

2006 -2015 Service Manual

DS 250



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SAFETY NOTICE

This manual has been prepared as a guide to correctly service and repair the 2006 DS 250™ 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

INTRODUCTION

GENERAL INFORMATION

This Shop Manual covers the following 2006 ATV models:

MODEL	MODEL NUMBER
DS 250 CE (European Community models)	3J6B
DS 250 (North America and International models)	3J6C

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

The information and component/system descriptions contained in this manual are correct at time of publication. 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, it may have 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.

VEHICLE SERIAL NUMBER LOCATION



1. V.I.N. (Vehicle Identification Number)
2. Model number

ENGINE SERIAL NUMBER LOCATION



E.I.N. (ENGINE IDENTIFICATION NUMBER)

ARRANGEMENT OF THE 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.

Illustrations and photos show the typical construction of the different assemblies and, in all cases, may not reproduce the full detail or exact shape of the parts shown, however, they represent parts that 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 inter-related, we suggest, that before undertaking any task, you read and thoroughly understand the entire section or subsection concerning the procedure.

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.

INTRODUCTION

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

TYPICAL PAGE

Section 03 ENGINE
Subsection 05 (CYLINDER AND HEAD)

CYLINDER AND HEAD
CYLINDER AND HEAD

Diagram illustrating the assembly of the cylinder and head components. The diagram shows an exploded view of the engine components, including the cylinder head (9), intake manifold (12), and engine oil (10). Torque specifications are provided for various fasteners: 10 N•m (89 lbf•in) for the head bolts (21), 33 N•m (24 lbf•ft) for the intake manifold bolts (22), 60 N•m (44 lbf•ft) for the head bolts (21), 10 N•m (89 lbf•in) for the head bolts (23), and 10 N•m (89 lbf•in) for the head bolts (27). A callout indicates the application of Loctite 243 to the head bolts (21). A drop symbol indicates the application of a liquid product to a surface. A bold face number (4) indicates a special procedure concerning this part.

V00A2NS

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Page heading indicates section and subsection detailed.

Subsection title indicates beginning of the subsection.

Exploded view assists you in identifying parts and related positions.

Bold face number indicates special procedure concerning this part.

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

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•ft instead of lbf•in. Use appropriate torque wrench.

Illustration number for publishing process.

Page number

TYPICAL PAGE

Title indicates main procedure to be carried-out.

Subtitle indicates main procedure to be carried-out.

Call-outs for above illustration.

Section 03 ENGINE Subsection 06 (MAGNETO SYSTEM)

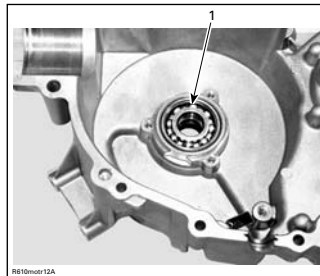
BEARING

Inspection

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

Removal

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



1. Ball bearing

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.

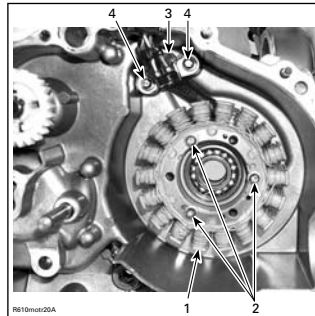
Reinstall other removed parts in the reverse order.

STATOR AND TRIGGER COIL

Removal

Remove.

- magneto housing cover no. 7
- screw no. 11 and 12
- stator with trigger coil no. 13.



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 IGNITION SYSTEM for the trigger coil.

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

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

INTRODUCTION

SELF-LOCKING FASTENERS PROCEDURE

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

Use a metal brush or a screw tap to clean the hole properly then use a solvent, let act during 30 minutes and wipe off. The solvent utilization is to ensure the adhesive works properly.

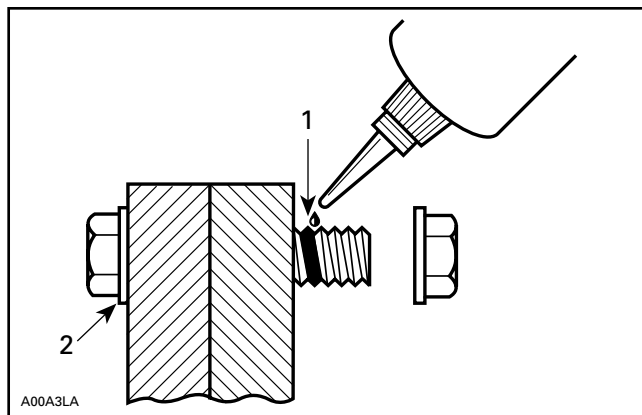
LOCTITE® APPLICATION PROCEDURE

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

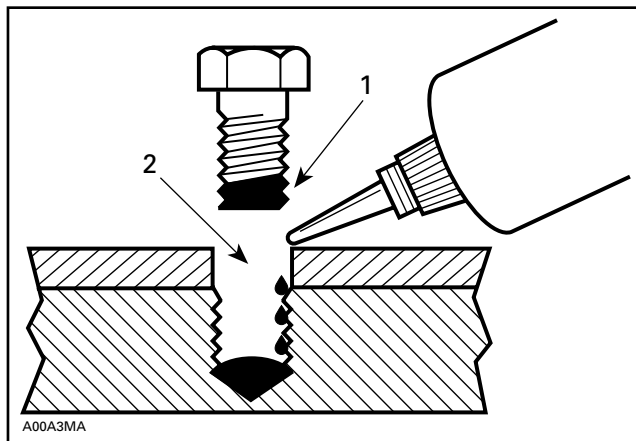
Uncovered Holes (bolts and nuts)



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.

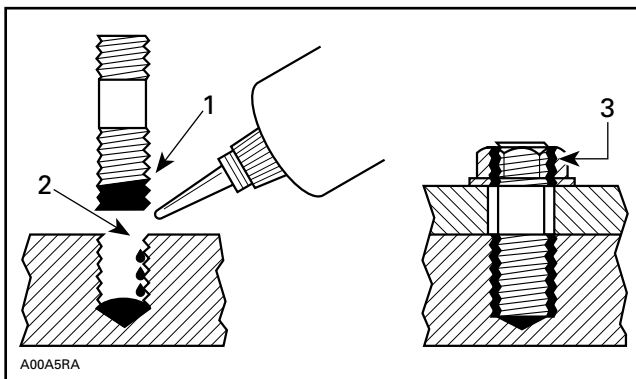
Blind Holes



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

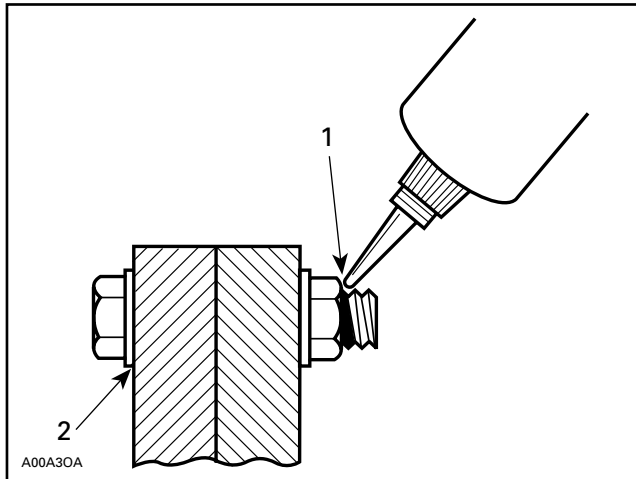


1. On threads
2. On threads and in the hole
3. Onto nut threads

- 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

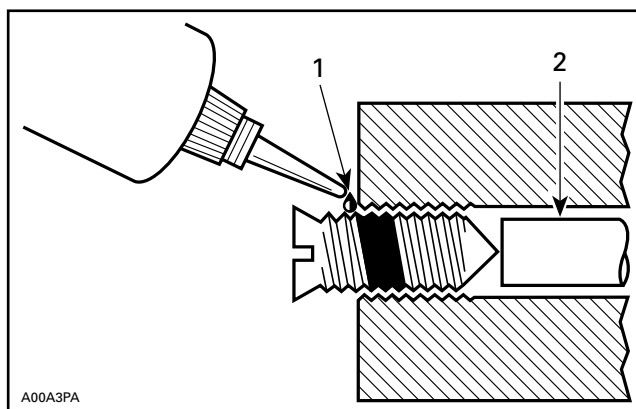


1. Apply here
2. Do not apply

- 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

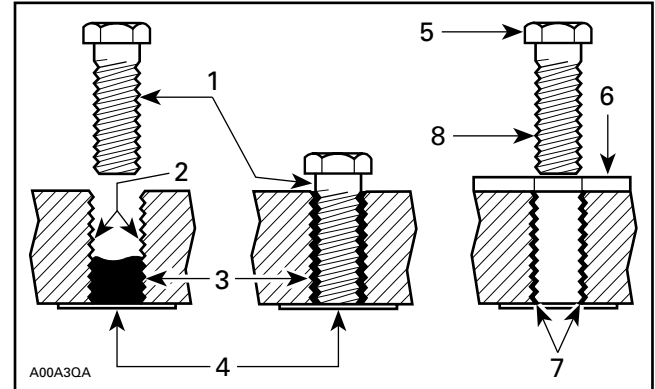


1. Apply here
2. Plunger

- 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.

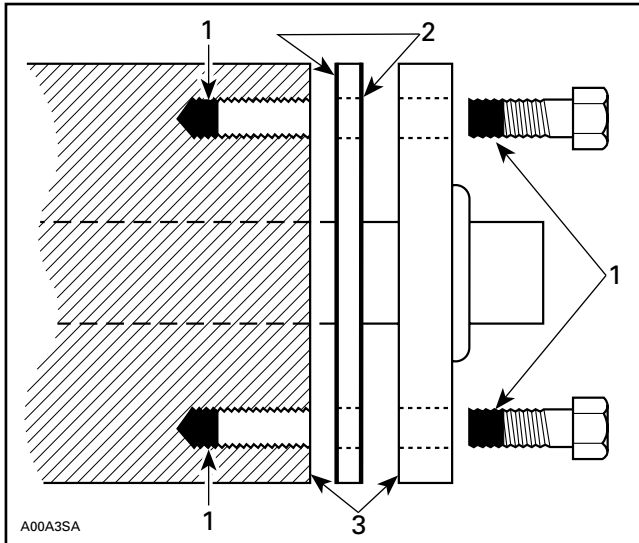
Option 2: Apply FORM-A-THREAD on the screw and insert in damaged hole.

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.

INTRODUCTION

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.

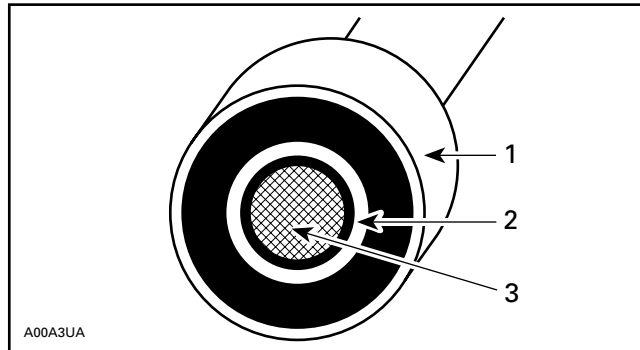
NOTE: If the cover is bolted to blind holes (above), apply proper strength Loctite in the hole and on threads. Tighten.

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.

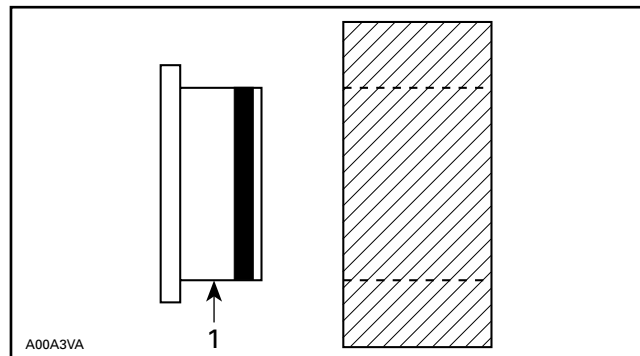
- DO NOT use antiseize Loctite or any similar product.
- No curing period is required.

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.

INTRODUCTION

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.

Property class and head markings	4.8  	8.8  9.8 	10.9 	12.9   
Property class and nut markings	5 	10 	10 	12 

A00A8BS

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.

Section 01 MAINTENANCE

Subsection 01 (MAINTENANCE CHART)

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.

A: ADJUST C: CLEAN I: INSPECT L: LUBRICATE R: REPLACE T: PROCEED WITH TASK		INITIAL INSPECTION 10 HOURS OR 30 DAYS OR 200 KM (125 mi) (The initial maintenance is very important and must not be neglected.)				
		EVERY 25 HOURS OR 500 KM (310 mi)				
		EVERY 50 HOURS OR 1000 KM (620 mi)				
		EVERY 100 HOURS OR 2000 KM (1250 mi) OR 1 YEAR				
		EVERY 200 HOURS OR 4000 KM (2485 mi) OR 2 YEAR				
PART/TASK	REFER TO					
ENGINE						
Engine oil	R		R			LUBRICATION
Engine oil strainer	C					
Gearbox oil	I				R	GEARBOX
Valve adjustment	T			T		CYLINDER HEAD
Condition of engine seals	I			I		ENGINE
Engine mount fasteners	I			I		ENGINE REMOVAL AND INSTALLATION
Engine air filter ⁽¹⁾		I, C		R		AIR INTAKE SYSTEM
Air injection valve filter ⁽¹⁾		I, C		R		
Exhaust system	I			I		EXHAUST SYSTEM
Spark arrester (except on CE models)				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 AND FUEL TANK
Carburetor	A			A		
Choke	I			I, A		
Fuel lines, connections and fuel tank pressure test	I			I		
Fuel filter	I			I	R	
ELECTRICAL SYSTEM						
Spark plug ⁽³⁾	I			R		IGNITION SYSTEM
Ignition timing	I		I			
Battery connections	I		I			CHARGING SYSTEM
Wiring harness, cables and lines	I			I		IGNITION SYSTEM and STARTING SYSTEM
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		

Section 01 MAINTENANCE

Subsection 01 (MAINTENANCE CHART)

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	EVERY 200 HOURS OR 4000 KM (2485 mi) OR 2 YEAR					
PART/TASK	REFER TO					
TRANSMISSION						
Drive belt				I		CONTINUOUSLY VARIABLE TRANSMISSION (CVT)
Drive and driven pulleys				I, C		
CVT air inlet/outlet ducts	I, C		I, C			
DRIVE TRAIN						
Drive chain adjustment and lubrication	(4)	(4)	(4)	(4)	(4)	STEERING AND FRONT SUSPENSION/ REAR SUSPENSION AND AXLE
Drive chain slider condition	(4)	(4)	(4)	(4)	(4)	
Drive chain sprockets	I			I		
Wheel bearings				I		
Wheel nuts/studs	I		I			
Tire wear and pressure	(4)	(4)	(4)	(4)	(4)	
Front and rear differentials oil level, seals and vents	I		I		R	
STEERING AND FRONT SUSPENSION						
Handlebar fastener	I			I		STEERING AND FRONT SUSPENSION
Steering system mechanism ⁽¹⁾	I			I		
Tie rod ends	I	I				
Ball joints		I				
Front wheel alignment	I			I		
A-arms			I			
Shock absorbers			I			
REAR SUSPENSION						
Swing arm				I		REAR SUSPENSION AND AXLE
Shock absorber			I			
BRAKES						
Brake fluid	I	I			R	BRAKING SYSTEM
Parking brake cable	A	A				
Brake system (discs, hoses, etc.)				I		
Brake pads ⁽¹⁾		I				

Section 01 MAINTENANCE

Subsection 01 (MAINTENANCE CHART)

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PART/TASK	REFER TO					
BODY/FRAME						
Frame fastener			I			BODY AND FRAME
Hitch/trailer ball condition (if installed)	(4)	(4)	(4)	(4)	(4)	
Seat fasteners	(4)	(4)	(4)	(4)	(4)	
Frame				I		
Engine and vehicle cleaning and protection	(4)	(4)	(4)	(4)	(4)	

(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) Every inspection.

N.A.: Not Applicable.

PRESEASON PREPARATION

SERVICE PRODUCTS

Description	Part Number	Page
pulley flange cleaner.....	413 711 809	5

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 2000 KM (1250 mi) OR 1 YEAR.

A: ADJUST C: CLEAN I: INSPECT L: LUBRICATE R: REPLACE T: PROCEED WITH TASK		INITIAL INSPECTION 10 HOURS OR 30 DAYS OR 200 KM (125 mi) (The initial maintenance is very important and must not be neglected.)			
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		EVERY 200 HOURS OR 4000 KM (2485 mi) OR 2 YEAR			
PART/TASK		REFER TO			
ENGINE					
Engine oil		R	R		LUBRICATION
Engine oil strainer		C			
Gearbox oil		I		R	GEARBOX

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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.
- Clean drive and driven pulleys with pulley flange cleaner (P/N 413 711 809) and install the drive belt.
- Start vehicle and allow it to run at idle speed until the engine reaches its operating temperature. Stop engine and change the spark plug.
- 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
BRP Cleaner	293 110 001	8
BRP Vinyl & Plastic Cleaner	413 711 200	8
fuel stabilizer.....	413 408 600	7
storage oil.....	413 711 600	7
storage oil.....	413 711 900	7
XP-S Lube	293 600 016	8

If the ATV is not used for an extended period of time, more than 4 months, be sure to thoroughly perform the following procedures for each involved system.

FUEL SYSTEM

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) against varnish deposits.

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

ENGINE

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 clean engine oil strainer. Refer to *LUBRICATION SYSTEM*.
- Remove air filter housing cover and air filter to spray storage oil (P/N 413 711 600) into carburetor.

NOTE: For USA, use storage oil (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 and spray storage oil into cylinder. Press start button, 1 or 2 seconds maximum, to lubricate cylinder.
- Reinstall the spark plug, air filter and air filter housing cover.
- Turn the fuel valve to OFF and drain carburetor.

ELECTRICAL SYSTEM

Battery

Remove battery from vehicle. Refer to *CHARGING SYSTEM* for battery removal and storage procedures.

COOLING SYSTEM

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*.

Section 01 MAINTENANCE

Subsection 03 (STORAGE PROCEDURES)

CVT TRANSMISSION

Remove drive belt from pulleys.

Inspect and clean pulleys then spray XP-S Lube (P/N 293 600 016) on pulley faces.

Do not reinstall drive belt. Close CVT cover.

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 BRP 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.

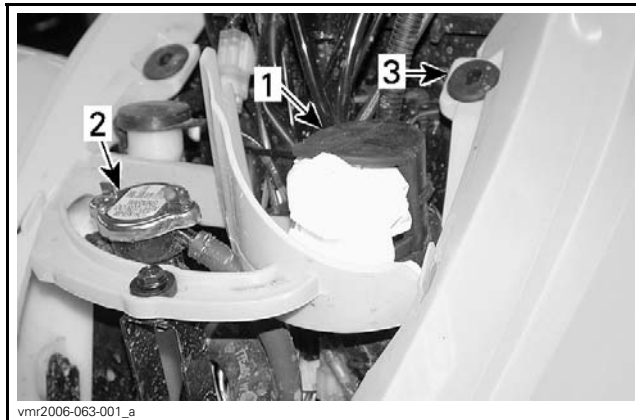
To clean the entire vehicle, including metallic parts use BRP Cleaner (P/N 293 110 001).

Inspect the vehicle and repair any damage. Touch up all metal spots where paint has been scratched off. Spray all metal parts with XP-S Lube (P/N 293 600 016).

Rags Installation

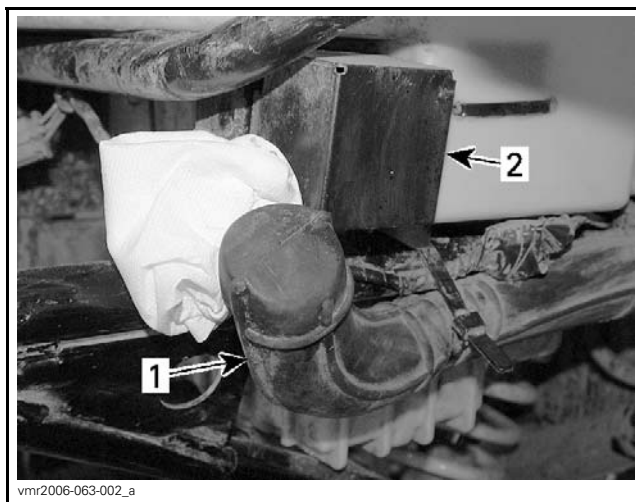
Using cleans rags, block the following locations: CVT inlet and outlet hoses, air filter box inlet and muffler. The rags will prevent the intrusion of small animals, leaves or other debris.

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



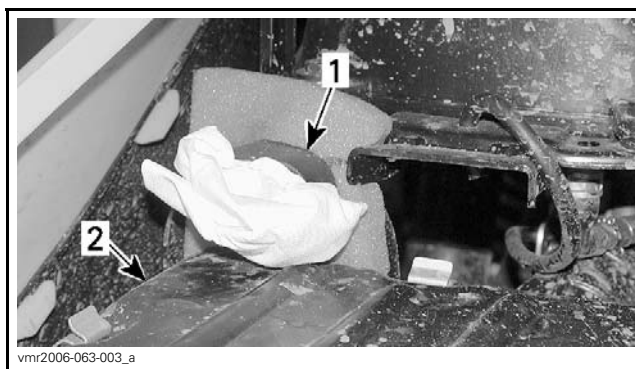
CVT AIR INLET HOSE — FRONT OF VEHICLE

1. CVT air inlet hose
2. Radiator cap
3. Front fender



CVT AIR OUTLET HOSE — RH REAR SIDE OF VEHICLE

1. CVT air outlet hose
2. Protective box for end of hose



AIR FILTER BOX INLET — UNDER SEAT

1. Air inlet
2. Air filter box cover



MUFFLER — LH REAR SIDE OF 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
XP-S Lube	293 600 016	11

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 *ENGINE* section.

Drain air filter 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 and lubricate carburetor. Refer to *CARBURETOR*.

Look for water in brake system. Replace brake fluid if necessary.

Lubricate all cables. Check if the cables operate properly.

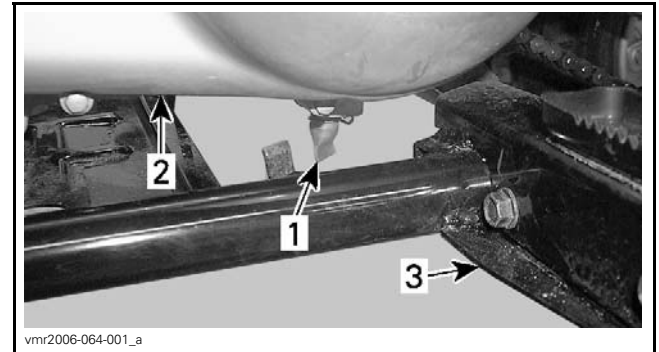
Spray all metal parts with XP-S Lube (P/N 293 600 016).

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



1. CVT cover drain tube
2. CVT cover
3. LH footrest

- Lubricate all cables. Check if the cables operate properly.
- Remove spark plug then crank engine slowly several times.
- Add a small quantity of engine oil in cylinder (approximately 2 teaspoonfuls). Do not reinstall spark plug 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.
- 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 clean oil strainer.

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

Spray all metal parts with XP-S Lube (P/N 293 600 016).

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

TRUBLESHOOTING CHART

The following charts are provided to help in diagnosing the probable source of troubles. It should be used as a guideline.

COOLING SYSTEM

Symptom: **HIGH ENGINE OPERATING TEMPERATURE.**

- 1. Check coolant level.**
 - *Check coolant level.*
- 2. Check radiator condition.**
 - *Radiating fins clogged. Clean radiating fins.*
 - *Radiator is perforated. Change radiator.*
- 3. Check radiator fan operation.**
 - *Fuse burnt. Replace*
 - *Thermo-switch defective. Replace*
 - *Fan defective (does not turn when engine gets hot). Replace fan.*
- 4. Check condition of hoses and hose clamps fixation.**
 - *Hoses are brittle and/or hard. Replace.*
 - *Hose clamps are loose. Retighten clamps.*
- 5. Check coolant bleeding screw on thermostat housing.**
 - *Screw looses and/or gasket ring is missing. Retighten screw and/or place gasket ring.*
- 6. Check thermostat (located on cylinder head).**
 - *Thermostat defective (does not open when engine gets hot). Replace thermostat.*
- 7. Check thermo-switch for electrical/mechanical failure.**
 - *Thermo-switch defective. Replace.*
- 8. Check leak indicator hole (under magneto cover) if coolant leaks.**
 - *Coolant leaking from leak indicator hole means a damaged oil seal and/or O-ring on water pump cover. Replace both oil seals and O-rings (refer to COOLING SYSTEM).*
- 9. Check condition of water pump impeller.**
 - *Impeller fins broken and/or impeller thread is damaged. Replace.*
- 10. Check cylinder head and/or cylinder base gasket.**
 - *Worn out gasket(s) is (are) causing water leakage. Replace.*

ELECTRICAL SYSTEM

Symptom: **ENGINE DOES NOT START — NO SPARK.**

- 1. Check spark plug electrode condition.**
 - *Gap is too large. Readjust gap (refer to TECHNICAL SPECIFICATIONS).*
- 2. Check ignition coil for damage and/or electrical failure.**
 - *Ignition coil damaged. Vibration problem. Electrically damaged part. Replace ignition coil.*
 - *Connector is corroded or ignition coil shows electrical failure. Clean connector area and/or replace ignition coil.*

Section 02 TROUBLESHOOTING

Subsection 01 (TROUBLESHOOTING CHART)

Symptom: **ENGINE DOES NOT START — NO SPARK.** (cont'd)

3. Verify condition of trigger coil.

- Mechanically damaged part. Vibration problem. Electrically damaged part. Replace trigger coil and/or tighten mounting screw(s).
- Metallic particles caused a short circuit between the soldered connections. Clean trigger coil from metallic dust.

4. Check wire harness for cracks or other damages.

- Harness shows electrical failure and/or other damages. Replace wire harness.

5. Check magneto flywheel for damage and/or electrical failure.

- Radial position of rotor wrong due to a broken woodruff key. Replace woodruff key.
- Connector on magneto is damaged and/or has electrical failure. Repair and clean contacts of connector.

6. Check ignition module.

- Fuse burnt. Replace.
- Module not grounded correctly. Repair ground connection.
- Grounded BLUE/YELLOW between ignition module and shift gear module. Replace defective parts.
- Module electrical failure or damaged component. Replace ignition module.
- Connectors are corroded. Clean and reconnect.
- Harness electrical failure and/or other damages. Replace wire harness.

7. Check shift gear module.

- Fuse burnt. Replace.
- Connectors are corroded. Clean and reconnect.
- Harness electrical failure and/or other damages. Replace wire harness.
- Grounded BLUE/YELLOW wire between ignition module and shift gear module. Replace defective parts.

LUBRICATION SYSTEM

Symptom: **LOW OR NO OIL PRESSURE/HIGH OIL CONSUMPTION.**

1. Check oil level and search for leakage on crankcase and/or defective sealing ports.

- Crankcase is leaking due to damage. Rebuild engine with new crankcase and gasket parts.
- Crankcase is leaking due to loose screws. Retighten screws with recommended torque.
- Sealing rings, O-rings and/or gaskets are brittle and/or hard or damaged. Replace damaged parts.
- Piston rings worn out (blue colored engine exhaust gas). Replace piston rings (refer to PISTON AND CYLINDER).
- Piston rings are broken (low compression and blue colored engine exhaust gas). Replace piston rings (refer to PISTON AND CYLINDER).
- Valve stem seal damaged and/or sealing lip is hard and/or brittle. Replace all valve stem seals.

2. Check oil strainer screw on engine bottom.

- Screw is loose and/or gasket is damaged, brittle or hard. Retighten screw and/or replace gasket.

3. Check oil pressure relief valve function.

- Valve spring damaged (valve always open). Replace spring.
- 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.

- Plug is loosed and/or gasket ring is missing. Retighten the plug and/or place gasket ring.

Symptom: **LOW OR NO OIL PRESSURE/HIGH OIL CONSUMPTION.** (cont'd)

5. Check leak indicator hole if oil leaks (under magneto cover).

- Oil leaking from leak indicator hole means a damaged oil seal and/or O-ring on water pump cover. Replace both oil seals and O-rings (refer to COOLING SYSTEM).

6. Check oil orifice(s) on the oil pump suction side.

- Oil orifice(s) is (are) clogged. Clean from contamination. Replace oil and oil filter if necessary (refer to LUBRICATION SYSTEM).

7. Check oil pump function.

- Oil pump rotor is out of wear limit. Replace oil pump shaft (refer to LUBRICATION SYSTEM).
- Oil pump seized due to oil leakage and/or air inclusion. Replace oil pump (refer to LUBRICATION SYSTEM).
- Chain driving oil pump is broken or otherwise damaged. Replace chain and sprockets.
- Incorrect oil being used. Use a high quality oil (refer to TECHNICAL SPECIFICATIONS).

Symptom: **OIL CONTAMINATION (WHITE APPEARANCE).**

1. Check leak indicator hole (under magneto cover) if coolant and oil leaks.

- Leakage of oil/coolant mixture from leak indicator hole means damaged oil seals and/or O-rings on water pump cover. Replace sealing rings, O-rings and refill with recommended oil and/or coolant (refer to COOLING SYSTEM).

2. Check cylinder head and/or cylinder base gasket.

- Gasket damaged or leaking. Retighten cylinder head with recommended torque and/or replace gasket.

3. Check screws for torque.

- Screws not fixed. Retighten screws with recommended torque and/or replace oil.

4. Check oil for particles (may indicate possible damages inside the engine).

- Oil contamination due to metal or plastic particles. Replace possibly damaged parts. Use a high quality oil (refer to TECHNICAL SPECIFICATIONS).

CYLINDER HEAD

Symptom: **UNUSUAL ENGINE NOISE AND/OR VIBRATION AT IDLE SPEED.**

1. Check oil pressure relief valve function.

- Valve opens due to contamination and/or spring damaged (valve remains open). Clean and/or replace spring and/or mechanism.
- Faulty chain tensioner. Replace spring and/or mechanism.

Symptom: **UNUSUAL ENGINE NOISE AND/OR VIBRATION ABOVE IDLE SPEED.**

1. Check items 1 of UNUSUAL ENGINE NOISE AND/OR VIBRATION AT IDLE SPEED.

2. Check noise coming from cylinder head area.

- Check valve timing. Readjust valve timing and/or replace defective part(s).
- Chain guide worn out. Replace chain guide.
- Stretched chain and/or worn out sprocket. Replace chain and sprocket at the same time.
- Sprocket screw got loose. Retighten screw with recommended torque.
- Rocker arm(s) is (are) worn out (valve adjustment). Readjust valve clearance and/or replace rocker arm(s).

Section 02 TROUBLESHOOTING

Subsection 01 (TROUBLESHOOTING CHART)

CRANKSHAFT

Symptom: **UNUSUAL ENGINE NOISE AND/OR VIBRATIONS.**

- 1. Check crankshaft deflection.**
 - *The crankshaft deflection is out of specification. Replace.*
- 2. Check crankshaft bearings.**
 - *Ball bearings do not turn smoothly and freely. Replace bearings.*
- 3. Check connecting rod bearing.**
 - *Broken or wear needle bearings. Replace crankshaft.*
- 4. Check balancing shaft bearings and balancing shaft phasing with crankshaft.**
 - *Defective balancing shaft bearings. Replace.*
 - *Balancing shaft is not in phase with crankshaft. Install balancing shaft correctly.*
- 5. Check starting clutch.**
 - *Defective starting clutch. Replace.*

GEARBOX

Symptom: **UNUSUAL ENGINE NOISE AND/OR VIBRATIONS.**

- 1. Check oil level in gearbox.**
 - *Oil leakage through plug cover area. Replace O-ring and retighten screw with recommended torque.*
 - *Oil leakage in gearbox cover gasket area. Replace gasket and do the torque procedure (refer to GEARBOX).*
- 2. Check bearings in the gearbox for free movement.**
 - *Bearing(s) do(es) not move freely. Replace bearing(s).*
- 3. Check for whistling noise inside gearbox.**
 - *Countershaft and intermediate shaft are noisy. Replace countershaft and intermediate shaft the same time.*
- 4. Check for gear noise.**
 - *Teeth of gears are damaged and/or worn. Replace respective gears.*

Symptom: **FAILURE OF INDICATOR LAMPS (TRANSMISSION LEVER POSITION).**

- 1. Check contact switches (gearbox) for damage and/or wear.**
 - *Shifting indicator switch(es) pin(s) is (are) worn and/or otherwise damaged. Replace shifting indicator switch(es).*
 - *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.*
 - *Wire harness has broken cables or used sheath wires. Replace wire harness.*
- 2. Check connector condition.**
 - *Connector contact(s) is (are) corroded and/or otherwise damaged. Clean connector(s) and/or replace wire harness if damaged.*
 - *Electrical system failed and/or otherwise damaged. Repair and/or replace damaged part(s).*
- 3. Check index spring placed underneath gearbox cover.**
 - *Indexation fails due to broken and/or damaged index spring. Clean gearbox from metal particles, replace index spring and/or damaged part(s).*

Symptom: **TRANSMISSION LEVER HARD TO SHIFT.**

1. Check shift forks for wear and/or damages.

- Shift fork(s) is (are) worn out and/or engagement pins are damaged. Replace shift fork(s).
- Shift fork(s) is (are) worn out and/or fork(s) is (are) damaged. Replace shift fork(s).
- Shift gear(s) is (are) worn out. Replace shift gear(s).

2. Check engine idle speed.

- Idle speed is too high (CVT starts to work). Adjust idle speed.
- Choke is in use and increases the engine RPM. Release choke.
- Choke lever is locked in down position on carburetor and/or choke cable is kinked. Replace choke cable.

CVT

Symptom: **THE ATV ACCELERATES SLOWLY, ESPECIALLY WHEN IT IS STOPPED.**

1. Check drive belt condition.

- Belt is too narrow (drive belt engagement is higher in drive pulley). Replace belt if width is less than specified (refer to CONTINUOUSLY VARIABLE TRANSMISSION or TECHNICAL SPECIFICATIONS).

2. Check centrifugal clutch on driven pulley.

- Liners of centrifugal clutch are out of specification (refer to CONTINUOUSLY VARIABLE TRANSMISSION). Replace centrifugal clutch assembly.

3. Check roller on drive pulley inner sheave.

- Rollers are worn and/or wrong installed and/or otherwise damaged (refer to CONTINUOUSLY VARIABLE TRANSMISSION). Replace all rollers at the same time (roller kit).

4. Check function of sprag clutch on driven pulley.

- Sprag clutch is clogged and/or worn out (refer to CONTINUOUSLY VARIABLE TRANSMISSION). Replace sprag clutch together with ball bearing and oil seal (refer to CONTINUOUSLY VARIABLE TRANSMISSION).

Symptom: **ENGINE MAXIMUM RPM IS TOO HIGH AND TOP SPEED IS NOT REACHED.**

1. Check items 1 to 3 of THE ATV ACCELERATES SLOWLY, ESPECIALLY WHEN IT IS STOPPED.

2. Check driven pulley spring tension.

- Spring tension is too stiff. Replace spring (recommended BRP spring).

Symptom: **PULLEY NOISE AT IDLE SPEED.**

1. Check slide pieces (drive pulley).

- Worn slide pieces (increased clearance to drive pulley inner sheave). Replace all slide pieces at the same time (slide piece kit).

2. Check driven pulley sliding mechanism (between driven pulley outer and inner sheave).

- Mechanism is stuck and/or damaged. Replace driven pulley assembly.

3. Check rollers for wear (located on inner sheave of drive pulley).

- Roller(s) worn out. Replace all rollers at the same time (roller kit).

4. Check drive pulley nut for torque.

- Loose nut. Retighten nut with recommended torque.

5. Check driven pulley bearing(s) for free movement.

- Bearing(s) do(es) not move freely. Replace bearing(s) and oil seal inside driven pulley at the same time.

Section 02 TROUBLESHOOTING

Subsection 01 (TROUBLESHOOTING CHART)

Symptom: **PULLEY NOISE WHEN ACCELERATING/DECELERATING.**

1. Check items 1 to 5 of **PULLEY NOISE AT IDLE SPEED.**
2. Check if belt runs in dry conditions.
 - 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 driven pulley nut/bearing in CVT cover for free movement.
 - Bearing does not move freely. Replace bearing.
 - Bearing seat on driven pulley nut is worn and/or otherwise damaged. Replace driven pulley nut.

Symptom: **VIBRATIONS ORIGINATING FROM DRIVE PULLEY.**

1. Check tightening torque of drive pulley nut.
 - Moving outer sheave. Retighten nut.
2. Check inner sheave bushings.
 - Excessive gap between bushings and inner sheave shaft, thus restraining sliding sheave movements. Replace inner sheave assembly.

Symptom: **VIBRATIONS ORIGINATING FROM DRIVEN PULLEY.**

1. Check centrifugal clutch on driven pulley.
 - Centrifugal clutch out of round after replacement. Reinstall centrifugal clutch turned by 180°.

Symptom: **PULLEYS DO NOT DOWN SHIFT PROPERLY.**

1. Refer to **VIBRATIONS COMING FROM DRIVEN PULLEY** and check items listed.
2. Check drive pulley bushings (cleanliness, wear, etc.).
 - Bushings stick to fixed sheave pulley shaft. Clean or replace.
3. Check driven pulley spring tension.
 - Spring tension is too weak. Replace.

Symptom: **BELT GLAZED EXCESSIVELY OR HAVING BAKED APPEARANCE.**

1. Check if drive pulley air intake is clogged.
 - Drive pulley area heats up due to contamination. Clean air intake from contamination.
2. Check if pulley sheaves are clean.
 - Oil on pulley surfaces. Clean pulley sheaves and replace belt.

Symptom: **BELT WORN EXCESSIVELY IN TOP WIDTH.**

1. Check drive pulley.
 - Excessive slippage due to irregular outward actuation movement of drive pulley. Carry out drive pulley inspection.
2. Check drive belt identification number.
 - Improper belt angle (wrong type of belt). Replace belt with an appropriate drive belt.
3. Check drive belt width.
 - Considerable wear. Replace belt if less than specified (refer to CONTINUOUSLY VARIABLE TRANSMISSION or TECHNICAL SPECIFICATIONS).

Symptom: **BELT SIDES WORN CONCAVE.**

1. Check pulley sheave surfaces.
 - Rough or scratched pulley sheave surfaces. Repair or replace.

Symptom: **BELT SIDES WORN CONCAVE.** (cont'd)

2. Check drive belt identification number.

- *Unspecified type of belt. Replace belt with an appropriate drive belt (refer to TECHNICAL SPECIFICATIONS).*

Symptom: **BELT DISINTEGRATION.**

1. Check drive belt identification number.

- *Excessive belt speed. Using unspecified type of belt. Replace belt with proper type of belt (refer to TECHNICAL SPECIFICATIONS).*

2. Check if pulley sheaves are clean.

- *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.*

Symptom: **FLEX CRACKS BETWEEN COGS.**

1. Check drive belt condition.

- *Considerable use, belt wearing out. Replace.*

ENGINE GENERAL

Symptom: **ENGINE BACKFIRES.**

1. Check spark plug and/or electrical system.

- *Carbon accumulation caused by defective spark plug. Clean carbon accumulation and replace spark plug.*
- *Electrical system failure. Replace defective part(s).*

2. Check leakage on intake manifold.

- *Air leak on intake system. Retighten screws and/or replace intake manifold.*

3. Check exhaust air leaking.

- *Exhaust gasket is leaking. Retighten screws and/or replace exhaust gasket.*

4. Check intake valve(s) for leaking.

- *Intake valve(s) is (are) leaking. Repair or replace valve(s).*

5. Check if fuel supply is to less at high RPM.

- *Fuel line is contaminated and/or bent (engine gets lean). Clean and/or replace defective part(s).*

Symptom: **ENGINE SUDDENLY TURNS OFF.**

1. Check condition of spark plug (blue spark ideal).

- *Red, jumping spark means a damaged spark plug. Replace spark plug with appropriate heat range (refer to TECHNICAL SPECIFICATIONS).*

2. Check fuel supply to carburetor.

- *Run out of fuel. Refill.*
- *Defective fuel valve. Replace fuel valve.*
- *Poor quality and/or wrong fuel. Clean from contamination and use appropriate fuel (refer to TECHNICAL SPECIFICATIONS).*
- *Carburetor contaminated. Clean jets and carburetor float chamber from contamination.*
- *Fuel line clogged and/or bent. Clean fuel supply from contamination and/or replace defective part(s).*
- *Fuel supply to less at high RPM. Clean fuel supply from contamination.*

Section 02 TROUBLESHOOTING

Subsection 01 (TROUBLESHOOTING CHART)

Symptom: **ENGINE SUDDENLY TURNS OFF.** (cont'd)

3. Perform engine leak test. Check for possible piston seizure.

- Damaged head gasket and/or seal and/or leaking inlet/exhaust valve(s). Replace and/or repair defective parts.

4. Piston seizure.

- Spark plug heat range is too low. Install spark plug with appropriate heat range (refer to TECHNICAL SPECIFICATIONS).

- Compression ratio is too high. Install genuine parts.

- Poor oil quality. Use a high quality oil.

- Leaks at air intake manifold (engine gets too lean). Retighten screws or replace air intake manifold.

5. Melted and/or perforated piston dome; melted section at ring end gap.

- Spark plug heat range is too low. Install recommended spark plug (refer to TECHNICAL SPECIFICATIONS).

- Coolant less than recommended level (engine gets too hot). Repair cooling circuit and/or refill with recommended liquid.

6. Cracked or broken piston.

- Cracked or broken piston due to excessive piston/cylinder clearance or engine over revving. Replace piston. Check piston/cylinder clearance (refer to PISTON AND CYLINDER).

7. Check piston rings and cylinder surface for grooves.

- Poor oil quality. Use a high quality oil.

- Contamination (like sand) through engine intake. Replace defective part(s) and use new air filter.

8. Check connecting rod, crankshaft, rocker arm rollers movement.

- Connecting rod failure due to leak of oil. Repair and replace defective parts and use a high quality oil.

- Crankshaft failure due to leak of oil. Repair and replace defective parts and use a high quality oil.

- Oil contamination due to clogged oil filter. Replace oil filter and oil at the same time, replace defective part(s) (refer to LUBRICATION SYSTEM).

9. Check valve springs exhaust/inlet.

- Broken valve spring damages the cylinder head, valve(s), rocker arm(s) and/or piston. Replace defective part(s) and do the valve adjustment.

Symptom: **ENGINE DOES NOT OFFER MAXIMUM POWER AND/OR DOES NOT REACH MAXIMUM OPERATING RPM.**

1. Check items 1 and 2 of engine suddenly turns off.

2. Check air intake system.

- Air filter is clogged due to contamination. Replace air filter.

3. Check spark arrester.

- Spark arrester is clogged. Clean or replace spark arrester.

4. Check spark plug condition and/or gap.

- Fouled spark plug or wrong spark plug gap. Readjust gap and clean spark plug or replace.

5. Check spark plug type.

- Improper spark plug heat range. Install recommended spark plug (refer to TECHNICAL SPECIFICATIONS).

6. Perform engine leak test. Check for possible piston seizure.

- Damaged head gasket and/or seal and/or leaking inlet/exhaust valve(s). Replace and/or repair defective parts.

Symptom: **ENGINE DOES NOT OFFER MAXIMUM POWER AND/OR DOES NOT REACH MAXIMUM OPERATING RPM.** (cont'd)

- 7. Check for water in fuel (wrong fuel).**
 - *There is water in fuel or wrong fuel. Drain fuel system, search for leakage and refill it with appropriate fuel.*
- 8. Check drive belt.**
 - *Worn belt. Replace belt if width is less than specified (refer to CONTINUOUSLY VARIABLE TRANSMISSION).*
- 9. Check engine compression.**
 - *Worn piston and/or piston ring(s). Replace (refer to PISTON AND CYLINDER).*

Symptom: **ENGINE TURNS OVER BUT FAILS TO START.**

- 1. Check items of engine does not start — no spark.**
- 2. Check fuel supply.**
 - *Ensure fuel valve is on.*
- 3. Check for fuel on spark plug.**
 - *Flooded engine (spark plug wet when removed). Do not over choke. 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.**
 - *Insufficient engine compression. Replace defective part(s) (e.g.: piston, ring(s), etc.).*
 - *Valve seat worn and/or otherwise damaged. Repair by performing valve guide procedure (refer to CYLINDER HEAD). Readjust valve clearance.*

Symptom: **MELTED AIR INJECTION VALVE HOSE.**

- 1. Check reed valve.**
 - *Faulty reed valve of air injection system. Repair or replace.*

Symptom: **HIGH ENGINE OPERATING TEMPERATURE.**

- 1. Check if cooling system shows any failure (see COOLING SYSTEM).**
 - *System is leaking. Repair and/or replace damaged part(s).*
- 2. Check condition and heat range of spark plug.**
 - *Melted spark plug tip or inadequate heat range. Install recommended spark plug (refer to TECHNICAL SPECIFICATIONS).*
- 3. Check air inlet and outlet of the CVT cover.**
 - *Air circulation is clogged (overheating). Clean air circulation from contamination.*
 - *Drive belt worn and/or otherwise damaged. Replace belt with an appropriate drive belt (refer to CONTINUOUSLY VARIABLE TRANSMISSION).*

STARTING SYSTEM

Symptom: **STARTER DOES NOT TURN.**

- 1. Proper combination of switches, brake and gearbox is not met.**
 - *Refer to STARTING SYSTEM for engine starting requirements.*
- 2. Burnt fuse.**
 - *Check main fuse, 15 A fuse (ignition and shift gear control modules supply) and wiring condition.*

Section 02 TROUBLESHOOTING

Subsection 01 (TROUBLESHOOTING CHART)

Symptom: **STARTER DOES NOT TURN.** (cont'd)

3. **Poor contact of battery terminal(s) or ground cable connections.**
 - *Clean and tighten terminal(s).*
4. **Weak battery.**
 - *Recharge battery.*
5. **Poor contact or open circuit of: start button, engine stop switch, ignition switch or starting solenoid.**
 - *Check and replace defective part.*
6. **Brake or Neutral switch is defective.**
 - *Check brake and/or neutral switch and wiring condition.*
7. **Faulty shift gear control module.**
 - *Check module/wiring and replace defective part.*
8. **Engine mechanical problem (ensure that other electric components are good).**
 - *Check engine.*

Symptom: **STARTER TURNS, BUT DOES NOT CRANK THE ENGINE.**

1. **Weak battery.**
 - *Recharge or replace battery.*
2. **Poor contact of battery terminal(s).**
 - *Clean and tighten terminal(s).*
3. **Poor battery ground cable connection.**
 - *Clean and tighten.*
4. **Burnt or poor contact of solenoid switch contact disc.**
 - *Replace starting solenoid.*
5. **Broken or worn starter reduction gear.**
 - *Check and replace gear if defective.*
6. **Worn or damaged starting clutch.**
 - *Check and replace clutch if defective.*
7. **Defective electric starter.**
 - *Check and replace electric starter if defective.*

Symptom: **STARTER MOTOR KEEPS TURNING.**

1. **Shorted starting solenoid switch winding.**
 - *Replace starter solenoid.*
2. **Melted solenoid contacts.**
 - *Replace starter solenoid.*
3. **Start button stuck.**
 - *Fix or remove mud/ice/dirt or replace it.*

ENGINE REMOVAL AND INSTALLATION

SERVICE TOOLS

Description	Part Number	Page
engine removal hook	529 035 829	26

GENERAL

WARNING

Before performing any service or inspection operation on the vehicle, wait until the engine and exhaust have cooled down to avoid potential burns.

WARNING

Always disconnect battery or starter cables exactly in the specified order, BLACK (-) cable first.

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

WARNING

Torque wrench tightening specifications must strictly be adhered to. Locking devices (ex.: 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.

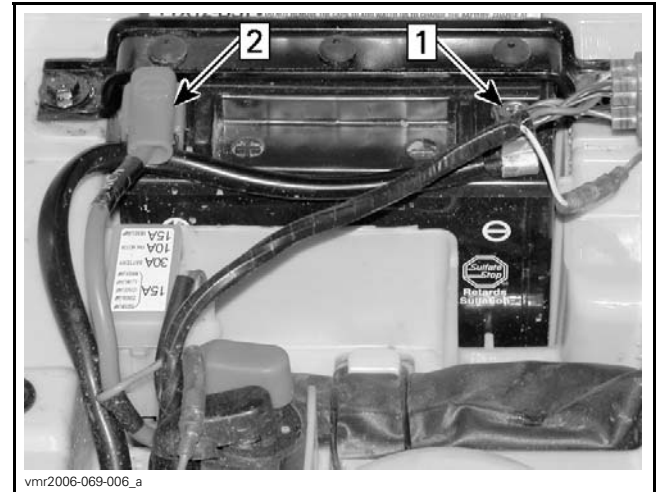
REMOVAL

Turn fuel valve to OFF.

Drain engine oil. Refer to *LUBRICATION SYSTEM*.

Remove seat.

Disconnect battery posts.



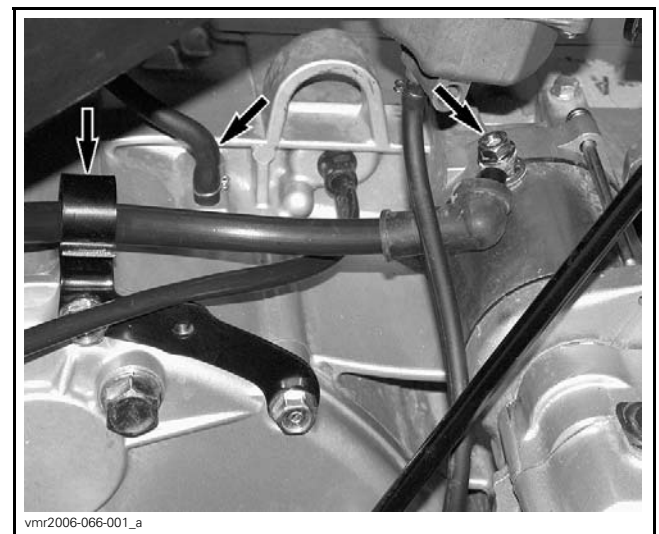
Step 1: Negative first
Step 2: Positive last

Remove front fender. Refer to *BODY*.

From RH Side of Vehicle:

Disconnect starter cable and unclip cable.

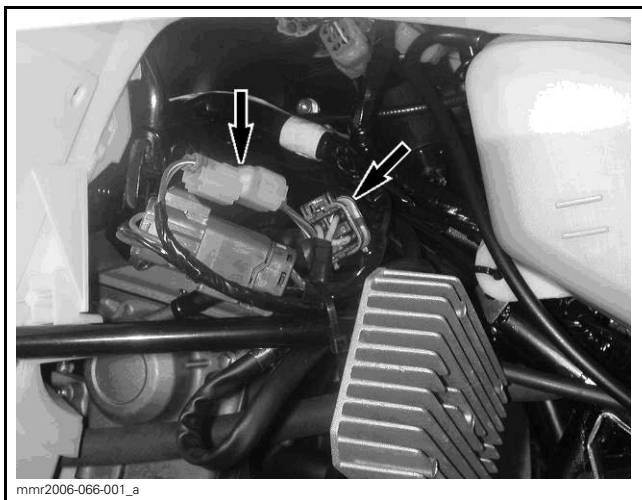
Disconnect gearbox vent hose.



Disconnect magneto connectors.

Section 03 ENGINE

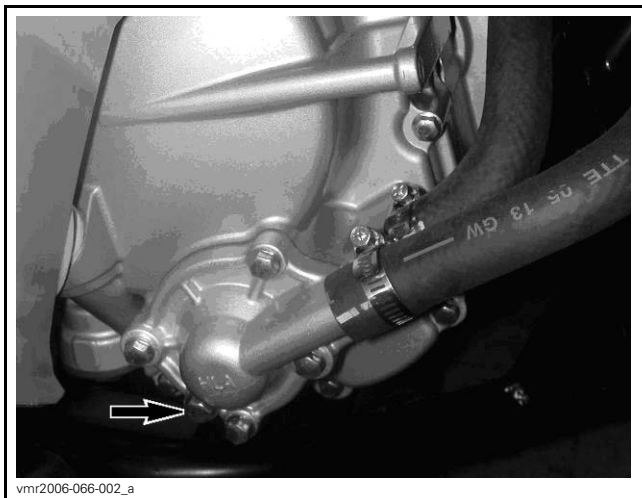
Subsection 01 (ENGINE REMOVAL AND INSTALLATION)



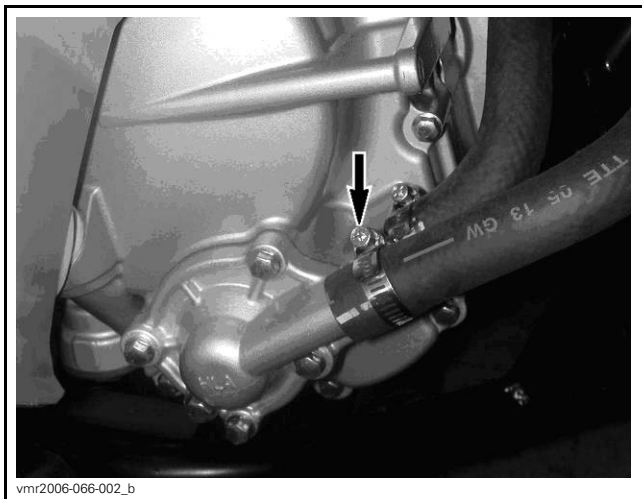
Remove radiator cap.

Drain engine coolant. Drain plug is located on water pump cover.

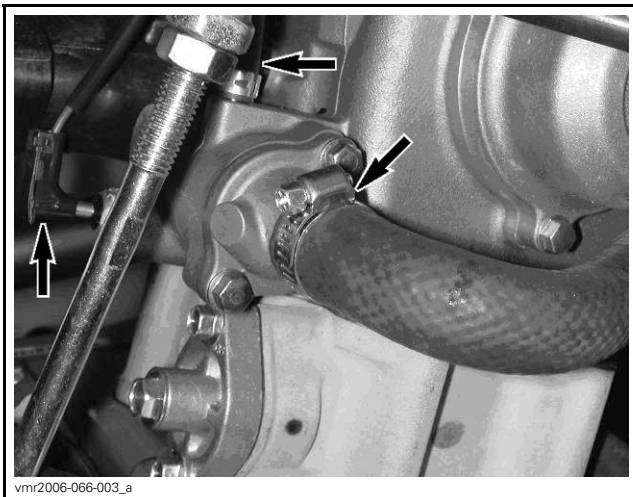
NOTE: Use a container to recover coolant. Dispose coolant as per environmental laws.



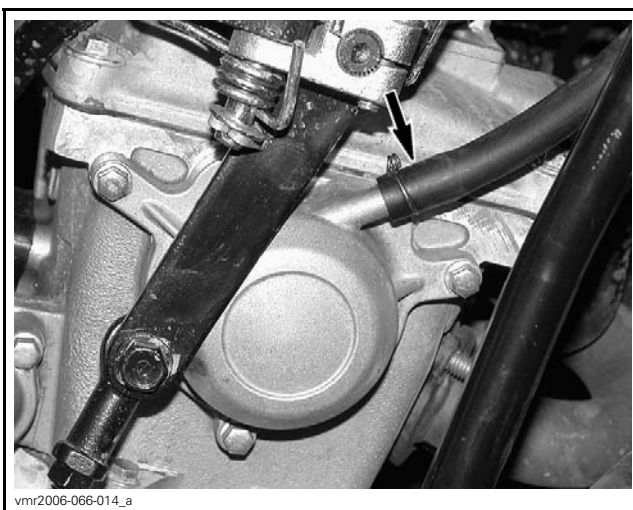
Disconnect coolant inlet hose.



Disconnect engine temperature sensor, bypass hose and coolant outlet hose.

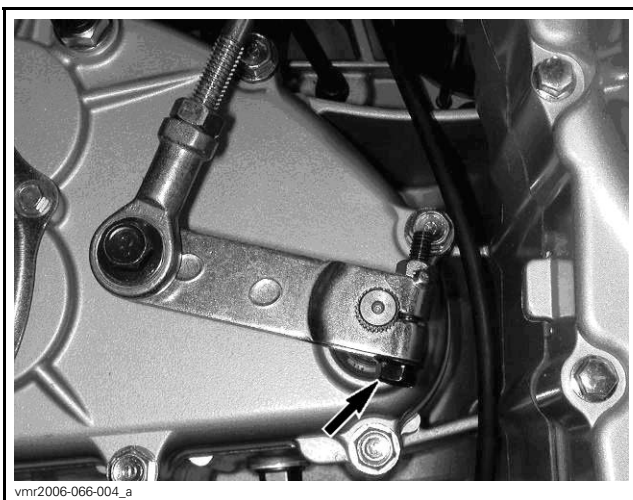


Disconnect engine vent tube.



Remove engine sprocket. Refer to *REAR SUSPENSION AND AXLE*.

Remove shift lever bolt then pull out lever.



Section 03 ENGINE

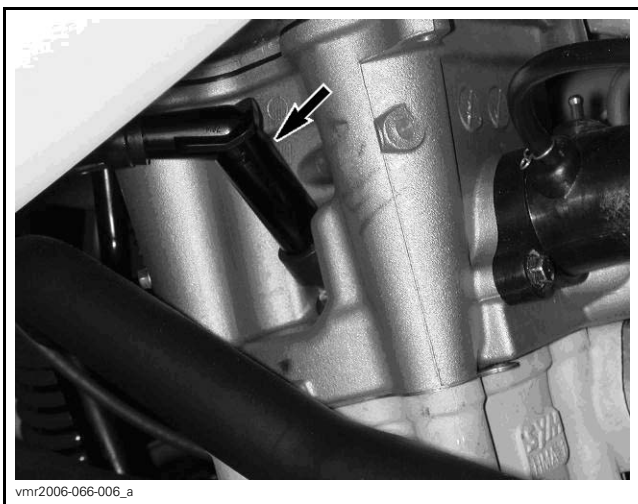
Subsection 01 (ENGINE REMOVAL AND INSTALLATION)

Disconnect gearbox switch connectors.



From LH Side of Vehicle:

Remove spark plug cap.

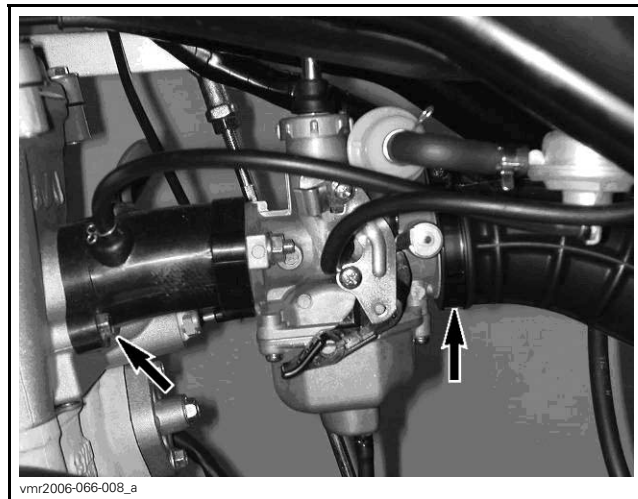


Remove muffler and exhaust pipe. Refer to *EX-HAUST SYSTEM*.

Disconnect vacuum tube and air supply hose from air injection valve.

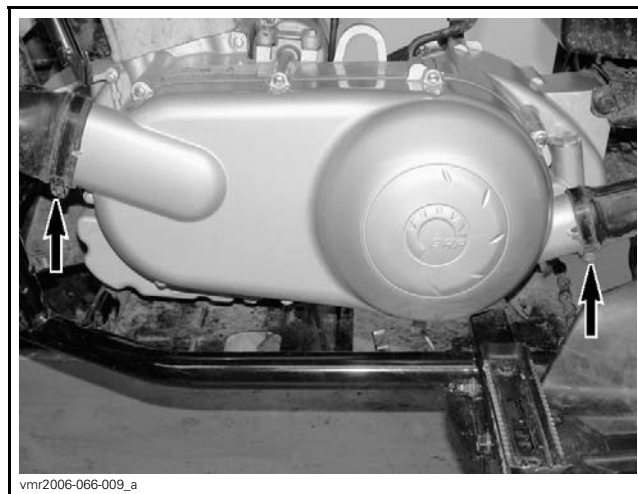


Remove carburetor from intake manifold and from air intake hose.



Temporarily attach carburetor to body for engine removal.

Disconnect inlet and outlet air hoses from CVT cover.



Remove speedometer cable from crankcase (if so equipped).

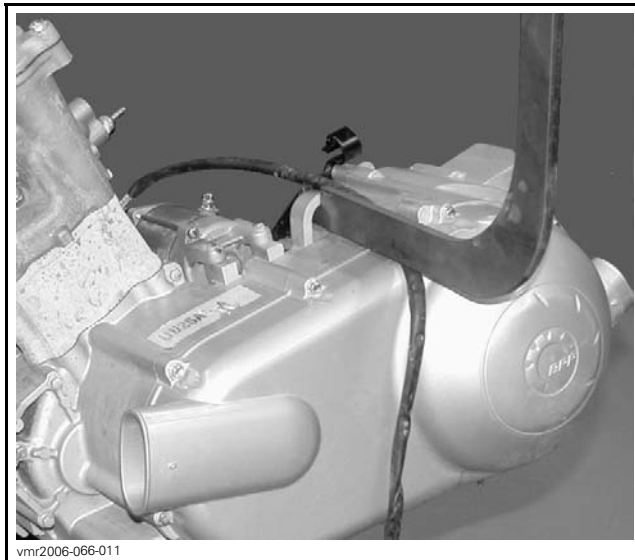
Section 03 ENGINE

Subsection 01 (ENGINE REMOVAL AND INSTALLATION)



Engine Removal

Remove engine mount nuts.



Remove engine mount bolts.

Remove LH and RH front engine supports.



Turn steering on RH side to make room.

Install engine removal hook (P/N 529 035 829), in engine hook and lift tool to support engine weight.



Carefully pull out engine from left side.





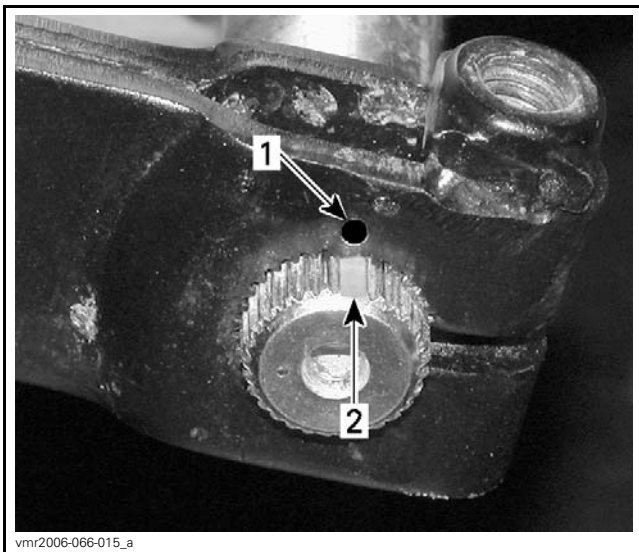
INSPECTION

Check parts for cracks, corrosion or any other default. Also check engine supports. Replace damaged part as necessary.

INSTALLATION

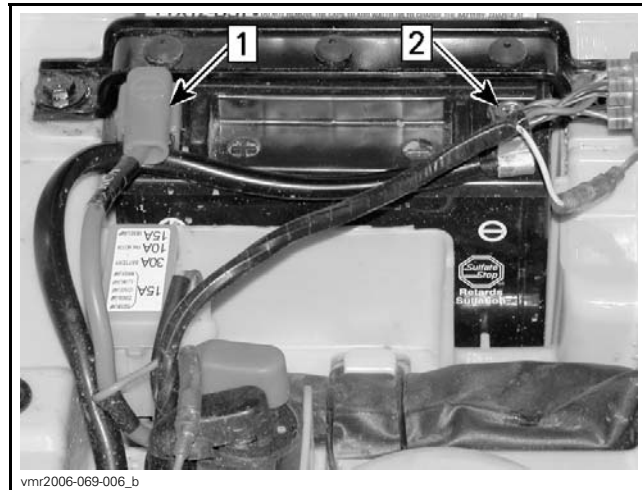
Installation is the reverse procedure of removal. However, pay attention to the following.

Align shift lever dot with flat surface on shift shaft.



- 1. Dot
- 2. Flat surface

Reconnect battery cables.



- Step 1: Positive first
- Step 2: Negative last

Refill cooling system. Refer to *COOLING SYSTEM*.

Refill engine with oil. Refer to *LUBRICATION SYSTEM*.

Check throttle and choke cables adjustment. Refer to *FUEL SYSTEM*.

ENGINE LEAK TEST

SERVICE TOOLS

Description	Part Number	Page
camshaft locking tool.....	529 036 055	30
leak down tester.....	529 035 661	30

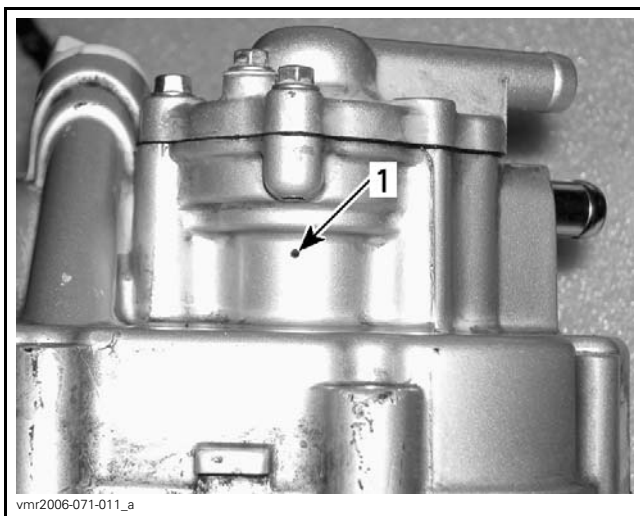
GENERAL

Before performing the engine leak test, verify the following:

- clamp(s) tightness
- radiator and hoses.

Repair Tips

- Blue exhaust gas means damaged/worn piston rings.
- Oily contamination on leak indicator hole (under magneto cover) means a damaged oil seal on water pump shaft.
- Coolant out of leak indicator hole means a damaged rotary seal on water pump shaft (refer to *COOLING SYSTEM*).



1. Leak indicator hole

- Coolant escaping from water pump cover means damaged gasket(s) and/or loosened screws (refer to *COOLING SYSTEM*).

NOTE: For all the checkpoints mentioned above see the appropriate engine section to diagnose and repair the engine.

PROCEDURES

Preparation

CAUTION: Perform leak down testing with the engine cold. Introducing cold air into a hot engine can warp or fracture valves and/or other engine parts.

Disconnect battery. Refer to *CHARGING SYSTEM*.

Remove radiator cap located under front cover.

Unplug and remove spark plug cable.

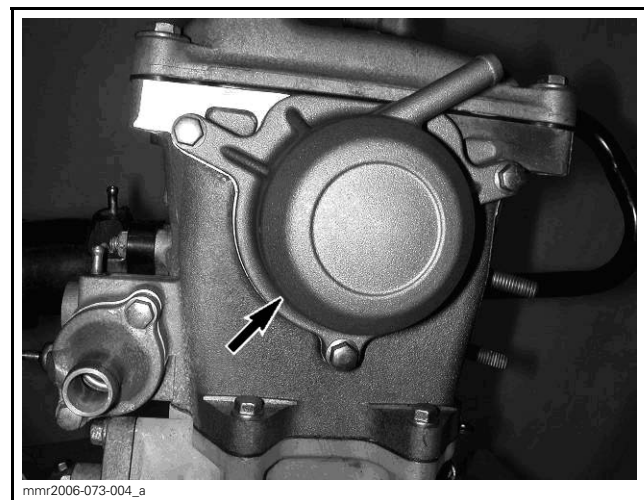
Remove spark plug from cylinder head.

Remove CVT cover.

How to Position Piston at TDC (compression)

NOTE: The engine must be set to precisely TDC (compression); if this is not ensured the engine will continue to rotate when pressure builds up.

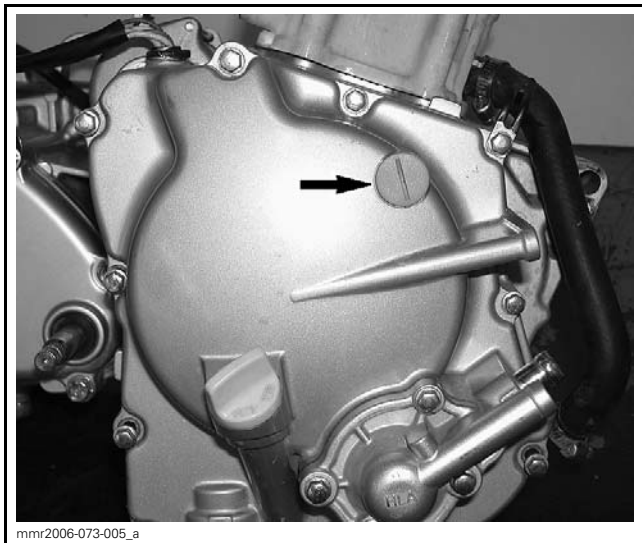
- On right side of engine, remove the cylinder head side cover.



Section 03 ENGINE

Subsection 02 (ENGINE LEAK TEST)

- Unscrew the magneto access plug.



- Turn drive pulley clockwise to bring piston at TDC. Align TDC mark besides the letter "T" as shown.



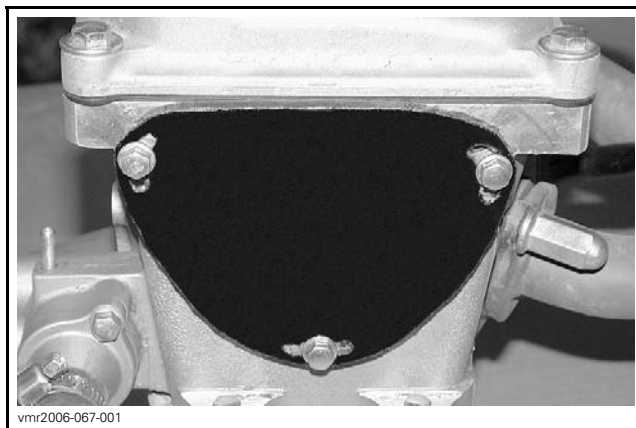
TCD MARK BESIDE THE T ALIGNED

- Check if marks are aligned on camshaft gear as shown. Otherwise, continue turning drive pulley until crankshaft and camshaft marks are properly positioned.



How to Lock Piston at TDC (compression)

- To maintain the piston at TDC position, install the camshaft locking tool (P/N 529 036 055).



Leak Test

Thread the correct adaptor hose of the leak down tester (P/N 529 035 661) into the spark plug hole. Do not connect the adaptor hose to the leak down tester at this time.



Connect the tester to an air supply.

Set gauge needle to zero (0).

NOTE: Each tester will have specific instruction on the gauge operation and required pressure.

Connect the tester to the adaptor hose.

Supply combustion chamber with air pressure.

Record the amount of leaking or percentage (depending on tester).

LEAKAGE PERCENTAGE	ENGINE CONDITION
0% to 15%	Excellent condition
16% to 25%	Good condition
26% to 40%	Fair condition; engine will run and in some cases, performance might be affected
41% and higher	Poor condition, diagnose and repair engine

Diagnosis

Listen for air leaks.

- air escaping from intake side means leaking intake valve(s)
- air escaping from exhaust side means leaking exhaust valve(s)
- air bubbles out of radiator means leaking cylinder head gasket
- air/oil escaping from crankcase means damaged gasket and/or loosened screws
- air/coolant escaping from cylinder/head means damaged gasket(s) and/or loosened screws
- air escaping into crankcase area means excessively worn cylinder and/or broken piston rings.

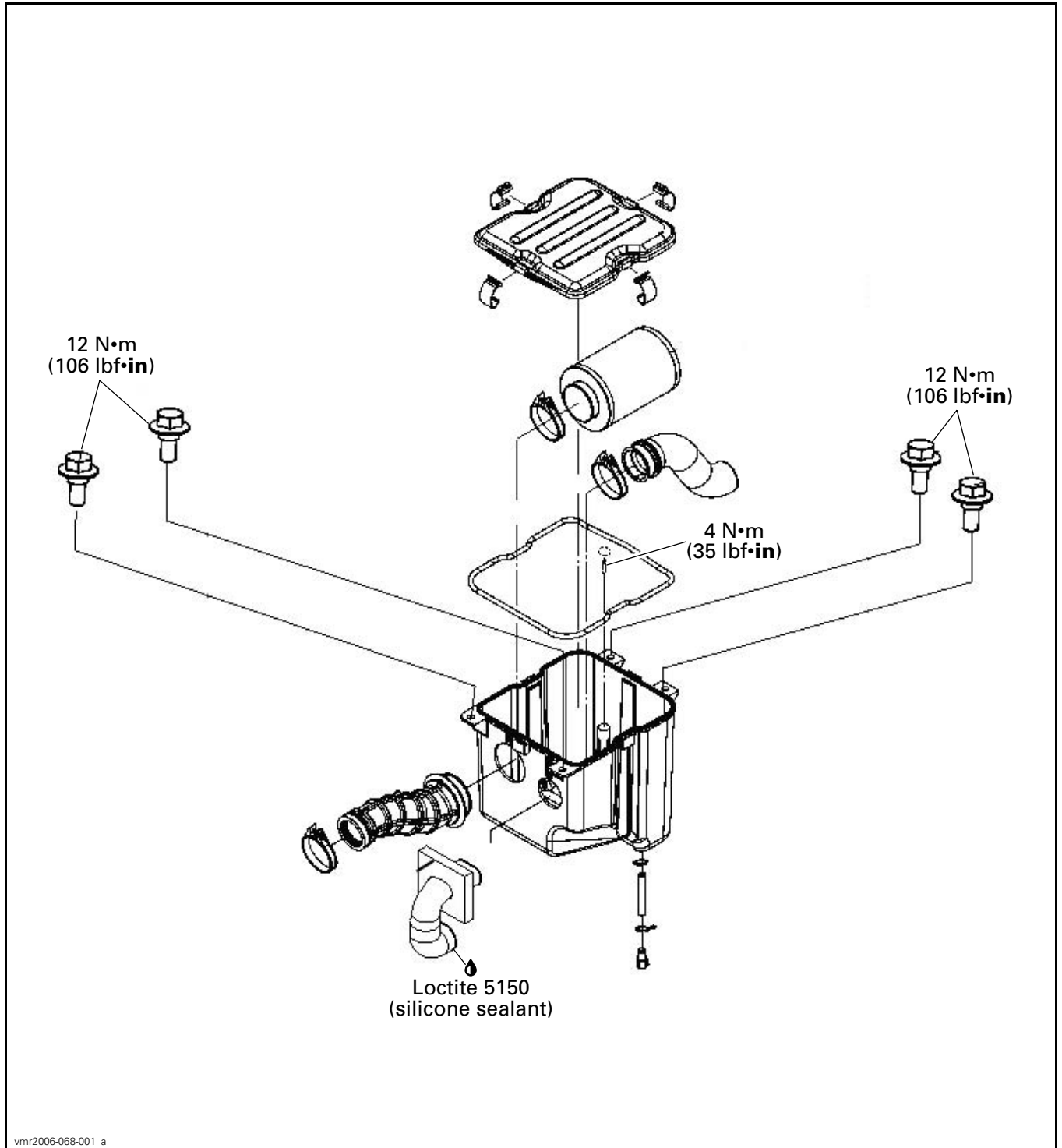
Reassembly

Reverse the preparation procedure. Ensure to respect torque values and use of appropriate products/lubricants. Refer to exploded views of other sections as required.

AIR INTAKE SYSTEM

SERVICE PRODUCTS

Description	Part Number	Page
Loctite 5150 (silicone sealant)	293 800 086	35



GENERAL

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

CAUTION: Do not start engine when liquid or deposits are found in the drain tube. If you have oil in the air filter housing, check engine oil level. Maybe oil level is too high.

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

Disconnect battery before working on fuel system.

⚠ 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

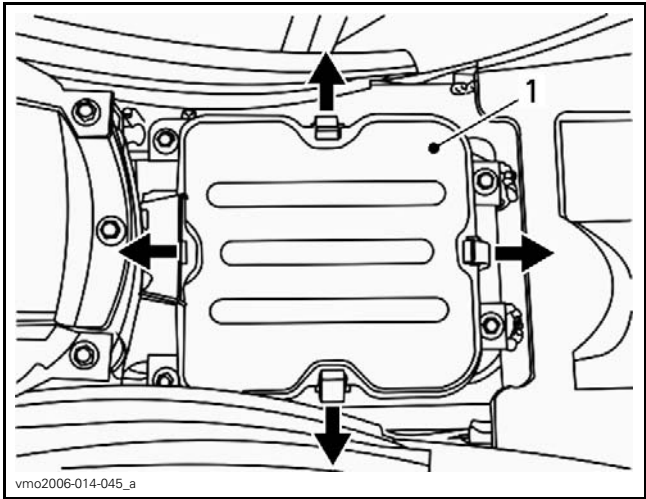
AIR FILTER

Removal

NOTE: When replacing air filter, clean or replace the air injection valve filters at the same time.

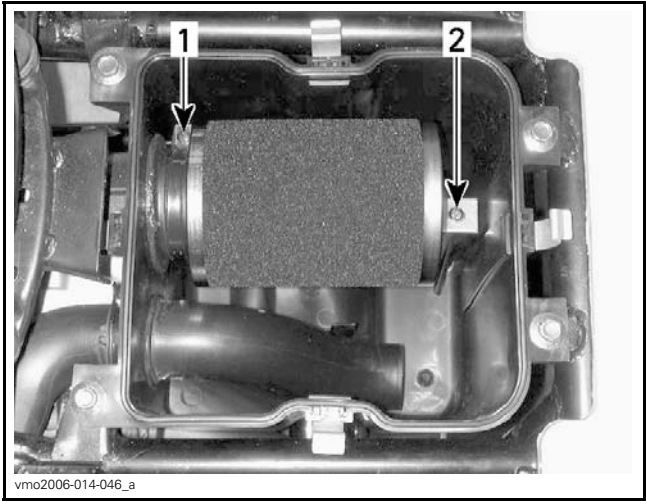
Remove seat.

Release clamps and remove air filter housing cover.



1. Air filter housing cover

Loosen clamp and remove retaining screw, then remove air filter.



1. Clamp
2. Retaining screw

CAUTION: Engine performance degradation or severe damages can occur if the air filter is not properly maintained and/or if it not well oiled.

Cleaning

Pour 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 filter housing.

Rinse the filter with warm water until all cleaning solution disappears.

NOTE: If the air filter foam is still dirty, replace it with a new one.

Then, let the filter dry completely.

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

Installation

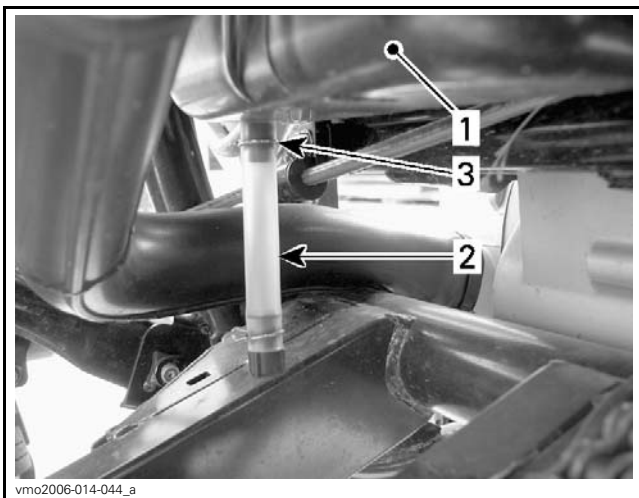
Properly reinstall removed parts in the reverse order of their removal.

NOTE: Make sure that air filter housing cover is installed properly.

AIR FILTER HOUSING

Draining

Periodically inspect air filter housing drain tube for liquid or deposits.



TYPICAL

1. Air filter housing
2. Drain tube
3. Clamp

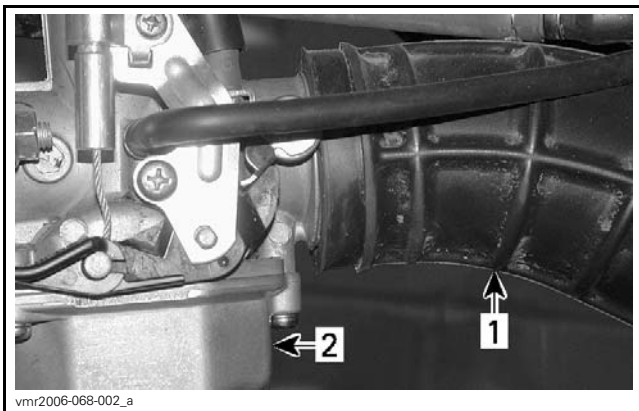
If liquid/deposits are found, squeeze and remove the clamp. Pull drain tube out and empty it.

CAUTION: Do not start engine when liquid/deposits are found in the drain tube.

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

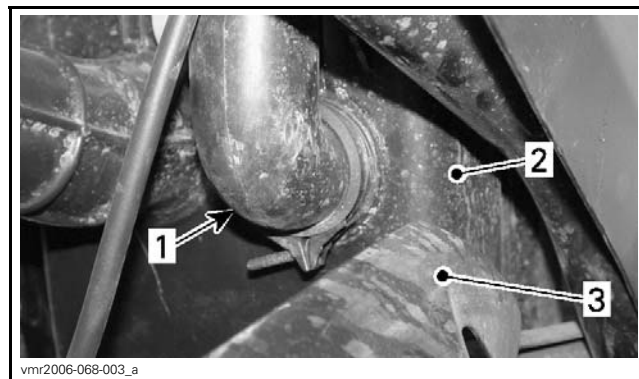
Removal

Unscrew clamp retaining air intake hose to carburetor.



1. Air intake hose
2. Carburetor

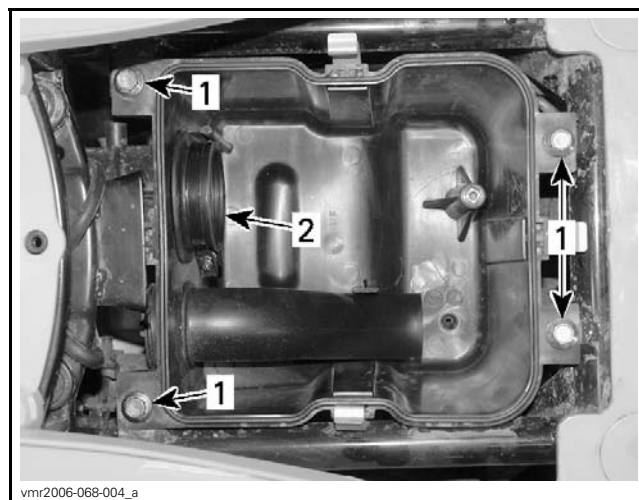
Unscrew air intake duct clamp from air filter housing.



1. Air intake duct
2. Air filter housing
3. Exhaust shield

Remove air filter, see procedure above.

Unscrew bolts holding air filter housing to frame then slide air intake hose inside air filter housing.



1. Air filter housing bolts
2. Air intake hose

Remove air filter housing.

Installation

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

Apply Loctite 5150 (silicone sealant) (P/N 293 800 086) to air intake hose groove to seal the hose and air filter housing.

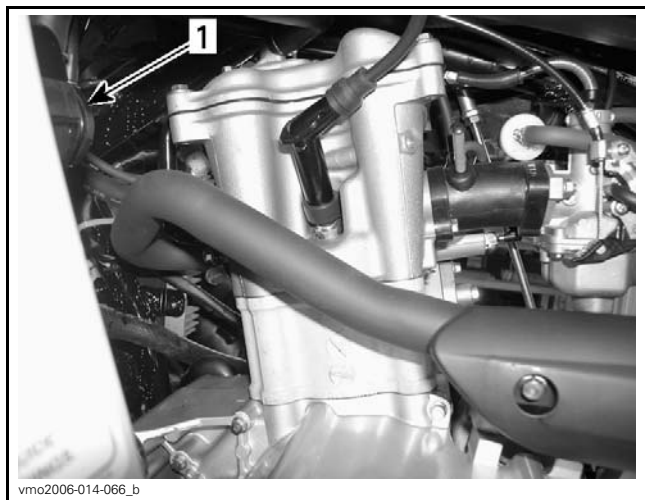
AIR INJECTION VALVE FILTER

Removal

From the left side of vehicle, disconnect hoses from air injection valve.

Section 03 ENGINE

Subsection 03 (AIR INTAKE SYSTEM)

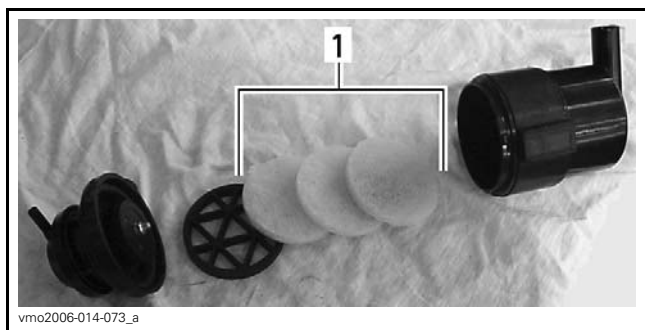


1. Air injection valve

Remove air injection valve from its supports.

While holding one half, turn the other half counter-clockwise to open.

Extract filters from air injection valve.



1. Air injection valve filters

Cleaning

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

While filters soak, clean inside of air injection valve.

Rinse filters with warm water until all cleaning solution disappears.

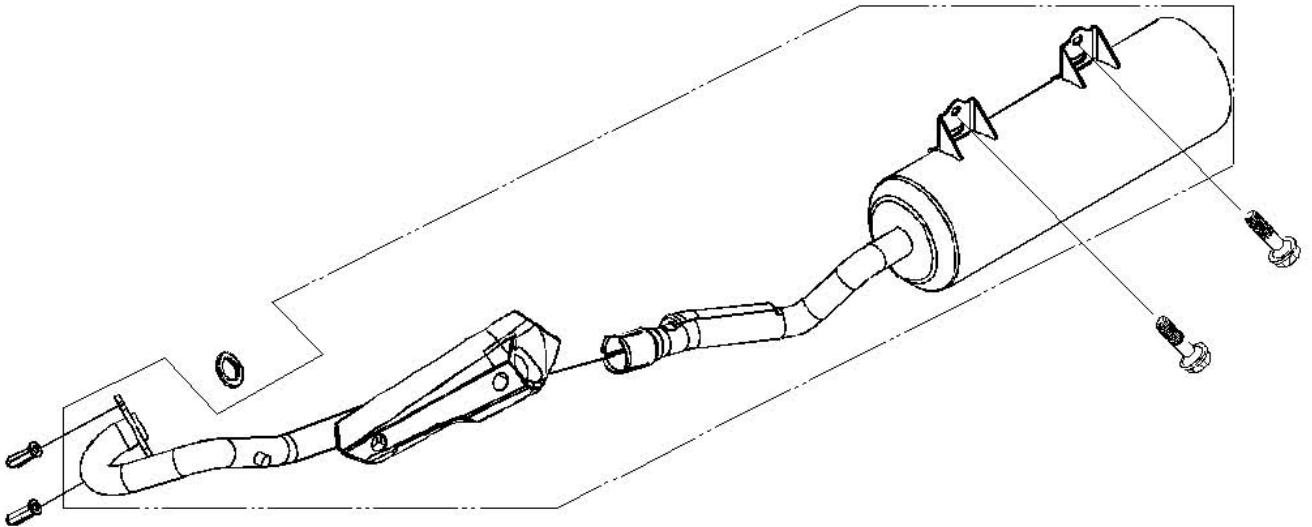
NOTE: If filters are still dirty, replace them with new ones.

Then, let filters dry completely.

Installation

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

EXHAUST SYSTEM



vmr2006-069-001

Section 03 ENGINE

Subsection 04 (EXHAUST SYSTEM)

GENERAL

WARNING

Before performing any service or inspection operation on the vehicle, wait until the engine and exhaust have cooled down to avoid potential burns.

WARNING

Always disconnect battery or starter cables exactly in the specified order, BLACK (-) cable first.

