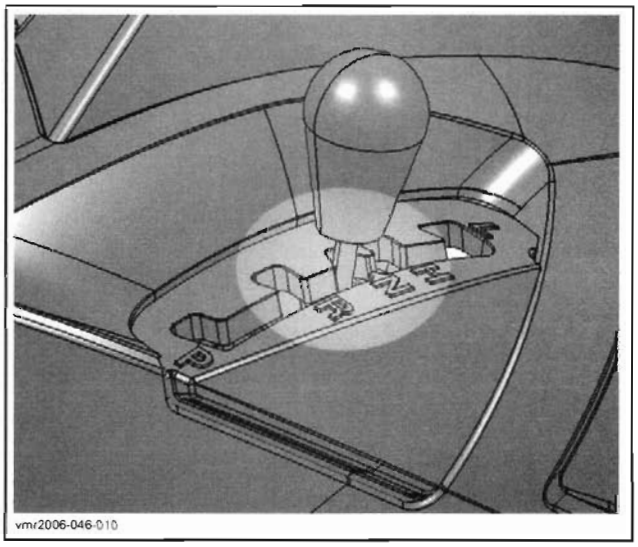
Replace all defective parts.

Installation

If no new parts are installed, reverse the removal procedure.

If a new link rod, link rod anchor or a new tie-rod end is installed, do the following:

- Screw the tie-rod end and the link rod anchor completely on the link rod.
- Install the tie-rod end on shifting plate and link rod anchor on transmission lever.
- Be sure gearbox is engaged on NEUTRAL position.
- Turn link rod until the transmission lever is located in the middle of the NEUTRAL slot.

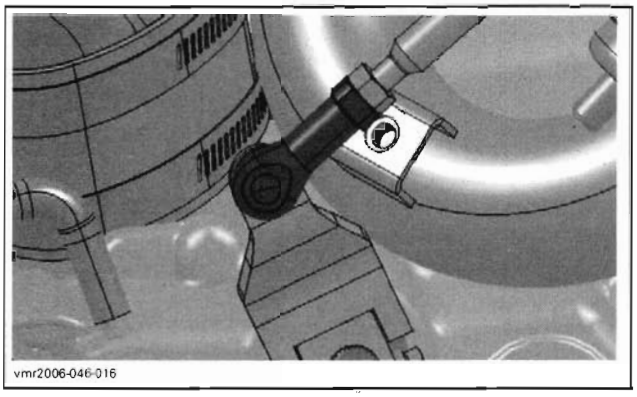


- Torque jam nuts, one on both ends of link rod.
- Verify if the transmission lever moves into the PARK and LOW slots. If not, the gearbox was not engaged on NEUTRAL. Place gearbox on NEUTRAL position and redo the procedure.
- Install removed parts and test drive to confirm all is working well.

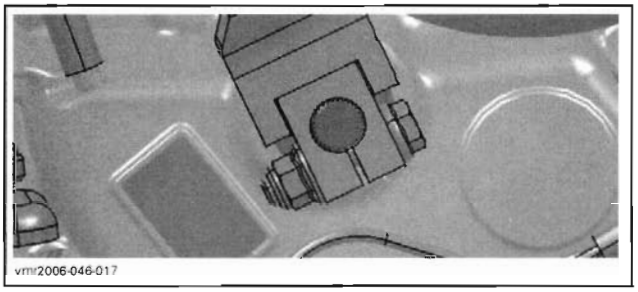
SHIFTING PLATE

Removal

Remove link rod from shifting plate.



Remove shifting plate bolt.



NOTE: Mark the location of shifting plate before removing it from shift shaft.

Inspection

Check shifting plate for cracks, bending or other damages. Replace if necessary.

Installation

The installation is the reverse of the removal procedure. However, pay attention to the following.

Be sure the gearbox is engaged on NEUTRAL before performing this procedure.

Align shifting plate mark with shift shaft mark. If new parts are used, align shifting plate slot with the shift shaft location without splines.

Install all removed parts and test drive to confirm all is working well.

4X4 COUPLING UNIT

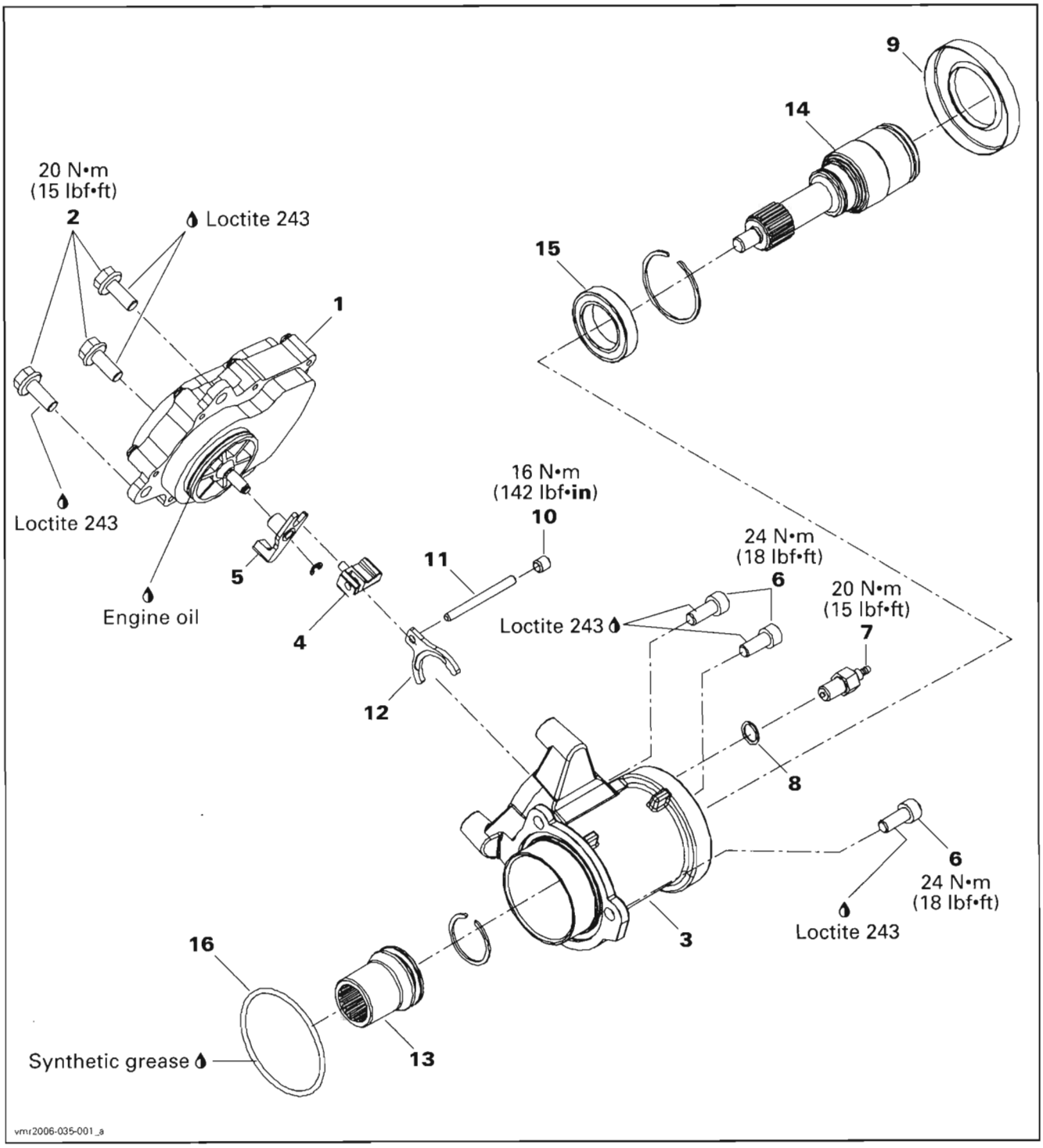
SERVICE TOOLS

Description	Part Number	Page
multimeter FLUKE 111	529 035 868	335–336

SERVICE PRODUCTS

Description	Part Number	Page
Loctite 243 (blue)	293 800 060	336
synthetic grease	293 550 010	341

OUTLANDER 400 SERIES



GENERAL

During assembly/installation, use the torque values and services products as in the exploded view(s).

Clean threads before applying a threadlocker. Refer to *SELF-LOCKING FASTENERS* and *LOCTITE APPLICATION* at the beginning of this manual for complete procedure.

⚠ WARNING

Torque wrench tightening specifications must strictly be adhered to.
Locking devices (e.g.: locking tabs, elastic stop nuts, 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.

PROCEDURES

NOTE: For the Outlander 800 Series, procedures for the 4 x 4 coupling unit are covered in the *GEARBOX AND 4X4 COUPLING UNIT* subsection.

ACTUATOR

Test

Remove LH inner fender.

Unplug disconnect unit connector.

Using the multimeter FLUKE 111 (P/N 529 035 868), check if the 2WD/4WD switch works properly.



529 035 868

- Turn ignition key ON.
- Select 2WD position, install the RED probe to the WHITE wire connector and the BLACK probe to the WHITE/BLACK wire connector. The obtained value should be 12 Vdc.
- Select 4WD position, install the RED probe to the WHITE/BLUE wire connector and the BLACK probe to the WHITE wire connector. The obtained value should be 12 Vdc.

If the selector is out of specifications, check wires, connectors and replace the selector if necessary.

If the selector is good, replace the actuator.

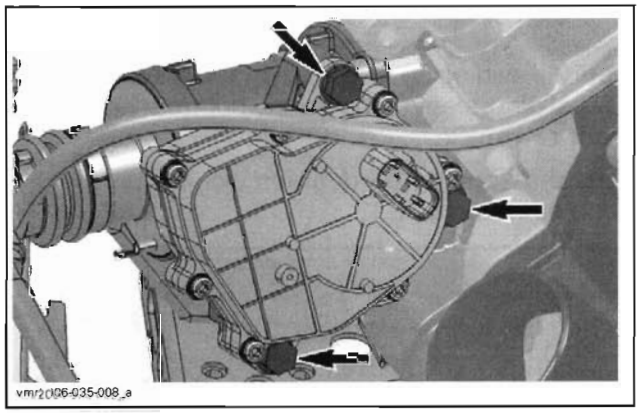
Removal

NOTE: Before beginning any servicing on the actuator, make sure the vehicle is in 2WD position.

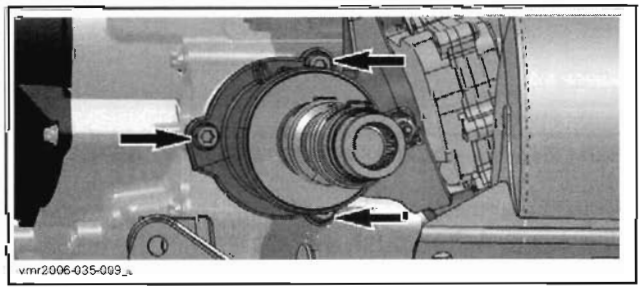
Remove the LH and RH footrests.

Unplug actuator connector.

Unscrew actuator bolts **no. 2**.



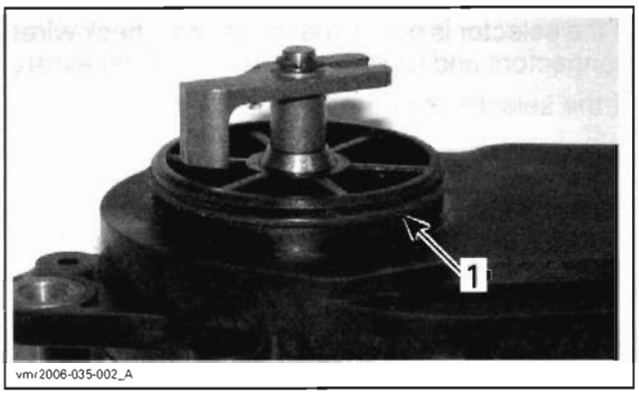
To reach the third bolt behind CVT housing, unscrew coupling unit housing **no. 3** from engine then rotate the actuator.



When all actuator bolts are removed, pull the actuator out of housing.

Installation

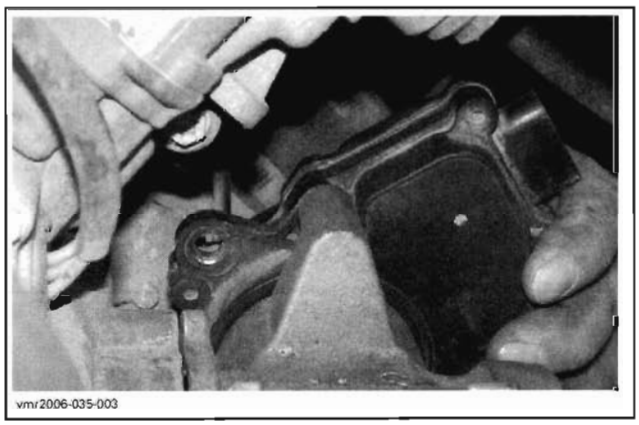
Apply a small amount of engine oil on actuator O-ring.



1. Actuator O-ring

Verify if sliding sleeve **no. 4** is in 2WD position. The sliding sleeve should be pointed toward the front of vehicle.

Turn the actuator 37 degrees clockwise from the mounting position.



FROM RH SIDE — ACTUATOR POSITIONS AT 37 DEGREES

Align the actuator fork **no. 5** with the dog on sliding sleeve **no. 4** then push the actuator in the housing.

Rotate the actuator counterclockwise until it orients itself to mounting position.

CAUTION: Do not cut or break the actuator O-ring.

Apply Loctite 243 (blue) (P/N 293 800 060) on actuator bolts then torque them to 20 N•m (15 lbf•**in**).

Apply Loctite 243 (blue) (P/N 293 800 060) on coupling unit housing bolts **no. 6** then torque them to 24 N•m (17 lbf•**in**).

Connect actuator.

Lift the front of vehicle until front wheels turn freely.

Try to turn the front propeller shaft. The shaft should turn easily.

Place ignition switch to ON position and select the 4WD position.

The front propeller shaft should not turn (the PARK position must be selected).

If the front propeller shaft turns, the actuator is not installed correctly. Remove actuator and reinstall it.

Install all other removed parts.

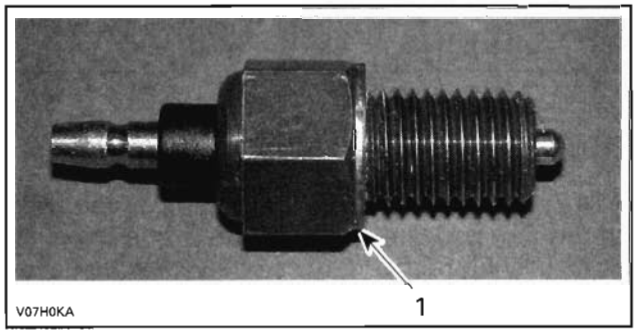
2WD/4WD SWITCH

Removal

Remove RH footrest.

Unplug the 2WD/4WD switch connector.

Unscrew the switch from coupling unit housing. Remove switch with its sealing ring.

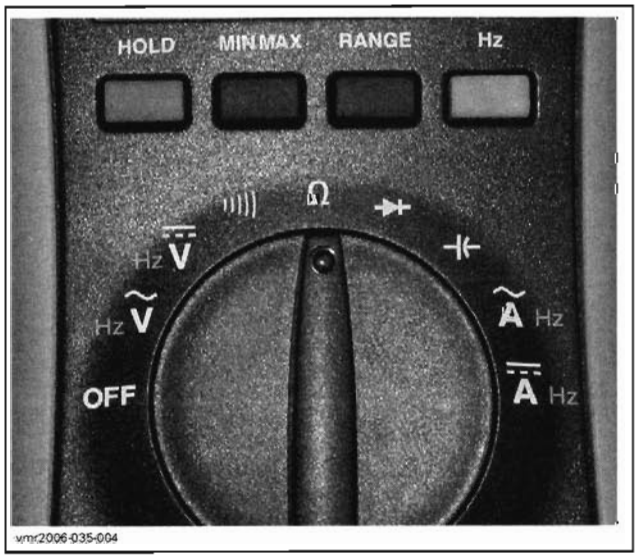


1. Sealing ring

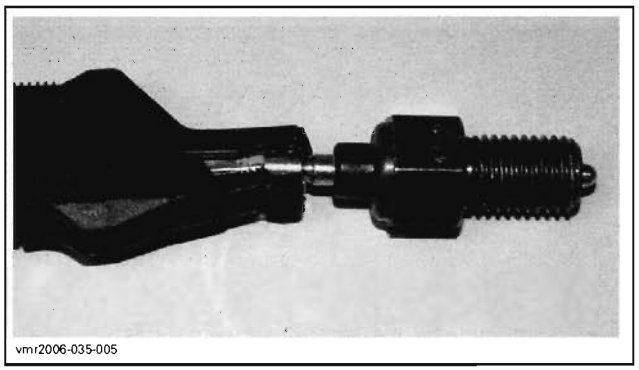
Test

Using the multimeter FLUKE 111 (P/N 529 035 868), do the following to check the switch.

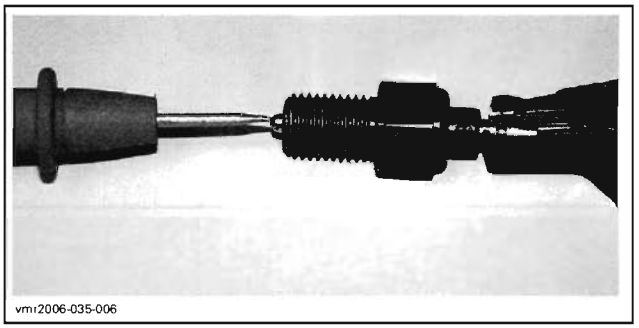
– Place the multimeter selector on Ω.



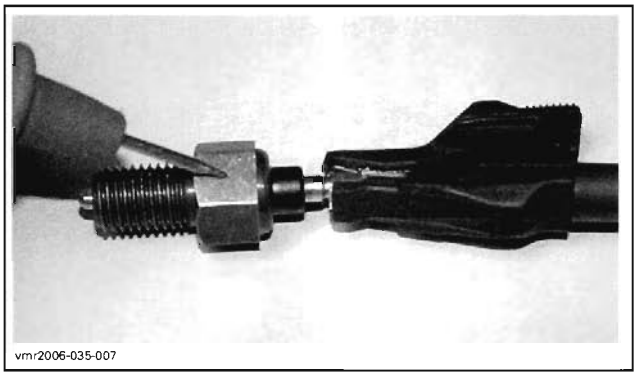
– Using an alligator clip, place the BLACK probe on the external pin.


vmr2006-035-005

– Touch the contact pin with the RED probe. The multimeter should indicate ±1Ω.


vmr2006-035-006

– Apply the RED probe on switch body. The measure should be O.L.


vmr2006-035-007

If switch is out of specifications, replace it.

Installation

The installation is the reverse of the removal procedure.

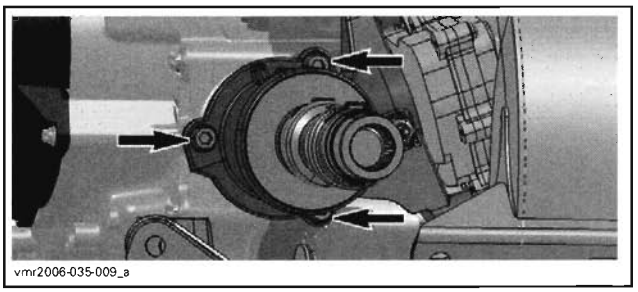
COUPLING UNIT

Removal

Remove front propeller shaft. Refer to *FRONT DRIVE*.

Unplug coupling unit connector and 2WD/4WD switch connector.

Unscrew bolts **no. 6** retaining the coupling unit housing **no. 3** to the engine.

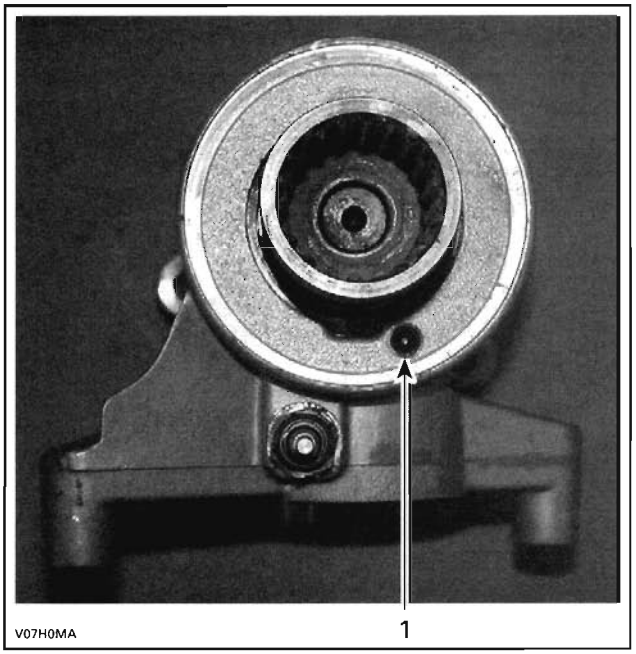

vmr2006-035-009_a

TYPICAL

Pull out the coupling unit.

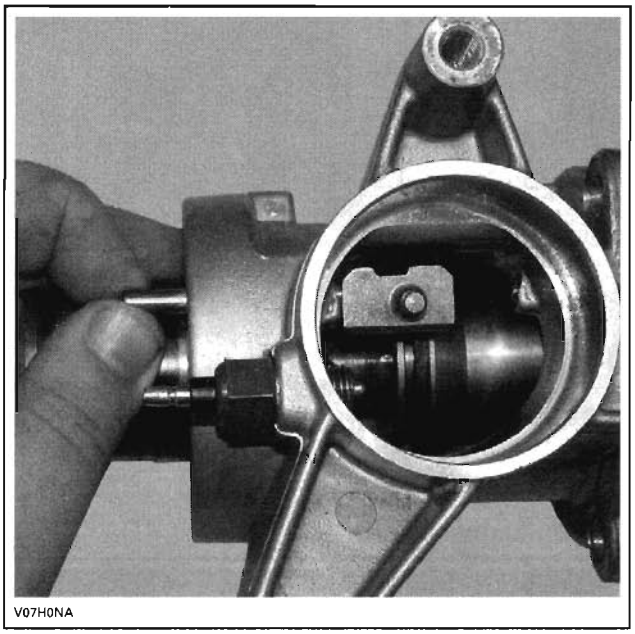
Disassembly

Remove:
– oil seal **no. 9**
– Allen screw **no. 10**

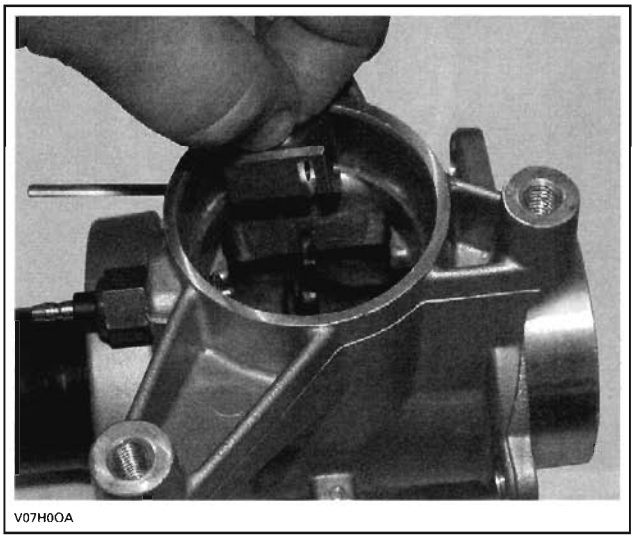


1. Allen screw

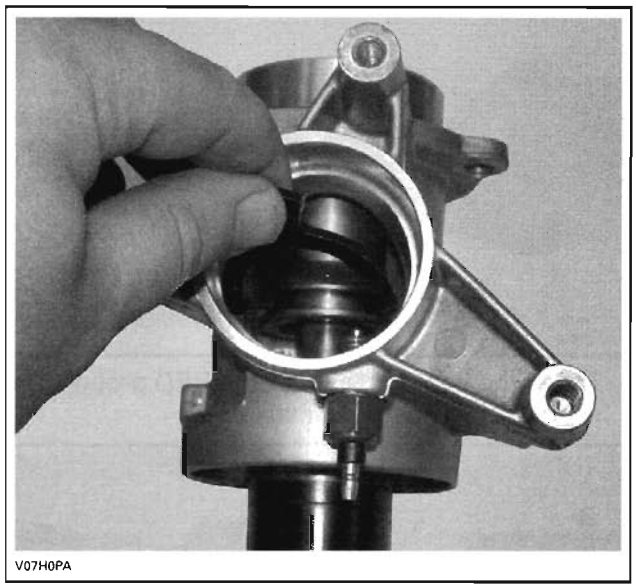
– pin **no. 11**


V07H0NA

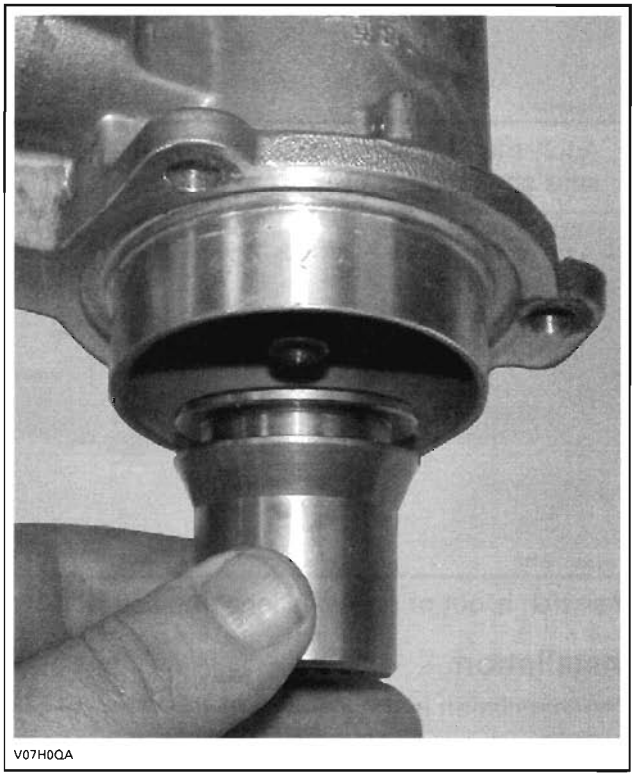
– sliding sleeve no. 4


V07H0OA

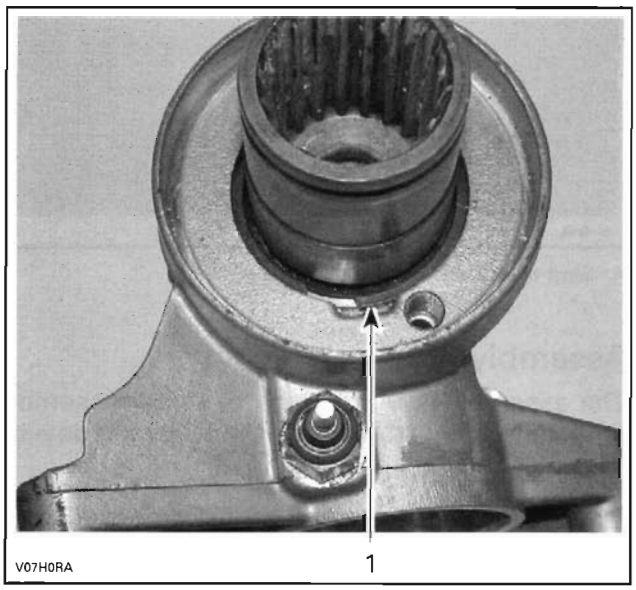
– shifter plate no. 12


V07H0PA

– coupling sleeve no. 13

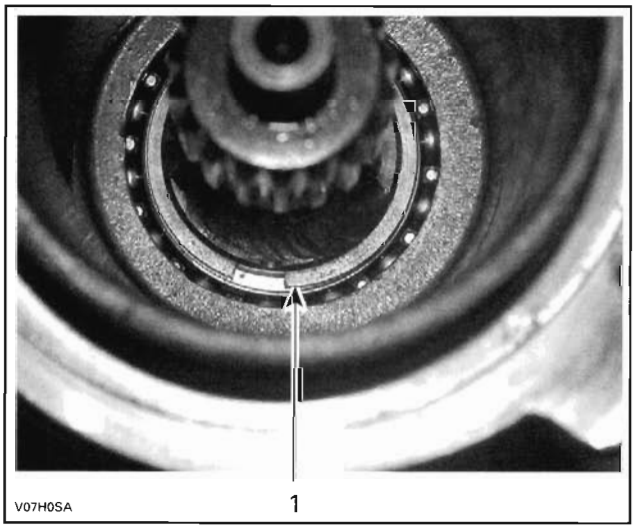

V07H0QA

– outer circlip



1. Outer circlip

– inner circlip



1. Inner circlip

– shaft **no. 14**.

Using a suitable puller, remove the ball bearing **no. 15**.

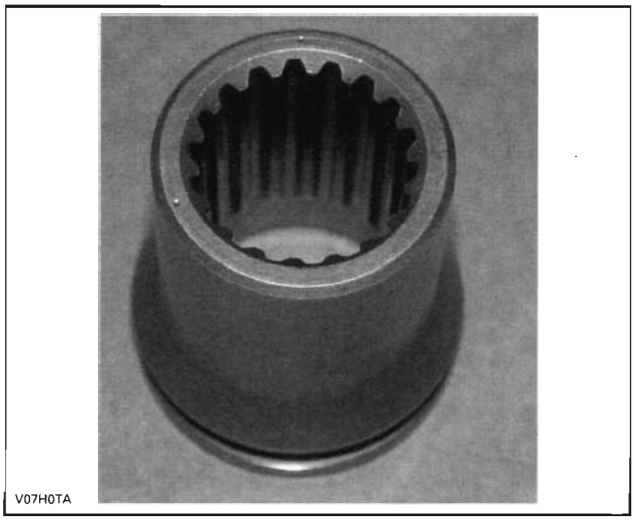
NOTE: Remove the ball bearing only if it does not turn freely and smoothly.

Inspection

Check disconnect unit housing and actuator for cracks or other damages. Replace defective part(s) if necessary.

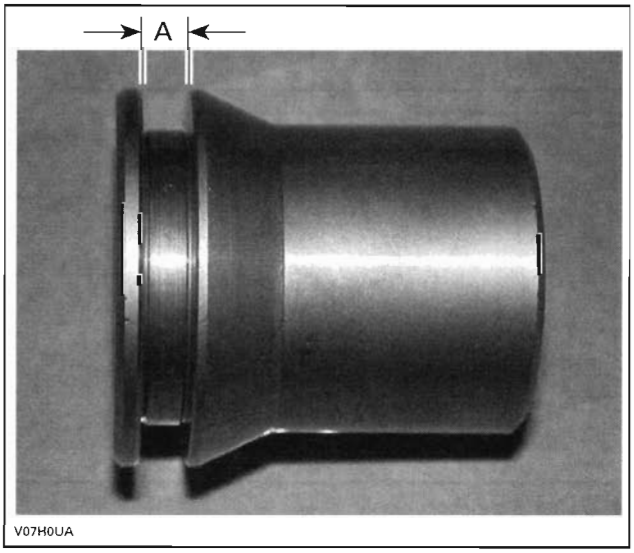
Check if the actuator O-ring and the coupling unit housing O-ring **no. 16** are brittle, hard or damaged.

Check splines of coupling sleeve **no. 13** for wear or other damages. Replace if splines are damaged.



Measure the coupling sleeve groove. If the width of groove is out of specification replace the coupling sleeve.

COUPLING SLEEVE GROOVE WIDTH	
Service limit	5.00 mm (.197 in)



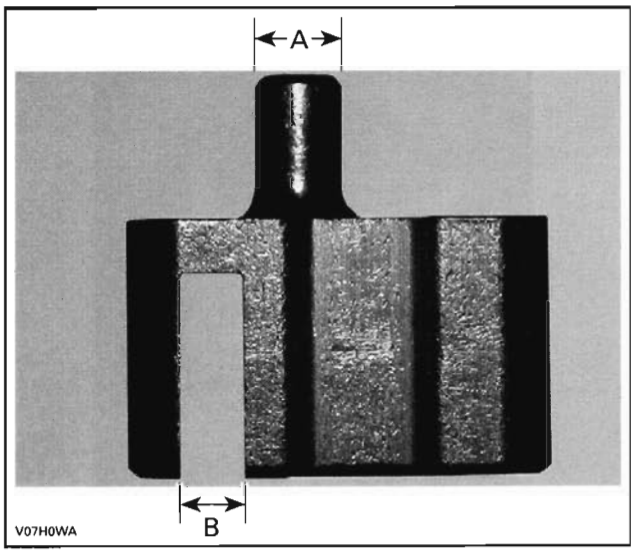
A. Groove width

Check sliding sleeve dog for bend and measure it.

SLIDING SLEEVE DOG THICKNESS	
Service limit	4.80 mm (.189 in)

Measure the sliding sleeve groove.

SLIDING SLEEVE GROOVE WIDTH	
Service limit	3.60 mm (.142 in)

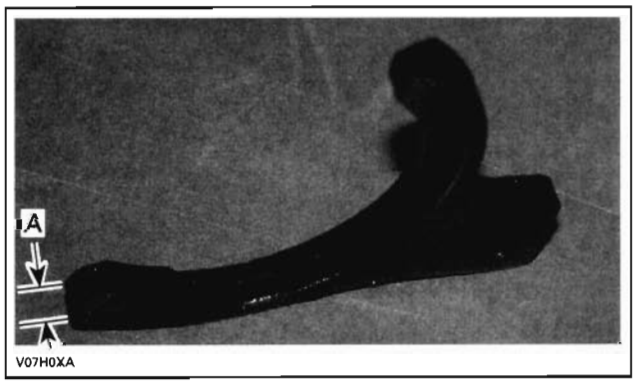


A. Sliding sleeve dog thickness
B. Sliding sleeve groove width

Check shifter plate for visible damage, wear or bent claws.

Measure the shifter plate claw thicknesses.

SHIFTER PLATE CLAWS THICKNESS	
Service limit	2.93 mm (.115 in)

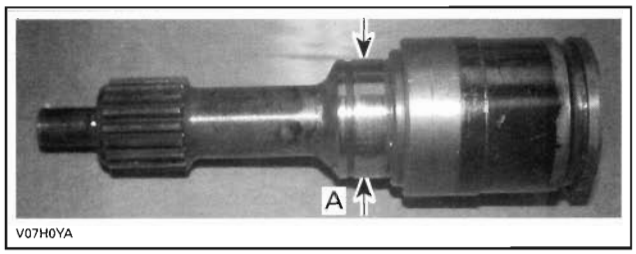


A. Shifter plate thickness

Check inner and outer shaft splines for wear or other damages. Replace shaft if necessary.

Measure shaft for wear limit.

SHAFT	
Service limit	29.995 mm (1.181 in)



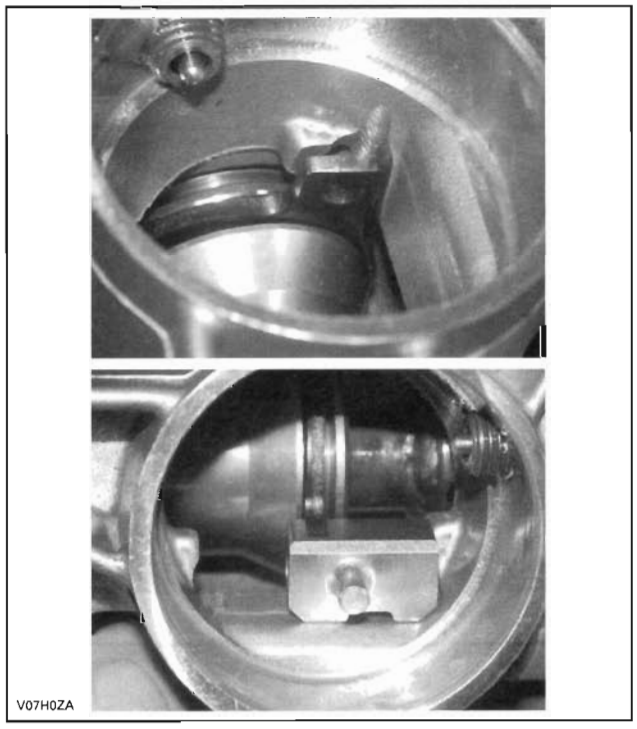
A. Shaft diameter in the area of bearing

Assembly

The assembly is the reverse of the disassembly procedure. Pay attention to the following details.

Apply engine oil on moving parts.

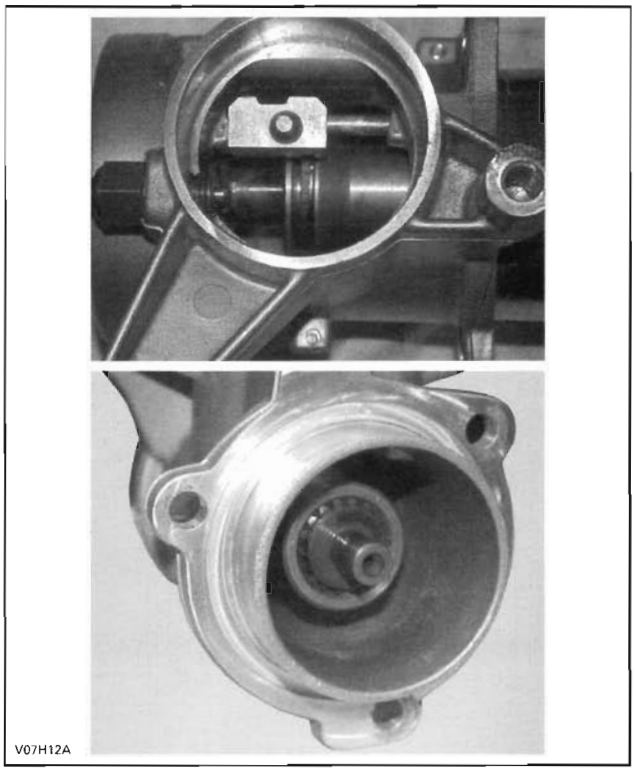
Install the shifter plate and coupling sleeve as per the following illustrations.



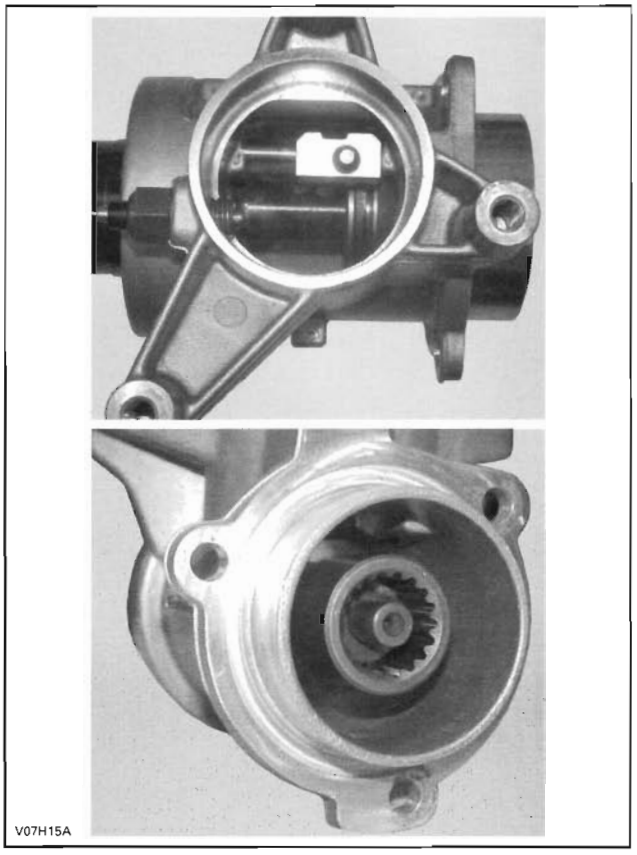
Insert pin and install Allen screw.

Check if the shifter plate and the coupling sleeve are installed properly.

When the sliding sleeve is positioned on left side, the coupling sleeve is equal with the end of the shaft splines.


V07H12A

Move the sliding sleeve on right side and check if the coupling sleeve is flush with the end of shaft.


V07H15A

To install the actuator on housing, refer to actuator *INSTALLATION* procedure above in this section.

Installation

The installation is the reverse of removal procedure.

Apply synthetic grease (P/N 293 550 010) on coupling unit housing O-ring.

FRONT DRIVE

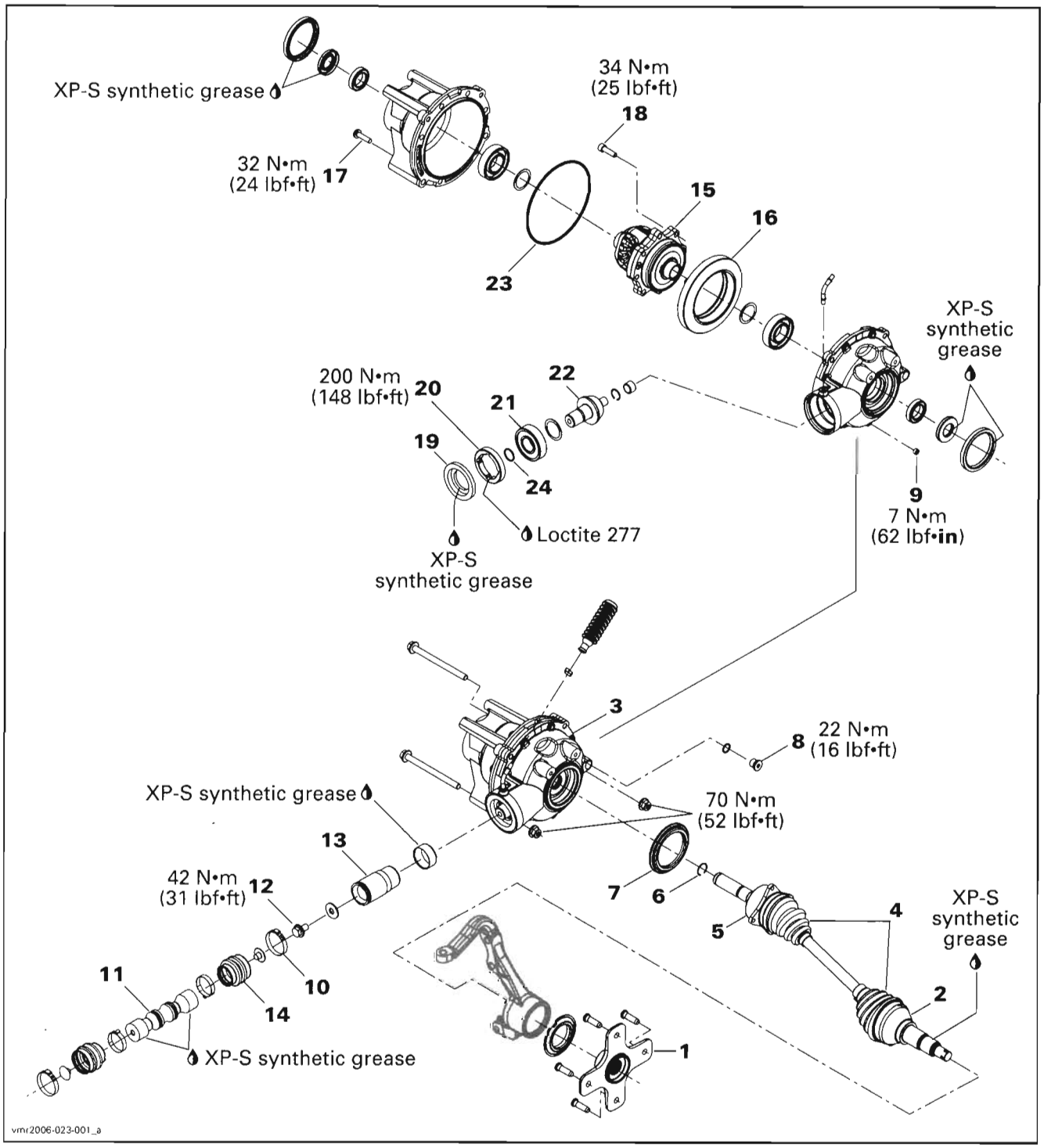
SERVICE TOOLS

Description	Part Number	Page
backlash measurement tool	529 035 665	352
CV boot clamp pliers	295 000 069	348
differential spanner socket	529 035 649	351
pliers Oetiker 1099	295 000 070	348

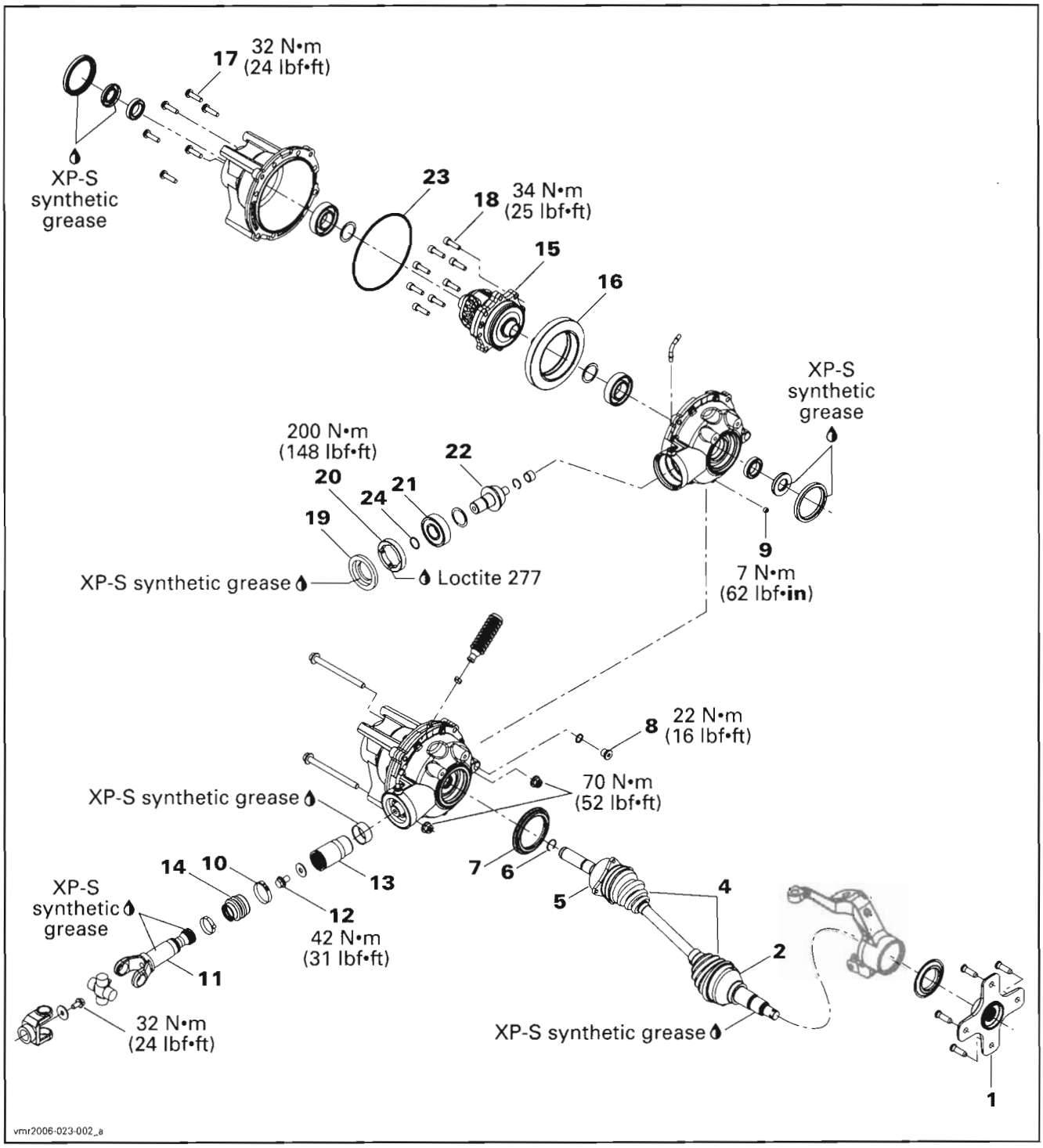
SERVICE PRODUCTS

Description	Part Number	Page
Bombardier differential oil	293 600 043	349
Loctite 277	293 800 073	353
XP-S synthetic grease	293 550 010	348, 353, 355

Outlander 400 Series



Outlander 800 Series



GENERAL

The procedure explains below is the same for the RH and LH sides unless otherwise instructed.

During assembly/installation, use torque values and service products as in the exploded views.

Clean threads before applying threadlocker. Refer to *SELF-LOCKING FASTENERS* and *LOCTITE APPLICATION* at the beginning of this manual for complete procedure.

⚠ WARNING

Torque wrench tightening specifications must strictly be adhered to.
Locking devices (e.g.: locking tabs, elastic stop nuts, 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.

PROCEDURES

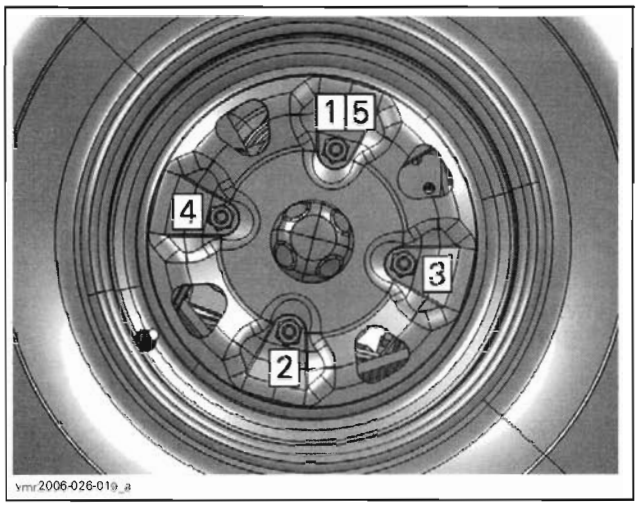
TIRES AND WHEELS

⚠ WARNING

When the tires are replaced, never install a bias tire with a radial tire. Such a combination could create handling and/or stability problems.
Do not mix tires of different size and/or design on the same axle.
Front and rear tire pairs must be the identical model and manufacturer.
For unidirectional tread pattern, ensure that the tires are installed in the correct direction of rotation.
The radial tires must be installed as a complete set.
Severe injury or death can result if these instructions are not followed.

The tires are directional and their rotation must be kept in a specific direction for proper operation.

Torque wheel nuts to 70 N•m (52 lbf•ft) on **Outlander 400 Series** and to 90 N•m (66 lbf•ft) on **Outlander 800 Series** in accordance with the following illustration.



CAUTION: Always use the recommended wheel nuts. Using a different nut could cause damages to the rim.

Outlander 800 Series

On these models, wheel balancing is necessary. To perform this operation, use a wheel balancer and adhesive weights.

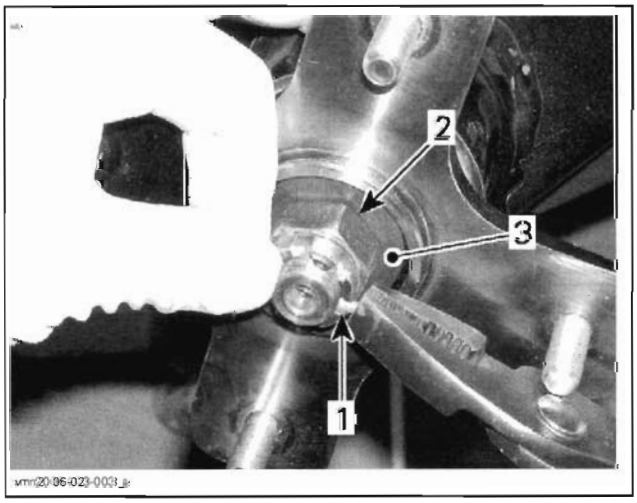
WHEEL HUB

Removal

Raise the front of vehicle, support it securely on jack stands and remove front wheel.

Apply parking brake or select 4WD position and place transmission lever on P.

Remove:
- wheel cap
- cotter pin
- castellated nut
- Belleville washer.



1. *Cotter pin*
2. *Castellated nut*
3. *Belleville washer*

Pull wheel hub **no. 1** to remove it.

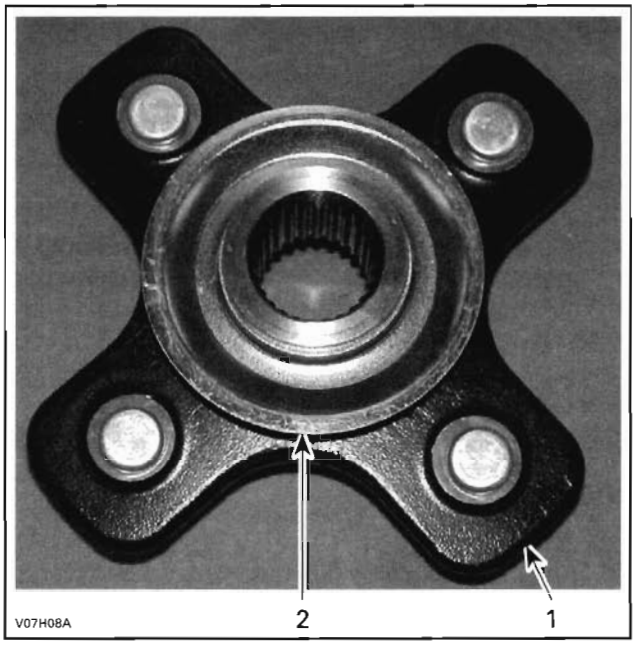
Inspection

Check wheel hub for cracks or other damages.

Check inner splines for wear or other damages.

If any damage is detected on wheel hub, replace it with a new one.

Check wear ring. If damage is apparent, replace the wear ring.



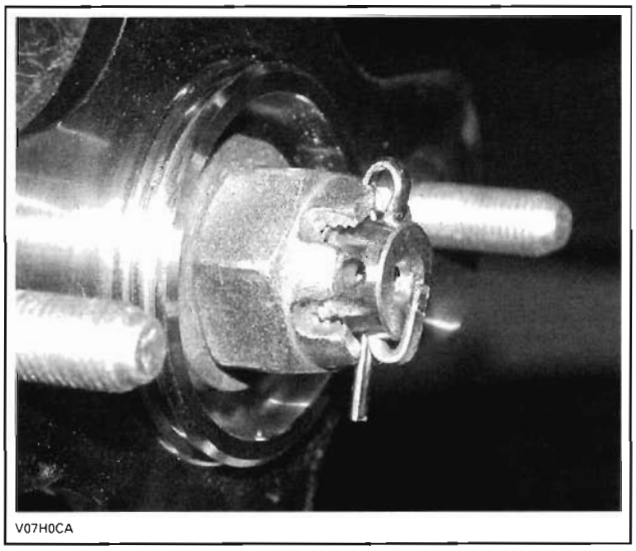
1. Wheel hub
2. Wear ring

Installation

The installation is the reverse of removal procedure.

Install Belleville washer so that the inside diameter protrudes outward and contacts the nut.

Tighten the castellated nut on the drive shaft end to 205 N•m (151 lbf•ft) and further tighten until one of its grooves is aligned with a cotter pin hole. Install a new cotter pin and the wheel cap. Fold one pin of cotter pin over drive shaft end.



FRONT DRIVE SHAFT

Removal

Remove the appropriate wheel hub **no. 1**, see above.

Models with Shock Absorbers and Upper A-Arm

Remove bolt that attach the shock absorber to the upper A-arm.

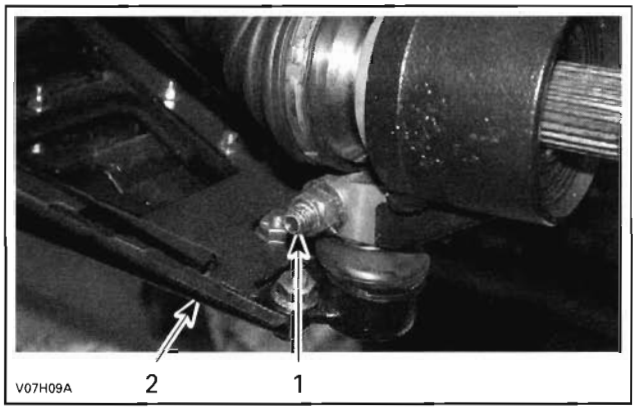
Detach upper A-arm from knuckle.

Models with Struts

Unscrew bolts holding strut to knuckle.

All Models

Remove ball joint retaining bolt from lower suspension arm.



1. Ball joint retaining bolt
2. Lower suspension arm

Separate knuckle from lower suspension arm.

Move CV joint **no. 2** out of knuckle then place the knuckle and the tie-rod out of way.

Remove caliper. Refer to *BRAKES*.

Pull drive shaft out of differential **no. 3**.

NOTE: Pull drive shaft strongly.

Inspection

Inspect the condition of boots **no. 4**. If there is any damage or evidence of leaking lubricant, replace them. Refer to *DRIVE SHAFT BOOT* section.

Check splines for excessive wear. Replace if necessary.

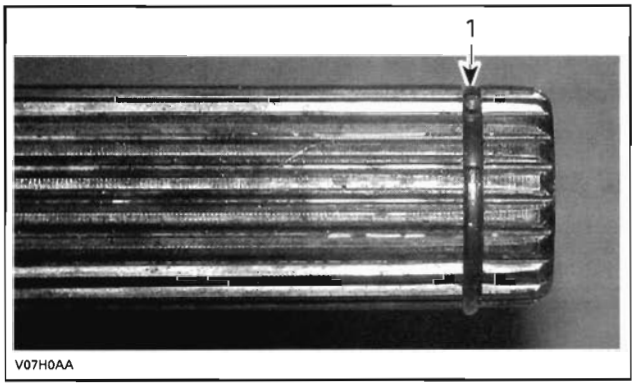
NOTE: If the splines on plunging joint **no. 5** are worn, a check of differential inner splines should be done.

Check the stop ring **no. 6** at the end of drive shaft. If wear is apparent, replace the wear ring **no. 7**.

Check if the bearings in knuckle move freely and smoothly. If not, replace them. Refer to *STEERING SYSTEM*.

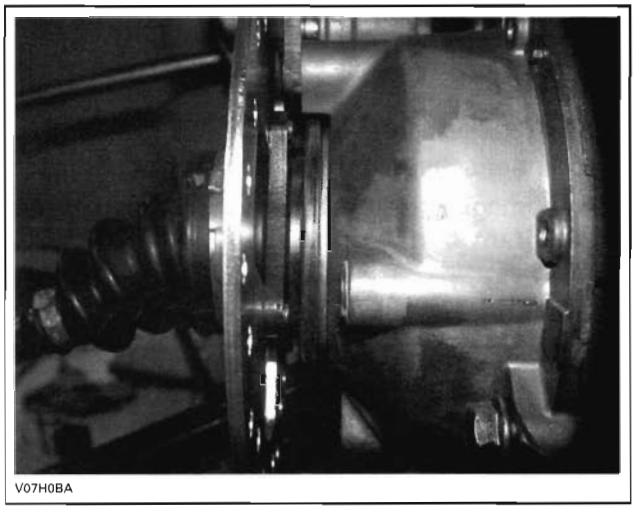
Installation

Apply XP-S synthetic grease (P/N 293 550 010) to the splines and insert the end of drive shaft in differential and pull joint a little to make sure that the stop ring is locked in differential side gear groove.



1. Stop ring

NOTE: The wear ring should be close to the differential.



TYPICAL

Insert the other end of drive shaft in the knuckle and install the knuckle to the lower suspension arm. Install and torque the ball joint retaining bolts to 48 N•m (35 lbf•ft).

Install all other removed parts.

Drive Shaft Boot

Removal

Remove:

- clamps from rubber boot using CV boot clamp pliers (P/N 295 000 069) and pliers Oetiker 1099 (P/N 295 000 070)
- large end of the boot from plunging joint **no. 5** or CV joint **no. 2**.

Clamp joint housing in a vise.

Align shaft with joint.

Pull hard on shaft to remove from joint.

Remove boot from drive shaft.

Inspection

Check bearing in plunging joint **no. 5** or CV joint **no. 2**. If bearing is hard to move, change plunging joint or CV joint.

Check circlip for damage, change as necessary.

Installation

For installation, reverse the removal procedure. Pay attention to the following details.

Insert boot, do not forget the small clamp.

To insert shaft in joint:

- clamp joint in a vise with joint facing up
- center clip on shaft
- carefully insert shaft into joint
- push hard to engage clip.

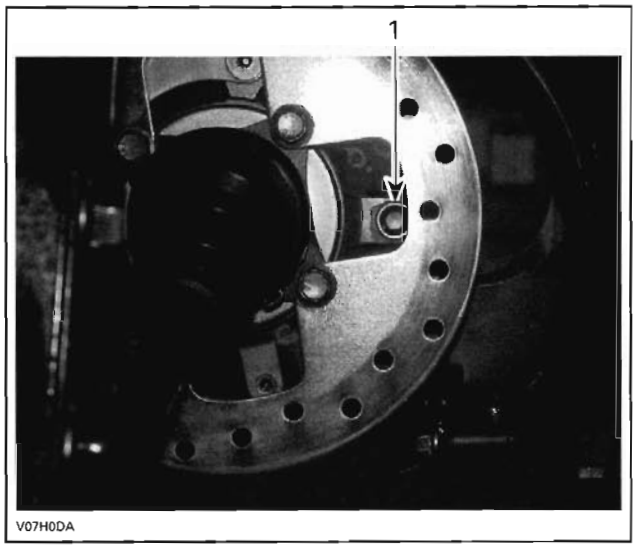
Pack bearing area with grease (included with the new boot kit).

NOTE: Do not use or add other grease.

FRONT DIFFERENTIAL

Oil Level

Clean filler plug prior to checking oil level.



1. Filler plug

With vehicle on a level surface, check oil level by removing filler plug no. 8. Oil level must reach the lower edge.

Add oil if necessary. Use Bombardier differential oil (P/N 293 600 043) or a 75W90 synthetic oil (API GL-5).

Oil Change

Place vehicle on a level surface. Set transmission in park position.

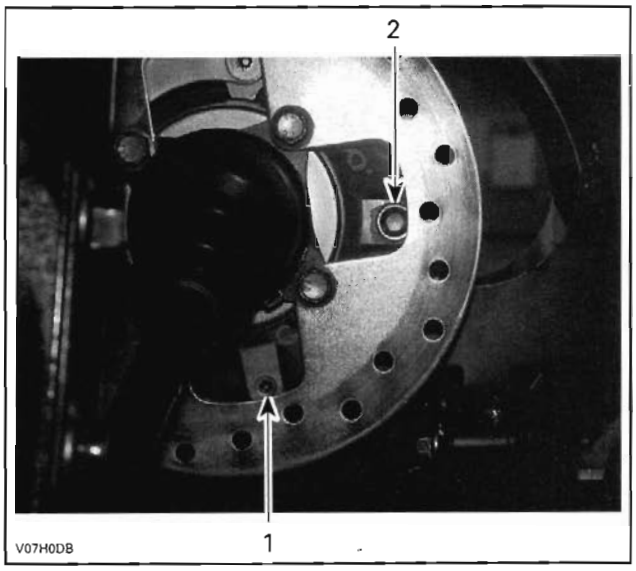
Lift LH side of vehicle.

Clean drain plug area.

Place a drain pan under differential drain plug area.

Remove drain plug no. 9.

Unscrew filler plug.



1. Drain plug
2. Filler plug

Clean drain plug area then reinstall plug.

Lower vehicle.

Use a funnel and refill front differential with 500 mL (17 oz. US) of Bombardier differential oil (P/N 293 600 043). If the Bombardier differential oil is not available, use a 75W90 synthetic oil (API GL-5).

Reinstall filler plug.

Removal

Raise front of vehicle, support it securely on jack stands and remove front wheels.

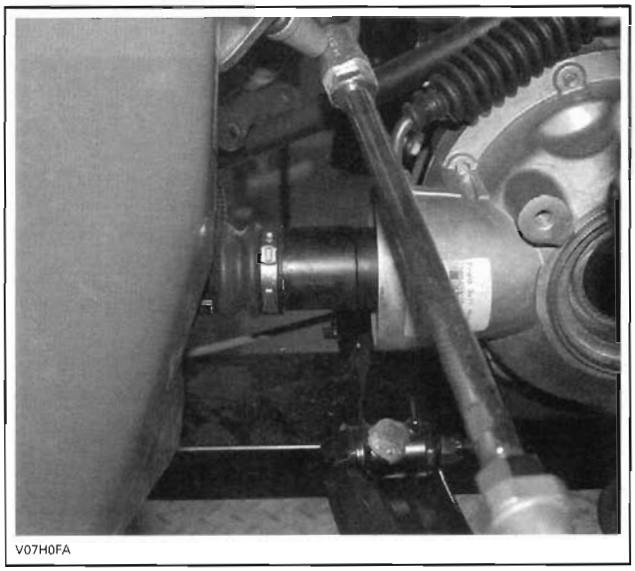
Drain the differential.

On both sides, remove the drive shafts (refer to *FRONT DRIVE SHAFT* above).

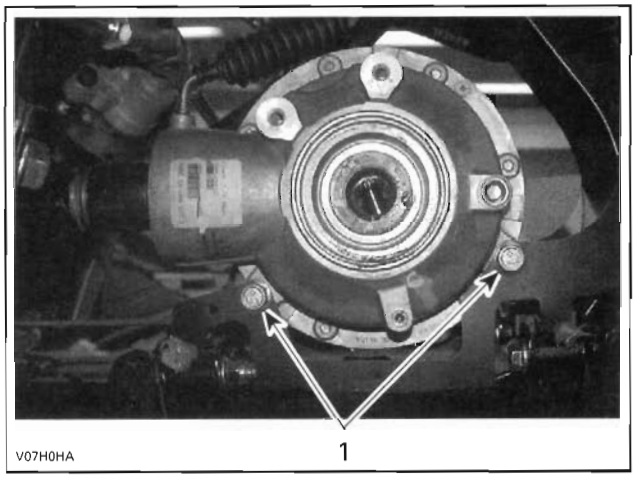
Outlander 400 Series

Remove:

- Oetiker clamp no. 10 (discard it) on propeller shaft no. 11 (differential side)



– both differential mounting bolts.



1. Differential mounting bolts

Move the differential forward to disconnect the propeller shaft.

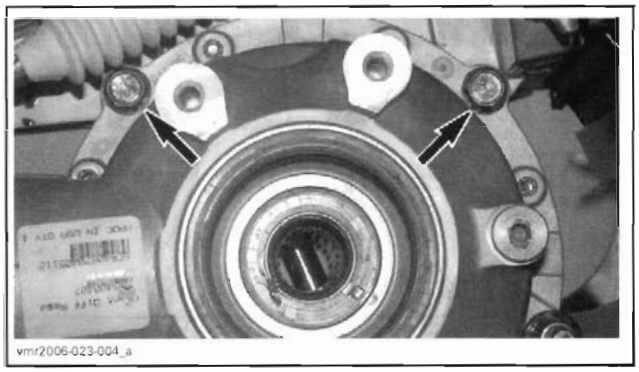
Remove the differential from the RH side.

Unscrew bolt no. 12 retaining the propeller shaft adaptor no. 13.

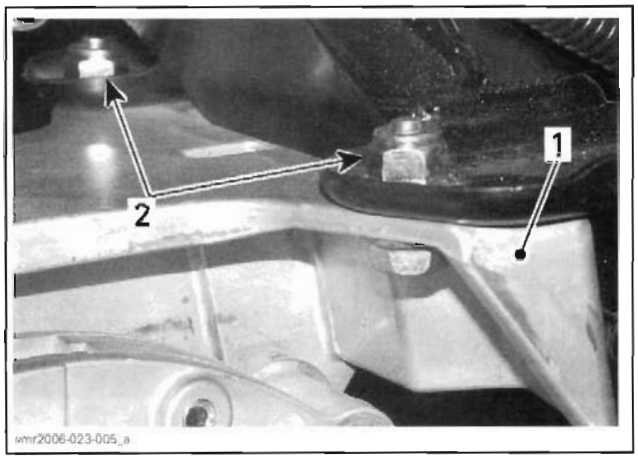
Outlander 800 Series

Remove:

– both upper A-arms
– bolts that attach winch bracket to the frame (XT models)
– upper differential bolts

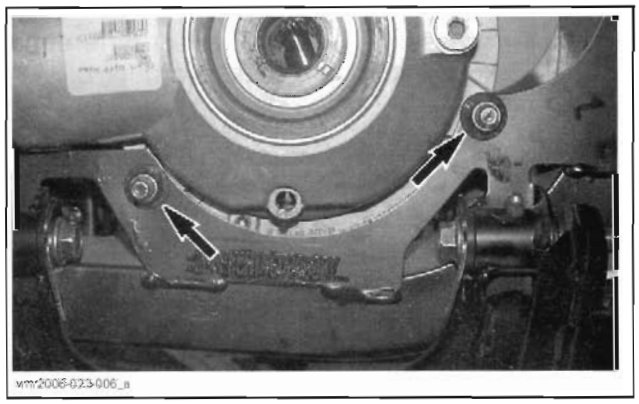


– differential support bolts



1. Differential support
2. Differential support bolts

– lower differential bolts



– differential support by the left side
– Oetiker clamp no. 10 that attach propeller shaft bellows no. 14 to the propeller shaft adaptor no. 13



– differential **no. 3** from the right side of vehicle.

Inspection

Check backlash and drag torque, see *ADJUSTMENT* further in this section.

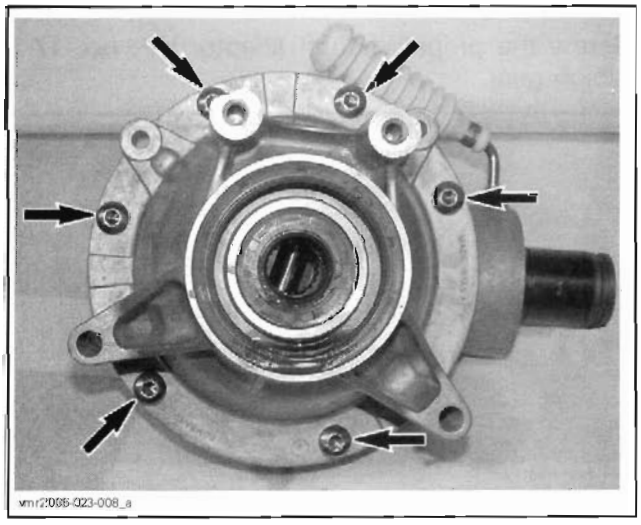
Check if oil seals are brittle, hard or damaged. Replace if necessary.

Disassembly

Ring Gear Carrier/Ring Gear

To change ring gear carrier **no. 15** or ring gear **no. 16**:

– Unscrew the TORX screws **no. 17**, then separate half housings.



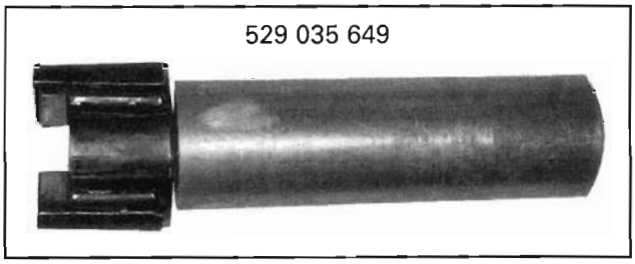
NOTE: Be careful to keep track of shims on each end of ring gear carrier.

– Extract ring gear carrier with ring gear out of half housing.
– Unscrew Allen socket screws **no. 18** then separate ring gear from ring gear carrier.

Pinion Gear

Remove oil seal **no. 19**.

Unscrew the pinion nut **no. 20**. Use the differential spanner socket (P/N 529 035 649).



Remove the bearing **no. 21** at the same time as the pinion gear **no. 22**. Be careful to keep track of shims.

NOTE: The pinion gear and bearing can be easily removed using the following suggested tool:

– pipe 3-1/2 in dia. x 5 in (1)
– screwed rod M10 x 1.25, 7 in length (1)
– nut M10 x 1.25 (3)
– flat bar (1).

Adjustment

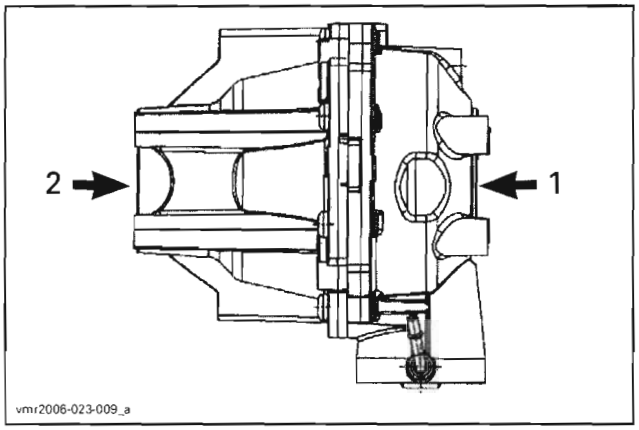
A shimming procedure must be done when ring gear carrier, pinion gear, ring gear or housing is (are) changed.

Measure the old pinion shim stack. If the shims measure over 1 mm (.039 in), install shim stacks on the differential components as per CHART A.

If the old pinion shim stack measurement is under 1 mm (.039 in), install a .5 mm (.02 in) shim on the differential components as per CHART B.

CHART A		CHART B	
PINION	1.85 mm (.073 in)	PINION	.5 mm (.02 in)
BACKLASH	1 mm (.039 in)	BACKLASH	
PRELOAD		PRELOAD	

NOTE: The procedure above sets the pinion shim thickness and should not be modified thereafter. Any changes should be done on the preload and/or backlash side(s).

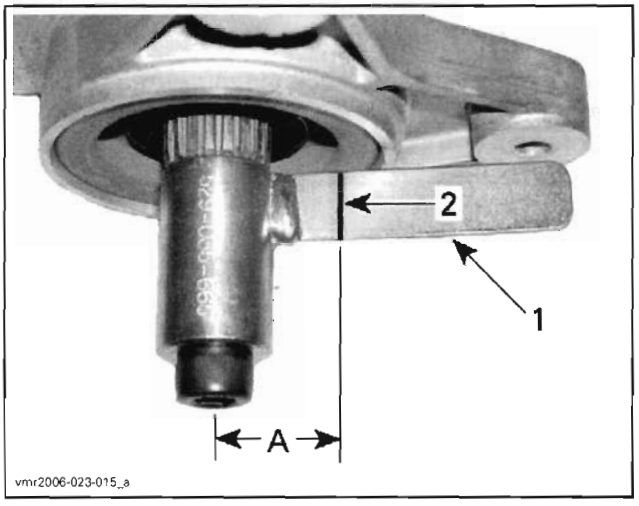


1. Backlash side
2. Preload side

Assemble the differential and check backlash as well as preload.

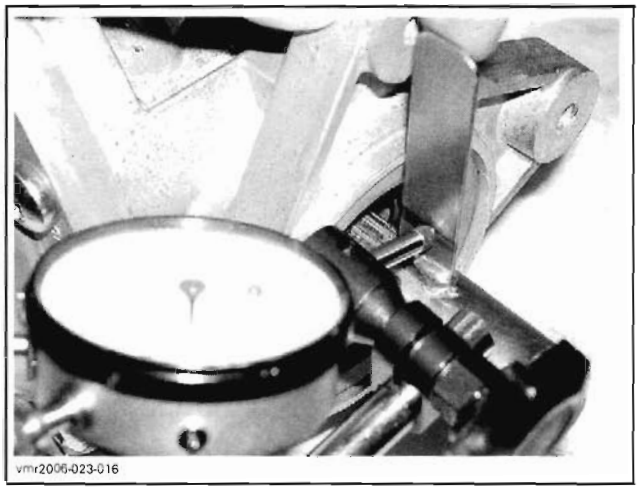
Backlash

- Using a dial indicator and the backlash measurement tool (P/N 529 035 665), measure the backlash. Place the backlash measurement tool at the end of pinion gear.
- From center of bolt, measure 25.4 mm (1 in) and scribe a mark on the tab.



1. Tab of backlash measurement tool
2. Mark on tab
A. 25.4 mm (1 in)

- Position the dial indicator tip against the tab at a 90° angle and right on the previously scribed mark.
- Gently, move the tab back and forth. Note the result.



- Rotate pinion gear 1/2 turn and check backlash again. Note the result.
- Rotate pinion gear 1 turn and check backlash again.

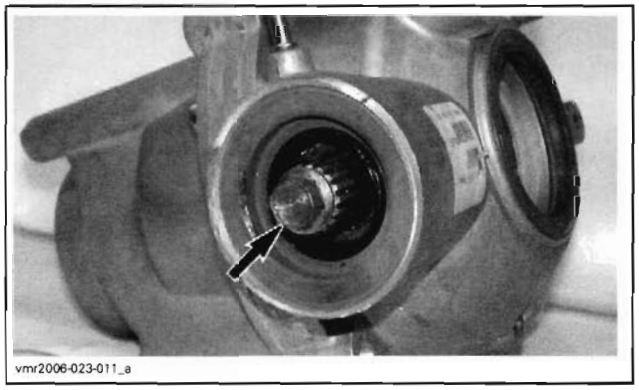
If backlash is below 0.05 mm (.002 in), increase backlash shim by 0.05 mm (.002 in) and check the backlash again.

If backlash is greater than 0.356 mm (.014 in), decrease backlash shim by 0.05 mm (.002 in) and check the backlash again.

Measure preload.

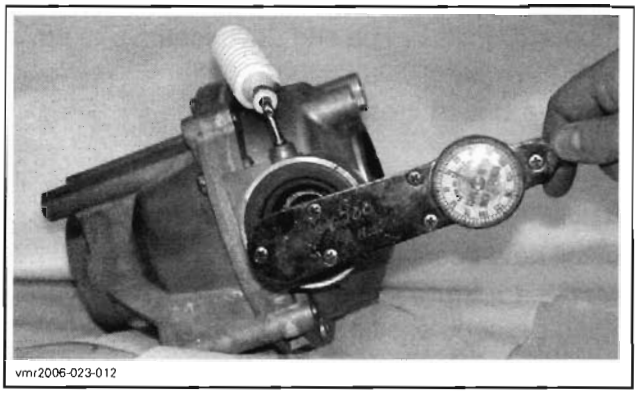
Preload

Screw the propeller shaft adaptor bolt **no. 12** in pinion gear.



TYPICAL

Using a needle torque wrench, measure the drag torque.



TYPICAL

If the drag torque is greater than 0.7 N•m (6 lbf•**in**), reduce preload shim by 0.05 mm (.002 in) and check drag torque again.

If the drag torque is less than 0.06 N•m (.5 lbf•**in**), increase preload shim by 0.05 mm (.002 in) and check drag torque again.

Assembly

Ring Gear Carrier/Ring Gear

To assemble, reverse the removal procedure. Pay attention to the following details.

Verify condition of half housing seal **no. 23**. Change seal if necessary.

Check all bearings and all oil seals. Change them if necessary.

Pinion Gear

To install, reverse the removal procedure. Pay attention to the following details.

Check O-ring **no. 24** for damage. If so, change it.

Install the shim(s) then the ball bearing.

Install the nut **no. 20**. Apply Loctite 277 (P/N 293 800 073) on threads nut then torque it to 200 N•m (148 lbf•ft).

Apply XP-S synthetic grease (P/N 293 550 010) in the lips of the new oil seal **no. 19** and install it.

Installation

The installation is the reverse of the removal procedure.

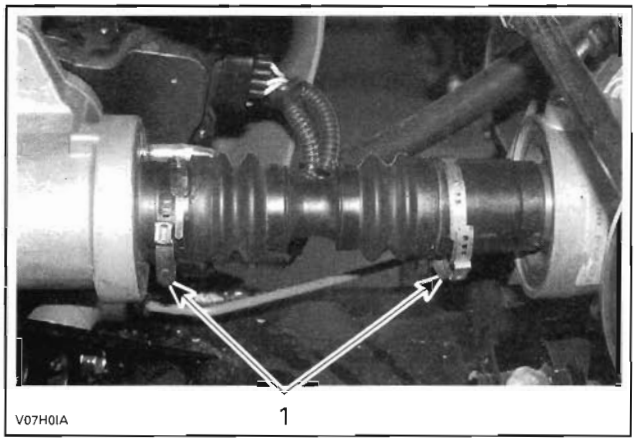
FRONT PROPELLER SHAFT

Removal

Outlander 400 Series

Remove:

- RH footwell
- RH inner fender
- RH drive shaft
- both Oetiker clamps (discard them)



1. Remove these clamps

- differential mounting bolts.

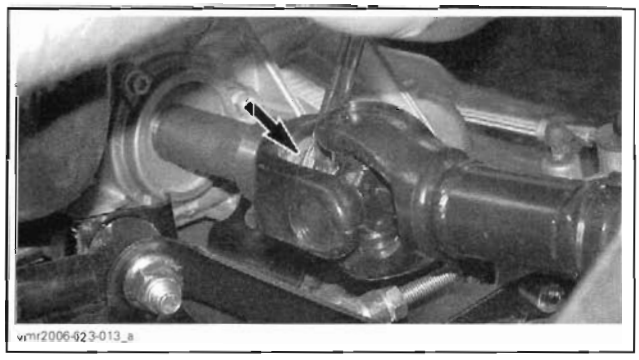
Pull differential **no. 3** back then separate propeller shaft **no. 11** from differential and disconnect unit.

Outlander 800 Series

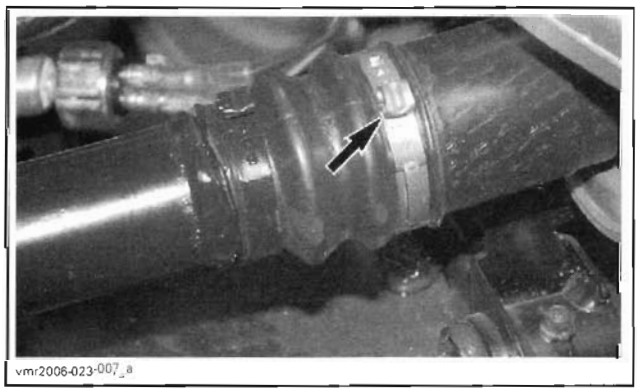
Place vehicle on PARK position and select 4WD.

Remove the RH footrest.

Unscrew propeller shaft bolt on engine side.



Remove the Oetiker clamp **no. 10** that attach propeller shaft bellows **no. 14** to the propeller shaft adaptor **no. 13**. Discard clamp.



Remove LH drive shaft.

Unscrew lower and upper differential bolts.

Remove them and move the differential forwards.

Remove front propeller shaft **no. 11**.

Inspection

Check:
- splines for wear or damage
- if U-joint moves freely in all direction
- bellows for holes or brittleness.

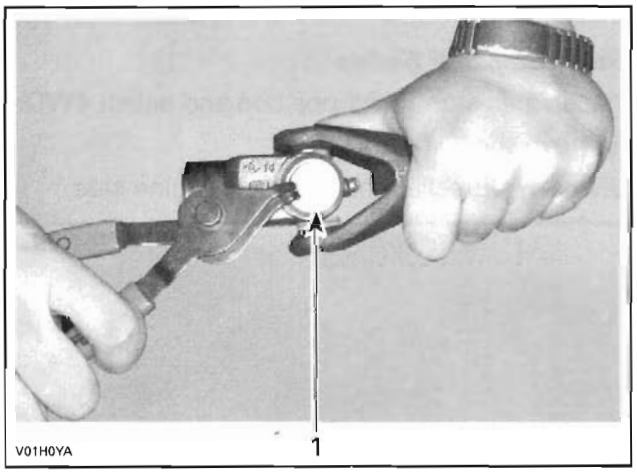
Installation

Installation is the reverse of removal procedure.

PROPELLER SHAFT U-JOINT

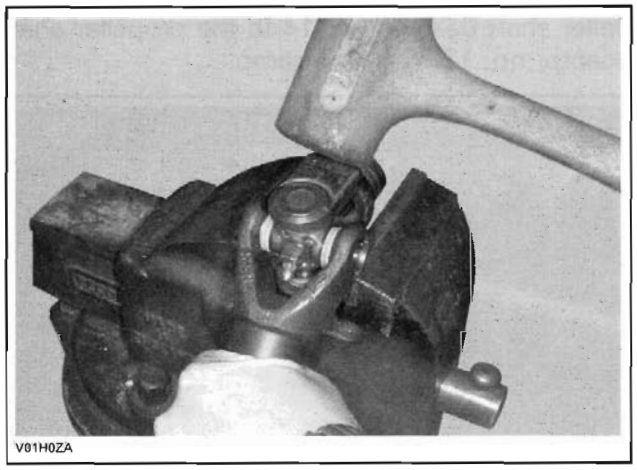
Removal

Remove internal snap ring from bearing caps.



1. Snap ring

Support inner yoke in vice and drive other yoke down with a soft hammer.



Support U-joint in vice and drive inner yoke down to remove remaining bearing caps.

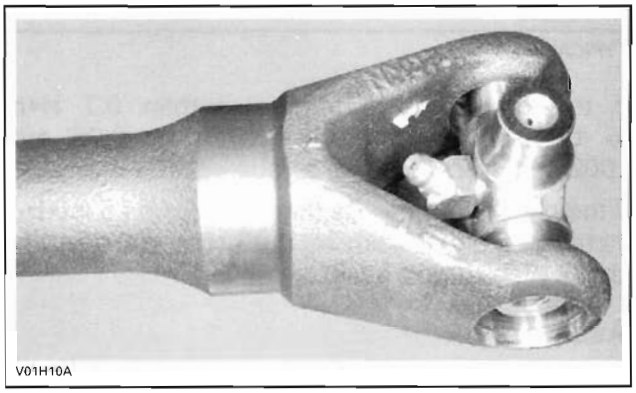
Remove U-joint cross.

Installation

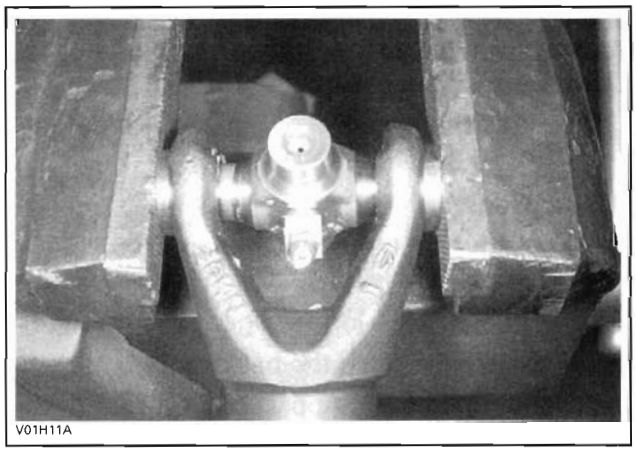
Install new U-joint cross in inner yoke.

Install new bearing cap by hand.

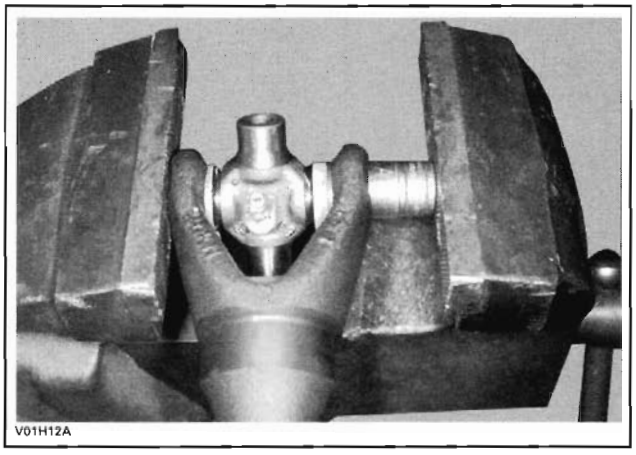
NOTE: Carefully install U-joint cross with grease fitting properly positioned.



Tighten vise to force bearing caps in.



Using a suitable tappet, fully seat bearing cap in one side. Continually, check for free movement of bearing cross as bearing caps are assembled.



Install snap ring.

Repeat procedure for other sides.

Grease U-joint, using a grease gun with XP-S synthetic grease (P/N 293 550 010).

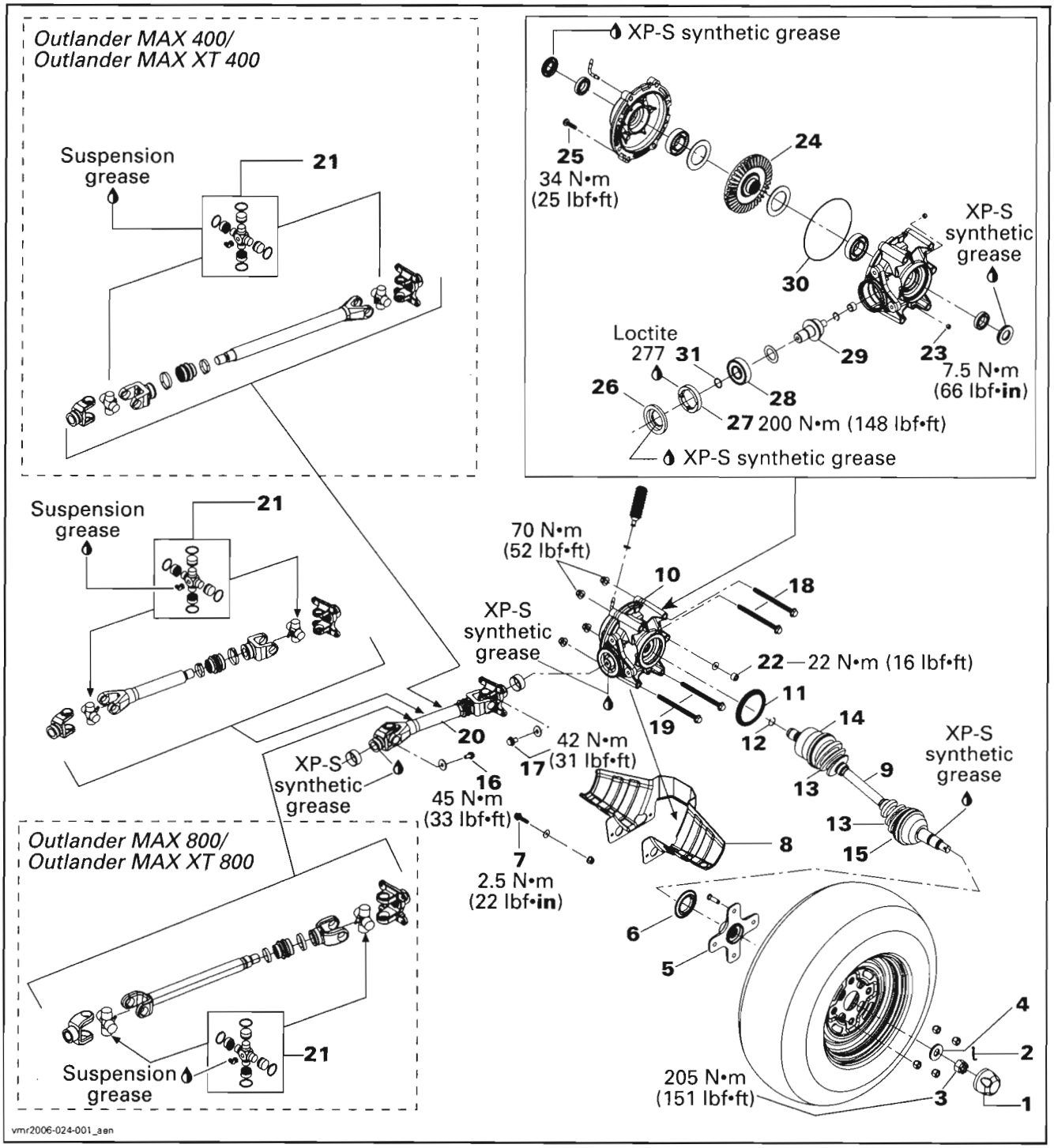
REAR DRIVE

SERVICE TOOLS

Description	Part Number	Page
backlash measurement tool	529 035 665	365
CV boot clamp pliers	295 000 069	361
differential spanner socket	529 035 649	364
pliers Oetiker 1099	295 000 070	361

SERVICE PRODUCTS

Description	Part Number	Page
Bombardier differential oil	293 600 043	364
Loctite 277	293 800 073	366
suspension grease	293 550 033	362–363
XP-S synthetic grease	293 550 010	360, 362, 366


Outlander MAX 400/
Outlander MAX XT 400
Suspension grease
21
XP-S synthetic grease
25
34 N•m
(25 lbf•ft)
24
30
XP-S synthetic grease
Loctite 277
31
29
23
7.5 N•m
(66 lbf•in)
26
28
27 200 N•m (148 lbf•ft)
XP-S synthetic grease
Suspension grease
21
70 N•m
(52 lbf•ft)
10
18
XP-S synthetic grease
22—22 N•m (16 lbf•ft)
11
19
12
14
XP-S synthetic grease
20
42 N•m
(31 lbf•ft)
17
16
45 N•m
(33 lbf•ft)
XP-S synthetic grease
9
13
13
15
8
7
2.5 N•m
(22 lbf•in)
Outlander MAX 800/
Outlander MAX XT 800
6
5
4
2
Suspension grease
21
205 N•m
(151 lbf•ft)
3
1
vmr2006-024-001_aen

GENERAL

During assembly/installation, use torque values and service products as in the exploded views.

Clean threads before applying a threadlocker. Refer to *SELF-LOCKING FASTENERS* and *LOCTITE APPLICATION* at the beginning of this manual for complete procedure.

⚠ WARNING

Torque wrench tightening specifications must strictly be adhered to.
Locking devices (e.g.: locking tabs, elastic stop nuts, 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.

PROCEDURES

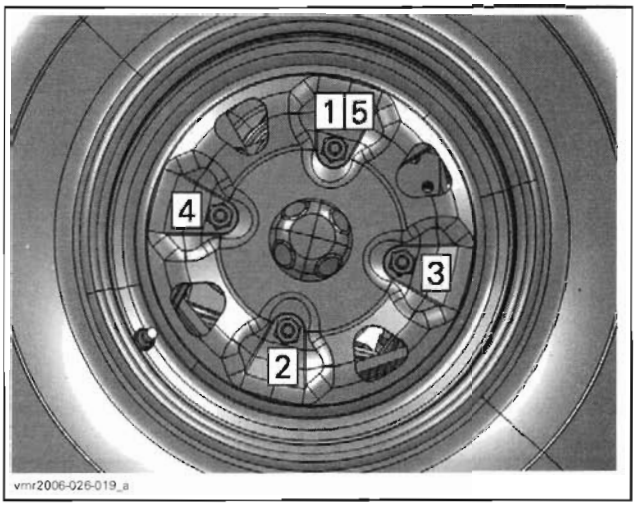
TIRES AND WHEELS

⚠ WARNING

When the tires are replaced, never install a bias tire with a radial tire. Such a combination could create handling and/or stability problems.
Do not mix tires of different size and/or design on the same axle.
Front and rear tire pairs must be the identical model and manufacturer.
For unidirectional tread pattern, ensure that the tires are installed in the correct direction of rotation.
The radial tires must be installed as a complete set.
Severe injury or death can result if these instructions are not followed.

The tires are directional and their rotation must be kept in a specific direction for proper operation.

Torque wheel nuts to 70 N•m (52 lbf•ft) on **Outlander 400 Series** and 90 N•m(66 lbf•ft) on **Outlander 800 Series** in accordance with the following illustration.



CAUTION: Always use the recommended wheel nuts. Using a different nut could cause damages to the rim.

Outlander 800 Series

On these models, wheel balancing is necessary. To perform this operation, use a wheel balancer and adhesive weights.

WHEEL HUB

Removal

Remove:
- appropriate wheel
- wheel cap **no. 1**
- cotter pin **no. 2** (discard it)
- castellated nut **no. 3**
- Belleville washer **no. 4**
- wheel hub **no. 5**.

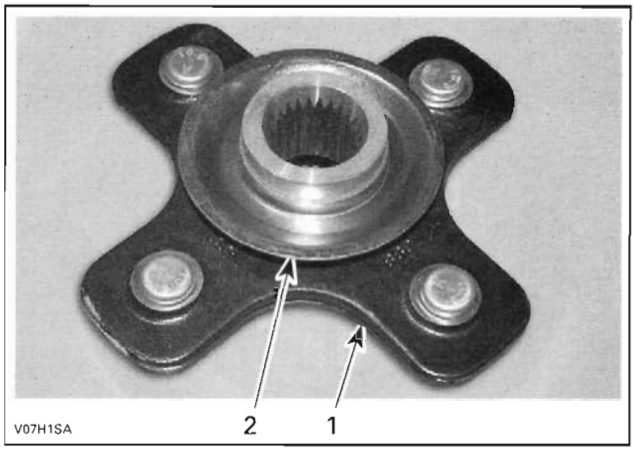
Inspection

Check wheel hub for cracks or other damages.

Check inner splines for wear or other damages.

If any damage is detected on wheel hub, replace it with a new one.

Check wear ring **no. 6**. If it is loose on hub, replace the wear ring.



1. Wheel hub
2. Wear ring

Installation

The installation is the reverse of removal procedure. Pay attention to the following.

Apply XP-S synthetic grease (P/N 293 550 010) on drive shaft splines.

Install Belleville washer **no. 4** in correct orientation. Inside diameter must protrude outward.

Torque castellated nut to 205 N•m (151 lbf•ft) and further tighten until one of its grooves is aligned with a cotter pin hole. Install a new cotter pin. Fold one pin of cotter pin over drive shaft end.

DIFFERENTIAL PROTECTOR

Removal

Remove bolts **no. 7** retaining the protector **no. 8** to the hitch.

Installation

The installation is the reverse of removal procedure.

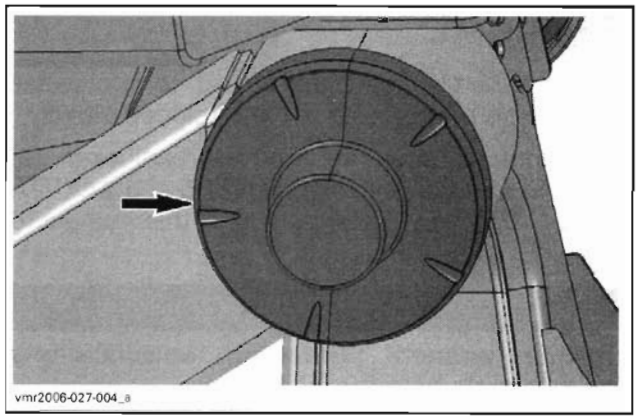
DRIVE SHAFT

Removal

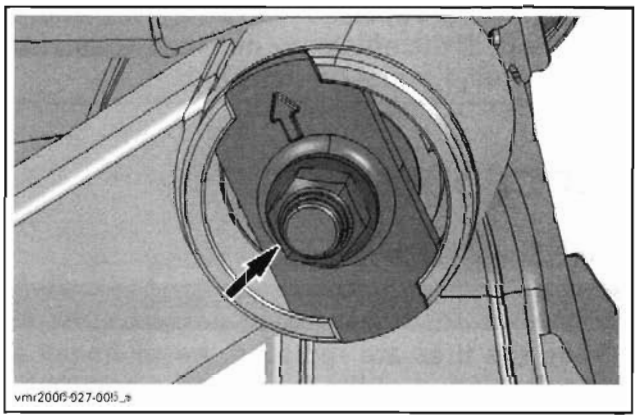
Remove the appropriate wheel hub and the footrest on this side.

Near trailing arm and frame junction, remove:

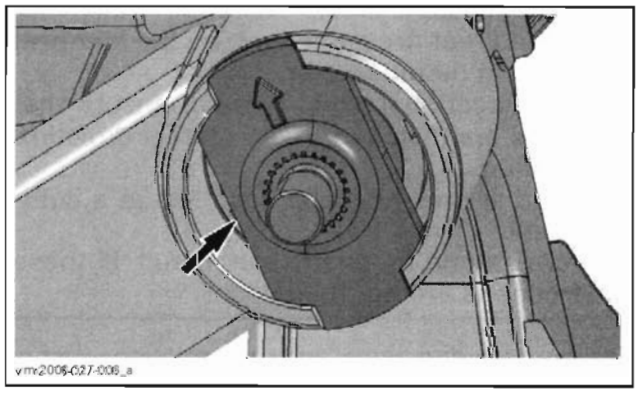
- protective cap



- elastic nut



- washer
- torsion bar lever.



Remove the lower shock absorber bolt.

Remove trailing arm.

Pull drive shaft **no. 9** out of differential **no. 10**.

NOTE: Pull drive shaft strongly.

Inspection

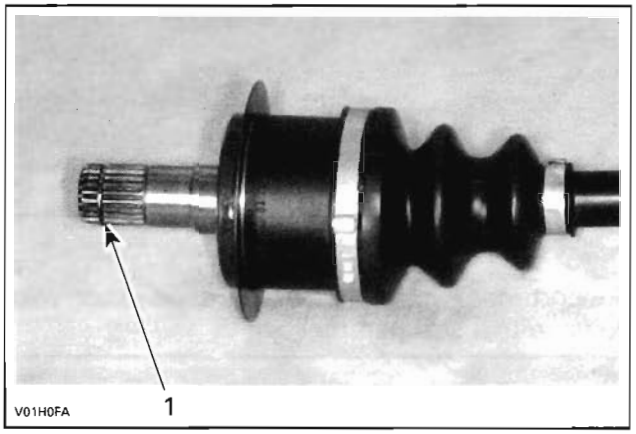
Inspect the condition of boots. If there is any damage or evidence of leaking lubricant, replace them. Refer to *DRIVE SHAFT BOOT* section.

Check shaft splines. Replace drive shaft if necessary.

Check wear ring **no. 11** on drive shaft end. Replace if necessary.

Installation

Insert the end of drive shaft in differential and pull joint a little to make sure that the stop ring **no. 12** is locked in differential gear groove.



1. Stop ring

NOTE: Make sure that you do not interchange LH and RH drive shafts. The shafts are different lengths.

Install the other parts in the reverse order of removal procedure. Refer to the appropriate sections to apply the proper torque.

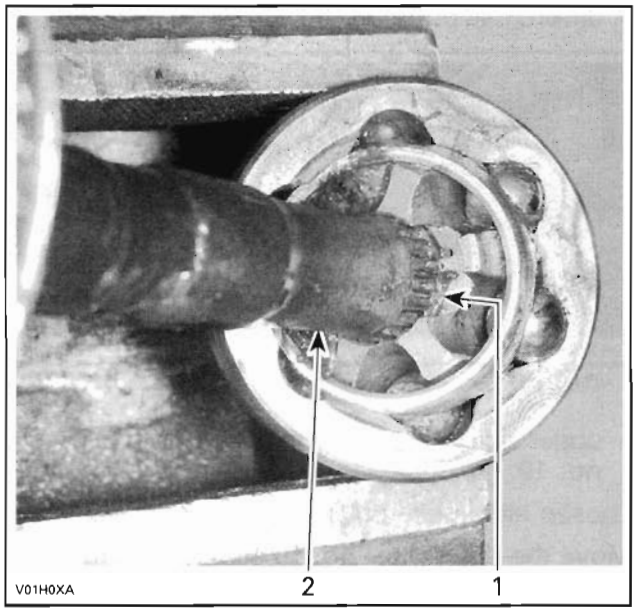
DRIVE SHAFT BOOT

Removal

Remove:

- drive shaft from vehicle
- clamps from rubber boot **no. 13** using CV boot clamp pliers (P/N 295 000 069) and pliers Oetiker 1099 (P/N 295 000 070)
- large end of the boot from plunging joint **no. 14** or CV joint **no. 15**.

Move apart circlip and pull out the shaft from bearing. Do not remove circlip.



1. Circlip
2. Shaft

Remove boot from drive shaft.

Inspection

Check bearing in plunging joint **no. 14** or CV joint **no. 15**. If bearing is hard to move, change plunging joint or CV joint.

Check circlip for damage, change as necessary.

Installation

For installation, reverse the removal procedure. Pay attention to the following details.

Insert boot, do not forget the small clamp.

Insert shaft and push firmly.

Pack bearing area with grease (including with the new boot kit).

NOTE: Do not use any other grease.

REAR PROPELLER SHAFT

Removal

Install a jack stand to support the vehicle during the procedure.

Remove:

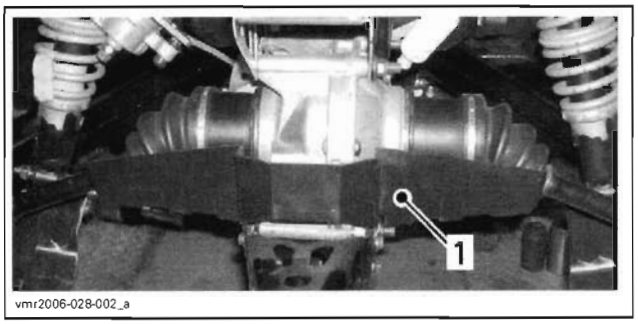
- rear wheel
- caliper (suspend it out of the way)

CAUTION: Do not let caliper hang by the hose and do not stretch or twist hose.

- rear propeller shaft bolts **no. 16** and **no. 17** (engine and differential sides)

NOTE: The propeller shaft bolts are different, they must be reinstalled in same location.

– differential protector **no. 8**



1. Differential protector

– upper and lower differential bolts **no. 18** and **no. 19**.

Loosen hitch plate bolts.

Move the differential **no. 10** backward.

Unplug the propeller shaft **no. 20** from the differential then remove it from vehicle.

Inspection

Check yoke U-joint **no. 21** for wear, backlash or axial play, replace if necessary.

Inspect engine seal for damage or leaks. Replace if necessary.

Inspect disc brake (refer to *HYDRAULIC BRAKES*).

Installation

Installation is essentially the reverse of removal procedure. Pay attention to the following details.

Apply XP-S synthetic grease (P/N 293 550 010) on engine drive shaft splines.

Install the propeller shaft bolt (engine side) and torque it to 45 N•m (33 lbf•ft).

Apply XP-S synthetic grease (P/N 293 550 010) to splines before insert the end of the propeller shaft into differential. Torque propeller shaft bolt to 34 N•m (25 lbf•ft).

Reinstall all other removed parts.

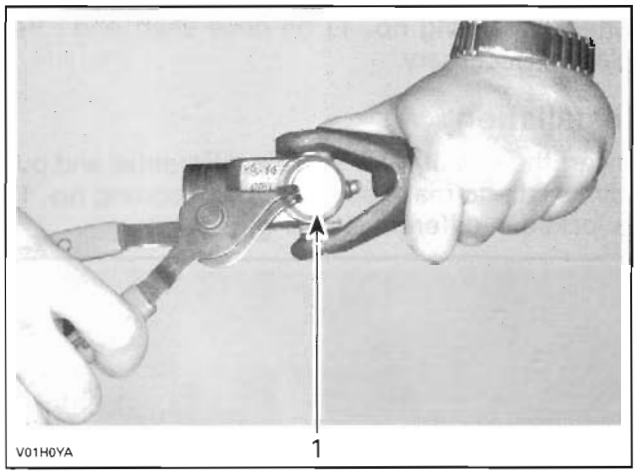
Grease U-joint from rear propeller shaft. Use a grease gun with suspension grease (P/N 293 550 033).

REAR PROPELLER SHAFT U-JOINT

Remove the disc brake before working on differential side of propeller shaft.

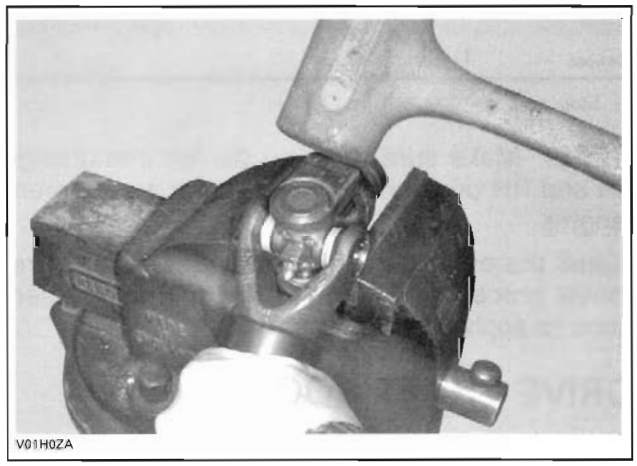
Removal

Remove internal snap ring from bearing caps.



1. Snap ring

Support inner yoke in vice and drive other yoke down with a soft hammer.



Support U-joint in vice and drive inner yoke down to remove remaining bearing caps.

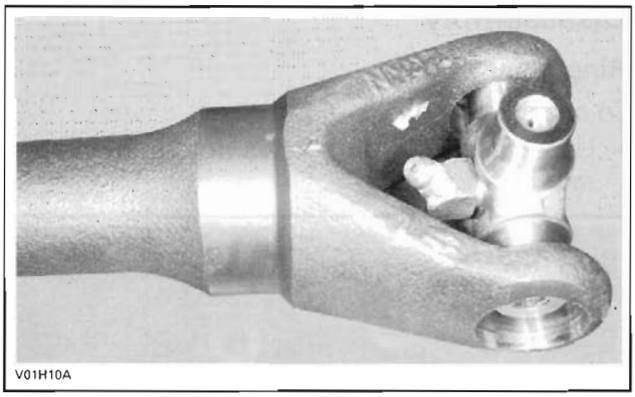
Remove U-joint cross.

Installation

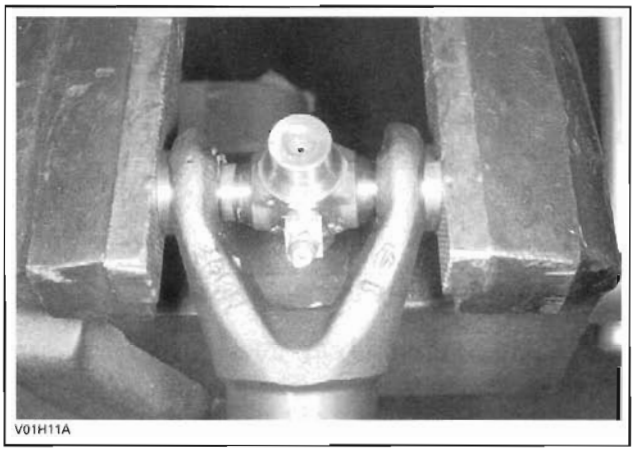
Install new U-joint cross in inner yoke.

Install new bearing cap by hand.

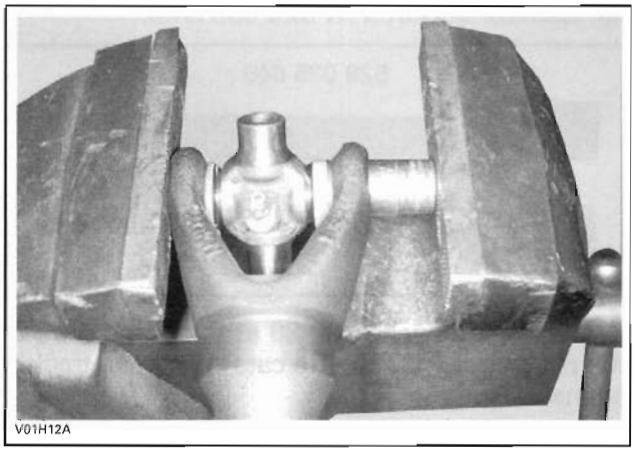
NOTE: Carefully install U-joint cross with grease fitting properly positioned.


V01H10A

Tighten vise to force bearing caps in.


V01H11A

Using a suitable tappet, fully seat bearing cap in one side. Continually, check for free movement of bearing cross as bearing caps are assembled.


V01H12A

Install snap ring.

Repeat procedure for other sides.

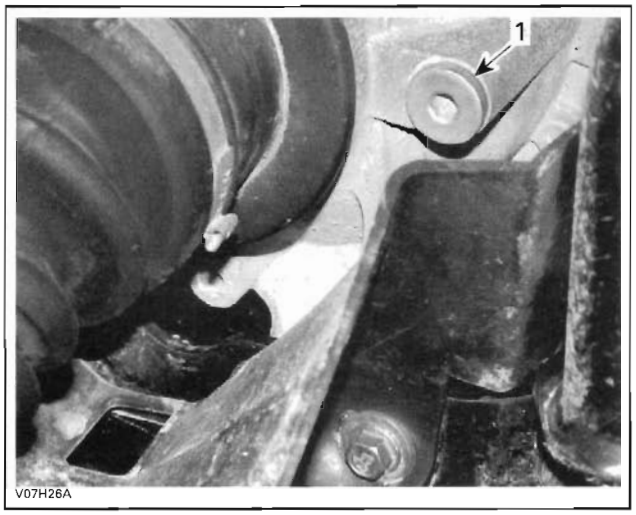
Grease U-joint, using a grease gun with suspension grease (P/N 293 550 033).

REAR DIFFERENTIAL

Oil Level

Place bottom of frame horizontally.

Clean filler plug prior to check oil level. Check oil level by removing filler plug **no. 22**.



V07H26A

1. Filler plug

The rear differential oil is not level with the filler plug threads.

It is possible to verify the oil level by inserting a wire with a 90° bend through the oil filler hole.

Oil level is between 25 to 32 mm (1 to 1-1/4 in) from the bottom of oil filler plug threads when the vehicle is level on ground.

When replacing the oil in the differential, it is easier to measure the right quantity of oil to add in order to reach the proper level. Refer to *OIL REPLACEMENT*.

Add oil if necessary.

Oil Replacement

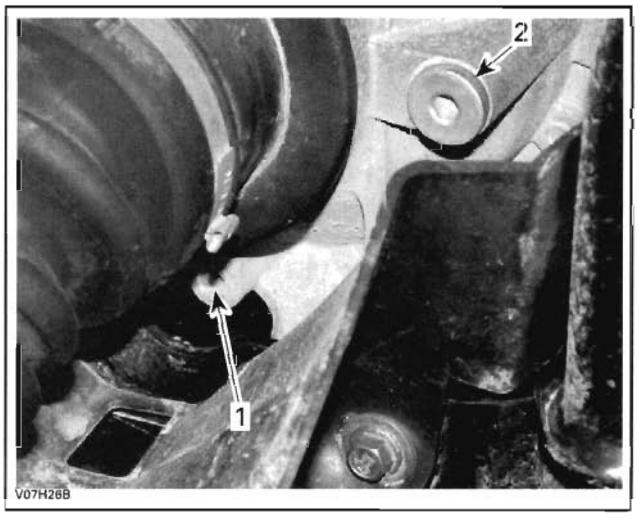
Ensure vehicle is on a level surface.

Clean drain plug area.

Place a drain pan under rear differential drain plug area.

Unscrew filler plug **no. 22**.

Remove drain plug **no. 23**.



1. Drain plug
2. Filler plug

Clean drain plug area then reinstall drain plug.

Use a funnel and refill rear differential at the proper level with recommended oil.

MODEL	CAPACITY	RECOMMENDED OIL
All models	300 mL (10 U.S. oz)	Bombardier differential oil (P/N 293 600 043) or REDLINE pump oil 75W90 (API GL5)

Reinstall filler plug.

Removal

Install a jack stand under differential to support the vehicle during the following procedure.

Remove:
- rear wheels
- trailing arms
- drive shafts
- differential protector **no. 8**
- upper and lower differential bolts **no. 18** and **no. 19**
- propeller shaft bolt **no. 17** and its washer
- differential **no. 10**.

Inspection

Turn rear differential gear with a finger; it should turn smoothly. Replace if necessary.

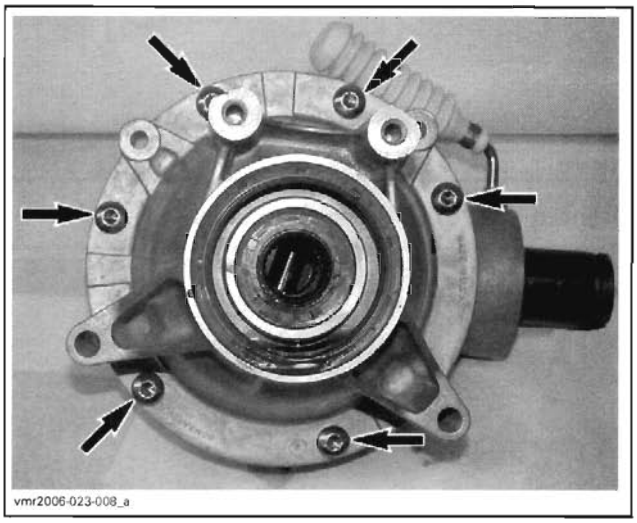
Check backlash and drag torque, see *ADJUSTMENT* further in this section.

Check if oil seals are brittle, hard or damaged. Replace if necessary.

Disassembly

Ring Gear

To change ring gear **no. 24**:
- Unscrew the TORX screws **no. 25**, then separate half housings.



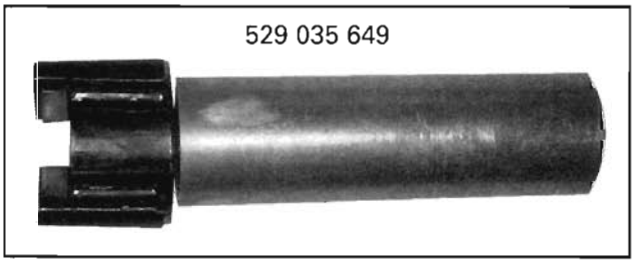
TYPICAL — FRONT DIFFERENTIAL SHOWN

NOTE: Be careful to keep track of shims on each end of ring gear.
- Extract ring gear out of half housing.

Pinion Gear

Remove oil seal **no. 26**.

Unscrew the pinion nut **no. 27**. Use the differential spanner socket (P/N 529 035 649).



Remove the bearing **no. 28** at the same time as the pinion gear **no. 29**. Be careful to keep track of shims.

NOTE: The pinion gear and bearing can be easily removed using the following suggested tool:
- pipe 3-1/2 in diameter x 5 in (1)
- screwed rod M10 x 1.25, 7 in length (1)
- nut M10 x 1.25 (3)
- flat bar (1).

Adjustment

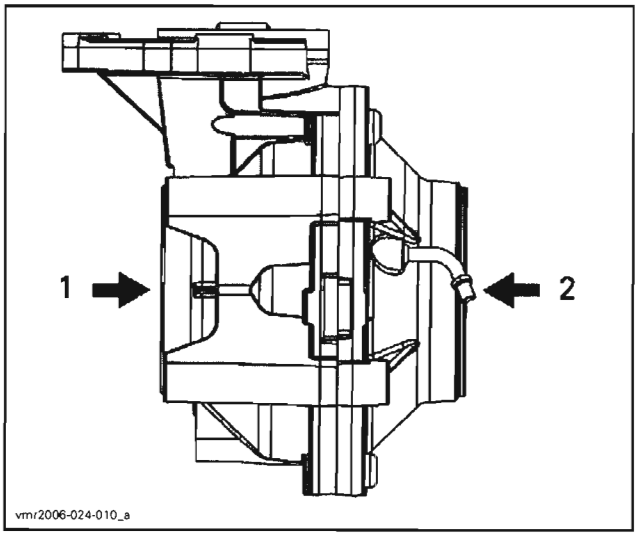
A shimming procedure must be done when pinion gear, ring gear or housing is (are) changed.

Measure the old pinion shim stack. If the shims measure over 1 mm (.039 in), install shim stacks on the differential components as per CHART A.

If the old pinion shim stack measurement is under 1 mm (.039 in), install a .5 mm (.02 in) shim on the differential components as per CHART B.

CHART A		CHART B	
PINION	2.18 mm (.086 in)	PINION	.5 mm (.02 in)
BACKLASH	.94 mm (.037 in)	BACKLASH	
PRELOAD	1.37 mm (.054 in)	PRELOAD	

NOTE: The procedure above sets the pinion shim thickness and should not be modified thereafter. Any changes should be done on preload and/or backlash side(s).

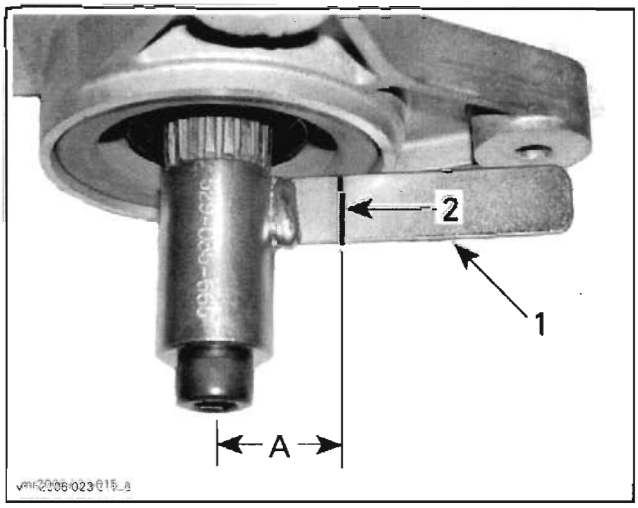


1. Backlash side
2. Preload side

Assemble the differential.

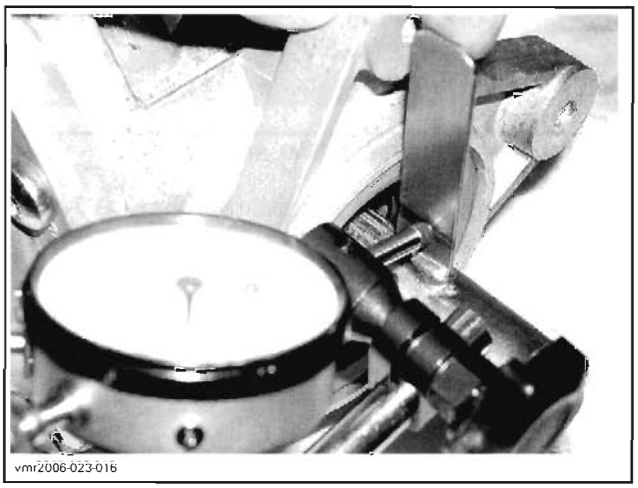
Backlash

- Using a dial indicator and the backlash measurement tool (P/N 529 035 665), measure the backlash. Place the backlash measurement tool at the end of pinion gear.
- From center of bolt, measure 25.4 mm (1 in) and scribe a mark on the tab.



1. Tab of backlash measurement tool
2. Mark on tab
A. 25.4 mm (1 in)

- Position the dial indicator tip against the tab at a 90° angle and right on the previously scribed mark.
- Gently, move the tab back and forth. Note the result.



- Rotate pinion gear 1/2 turn and check backlash again. Note the result.
- Rotate pinion gear 1 turn and check backlash again.

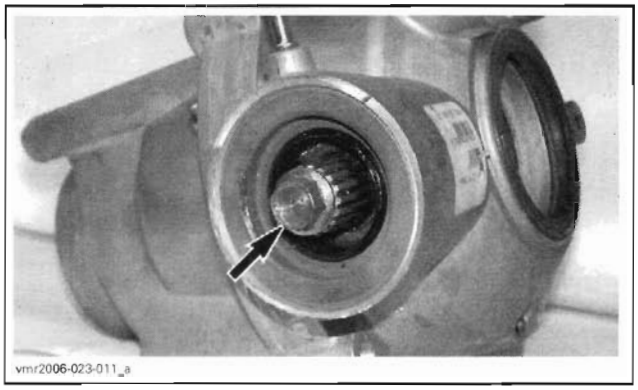
If backlash is below 0.05 mm (.002 in), increase backlash shim by 0.05 mm (.002 in) and check the backlash again.

If backlash is greater than 0.356 mm (.014 in), decrease backlash shim by 0.05 mm (.002 in) and check the backlash again.

Measure preload.

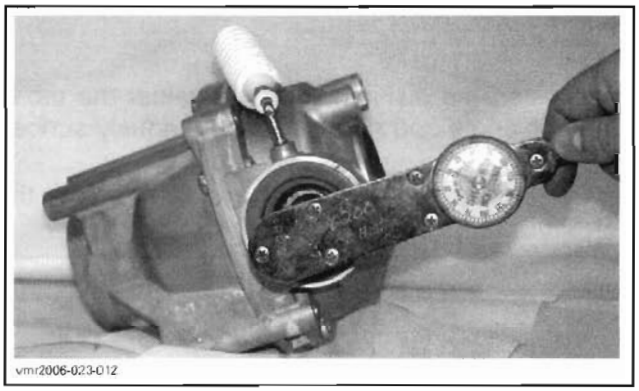
Preload

Screw the propeller shaft adaptor bolt in pinion gear.



TYPICAL — FRONT DIFFERENTIAL SHOWN

Using a needle torque wrench, measure the drag torque.



TYPICAL — FRONT DIFFERENTIAL SHOWN

If the drag torque is greater than 0.7 N•m (6 lbf•**in**), reduce preload shim by 0.05 mm (.002 in) and check drag torque again.

If the drag torque is less than 0.06 N•m (.5 lbf•**in**), increase preload shim by 0.05 mm (.002 in) and check drag torque again.

Assembly

Ring Gear

To assemble, reverse the removal procedure. Pay attention to the following details.

Verify condition of half housing seal **no. 30**. Change seal if necessary.

Check all bearings and all oil seals. Change them if necessary.

Pinion Gear

To install, reverse the removal procedure. Pay attention to the following details.

Check O-ring **no. 31** for damage. If so, change it.

Install the shim then the ball bearing.

Install the nut **no. 27**. Apply Loctite 277 (P/N 293 800 073) on threads nut then torque it to 200 N•m (148 lbf•ft).

Apply XP-S synthetic grease (P/N 293 550 010) in the lips of the new oil seal **no. 26** and install it.

Installation

The installation is the reverse of the removal procedure.

STEERING SYSTEM

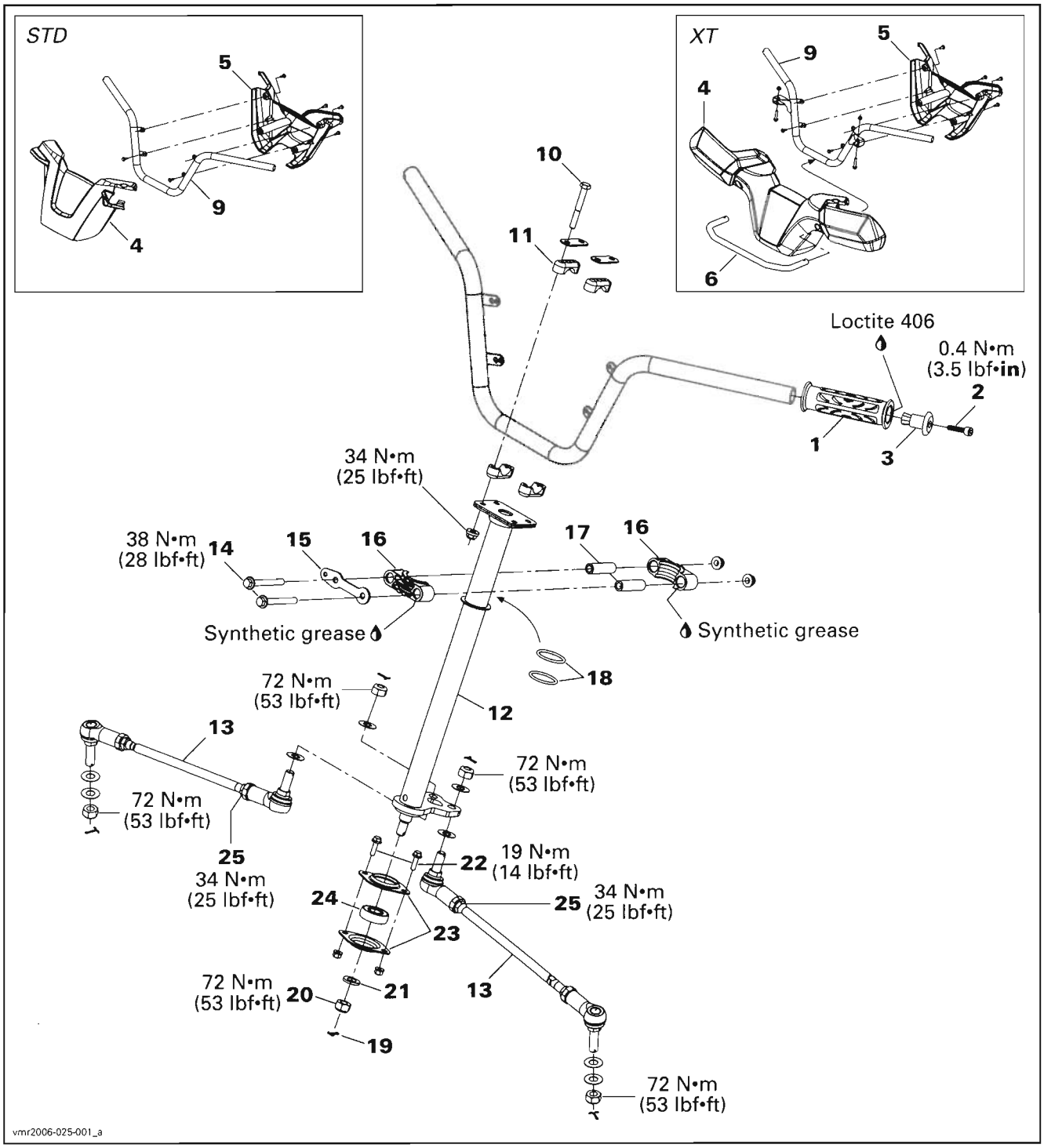
SERVICE TOOLS – OTHER SUPPLIER

Description	Part Number	Page
Smoothflow™ tapered tip	16 ga #511 rtt-b	370

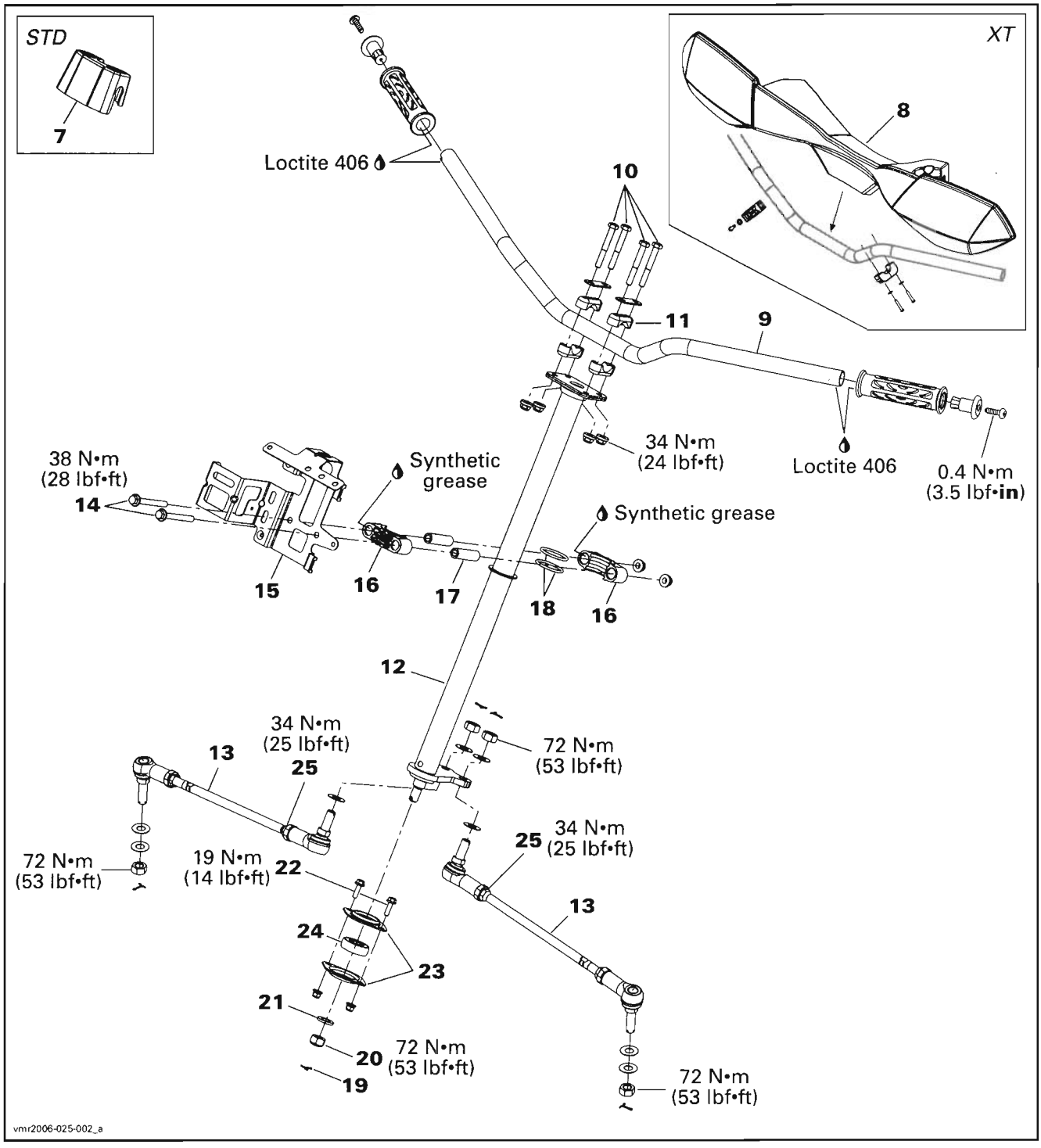
SERVICE PRODUCTS

Description	Part Number	Page
Loctite 406 (glue)	293 800 100	370
pulley flange cleaner	413 711 809	370
synthetic grease	529 550 010	373

Outlander 400 Series



Outlander 800 EFI Series



GENERAL

During assembly/installation, use the torque values and service products as in the exploded views.

Clean threads before applying a threadlocker. Refer to *SELF-LOCKING FASTENERS* and *LOCTITE APPLICATION* at the beginning of this manual for complete procedure.

⚠ WARNING

Torque wrench tightening specifications must strictly be adhered to.
Locking devices (e.g.: locking tabs, elastic stop nuts, 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.

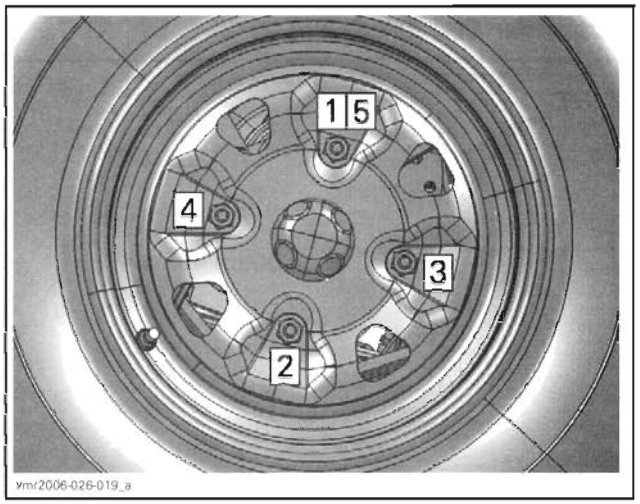
TIRES AND WHEELS

⚠ WARNING

When the tires are replaced, never install a bias tire with a radial tire. Such a combination could create handling and/or stability problems.
Do not mix tires of different size and/or design on the same axle.
Front and rear tire pairs must be the identical model and manufacturer.
For unidirectional tread pattern, ensure that the tires are installed in the correct direction of rotation.
The radial tires must be installed as a complete set.
Severe injury or death can result if these instructions are not followed.

The tires are directional and their rotation must be kept in a specific direction for proper operation.

Torque wheel nuts to 70 N•m (52 lbf•ft) in accordance with the following illustration.



CAUTION: Always use the recommended wheel nuts. Using a different nut could cause damages to the rim.

PROCEDURES

HANDLEBAR GRIP

Removal

Loosen the screw **no. 2** at the end of handlebar grip **no. 1**.

Remove the handlebar grip cap **no. 3**.

Cut and remove the handlebar grip.

Installation

Remove all rubber residues of the old grip before installing the new.

Clean the handlebar with pulley flange cleaner (P/N 413 711 809) or alcohol to remove any greasy matter on it.

Install handlebar grip by blowing compressed air between handle grip and handlebar.

Install a Smoothflow™ tapered tip (P/N 16 ga #511 rtt-b) from EFD Inc on a bottle of Loctite 406 (glue) (P/N 293 800 100).

Lift a part of the grip using a small screwdriver and inject glue (about 4 spots per side).

NOTE: The glue dries quickly. Do not apply it before installing grip.

Apply pressure on the grip for approximately 30 seconds to set the glue.

Install the handlebar grip cap and torque screw 0.4 N•m (3.5 lbf•**in**).

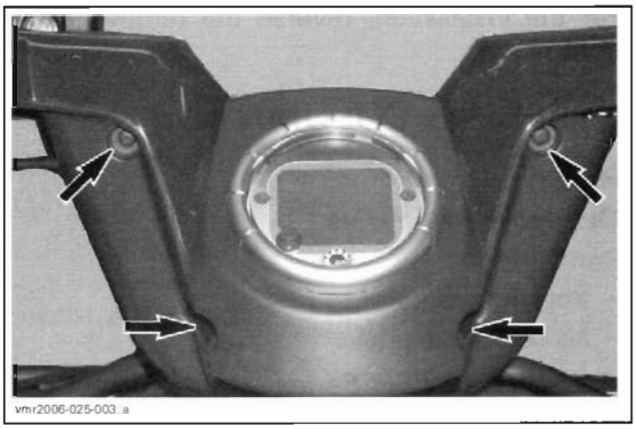
HANDLEBAR COVER

Removal

Outlander 400 Series

Front Handlebar Cover

Remove handlebar cover screws.



TYPICAL — FRONT HANDLEBAR COVER SCREWS

Separate the front handlebar cover **no. 4** from the rear handlebar cover **no. 5**.



TYPICAL

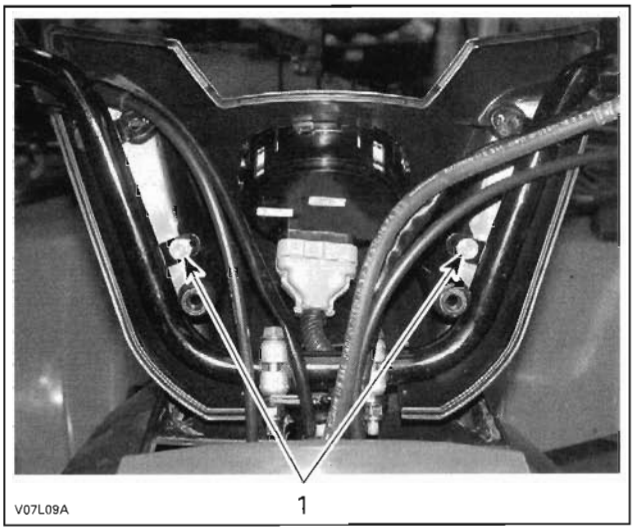
On **XT models**, unscrew the accessories support **no. 6** from the handlebar.

Remove the front handlebar cover.

Rear Handlebar Cover

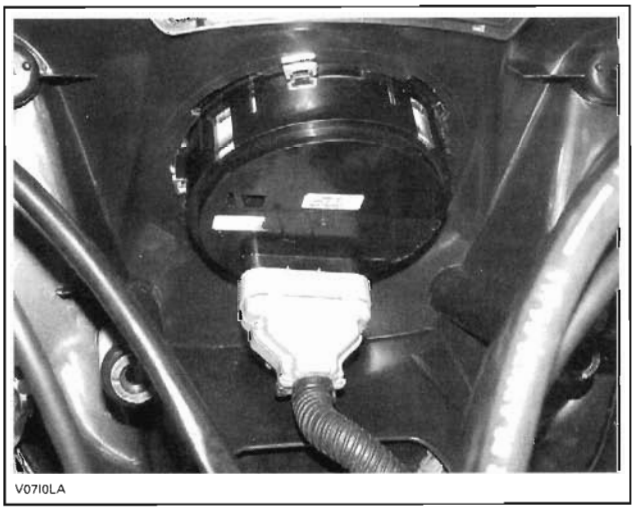
Remove:

- front handlebar cover **no. 4**
- rear cover screws.



TYPICAL
1. Rear cover screws

Unplug the speedometer.



TYPICAL

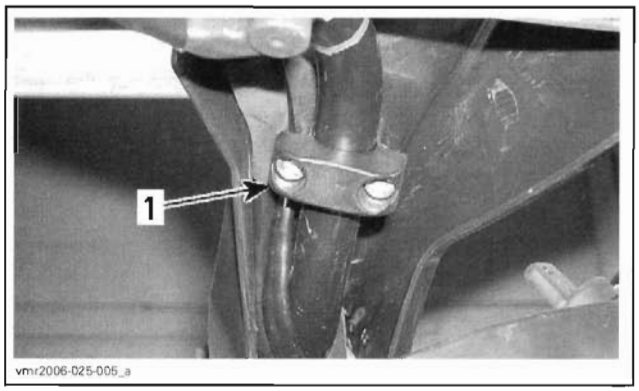
Remove rear handlebar cover **no. 5** from vehicle.

Outlander 800 EFI Series

On **models without XT package**, just pull the handlebar cover **no. 7** to remove it.



On XT models, unscrew both plastic U-clamps that attach handlebar cover no. 8 to the handlebar no. 9.



1. Plastic U-clamp

Inspection

Check covers for cracks or other damages. Replace if necessary.

Installation

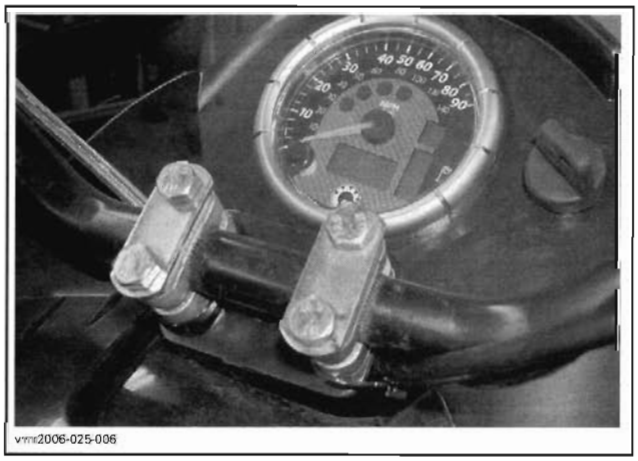
The installation is the reverse of removal procedure.

HANDLEBAR

Removal

Remove:
- handlebar cover(s)
- handlebar grips no. 1
- throttle and brake handles as well as multi-function switch (see below in this section)

NOTE: Remove handlebar grips, throttle handle, brake handle and multi-function switch only if the handlebar is defective and replace with a new.
- steering clamp mounting bolts no. 10 and steering clamps no. 11



- handlebar no. 9.

Inspection

Inspect the handlebar for damage, cracks or bending, replace if any of these problems is detected.

Installation

For the installation, reverse the removal procedure.

STEERING COLUMN

Removal

Outlander 400 Series

Remove:
- front fender (refer to *BODY*)
- handlebar cover(s).

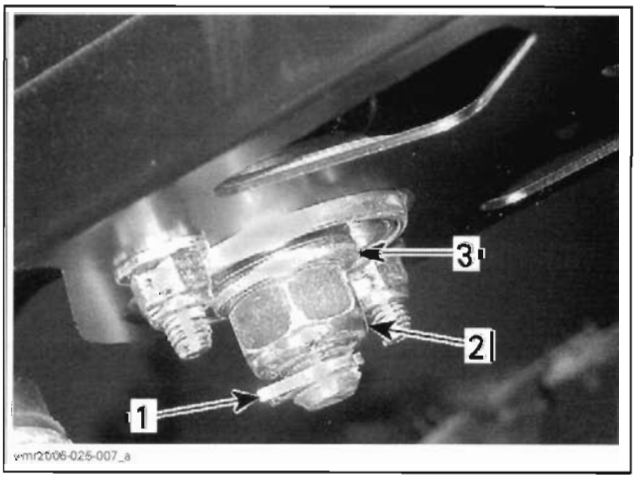
Outlander 800 EFI Series

Remove:
- both footrests
- console and dashboard
- air intake silencer.

All Models

Remove handlebar (only if the replacement of the steering column is necessary).

Remove the cotter pin (discard it), the elastic stop nut and the washer to bottom end of steering column.



1. Cotter pin
2. Elastic nut
3. Washer

Separate steering column no. 12 and tie-rods no. 13. Refer to *TIE-ROD*, further in this section.

Remove half bushing bolts no. 14, plate no. 15, half bushing no. 16 and bushings no. 17.

Pull out steering column.

Inspection

Inspect steering column for wear, cracks or bending, replace if any of these problems is detected.

Check if O-rings **no. 18** are brittle, hard or otherwise damaged. Replace if necessary.

At the same time, check steering bearing condition. It must turn smoothly and freely. If not, refer to *STEERING COLUMN BEARING* for replacement procedure.

Installation

For the installation, reverse the removal procedure. Pay attention to the following.

Apply synthetic grease (P/N 529 550 010) on O-rings and on bushings.

Install a new cotter pin. Both ends of cotter pin must be folded.

STEERING COLUMN BEARING

Removal

Place vehicle on jack stands and remove one wheel.

Outlander 400 Series

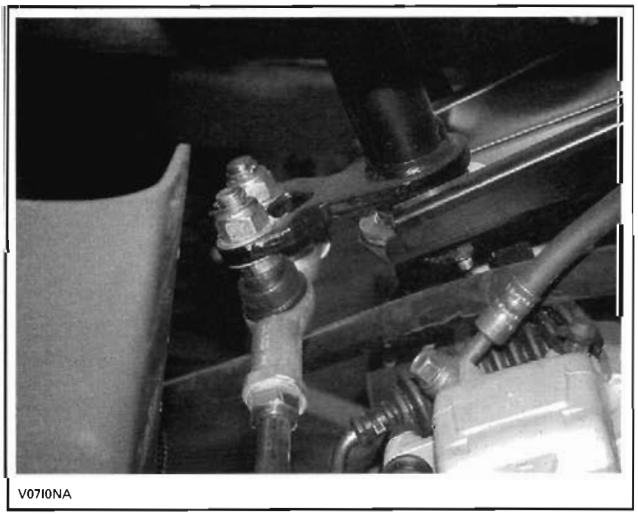
Remove front fender and console. Refer to *BODY*.

Outlander 800 EFI Series

Remove:
- both footrests
- console and dashboard
- air intake silencer.

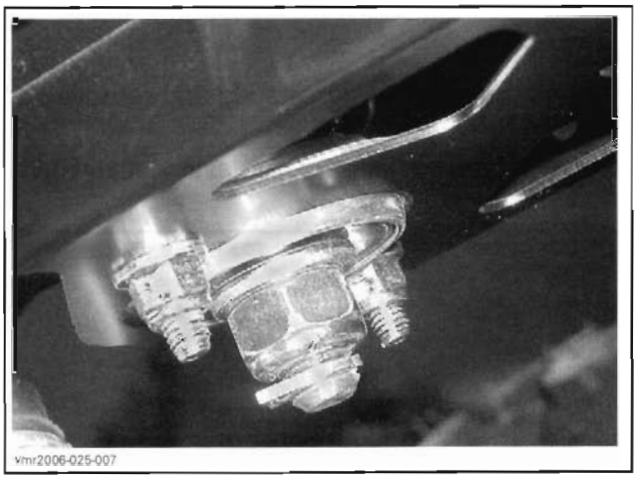
All Models

Separate tie-rods **no. 13** from steering column **no. 12**. Refer to *TIE-ROD* section.



TYPICAL

Remove cotter pin **no. 19** (discard it), elastic nut **no. 20** and flat washer **no. 21** to bottom end of steering column **no. 12**.



Pull up steering column.

Remove bolts **no. 22** and bearing flanges **no. 23**.

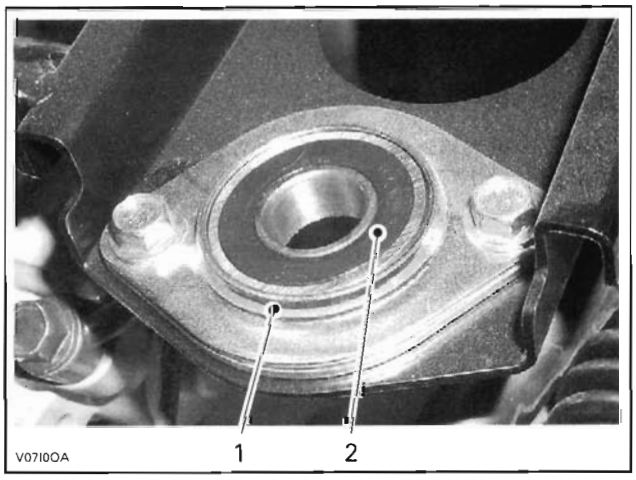
Remove bearing **no. 24**.

Installation

For installation, reverse the removal procedure. Pay attention to the following details.

Place flanged collar outward.

NOTE: Install both bearing flanges on top of frame support.



1. Flanged collar
2. Bearing

Install flanged collar bolts **no. 22**.

Install the steering column, flat washer, elastic nut and a new cotter pin. Both ends of cotter pin must be folded.

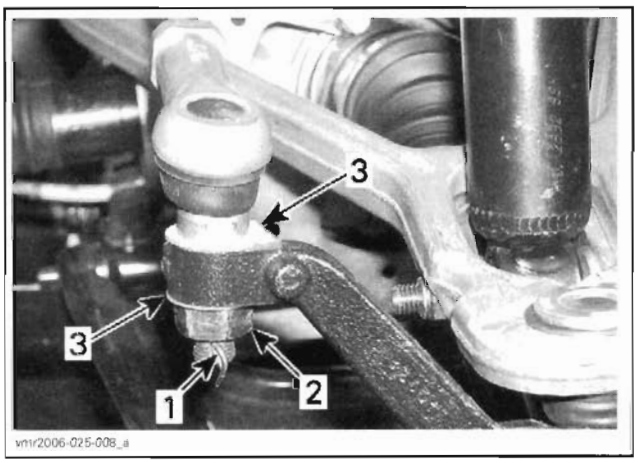
TIE-ROD

NOTE: Use the same procedure for RH and LH side.

Removal

Place the vehicle on jack stands and remove the appropriate wheel.

Remove cotter pin (discard it), elastic nut and hardened washers.



1. *Cotter pin*
2. *Elastic nut*
3. *Hardened washers*

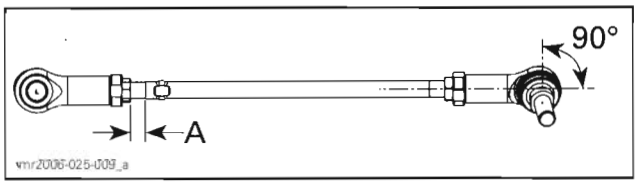
Inspection

Inspect ball joint ends for wear or looseness, if excessive, replace.