WARNING

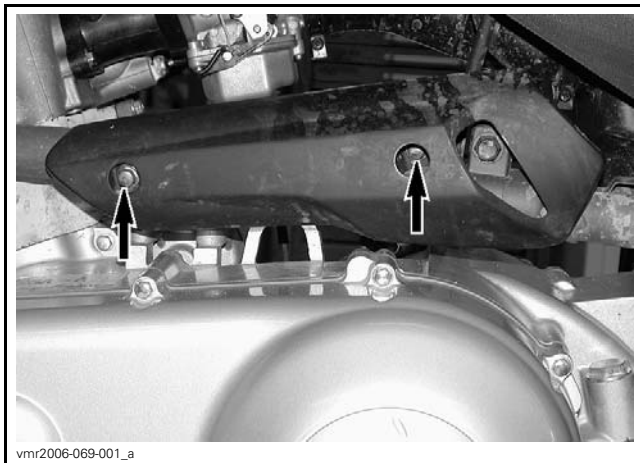
Torque wrench tightening specifications must strictly be adhered to.
Locking devices (ex.: locking tabs, elastic stop nuts, self-locking fasteners, cotter pin, etc.) must be installed or replaced with new ones where specified. If the efficiency of a locking device is impaired, it must be renewed.

PROCEDURES

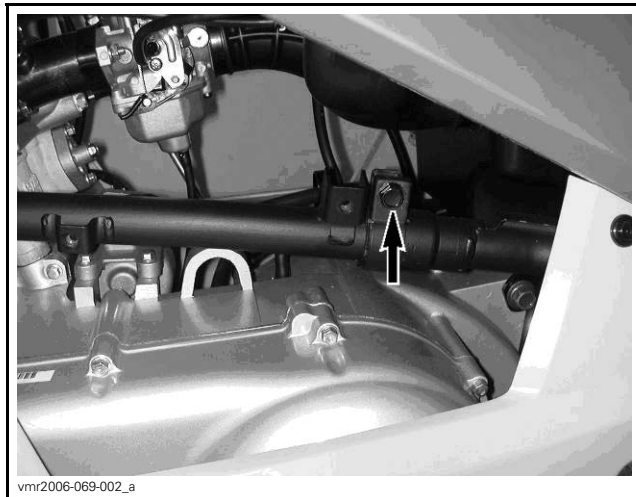
MUFFLER

Removal

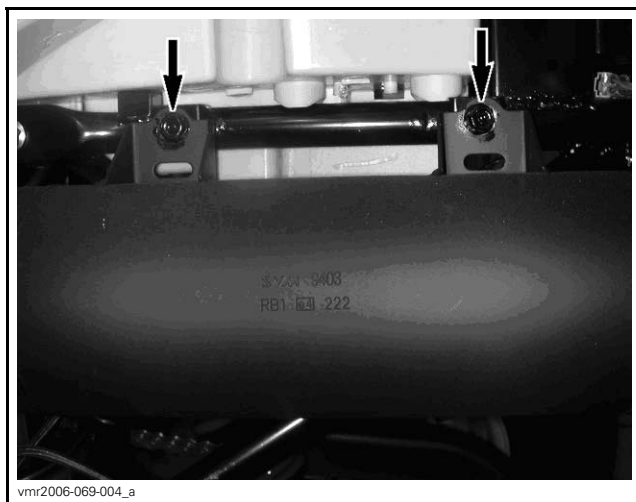
Remove screws and pull out heat shield.



Loosen muffler clamp.



Remove screws then pull out muffler.



Inspection

Check part for cracks, rust or any other default. Also check mounting bracket area.

Installation

Installation is the reverse procedure of removal.

EXHAUST PIPE

Removal

Remove muffler.

Remove retaining nuts from cylinder head then pull out exhaust pipe.



Inspection

Check part for cracks, rust or any other default. Replace damaged part as necessary.

Installation

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

Loosely install pipe and muffler before tightening all parts. Torque exhaust pipe nuts first.

SPARK ARRESTER

All Models except Europe

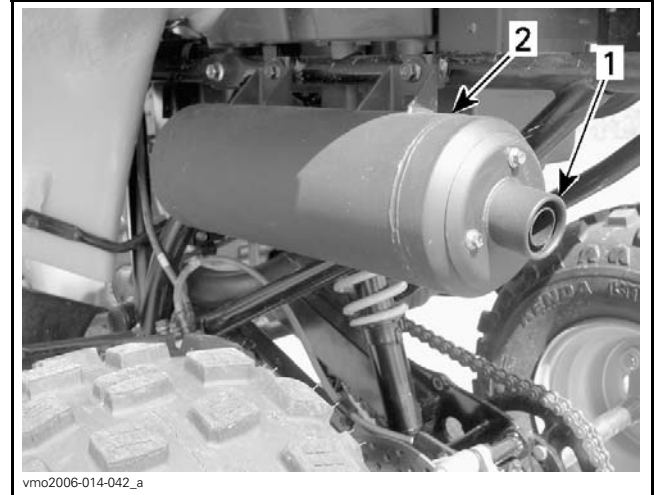
The spark arrester must be periodically purged of accumulated carbon.

WARNING

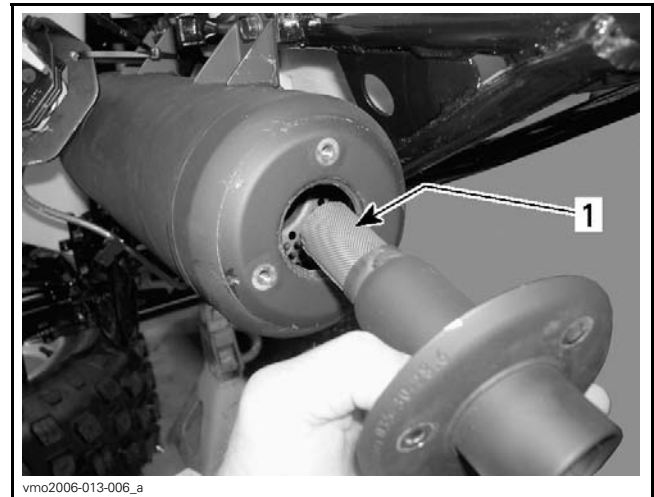
Never perform this operation immediately after the engine has been run because exhaust system is very hot. Wear eye protection and gloves. Respect all applicable laws and regulations.

Removal

Remove the spark arrester from the muffler.



1. Remove muffler end
2. Muffler



1. Spark arrester

Cleaning

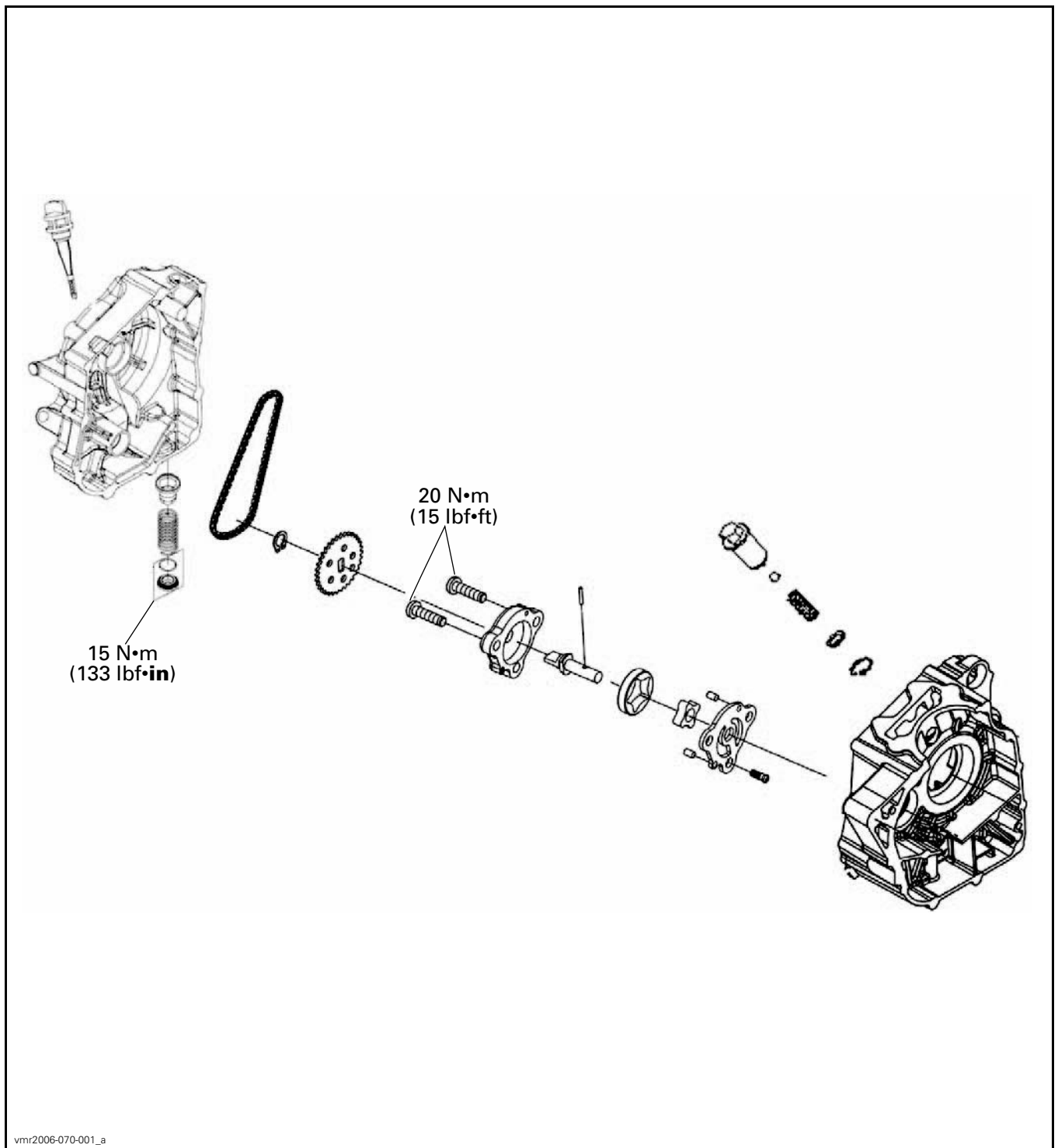
Remove carbon deposits from the spark arrester using a brush.

NOTE: Use a soft brush and be careful to avoid damaging spark arrester.

Installation

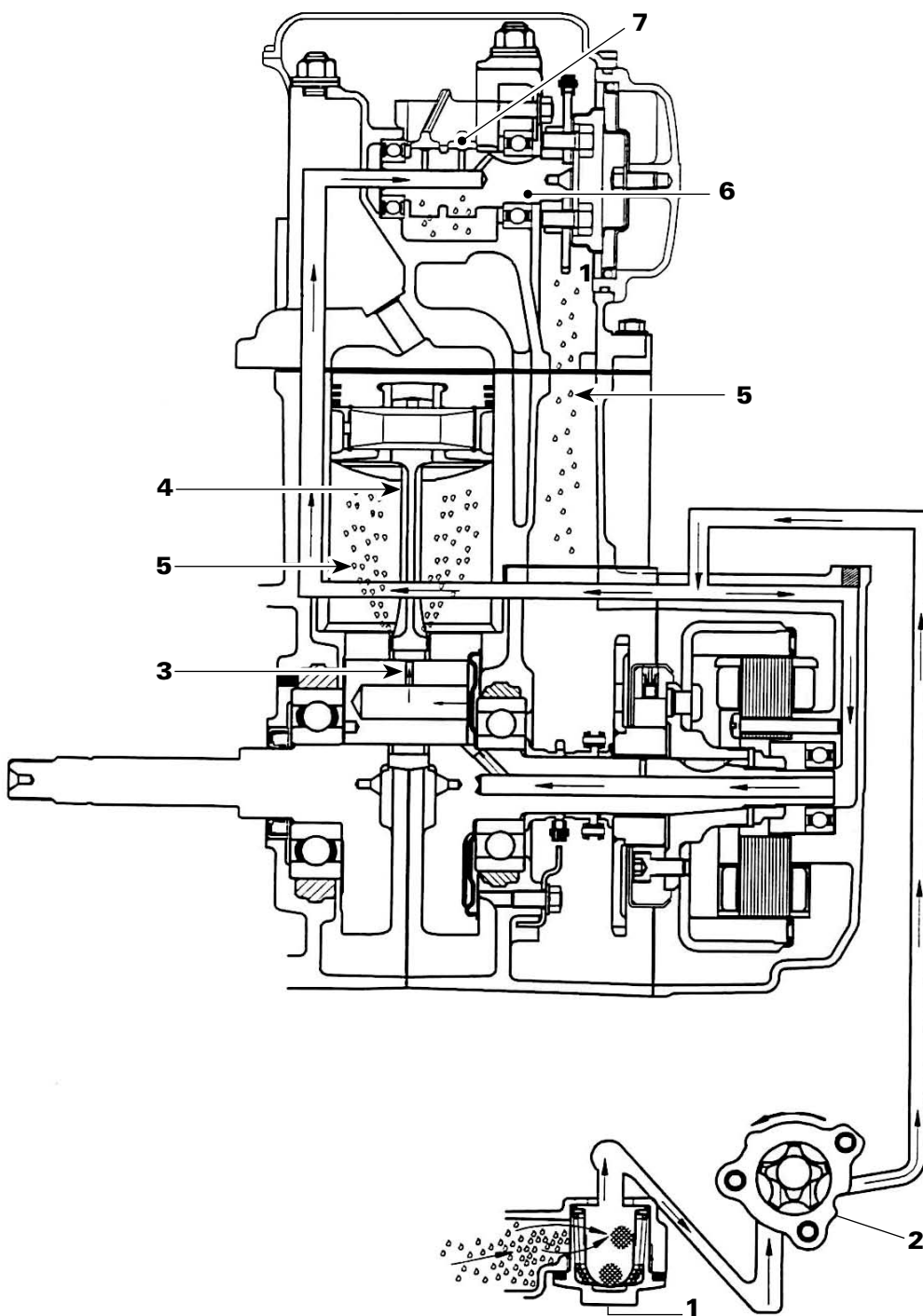
Installation is the reverse procedure of removal.

LUBRICATION SYSTEM



Section 03 ENGINE

Subsection 05 (LUBRICATION SYSTEM)



vmr2006-070-002_a

ENGINE LUBRICATION

- 1. Oil strainer
- 2. Oil pump
- 3. Lubrication outlet
- 4. Connecting rod
- 5. Lubrication spray
- 6. Camshaft
- 7. Valve rocker arm

GENERAL

The engine removal is not necessary to service the lubrication system.

WARNING

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

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

WARNING

Torque wrench tightening specifications must strictly be adhered to. Locking devices (ex.: 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.

Dispose oil as per your local environmental regulations.

ENGINE OIL

Recommended Oil

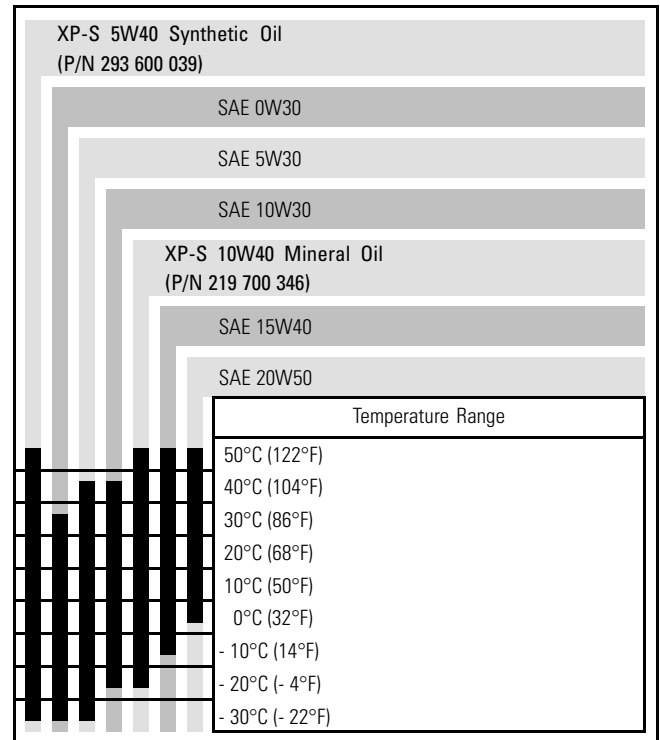
Use 4-stroke engine oil that meets or exceeds the requirements for API service classification SM, SL or SJ. Always check the API service label certification on the oil container, it must contain at least one of the above standards.

Oil Viscosity

SAE 5W30 is recommended for all seasons.

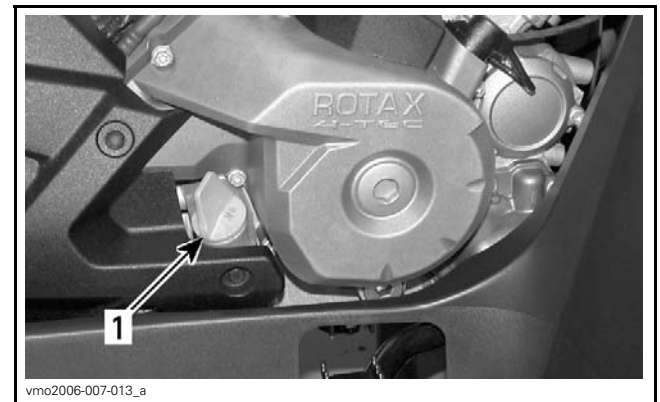
However, during the hottest days of the summer the BRP XP-S 10W40 mineral oil (P/N 219 700 346) can be used.

NOTE: For improved overall performance and all season applications, use XP-S 5W40 synthetic oil (P/N 293 600 039).



Oil Level

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



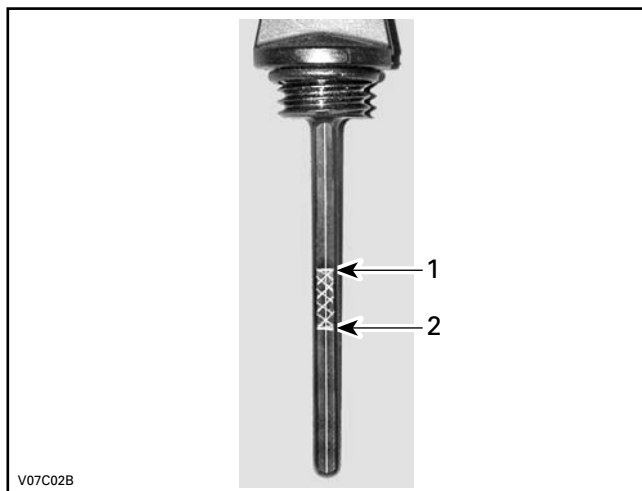
RH SIDE OF ENGINE
1. Dipstick

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 completely.
3. Remove and check oil level. It should be near or equal to the upper mark.

Section 03 ENGINE

Subsection 05 (LUBRICATION SYSTEM)



TYPICAL

1. Full
2. Add

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

Oil is to be replaced and oil strainer cleaned at the same time. Oil change should be done with a warm engine.

WARNING

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

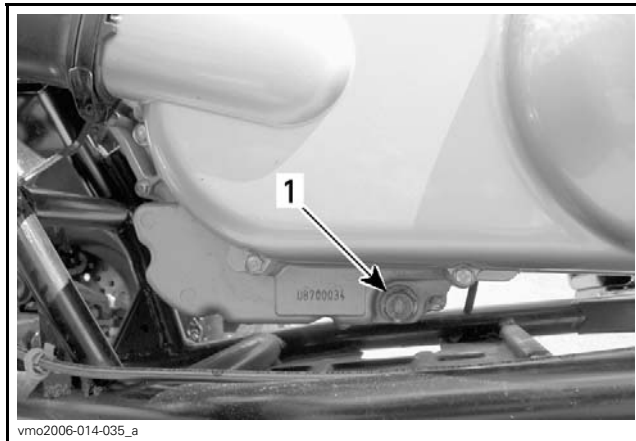
Ensure vehicle is on a level surface.

Remove dipstick.

Clean the drain plug area.

Place a drain pan under the engine drain plug area.

Unscrew drain plug.

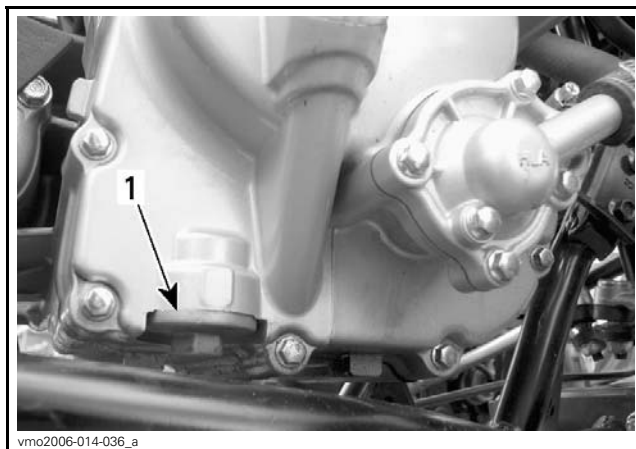


LH SIDE UNDERNEATH CVT COVER

1. Oil drain plug

Unscrew the oil strainer cover.

Allow enough time for oil to flow out of oil strainer hole.



RH SIDE OF ENGINE

1. Oil strainer cover

Remove oil strainer and spring.

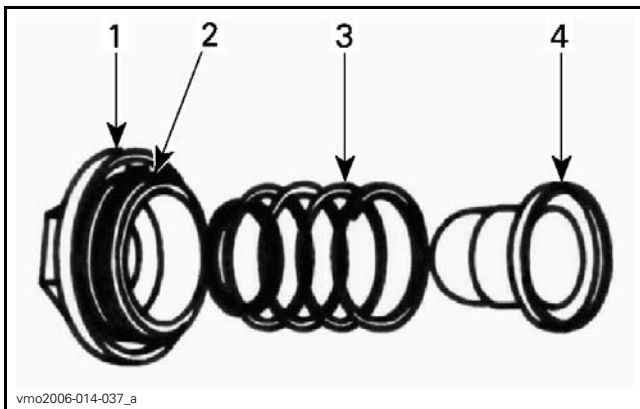
To clean oil strainer, use a solvent then dry with compressed air.

WARNING

Always wear eye protector. Chemicals can cause a rash break out and an injury to your eyes.

NOTE: Check cover O-ring and replace it if necessary.

Wipe out any oil spillage on engine.



1. Cover
2. O-ring
3. Spring
4. Strainer

Reinstall oil strainer, spring, O-ring and torque cover to 15 N•m (133 lbf•in).

Verify drain plug washer condition and replace it if necessary.

Clean washer area on engine and drain plug then reinstall plug and torque it to 40 N•m (30 lbf•ft).

Refill engine at the proper level with the recommended oil.

NOTE: Engine oil quantity is written on the dipstick.

Start engine and let idle for a few minutes. Ensure oil strainer and drain plug areas are not leaking.

Stop engine. Wait a while to allow oil to flow down to crankcase then check oil level. Refill as necessary.

ENGINE OIL PRESSURE

An engine oil pressure test can not be performed. To verify if engine lubrication is adequate, proceed as follows.

Remove valve cover. Refer to *CYLINDER HEAD*.

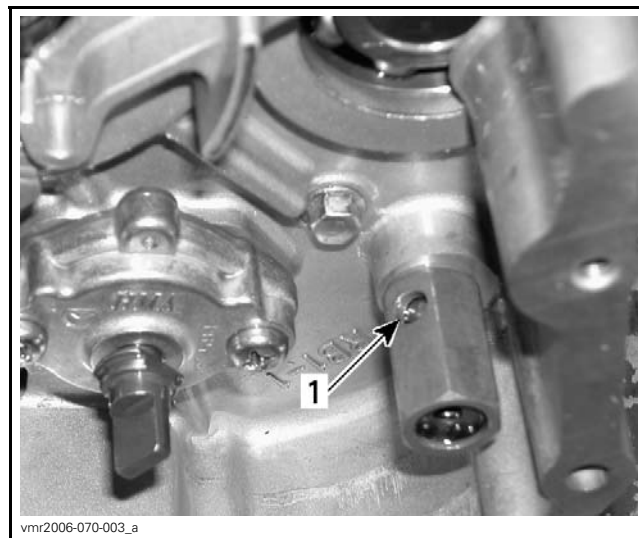
Start engine and run at idle speed to validate if engine oil reaches rocker arms.

CAUTION: Do not race engine with valve cover removed.

If oil properly flows, everything is correct. Otherwise, verify strainer, oil pressure relief valve and oil pump.

ENGINE OIL PRESSURE RELIEF VALVE

The oil pressure relief valve opens when the oil pressure exceeds a predefined amount. This allows oil pressure to drop. Oil flows out of relief valve by the side hole.



1. Bypass hole

NOTE: If oil pressure is low (as per *ENGINE OIL PRESSURE*), check ball of oil pressure relief valve for contamination.

Removal

Drain engine oil.

Remove magneto cover. Refer to *MAGNETO AND STARTER DRIVE*.

Remove circlip then spring and ball.

WARNING

Spring is compressed and will go out with some force.

Cleaning and Inspection

Clean oil pressure relief valve bore from contamination with an air gun.

Inspect valve bore, ball and spring for damage.

Replace parts if important wear or damage are present.

Installation

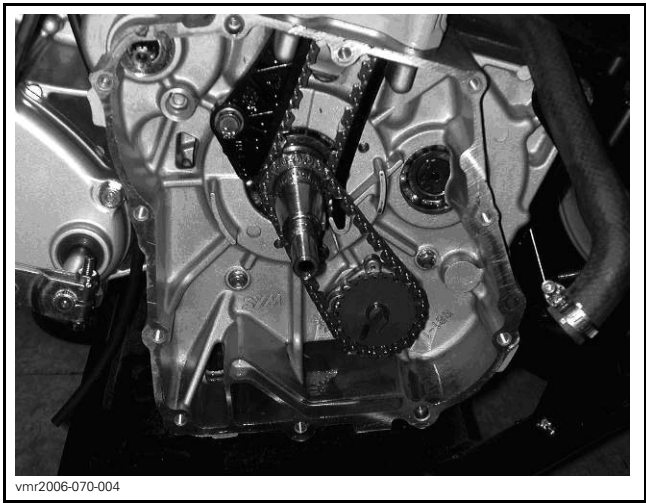
For installation, reverse the removal procedure. Ensure to reinstall ball.

OIL PUMP

Removal

Remove magneto flywheel and starting clutch gear. Refer to *MAGNETO AND STARTER DRIVE*.

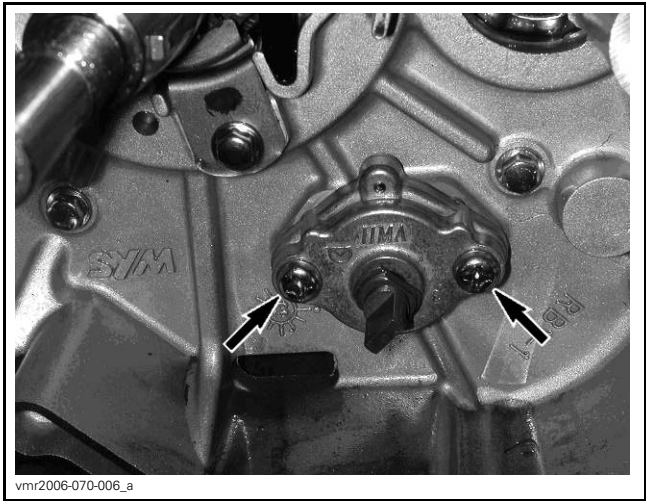
Section 03 ENGINE
Subsection 05 (LUBRICATION SYSTEM)



Remove circlip.

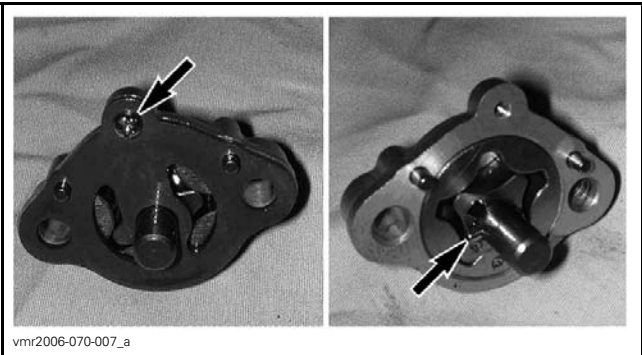


Pull out oil pump drive chain and sprocket.
Make sure oil pump shaft can be turned freely.
Remove pump housing screws.



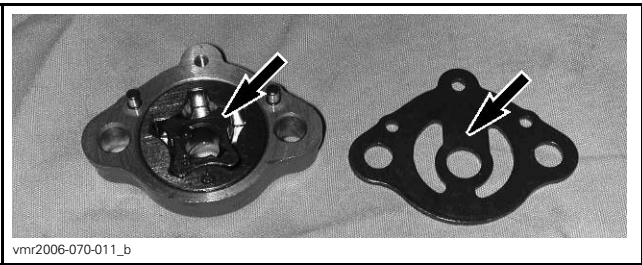
Remove pump.
Remove screw on friction plate and remove it.

Remove oil pump shaft roller and shaft.

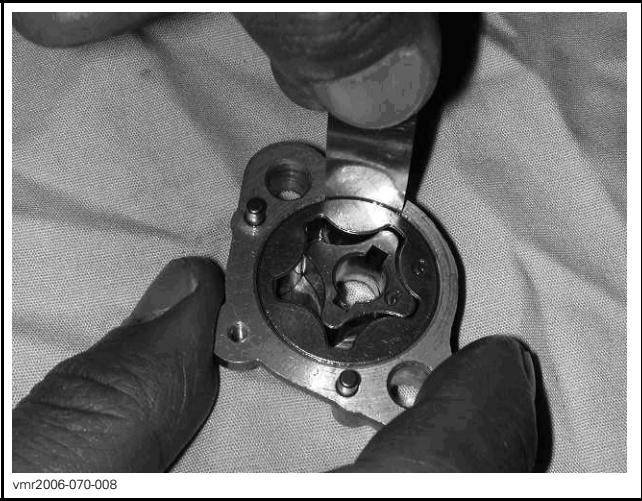


Inspection

Inspect and clean oil passages.
Check inner rotor and oil pump housing for pitting, scratches or other damage.
Check side contact surface of rotor and friction plate.



Check clearance between oil pump housing and outer rotor.



OIL PUMP HOUSING AND OUTER ROTOR CLEARANCE	
NEW	0.15 - 0.20 mm (.006 - .008 in)
SERVICE LIMIT	0.25 mm (.010 in)

Check clearance between inner rotor and outer rotor.

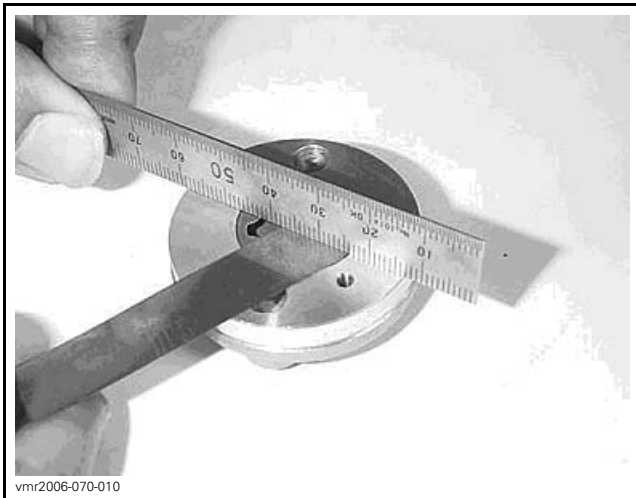


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INNER ROTOR AND OUTER ROTOR CLEARANCE

NEW	0.15 mm (.006 in)
SERVICE LIMIT	0.20 mm (.008 in)

Check clearance between rotor side face and pump housing.



vmr2006-070-010

ROTOR SIDE FACE AND PUMP HOUSING CLEARANCE

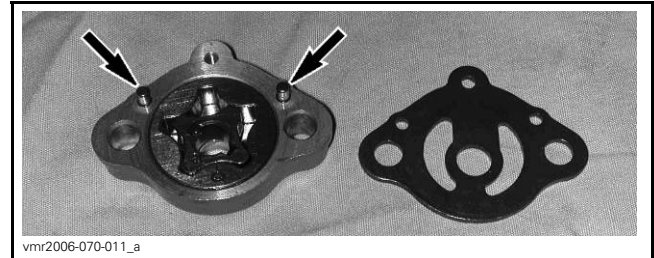
NEW	0.04 - 0.09 mm (.002 - .004 in)
SERVICE LIMIT	0.12 mm (.005 in)

Assembly

Assembly is the reverse procedure of disassembly. However, pay attention to the following.

Align indent on driving shaft with that of inner rotor.

Install pump shaft and roller. Install pump housing and align pins properly.

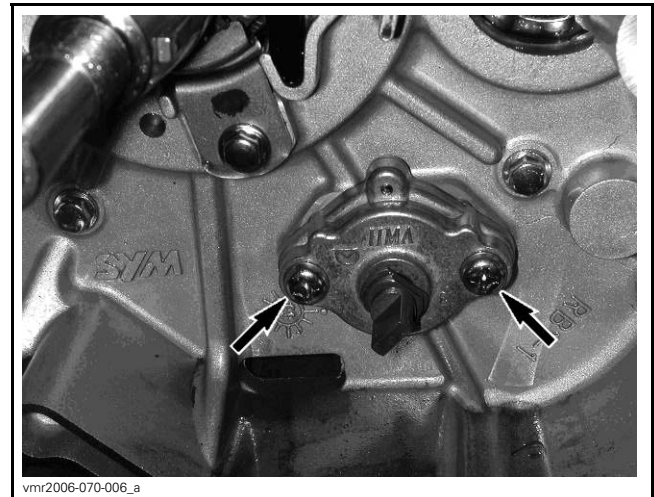


vmr2006-070-011_a



vmr2006-070-012_a

Properly torque screws.



vmr2006-070-006_a

Make sure oil pump shaft can be turned freely.
Ensure to properly lock sprocket with circlip.



vmr2006-070-005_a

Section 03 ENGINE

Subsection 05 (LUBRICATION SYSTEM)

Reinstall magneto flywheel and cover. Refer to *MAGNETO AND STARTER DRIVE*.

Refill engine with the recommended oil.

Verify if lubrication system is working properly.
Refer to *ENGINE OIL PRESSURE*.

COOLING SYSTEM

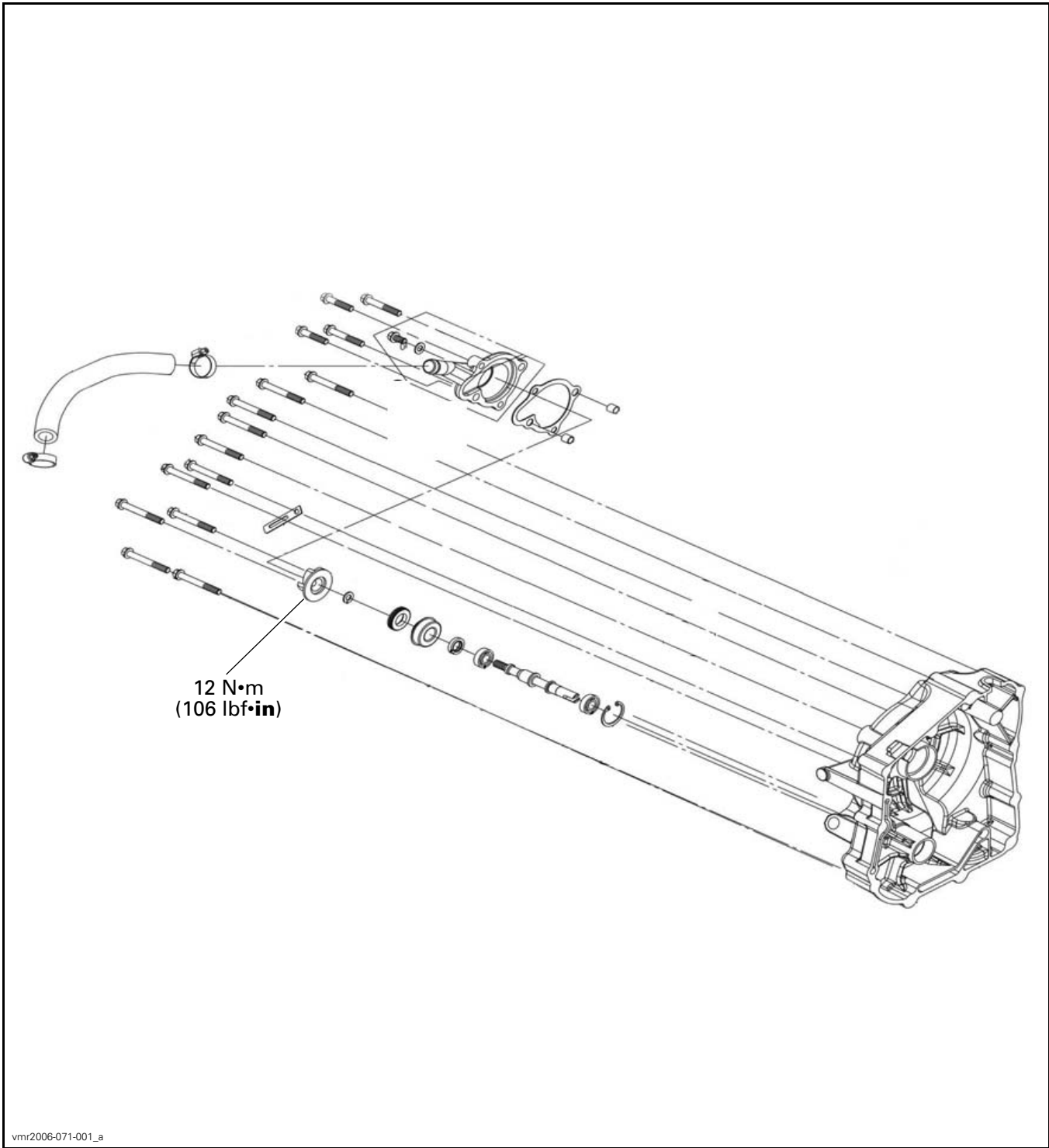
SERVICE TOOLS

Description	Part Number	Page
special radiator cap	529 035 991	52
water pump oil seal installer	529 036 052	57

SERVICE PRODUCTS

Description	Part Number	Page
Loctite 5910.....	293 800 081	57
Loctite 592 (pipe sealant)	293 800 018	55

WATER PUMP



vmr2006-071-001_a

GENERAL

The engine removal is not necessary when working on water pump, thermostat or thermo-switch. Check general condition of hoses and clamp tightness.

Air bubbles in radiator when engine is running indicates a leaking engine gasket.

 **WARNING**

In order to avoid getting burned, do not remove or loosen the radiator cap or the engine drain plug when the engine is hot.

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

 **WARNING**

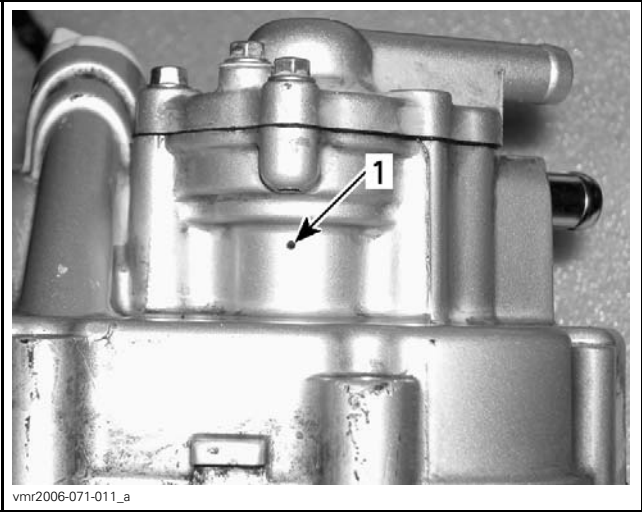
Torque wrench tightening specifications must strictly be adhered to. Locking devices (ex.: locking tabs, elastic stop nuts, self-locking fasteners, cotter pin, etc.) must be installed or replaced with new ones where specified. If the efficiency of a locking device is impaired, it must be renewed.

COOLING SYSTEM INSPECTION

LEAK INDICATOR HOLE

Check the leak indicator hole if there is oil and/or coolant and replace oil seals in water pump cover if necessary (refer to *WATER PUMP*).

NOTE: Coolant leakage indicates a faulty seal on impeller side and oil leakage indicates a faulty seal on crankcase side.



1. Leak indicator hole

COOLING SYSTEM LEAK TEST

Remove the front cover. Refer to *BODY*.

Remove the radiator cap.

Install the special radiator cap (P/N 529 035 991) on radiator.

Pressurize cooling system to 90 kPa (13 PSI).



Check all hoses, radiator and cylinder/base for coolant leaks. Spray a soap/water solution and look for air bubbles.

PROCEDURES

ENGINE COOLANT

Recommended Coolant

Use Bombardier premixed coolant (P/N 219 700 362) or with distilled water and antifreeze solution (50% water, 50% antifreeze).

CAUTION: To prevent rust formation or freezing condition, always replenish the system with Bombardier premixed coolant or with 50% antifreeze and 50% distilled water. Pure antifreeze without water thickens and does not have the same efficiency. Always use ethylene glycol antifreeze containing corrosion inhibitors specifically recommended for aluminum engines.

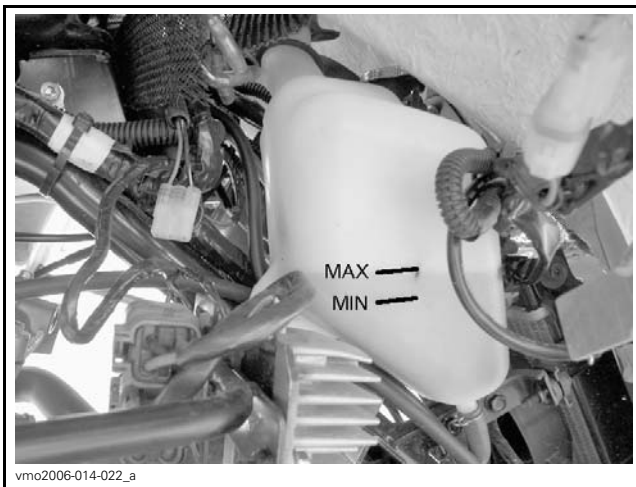
Coolant Level

Remove front cover. Refer to *BODY*.

WARNING

Check coolant level with engine cold. Never add coolant in cooling system when engine is hot.

With vehicle on a level surface, liquid should be between MIN. and MAX. level marks of coolant reservoir.



NOTE: When checking level at temperature lower than 20°C (68°F), it may be slightly lower than MIN. mark.

Add recommended coolant up to MAX. mark if required. Use a funnel to avoid spillage. **Do not overfill.**

Reinstall and tighten filler cap.

Reinstall front cover.

If coolant is added in the coolant reservoir, check also level in radiator.

NOTE: A cooling system that frequently requires coolant is the indication of a leak or an engine problem.

Draining Cooling System

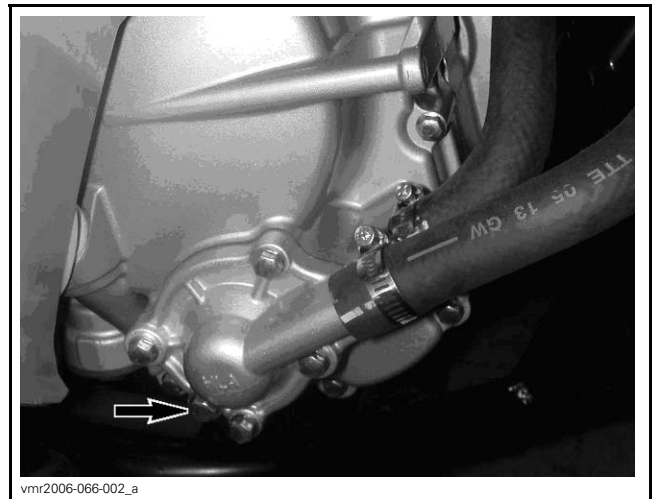
WARNING

In order to avoid getting burned, never drain or refill cooling system when engine is hot.

Remove front cover. Refer to *BODY*.

Remove radiator cap.

Remove drain plug.



NOTE: Use a container to receive coolant. Dispose coolant as per environment local laws.

Filling and Bleeding Cooling System

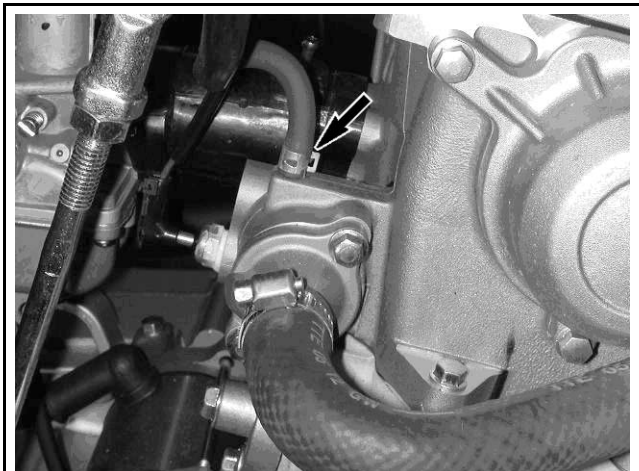
Ensure drain plug is installed then refill cooling system.

Install radiator cap.

Remove bleed tube.

Section 03 ENGINE

Subsection 06 (COOLING SYSTEM)



vmr2006-071-012_a

Run engine until air bubbles have all escaped from bleed nipple.

Stop engine. Reinstall bleed tube.

Carefully remove radiator cap.

WARNING

Let engine cool down. Otherwise, coolant under pressure will rush out and you might get burned.

Run engine.

Ensure there is no air bubbles in coolant and that level is stable.

Stop engine.

Refill radiator as necessary.

Reinstall radiator cap.

Adjust coolant level in coolant reservoir.

RADIATOR CAP

Test

Use a suitable pressure tester and check radiator cap. It should stand a pressure of 76 - 103 kPa (11 - 15 PSI) and release pressure above that value.

THERMOSTAT

Removal

Drain cooling system.

Remove thermostat retaining screws.



vmr2006-071-013_a

Pull thermostat out.

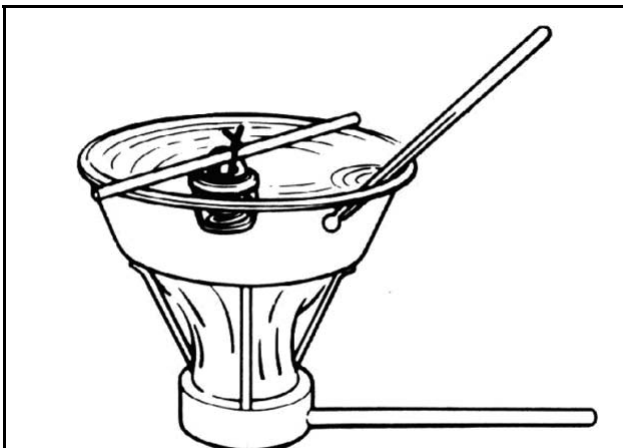


vmr2006-071-014

Test

Visually inspect thermostat for damage.

Put thermostat in a container filled with coolant and heat container. Use a suitable thermometer to measure coolant temperature.



vmr2006-071-015

Thermostat should open when coolant temperature reaches 82 - 85°C (180 - 203°F). When temperature cools down below 82°C (180°F), thermostat should close. Otherwise, replace thermostat. Check if the gasket is damaged. If so, replace thermostat and gasket.

Installation

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



Refill cooling system. Ensure there is no leak.

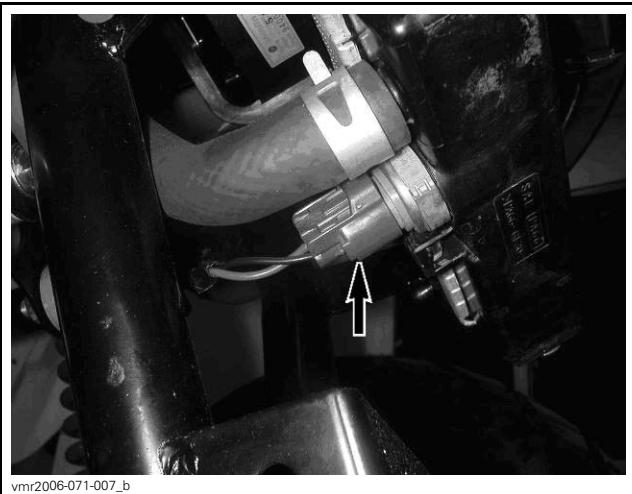
THERMO-SWITCH

Removal

NOTE: The thermo-switch is located on RH bottom of radiator.

Drain cooling system.

Unplug connector from thermo-switch.



Unscrew thermo-switch.

Test

Thermo-switch is a normally open switch (no continuity). It controls cooling fan.

When coolant temperature reaches 92°C (198°F), switch closes (continuity). Cooling fan turns on.

When coolant temperature cools down to 87°C (189°F), switch reopens. Cooling fan turns off.

To test, put thermo-switch in a container filled with coolant and heat container. The end of the switch should not touch container. Use a suitable thermometer to measure coolant temperature.

Using a multimeter, check switch continuity as per temperature given above.

Replace switch if necessary.

Installation

Apply Loctite 592 (pipe sealant) (P/N 293 800 018) on thermo-switch threads before installation.

Refill cooling system with recommended coolant.

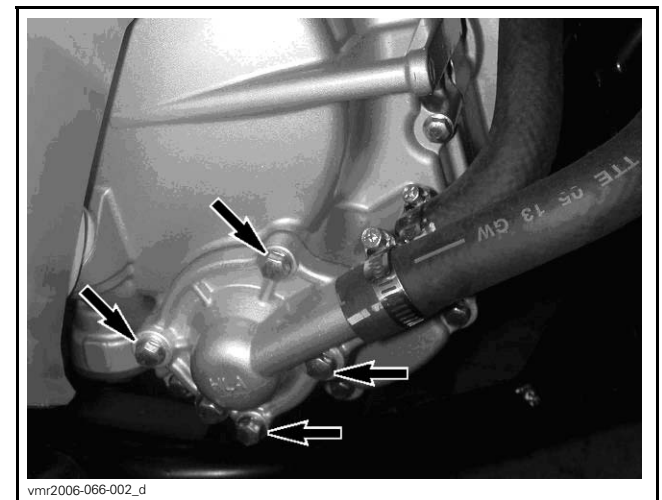
Pressure test cooling system.

WATER PUMP

Disassembly

Drain cooling system.

Remove water pump cover.

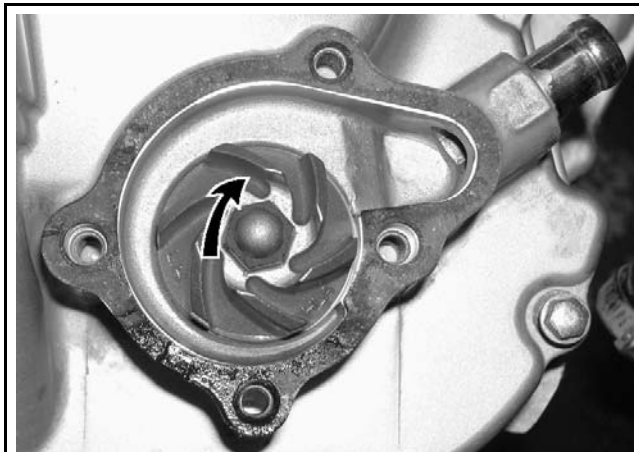


Remove water pump impeller. Loosen nut clockwise.

CAUTION: Nut has LH threads.

Section 03 ENGINE

Subsection 06 (COOLING SYSTEM)



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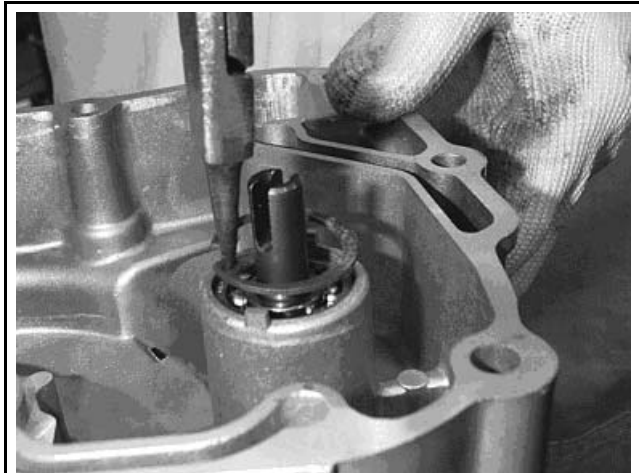
Remove magneto cover. Refer to *MAGNETO AND STARTER DRIVE*.

Remove gasket and dowel pin.

Rotate impeller shaft. Bearing must turn smoothly and freely. No excessive axial or radial play must be detected during inspection.

Replace bearings if defective or suspicious with new ones.

Remove bearing circlip.



vmr2006-071-017

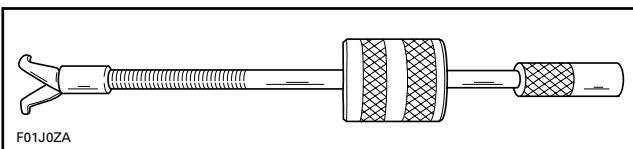
Push out impeller shaft.



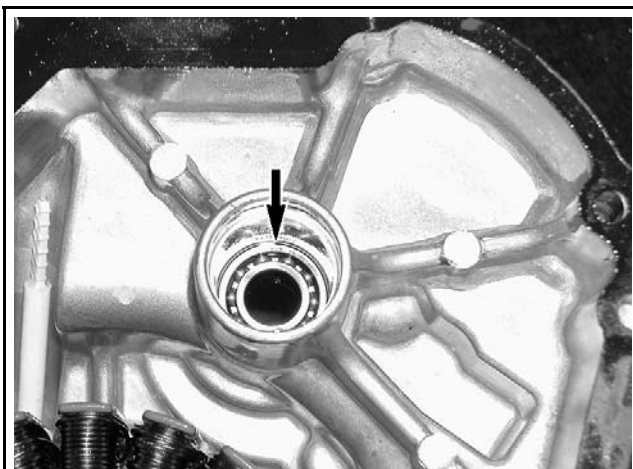
vmr2006-071-018

Remove inner bearing.

Use a claw type hammer puller and pull bearing out from inner race.



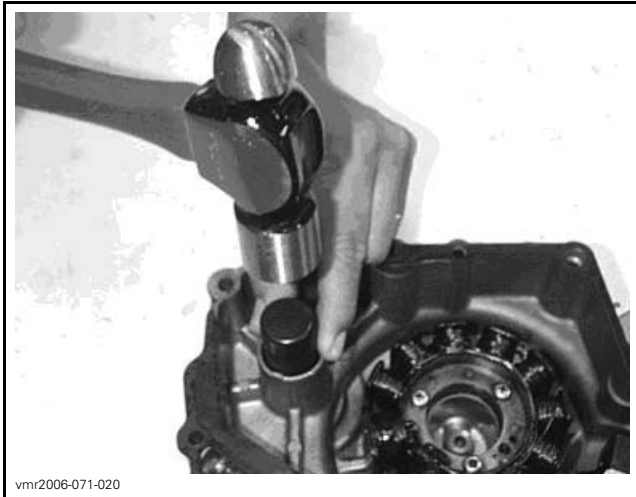
F01J0ZA



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Push out mechanical seal using an appropriate pusher.

CAUTION: Do not remove seal needlessly. Removal will damage seal.



Inspection

Check impeller and impeller shaft for wear and damage.

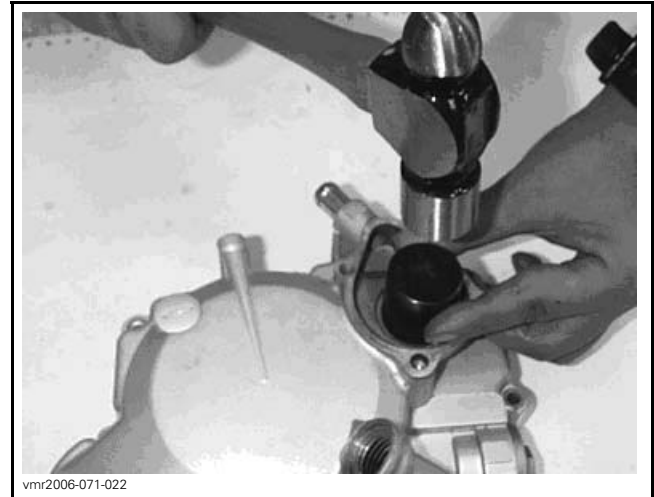
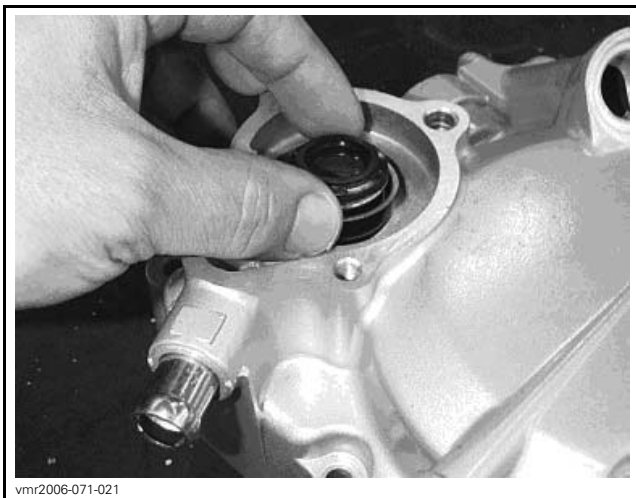
Assembly

Assembly is the reverse of disassembly procedure. However, pay attention to the following.

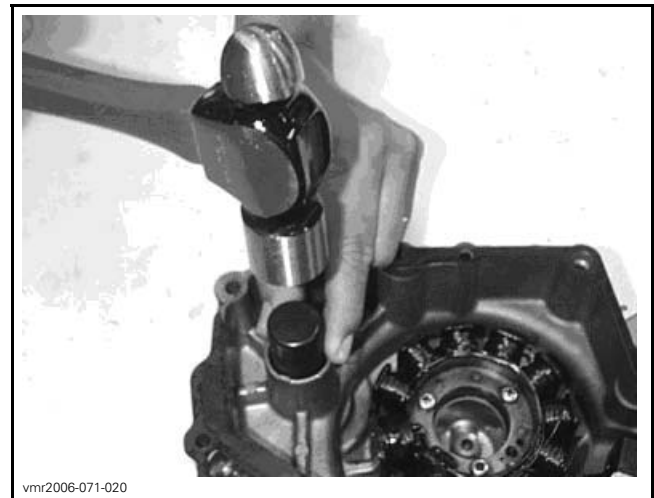
Apply Loctite 5910 (P/N 293 800 081) on mating surface of seal with its bore.

Use water pump oil seal installer (P/N 529 036 052) to properly install mechanical seal.

CAUTION: Using an inappropriate pusher may damage seal or may install seal inadequately.

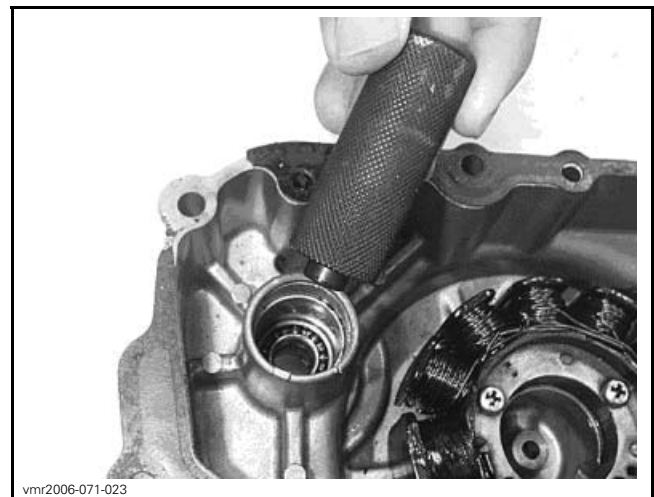


Install inner seal using an appropriate pusher.



Install inner bearing using an appropriate pusher.

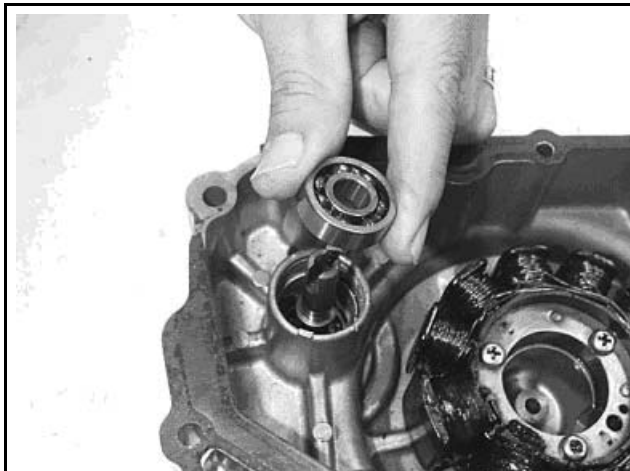
CAUTION: Install a new bearing only.



Install impeller shaft then bearing.

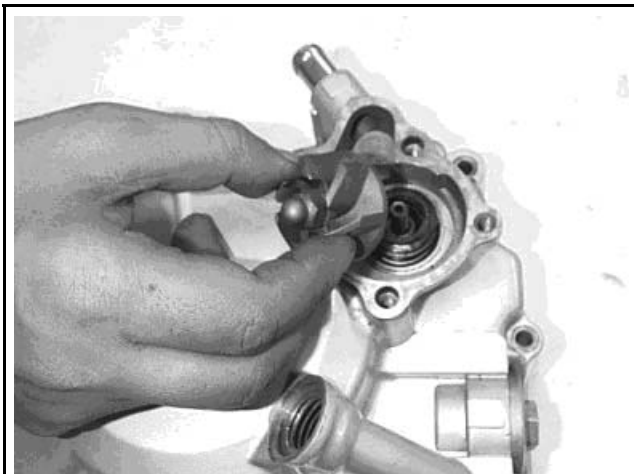
Section 03 ENGINE

Subsection 06 (COOLING SYSTEM)



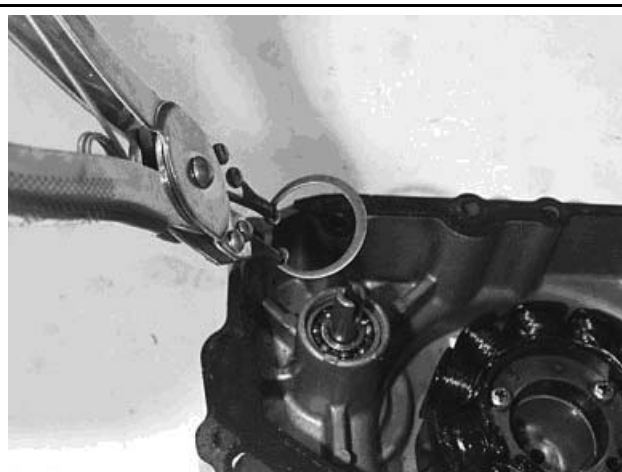
Install circlip.

Install impeller and properly torque.



Install dowel pin and gasket.

Install pump cover.



Install a new seal to impeller shaft.

CAUTION: Always install a new seal whenever mechanical seal is replaced.

Ensure to position the ceramic side on shaft side.



Install magneto cover. Refer to *MAGNETO AND STARTER DRIVE*.

Refill cooling system. Ensure there is no leak.

COOLING FAN MOTOR

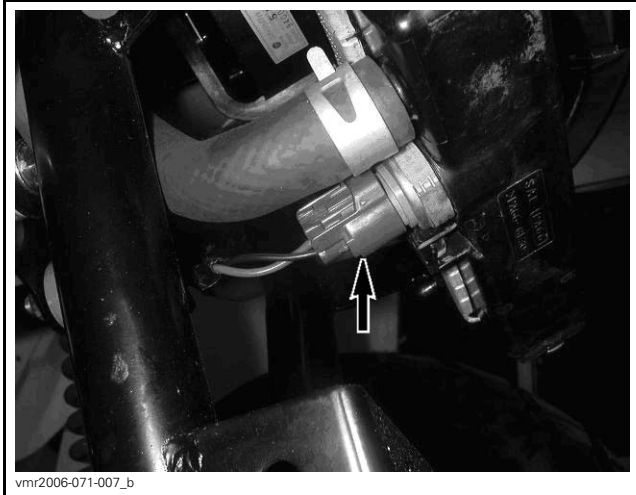
Test

Turn ignition switch on.

Unplug connector from thermo-switch.



1. Ceramic side here



Use a jumper and connect BLACK/BLUE wire from connector to a good ground.

Fan should turn. If so, check thermo-switch and wiring.

If fan does not turn, directly connect wires from a 12 Vdc battery to fan motor connector. If fan does not turn, replace it. If it turns, check its fuse and wiring.

Reconnect all connectors.

Replacement

Refer to *RADIATOR*.

RADIATOR

Removal

Drain cooling system.

Remove radiator shield. Refer to *BODY*.

Clean radiator with low pressure water and compressed air as necessary.

CAUTION: Be careful with compressed air as it could damage radiator fins.

Drain cooling system.

Remove radiator retaining screws.



Disconnect top hoses from radiator.

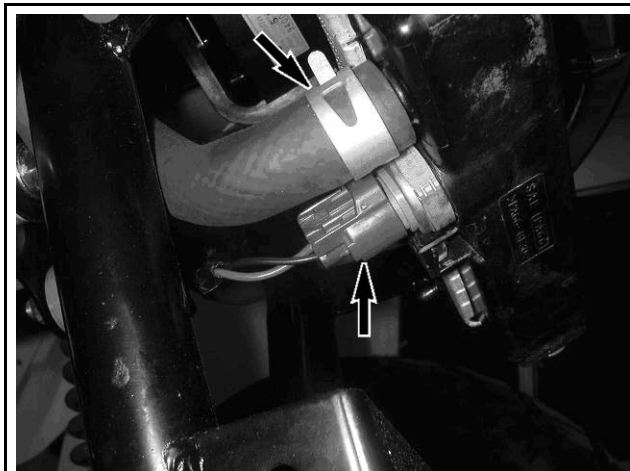


Remove bottom hose.

Unplug connector from thermo-switch.

Section 03 ENGINE

Subsection 06 (COOLING SYSTEM)



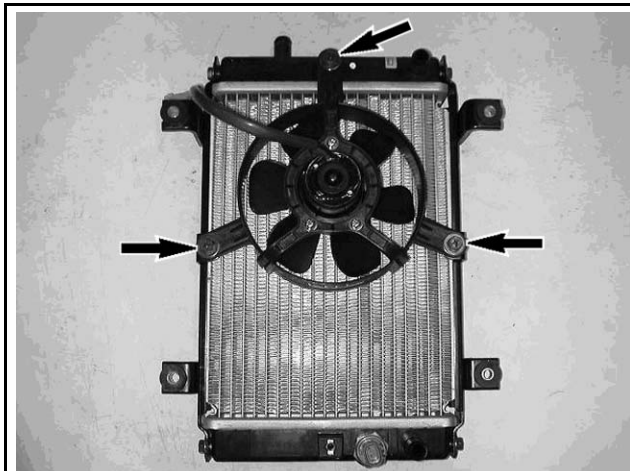
vmr2006-071-007_a

Pull out radiator with cooling fan.

Disassembly

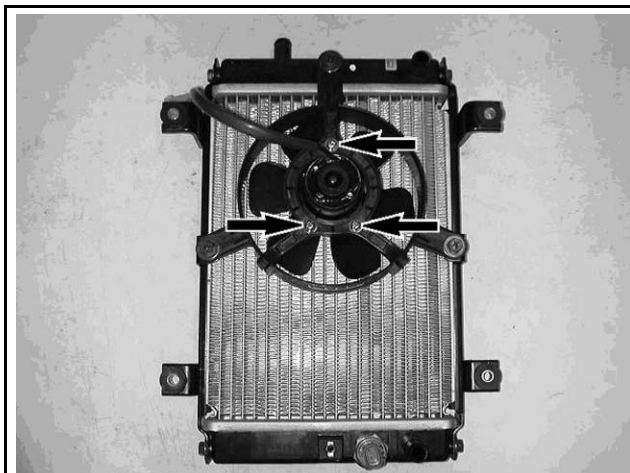
Remove thermo-switch.

Remove fan duct screws.



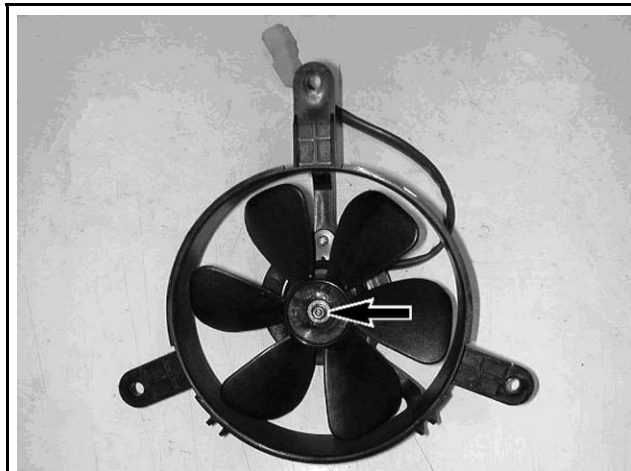
vmr2006-071-008_a

Remove fan motor screws.



vmr2006-071-008_b

Remove fan nut.



vmr2006-071-009_a

Inspection

Check radiator air passage for clogging or damage.

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

Check for any coolant leakage from radiator and hoses.

Check fan for bending, cracks or other damage.

Assembly

Assembly is the reverse procedure of disassembly.

Installation

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

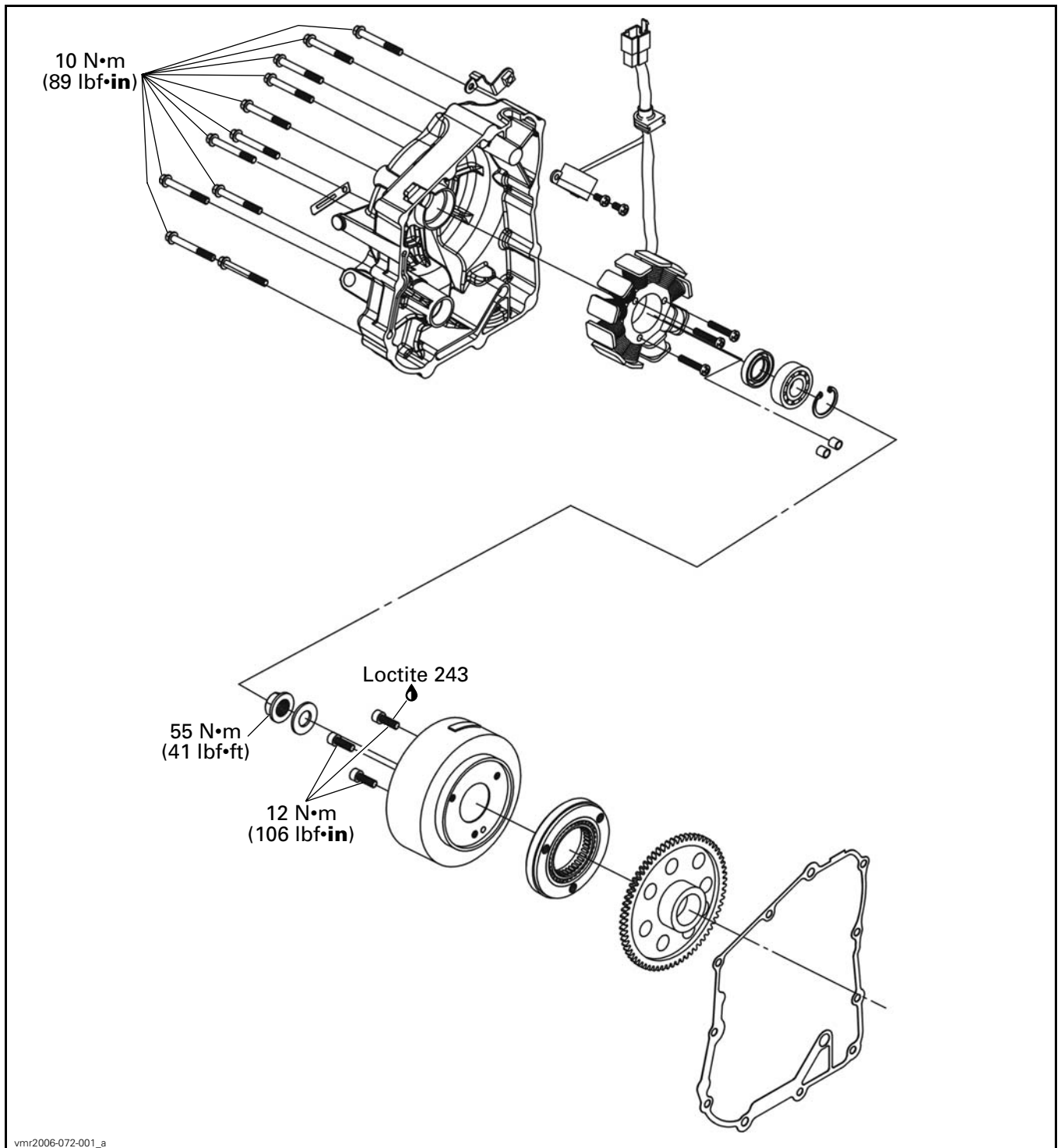
Refill and bleed cooling system with recommended coolant.

Pressure test cooling system.

MAGNETO AND STARTER DRIVE

SERVICE TOOLS

Description	Part Number	Page
crankshaft protector	529 036 051	66
magneto puller	529 036 049	66



Section 03 ENGINE

Subsection 07 (MAGNETO AND STARTER DRIVE)

GENERAL

Always disconnect battery.

WARNING

Always disconnect battery cables exactly in the specified order, BLACK (-) cable first.

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

WARNING

Torque wrench tightening specifications must strictly be adhered to. Locking devices (ex.: 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

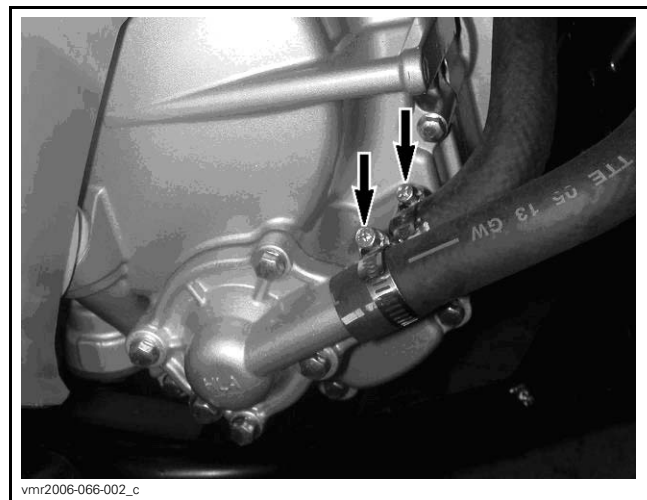
MAGNETO COVER

Removal

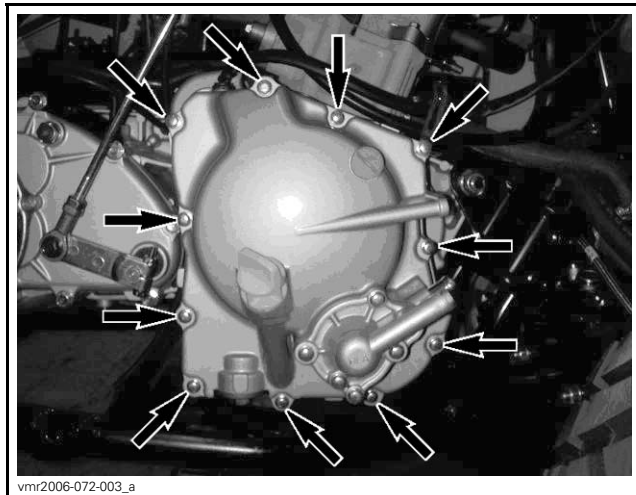
Drain engine oil. Refer to *LUBRICATION SYSTEM*.

Drain engine coolant. Refer to *COOLING SYSTEM*.

Disconnect coolant hoses.



Remove magneto cover.



Remove dowel pins and gasket.



Inspection

Inspect bearing. See *CRANKSHAFT END BEARING* in this section.

Installation

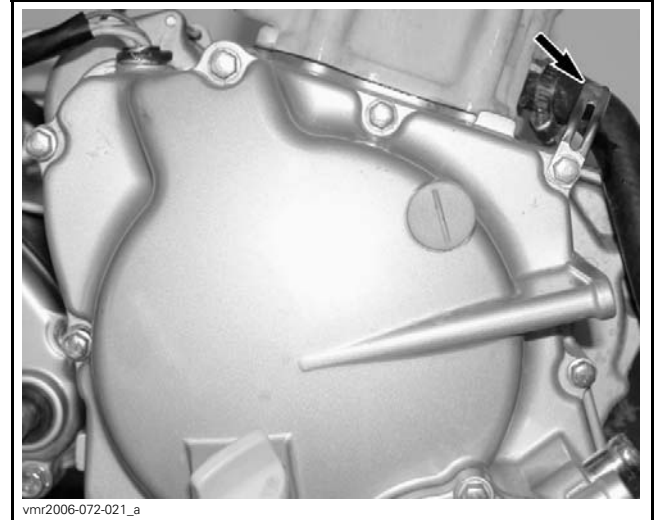
Remove water pump cover.

Install dowel pins and a new gasket.



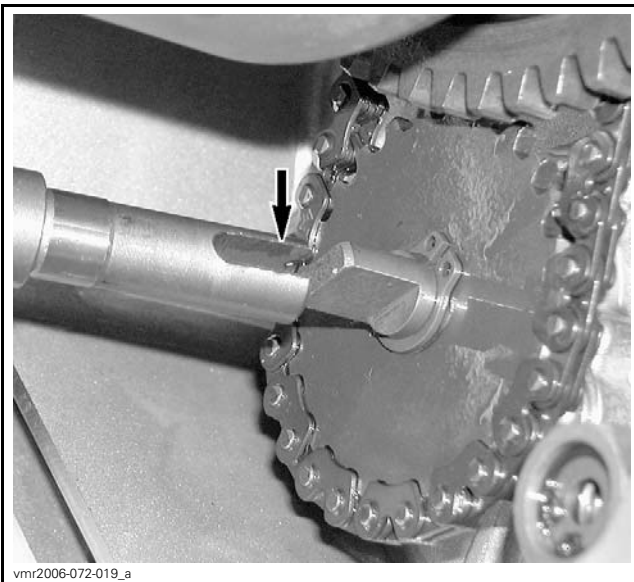
Install magneto cover.

Pay attention to engage water pump shaft end onto oil pump shaft. Turn coolant impeller as required.



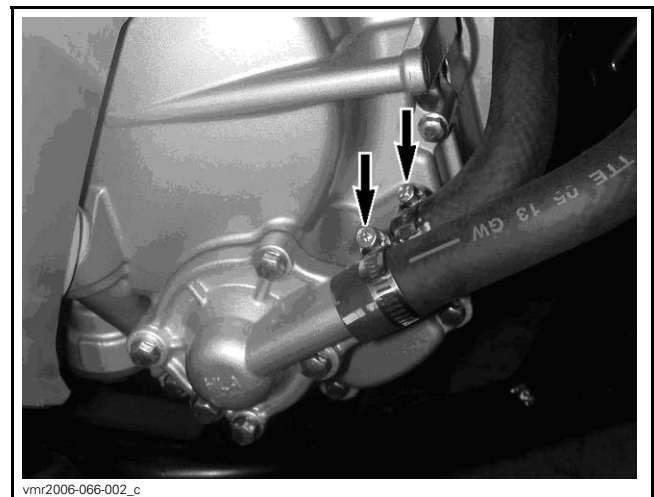
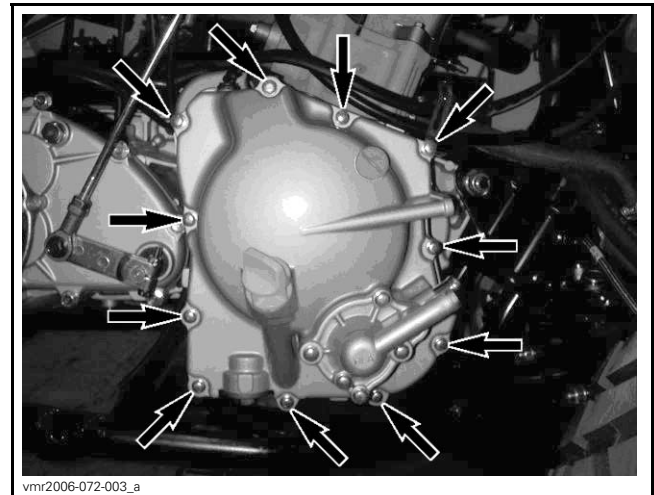
Properly torque cover screws.

Reinstall water pump cover with a new gasket.



CAUTION: Misalignment of water pump shaft will cause damage to engine components. Do not force cover at installation.

Position bracket as shown.



Reinstall coolant hoses.

Refill engine with the recommended oil. Refer to *LUBRICATION SYSTEM*.

Refill engine with the recommended coolant. Refer to *COOLING SYSTEM*.

Section 03 ENGINE

Subsection 07 (MAGNETO AND STARTER DRIVE)

TRIGGER COIL

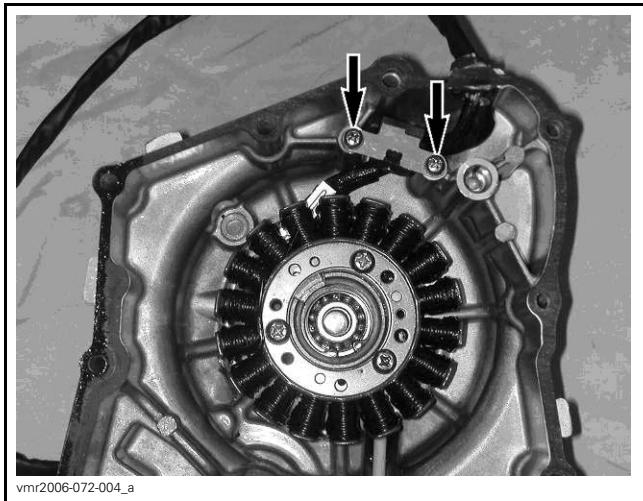
Test

Refer to *IGNITION SYSTEM*.

Removal

Remove magneto cover.

Remove trigger coil screws and pull trigger coil out.



Installation

Installation is essentially the reverse procedure of removal. However, pay attention to the following.

If removed, install stator in magneto cover prior to trigger coil.

STATOR

Test

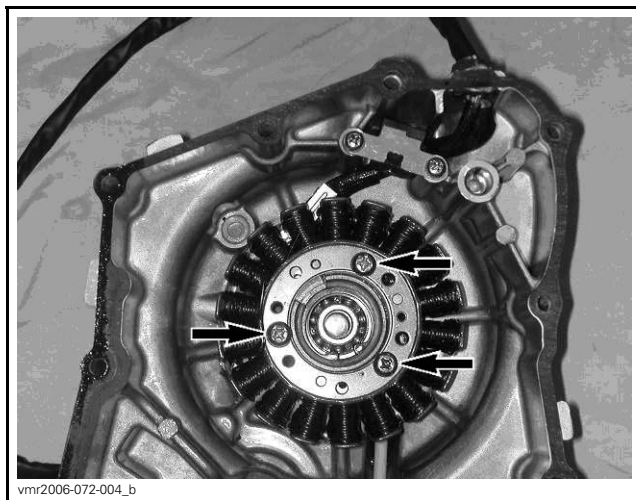
Refer to *CHARGING SYSTEM* for the stator test.

Removal

Remove magneto cover.

Remove trigger coil.

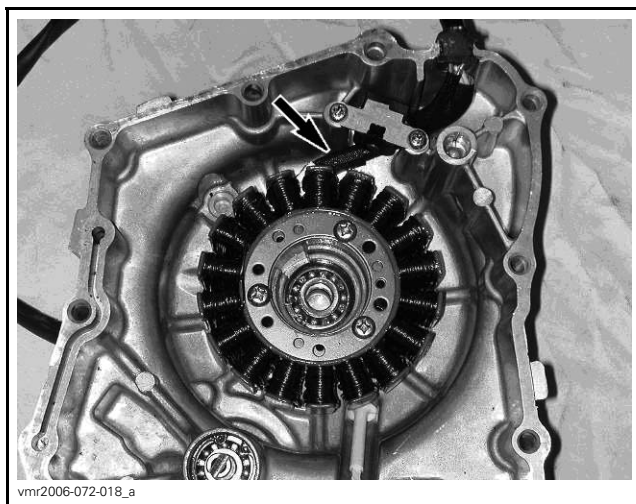
Remove stator screws and pull stator out.



Installation

Install stator in magneto cover. Position wiring harness in recess of crankcase.

CAUTION: Ensure to route wiring harness under trigger coil.



CRANKSHAFT END BEARING

Inspection

Remove magneto cover.

Bearing must turn smoothly and freely.

No excessive axial or radial play must be detected during inspection.

Replace a defective or suspicious bearing with a new one.

Check oil seal for wear or damage. Replace it if necessary.



Removal

Remove magneto cover.

NOTE: It is not necessary to remove stator to remove bearing.

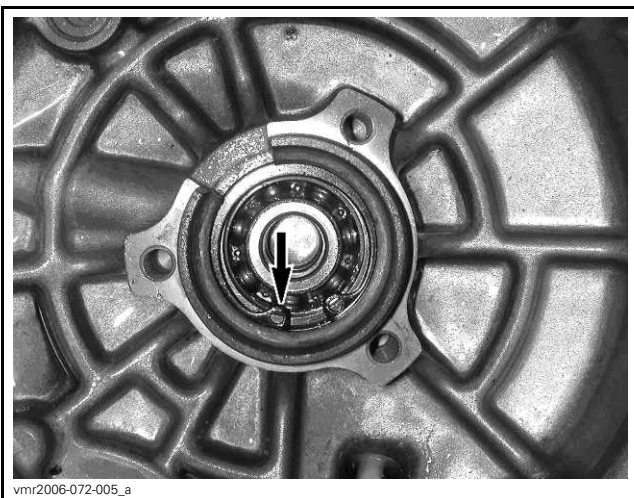
Always heat bearing bore up to 100°C (212°F) before removing its bearing. Use a heat gun.

WARNING

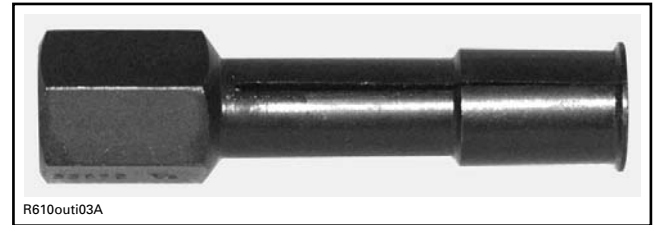
Clean oil, outside and inside, from cover before heating. Oil is inflammable.

CAUTION: Always support cover properly to remove bearing. Damage may occur if this procedure is not performed correctly.

Remove snap ring.



To remove bearing, use a blind hole bearing puller with a hammer puller.



Installation

Use an appropriate pusher to install magneto cover bearing.

CAUTION: Always support cover properly when installing bearing.

Never use a hammer to install bearing. Use a press only.

Always heat cover housing up to 100°C (212°F) before installing bearing. Use a heat gun.

WARNING

Clean oil, outside and inside, from housing before heating. Oil is inflammable.

Place new bearing in freezer for 10 minutes before installation.

Push against outer race to install bearing in its bore.

FLYWHEEL

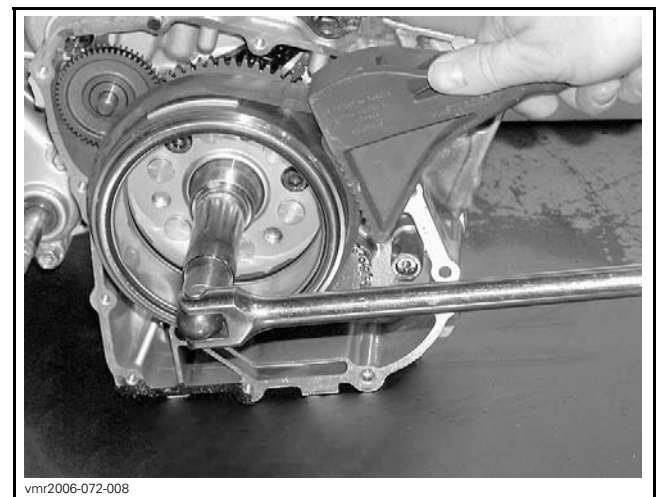
Removal

Remove magneto cover.

Hold flywheel with an appropriate pulley retainer.

NOTE: If you are unable to retain flywheel, remove CVT cover and block drive pulley with the pulley holder. Refer to *CONTINUOUSLY VARIABLE TRANSMISSION (CVT) SYSTEM*.

Remove flywheel nut.

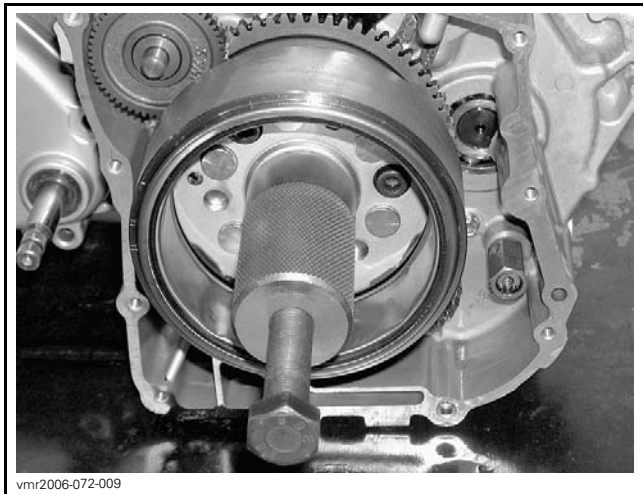


Section 03 ENGINE

Subsection 07 (MAGNETO AND STARTER DRIVE)

Install crankshaft protector (P/N 529 036 051) on crankshaft end .

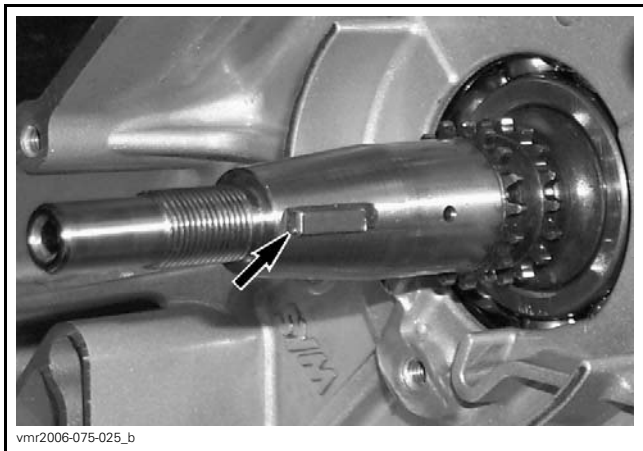
Use magneto puller (P/N 529 036 049) to remove flywheel.



NOTE: Turn puller screw to apply some pulling force then tap puller end with a hammer to release flywheel from crankshaft.

Inspection

Inspect woodruff key and keyways of crankshaft and flywheel.



Installation

CAUTION: Before installing flywheel, ensure taper is clean and free of grease.

NOTE: Make sure starter reduction gear is installed first.

Install flywheel and align its keyway with woodruff key on crankshaft.



Properly torque flywheel nut.

CAUTION: Ensure flywheel is well locked to adequately apply tightening torque.

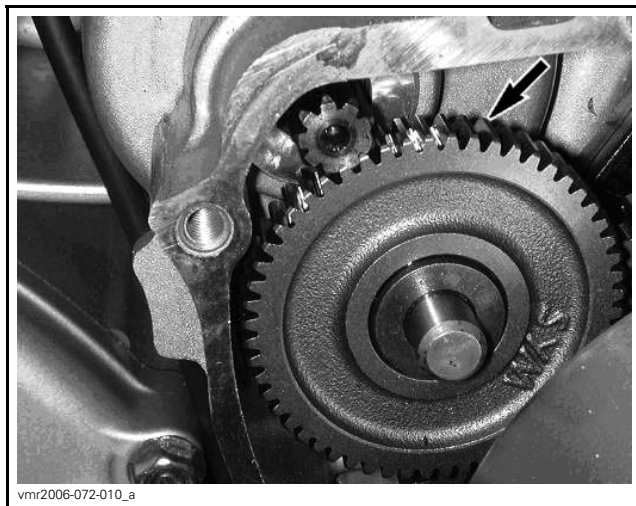
STARTER REDUCTION GEAR

Removal

Remove magneto cover.

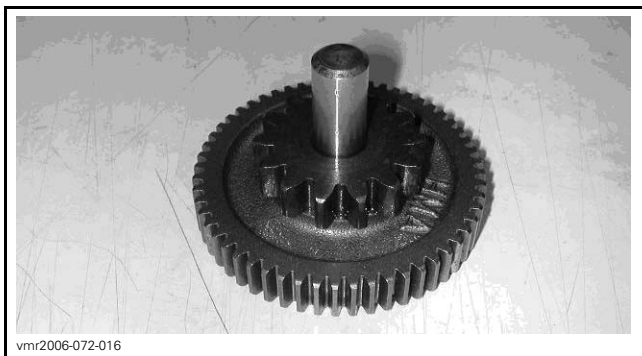
Remove flywheel.

Remove starter reduction gear and shaft.



Inspection

Check for wear and damage.



Installation

Installation is essentially the reverse procedure of removal.

STARTING CLUTCH GEAR

Inspection

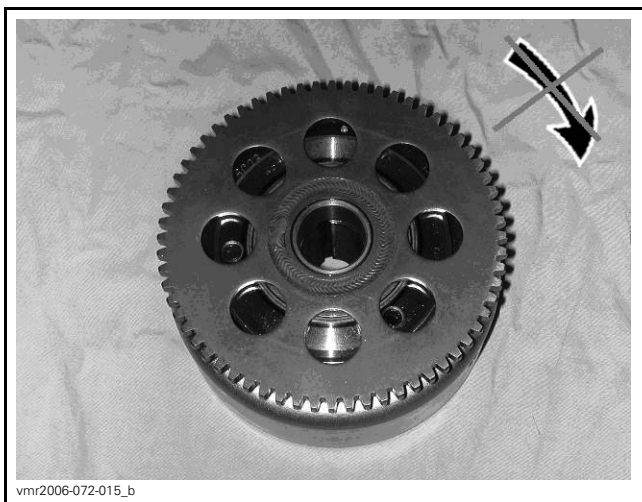
Remove magneto cover.

Remove flywheel.

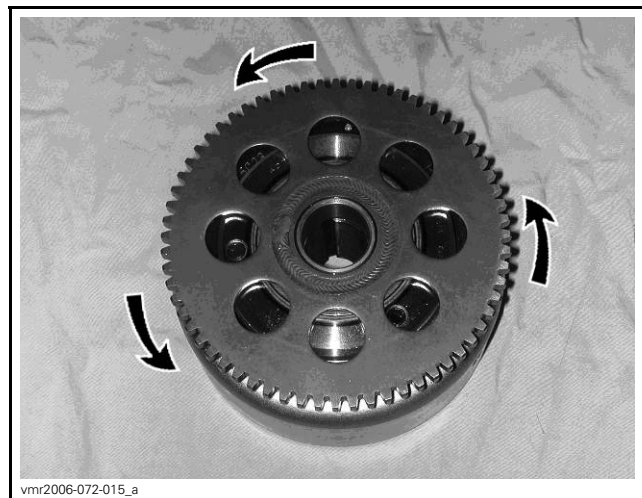
Check starting clutch gear for wear and damage.

Check clutch operation as follows.

Firmly hold flywheel while turning starting clutch gear clockwise. Gear must not turn.



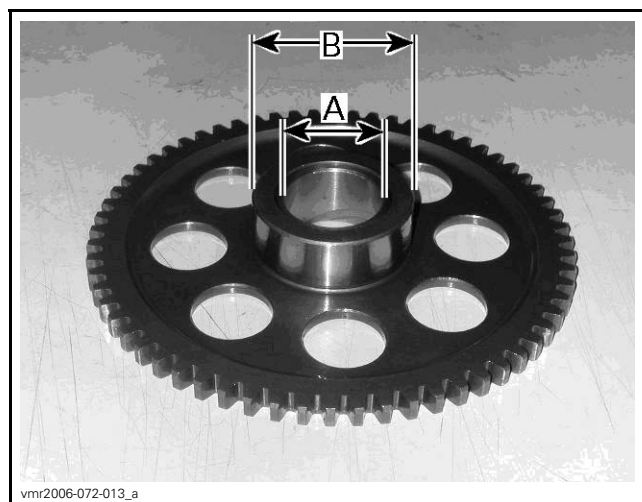
Firmly hold flywheel while turning starting clutch gear counterclockwise. Gear must turn freely.



Check outside diameter for hammered surface, deformation or scratches.

Measure diameters as follows.

STARTING CLUTCH GEAR		
CONDITION	INNER DIAMETER	OUTER DIAMETER
New	25.026 - 25.045 mm (.9853 - .9860 in)	42.192 - 42.208 mm (1.6611 - 1.6617 in)
Service limit	25.050 mm max. (.9862 in)	42.100 mm min. (1.6575 in)



A. Inner diameter
B. Outer diameter

Check each roller of one way clutch for wear or damage.

Section 03 ENGINE

Subsection 07 (MAGNETO AND STARTER DRIVE)



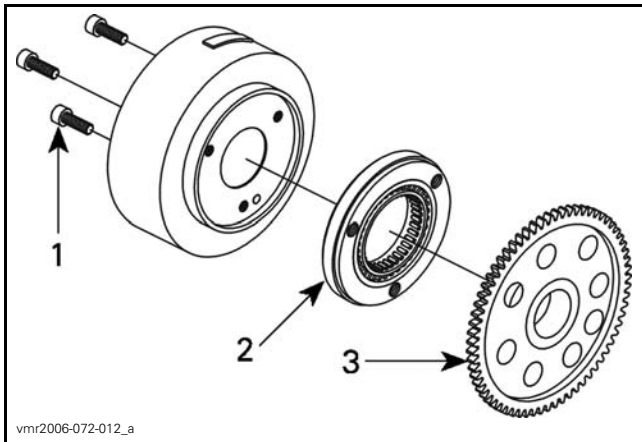
Removal

Remove magneto cover.

Remove flywheel.

Pull out starting clutch from flywheel.

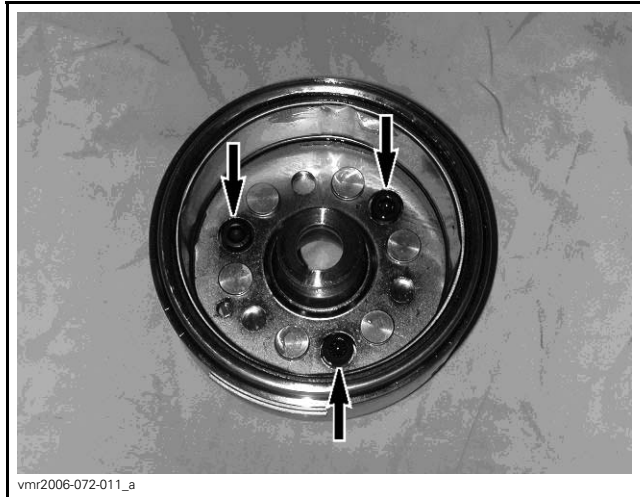
Remove screws then pull out one way clutch.



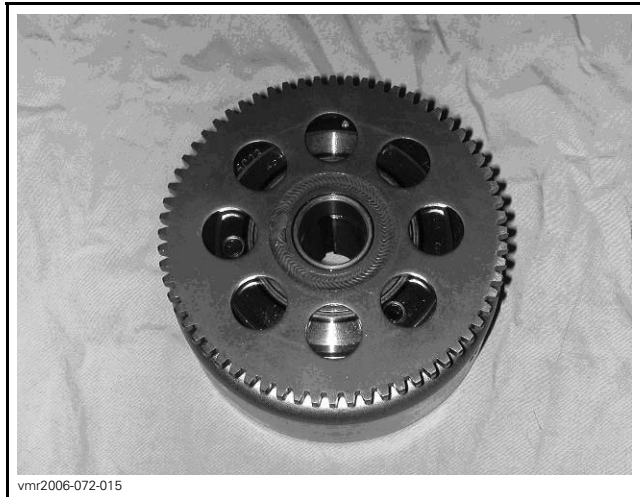
1. Retaining screws
2. One way clutch
3. Starting clutch

Installation

Install one way clutch on flywheel. Properly torque screws.



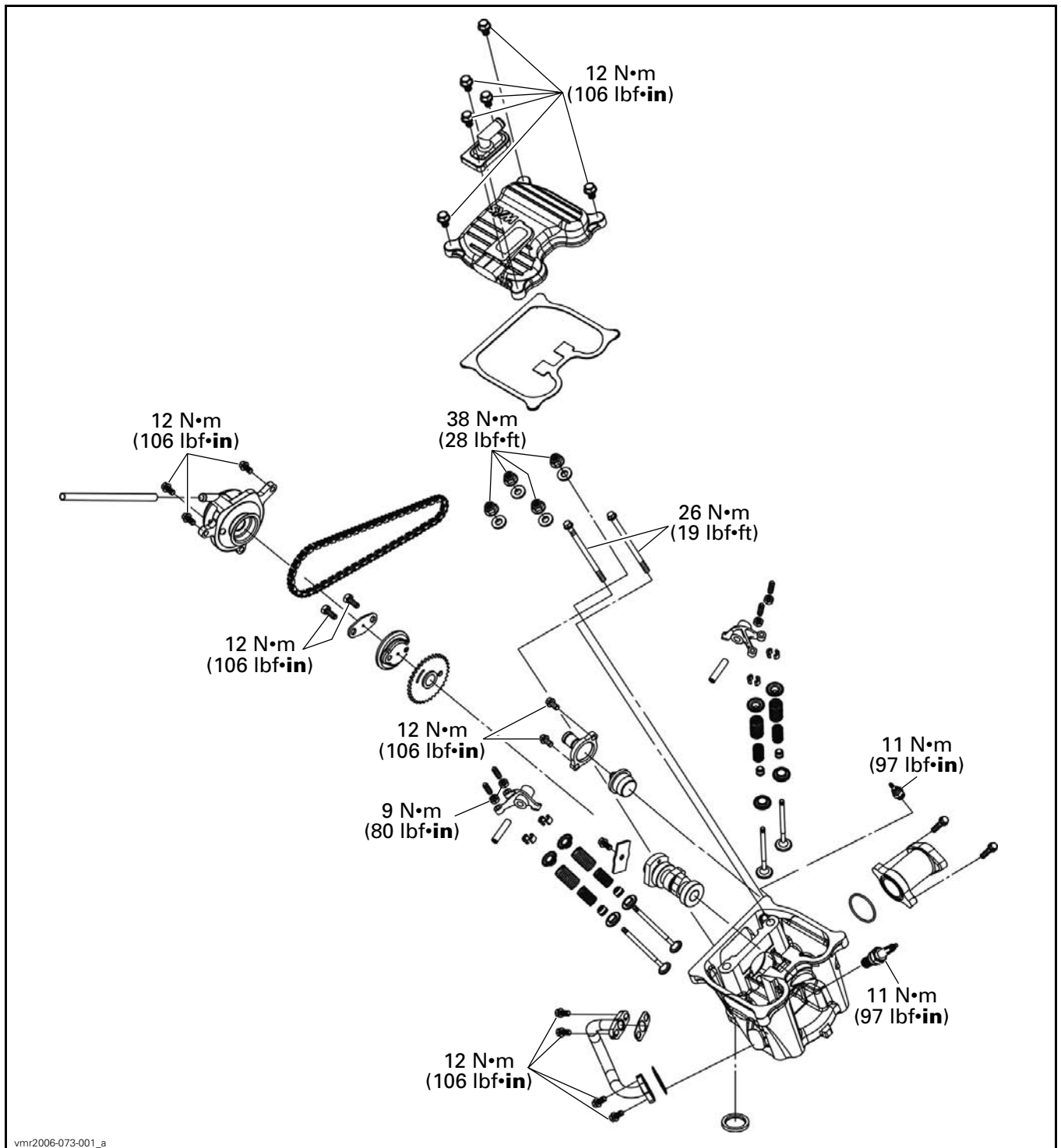
Install gear on one way clutch. Turn gear counter-clockwise to ease installation.



CYLINDER HEAD

SERVICE TOOLS

Description	Part Number	Page
valve spring compressor clamp	529 035 724	74, 80
valve spring compressor cup	529 035 764	74, 80



Section 03 ENGINE

Subsection 08 (CYLINDER HEAD)

GENERAL

When diagnosing an engine problem, always perform a leak test. Refer to *ENGINE LEAK TEST*.

Always place the vehicle on level surface.

Always disconnect the negative wire from the battery before working the engine.

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

WARNING

Torque wrench tightening specifications must strictly be adhered to.

Locking devices (ex.: 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.

When disassembling parts that are duplicated in the engine, (valves, springs, etc.), it is strongly recommended to note their position and to keep the parts of the same assembly as a "group". If you find a defective component, it will be much easier to find the cause of the failure among its group of parts (for example, if you find a worn valve guide, a bent spring could be the cause; it will be easier to know which one of the springs is the cause and to replace it). Besides, since parts are matched together, it is a good practice to reinstall parts in the same position.

Intake port/air filter contaminated (clogged) with dirt, sand, etc. leads to worn valves, piston rings and finally to loss of power.

CAUTION: In case of piston rings and/or valve replacement, always clean the whole engine and change oil.

VALVE CLEARANCE ADJUSTMENT

NOTE: Engine temperature must be below 35°C (95°F) to perform valve adjustment.

Preparation for Adjustment with Engine in Vehicle

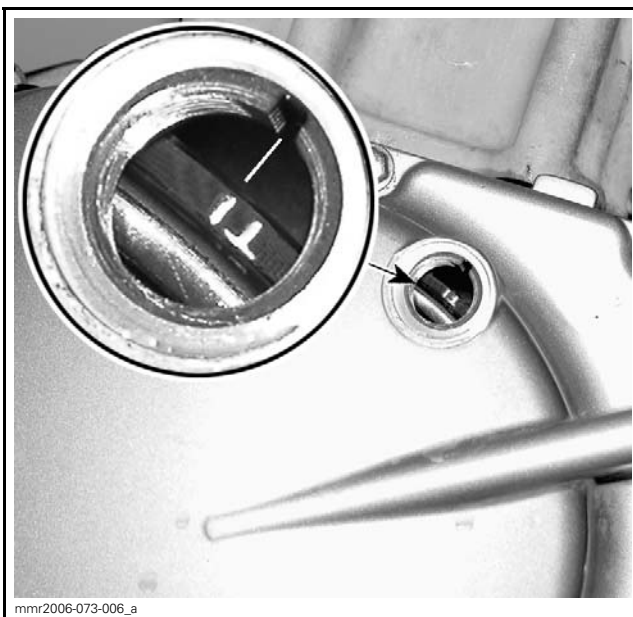


Remove fuel tank, air injection pipe upper screws, valve cover and spark plug.

Remove cylinder head side cover, CVT cover and magneto access plug.

Positioning Crankshaft and Camshaft

Turn drive pulley clockwise to bring piston at TDC. Align TDC mark as shown.



TDC MARK BESIDES THE "T" ALIGNED

Check if marks are aligned on camshaft gear as shown. Otherwise, continue turning drive pulley until crankshaft and camshaft marks are properly positioned.



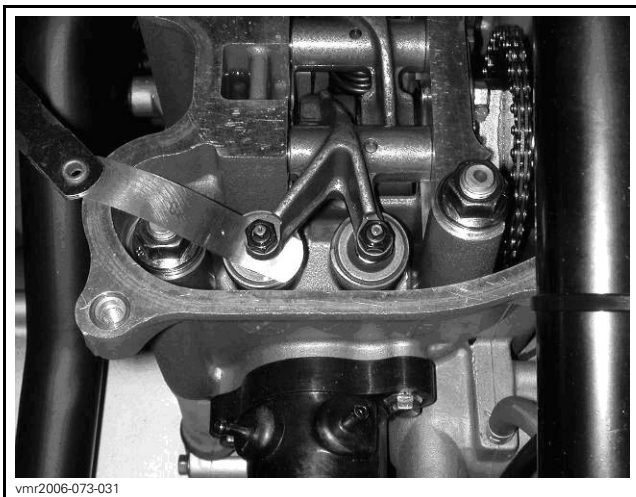
Adjustment

When marks are properly aligned, check valve clearance with a feeler gauge.

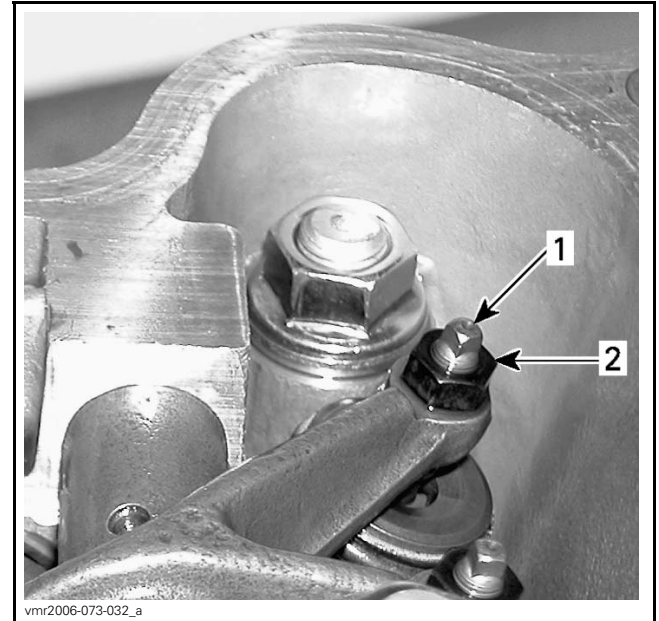
NOTE: All valves can be adjusted in this position.

VALVE CLEARANCE	
INTAKE	0.08 - 0.12 mm (.003 to .005 in)
EXHAUST	0.13 - 0.17 mm (.005 - .007 in)

Insert the appropriate thickness feeler gauge between valve stem end and rocker arm contact surface.



If adjustment is required, hold adjusting screw while loosening locking nut.



1. Adjusting screw
2. Lock nut

Turn adjustment screw as required.

When adjustment is appropriate, hold adjusting screw while tightening locking nut.

Recheck adjustment.

Reinstall cylinder head side cover.

NOTE: It is a good opportunity to check the engine lubrication system. See *ENGINE OIL PRESSURE* in the *LUBRICATION SYSTEM* section.

Reinstall remaining removed parts.

CYLINDER HEAD REMOVAL

Clean engine.

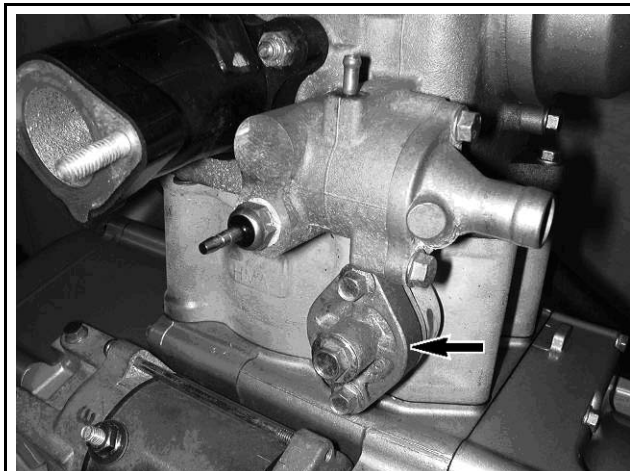
Remove engine from vehicle. Refer to *ENGINE REMOVAL AND INSTALLATION*.

NOTE: Rocker arms can be removed when engine is in vehicle.

Remove timing chain tensioner.

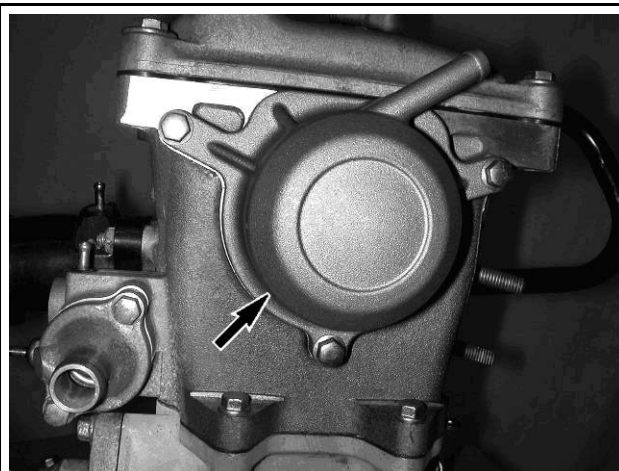
Section 03 ENGINE

Subsection 08 (CYLINDER HEAD)



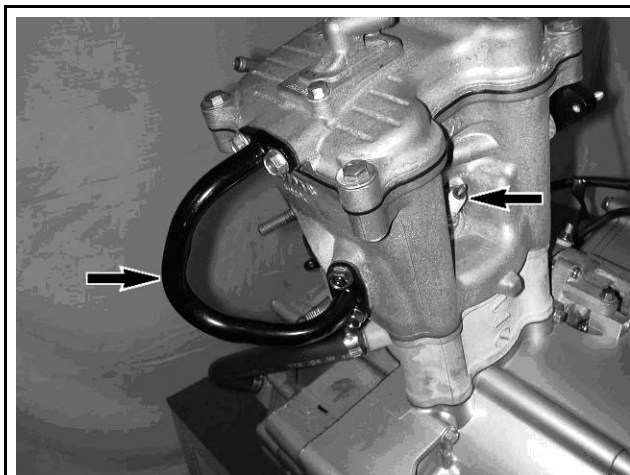
mmr2006-073-002_a

Remove air injection system pipe and spark plug.



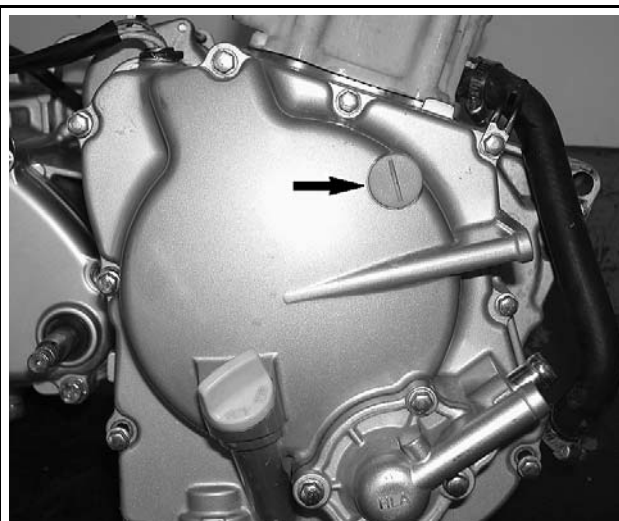
mmr2006-073-004_a

Remove magneto access plug.



mmr2006-073-003_a

Remove valve cover.



mmr2006-073-005_a

Remove CVT cover.

Turn drive pulley clockwise to bring piston at TDC.
Align TDC mark as shown.



mmr2006-073-007_a

Remove cylinder head side cover.

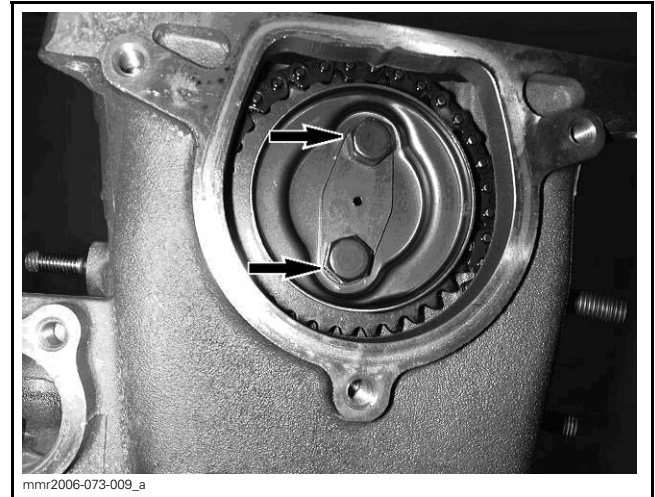


TDC MARK BESIDES THE "T" ALIGNED

Check if marks are aligned on camshaft gear as shown. Otherwise, continue turning drive pulley until crankshaft and camshaft marks are properly positioned.



Remove camshaft gear bolts. Detach gear from chain.

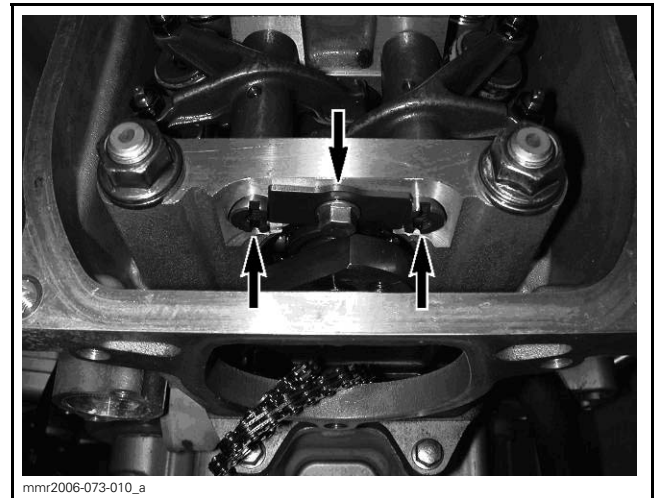


NOTE: Attach timing chain to prevent it from falling.

Remove camshaft locking plate.

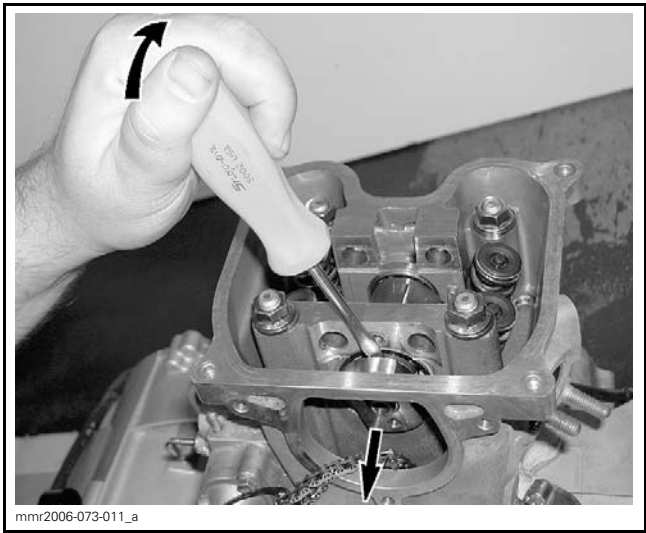
Screw in a M5 x 0.8 x 75 screw in rocker arm shaft end then pull it out. Remove both shafts.

NOTE: The throttle idle stop screw can be used.

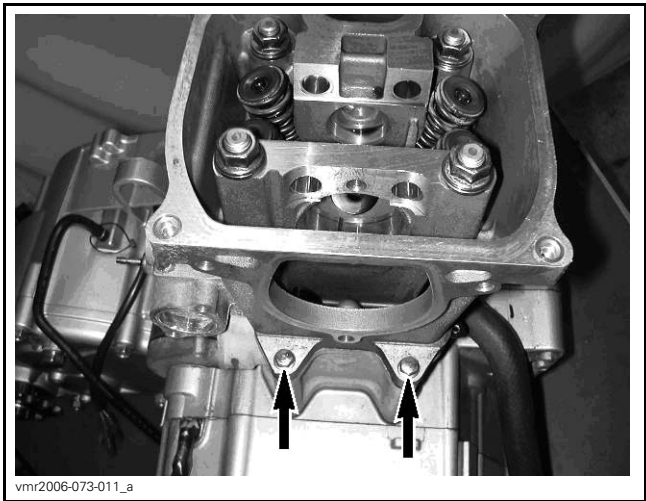


Remove camshaft. Use a suitable puller or carefully pry out with a screwdriver.

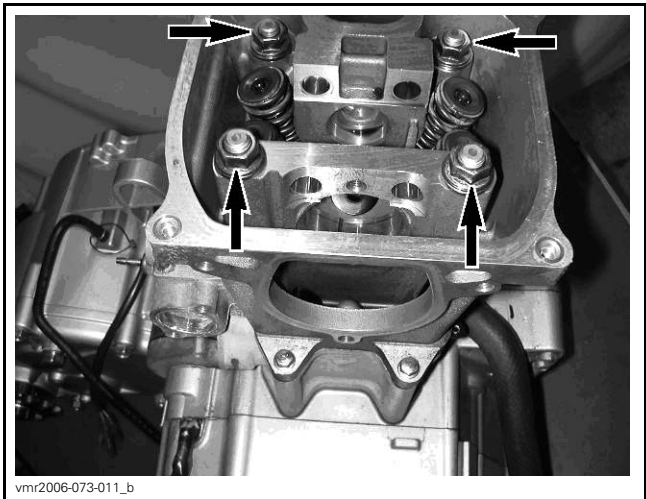
Section 03 ENGINE
Subsection 08 (CYLINDER HEAD)



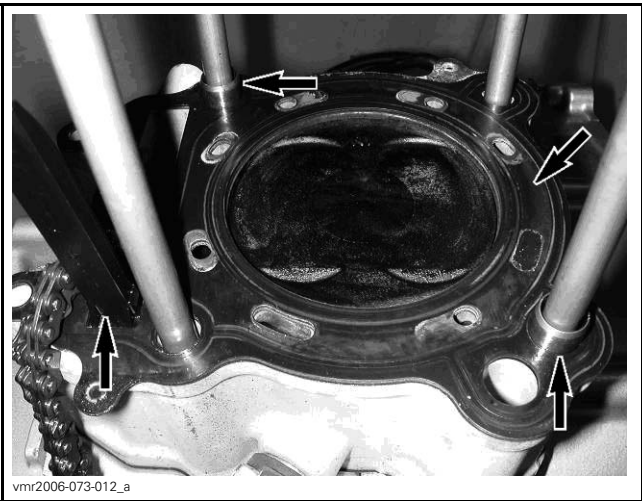
Remove small mounting bolts.



Remove cylinder head retaining nuts. Remove cylinder head.



Remove cylinder head gasket, dowel pins and chain guide.



CYLINDER HEAD DISASSEMBLY

Valve

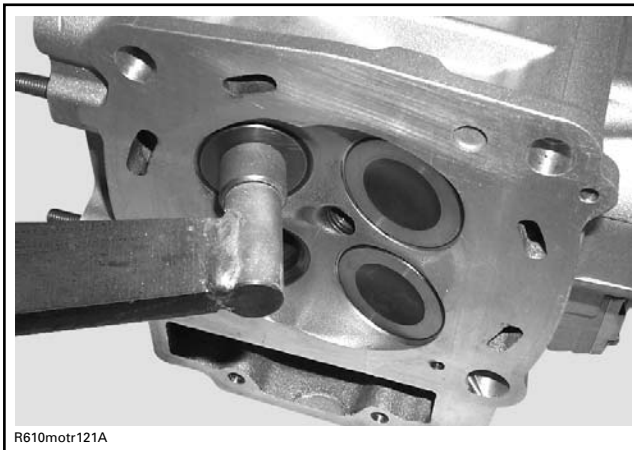
Use valve spring compressor clamp (P/N 529 035 724) and valve spring compressor cup (P/N 529 035 764).



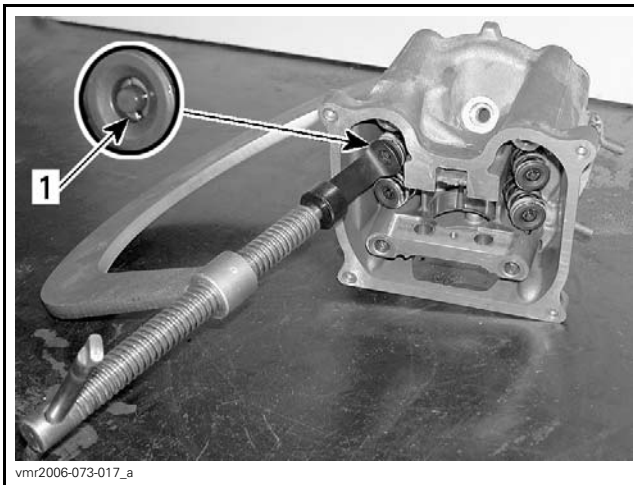
Compress spring valve and remove valve cotters.

⚠ WARNING

Always wear safety glasses when disassembling valve springs. Be careful when unlocking valves. Components could fly away because of the strong spring preload.



TYPICAL — LOCATE VALVE SPRING COMPRESSOR CLAMP IN CENTER OF THE VALVE



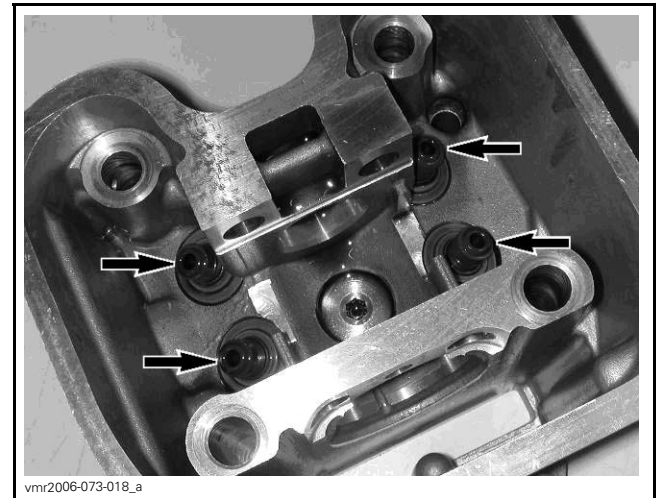
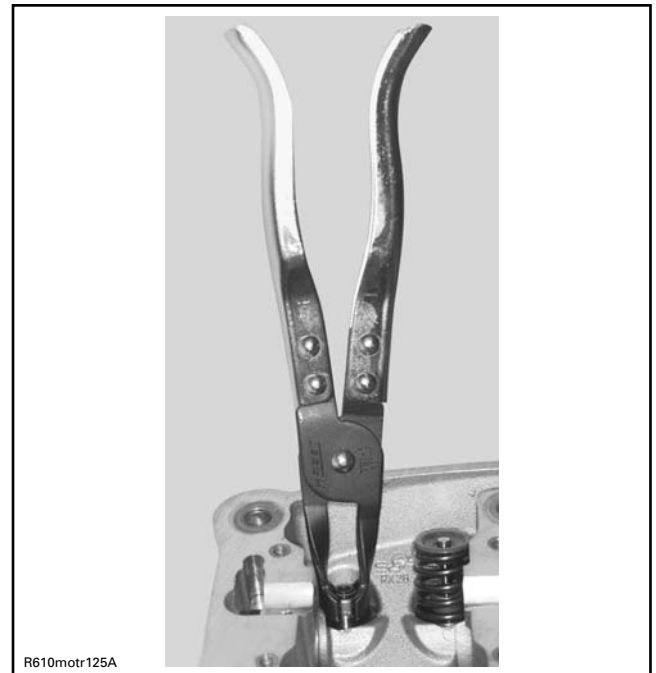
1. Valve cotter

CAUTION: To avoid changing spring characteristics, do not compress too much. Compress spring about the length of valve cotter.

Carefully remove clamp then pull out valves.

Valve Stem Seal

Remove valve stem seals with valve stem seal pliers (Snap-on YA 8230).



CLEANING

Clean gasket residues off the contact surfaces.

CAUTION: Pay attention not to damage contact surface of the gasket. It is better to moisten the gasket residue for easy scraping. Take care so that no residue falls into crankcase or oil/coolant passages.

Clean carbon deposits in combustion chamber. Clean residues and foreign materials on cylinder head matching surfaces.

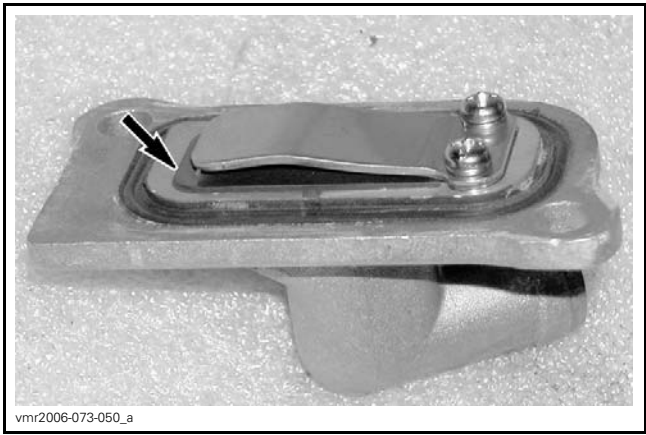
PARTS INSPECTION

Reed Valve

Remove reed valve from valve cover.

Section 03 ENGINE
Subsection 08 (CYLINDER HEAD)

Inspect valve condition. Valve blade should not be bent and should rest against its seat.

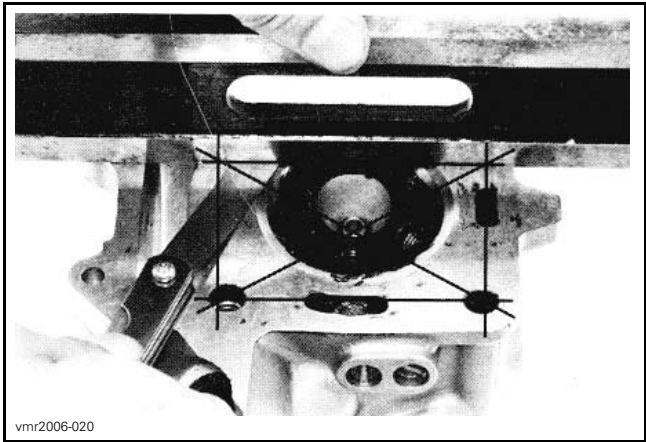


Replace valve as necessary.

Cylinder Head

Check if spark plug and valve ports are cracked. Check also between valve seats.

Measure cylinder head warpage with a straight edge and a feeler gauge.

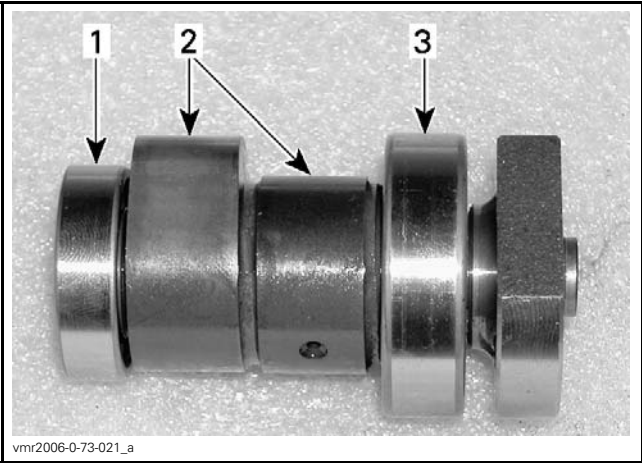


WARPAGE	
Service limit	0.50 mm (.020 in)

Camshaft

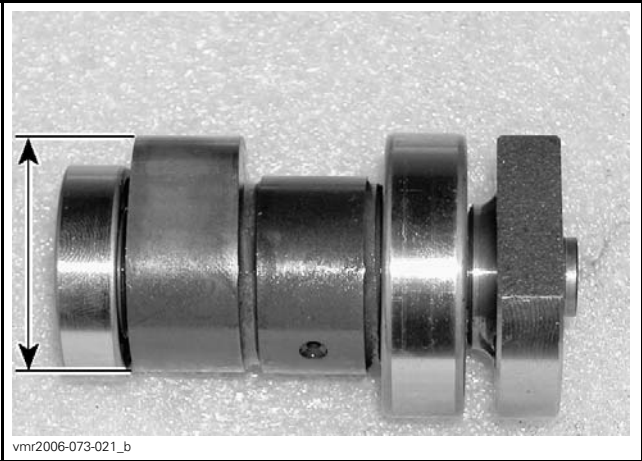
Check each lobe of camshaft for scoring, scuffing, cracks or other signs of wear.

Manually turn each bearing to see if it turns freely, smoothly and noiselessly. Check for radial and axial play.



- 1. Bearing
- 2. Lobe
- 3. Bearing

Measure cam lobe with a micrometer.



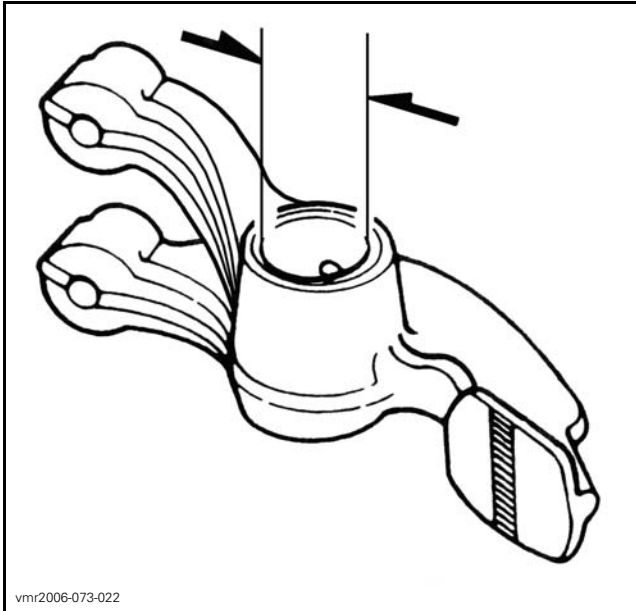
CAMSHAFT LOBE		
DESCRIPTION	INTAKE	EXHAUST
New	34.880 mm (1.3732 in)	34.740 mm (1.3677 in)
Service limit	34.860 mm (1.3724 in) min.	34.725 mm (1.367 in) min.

If any component does not meet requirements, replace camshaft as a set with bearings.

Rocker Arm

Inspect each rocker arm for cracks and scored friction surfaces. Ensure lubrication hole is not plugged.

Measure rocker arm bore diameter.

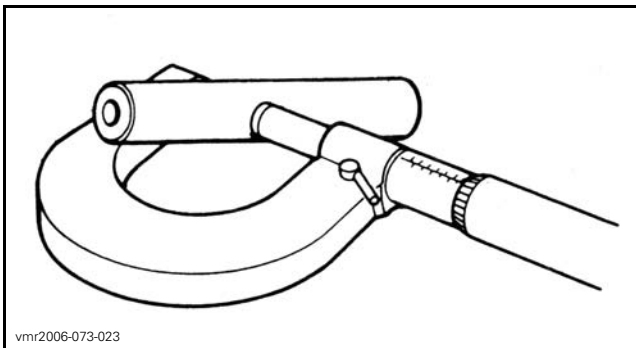


ROCKER ARM BORE DIAMETER	
New	11.982 - 12.000 mm (.4717 - .4724 in)
Service limit	12.080 mm (.4756 in) max.

Check adjustment screws for free movement, cracks and/or excessive play.

Rocker Arm Shaft

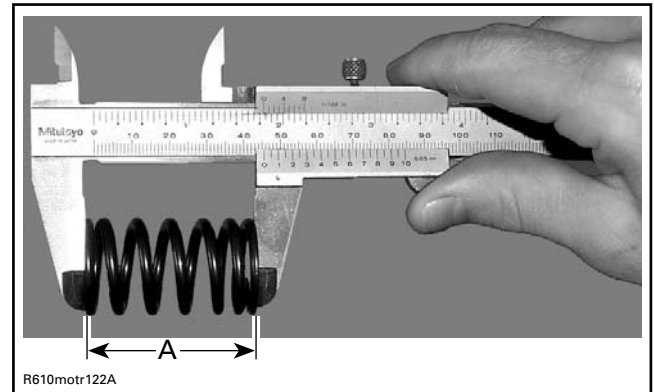
Check for scored friction surfaces.
Measure rocker arm shaft diameter.



ROCKER ARM SHAFT DIAMETER	
New	11.966 - 11.984 mm (.4711 - .4718 in)
Service limit	11.936 mm (.4699 in) max.

Valve Spring

Check valve spring for visible damages.
Check also for free length and straightness.



A. Valve spring free length

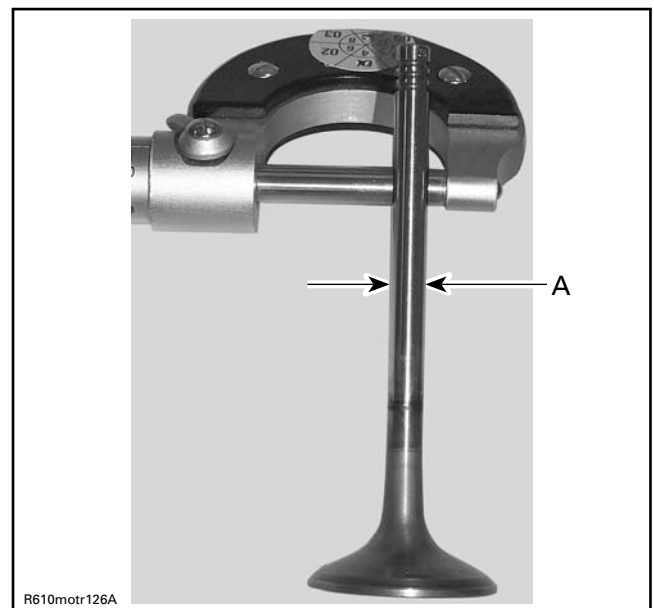
VALVE SPRING FREE LENGTH		
DESCRIPTION	INNER	OUTER
New	38.70 mm (1.523 in)	40.40 mm (1.591 in)
Service limit	35.20 mm (1.386 in)	36.90 mm (1.453 in)

Valve

Inspect valve surface, check for abnormal stem wear, burning, cracking and bending.

Check the operation condition of valve stem in valve guide.

Measure valve stem outer diameter at 3 different places.

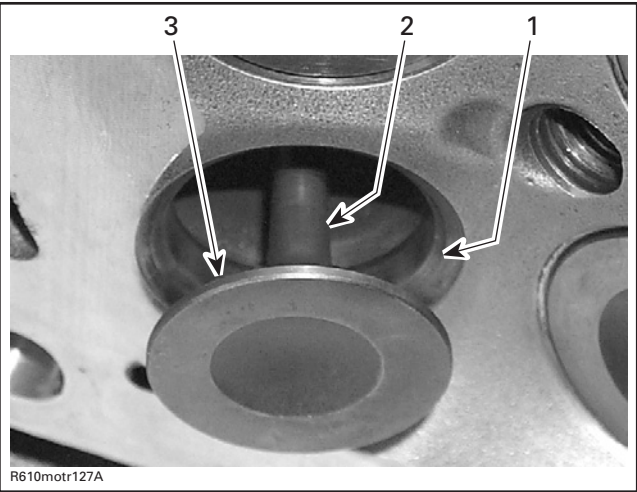


A. Valve stem diameter

Section 03 ENGINE
Subsection 08 (CYLINDER HEAD)

Table with 3 columns: DESCRIPTION, INTAKE, EXHAUST. Rows include New and Service limit measurements for Valve Stem Diameter.

Check valve face and seat for burning or pittings. Replace valve or cylinder head if damaged.
NOTE: Whenever a valve is replaced, it must be properly faced.

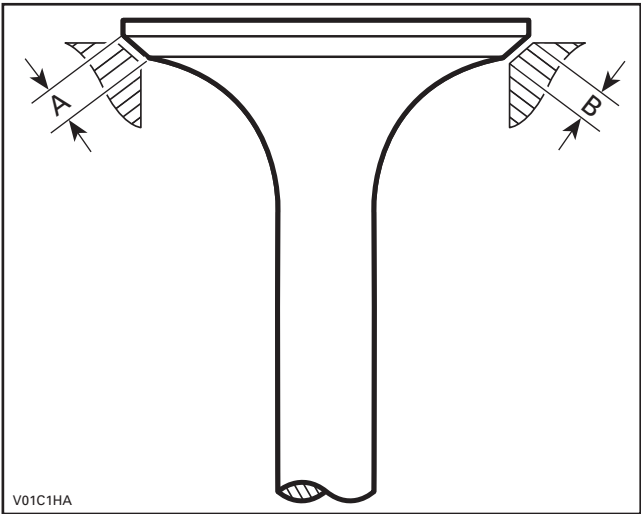


- TYPICAL
1. Valve seat
2. Valve stem
3. Valve face (contact surface to valve seat)

Measure valve face contact width.
NOTE: The location of contact area should be in center of valve seat.
Measure valve seat width, using a caliper.

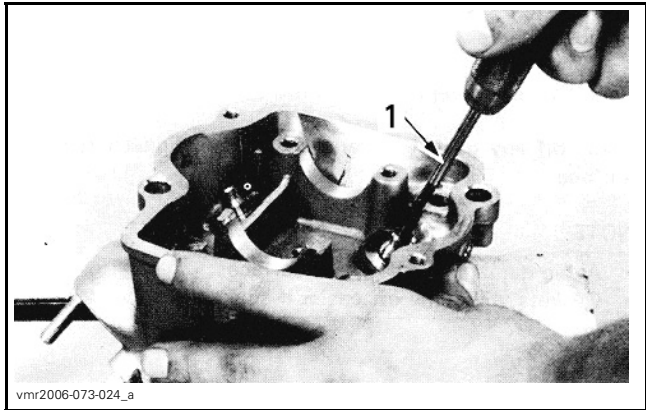
Table with 2 columns: SERVICE LIMIT, MEASUREMENT. Row includes Valve Seat Contact Width with a service limit of 1.60 mm (.063 in).

If valve seat contact width is too wide or has dark spots, replace cylinder head.



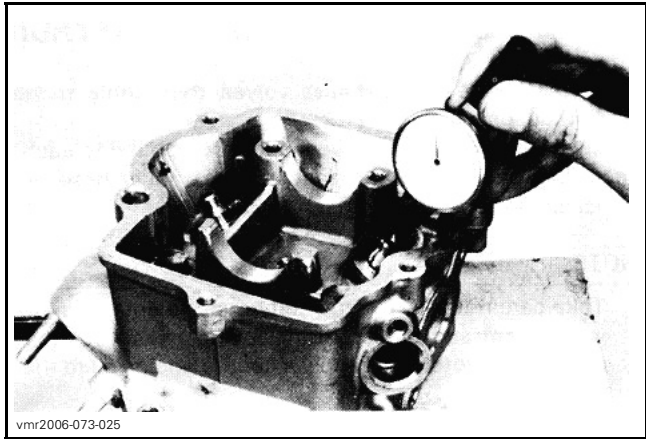
A. Valve face contact width
B. Valve seat contact width

Valve Guide
Clean valve guide with a 5 mm (.1968 in) reamer to remove carbon deposits before measuring.



1. Reamer

Measure each valve guide inner diameter at 3 different places.



VALVE GUIDE INNER DIAMETER	
DESCRIPTION	INTAKE
New	5.000 - 5.012 mm (.1968 - .1973 in)
Service limit	5.030 mm (.1980 in)

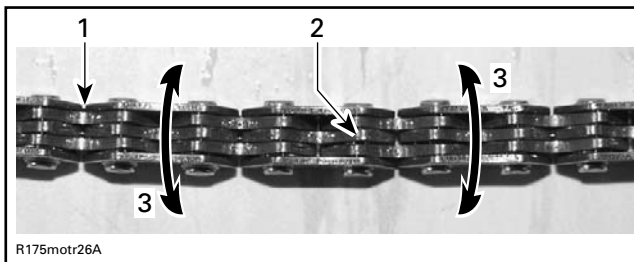
If part does not meet requirements, replace cylinder head.

NOTE: Whenever a valve guide is replaced, it must be properly reamed.

Timing Chain

Check timing chain sprocket condition. Mesh chain in sprocket and check for excessive radial play.

Check chain condition for wear and the condition of the chain segments.



1. Timing chain
2. Timing chain segments
3. Timing chain bending

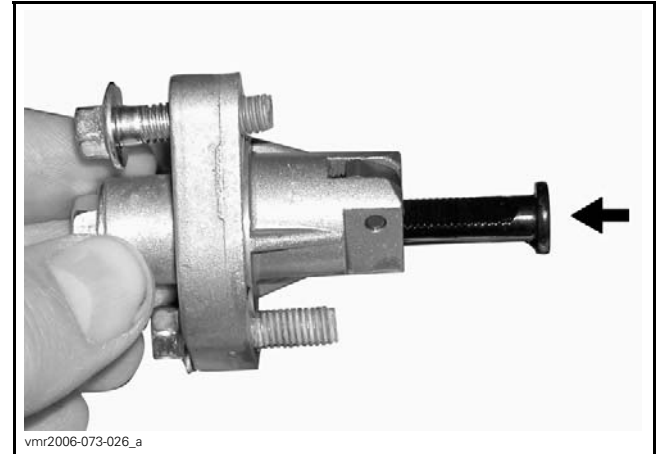
If sprocket is worn or timing chain is excessively worn or damaged, replace them as a set: crankshaft, camshaft gear and chain. Refer to *CRANK-SHAFT AND CRANKCASE* for procedures.

Chain Tensioner

Check tensioner notches for damage.

Install spring and screw. Tensioner pusher should go out.

Try to push in pusher. It must not go in. Otherwise, replace it.



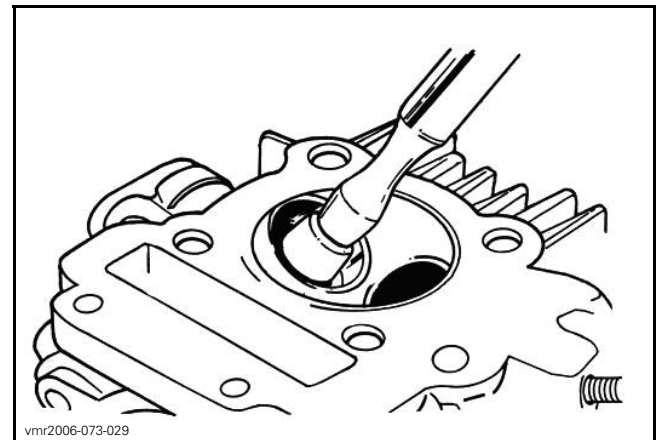
CYLINDER HEAD ASSEMBLY

Assembly is essentially the reverse procedure of disassembly. However, pay attention to the following.

Cylinder Head

Install new valve stem seals every time valves are removed.

When installing new valves, apply some lapping compound to valve face and work valve on its seat with a lapping tool. Ensure to properly clean cylinder head and valve when done.

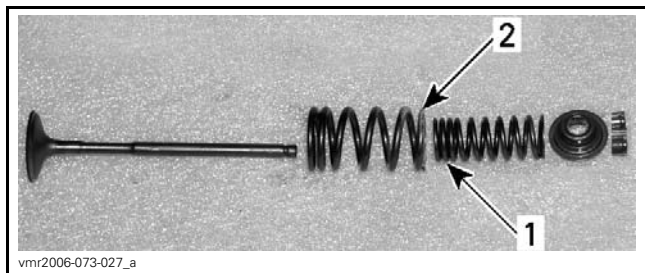


Position **inner** spring with its tightest coils against cylinder head.

Position painted area of **outer** spring against valve spring retainer.

Section 03 ENGINE

Subsection 08 (CYLINDER HEAD)



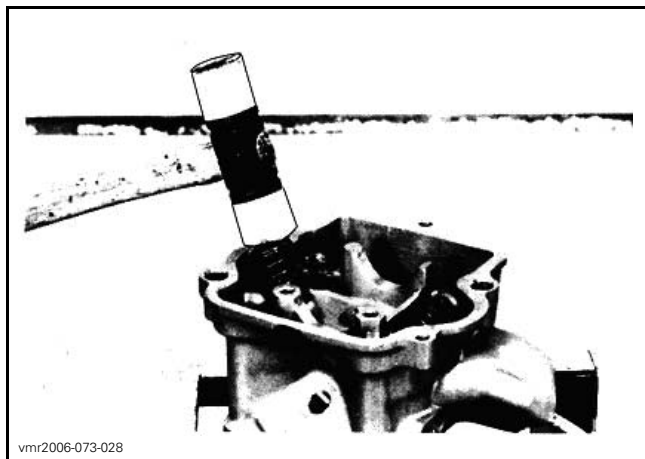
1. Tightest coils here
2. Painted area here

Use valve spring compressor clamp (P/N 529 035 724) and valve spring compressor cup (P/N 529 035 764) to reinstall valve springs.

WARNING

Never remain facing valve springs end. You might be injured if case of tool failure.

After spring is installed, ensure it is properly locked by tapping on valve stem end with a soft hammer so that valve opens and closes a few times.



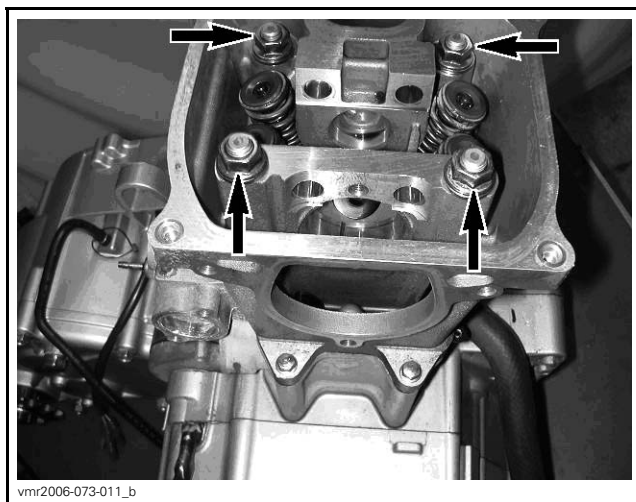
CYLINDER HEAD INSTALLATION

Install chain guide, dowel pins and a new cylinder head gasket onto the cylinder.

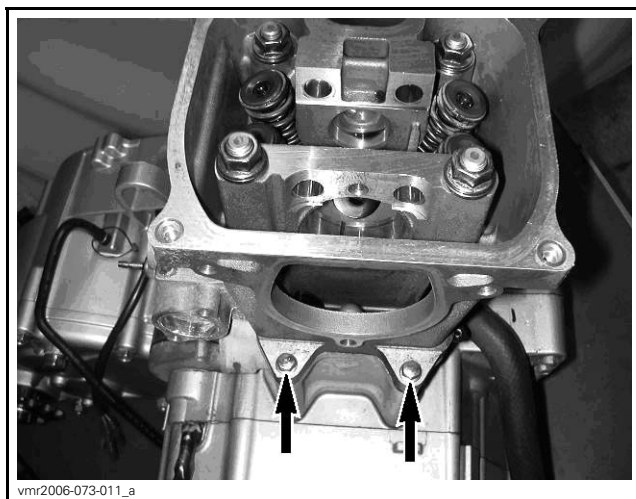
CAUTION: Prior to inserting chain guide, ensure to pull up chain to recover all slack so that chain is completely meshed with crankshaft gear. Hold chain tight then insert guide. This operation is critical so that chain remains in position for further assembly.



Install cylinder head and properly torque screws.



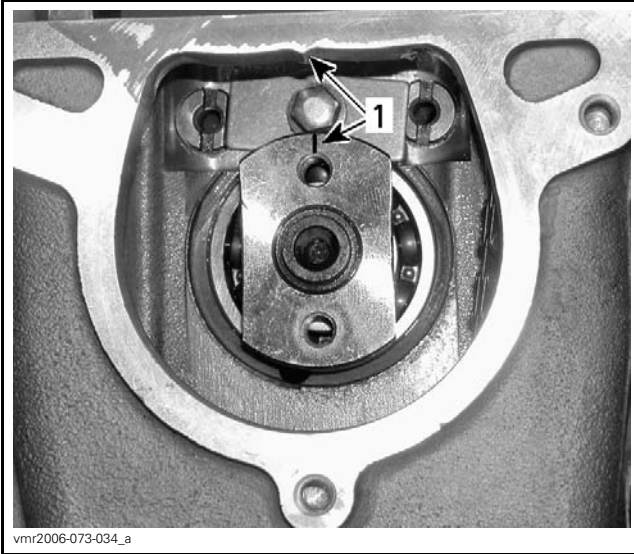
Install and properly torque small mounting bolts.



Install camshaft into cylinder head.
Align its mark with cylinder head mark.

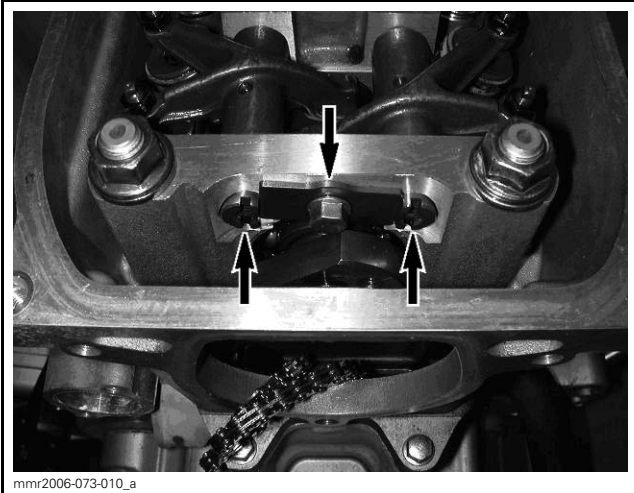
Section 03 ENGINE

Subsection 08 (CYLINDER HEAD)



1. Marks aligned

Install and turn rocker arm shafts so that their flat sides align with locking plate. Secure locking plate.



To properly perform camshaft timing, do the following.

- Position crankshaft at TDC. Align TDC mark as shown

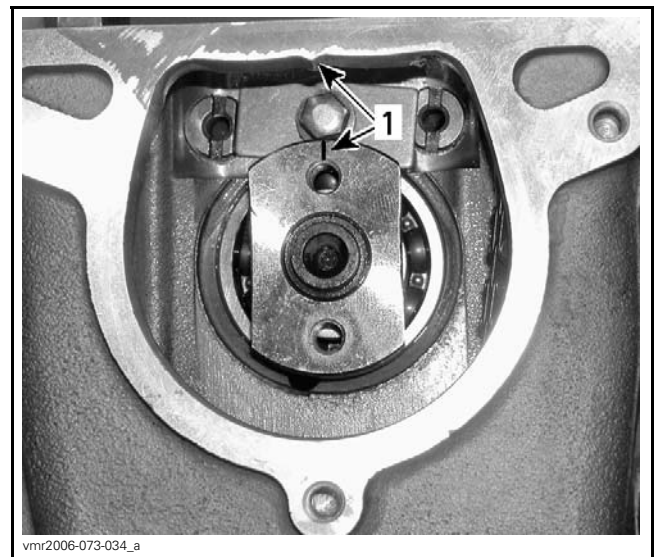


TDC MARK BESIDES THE "T" ALIGNED

CAUTION: Crankshaft must be placed at TDC position to set camshaft sprocket at the proper position. Otherwise serious engine damage might occur.

CAUTION: Ensure timing chain is properly meshed with crankshaft gear.

- Align camshaft mark with cylinder head. Hold in this position.

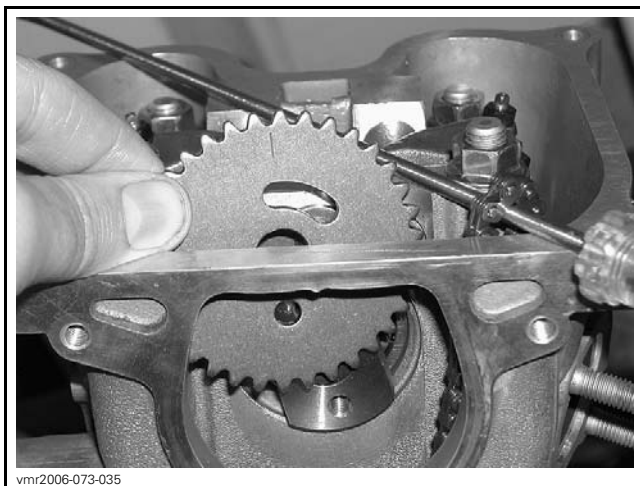


1. Marks aligned

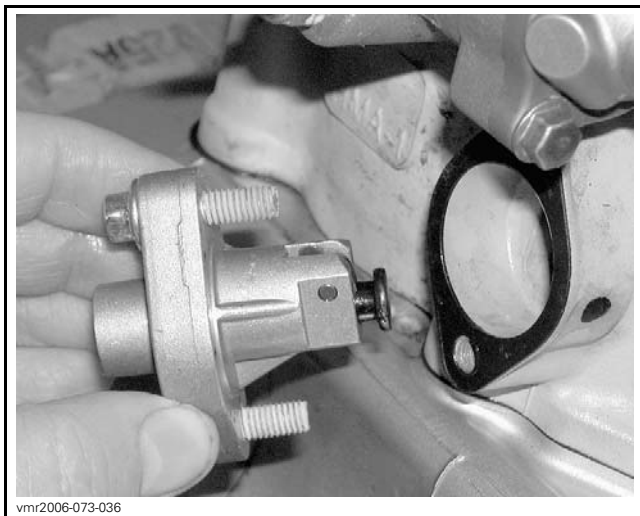
- Install timing chain on sprocket then bring them to camshaft aligning timing marks as shown.

Section 03 ENGINE

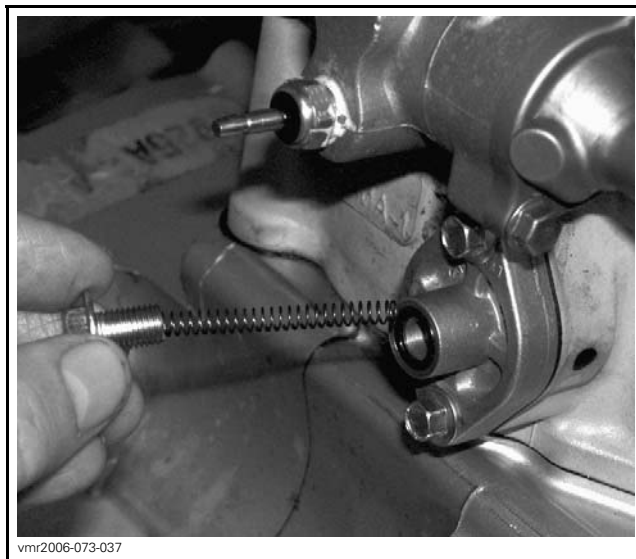
Subsection 08 (CYLINDER HEAD)



- Install and tighten retaining screws.
- Remove chain tensioner adjuster screw and spring.
- Fully push tensioner end in its body then install it in cylinder as shown.



- Torque tensioner screws.
- Install tensioner spring and tighten adjuster screw.



- **Recheck** camshaft timing marks.

NOTE: Ensure crankshaft is still at the proper position.

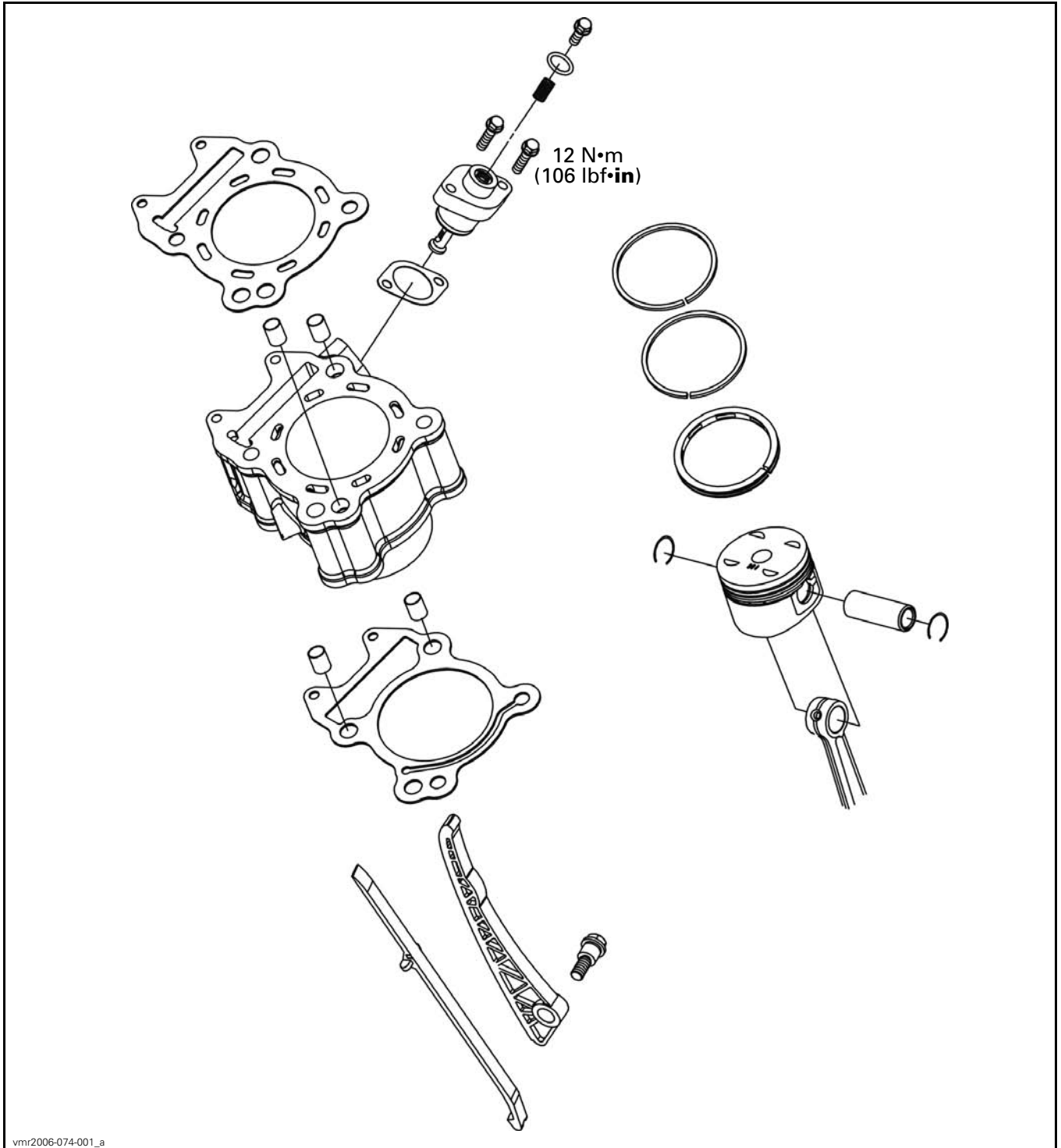
Install remaining components except valve cover and air injection pipe and spark plug.

Perform valve adjustment.

PISTON AND CYLINDER

SERVICE TOOLS

Description	Part Number	Page
piston circlip installer	529 036 048	88



Section 03 ENGINE

Subsection 09 (PISTON AND CYLINDER)

GENERAL

When diagnosing an engine problem, always perform an engine leak test. This will help pinpoint a problem. Refer to the instructions included with your leak tester and *ENGINE LEAK TEST* section for procedures.

Always place the vehicle on level surface.

Always disconnect the negative wire from the battery before working the engine.

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

WARNING

Torque wrench tightening specifications must strictly be adhered to.

Locking devices (ex.: 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.

When disassembling parts that are duplicated in the engine, (valves, springs, etc.), it is strongly recommended to note their position and to keep the parts of the same assembly as a "group". If you find a defective component, it will be much easier to find the cause of the failure among its group of parts (for example, if you found a worn valve guide, a bent spring could be the cause; it will be easy to know which one of the springs is the cause and to replace it). Besides, since parts are matched together, it is a good practice to reinstall parts in the same position.

Intake port/air filter contaminated (clogged) with dirt, sand, etc. (leads to worn valves, piston rings and finally to leak of power).

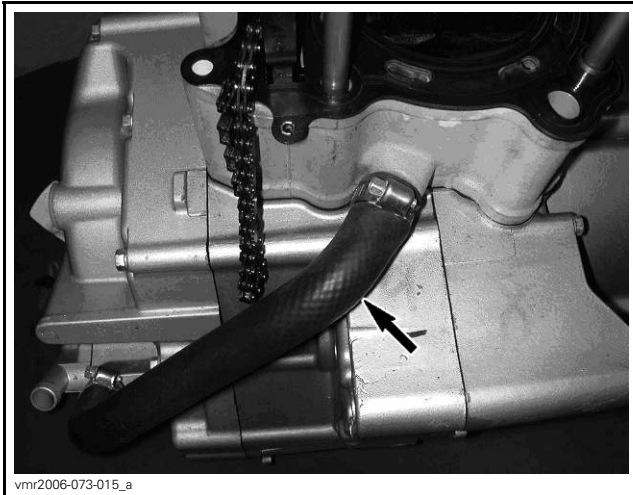
CAUTION: In case of piston rings and/or valve replacement, always clean the whole engine and change oil.

DISASSEMBLY

Remove engine from vehicle. Refer to *ENGINE REMOVAL AND INSTALLATION*.

Remove cylinder head. Refer to *CYLINDER HEAD*.

Remove coolant hose then cylinder.



Remove cover crankcase opening with a clean cloth.

Remove piston pin circlips.

WARNING

Piston ring circlips are spring loaded.

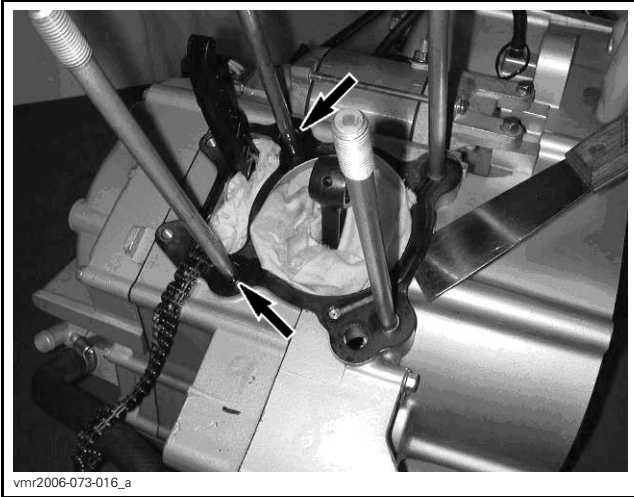
Discard circlips.

Push piston pin out and remove piston.



Clean piston pin from deposits using synthetic abrasive woven.

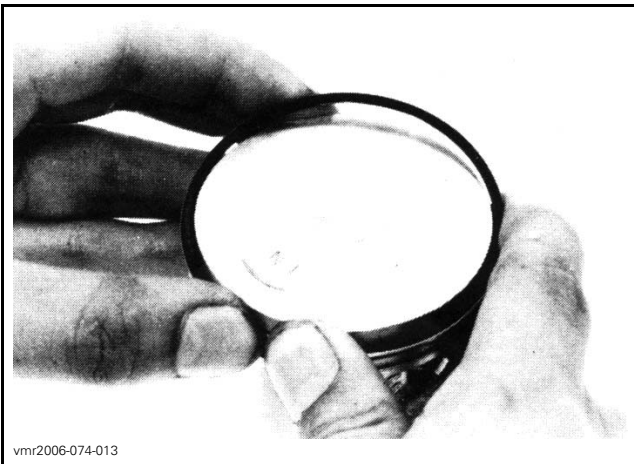
Remove gasket and dowel pins.



Clean gasket residues off the contact surfaces.

CAUTION: Pay attention not to damage contact surface of the gasket. It is better to moisten the gasket residue for easy scraping. Take care so that no residue falls into crankcase or oil/coolant passages.

Remove piston rings.



Clean piston grooves.

NOTE: A broken ring works well.

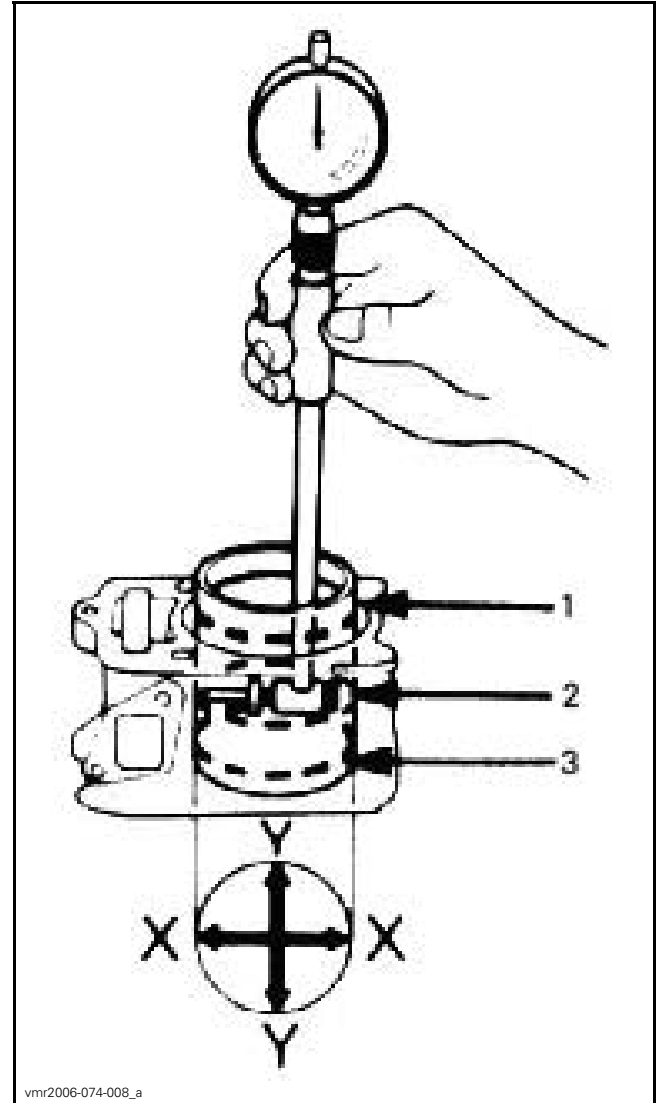
Clean piston from carbon deposits.

INSPECTION

Cylinder

Check cylinder for cracks, scoring and wear ridges on the top and bottom of the cylinder. If found, replace cylinder.

Measure cylinder bore at 3 positions; top, center and bottom. Measure along X and Y axis.



1. Top
2. Center
3. Bottom

CYLINDER DIAMETER	
Service limit	71.10 mm (2.799 in)

Section 03 ENGINE
Subsection 09 (PISTON AND CYLINDER)

Measure cylinder head warpage with a straight edge and a feeler gauge.

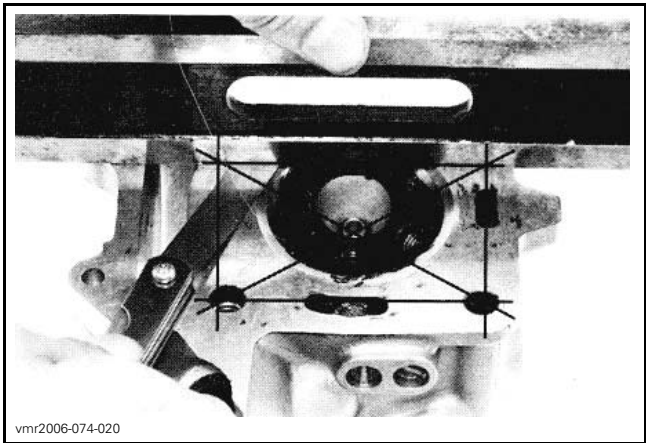


Table with 2 columns: Specification, Value. Title: CYLINDER WARPAGE. Row 1: Service limit, 0.50 mm (.020 in)

Replace cylinder if out of specifications.

Piston Ring

Using a feeler gauge, measure top and second rings clearance with piston groove.

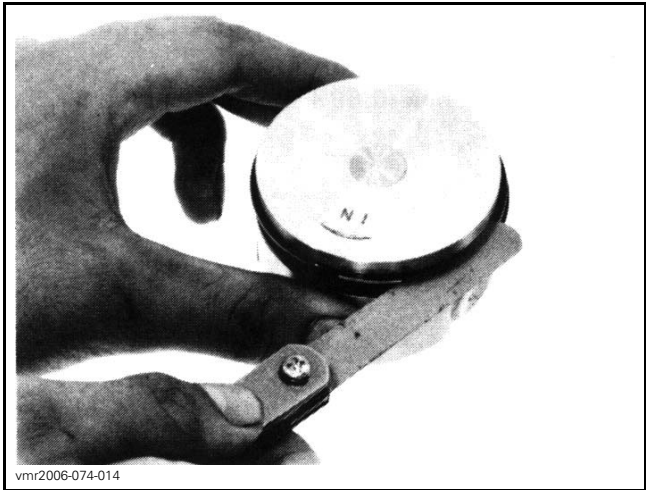


Table with 2 columns: Specification, Value. Title: PISTON/RING CLEARANCE. Row 1: Nominal (new), 0.015 - 0.050 mm (.0006 - .020 in). Row 2: Service limit, 0.09 mm (.004 in)

If out of specifications, replace piston and rings. Slide rings into cylinder one at a time for measurement. Position ring at 20 mm (.787 in) from top of cylinder.

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

Using a feeler gauge, check ring end gap.



A. 20 mm (.787 in) from top

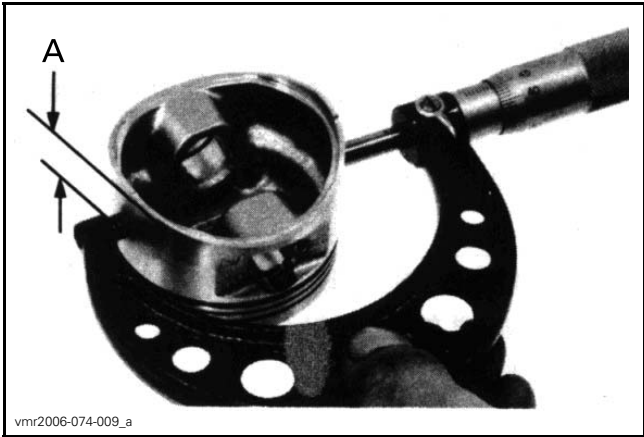
Table with 3 columns: Specification, Ring Type, Value. Title: RING END GAP. Rows for Nominal (new) and Service limit for Top ring, 2nd ring, and Oil ring.

Replace rings if gap is out of specifications.

Piston

Inspect piston for scoring, cracking or other damages. Replace piston as necessary.

Using a micrometer, measure piston as shown.



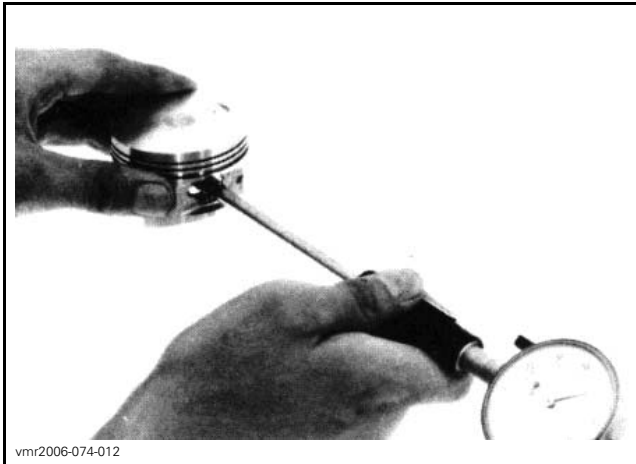
A. 10 mm (.394 in) perpendicularly (90°) to piston pin

Section 03 ENGINE

Subsection 09 (PISTON AND CYLINDER)

PISTON DIAMETER	
Nominal (new)	70.430 - 70.480 mm (2.773 - 2.775 in)
Service limit	70.380 mm (2.771 in)

Using a small diameter bore gauge, measure piston pin bore diameter.



PISTON PIN BORE	
Nominal (new)	17.002 - 17.008 mm (.6694 - .6696 in)
Service limit	17.020 mm (.6701 in)

Replace piston if out of specifications.
Calculate the piston/cylinder clearance as follows.

Clearance = measured piston diameter – piston diameter service limit

PISTON/CYLINDER WALL CLEARANCE	
Nominal (new)	0.010 - 0.040 mm (.0004 - .0016 in)
Service limit	0.10 mm (.0039 in)

If clearance exceeds specified tolerance, replace worn part.

Piston Pin

Inspect piston pin for scoring, cracking or other damages.

Using a micrometer, measure piston pin diameter.

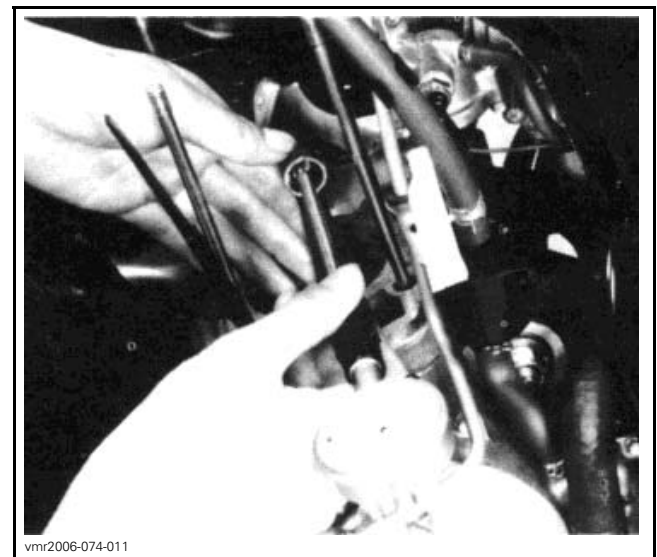


PISTON PIN	
Nominal (new)	16.994 - 17.000 mm (.6691 - .6693 in)
Service limit	16.960 mm (.6677 in)

Replace piston pin if out of specification.