Installation

For the installation, reverse the removal procedure. Pay attention to the following details.

When installing a tie-rod, screw threaded end of tie-rod into ball joint. The maximum length for tie-rod groove to ball joint end must match value **A** in the following chart:



MODEL		A
ALL	mm	17 ± 5
	in	.67 ± .20

NOTE: Torque the ball joint lock nut **no. 25** to 34 N•m (25 lbf•ft).

Install a new cotter pin. Both ends of cotter pin must be folded.

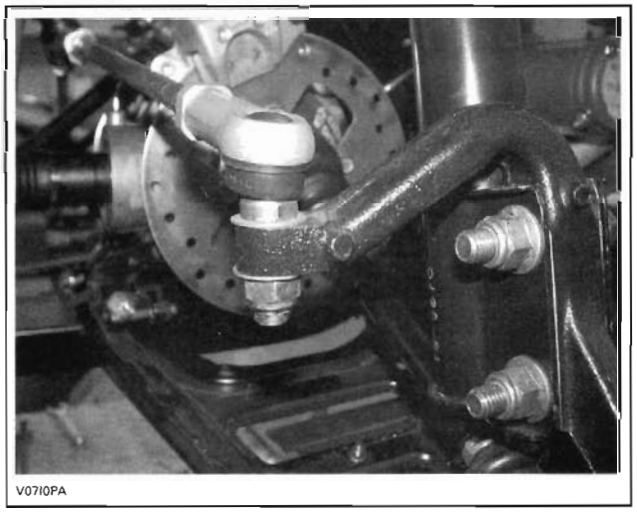
KNUCKLE

Removal

Outlander 400 Series

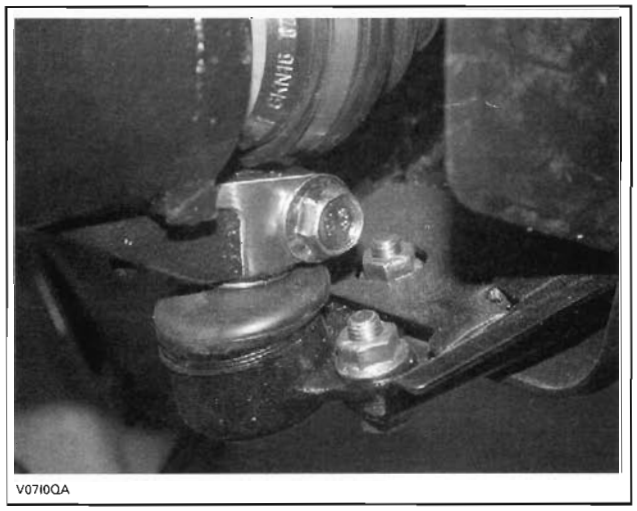
Place vehicle on jack stands and remove the appropriate wheel.

Separate tie-rod **no. 13** from knuckle.

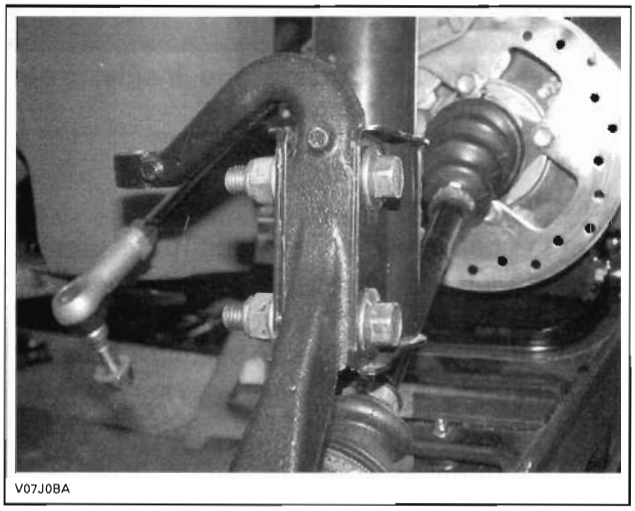


TYPICAL

Remove:
- wheel hub (refer to *FRONT DRIVE*)
- bolt retaining the lower ball joint to the knuckle



- strut bolts


V07J0BA

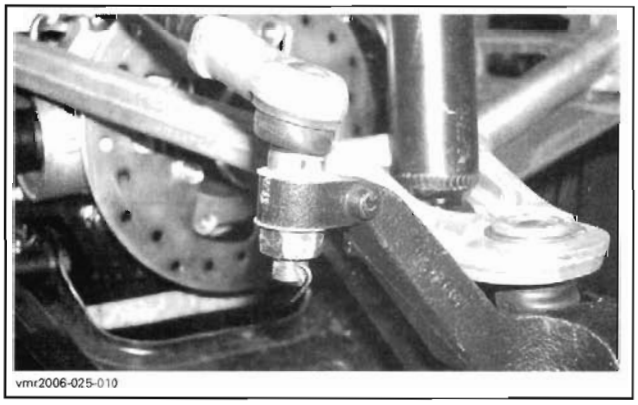
TYPICAL

– knuckle.

Outlander 800 EFI Series

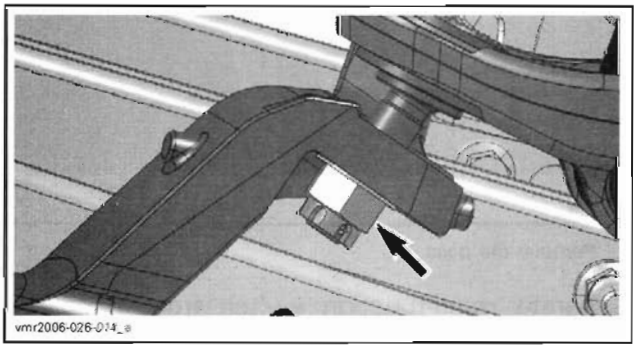
Place vehicle on jack stands and remove the appropriate wheel.

Separate tie-rod **no. 13** from knuckle.

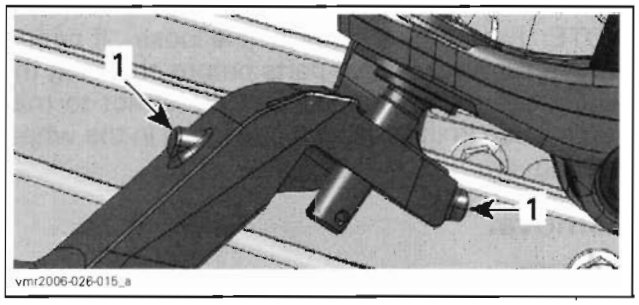

vmr2006-025-010

Remove wheel hub. Refer to *FRONT SUSPENSION*.

Unscrew the upper ball joint nut and separate upper ball joint to knuckle.


vmr2006-026-014_a

Using a hammer, hit on the knuckle tip to separate ball joint from knuckle. A ball joint remover can be used if the ball joint is jammed into knuckle.

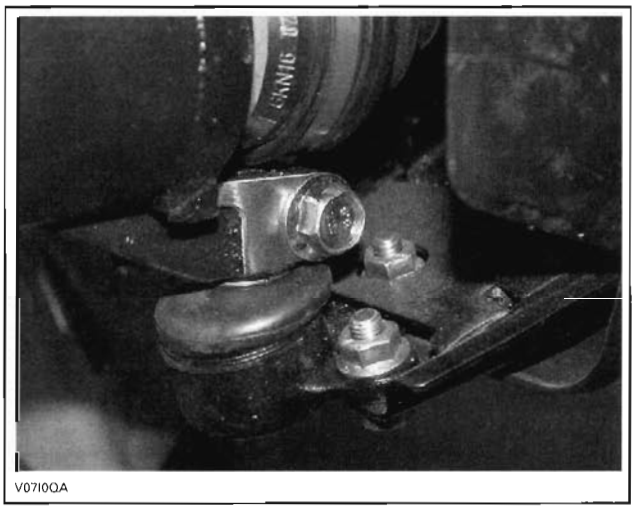


vmr2006-026-015_a

1. Hit here

CAUTION: Never hit on upper suspension arm. Permanent damages should be caused on arm and its replacement will be necessary.

Remove bolt that attache lower ball joint to knuckle.


V07I0QA

Remove knuckle.

Inspection

Check knuckle for cracks or other damages. Replace if necessary.

Check if wheel bearing turns freely and smoothly. See *WHEEL BEARING* below if the replacement is necessary.

Installation

The installation is the reverse of removal procedure.

WHEEL BEARING

Inspection

Raise the front of vehicle.

Hold the wheel by the top and the bottom and move it. Check for lateral play.

If there is any loose, replace the wheel bearing.

NOTE: First, check if ball joint is loose. If necessary repair all defective parts before checking the wheel bearing condition. Be careful not to misjudge loose in the ball joint and loose in the wheel bearing.

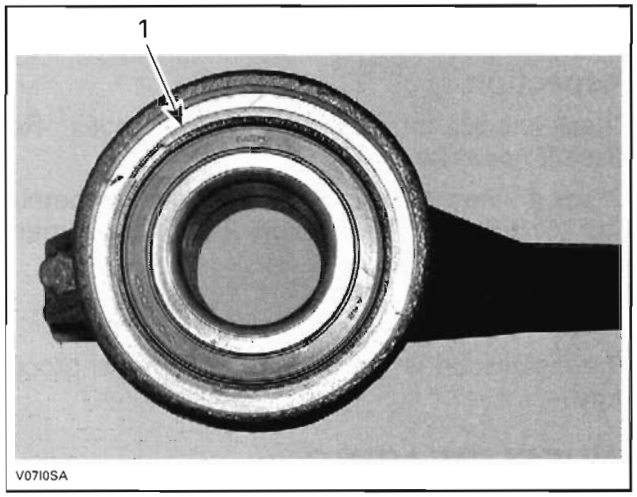
Removal

Remove:

- knuckle from vehicle, (see above)
- seal (discard)


V07I0RA

- circlip.



V07I0SA

1. Circlip

Using a press machine, push the bearing out of knuckle.

NOTE: It may be necessary to heat the knuckle to remove the bearing.

⚠ WARNING

Clean all grease, outside and inside, from knuckle before heating it.

Installation

Place the bearing in a freezer for 10 minutes before installing.

Place the knuckle in oven to 100°C (212°F) for 30 minutes maximum to ease bearing installation.

When knuckle is cold, install the circlip and the new seal.

Install the other parts in the reverse order of removal procedure.

MULTI-FUNCTION SWITCH

Test

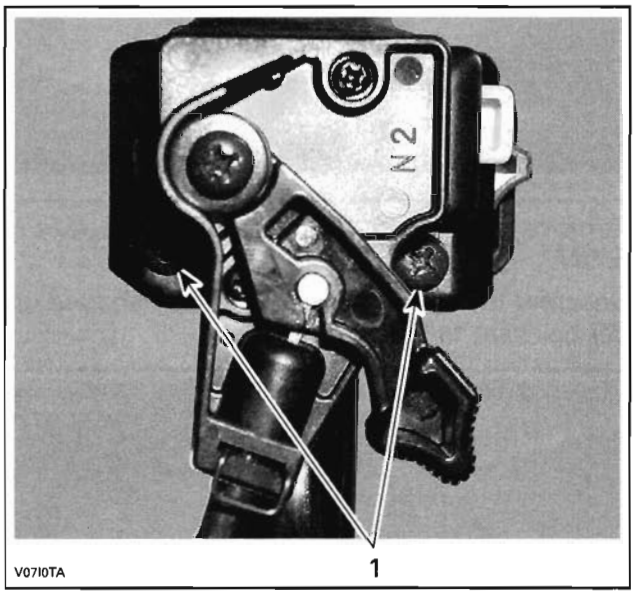
Refer to *INSTRUMENTS AND ACCESSORIES* for Hi-Lo Beam button.

Refer to *STARTING SYSTEM* for engine stop switch and start button.

Removal

Remove choke cable from multi-function switch. Refer to *CARBURETOR* for procedure.

Remove bolts.



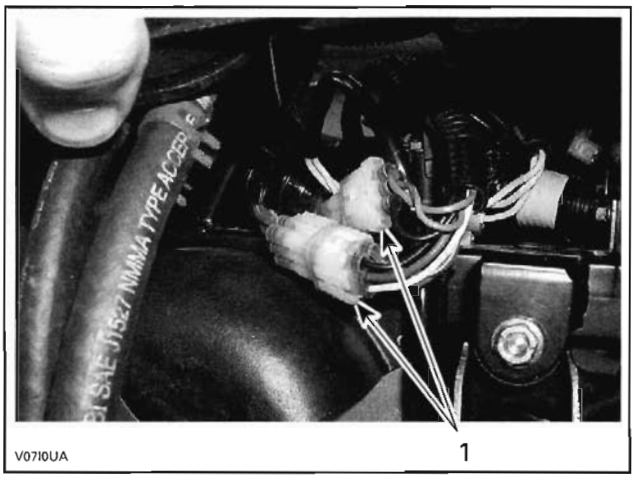
V07I0TA

1. Remove the bolts

Separate multi-function switch from handlebar **no. 9**.

Remove console. Refer to *BODY*.

Unplug multi-function switch connector. The connector is located under console.



UNDER CONSOLE
1. Unplug these connectors

Installation

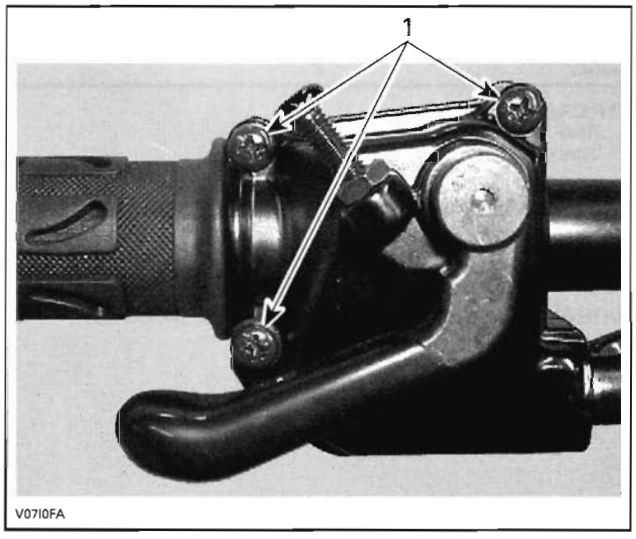
For installation, reverse the removal procedure.

NOTE: Install choke cable and adjust it. Refer to *CARBURETOR*.

THROTTLE HANDLE

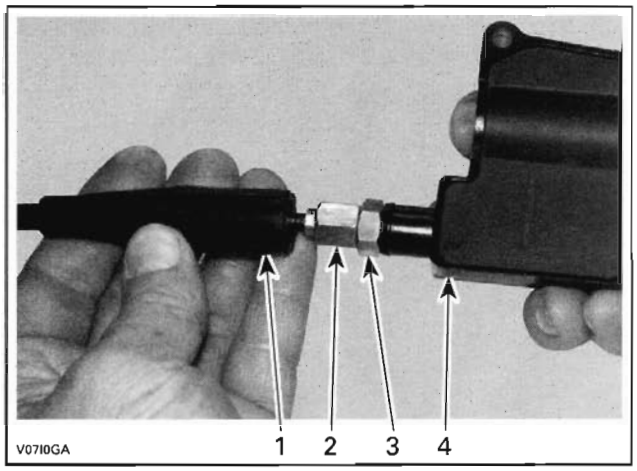
Removal

Remove screws.



1. Remove screws

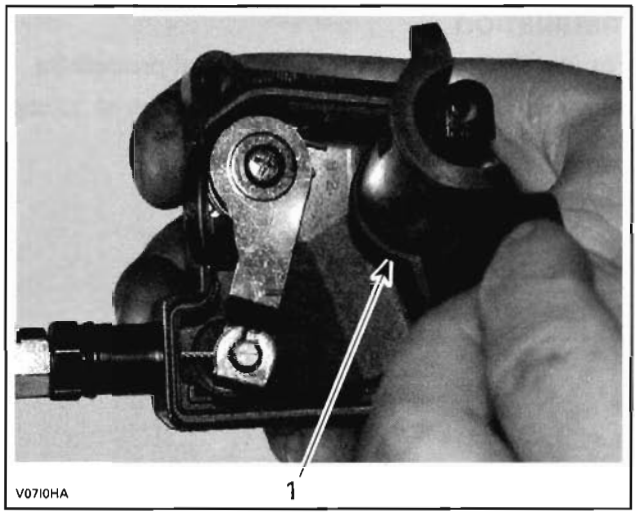
Separate throttle handle from handlebar **no. 9**. Slide rubber protector back to expose throttle cable adjuster.



1. Cable protector
2. Throttle cable adjuster
3. Lock nut
4. Throttle lever housing

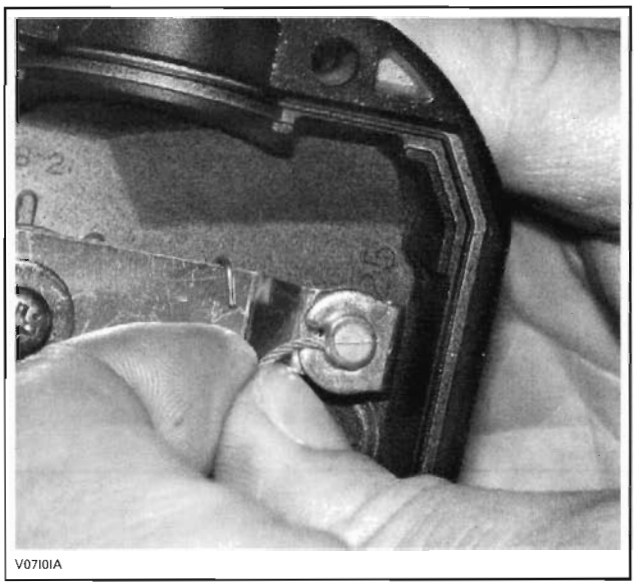
Screw in the throttle cable adjuster.

Remove inner housing protector.



1. Inner housing protector

Remove throttle cable from housing.


V07I01A

Slide cable in clip slot and remove the end of the cable from clip.

Installation

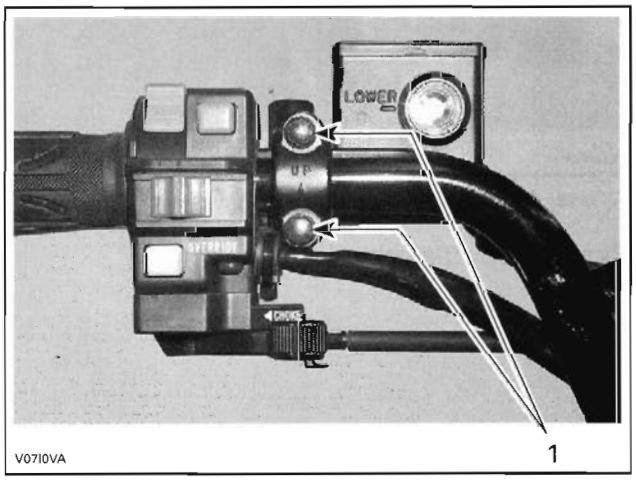
For installation, reverse the removal procedure.

Refer to *CARBURETOR* for adjustment procedure.

HANDLE BRAKE

Removal

Remove screws.



TYPICAL
1. Remove the screws

Separate handle brake from handlebar no. 9.

Hose Removal

Refer to *HYDRAULIC BRAKES* for specifics instructions.

Installation

For installation, reverse the removal procedure.

ADJUSTMENT

STEERING ALIGNMENT

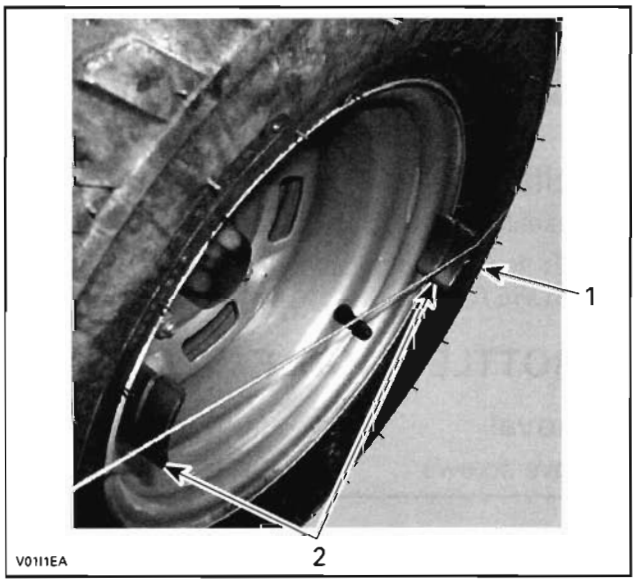
Place vehicle on level surface.

Check that handlebar is straight.

Check pressure in each tires. Always follow recommended pressure.

Place a rope around the vehicle and using an elastic, link both ends together.

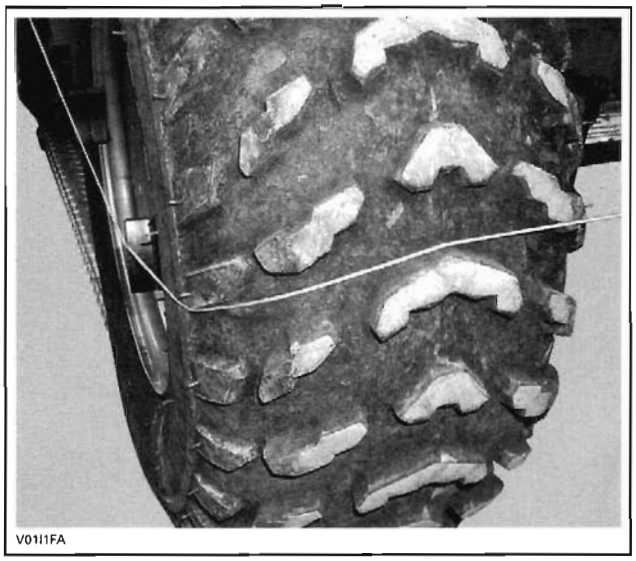
Install spacers on rear rims. These spacers will prevent the rope from touching the tires.



TYPICAL
1. Rear wheel
2. Spacers

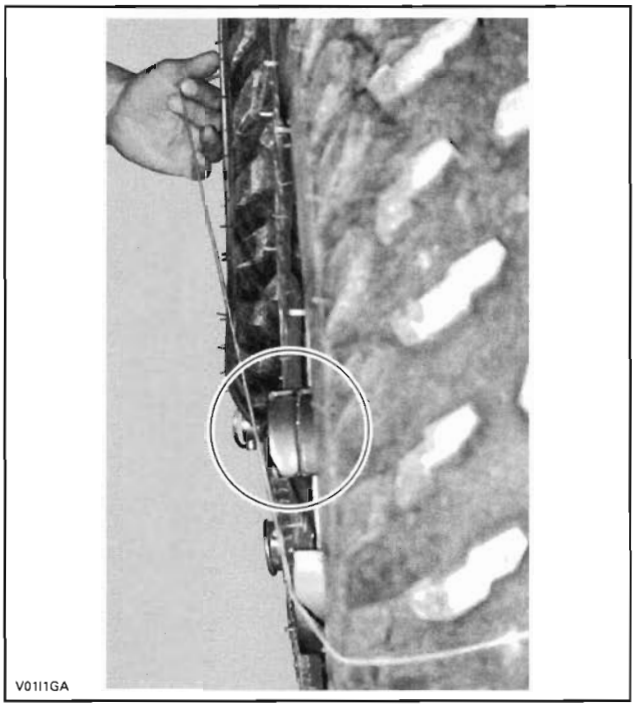
NOTE: Many items can be used as spacers. Magnets are recommended.

The rope must be place at the center of the wheels. Do not place rope on tire threads.



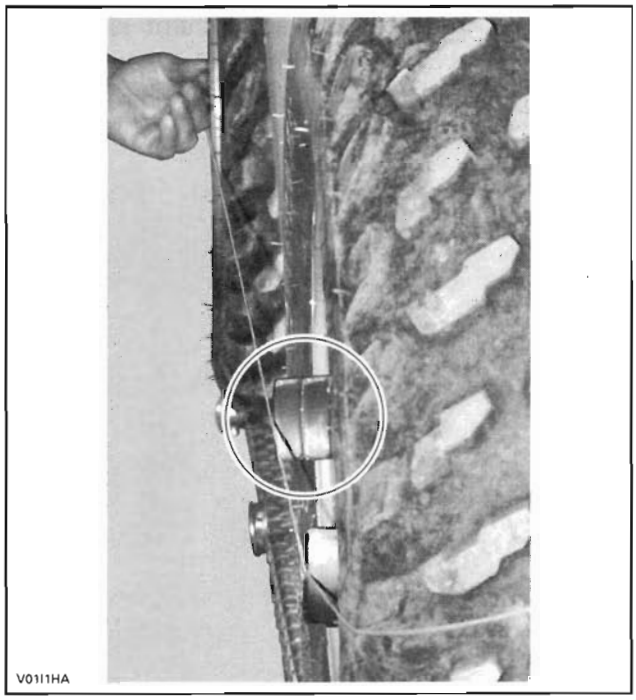
TYPICAL

From the front of vehicle, near the front of rim, move rope so that it does not touch the first spacer.



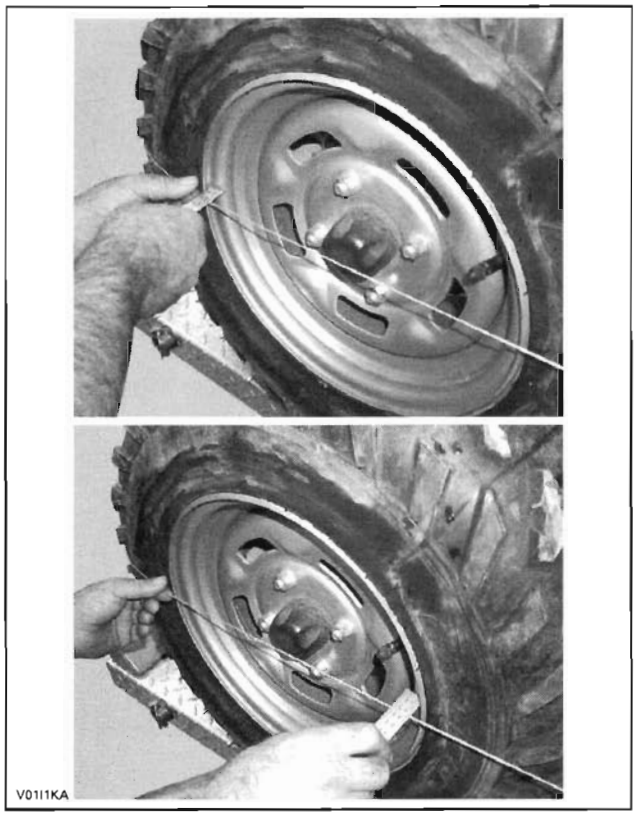
TYPICAL

Then, bring the rope back until it touches the spacer.



TYPICAL

Keep this position and measure the distance between the rope and the rim, to the front and to the rear of wheel.



TYPICAL

The perfect total toe-out adjustment is 0 mm ± 4 mm (0 in ± .157 in) each side.

Set alignment of wheel by adjusting tie-rod.

FRONT SUSPENSION

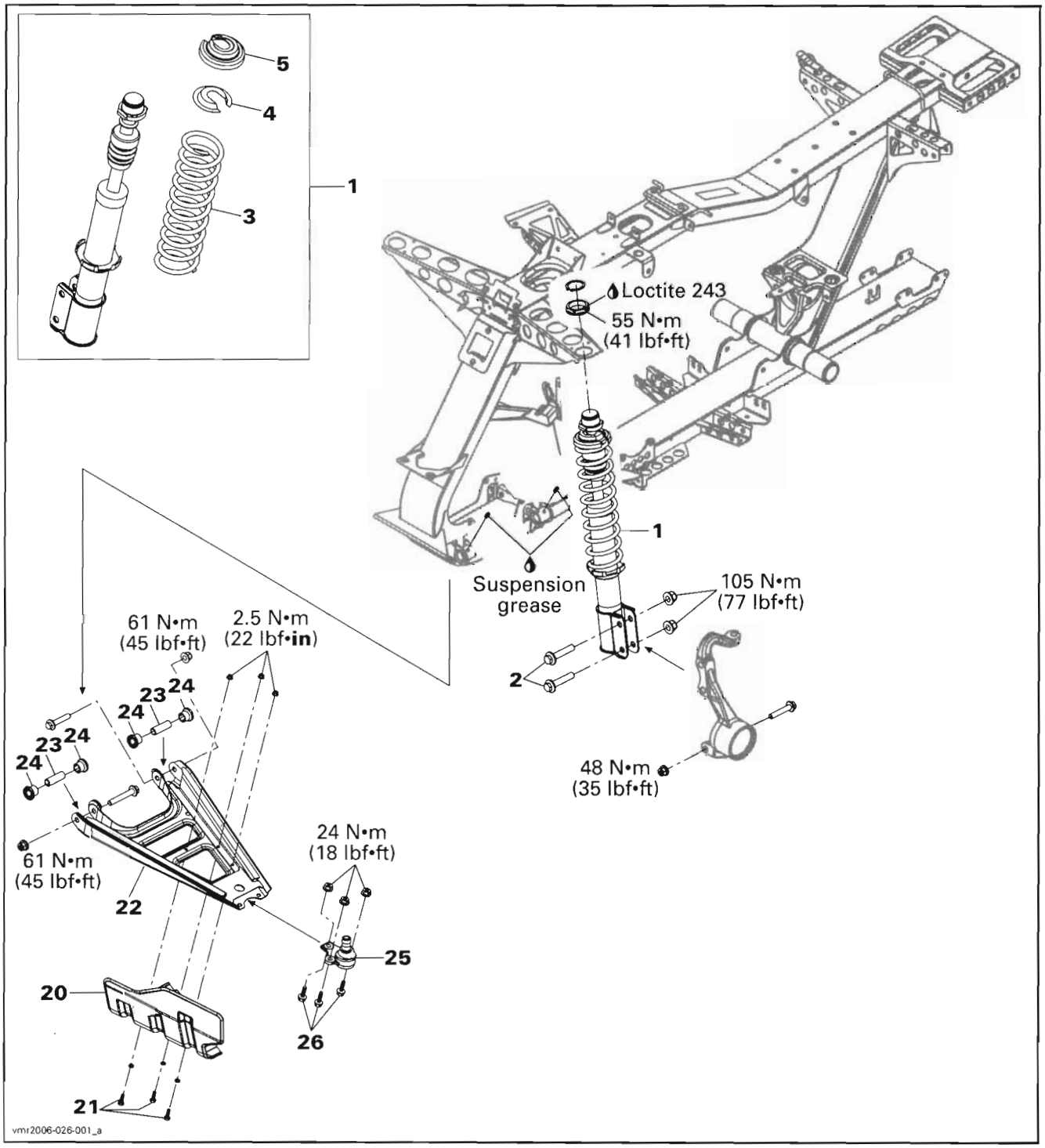
SERVICE TOOLS

Description	Part Number	Page
ball joint installer	529 036 020	389
shock/spring remover	529 036 007	385

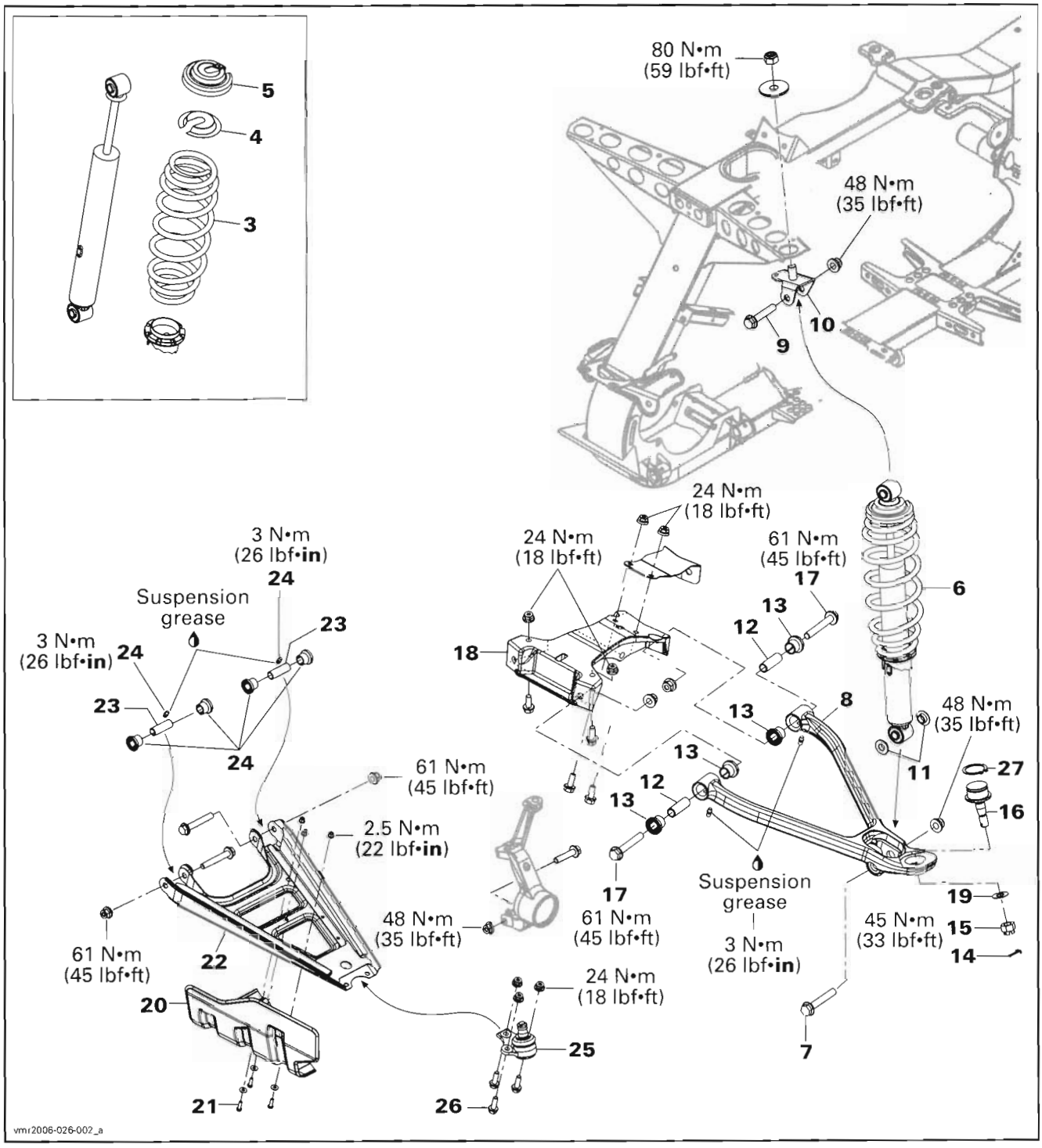
SERVICE PRODUCTS

Description	Part Number	Page
suspension grease	293 550 033	387

Outlander 400 Series



Outlander 800 Series



GENERAL

The procedure explained below is the same for the RH and LH sides unless otherwise noted.

During assembly/installation, use the torque values and service products as in the exploded view.

Clean threads before applying a threadlocker. Refer to *SELF-LOCKING FASTENERS* and *LOCTITE APPLICATION* at the beginning of this manual for complete procedure.

⚠ WARNING

Torque wrench tightening specifications must strictly be adhered to.
Locking devices (e.g.: locking tabs, elastic stop nuts, 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.

PROCEDURES

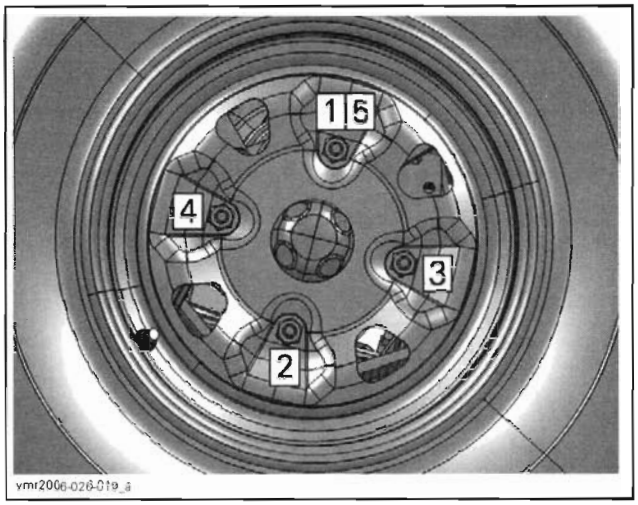
TIRES AND WHEELS

⚠ WARNING

When the tires are replaced, never install a bias tire with a radial tire. Such a combination could create handling and/or stability problems.
Do not mix tires of different size and/or design on the same axle.
Front and rear tire pairs must be the identical model and manufacturer.
For unidirectional tread pattern, ensure that the tires are installed in the correct direction of rotation.
The radial tires must be installed as a complete set.
Severe injury or death can result if these instructions are not followed.

The tires are directional and their rotation must be kept in a specific direction for proper operation.

Torque wheel nuts to 70 N•m (52 lbf•ft) in accordance with the following illustration.



CAUTION: Always use the recommended wheel nuts. Using a different nut could cause damages to the rim.

SHOCK ABSORBER AND SPRING

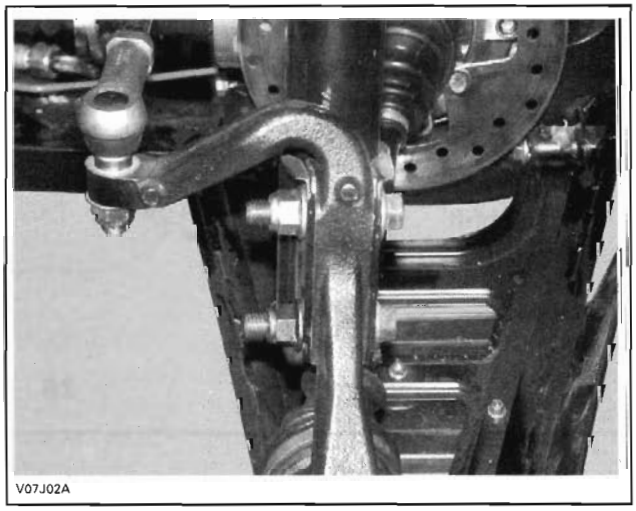
Removal

Outlander 400 Series

Loosen wheel nuts.

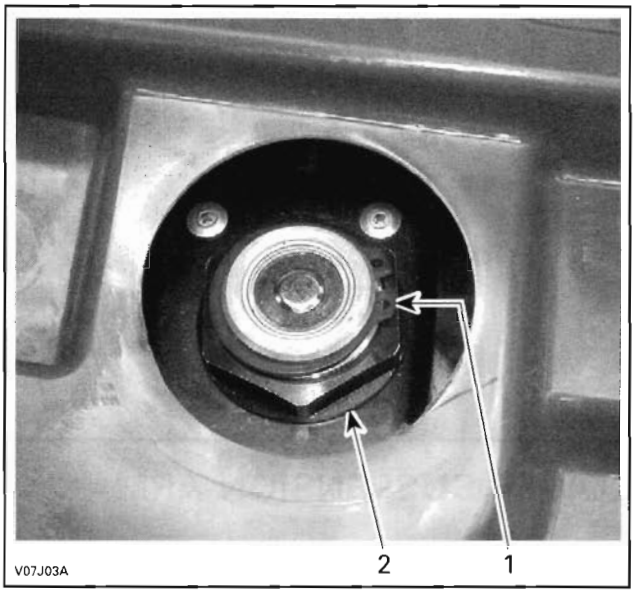
Lift front of vehicle until front struts **no. 1** are fully extended then install a jack stand under the frame to support the vehicle off the ground.

Remove:
- appropriate wheel
- front rack and cap on the top of the front fender
- bolts **no. 2** retaining strut to the knuckle



TYPICAL

- circlip
- shock nut.



1. Circlip
2. Shock nut

Remove shock from vehicle.

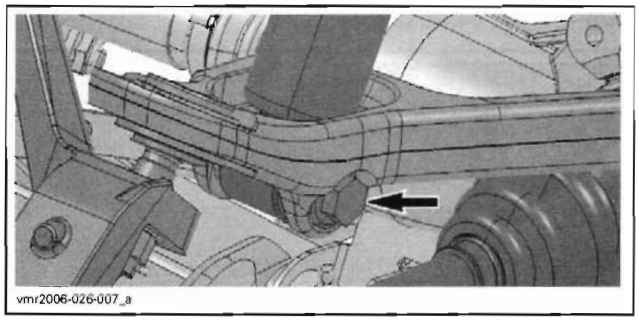
Outlander 800 Series

Loosen wheel nuts of the appropriate wheel.

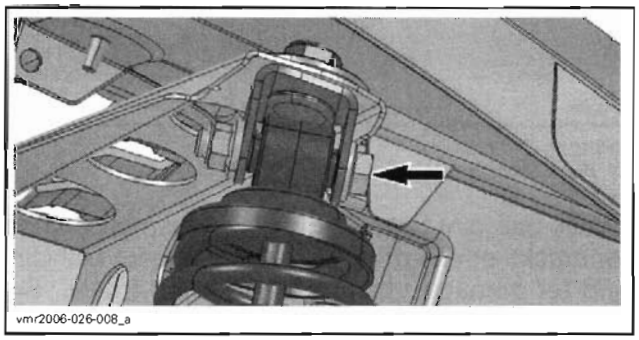
Lift the front of the vehicle until shock absorber **no. 6** is fully extended then install a jack stand under the frame to support the vehicle off the ground.

Remove wheel.

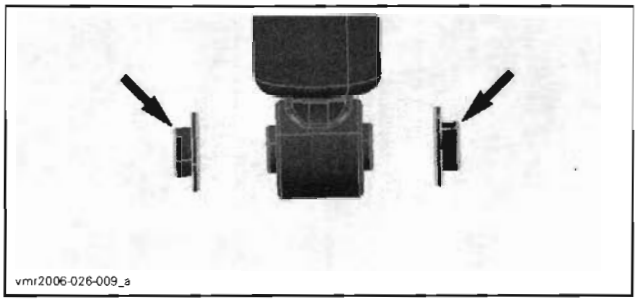
Remove lower bolt **no. 7** from upper A-arm **no. 8**.



Then the upper bolt **no. 9** from shock absorber support **no. 10**.

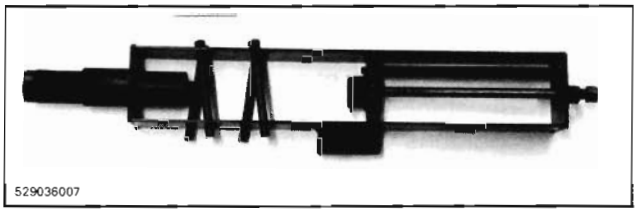


When the shock absorber is removed from upper arm, pay attention not to mislay the both metallic bushings **no. 11**.

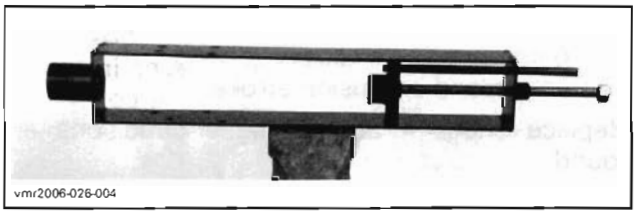


Disassembly

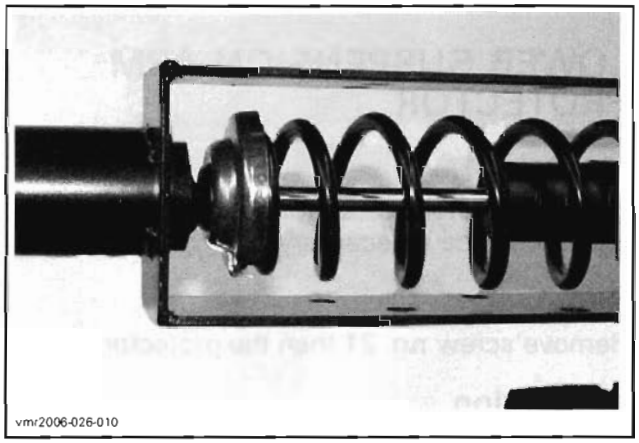
To remove spring from the shock absorber, use the shock/spring remover (P/N 529 036 007).



Place the tool in a vise.

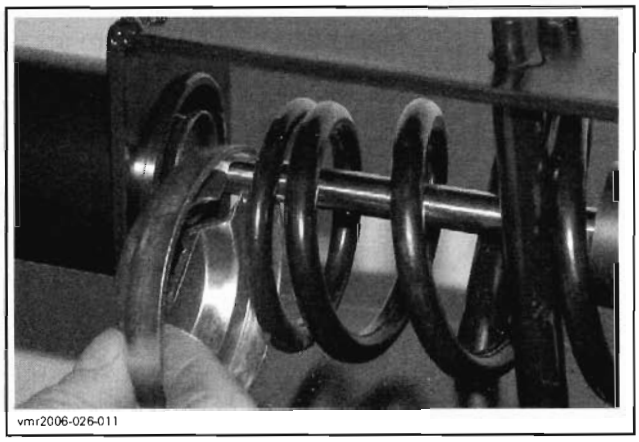


Position the shock absorber in the tool and install the spring compressor pins.



Tighten the shock spring remover screw until the spring **no. 3** is sufficiently compressed to remove spring locking devices.

Remove spring stopper **no. 4** and its cap **no. 5** then release the shock spring remover screw.


vmr2006-026-011

Inspection

Inspect the spring **no. 3** for damage. Replace if necessary.

Inspect shock for oil leakage. Extend and compress the piston several times over its entire stroke. Check that it moves smoothly and with uniform resistance with rod up. Any of the following conditions will denote a defective shock:

- A skip or hang up when reversing stroke at mid travel.
- Seizing or binding conditions except at extreme end of either stroke.
- A gurgling noise after completing one full compression and extension stroke.

Replace shock if any of these conditions are found.

Assembly and Installation

For assembly and installation, reverse the disassembly and removal procedures.

LOWER SUSPENSION ARM PROTECTOR

Inspection

Check protector **no. 20** for cracks or other damages. Replace if necessary.

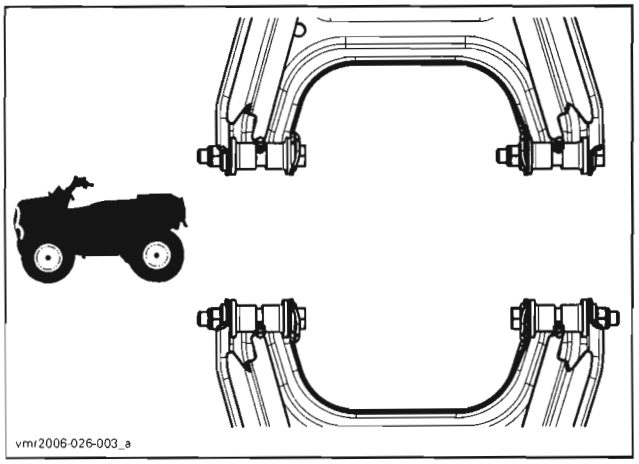
Removal

Remove screw **no. 21** then the protector.

Installation

The installation is the reverse of removal procedure.

Install lower suspension arm bolts as per following illustration.


vmr2006-026-003_a

LOWER SUSPENSION ARM

Inspection

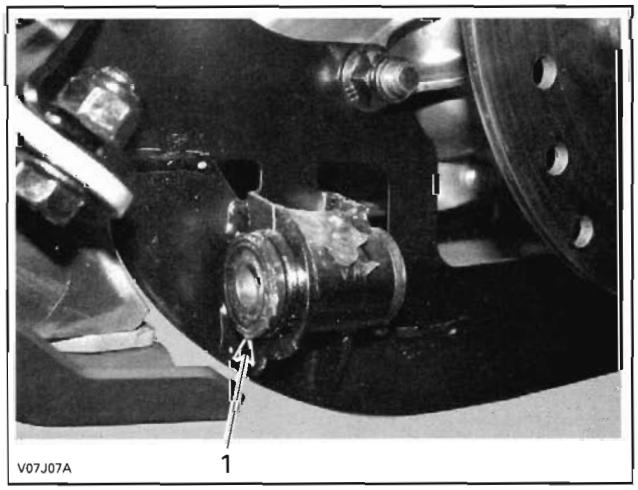
Check lower suspension arms **no. 22** for distortion or damage. Replace suspension arms if necessary.

Move lower suspension arm from side to side. There should be no noticeable loose. Replace bushings if necessary.

Move lower suspension arm up and down. There should be no noticeable loose. Replace bushings if necessary.

The following items are performed when the lower suspension arm is removed.

Inspect pivot bushings **no. 23** and cushions **no. 24** for wear or damages. Replace bushings and/or cushions if necessary.



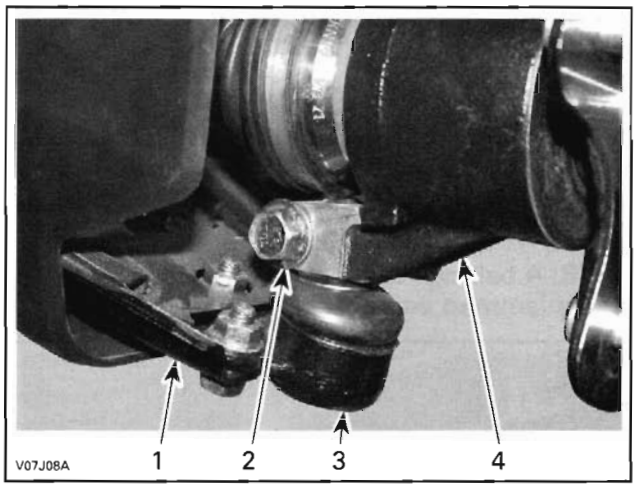
TYPICAL
1. Pivot bushing

Check ball joint bellows on lower suspension arm for cracks or any other damage. Inspect ball joint end for damage. Ensure it's moving freely. Replace ball joints as required, see below for procedure.

Removal

Remove wheel.

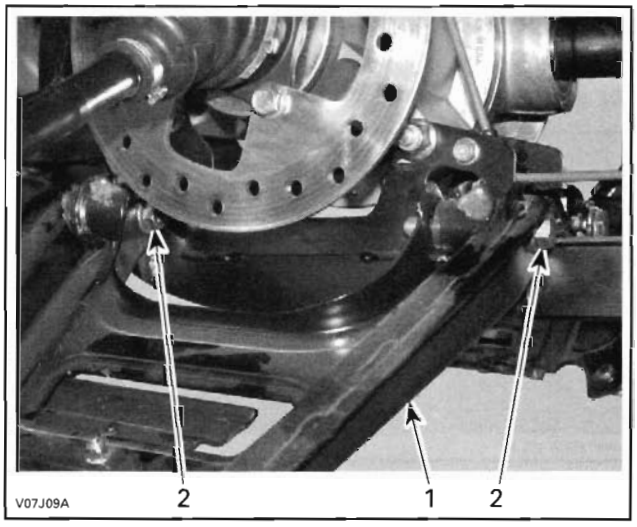
Remove bolt retaining lower suspension arm to the knuckle.



TYPICAL
1. *Lower suspension arm*
2. *Ball joint bolt*
3. *Ball joint*
4. *Knuckle*

Separate lower suspension arm from knuckle.

Remove bolts retaining lower suspension arm to frame.



TYPICAL
1. *Lower suspension arm*
2. *Remove bolts*

Remove lower suspension arm from vehicle.

Installation

For assembly, reverse the disassembly procedure. However, pay attention to the following.

Install lower suspension arm to frame.

Attach lower suspension arm **no. 22** to knuckle.

Install wheel.

LOWER BALL JOINT

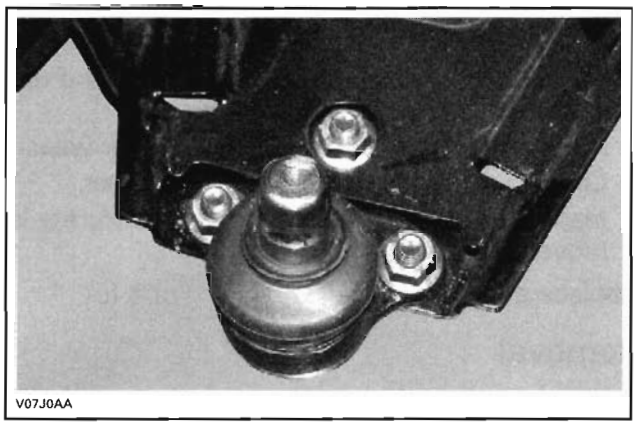
Inspection

Check lower ball joint **no. 25** for damage, pitting, looseness and roughness. If so, replace it.

Check ball joint bellows for cracks. Change if necessary.

Removal

Remove:
- appropriate wheel
- lower suspension arm from knuckle
- bolts **no. 26** retaining ball joint to lower suspension arm.



Extract the ball joint by pulling it out of lower suspension arm.

Installation

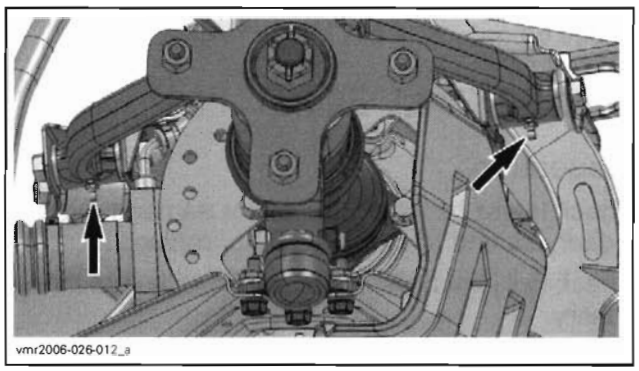
The installation is the reverse of removal procedure.

UPPER SUSPENSION ARM

Outlander 800 Series Only

Lubrication

Use suspension grease (P/N 293 550 033) to lubricate both upper suspension arms **no. 8**. There are two grease fitting on each arm.


vmr2006-026-012_a

Inspection

Check upper suspension arm for cracks, pitting, distortion or other damages. Replace as required.

Move upper suspension arm up and down then from side to side. There should be no noticeable play. Replace pivot bushings **no. 12** and/or cushions **no. 13** if necessary.

The following items are performed when the upper suspension arm is removed.

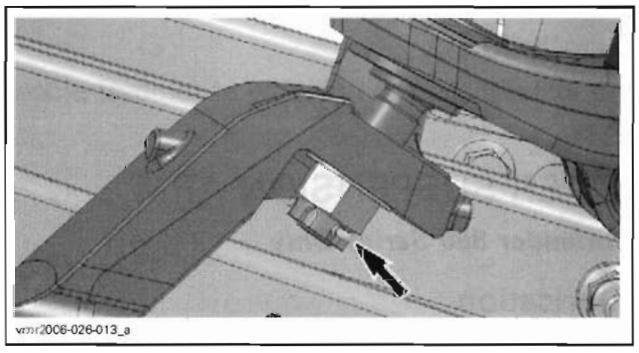
- Inspect pivot bushings and cushions for wear.
- Check ball joint bellows for crack or wear.
- Inspect ball joint end for damages. Ensure it is moved freely.

Replace all defective parts.

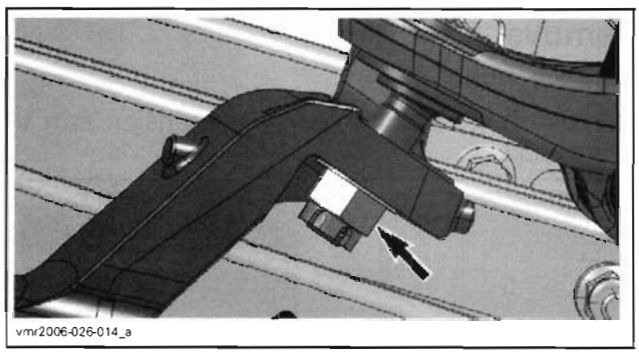
Removal

Remove appropriate wheel.

Remove cotter pin **no. 14** retaining upper ball joint nut **no. 15**. Discard cotter pin.

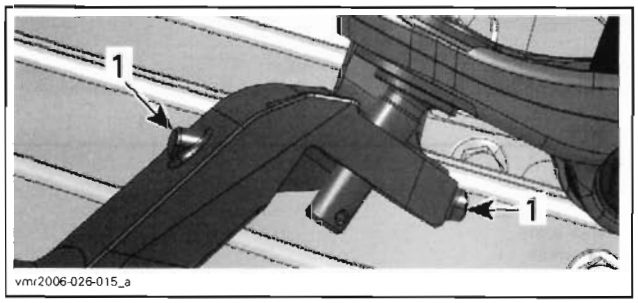

vmr2006-026-013_a

Unscrew upper ball joint nut.


vmr2006-026-014_a

Using a hammer, hit on the knuckle tip to separate ball joint **no. 16** from knuckle.

NOTE: A ball joint remover can be used if the ball joint is jammed into knuckle.

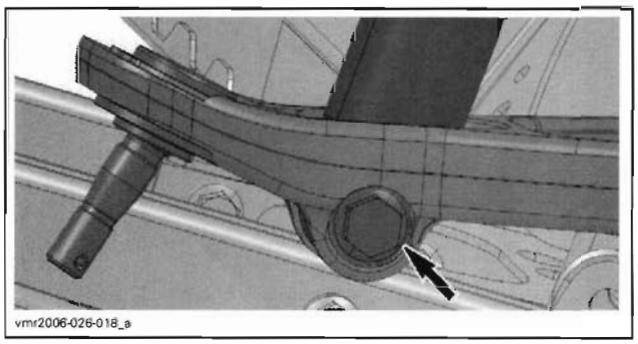


vmr2006-026-015_a

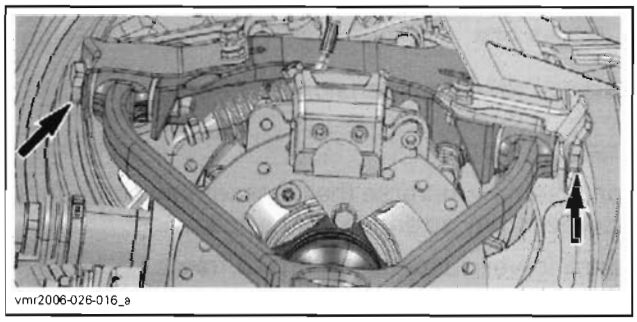
1. Hit here

CAUTION: Never hit on upper suspension arm. Permanent damages should be caused on arm and its replacement will be necessary.

Remove shock absorber lower bolt **no. 7** from upper suspension arm.


vmr2006-026-018_a

Unscrew bolts **no. 17** that attach upper suspension arm to upper suspension arm bracket **no. 18**.


vmr2006-026-016_a

Remove upper suspension arm from vehicle.

Installation

Position the upper suspension arm and install its bolts **no. 17**. Torque to 61 N•m (45 lbf•ft).

Attach the upper suspension arm to knuckle. When hardened washer **no. 19** and upper ball joint nut **no. 15** are installed, tighten nut to 45 N•m (33 lbf•ft) and further tighten until one of its grooves is aligned with a cotter pin hole.

Install a new cotter pin. Both end of cotter pin must be folded.

Install the shock absorber lower bolt and torque it to 48 N•m (35 lbf•ft).

Install wheel.

UPPER SUSPENSION ARM BRACKET

Outlander 800 Series Only

Removal

Remove both front wheels.

Unscrew the left caliper and attach it out of way.

Unscrew upper suspension arms from their bracket **no. 18**.

Remove upper differential bolts.

Remove front bolts that attach the upper suspension arm bracket to frame.

Slide bracket backward then pull it by the left side.

Inspection

Check the upper suspension arm bracket for crack or other damages. Replace as required.

Installation

The installation is the reverse of the removal procedure.

NOTE: Install bolts holding bracket to frame and upper differential bolts before tightening them.

UPPER BALL JOINT

Outlander 800 Series Only

Inspection

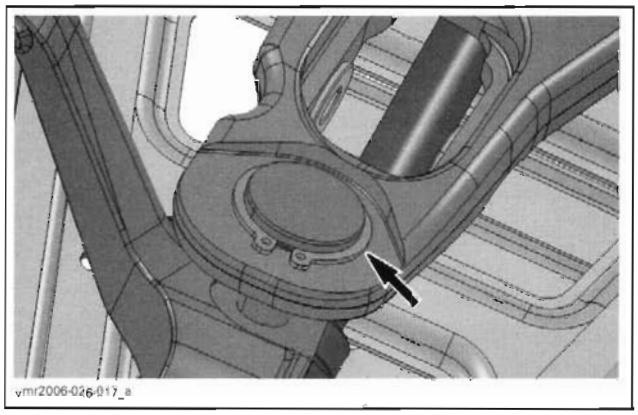
Check upper ball joint **no. 16** for damage, pitting, looseness and roughness. If so, replace it.

Check ball joint bellows for cracks. Replace as required.

Removal

Remove upper suspension arm.

Remove the circlip **no. 27**.

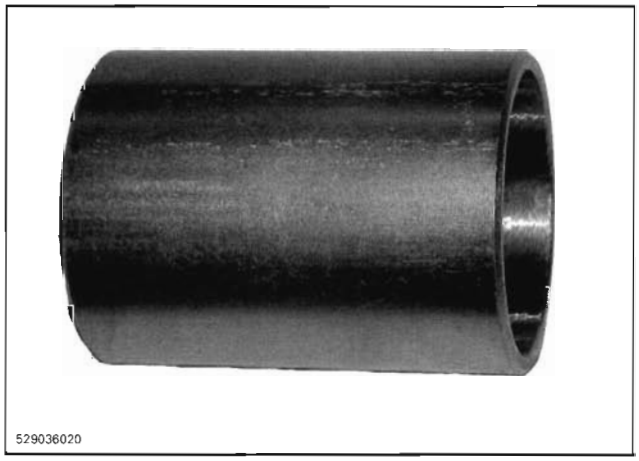


Using a press and a piece of pipe, remove the ball joint.

CAUTION: Support upper suspension arm properly to avoid damaging ball joint location.

Installation

To install the upper ball joint properly, use the ball joint installer (P/N 529 036 020).



Support the upper suspension arm before pressing the ball joint into its location.

Install the upper suspension arm.

Install wheel.

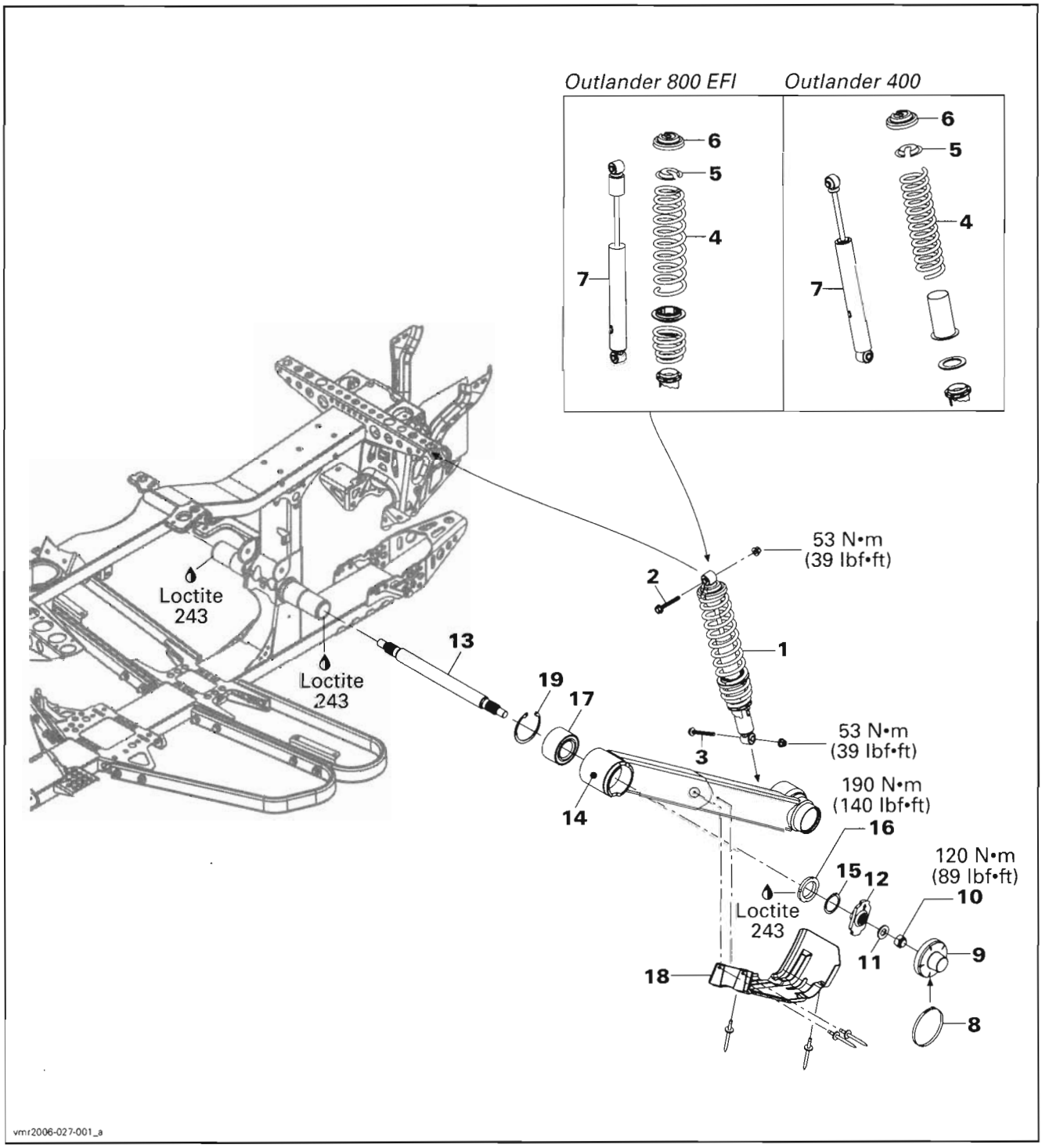
REAR SUSPENSION

SERVICE TOOLS

Description	Part Number	Page
Bearing extractor/installer	529 035 918	398
Bearing extractor/installer	529 035 920	398
shock spring remover	529 036 007	394
spanner wrench	529 035 925	396
trailing arm support	529 035 922	397

SERVICE PRODUCTS

Description	Part Number	Page
Loctite 243 (blue)	293 800 060	397


Outlander 800 EFI
Outlander 400
6
5
4
7
53 N•m
(39 lbf•ft)
2
1
Loctite
243
13
19
17
3
14
190 N•m
(140 lbf•ft)
16
15
12
120 N•m
(89 lbf•ft)
10
11
9
18
8
vmr2006-027-001_a

GENERAL

The procedure described below is the same for the RH and LH sides, unless otherwise instructed.

During assembly/installation, use the torque values and service products as in the exploded views.

Clean threads before applying a threadlocker. Refer to *SELF-LOCKING FASTENERS* and *LOCTITE APPLICATION* at the beginning of this manual for complete procedure.

⚠ WARNING

Torque wrench tightening specifications must strictly be adhered to.
Locking devices (e.g.: locking tabs, elastic stop nuts, 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.

PROCEDURES

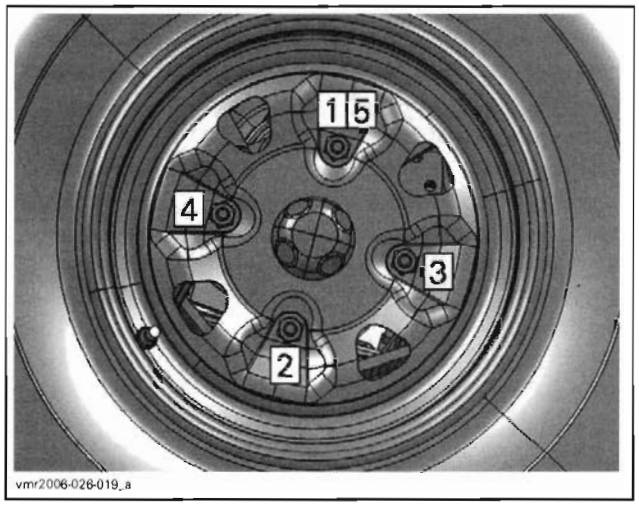
TIRES AND WHEELS

⚠ WARNING

When the tires are replaced, never install a bias tire with a radial tire. Such a combination could create handling and/or stability problems.
Do not mix tires of different size and/or design on the same axle.
Front and rear tire pairs must be the identical model and manufacturer.
For unidirectional tread pattern, ensure that the tires are installed in the correct direction of rotation.
The radial tires must be installed as a complete set.
Severe injury or death can result if these instructions are not followed.

The tires are directional and their rotation must be kept in a specific direction for proper operation.

Torque wheel nuts in accordance with the following illustration.



CAUTION: Always use the recommended wheel nuts. Using a different nut could cause damages to the rim.

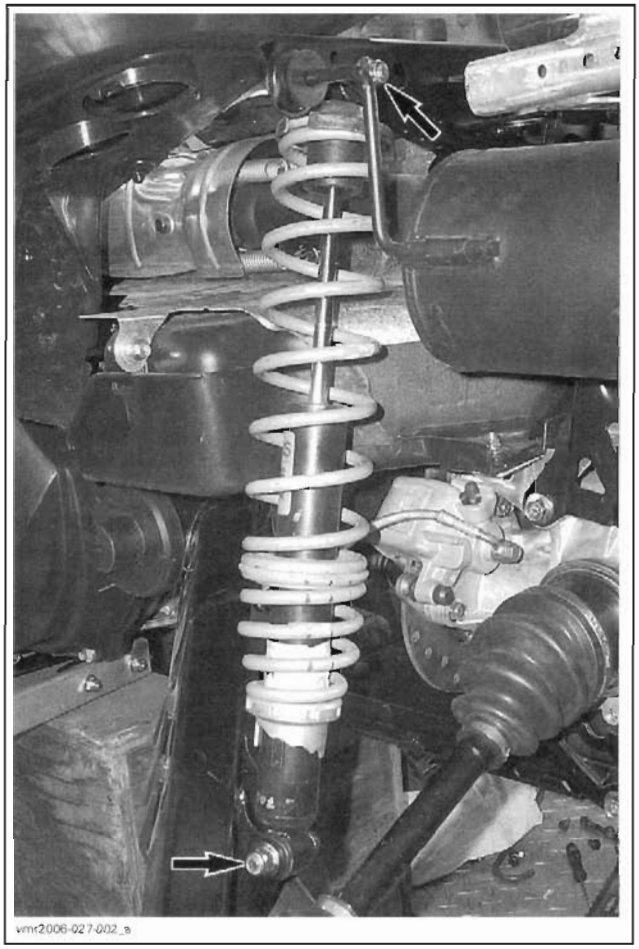
REAR SHOCK

Removal

Lift rear of vehicle until rear shock absorbers **no. 1** are fully extended.

Install jack stands or blocks under the frame to support the vehicle.

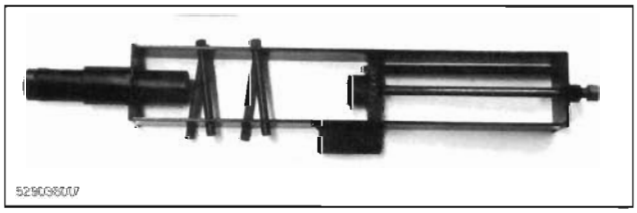
Remove upper **no. 2** and lower **no. 3** bolts retaining shock absorbers.



OUTLANDER 800 SHOWN

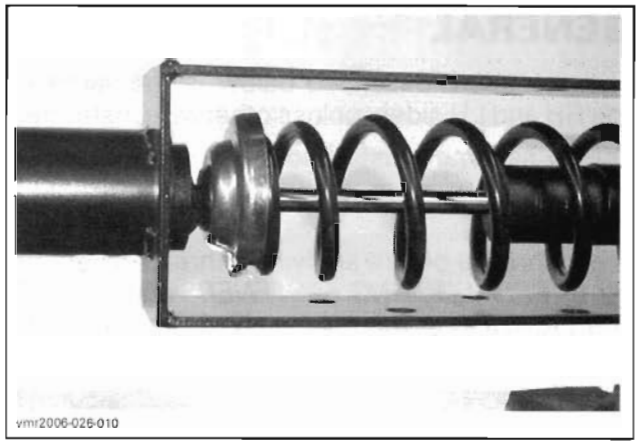
Disassembly

Use the shock spring remover (P/N 529 036 007).



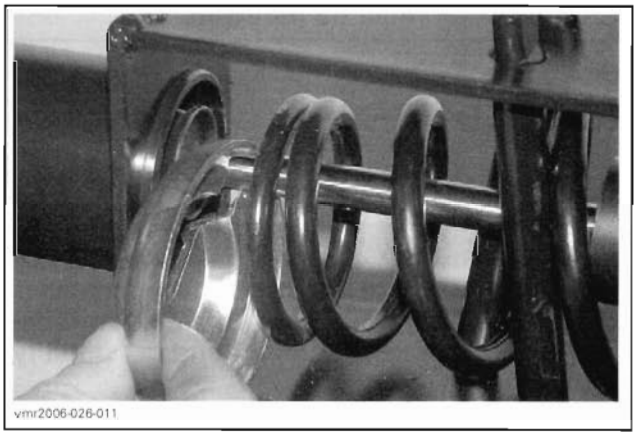
Place the tool in a vise.

Position the shock absorber in the tool and install the spring compressor pins.



Tighten the shock spring remover screw until the spring **no. 4** is sufficiently compressed to remove spring locking devices.

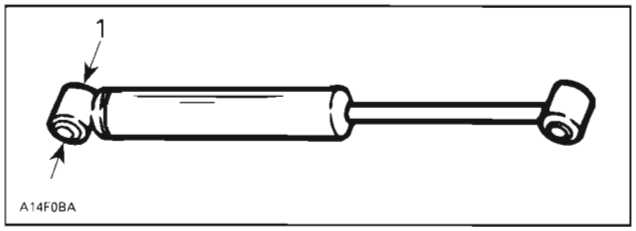
Remove spring stopper **no. 5** and its cap **no. 6** then release the shock spring remover screw.



Remove spring(s) from shock.

Inspection

Secure the shock body end **no. 7** in a vise with its rod upward.



TYPICAL
1. Clamp here

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.

Replace if any faults are present.

Assembly and Installation

Assembly and installation are essentially the reverse of disassembly and removal procedures.

NOTE: Install cap opening at 180° from spring stopper opening.

TORSION BAR

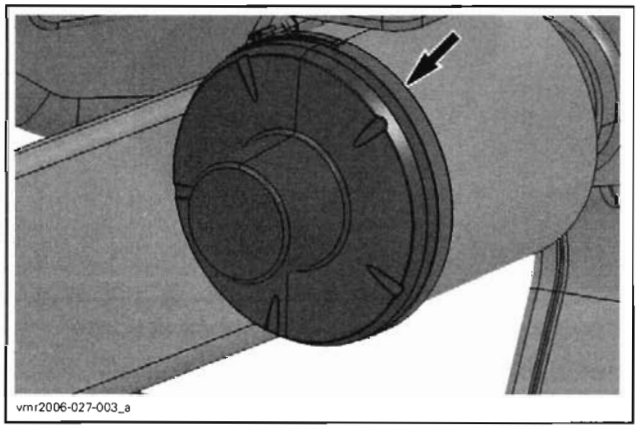
Removal

Apply parking brake and lift rear of vehicle until rear shock absorbers **no. 1** are fully extended.