Connecting Rod

Using a small diameter bore gauge, measure small end connecting rod diameter.



CONNECTING ROD SMALL END	
Nominal (new)	17.016 - 17.034 mm (.6699 - .6706 in)
Service limit	17.06 mm (.6717 in)

Replace connecting rod if out of specification.

Section 03 ENGINE

Subsection 09 (PISTON AND CYLINDER)

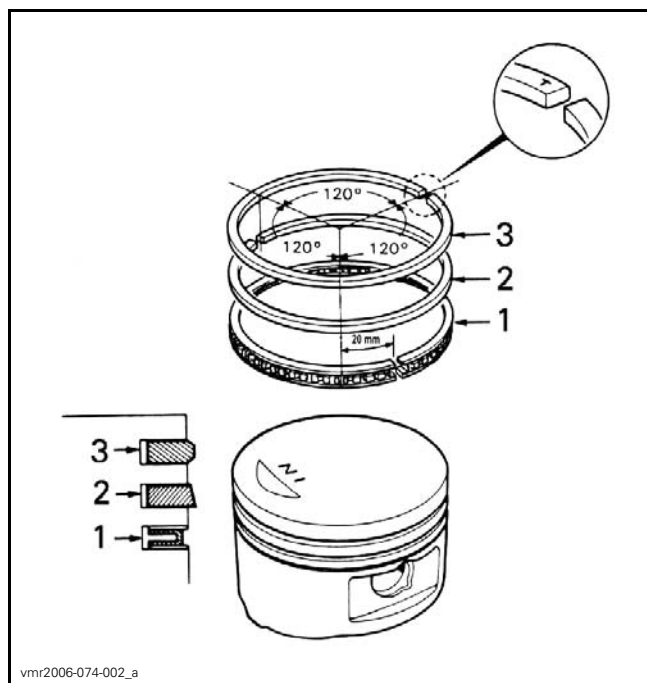
ASSEMBLY

Assembly is essentially the reverse procedure of disassembly. However, pay attention to the following.

Carefully install piston ring with their openings on piston as shown.

Install oil ring first then other rings going up.

Do not align ring openings with piston thrust side axis or piston pin axis.



1. Oil scraper
2. 2nd ring
3. Top ring

CAUTION: Be careful not to break rings at installation. Dots on rings must be positioned on top. Ensure rings can move freely after installation.

Position piston with the IN letters (on dome) towards intake side.

Coat piston pin with engine oil and install it.

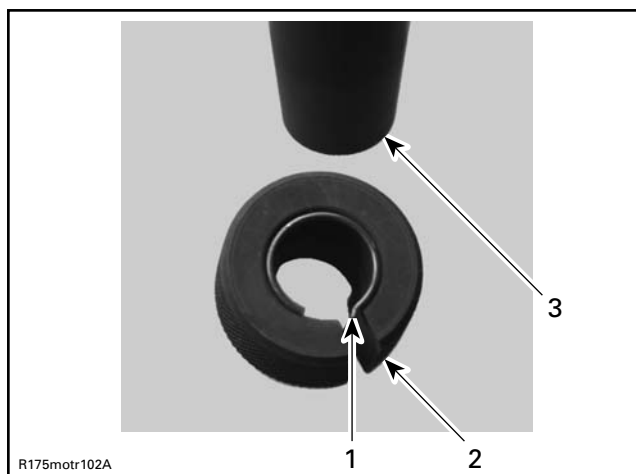


Install new circlips. Use piston circlip installer (P/N 529 036 048).

CAUTION: Always install new circlips.



Place circlip in sleeve as shown.



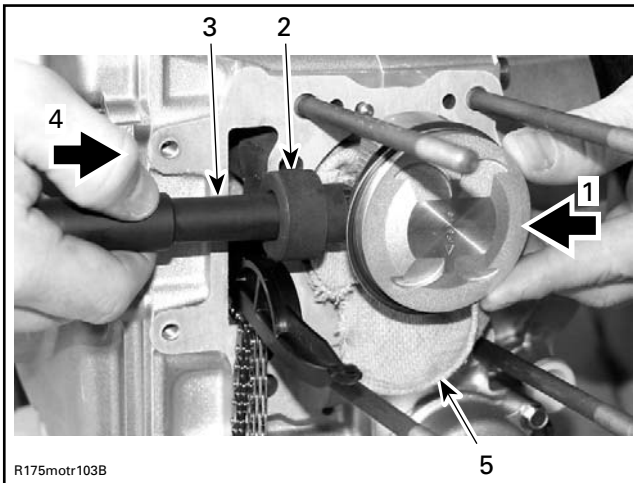
1. Circlip
2. Sleeve
3. Piston circlip installer tip

Push taper side of installer until circlip reaches middle of sleeve.

Align sleeve with piston pin axis and push installer until circlip engages in piston.

Section 03 ENGINE

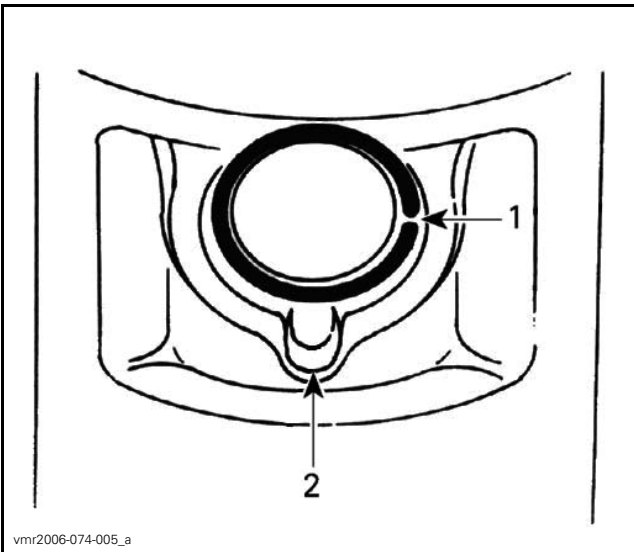
Subsection 09 (PISTON AND CYLINDER)



TYPICAL

1. Hold piston while pushing circlip in place
2. Sleeve
3. Circlip installer
4. Direction to push circlip
5. Rag

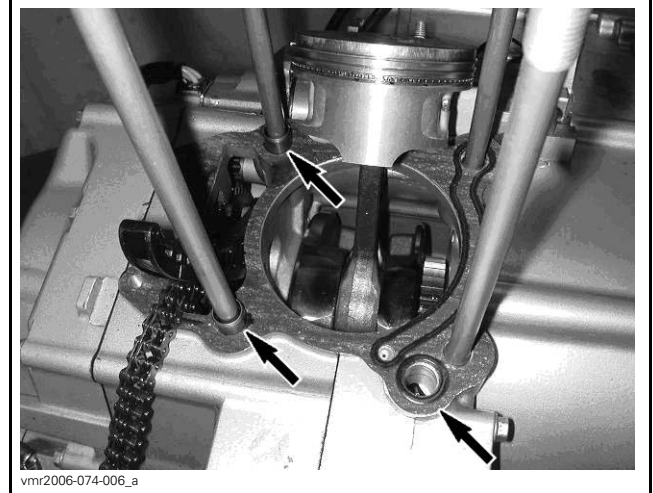
CAUTION: Do not align circlip opening with piston cutout.



CORRECT POSITION

1. Circlip opening
2. Cutout

Install dowel pins and a new gasket.

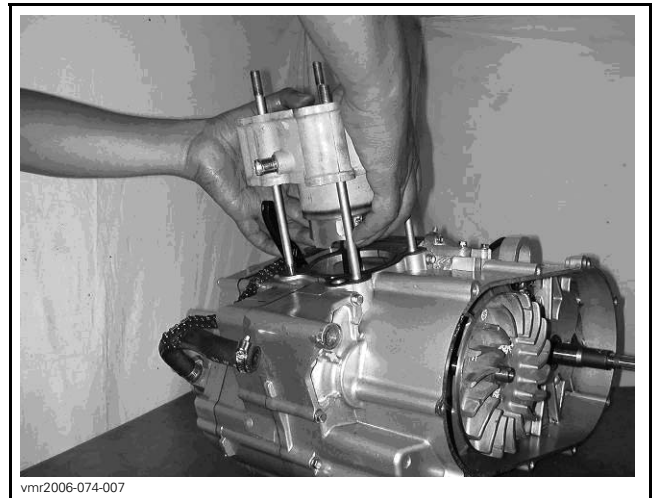


Coat cylinder, piston and rings with engine oil.

Use a suitable ring compressor to compress and hold rings while inserting cylinder.

Carefully insert cylinder over piston.

CAUTION: Do not force cylinder to enter piston. This would damage ring(s).



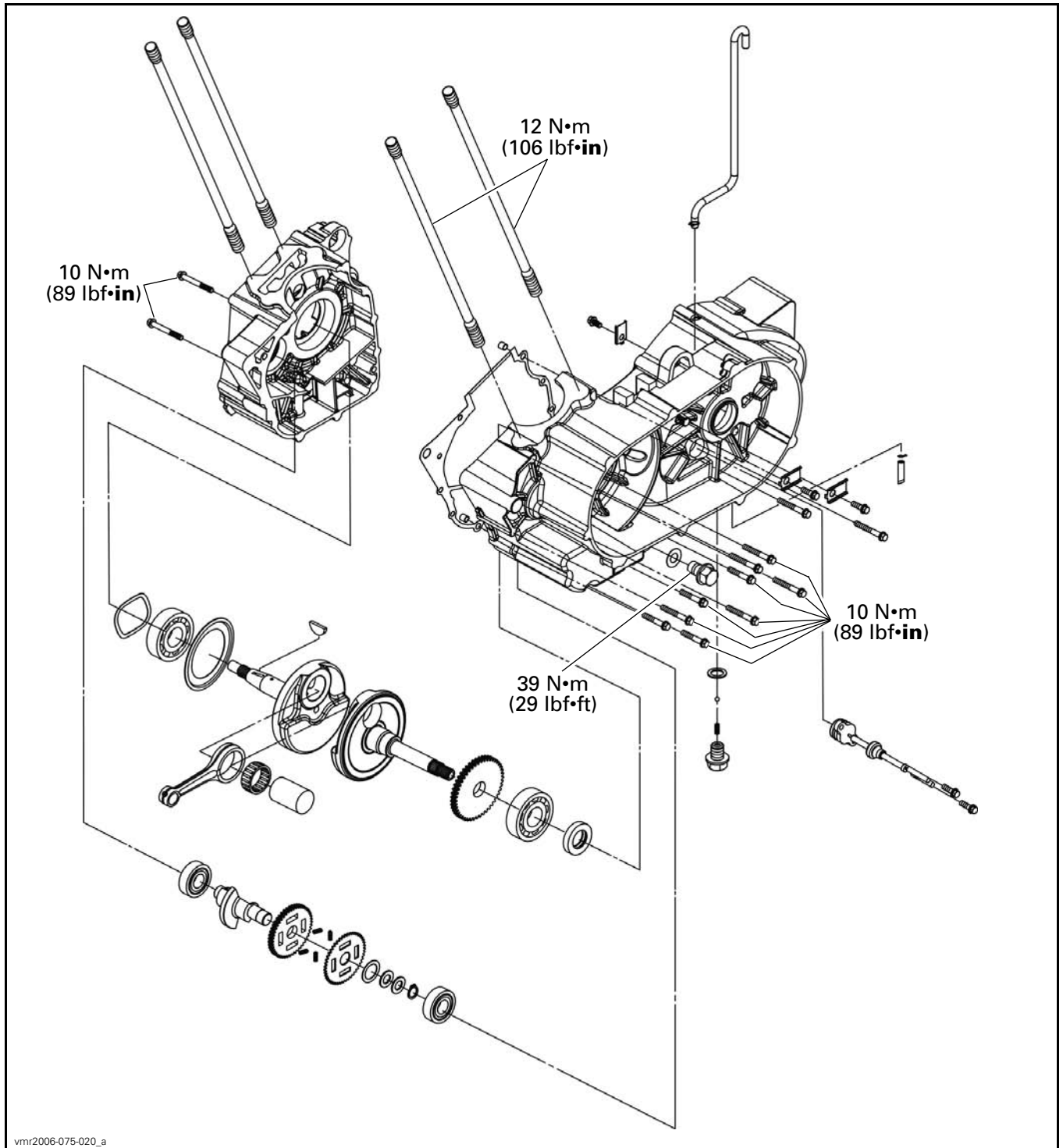
TYPICAL

Install remaining components.

CRANKSHAFT AND CRANKCASE

SERVICE PRODUCTS

Description	Part Number	Page
synthetic grease	293 550 014	92



Section 03 ENGINE

Subsection 10 (CRANKSHAFT AND CRANKCASE)

GENERAL

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

WARNING

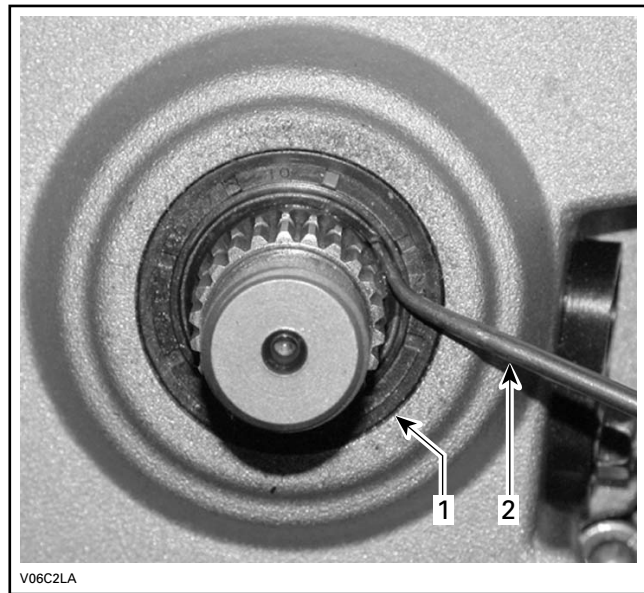
Torque wrench tightening specifications must strictly be adhered to. Locking devices (ex.: locking tabs, elastic stop nuts, self-locking fasteners, etc.) must be installed or replaced with new ones where specified. If the efficiency of a locking device is impaired, it must be renewed.

Oil Seals

NOTE: Oil seals can be replaced when engine is installed in vehicle.

Using a small tool, like an awl or a pick, remove oil seal from its housing.

CAUTION: Pay attention not to damage shaft during removal of oil seal.



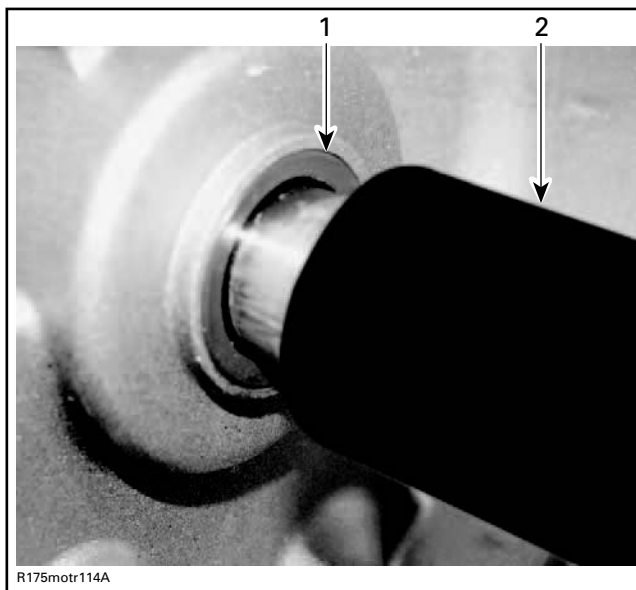
TYPICAL

1. Oil seal in its housing
2. Awl or pick

Check shaft surface around oil seal friction area for grooves and replace if necessary (crankcase disassembly is required).

Apply synthetic grease (P/N 293 550 014) inside oil seal lips.

Install new seal using an appropriate seal pusher.



TYPICAL

1. Oil seal
2. Seal pusher

Preparation for Crankcase Disassembly

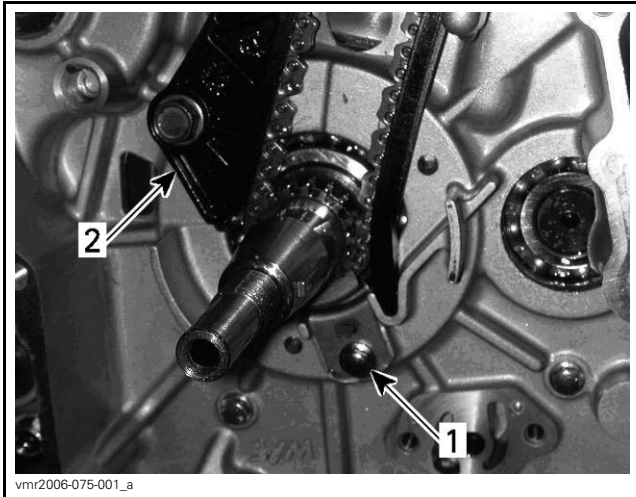
Remove the following.

- engine from vehicle. Refer to *ENGINE REMOVAL AND INSTALLATION*
- electric starter
- cylinder head. Refer to *CYLINDER HEAD*
- cylinder and piston. Refer to *CYLINDER AND PISTON*
- drive and driven pulley. Refer to *TRANSMISSION*
- magneto flywheel. Refer to *MAGNETO AND STARTER DRIVE*.

CRANKCASE DISASSEMBLY

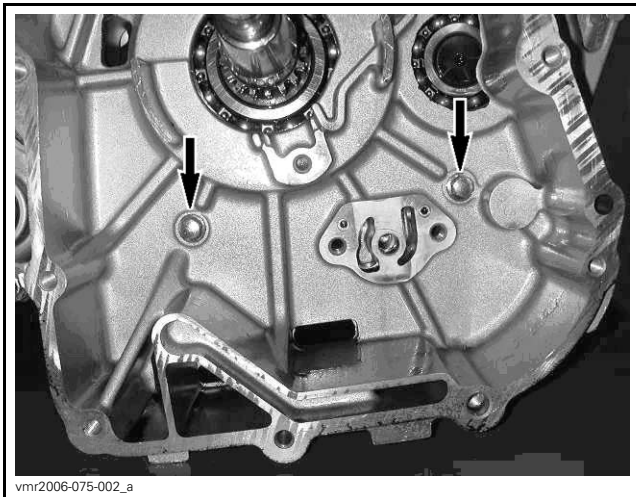
Remove the timing chain locking plate then chain.

Loosen the pivot bolt and remove the chain guide.



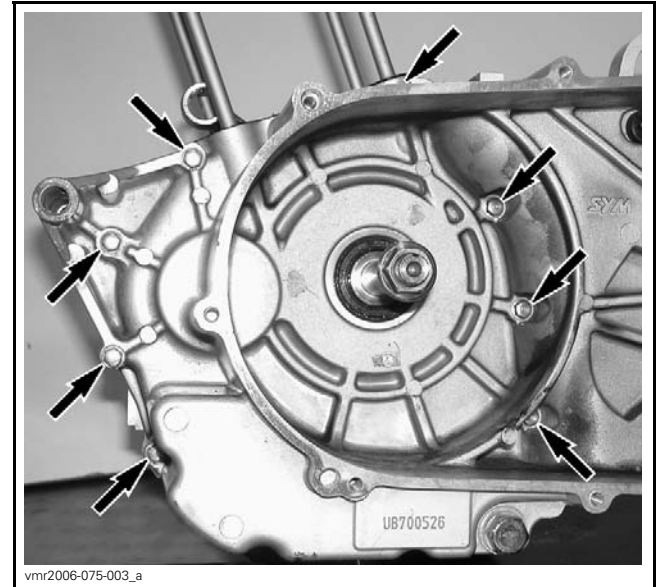
1. Locking plate
2. Chain guide

Remove bolts on the right half crankcase.



NOTE: It is not necessary to remove oil pump cover.

Remove bolts on the left half crankcase.



Place crankcase as shown.

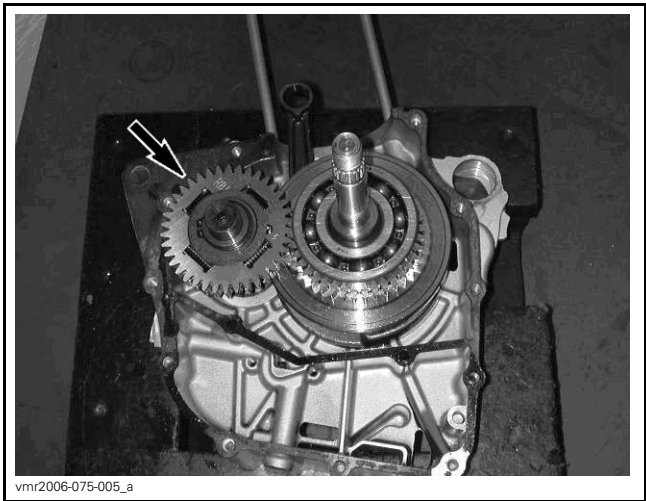


Hold up crankcase so that it does not touch the working table and tap the left half crankcase with a plastic hammer to remove it.

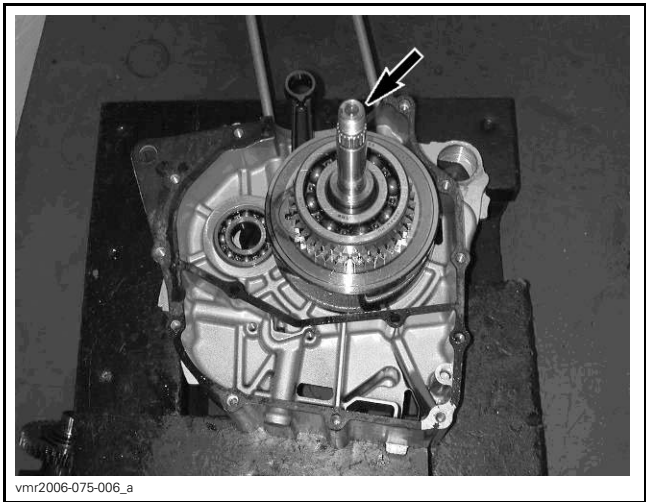
CAUTION: Care should be taken not to damage the contact surfaces.

Remove balance shaft from right half crankcase.

Section 03 ENGINE
Subsection 10 (CRANKSHAFT AND CRANKCASE)



Remove crankshaft from right half crankcase.

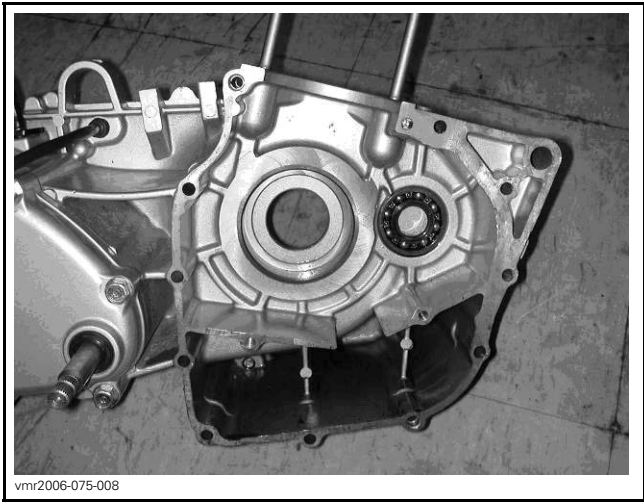


Remove gasket and dowel pins.
Scrape gasket residues off the crankcase contact surface.



CAUTION: Pay attention not to damage contact surface of the gasket. It is better to moisten the gasket residue for easy scraping.

Drive out left half crankcase oil seal.

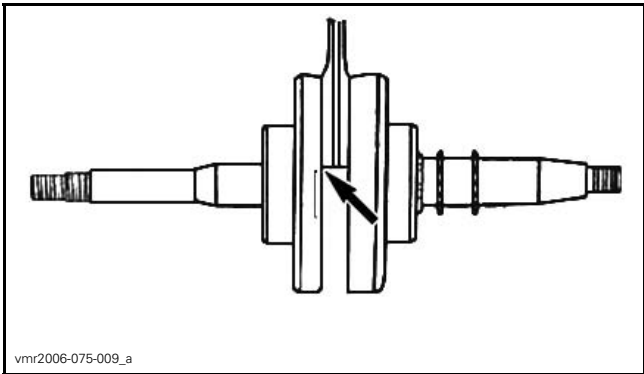


INSPECTION

Crankshaft

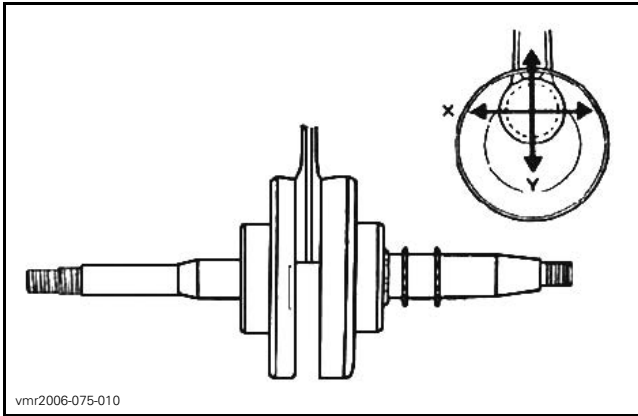
NOTE: Crankshaft axial play is took up by a wave washer. If washer is worn, replace with a new one.

Use a feeler gauge and measure axial clearance of connecting rod big end.



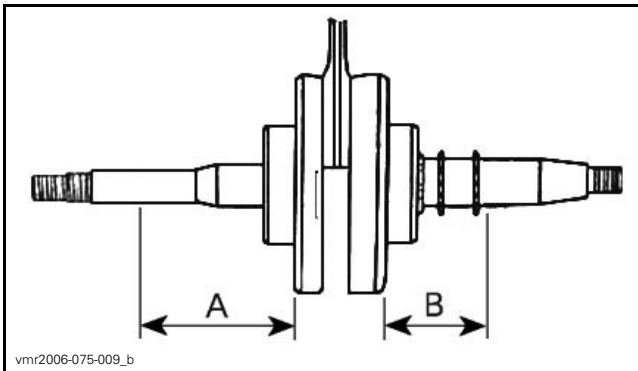
AXIAL CLEARANCE	
New	0.10 - 0.40 mm (.004 - .016 in)
Service limit	0.60 mm (.024 in)

Measure the radial clearance of connecting rod big end with a dial indicator.



RADIAL CLEARANCE	
New	0 - 0.008 mm (0 - 0.0003 in)
Service limit	0.05 mm (.002 in)

Place the crankshaft on V-blocks and support where shown. Measure crankshaft deflection with a dial indicator.

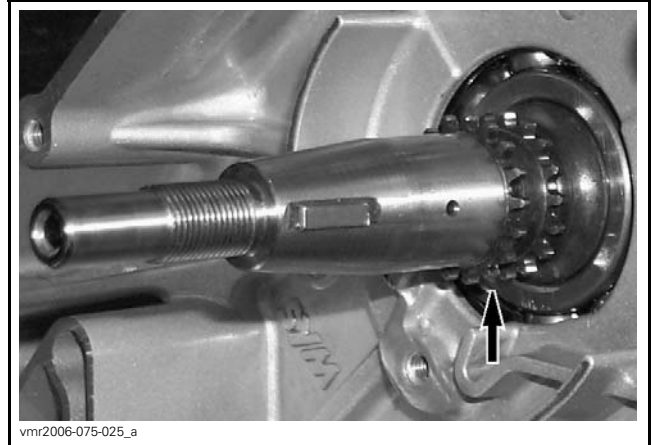


A. 90 mm
B. 60 mm

CRANKSHAFT DEFLECTION	
Service limit	0.10 mm (.004 in)

If a part does not meet specifications, replace it or have it repaired at a specialized shop.

Crankshaft Gears



Timing Chain Gear

Mesh chain in gear and check for excessive radial play. If gear is worn or damaged, replace as a set: crankshaft, camshaft gear and chain.

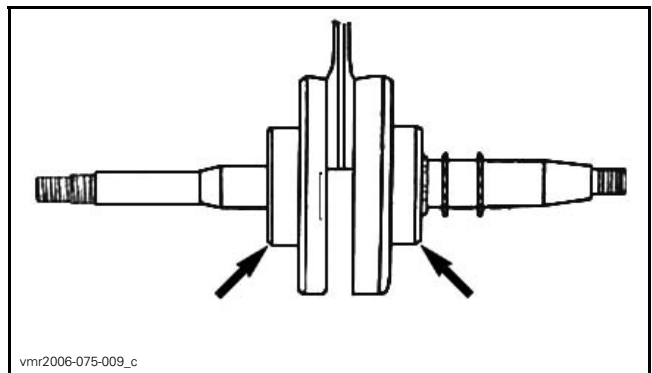
NOTE: Refer to *CYLINDER HEAD* for timing chain inspection.

Balance Shaft Gear

Check gear condition on crankshaft and balance shaft. If any gear is worn or damaged, replace crankshaft and balance shaft as a set. Ensure gear is tight and cannot move on its shaft.

Crankshaft Bearing

Manually turn the bearing to see if it turns freely, smoothly and noiselessly. Check for radial and axial play.



If any defect is detected, replace bearing with a new one.

CAUTION: The bearings should be replaced in pair.

Use a suitable puller to remove bearings from crankshaft.

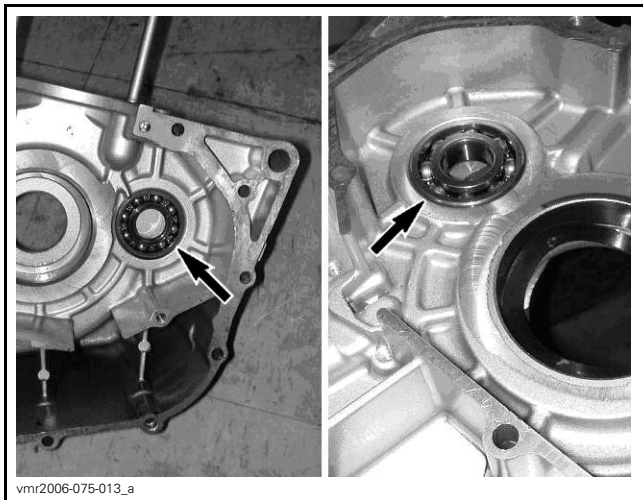
Section 03 ENGINE

Subsection 10 (CRANKSHAFT AND CRANKCASE)

Balance Shaft Bearing

Check bearings on right and left crankcase halves. Manually turn the bearing to see if it turns freely, smoothly and noiselessly. Check for radial and axial play.

If any defect is detected, replace bearing with a new one.



Use a suitable bearing puller to remove bearings from balance shaft.

CRANKCASE ASSEMBLY

Install wave washer into right half crankshaft bearing seat.



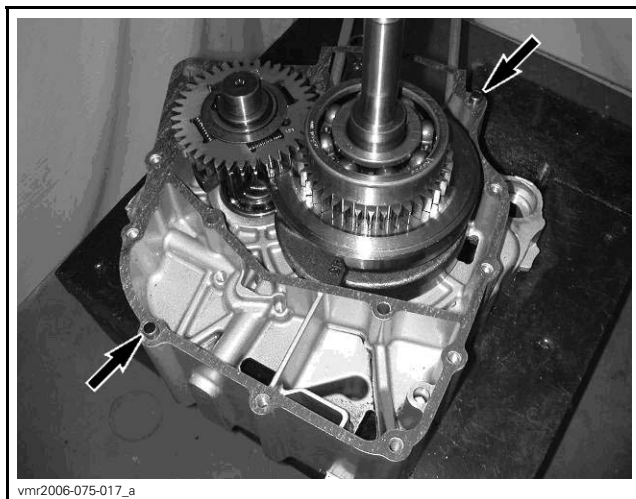
Install crankshaft in the right half crankcase. Align connecting rod in opening.



Align the position dot on the balance shaft drive gear with dot of driven gear. Then, install balance shaft into right half crankcase.



Install dowel pins and a new gasket.



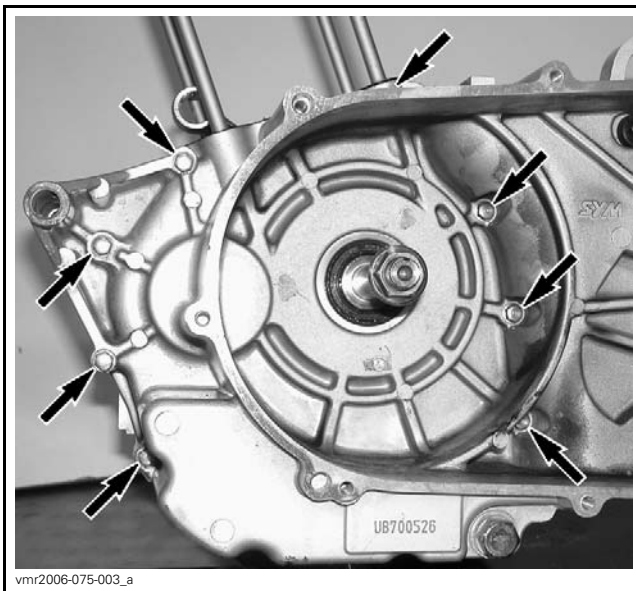
Install the left half crankcase onto the right half crankcase.

Section 03 ENGINE

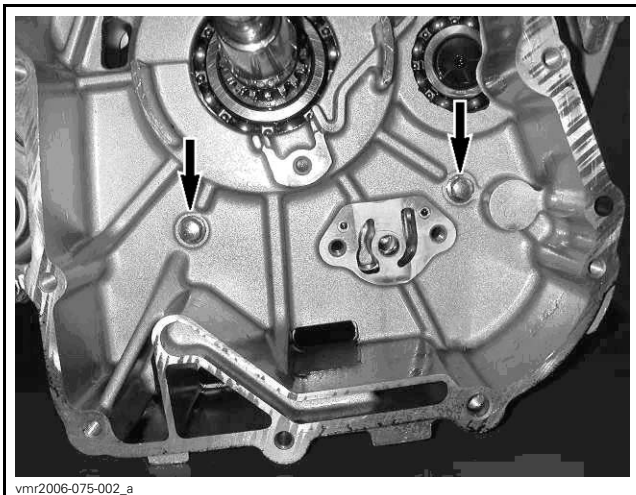
Subsection 10 (CRANKSHAFT AND CRANKCASE)



First, torque crankcase bolts in a criss-cross sequence to half torque value. Ensure crankcase halves are properly aligned. Then, tighten bolts to final torque using the same sequence.



Properly torque bolts on the right half crankcase.



Clean the crankshaft.

Apply a layer of grease on the lip of oil seal. Put seal on crankshaft.



Using an suitable pusher, install the oil seal in the left half crankcase with care not to damage the lip of the oil seal.



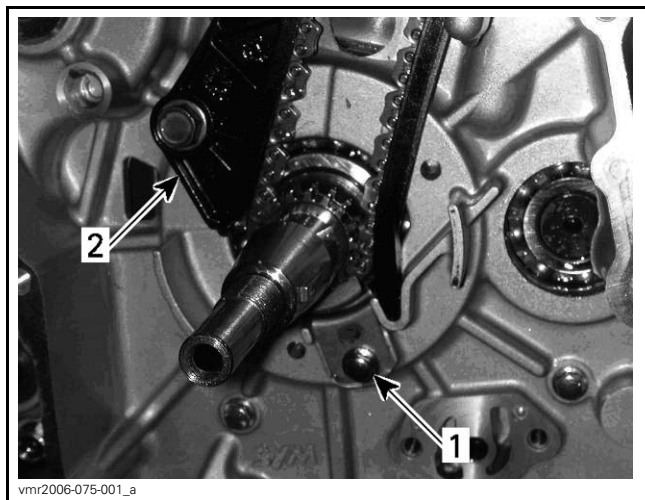
Install the chain guide and tighten the pivot bolt. Properly torque bolt.

Install the timing chain.

Install the timing chain locking plate.

Section 03 ENGINE

Subsection 10 (CRANKSHAFT AND CRANKCASE)



- 1. Locking plate
- 2. Chain guide

GEARBOX

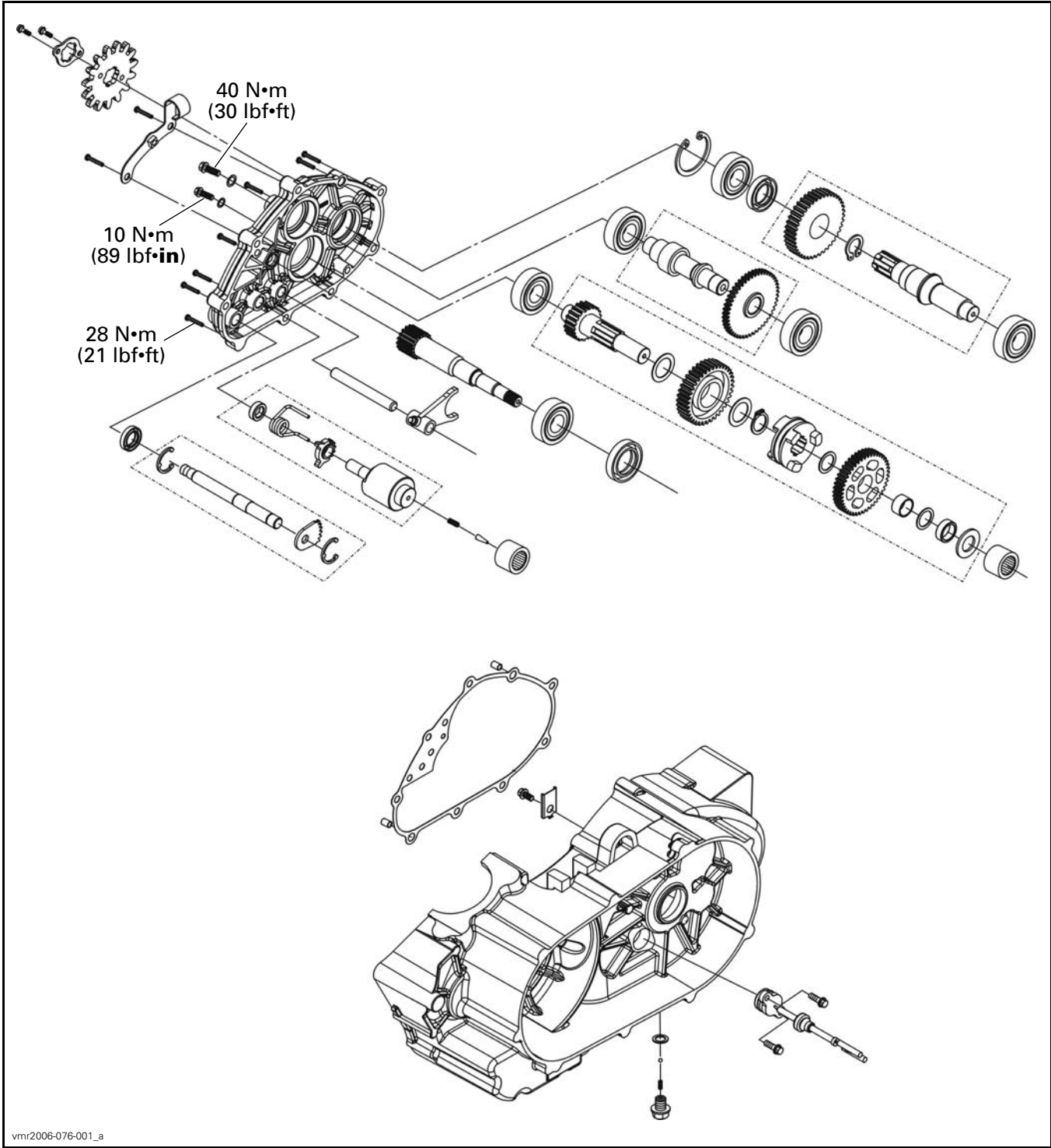
SERVICE TOOLS

Description	Part Number	Page
countershaft needle bearing installer	529 036 053	105

SERVICE PRODUCTS

Description	Part Number	Page
synthetic grease	293 550 014	103

Section 03 ENGINE
Subsection 11 (GEARBOX)



GENERAL

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

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.

NOTE: Gearbox and some seals can be serviced with engine installed in vehicle.

GEARBOX OIL LEVEL

Gearbox oil level cannot be checked.

To ensure the level is adequate, drain gearbox and refill with the recommended oil and quantity.

GEARBOX OIL CHANGE

Oil change should be done with a warm engine.

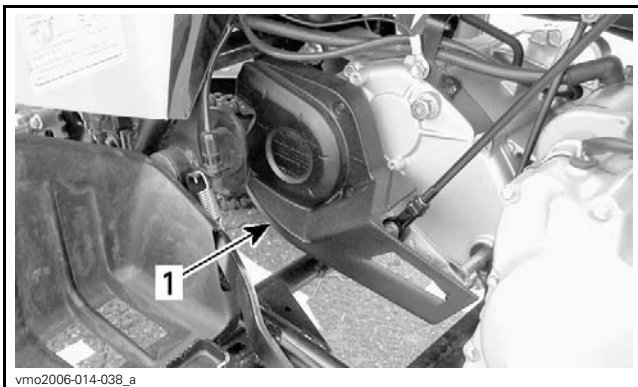
WARNING

The gearbox oil can be very hot.

Draining Procedure

Place the vehicle on a level surface.

Remove the drive chain protector.

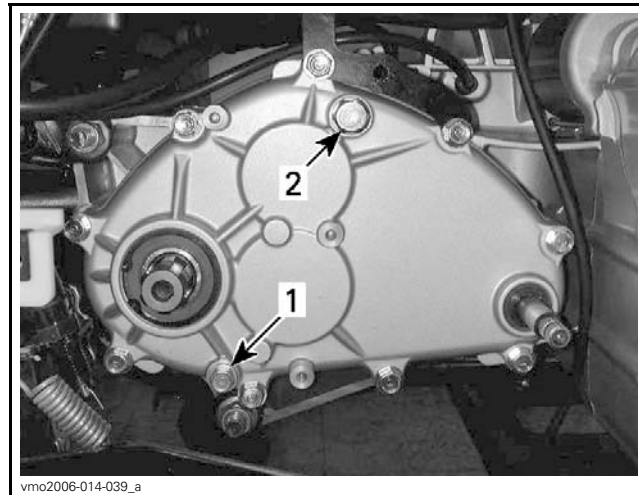


1. Drive chain protector

Clean fill and drain plug areas.

Remove gearbox fill plug.

Place a drain pan under the gearbox drain plug area then remove plug.



1. Gearbox drain plug
2. Gearbox fill plug

NOTE: To completely drain the gearbox, place a jack under the left footpeg and tilt the vehicle toward the right side.

Inspection

Oil condition gives information about the teeth condition inside the gearbox. See *TROUBLESHOOTING* section.

Clean the 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 washer on drain plug if damaged.

Filling Procedure

When the gearbox is empty, install and torque the drain plug at 9 N•m (80 lbf•in) and replace the vehicle on the ground.

Refill gearbox as follows.

CONDITION	OIL TYPE	QUANTITY
Oil change	XP-S chaincase oil (P/N 413 801 900) or an equivalent	800 mL (27 U.S. oz.)
Refill after gearbox overhaul		900 mL (30 U.S. oz.)

NOTE: Gearbox oil quantity is also written on the gearbox cover.

CAUTION: Do not use other unrecommended types of oil when servicing. Do not mix with other types of oil.

Reinstall and torque oil fill plug to 39 N•m (29 lbf•ft).

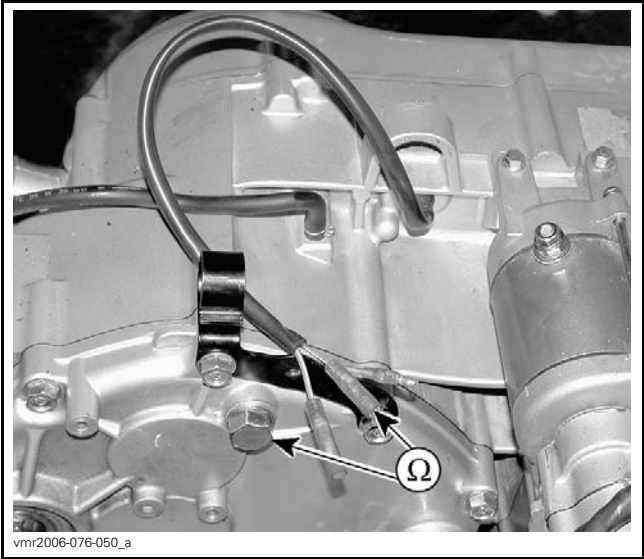
GEARBOX SWITCH

Disconnect gearbox switch connectors.



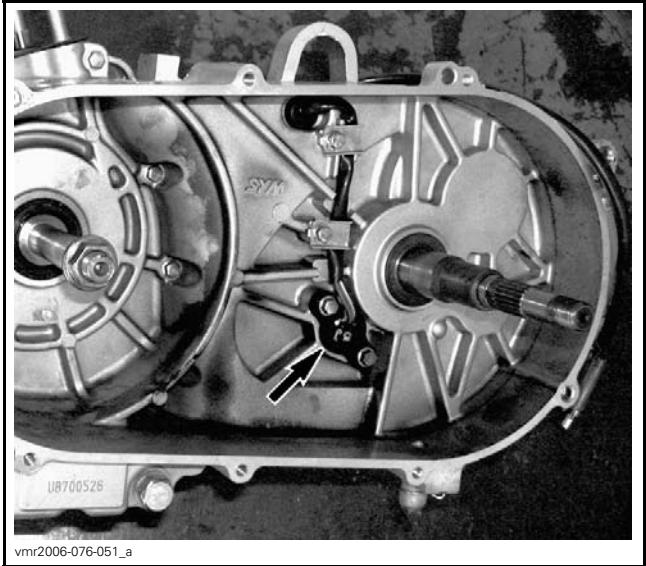
Using a multimeter, check switch as follows.

WIRE	SHIFT LEVER POSITION	RESISTANCE
BROWN/YELLOW and engine ground	Forward	0.5 Ω max
	Any other position	Infinite (0L.)
GREEN/RED and engine ground	Neutral	0.5 Ω max
	Any other position	Infinite (0L.)
GREEN/WHITE and engine ground	Reverse	0.5 Ω max
	Any other position	Infinite (0L.)



If any test fail, check wiring and if good, replace gearbox switch. Remove driven pulley to have access to switch. Refer to *CONTINUOUS VARIABLE TRANSMISSION*.

NOTE: Also pay attention to shift drum contact pin condition.



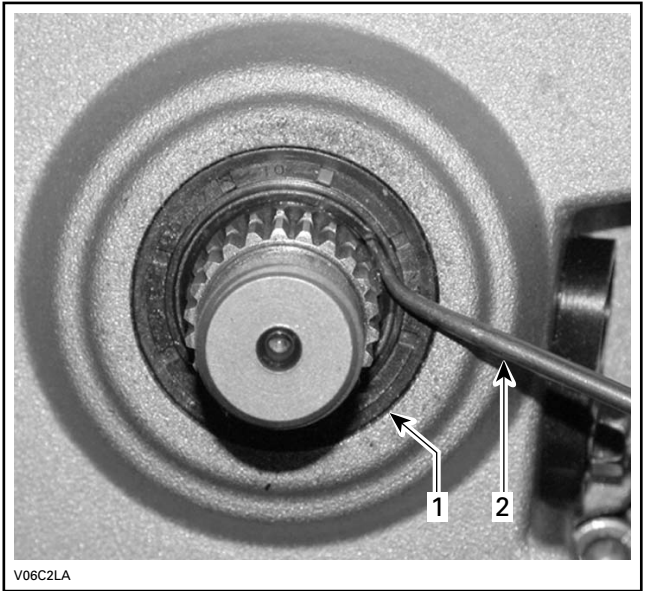
OIL SEAL REPLACEMENT

NOTE: Oil seals can be replaced when engine is installed in vehicle.

Remove required component(s).

Using a small tool, like a pick, remove oil seal from its housing.

CAUTION: Pay attention not to damage shaft during removal of oil seal.



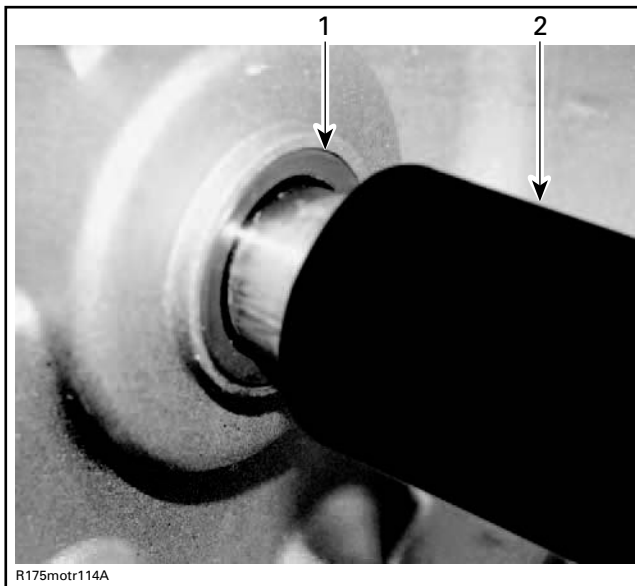
1. Oil seal in its housing
2. Pick

Check bearing for contamination and/or metal shavings. Replace if necessary (gearbox disassembly is required).

Check shaft surface around oil seal friction area for grooves and replace if necessary (gearbox disassembly is required).

Apply synthetic grease (P/N 293 550 014) inside oil seal lips.

Install new seal using an appropriate seal pusher.



TYPICAL
1. Oil seal
2. Seal pusher

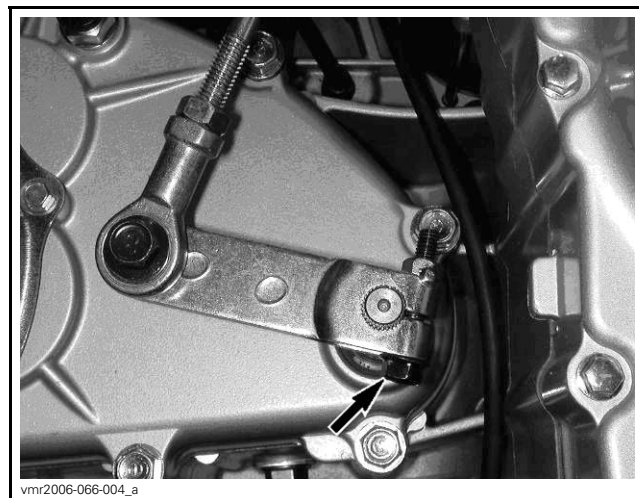
GEARBOX DISASSEMBLY

Drain gearbox oil.

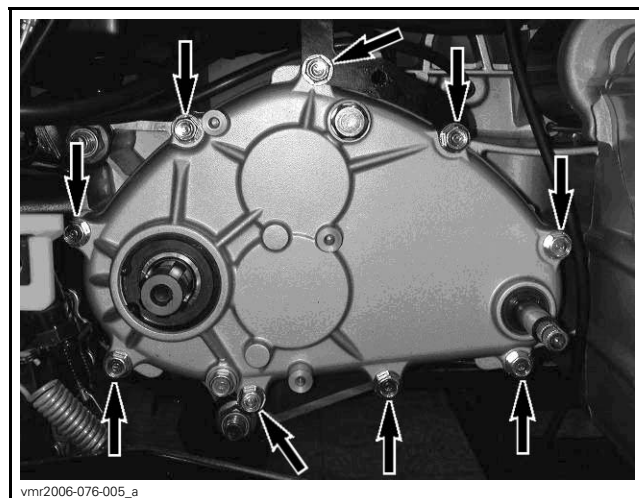
Remove drive and driven pulleys. Refer to *CONTINUOUSLY VARIABLE TRANSMISSION (CVT)*.

Remove engine sprocket. Refer to *REAR SUSPENSION AND AXLE*.

Remove shift lever bolt then pull out lever.



Remove gearbox cover screws then cover.



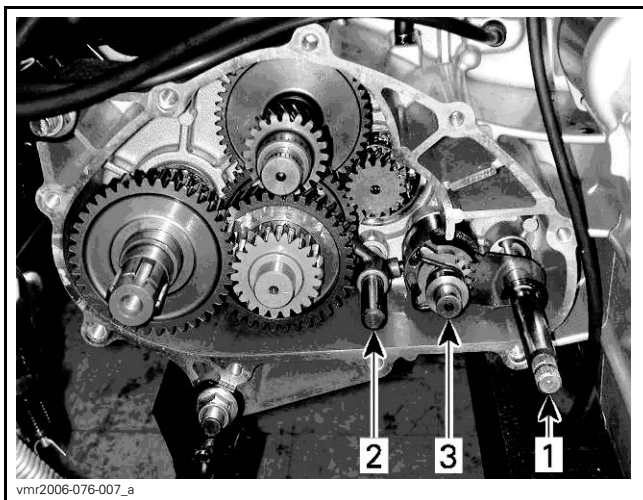
Remove shift drum catch ball from underneath gearbox.



Remove shift spindle, shift fork and shaft, and shift drum.

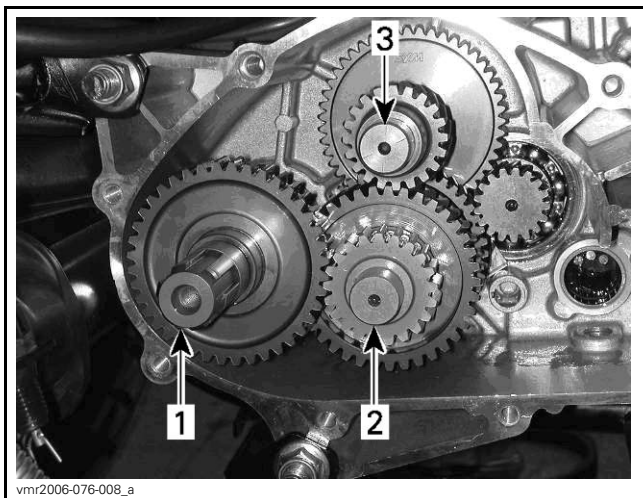
Section 03 ENGINE

Subsection 11 (GEARBOX)



1. Spindle
2. Shift fork
3. Shift drum

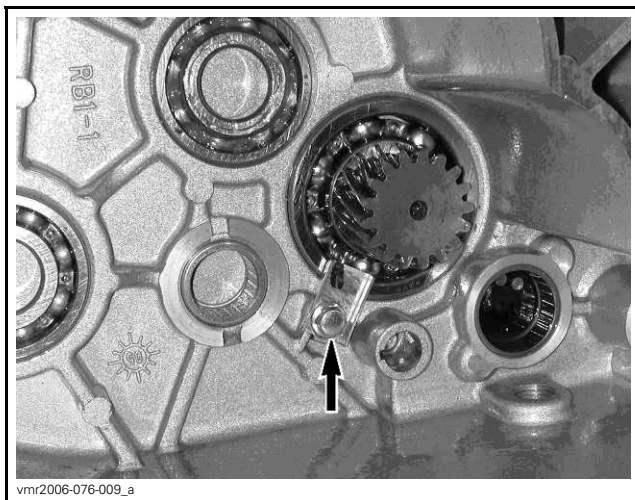
Remove output shaft, countershaft and reverse shaft.



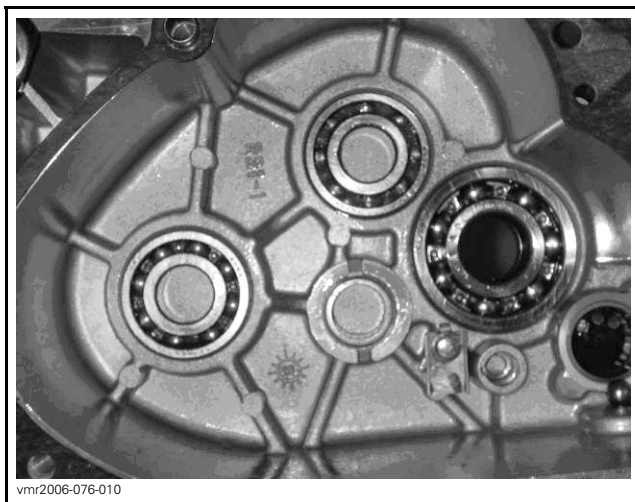
1. Output shaft
2. Countershaft
3. Reverse shaft

Remove drive shaft bearing setting plate.

CAUTION: Do not remove drive shaft needlessly. If removed, replace its bearing and seal.



Remove drive shaft towards inside of case.



Remove gasket and dowel pins.

Bearings

All bearings must turn smoothly and freely.

No excessive axial or radial play must be detected during inspection.

Replace a defective or suspicious bearing with a new one.

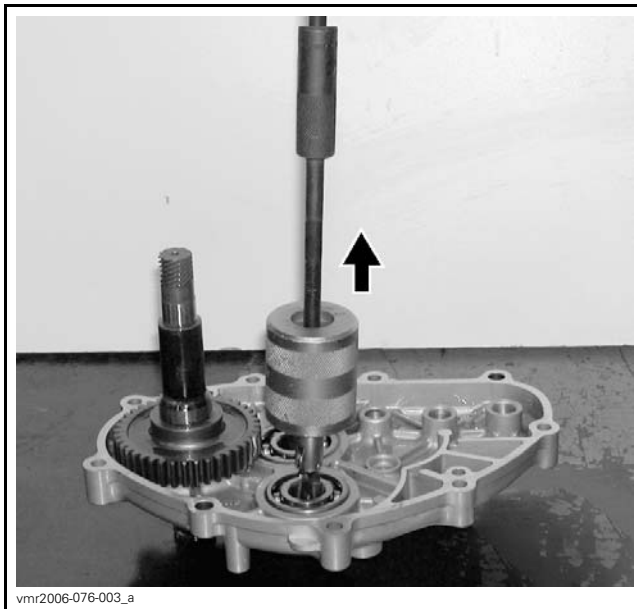
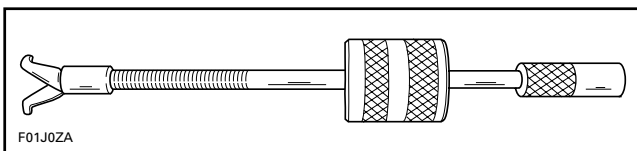
Always heat bearing bore up to 100°C (212°F) before removing its bearing. Use a heat gun.

WARNING

Clean oil, outside and inside, from case before heating. Oil is inflammable.

CAUTION: Always support the case properly to remove bearing. Case damage may occur if this procedure is not performed correctly.

Use a claw type hammer puller and pull from inner race.



To remove a bearing from a blind bore, use a blind hole bearing puller with a hammer puller.



Use an appropriate pusher to install bearing.

CAUTION: Always support crankcase properly when installing a bearing.

Unless otherwise instructed, never use hammer to install a bearing. Use a press only.

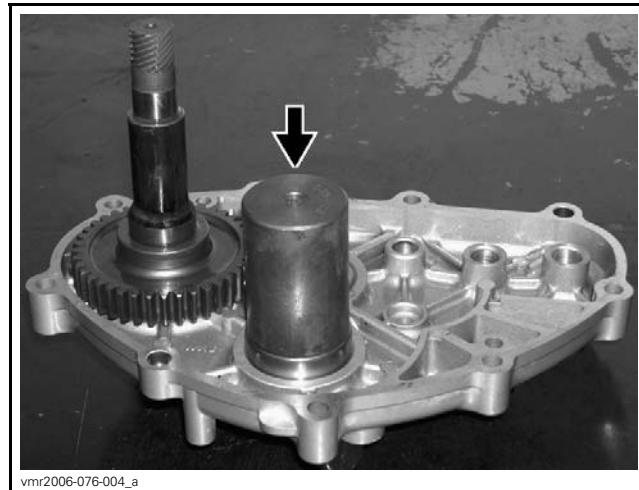
Always heat crankcase housing up to 100°C (212°F) before installing bearing. Use a heat gun.

⚠ WARNING

Clean oil, outside and inside, from housing before heating. Oil is inflammable.

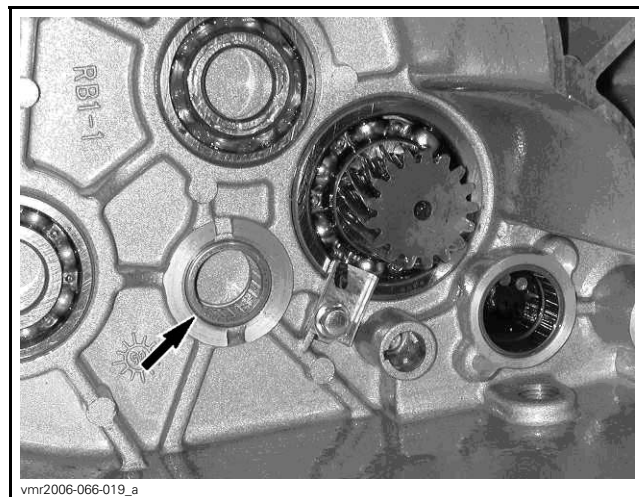
Place new bearing in freezer for 10 minutes before installation.

Push against outer race to install a bearing in its bore.



Push against inner race to install a bearing on its shaft.

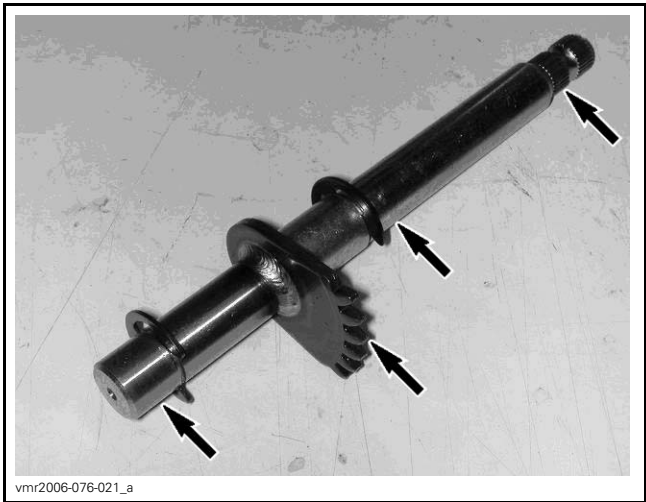
To install countershaft needle bearing, use countershaft needle bearing installer (P/N 529 036 053).



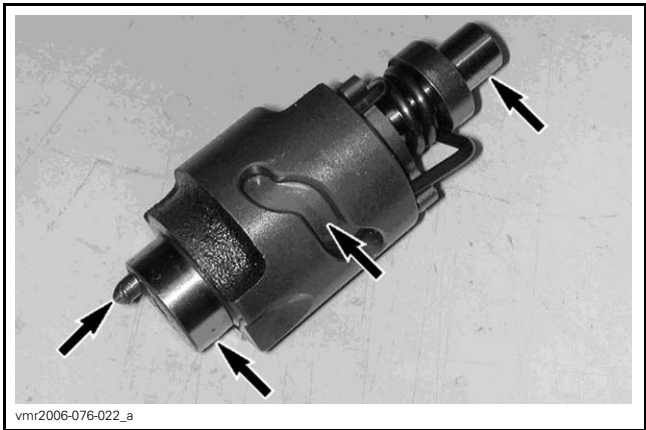
CAUTION: Not using the appropriate pusher will damage bearing.

GEARBOX INSPECTION

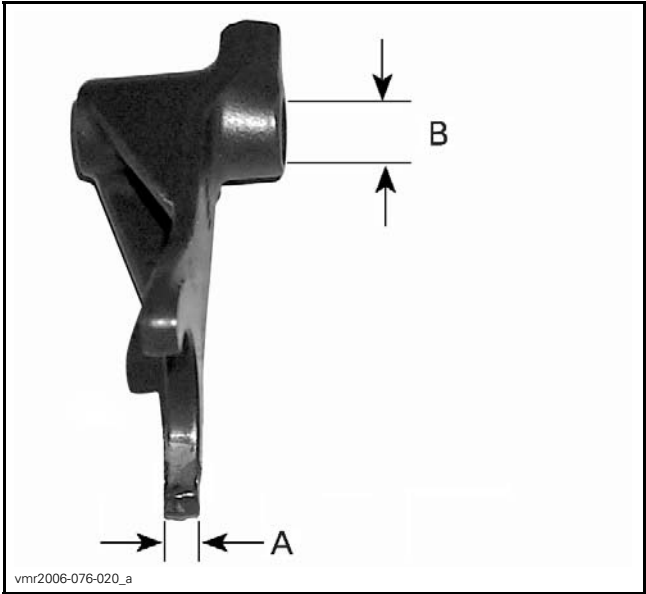
Check shift spindle for wear or damage.



Check shift drum for wear or damage.
Push the contact pin. It must move freely and remain in its housing.



Check shift fork for bending, wear or other damage. Measure as shown. Replace if damaged or out of specifications.



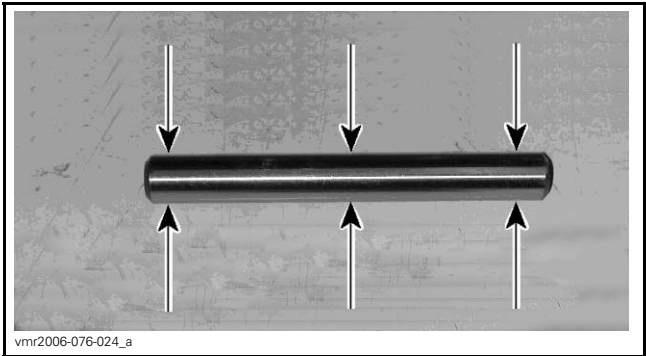
TYPICAL
A. Claw thickness
B. Bore diameter

SHIFT FORK		
CONDITION	CLAW THICKNESS	BORE DIAMETER
New	5.93 - 6.00 mm (.233 - .236 in)	12.016 - 12.043 mm (.4731 - .4741 in)
Service limit	5.73 mm (.226 in) min.	12.01 mm (.473 in) max.

Check also wear at shifting pin.

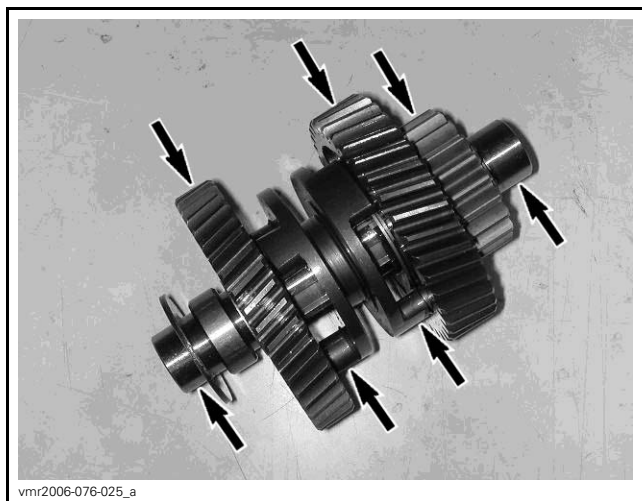


Check shift fork shaft for bending, wear or other damage. Measure diameter at 3 places. Replace if damaged or out of specifications.

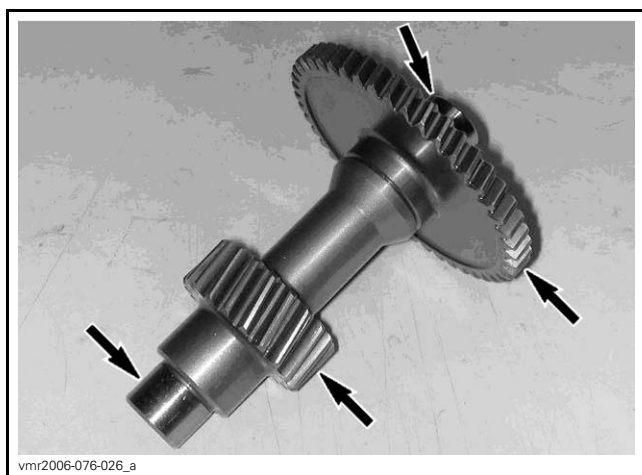


SHIFT FORK SHAFT	
DESCRIPTION	BORE DIAMETER
New	11.982 - 12.000 mm (.4717 - .4724 in)
Service limit	11.97 mm (.471 in) min.

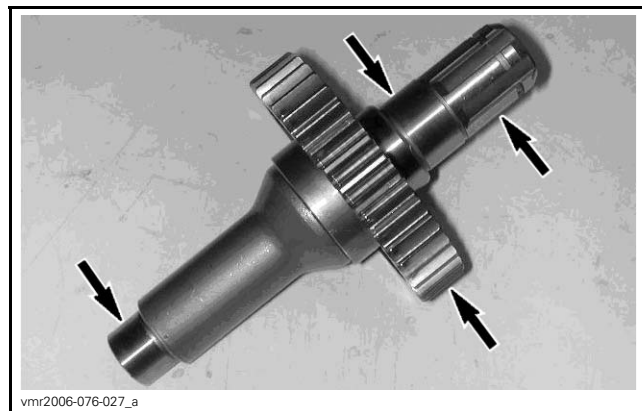
Check countershaft for wear, damage and free movement of gears.



Check reverse shaft for wear or damage.



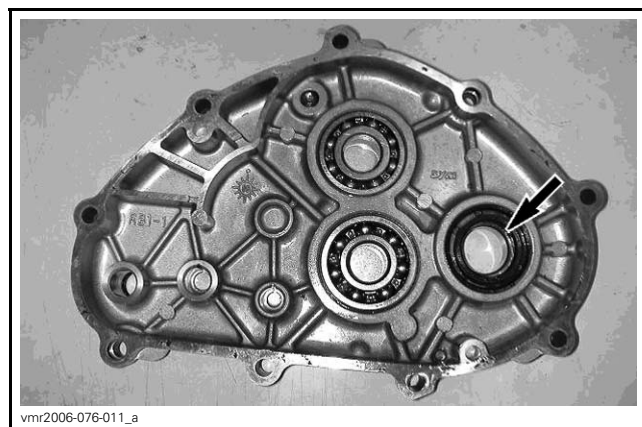
Check output shaft for wear or damage.



GEARBOX ASSEMBLY

Assembly is essentially the reverse procedure of disassembly. However, pay attention to the following.

Apply grease on seal lip of output shaft seal.



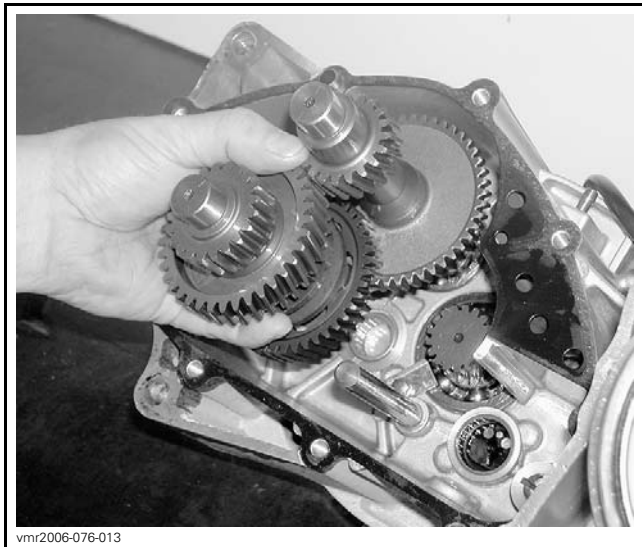
Hold reverse shaft and countershaft together. Pay attention that spacer is in place on end of countershaft.



Insert shafts together in gearbox.

Section 03 ENGINE

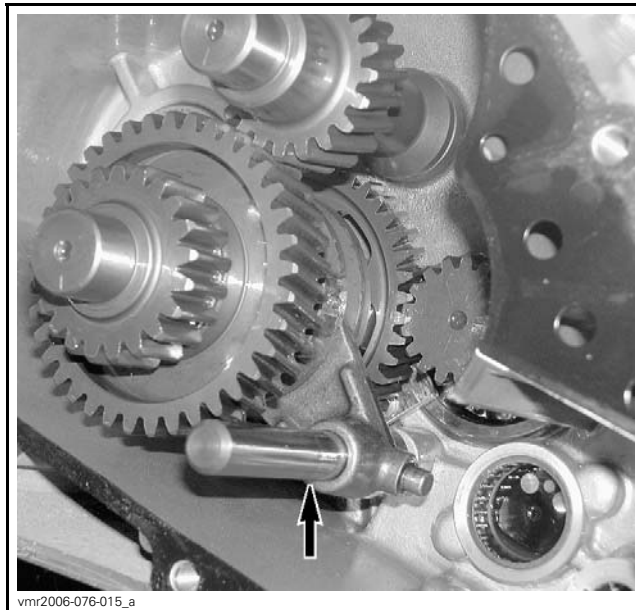
Subsection 11 (GEARBOX)



Install fork in sliding gear.

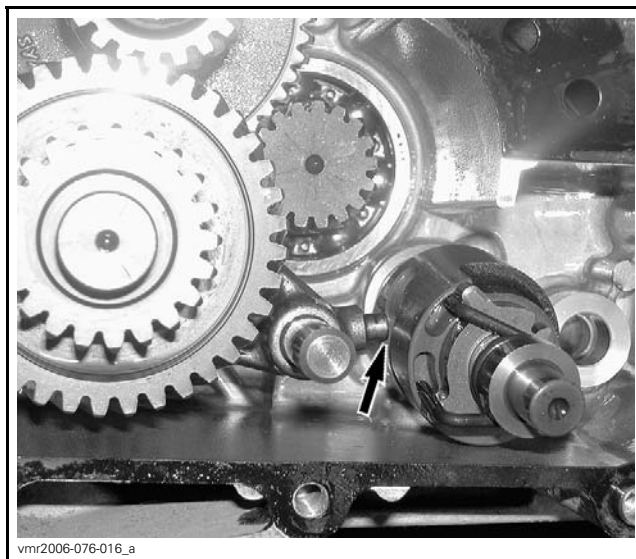


Insert shaft in fork then in gearbox.



Ensure drum shift catch ball is removed underneath gearbox.

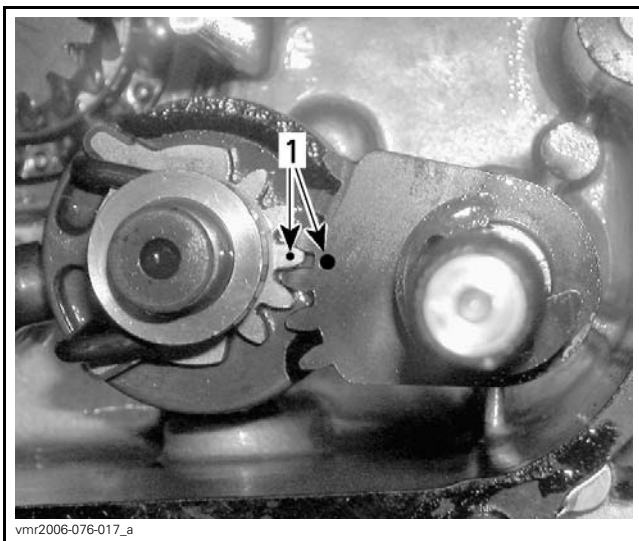
Slightly move fork to allow insertion in drum shaft.
Properly mesh fork pin in drum shaft.



Install catch ball underneath gearbox.

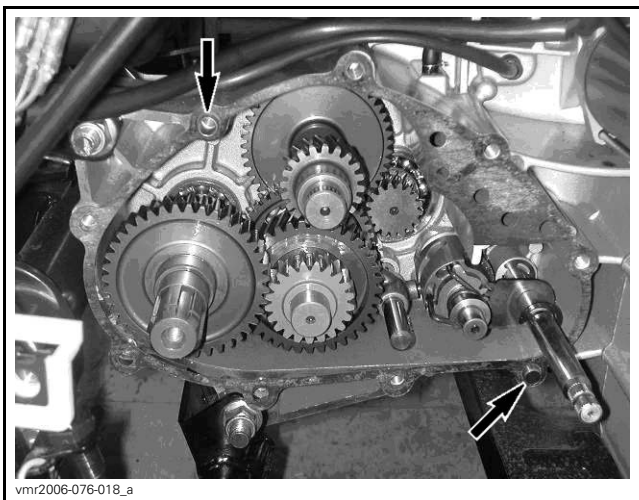


Install shift spindle in gearbox. When meshing teeth, ensure to align dots as shown.



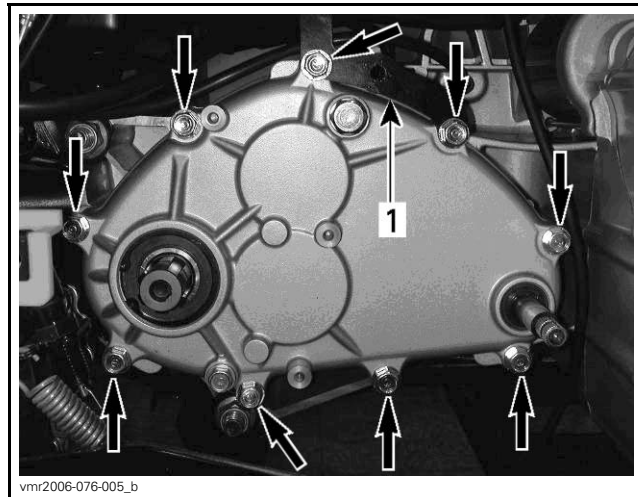
1. Align dots

Install dowel pins and a new gasket.



Install gearbox cover.
Install bracket where shown.

vmr2006-076



1. Bracket here

Properly torque screws.

Install remaining parts.

Refill gearbox with the recommended oil. See *OIL CHANGE*.

CARBURETOR AND FUEL TANK

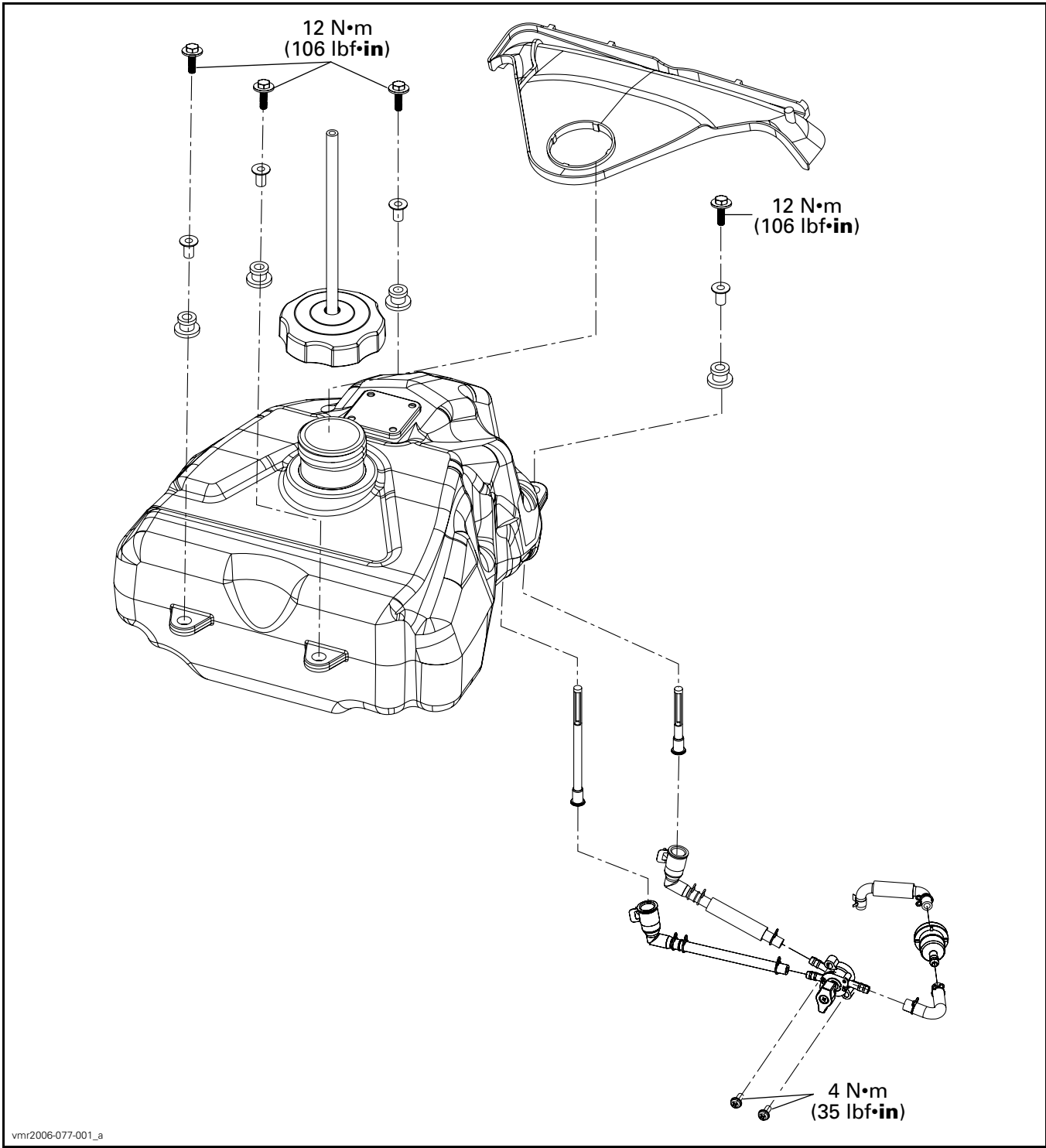
SERVICE TOOLS

Description	Part Number	Page
cable luber	529 035 738	120–121
digital inductive tachometer	529 014 500	117
float level gauge	529 035 520	116
small hose pincher.....	295 000 076	114–115, 117–118

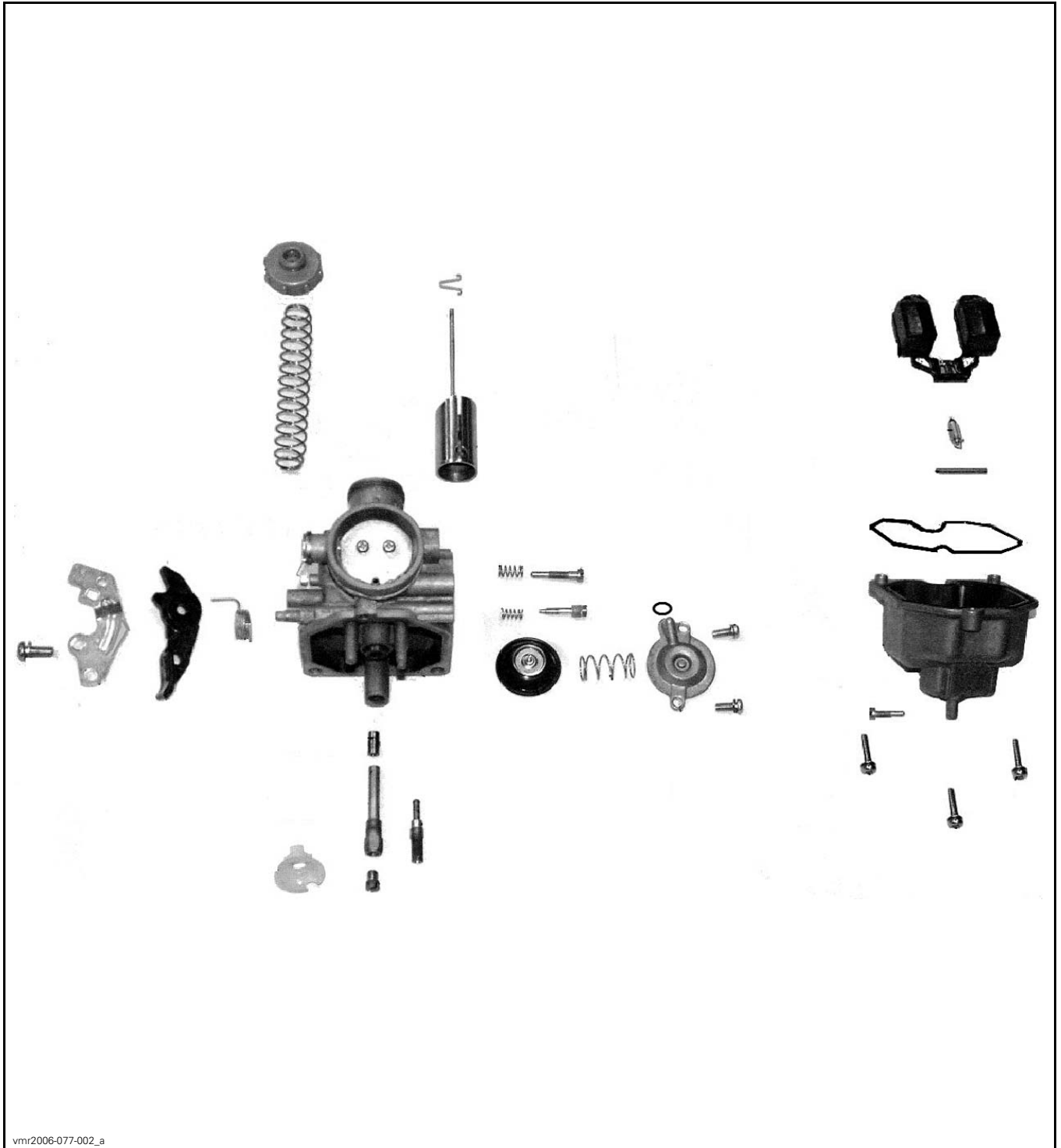
SERVICE PRODUCTS

Description	Part Number	Page
cable lubricant.....	293 600 041	120–121

FUEL TANK, FUEL VALVE AND FUEL FILTER



CARBURETOR



Section 04 FUEL SYSTEM

Subsection 01 (CARBURETOR AND FUEL TANK)

GENERAL

Before performing any repair on the fuel system, always turn fuel valve to OFF position and disconnect battery before working on fuel system.

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 small 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.

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 BRP parts department. This will ensure continued proper and safe operation.

WARNING

Use of improper fuel lines could compromise fuel system integrity.

PROCEDURES

CARBURETOR

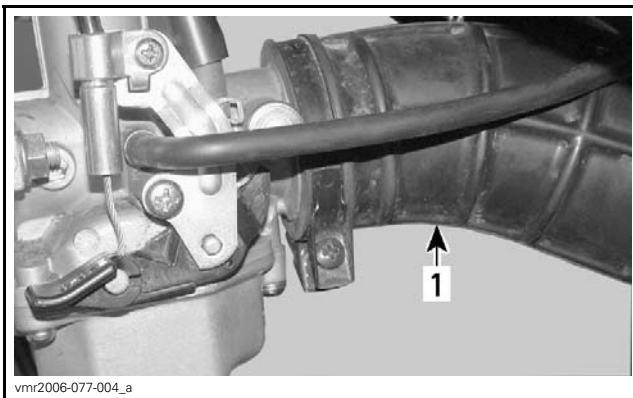
CAUTION: Although some jets can be replaced by other jets from other carburetors, such modifications should not be performed. They can greatly affect engine calibration and can cause severe damage to engine. Use only recommended jetting specific for this carburetor.

Removal

Turn fuel valve to OFF.



Unscrew the air intake hose from carburetor.

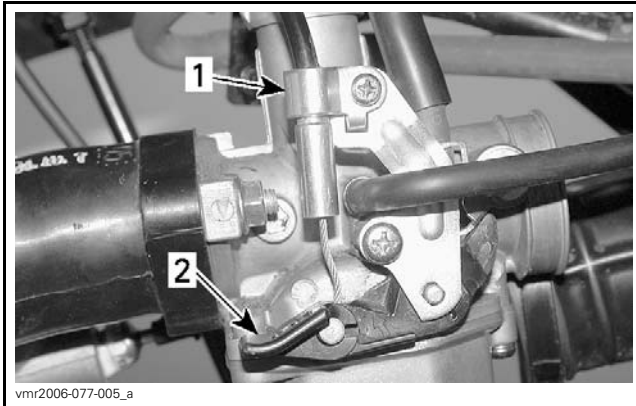


1. Air intake hose

Loosen the choke cable retaining plate then remove choke cable from its lever.

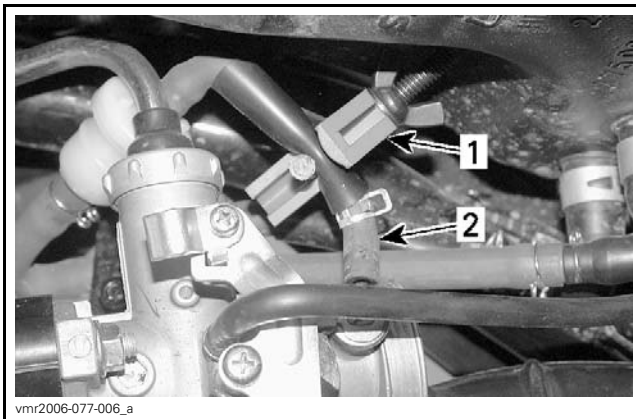
Section 04 FUEL SYSTEM

Subsection 01 (CARBURETOR AND FUEL TANK)



1. Choke cable retaining plate
2. Choke lever on carburetor

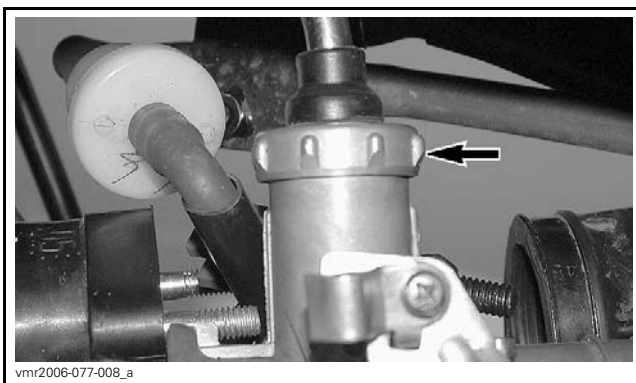
Install a small hose pincher (P/N 295 000 076) on fuel line then disconnect the fuel line from carburetor.



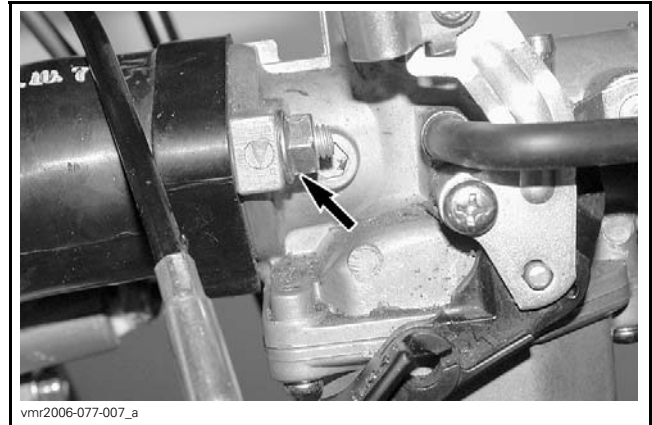
1. Small hose pincher
2. Fuel line

Unscrew and remove carburetor cover.

NOTE: Take care not to drop throttle valve piston. If so, check the jet needle for damages and replace it if necessary.



Unscrew nuts that attach carburetor to intake manifold.



Remove carburetor.

Cleaning and Inspection

The entire carburetor should be cleaned with a general solvent and dried with compressed air before disassembly.

CAUTION: Heavy duty carburetor cleaner may be harmful to the float material and to the rubber parts, O-rings, etc. Therefore, it is recommended to remove those parts prior to cleaning.

Carburetor body and jets should be cleaned in a carburetor cleaner following manufacturer's instructions.

WARNING

Solvent with a low flash point such as gasoline, naphtha, benzol, etc., should not be used as they are flammable and explosive.

Installation

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

CAUTION: Intake manifold and air intake hose must be checked for cracks and/or damage. At assembly, they must be perfectly matched with the air filter housing, carburetor and engine or severe engine damage will occur.

Make sure throttle valve piston groove passes the inside protrusion in carburetor before closing the carburetor cover.

WARNING

Throttle valve piston groove must be aligned with carburetor inside protrusion to allow throttle valve piston to reach idle bottom position. Otherwise, throttle valve piston will be half opened leading to potentially dangerous situation.

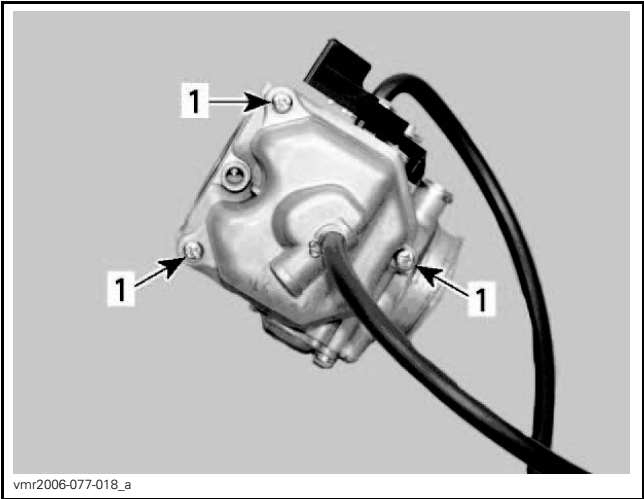
Section 04 FUEL SYSTEM
Subsection 01 (CARBURETOR AND FUEL TANK)

Carburetor Adjustments

Float Level

Correct fuel level in float chamber is vital for maximum engine efficiency. To check for correct float level proceed as follows:

- Remove carburetor.
- Turn the carburetor upside down and remove float bowl.



1. Float bowl screws

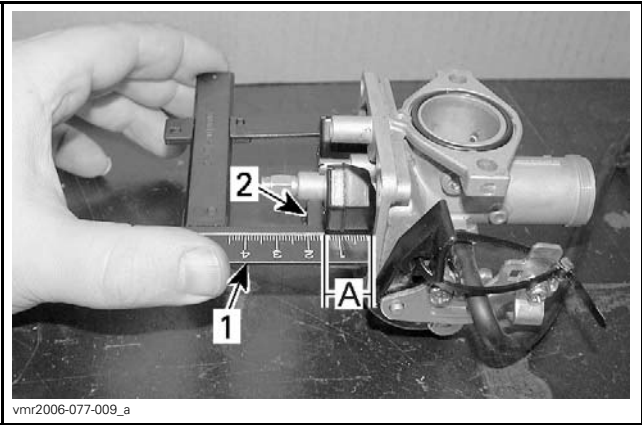
- Make sure that float arm is symmetric, not distorted.

With carburetor chamber on the side:

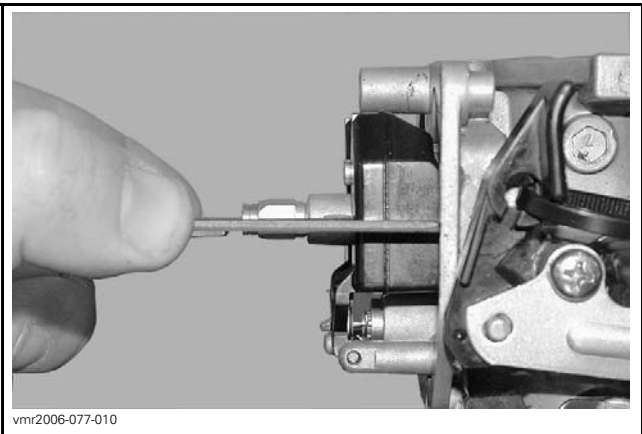
- Measure height between bowl seat and the top edge of float arm. Use float level gauge (P/N 529 035 520).
- Keep float level gauge perfectly horizontal and in line with main jet hole.

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.



TYPICAL
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 contact tab, do not pry on. This would apply pressure on needle and damage valve seat/needle.

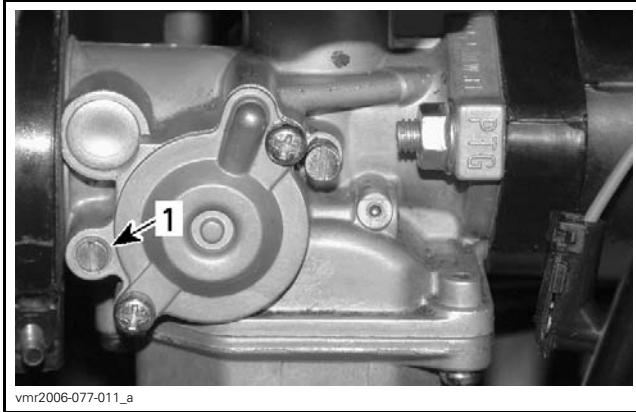
CARBURETOR FLOAT LEVEL ADJUSTMENT

FLOAT LEVEL	14.8 mm (.5827 in)
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Pilot Screw

Place vehicle on a level surface and apply parking brake.

Turn the pilot screw clockwise until it sits lightly then unscrew of 2 turns.

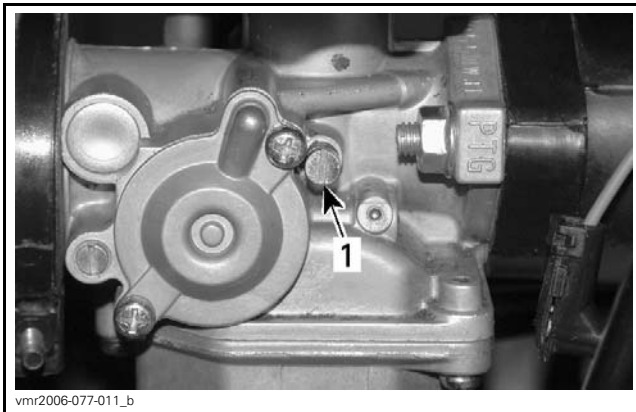


1. Pilot screw

Idle Speed

Warm up engine; using a digital inductive tachometer (P/N 529 014 500), adjust idle speed to 1700 ± 100 RPM by turning idle speed screw.

CAUTION: Do not attempt to set the idle speed by using the pilot screw.



1. Idle speed screw

Connect an exhaust analyzer. Refer to manufacturer's instructions concerning the proper procedure. The recommended CO value is 1.0~1.5%.

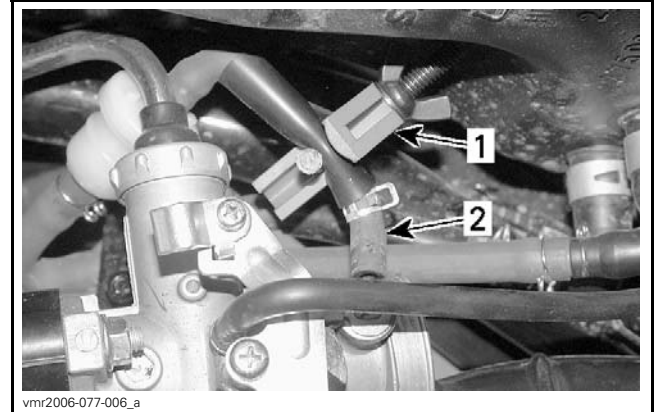
Make sure idle speed and CO are in the recommended values when engine speed is stable. If idle speed and CO values are fluctuating, repeat the adjustment procedures as described above.

FUEL FILTER

Removal

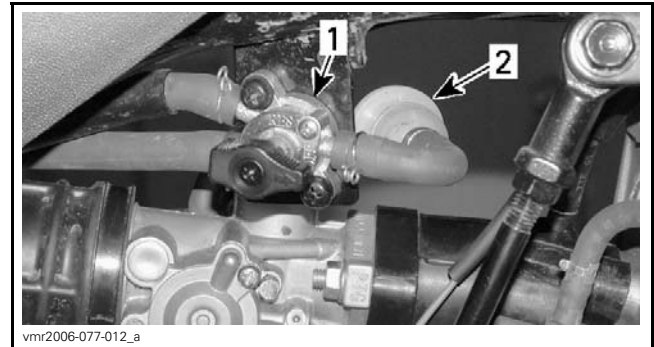
Turn fuel valve to OFF position.

Install a small hose pincher (P/N 295 000 076) on fuel line then disconnect the fuel line from carburetor.



1. Small hose pincher
2. Fuel line

Unplug fuel line (between filter and valve) from fuel valve.



1. Fuel valve
2. Fuel filter

Remove fuel filter from vehicle.

Installation

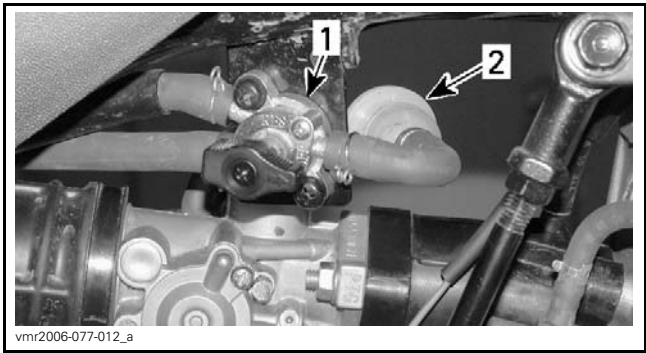
The installation is the reverse of the removal procedure.

FUEL VALVE

Inspection

To check if the valve works correctly, turn it to OFF position and unplug from fuel valve, the fuel line going to fuel filter.

Section 04 FUEL SYSTEM
Subsection 01 (CARBURETOR AND FUEL TANK)



- 1. Fuel valve
- 2. Fuel filter

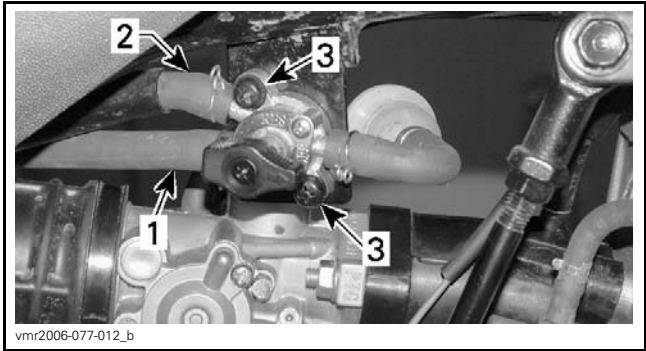
No fuel should leak from fuel valve in this position. Turn fuel valve to ON to check if the valve works properly. Close valve when fuel leaks from fuel valve.

Removal

Turn fuel valve to OFF position.

Install a small hose pincher (P/N 295 000 076) on the main fuel line and on the reserve fuel line then remove all hoses from fuel valve. Identify each hose for reinstallation.

Remove screws securing the fuel valve to frame.



- 1. Main fuel line
- 2. Reserve fuel line
- 3. Fuel valve screws

Installation

For installation, reverse the removal procedure.

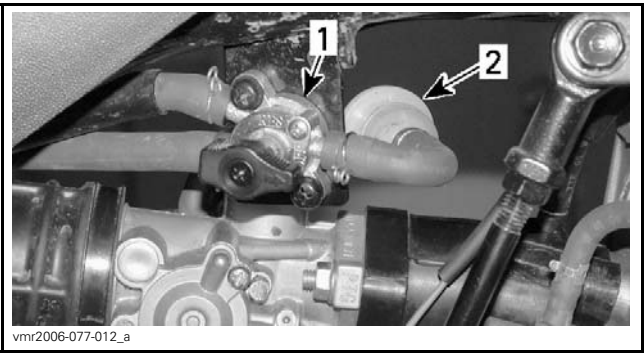
FUEL TANK

Removal

Remove front fender. Refer to *BODY*.

Turn fuel valve to OFF position.

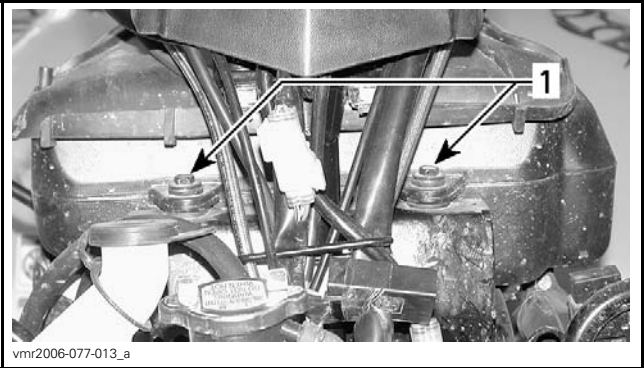
Unplug fuel line (between filter and valve) from fuel valve.



- 1. Fuel valve
- 2. Fuel filter

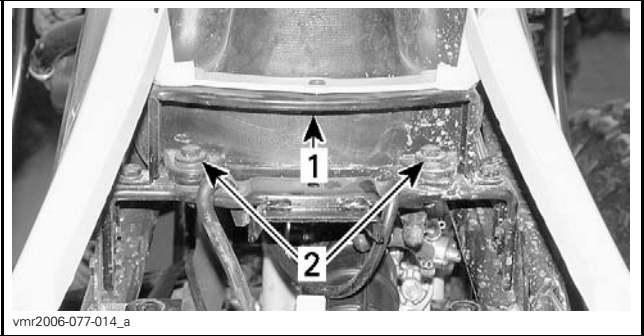
Unscrew fuel valve from frame.

Unscrew bolts retaining the front of fuel tank to frame.



- 1. Fuel tank front bolts

Remove fender bracket and rear fuel tank bolts.



- 1. Fender bracket
- 2. Fuel tank rear bolts

Turn handlebar fully to right then lift up fuel tank and remove it from the left side of vehicle.

Installation

For installation, reverse the removal procedure.

THROTTLE CABLE

Removal

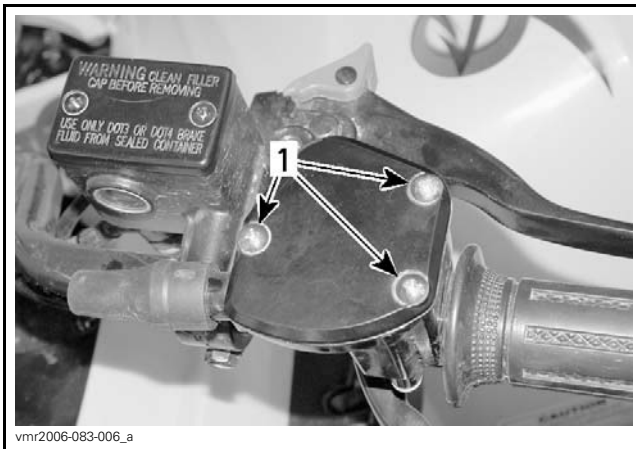
WARNING

Ensure the key is turned OFF, prior to performing the throttle cable removal.

NOTE: To ease reinstallation, take note cable routing.

Throttle Lever Side

Remove throttle housing cover.



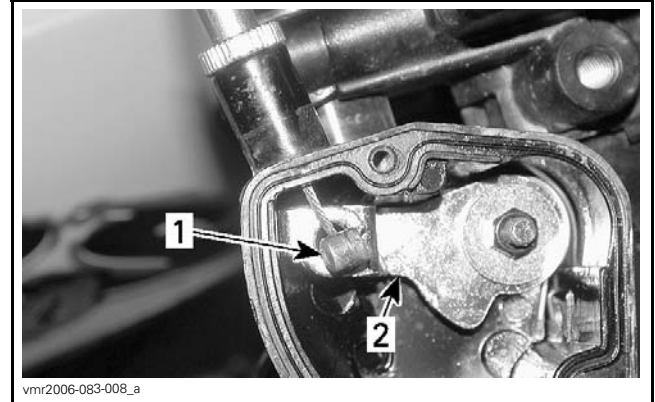
1. Throttle housing cover screws

Move back rubber cap.



Tighten adjustment screw to its maximum.

Using long nose pliers, disconnect throttle cable from throttle lever.



1. Throttle cable barrel
2. Throttle lever

Unscrew throttle adjustment screw completely and remove cable.



Carburetor Side

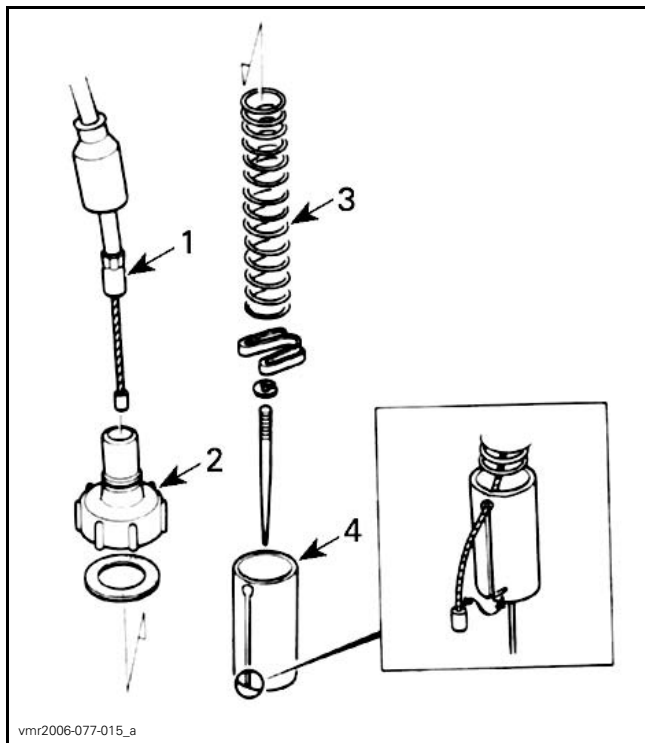
Unscrew carburetor cover from the carburetor.

Compress the carburetor spring to expose the throttle cable.

Push throttle cable forward out of the throttle valve piston.

Section 04 FUEL SYSTEM

Subsection 01 (CARBURETOR AND FUEL TANK)



1. Throttle cable
2. Carburetor cover
3. Carburetor spring
4. Valve piston

Separate throttle cable from carburetor cover.
Remove throttle cable from vehicle.

Lubrication

The throttle cable must be lubricated with cable lubricant (P/N 293 600 041) or an equivalent.

⚠ 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 and from carburetor.

Install the cable luber (P/N 529 035 738) on cable.
Insert the needle of lubricant can on cable luber hole.

⚠ WARNING

Always wear eye protection and gloves when lubricating cables.

NOTE: Place a rag around cable luber to prevent lubricant splash.

Put lubricant until it passes through the cable.

Place the cable in a vertical position during approximately 15 minutes or until no lubricant flows out of cable.

Reinstall and adjust cable, see below.

Installation

For installation, reverse the removal procedure.

Adjustment

⚠ WARNING

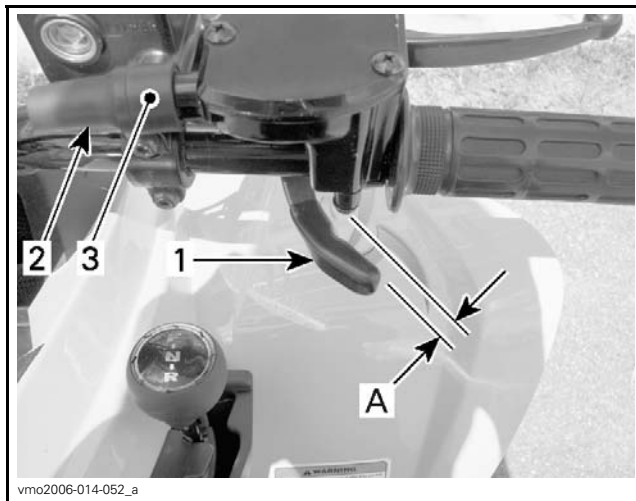
Ensure the key is turned OFF, prior to perform the throttle cable adjustment.

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.



TYPICAL

1. Throttle lever
2. Rubber protector
3. Cable adjuster
- A. 1 to 3 mm (.039 to .118 in)

Tighten lock nut and reinstall protector.

With the transmission lever in NEUTRAL position, start the engine. Check if the throttle cable is adjusted correctly by turning handlebar fully to the right and left. If the engine RPM increases, readjust the throttle cable or verify the cable routing.

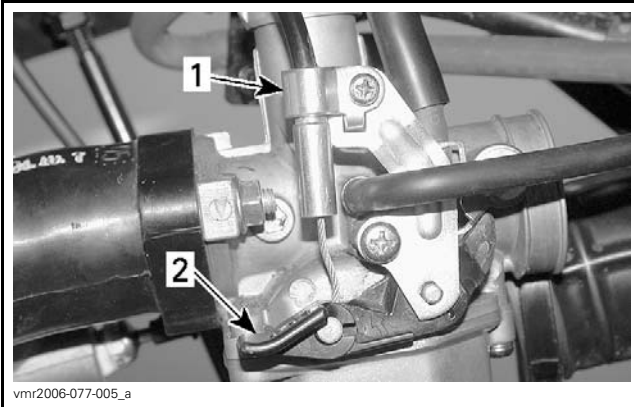
CHOKE CABLE

Removal

NOTE: Before removing choke cable, note its routing to ease the installation.

Carburetor Side

Loosen the choke cable retaining plate then remove choke cable from its lever.

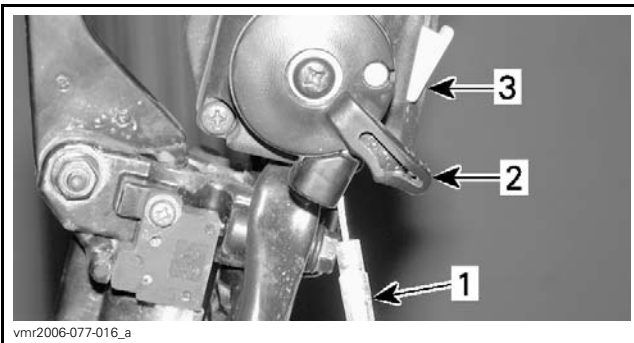


1. Choke cable retaining plate
2. Choke lever on carburetor

Multifunction Switch Side

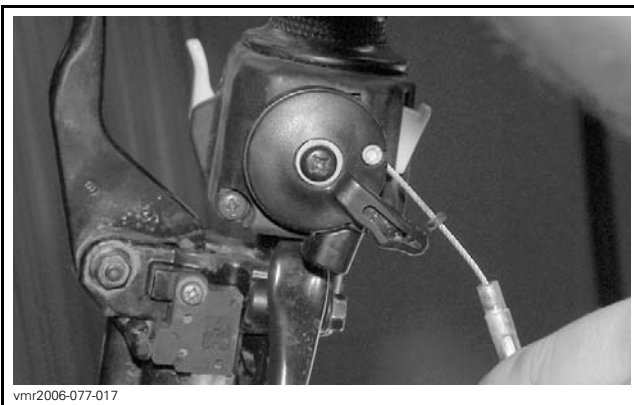
Push the choke lever to FULL position.

Underneath multifunction switch, pull cable to remove the cable housing from multifunction switch.



1. Choke cable
2. Choke lever
3. Multifunction switch

Align the choke cable end with the lever slot then remove the cable.



Lubrication

The choke cable must be lubricated with cable lubricant (P/N 293 600 041) or an equivalent.

⚠ 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 choke cable, remove cable from multifunction switch and from carburetor.

Install the cable luber (P/N 529 035 738) on cable.

Insert the needle of lubricant can on cable luber hole.

⚠ WARNING

Always wear eye protection and gloves when lubricating cables.

NOTE: Place a rag around cable luber to prevent lubricant splash.

Put lubricant until it passes through the cable.

Place the cable in a vertical position during approximately 15 minutes or until no lubricant flows out of cable.

Reinstall cable.

Installation

Install the choke cable by reversing the removal procedure.

CHARGING SYSTEM

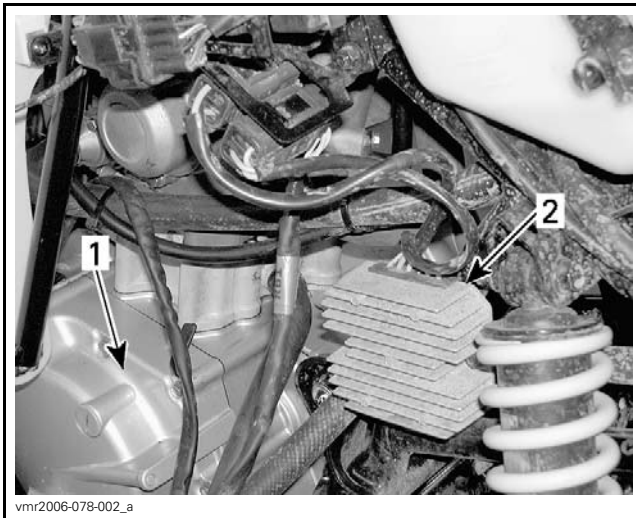
SERVICE TOOLS

Description	Part Number	Page
multimeter Fluke 111	529 035 868	123

SERVICE PRODUCTS

Description	Part Number	Page
dielectric grease	293 550 004	126

GENERAL



1. Magneto
2. Voltage regulator/rectifier

The magneto is the source of electrical energy to charge the battery and keep it at a full state of charge. The magneto is coupled to the engine and it transforms magnetic field into electric current through a stator.

The magneto supplies unregulated AC current (alternative current) to the voltage regulator/rectifier.

Voltage Regulator/Rectifier

A voltage regulator/rectifier receives the AC voltage and rectifies (converts) it into DC. The voltage is also regulated to a predefined voltage (DC).

Battery

The battery supplies with electric current the electric starter and the entire vehicle. So, only DC current is used in the entire electrical system.

PROCEDURES

For best results, use the multimeter Fluke 111 (P/N 529 035 868).



If the battery is regularly discharged, check current leakage.

VOLTAGE REGULATOR/RECTIFIER

NOTE: First, ensure battery is in good condition and fully charged prior to performing tests.

Static Test: Continuity

Due to internal circuitry, there is no static test available to check continuity.

Dynamic Test: DC Current

Proceed as follows:

Turn off lights and disconnect any accessory from power outlet.

Remove cooling fan fuse to prevent fan to start.

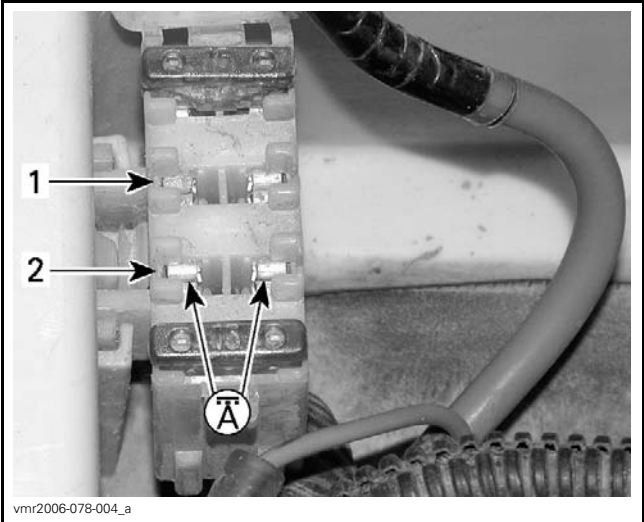
Start engine.

While engine is running, remove 30 A fuse.

Set multimeter to Adc.

Section 05 ELECTRICAL SYSTEM
Subsection 01 (CHARGING SYSTEM)

Connect multimeter between fuse pins.



1. Fan fuse removed (10 A)
2. 30 A fuse removed

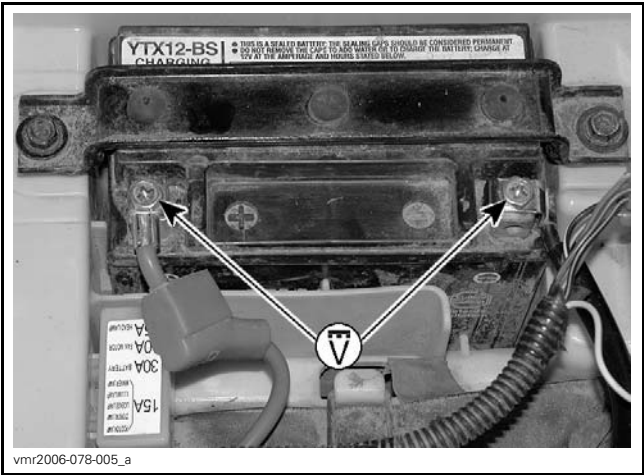
Read current.

Table with 2 columns: TEST ENGINE SPEED, CURRENT. Row 1: 1500 RPM, approx. 1.2 A

If current is below specification, check magneto (stator) prior to concluding that rectifier is faulty.
Reinstall fuses.

Dynamic Test: Voltage

Proceed as follows:
Slide rubber boot away from positive battery terminal.
Set multimeter to Vdc scale.
Start engine.
Connect multimeter to battery posts.



Read voltage.

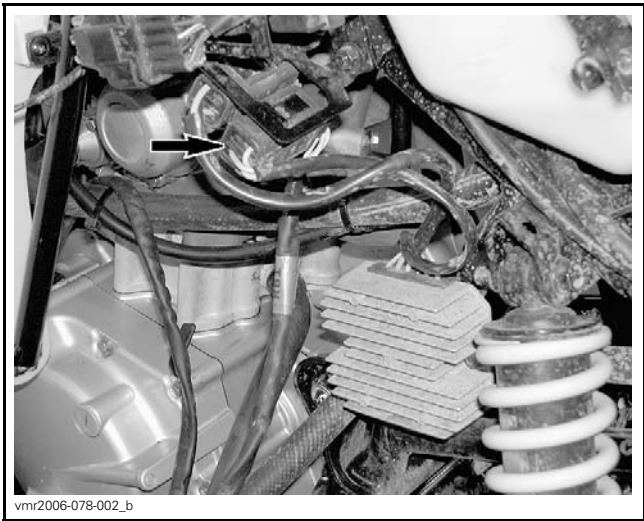
Table with 2 columns: TEST ENGINE SPEED, VOLTAGE. Row 1: 1500 RPM, Max. 13.5 - 15 Vdc

If voltage is above specification, replace voltage regulator/rectifier.
If voltage is below specification, check wiring and connections.
Properly secure battery positive terminal boot.
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.

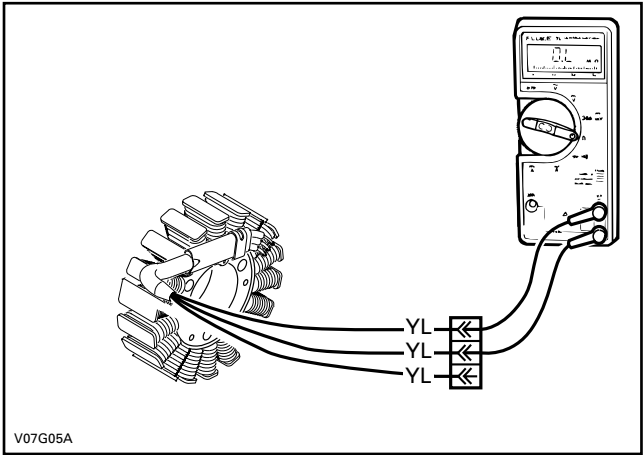
STATOR

Static Test: Continuity

Disconnect magneto wiring harness connector.



Set multimeter to Ohms.
Connect multimeter between YELLOW wires as follows.



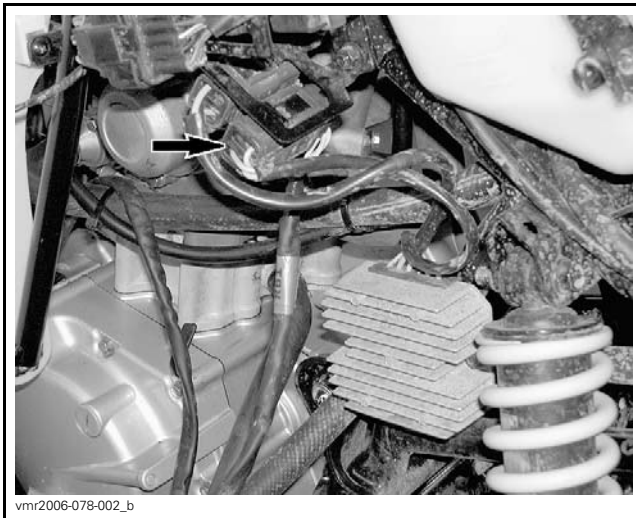
Read resistance.

TERMINAL	RESISTANCE @ 20°C (69°F)
1 and 2	0.3 - 0.4 Ω
1 and 3	
2 and 3	

If any result is out of specification, replace stator.
Reconnect connectors properly.

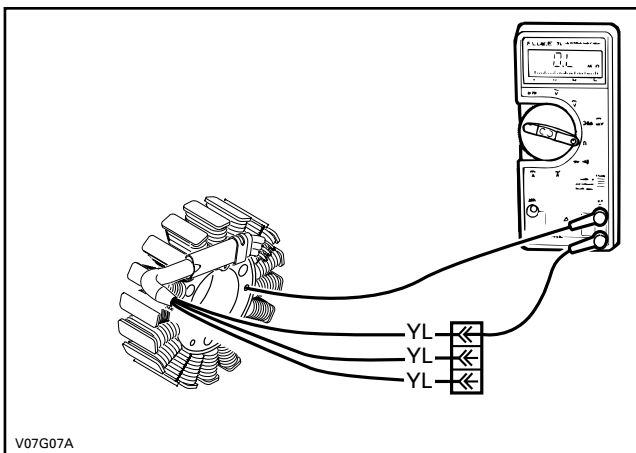
Static Test: Insulation

Disconnect the magneto wiring harness connector.



Set multimeter to Ω .

Connect multimeter as follows.



Read resistance.

TERMINAL	RESISTANCE @ 20°C (69°F)
Any YELLOW wire and engine ground	Infinity (open circuit)

If there is a resistance or continuity, the stator coils and/or the wiring is grounded and need to be repaired or replaced.

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.

CAUTION: 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 fuse burnt, faulty voltage regulator/rectifier or stator
- short circuit or battery drain (proceed with current leakage test).

Current Leakage Test

Turn OFF lights and hazard lights/flashers (if so equipped).

NOTE: It is required to turn ignition switch ON to allow turning off hazard lights.

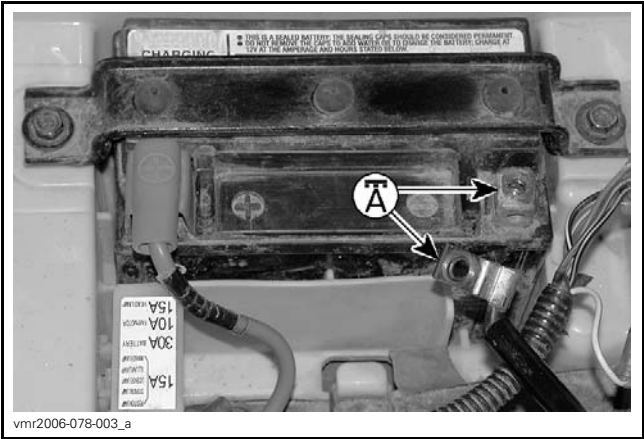
Turn ignition switch to OFF.

Disconnect negative (BLACK) cable from battery.

Set multimeter to Adc.

Connect multimeter as shown.

Section 05 ELECTRICAL SYSTEM
Subsection 01 (CHARGING SYSTEM)



CURRENT LEAKAGE LIMIT

Less than 1 mA

If leakage current is above specification, it may indicate a short circuit. Unplug harness connectors one at a time to locate the short circuit.

Unloaded 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 12.35 Vdc minimum.

Load Test

This is the best test of the battery 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 30 seconds into the test, check battery voltage; if battery is in good condition, it will have at least 10.5 Vdc.

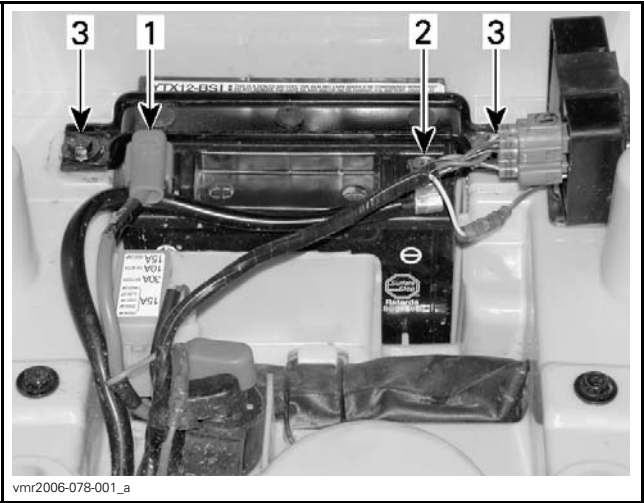
Removal

Disconnect BLACK (-) cable first then RED (+) cable.

**WARNING**

Always respect this order for disassembly; disconnect BLACK (-) cable first.

Remove the retaining screws than bracket.



- 1. Positive cable (RED)
- 2. Negative cable (BLACK)
- 3. Retaining screws

Remove battery from vehicle.

Cleaning

Clean the battery tray, cables and battery posts using a solution of baking soda and water.

Remove oxidation (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, and if bracket is properly secured.

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

Reinstall battery in vehicle.

Properly secure retaining bracket.

Reconnect battery cables.

 WARNING

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

IGNITION SYSTEM

SERVICE TOOLS

Description	Part Number	Page
digital/inductive type tachometer	529 014 500	141
multimeter Fluke 111	529 035 868	130

GENERAL

Overview

A CDI (Capacitor Discharge Ignition) system is utilized. The ignition system is made up of the following components.

Battery/Ignition Switch

The ignition switch allows battery to supply the ignition module for the ignition system.

Magneto Flywheel/Trigger Coil

The magneto flywheel features one protrusion that is working with the trigger coil. The trigger coil sends the signals to the ignition module to be processed for the ignition system.

Ignition Module

It is basically responsible for the ignition system. It contains ignition timing data to fire ignition coil at the proper time according to RPM.

It works in conjunction with the trigger coil and shift gear control module. Using information from the shift gear control module, the ignition module performs the following:

- It limits engine RPM so that vehicle speed does not exceed approximately 15 km/h (9 MPH) when gearbox is in reverse.
- It allows full engine RPM in Reverse when override switch is used. For override switch testing, refer to *IGNITION SYSTEM*.

European Models

- It stops engine when moving transmission lever when engine RPM is too high.
- It requires that ignition key is turned ON to allow turning ON or OFF hazard lights. For hazard switch testing, refer to *LIGHTS AND ACCESSORIES*.

Shift Gear Control Module

It monitors gearbox position (F, N and R) to allow different predefined engine/vehicle behaviors. It controls reverse and neutral pilot lamps. It works in conjunction with the ignition module. For gearbox switch testing, refer to *GEARBOX*.

- It prevents engine cranking when engine stop switch is OFF (with ignition switch ON).

European Models

- It prevents engine starting if transmission lever is not in Neutral AND any brake lever/pedal is held.
- It stops engine if any brake lever/pedal is not held when moving transmission lever.

Ignition Coil/Spark Plug

The ignition coil receives its signals from the ignition module. The ignition coil steps up the input voltage and the end result is firing of the spark plug.

Section 05 ELECTRICAL SYSTEM
Subsection 02 (IGNITION SYSTEM)

Ignition System Components Location



- 1. Battery, fuses and ignition module
- 2. Ignition switch
- 3. engine stop switch
- 4. Magneto flywheel/trigger coil
- 5. Shift gear control module

- 1. fuse
- 2. spark plug (spark occurrence)
- 3. battery
- 4. ignition switch
- 5. engine stop switch
- 6. trigger coil
- 7. ignition coil
- 8. ignition module
- 9. shift gear control module.

Intermittent Ignition Problems

In dealing with intermittent problems there is no easy diagnosis. For example, problems that occur only at cold engine 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.

REPAIR 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.

For best electrical measurement results, use the multimeter Fluke 111 (P/N 529 035 868).



TROUBLESHOOTING

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:

FUSES

Check condition of main fuse and 15 A fuse (supplying ignition module and shift gear control module). Replace burnt fuse as necessary.



1. Fuses

CAUTION: Do not use higher rated fuse as this can cause severe damage.

SPARK PLUG

Spark Occurrence

Remove spark plug and connect to the ignition coil cable. 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: 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, test ignition system as per sequence in *TROUBLESHOOTING*.

Disassembly

Unplug the spark plug cable.

Unscrew the spark plug one turn.

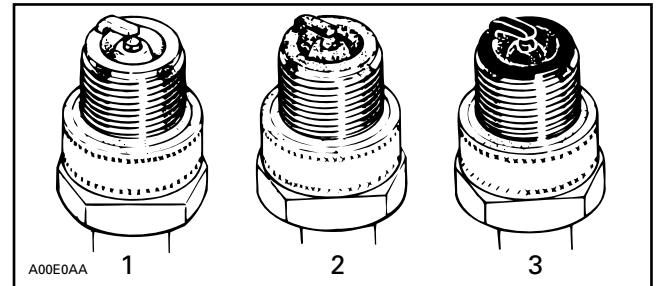
Clean the spark plug and cylinder head with pressurized air.

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).

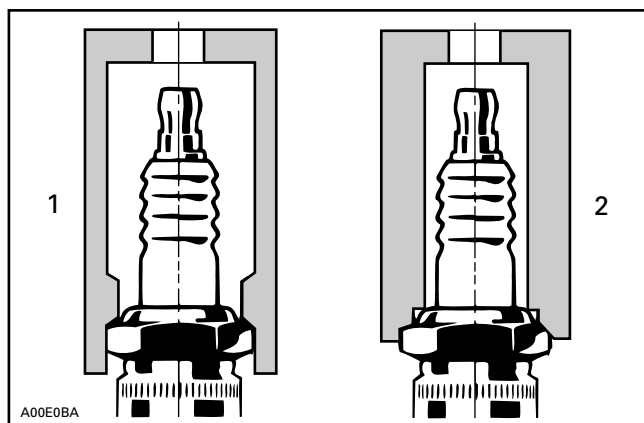
Installation

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 0.8 mm (.031 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.

Section 05 ELECTRICAL SYSTEM

Subsection 02 (IGNITION SYSTEM)



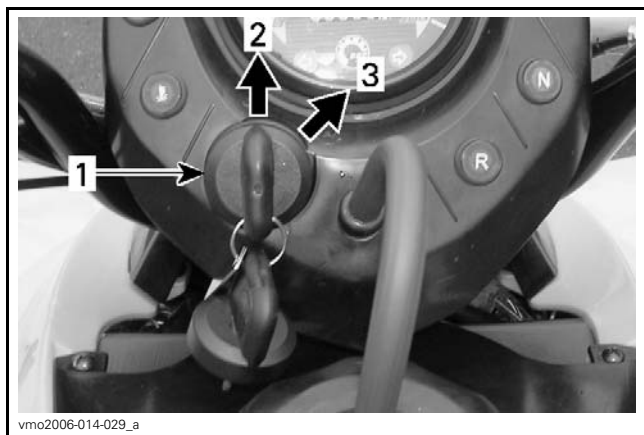
1. Proper socket
2. Improper socket

– Torque spark plug to 12 N•m (106 lbf•in).

BATTERY

At least 8 V is required for proper operation of the ignition system (however 10.2 V is required for engine starting). Check battery voltage and condition. Refer to *CHARGING SYSTEM* section.

IGNITION SWITCH



TYPICAL

1. Ignition switch
2. OFF position
3. ON position (lights on)

Test

All Models except Europe

As a quick test to check if ignition key works properly, turn switch ON. If tail light turns on (assuming bulb is good), ignition switch is good.

European Models

As a quick test to check if ignition key works properly, turn it ON. Press horn button. If horn sounds (assuming it is good), ignition switch is good.

All Models

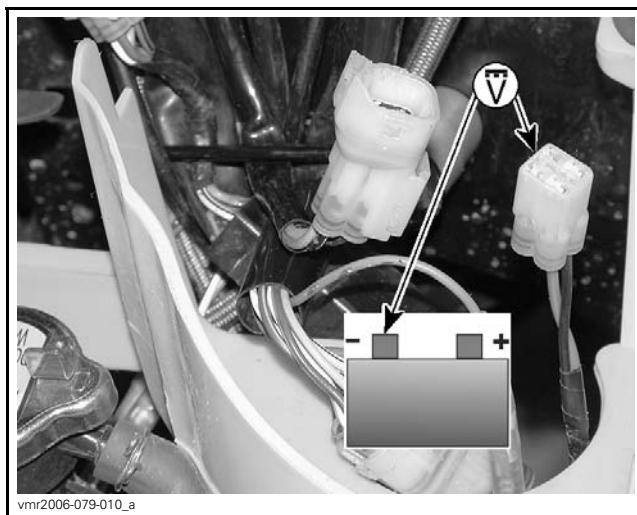
If test failed, perform the following tests.

Remove front cover. Refer to *BODY*.

Disconnect ignition switch connector with the RED wire.

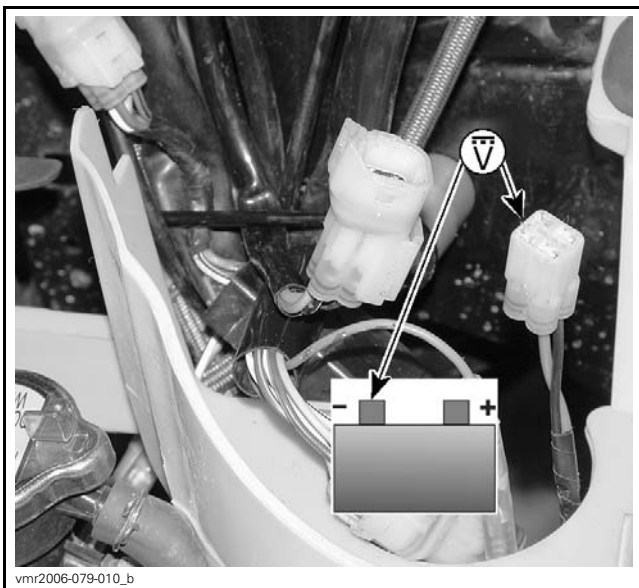


Measure voltage between RED supply wire and battery ground.



If reading is lower than battery voltage, test wiring harness. If voltage is good, test switch.

Use a multimeter and measure the resistance between the following wires.



All Models except Europe

IGNITION SWITCH CONNECTOR		
POSITION	TERMINAL	RESISTANCE
OFF	RED and BROWN wires	Infinite (OL.)
ON		0.4 Ω max.

European Models

IGNITION SWITCH CONNECTOR		
POSITION	TERMINAL	RESISTANCE
OFF	RED and BLACK wires	Infinite (OL.)
ON		0.4 Ω max.

Replace switch if defective.

If switch is good, continue the other tests.

Removal

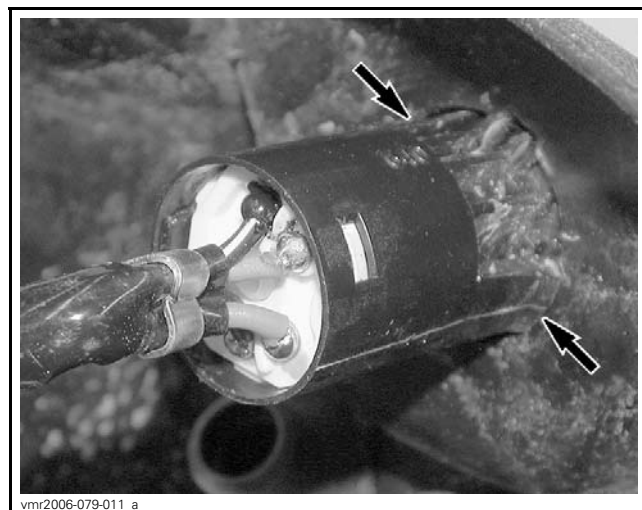
Remove front cover. Refer to *BODY*.

Disconnect ignition switch connector.

Remove steering cover. Refer to *STEERING AND FRONT SUSPENSION*. Disconnect ignition switch with RED wire.



Push tabs of switch and while holding them squeezed, push switch out.

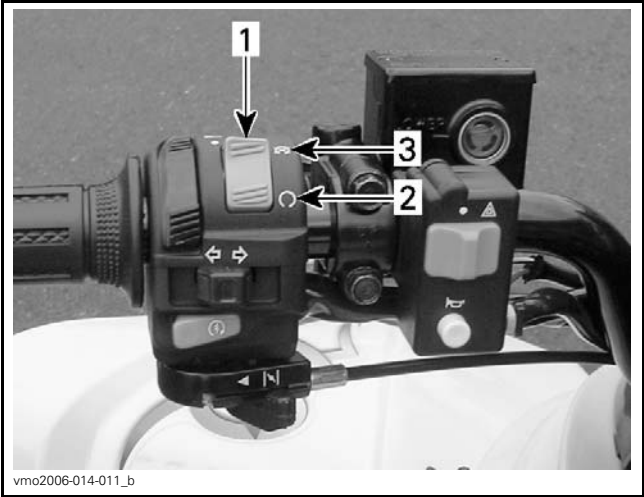


Installation

Properly index switch in its hole then push until tabs snaps in.

Install remaining components.

ENGINE STOP SWITCH



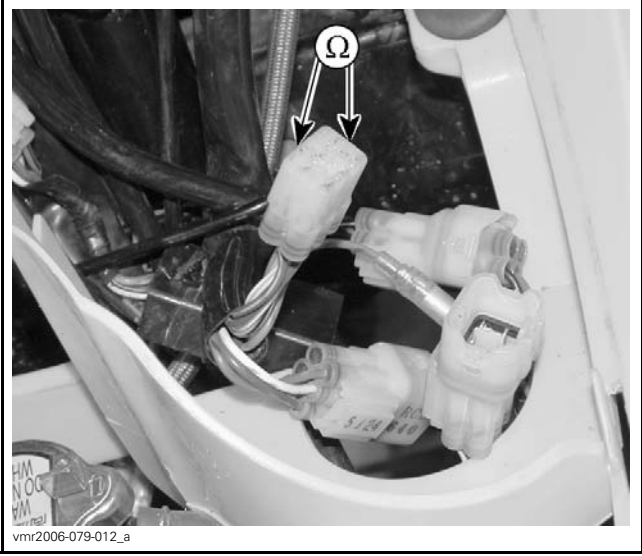
- 1. Engine stop switch
- 2. RUN position
- 3. OFF position

Test

Remove front cover. Refer to *BODY*. Disconnect engine stop switch connector with the BLUE/YELLOW wires.



Use a multimeter and set it to Ω . Measure the resistance as follows.



ENGINE STOP SWITCH		
POSITION	WIRE	RESISTANCE
OFF	BLUE/YELLOW and BLUE/YELLOW	Infinite (0L.)
RUN		0.4 Ω max.

Replace switch if defective.
If switch is good, continue the other tests.

TRIGGER COIL



TRIGGER COIL INSIDE MAGNETO COVER

NOTE: The trigger coil is not adjustable.

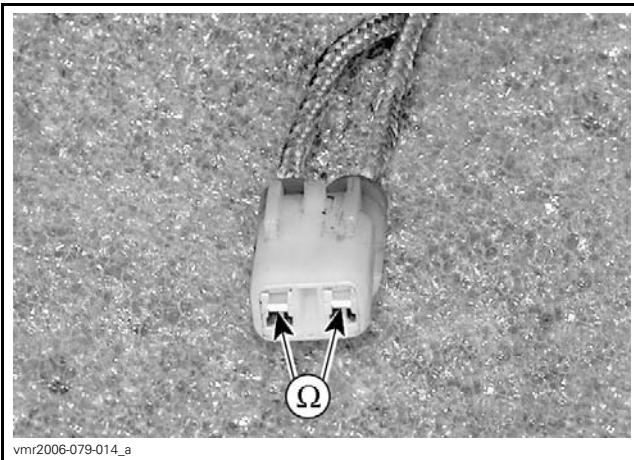
Static Test: Continuity

Check resistance with a high-sensitivity ohmmeter.

- 1. Disconnect trigger coil connector.



2. Use a multimeter and set it to Ω . Read resistance as follows.



TRIGGER COIL	
WIRE	RESISTANCE
BLUE/YELLOW and GREEN/WHITE	446 - 545 Ω

Dynamic Test: Voltage

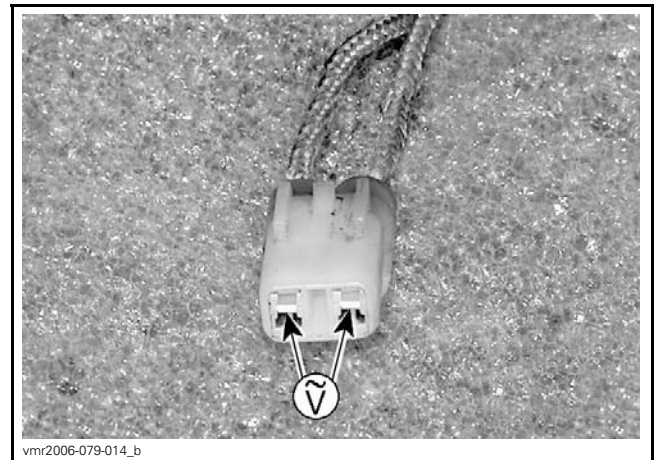
1. Disconnect trigger coil connector.



2. Use a multimeter and set it to Vac.
3. Set engine stop switch to RUN.
4. Press START button.

NOTE: On European models, set transmission to Neutral and press any brake while starting.

5. Read voltage as follows.



TRIGGER COIL	
WIRE	RESISTANCE
BLUE/YELLOW and GREEN/WHITE	0.4 and 0.7 Vac

6. Repeat test 3 times.
7. Reconnect connectors.

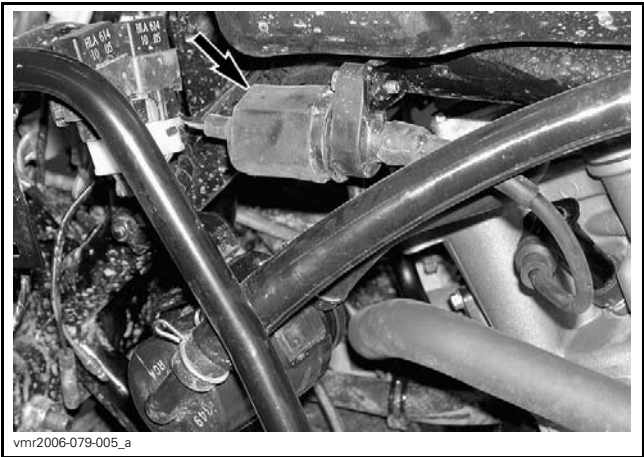
NOTE: Check wires condition and particularly where they go out of magneto cover.

8. If trigger coil is out of specification, replace it. If it tests good continue the other tests.

Replacement

Refer to *MAGNETO AND STARTER DRIVE*.

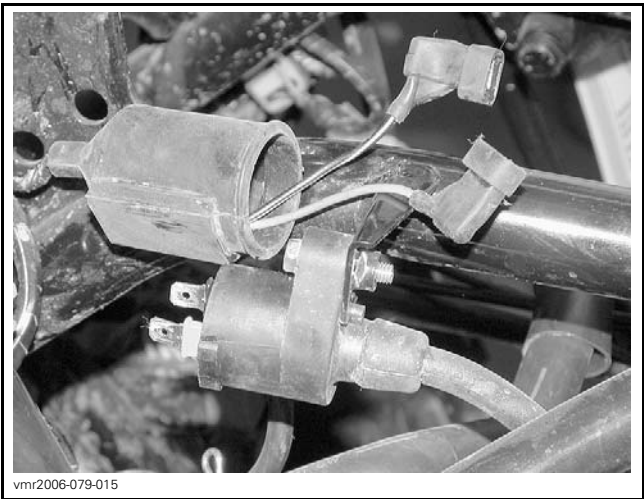
IGNITION COIL



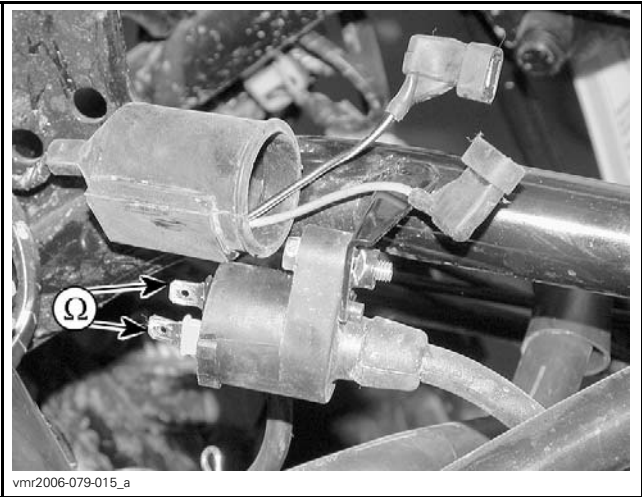
NOTE: An ignition coil with good resistance measurement can still be faulty. Voltage leak can occur at high voltage level which is not detectable with an ohmmeter. Replacing ignition coil may be necessary as a test.

Primary Winding Static Test

Slide rubber boot out.
Disconnect connectors from ignition coil.



Use a multimeter and set it to Ω . Read resistance as follows.



IGNITION COIL	
TERMINALS	RESISTANCE @ 20°C (68°F)
1 and 2	0.19 - .23 Ω

If not within specification, replace ignition coil.

Power Supply to Primary Winding

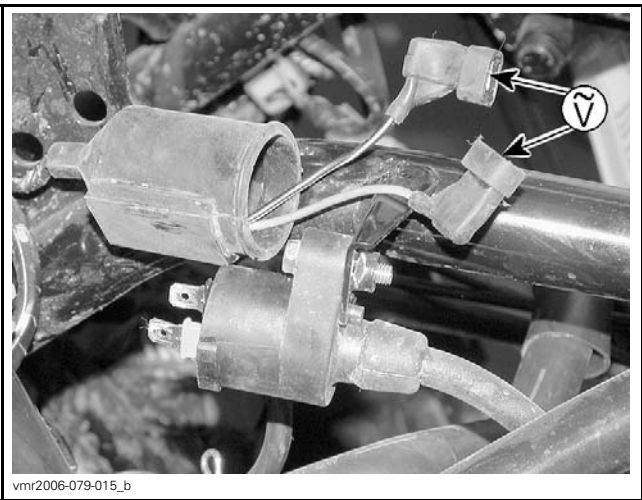
If primary winding tests good, check power supply from electronic module as follows.

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

Use a multimeter and set it to Vac.

Press START button.

Read voltage as follows.



IGNITION COIL CONNECTORS (HARNESS SIDE)	
WIRES	VOLTAGE
BLACK/YELLOW and GREEN	Approximately 3.5 Vac

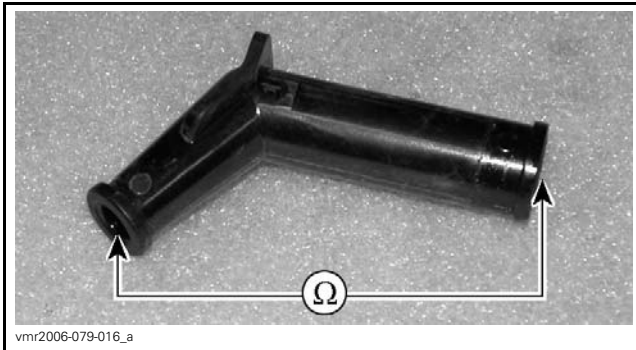
If there is no voltage, either wiring harness, electronic module or shift gear control module is faulty.

Secondary Winding Static Test

The spark plug cap includes a resistance. It should be checked prior to replacing a suspected ignition coil.

Unscrew spark plug cap.

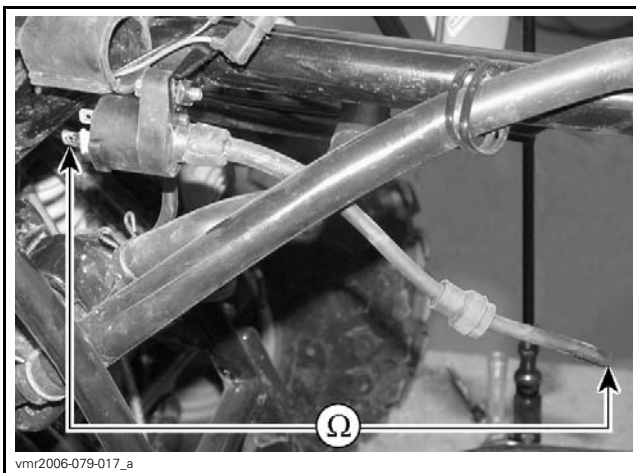
Use a multimeter and set it to Ω . Read resistance as follows.



SPRAK PLUG CAP	
TERMINALS	RESISTANCE
Each end of cap	Approximately 5 k Ω

If measurement is out of specification, replace cap.

With spark plug cap removed, measure resistance as follows.



IGNITION COIL	
TERMINALS	RESISTANCE
GREEN terminal and spark plug cable end	2.8 - 3.4 k Ω

NOTE: Check high tension cable condition. It may leak through its insulation to a nearby metallic part.

If resistance is good, continue tests. Otherwise, replace ignition coil.

Secondary Winding Dynamic Test

The output voltage should not be less than 12 kV. 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 output is under specification, replace it. If it tests good ensure wiring and connectors are in good condition then continue the next tests.

Reconnect terminals and reinstall ignition coil boot.

IGNITION MODULE



NOTE: Power supply comes through shift gear control module. A failure of shift gear control module will lead to ignition problems.

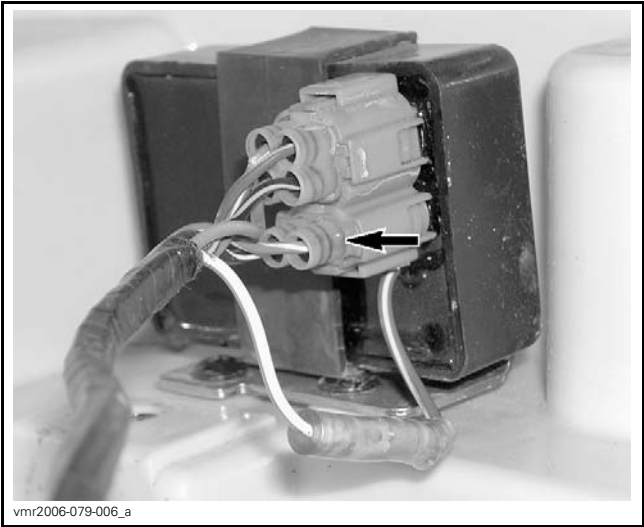
Test

NOTE: Bad grounding of ignition module through its GREEN wire may cause engine misfire or a no spark condition.

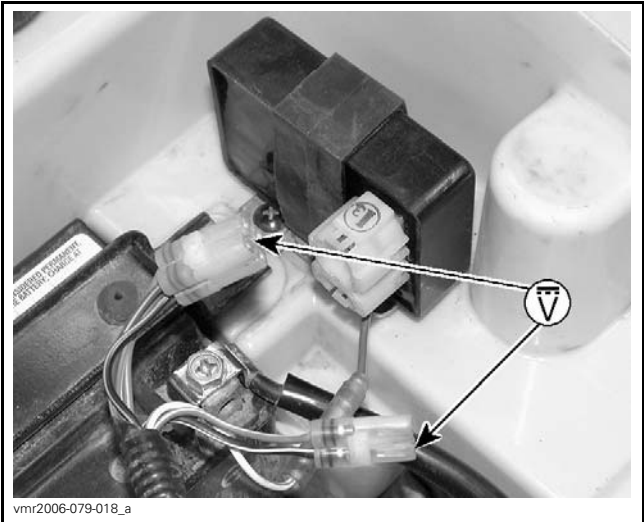
Disconnect ignition module connectors.

Section 05 ELECTRICAL SYSTEM

Subsection 02 (IGNITION SYSTEM)

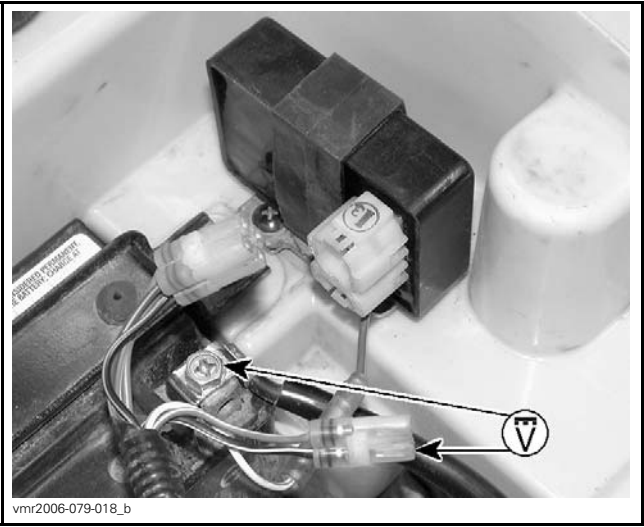


Use a multimeter and set it to Vdc.
Read voltage as follows.



IGNITION MODULE		
2-PIN CONNECTOR	3-PIN CONNECTOR	VOLTAGE
BLACK/WHITE	GREEN	Battery voltage

There should be battery voltage.
Otherwise, measure voltage as follows.



IGNITION MODULE		
2-PIN CONNECTOR	3-PIN CONNECTOR	VOLTAGE
BLACK/WHITE	Battery ground	Battery voltage

- If voltage is now adequate, repair ground wire of ignition module.



BATTERY AND IGNITION MODULE GROUNDS
(CLOSE TO REAR BRAKE MASTER CYLINDER)

If there is still no voltage, check shift gear supply voltage (it provides power to ignition module). See *SHIFT GEAR CONTROL MODULE* below.

When every other components above have been tested and are good, ignition module can be suspected. Ensure wiring and connectors are in good condition prior to replacing it.

Removal

- Remove seat.
- Unplug connectors.
- Slide module out of its retaining strap.

Installation

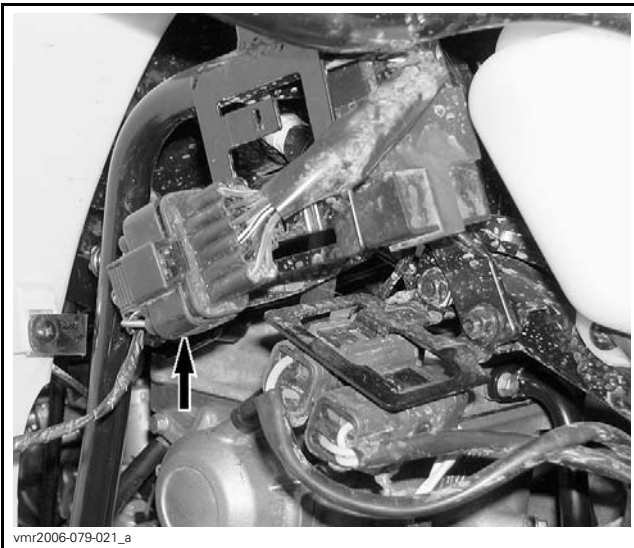
For the installation, reverse the removal procedure.

SHIFT GEAR CONTROL MODULE

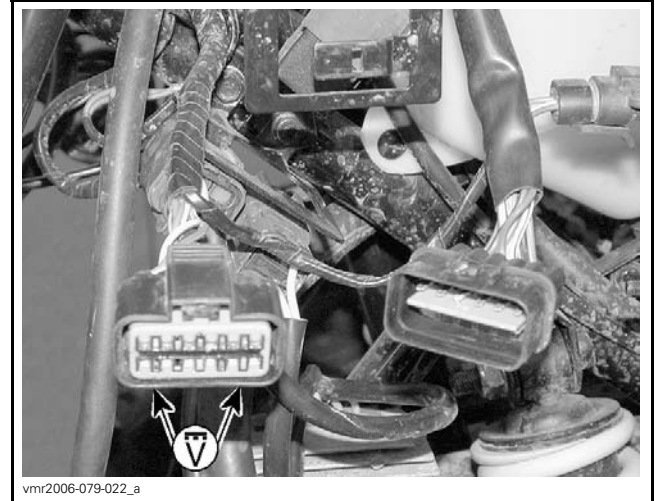


Test

NOTE: A grounded BLUE/YELLOW wire between trigger coil and shift gear control module may cause engine misfire or a no spark condition. Disconnect shift gear control module connector.

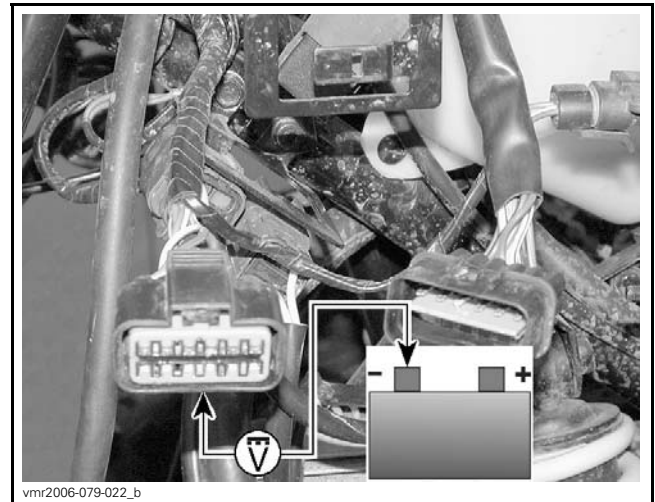


Use a multimeter and set it to Vdc.
Read voltage as follows.



SHIFT GEAR CONTROL MODULE	
WIRES	VOLTAGE
WHITE/BLACK and GREEN	Battery voltage

If there is no voltage, recheck as follows.



SHIFT GEAR CONTROL MODULE	
WIRES	VOLTAGE
WHITE/BLACK and battery ground	Battery voltage

If there is voltage, check module ground wire.
If there is no voltage, wiring harness is faulty between battery and shift gear control module.
Reconnect connector.

Removal

Unplug connector.
Slide module out of its retaining strap.

Section 05 ELECTRICAL SYSTEM

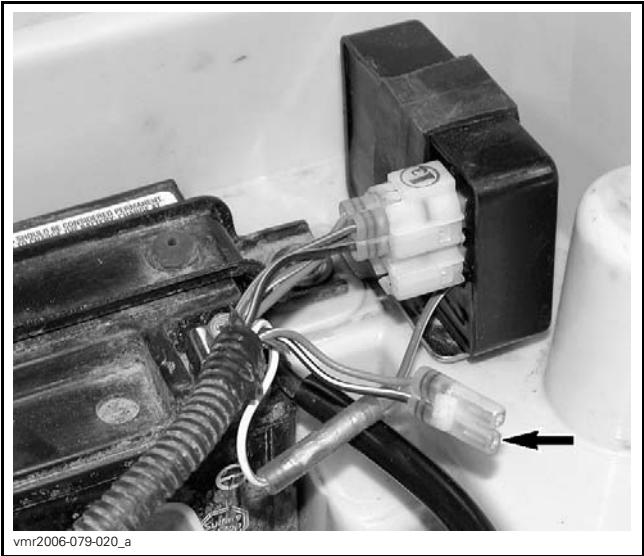
Subsection 02 (IGNITION SYSTEM)

Installation

For the installation, reverse the removal procedure.

OVERRIDE SWITCH

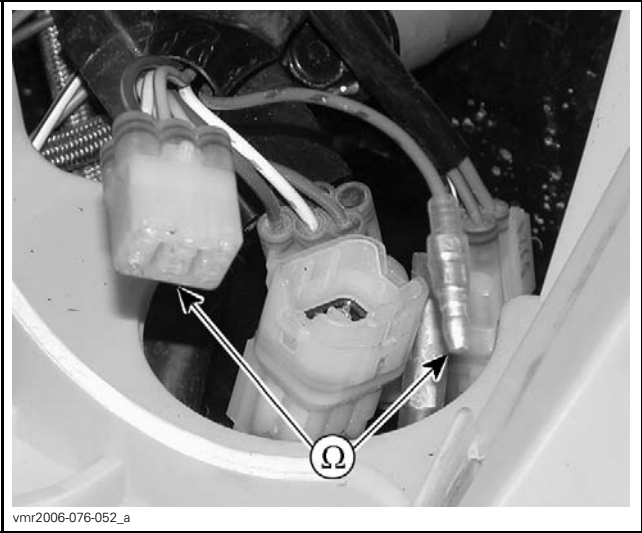
NOTE: If engine RPM is not limited in reverse operation, check GREEN/WHITE wire between gear-box and ignition module.



Remove front cover. Refer to *BODY*.
Disconnect override switch connector with the WHITE/BBLUE wire and disconnect the single connector with the GREEN wire.



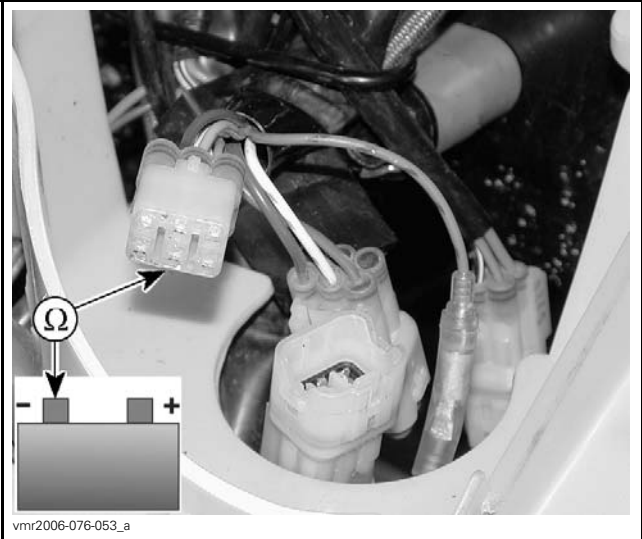
Using a multimeter, check switch as follows.



WIRE	OVERRIDE SWITCH POSITION	RESISTANCE
WHITE/BBLUE with GREEN wire	Pressed and held	0.5 Ω max.
	Released	Infinite (OL.)

If test failed, check wiring harness going to switch and if good, replace switch.

If test succeeded recheck switch as follows.



WIRE	OVERRIDE SWITCH POSITION	RESISTANCE
GREEN with battery ground	Pressed and held	0.5 Ω max.
	Released	Infinite (OL.)

If test failed, check GREEN wire going to ground.

If test succeeded, check wiring harness going to ignition module. If good, try a new module.

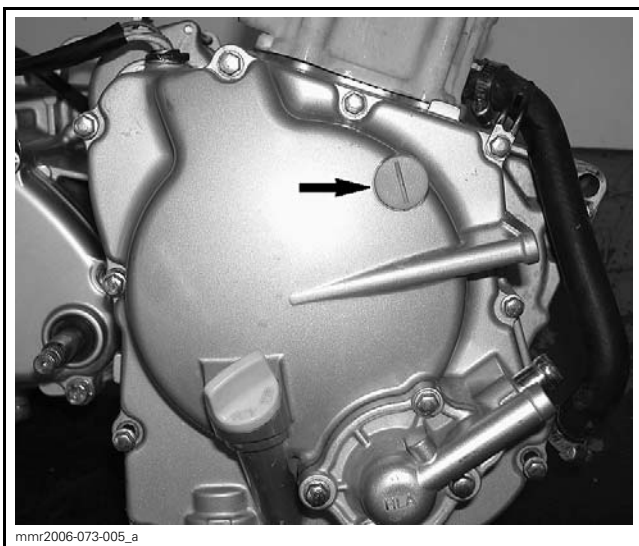
Reconnect connectors and reinstall front cover.

ADJUSTMENT

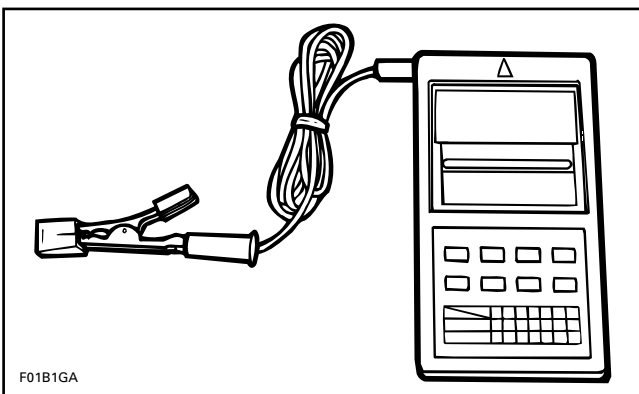
IGNITION TIMING

Ignition timing is not adjustable. However, its integrity can be checked to ensure components are working properly.

Remove magneto access plug.



Use a timing light and the digital/inductive type tachometer (P/N 529 014 500).



Start engine.

Bring engine speed to 1600 RPM and ensure the line besides "F" properly aligns using the timing light.



Increase engine speed to 6000 RPM to ensure ignition timing advances.

If marks are aligned and timing advanced as described, ignition timing is adequate.

Otherwise, try another ignition module and/or trigger coil.

NOTE: Woodruff key of magneto flywheel could be broken.

Reinstall magneto access plug.

STARTING SYSTEM

SERVICE TOOLS

Description	Part Number	Page
multimeter Fluke 111	529 035 868	143

SERVICE PRODUCTS

Description	Part Number	Page
dielectric grease	293 550 004	147

GENERAL

Starting System Components Location



1. Battery, fuses and starting solenoid
2. Ignition switch
3. Start switch and engine stop switch
4. Brake switch
5. Shift gear control module
6. Electric starter

Tool

For best electrical measurement results, use the multimeter Fluke 111 (P/N 529 035 868).



Engine Starting

The following conditions must be met to allow engine cranking.

ALL MODELS EXCEPT EUROPEAN MODELS
Ignition switch turned ON
Engine stop switch in RUN position
Transmission in Neutral position
NOTE: Engine can be cranked in P or R if any brake lever is held when pressing start button.
Start button is pressed and held

EUROPEAN MODELS
Ignition switch turned ON
Engine stop switch in RUN position
Transmission in Neutral position
Any brake lever is held when pressing start button
Start button is pressed and held

The battery will supply the starter through the starting solenoid to crank engine if the above conditions are met.

Section 05 ELECTRICAL SYSTEM

Subsection 03 (STARTING SYSTEM)

Troubleshooting

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, brake switch (European models), starting solenoid, electrical cables, connections, shift gear control module.

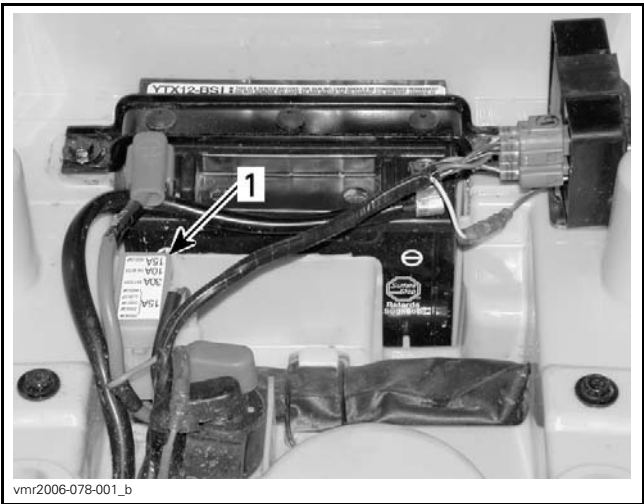
Check these components before removing starter. Consult *STARTING SYSTEM* in *TROUBLESHOOTING* section for a general view of possible problems.

TESTING PROCEDURES

NOTE: Ensure to turn on the appropriate switches to perform the tests.

FUSES

Make sure main fuse and 15 A fuse (supplying ignition module and shift gear control module) are in good condition. If fuses test good, continue with next tests.



1. Fuses

NOTE: Starting solenoid may be the cause of a burnt fuse. If solenoid tests good, an accessory may be defective.

BATTERY

To check battery condition, refer to *CHARGING SYSTEM*. If it tests good, continue with the next tests.

IGNITION SWITCH

Refer to *IGNITION SYSTEM* for testing procedures.

ENGINE STOP SWITCH

Refer to *IGNITION SYSTEM* for testing procedures.

START SWITCH

Disconnect solenoid connector.



Use a multimeter and set it to Vdc.

Read voltage as follows.



STARTING SOLENOID CONNECTOR		
POSITION	WIRE	VOLTAGE
Start switch pressed and held	GREEN/YELLOW and battery ground	Battery voltage

If there is no voltage, check wire between ignition switch and starting solenoid.

Section 05 ELECTRICAL SYSTEM

Subsection 03 (STARTING SYSTEM)

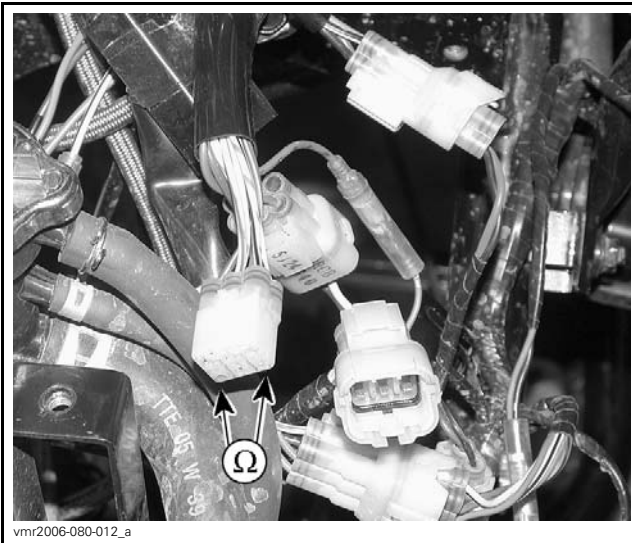
NOTE: On European models, ensure brake switch is working properly. Refer to *BRAKING SYSTEM*.
If voltage is good, continue testing.

Remove front cover. Refer to *BODY*.

Disconnect start switch connector with the YELLOW/RED and YELLOW/BLACK wires.



Use a multimeter and set it to Ω .
Read resistance as follows.



START SWITCH		
POSITION	WIRE	RESISTANCE
Switch released	YELLOW/RED and YELLOW/BLACK	Infinite (0L.)
Switch depressed and held		0.6 Ω max.

Replace switch if defective.

If switch tests good, check starting solenoid winding. See below. If winding tests good, check power supply to shift gear control module. Refer to *IGNITION SYSTEM*.

Reconnect switch connector.

STARTING SOLENOID

Inspect connections and clean as necessary.



Static Test: Continuity

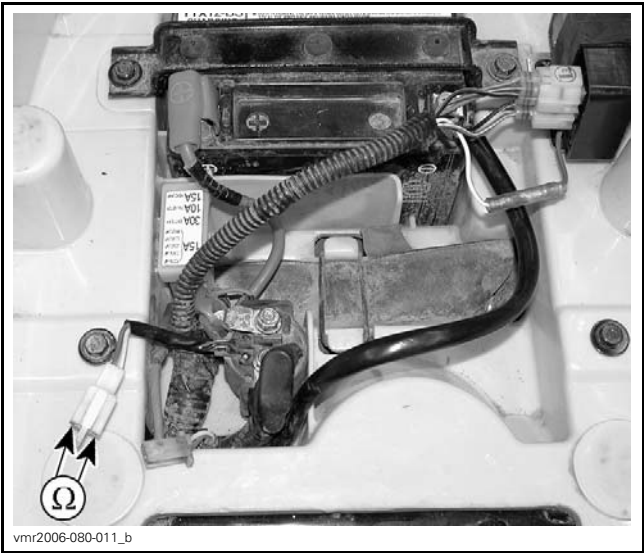
Disconnect connector from solenoid.



Section 05 ELECTRICAL SYSTEM

Subsection 03 (STARTING SYSTEM)

Use a multimeter and set it to Ω .
Read resistance as follows.



SOLENOID CONNECTOR		RESISTANCE
1	2	Approximately 4 Ω

If measurement is out of specification, replace solenoid.

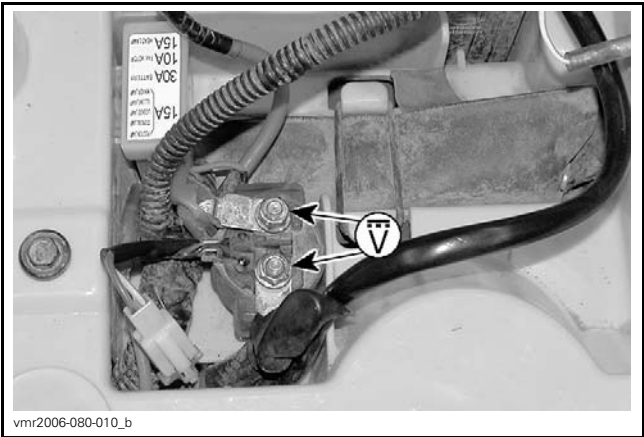
Dynamic Test

Temporarily disconnect spark plug cable to prevent engine starting.

CAUTION: Be aware that engine will crank in the following test.

Use a multimeter and set at Vdc.

Depress start button and while engine is cranking, measure the voltage drop as follows.



SOLENOID POSTS		VOLTAGE
Post coming from battery	Post going to starter	0.2 Vdc max.

If voltage is out of specification, replace solenoid.
If solenoid tests good, continue testing.

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 RED (+) 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.

SHIFT GEAR CONTROL MODULE

When other components have been tested above and are good, the shift gear control module can be suspected. Test it as described in *IGNITION SYSTEM*.

PART REPLACEMENT

ELECTRIC STARTER

Removal

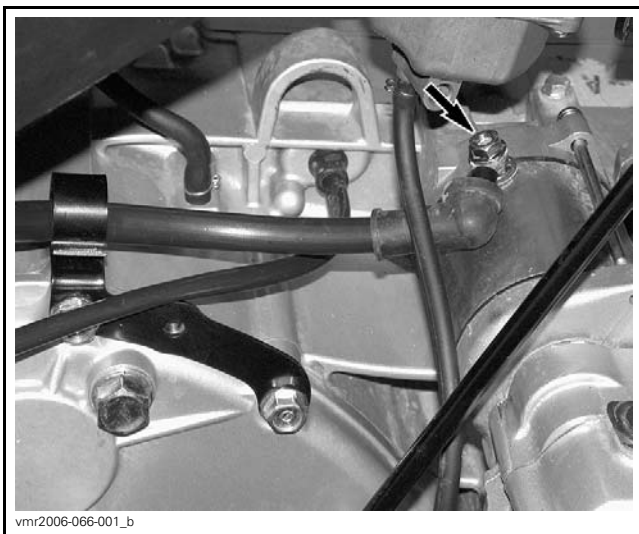
Turn OFF ignition switch.