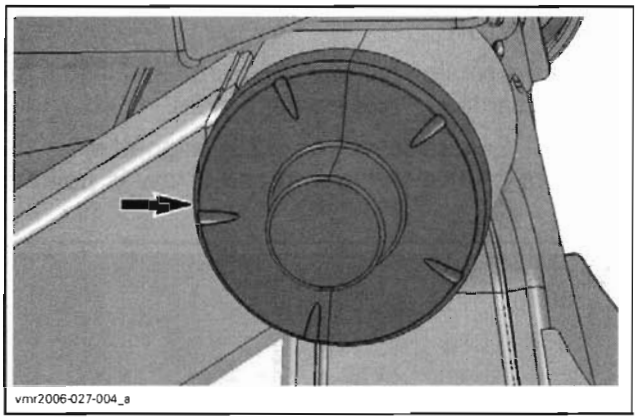
Install a jack stand or blocks under the frame to safely support the vehicle.

Remove:

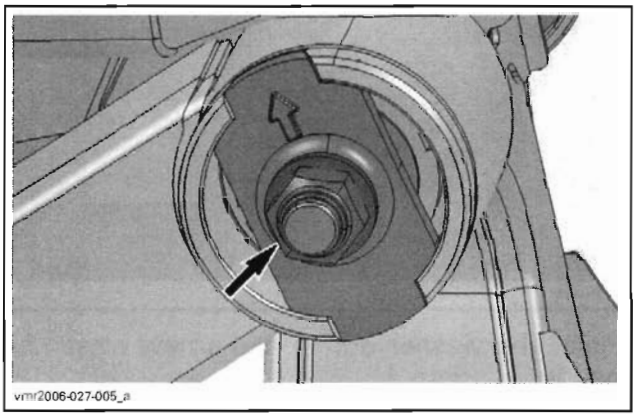
- both footrests
- clamps (discard) **no. 8**



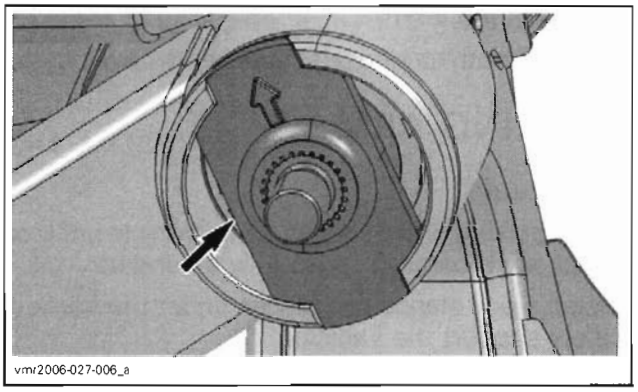
- protective covers **no. 9**



- elastic nuts **no. 10** (discard them) and flat washers **no. 11**



- torsion bar levers **no. 12**



- torsion bar **no. 13**.

Inspection

Check:

- torsion bar for cracks, bending or other damages
- splines for damages (torsion bar and torsion bar lever)
- torsion bar lever tabs for racking, cracks or other damages.

NOTE: If a tab is damaged, check the trailing arm **no. 14** for damages.

Replace all damaged parts.

Installation

Insert the torsion bar into the frame and install the torsion bar lever (one on each side).

NOTE: Ensure lever **no. 12** is aligned with the cut-outs on the swing arm and arrow is pointing up.


V07H1GB

Install the washer **no. 11** and a new elastic nut **no. 10**.

First torque the right hand side elastic nut to 55 N•m (41 lbf•ft), then the left hand side to 120 N•m (89 lbf•ft).

Reinstall both torsion bar covers with new clamps.

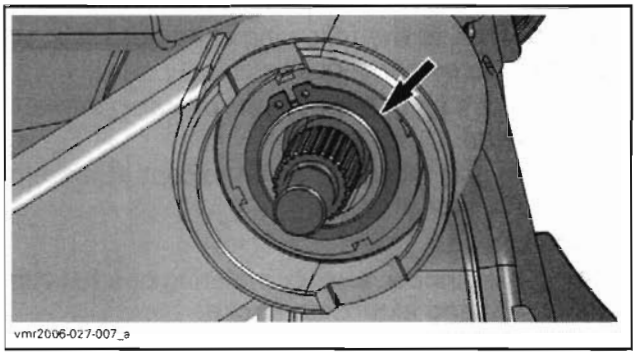
TRAILING ARM

Removal

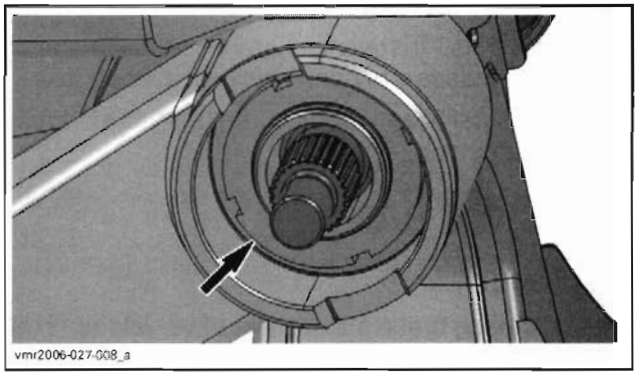
Apply parking brake and lift rear of vehicle until rear shock absorbers **no. 1** are fully extended.

Install a jack stands or a blocks under the frame to safely support the vehicle.

Remove:
- wheel hub (refer to *REAR DRIVE*)
- clamp **no. 8**
- protective cover **no. 9**
- elastic nut **no. 10** (discard)
- washer **no. 11**
- torsion bar lever **no. 12**
- circlip **no. 15**.


vmr2006-027-007_a

Unscrew the trailing arm nut **no. 16**.


vmr2006-027-008_a

To do this, use the spanner wrench (P/N 529 035 925).


529035925

Unscrew lower bolt **no. 3** of shock absorber.

Remove trailing arm **no. 14**.

Inspection

Check:
- trailing arms for cracks, bending or other damages
- bearings for smooth and free operation.

Replace all damaged parts.

Installation

Insert drive shaft end into trailing arm.

Install the trailing arm on frame.

Install the lower shock absorber bolt to support the trailing arm. Do not torque yet.

Frame Side

Apply Loctite 243 (blue) (P/N 293 800 060) on trailing arm nut threads.

Install the trailing arm nut and torque it to 190 N•m (140 lbf•ft).

Install circlip, torsion bar lever, washer and a new elastic nut. Torque the left elastic nut to 120 N•m (89 lbf•ft) and the right elastic nut to 55 N•m (41 lbf•ft).

Install protective cover.

Wheel Side

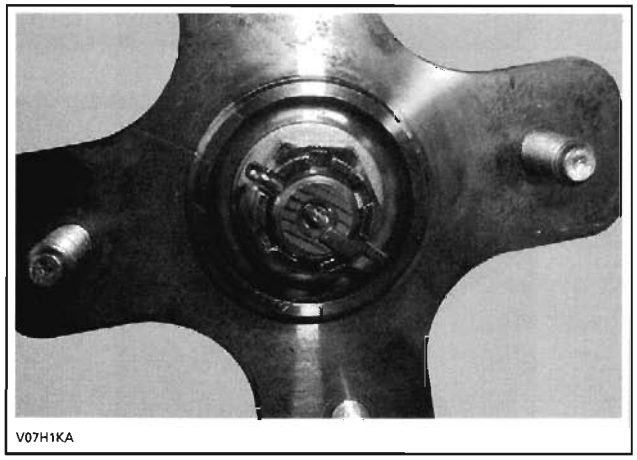
Install:

- wheel hub
- washer
- castellated nut.

Torque castellated nut to 205 N•m (151 lbf•ft) and further tighten until its grooves align with the next cotter pin hole.

Install a new cotter pin then the wheel cap.

NOTE: The longer end of cotter pin must be folded over shaft end.


V07H1KA

Torque the shock absorber bolt to 53 N•m (39 lbf•ft).

Install wheel.

TRAILING ARM BEARINGS

Remove trailing arm. Refer to procedure above.

Inspection

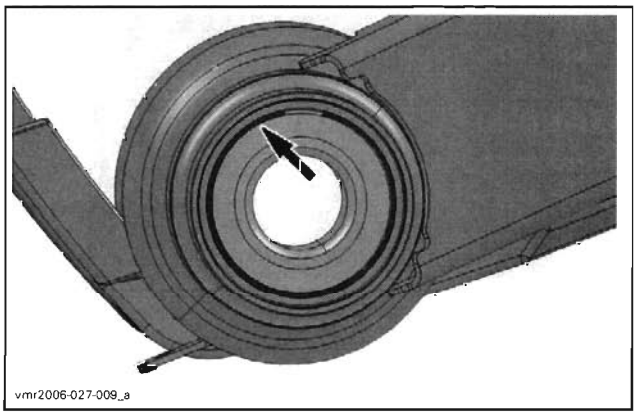
Check inner race of each bearing **no. 17** with your finger. The bearings should turn smoothly and quietly. Remove and discard bearings if race does not turn smoothly or quietly.

Removal

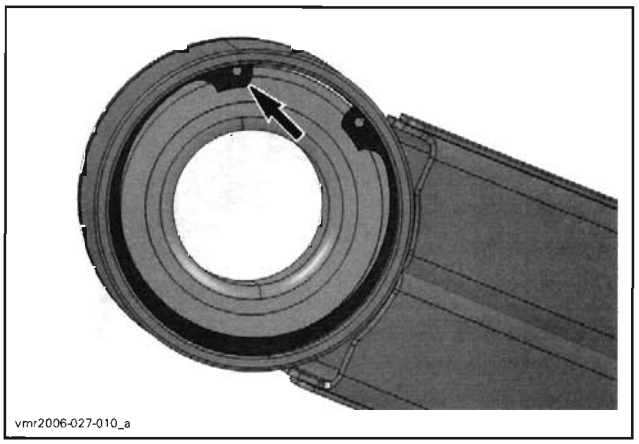
The same procedure can be used for both bearings.

NOTE: Before extracting the bearing on wheel side, remove the protector **no. 18** by drilling the pop rivets with a 3/16" drill.

Remove the circlip **no. 19**.


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WHEEL SIDE

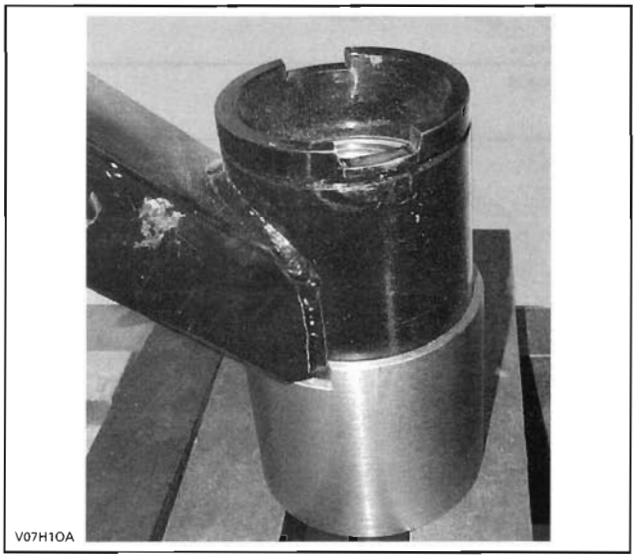

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FRAME SIDE

Place the trailing arm support (P/N 529 035 922) on the end of trailing arm.



WHEEL SIDE



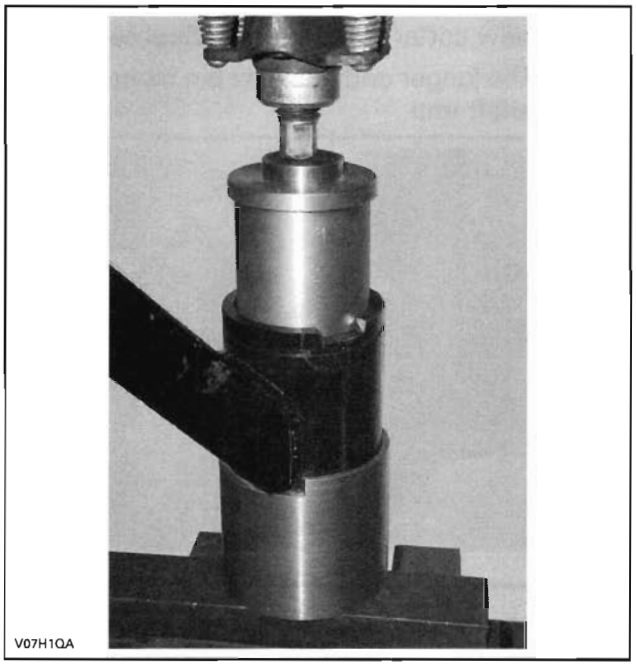
FRAME SIDE

Using a press and the proper bearing extractor/installer, remove the bearing.

TOOL	LOCATION
Bearing extractor/installer (P/N 529 035 918)	Wheel side
Bearing extractor/installer (P/N 529 035 920)	Frame side



WHEEL SIDE



FRAME SIDE

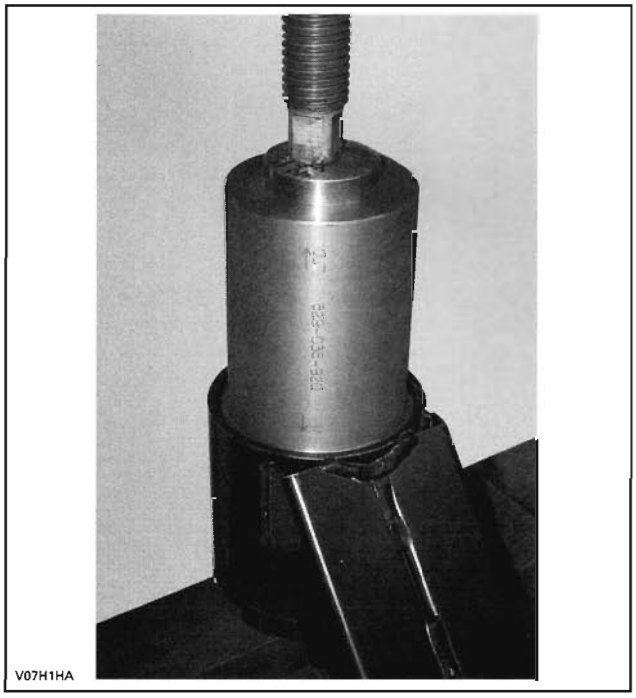
Installation

Clean the bearing housing.

To install the bearing in its location, use the same tool as per removal procedure.



WHEEL SIDE



FRAME SIDE

Install the circlip. If the circlip is slacked, replace it with a new.

Install all other removed parts.

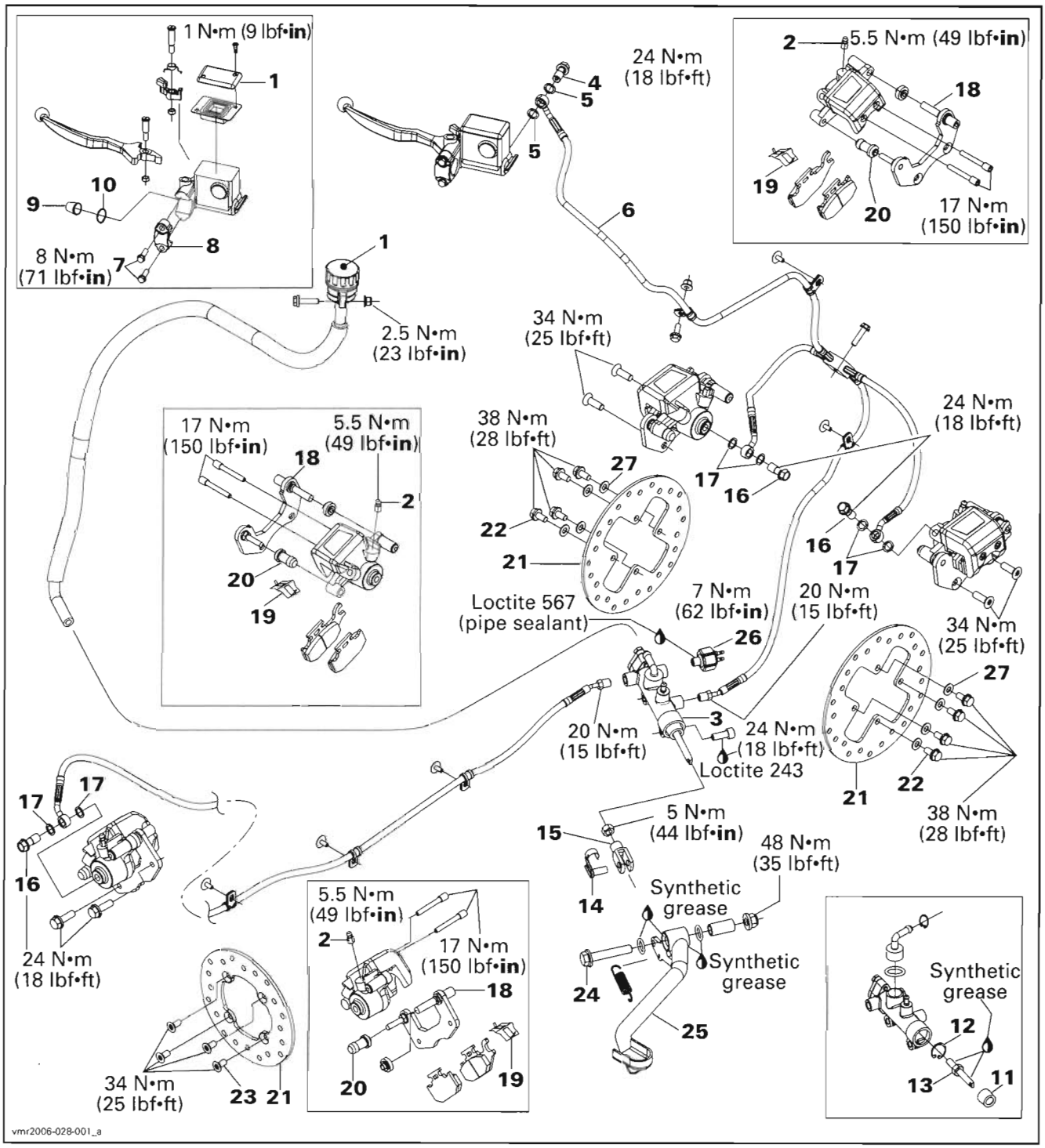
FRONT AND REAR BRAKES

SERVICE TOOLS

Description	Part Number	Page
vacuum/pressure pump	529 021 800	404

SERVICE PRODUCTS

Description	Part Number	Page
dielectric grease	293 550 004	407, 410
GTLMA brake fluid	293 600 062	403
Loctite 567 (pipe sealant)	293 800 013	406
XP-S synthetic grease	293 550 010	408, 413


1 N•m (9 lbf•in)
1
10
9
8
8 N•m (71 lbf•in)
7
24 N•m (18 lbf•ft)
4
5
5
6
2
5.5 N•m (49 lbf•in)
18
19
20
17 N•m (150 lbf•in)
1
2.5 N•m (23 lbf•in)
34 N•m (25 lbf•ft)
17 N•m (150 lbf•in)
5.5 N•m (49 lbf•in)
18
2
20
19
38 N•m (28 lbf•ft)
27
22
21
17
16
24 N•m (18 lbf•ft)
16
17
Loctite 567 (pipe sealant)
7 N•m (62 lbf•in)
26
20 N•m (15 lbf•ft)
34 N•m (25 lbf•ft)
27
3
20 N•m (15 lbf•ft)
24 N•m (18 lbf•ft)
Loctite 243
21
22
38 N•m (28 lbf•ft)
17
17
16
24 N•m (18 lbf•ft)
5 N•m (44 lbf•in)
15
48 N•m (35 lbf•ft)
14
Synthetic grease
Synthetic grease
24
25
5.5 N•m (49 lbf•in)
2
17 N•m (150 lbf•in)
18
20
19
34 N•m (25 lbf•ft)
23
21
Synthetic grease
12
13
11
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GENERAL

During assembly/installation, use the torque values and service products as in the exploded view(s).

Clean threads before applying a threadlocker. Refer to *SELF-LOCKING FASTENERS* and *LOCTITE APPLICATION* at the beginning of this manual for complete procedure.

⚠ WARNING

Torque wrench tightening specifications must strictly be adhered to.
Locking devices (e.g.: locking tabs, elastic stop nuts, 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.

CAUTION: Avoid spilling brake fluid on plastic, rubber or painted parts. Protect these parts with a rag when servicing brake system.

CAUTION: To avoid serious damage to the brake system, use only DOT 4 brake fluid from a sealed container. Do not use brake fluid taken from old or already opened containers, nor mix different fluids for topping off.

CAUTION: Sealing washers must be discarded and replaced with new ones every time a Banjo fitting is unscrewed.

Hydraulic Brakes System

The brake system consists of two circuits. Each system has its own master cylinder and reservoir.

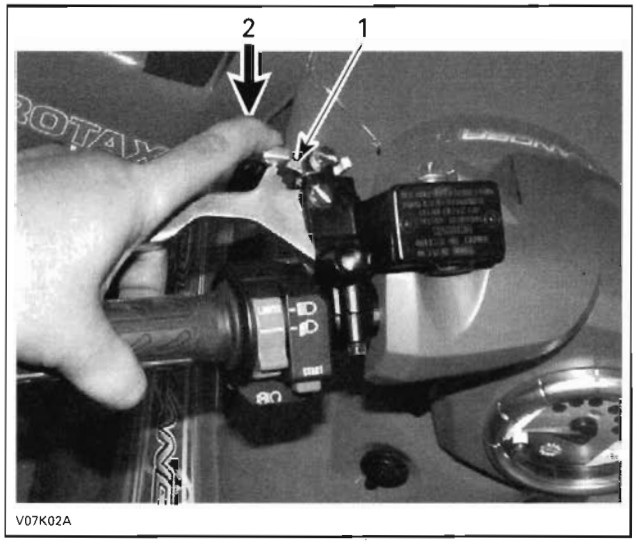
Both front and rear brakes are disc type.

⚠ WARNING

Periodically check the brake hoses for damages or leaks. Repair any damage before operating the vehicle.

Parking Brake

The parking brake operates all brakes. It is activated by a locking mechanism on LH brake lever.



TYPICAL
1. *LH brake lever*
2. *Locking mechanism*

PROCEDURES

BRAKE FLUID

Recommended Fluid

Always use brake fluid meeting the specification DOT 4 only such as GTLMA brake fluid (P/N 293 600 062) sold by BRP.

Fluid Level

With vehicle on a level surface, check brake fluid in reservoir for proper level. It should be above MIN. mark.

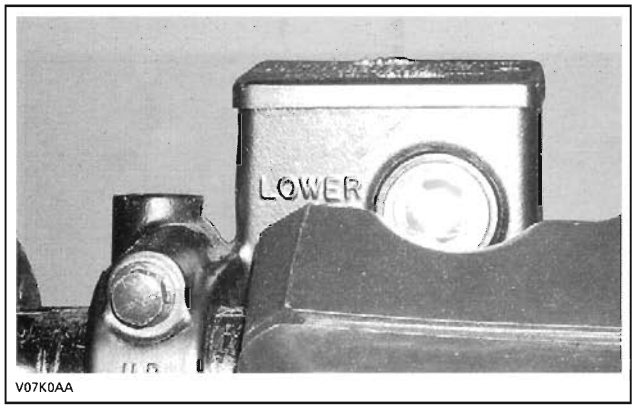
Clean filler cap before removing.

Add fluid as required. Do not overfill.

NOTE: A low level may indicate leaks or worn brake pads.

Front Brake Fluid Reservoir

Turn steering in the straight-ahead position to ensure reservoir is level. Check the brake fluid level, the reservoir is full when the fluid reaches the top of window.



Visually inspect lever boot condition. Check for cracks, tears, etc. Replace if damaged.

Rear Brake Fluid Reservoir



Brake Fluid Replacement

⚠ WARNING

A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.

Brake Fluid Draining

Remove reservoir cover **no. 1** with its diaphragm.

Connect a clear hose to bleeding screw **no. 2**.

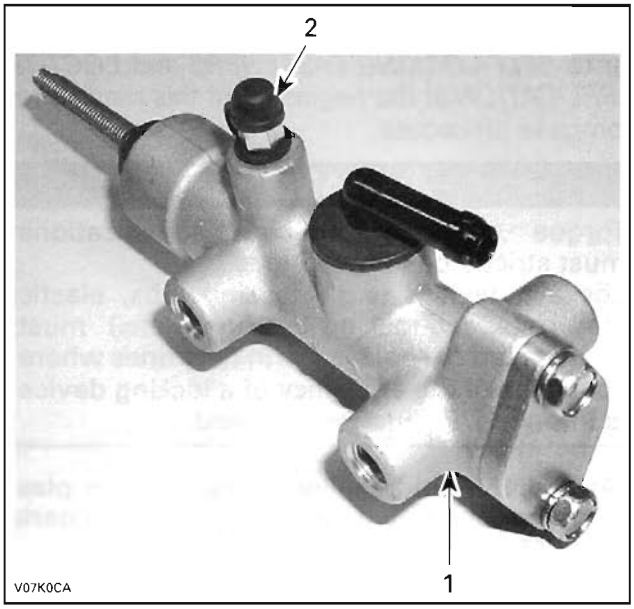
Loosen bleeding screw and pump brake lever or brake pedal until no more fluid flows out of bleeding screw.

Brake Fluid Filling and Bleeding

Close bleeding screws.

Fill reservoirs with DOT 4 brake fluid.

Unscrew the bleeding screw on the top of rear master cylinder **no. 3** until brake fluid comes out then close it.



1. Rear master cylinder
2. Bleeding screw

On each caliper, unscrew the bleeding screw until the brake fluid comes out then close it.

Bleed system as per the following procedure.

With a Vacuum Pump

Using a clear hose, install the vacuum/pressure pump (P/N 529 021 800) to bleeding screw. Place the pump in vacuum position. See the manufacturer's operating instructions.

Pump vacuum pump loosen bleed. Close bleed and refill reservoir when the fluid level is low.

NOTE: Check fluid level often to prevent air from being pumped into the system.

Repeat the procedure until no more air bubbles appear in hose.

NOTE: For the front brake system, switch to LH and RH caliper. Turn handlebar to full RH side when bleeding right caliper and turn to the LH side for the left caliper. This helps to reach air into the caliper. The front and the rear brakes must be bled at the same time.

Close bleeding screw and operate brake lever or brake pedal. If it still feels spongy, bleed system again.

Repeat the procedures until air bubbles do not appear in hose and lever or pedal is stiff.

Fill reservoirs to the upper level with DOT 4 brake fluid.

Install diaphragms and covers on reservoirs.

Without a Vacuum Pump

If vacuum pump is not available, use the following procedure.

Install a clear hose to bleeding screw.

Open bleeding screw. Fill reservoirs and pump brake lever or brake pedal until fluid freely flows out of the hose.

Close bleeding screw.

Pump up system pressure with brake lever or brake pedal until lever or pedal resistance is felt.

Squeeze brake lever or depress brake pedal, open bleeding screw and then close it.

NOTE: Do not release brake lever or brake pedal until bleeding screw has been closed. For the front brake system, switch to LH and RH caliper. Turn handlebar to full RH side when bleeding right caliper and turn to the LH side for the left caliper. This helps to reach air into the caliper. The front and the rear brakes must be bled at the same time.

Release brake lever or brake pedal slowly.

Repeat the procedure until no more air bubbles appear in hose and lever or pedal is stiff.

BRAKE LIGHT SWITCH

Inspection

Check switch **no. 26** for dirt or corrosion. Make sure it is operating properly.


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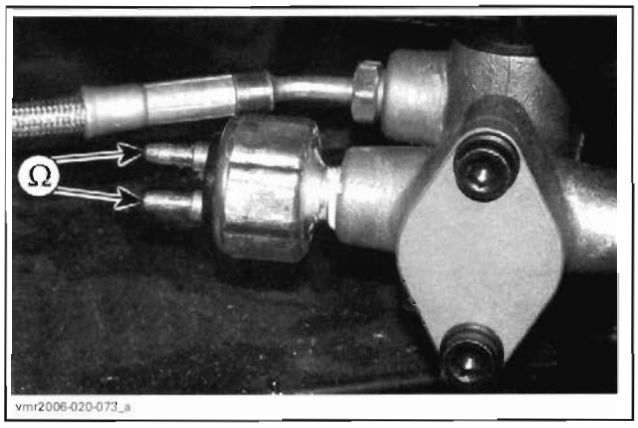
Depress brake pedal and check for brake light to turn on. Repeat with the brake lever.

Test

Disconnect switch connectors.

Check switch operation as follows.

BRAKE SWITCH POSITION	PIN		RESIGTANCE
Firmly pushed	BLACK/ RED	RED	0.2 Ω max.
Released			Infinite (O.L.)



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If switch is defective, replace with a new one.

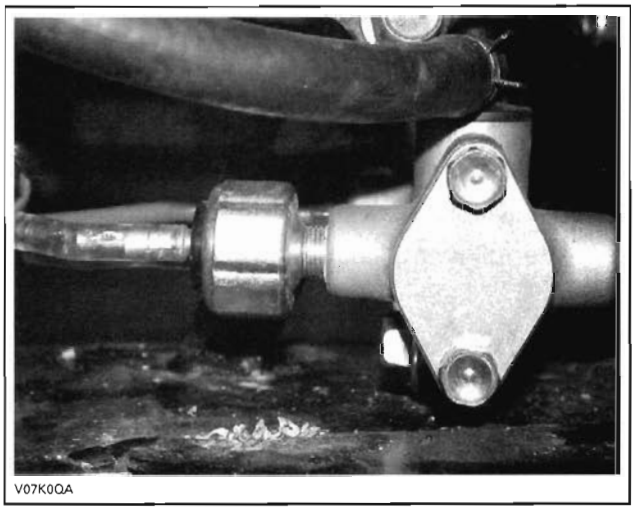
Outlander 800 Series

Verify wire continuity between brake switch and ECM.

ECM CONNECTOR PIN	BRAKE SWITCH PIN	RESISTANCE
B-23	RED	Close to 0 Ω

Removal

The rear brake switch is located on the rear master cylinder.


V07K0QA

The rear brake light switch cannot be adjusted.

Disconnect switch connectors.

Drain brake system.

Unscrew brake light switch from master cylinder. Catch spilled fluid with a rag.

Installation

For installation, reverse the removal procedure.

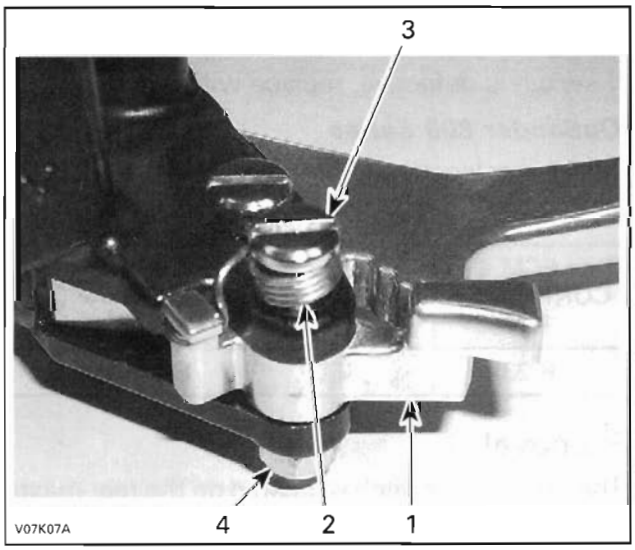
NOTE: Apply Loctite 567 (pipe sealant) (P/N 293 800 013) on threads of brake light switch.

PARKING BRAKE MECHANISM

Removal

Remove:

- nut
- screw
- spring
- brake lever lock.

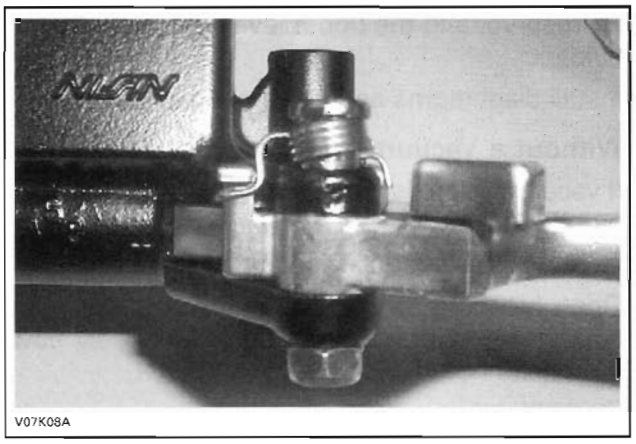


1. *Brake lever lock*
2. *Spring*
3. *Screw*
4. *Nut*

Installation

For installation, reverse the removal procedure.

See the following illustration to install the spring properly.

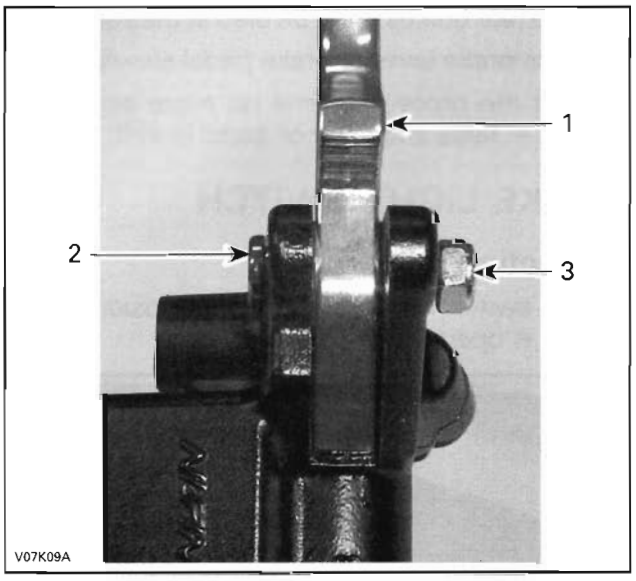


BRAKE LEVER

Removal

Remove:

- parking brake mechanism (see above)
- nut
- screw
- brake lever.



1. *Brake lever*
2. *Screw*
3. *Nut*

Inspection

Check brake lever for bending, cracks or other damages. Replace if necessary.

Installation

For installation, reverse the removal procedure.

FRONT MASTER CYLINDER

Removal

Remove master cylinder cover and its diaphragm then drain brake fluid until front master cylinder reservoir is empty.

Remove the handlebar cover.

Remove banjo fitting **no. 4** and sealing washers **no. 5** retaining brake hose **no. 6** to front master cylinder.

Remove screws **no. 7** from master cylinder holder **no. 8** and remove master cylinder from handlebar.

Disassembly

Remove brake lever lock and brake lever.

Remove piston boot **no. 9**, snap ring **no. 10**, piston and spring.

Inspection and Lubrication

Discard any remaining fluid inside reservoir.

Clean reservoir, piston and master cylinder thoroughly with clean brake fluid.

Check:

- boot for crack
- spring for damage
- piston cup for wear, deterioration or damages
- master cylinder and piston for scoring, scratches or other damages.

Change part(s) if necessary.

Check if the end cap O-ring is brittle, hard or damaged.

NOTE: If master cylinder housing is damaged or leaking, replace as an assembly.

Assembly

Coat piston and piston cups with clean brake fluid.

Install:

- spring onto piston
- piston into master cylinder
- snap ring into groove in the master cylinder
- boot into master cylinder and the groove in piston.

Apply dielectric grease (P/N 293 550 004) to the brake lever contacting surface of the piston.

Install brake lever and locking mechanism.

NOTE: Apply dielectric grease (P/N 293 550 004) on lever pivot bolt.

Installation

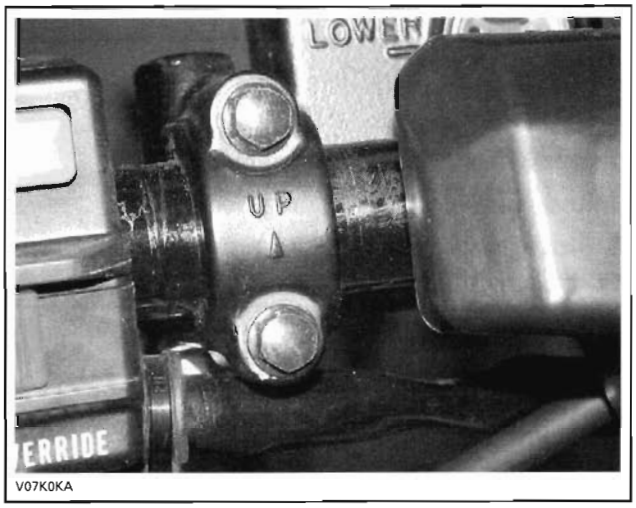
For the installation, reverse the removal procedure, pay attention to the following details.

Place the brake lever assembly on the handlebar.

Position cylinder holding bracket **no. 8** with the UP mark upward.

Install bolts **no. 7** and tighten loosely.

With the handlebar in straight ahead position, position cylinder reservoir parallel to the ground. Tighten upper bolt first.



V07K0KA

Connect brake hose to master cylinder with Banjo fitting and new sealing washers.

Bleed brake system.

Check for leaks and make sure the brakes operate normally before driving.

REAR MASTER CYLINDER

Removal

Drain brake fluid.

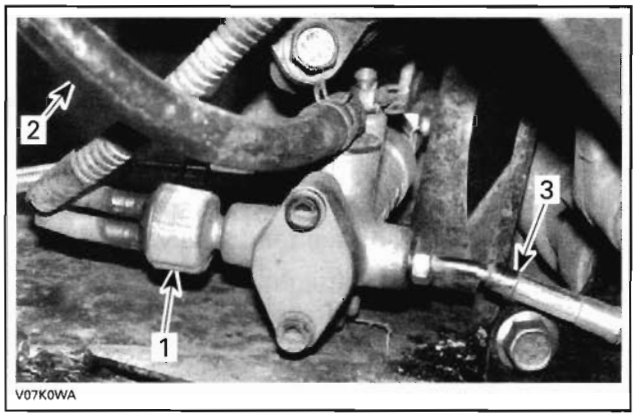
Remove LH and RH footrests.

Unplug brake switch connectors.

NOTE: At this time, check hoses and fittings for damages or leaks.

Disconnect reservoir flexible hose and plug the end to avoid brake fluid spillage.

Unscrew rear hose from master cylinder.

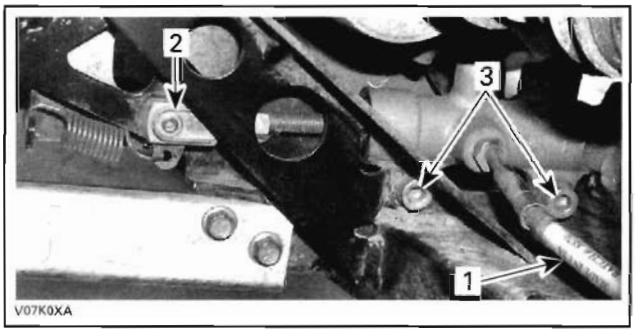


1. Brake switch
2. Reservoir hose
3. Rear hose

Unscrew front hose from master cylinder.

Unhook push rod from brake pedal.

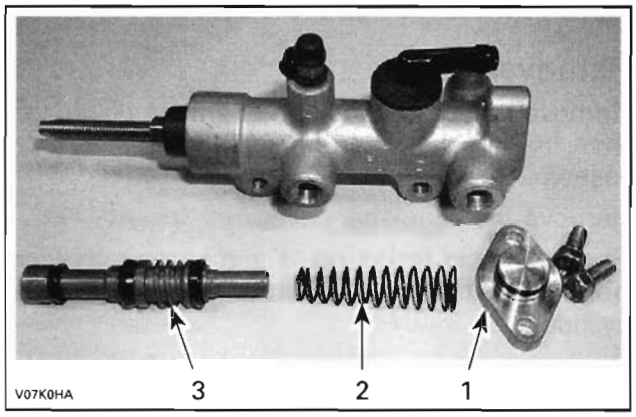
Remove bolts retaining master cylinder to the frame.



1. Front hose
2. Push rod lock
3. Master cylinder bolts

Disassembly

Remove:
- end cap
- spring
- piston



1. End cap
2. Spring
3. Piston

- boot **no. 11**
- snap ring **no. 12**
- push rod **no. 13**.

Inspection and Lubrication

Discard any remaining fluid inside reservoirs.

Clean reservoirs, pistons and master cylinders thoroughly with clean brake fluid.

Check:
- boots for crack
- springs for damage
- piston cups for wear, deterioration or damages
- master cylinders and pistons for scoring, scratches or other damages.

Change part(s) if necessary.

Check locking pin **no. 14** for excessive wear, replace if necessary.

Check if the end cap O-ring is brittle, hard or damaged.

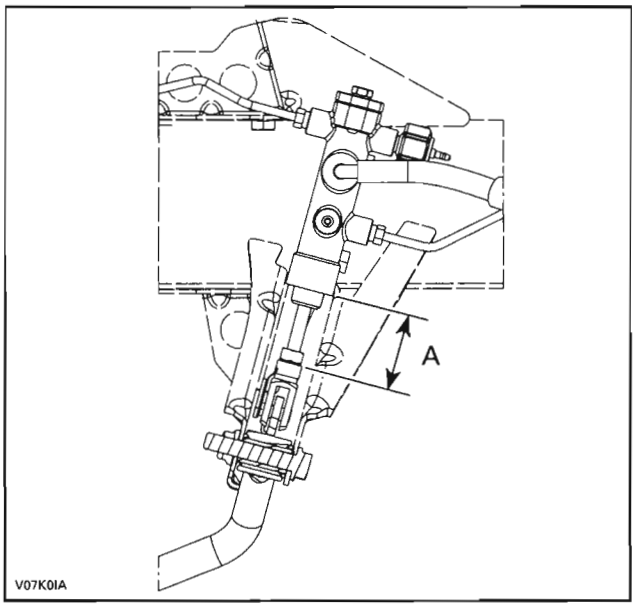
NOTE: If master cylinder housing is damaged or leaking, replace as an assembly.

Assembly

Apply XP-S synthetic grease (P/N 293 550 010) on both ends of push rod.

Install:
- push rod
- snap ring
- boot.

If push rod yoke **no. 15** has been removed, reinstall it then adjust push rod length, see the following illustration.

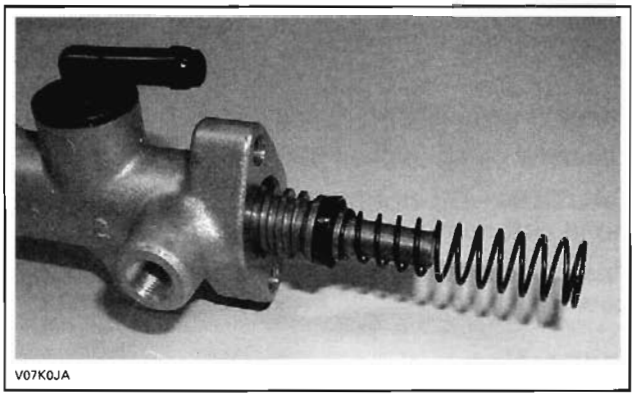


A. 44 ± 1 mm (1.732 ± .039 in)

Coat piston and piston cups with clean brake fluid.

The spring is conical. Install the smaller end on piston.

Insert piston in the master cylinder.



Install the end cap. Do not forget the O-ring.

Installation

Install master cylinder to frame.

Hook push rod on brake pedal.

Connect front and rear hoses on master cylinder.

Connect flexible hose from reservoir.

Fill up reservoir with clean brake fluid.

Bleed brake system.

Check for leaks and make sure the brakes operate normally before driving.

Connect brake light switch connectors.

CALIPER

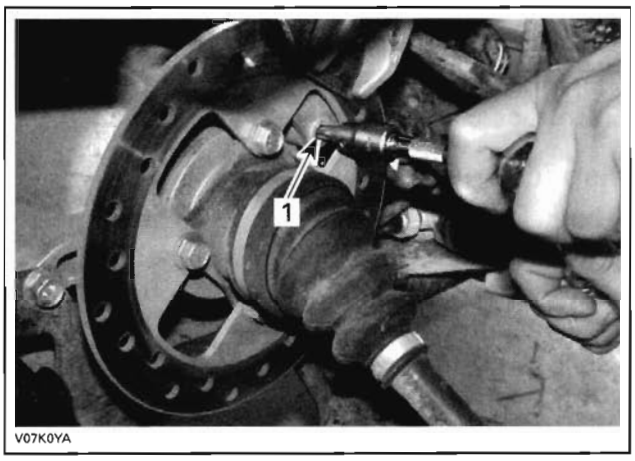
Removal

Loosen wheel nuts.

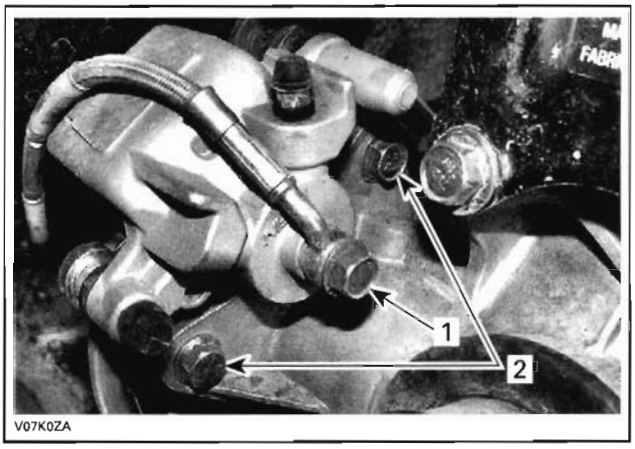
Raise vehicle and support it securely.

Remove appropriate wheel.

Remove the caliper bolts/screws then the caliper. If the caliper is not being removed from the vehicle as during brake pad replacement, simply hang the caliper with a piece of wire to take the weight off the brake hose. If the caliper is being removed for replacement, drain brake system before removing the Banjo fitting **no. 16** and its sealing ring **no. 17**. Remove the caliper from the vehicle.



FRONT CALIPER
1. Retaining screw



REAR CALIPER
1. Remove banjo fitting and washers
2. Unscrew bolts

Catch spilled fluid with a rag. Attach the brake hose in a position to prevent the fluid from flowing out.

Disassembly

Remove brake pads, see the following section.

Remove:
- slide caliper support **no. 18**
- pad spring **no. 19**.

Place rag over piston.

Place caliper body with piston down and apply small squirts of air pressure to the fluid inlet to remove piston.

⚠ WARNING

Do not use high pressure air or bring nozzle too close to inlet.

Remove piston seal.

CAUTION: Be careful not to damage piston sliding surface.

Clean piston grooves, caliper cylinder and piston with clean brake fluid.

Clean slide pins with brake cleaner and a rag.

Inspection

If boots **no. 20** are deteriorated or hard, replace with new ones.

Check caliper cylinder for scratches, rust or other damages. If so, replace caliper.

Check piston for scratches, rust or other damages. If so, replace piston.

Assembly

Coat piston seal with clean brake fluid and install it into piston grooves in caliper.

Coat piston with clean brake fluid and install into cylinder with the closing toward caliper body.

Apply dielectric grease (P/N 293 550 004) into sliding bores and install slide pins.

NOTE: Make sure that rubber boots are correctly installed in slide pins grooves.

Install pad spring, caliper bracket and pads.

Installation

For the installation, reverse the removal procedure, pay attention to the following details.

Use new sealing washers when installing banjo fitting retaining brake hose to caliper.

Install caliper in its original position.

Bleed the brake system.

Check for leaks and make sure the brakes operate normally before driving.

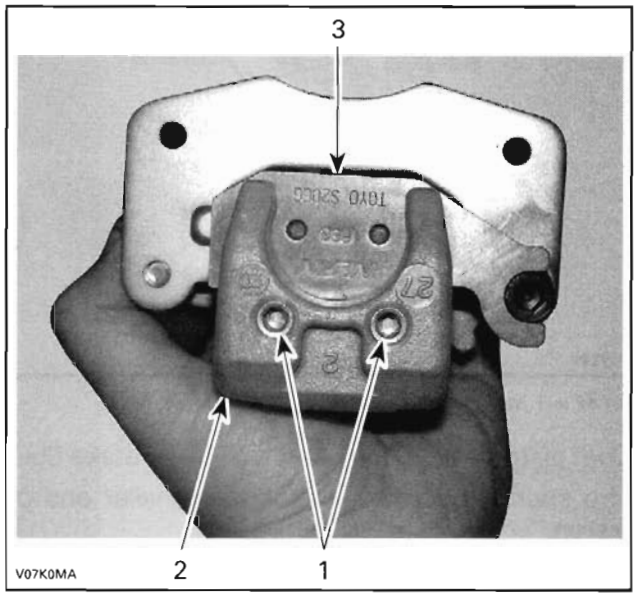
BRAKE PADS

Removal

Raise vehicle and support it securely.

Remove appropriate wheel.

Loosen pad pins.



1. Pad pins
2. Caliper
3. Pad

Remove caliper from its support.

Unscrew pad pins then remove pads.

CAUTION: Do not let the caliper hang by the hose and do not stretch or twist the hose.

Push piston all the way in to allow installation of new pads.

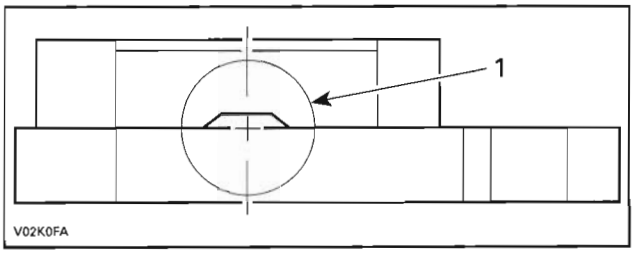
Inspection

CAUTION: Do not clean brake pads in petroleum based solvent. Use brake system cleaner only. Soiled brake pads must be replaced with new ones.

Measure brake pad lining thickness.

Brake pads must be replaced when lining is 1 mm (1/32 in) thick or less, or look the hollow places on both sides on the pad lining.

There are four hollow places on one set of brake pads. When the pad wear reaches one of the hollow places, the pad must be changed even if the pad wear does not reach another hollow place.



1. Hollow place

BRAKE PAD MINIMUM THICKNESS	1 mm (1/32 in)

⚠ WARNING

Avoid getting oil or grease on brake pads. Contaminated brake pads can affect stopping capacities.

CAUTION: Brake pads must always be replaced in pairs.

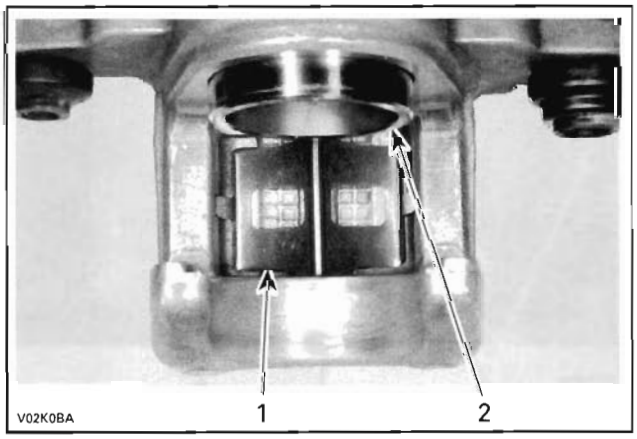
Installation

Clean the visible portion of piston with clean brake fluid.

Push caliper pistons inward before installing brake pads.

NOTE: Use a C-clamp or another suitable tool. To avoid damaging the piston, use an old pad to push it into the caliper.

Make sure that pad spring is in position.



1. Pad spring
2. Piston

Install new brake pads.

Install new pad pins by pushing in the pads against pad spring to align pad slots in the pads and caliper body.

Install brake caliper so the disc is positioned between pads.

NOTE: Be careful not to damage pads and make sure pads are correctly inserted in their location.

After the job is completed, firmly depress the brake lever a few times to bring the pads in contact with the disc.

Check for leaks and make sure the brakes operate normally before driving. The pads must rest flat on the disk.

BRAKE DISC

Inspection

Brake discs **no. 21** can be inspected without removing them from the vehicle.

Raise vehicle and support it securely. Remove wheels and visually inspect disc surfaces for scratches or grooves. Make sure to check both sides of disc.

Measure thickness of the disc.

DISC MINIMUM THICKNESS	
Front	3.5 mm (.138 in)
Rear	4.3 mm (.170 in)

Replace disc if not within specifications.

CAUTION: Brake discs should never be machined.

Turn the disc by hand and check warpage.

MAXIMUM DISC WARPAGE	
Front	0.2 mm (.01 in)
Rear	

Removal

Front Brake Disc

Apply parking brake and raise the front of the vehicle.

Remove:
- appropriate wheel
- inner fender (**Outlander 400 Series**)
- wheel hub
- shock absorber (**Outlander 800 Series**).

Separate knuckle from lower A-arm.

Remove drive shaft from knuckle.

Attach upper A-arm or strut out of way.

Unscrew brake disc bolts **no. 22**.

Keep the Belleville washers **no. 27**.

Release parking brake and remove caliper.

CAUTION: Do not let the caliper hang by the hose and do not stretch or twist the hose.

Remove brake disc. Pay attention not to cut the CV boot.

Rear Brake Disc

Outlander 400 Series

Remove:
- LH wheel
- caliper (suspend it out of the way)

CAUTION: Do not let the caliper hang by the hose and do not stretch or twist the hose.
- rear propeller shaft (refer to *REAR DRIVE*).

Place the propeller shaft in a vise.

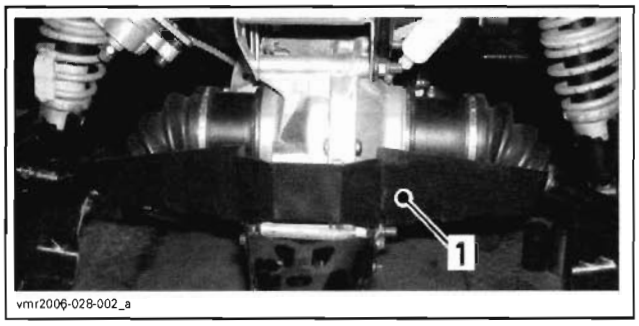
Heat up brake disc around screws to facilitate removal.

Remove brake disc screws **no. 23** retaining brake disc to the propeller shaft.

Outlander 800 Series

Remove:
- rear wheels
- caliper (suspend it out of the way)

CAUTION: Do not let the caliper hang by the hose and do not stretch or twist the hose.
- rear propeller shaft bolt from differential
- differential protector



1. Differential protector

- differential bolts.

Loosen hitch plate bolts.

Move the differential backward.

Disconnect propeller shaft from differential.

Unscrew brake disc screws **no. 23**. Heat up brake disc around screws to facilitate removal.

Installation

The installation is the reverse of removal procedure. However, pay attention to the following details.

Front Brake Disc

Do not forget Belleville washers **no. 27** when installing brake disc bolts. Install each Belleville washer **no. 27** with its concave side towards brake disc.

⚠ WARNING

Never substitute Belleville washer with another type of washer (flat, lock, etc.).

Rear Brake Disc

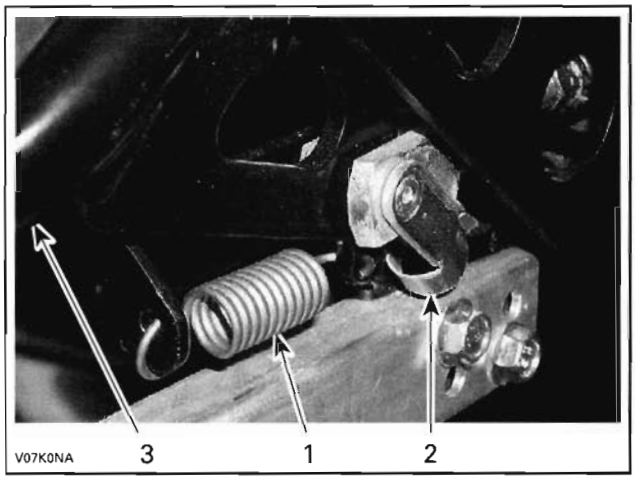
Install brake disc on propeller shaft and tighten bolts **no. 22** and screws **no. 23** to 34 N•m (25 lbf•ft) in a criss-cross sequence.

BRAKE PEDAL

Removal

Remove RH footwell.

Unhook:
- return spring
- master cylinder push rod hook.



1. Return spring
2. Push rod hook
3. Brake pedal

Remove bolt **no. 24** retaining the brake pedal **no. 25** to frame.

Inspection

Check brake pedal for cracks or distortion.

Check if O-rings are brittle, hard or otherwise damaged.

Replace any defective parts.

Installation

For installation, reverse the removal procedure.

Apply XP-S synthetic grease (P/N 293 550 010) on both O-rings and into brake pedal.

BRAKE HOSES

Inspection

Brake hoses should be inspected frequently for leaks and damages.

Check if the hoses are crushed or damaged. Any deformation can restrict the proper flow of fluid and cause braking problems.

Check hoses for cracking or scrapes. This damage can cause hose failure under pressure.

When hoses are removed or disconnected, cleanliness must be observed. Clean all joints and connections before disassembly. New hoses should be cleaned with brake fluid before installation to remove any contamination.

Replace any defective parts.

Removal

NOTE: Before removing any hoses, drain brake system.

Remove all necessary parts to reach the hoses.

Thoroughly clean the area around the joints that will be disconnected.

Place a drain pan under the joint that will be disconnected.

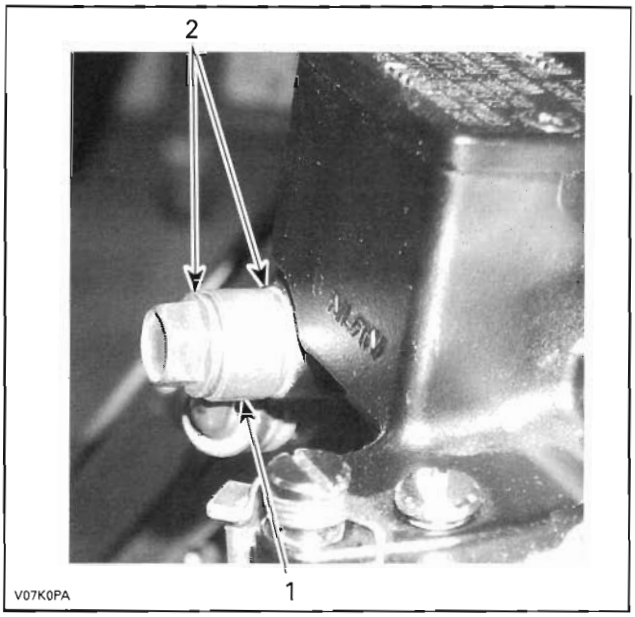
Disconnect any retaining clips or brackets holding the hose and remove the defective part(s).

Installation

Install the new hose.

Make sure the piece will not rub against any other part.

When there is a banjo fitting securing the hose to the caliper or to the master cylinder, always replace the sealing washers with new ones.



FRONT MASTER CYLINDER SHOWN
1. Banjo fitting
2. Sealing washers

Install any retaining clips or brackets.

Refill and bleed the system.

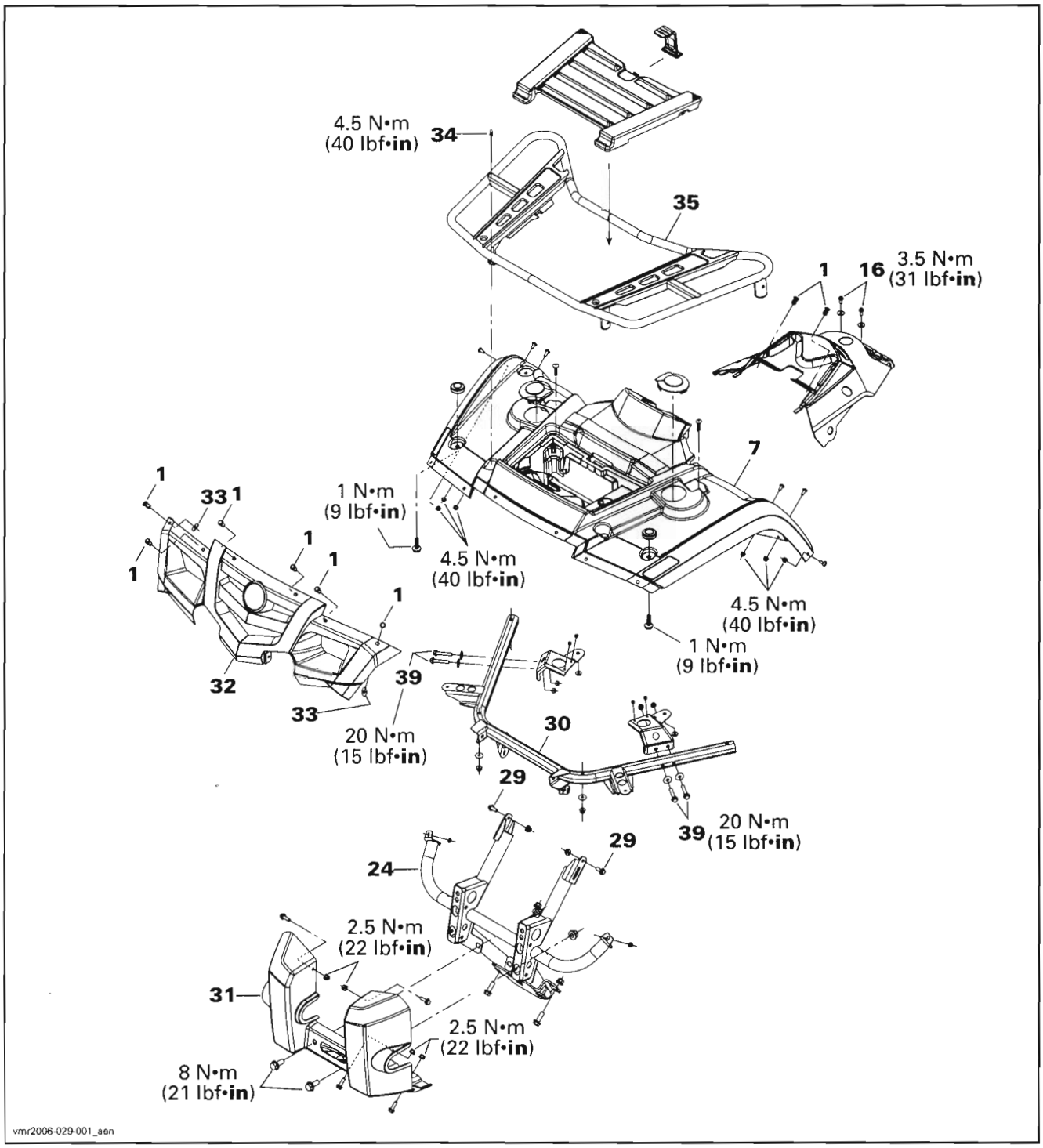
BODY

SERVICE TOOLS

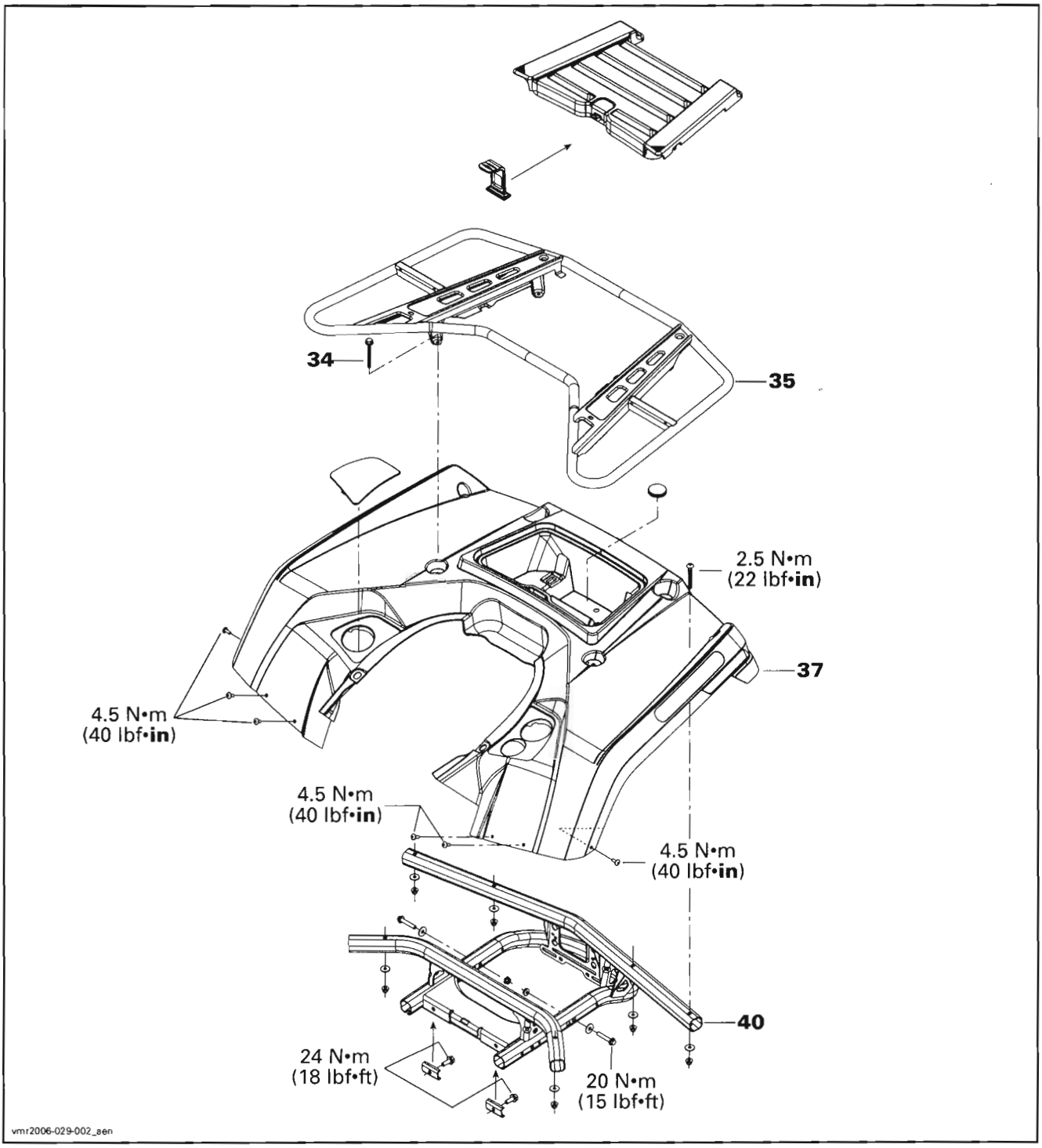
Description	Part Number	Page
pliers Oetiker 1099	295 000 070	426

OUTLANDER 400 SERIES

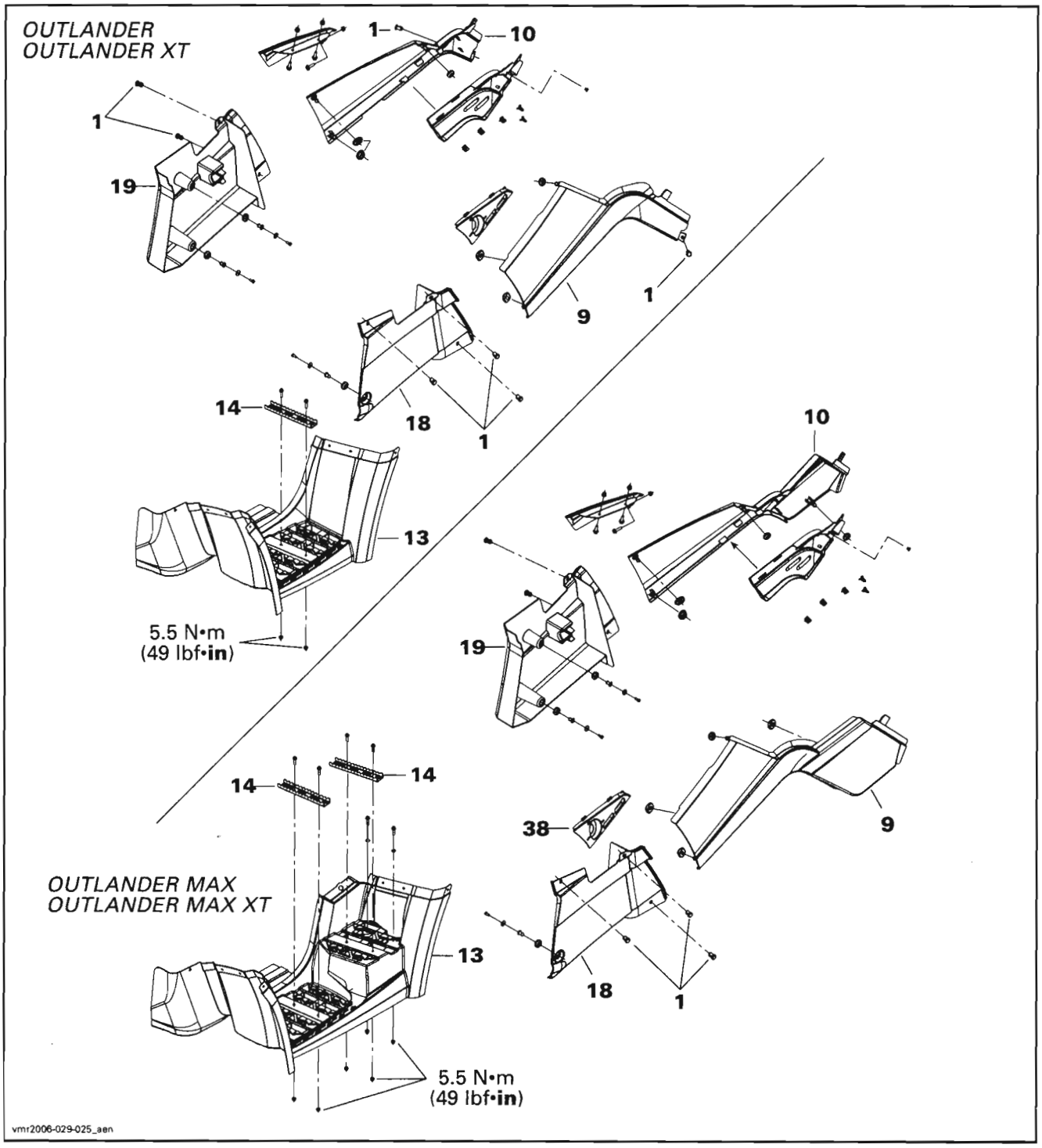
Body Parts (front view)



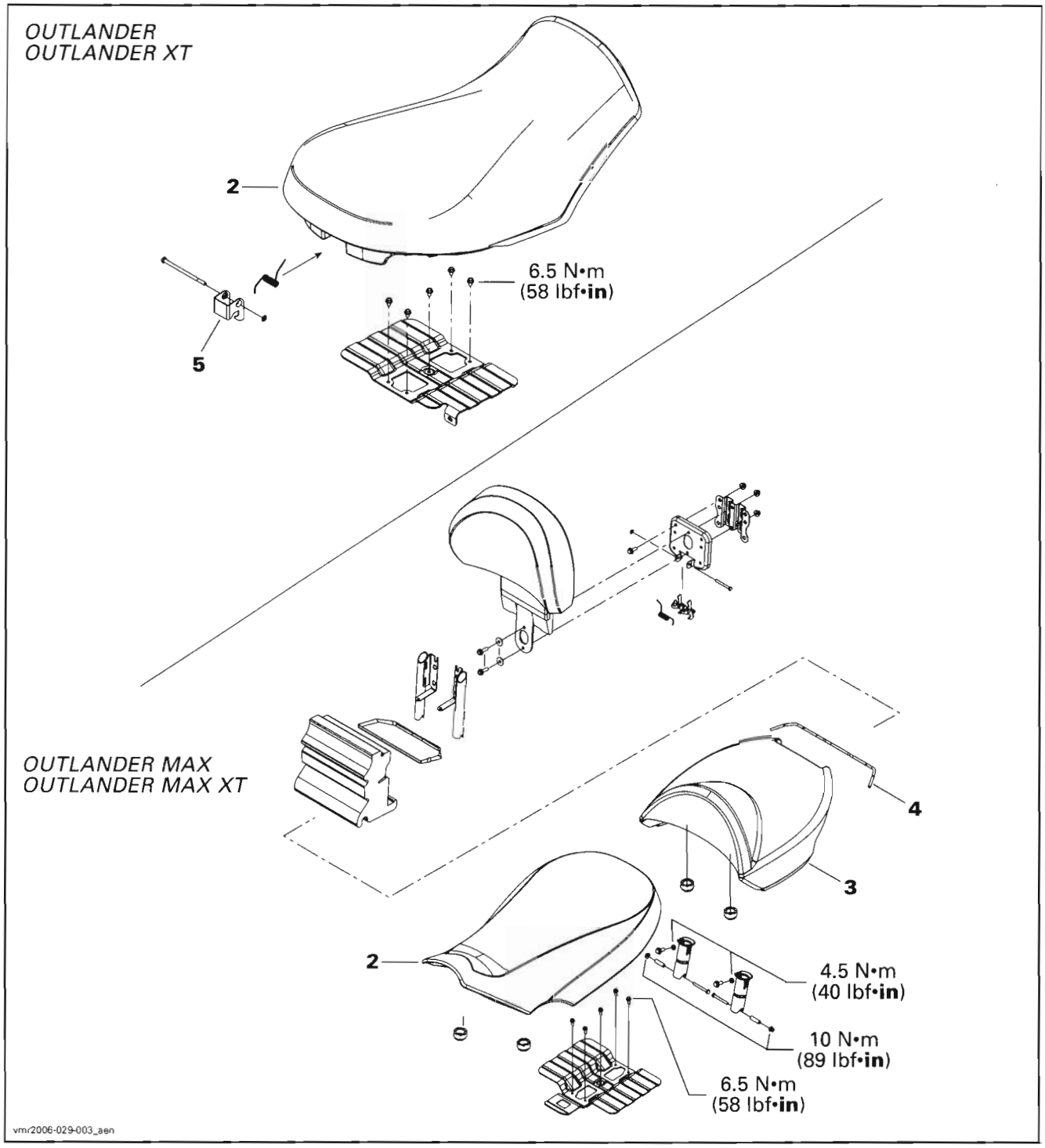
Body Parts (rear view)



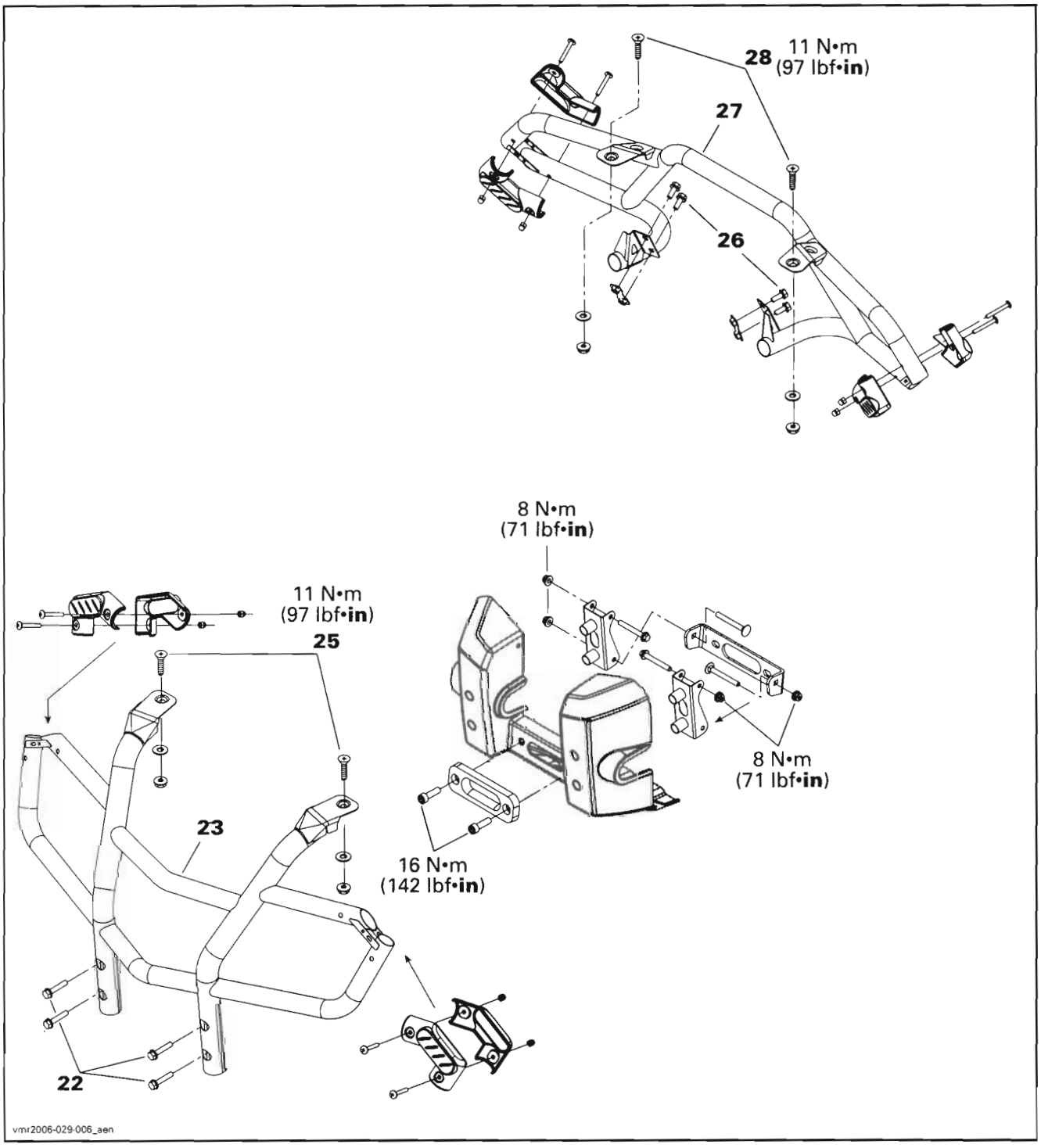
Body Parts (side view)



Seat

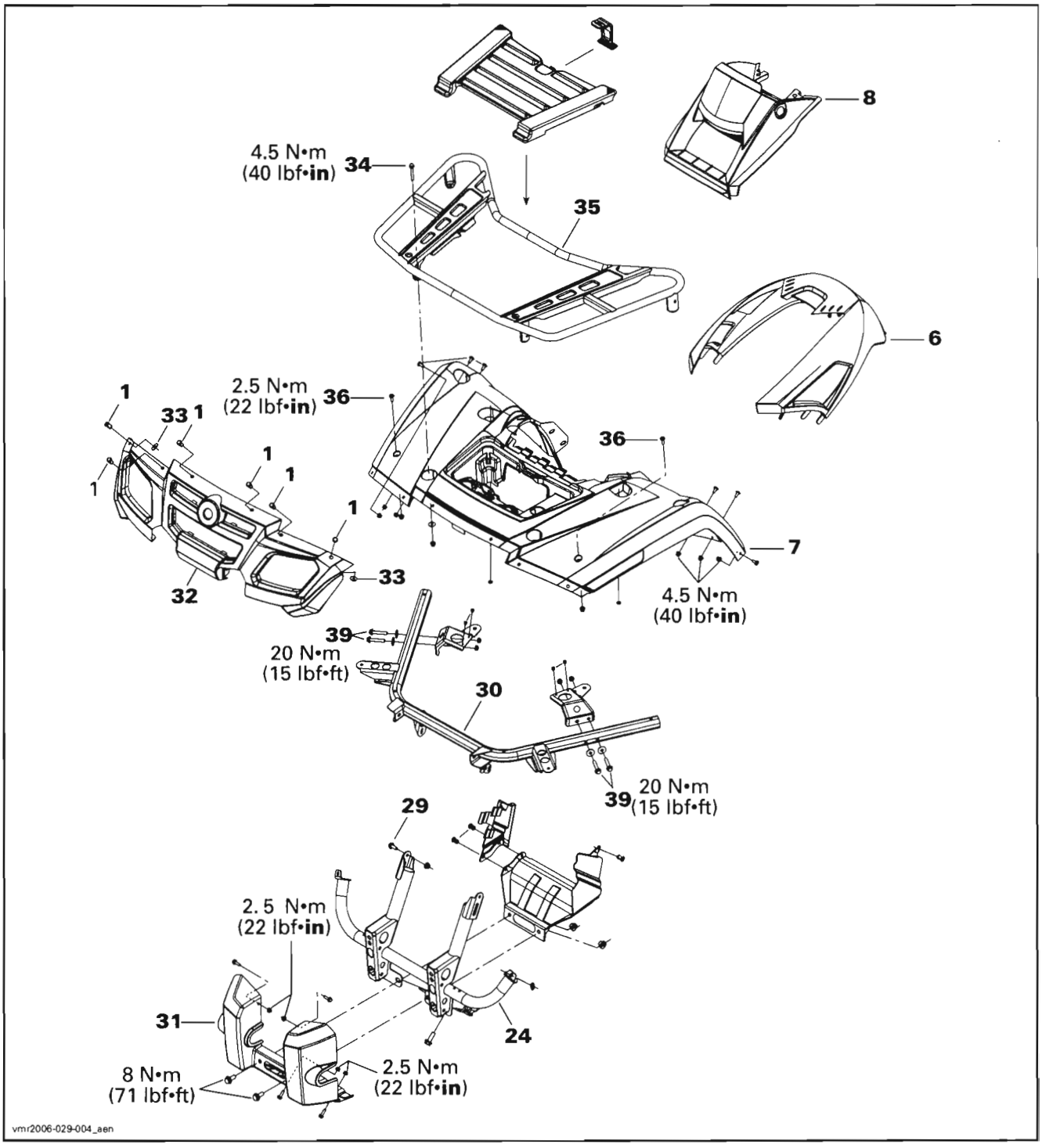

OUTLANDER
OUTLANDER XT
2
6.5 N•m
(58 lbf•in)
5
OUTLANDER MAX
OUTLANDER MAX XT
4
3
2
4.5 N•m
(40 lbf•in)
10 N•m
(89 lbf•in)
6.5 N•m
(58 lbf•in)
vmr2006-029-003_aen

XT Package

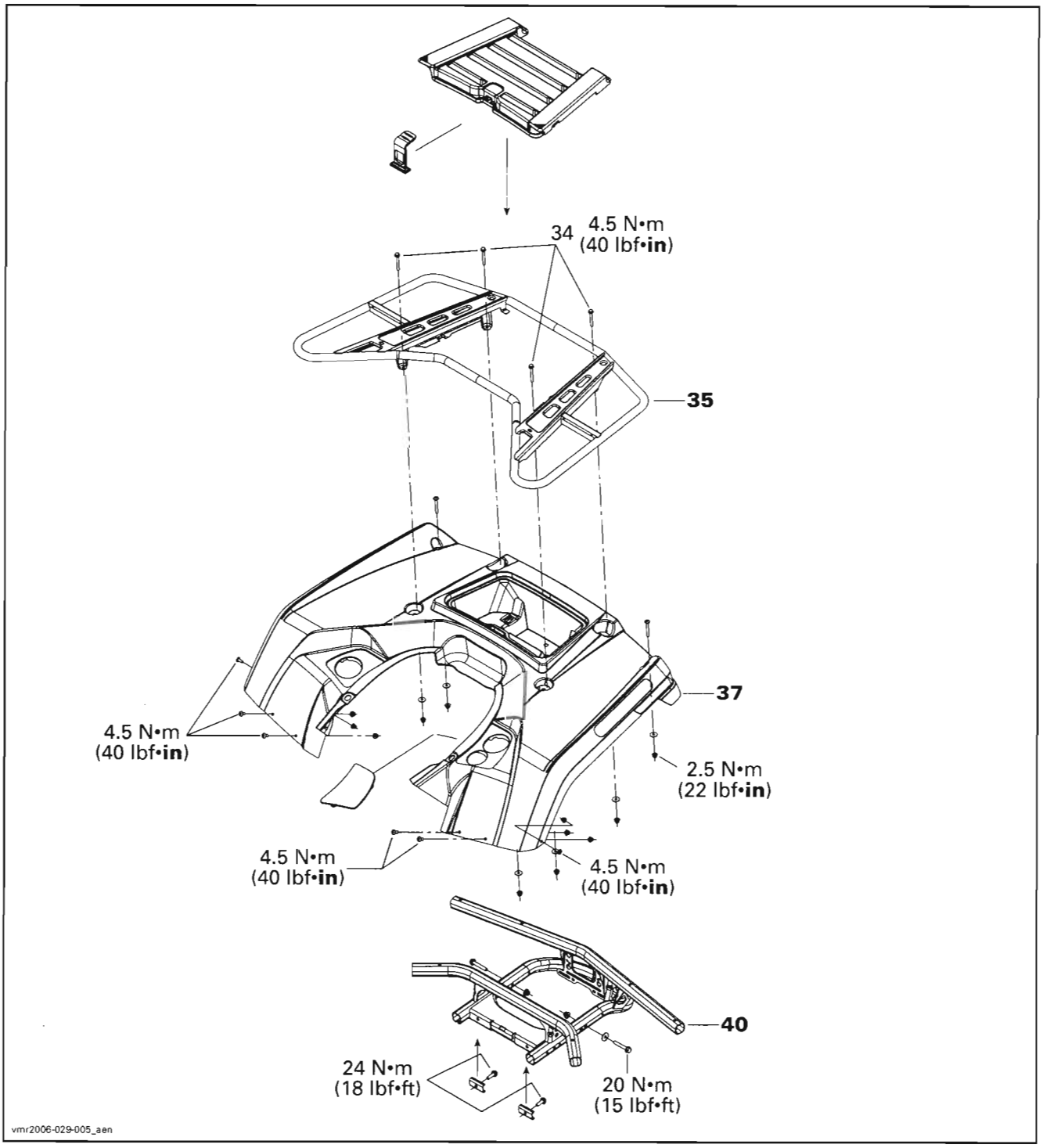

28
11 N•m
(97 lbf•in)
27
26
8 N•m
(71 lbf•in)
11 N•m
(97 lbf•in)
25
23
16 N•m
(142 lbf•in)
8 N•m
(71 lbf•in)
22
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OUTLANDER 800 SERIES

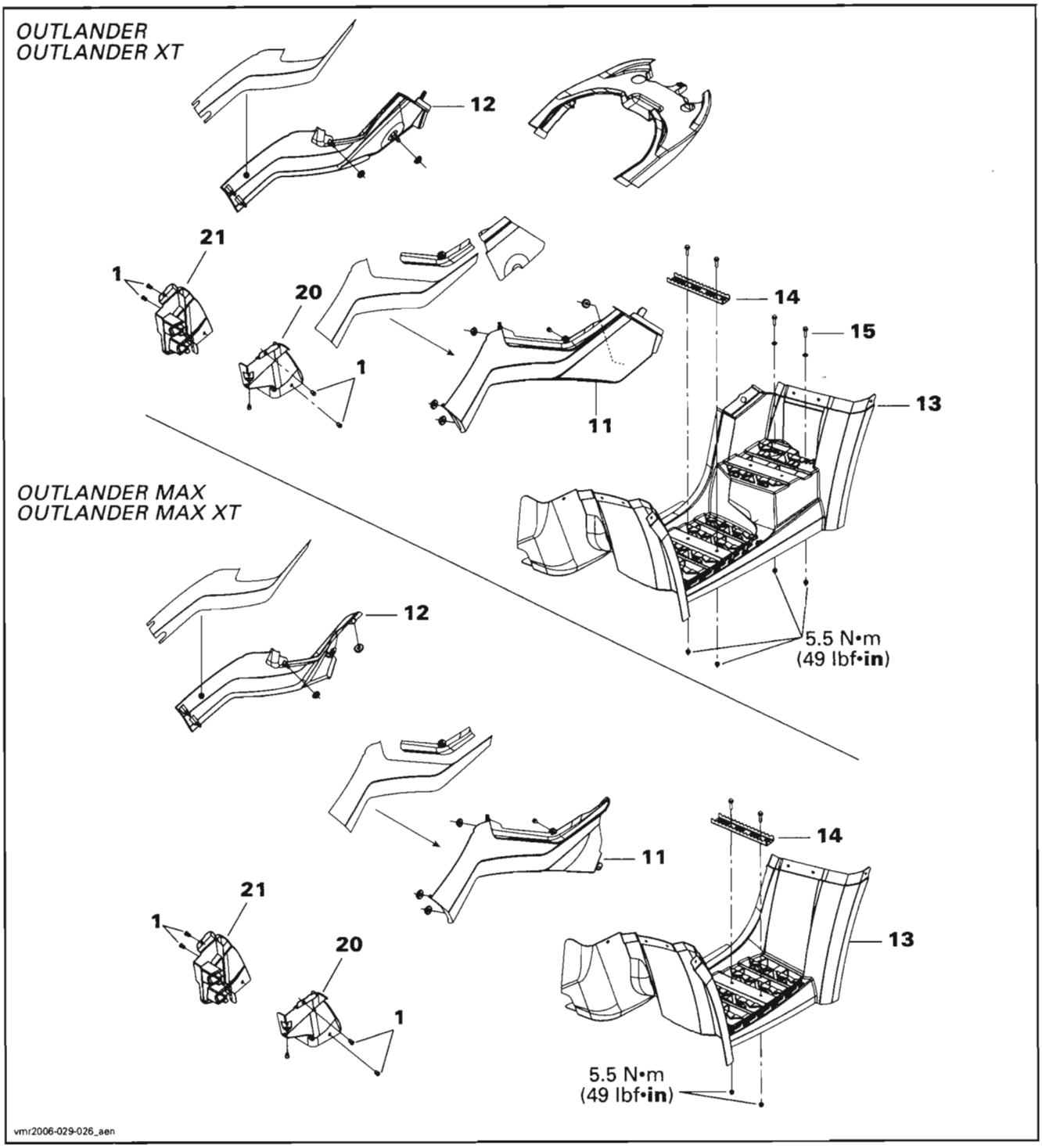
Body Parts (front view)



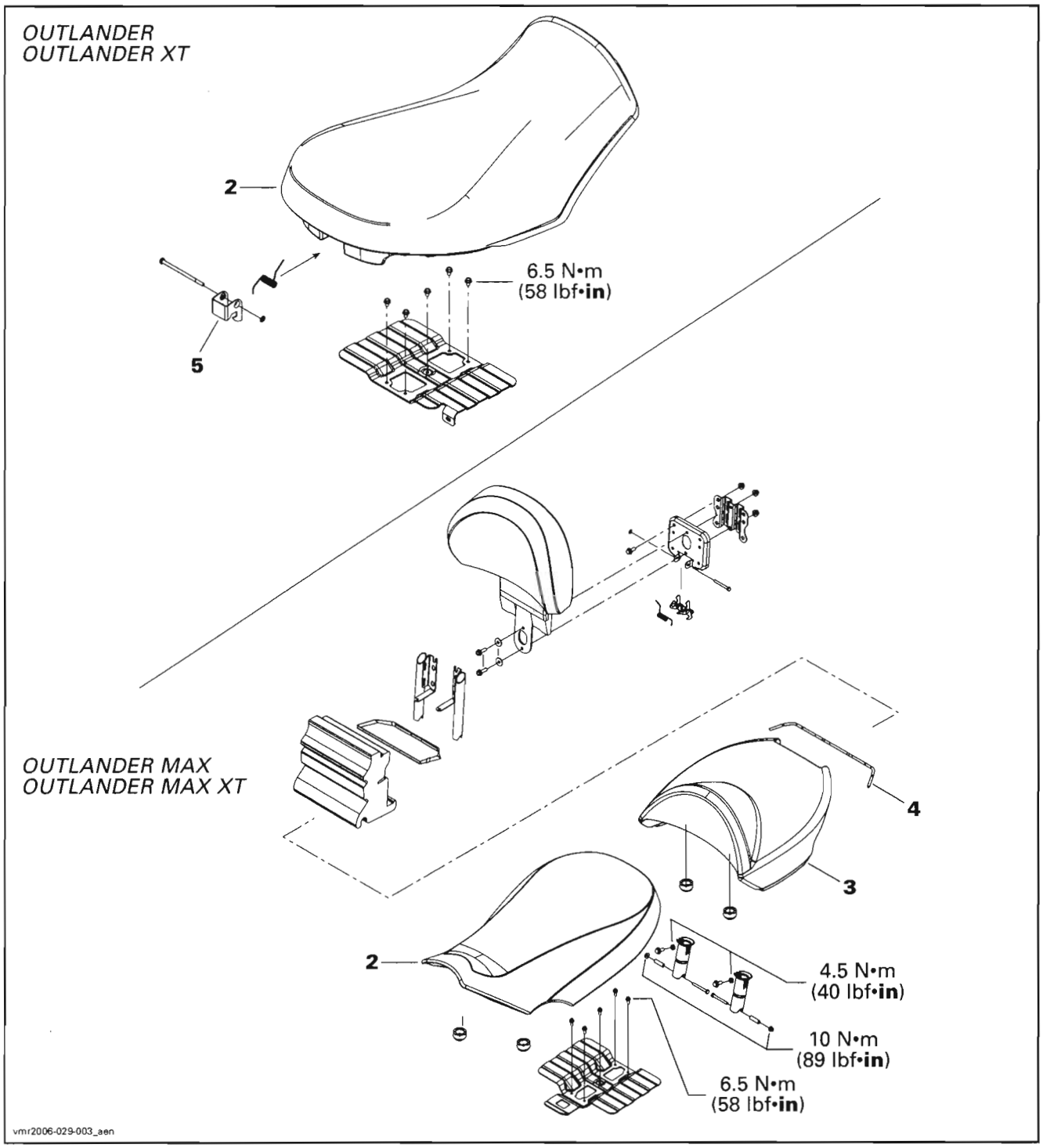
Body Parts (rear view)



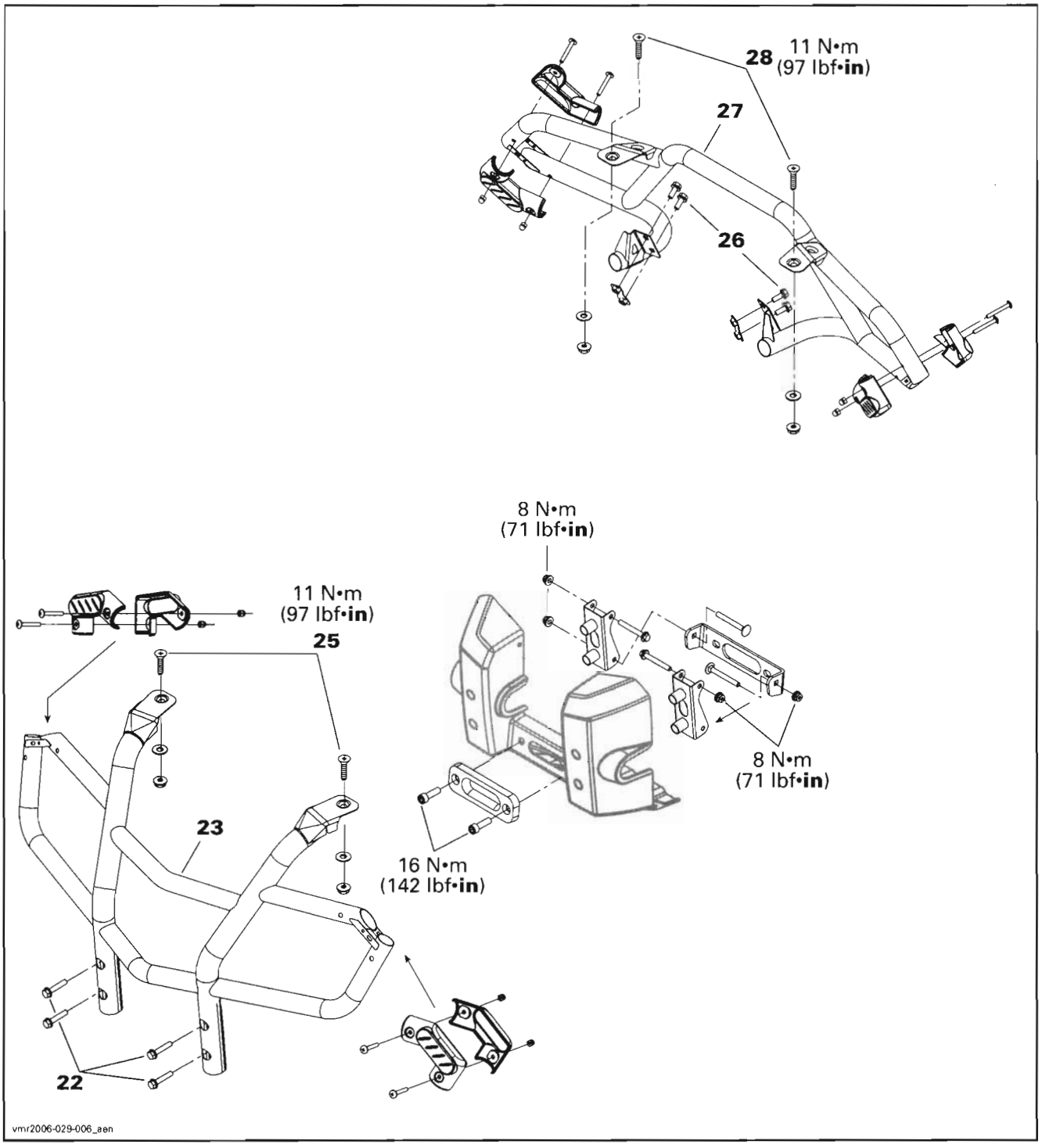
Body Parts (side view)



Seat


OUTLANDER
OUTLANDER XT
2
6.5 N•m
(58 lbf•in)
5
OUTLANDER MAX
OUTLANDER MAX XT
4
3
2
4.5 N•m
(40 lbf•in)
10 N•m
(89 lbf•in)
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vmr2006-029-003_aen

XT Package


28
11 N•m
(97 lbf•in)
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26
8 N•m
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(97 lbf•in)
25
23
16 N•m
(142 lbf•in)
8 N•m
(71 lbf•in)
22
vmr2006-029-006_aen

GENERAL

During assembly/installation, use the torque values and service products as in the exploded views.

Clean threads before applying a threadlocker. Refer to *SELF-LOCKING FASTENERS* and *LOCTITE APPLICATION* at the beginning of this manual for complete procedure.

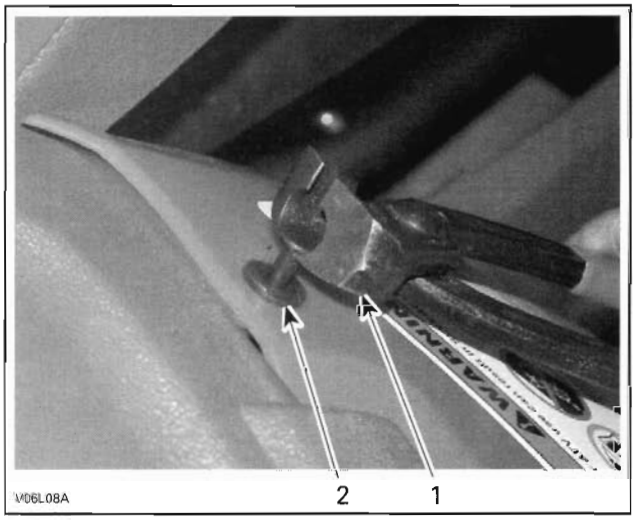
⚠ WARNING

Torque wrench tightening specifications must strictly be adhered to.
Locking devices (e.g.: locking tabs, elastic stop nuts, 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.

Plastic Rivet

Plastic rivets no. 1 are used in the riveting of the various body parts. Plastic rivets can be removed carefully with pliers Oetiker 1099 (P/N 295 000 070).

NOTE: Reuse the plastic rivets.



TYPICAL
1. Pliers
2. Plastic rivet

PROCEDURES

SEAT

Cleaning

It is recommended to clean seat(s) no. 2 and/or no. 3 with a solution of warm soapy water, using a soft clean cloth.

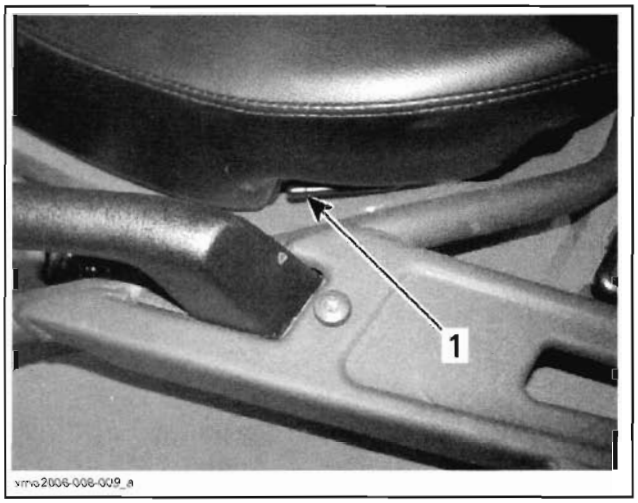
CAUTION: Avoid use of harsh detergents such as strong soaps, degreasing solvents, abrasive cleaners, paint thinners, etc. that may cause damage to the seat cover.

Removal

Passenger's Seat

Outlander MAX/MAX XT Models

– Pull one of the passenger's seat latch levers no. 4. Those levers are located underneath the RH or LH rear end of seat.



TYPICAL — LH SIDE
1. Seat latch

– Gently lift the rear of seat no. 3.
– Pull seat rearwards.
– Continue lifting movement until you can release the front retaining device then completely remove passenger's seat.

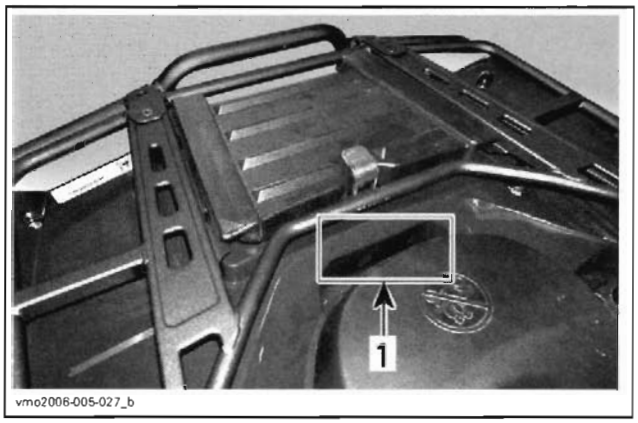
Operator's Seat

Outlander MAX/MAX XT Models

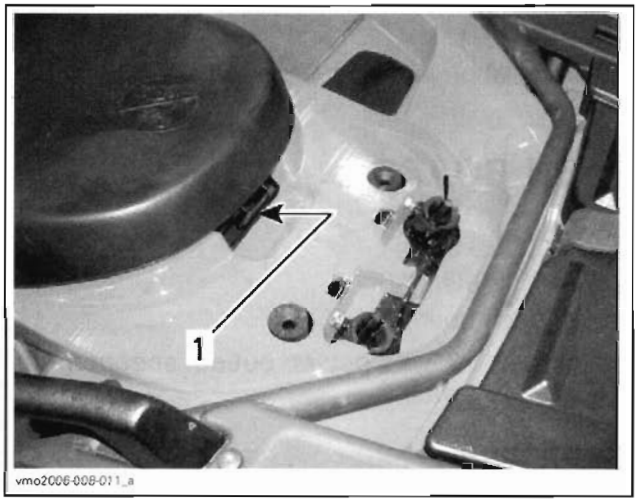
Remove passenger's seat no. 3 as mentioned above.

All Models

To remove seat no. 2, pull latch lever no. 5 forward while gently lifting rear of seat.



OUTLANDER/OUTLANDER XT
1. Seat latch

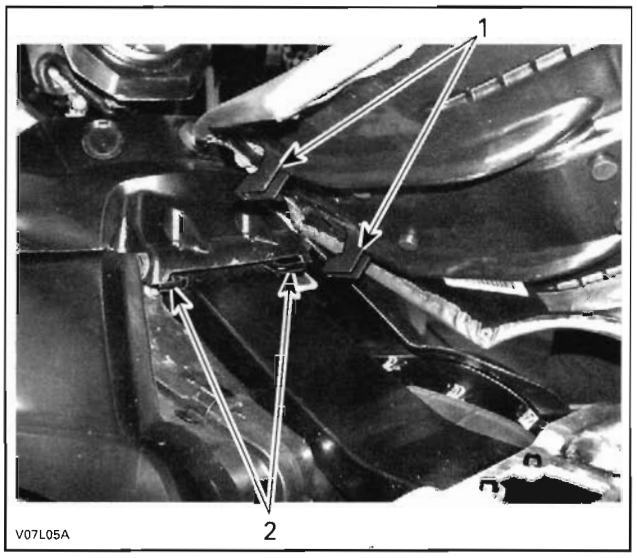


OUTLANDER MAX/OUTLANDER MAX XT
1. Seat latch

Pull seat rearward. Continue lifting movement until you can release the front retaining device then completely remove seat.

Installation

Insert front tabs of seat into frame hooks. When seat rests in its position, firmly push seat down to latch.



1. Insert these tabs in hooks
2. Hooks

NOTE: A distinctive snap will be felt. Double check that the seat is secure by giving it a tug to confirm proper latching.

⚠ WARNING

Make sure seat is securely latched before riding.

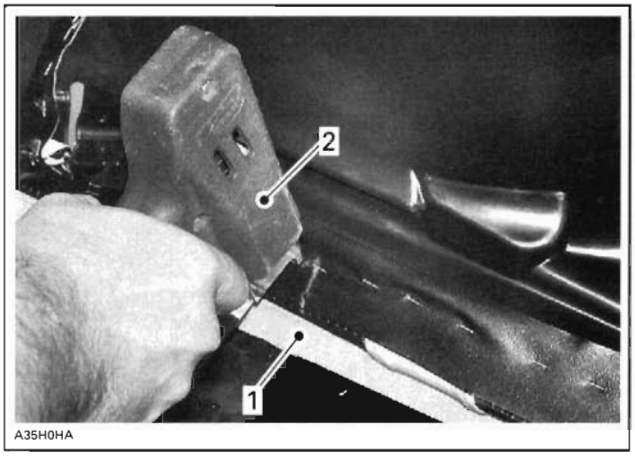
Seat Cover Replacement

Remove the old seat cover. Check the foam and replace if necessary.

Install staples with an electric tacker such as Arrow tacker **no. ETN-50** or with a manual tacker such as Arrow tacker **no. T-50**.

NOTE: For an easier installation, it's highly recommended to use an electric tacker.

Ensure that the seat rest firmly against a hard surface such as a piece of wood. This is done to get the staples completely pushed in place.



TYPICAL
1. *Piece of wood*
2. *ETN-50 (electric)*

After cover installation cut all around the excess of material.

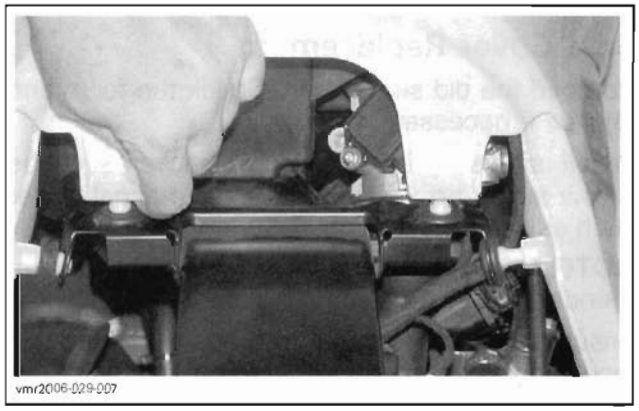
CENTRAL PANEL

Outlander 800 Series

Removal

Remove seat(s).

Come off the plastic studs from the grommets.



Pull central panel **no. 6** to separate its tabs from front fender **no. 7**.



Installation

The installation is the reverse of the removal procedure.

DASH BOARD

Removal

Remove central panel.

Lift up dash board **no. 8**.

Disconnect 12–volt power outlet, speedometer and ignition switch.

Installation

For installation, reverse the removal procedure.

SIDE PANEL

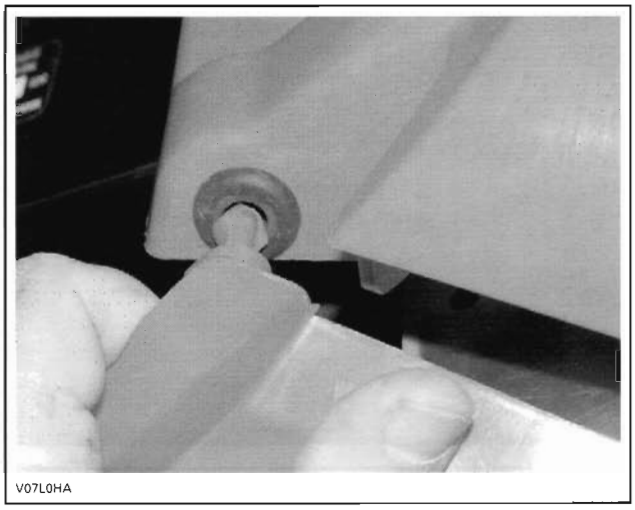
Removal

Outlander 400 Series

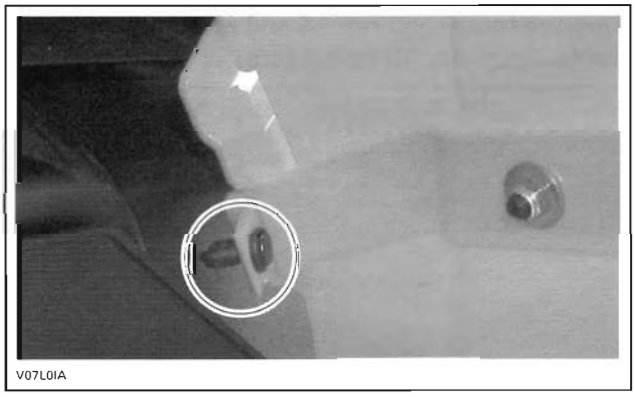
NOTE: Use the same procedure to remove the LH and RH side panels **no. 9** and **no. 10**.

Remove the seat(s).

Come off the plastic studs from the grommets.



Remove plastic rivet from lower tab.



Move the tabs out of their slots.

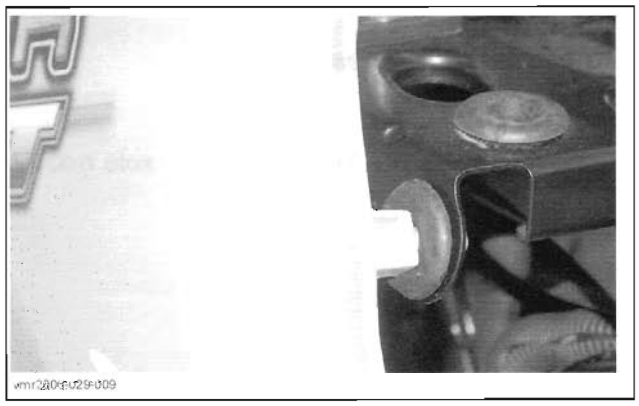
Remove the side panel completely.

Outlander 800 Series

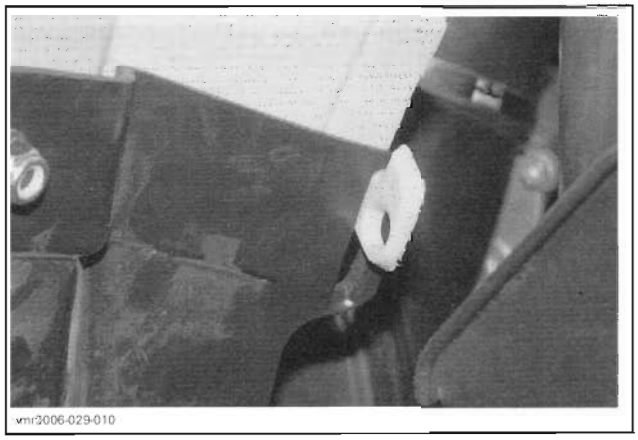
NOTE: Use the same procedure for the LH and RH side panels no. 11 and no. 12.

Remove seat(s) and central panel no. 6.

Come off the plastic studs from the grommets.



Unhook the side panel from footrest.



Remove side panel from vehicle.

Installation

The installation is the reverse of removal procedure.

FOOTREST

Removal

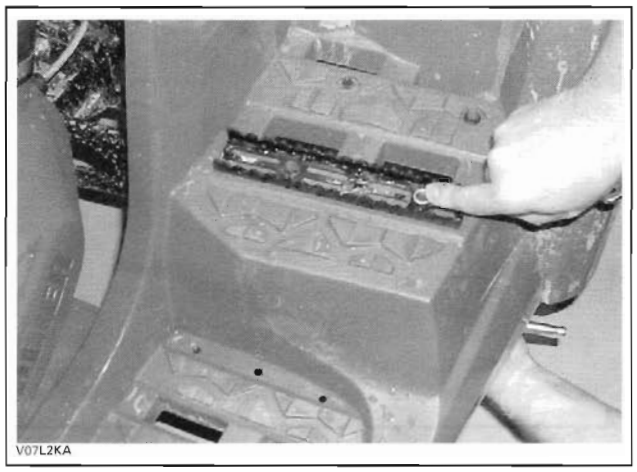
Outlander 400 Series

Remove:

- side panel no. 9 or no. 10

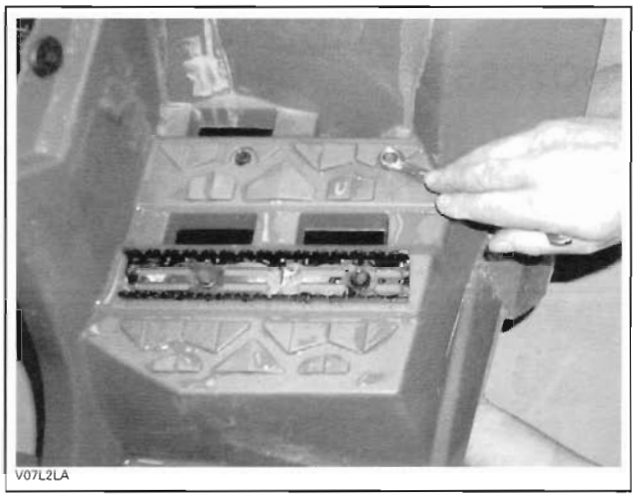


- footpeg(s) no. 14



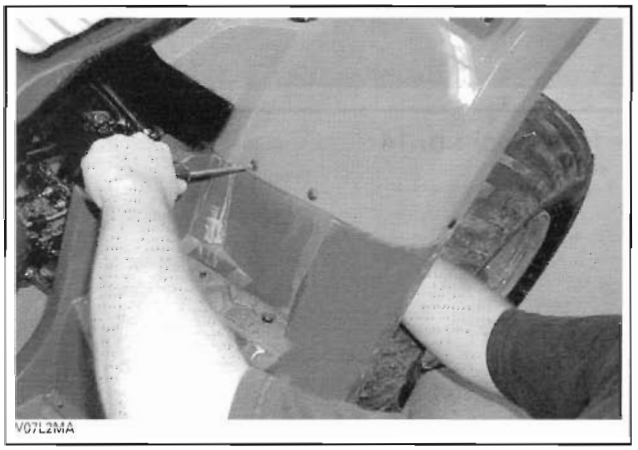
OUTLANDER MAX/XT

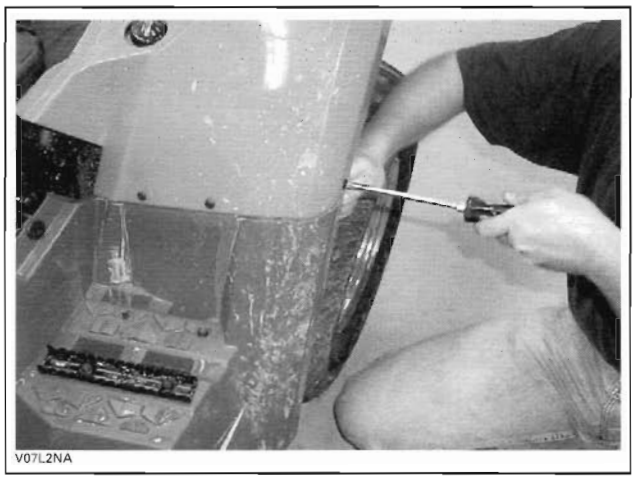
– footrest support retaining screws



OUTLANDER MAX/XT ONLY

– all screws retaining the footrest **no. 13** to fenders.

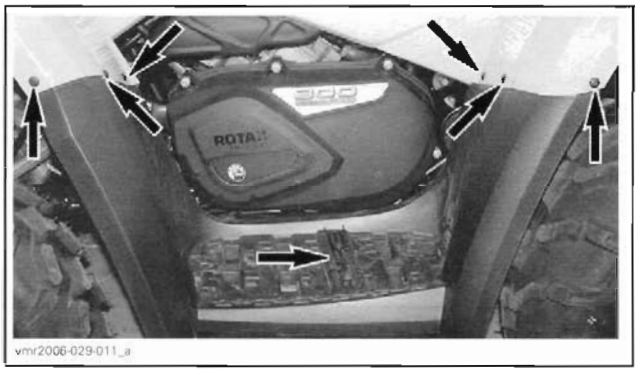




Pull the footrest out of vehicle.

Outlander 800 Series

Remove footpeg(s) **no. 14** and all bolts that attach the footrest **no. 13** to fenders.



On **MAX** and **MAX XT models**, remove the footrest support retaining screws **no. 15**.

Installation

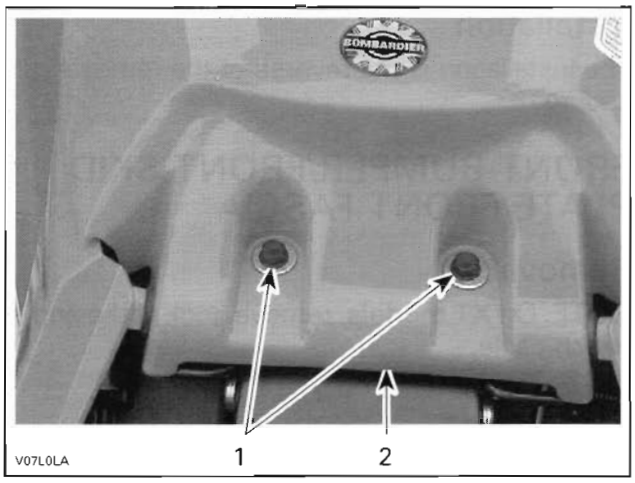
The installation is the reverse of removal procedure.

CONSOLE

Outlander 400 Series

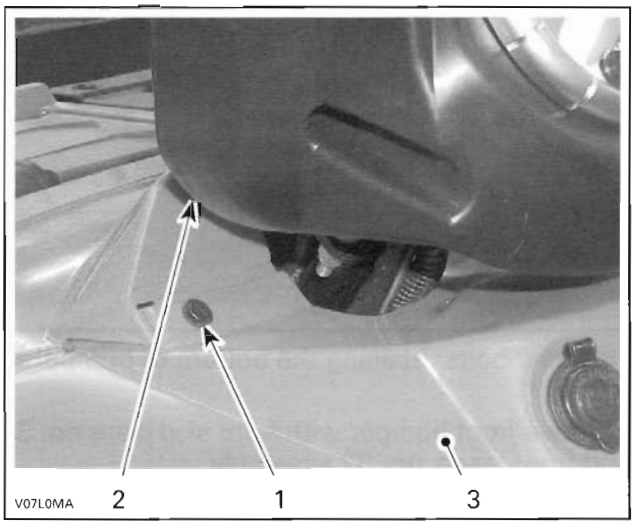
Removal

Remove screws **no. 16** retaining console **no. 17**.



1. *Console screws*
2. *Console*

Remove plastic rivets **no. 1** near handlebar cover.



1. *Plastic rivet*
2. *Handlebar cover*
3. *Console*

Lift the console then unplug the ignition switch and the 12-volt power outlet.

Remove the console.

Installation

The installation is the reverse of removal procedure.

INNER FENDER

Removal

Outlander 400 Series

Lift the front of vehicle and support it securely.

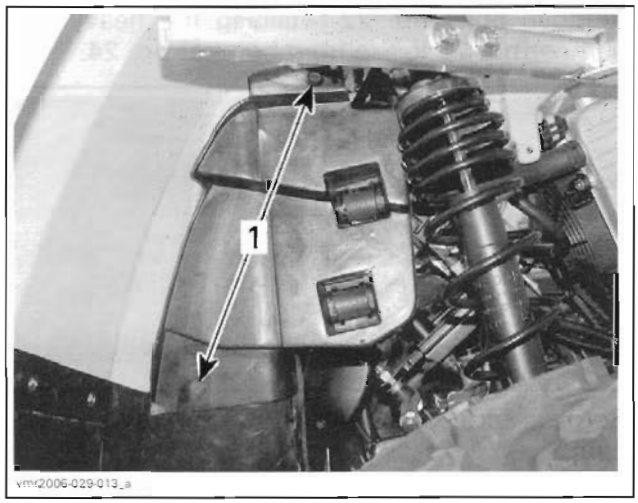
Remove:

- appropriate wheel
- all fastening hardware
- inner fender **no. 18** or **no. 19**.

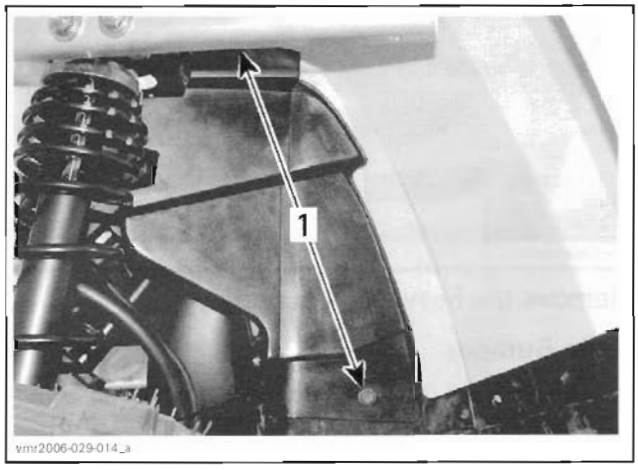
NOTE: On RH side, unclip the radiator hose.

Outlander 800 Series

Remove the plastic rivets that attach inner fenders **no. 20** and **no. 21** to footrest and frame.



INNER FENDER ON RH SIDE
1. *Plastic rivets*



INNER FENDER ON LH SIDE.
1. *Plastic rivets*

On the RH side, detach coolant hoses from inner fender **no. 21**.

Installation

The installation is the reverse of removal procedure.

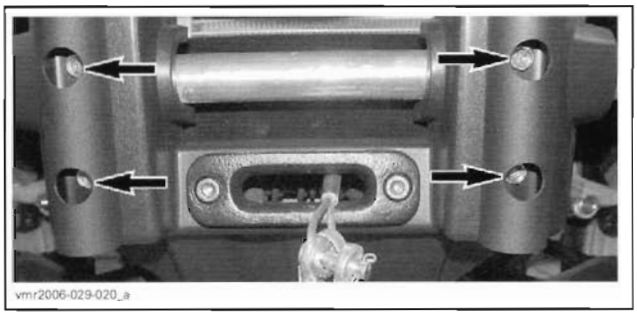
HEAVY DUTY BUMPER

XT Models

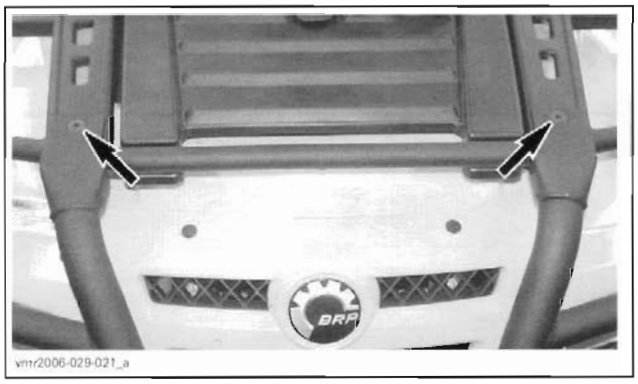
Removal

Front Bumper

Remove bolts **no. 22** retaining the heavy duty bumper **no. 23** to the front bumper **no. 24**.



Remove screws **no. 25** that attach the heavy duty bumper to the rack.

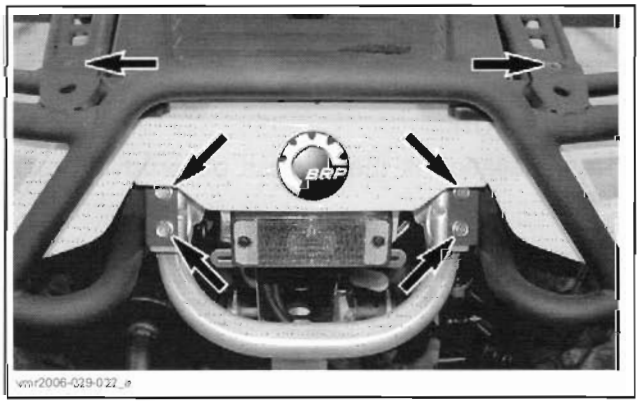


Remove the heavy duty bumper.

Rear Bumper

Unscrew bolts **no. 26** retaining the rear heavy duty bumper **no. 27** to the rear bumper.

Remove screws **no. 28** that attach the heavy duty bumper to the rack.



Installation

The installation is the reverse of the removal procedure.

FRONT BUMPER/FRONT SKID PLATE/FRONT FASCIA

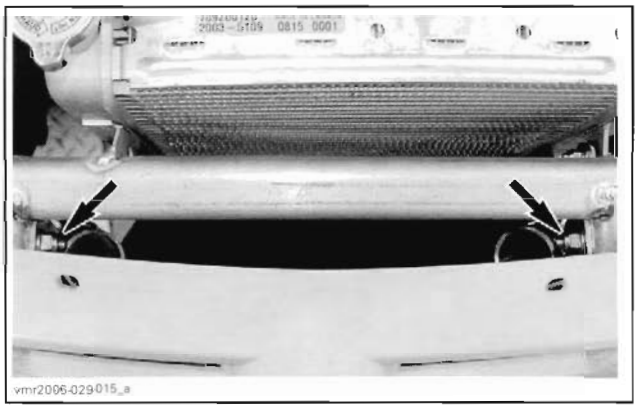
Removal

NOTE: On **XT models**, remove hook at the end of winch cable.

Remove front fender.

Unplug headlamps connectors.

Unscrew bolts **no. 29** that attach front bumper **no. 24** to fender support **no. 30**.



Unscrew bolts retaining the bottom of bumper to frame.

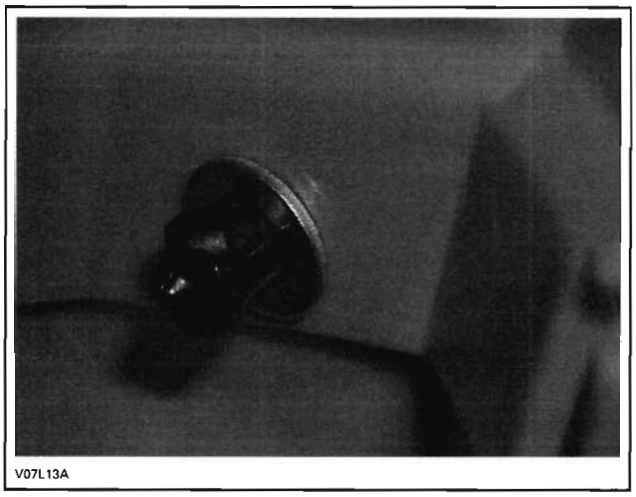
Remove front bumper with front skid plate **no. 31** and front fascia **no. 32** assembly.

Place the assembly on a bench and disassemble all parts if necessary.

Installation

The installation is the reverse of removal procedure.

NOTE: Install a washer **no. 33** under each plastic rivet located at the both ends of fascia.


V07L13A

LUGGAGE RACK

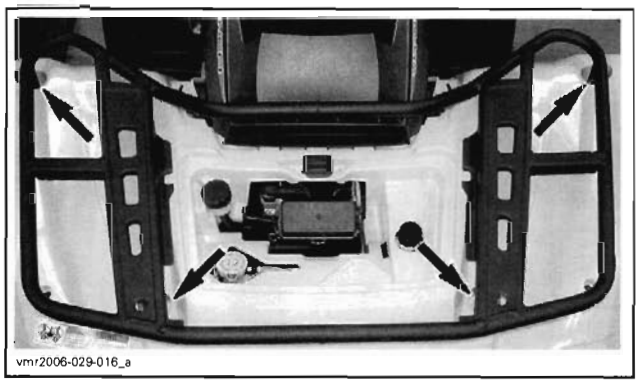
NOTE: Use the same procedure for front or rear luggage racks.

Removal

NOTE: On XT models, heavy duty bumpers (front and rear) must be removed to allow luggage racks removal.

Remove storage or service compartment cover.

Unscrew the four (4) bolts **no. 34** retaining the rack **no. 35**.


vmr2006-029-016_a

Remove luggage rack.

Installation

The installation is the reverse of removal procedure.

FENDER

Removal

Front Fender

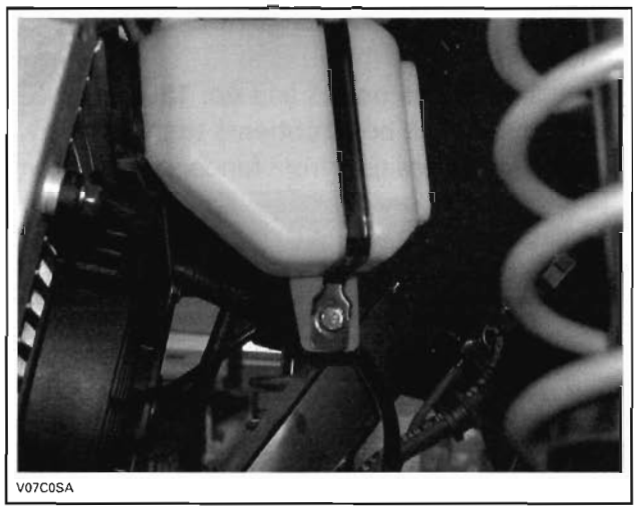
Outlander 400 Series

Remove:

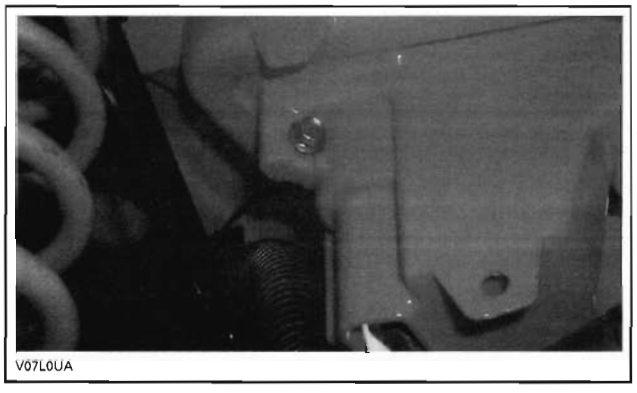
- side panels **no. 9** and **no. 10**
- luggage rack **no. 35**
- plastic rivets **no. 1** retaining front fender **no. 7** to front fascia
- all screws retaining the footrests to fender


V07L0RA

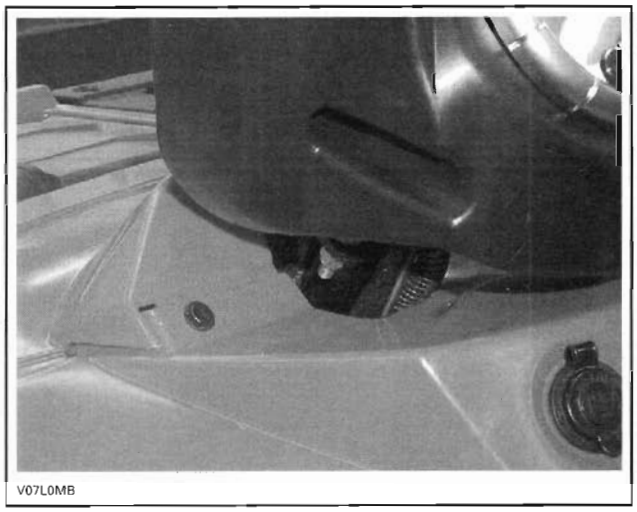
- service compartment cover
- coolant reservoir support


V07C0SA

- rear brake fluid reservoir bolt


V07L0UA

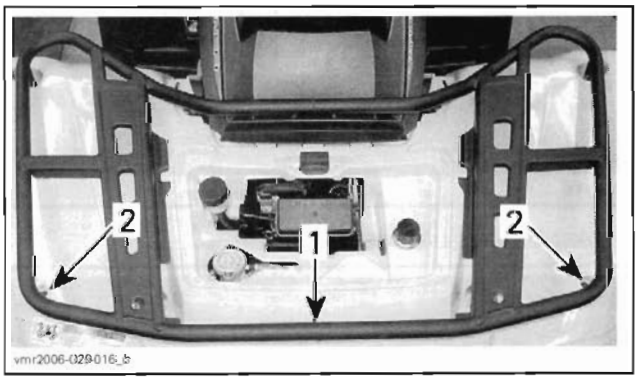
- inner fenders
- plastic rivets **no. 1** retaining front fender to console.


V07L0MB

Lift and remove front fender. Place it in a place to avoid scratches.

Outlander 800 Series

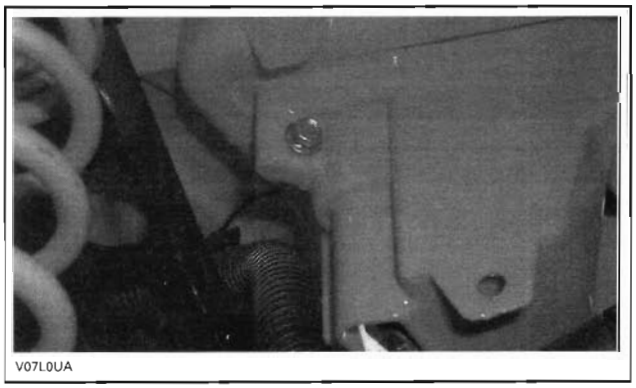
Remove:
- both side panels **no. 11** and **no. 12**
- bolts that attach both footrests to the fender
- plastic rivets retaining front fender **no. 7** to front fascia
- luggage rack
- fender bolts **no. 36**



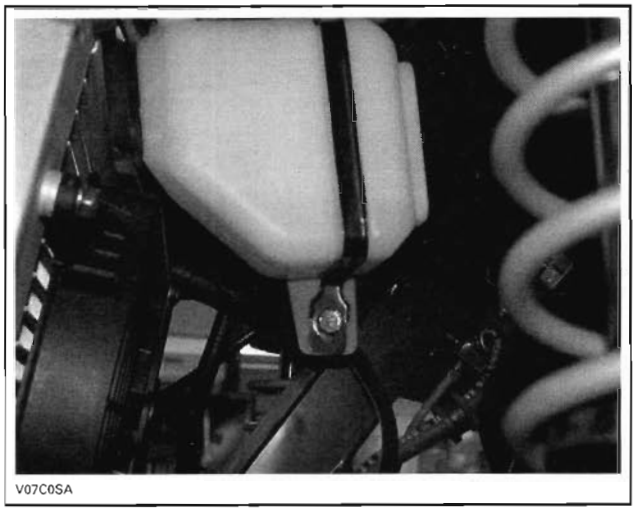
vmr2006-029-016_b

1. Luggage rack
2. Fender bolts

- brake fluid reservoir bolt

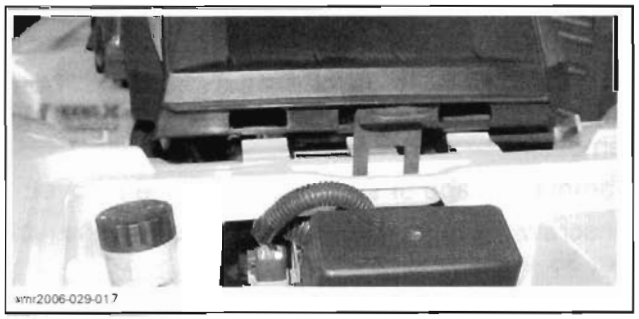

V07L0UA

- coolant reservoir support

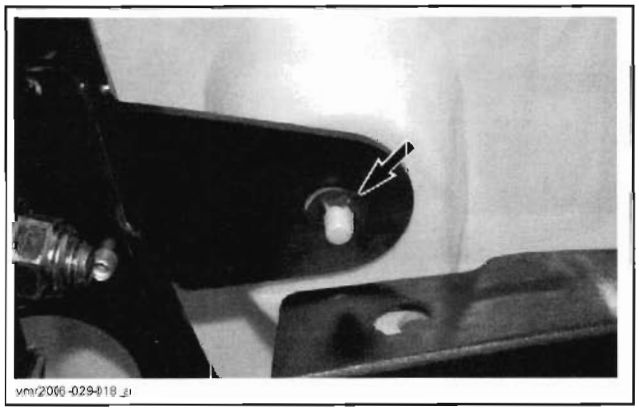

V07C0SA

- both inner fenders.

Detach dash board **no. 8** from fender.


vmr2006-029-017

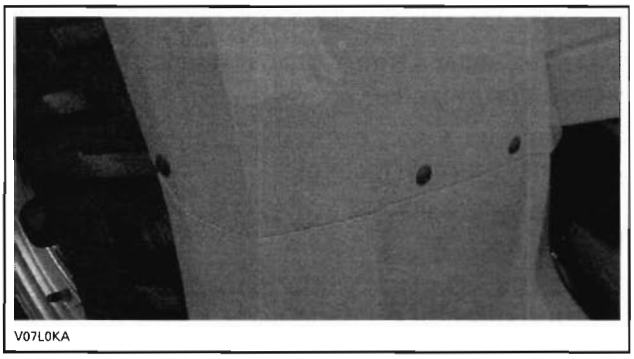
Remove push nuts retaining fender to frame.


vmr2006-029-018

Lift up fender and place it in a safe place to avoid scratches.

Rear Fender

Remove:
- seat
- both side panels
- luggage rack **no. 35**
- all screws retaining the footrests to rear fender **no. 37**


V07L0KA

– fuel tank cap.

Lift and remove fender. Place it in a place to avoid scratches.

Installation

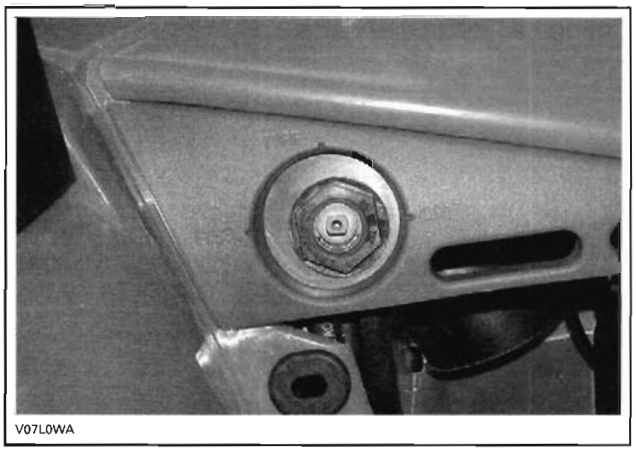
The installation is the reverse of removal procedure.

FUEL VALVE SUPPORT

Outlander 400 Series

Removal

Remove:
– seat
– LH side panel
– fuel valve cap
– fuel valve nut


V07L0WA

– console.

Unlatch the fuel valve support **no. 38**.

Installation

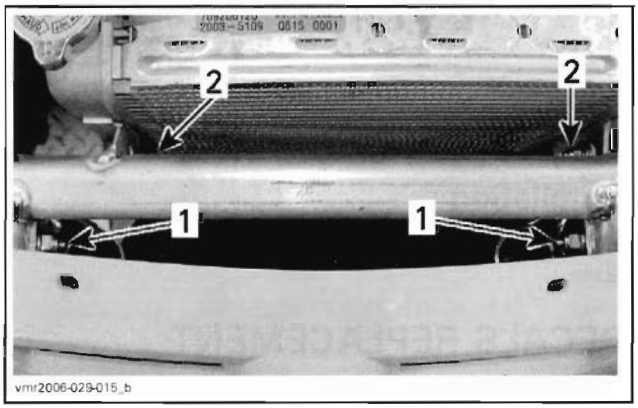
The installation is the reverse of removal procedure.

FENDER SUPPORT

Removal

Front Fender Support

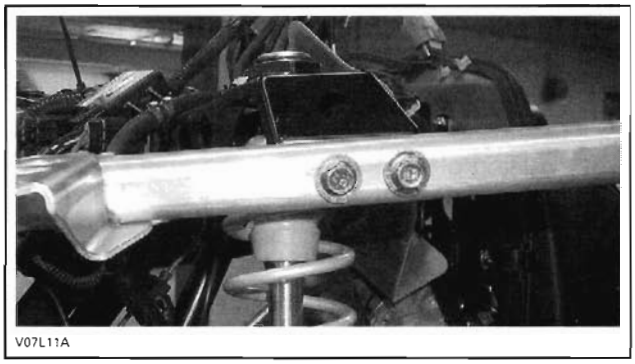
Remove:
– front fender
– front bumper bolts **no. 29**
– radiator mounting bolts



vmr2006-029-015_b

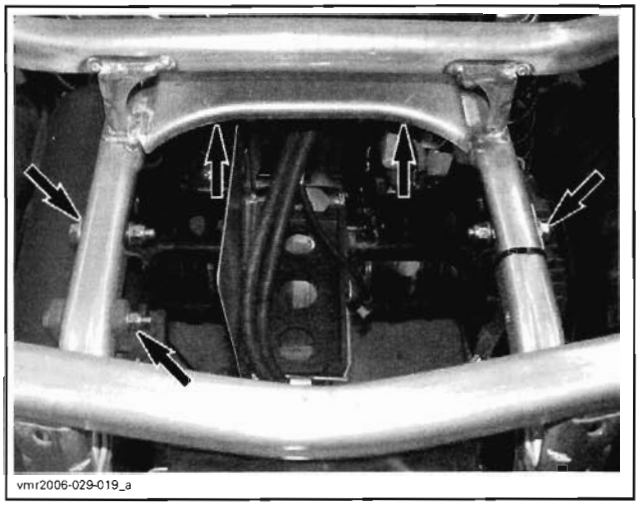
1. Radiator bolts
2. Bumper bolts

– bolts **no. 39** retaining the fender support **no. 30** to the frame.


V07L11A

Rear Fender Support

Remove:
– rear fender
– bolts that attach fender support **no. 40** to frame
– exhaust support bolt.


vmr2006-029-019_a

Installation

The installation is the reverse of removal procedure.

DECALS REPLACEMENT

Removal

Using a heat gun warm up one end of decal for a few seconds until decal can roll off when rubbing with your finger.

Pull decal slowly and when necessary apply more heat to ease removal on the area that has to be peeled off.

If decal tears while pulling off, it has to be heated for a few seconds longer. If decal tends to stretch while pulling off, stop heating and wait a few seconds to let it cool, then peel it off.

Installation

Using isopropyl alcohol, clean the surface and dry thoroughly.

Apply liquid soap to new decal and carefully position it. 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 these products in a well ventilated area.

HITCH/TRAILER BALL

Inspection

The hitch/trailer ball is optional. If the vehicle is equipped with this option, often check the solidity of the installation.

PLASTIC 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:

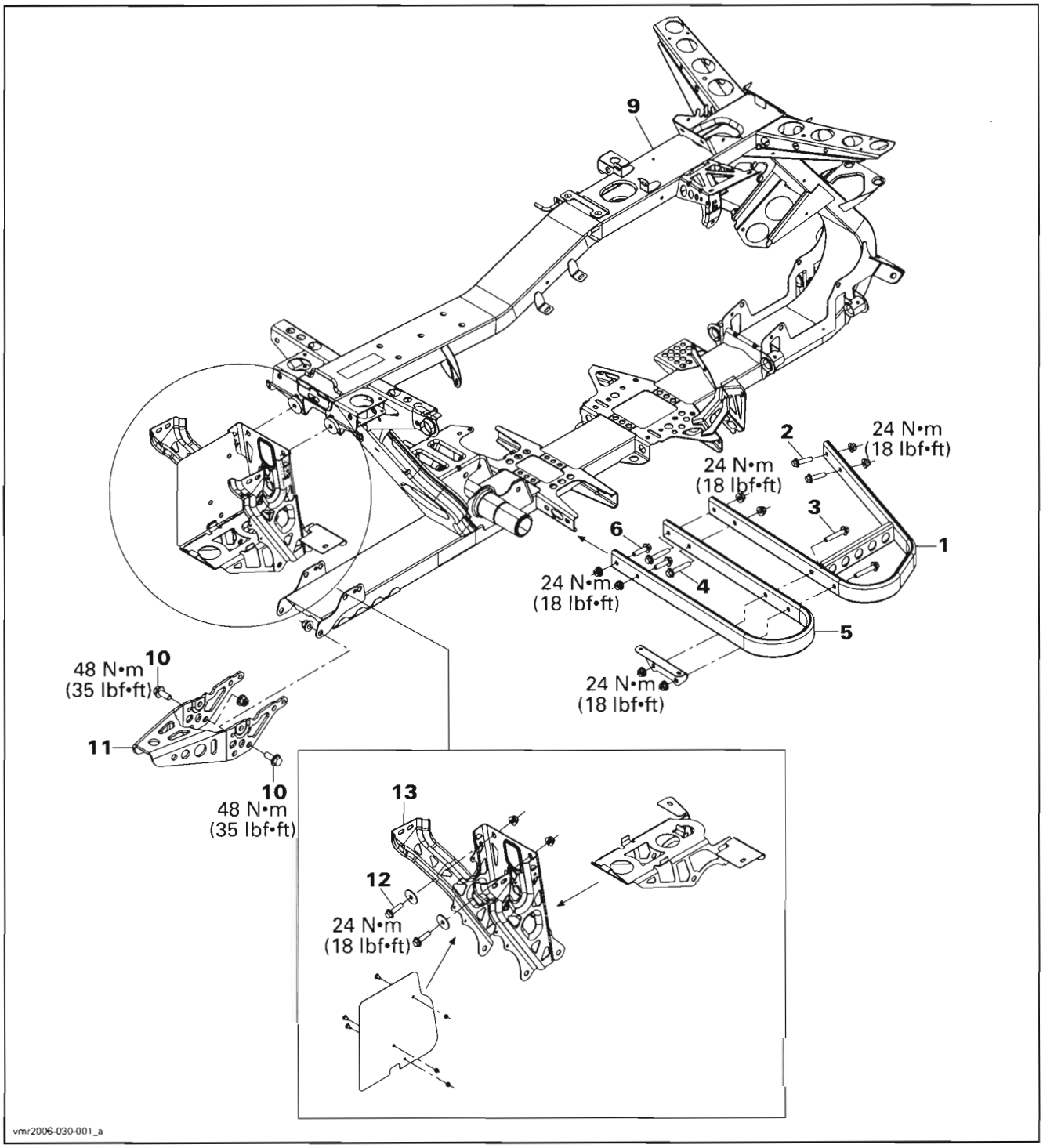
- gasoline
- brake fluid
- kerosene
- diesel fuel
- lighter fluid
- varsol
- naphtha
- acetone
- strong detergents
- abrasive cleaners
- waxes containing an abrasive or a cleaning agent in their formula.

PLASTIC REPAIR

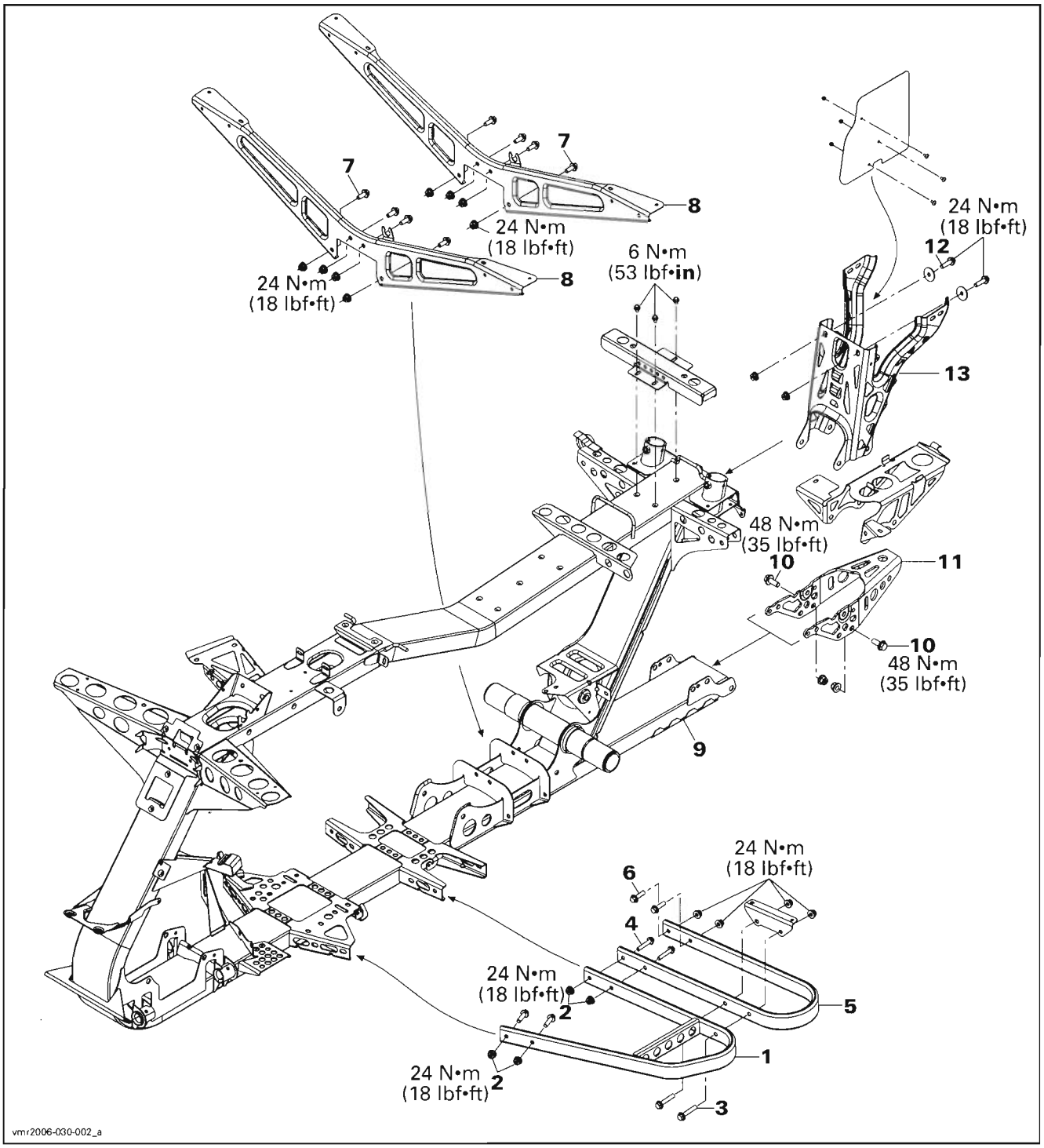
No plastic part on the vehicle is repairable. Change all defective parts.