Disconnect BLACK (-) cable from battery.

 **WARNING**

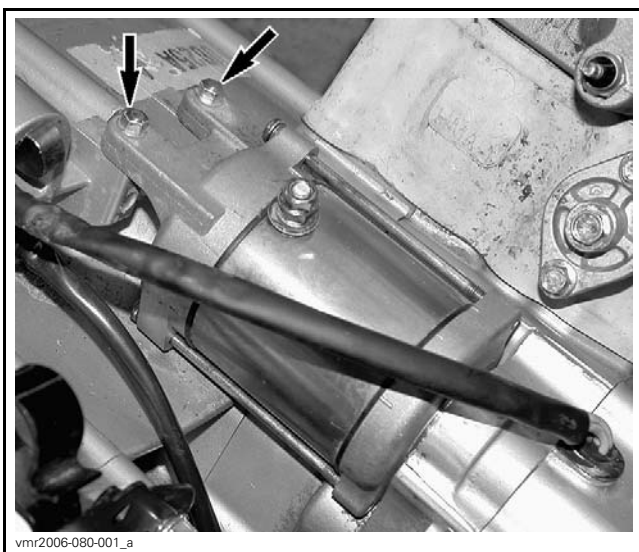
Always disconnect BLACK (-) cable first and reconnect last.

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. Tighten starter screws.

Connect the RED (+) cable to the starter and tighten nut. 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.

LIGHTS AND ACCESSORIES

SERVICE TOOLS

Description	Part Number	Page
multimeter Fluke 111	529 035 868	149

GENERAL



LOCATION OF SOME CONCEALED COMPONENTS

1. Light relays
2. Turn signal and hazard lights relay (European models)
3. Hazard module (European models)
4. Engine overheat lamp module



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. 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 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).



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.

Pay attention to ground wires.

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

Section 05 ELECTRICAL SYSTEM
Subsection 04 (LIGHTS AND ACCESSORIES)

Checking for Shorts Between 2 Wires

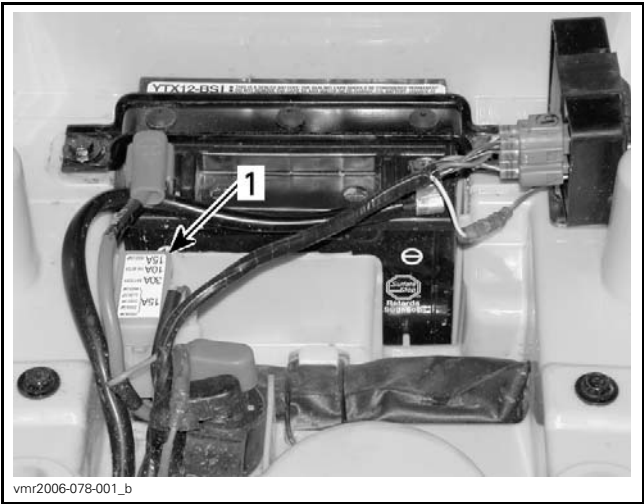
When checking continuity of a wire in a circuit, wires should be checked for short circuit as follows.

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 (OL.). Otherwise, there is a short circuit between both wires. We must therefore identify and correct the fault.

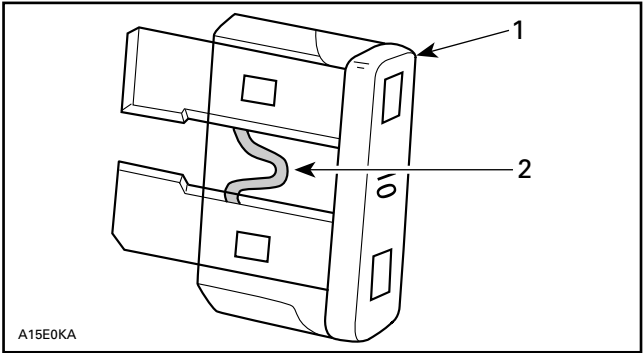
PROCEDURES

FUSES



1. Fuses

Check if filament is melted.



TYPICAL
1. Fuse
2. Check if melted

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.

HEADLAMP

NOTE: Assuming headlamps are good, failure of both LO or HI beam headlamps may be caused by their respective relay. All lights failure may be caused by fuse or headlamp switch.

Test

Check fuses. Refer to *FUSES* above.

Turn on ignition switch.

Turn on headlamp switch in LO or HI position.

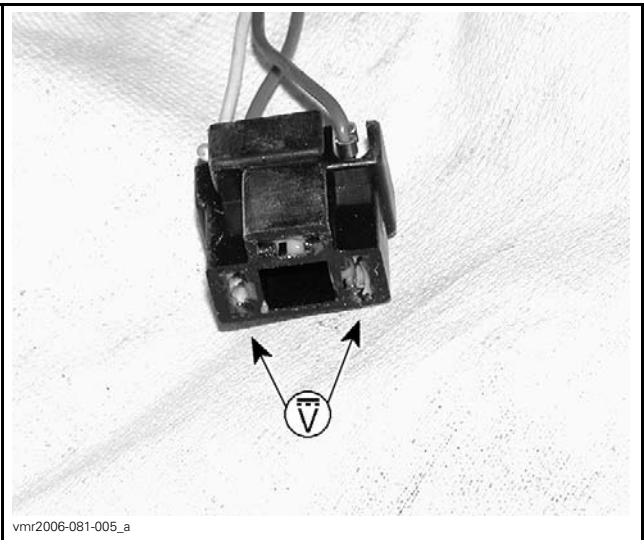
Disconnect headlamp connector. Refer to *BULB REPLACEMENT*.

Using a multimeter, set it to Vdc.

Read voltage on headlamp connector as follows.



ALL MODELS EXCEPT EUROPE

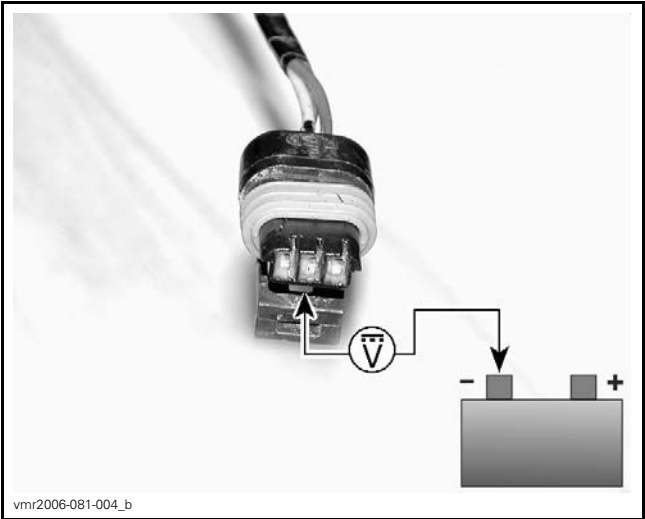


EUROPEAN MODELS

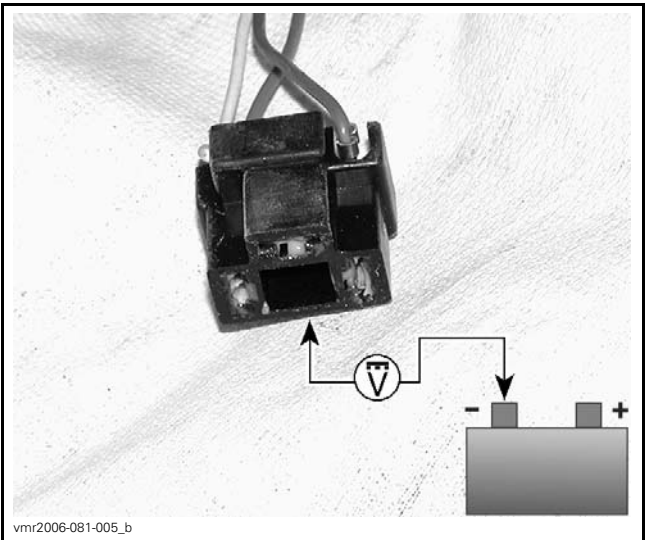
Section 05 ELECTRICAL SYSTEM
Subsection 04 (LIGHTS AND ACCESSORIES)

SWITCH POSITION	WIRE COLOR		VOLTAGE
LO beam	WHITE	GREEN	Battery voltage
HI beam	BLUE		

If voltage is good, replace headlamp bulb.
 If there is no voltage, recheck by measuring voltage as follows.



ALL MODELS EXCEPT EUROPE

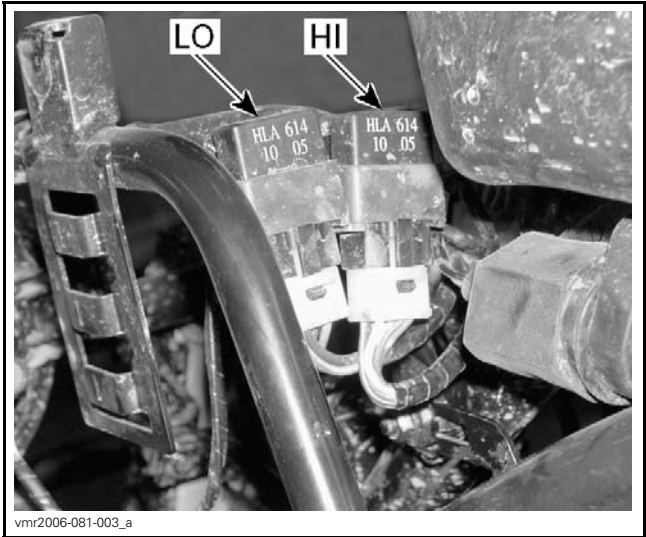


EUROPEAN MODELS

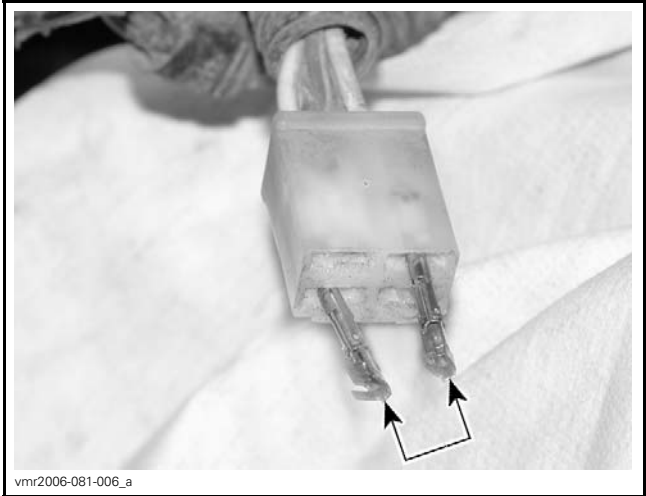
SWITCH POSITION	WIRE COLOR		VOLTAGE
LO beam	WHITE	Battery ground	Battery voltage
HI beam	BLUE		

If voltage is good, check headlamp ground wire.
 If voltage is not good, continue testing.

LO Beam Relay
 Disconnect LO beam relay connector.



Using a jumper wire, connect wires as follows.



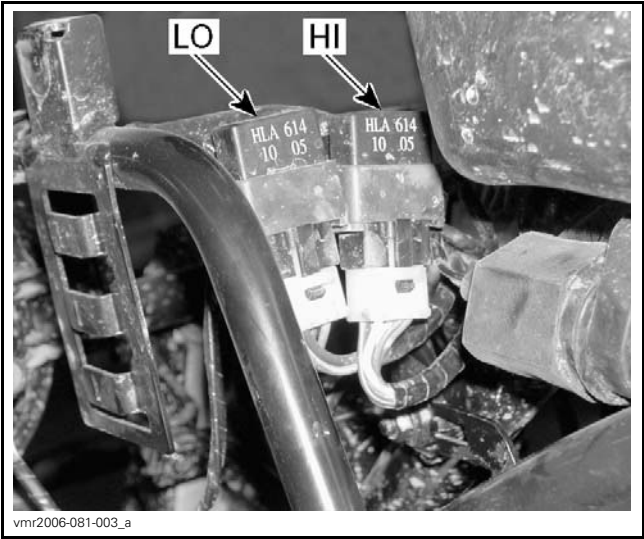
RELAY CONNECTOR WIRES	
RED/WHITE	WHITE

Battery voltage should appear to headlamp terminals. If so, replace relay. Otherwise, check wire between relay and headlamp and also wire from battery to relay.
 Reconnect relay connector and retry headlamps. If they do not work, continue testing.

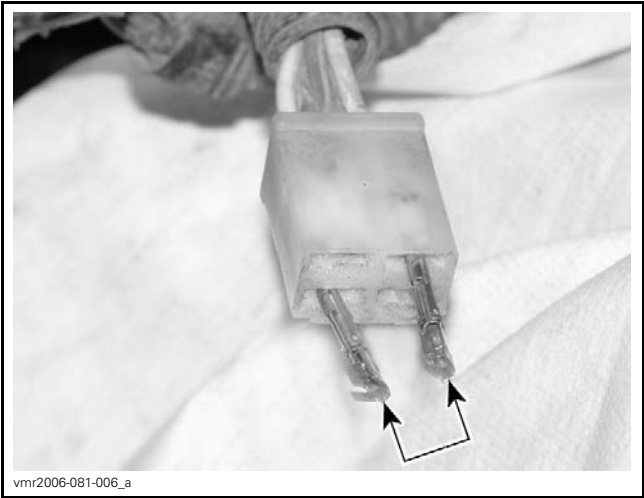
HI Beam Relay
 Disconnect HI beam relay connector.

Section 05 ELECTRICAL SYSTEM

Subsection 04 (LIGHTS AND ACCESSORIES)



Using a jumper wire, connect wires as follows.



RELAY CONNECTOR WIRES	
RED/WHITE	BLUE

Battery voltage should appear to headlamp terminals. If so, replace relay. Otherwise, check wire between relay and headlamp and also wire from battery to relay.

Reconnect relay connector and retry headlamps. If they do not work, continue testing.

Headlamp Switch

Remove front cover. Refer to *BODY*.

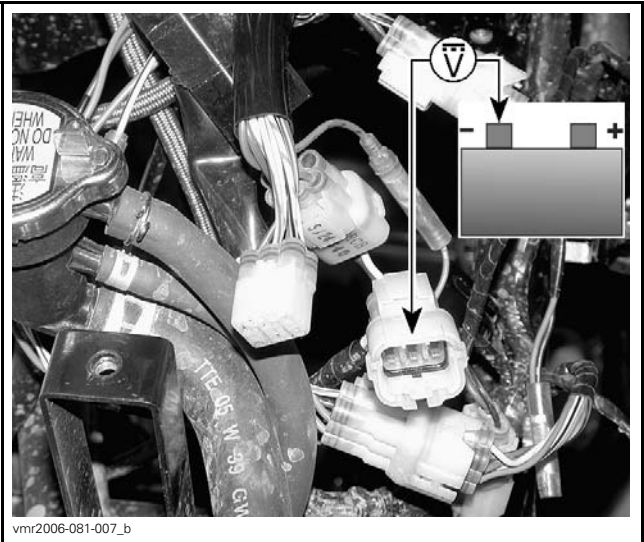
Disconnect headlamp switch connector with the WHITE/BLACK and BLUE wires coming from headlamp switch.



Turn on ignition switch.

Use a multimeter and set it to Vdc.

Read switch supply voltage from main harness as follows.



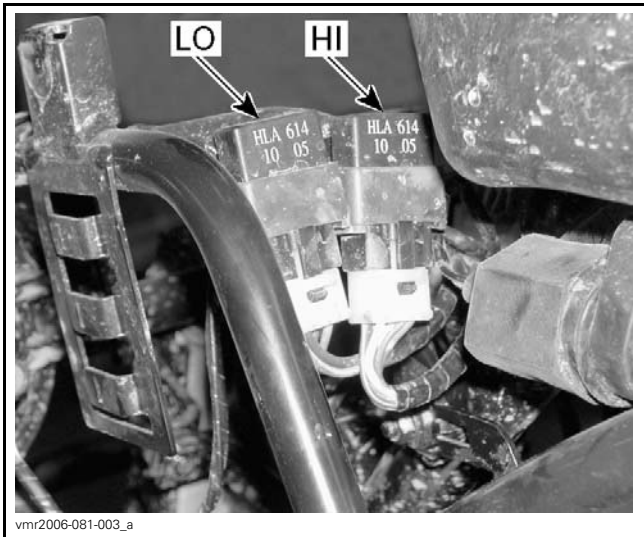
SWITCH SUPPLY VOLTAGE		
WIRE COLOR		VOLTAGE
WHITE/BLACK	Battery ground	Battery voltage

There should be battery voltage.

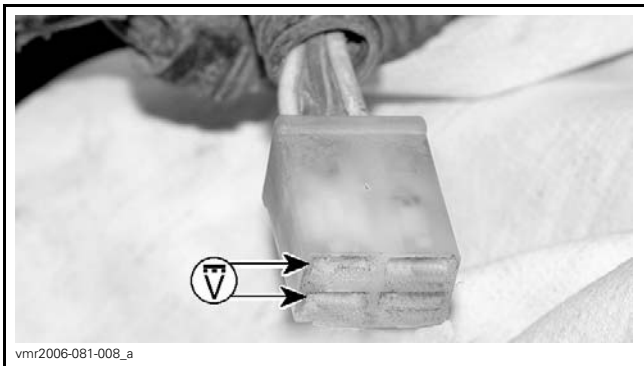
Otherwise, check wire from battery to switch.

Reconnect connector.

Disconnect LO beam relay connector.

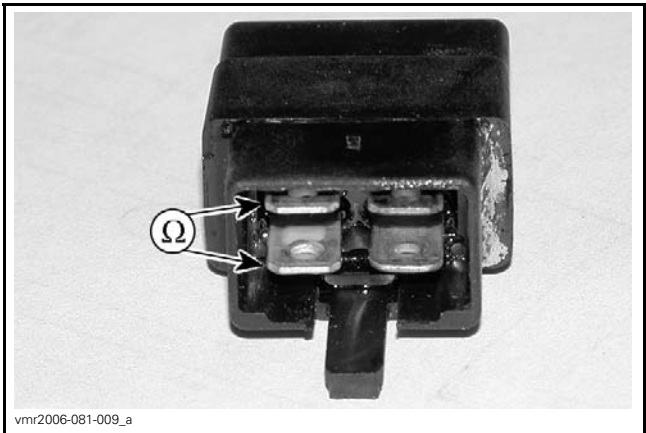


Turn ignition switch on.
Select LO beam at headlamp switch.
Use a multimeter and set it to Vdc.
Measure relay supply voltage as follows.



RELAY SUPPLY VOLTAGE		
WIRE COLOR		VOLTAGE
WHITE	GREEN	Battery voltage

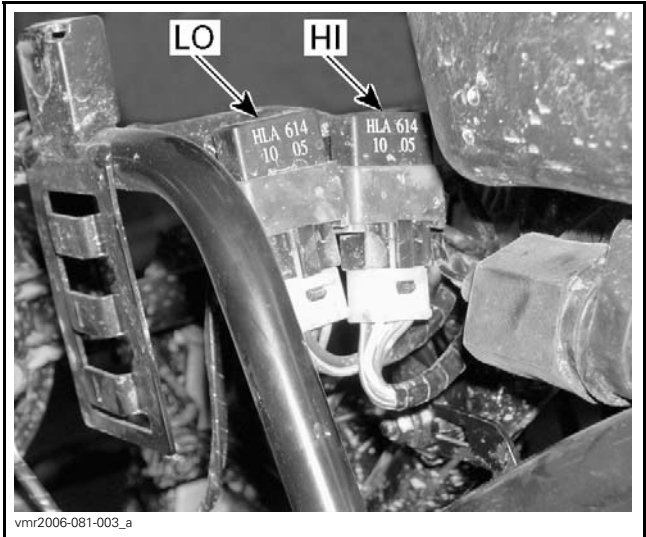
If voltage test failed, check ground wire. If it is good, continue testing.
Use a multimeter and set it to Ω .
Measure relay winding resistance as follows.



WHITE TERMINALS

RELAY WINDING RESISTANCE		
WHITE TERMINALS		RESISTANCE
1	2	Approximately 110 Ω

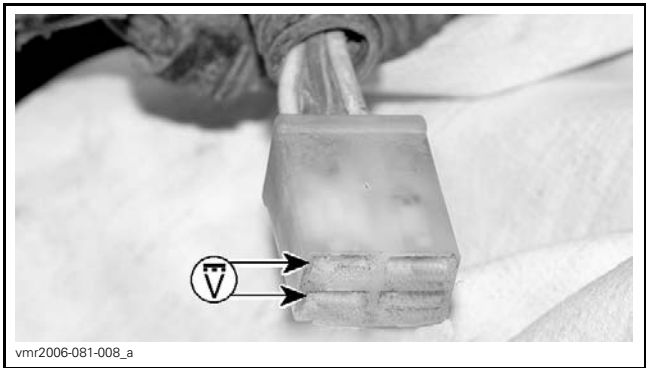
If out of specification, replace relay.
Reconnect relay connector.
Disconnect HI beam relay connector.



Turn ignition switch on.
Select HI beam at headlamp switch.
Use a multimeter and set it to Vdc.
Measure relay supply voltage as follows.

Section 05 ELECTRICAL SYSTEM

Subsection 04 (LIGHTS AND ACCESSORIES)

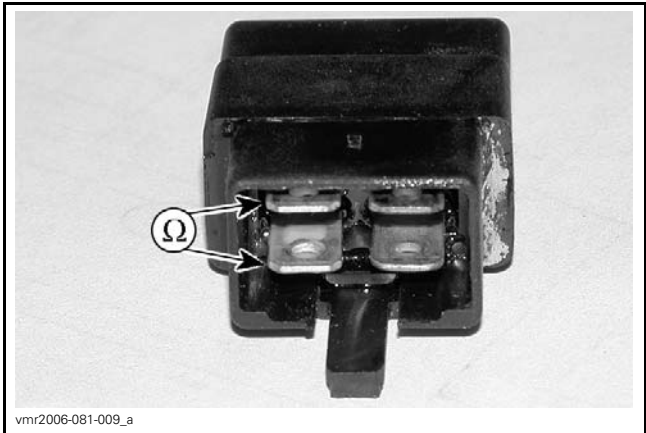


RELAY SUPPLY VOLTAGE		
WIRE COLOR		VOLTAGE
BLUE	GREEN	Battery voltage

If voltage test failed, check ground wire. If it is good, continue testing.

Use a multimeter and set it to Ω .

Measure relay winding resistance as follows.



WHITE TERMINALS

RELAY WINDING RESISTANCE		
WHITE TERMINALS		RESISTANCE
1	2	Approximately 110 Ω

If out of specification, replace relay.

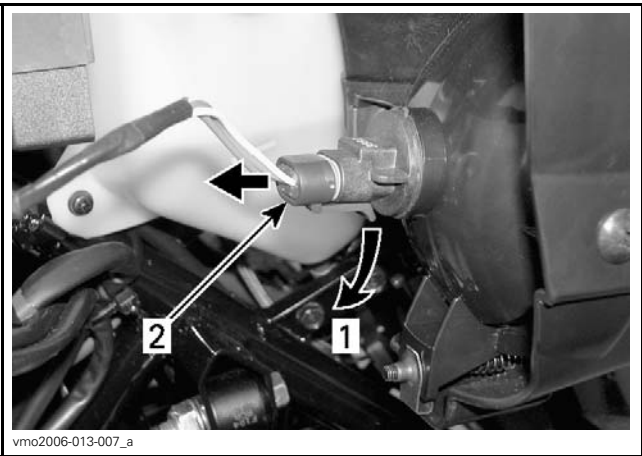
Reconnect relay connector.

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.

All Models except Europe

To unplug connector, release locking tab then pull on connector using a wiggle movement.



1. Release locking tab
2. Pull on connector using a wiggle movement

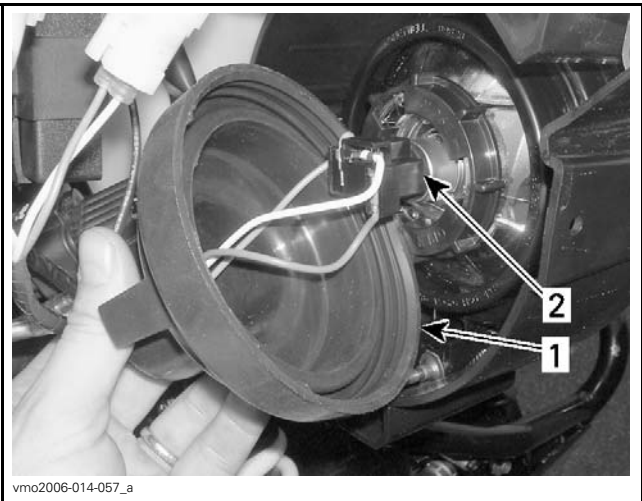
Unlock bulb holder by turning it counterclockwise.

Replace bulb.

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

European Models

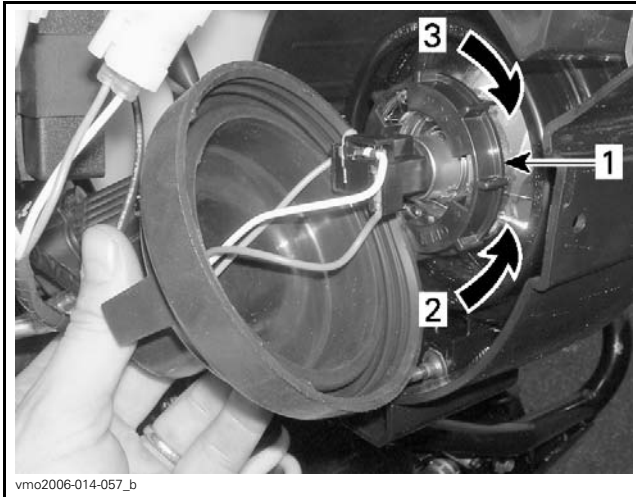
To unplug connector, remove rubber protector from headlamp housing, then pull on connector using a wiggle movement.



1. Remove rubber protector
2. Pull on connector using a wiggle movement

Unlock bulb holder by turning it counterclockwise.

Replace bulb.



1. Bulb holder
2. Unlock (open)
3. Lock (close)

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

Unlock bulb holder by turning it counterclockwise.

Replace bulb.

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

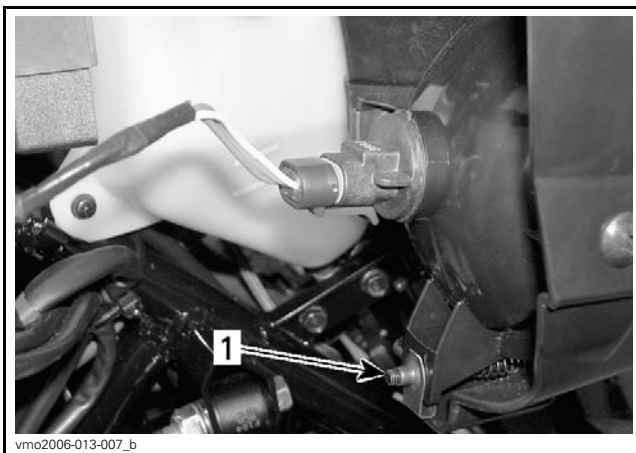
Validate light works.

Headlamp Beam Aiming

Select high intensity.

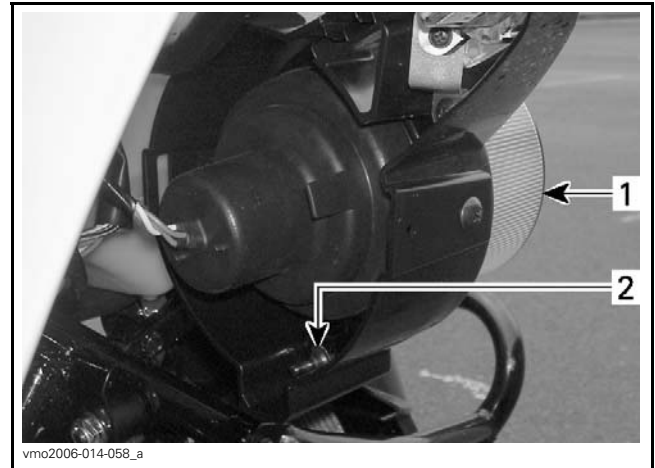
Turn knob to adjust beam height to your convenience or as per your local regulations. Adjust both headlamps evenly.

All Models except Europe



1. Beam height adjustment

European Models



1. Headlamp housing
2. Beam height adjustment

TURN SIGNAL LIGHTS

European Models

Tests

Check fuses. Refer to *FUSES* above.

NOTE: When turn signal switch or hazard switch is turned on and turn signal lights do not flash, check hazard control module and flasher module.

Remove lens. Refer to *REPLACEMENT* below.

Turn on ignition switch.

Position turn signal switch to the faulty side.

Using a multimeter, set it to Vdc.

Read voltage on socket terminals.



FRONT

Section 05 ELECTRICAL SYSTEM

Subsection 04 (LIGHTS AND ACCESSORIES)

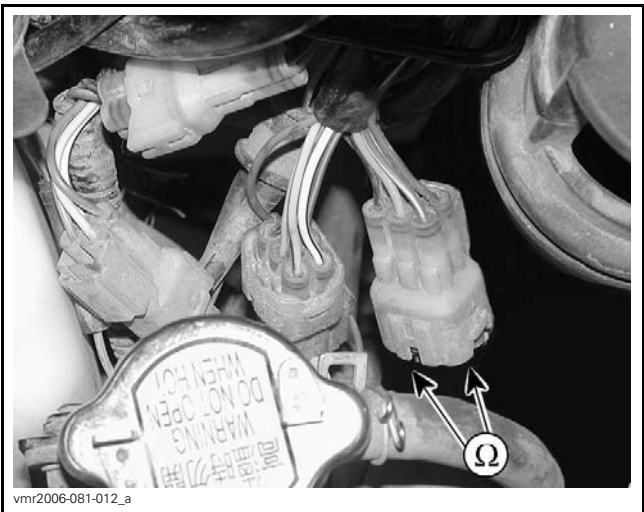


REAR

There should be pulsating battery voltage.
If voltage is good, replace bulb.
If voltage is not good, check wires and if good, continue testing.

Turn Signal Switch

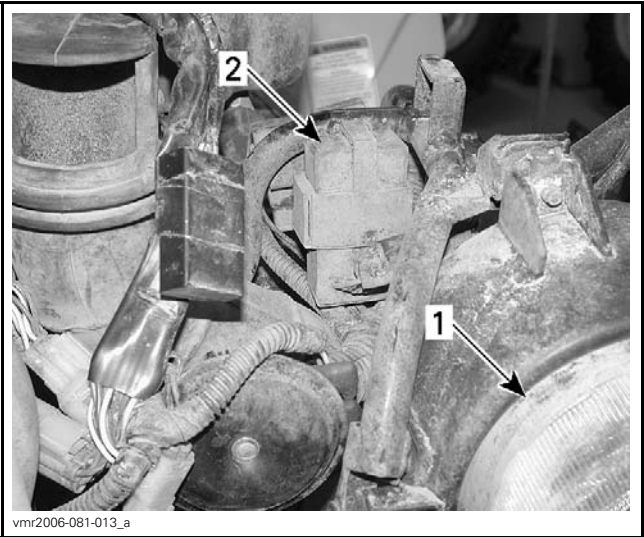
Remove front cover. Refer to *BODY*.
Disconnect switch connector with the PINK wire coming from turn signal switch.
Using a multimeter, set it to Ω .
Check switch as follows.



TURN SIGNAL SWITCH			
SWITCH POSITION	WIRE COLOR		RESISTANCE
OFF	BLACK	PINK	Infinity (0L.)
		BROWN/WHITE	
Left turn	BLACK	PINK	Close to 0 Ω
Right turn		BROWN/WHITE	

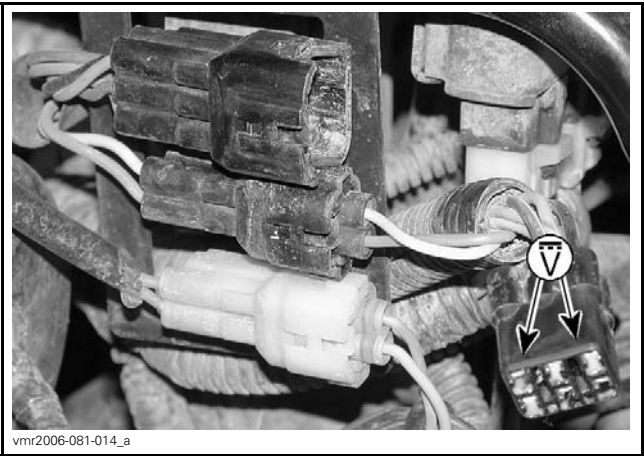
If switch is out of specifications, replace multi-function switch. See *STEERING AND FRONT SUSPENSION*.
If switch is good, continue testing.
Reconnect connectors.

Hazard Control Module



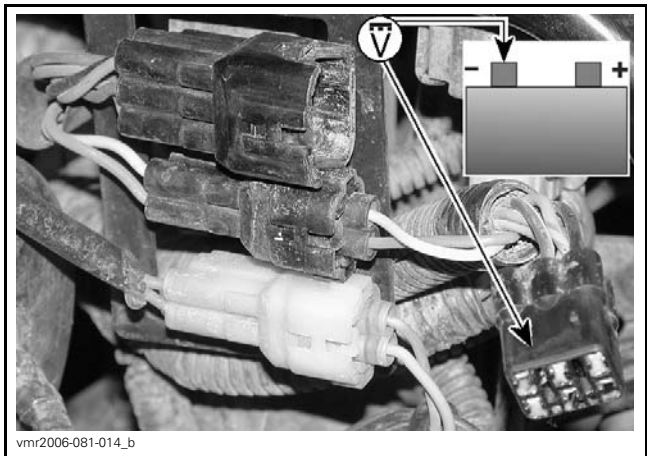
- 1. LH headlamp
- 2. Hazard control module

Check module power supply as follows.
Disconnect 6-pin connector.
Use a multimeter and set it to Vdc.
Read voltage as follows.



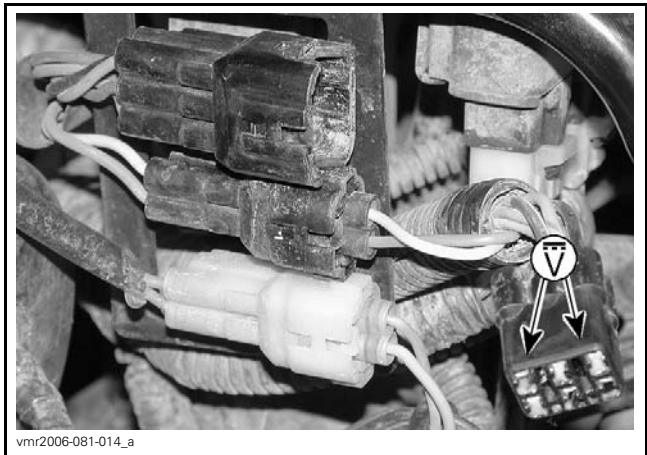
HAZARD CONTROL MODULE SUPPLY VOLTAGE		
WIRE COLOR		VOLTAGE
RED	GREEN	Battery voltage

If there is no voltage, recheck as follows.



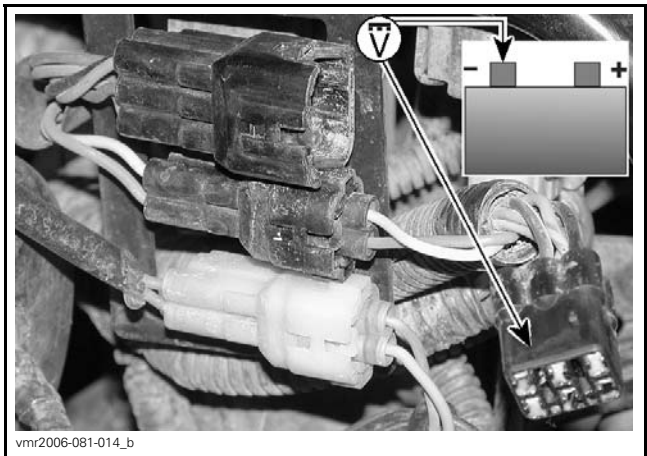
HAZARD CONTROL MODULE SUPPLY VOLTAGE		
WIRE COLOR		VOLTAGE
RED	Battery ground	Battery voltage

If there is now voltage, check ground wire.
If there is no voltage, check wire from battery to module.
Check module power supply (switched) as follows.
Disconnect 6-pin connector.
Use a multimeter and set it to Vdc.
Turn ignition switch on.
Read voltage as follows.



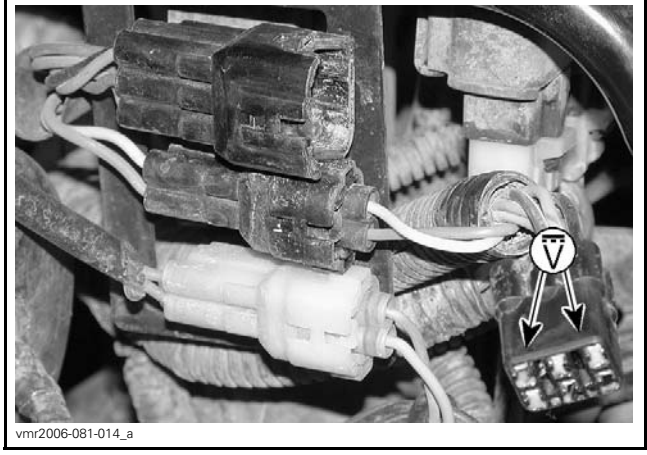
HAZARD CONTROL MODULE SUPPLY VOLTAGE		
WIRE COLOR		VOLTAGE
BLACK	GREEN	Battery voltage

If there is no voltage, recheck as follows.



HAZARD CONTROL MODULE SUPPLY VOLTAGE		
WIRE COLOR		VOLTAGE
BLACK	Battery ground	Battery voltage

If there is now voltage, check ground wire.
If there is no voltage, check wire from ignition switch to module. Also ensure ignition switch is good. Refer to *IGNITION SYSTEM*.
Input Signals from Ignition Switch to Module
IMPORTANT: Ensure hazard switch is OFF.
Turn ignition switch on.
Activate turn signal switch and read voltage as follows.

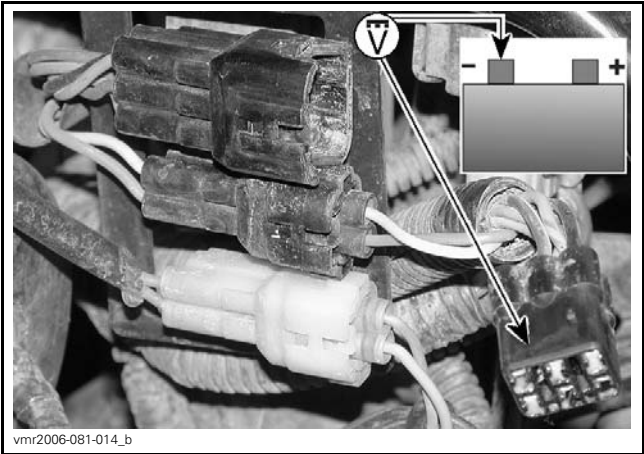


Section 05 ELECTRICAL SYSTEM

Subsection 04 (LIGHTS AND ACCESSORIES)

TURN SIGNAL SWITCH	HAZARD CONTROL MODULE INPUTS		
	WIRE COLOR		VOLTAGE
Left turn	PINK	GREEN	Pulsating battery voltage
Right turn	BROWN/WHITE		

If there is no voltage, recheck as follows.



TURN SIGNAL SWITCH	HAZARD CONTROL MODULE INPUTS		
	WIRE COLOR		VOLTAGE
Left turn	PINK	Battery ground	Pulsating battery voltage
Right turn	BROWN/WHITE		

If there is now voltage, check ground wire.

If there is no voltage, check wire from turn signal switch.

Reconnect connector.

Output Signals from Hazard Control Module

IMPORTANT: Ensure hazard switch is OFF.

Turn ignition switch on.

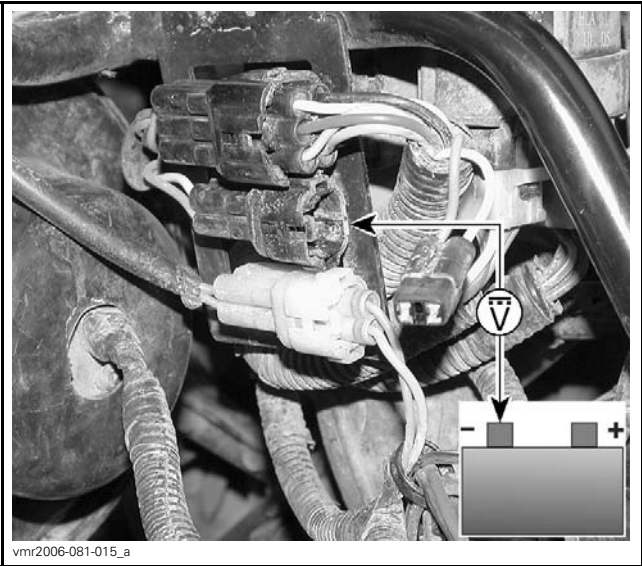
Activate turn signal switch and read voltage as follows.

Disconnect 2-pin connector.

Use a multimeter and set it to Vdc.

Turn ignition switch on.

Activate turn signal switch and read voltage as follows.



TURN SIGNAL SWITCH	HAZARD CONTROL MODULE OUTPUTS		
	WIRE COLOR		VOLTAGE
Left turn	ORANGE	Battery ground	Pulsating battery voltage
Right turn	LIGHT BLUE		

If there is no voltage, replace hazard control module.

If there is voltage, check wires from module to turn signal lights.

Reconnect connector.

NOTE: To test the hazard lights system, set switch to on and check output signals from module. Pulsating voltage must be present on both sides simultaneously. Otherwise, replace module.

Flasher Module



Check signals coming from hazard control module as follows.

Section 05 ELECTRICAL SYSTEM

Subsection 04 (LIGHTS AND ACCESSORIES)

Remove front fender. Refer to *BODY*.
Unscrew retaining screw then pull out module.
Disconnect module.
Use a multimeter and set it to Vdc.
Activate indicator light switch and read voltage as follows.

TURN SIGNAL SWITCH	FLASHER MODULE INPUTS (from hazard module)		
	WIRE COLOR		VOLTAGE
Left turn	ORANGE	GREEN	Pulsating battery voltage
Right turn	LIGHT BLUE		

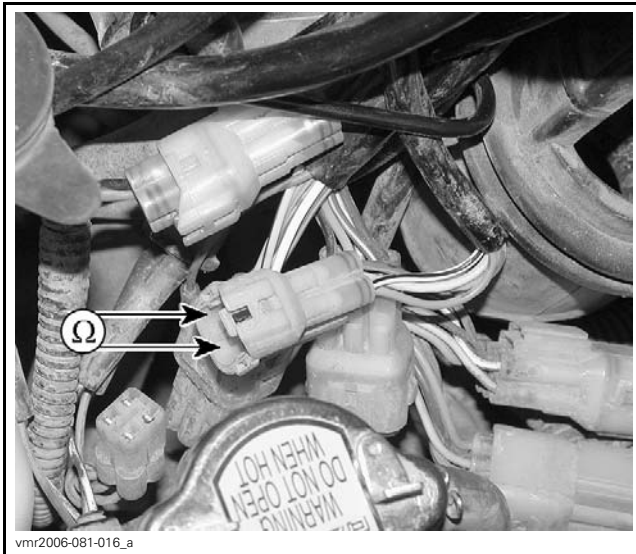
If there is no voltage, check wiring harness from hazard control module and ground wire.
If voltage is good, replace flasher module.

Hazard Lights

Since the same lights and modules are used as for turn signal lights, perform the tests above. If everything works, check hazard switch.

Hazard Switch

Disconnect connector with GREY and GREEN wires coming from switch.
Use a multimeter and set it to Ω .
Check switch as follows.



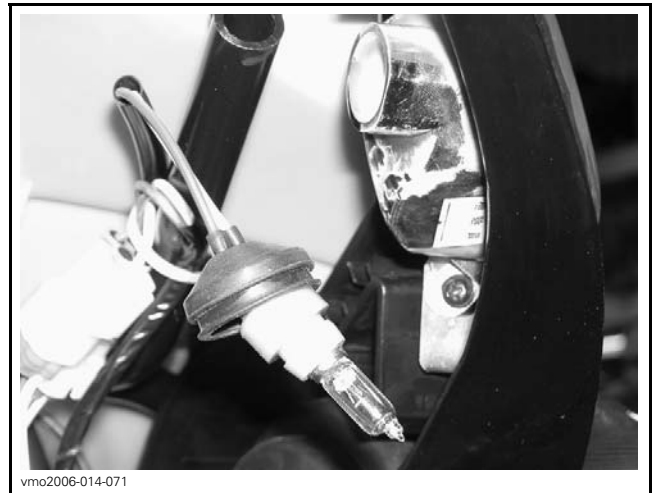
HAZARD SWITCH			
SWITCH POSITION	WIRE COLOR		RESISTANCE
OFF	GREY	GREEN	Infinity (0L.)
ON			Close to 0 Ω

If switch test failed, replace the auxiliary multi-function switch. See *STEERING AND FRONT SUSPENSION*.

Front Turn Signal Bulb Replacement

Remove rubber protector then pull on rubber bulb housing to gain access to bulb.

Replace bulb.

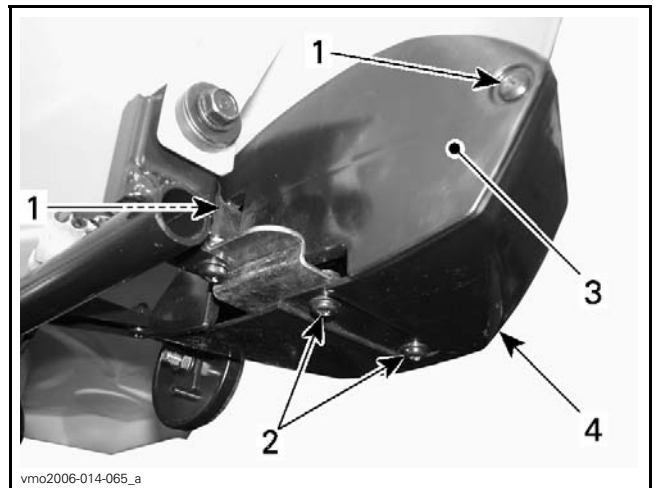


PULL ON BULB HOUSING TO REMOVE

Validate bulb works.

Rear Turn Signal Bulb Replacement

Unscrew housing cover screws and lower housing retaining screws.



1. Housing cover screws
2. Lower housing screws
3. Housing cover
4. Housing

Release housing from rear fender then remove lamp housing.

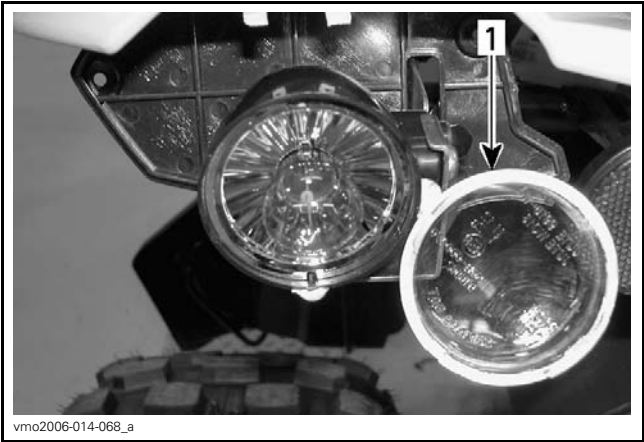
Section 05 ELECTRICAL SYSTEM

Subsection 04 (LIGHTS AND ACCESSORIES)



RELEASE HOUSING FROM REAR FENDER

Remove lamp lens.



PULL ON LENS TO REMOVE
1. Lamp lens

Push bulb in and hold while turning counterclockwise to release.

Install the new bulb by first pushing in while turning clockwise.

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

Validate bulb works.

POSITION LIGHT

European Models

Test

Remove steering cover. Refer to *STEERING AND FRONT SUSPENSION*.

Remove socket from position light.

Turn ignition switch on.

Turn headlamp switch either LO or HI.

Use a multimeter and set it to Vdc.

Read voltage as follows.



POSITION LIGHT SOCKET		
WIRES		VOLTAGE
BROWN	GREEN	Battery voltage

There should be battery voltage. If so, replace bulb.

If there is no voltage, measure voltage between BROWN wire and battery ground.

If there is now voltage, check ground wire.

If there is still no voltage, check wiring harness from headlamp switch.

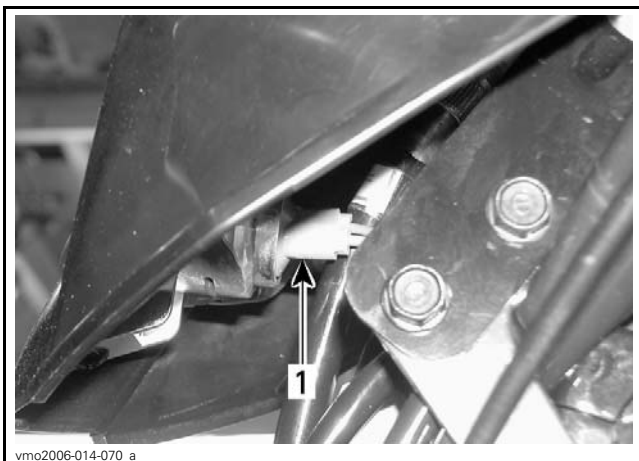
Reinstall parts.

Bulb Replacement



BULB ACCESS

Pull on rubber bulb housing to gain access to bulb.
Replace bulb.



1. Bulb housing

Validate light works.

PILOT LAMPS

Tests

For all tests, turn ignition switch on.

Remove faulty bulb. See procedure below.

Activate proper switch so that suspected lamp turns on (for example, set shift lever to neutral to validate neutral switch).

Using a multimeter, measure voltage at socket terminals. Battery voltage should be read.

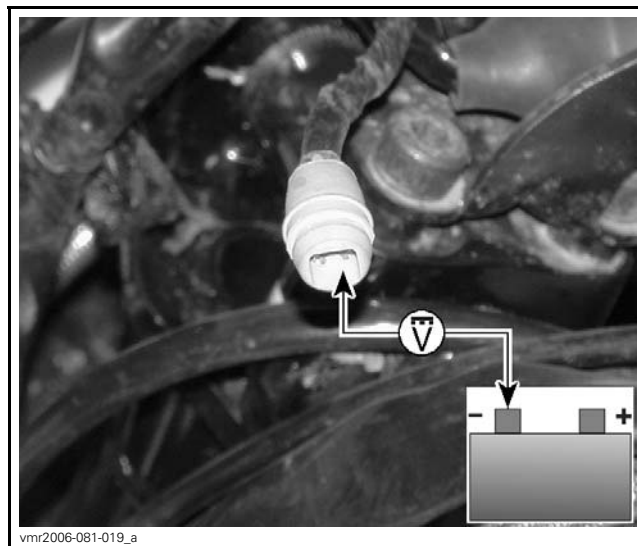


If so, replace bulb.

Otherwise, follow appropriate procedure below.

Gearbox Position Lamps

Measure voltage at lamp socket between suspected supply wire and battery ground.



If there is no voltage, check wire from battery to lamp socket.

If battery voltage is present, continue the following tests.

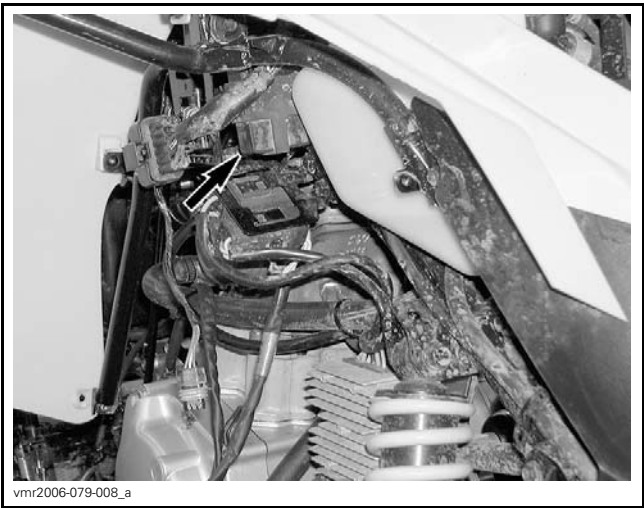
Check gearbox switch. Refer to *GEARBOX*.

If test succeeded, check suspected wire from gearbox switch connector to shift gear control module.



GEARBOX SWITCH CONNECTOR

Section 05 ELECTRICAL SYSTEM
Subsection 04 (LIGHTS AND ACCESSORIES)



SHIFT GEAR CONTROL MODULE

SWITCH FUNCTION	WIRE COLOR
Forward	BROWN/YELLOW
Neutral	GREEN/RED
Reverse	GREEN/WHITE

If wire test failed, repair/replace wire as necessary.

If wire tests good, check suspected wire from shift gear control module to pilot lamp.



SHIFT GEAR CONTROL MODULE



PILOT LAMP

If wire test failed, repair/replace wire as necessary.

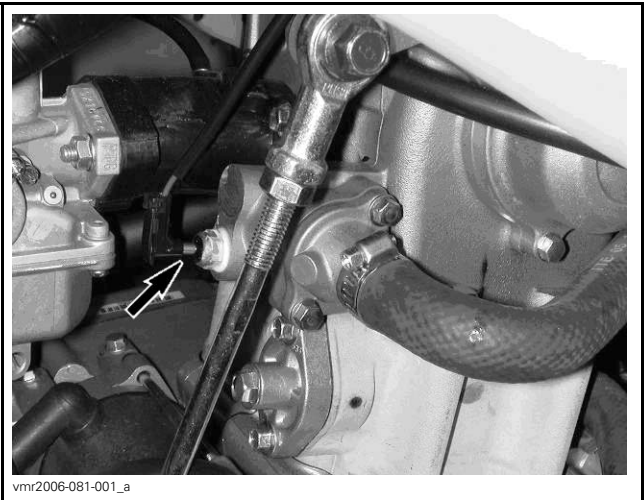
If wire tests good, try a new shift gear control module.

Engine Overheat Lamp

When engine overheat sensor reaches a resistance of 17 Ω (equivalent to coolant temperature of 123 °C (253 °F)), engine overheat lamp module turns on pilot lamp.

Drain cooling system. Refer to *COOLING SYSTEM*.

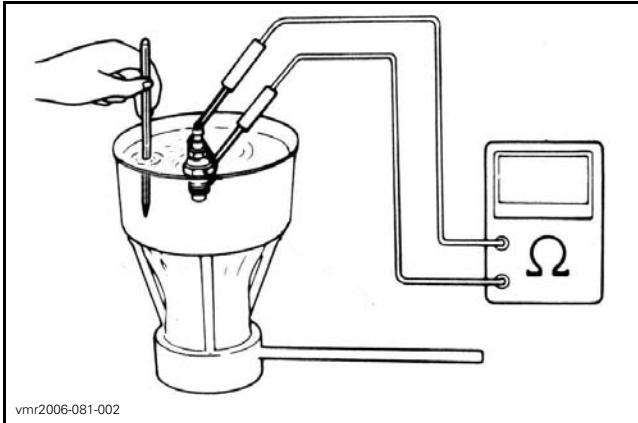
Disconnect and remove sensor from engine.



Put sensor in a container filled with coolant and heat container. Use a suitable thermometer to measure coolant temperature.

Section 05 ELECTRICAL SYSTEM

Subsection 04 (LIGHTS AND ACCESSORIES)



Heat coolant to 123 °C (253 °F) and measure resistance of sensor. It should be within 15 - 19 Ω . Otherwise, replace sensor.

Reinstall and reconnect sensor.

Refill cooling system. Refer to *COOLING SYSTEM*.

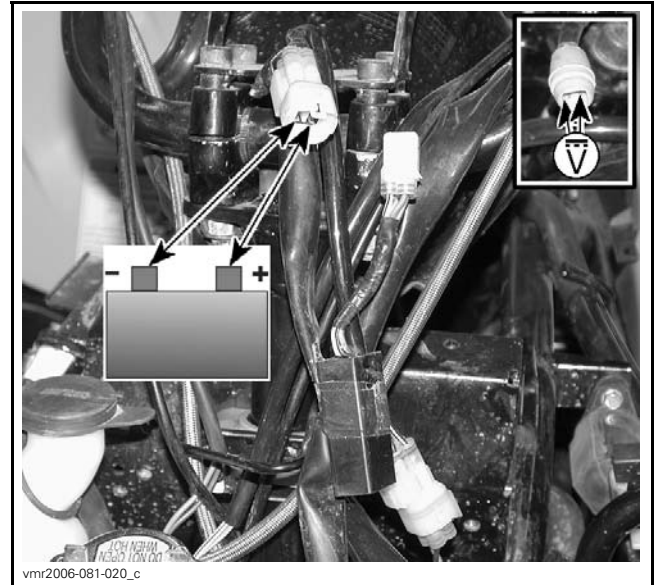
Remove front cover to gain access to module. Refer to *BODY*.

Disconnect connector at engine overheated lamp module.



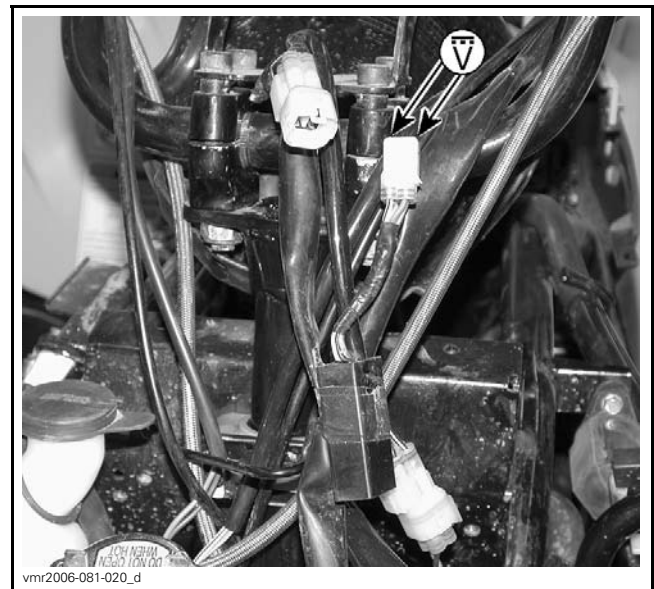
Apply directly 12 Vdc on GREEN/BLACK wire and connect battery ground to the other wire.

Measure voltage at lamp socket. Battery voltage should be read.



If there is no voltage, check supply wire going to lamp socket. If good, check ground wire of lamp socket. If good, continue testing.

Measure voltage between WHITE/BLACK and GREEN wires going to module. You should read battery voltage.

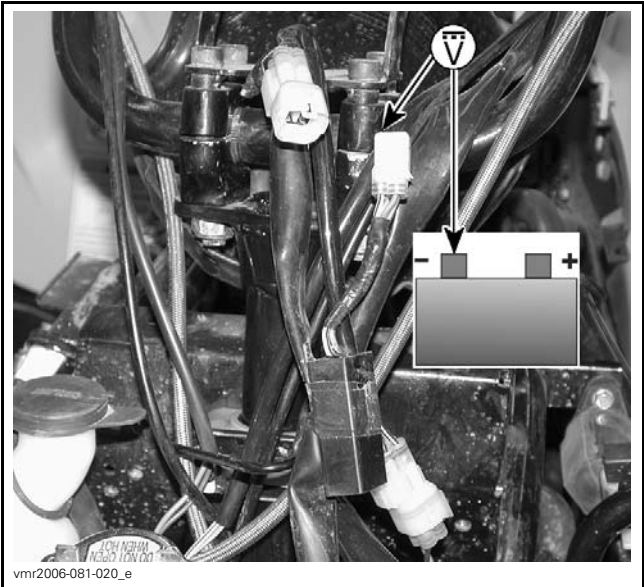


If so, try a new module.

Otherwise, measure voltage between WHITE/BLACK supply wire and battery ground. You should read battery voltage.

Section 05 ELECTRICAL SYSTEM

Subsection 04 (LIGHTS AND ACCESSORIES)



If so, check module ground wire .

Otherwise, check supply wire from battery to module.

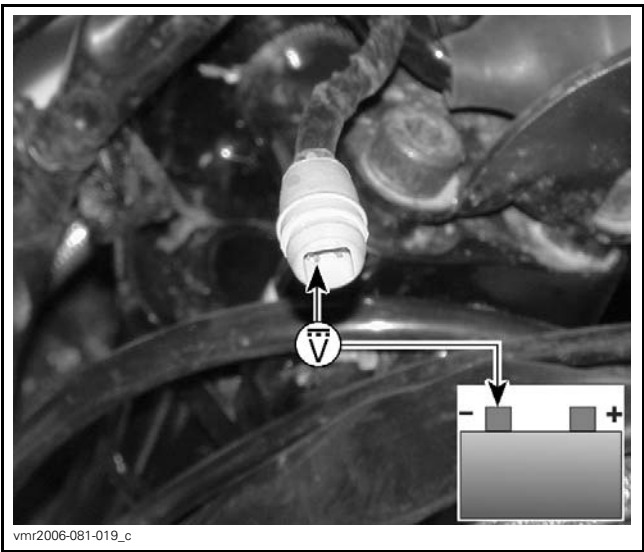
Reinstall removed parts.

Hi Beam Lamp (European models)

First ensure hi beam headlamps work. If so, continue testing. Otherwise, refer to *HEADLAMP*.

Use a multimeter and set it to Vdc.

Measure voltage at lamp socket as follows.



HI BEAM LAMP SOCKET		
WIRES		VOLTAGE
BLUE	Battery ground	Battery voltage

If battery voltage is present, check socket ground wire.

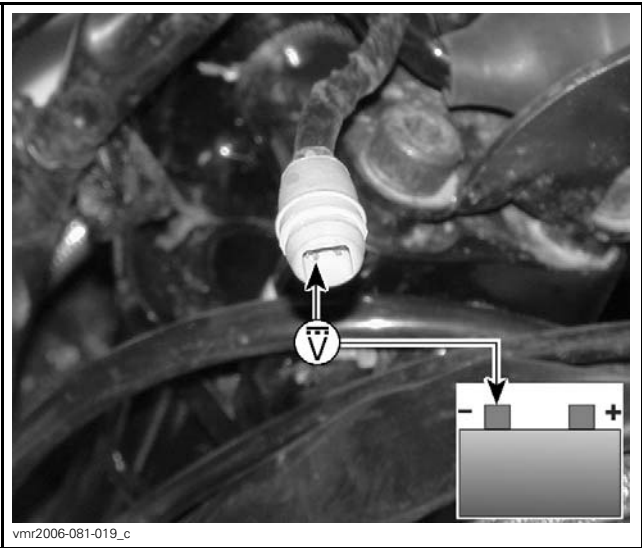
If there is no voltage, check supply wire of socket.

Reinstall removed parts.

Turn signal Lamp (European models)

Use a multimeter and set it to Vdc.

Measure voltage at lamp socket as follows.



TURN SIGNAL SWITCH POSITION	TURN SIGNAL LIGHT SOCKET	
	WIRES	VOLTAGE
Left	ORANGE	Battery ground
Right	LIGHT BLUE	

If battery voltage is present, check socket ground wire.

If there is no voltage, check supply wire of socket from hazard control module. If it is good, replace hazard module.

Reinstall removed parts.

Hazard Lamp (European models)

Refer to *TURN SIGNAL LAMP* above. The same tests apply. The difference is that both lamps blink simultaneously.

Lamp Replacement

Remove steering cover. Refer to *STEERING AND FRONT SUSPENSION*.

Pull lamp out.

Install new lamp.

Reinstall lamp.

Validate lamp works.

TAILLIGHT

Test

Turn ignition switch on.

On European models, turn headlamp switch to either LO or HI beam.

Use a multimeter and set it to Vdc.

Measure voltage as follows.



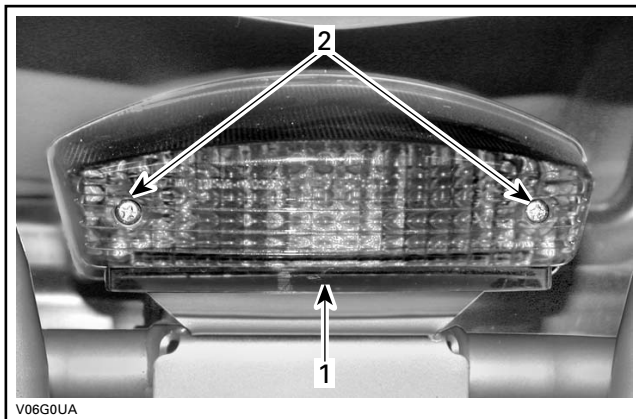
TAIL LIGHT		
WIRES		VOLTAGE
BROWN	GREEN	Battery voltage

If voltage is adequate, replace bulb.

If there is no voltage, check wiring harness.

Bulb Replacement

Unscrew lens screws to expose bulb.



1. Lens
2. Screws

Push bulb in and hold while turning counterclockwise to release.

Install the new bulb by first pushing in while turning clockwise. Reinstall lens.

HORN

European Models

Horn Switch

Remove front cover. Refer to *BODY*.

Disconnect horn switch connector (4-pin connector with WHITE/BLACK and LIGHT GREEN wires).

Use a multimeter and set it to Ω .

Check switch as follows.



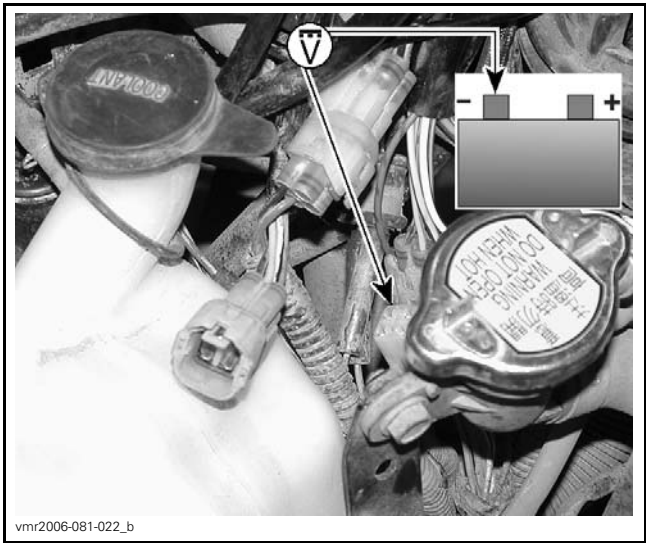
HORN SWITCH		
POSITION	WIRE	RESISTANCE
Released	WHITE/BLACK and LIGHT GREEN	Infinite (0L.)
Pressed and held		0.5 Ω max.

If test failed, replace auxiliary multifunction switch. See *STEERING AND FRONT SUSPENSION*.

Turn ignition switch on.

If test succeeded, set multimeter to Vdc and measure voltage as follows.

Section 05 ELECTRICAL SYSTEM
Subsection 04 (LIGHTS AND ACCESSORIES)



HORN SWITCH MAIN HARNESS CONNECTOR	
WIRE	VOLTAGE
WHITE/BLACK and battery ground	Battery voltage

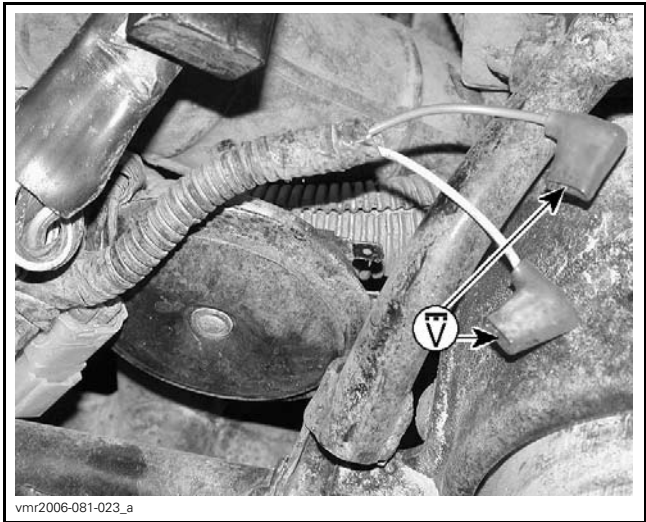
If voltage is not appropriate, check supply wire from battery.

If voltage is good, check voltage at horn terminals as follows.

Reconnect horn switch connector.

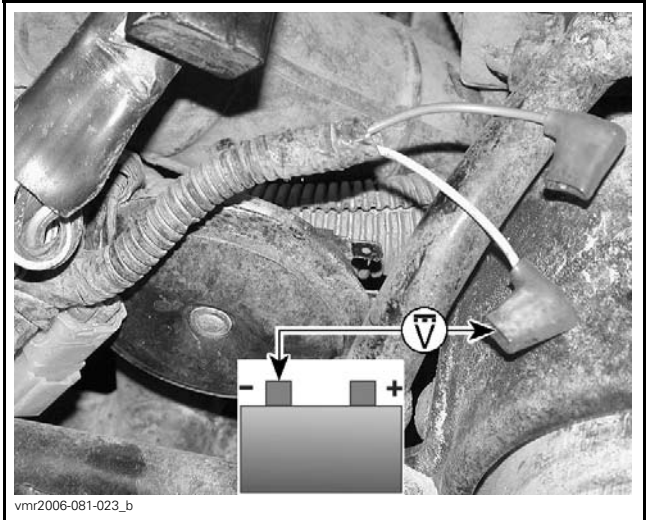
To get access to horn and terminals, remove front fender. Refer to *BODY*.

Measure voltage as follows.



HORN TERMINALS		
HORN SWITCH POSITION	WIRE	VOLTAGE
Pressed and held	LIGHT GREEN and GREEN wires	Battery voltage

If voltage is adequate, replace horn.
Otherwise, recheck voltage as follows.



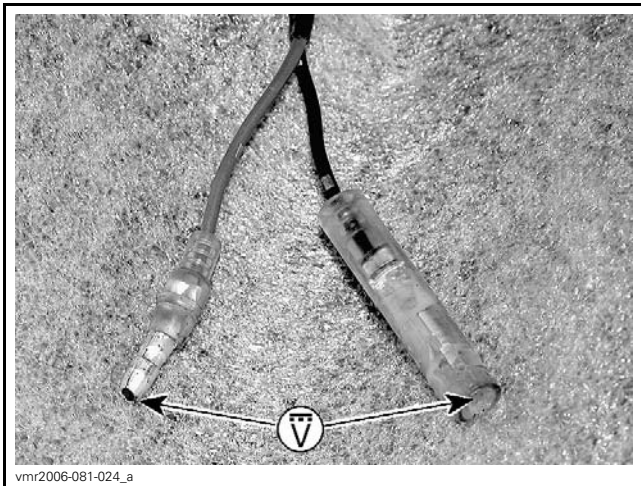
HORN TERMINALS		
HORN SWITCH POSITION	WIRE	VOLTAGE
Pressed and held	LIGHT GREEN and battery ground	Battery voltage

If there is now voltage, check ground wire.
If there is still no voltage, check wire between horn switch and horn.

12-VOLT POWER OUTLET

Test

Turn ignition switch on.
Unplug the power outlet connectors.
Use a multimeter and set it to Vdc.
Measure voltage as follows.



OUTLET CONNECTORS		VOLTAGE
1	2	Battery voltage

- No voltage:
 - Check fuses and wiring condition.
- Voltage is good:
 - Change power outlet.

Reconnect terminals.

Removal

Unplug the connectors of the power outlet.
Unscrew the retaining nut.

Installation

Reverse the removal procedure.

CONTINUOUSLY VARIABLE TRANSMISSION (CVT)

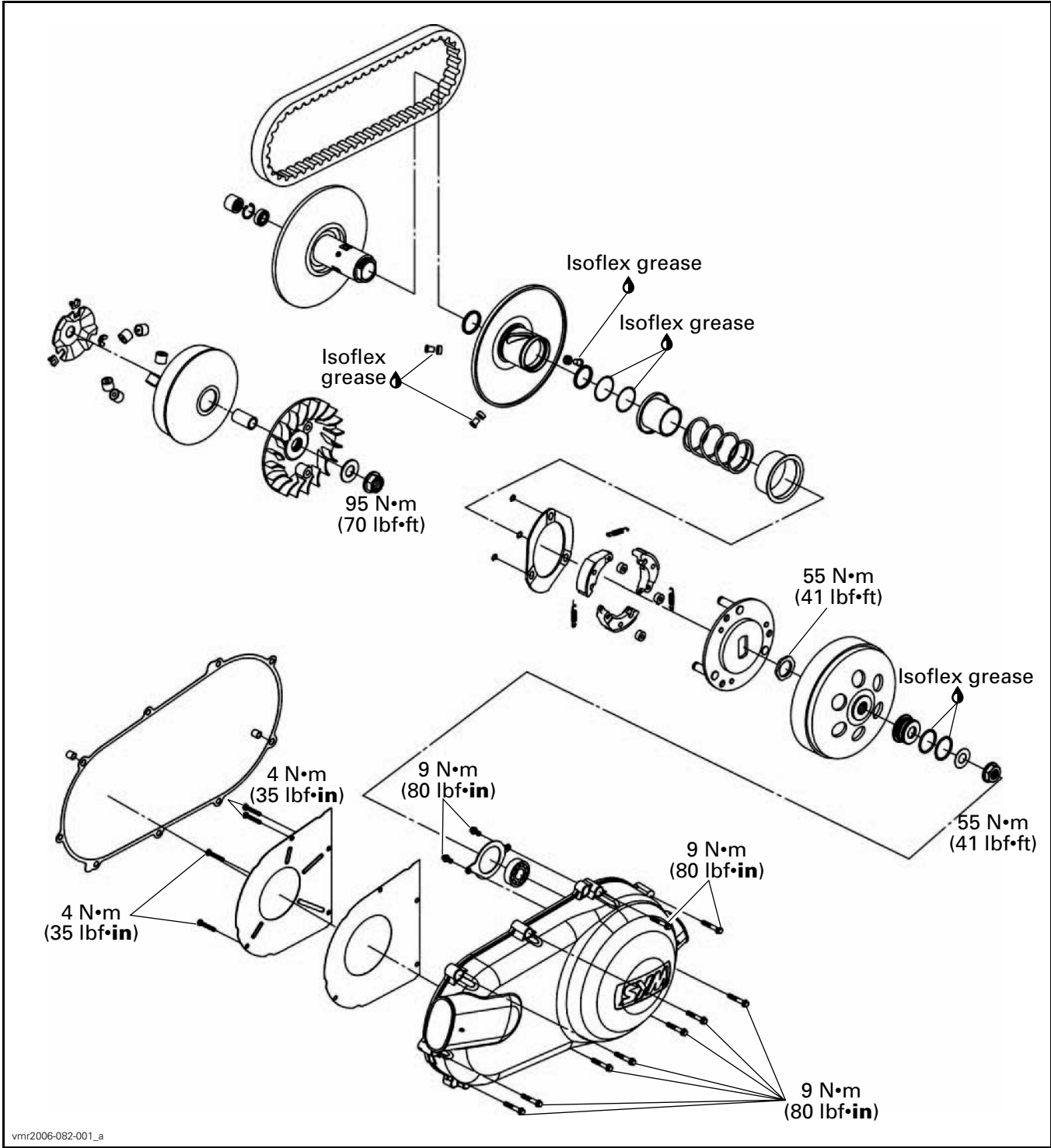
SERVICE TOOLS

Description	Part Number	Page
blind hole puller kit.....	529 036 056	172
driven pulley holding support.....	529 035 864	176
driven pulley support	529 035 863	176
driven pulley support tab kit	529 036 047	176
pulley holder	529 036 054	172, 175–176

SERVICE PRODUCTS

Description	Part Number	Page
Isoflex grease	293 550 021	178
pulley flange cleaner.....	413 711 809	174, 176

Section 06 TRANSMISSION
Subsection 01 (CONTINUOUSLY VARIABLE TRANSMISSION (CVT))



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.

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.

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 touch CVT while engine is running. Never drive vehicle when CVT cover is removed.

CAUTION: These pulleys have metric threads. Do not use imperial threads puller. Always tighten puller by hand to ensure that the drive pulley has the same type of threads prior to fully tightening.

PROCEDURES

DRIVE BELT

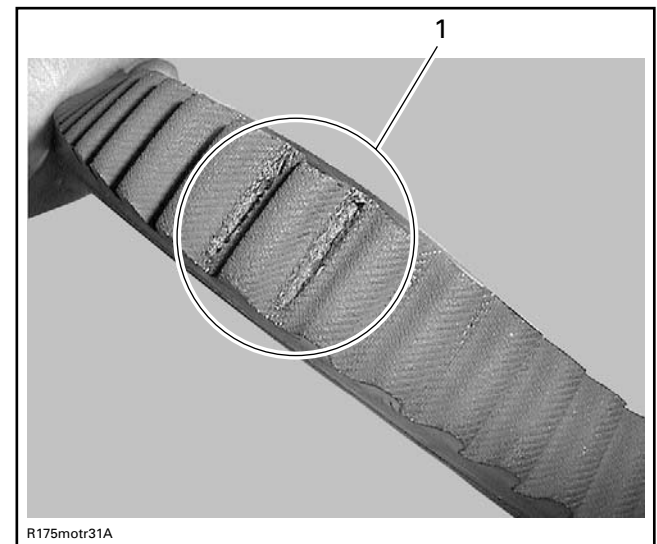
Removal

Remove CVT cover (refer to *CVT COVER* further).

To remove the drive belt, the fixed sheave of the drive pulley and the driven pulley must be removed. Refer to *DRIVE PULLEY* and *DRIVEN PULLEY*.

Inspection

Inspect belt for cracks, fraying or abnormal wear. Replace if necessary.



TYPICAL

1. Cracks inside the belt

Check drive belt width. Replace if it is out of specification (see table below).

DRIVE BELT WIDTH	
NOMINAL (new)	24.00 mm (.945 in)
SERVICE LIMIT	22.50 mm (.886 in)

Installation

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

The maximum drive belt life span is obtained when the drive belt has the proper rotation direction. Install it so the printed text on belt is pointing towards front of the vehicle (the text must be legible).

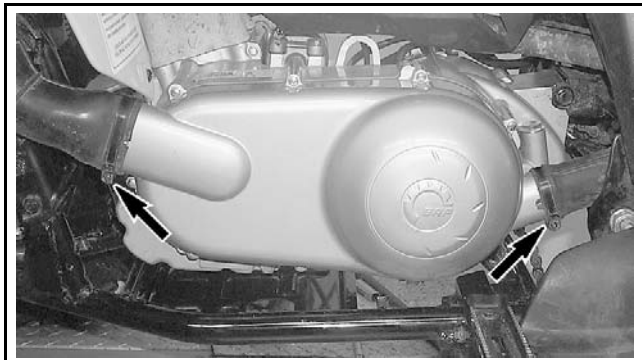
CVT COVER

Removal

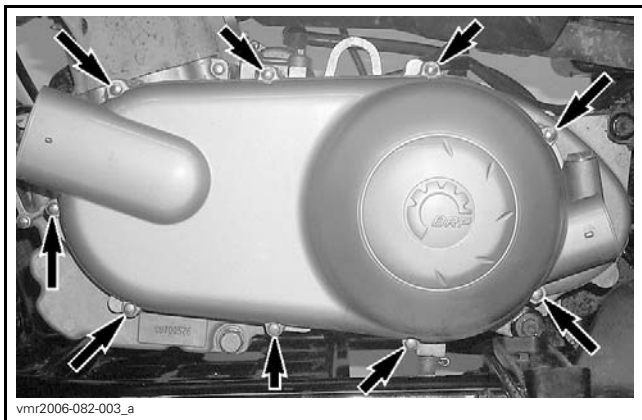
Unscrew clamps retaining CVT cooling hoses to CVT cover.

Section 06 TRANSMISSION

Subsection 01 (CONTINUOUSLY VARIABLE TRANSMISSION (CVT))



Remove all cover screws.



NOTE: Remove the center top screw last. This screw allows to support the cover during removal. Pull CVT cover.

Inspection

Check CVT cover for cracks or other damages. Replace if necessary.

Check if the gasket is brittle, hard or otherwise damaged. Replace if necessary.

Check if the CVT cover bearing turns smoothly and freely. Otherwise, replace it. See *CVT COVER BEARING* below.

Installation

Install the gasket on CVT cover.

Install the CVT cover. Align the end of driven pulley nut with the ball bearing.

NOTE: Do not force the CVT cover to install it.

Install the center top screw of cover in first.

Install the other screws then torque them in a crisscross sequence.

Install CVT cooling hoses then torque clamps.

CVT COVER BEARING

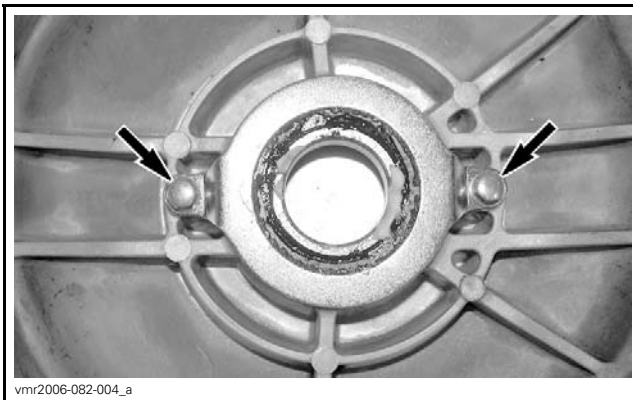
Inspection

Check if the CVT cover bearing turns smoothly and freely. Otherwise, replace it.

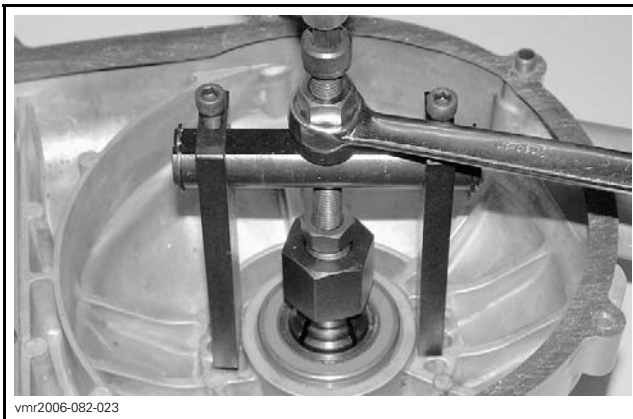
Removal

Remove CVT cover from engine.

Remove both screws retaining the bearing plate to CVT cover.



Using the blind hole puller kit (P/N 529 036 056), remove the bearing from CVT cover.



Installation

Clean bearing area.

Using a suitable pusher, install the new bearing into CVT cover.

Install CVT cover on engine.

DRIVE PULLEY

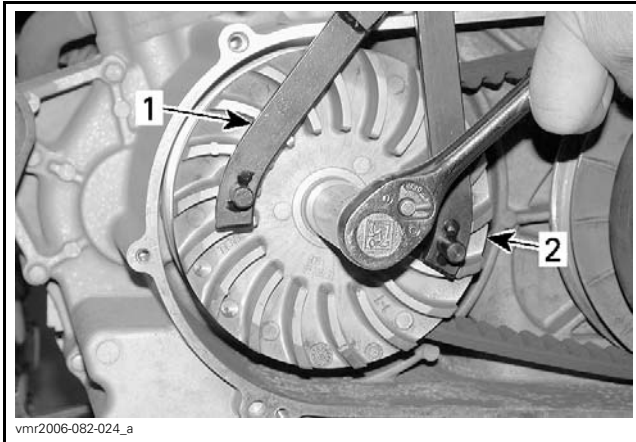
Removal of Drive Pulley

Remove CVT cover.

Hold fixed sheave with the pulley holder (P/N 529 036 054). Remove drive pulley nut and thrust washer then pull the fixed sheave.

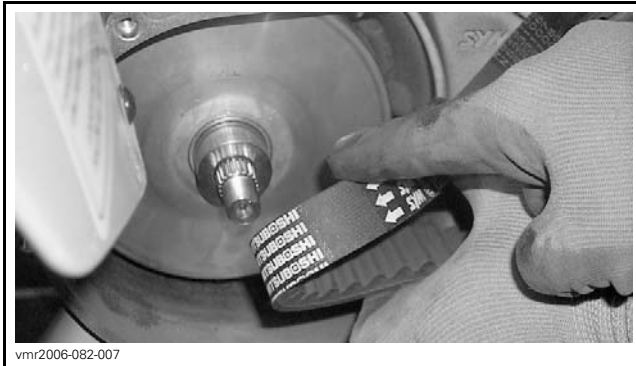
Section 06 TRANSMISSION

Subsection 01 (CONTINUOUSLY VARIABLE TRANSMISSION (CVT))

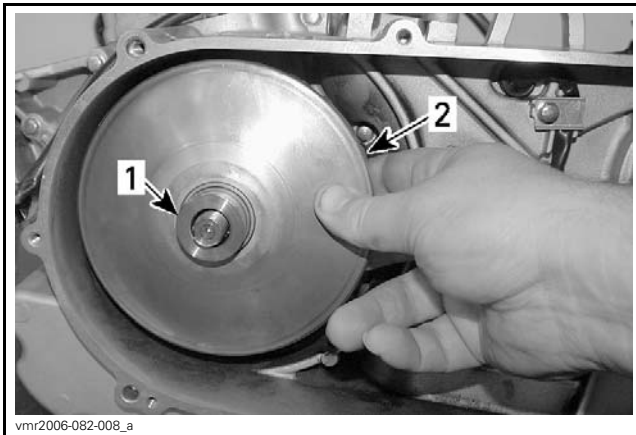


1. Pulley holder
2. Fixed sheave of drive pulley

Move away the drive belt.



Remove drive pulley sliding sheave by placing a finger behind sliding sheave ramp plate and pull.



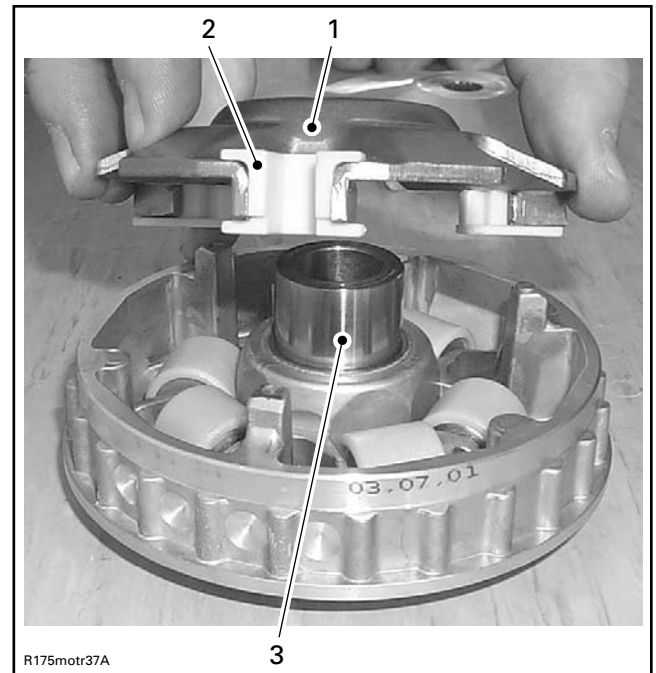
1. Drive pulley spacer
2. Sliding sheave of drive pulley

Disassembly of Drive Pulley

Sliding Sheave

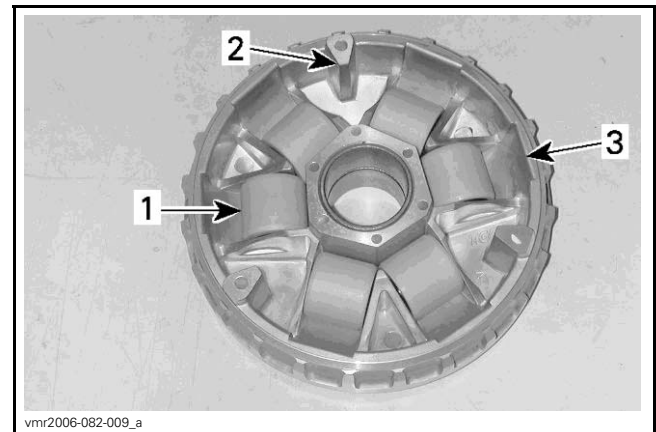
Lift ramp plate with sliding shoes.