FRAME

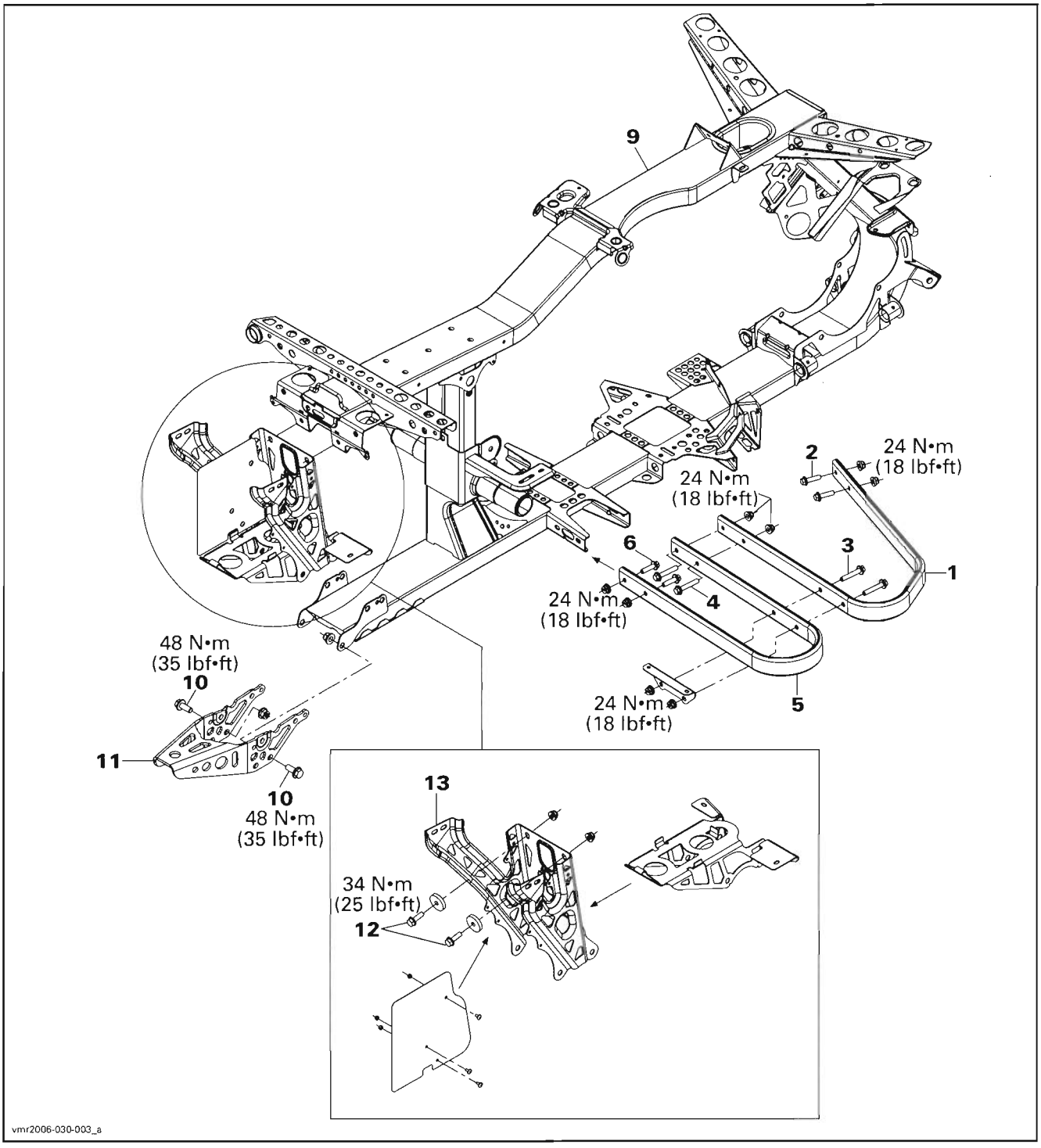
Outlander 400 Series



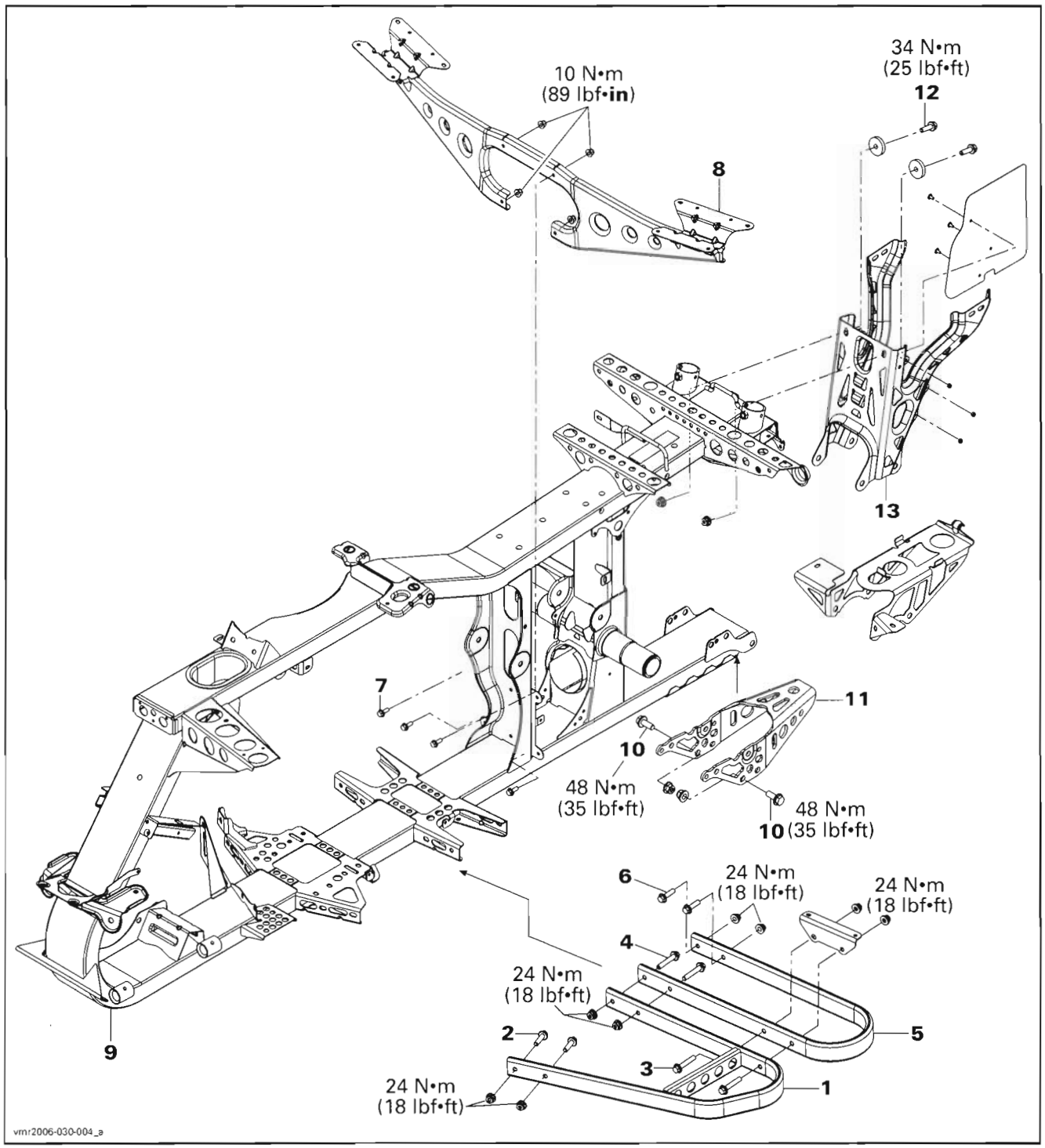
Outlander MAX 400 Series



Outlander 800 Series



Outlander MAX 800 Series



GENERAL

During assembly/installation, use the torque values and service products as in the exploded views.

Clean threads before applying a threadlocker. Refer to *SELF-LOCKING FASTENERS* and *LOCTITE APPLICATION* at the beginning of this manual for complete procedure.

⚠ WARNING

Torque wrench tightening specifications must strictly be adhered to.
Locking devices (e.g.: locking tabs, elastic stop nuts, 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.

CAUTION: Before performing electrical welding anywhere on the vehicle, unplug the electronic module connector. Also unplug the negative cable and the voltage regulator. This will protect the electronic module and battery against damage caused by flowing current when welding.

PROCEDURES

FOOTREST SUPPORT

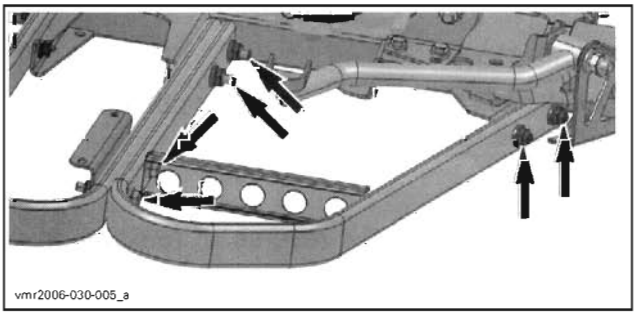
NOTE: Use the same procedure for RH or LH footrest supports.

Removal

Front Footrest Support

To remove the front support **no. 1**, do the following:

- Remove the appropriate footrest.
- Unscrew bolts **no. 2**, **no. 3** and **no. 4**.



- Remove the front footrest support.

Rear Footrest Support

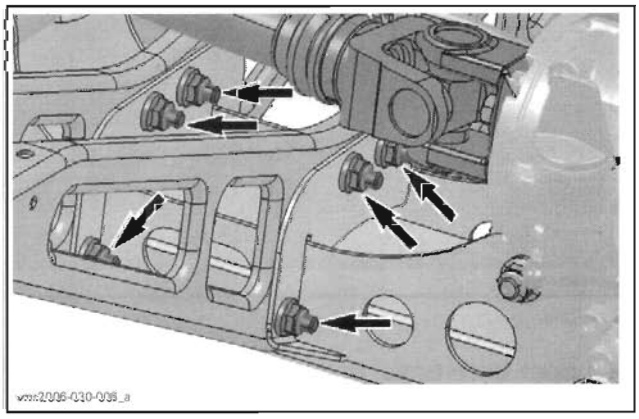
To remove the rear footrest support **no. 5**, use same procedure than front footrest support but remove bolts **no. 6** instead of bolts **no. 2**.

Passenger Footrest Support

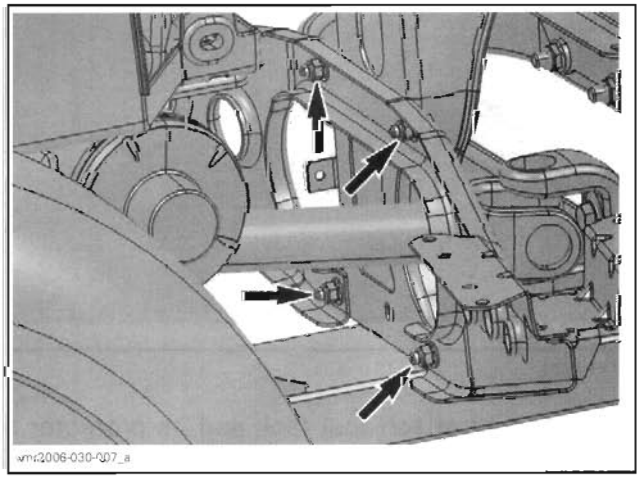
All MAX/MAX XT Models

Remove both footrests.

Unscrew bolts **no. 7** then remove passenger footrest support(s) **no. 8**.



OUTLANDER MAX 400



OUTLANDER MAX 800

Inspection

Check footrest support(s) for cracks, bending or other damages. Replace if necessary.

Installation

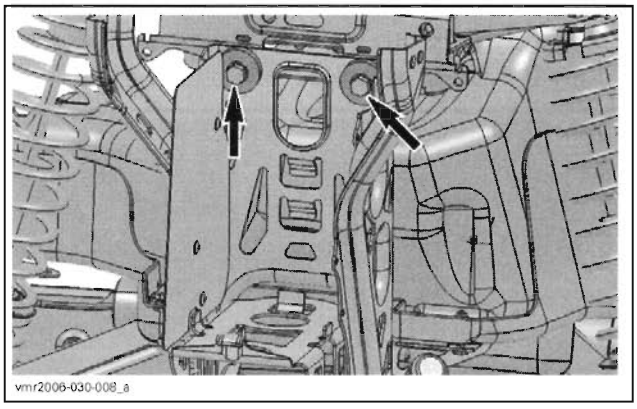
The installation is the reverse of removal procedure.

NOTE: Install all bolts before tightening.

BATTERY SUPPORT

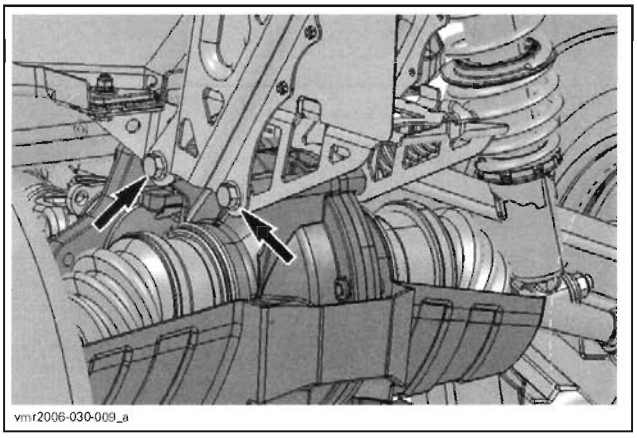
Removal

Remove:
- battery (refer to *STARTING SYSTEM*)
- bolts **no. 12** retaining the battery support **no. 13** to frame **no. 9**



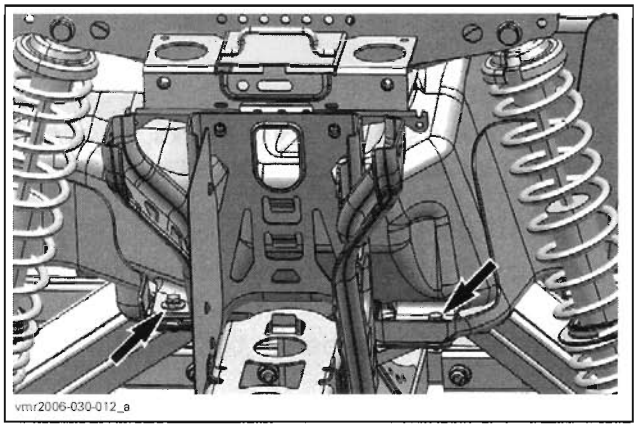
TYPICAL

- upper differential bolts



TYPICAL

- bolts that attach fuel tank and its protector to frame.



- battery support from vehicle.

Inspection

Check battery support for cracks or other damages. Replace if necessary.

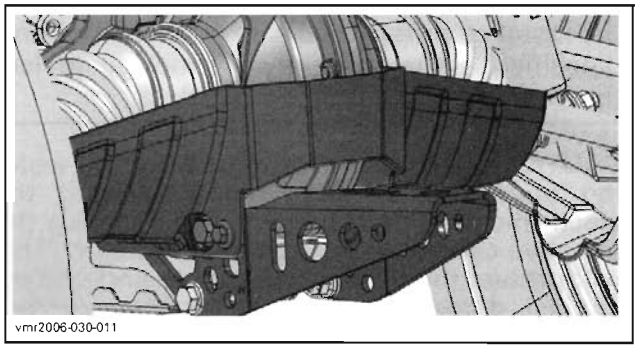
Installation

The installation is the reverse of removal procedure.

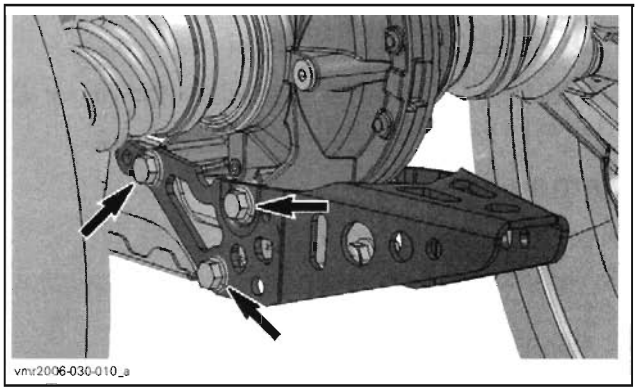
HITCH

Removal

Remove:
- differential protector



- bolts **no. 10** retaining the hitch **no. 11** to frame
- lower differential bolts



- hitch from vehicle.

Inspection

Check hitch for cracks, bending or other damages. Replace if necessary.

Installation

The installation is the reverse of removal procedure.

FRAME

Cleaning

Clean frame no. 9 with appropriate cleaners and rinse with high pressure hose.

NOTE: Clean the draining holes under frame. The drain holes are located at the rear of bottom side of frame.

Touch up all metal spots where paint has been scratched off. Spray all bare metal parts of vehicle with metal protector.

Welding

Steel Frame:

- electric welding
- amperage: 70 - 110 A
- voltage: 20 - 24 V
- rod: E-7014 (3/32 in).

CAUTION: Before performing electrical welding anywhere on the vehicle, unplug the multiple connector at the electronic module connector. Also unplug the negative cable and the voltage regulator. This will protect the electronic module and battery against damage caused by flowing current when welding.

NOTE: Install the ground as close as possible from the reparation area.

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.

OUTLANDER SERIES

MODEL			OUTLANDER™ 400	OUTLANDER™ 800
ENGINE				
Type			ROTAX 400, 4-stroke, single cylinder, Single Over Head Camshaft (SOHC)	ROTAX V-810, 4-stroke, twin cylinders, Single Over Head Camshaft (SOHC)
Maximum HP RPM			7000 RPM	
ELECTRICAL				
Engine RPM limiter setting	Forward	RPM	8000	
	Reverse	RPM	4000 ± 100	3200
Battery	Type		Dry battery type	
	Voltage		12 volts	
	Nominal rating		18 A•h	
	Power starter output		0.7 KW	
Headlamp			2 x 35 W	
Taillight			8/27 W	
Indicator lights			LEDS, 0.7 V approximately (each)	
Fuses	Accessories		15 A (power outlet and auxiliary supply)	20 A
	Fan		20 A	
	Main		30 A	
	Charging system		20 A	—
	Ignition coils		—	5 A
	Fuel injectors		—	5 A
	Speedometer/speed sensor/ tail lamp		—	7.5 A
	Fuel pump		—	7.5 A
	Engine control module (ECM)		—	5 A
	Main accessories		—	30 A
CARBURETION				
Carburetion/EFI	Type		Mikuni constant depression type with manual choke and ECS (Enricher Coasting System)	DeLorto 46 mm throttle body, 1 injector per cylinder
	Model		BSR33	—
Fuel pump	Type		Mikuni (Pulsation pump)	Bosh
	Model		External (vacuum-operated)	Electrical (in fuel tank)
Idle engine speed		RPM ± 50	1300	1250
Main jet			133.8	—
Pilot jet			32.5	—
Needle jet			(826) P-4	—
Jet needle			5 FEY 1	—
Clip position number			3	—

MODEL			OUTLANDER™ 400	OUTLANDER™ 800
Choke plunger position			Variable choke	—
Adjustment	Throttle cable		0.5 mm (.02 in)	1.0 mm (.04 in)
	Preliminary pilot screw turn		2.5	—
	Float level	± 0.5 mm	10.0	—
		± 0.020 in	.390	—
Fuel	Type		Regular unleaded gasoline	
	Octane no.		87 (Ron + Mon)/2	
DRIVE TRAIN				
Transmission type			CVT (Continuously Variable Transmission). Dual range (HI-LO) with park, neutral and reverse	
Engagement RPM		± 100 RPM	1450	1750
Front differential			Shaft driven/single Auto-lock differential (pump driven)	
Front differential ratio			3.6:1	
Rear axle			Shaft driven/single differential	
Rear axle ratio			3.6:1	
TRANSMISSION				
GEARBOX				
Output shaft backlash	New minimum	mm (in)	—	0.10 (.0039)
	New maximum		—	0.20 (.0079)
	Service limit		—	0.25 (.0098)
Bevel gear axial clearance	New minimum	mm (in)	—	0.02 (.0008)
	New maximum		—	0.15 (.0059)
	Service limit		—	0.19 (.0075)
Shifting sleeve groove width	New minimum	mm (in)	—	5.25 (.207)
	New maximum		—	5.35 (.211)
	Service limit		—	5.50 (.217)
Shifting fork claw thickness	New minimum	mm (in)	—	4.95 (.195)
	New maximum		—	5.05 (.199)
	Service limit		—	4.80 (.189)
Shift fork claw thickness (for high gear shifting)	New minimum	mm (in)	—	4.80 (.189)
	New maximum		—	4.90 (.193)
	Service limit		—	4.70 (.185)
Shift fork claw thickness (for low/reverse gear shifting)	New minimum	mm (in)	—	5.10 (.201)
	New maximum		—	5.20 (.205)
	Service limit		—	5.00 (.197)
Shift fork pin diameter	New minimum	mm (in)	—	6.920 (.272)
	New maximum		—	6.970 (.274)
	Service limit		—	6.850 (.270)
Gap of shift fork engagement groove (high gear shifting)	New minimum	mm (in)	—	5.00 (.197)
	New maximum		—	5.10 (.201)
	Service limit		—	5.20 (.205)
Gap of shift fork engagement groove (low/reverse gear shifting)	New minimum	mm (in)	—	5.30 (.209)
	New maximum		—	5.40 (.213)
	Service limit		—	5.50 (.217)

MODEL				OUTLANDER™ 400	OUTLANDER™ 800
Diameter free pinions		New minimum	mm (in)	—	29.000 (1.1417)
		New maximum		—	29.013 (1.1422)
		Service limit		—	29.015 (1.1422)
Intermediate gear shaft		New minimum	mm (in)	—	24.979 (.983)
		New maximum		—	25.000 (.984)
		Service limit		—	24.977 (.983)
Counter shaft	Right side	Service limit	mm (in)	—	17.990 (.708)
	Free pinion bearing			—	24.970 (.983)
	CVT side			—	24.970 (.983)
Bevel gear shaft	Free pinion bearing	Service limit	mm (in)	—	24.984 (.984)
CVT					
Drive belt width		Service limit	mm (in)	30.00 (1.181)	
Governor cup roller outer diameter		New minimum	mm (in)	13.70 (.539)	
		New maximum		13.90 (.547)	13.80 (.543)
		Service limit		13.20 (.519)	
Governor cup roller inner diameter		New minimum	mm (in)	—	8.05 (.317)
		New maximum		—	8.15 (.321)
		Service limit		—	9.00 (.354)
Centrifugal lever pivot bolt diameter		New minimum	mm (in)	6.078 (.239)	
		New maximum		6.100 (.240)	
		Service limit		6.000 (.236)	
Centrifugal lever bore diameter		Service limit	mm (in)	6.200 (.244)	
Drive pulley sliding half centrifugal lever pivot bolt bore diameter		New minimum	mm (in)	6.113 (.241)	
		New maximum		6.171 (.243)	
		Service limit		6.300 (.248)	
Drive pulley sliding half large bushing		New minimum	mm (in)	55.000 (2.165)	
		New maximum		55.020 (2.166)	55.040 (2.167)
		Service limit		55.200 (2.173)	
Drive pulley sliding half small bushing		New minimum	mm (in)	30.000 (1.181)	
		New maximum		30.020 (1.182)	30.040 (1.183)
		Service limit		30.200 (1.189)	
Driven pulley sliding half bushing		New minimum	mm (in)	30.000 (1.181)	30.060 (1.183)
		New maximum		30.020 (1.182)	30.100 (1.185)
		Service limit		30.200 (1.189)	
Driven pulley sliding fixed bushing		New minimum	mm (in)	30.000 (1.181)	30.060 (1.183)
		New maximum		30.020 (1.182)	30.100 (1.185)
		Service limit		30.200 (1.189)	
Torque gear on driven pulley		Service limit	mm (in)	7.500 (.295)	

MODEL		OUTLANDER™ 400	OUTLANDER™ 800
STEERING			
Turning radius	Standard	1.83 m (6 ft)	2.16 m (7 ft)
	MAX	2.0 m (6 ft 7 in)	4.80 m (7 ft 9 in)
Total toe (vehicle on ground) mm (in)		0 ± 4 (0 ± .157)	0 (0)
Camber angle		0°	
Tie-rod maximum length unengaged mm (in)		286.5 ± 5 (11.28 ± 0.197)	
SUSPENSION			
FRONT			
Suspension type		MacPherson	Double A-Arm
Suspension travel		178 mm (7 in)	203 mm (8 in)
Shock absorber	Qty	2	
	Type	Oil	
Spring free length	Standard	354 mm (13.94 in)	349 mm (13.74 in)
	MAX	375 mm (14.76 in)	358 mm (14.09 in)
Spring color code	Standard	Blue/Red/Blue	Green/Gold/Green
	MAX	Blue/Yellow/Blue	Gold/Black/Blue
Front preload adjustment		N.A.	5 settings
REAR			
Suspension type		TTI™ independent	
Suspension travel		203 mm (8 in)	229 mm (9 in)
Shock absorber	Qty	2	
	Type	Oil	
Spring free length	Standard	371 mm (14.37 in)	Short 98 mm (3.86 in) Long 308 mm (12.13 in)
	MAX	413 mm (16.26 in)	Short 98 mm (3.86 in) Long 318 mm (12.52 in)
Spring color code	Standard	Blue/Black/Blue	Short Gold/Red/Blue Long Green/Gold/Blue
	MAX	Blue/Green/Blue	Short Gold/Red/Blue Long Gold/Blue/Blue
Rear preload adjustment		5 settings	
BRAKES			
Front brake	Qty	2	
	Type	Hydraulic, discs	
Rear brake	Qty	1	
	Type	Hydraulic, disc	

MODEL				OUTLANDER™ 400	OUTLANDER™ 800
Parking brake				Hydraulic lock-4 wheels	
Caliper				Floating	
Lining material			Front	Organic	
			Rear	Metallic	
Minimum pad thickness			mm (in)	1 (.04)	
Minimum brake disc thickness		Front	mm (in)	3.5 (.138)	
		Rear	mm (in)	4.3 (.17)	
Maximum brake disc warpage			mm (in)	0.2 (.01)	
TIRES AND WHEELS					
TIRES					
Pressure	Standard	Front	Maximum	28 kPa (4 PSI)	34 kPa (5 PSI)
			Minimum	24 kPa (3.5 PSI)	31 kPa (4.5 PSI)
		Rear	Maximum	31 kPa (4.5 PSI)	
			Minimum	28 kPa (4 PSI)	
	MAX	Front	Maximum	34 kPa (5 PSI)	34 kPa (5 PSI)
			Minimum	31 kPa (4.5 PSI)	31 kPa (4.5 PSI)
		Rear	Maximum	34 kPa (5 PSI)	48 kPa (7 PSI)
			Minimum	31 kPa (4.5 PSI)	34 kPa (5 PSI)
Minimum tire thread depth			mm (in)	3 (0.118)	
Size			Front	25 x 8 x 12	26 x 8 x 12
			Rear	25 x 10 x 12 XT: 25 x 11 x 12	26 x 10 x 12
WHEELS					
Size			Front	12 x 6	
			Rear	12 x 7.5	
DIMENSION					
Overall length			Standard	2.18 m (86 in)	
			MAX	2.39 m (94 in)	
Overall width				1.17 m (46 in)	
Overall height				1.14 m (45 in)	
Dry weight			Standard	276 kg (607 lb)	290 kg (639 lb)
			MAX	298 kg (657 lb)	313 kg (689 lb)
Wheel base			Standard	1.24 m (49 in)	1.30 m (51 in)
			MAX	1.45 m (57 in)	1.50 m (59 in)
Wheel track		Front	mm (in)	965 (38)	
		Rear	mm (in)	914 (36)	
Ground clearance			mm (in)	236 (9.3)	305 (12)
CAPACITIES					
Fuel tank				16 L (4.2 U.S. gal)	20 L (5.3 U.S. gal)
Fuel tank reserve				2 L (0.6 U.S. gal)	
Engine oil		Capacity (oil change with filter)		3 L (3.17 quarts) (engine/transmission)	2 L (2.11 quarts)
		Recommended		SAE, 4 stroke mineral based oil SG, SH or SJ or XP-S 5W40 synthetic 4-stroke oil. Refer to the oil viscosity chart in the *MAINTENANCE* section	

MODEL			OUTLANDER™ 400	OUTLANDER™ 800
Gearbox oil	Capacity		—	400 mL (14 U.S. oz)
	Recommended		—	XP-S chaincase oil
Differential oil	Capacity	Front	500 mL (17 U.S. oz)	
		Rear	300 mL (10 U.S. oz)	250 mL (8.5 U.S. oz)
	Recommended		Synthetic polyolester oil 75W90 (API GL5)	
CV joint grease			TEXACO, HTBJ grease (M3014), ONLY	
Propeller shaft grease			Suspension synthetic grease (P/N 293 550 033)	
Hydraulics brakes	Capacity		250 mL (8.5 U.S. oz)	
	Recommended		Brake fluid DOT 4, ONLY	
Cooling system			2.5 L (2.65 quarts)	
BODY AND FRAME				
Weight distribution	Front/rear %		49/51 MAX: 46/54	51/49 MAX: 48/52
Rear storage box (included with rear rack weight)			10 kg (22 lb)	
Rack	Front		45 kg (100 lb)	
	Rear (including rear storage box and tongue weight)		90 kg (200 lb)	
Total vehicle load allowed (including driver, all other loads and added accessories)		Standard	230 kg (500 lb)	235 kg (517 lb)
		MAX	235 kg (517 lb)	272 kg (600 lb)
Gross vehicle weight rating		Standard	460 kg (1014 lb)	460 kg (1014 lb)
		MAX	554 kg (1219 lb)	620 kg (1365 lb)
Towing capacity			500 kg (1100 lb)	590 kg (1300 lb)
Tongue capacity (included with rear rack weight)			14 kg (30 lb)	23 kg (50 lb)
MATERIAL				
Frame		Material	Steel	
		Color	Black	
Wheel		Material	Steel	Aluminum
		Color	Silver	
Front/rear rack		Material	Steel	
		Color	Black	
Front bumper		Material	Aluminum	
		Color	Aluminum	
Front/rear fender		Material	High density polyethylene	
		Color	Yellow/Laurentian green/Viper red	
Fuel tank protector(s)		Material	High density polyethylene	
		Color	Black	
Steering cover		Material	Polypropylene	High density polyethylene
		Color	Earth grey	
Storage compartment cover		Material	Polypropylene (glass fiber-reinforced)	
		Color	Earth gray	
Front fascia		Material	High density polyethylene	
		Color	Yellow/Laurentian green/Viper red	

MODEL		OUTLANDER™ 400	OUTLANDER™ 800
Front skid plate	Material	High density polyethylene	
	Color	Earth grey	
Side panel	Material	High density polyethylene	
	Color	Yellow/Laurentian green/Viper red	
Foot rest	Material	High density polyethylene	
	Color	Black	
Console	Material	High density polyethylene	
	Color	Yellow/Laurentian green/Viper red	
Air box cover	Material	Polypropylene (glass fiber-reinforced)	
	Color	Black	
Air box	Material	Polypropylene (glass fiber-reinforced)	
	Color	Black	
Transmission lever locator	Material	Polypropylene (glass fiber-reinforced)	
	Color	Earth grey	
A-arm protector	Material	Polypropylene	
	Color	Black	
Engine cover	Material	High density polyethylene	
	Color	Earth grey	
Seat base	Material	Polypropylene	
	Color	Black	
Seat cover	Material	Thermoformed vinyl	
	Color	Deep earth grey	

ELECTRICAL CONNECTORS

SERVICE TOOLS

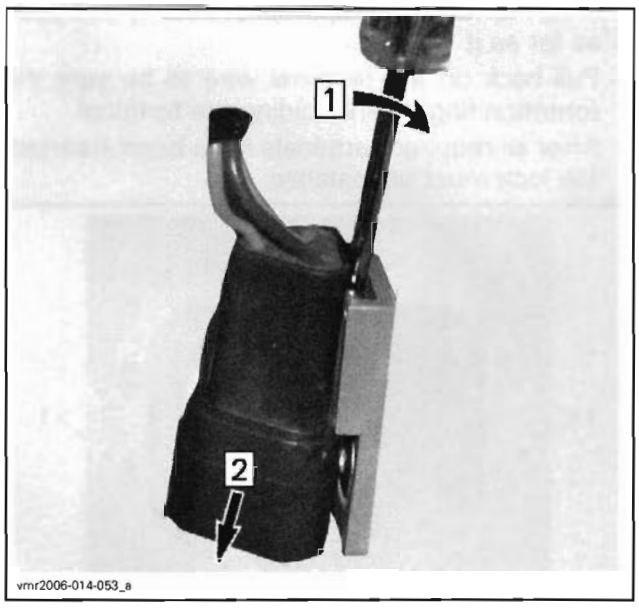
Description	Part Number	Page
crimper die	529 035 906	456
crimping pliers	529 035 730	459
crimping tool	529 035 909	456

DEUTSCH CONNECTORS

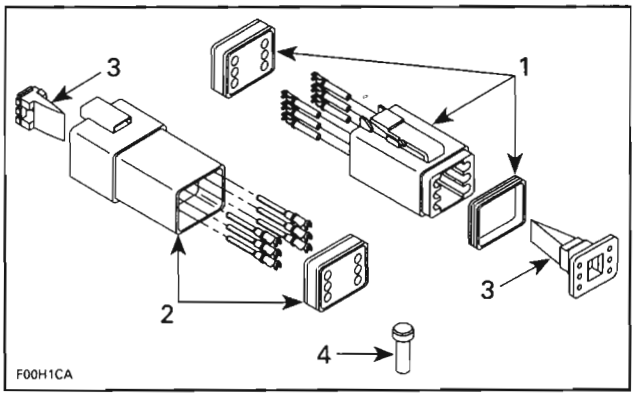
Deutsch connectors are used on some harnesses.

Removal from Engine Connector Bracket

To remove Deutsch connectors from engine connector bracket, slide a flat screwdriver between the connector bracket and the Deutsch connector and push out connector.



Connector Disassembly

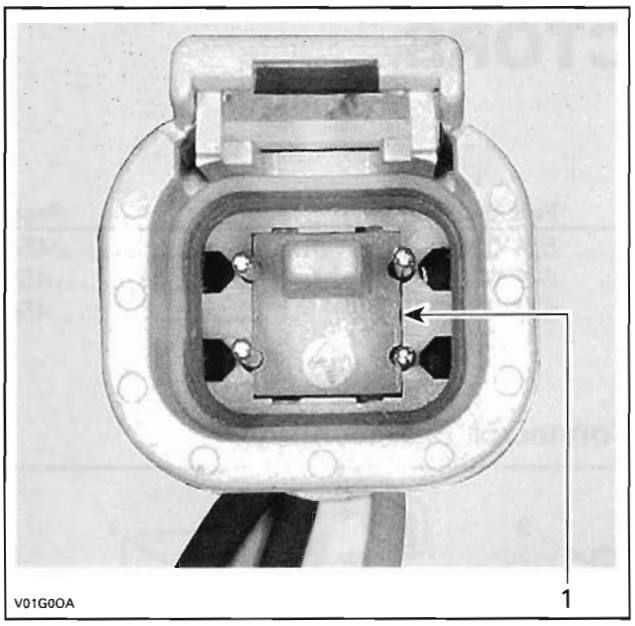


1. Male connector
2. Female connector
3. Secondary locks
4. Sealing cap

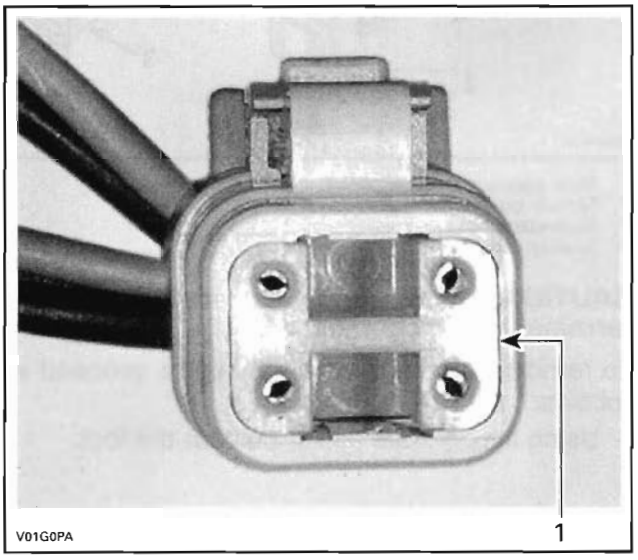
CAUTION: Do not apply dielectric grease on terminal inside connector.

To remove terminals from connector, proceed as follows:

– Using a long nose pliers, pull out the lock.



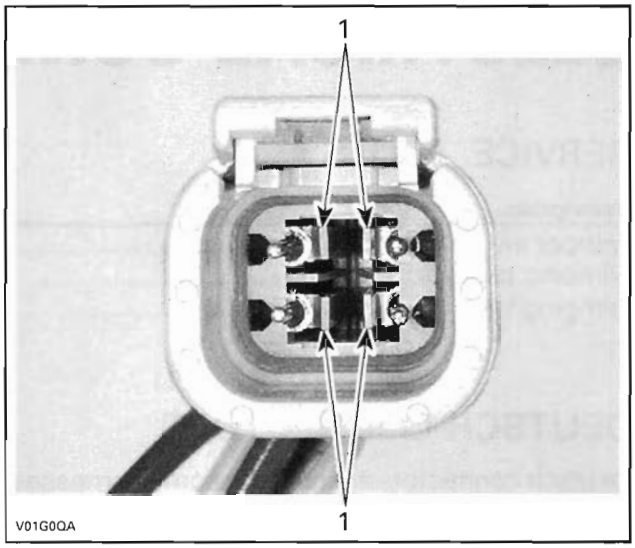
FEMALE CONNECTOR
1. Female lock



MALE CONNECTOR
1. Male lock

NOTE: Before extraction, push wire forward to relieve pressure on retaining tab.

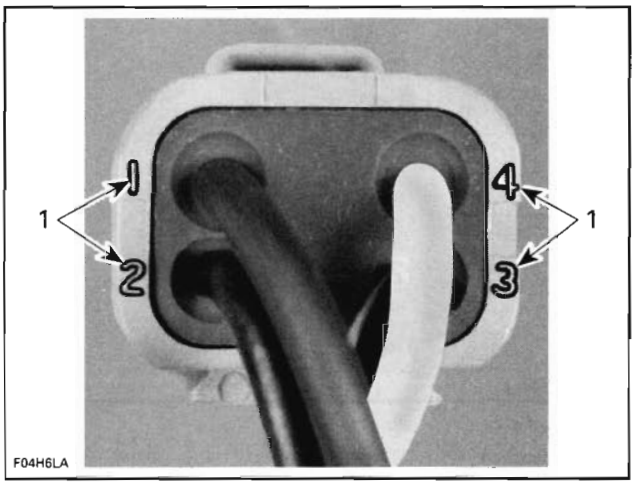
- Insert a 4.8 mm (.189 in) wide screwdriver blade inside the front of the terminal cavity.
- Pry back the retaining tab while gently pulling wire back until terminal is removed.



FEMALE CONNECTOR
1. Retaining tabs

To install:

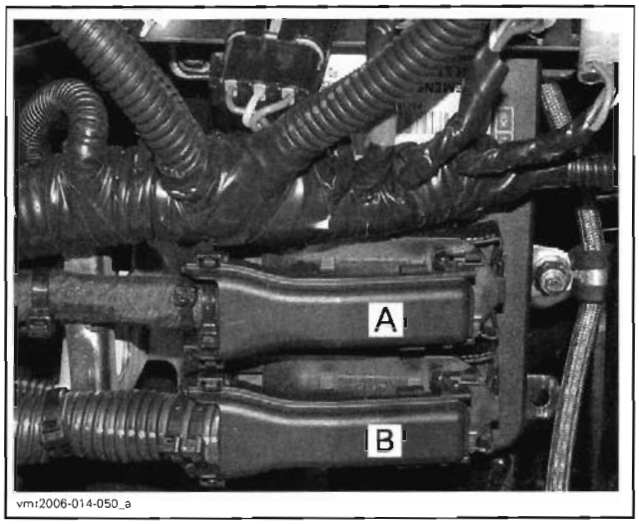
- For insertion of a terminal, make sure the lock is removed.
- Insert terminal into appropriate cavity and push as far as it will go.
- Pull back on the terminal wire to be sure the retention fingers are holding the terminal.
- After all required terminals have been inserted, the lock must be installed.



1. Wire identification numbers

ECM CONNECTORS

There are two ECM connectors used and they are connected on the ECM. The engine harness female connector is connected on the module male connector "A" and the vehicle system control harness female connector is connected to the module male connector "B". The ECM connectors have 41 pins.

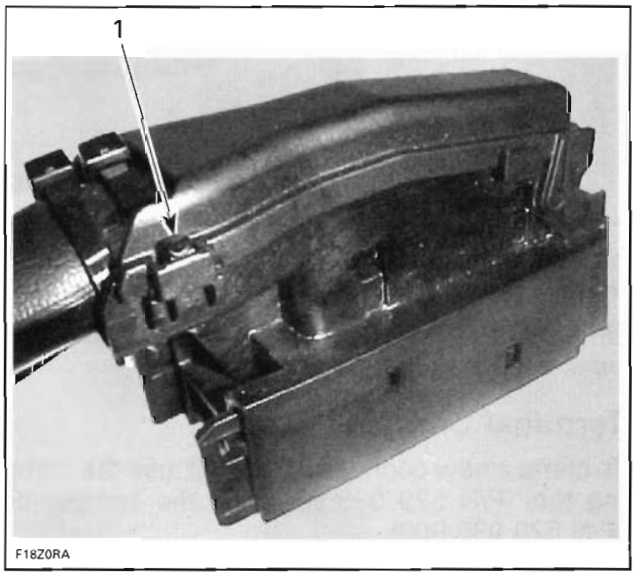


For probing techniques and tool, refer to *ENGINE MANAGEMENT*.

CAUTION: Do not disconnect the ECM connectors needlessly. They are not designed to be disconnected/reconnected frequently.

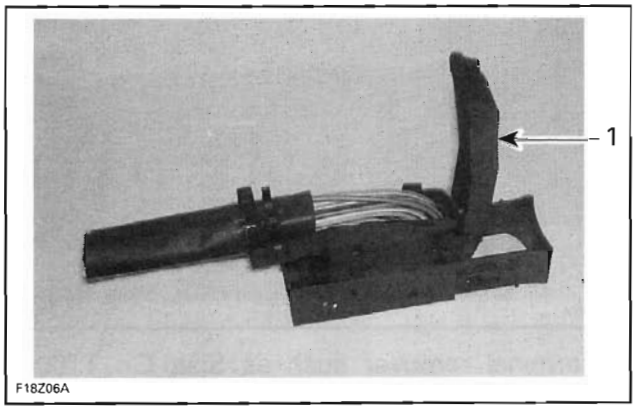
Terminal Removal

Unlock the connector cover by pushing in the tabs on top of the connector with a flat screwdriver to be able to flip the top cover up.



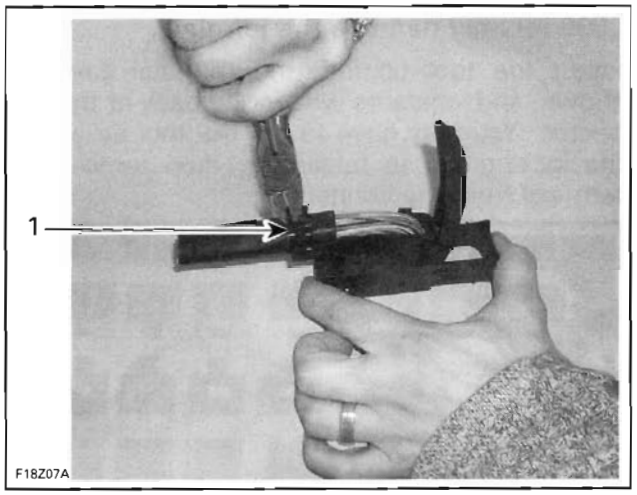
1. Push in tab

Lift the cover by pushing it forward.



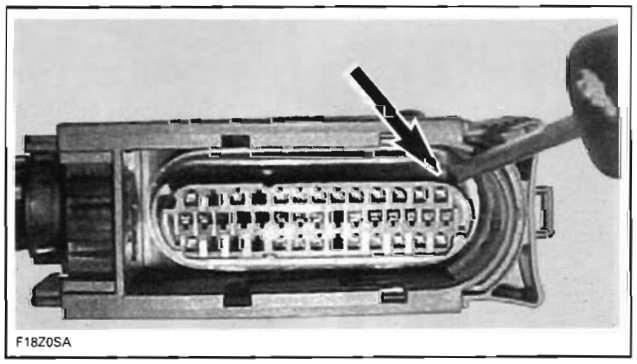
1. Cover

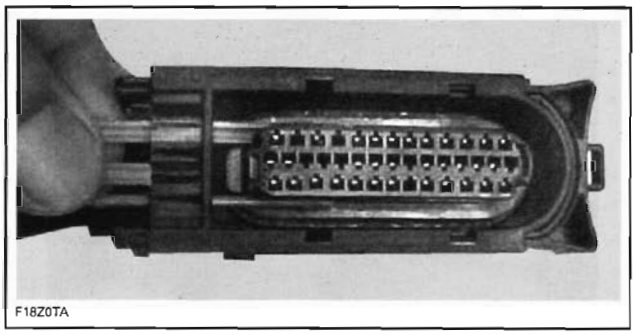
Cut both tie raps that secure the harness to the connector.



1. Tie raps

Turn the connector over and remove the orange locking tab by pushing and then pulling toward the wire harness.

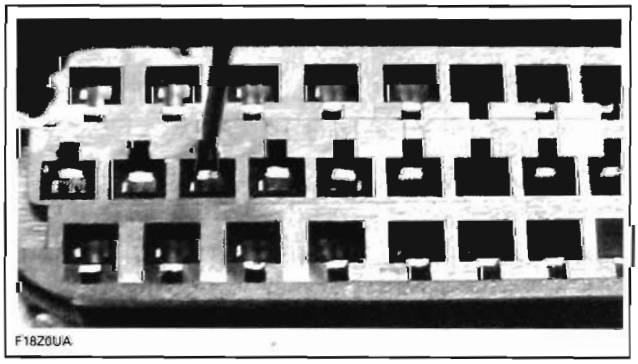


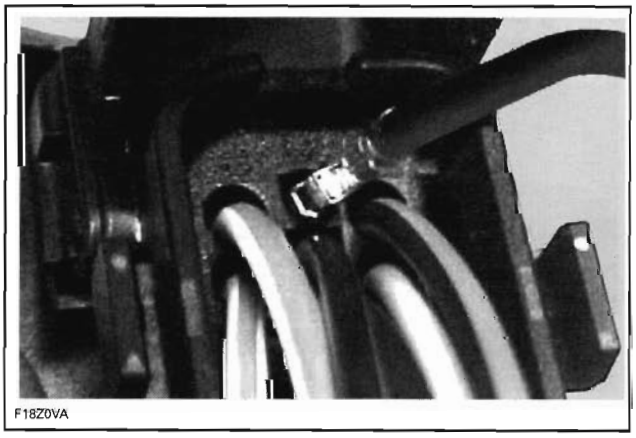

F18Z0TA

A terminal remover such as Snap-On TT600-1 tool (or a 0.76 mm (.030 in) oxyacetylene torch tip cleaner or a #68 drill bit) must be inserted into the terminal cavity to release the locking tab from the connector.

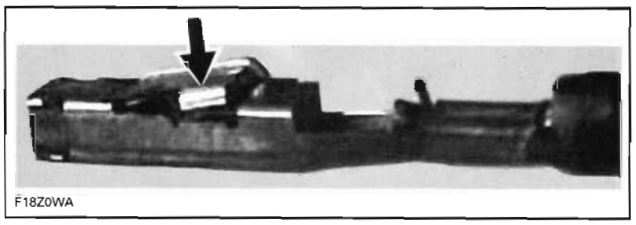
CAUTION: Using a tool tip larger than 0.76 mm (.030 in) may damage the terminal.

Insert the tool tip into the terminal cavity as shown, and locate its wire in the back of the connector. You may have to pry the tool tip against the locking tab to release it, then remove the terminal from the connector.


F18Z0UA


F18Z0VA

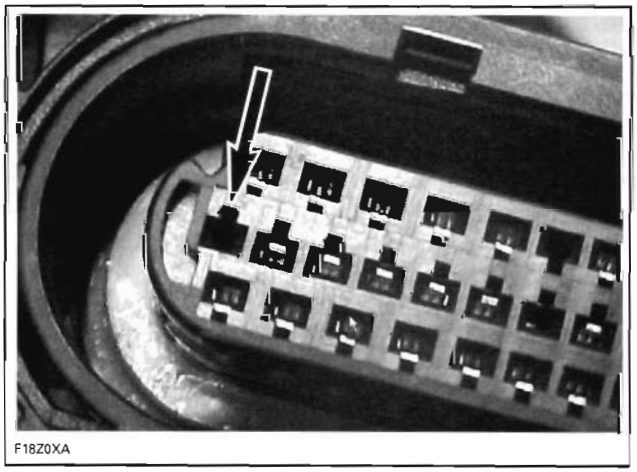
Check the locking tab on the terminal, it may have to be bent out a little so it will lock in its cavity when it is re-inserted.


F18Z0WA

If the wire is in good condition but the terminal is rusted or corroded, remove defective terminal and crimp a new one. If wire and terminal are defective, replace with a new genuine wire and new terminal and crimp them together as explained below.

IMPORTANT: Use genuine wires only. Otherwise wires will not fit properly.

When re-inserting the terminal, the locking tab must be installed facing the smaller cutout of the terminal cavity.

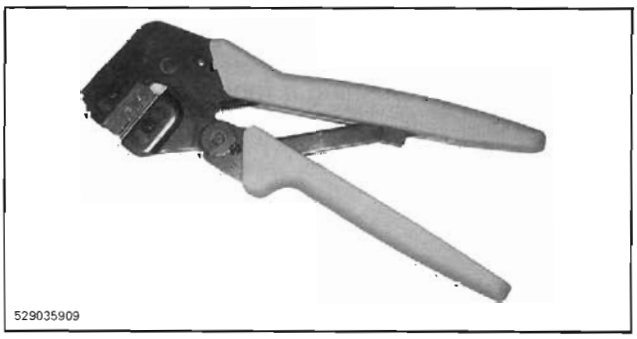

F18Z0XA

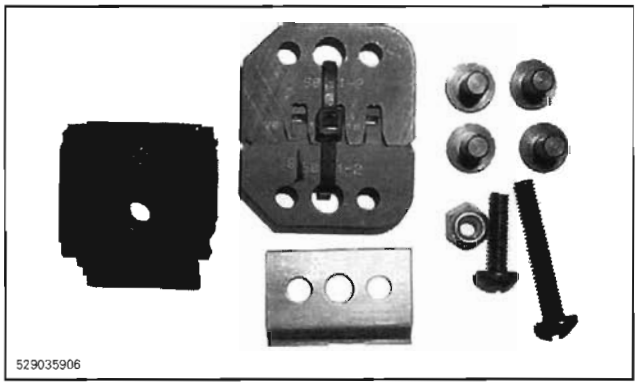
Insert the terminal, ensuring the locking tab snaps into its cavity.

Re-install the orange locking tab, attach the 2 tie raps, and close the connector cover.

Terminal Crimping (Kostal)

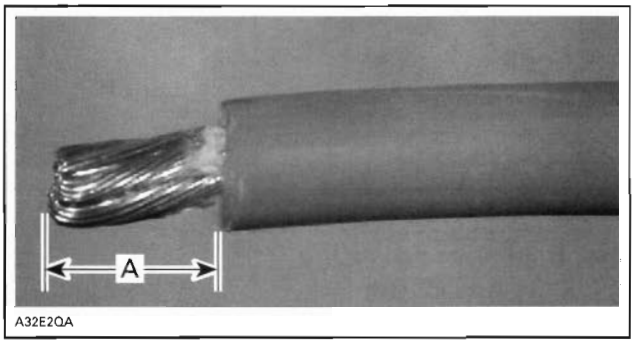
To crimp a new connector terminal, use the crimping tool (P/N 529 035 909) and the crimper die (P/N 529 035 906).


529035909



To properly crimp the wires, strictly follow this procedure.

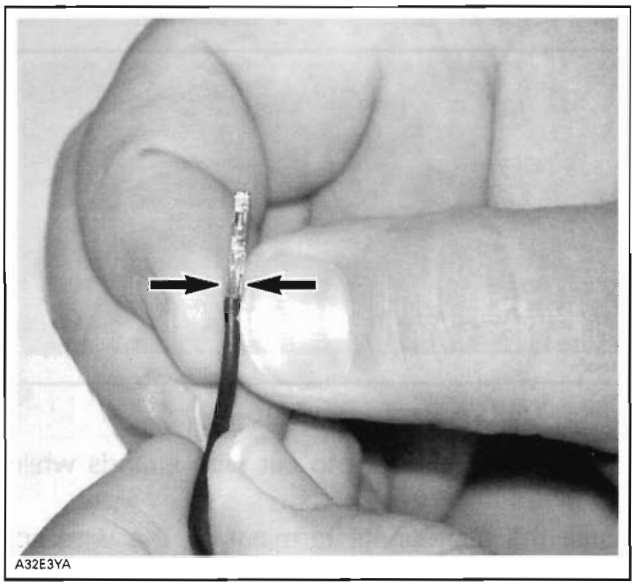
Strip the wire to a maximum of 3 mm (1/8 in).



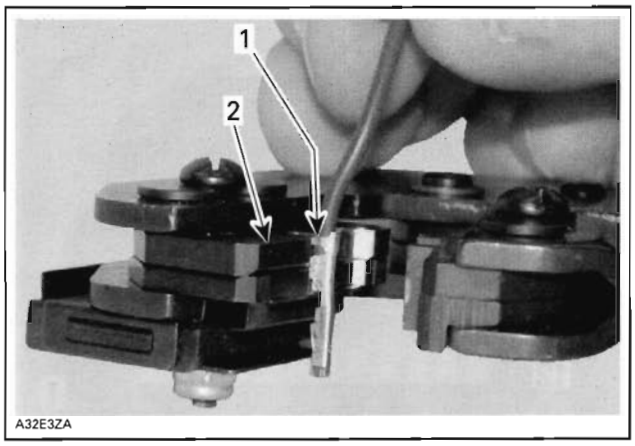
TYPICAL
A. 3 mm (1/8 in) max.

Position wire in terminal.

Squeeze the terminal tabs with your fingers to temporarily retain terminal in place.



Insert terminal with wire in crimping pliers and position so that top of terminal tabs are flush with pliers edge or a little bit lower as shown.



1. Top of terminal tabs
2. Align tabs with pliers edge

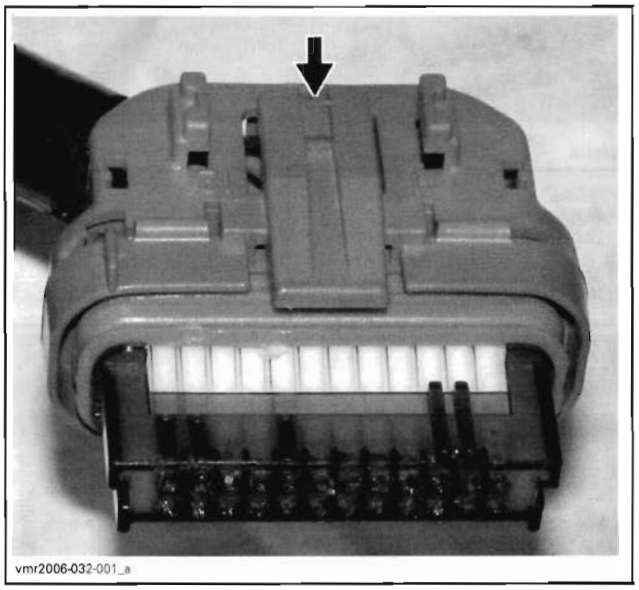
Crimp terminal. Ensure no tiny wire goes out of terminal. This might cause strange problems of the electrical system.

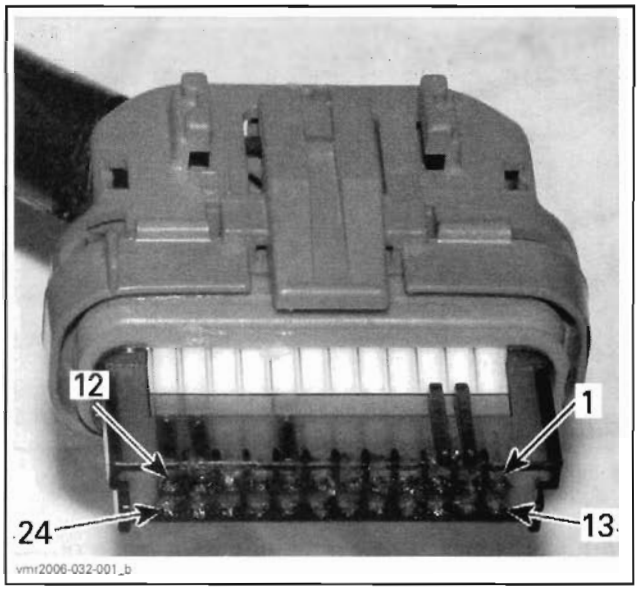
Lubrication

Do not apply any product to the pins of the connector on the ECM.

MULTI-FUNCTION SPEEDOMETER CONNECTOR

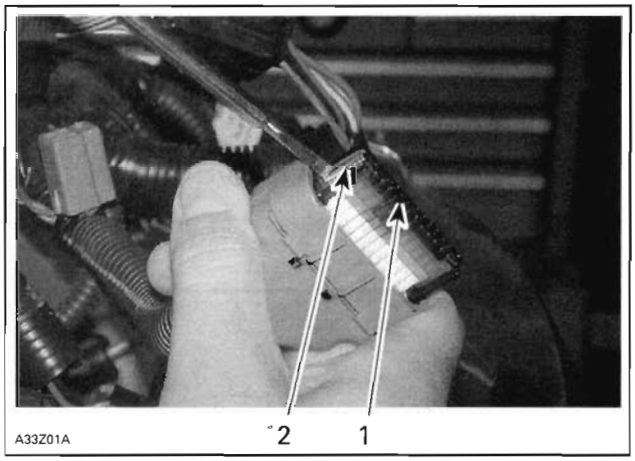
Firmly push down tab and hold to unlock connector while pulling it out.





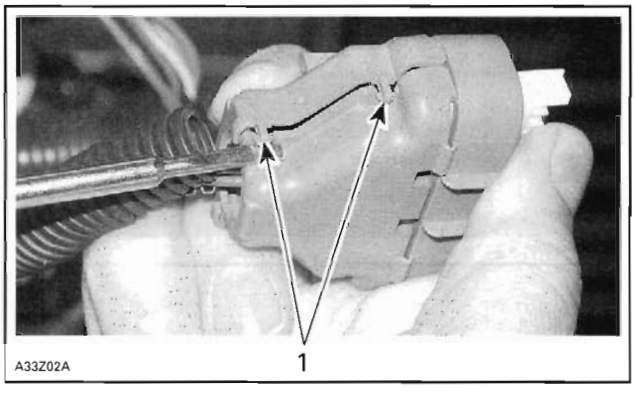
CONNECTOR PINOUT

Push on both tabs to remove retainer.



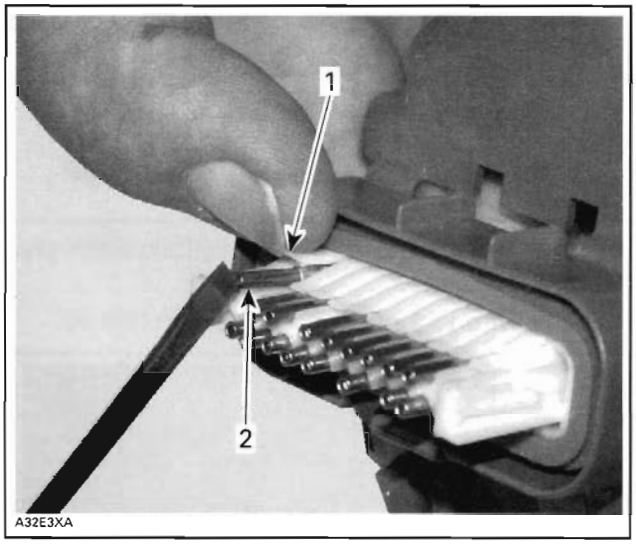
TYPICAL
1. *Retainer*
2. *Tab (one on each side)*

Open housing by lifting 4 tabs.



TYPICAL
1. *Tabs (2 on each side)*

Lift the top plastic lock of the female terminal to be removed and hold in position. Lift the female terminal to unlock from the housing and push out of housing.

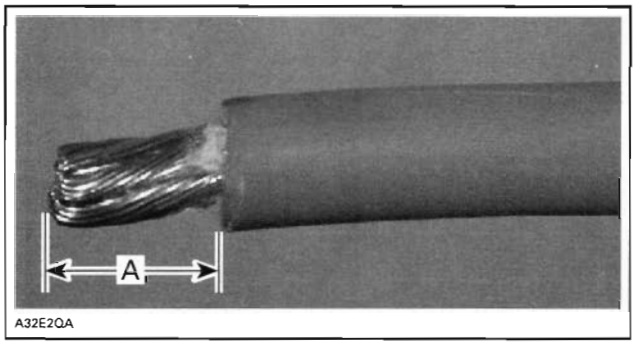


TYPICAL
1. *Lift and hold plastic lock*
2. *Lift to unlock and push out*

BATTERY AND STARTER CABLE TERMINALS

Crimping

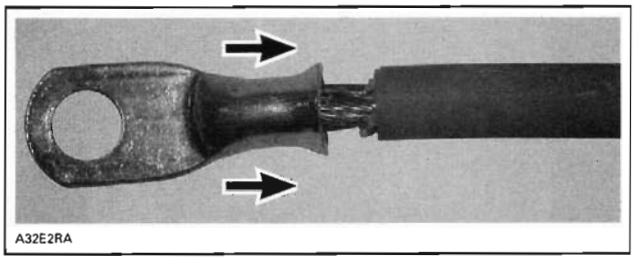
Carefully strip the wire approximately to 10 mm (3/8 in) in length, using a wire stripping tool or sharp blade/knife.



A. 10 mm (3/8 in)

NOTE: Make sure not to cut wire strands while stripping the wire.

Install the appropriate terminal on the wire according to the requirement. Refer to appropriate *PARTS CATALOG*.


A32E2RA

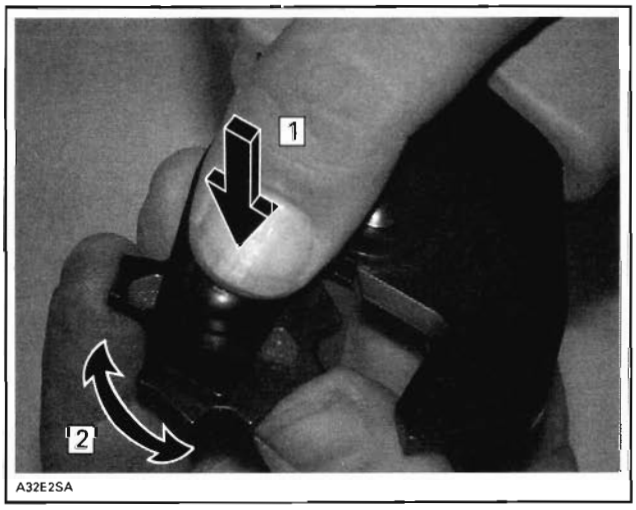
INSTALLATION OF TERMINAL

Follow the instructions provided with the crimping pliers (P/N 529 035 730) to select the proper position of the tool.

529 035 730



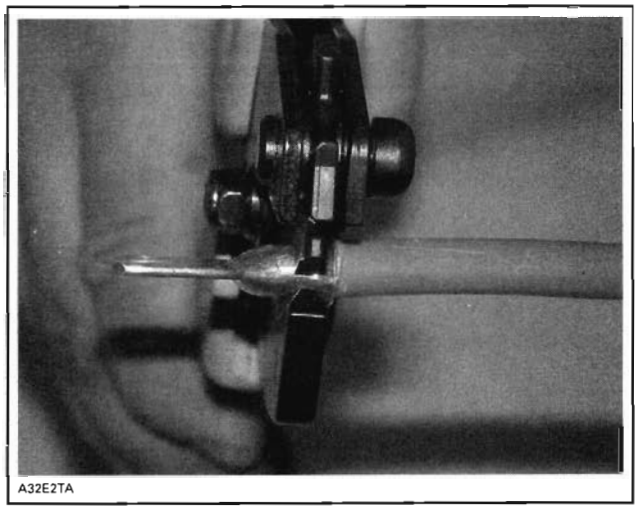
NOTE: Different wires require different crimping pliers settings, so make sure to follow the instruction supplied with the tool.



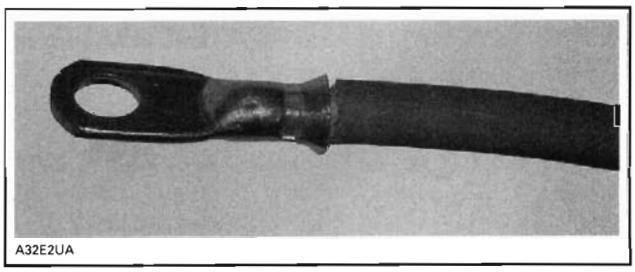
A32E2SA

POSITIONING THE CRIMPING PLIERS
Step 1: Press
Step 2: Rotate

After positioning the crimping pliers, crimp the terminal already installed on wire.


A32E2TA

CRIMPING OF WIRE


A32E2UA

PROPERLY CRIMPED WIRE

To verify, if the wire is properly crimped, apply some pulling force on wire and the terminal at the same time from both directions.

CAUTION: Never weld the wire to the terminal. Welding can change the property of the wire and it can become brittle and break.

Install the protective heat shrink rubber tube on the terminal. Heat the heat shrink rubber tube using the heat gun so that it grasps the wire and the terminal.

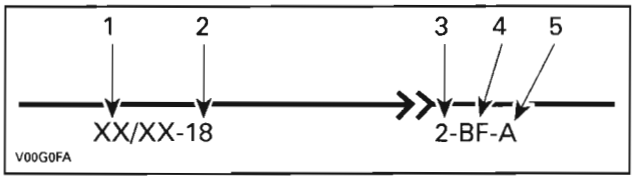
CAUTION: Make sure that the protective heat shrink rubber tube has been properly installed and no part of wire is exposed.

WIRING DIAGRAMS

WIRING CONNECTORS CODING

⚠ WARNING

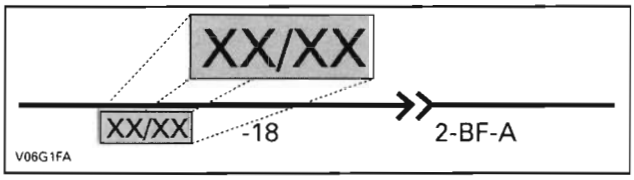
Ensure all terminals are properly crimped on the wires and all connector housings are properly fastened.



1. *Wire colors*
2. *Wire gauge*
3. *Connector housing area*
4. *Connector identification*
5. *Wire location in connector*

WIRE COLORS

It identifies the color of a wire. When a 2-color scheme is used, the first color is the main color while the second color is the tracer color.

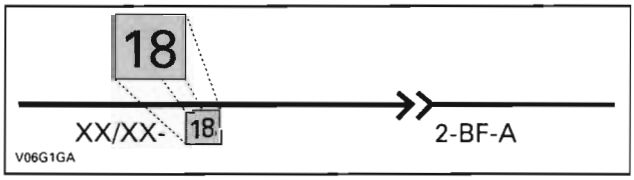


THE SHADED PART INDICATES THE WIRE COLOR

Example: YL / BK is a YELLOW wire with a BLACK stripe.

WIRE GAUGE

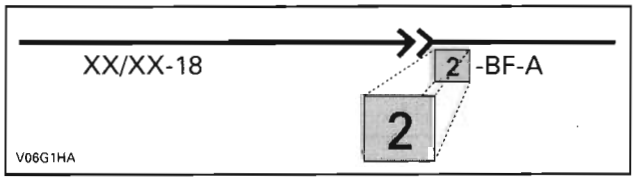
The number after wire color indicates the gauge of a wire.

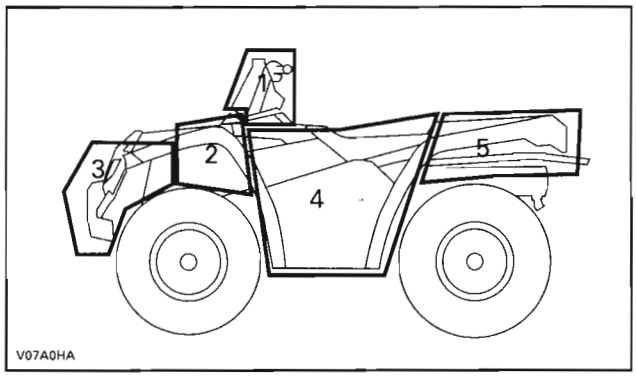


THE SHADED PART INDICATES THE WIRE GAUGE

Example: YL / BK is a YELLOW wire with a BLACK stripe.

CONNECTOR HOUSING AREA

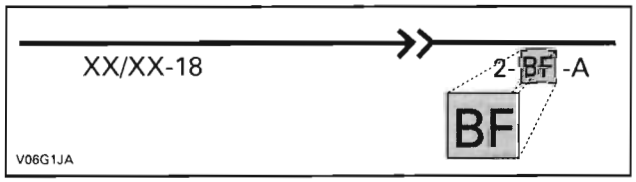




AREA	LOCATION
1	Steering area
2	Service compartment
3	Front of vehicle
4	Engine area
5	Rear of vehicle

CONNECTOR IDENTIFICATION

Indicates the connector's function. If there are many connectors in the same area, this helps to identify which wire is in which connector.



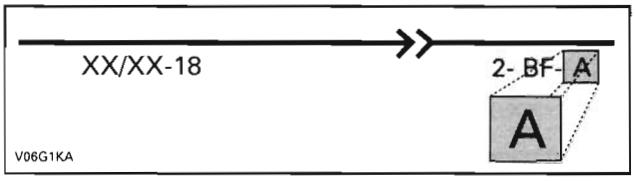
THE SHADED PART INDICATES A CONNECTOR

ABBREVIATION	DESCRIPTION
BA	Ignition coil
BAT	Battery
BD	2WD/4WD switch
CA	Magneto
CAPS	Camshaft position sensor
CC	Ignition switch
CI	multi-function speedometer
CPS	Crankshaft position sensor
CTS	Coolant temperature sensor
CV	Speed sensor
DB	Diagnostic connector
DC	DC outlet
ECM	Engine control module
FP	Fuel pump
FRA	Brake light switch
FT	Cooling fan
HIC	Harness interconnector (engine/vehicle)
IDLE	Idle bypass valve
INJ1 and INJ2	Fuel injector
MAPTS	Manifold air pressure and temperature sensor
MD	2WD/4WD actuator
MG	multi-function switch
OPS	Oil pressure switch
PD	RH headlight
PF1	Fuse Holder (main)
PF2	Fuse Holder (near battery)
PG	LH headlight
PRN	Subtransmission switch
RD	Voltage regulator/Rectifier
SD	2WD/4WD actuator switch
SM	Starter motor
SPK1 and SPK2	Spark plug
SS	Starter solenoid
SW	Winch relay
SWW	Winch switch

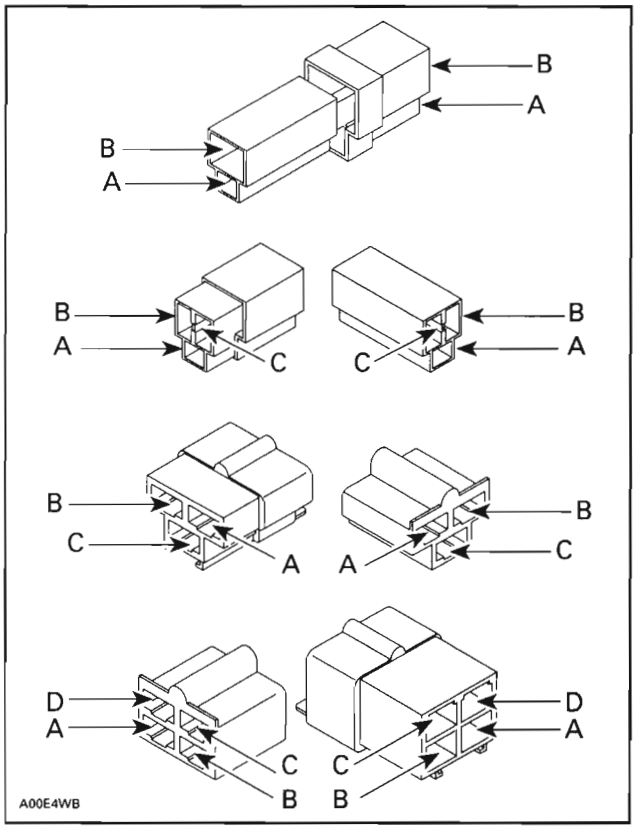
ABBREVIATION	DESCRIPTION
TPS	Throttle position sensor
WM	Winch motor

WIRE LOCATION IN CONNECTOR

This is the wire position in the connector. The number or letter given refers to the physical identification stamped on the connector.



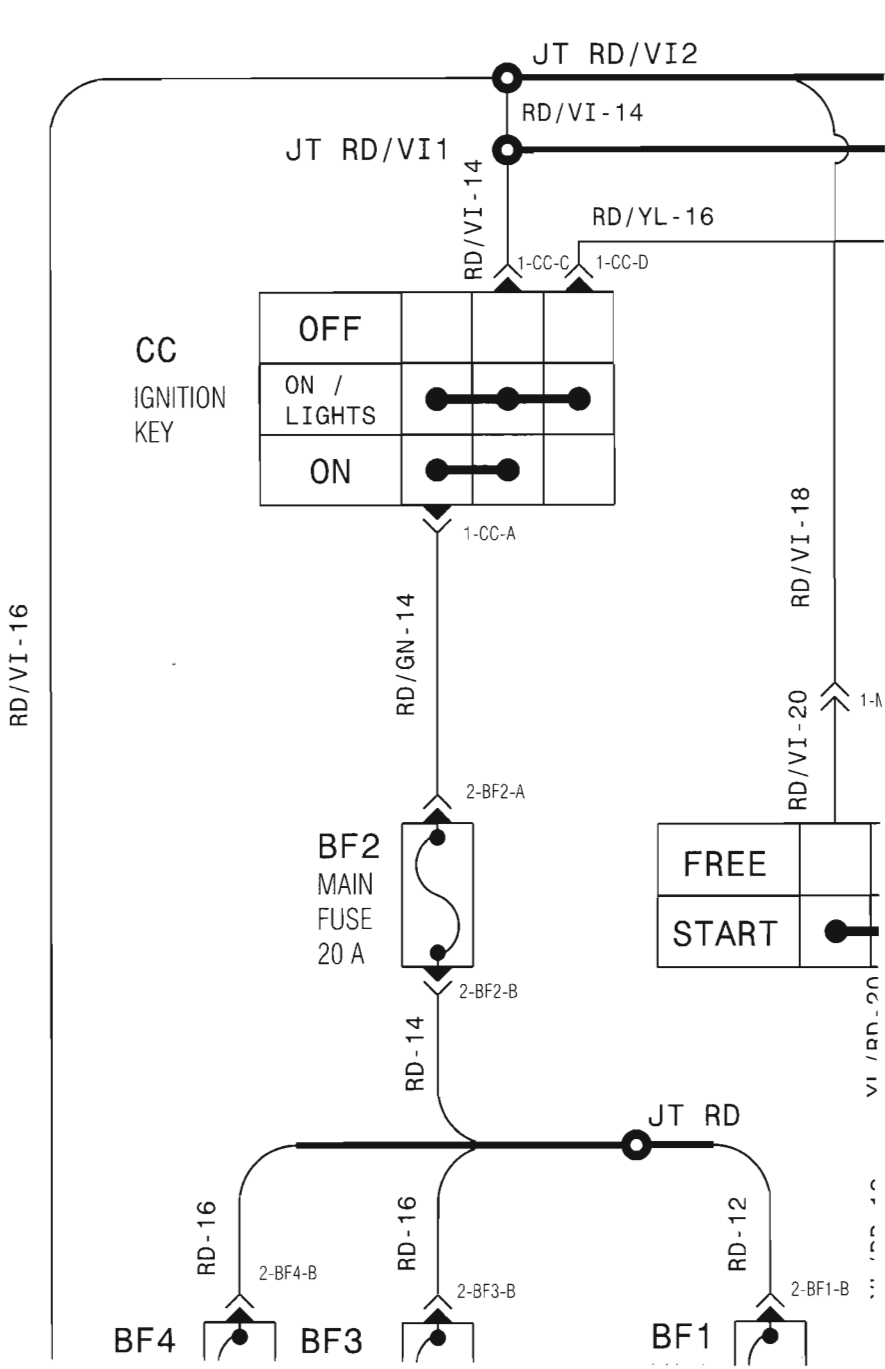
THE SHADED PART INDICATES THE CONNECTOR LOCATION IN HOUSING



TYPICAL

OUTLANDER 400 2006

GENERAL SYSTEM



2

TERMINAL IDENTIFICATION		
	NAME	ZONE-CONNECTOR NAME-TERMINAL #/A
EX:	CI	1 - CI - 15
EX:	CV	4 - CV - A
EX:	ME	2 - ME

1

RD/YL-16

RD/YL-16

HI

LO

G1-6

MG
MULTIFUNCTION
SWITCH 1/4
(START)

1-MG1-1

4-BA

BA
IGNITION
COIL

WH/GN-18

RE
RESISTOR
5 K ohms

SPK
SPARK
PLUG

JT

GN-18

BU-18

3-PG-B

3-PG-

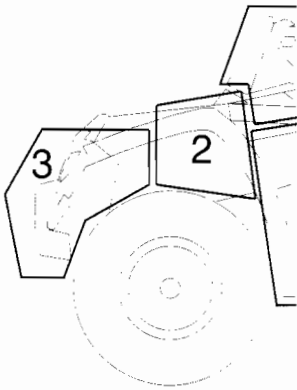
3-PG-A

PG
LEFT
HEAD

11	12	13	14	15

3

ZONE #	ZONE DESCRIPTION
1	STEERING AREA
2	SERVICE COMPARTMENT
3	FRONT OF VEHICLE
4	ENGINE AREA
5	REAR OF VEHICLE



	COLOR	AWG SIZE
EX:	BK/YL -	12

1-MG1-4

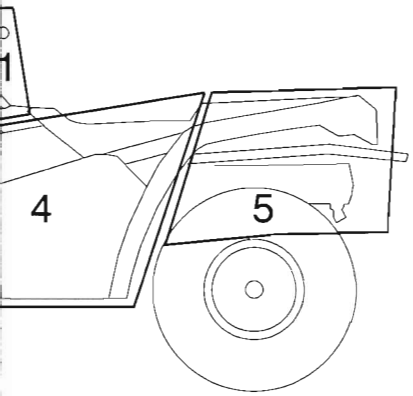
MG
MULTIFUNCTION
SWITCH 2/4
(LIGHTS)

SWW
WINCH CONTROL
(OPTIONAL: XT)

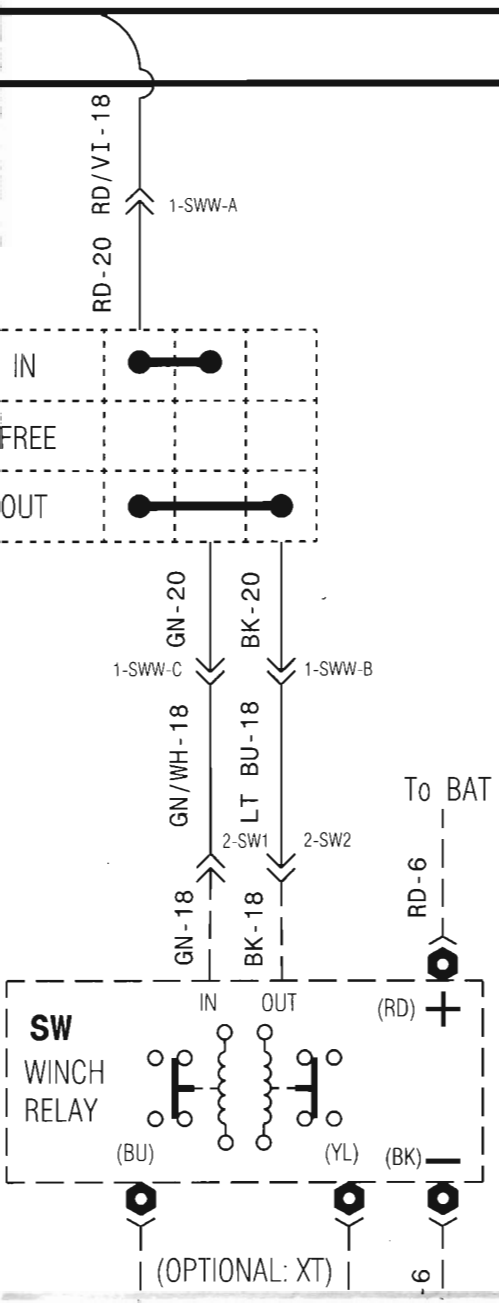
GN-16
BU-16
1-MG1-2
1-MG1-5
GN-16
BU-16
RD/VI-16
GN
JT BU
GN-18
BU-18
3-PD-B
3-PD-C
5-PR-2
BK-16
3-PD-A
PD
RIGHT
HEAD
PR
TAIL LIGHT
RD-16
WH-16

16	17	18	19	20	2

4



AWG	MAX
# 6	1
# 8	
# 10	
# 12	
# 14	
# 16	
# 18	
* AT	5



5

. CURRENT	MAX. FUSE CURRENT	MAX. WATT
00 amps	125 amps	1450 watts
65 amps	80 amps	930 watts
40 amps	50 amps	580 watts
25 amps	30 amps	365 watts
16 amps	20 amps	230 watts
10 amps	15 amps	145 watts
6 amps	7.5 amps	85 watts
0°C MAX		

COLOR CODE	
BE	BEIGE
BK	BLACK
BU	BLUE
BN	BROWN
GN	GREEN
GY	GREY
OR	ORANGE
RD	RED
VI	VIOLET
WH	WHITE
YL	YELLOW
PK	PINK
LT BU	LIGHT BLUE



27	28	29	30

6

	FRAME GROUND
	EGINE GROUND
	PHILLIPS SCREW
	NUT CONNECTION
	SPLICE CONNECTION
	COMPONENT CONNECTION
	END OF MODULE
	SECTION OF MODULE
	SLOTTED SCREW

●	WELDED JOINT
	SHRINKED JOINT
	CROSSED WIRE
	WIRE BUS
	SIMPLE CONDUCTOR WIRE
	FEMALE TERMINAL
	MALE TERMINAL
	STEEL LINK (FRAME)
	TERMINAL
	OPTIONAL

R

P

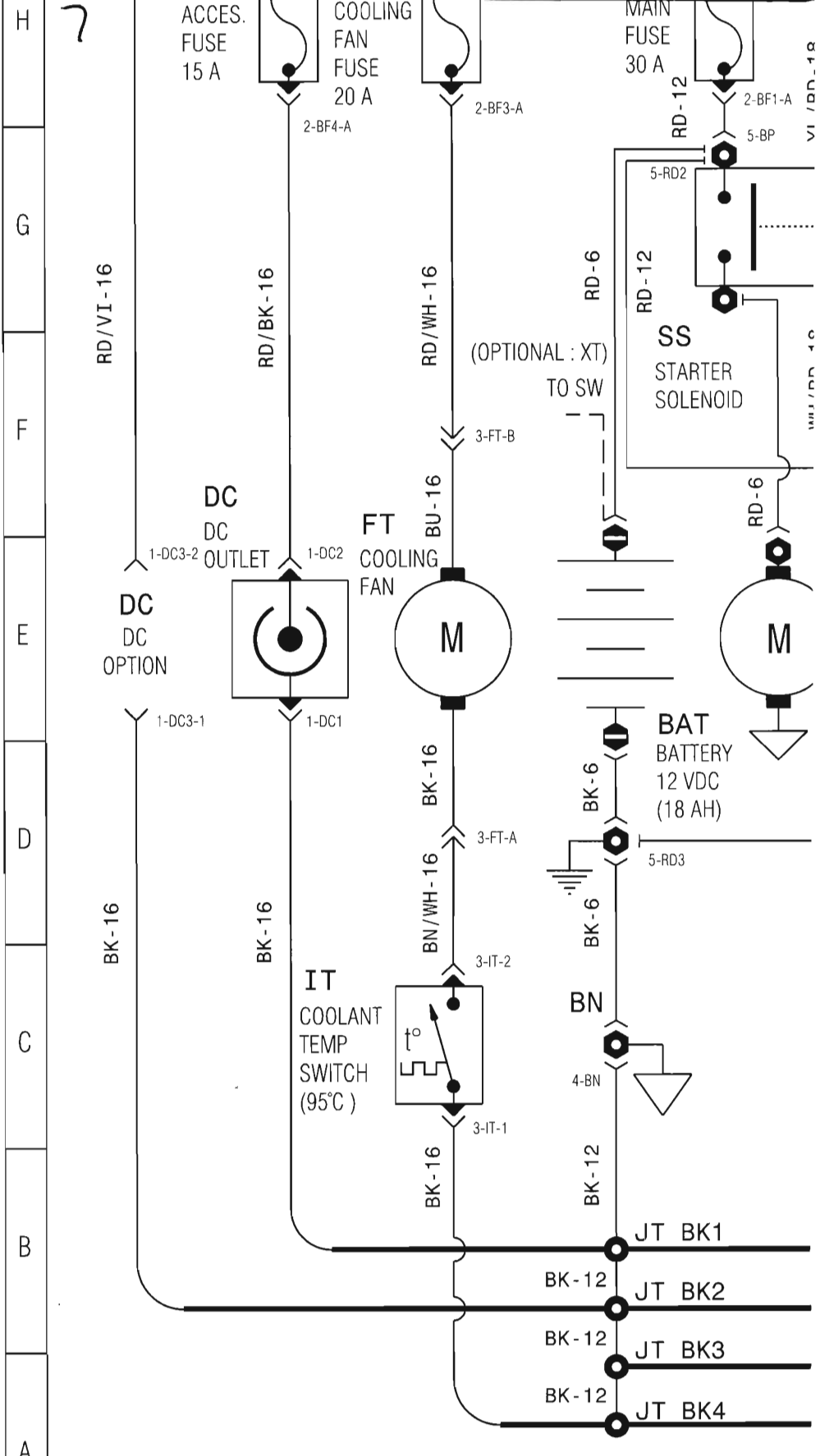
N

M

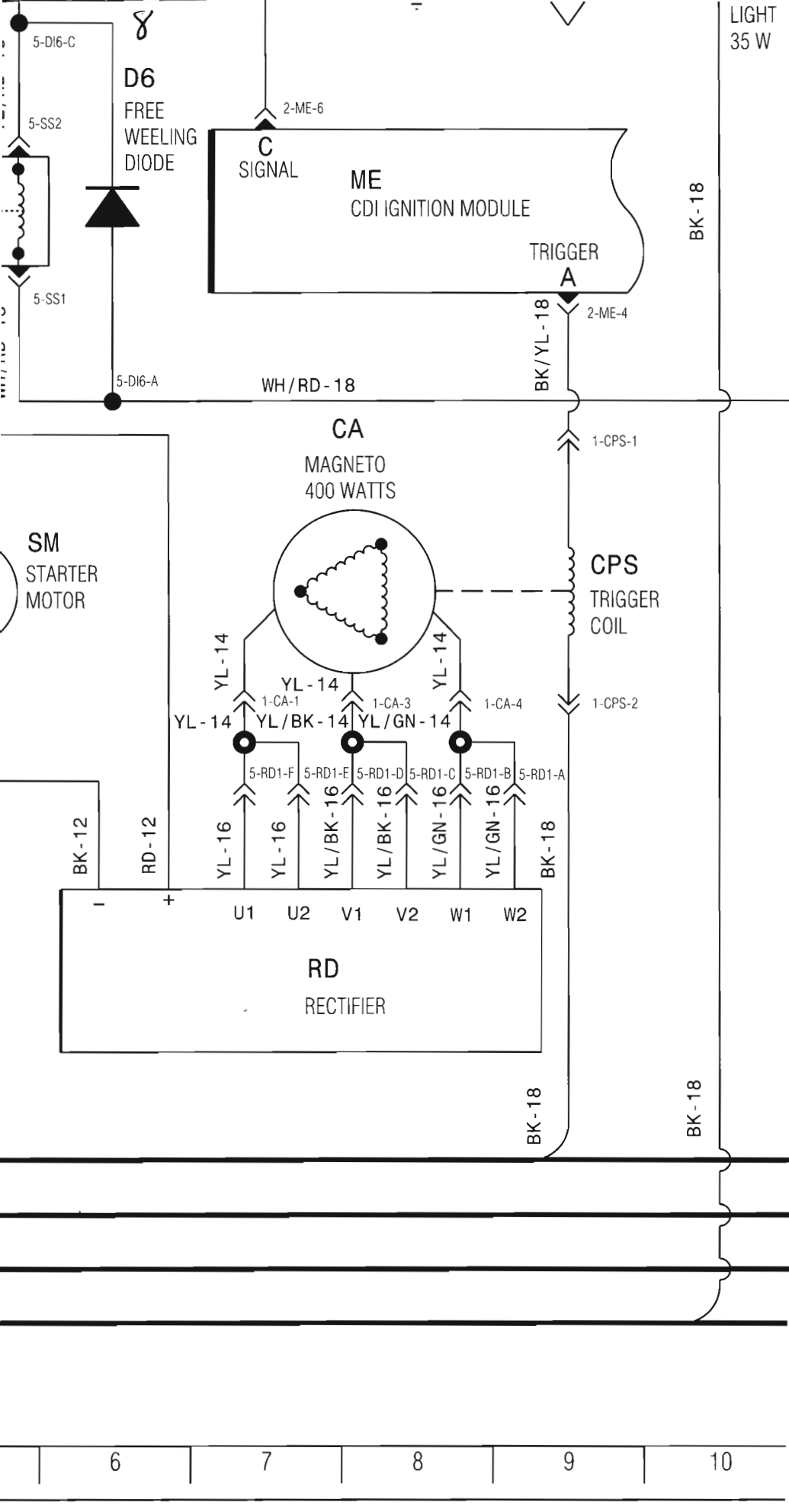
L

K

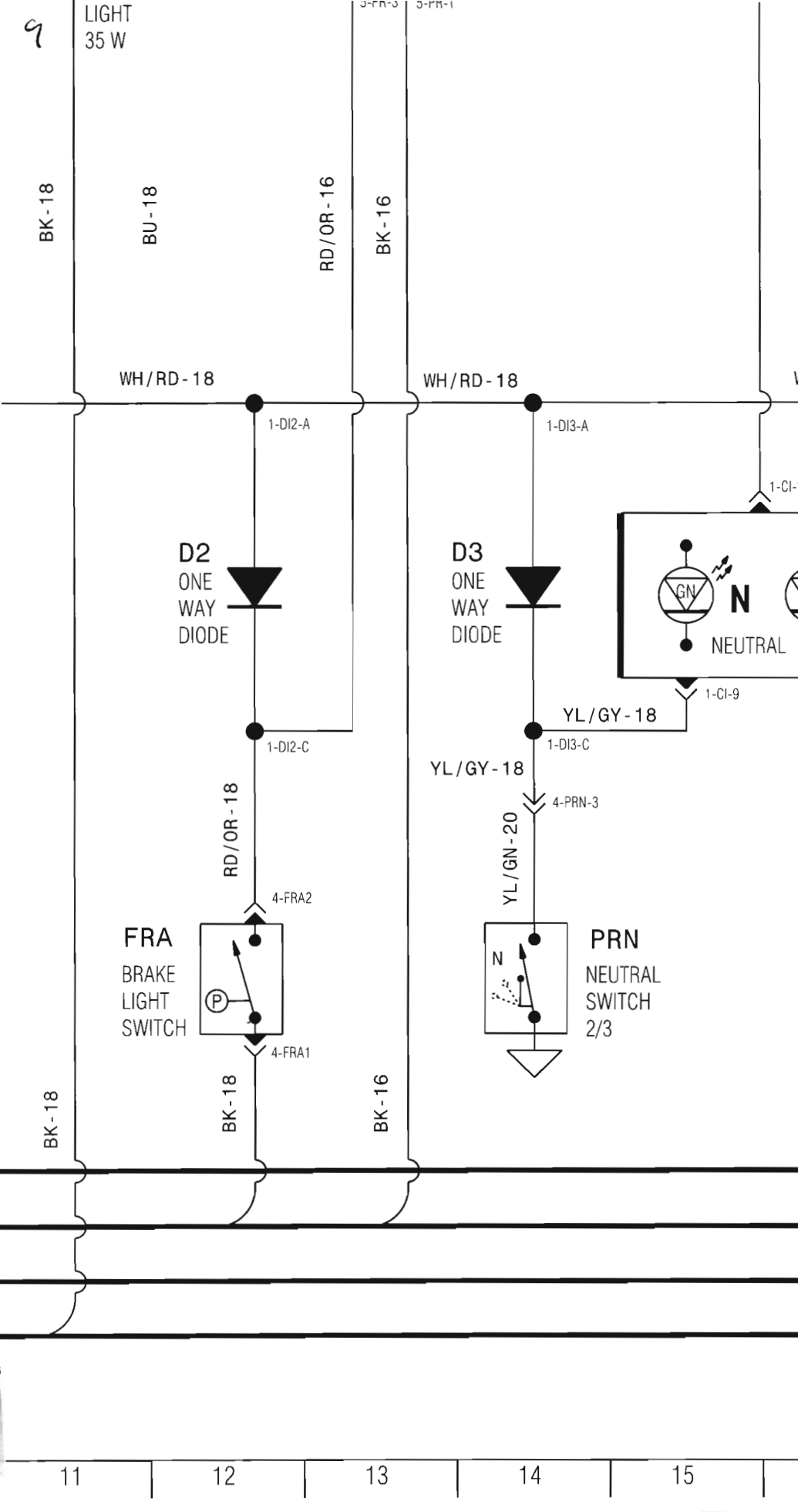
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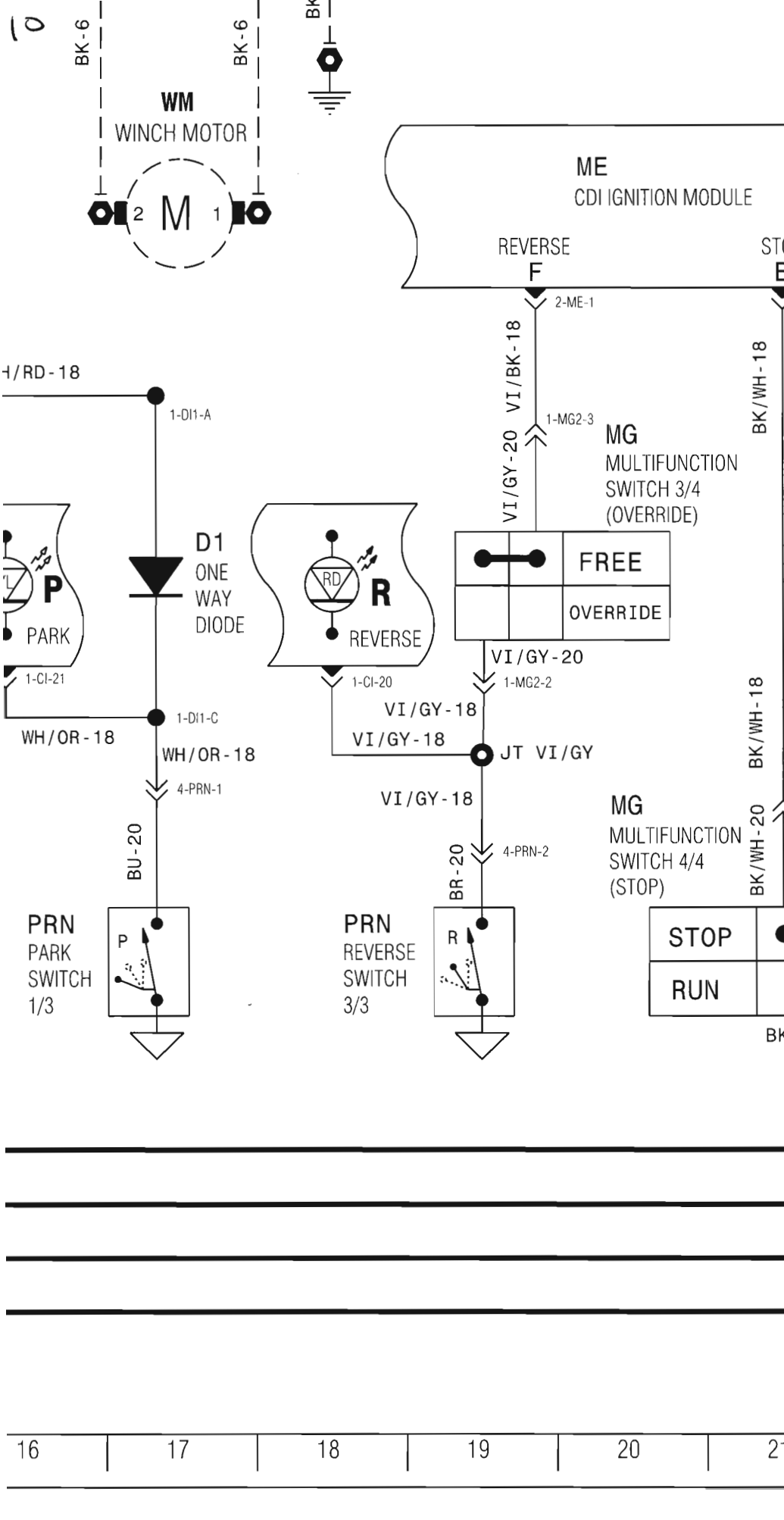


VMR2006-033-200 AEN

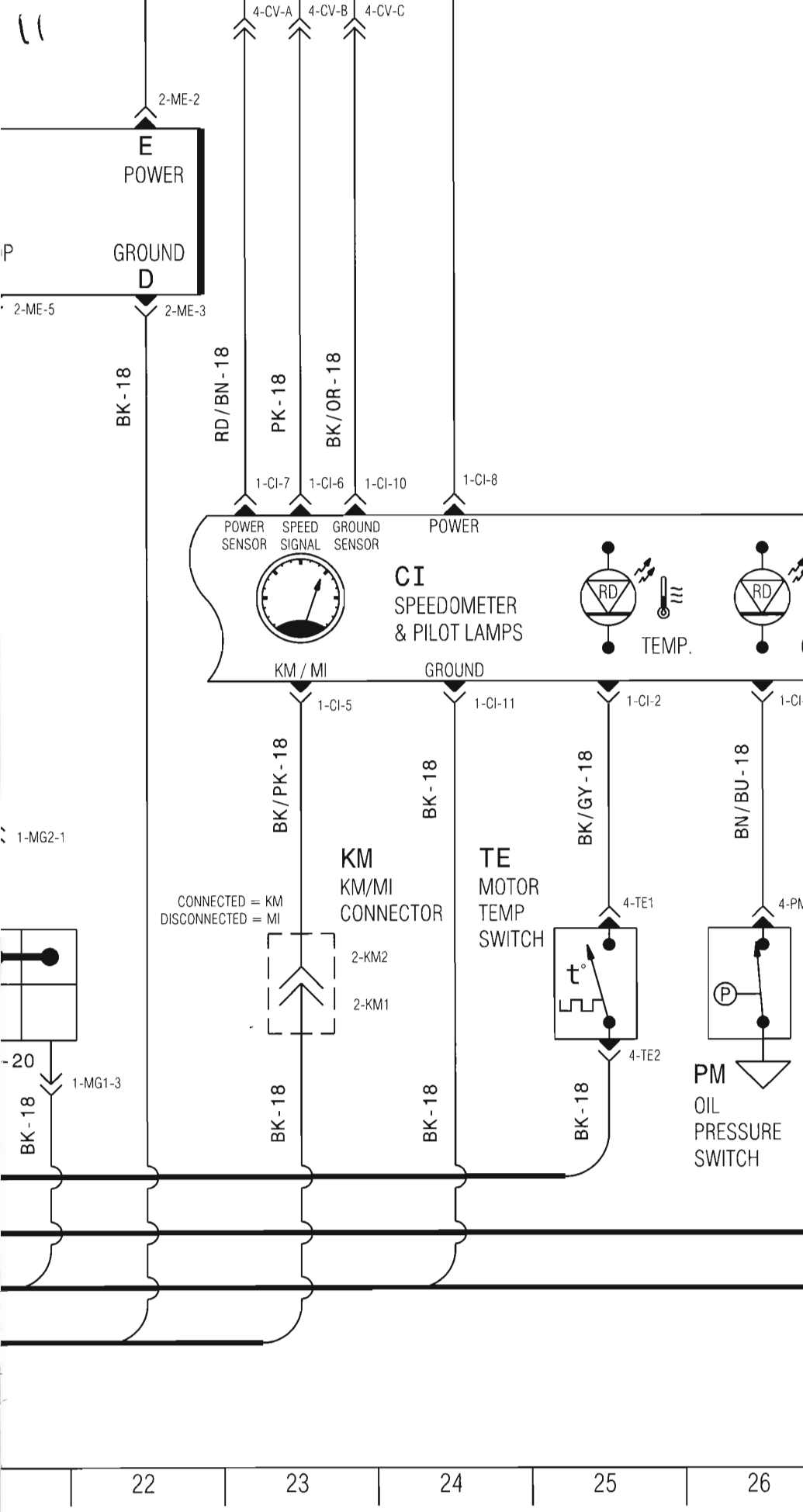

LIGHT
35 W
5-DI6-C
D6
FREE
WEELING
DIODE
5-SS2
2-ME-6
C
SIGNAL
ME
CDI IGNITION MODULE
TRIGGER
A
BK-18
5-SS1
2-ME-4
BK/YL-18
5-DI6-A
WH/RD-18
CA
MAGNETO
400 WATTS
1-CPS-1
SM
STARTER
MOTOR
CPS
TRIGGER
COIL
YL-14
YL-14
YL-14
1-CA-1
1-CA-3
1-CA-4
1-CPS-2
YL-14
YL/BK-14
YL/GN-14
5-RD1-F
5-RD1-E
5-RD1-D
5-RD1-C
5-RD1-B
5-RD1-A
YL-16
YL-16
YL/BK-16
YL/BK-16
YL/GN-16
YL/GN-16
BK-18
BK-12
RD-12
I
+
U1
U2
V1
V2
W1
W2
RD
RECTIFIER
BK-18
BK-18

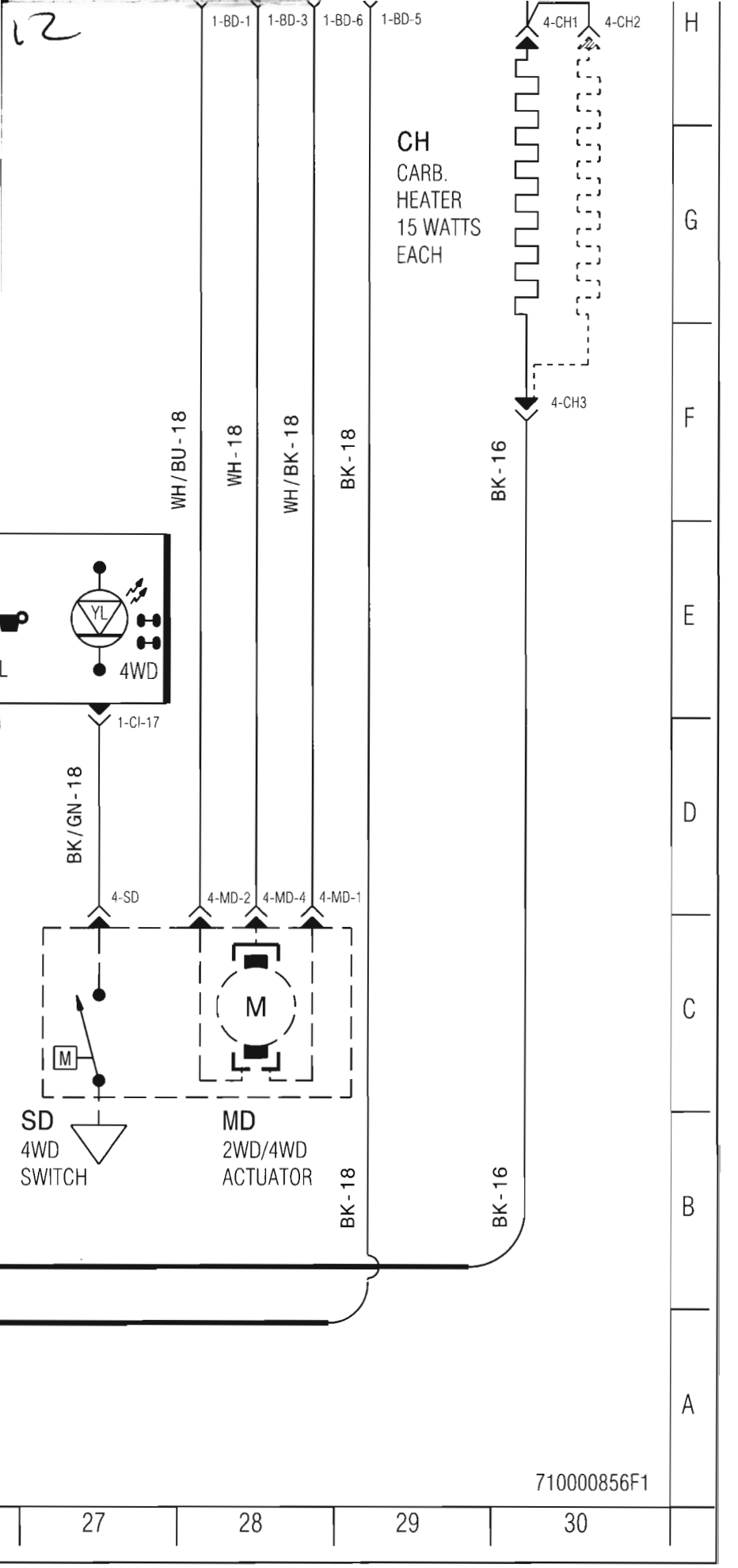
6 7 8 9 10


LIGHT
35 W
BK-18
BU-18
RD/OR-16
BK-16
WH/RD-18
WH/RD-18
1-DI2-A
1-DI3-A
D2
ONE
WAY
DIODE
D3
ONE
WAY
DIODE
GN
N
NEUTRAL
1-CI-9
YL/GY-18
1-DI2-C
1-DI3-C
YL/GY-18
4-PRN-3
YL/GN-20
RD/OR-18
4-FRA2
FRA
BRAKE
LIGHT
SWITCH
P
4-FRA1
PRN
NEUTRAL
SWITCH
2/3
N
BK-18
BK-16
BK-18
BK-16
11
12
13
14
15



16	17	18	19	20	21

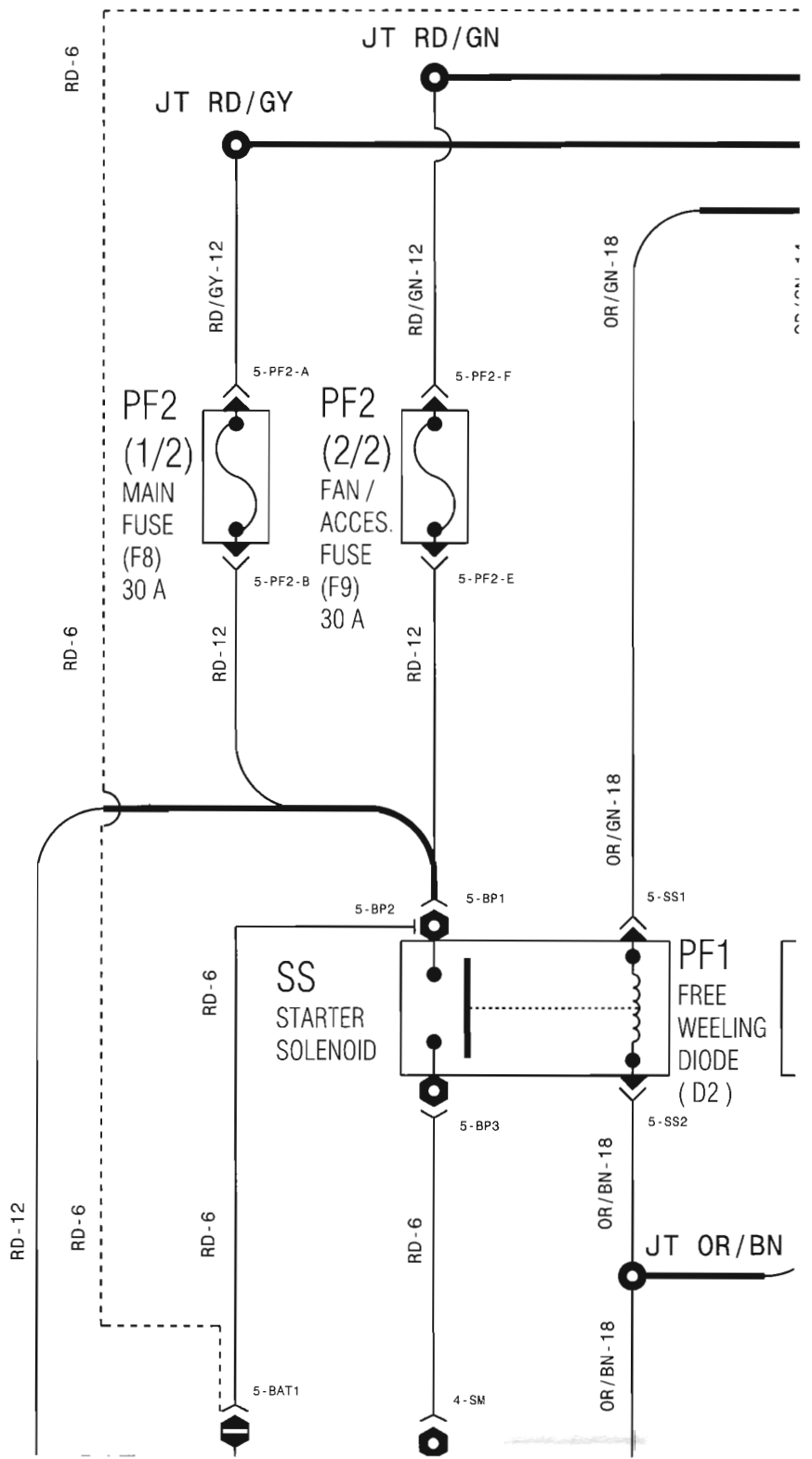

4-CV-A
4-CV-B
4-CV-C
2-ME-2
E
POWER
GROUND
D
2-ME-5
2-ME-3
BK-18
RD/BN-18
PK-18
BK/OR-18
1-CI-7
1-CI-6
1-CI-10
1-CI-8
POWER SENSOR
SPEED SIGNAL
GROUND SENSOR
POWER
CI
SPEEDOMETER
& PILOT LAMPS
RD
TEMP.
KM / MI
GROUND
1-CI-5
1-CI-11
1-CI-2
BK/PK-18
BK-18
BK/GY-18
BN/BU-18
1-MG2-1
KM
KM/MI
CONNECTOR
CONNECTED = KM
DISCONNECTED = MI
2-KM2
2-KM1
TE
MOTOR
TEMP
SWITCH
4-TE1
4-TE2
t°
PM
OIL
PRESSURE
SWITCH
1-MG1-3
BK-18
22
23
24
25
26


12
1-BD-1
1-BD-3
1-BD-6
1-BD-5
4-CH1
4-CH2
CH
CARB.
HEATER
15 WATTS
EACH
4-CH3
WH/BU-18
WH-18
WH/BK-18
BK-18
BK-16
YL
4WD
1-CI-17
BK/GN-18
4-SD
4-MD-2
4-MD-4
4-MD-1
M
M
SD
4WD
SWITCH
MD
2WD/4WD
ACTUATOR
BK-18
BK-16
H
G
F
E
D
C
B
A
710000856F1
27
28
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30

800 I

OUTLANDER 800 2006

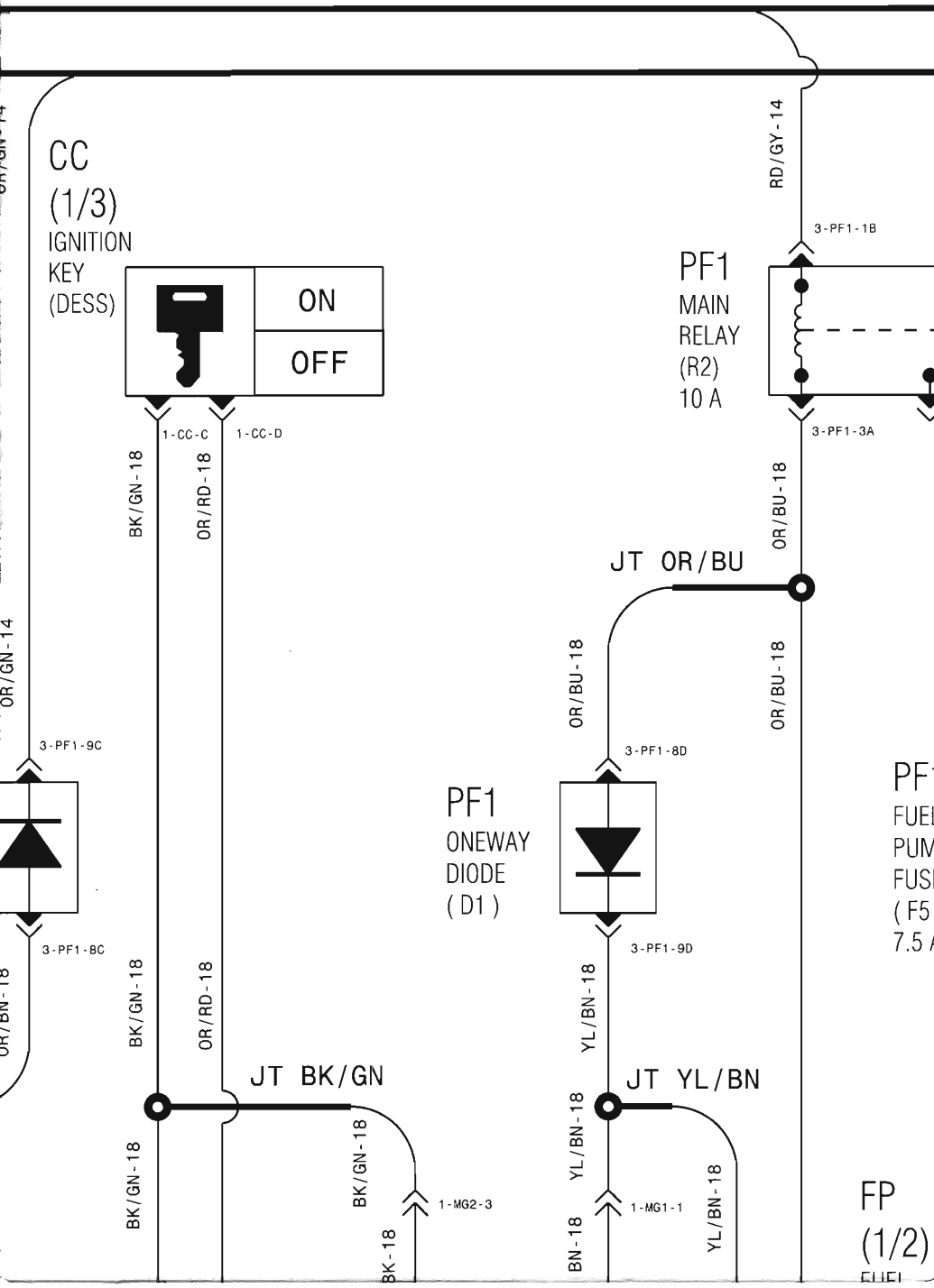
GENERAL SY



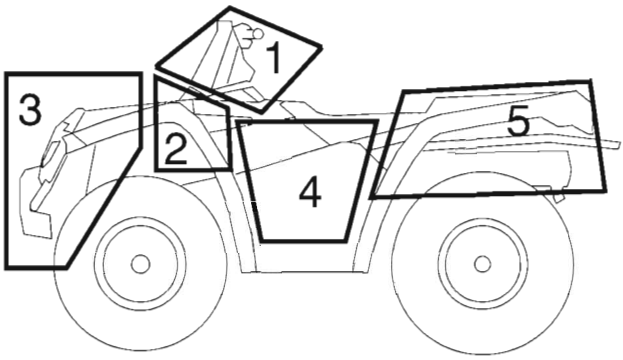
800·2

5 6 7 8 9

YSTEM



10	11	12	13	14



JT OR/GN

RD/GY-14

OR/GN-14

VI/GN-16

3-PF1-1A

3-PF1-6C

3-PF1-4E

PF1
RELAYS
SPEEDO
FUSE
(F4)
7.5 A

PF1
IGNITION
COIL
FUSE
(F1)
5 A

VI/GN-16

HIC
HARNE
INTER
CONNE

2-HIC-2

3-PF1-3B

3-PF1-7C

3-PF1-5E

RD/BE-14

RD/BE-14

RD/BE-14

VI/GN-16

JT RD/BE

BA
IGNITION
COIL

RD/BE-14

RD/BE-14

RD/BE-14

4-BA-2

3-PF1-9B

3-PF1-5A

3-PF1-5C

PF1
ECM
FUSE
(F6)
5 A

PF1
INJECTORS
FUSE
(F3)
5 A

3-PF1-8B

3-PF1-4A

3-PF1-4C

VI/BU-16

HIC
HARNESS
INTER
CONNECTION

2-HIC-3

4-BA-1

BE-18

BN/OR-16

BU/GY-18

JT VI/BU

INJ1
FUEL
INJECTOR
(FRONT)

INJ2
FUEL
INJECTOR
(REAR)

VI/BU-18

VI/BU-18

BK

BK-14

5-FP-3

4-INJ1-2

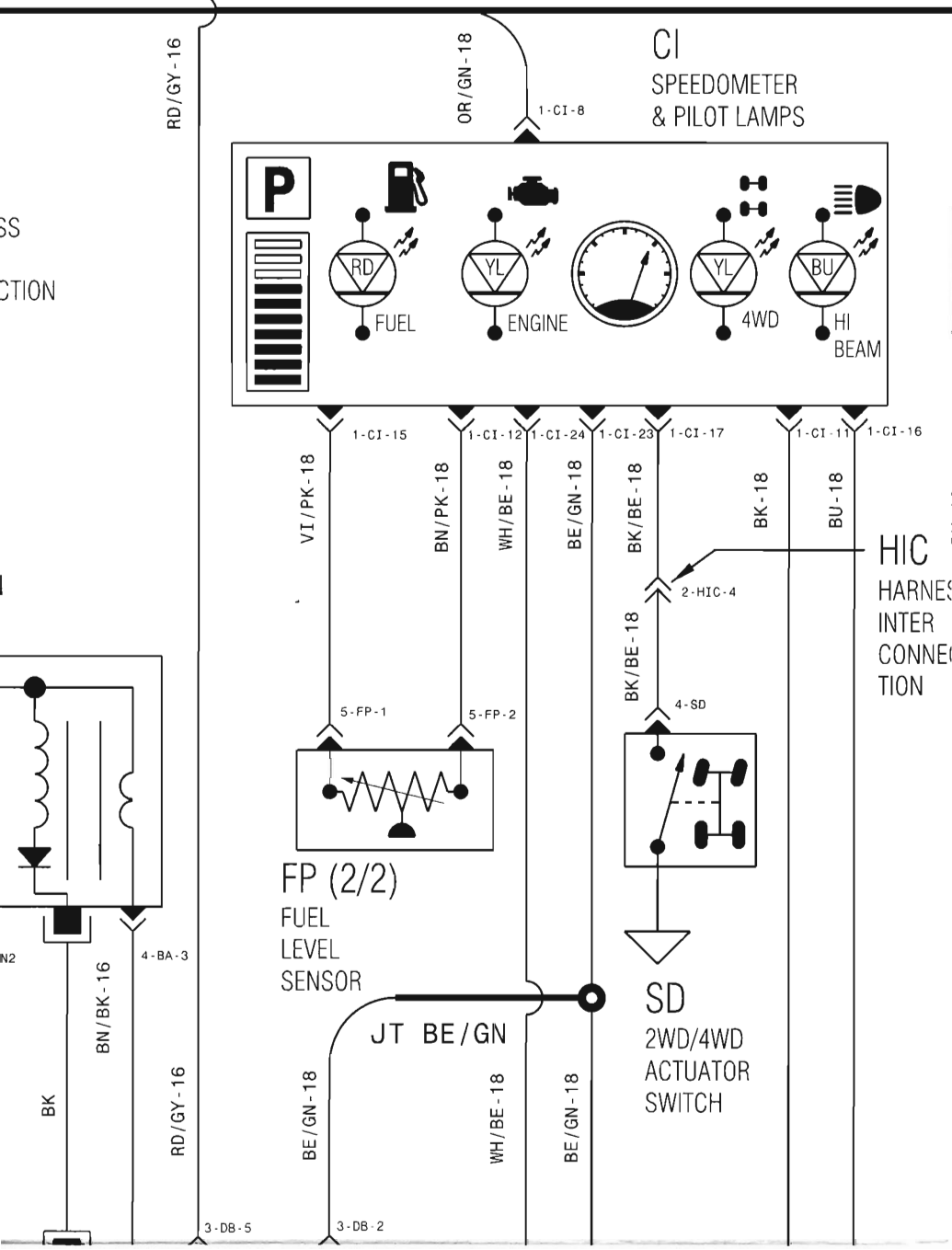
4-INJ2-2

15	16	17	18	19

TERMINAL IDENTIFICATION

	NAME	ZONE-CONNECTOR NAME-TERMINAL #/A
X:	CI	1 - CI - 15
X:	CV	4 - CV - A
X:	ME	2 - ME

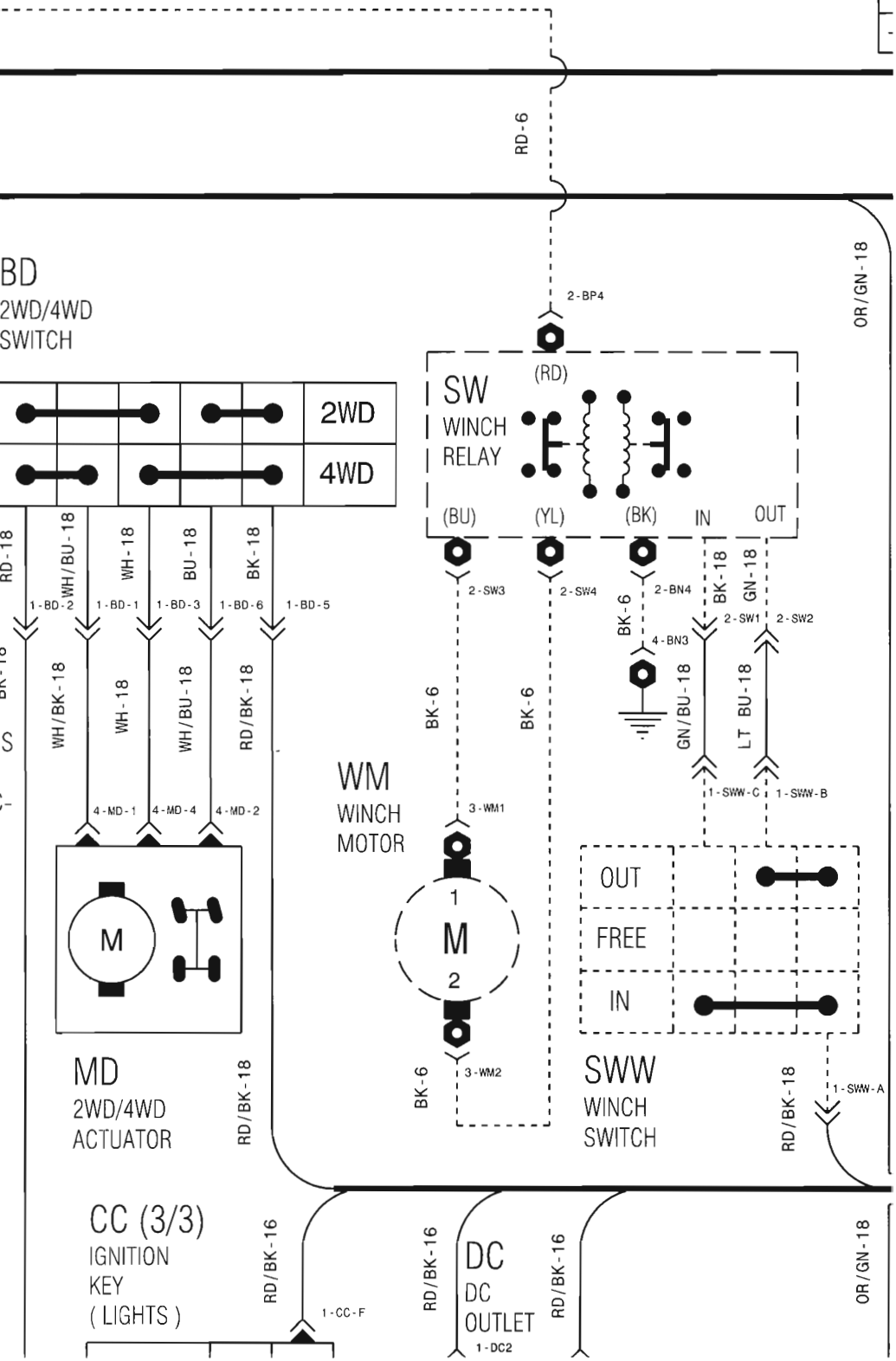
AWG	MAX. CURRENT
# 6	100 amps
# 8	65 amps
# 10	40 amps
# 12	25 amps
# 14	16 amps
# 16	10 amps
# 18	6 amps
* AT	50°C MAX



20	21	22	23	24

MAX. FUSE CURRENT	MAX. WATT
125 amps	1450 watts
80 amps	930 watts
50 amps	580 watts
30 amps	365 watts
20 amps	230 watts
15 amps	145 watts
7.5 amps	85 watts

ZONE #	ZONE DESCRIPTION
1	STEERING AREA
2	MODULE AREA
3	FRONT OF VEHICLE
4	ENGINE AREA
5	REAR OF VEHICLE



25	26	27	28

●	WELDED JOINT
▬	SHRINKED JOINT
⊹	CROSSED WIRE
⌐	WIRE BUS
—	SIMPLE CONDUCTOR WIRE
—	FEMALE TERMINAL
→	MALE TERMINAL
⊸	STEEL LINK (FRAME)
⊣	TERMINAL

⏚	FRAME GROUND
⏚	EGINE GROUND
⊕	PHILLIPS SCREW
⬢	NUT CONNECTION
◉	SPLICE CONNECTION
⩚	COMPONENT CONNECTION
▭	SECTION OF MODULE
⬣	SLOTTED SCREW
– –	OPTIONAL

COLOR CODE	
BE	BEIGE
BK	BLACK
BU	BLUE
BN	BROWN
GN	GREEN
GY	GREY
OR	ORANGE
RD	RED
VI	VIOLET
WH	WHITE
YL	YELLOW
PK	PINK
LT BU	LIGHT BLUE

P N M L K J H

OR/GN-16
RD/GN-14
OR/GN-14
OR/GN-16
OR/GN-14
RD/GN-14

3-PF1-10C
3-PF1-10D
3-PF1-3D
3-PF1-1D

3-PF1-12D
3-PF1-12C
3-PF1-1E
3-PF1-3E

PF1
ACCESSORIES
RELAY
(R3)
30 A

PF1
FAN
RELAY
(R1)
10 A

RD/YL-14
OR/BK-18
OR/GN-16
OR/WH-18
BN/RD-16

PR
TAIL
LIGHT

5-PR-2
BK-18

3-PF1-6A
3-PF1-6E

PF1
ACCESSORIES
FUSE
(F7)
20 A

PF1
COOLING
FAN
FUSE
(F2)
20 A

P
B

RD-18
WH-18

3-PF1-7A
3-PF1-7E

5-PR-1
5-PR-3

RD/BK-14
OR/BK-18
BK-16
RD/OR-16
OR/WH-18
BN/WH-16

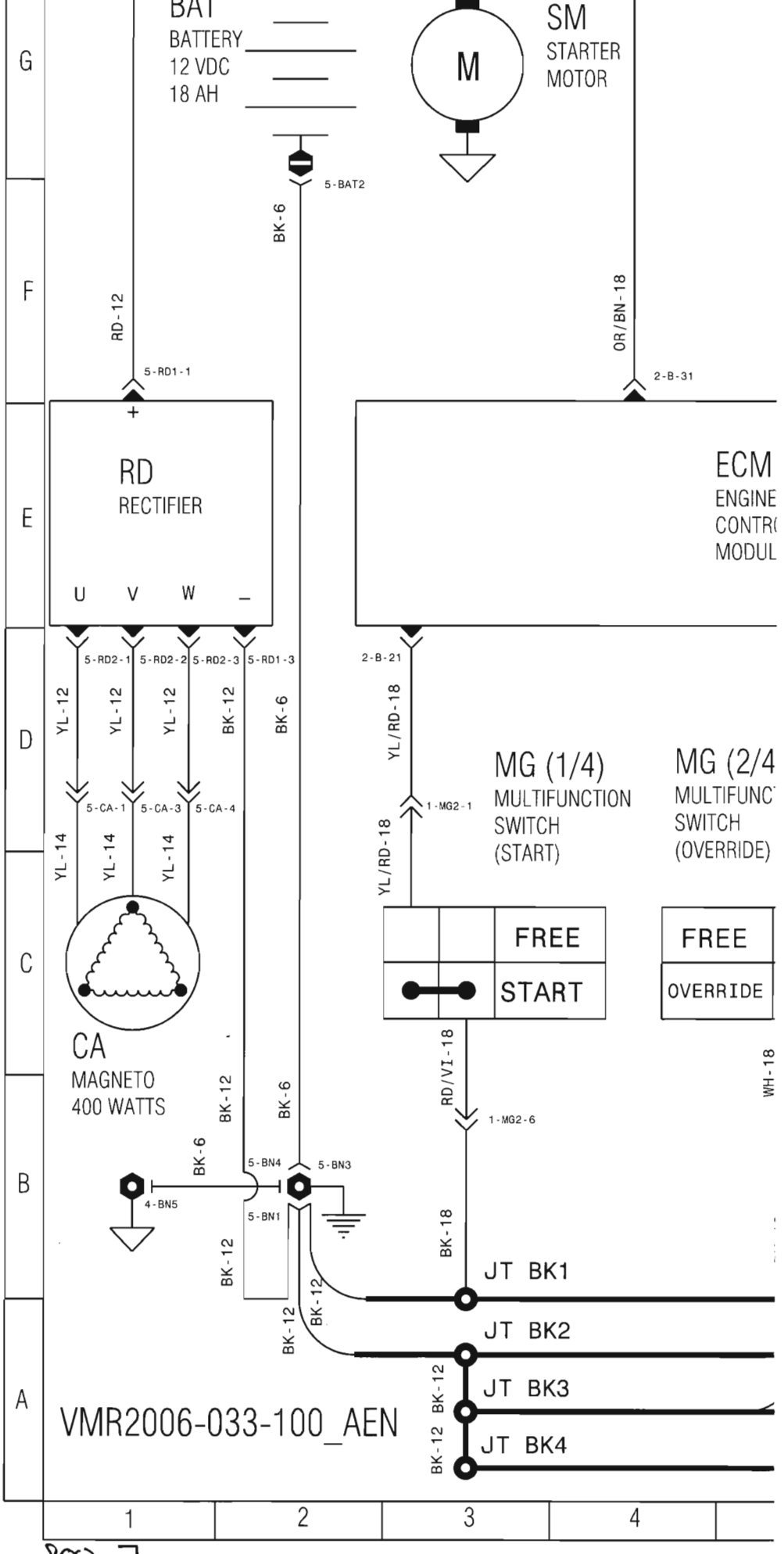
JT RD/BK

3-FT-B

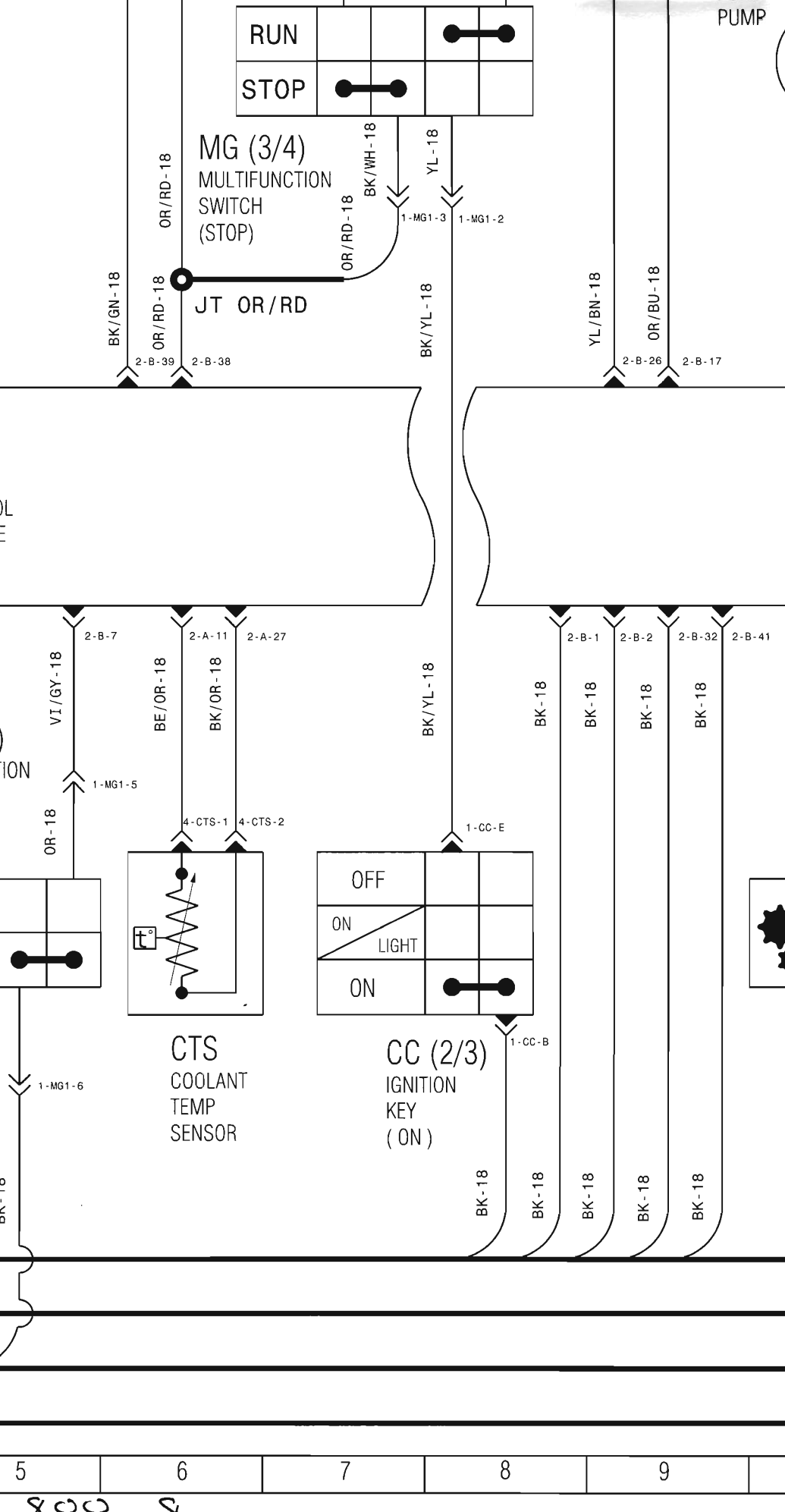
OR/GN-16
BU-16

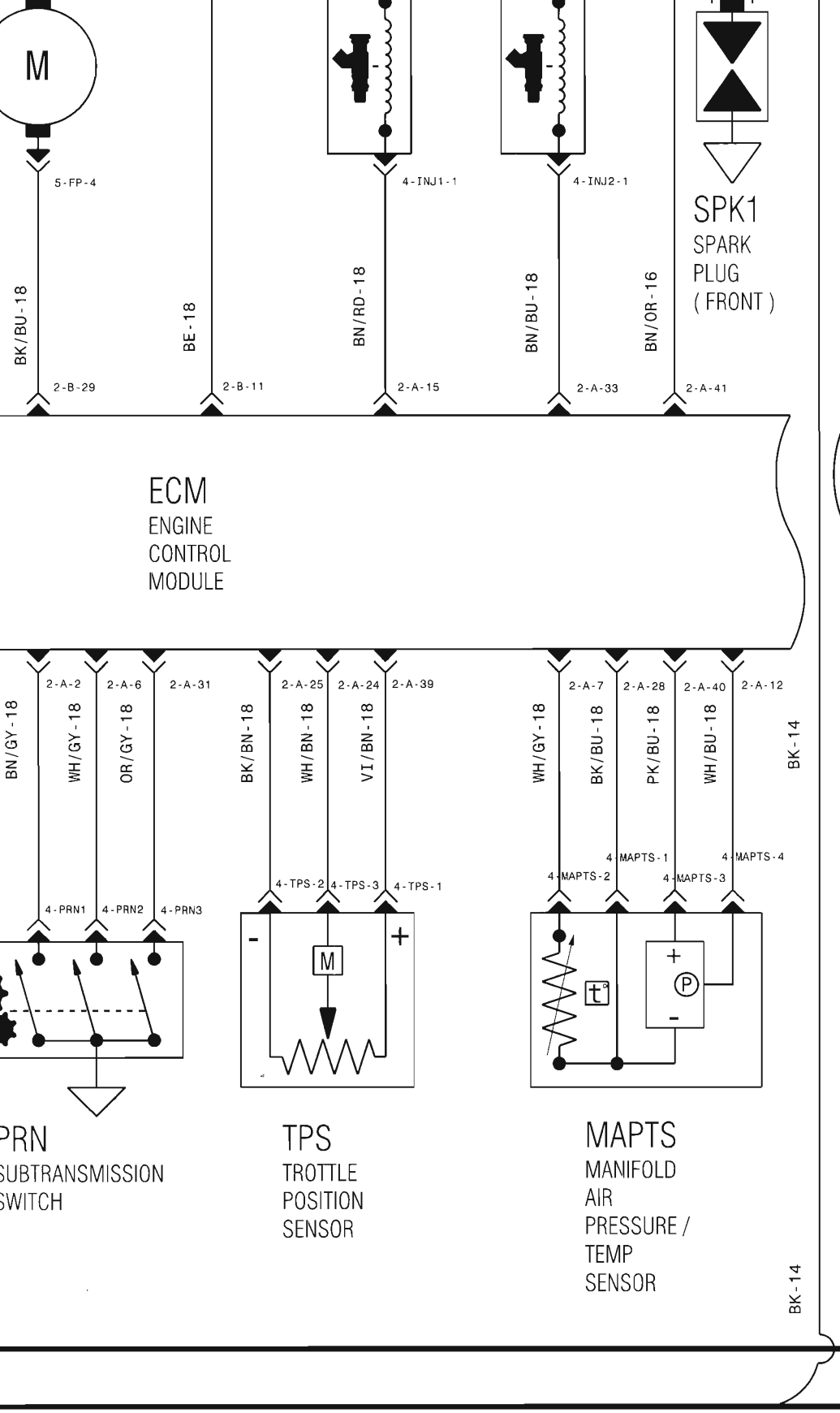
HIC
HARNESS

FT
COOLING


BAT
BATTERY
12 VDC
18 AH
M
SM
STARTER
MOTOR
5-BAT2
BK-6
RD-12
5-RD1-1
OR/BN-18
2-B-31
RD
RECTIFIER
U V W –
ECM
ENGINE
CONTRO
MODUL
5-RD2-1
5-RD2-2
5-RD2-3
5-RD1-3
2-B-21
YL-12
YL-12
YL-12
BK-12
BK-6
YL/RD-18
MG (1/4)
MULTIFUNCTION
SWITCH
(START)
MG (2/4
MULTIFUNC
SWITCH
(OVERRIDE)
1-MG2-1
5-CA-1
5-CA-3
5-CA-4
YL-14
YL-14
YL-14
YL/RD-18
FREE
START
FREE
OVERRIDE
CA
MAGNETO
400 WATTS
RD/VI-18
WH-18
1-MG2-6
BK-12
BK-6
BK-6
5-BN4
5-BN3
4-BN5
5-BN1
BK-18
BK-12
BK-12
BK-12
JT BK1
JT BK2
JT BK3
JT BK4
BK-12
BK-12
VMR2006-033-100_AEN
G
F
E
D
C
B
A
1
2
3
4

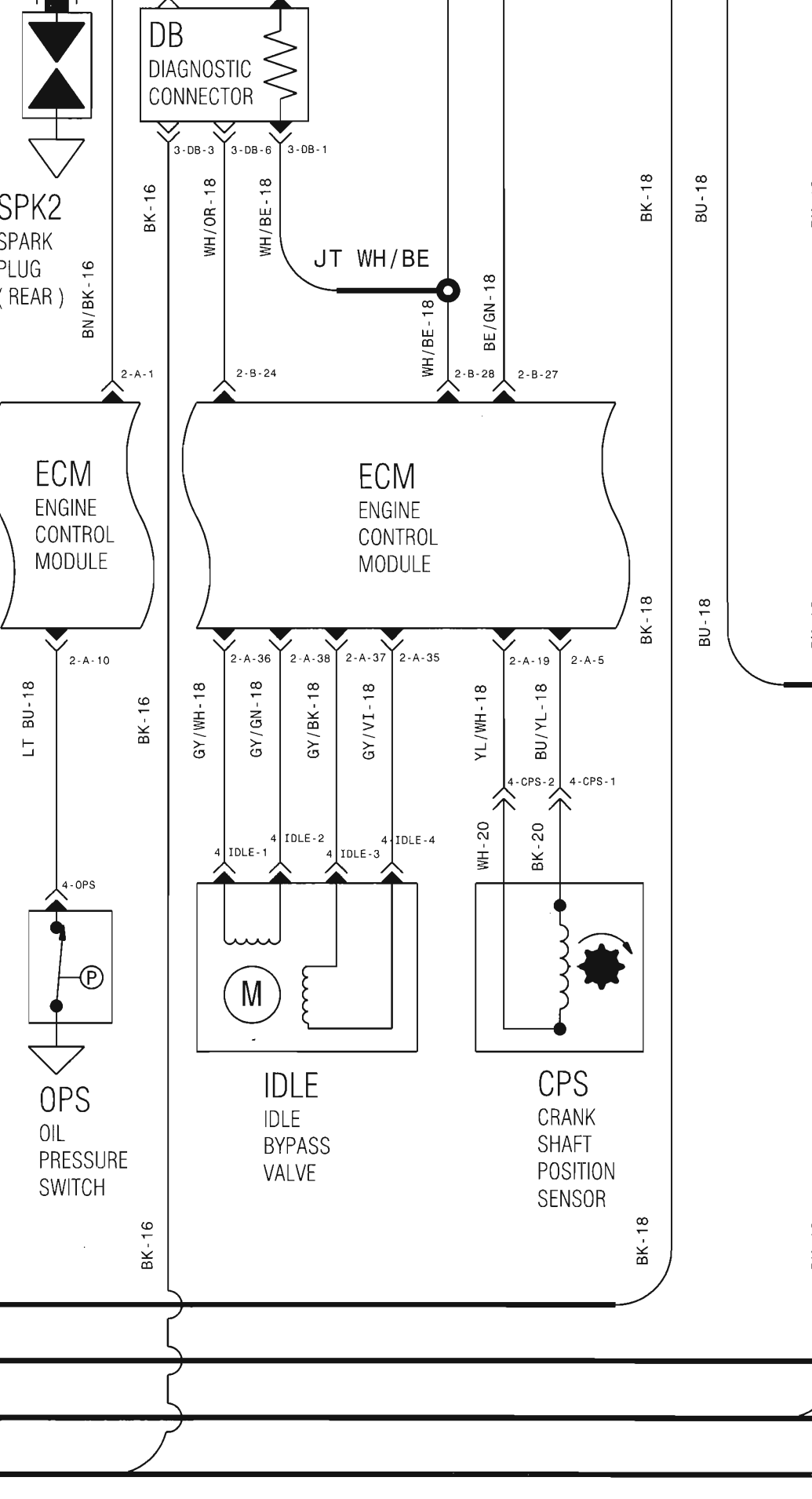
800 7


PUMP
RUN
STOP
MG (3/4)
MULTIFUNCTION
SWITCH
(STOP)
OR/RD-18
BK/WH-18
YL-18
1-MG1-3
1-MG1-2
JT OR/RD
BK/GN-18
2-B-39
2-B-38
BK/YL-18
YL/BN-18
OR/BU-18
2-B-26
2-B-17
2-B-7
2-A-11
2-A-27
VI/GY-18
BE/OR-18
BK/OR-18
1-MG1-5
OR-18
4-CTS-1
4-CTS-2
1-CC-E
2-B-1
2-B-2
2-B-32
2-B-41
BK-18
OFF
ON
LIGHT
ON
1-CC-B
1-MG1-6
CTS
COOLANT
TEMP
SENSOR
CC (2/3)
IGNITION
KEY
(ON)
5
6
7
8
9

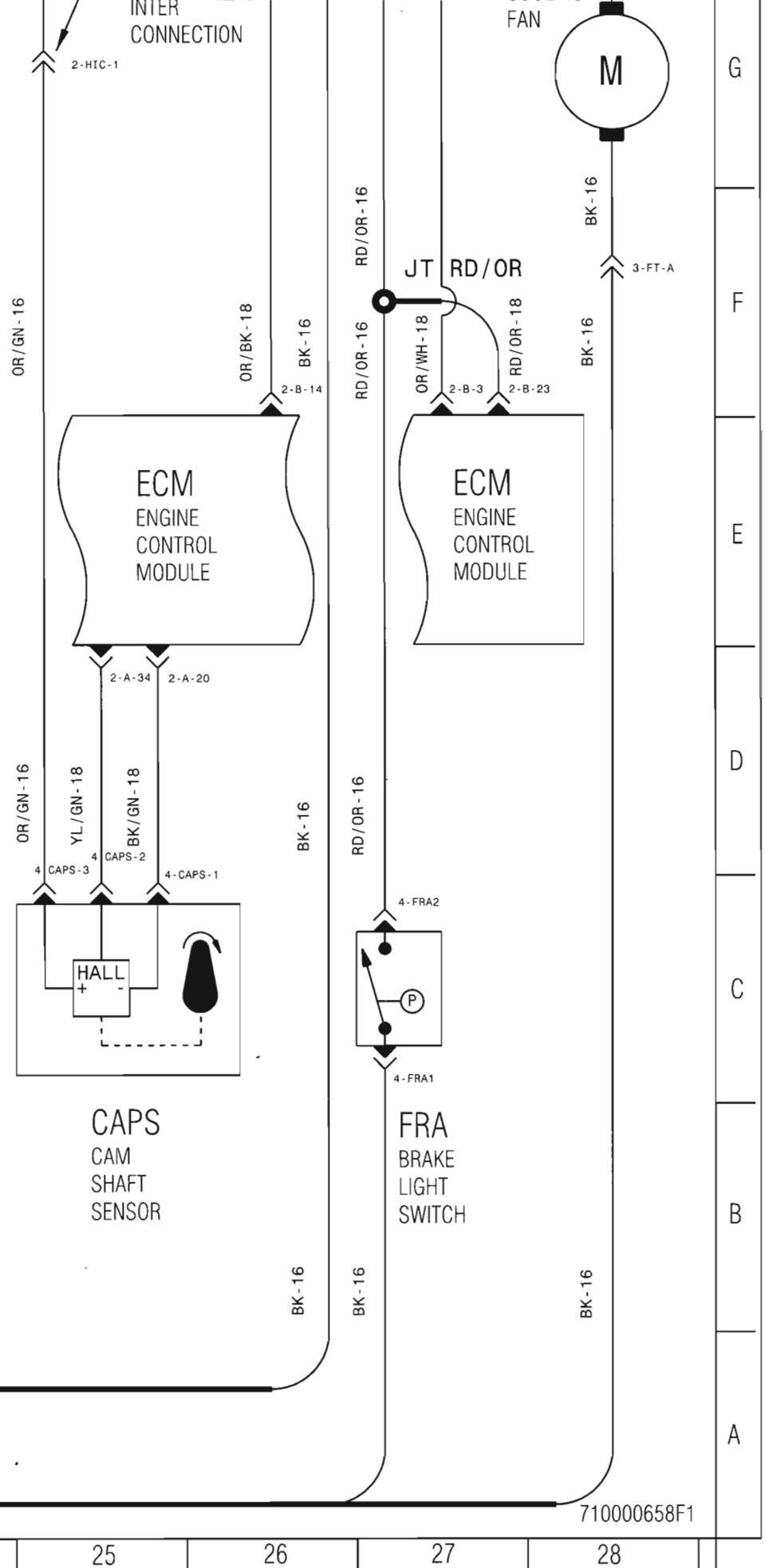


10	11	12	13	14

800 9


DB
DIAGNOSTIC
CONNECTOR
3-DB-3
3-DB-6
3-DB-1
SPK2
SPARK
PLUG
(REAR)
BN/BK-16
BK-16
WH/OR-18
WH/BE-18
JT WH/BE
WH/BE-18
BE/GN-18
BK-18
BU-18
2-A-1
2-B-24
2-B-28
2-B-27
ECM
ENGINE
CONTROL
MODULE
ECM
ENGINE
CONTROL
MODULE
2-A-10
LT BU-18
BK-16
2-A-36
2-A-38
2-A-37
2-A-35
GY/WH-18
GY/GN-18
GY/BK-18
GY/VI-18
4 IDLE-1
4 IDLE-2
4 IDLE-3
4 IDLE-4
2-A-19
2-A-5
YL/WH-18
BU/YL-18
4-CPS-2
4-CPS-1
WH-20
BK-20
4-OPS
P
M
OPS
OIL
PRESSURE
SWITCH
IDLE
IDLE
BYPASS
VALVE
CPS
CRANK
SHAFT
POSITION
SENSOR
BK-16
BK-18