Withdraw spacer.



TYPICAL

1. Ramp plate
2. Sliding shoes
3. Spacer



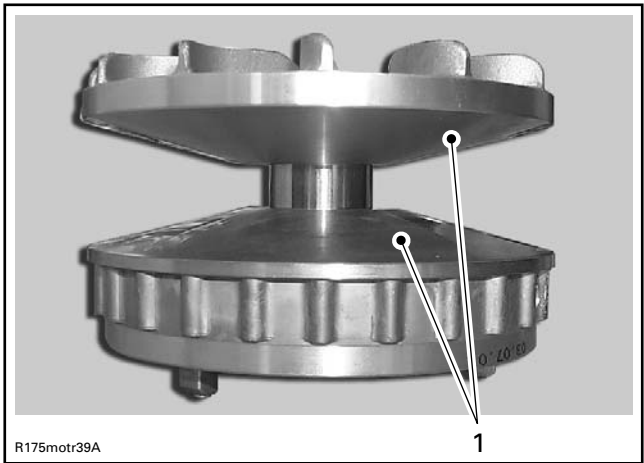
1. Roller
2. Contact surface to sliding shoes
3. Ramp for the rollers

Cleaning of Drive Pulley

Clean pulley faces and shaft with fine steel wool and dry cloth.

Section 06 TRANSMISSION

Subsection 01 (CONTINUOUSLY VARIABLE TRANSMISSION (CVT))



TYPICAL
1. Faces of drive pulley

Reclean mounting surfaces with paper towel and cleaning solvent. Use pulley flange cleaner (P/N 413 711 809).

Wipe off the mounting surfaces with a clean, dry paper towel.

Only use petrol base cleaner when cleaning bushings inside sliding sheave.

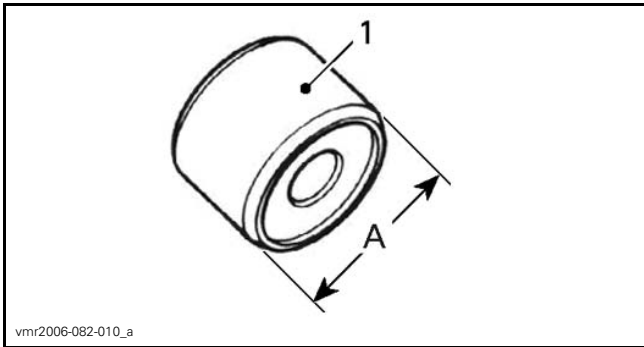
CAUTION: Do not use acetone to clean bushing.

Inspection of Drive Pulley

Drive pulley should be inspected annually.

Roller

Check outer surface of rollers for roundness or flat surfaces. Replace as required.



1. Contact surface to drive pulley sliding sheave
A. Roller diameter

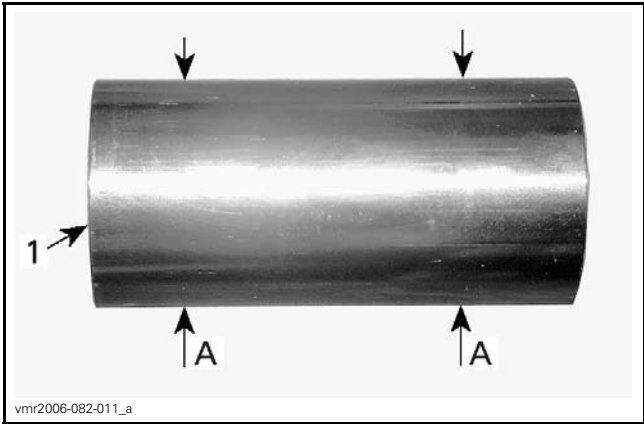
Measure the roller diameter. If a roller is out of specification, replace as required.

ROLLER DIAMETER	
SERVICE LIMIT	19.0 mm (.748 in)

Spacer

Check if the outer surface of spacer is worn or damaged. Replace as required.

Measure the sliding sheave spacer. If the external diameter is out of specification, replace as required.



1. Spacer
A. External diameter of spacer

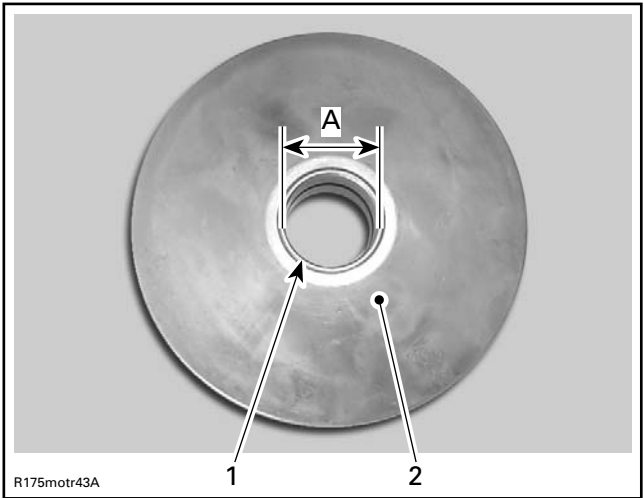
SLIDING SHEAVE SPACER	
SERVICE LIMIT	29.962 mm (1.180 in)

Sliding Sheave

Check sliding sheave for cracks and sliding contact surface for excessive wear. Replace sliding sheave if necessary.

Measure bushing diameters of sliding sheave.

Use a dial bore gauge to measure bushing diameter. Measuring point must be at least 5 mm (1/4 in) from each bushing edge.



1. Bushing
2. Drive pulley sliding sheave
A. Bore diameter of bushing

Section 06 TRANSMISSION

Subsection 01 (CONTINUOUSLY VARIABLE TRANSMISSION (CVT))

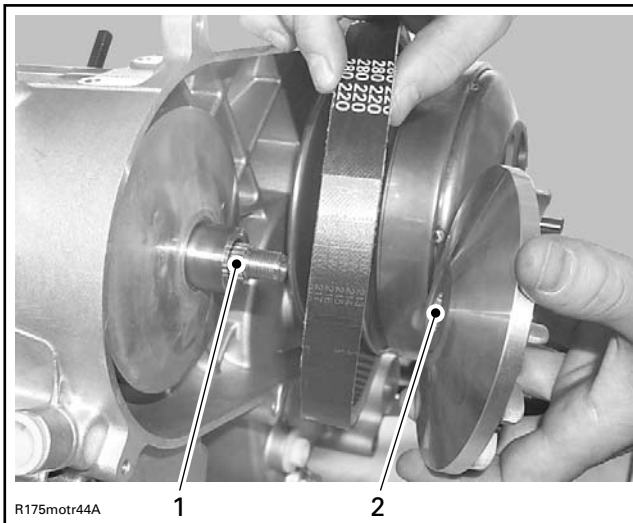
SLIDING SHEAVE BUSHING	
SERVICE LIMIT	30.060 mm (1.184 in)

Replace sliding sheave if bushing(s) is(are) out of specification. Visually inspect coatings.

Fixed Sheave

Check fixed sheave for scorings and other damages. If so, replace fixed sheave.

Check for any marks on fixed sheave splines. Replace if necessary.

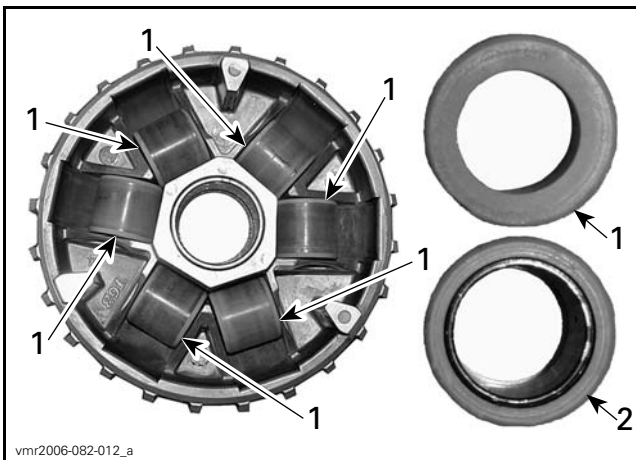


1. Splines on crankshaft PTO side
2. Drive pulley fixed sheave splines

Assembly of Drive Pulley

For assembly, reverse the disassembly procedure. Pay attention to following details.

When installing rollers, place them in accordance with the following illustration.



1. Closed faces
2. Open faces

Insert slider shoes into ramp plate to properly slide in guides of drive pulley sliding sheave.

Installation of Drive Pulley

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

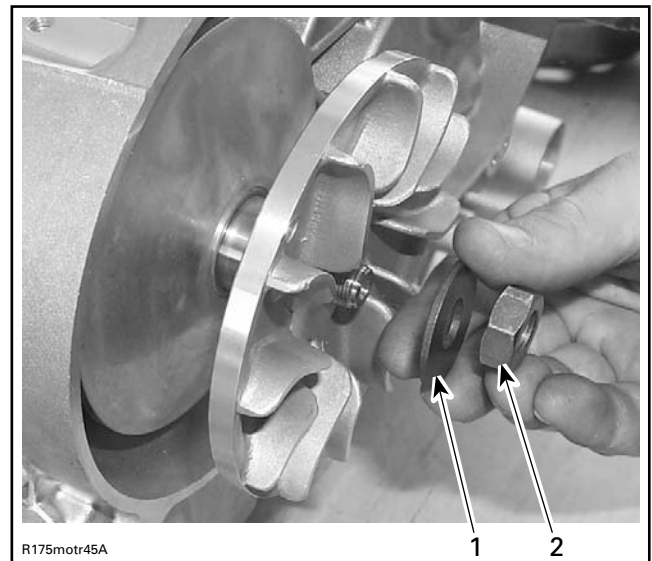
⚠ WARNING

Do not apply antiseize or any lubricant on drive pulley.

Clean mounting surfaces as described in *CLEANING* above.

Install drive pulley on crankshaft extension.

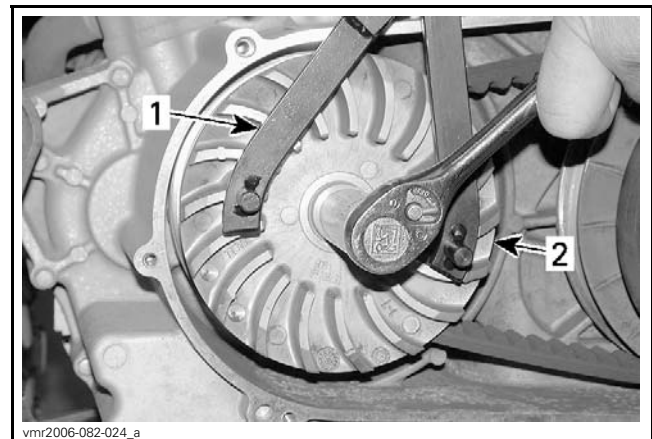
Place the washer then the nut.



TYPICAL

1. Shim
2. Drive pulley nut

Install the pulley holder (P/N 529 036 054) and torque nut to 95 N•m (70 lbf•ft).



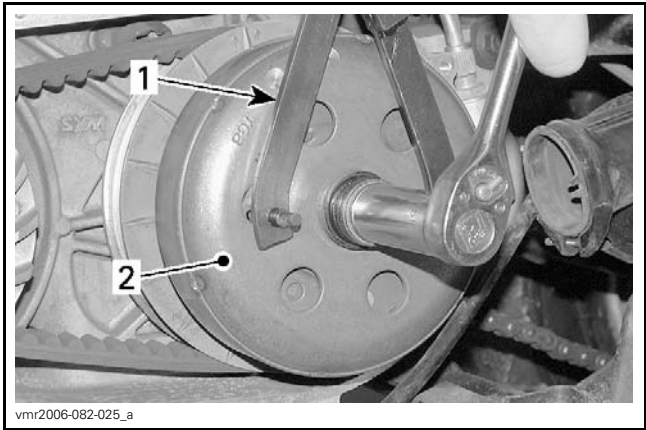
1. Pulley holder
2. Fixed sheave of drive pulley

DRIVEN PULLEY

Removal of Driven Pulley

Remove the drive pulley fixed sheave, see procedure in *DRIVE PULLEY* above.

Using the pulley holder (P/N 529 036 054), remove the driven pulley nut and the bearing collar.



1. Pulley holder
2. Clutch drum

Remove the clutch drum.

Remove the driven pulley with the drive belt.

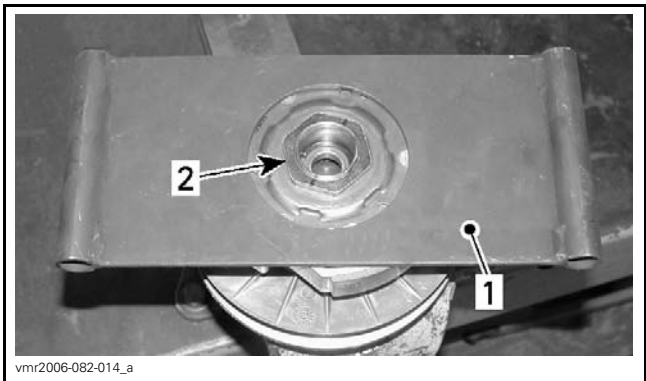
Disassembly of Driven Pulley

Remove centrifugal clutch nut as per following procedure.

Install the driven pulley support (P/N 529 035 863) in a vise and place the driven pulley assembly on it.

Replace tabs on the driven pulley holding support (P/N 529 035 864) with the driven pulley support tab kit (P/N 529 036 047).

Mount the holding support on driven pulley and unscrew the centrifugal clutch nut.



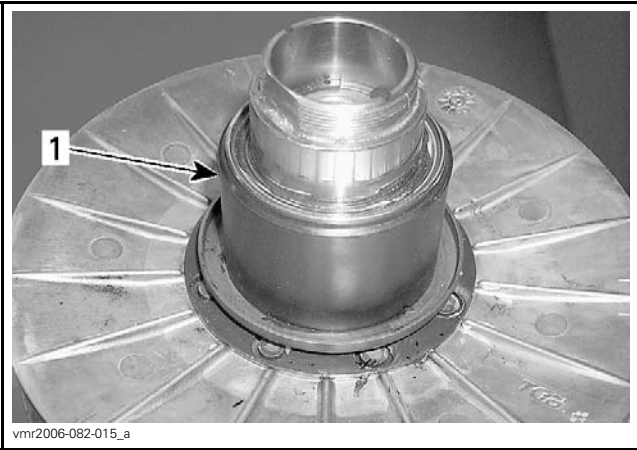
1. Driven pulley holding support
2. Centrifugal clutch nut

⚠ WARNING

Centrifugal clutch is spring loaded. Never unscrew centrifugal clutch nut without special tool.

Remove the holding support then remove centrifugal clutch from driven pulley.

Remove the seal collar from driven pulley.



1. Seal collar

Using long nose pliers, remove guide pins with their rollers.



Cleaning of Driven Pulley

When a dust deposit has to be removed 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 crankcase area from contamination.

⚠ WARNING

This procedure must be performed in a well ventilated area.

Section 06 TRANSMISSION

Subsection 01 (CONTINUOUSLY VARIABLE TRANSMISSION (CVT))

CAUTION: Avoid contact between cleaner and oil seals because damage may occur.

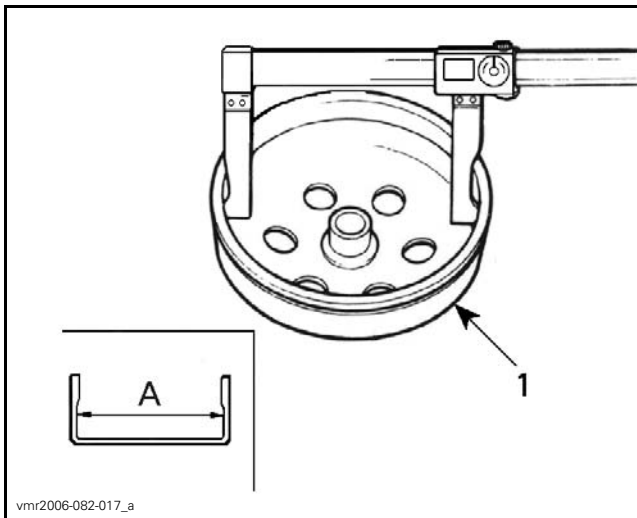
Inspection of Driven Pulley

Bearing Stay Collar

Check if O-rings are brittle, hard or otherwise damaged. Replace driven pulley if necessary.

Clutch Drum

Measure the inner diameter of clutch drum. Replace it if the inner diameter is out of specification.



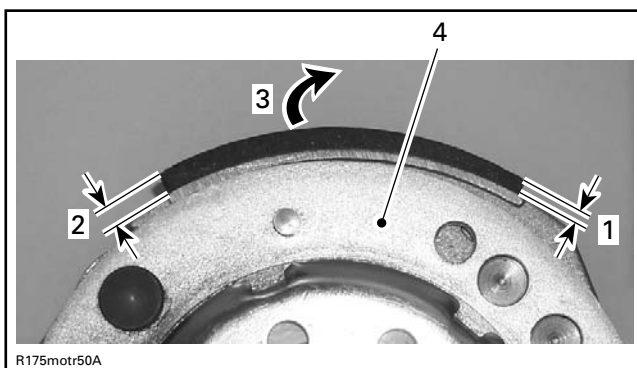
1. Clutch drum
A. Inner diameter

CLUTCH DRUM INNER DIAMETER	
SERVICE LIMIT	145.45 mm (5.73 in)

Centrifugal Clutch

Check levers on centrifugal clutch for free movement and lining wear.

NOTE: Centrifugal clutch engagement speed increases in accordance with lining thickness wear.



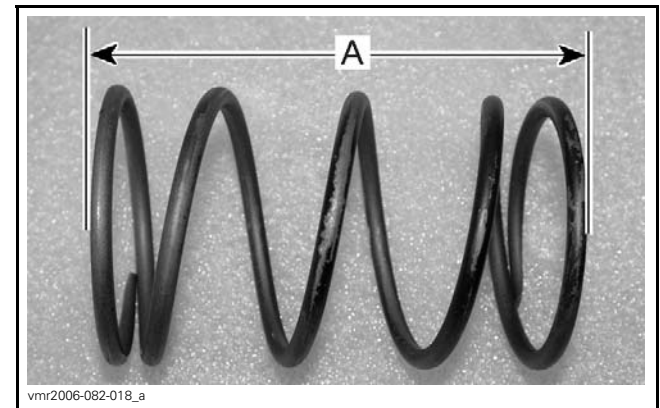
1. Lining thickness next to lever fixation
2. Lining thickness on lever end
3. Direction of lever movement
4. Centrifugal clutch

LINING THICKNESS	
SERVICE LIMIT	3.00 mm (.118 in)

If lining thickness is out of specifications, replace centrifugal clutch.

Driven Pulley Spring

Measure spring free length. Replace if the spring is out of specification.



A. Free length

SPRING FREE LENGTH	
SERVICE LIMIT	97.4 mm (3.835 in)

Sliding Sheave

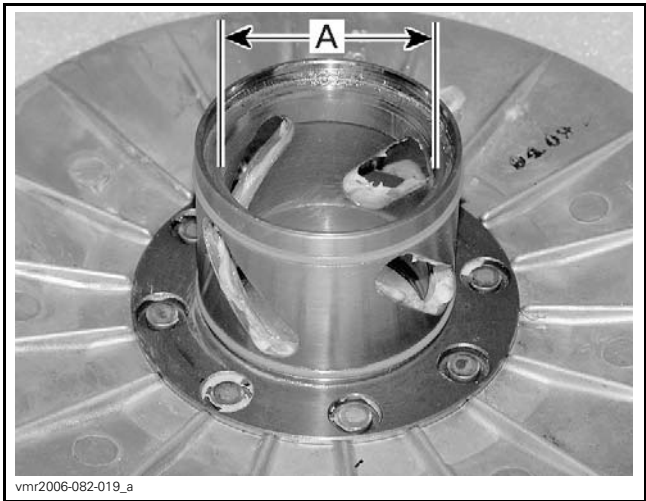
Check driven pulley sliding sheave for free movement. Replace driven pulley if necessary.

Check if guide pin grooves are damaged or worn. Replace drive pulley if necessary.

Check if O-rings and oil seals are brittle, hard or otherwise damaged. Replace driven pulley if necessary.

Measure the inner diameter of driven pulley shaft.

Section 06 TRANSMISSION
Subsection 01 (CONTINUOUSLY VARIABLE TRANSMISSION (CVT))



A. Inner shaft diameter

SLIDING SHEAVE INNER DIAMETER	
SERVICE LIMIT	41.07 mm (1.617 in)

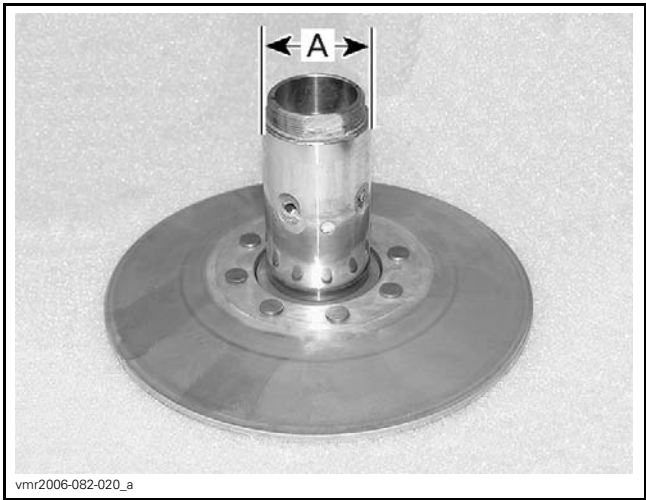
If the inner diameter of shaft is out of specification, change driven pulley.

Fixed Sheave

Check oil seal if brittle, hard or otherwise damaged. Replace as required.

Check ball bearing and needle bearing for free play and smooth operation. Replace driven pulley if necessary.

Measure the outside diameter of fixed sheave shaft.



A. Outside diameter

FIXED SHEAVE OUTSIDE DIAMETER	
SERVICE LIMIT	40.93 mm (1.611 in)

If the outside diameter of shaft is out of specification, change driven pulley.

Assembly of Driven Pulley

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

Lubricate the inner of sliding sheave with Isoflex grease (P/N 293 550 021).

Install guide pins in sliding sheave grooves then fill grooves with Isoflex grease (P/N 293 550 021).



Install seal collar over sliding sheave.



Reinstall all other removed parts.

Installation of Driven Pulley

For installation, reverse the removal procedure.

Torque driven pulley nut to 55 N•m (41 lbf•ft).

STEERING AND FRONT SUSPENSION

SERVICE TOOLS

Description	Part Number	Page
shock/spring remover	529 036 007	190

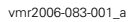
SERVICE TOOLS – OTHER SUPPLIER

Description	Part Number	Page
Smoothflow™ tapered tip	(16 ga #511 rtt-b)	181

SERVICE PRODUCTS

Description	Part Number	Page
Loctite 406 (glue)	293 800 100	181
pulley flange cleaner	413 711 809	181
synthetic grease XP-S	293 550 010	187

Subsection 01 (STEERING AND FRONT SUSPENSION)



GENERAL

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

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

HANDLEBAR GRIP

Removal

The handlebar grips are glued on handlebar. Using a knife, cut and remove 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 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 the glue (about 4 spots per side).

NOTE: The Loctite 406 dries quickly. Do not apply it before installing grip.

Apply pressure on the grip for approximately 30 seconds to set the glue.

MULTIFUNCTION SWITCH

Test

Refer to *ELECTRICAL SYSTEM*.

Removal

All Models except Europe

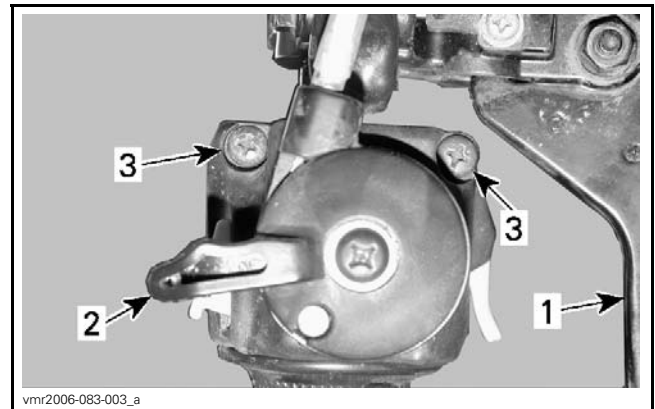
Remove front cover.



Remove CVT air inlet hose to reach multifunction switch connectors.

Unplug multifunction switch connectors.

Unscrew multifunction switch screws.



TYPICAL

1. Left brake lever
2. Choke lever
3. Multifunction switch screws

Separate multifunction switch from handlebar.

If necessary, remove the choke cable from multifunction switch. Refer to *CARBURETOR AND FUEL TANK*.

European Models

Remove front cover.

Section 07 STEERING AND FRONT SUSPENSION

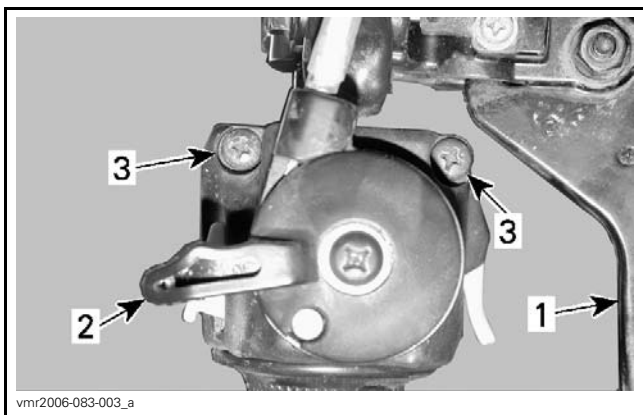
Subsection 01 (STEERING AND FRONT SUSPENSION)



Remove CVT air inlet hose to reach multifunction switch connectors.

Unplug multifunction switch connectors.

Unscrew multifunction switch screws.



TYPICAL

1. Left brake lever
2. Choke lever
3. Multifunction switch screws

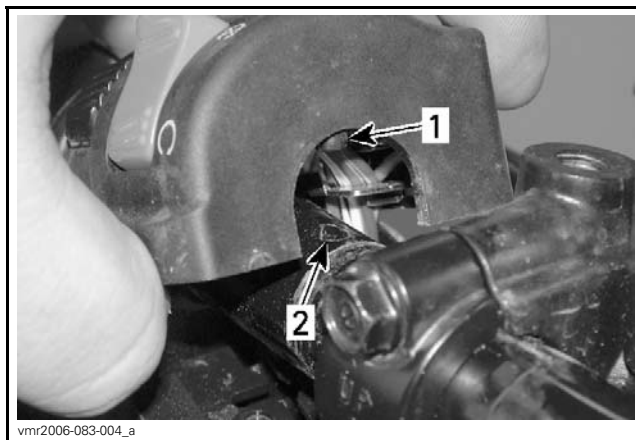
Separate multifunction switch from handlebar.

If necessary, remove the choke cable from the switch. Refer to *CARBURETOR AND FUEL TANK*.

Installation

For installation, reverse the removal procedure.

When installing multifunction switch, position the switch by inserting the switch pin in the handlebar hole.



TYPICAL

1. Multifunction switch pin
2. Handlebar hole

AUXILIARY MULTIFUNCTION SWITCH

European Models Only

Replacement

Remove front cover.



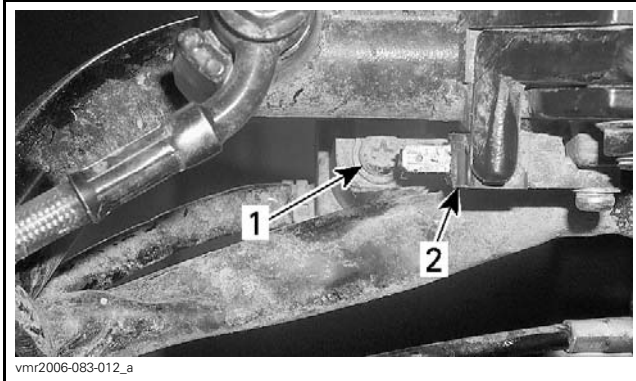
Remove CVT air inlet hose to reach auxiliary switch connector.

Unplug auxiliary switch connector.

Unplug brake switch connectors from LH brake lever and remove screw retaining auxiliary switch to handlebar.

Section 07 STEERING AND FRONT SUSPENSION

Subsection 01 (STEERING AND FRONT SUSPENSION)



1. Auxiliary switch screw
2. Brake switch on LH brake lever

Remove switch.

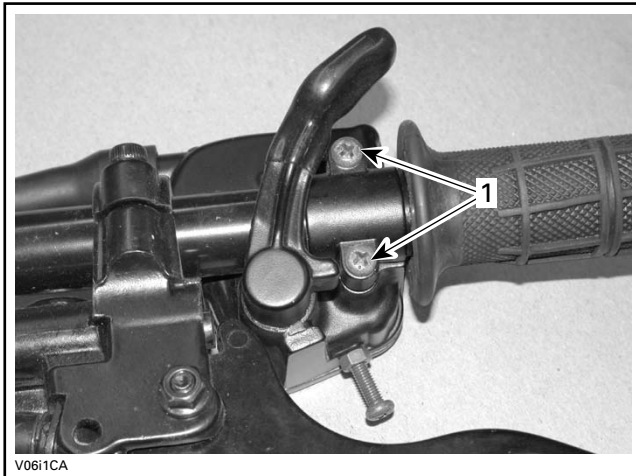
For installation, reverse the removal procedure.

THROTTLE LEVER

Removal

Procedure for Handlebar Replacement

Unscrew throttle clamp.

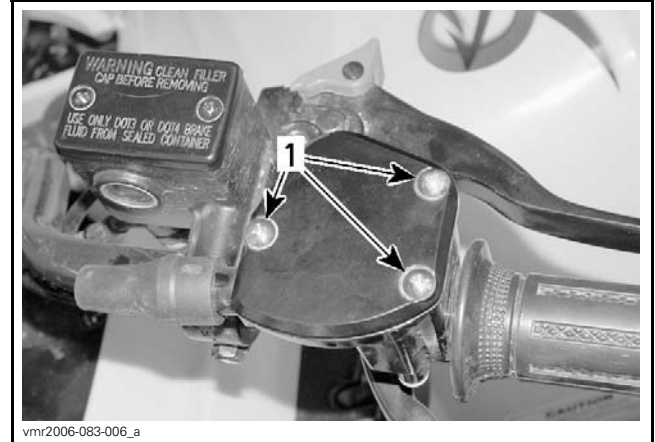


- TYPICAL**
1. Throttle clamp screws

Put throttle lever aside.

Procedure for Throttle Lever Replacement

Remove throttle housing cover.



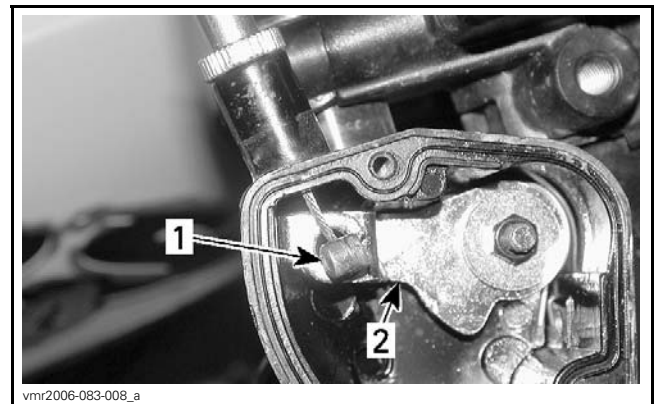
1. Throttle housing cover screws

Move back rubber cap.



Tighten adjustment screw to its maximum.

Using long nose pliers, disconnect throttle cable from throttle lever.



1. Throttle cable barrel
2. Throttle lever

Unscrew throttle adjustment screw completely and remove cable.

Section 07 STEERING AND FRONT SUSPENSION
Subsection 01 (STEERING AND FRONT SUSPENSION)



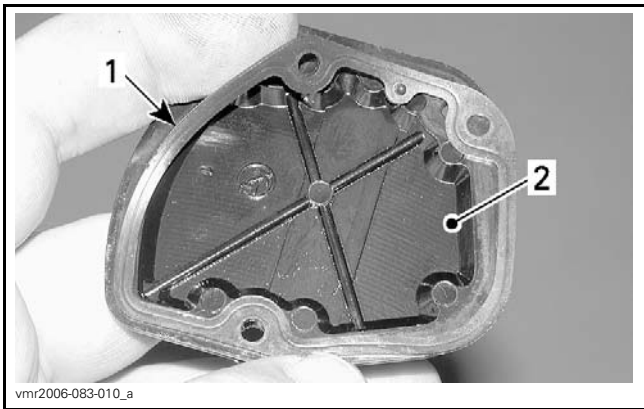
Unscrew throttle clamp to separate throttle lever from handlebar.



TYPICAL
1. Throttle clamp screws

Installation

For installation, reverse the removal procedure. Make sure gasket inside cover is installed properly.



1. Gasket
2. Throttle housing cover

Refer to *CARBURETOR AND FUEL TANK* for throttle cable adjustment procedure.

MASTER CYLINDER

Refer to *BRAKING SYSTEM*.

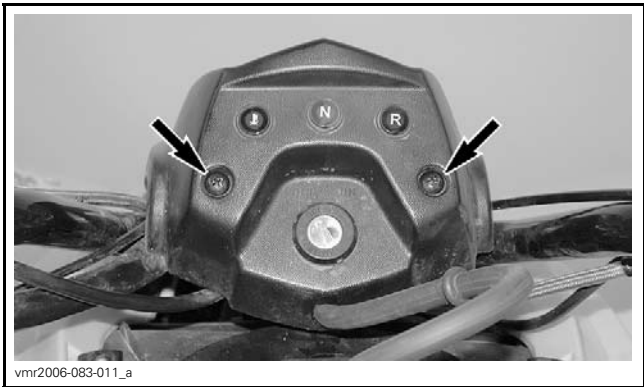
HANDLEBAR

Removal

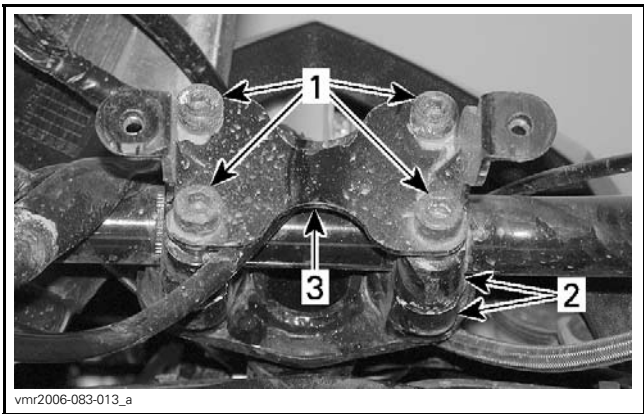
Procedure if Handlebar is not Replaced

All Models except Europe

Remove steering cover by unscrewing both retaining screws.



Remove handlebar bolts, steering cover support and steering clamps.



1. Handlebar bolt
2. Steering clamps
3. Steering cover support

Move handlebar toward the front of vehicle.

European Models

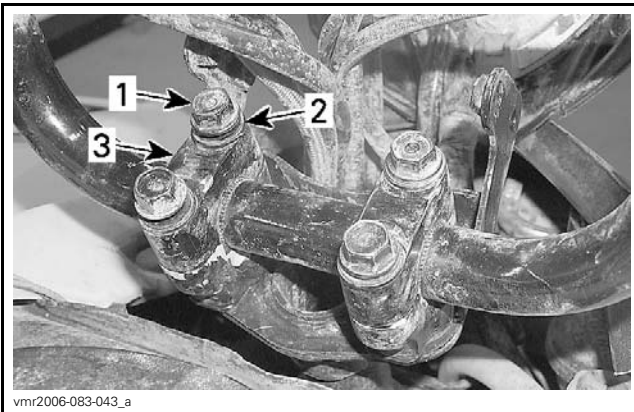
On each side, remove screws retaining steering cover to steering cover support.

Section 07 STEERING AND FRONT SUSPENSION

Subsection 01 (STEERING AND FRONT SUSPENSION)



Remove handlebar bolts, washers and steering clamps.



1. Handlebar bolt
2. Washer
3. Steering clamp

Move handlebar toward the front of vehicle.

Procedure for Handlebar Replacement

Use the same procedure as described in *PROCEDURE IF HANDLEBAR IS NOT REPLACED* above. However before removing handlebar bolts, remove the following items:

- RH and LH brake levers (see *BRAKING SYSTEM*)
- throttle lever
- multifunction switch
- auxiliary multifunction switch and mirrors (**European models**).

Remove handlebar from vehicle.

Inspection

Inspect the handlebar for damage, cracks or bending. Replace if any problem is detected.

Installation

For the installation, reverse the removal procedure.

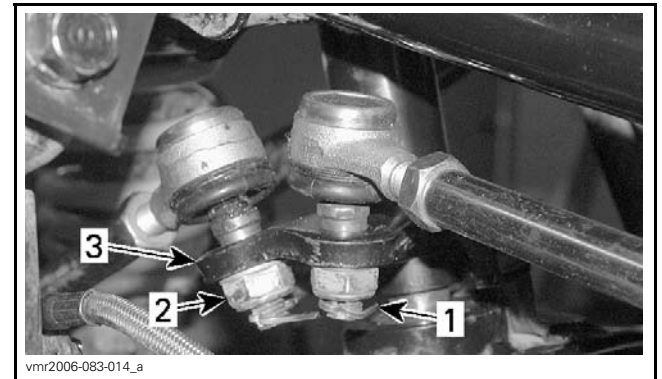
NOTE: When torquing, the gap between lower and upper steering clamps must be equal, on both sides and between rear and front.

TIE-ROD

Removal

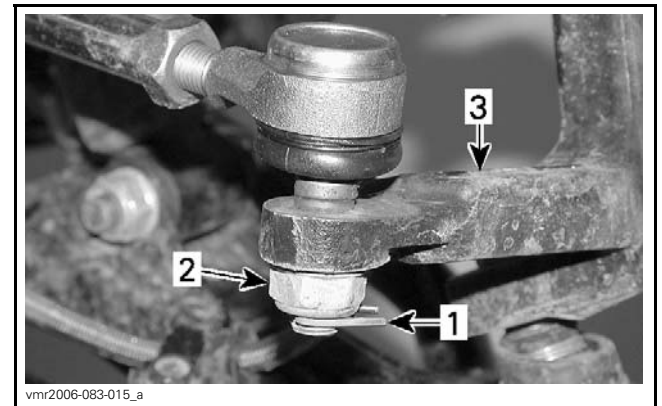
Place the vehicle on jack stands and remove appropriate front wheel.

Remove cotter pin, nut and tie-rod assembly. Discard cotter pin and nut.



STEERING COLUMN SIDE

1. Cotter pin
2. Nut
3. Steering column



NUCKLE SIDE

1. Cotter pin
2. Nut
3. Knuckle

Inspection

Inspect ball joint ends for wear or looseness, if excessive, replace.

Check rubber boots on tie-rods and ball joints. Replace defective part.

Check if the tie-rod is bent. Replace the tie-rod if necessary.

Section 07 STEERING AND FRONT SUSPENSION
Subsection 01 (STEERING AND FRONT SUSPENSION)

Installation

For the installation, reverse the removal procedure.

Install a new nut and a new cotter pin. Both ends of cotter pin must be folded.

Perform a steering adjustment. See further in this section.

STEERING COLUMN

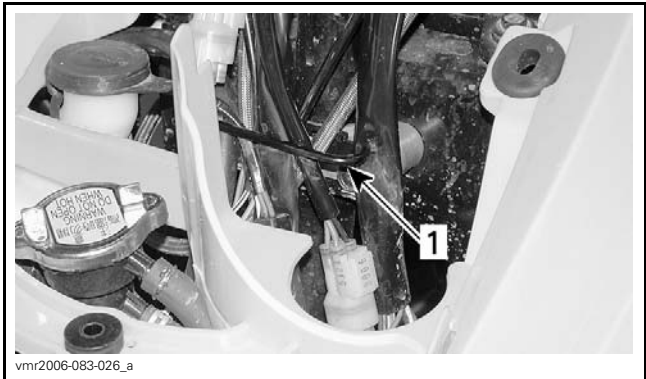
Removal

Remove front cover.

Remove handlebar, see procedure above.

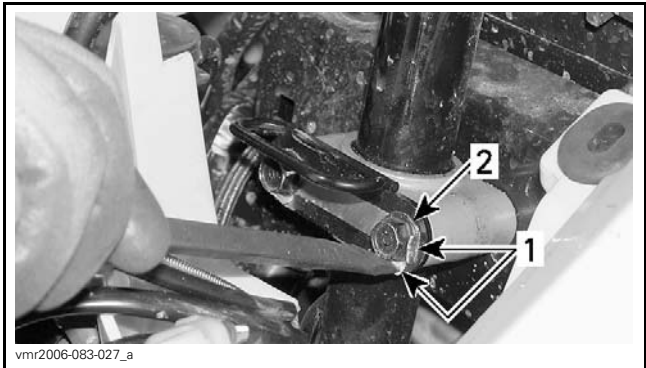
Remove CVT air inlet hose from front fender.

Move all wires and hoses out of holder.



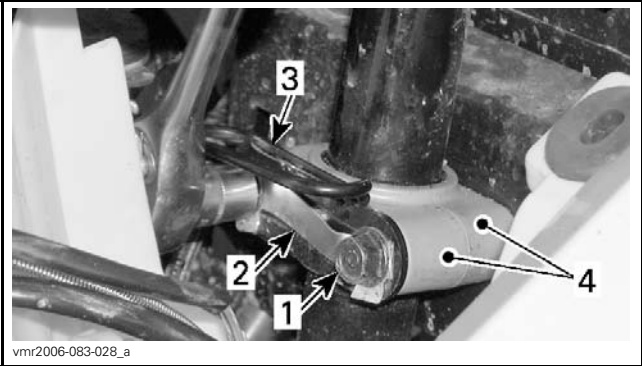
1. Holder

Unlock locking tabs from steering bolts.



1. Locking tabs
2. Steering bolt

Remove steering bolt, locking tabs plate, holder, half housings, bushings and seals.



1. Steering bolt
2. Locking tabs plate
3. Holder
4. Half housings

Remove tie-rods from steering column.

Using a hoist, lift the front of vehicle. Close fuel valve before lifting.

Remove cotter pin and nut at the bottom of steering column. Discard cotter pin.



Move steering column upward to separate steering column from steering column bearing.

Rotate steering column 1/2 turn then pull it between A-arm and frame.



Inspection

Inspect steering column for damage, cracks or bending, replace if any problem is detected.

Check bearing at the end of steering column. The bearing should turns smoothly and freely.

Check bearing seals for damages. Replace if necessary.

Installation

For the installation, reverse the removal procedure.

Apply synthetic grease XP-S (P/N 293 550 010) on both seals when installing half housings.

Install a new cotter pin. Both ends of cotter pin must be folded.

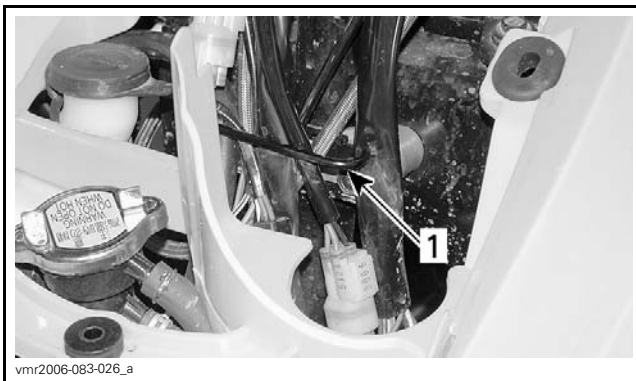
STEERING COLUMN BEARING

Removal

Remove front cover.

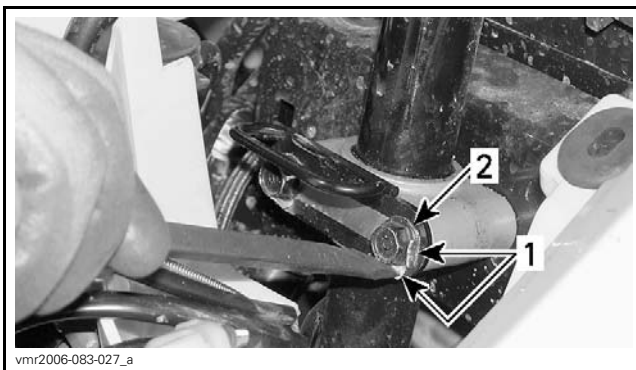
Remove CVT air inlet hose from front fender.

Move all wires and hoses out of holder.



1. Holder

Unlock locking tabs from steering bolts.



1. Locking tabs
2. Steering bolt

Loosen steering bolts.

Separate tie-rods from steering column.

Remove cotter pin and steering nut.

Lift up the steering column until it is free from bearing.

Remove seal.



Remove circlip.



Using a suitable puller, remove bearing.



Installation

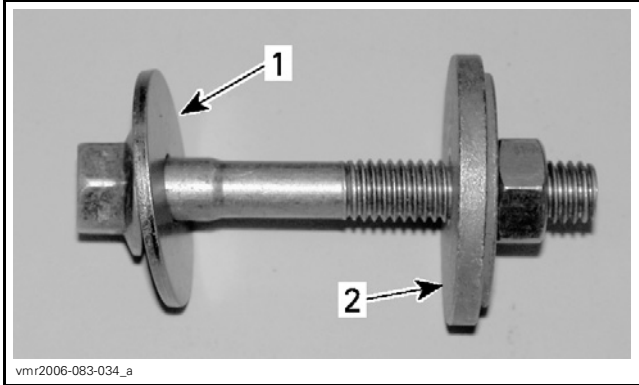
For installation, reverse the removal procedure.

To install the bearing, use the following items:

- bolt M8
- nut M8
- washer (P/N 224 081 301)
- large washer (P/N 517 302 322).

Section 07 STEERING AND FRONT SUSPENSION

Subsection 01 (STEERING AND FRONT SUSPENSION)



1. Washer
2. Large washer

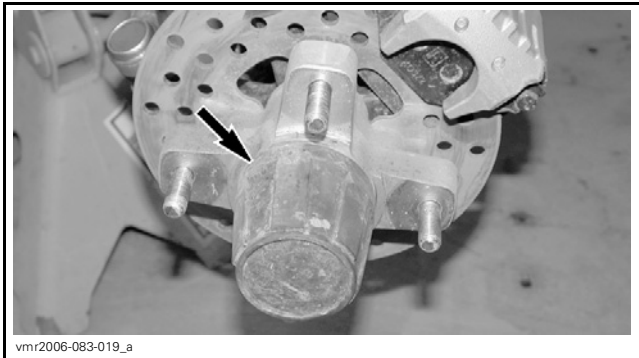
FRONT WHEEL HUB

Removal

Lift the front of vehicle and place it on jack stands.

Remove the appropriate wheel.

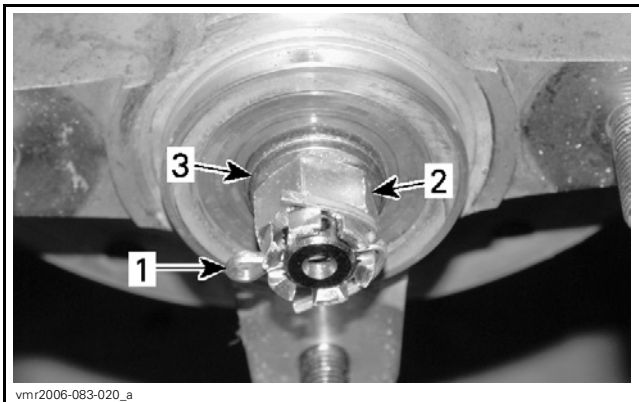
Remove the wheel cap.



Remove caliper from knuckle (refer to *BRAKING SYSTEM*). Place it on lower A-arm.

Remove and discard the cotter pin.

Unscrew the castle nut then remove the washer.



1. Cotter pin
2. Castle nut
3. Washer

Remove the insert between knuckle shaft and hub seal.



Pull wheel hub strongly. Use a puller if necessary.

Installation

The installation is the reverse of the removal procedure.

NOTE: When installing a new hub, install new bearings and new seals. Never reuse bearings.

Torque castle nut and further tighten until one of its grooves is aligned with a cotter pin hole.

Install a new cotter pin. Both ends of cotter pin must be folded.

WHEEL BEARING

Inspection

To verify the wheel bearings, the wheel hub removal is necessary.

Turn each bearing with a finger. The bearings must turn smoothly and freely. Replace bearings if necessary.

Removal

Remove wheel hub from vehicle.

Remove seals on both sides.

Using a blind hole puller, extract the outer bearing.

Remove the inner spacer.

Turn hub upside down and remove the inner bearing.

Installation

CAUTION: Never reuse bearings. Always replace both bearings at the same time.

Push the inner bearing and its seal.

Turn hub upside down and install the inner spacer.

Install the outer bearing and its seal.

Reinstall all other removed parts.

KNUCKLE

Removal

Raise front of vehicle and install jack stands under frame to support the vehicle off the ground.

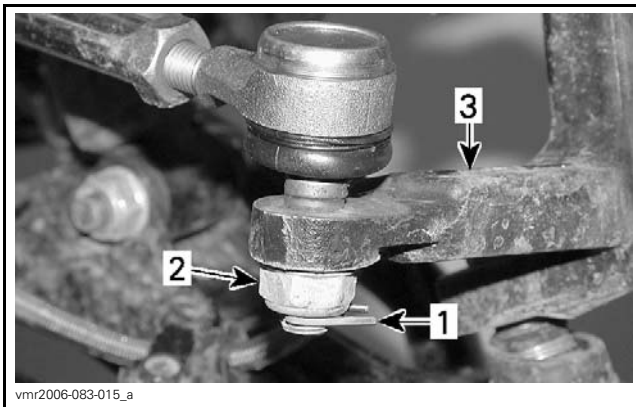
Remove appropriate wheel.

Remove caliper and suspend it out of the way.

CAUTION: Do not let the caliper hang by the hose and do not stretch or twist the hose.

Remove wheel hub from knuckle. See procedure above.

Detach tie-rod from knuckle.

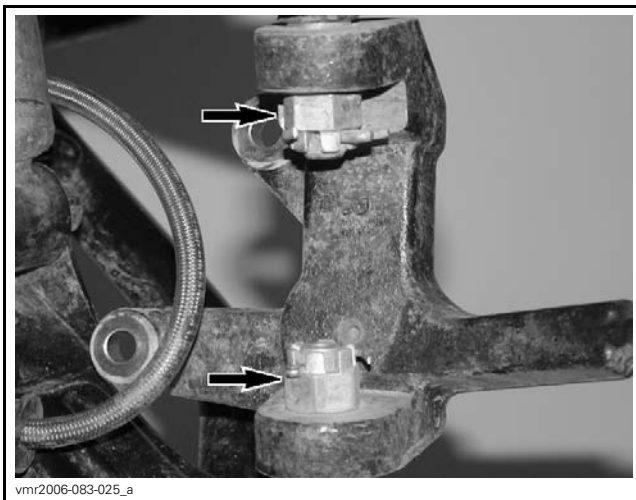


KNUCKLE SIDE

- 1. Cotter pin
- 2. Nut
- 3. Knuckle

Remove bolt that attach the shock absorber to lower A-arm.

Remove upper and lower ball joint nuts.



Remove knuckle from A-arms.

Installation

The installation is the reverse of the removal procedure.

Torque castle nut and further tighten until one of its grooves is aligned with a cotter pin hole.

Install a new cotter pin. Both ends of cotter pin must be folded.

SHOCK ABSORBER AND SPRING

Adjustment

Rear spring preload can be changed by setting the adjusting nut up or down. Shorten the spring to decrease preload or lengthen the spring to increase preload.

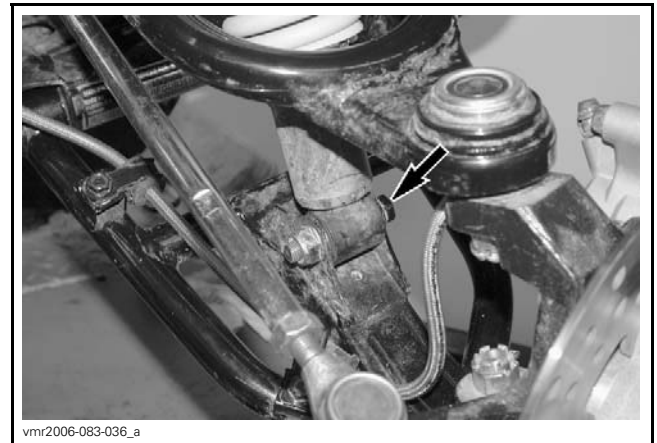
NOTE: The front springs are not adjustable.

Removal

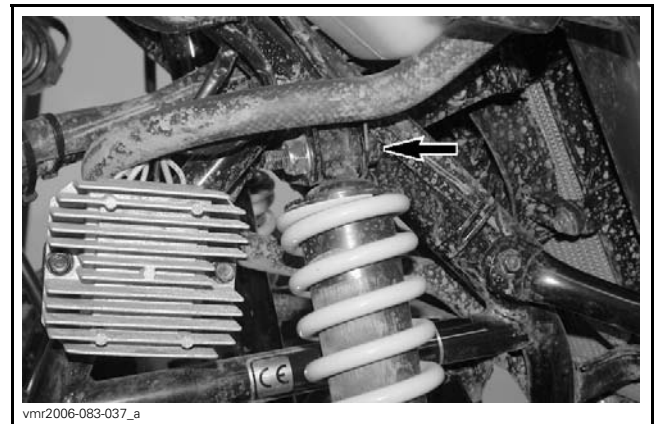
NOTE: Front wheel removal is not necessary to remove a front shock absorber.

Lift front of vehicle until front shock absorbers are fully extended. Install jack stands under the frame.

Remove the lower bolt that attach shock absorber to lower A-arm.



Remove the upper bolt holding shock absorber to frame.



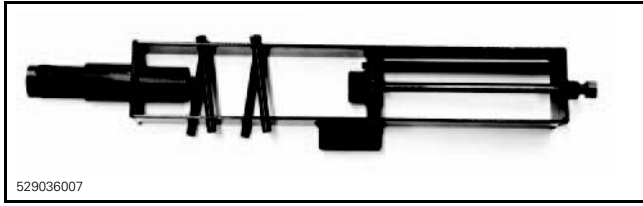
Pull shock absorber out of its attachments.

Section 07 STEERING AND FRONT SUSPENSION

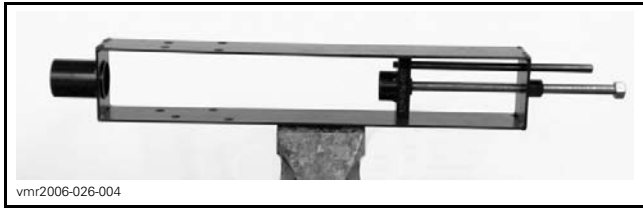
Subsection 01 (STEERING AND FRONT SUSPENSION)

Disassembly

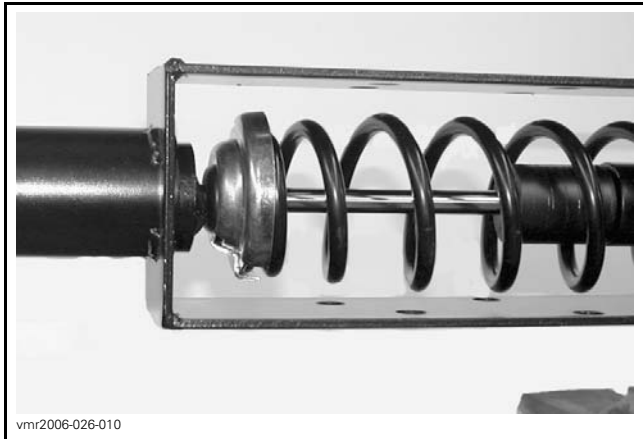
To remove spring from the shock absorber, use the shock/spring remover (P/N 529 036 007).



Place the tool in a vise.

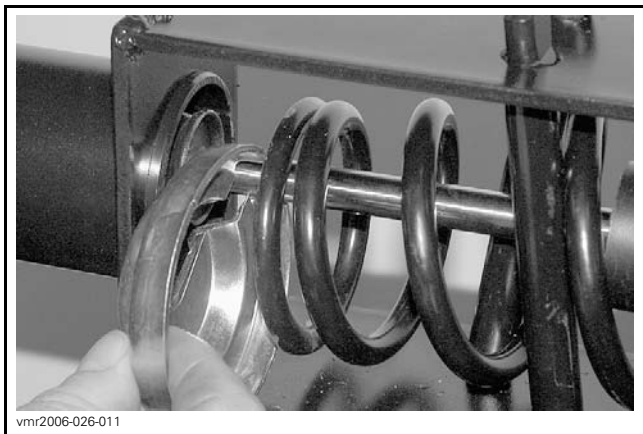


Position the shock absorber in the tool and install the spring compressor pins.



Tighten the shock spring remover screw until the spring is sufficiently compressed to remove spring locking devices.

Remove spring stopper and its cap then release the shock spring remover screw.



Inspection

Inspect the spring for damage. Replace if necessary.

Inspect shock for oil leakage. Extend and compress the shock 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 A-ARM

Inspection

Before removing A-arm, do the following:

- Move A-arm from side to side. There should be no noticeable looseness. Replace A-arm if necessary.
- Move A-arm up and down. There should be no noticeable looseness. Replace A-arm if necessary.

Check lower A-arms for distortion or damage. Replace as required.

Check rubber bushings for excessive wear, cracks or other damages. Replace A-arm if necessary.

Check ball joint bellows for cracks or any other damage. Replace A-arm if necessary.

Inspect ball joint end for damage. Ensure it's moving freely. Replace A-arm if necessary.

Removal

NOTE: Use the same procedure to remove RH or LH A-arm.

Lift front of vehicle and place jack stands under frame.

Remove appropriate wheel.

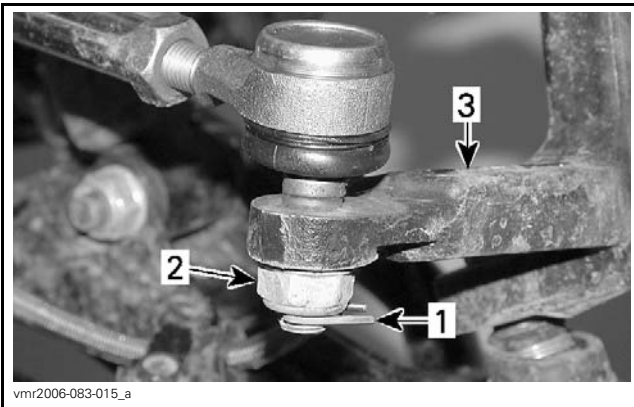
Remove the lower bolt of shock absorber.

Section 07 STEERING AND FRONT SUSPENSION

Subsection 01 (STEERING AND FRONT SUSPENSION)



Detach tie-rod from knuckle.



KNUCKLE SIDE

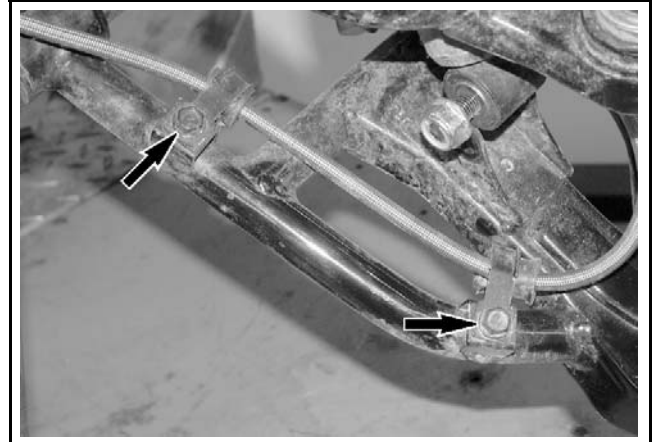
1. Cotter pin
2. Nut
3. Knuckle

Remove the lower ball joint nut.

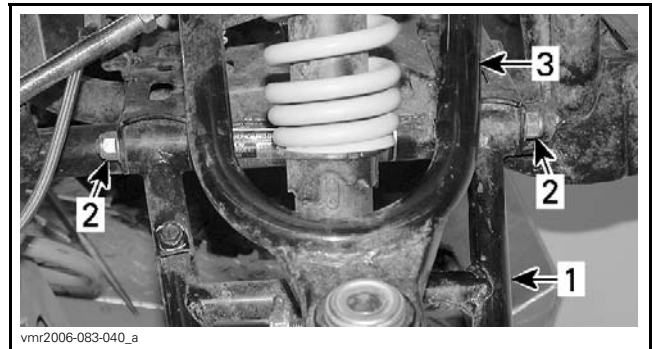


Separate lower ball joint from knuckle.

Remove screws holding brake hose to lower A-arm.



Remove bolts retaining A-arm to frame.



1. Lower A-arm
2. Bolts and nuts
3. Upper A-arm

Remove A-arm from vehicle.

Installation

NOTE: Install all bolts before torquing them.

Position A-arm on frame, then install bolts and nuts.

Insert ball joint end into knuckle and install ball joint nut.

Install shock absorber bolt.

Torque all bolts.

TORQUE	
A-arm bolts	49 N•m (36 lbf•ft)
Shock absorber bolt	45 N•m (33 lbf•ft)
Ball joint nut	49 N•m (36 lbf•ft) Further tighten until one of its grooves is aligned with a cotter pin hole. Install a new cotter pin. Both ends of cotter pin must be folded.

UPPER A-ARM

Inspection

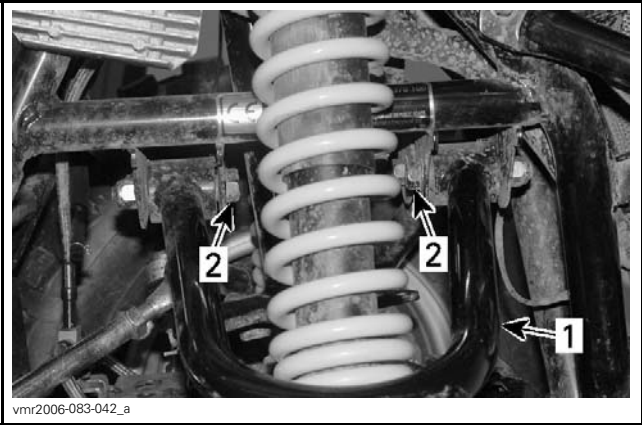
Before removing A-arm, do the following:
- Move A-arm from side to side. There should be no noticeable looseness. Replace A-arm if necessary.
- Move A-arm up and down. There should be no noticeable looseness. Replace A-arm if necessary.
Check lower A-arms for distortion or damage. Replace as required.
Check rubber bushings for excessive wear, cracks or other damages. Replace A-arm if necessary.
Check ball joint bellows for cracks or any other damage. Replace A-arm if necessary.
Inspect ball joint end for damage. Ensure it's moving freely. Replace A-arm if necessary.

Removal

NOTE: Use the same procedure to remove RH or LH A-arm.
Lift front of vehicle and place jack stands under frame.
Remove appropriate wheel.
Detach tie-rod from knuckle.



Remove bolts retaining A-arm to frame.



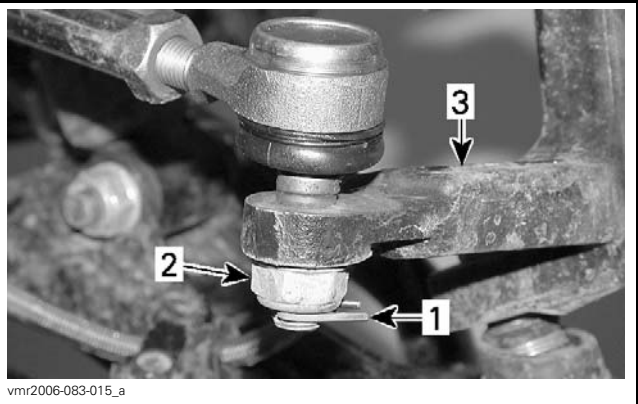
1. Upper A-arm
2. Bolts

Detach upper ball joint from knuckle.
Remove A-arm from vehicle.

Installation

NOTE: Install all bolts before torquing them.
Position A-arm on frame, then install bolts and nuts.
Insert ball joint end into knuckle and install ball joint nut.
Torque all bolts.

Table with 2 columns: Component, TORQUE. Row 1: A-arm bolts, 49 N•m (36 lbf•ft). Row 2: Ball joint nut, 49 N•m (36 lbf•ft) with additional instructions on tightening and cotter pin installation.



KNUCKLE SIDE
1. Cotter pin
2. Nut
3. Knuckle

Remove upper ball joint nut.

ADJUSTMENT

STEERING ALIGNMENT

Toe-In Adjustment

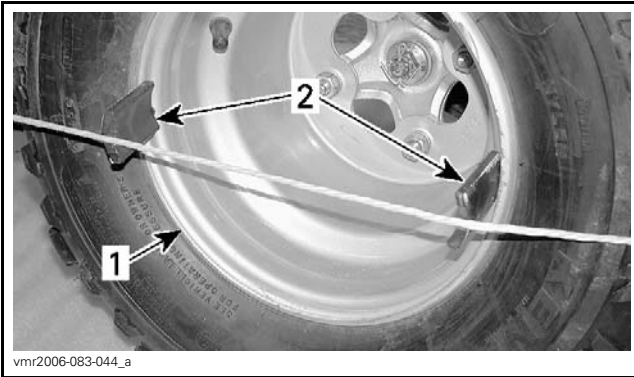
Place vehicle on a level surface (wheels on ground).

Check that handlebar is straight. Attach handlebar to make sure it does not move during adjustment.

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 tire.

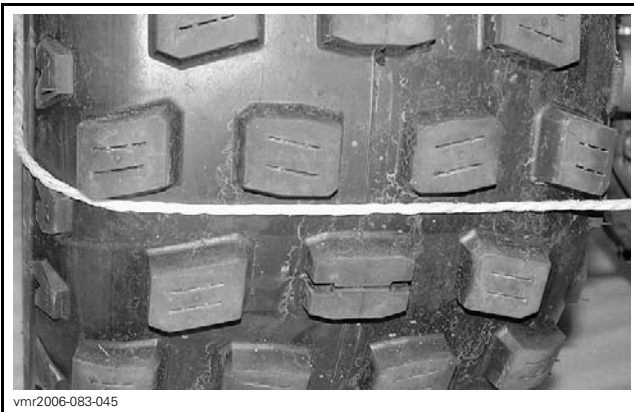


TYPICAL

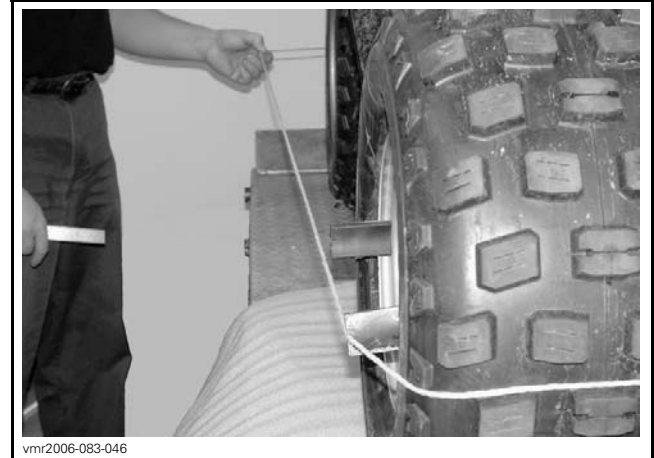
1. Rear rim
2. Spacers

NOTE: Different items can be used as spacers, like magnets (recommended).

The rope must be placed at the center of the wheels. Do not place rope on tire threads.



From the front of vehicle, near the front of rim, move rope so that the rope does not touch the first spacer.



Then, bring the rope back until it touches the spacer.



Keep this position and measure the distance between rope and rim. To the front and to the rear of wheel.



FRONT DISTANCE

Section 07 STEERING AND FRONT SUSPENSION

Subsection 01 (STEERING AND FRONT SUSPENSION)



REAR DISTANCE

The perfect front toe-in adjustment is 3 mm (.118 in) each side.

Adjust alignment with tie-rod.

REAR SUSPENSION AND AXLE

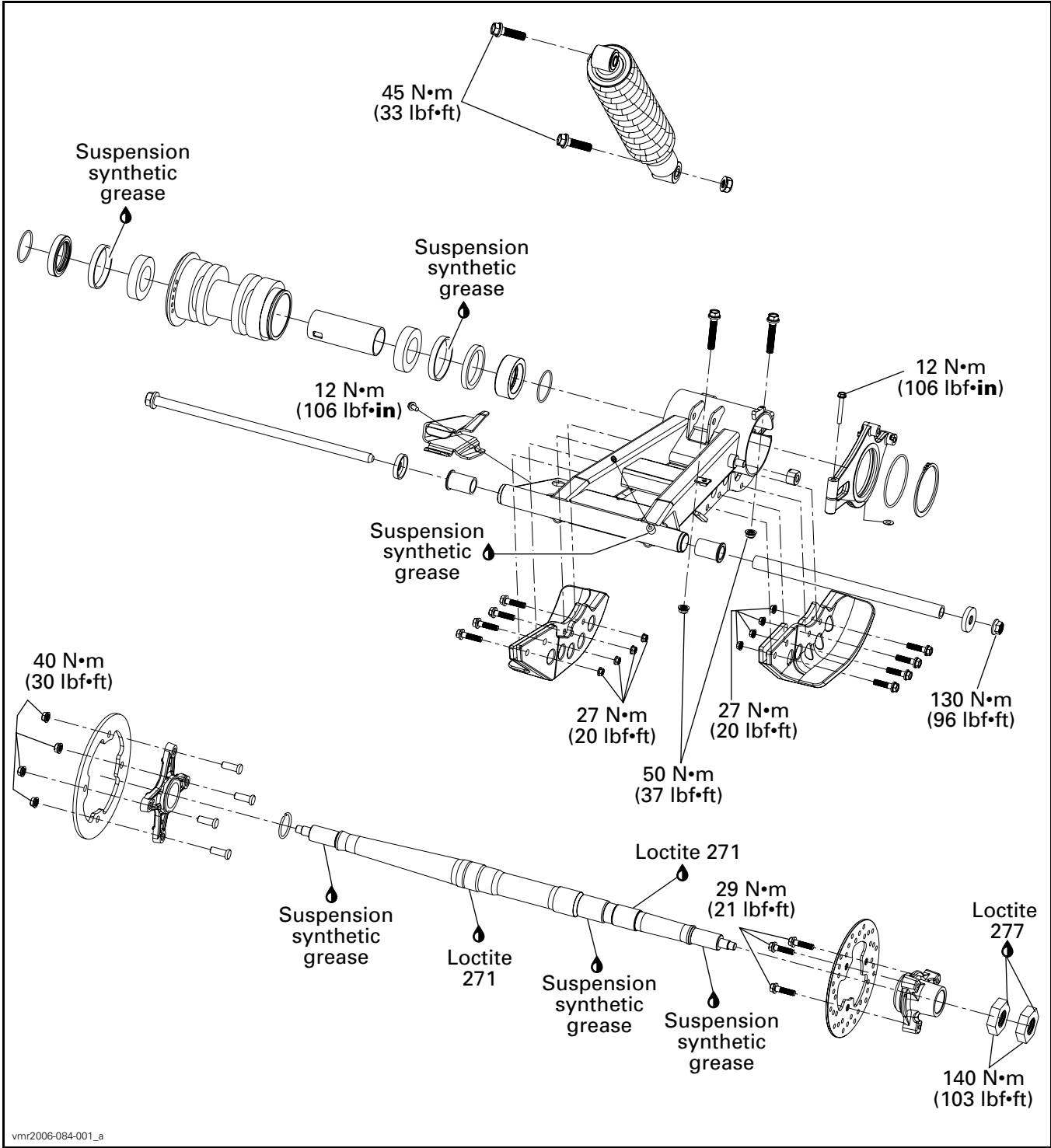
SERVICE TOOLS

Description	Part Number	Page
crankcase support sleeve tool	529 036 031	205
rear axle key	529 036 046	201
shock/spring remover	529 036 007	197

SERVICE PRODUCTS

Description	Part Number	Page
Loctite 271 (red)	293 800 005	203
Loctite 277 (green)	293 800 073	203
suspension synthetic grease	293 550 033	201–203, 205, 207

Section 08 REAR SUSPENSION AND AXLE
Subsection 01 (REAR SUSPENSION AND AXLE)



GENERAL

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

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.

After a repair is completed, ride vehicle for a few minutes to verify the following. Axle is not loose, drive chain adjustment, chain is not rubbing on any part or making noise, rear brake operates correctly, etc.

PROCEDURES

REAR SHOCK

Adjustment

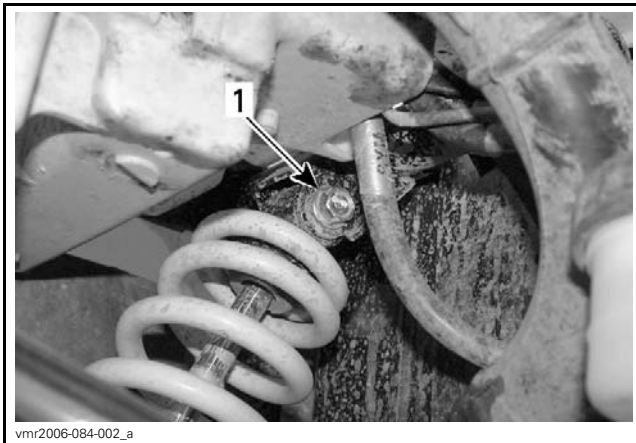
Preload can be changed by setting the adjusting nut to compress the spring to different lengths. Shortening the spring will increase the preload or lengthening the spring will decrease the preload.

Removal

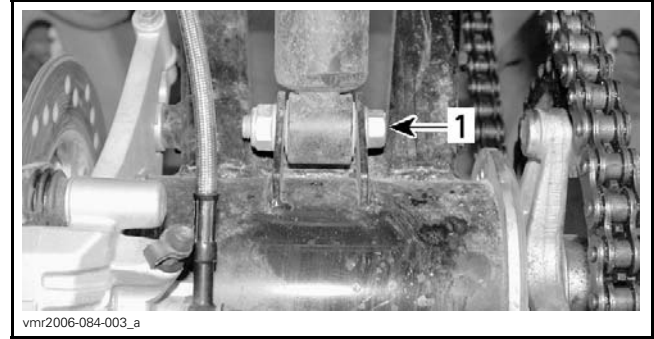
Lift rear of vehicle until rear shock absorber is fully extended.

Install jack stands under the frame to support the vehicle.

Remove bolts holding shock absorber.



1. Upper bolt

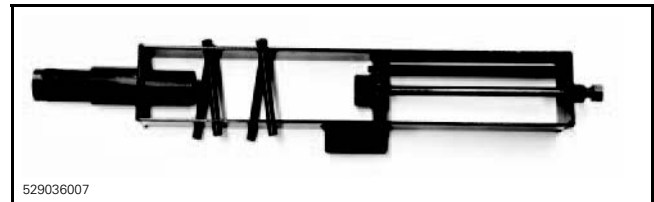


TYPICAL
1. Lower bolt

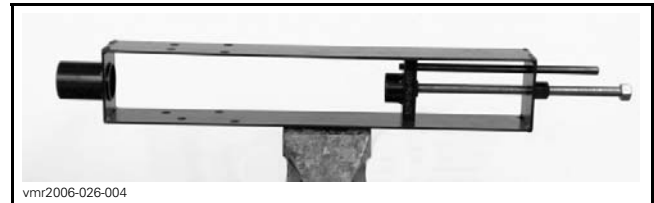
Remove shock absorber.

Disassembly

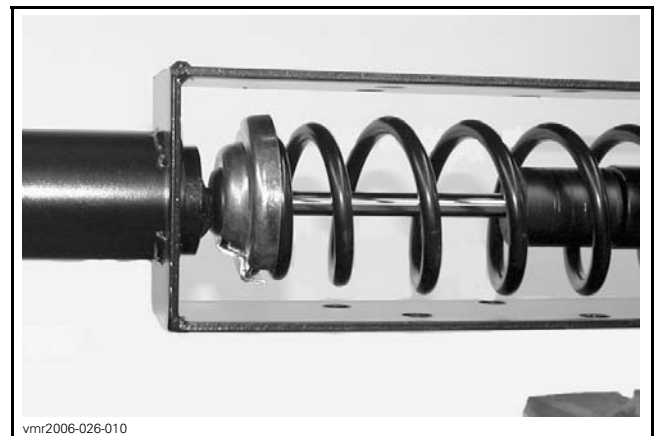
To remove spring from the shock absorber, use the shock/spring remover (P/N 529 036 007).



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 is sufficiently compressed to remove spring locking devices.

Remove spring stopper and its cap then release the shock spring remover screw.

Section 08 REAR SUSPENSION AND AXLE

Subsection 01 (REAR SUSPENSION AND AXLE)



Inspection

Inspect the spring for damage. Replace if necessary.

Inspect shock for oil leakage. Place shock in vertical position. Extend and compress the shock 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

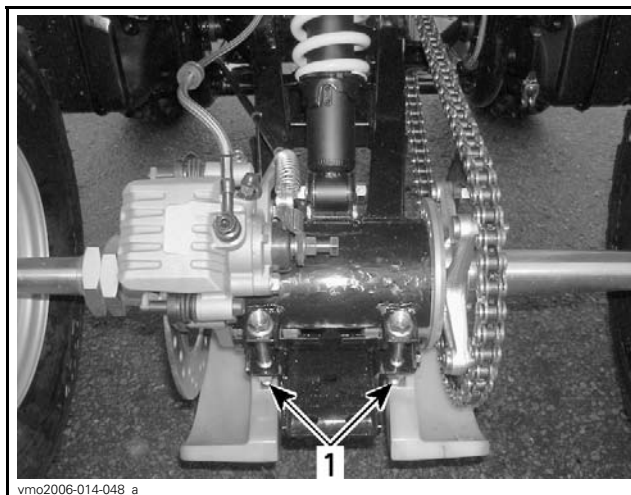
For assembly and installation, reverse the disassembly and removal procedures.

DRIVE CHAIN

Adjustment

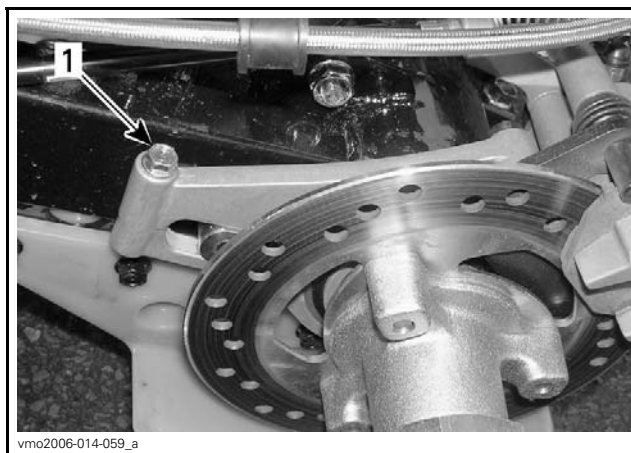
NOTE: Never adjust drive chain with the driver seated on the vehicle. Remove all load on vehicle. Select a level surface and set transmission to NEUTRAL.

Loosen chain tensioner lock bolts and caliper support bolt.



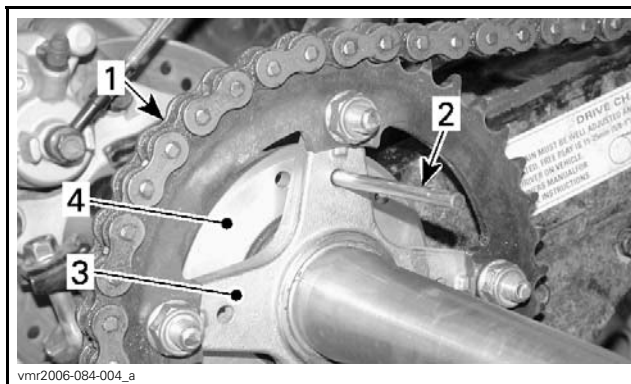
TYPICAL

1. Chain tensioner lock bolts



1. Caliper support bolt

Insert adjuster lock through sprocket hub and into chain tensioner.

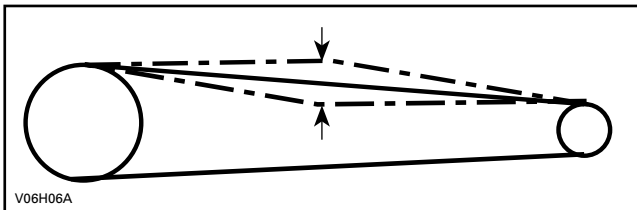


TYPICAL

1. Drive chain
2. Adjuster lock
3. Sprocket hub
4. Chain tensioner

Adjust chain by slowly moving the vehicle forward or backward.

The deflection of the chain should be 20 mm $\pm$ 5 mm (13/16 in $\pm$ 3/16 in).



Tighten the chain tensioner lock bolts to 62 N•m (46 lbf•ft) and caliper support bolt to 12 N•m (106 lbf•in).

CAUTION: Never operate this vehicle with the drive chain too loose or too tight as severe damage to the drive components can occur.

When the adjustment is done, repeat the above procedure to check the deflection several times at different spots on the chain.

Inspection

Check the deflection of drive chain and adjust if necessary. Replace drive chain when adjustment can not be reached with the chain tensioner.

Check for damage or missing O-ring or rollers.

Cleaning and Lubrication

CAUTION: Never wash the chain with a high pressure washer or gasoline. Damage to the O-ring will result, causing premature wear and drive chain failure.

Clean the side surfaces of the chain with a dry cloth.

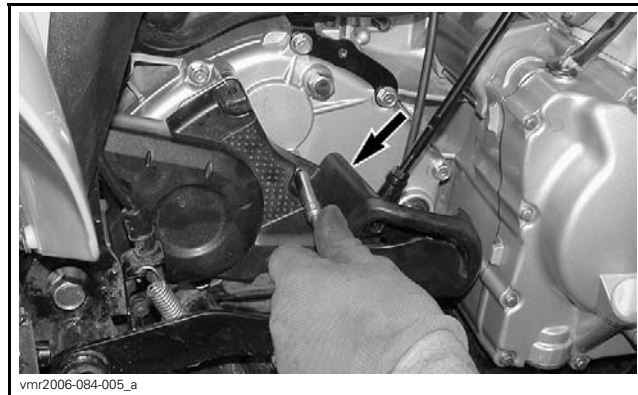
NOTE: Do not brush chain.

Lubricate only with an approved O-ring chain lubricant. Other commercial chain lubricants may contain solvent which could damage the O-rings.

Removal

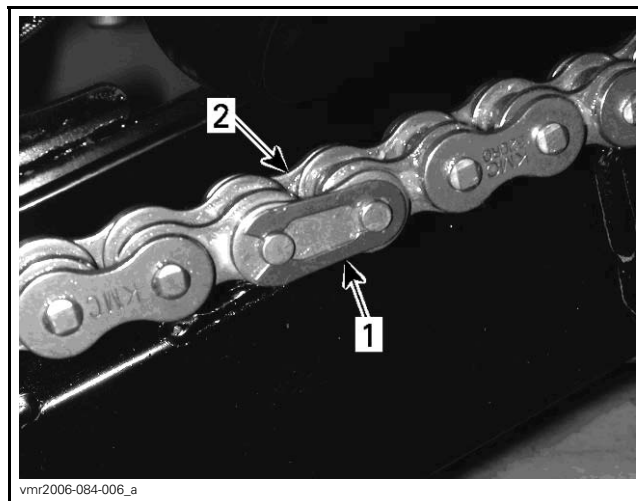
Lift the rear of vehicle and install jack stands under frame to support the rear of vehicle off the ground.

Remove drive chain protector.



Loosen drive chain. See procedure in *ADJUSTMENT* above.

Turn wheel to locate the master link.



1. Locking clip
2. Removable link

Remove locking clip, master link and O-rings.

Remove drive chain.

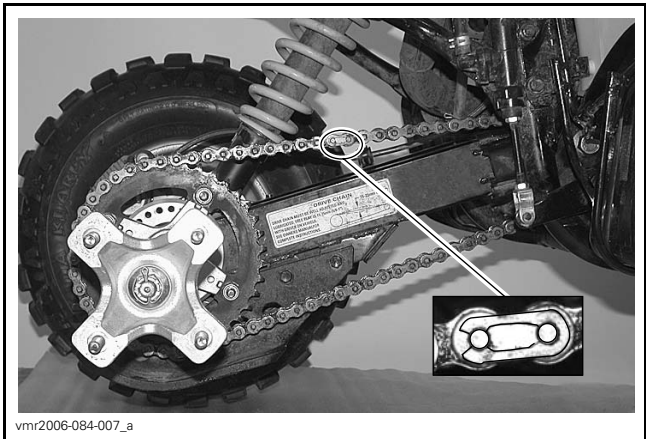
Installation

NOTE: When changing drive chain, always replace sprockets at the same time to prevent rapid chain and sprocket wear.

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

Use the following illustration to position the locking clip correctly.

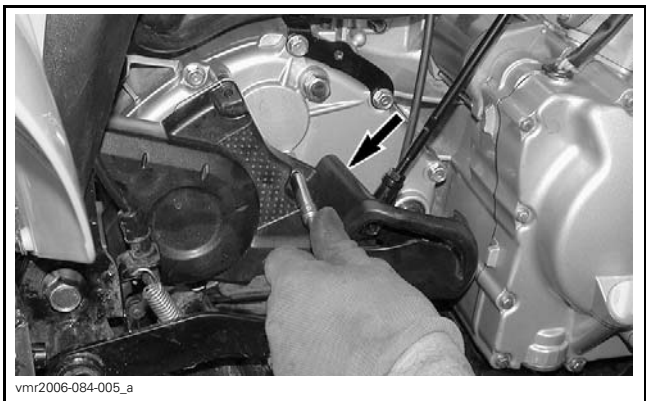
Section 08 REAR SUSPENSION AND AXLE
Subsection 01 (REAR SUSPENSION AND AXLE)



ENGINE SPROCKET

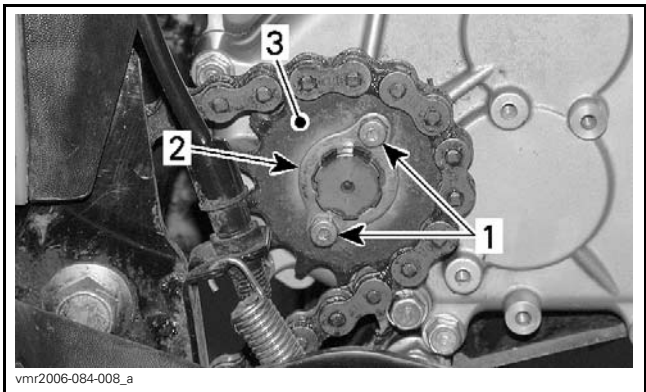
Removal

Remove drive chain protector.



Loosen drive chain.

Remove screws of engine sprocket locking plate.

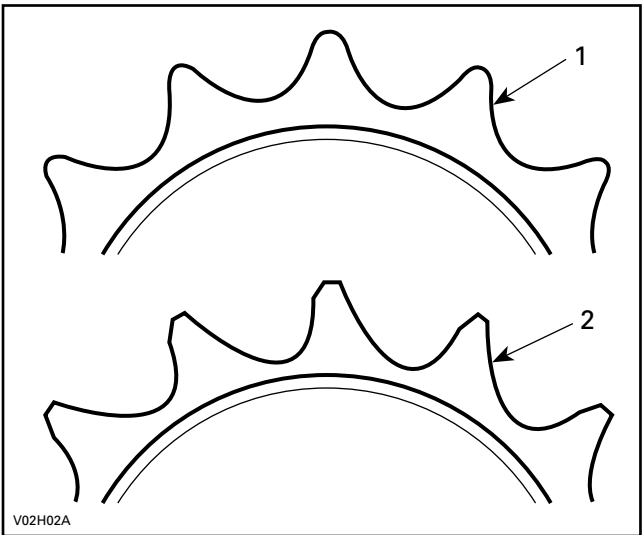


- 1. Screws
- 2. Engine sprocket locking plate
- 3. Engine sprocket

Remove sprocket from shaft.

Inspection

Check the engine sprocket for distortion, excessive wear or other damages.



- 1. Good
- 2. Replace

CAUTION: Replace chain and sprockets together to prevent premature wear of these components.

Installation

The installation is the reverse of the removal procedure.