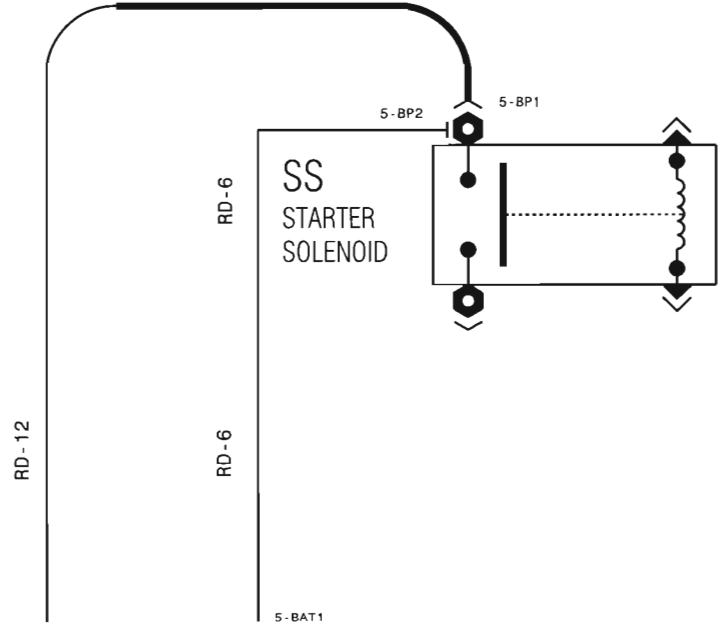
OFF
ON
LIGHT
ON
1-CC-A
RD/BU-16
MG (4/4)
MULTIFUNCTION
SWITCH
(LIGHTS)
1-MG2-4
RD/YL-16
LO
HI
BU-16
GN-16
1-MG2-5
1-MG2-2
JT
BU
JT GN
BU-18
GN-18
3-PG-3
3-PG-2
3-PD-3
3-PD-2
HI
LO
PG
LEFT
HEAD
LIGHT
35 W
PD
RIGHT
HEAD
LIGHT
35 W
BK-18
3-PG-1
3-PD-1
BK-16
1-DC1
DC
DC
OPTION
1-DC3-1
OR/GN-18
ECM
ENGINE
CONTROL
MODULE
2-B-20
2-B-6
BN/OR-18
PK-18
OR/GN-18
4-CV-C
4-CV-B
4-CV-A
HALL
-
+
CV
SPEED
SENSOR
20
21
22
23
24


INTER
CONNECTION
2-HIC-1
FAN
M
G
F
E
D
C
B
A
OR/GN-16
OR/BK-18
BK-16
2-B-14
RD/OR-16
JT RD/OR
OR/WH-18
RD/OR-18
2-B-3
2-B-23
BK-16
3-FT-A
ECM
ENGINE
CONTROL
MODULE
ECM
ENGINE
CONTROL
MODULE
2-A-34
2-A-20
OR/GN-16
YL/GN-18
BK/GN-18
BK-16
RD/OR-16
4 CAPS-3
4 CAPS-2
4-CAPS-1
HALL
+
-
4-FRA2
P
4-FRA1
CAPS
CAM
SHAFT
SENSOR
FRA
BRAKE
LIGHT
SWITCH
BK-16
BK-16
BK-16
710000658F1
25
26
27
28

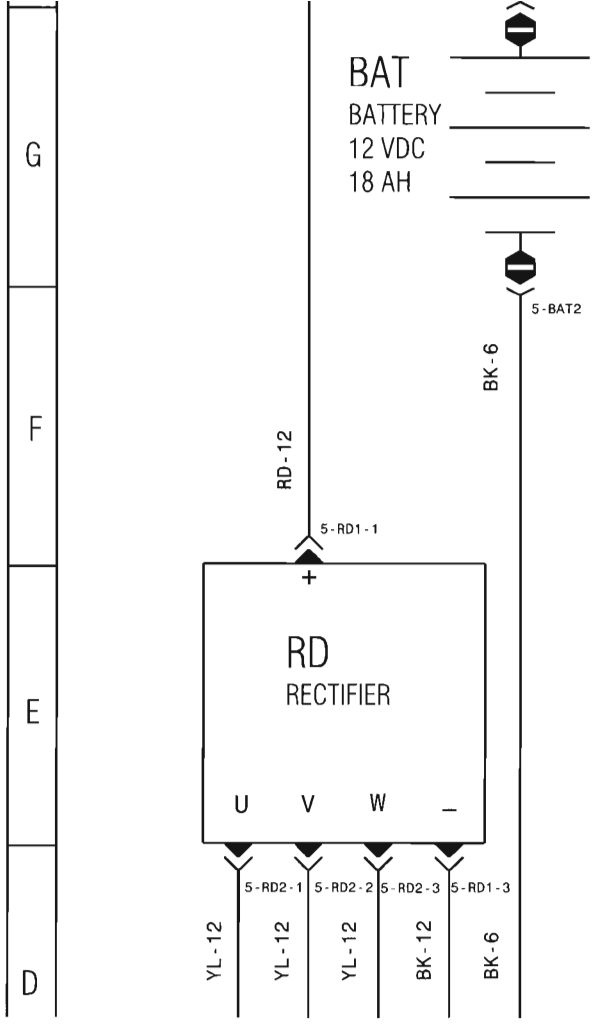
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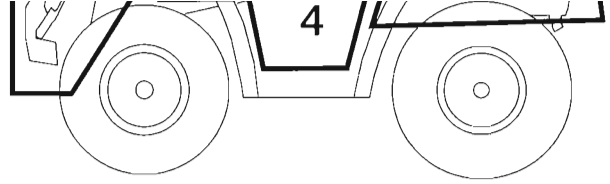
OUTLANDER 800 2006

CHARGING SYSTEM

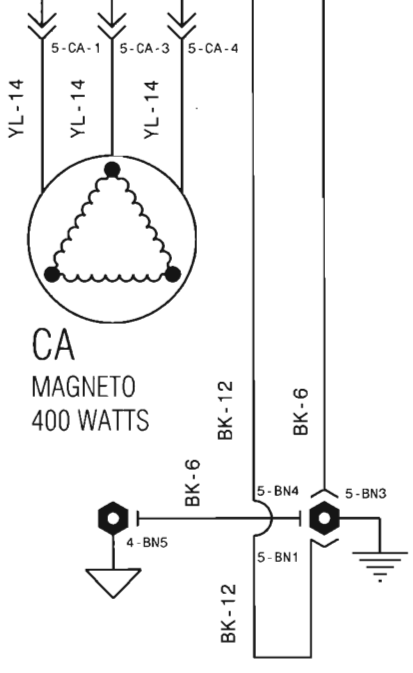








ZONE #	ZONE DESCRIPTION
1	STEERING AREA
2	MODULE AREA
3	FRONT OF VEHICLE
4	ENGINE AREA
5	REAR OF VEHICLE

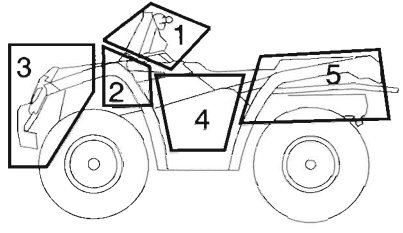


VMR2006-033-101_AEN

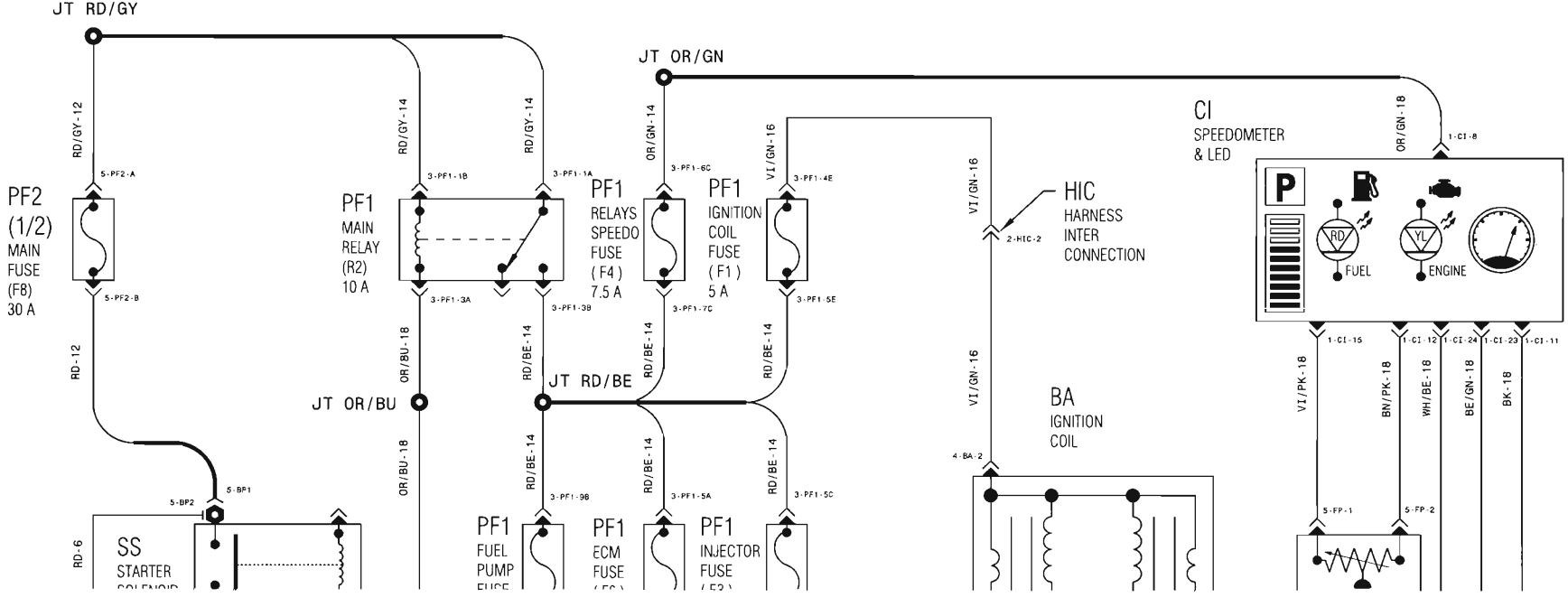
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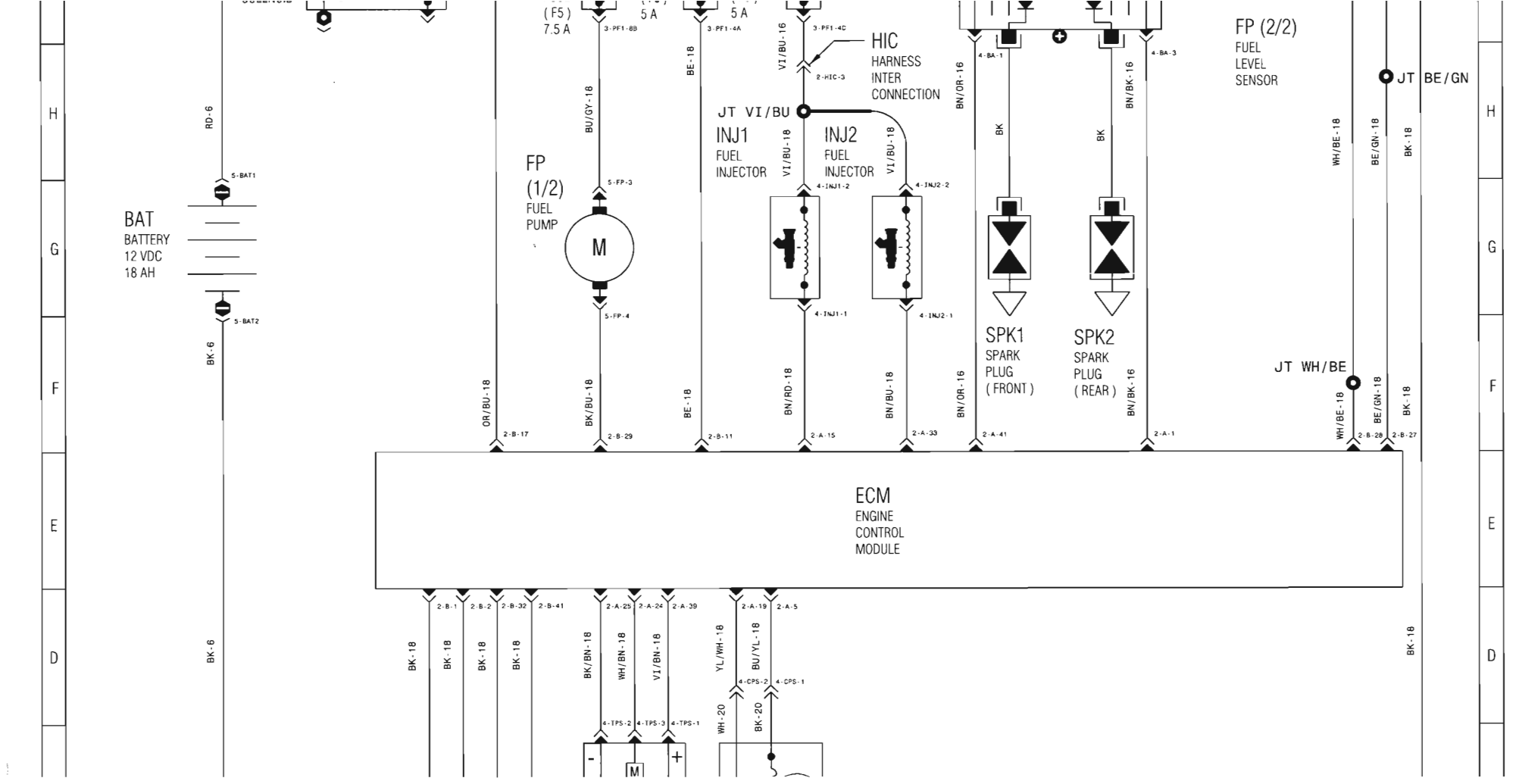
OUTLANDER 800 2006

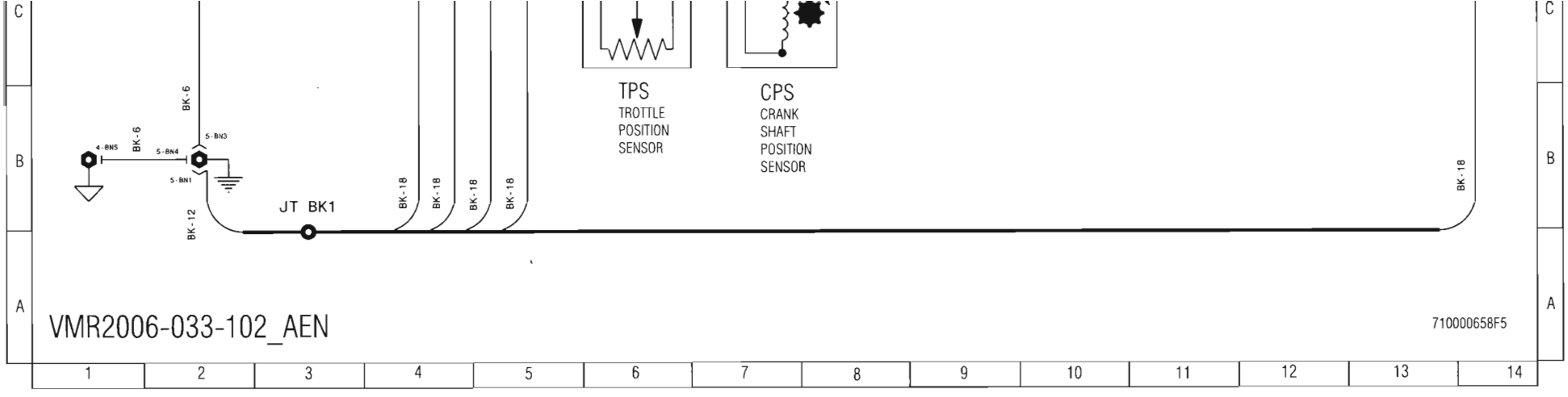
INJECTION / IGNITION SYSTEM



ZONE #	ZONE DESCRIPTION
1	STEERING AREA
2	MODULE AREA
3	FRONT OF VEHICLE
4	ENGINE AREA
5	REAR OF VEHICLE

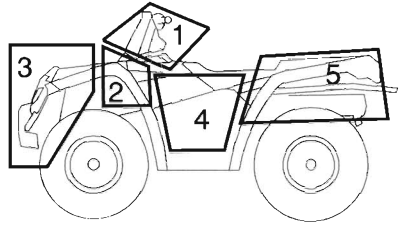



BAT
BATTERY
12 VDC
18 AH
5-BAT1
5-BAT2
RD-6
BK-6
BK-6
(F5)
7.5 A
5 A
5 A
3-PF1-8B
3-PF1-4A
3-PF1-4C
BU/GY-18
BE-18
VI/BU-16
HIC
HARNESS
INTER
CONNECTION
2-HIC-3
JT VI/BU
FP
(1/2)
FUEL
PUMP
5-FP-3
5-FP-4
M
INJ1
FUEL
INJECTOR
INJ2
FUEL
INJECTOR
VI/BU-18
VI/BU-18
4-INJ1-2
4-INJ2-2
4-INJ1-1
4-INJ2-1
BN/OR-16
BN/BK-16
4-BA-1
4-BA-3
BK
BK
SPK1
SPARK
PLUG
(FRONT)
SPK2
SPARK
PLUG
(REAR)
FP (2/2)
FUEL
LEVEL
SENSOR
JT BE/GN
WH/BE-18
BE/GN-18
BK-18
JT WH/BE
WH/BE-18
BE/GN-18
BK-18
OR/BU-18
BK/BU-18
BE-18
BN/RD-18
BN/BU-18
BN/OR-16
BN/BK-16
2-B-17
2-B-29
2-B-11
2-A-15
2-A-33
2-A-41
2-A-1
2-B-28
2-B-27
ECM
ENGINE
CONTROL
MODULE
2-B-1
2-B-2
2-B-32
2-B-41
2-A-25
2-A-24
2-A-39
2-A-19
2-A-5
BK-18
BK-18
BK-18
BK-18
BK/BN-18
WH/BN-18
VI/BN-18
YL/WH-18
BU/YL-18
BK-18
4-CPS-2
4-CPS-1
4-TPS-2
4-TPS-3
4-TPS-1
WH-20
BK-20
-
M
+

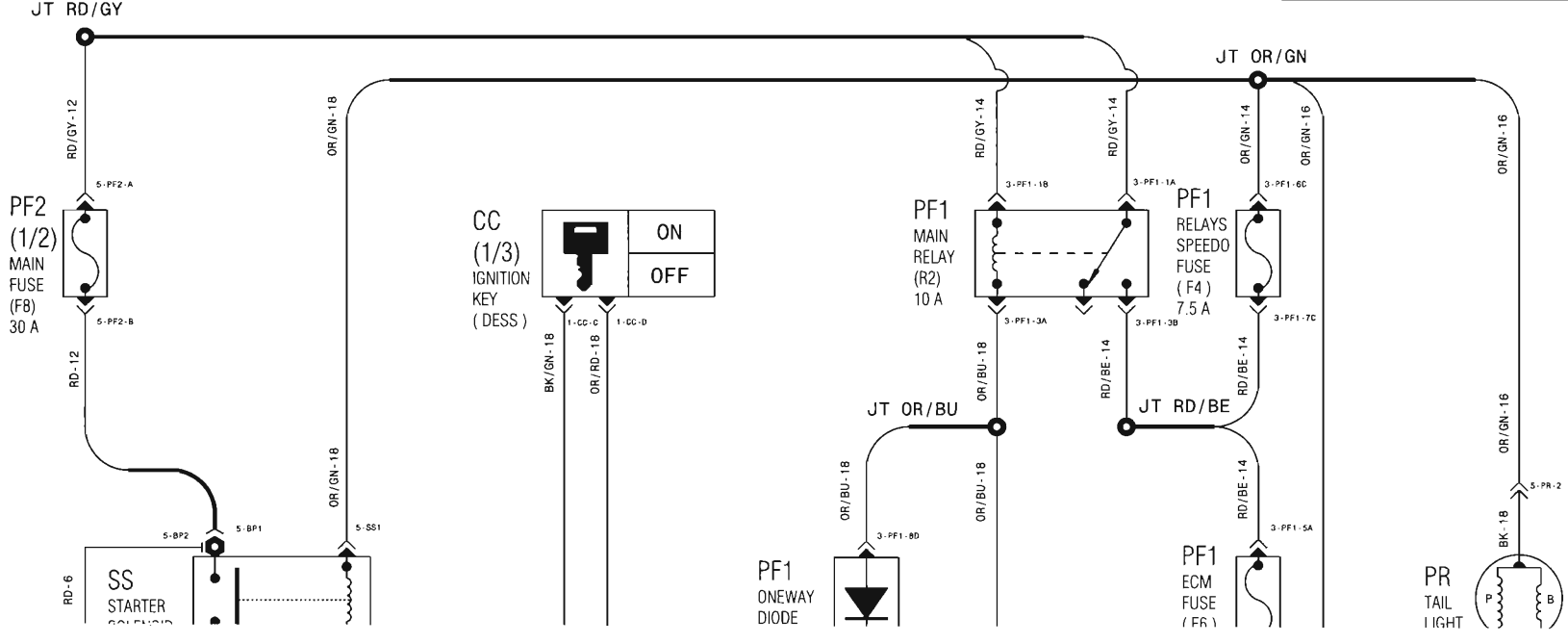

TPS
TROTTLE
POSITION
SENSOR
CPS
CRANK
SHAFT
POSITION
SENSOR
BK-6
BK-6
4-BN5
5-BN4
5-BN3
5-BN1
BK-12
JT BK1
BK-18
BK-18
BK-18
BK-18
BK-18
VMR2006-033-102_AEN
710000658F5
A
B
C
1
2
3
4
5
6
7
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12
13
14

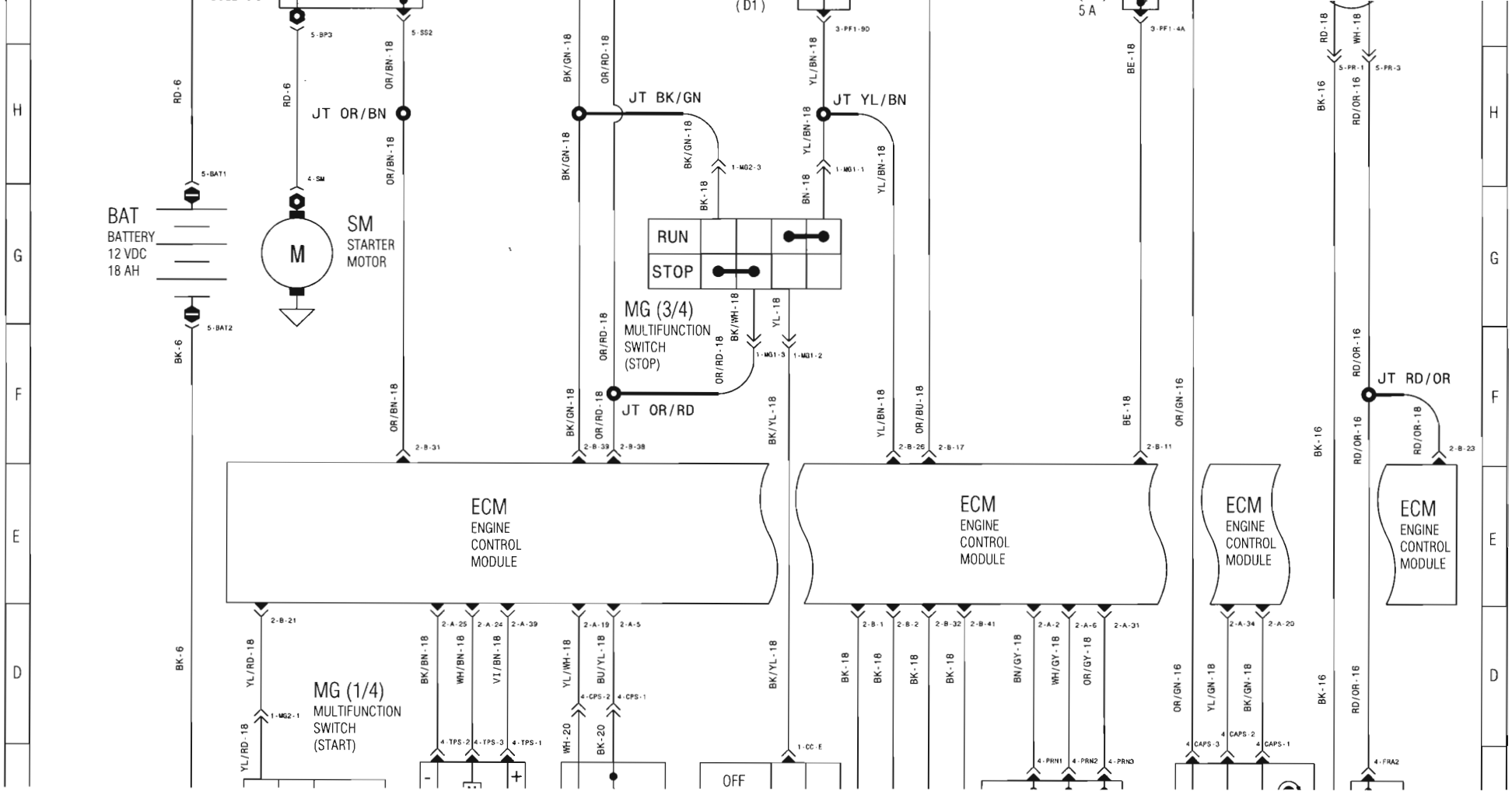
OUTLANDER 800 2006

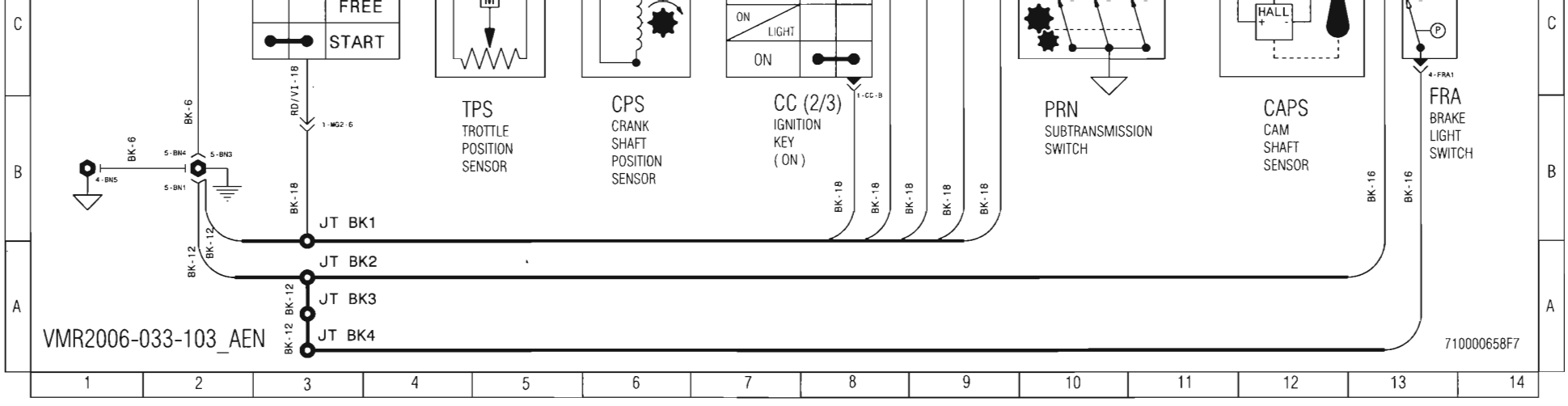
STARTING SYSTEM



ZONE #	ZONE DESCRIPTION
1	STEERING AREA
2	MODULE AREA
3	FRONT OF VEHICLE
4	ENGINE AREA
5	REAR OF VEHICLE

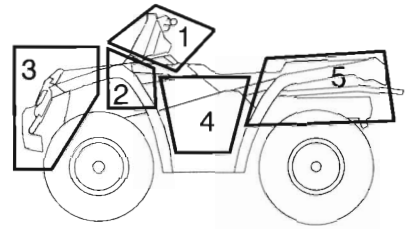



BAT
BATTERY
12 VDC
18 AH
SM
STARTER
MOTOR
M
JT OR/BN
JT BK/GN
JT YL/BN
JT OR/RD
JT RD/OR
RUN
STOP
MG (3/4)
MULTIFUNCTION
SWITCH
(STOP)
MG (1/4)
MULTIFUNCTION
SWITCH
(START)
ECM
ENGINE
CONTROL
MODULE
ECM
ENGINE
CONTROL
MODULE
ECM
ENGINE
CONTROL
MODULE
ECM
ENGINE
CONTROL
MODULE
OFF
5 A
RD-6
OR/BN-18
BK-6
BK/GN-18
OR/RD-18
YL/BN-18
BK-18
BN-18
BK/WH-18
YL-18
BK/YL-18
BE-18
OR/GN-16
BK-16
RD/OR-16
RD-18
WH-18
YL/RD-18
BK/BN-18
WH/BN-18
VI/BN-18
YL/WH-18
BU/YL-18
WH-20
BK-20
BK-1
BK-2
BK-32
BK-41
BN/GY-18
WH/GY-18
OR/GY-18
YL/GN-18
BK/GN-18
5-BAT1
5-BAT2
5-BP3
5-SS2
4-SM
3-PF1-9D
3-PF1-4A
5-PR-1
5-PR-3
1-MG2-3
1-MG1-1
1-MG1-3
1-MG1-2
1-MG2-1
1-CC-E
2-B-31
2-B-39
2-B-38
2-B-26
2-B-17
2-B-11
2-B-23
2-B-21
2-A-25
2-A-24
2-A-39
2-A-19
2-A-5
2-B-1
2-B-2
2-B-32
2-B-41
2-A-2
2-A-6
2-A-31
2-A-34
2-A-20
4-TPS-2
4-TPS-3
4-TPS-1
4-CPS-2
4-CPS-1
4-PRN1
4-PRN2
4-PRN3
4-CAPS-3
4-CAPS-2
4-CAPS-1
4-FRA2

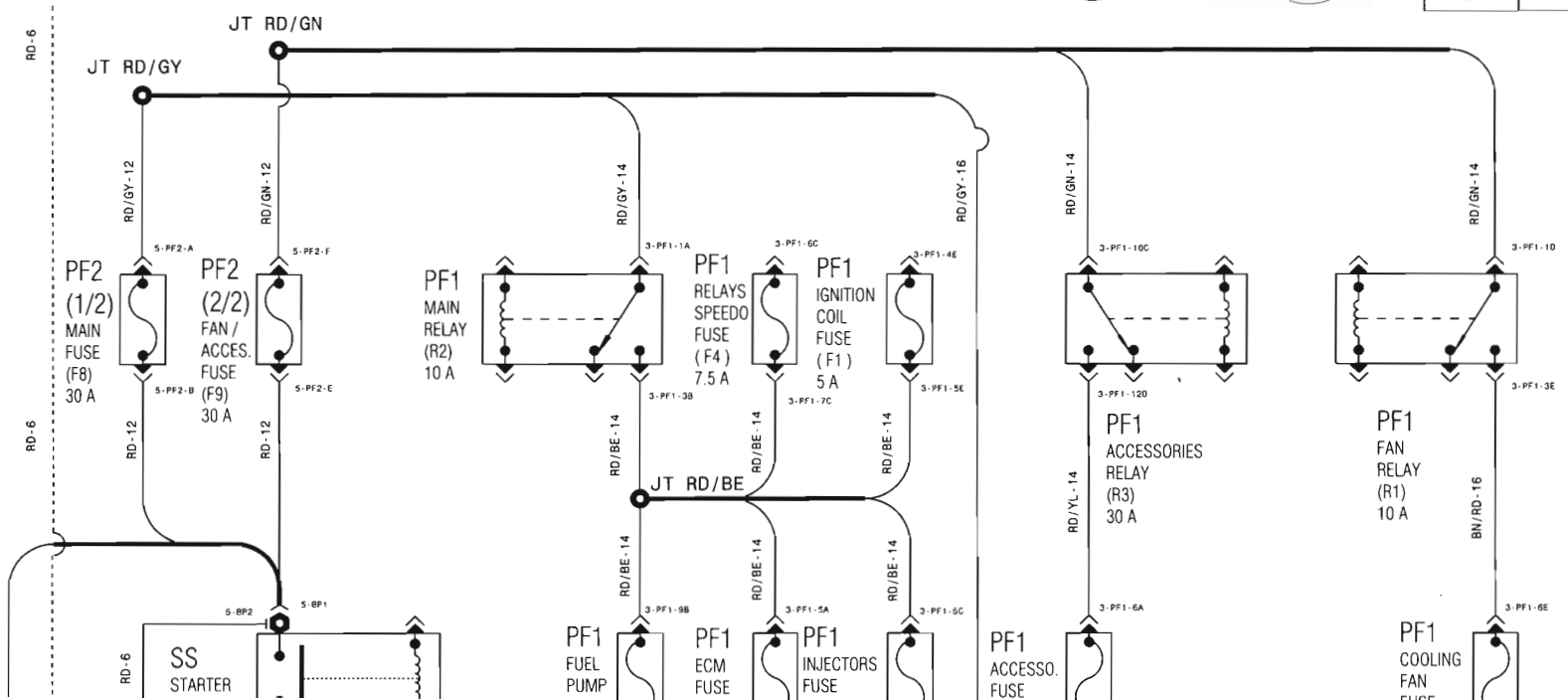

FREE
START
ON
LIGHT
ON
HALL
+ -
P
4-FRA1
1-CC-B
1-MG2-6
RD/VI-18
BK-6
BK-18
BK-12
BK-16
5-BN4
5-BN3
5-BN1
4-BN5
JT BK1
JT BK2
JT BK3
JT BK4
TPS
TROTTLE
POSITION
SENSOR
CPS
CRANK
SHAFT
POSITION
SENSOR
CC (2/3)
IGNITION
KEY
(ON)
PRN
SUBTRANSMISSION
SWITCH
CAPS
CAM
SHAFT
SENSOR
FRA
BRAKE
LIGHT
SWITCH
VMR2006-033-103_AEN
710000658F7
1
2
3
4
5
6
7
8
9
10
11
12
13
14
A
B
C

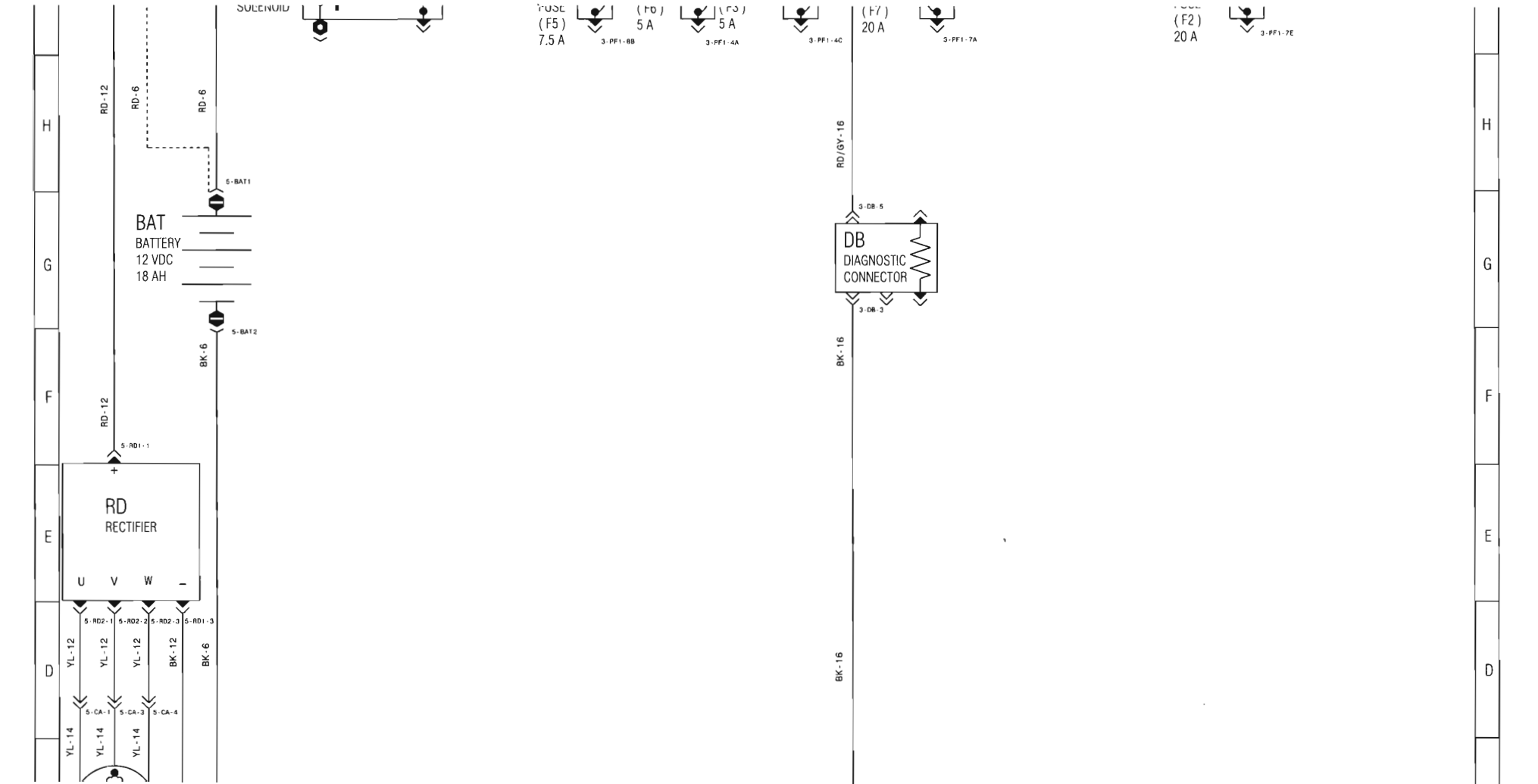
OUTLANDER 800 2006

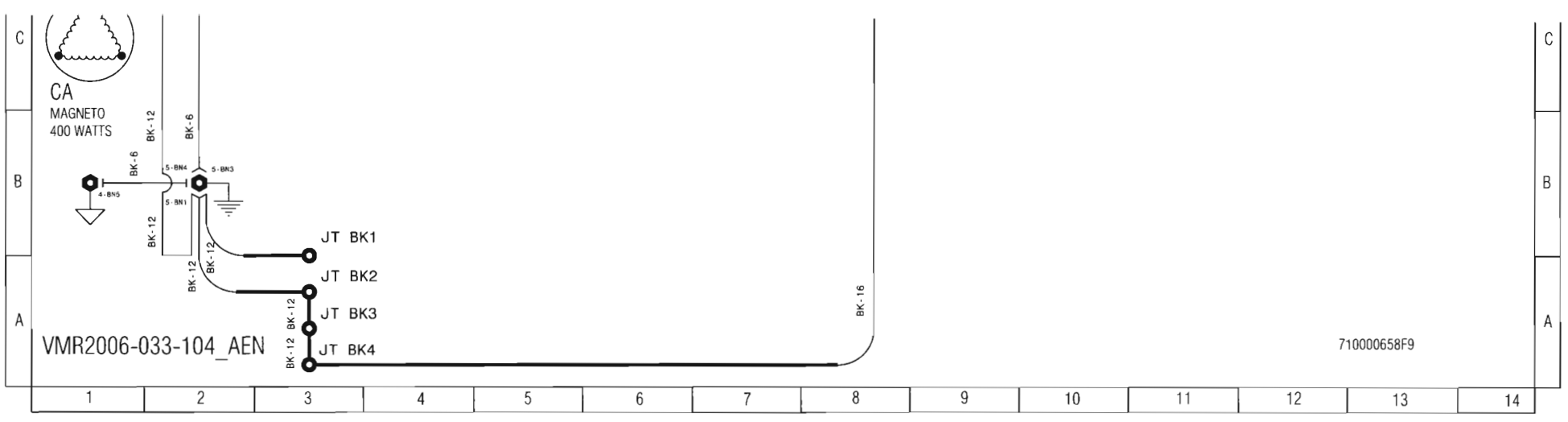
DISTRIBUTION SYSTEM



ZONE #	ZONE DESCRIPTION
1	STEERING AREA
2	MODULE AREA
3	FRONT OF VEHICLE
4	ENGINE AREA
5	REAR OF VEHICLE

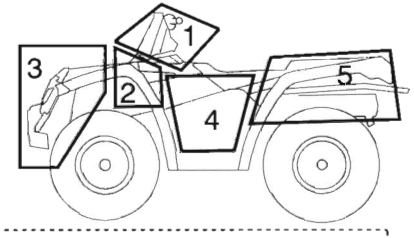



SOLENOID
FUSE (F5) 7.5 A
3-PF1-8B
FUSE (F6) 5 A
3-PF1-4A
FUSE (F3) 5 A
3-PF1-4C
FUSE (F7) 20 A
3-PF1-7A
FUSE (F2) 20 A
3-PF1-7E
RD-12
RD-6
RD-6
5-BAT1
BAT
BATTERY
12 VDC
18 AH
5-BAT2
BK-6
RD-12
5-RD1-1
RD
RECTIFIER
U
V
W
–
5-RD2-1
5-RD2-2
5-RD2-3
5-RD1-3
YL-12
YL-12
YL-12
BK-12
BK-6
5-CA-1
5-CA-3
5-CA-4
YL-14
YL-14
YL-14
RD/GY-16
3-DB-5
DB
DIAGNOSTIC
CONNECTOR
3-DB-3
BK-16
BK-16
H
G
F
E
D

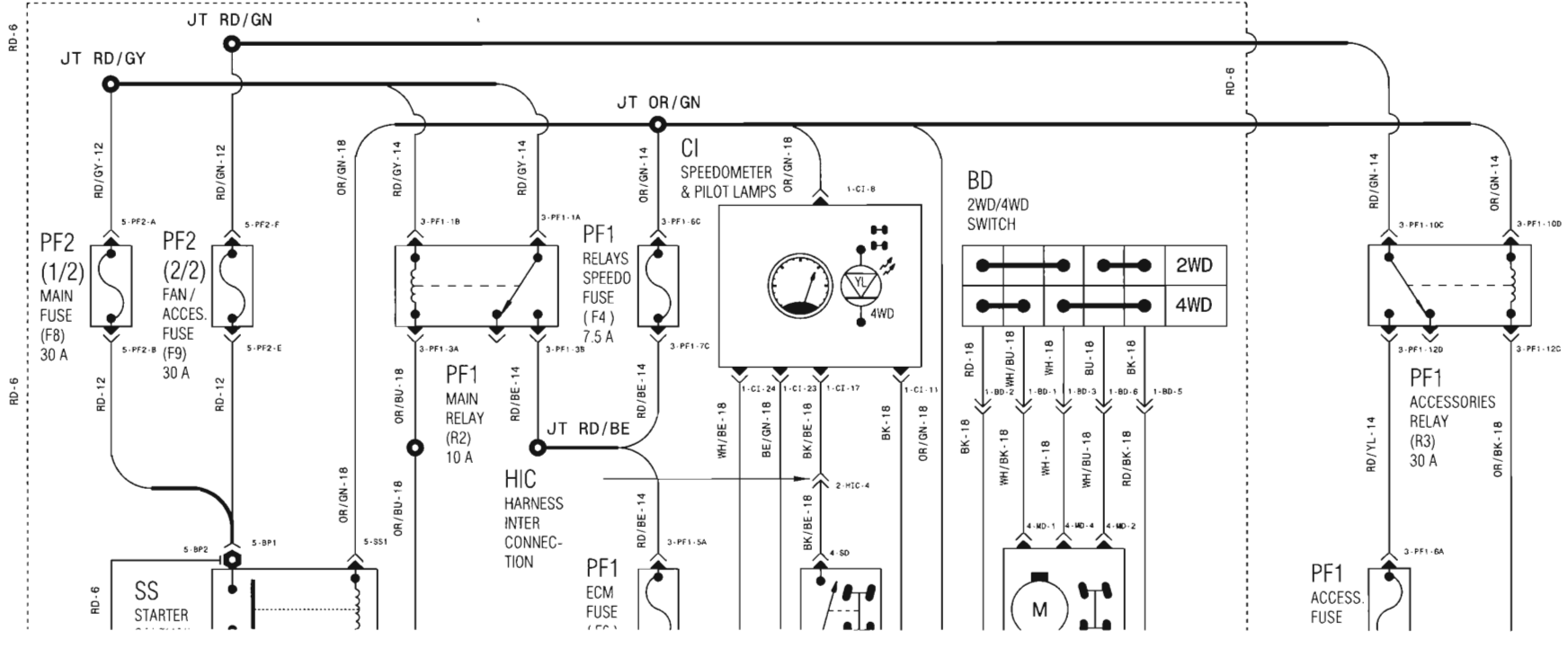

CA
MAGNETO
400 WATTS
BK-12
BK-6
BK-6
5-BN4
5-BN3
4-BN5
5-BN1
BK-12
BK-12
BK-12
JT BK1
JT BK2
JT BK3
JT BK4
BK-12
BK-12
BK-16
VMR2006-033-104_AEN
710000658F9
C
B
A
1
2
3
4
5
6
7
8
9
10
11
12
13
14

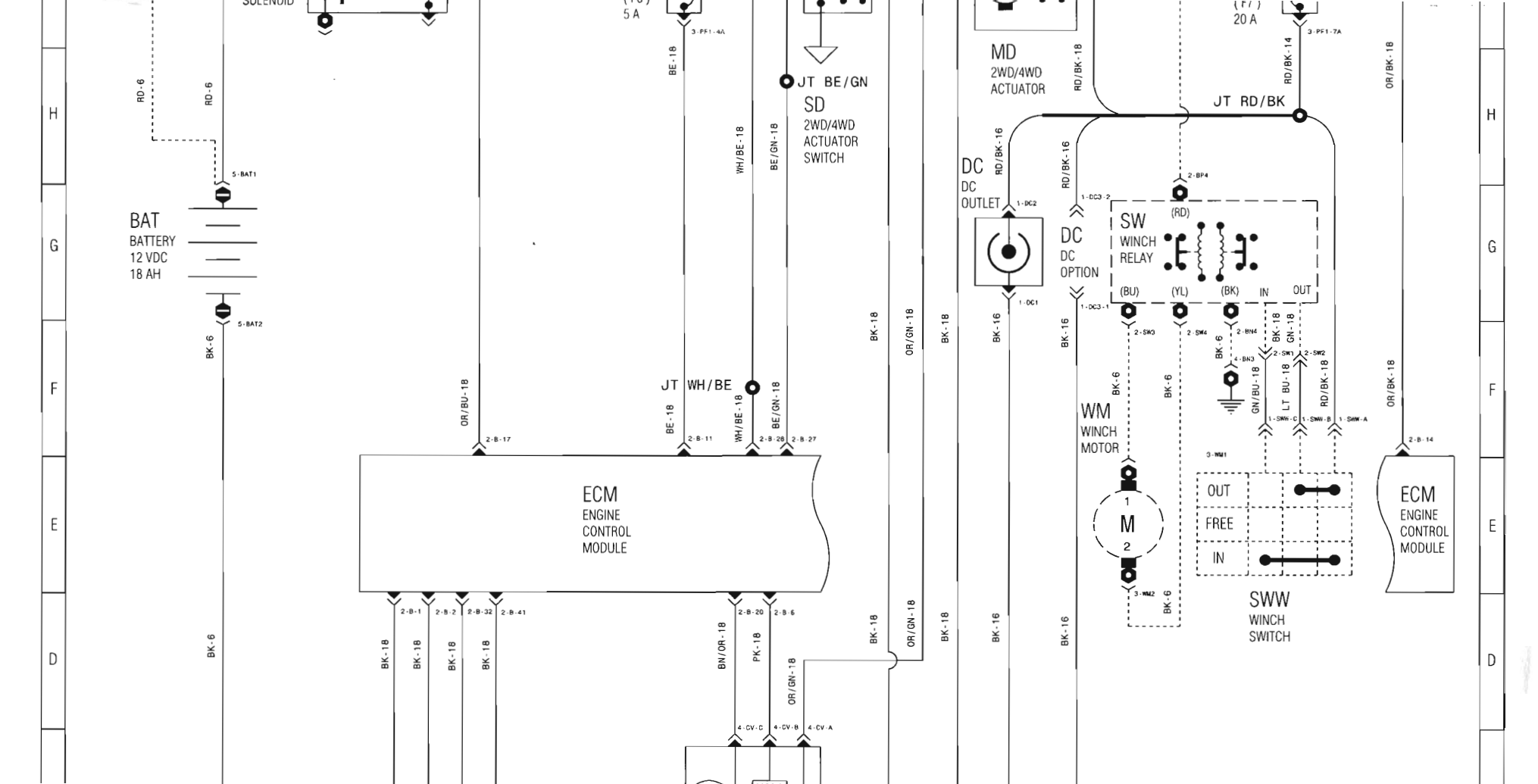
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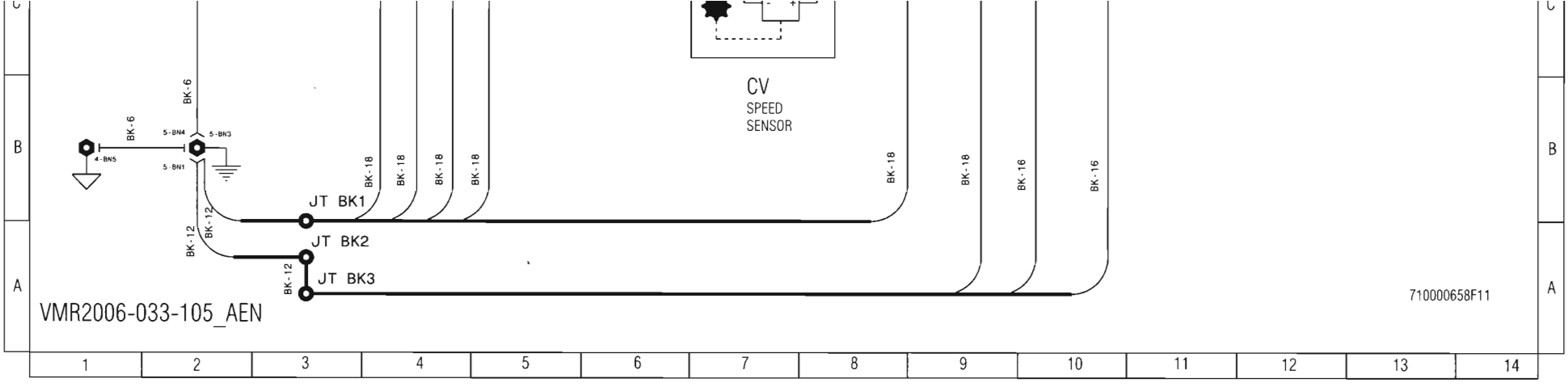
ACCESSORIES SYSTEM



ZONE #	ZONE DESCRIPTION
1	STEERING AREA
2	MODULE AREA
3	FRONT OF VEHICLE
4	ENGINE AREA
5	REAR OF VEHICLE

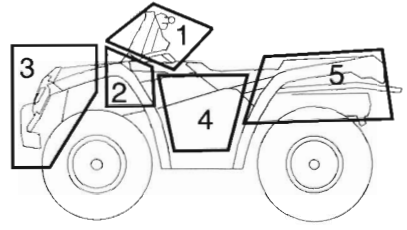



SOLENOID
5 A
3-PF1-4A
BE-18
JT BE/GN
SD
2WD/4WD
ACTUATOR
SWITCH
WH/BE-18
BE/GN-18
RD-6
RD-6
5-BAT1
BAT
BATTERY
12 VDC
18 AH
5-BAT2
BK-6
MD
2WD/4WD
ACTUATOR
RD/BK-18
3-PF1-7A
RD/BK-14
JT RD/BK
OR/BK-18
DC
DC
OUTLET
RD/BK-16
1-DC2
1-DC1
BK-16
2-BP4
1-DC3-2
DC
DC
OPTION
SW
WINCH
RELAY
(RD)
(BU)
(YL)
(BK)
IN
OUT
1-DC3-1
2-SW3
2-SW4
2-BN4
4-BN3
BK-18
GN-18
2-SW1
2-SW2
BK-6
GN/BU-18
LT BU-18
RD/BK-18
1-SWW-C
1-SWW-B
1-SWW-A
WM
WINCH
MOTOR
3-WM1
1
M
2
3-WM2
OUT
FREE
IN
SWW
WINCH
SWITCH
2-B-14
ECM
ENGINE
CONTROL
MODULE
OR/BU-18
2-B-17
JT WH/BE
2-B-11
2-B-28
2-B-27
BK-18
OR/GN-18
ECM
ENGINE
CONTROL
MODULE
2-B-1
2-B-2
2-B-32
2-B-41
2-B-20
2-B-6
BN/OR-18
PK-18
OR/GN-18
4-CV-C
4-CV-B
4-CV-A

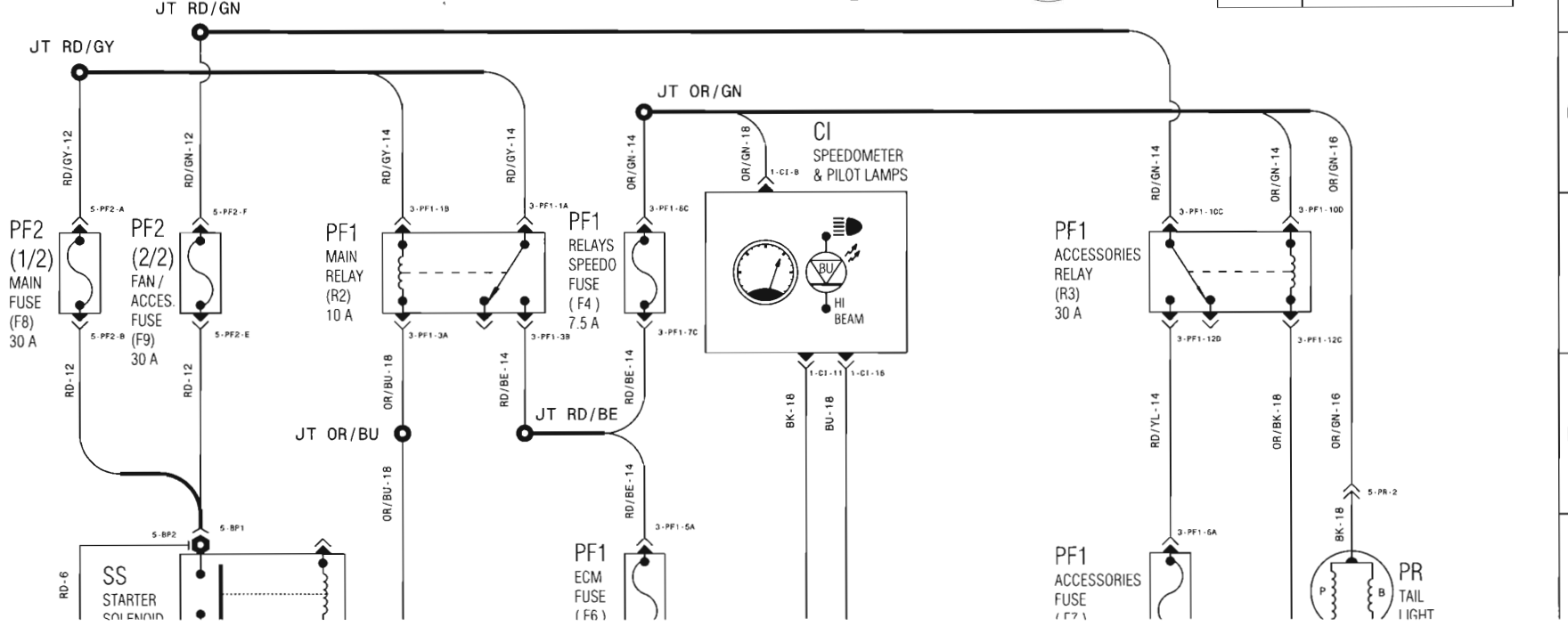

CV
SPEED
SENSOR
BK-6
BK-6
5-BN4
5-BN3
4-BN5
5-BN1
BK-12
BK-12
BK-12
BK-18
BK-18
BK-18
BK-18
BK-18
BK-18
BK-16
BK-16
JT BK1
JT BK2
JT BK3
VMR2006-033-105_AEN
710000658F11
A
B
C
1
2
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10
11
12
13
14

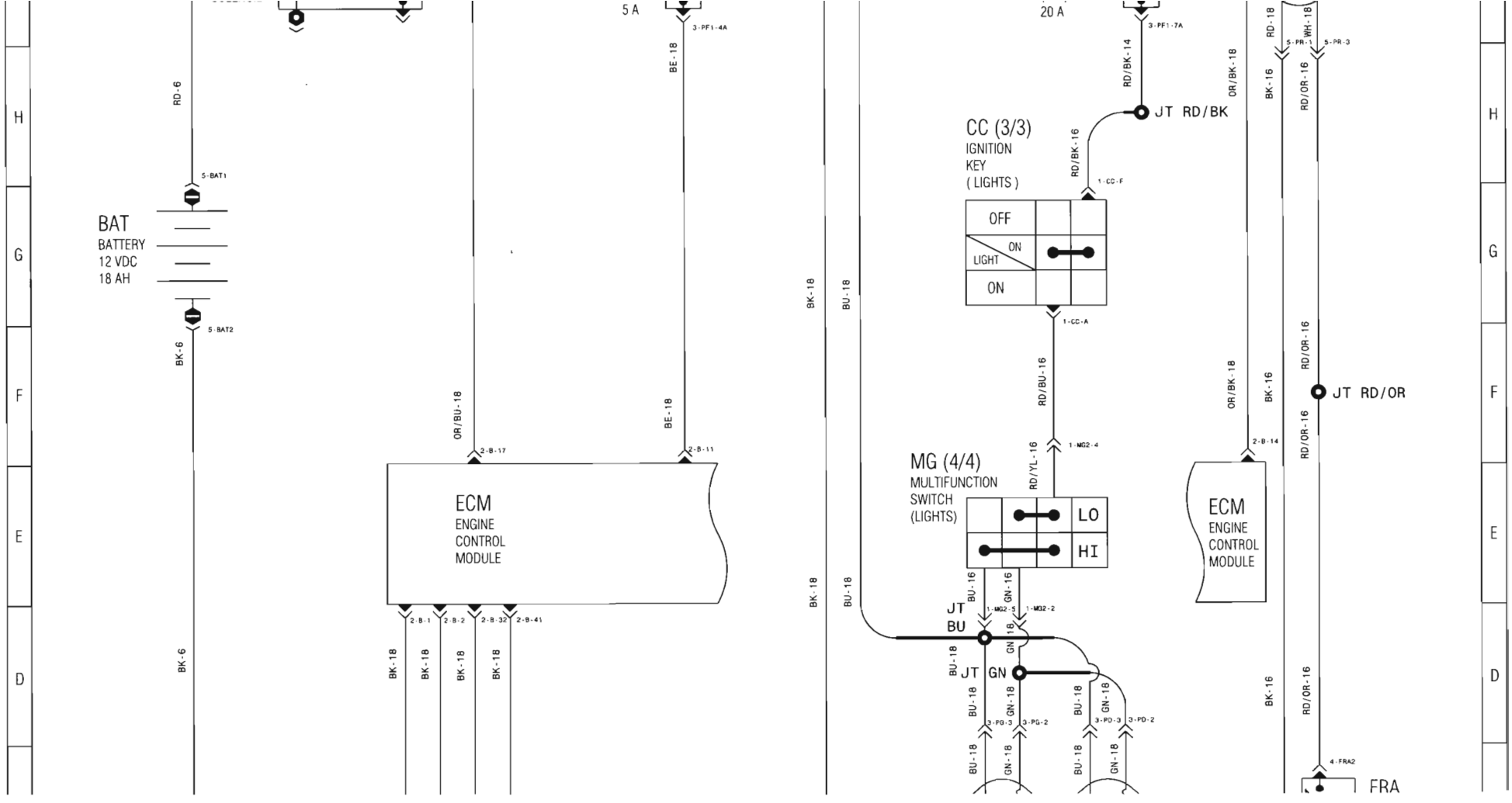
OUTLANDER 800 2006

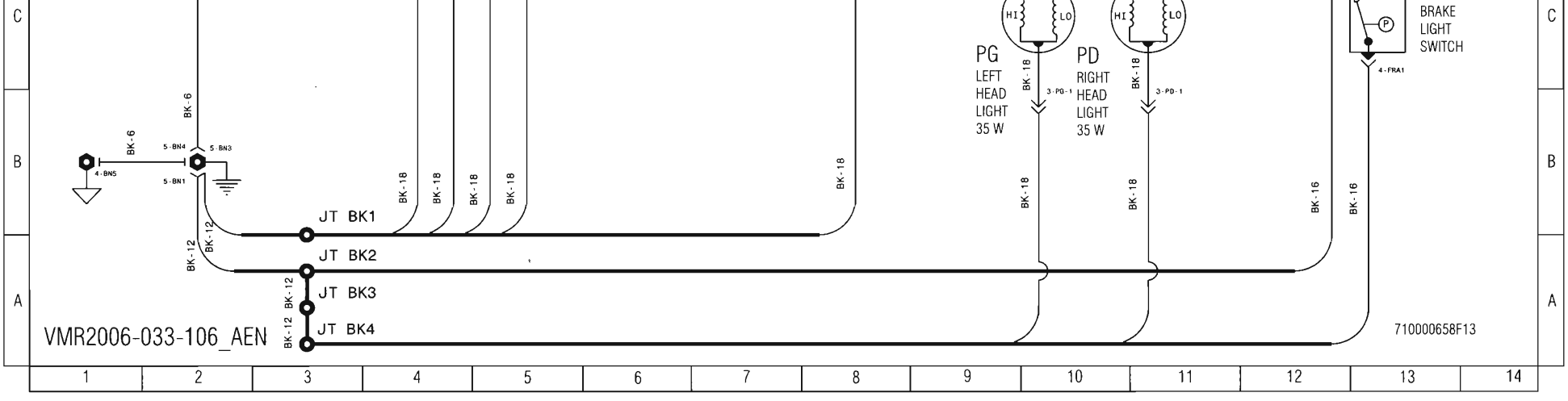
LIGHTING SYSTEM



ZONE #	ZONE DESCRIPTION
1	STEERING AREA
2	MODULE AREA
3	FRONT OF VEHICLE
4	ENGINE AREA
5	REAR OF VEHICLE

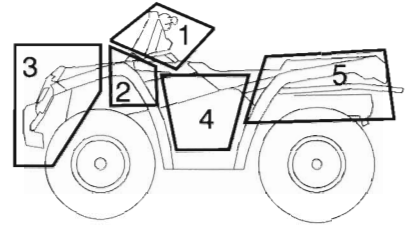



BAT
BATTERY
12 VDC
18 AH
5-BAT1
5-BAT2
RD-6
BK-6
BK-6
5 A
3-PF1-4A
BE-18
OR/BU-18
BE-18
2-B-17
2-B-11
ECM
ENGINE
CONTROL
MODULE
2-B-1
2-B-2
2-B-32
2-B-41
BK-18
BK-18
BK-18
BK-18
20 A
3-PF1-7A
RD/BK-14
JT RD/BK
CC (3/3)
IGNITION
KEY
(LIGHTS)
RD/BK-16
1-CC-F
OFF
ON
LIGHT
ON
1-CC-A
RD/BU-16
1-MG2-4
RD/YL-16
MG (4/4)
MULTIFUNCTION
SWITCH
(LIGHTS)
LO
HI
BU-16
GN-16
1-MG2-5
1-MG2-2
JT
BU
GN-18
JT GN
BU-18
GN-18
3-PG-3
3-PG-2
3-PD-3
3-PD-2
BU-18
GN-18
BU-18
GN-18
BU-18
BK-18
BU-18
BK-18
OR/BK-18
2-B-14
ECM
ENGINE
CONTROL
MODULE
RD-18
WH-18
5-PR-1
5-PR-3
BK-16
RD/OR-16
JT RD/OR
RD/OR-16
RD/OR-16
BK-16
4-FRA2
FRA

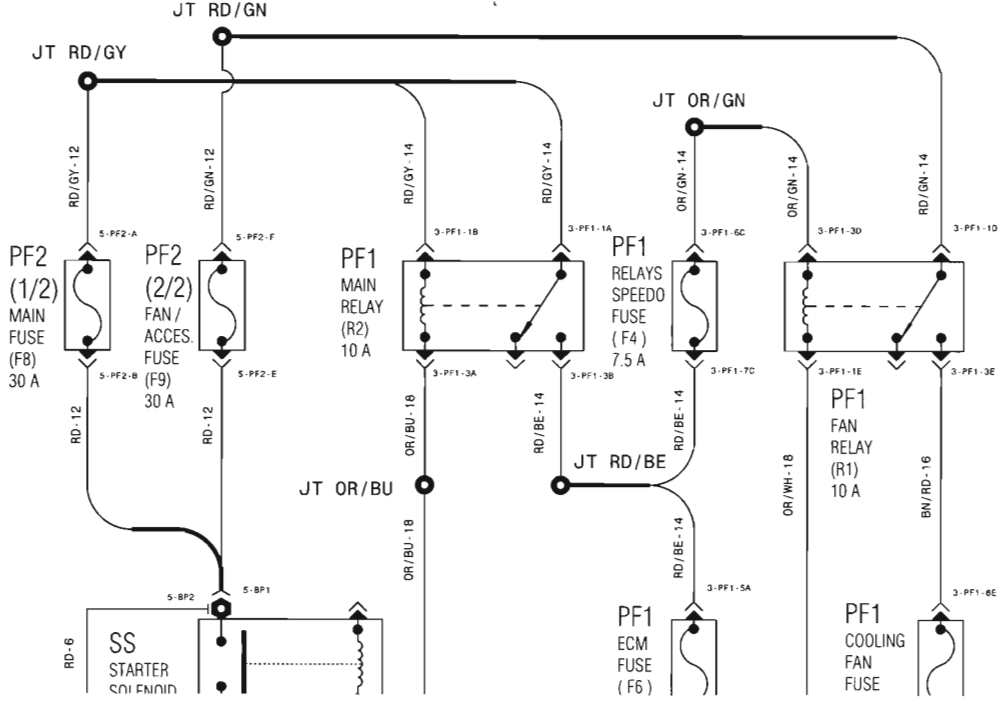

HI
LO
PG
LEFT
HEAD
LIGHT
35 W
PD
RIGHT
HEAD
LIGHT
35 W
BRAKE
LIGHT
SWITCH
4-FRA1
3-PG-1
3-PD-1
BK-18
BK-16
BK-6
BK-12
5-BN4
5-BN3
5-BN1
4-BN5
JT BK1
JT BK2
JT BK3
JT BK4
VMR2006-033-106_AEN
710000658F13
A
B
C
1
2
3
4
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10
11
12
13
14

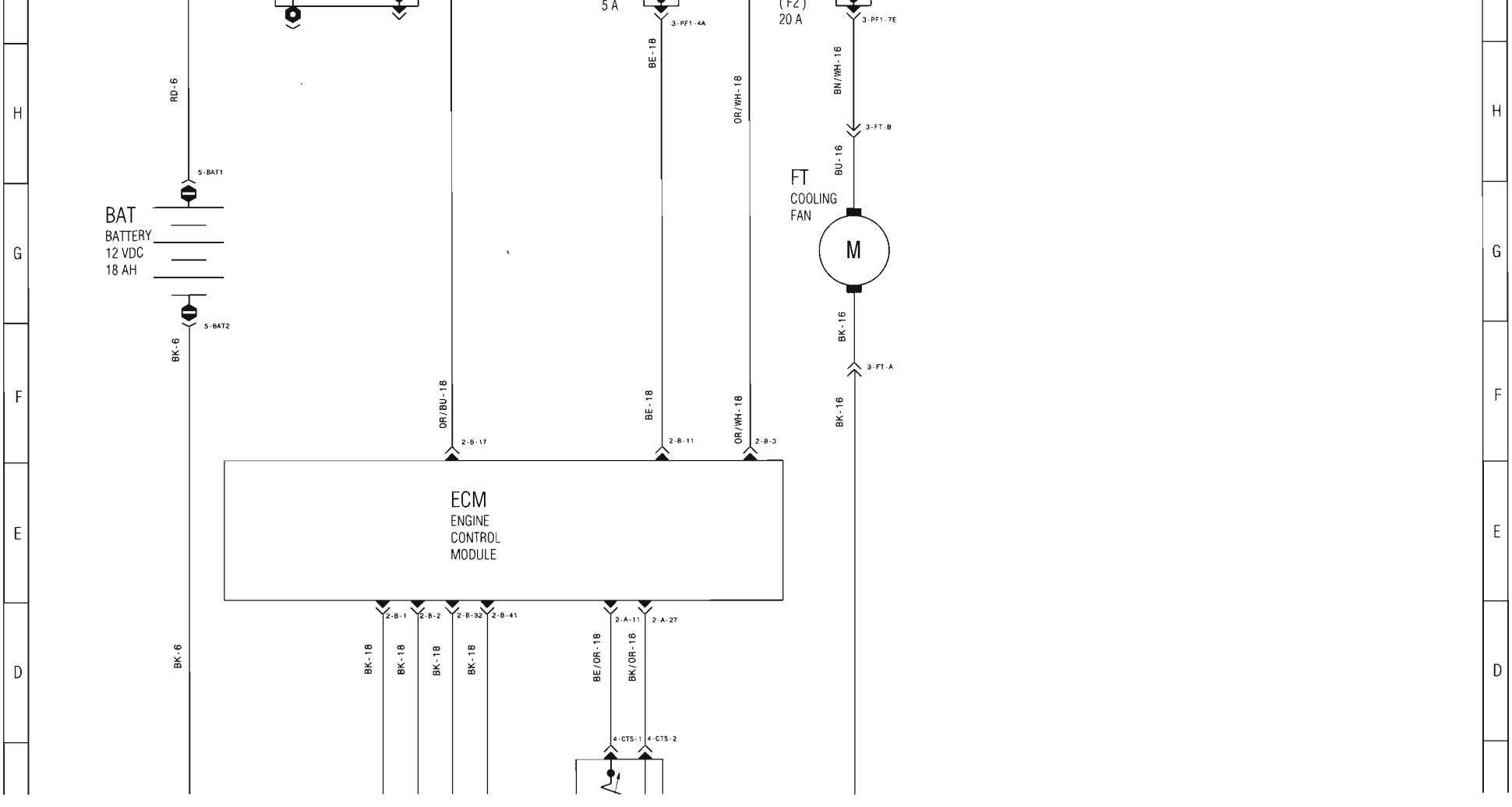
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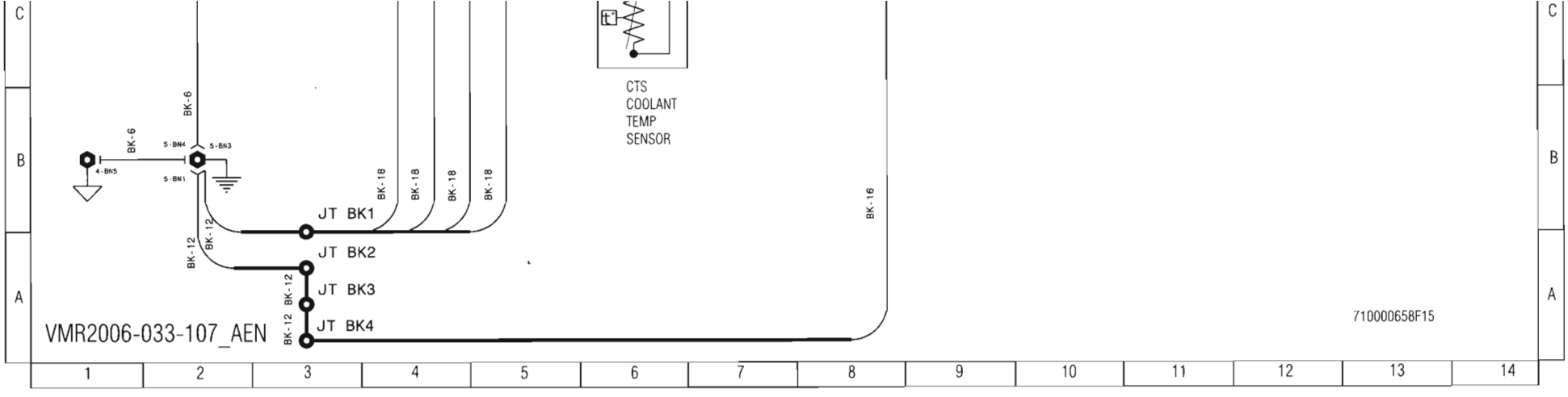
COOLING SYSTEM



ZONE #	ZONE DESCRIPTION
1	STEERING AREA
2	MODULE AREA
3	FRONT OF VEHICLE
4	ENGINE AREA
5	REAR OF VEHICLE




5 A
3-PF1-4A
BE-18
OR/WH-18
(F2)
20 A
3-PF1-7E
BN/WH-16
3-FT-B
BU-16
FT
COOLING
FAN
M
BK-16
3-FT-A
BK-16
RD-6
5-BAT1
BAT
BATTERY
12 VDC
18 AH
5-BAT2
BK-6
OR/BU-18
2-B-17
BE-18
2-B-11
OR/WH-18
2-B-3
ECM
ENGINE
CONTROL
MODULE
2-B-1
2-B-2
2-B-32
2-B-41
2-A-11
2-A-27
BK-18
BK-18
BK-18
BK-18
BE/OR-18
BK/OR-18
4-CTS-1
4-CTS-2
BK-6


C
B
A
BK-6
BK-6
5-BN4
5-BN3
4-BN5
5-BN1
BK-18
BK-18
BK-18
BK-18
BK-16
BK-12
BK-12
BK-12
BK-12
JT BK1
JT BK2
JT BK3
JT BK4
CTS
COOLANT
TEMP
SENSOR
VMR2006-033-107_AEN
710000658F15
1
2
3
4
5
6
7
8
9
10
11
12
13
14