AXLE SPROCKET

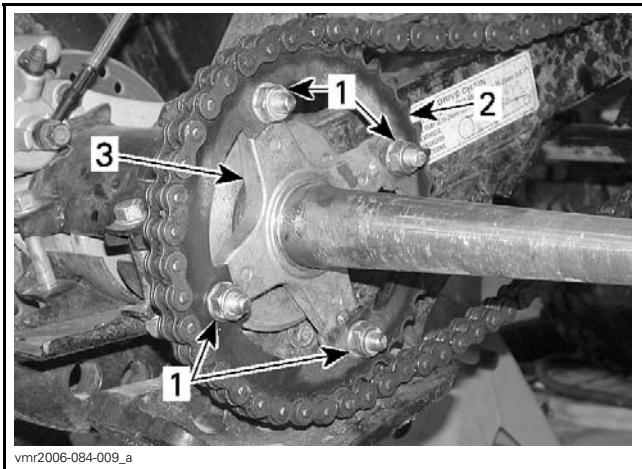
Removal

Lift the rear of vehicle and install jack stands under frame to support the rear of vehicle off the ground.

Remove RH rear wheel.

Loosen drive chain.

Unfasten nuts retaining axle sprocket to sprocket hub.

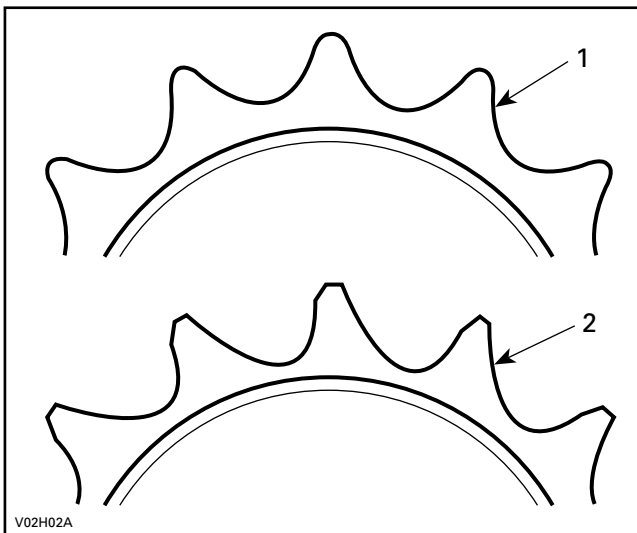


- 1. Sprocket nuts
- 2. Axle sprocket
- 3. Sprocket hub

Remove axle sprocket from vehicle.

Inspection

Check the axle sprocket for distortion, excessive wear or other damages.



1. Good
2. Replace

CAUTION: Replace chain and sprockets together to prevent premature wear of these components.

Installation

For installation, reverse the removal procedure.

WHEEL HUB

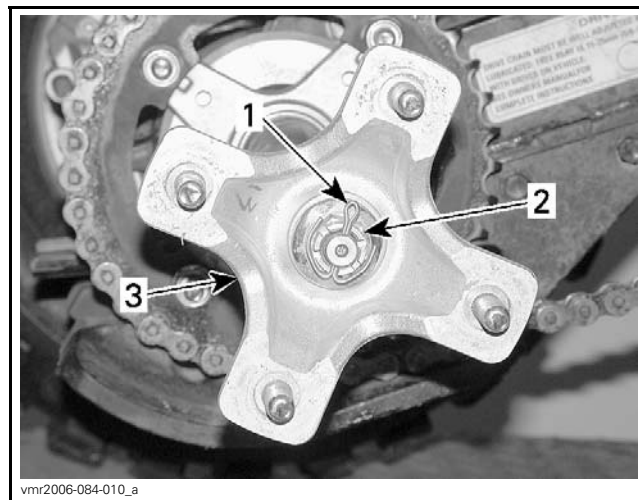
Removal

Lift the rear of vehicle and install jack stands under frame to support the rear of vehicle off the ground.

Apply parking brake.

Remove appropriate wheel.

Remove and discard the cotter pin.



1. Cotter pin
2. Castle nut
3. Wheel hub

Remove castle nut and washer.

Pull hub to remove it.

Inspection

Check hub for cracks or other damages. Replace if necessary.

Check hub splines for wear or damages. Replace hub if necessary.

Installation

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

Apply suspension synthetic grease (P/N 293 550 033) on splines before installing hubs.

Torque castle nut to 135 N•m (100 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.

BRAKE DISC HUB

Removal

Remove the LH wheel hub. Refer to *WHEEL HUB* above.

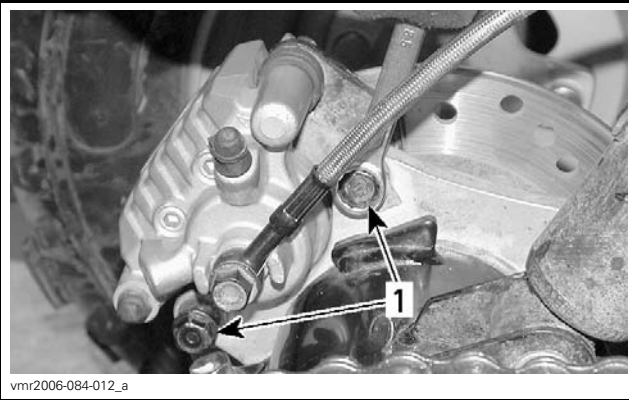
Using a pair of rear axle key (P/N 529 036 046), unscrew axle nuts.

Section 08 REAR SUSPENSION AND AXLE

Subsection 01 (REAR SUSPENSION AND AXLE)

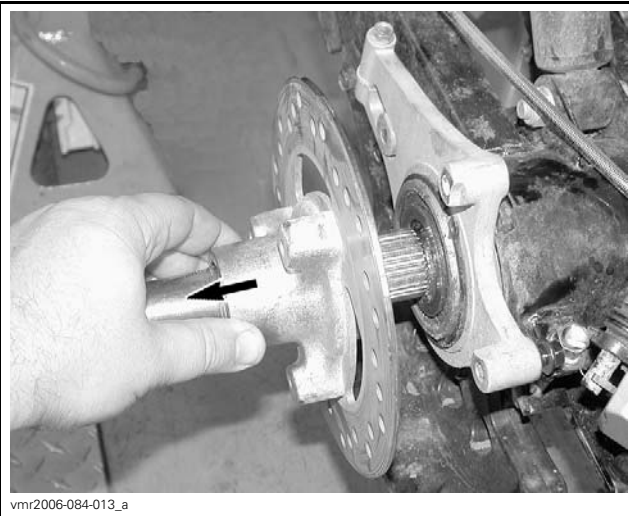


Release parking brake and unscrew bolts that retain caliper to its bracket.



1. Caliper bolts

Remove brake disc hub.



Inspection

Check hub for cracks or other damages. Replace it if necessary.

Check splines of hub for wear or damages. Replace hub if necessary.

Installation

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

Apply suspension synthetic grease (P/N 293 550 033) on splines before installing hub.

Torque each axle nuts to 140 N•m (103 lbf•ft).

REAR AXLE

Removal

Lift the rear of vehicle and install jack stands under frame to support the rear of vehicle off the ground.

Remove both wheel hubs. Refer to *WHEEL HUB* above in this section.

Loosen drive chain and remove chain from axle sprocket.



Remove brake disc hub. Refer to *BRAKE DISC HUB* above.

Slide out the rear axle from the right side of chain tensioner. If the bearings are defective, parts around the bearing area may be damaged. It is possible that the axle will not slide out easily if bearing inner races are seized on it.

Inspection

Check axle for bending, torsion or other damage. Replace if necessary.

Check axle for rust. Rust indicates a possible damage to axle. Replace it.

If bearings are seized on the axle, it must be cleaned, inspected and replaced if necessary. The bearings must still have a slide fit on the axle, otherwise it will result in a faulty reassembly and a failure may occur. Bearing races on the axle must be in good condition.

If the sprocket hub has been damaged, replace it also.

Installation

Insert the axle into the chain tensioner from the right side.

Apply suspension synthetic grease (P/N 293 550 033) on splines before installing hubs.

Apply Loctite 277 (green) (P/N 293 800 073) on nuts threads.

Reinstall all removed parts.

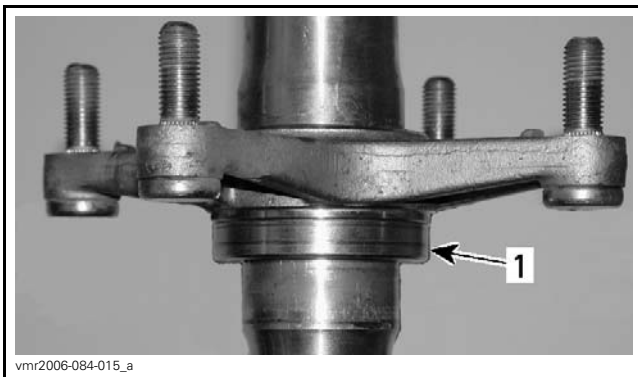
SPROCKET HUB

Removal

Remove rear axle from vehicle.

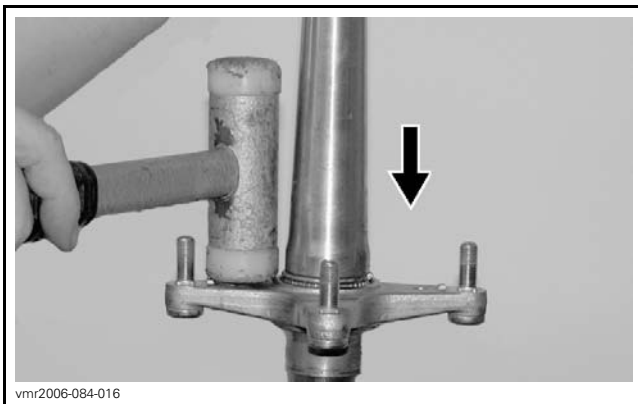
Unscrew axle sprocket bolts and remove sprocket.

Remove the sprocket hub spacer.



1. Sprocket hub spacer

Heat hub to break the threadlocker. Using an hammer, remove hub from axle. Strike on each branch of hub. If the hub is seized on axle, use a press with a pipe to push hub.

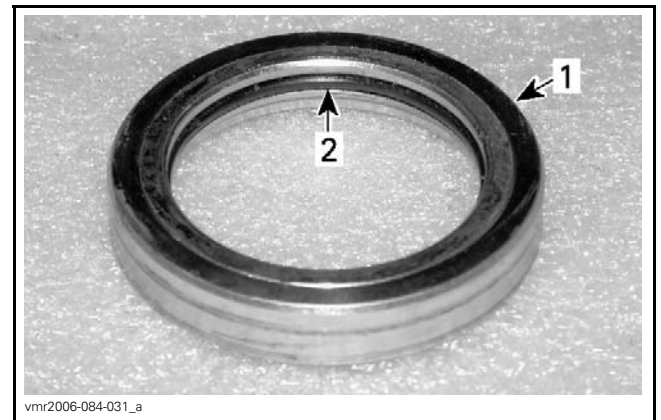


Inspection

Check hub splines for wear or damages. If splines are defective, change hub.

Check hub branches for straightness. If a branch is bent or distorted, replace hub.

Check if the O-ring inside sprocket hub spacer is brittle, hard or damaged. Replace if necessary.



1. Sprocket hub spacer
2. O-ring

Installation

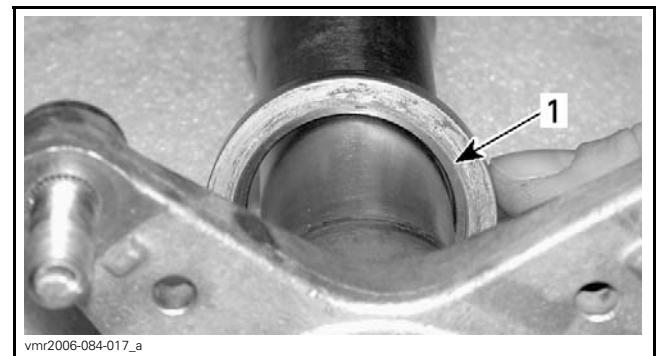
The installation is the reverse of the removal procedure. Pay attention to the following.

Apply Loctite 271 (red) (P/N 293 800 005) on sprocket hub splines.

The flat side of sprocket hub must be pointed toward the circlip on the axle. In this position, studs are pointed outside.

Apply suspension synthetic grease (P/N 293 550 033) on O-ring inside sprocket hub spacer.

Install sprocket hub spacer with the machined side toward hub.



1. Machined side

Install all other removed parts.

CHAIN TENSIONER

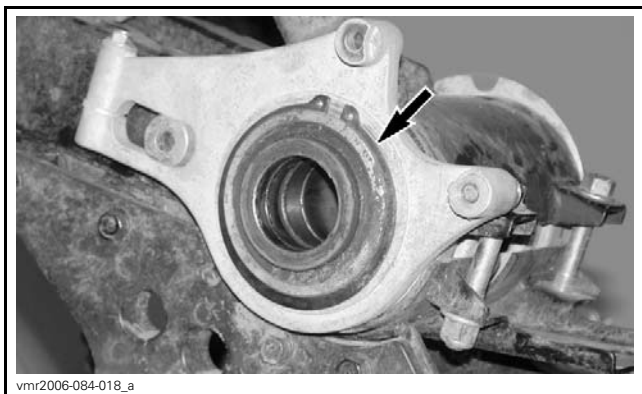
Removal

Remove rear axle. See procedure above.

Remove the circlip retaining caliper support to the chain tensioner.

Section 08 REAR SUSPENSION AND AXLE

Subsection 01 (REAR SUSPENSION AND AXLE)

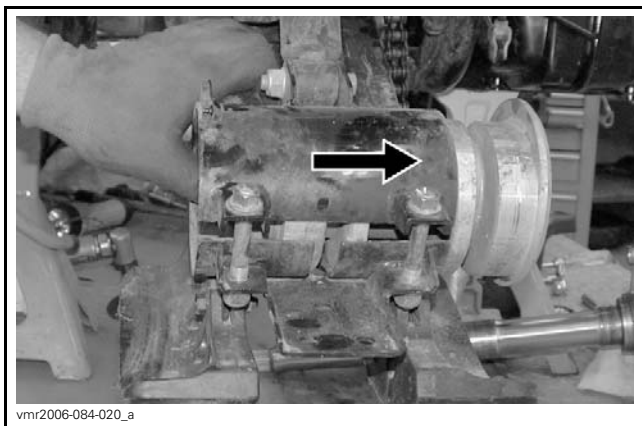


Loosen the rear bolt of the caliper support then remove it.



Slide out chain tensioner from the right side of the swing arm.

NOTE: Dirt between swing arm and chain tensioner may cause resistance during removal procedure. If required, use a soft hammer to strike on the chain tensioner or a pry bar to open the swing arm split.



Inspection

The rear axle should turn smoothly and freely inside chain tensioner. Replace bearings if a problem is detected.

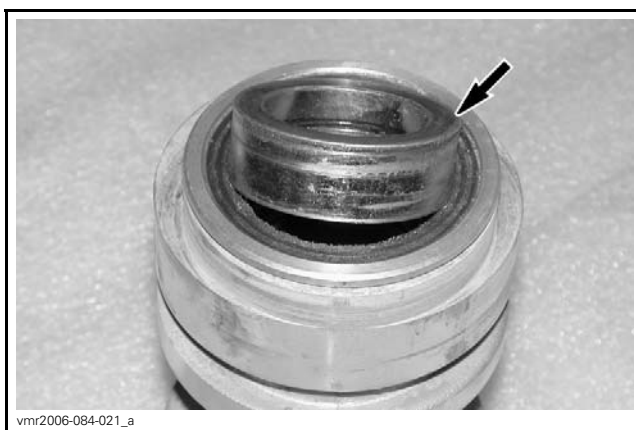
If a bearing is seized on the axle, this axle must be replaced. Bearings must be slide fit on the axle, otherwise it will result in a faulty reassembly and a failure may occur. Bearing mating surface on the axle must be in good condition.

Check chain tensioner for cracks or wear. Replace if necessary.

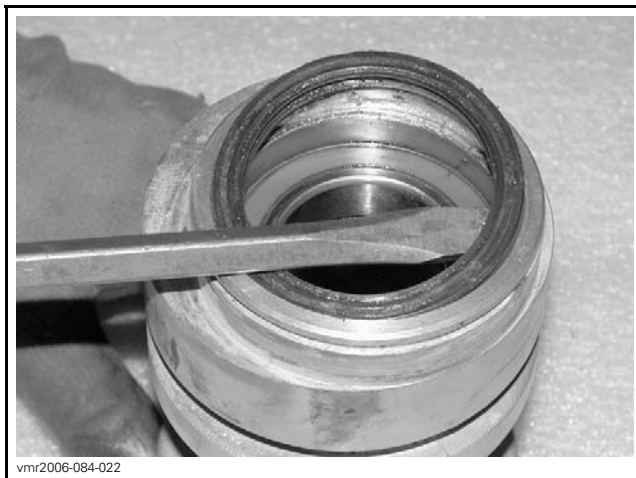
Check seals for wear and damages or if there is dirt or mud in bearings area. If a problem is detected, replace seals.

Disassembly

Remove chain tensioner sleeve.



Remove seal.



Remove spacer.

Section 08 REAR SUSPENSION AND AXLE

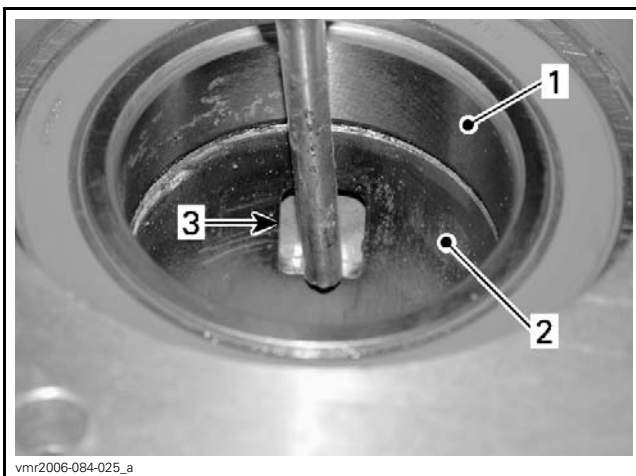
Subsection 01 (REAR SUSPENSION AND AXLE)



Turn chain tensioner upside down and remove seal.



Place a punch into one of the windows of inner sleeve and drive bearing and inner sleeve out of chain tensioner.



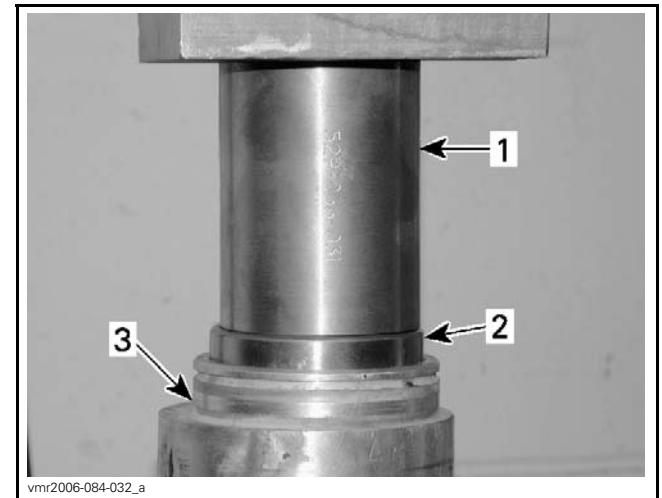
- 1. Bearing
- 2. Inner sleeve
- 3. Window

Turn chain tensioner upside down. Reinstall the inner sleeve with the windows on top and use the same procedure as above to remove the other bearing.

Discard seals, bearings and inner sleeve.

Assembly

To install new bearings, use the crankcase support sleeve tool (P/N 529 036 031) to push them in the chain tensioner. Do not forget the inner sleeve when installing the second bearing.



- 1. Crankcase support tool
- 2. Bearing
- 3. Chain tensioner

Install new seals. On the side without adjusting holes, position spacer before installing the seal. Put suspension synthetic grease (P/N 293 550 033) inside seals before installing them. Too much grease inside LH seal could cause pop out of it when installing the chain tensioner sleeve.

Installation

For installation, reverse the removal procedure.

SWING ARM

Lubrication

The swing arm's lubrication is necessary. Lubricate it with suspension synthetic grease (P/N 293 550 033).

Removal

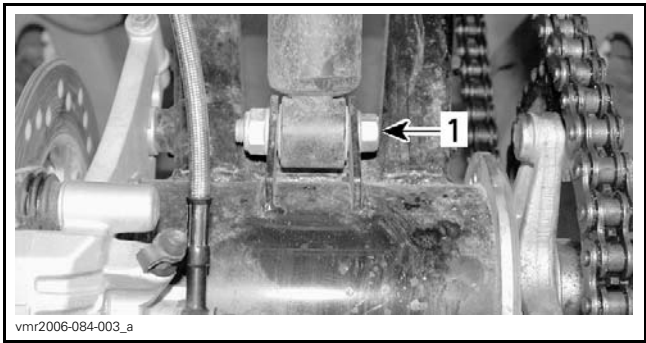
Lift rear of vehicle until rear shock absorber is fully extended.

Install jack stands under the frame to support the vehicle.

Procedure With Rear Axle Installed

Remove the lower bolt of shock absorber.

Section 08 REAR SUSPENSION AND AXLE
Subsection 01 (REAR SUSPENSION AND AXLE)



1. Lower bolt

Loosen drive chain.
Remove caliper from swing arm. Refer to *BRAKING SYSTEM*.
Unscrew bolt that attach brake hose bracket to swing arm (brake hose and parking brake cable on **European models**).



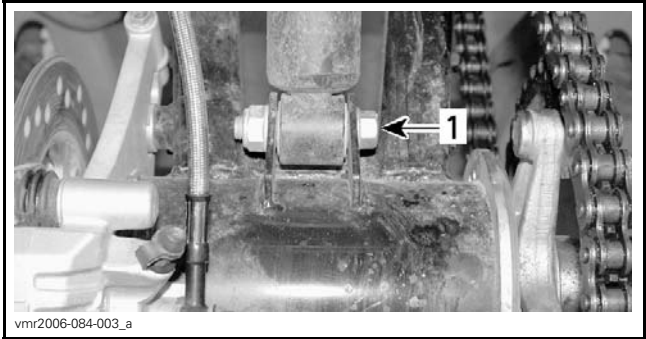
ALL MODELS EXCEPT EUROPE



EUROPEAN MODELS

CAUTION: Do not let the caliper hang by the hose and do not stretch or twist the hose.
Remove drive chain protector and RH footrest (refer to *BODY*).
Remove drive chain from engine sprocket.
Remove swing arm bolt.
Pull back rear drive train assembly to detach swing arm assembly with drive chain from the frame.

Procedure With Rear Axle Removed
NOTE: The rear axle must be removed only if the swing arm is replaced.
Remove the lower bolt of shock absorber.

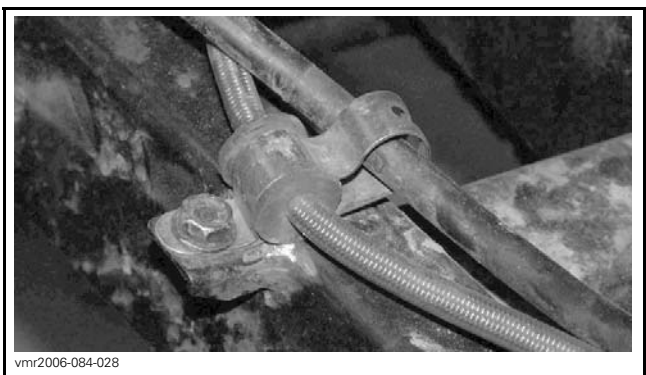


1. Lower bolt

Unscrew bolt that attach brake hose bracket to swing arm (brake hose and parking brake cable on **European models**).



ALL MODELS EXCEPT EUROPE

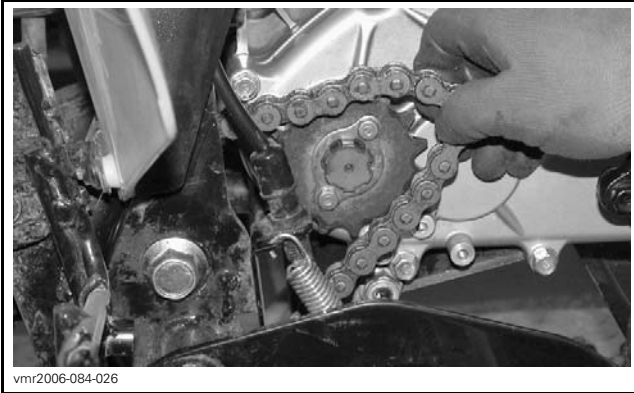


EUROPEAN MODELS

CAUTION: Do not let the caliper hang by the hose and do not stretch or twist the hose.
Remove drive chain protector and RH footrest (refer to *BODY*).
Remove drive chain from engine sprocket.

Section 08 REAR SUSPENSION AND AXLE

Subsection 01 (REAR SUSPENSION AND AXLE)



Remove swing arm bolt.

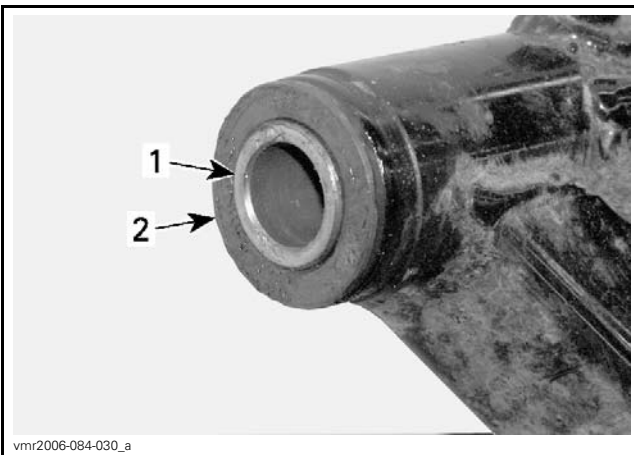
Remove swing arm.

Disassembly

Remove seals on both ends of swing arm.



Remove swing arm shaft.



1. Swing arm shaft
2. Bushing

Insert a long steel bar inside swing arm and remove bushings.

Inspection

Check swing arm for distortion, rust, cracks, bend or other damages. Change if necessary.

Check bushings and shaft for wear or damages. Replace defective parts.

Check if the seals are brittle, hard or otherwise damaged.

Assembly

Press new bushings into swing arm.

Insert swing arm shaft.

Install new seals on both ends of swing arm.

Installation

For installation, reverse the removal procedure.

Position drive chain on the front part of swing arm then install swing arm.

NOTE: Check if the swing arm moves freely.

Grease swing arm pivot with suspension synthetic grease (P/N 293 550 033).

Install all removed parts.

FRONT AND REAR BRAKES

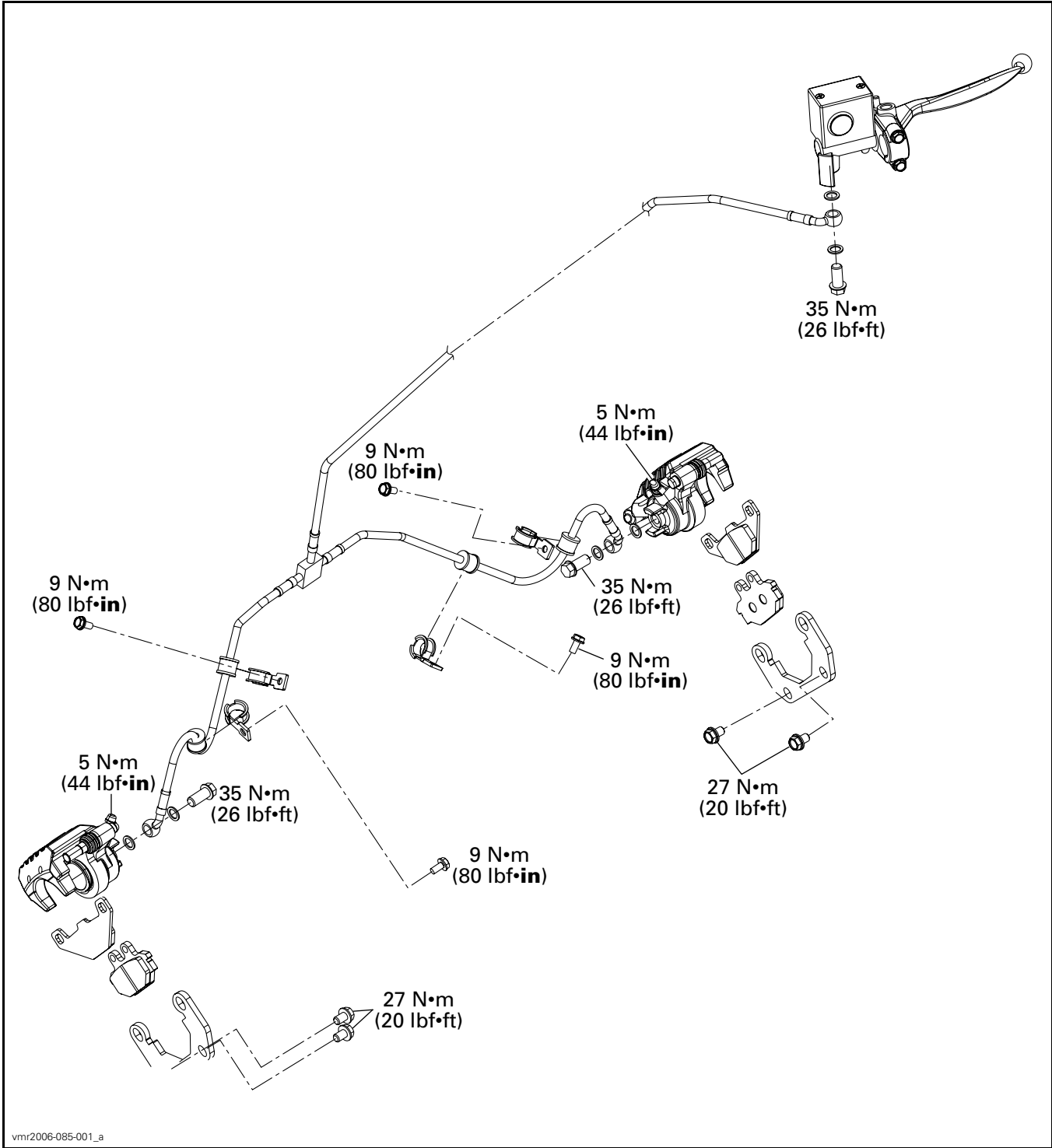
SERVICE TOOLS

Description	Part Number	Page
vacuum/pressure pump.....	529 021 800	226

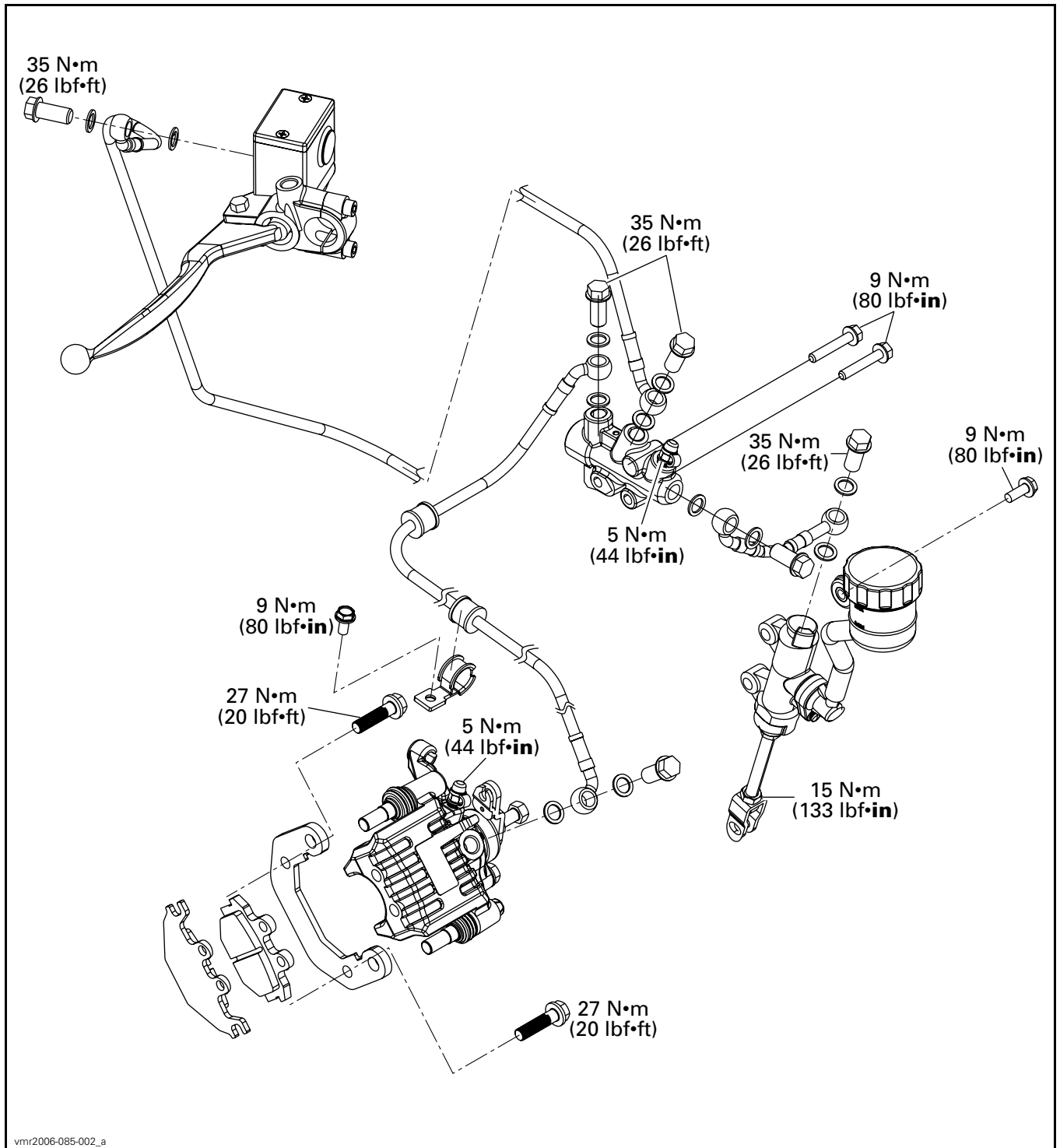
SERVICE PRODUCTS

Description	Part Number	Page
GTLMA brake fluid.....	293 600 062	212, 225
suspension synthetic grease	293 550 033	219, 232

ALL MODELS EXCEPT EUROPEAN MODELS
FRONT BRAKES



REAR BRAKE



Section 09 BRAKING SYSTEM

Subsection 01 (FRONT AND REAR BRAKES)

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, cotter pins, 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

A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean contaminated disc with a high quality brake degreasing agent.

CAUTION: Avoid spilling brake fluid on plastic, rubber or painted parts. Protect these parts with a rag when servicing brake circuit.

CAUTION: To avoid serious damage to the brake circuit, use 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 proper ones every time a Banjo fitting is unscrewed.

MAINTENANCE

BRAKE FLUID

The brake fluid must be changed in accordance with the maintenance chart.

Recommended Fluid

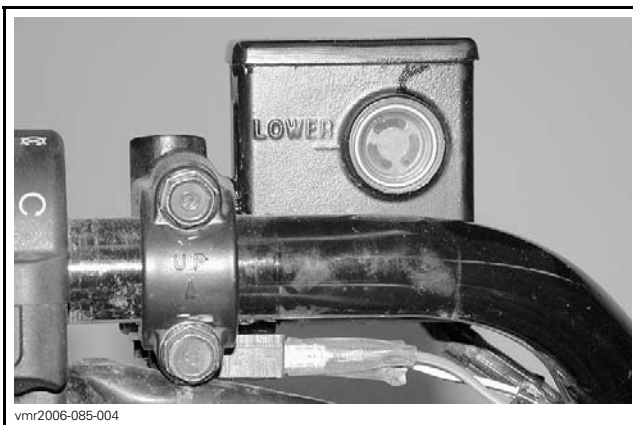
Use brake fluid meeting the specification DOT 3 or DOT 4 such as GTLMA brake fluid (P/N 293 600 062) sold by BRP.

Fluid Level

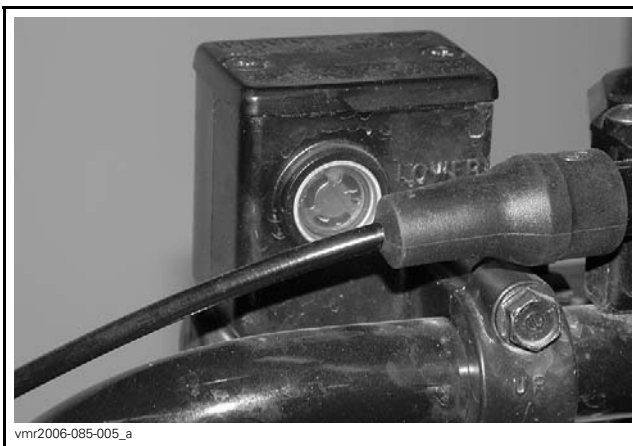
NOTE: A low level may indicate leaks or worn brake pads.

Brake Fluid Reservoirs on Handlebar

Turn steering in 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.



LH REAR BRAKE FLUID RESERVOIR



RH FRONT BRAKE FLUID RESERVOIR

Visually inspect lever boot condition. Check for cracks, tears, etc. Replace if damaged.

Add fluid as required. Do not overfill.

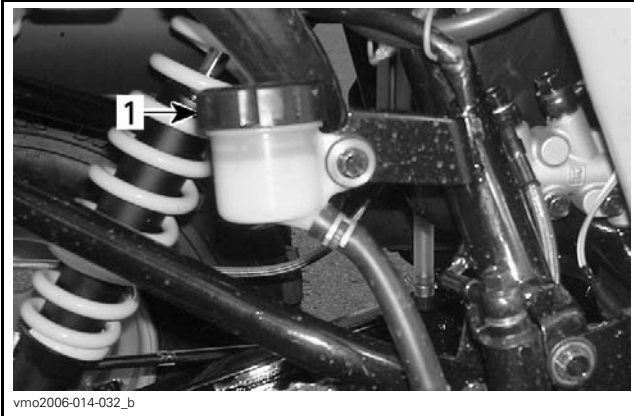
Brake Fluid Reservoir for Rear Brake Pedal

With vehicle on a level surface, check brake fluid in reservoir for proper level. It should be above MIN. mark.

Clean reservoir cover before removing.

Section 09 BRAKING SYSTEM

Subsection 01 (FRONT AND REAR BRAKES)



UNDERNEATH RH REAR FENDER
1. Reservoir cover

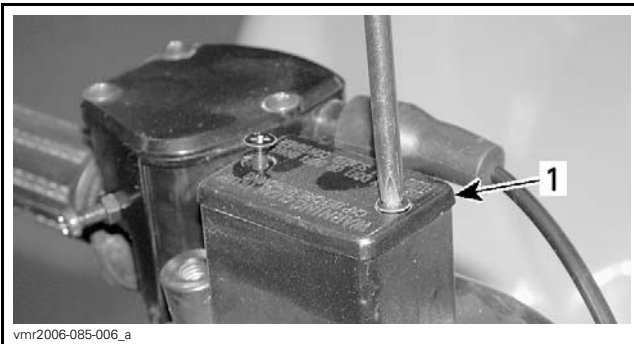
Add fluid as required. Do not overfill.

Brake Fluid Replacement

Front Brake Circuit

To drain front brake circuit use the following procedure:

- Remove reservoir cover with its diaphragm.



1. RH brake fluid reservoir cover

- Connect a clear hose to the RH caliper bleeding screw. Place the other end of hose in a container.
- Loosen bleeding screw and pump brake lever until no more fluid flows out of bleeding screw. Repeat procedure on LH side caliper.



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To fill front brake circuit do the following:

- Make sure reservoir cover and diaphragm are removed.
- Connect a clear hose to RH caliper and loosen bleeding screw. Place the other end of hose in a container.



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- Using a big syringe, push brake fluid into the LH caliper.



vmr2006-085-008_a

- When brake fluid freely flows out of RH caliper (without bubbles), close the bleeding screw.
- Continue to push brake fluid until reservoir is half full.
- Close bleeding screw on LH caliper.
- Fill reservoir.

NOTE: The reservoir is full when the fluid reaches the top of window.

- Squeeze brake lever. It should be firm.
- If yes, install diaphragm and cover on reservoir.
- If not, bleed front brake circuit as per procedure in *BRAKE SYSTEM BLEEDING*.

Rear Brake Lever Circuit

The removal of rear fender is necessary to drain, fill and bleed rear brake. Refer to *BODY*.

To drain and fill the brake lever circuit, use the following procedure:

- Remove reservoir cover of the master cylinder.

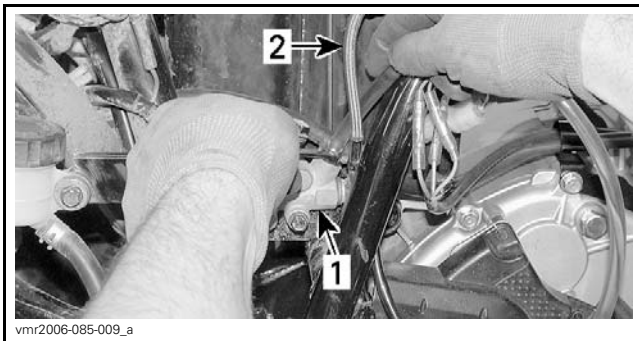
Section 09 BRAKING SYSTEM

Subsection 01 (FRONT AND REAR BRAKES)



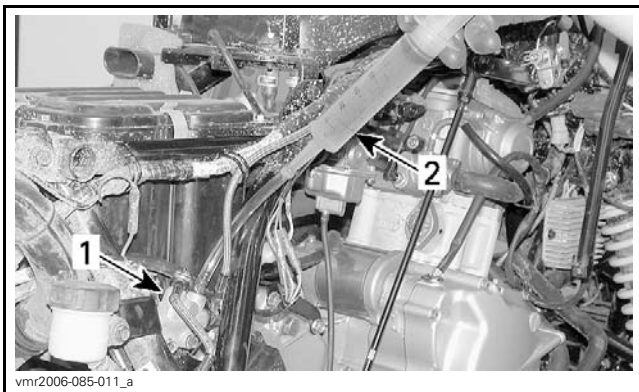
1. LH reservoir cover

- Connect a clear hose to bleeding screw of pressure control valve and loosen it. Place the other end of hose in a container.



1. Pressure control valve
2. Brake hose toward LH handle lever

- Squeeze LH brake lever several times to drain rear brake lever circuit completely.
- Using a big syringe, push brake fluid into brake lever circuit by the bleeding screw of pressure control valve.



1. Pressure control valve
2. Syringe with brake fluid

- Continue until reservoir is half full.
- Close bleeding screw.
- Fill reservoir.

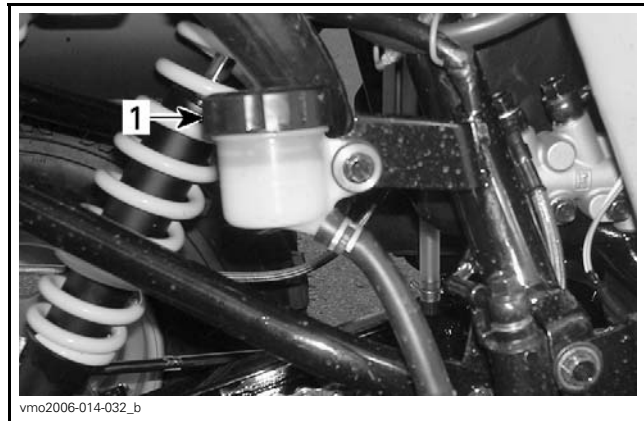
NOTE: The reservoir is full when the fluid reaches the top of window.

- Squeeze brake lever. It should be firm.
- If yes, install diaphragm and cover on reservoir.
- If not, bleed rear brake lever circuit as per procedure in *BRAKE SYSTEM BLEEDING*.

Rear Brake Pedal Circuit

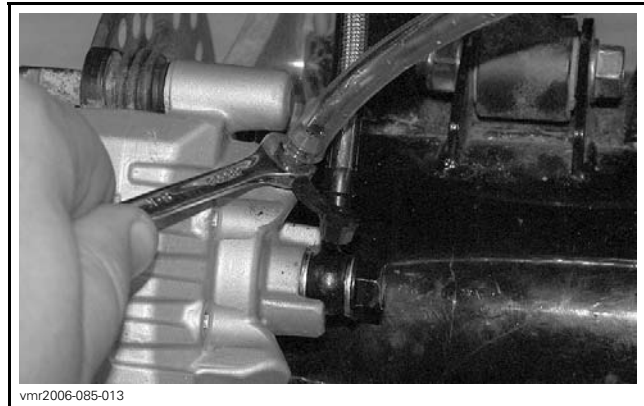
To drain and fill the rear brake pedal circuit, use the following procedure:

- Remove master cylinder reservoir cover of the rear brake pedal.

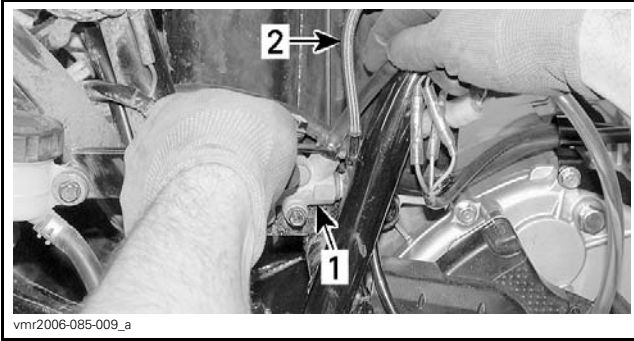


1. Reservoir cover

- Connect a clear hose to bleeding screw of rear caliper and loosen it. Place the other end of hose in a container.

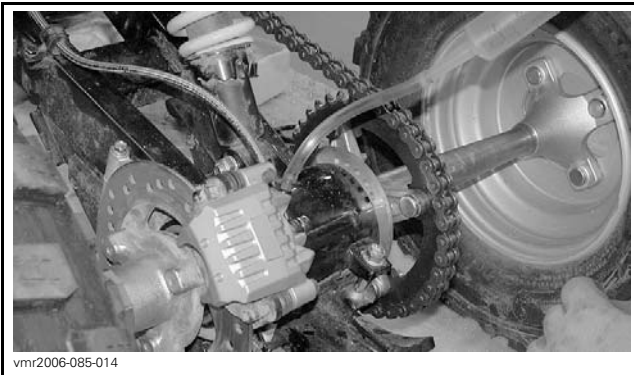


- Press brake pedal several times to drain rear brake pedal circuit completely.
- To fill the circuit, connect a clear hose to bleeding screw of pressure control valve and loosen it. Place the other end of hose in a container.



1. Pressure control valve
2. Brake hose toward LH handle lever

- Using a big syringe, push brake fluid into rear brake pedal circuit by the bleeding screw of rear caliper.



- When brake fluid freely flows out of bleeding screw, close it.
- Fill reservoir of rear brake pedal master cylinder.
- Press brake pedal. It should be firm.
- If yes, install cover on reservoir.
- If not, bleed rear brake pedal circuit as per procedure in *BRAKE SYSTEM BLEEDING*.

Brake System Bleeding

Front Brake Circuit

- Pump up circuit pressure with brake lever until lever resistance is felt.
- Squeeze brake lever, open bleeding screw and then close it.

NOTE: Do not release brake lever until bleeding screw has been closed. Switch to LH and RH caliper.

- Release brake lever slowly.
- Repeat the procedure until no more air bubbles appear in hose and lever is firm.

NOTE: Check fluid level often to prevent air from being pumped into the circuit.

- Install diaphragm and cover on reservoir.

Rear Brake Lever Circuit

- Pump up circuit pressure with brake lever until lever resistance is felt.
- Squeeze brake lever, open bleeding screw and then close it.

NOTE: Do not release brake lever until bleeding screw has been closed.

- Release brake lever slowly.
- Repeat the procedure until no more air bubbles appear in hose and lever is firm.

NOTE: Check fluid level often to prevent air from being pumped into the circuit.

- Install diaphragm and cover on reservoir.

Rear Brake Pedal Circuit

- Pump up circuit pressure with brake pedal until pedal resistance is felt.
- Press the pedal, open caliper bleeding screw and then close it.

NOTE: Do not release brake pedal until bleeding screw has been closed.

- Release brake pedal slowly.
- Repeat the procedure until no more air bubbles appear in hose and pedal is firm.

NOTE: Check fluid level often to prevent air from being pumped into the circuit.

- Install cover on reservoir.

PROCEDURES

CALIPERS

Removal

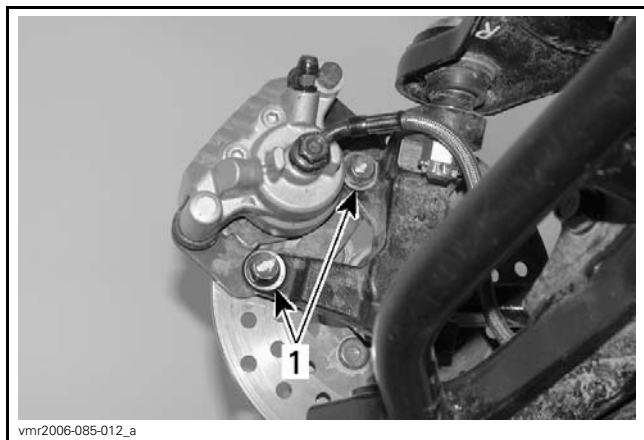
NOTE: This procedure can be used for front or rear calipers.

When working on front calipers, loosen wheel nuts, raise vehicle and support it securely then remove appropriate wheel.

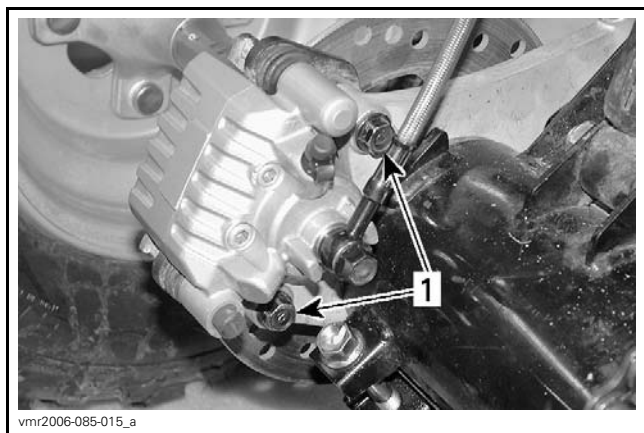
For all calipers, remove caliper bolts then the caliper.

Section 09 BRAKING SYSTEM

Subsection 01 (FRONT AND REAR BRAKES)



1. Front caliper bolts (RH)



1. Rear caliper bolts

If the caliper is not being removed from the vehicle as during brake pad replacement, simply hang the caliper with a piece of wire.

CAUTION: Do not let the caliper hang by the hose and do not stretch or twist the hose.

If the caliper is being removed for replacement, remove Banjo fitting and its sealing washers. Remove the caliper from the vehicle and discard sealing washers.

Catch spilled fluid with a rag. Attach the brake hose in a position to prevent the fluid from flowing out.

Inspection

Check piston for scratches, rust or other damages. If so, replace caliper.

Check brake pads. Refer to *BRAKE PAD* further in this section.

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. Torque Banjo fitting to 35 N•m (26 lbf•ft).

Install caliper in its original position. Torque caliper bolt to 27 N•m (20 lbf•ft).

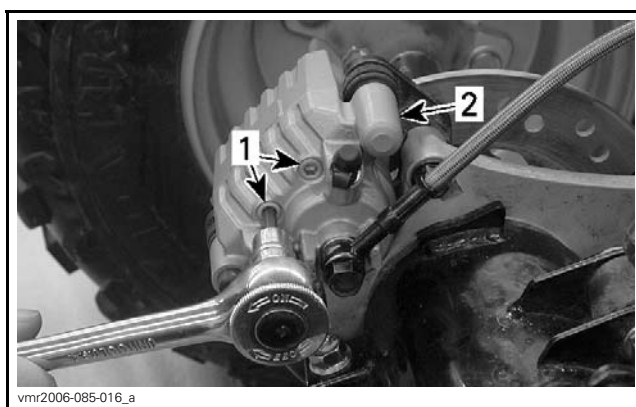
Refill and bleed the braking system.

Check for leaks and make sure the brakes operate normally before driving.

BRAKE PADS

Removal

Loosen pad pins.



1. Pad pins
2. Caliper

Remove caliper. See procedure above.

Remove pad pins.

Push piston all the way in to allow removal and installation of new pads.

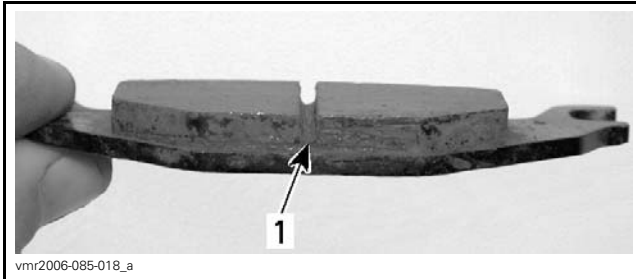


Remove pads.

Inspection

Measure brake pad lining thickness.

Brake pads must be replaced when lining is 2 mm (5/64 in) thick or less, or if the wear groove, on pad lining, is no longer visible.



1. Wear groove on pad lining

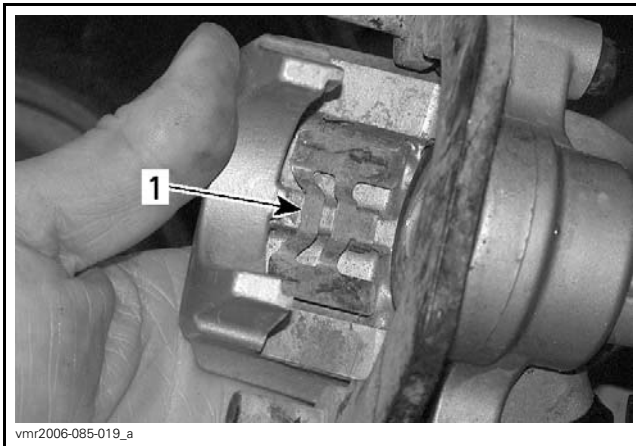
BRAKE PAD MINIMUM THICKNESS	2 mm (5/64 in)
------------------------------------	----------------

CAUTION: Brake pads must always be replaced in pairs.

Installation

Clean the visible portion of piston with clean brake fluid.

Make sure that pad spring is in position.



1. Pad spring

Install new brake pads and pad pins. Torque pad pins to 18 N•m (159 lbf•in).

Install brake caliper so the disc is positioned between pads.

After the job is completed, firmly depress the brake lever a few times to bring the pads in contact with the disc. The pads must rest flat on the disk

Check for leaks and make sure the brakes operate normally before driving.

MASTER CYLINDERS OF BRAKE LEVERS

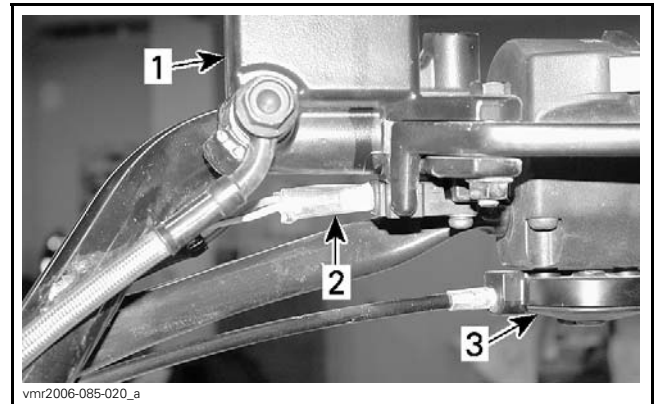
Removal

Master Cylinder of LH Rear Brake Lever

Drain the rear brake lever circuit. Refer to *BRAKE FLUID REPLACEMENT* in this section.

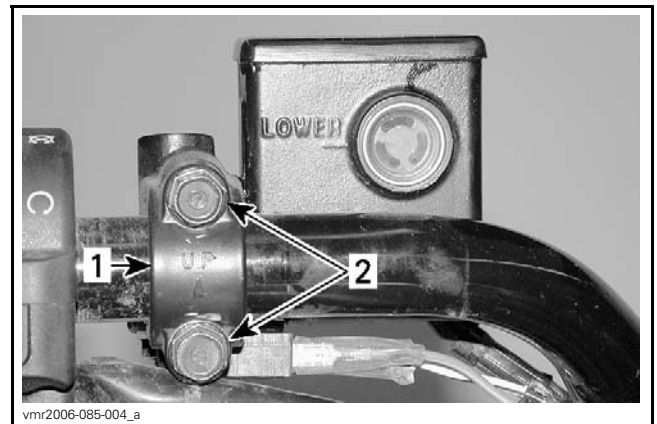
Remove banjo fitting and the sealing washers.

Unplug brake light switch connectors. Note position of wires for reinstallation.



1. Brake fluid reservoir
2. Brake light switch connectors
3. Choke lever

Unscrew master cylinder holder bolts.



1. Master cylinder holder
2. Bolts

Remove master cylinder of rear brake lever.

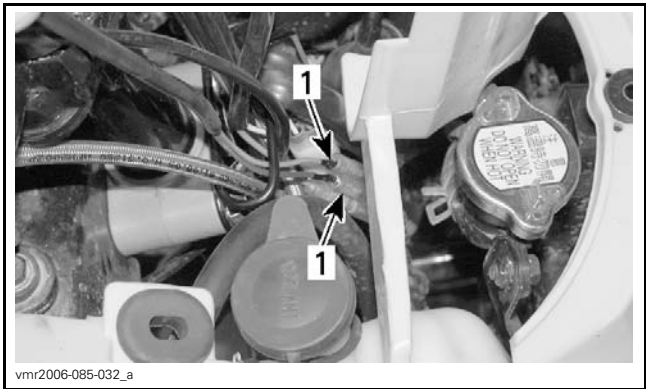
Master Cylinder of RH Front Brake Lever

Drain the front brake circuit. Refer to *BRAKE FLUID REPLACEMENT* in this section.

Remove banjo fitting and the sealing washers.

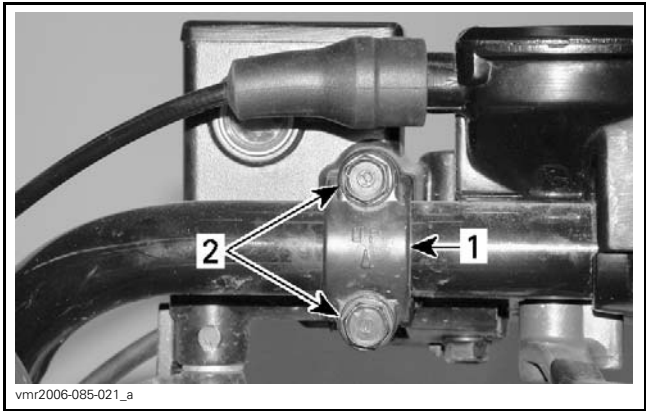
Unplug brake light switch connectors. The connectors are located under front cover. Note position of wires for reinstallation.

Section 09 BRAKING SYSTEM
Subsection 01 (FRONT AND REAR BRAKES)



1. Brake light switch connectors

Unscrew master cylinder holder bolts.



1. Master cylinder holder
2. Bolts

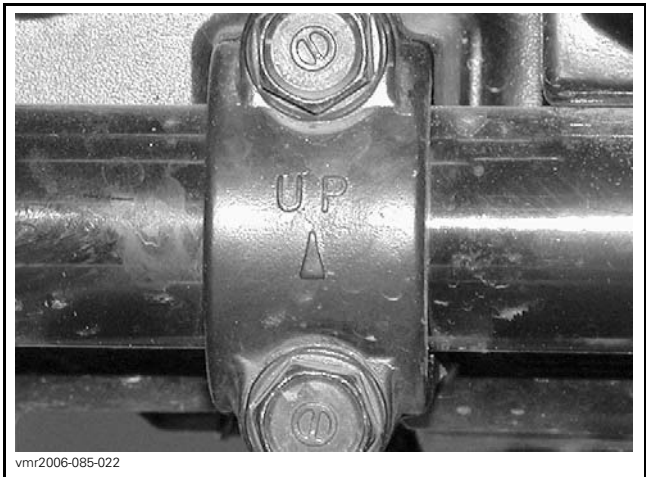
Remove master cylinder of front brake lever.

Installation

Master Cylinders of Front or Rear Brake Levers

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

Install the master cylinder holder with the arrow in the proper position.



Master Cylinder of LH Rear Brake Lever

Refill rear brake lever circuit.

Bleed rear brake system.

⚠ WARNING

Bleed rear brake lever and rear brake pedal circuits before riding vehicle.

Master Cylinder of RH Front Brake Lever

Refill and bleed front brake circuit.

⚠ WARNING

Bleed front brake circuit before riding vehicle.

REAR BRAKE PEDAL

Inspection

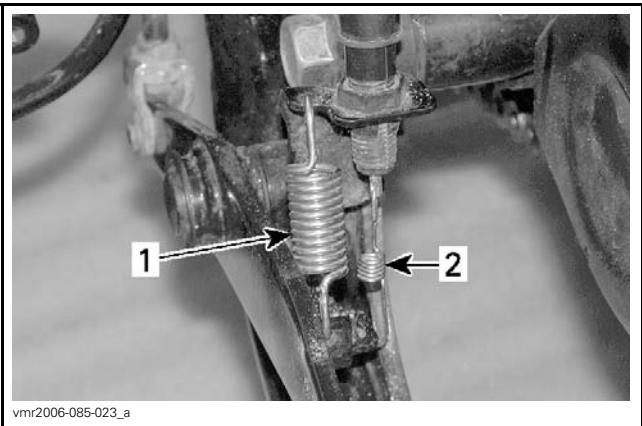
Check rear brake pedal for cracks or distortion. Replace if necessary.

Check brake pedal spring for distortion. Replace if necessary.

Removal

Remove the RH footrest. Refer to *BODY*.

Detach brake pedal spring and brake pedal switch spring.

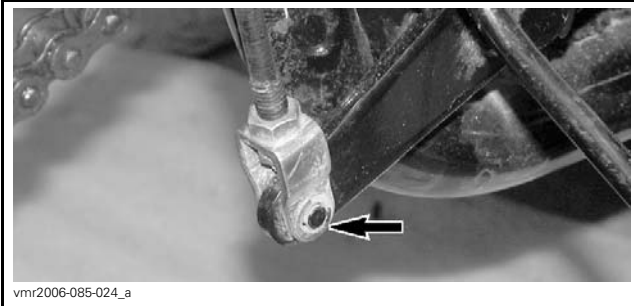


1. Brake pedal spring
2. Brake pedal switch spring

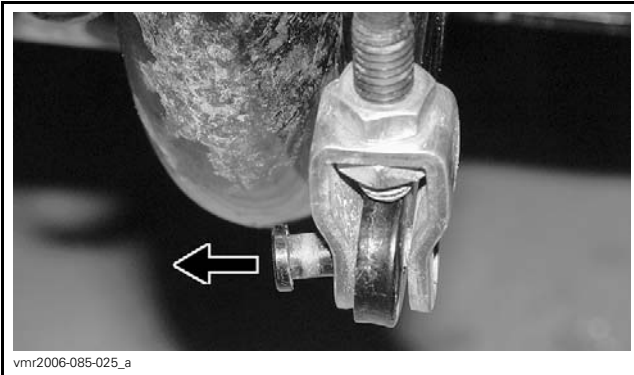
Remove E-clip holding yoke to the end of rear brake pedal.

Section 09 BRAKING SYSTEM

Subsection 01 (FRONT AND REAR BRAKES)



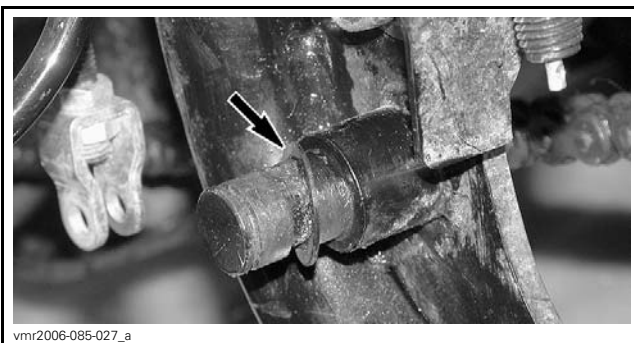
Then, remove pin to separate yoke and rear brake pedal.



Remove the big E-clip retaining rear brake pedal to frame.



Pull rear brake pedal and remove the washer.



Installation

The installation is the reverse of the removal procedure.

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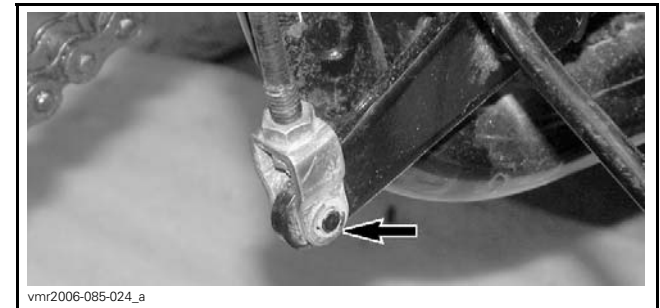
Apply suspension synthetic grease (P/N 293 550 033) on shaft before installing rear brake pedal.

MASTER CYLINDER OF REAR BRAKE PEDAL

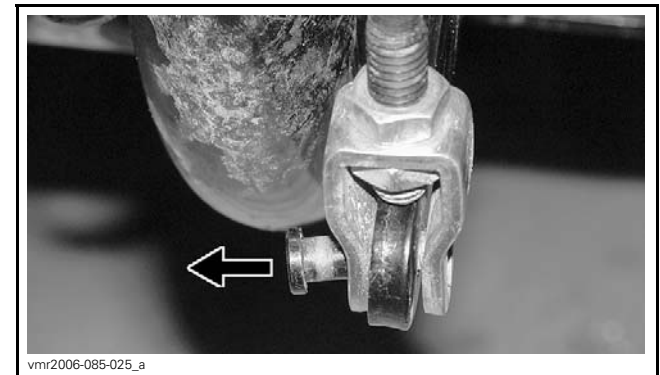
Removal

Drain rear brake pedal circuit. Refer to *BRAKE FLUID REPLACEMENT* in this section.

Remove E-clip holding yoke to the end of brake pedal.



Then, remove pin to separate yoke and brake pedal.



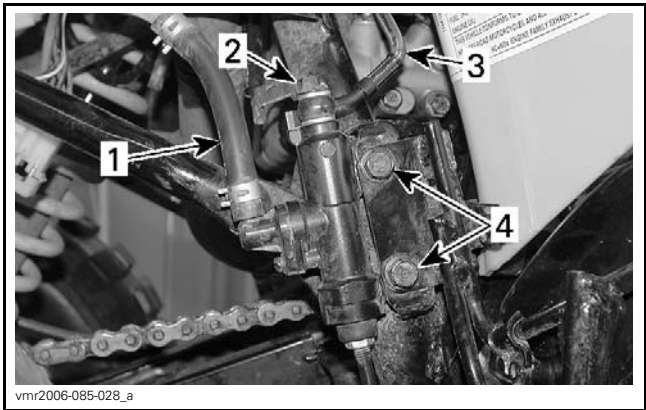
Unplug brake fluid reservoir hose from master cylinder.

Remove Banjo fitting that attach brake hose to the top of master cylinder. Discard sealing washers and catch spilled fluid with a rag.

Remove bolts securing master cylinder to frame.

Section 09 BRAKING SYSTEM

Subsection 01 (FRONT AND REAR BRAKES)



- 1. Brake fluid reservoir hose
- 2. Banjo fitting
- 3. Brake hose
- 4. Master cylinder bolts

Installation

For installation, reverse the removal procedure.
Refill and bleed rear brake pedal circuit.

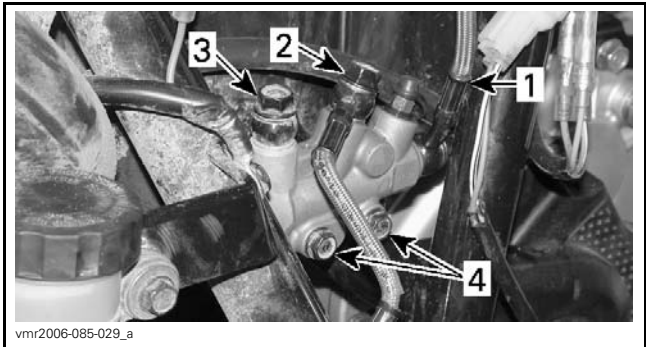
WARNING

Bleed rear brake pedal circuit before riding vehicle.

PRESSURE CONTROL VALVE

Removal

Remove rear fender. Refer to *BODY*.
Disconnect the three brake hoses. Discard sealing washers and catch spilled fluid with a rag.
Unscrew bolts securing pressure control valve to frame.



- 1. From LH brake lever
- 2. From rear master cylinder
- 3. Toward rear caliper
- 4. Pressure control valve bolts

Installation

The installation is the reverse of the removal procedure.

Refill rear brake system.
Bleed rear brake system.

WARNING

Bleed rear brake lever and pedal circuits before riding vehicle.

BRAKE DISCS

Inspection

Brake discs can be inspected without removing them from the vehicle.
NOTE: To verify the front brake discs, raise vehicle and support it securely. Remove wheels.
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 and rear	2 mm (5/64 in)

Replace disc if not within specifications.
CAUTION: Brake discs should never be machined.
Turn the brake disc and check warpage.

MAXIMUM DISC WARPAGE	
Front	0.1 mm (1/32 in)
Rear	

Removal

Front Brake Disc

Remove caliper. Refer to *CALIPER* in this section.
Remove front wheel hub. Refer to *STEERING AND FRONT SUSPENSION*.
Unscrew brake disc screws. Heat up brake disc around screws to facilitate removal.

Rear Brake Disc

Remove brake hub. Refer to *REAR SUSPENSION AND AXLE*.
Unscrew brake disc screws. 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.

Torque brake disc screws in accordance with the following table.

TORQUE FOR BRAKE DISC SCREWS	
Front brake disc	41 N•m (30 lbf•ft)
Rear brake disc	29 N•m (21 lbf•ft)

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 the appropriate brake circuit.

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.

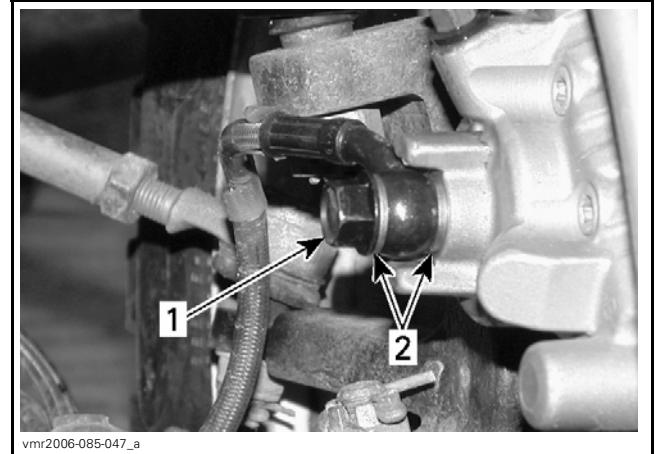
Disconnect any retaining clips or brackets holding the hoses.

Installation

Install the new hose.

Make sure the piece will not rub against any other part.

When there is a Banjo fitting securing the hoses to the calipers, pressure control valve or to master cylinders, always replace sealing washers with new ones.



FRONT CALIPER SHOWN

1. Banjo fitting
2. Sealing washers

Install any retaining clips or brackets. Crimp clips properly to firmly secure rubber grommets in place.

Refill and bleed brake circuit(s).

BRAKE LIGHT SWITCHES

NOTE: There is a brake light switch for each lever and the pedal.

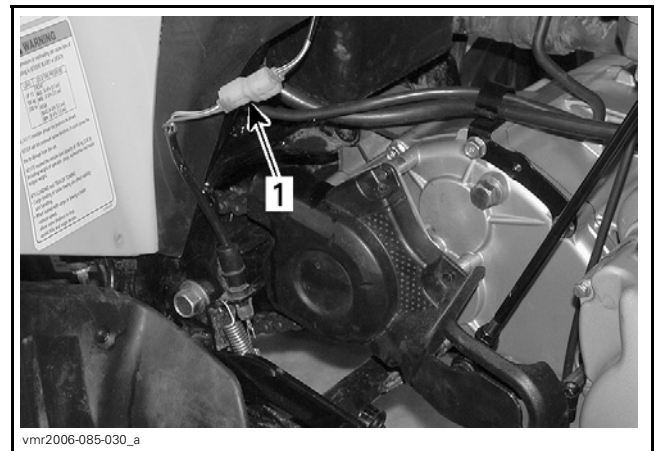
Inspection

Check switch for dirt or corrosion. Make sure it is operating properly.

Depress brake pedal and check for brake light to turn on. Repeat with each brake lever.

Test

Disconnect switch connector(s).

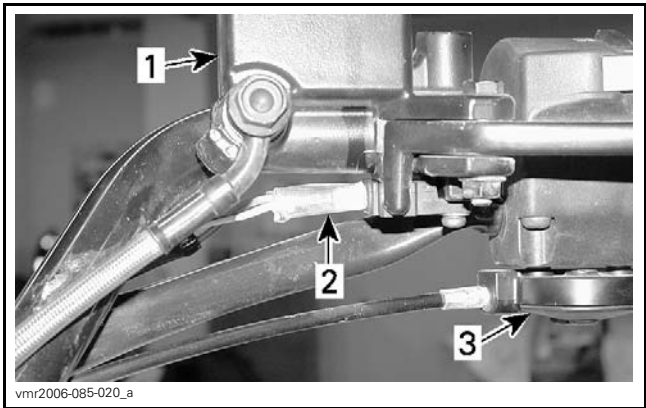


BRAKE PEDAL

1. Brake pedal switch connector

Section 09 BRAKING SYSTEM

Subsection 01 (FRONT AND REAR BRAKES)

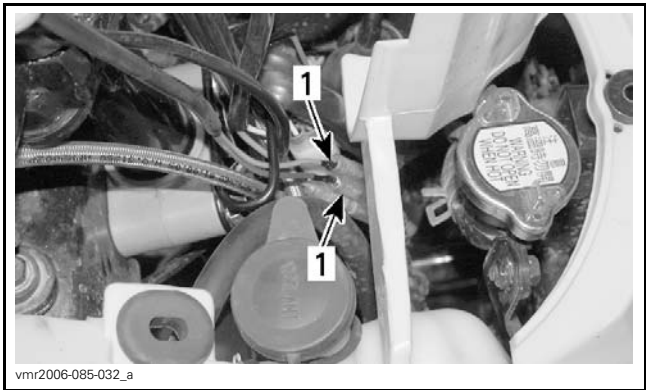


LH REAR BRAKE LEVER

1. Brake fluid reservoir

2. Brake light switch connectors

3. Choke lever



RH FRONT BRAKE LEVER

1. Brake light switch connectors

Check switch operation as follows.

SWITCH	SWITCH POSITION	WIRES/PINS		RESISTANCE
Brake pedal	Firmly pulled	WHITE/BLACK	GREEN/YELLOW	0.2 Ω max.
	Released			Infinite (OL.)
LH rear brake lever	Firmly pushed	Switch pins		0.2 Ω max.
	Released			Infinite (OL.)
RH front brake lever	Firmly pushed	BLACK	GREEN/YELLOW	0.2 Ω max.
	Released			Infinite (OL.)

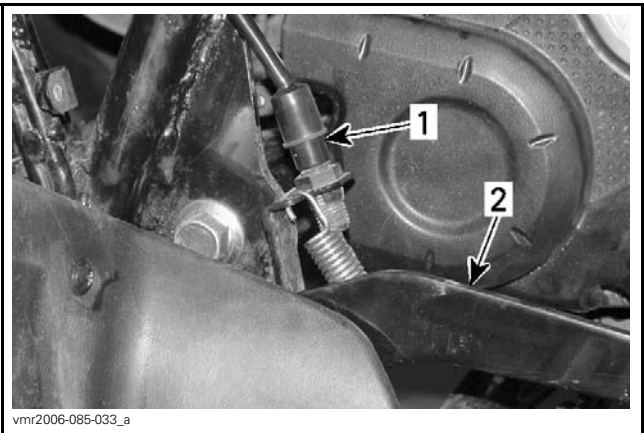
Removal

Front and Rear Brake Levers

The brake light switches on brake levers are not available in spare parts. Replace brake levers.

Rear Brake Pedal

The brake pedal switch is located over brake pedal.



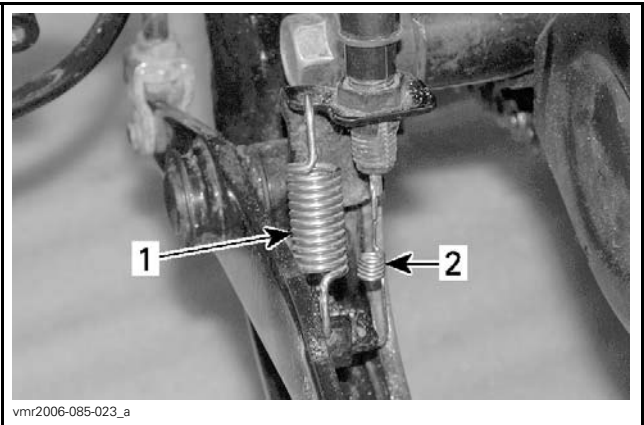
1. Brake pedal switch

2. Brake pedal

The brake pedal switch cannot be adjusted.

Disconnect switch connector.

Remove brake pedal switch spring from brake pedal.



1. Brake pedal spring

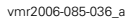
2. Brake pedal switch spring

Unscrew brake pedal switch from its support.

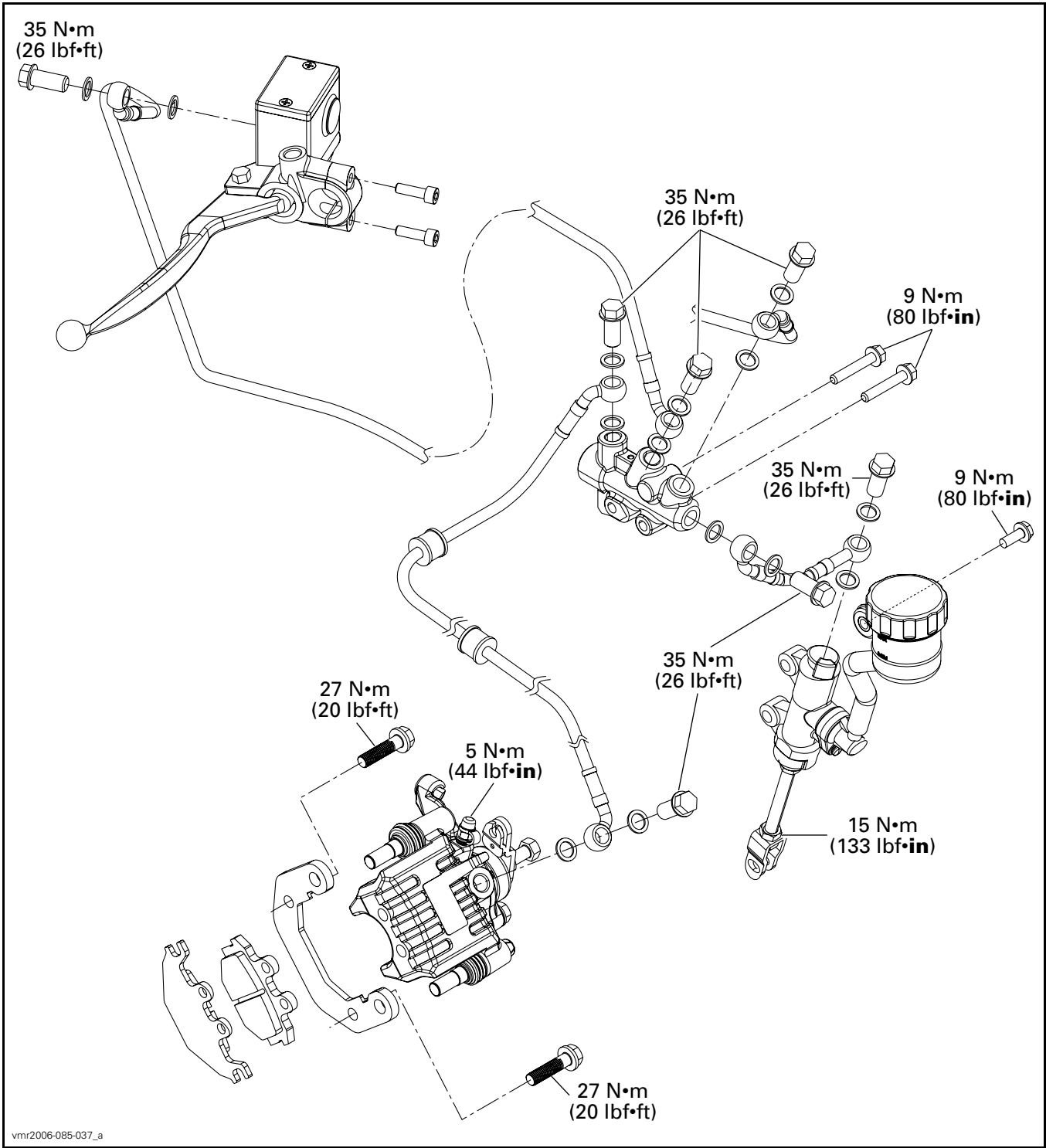
Installation

For installation, reverse the removal procedure.

FRONT BRAKES



REAR BRAKE



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, cotter pins, 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

A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean contaminated disc with a high quality brake degreasing agent.

CAUTION: Avoid spilling brake fluid on plastic, rubber or painted parts. Protect these parts with a rag when servicing brake circuit.

CAUTION: To avoid serious damage to the brake circuit, use 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 proper ones every time a Banjo fitting is unscrewed.

MAINTENANCE

BRAKE FLUID

The brake fluid must be changed in accordance with the maintenance chart.

Recommended Fluid

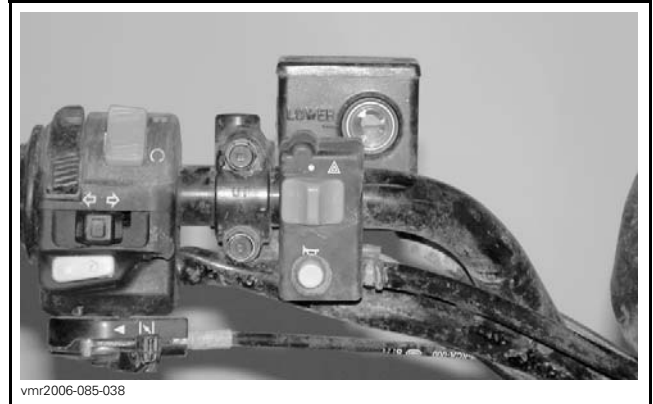
Use brake fluid meeting the specification DOT 3 or DOT 4 such as GTLMA brake fluid (P/N 293 600 062) sold by BRP.

Fluid Level

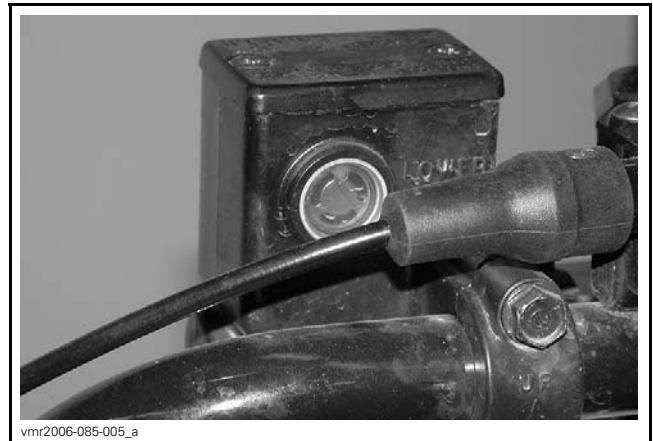
NOTE: A low level may indicate leaks or worn brake pads.

Brake Fluid Reservoir on Handlebar

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.



LH REAR BRAKE FLUID RESERVOIR



RH FRONT BRAKE FLUID RESERVOIR

Visually inspect lever boot condition. Check for cracks, tears, etc. Replace if damaged.

Add fluid as required. Do not overfill.

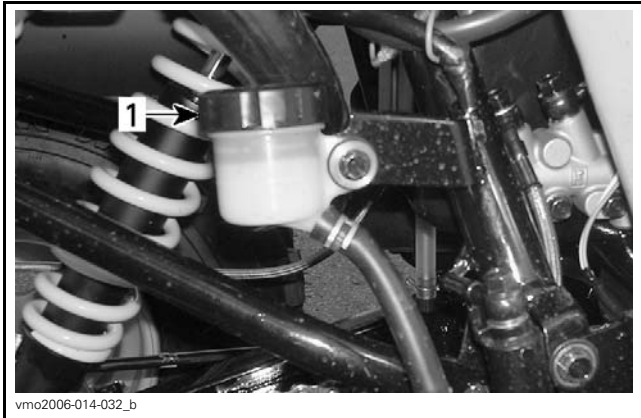
Brake Fluid Reservoir for Rear Brake Pedal

With vehicle on a level surface, check brake fluid in reservoir for proper level. It should be above MIN. mark.

Clean reservoir cover before removing.

Section 09 BRAKING SYSTEM

Subsection 01 (FRONT AND REAR BRAKES)



UNDERNEATH RH REAR FENDER

1. Reservoir cover

Add fluid as required. Do not overfill.

Brake Fluid Replacement

Brake Fluid Draining

Remove reservoir cover with its diaphragm.

Connect a clear hose to bleeding screw.

Loosen bleeding screw and pump brake lever or brake pedal until no more fluid flows out of bleeding screw.

Brake Fluid Filling

Close bleeding screws.

Fill reservoirs brake fluid.

On each caliper and on each pressure control valve, unscrew the bleeding screw until the brake fluid comes out then close it.

Bleed circuit as per the following procedure.

Brake Fluid Bleeding

Using 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 bleeding screw and refill reservoir when the fluid level is low.

NOTE: Check fluid level often to prevent air from being pumped into the circuit.

- Repeat the procedure until no more air bubbles appear in hose.

NOTE: For the front brake circuit, 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 circuit again.
- Repeat the procedures until air bubbles do not appear in hose and lever or pedal is firm.
- Fill reservoirs to the upper level with 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 circuit 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 circuit, 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.

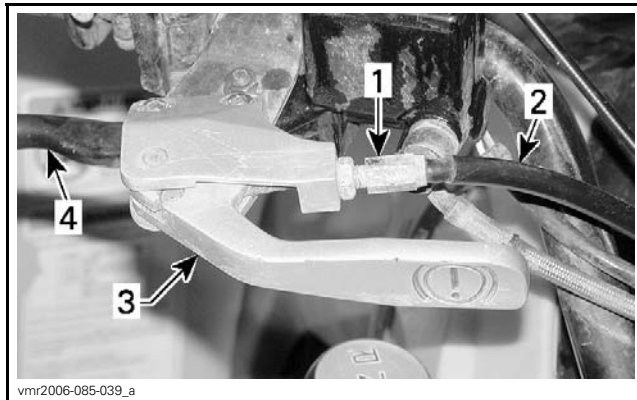
- Release brake lever or brake pedal slowly.
- Repeat the procedure until no more air bubbles appear in hose and lever or pedal is firm.

PROCEDURES

PARKING BRAKE (cable and lever)

Adjustment

Screw the cable adjuster located on parking brake lever.

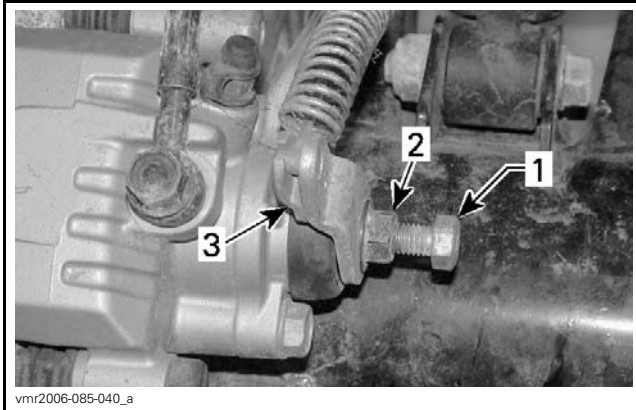


1. Cable adjuster
2. Parking brake cable
3. Parking brake lever
4. RH handle brake lever

Section 09 BRAKING SYSTEM

Subsection 01 (FRONT AND REAR BRAKES)

On rear caliper, loosen lock nut on adjusting bolt.



1. Adjusting bolt
2. Lock nut
3. Caliper brake lever

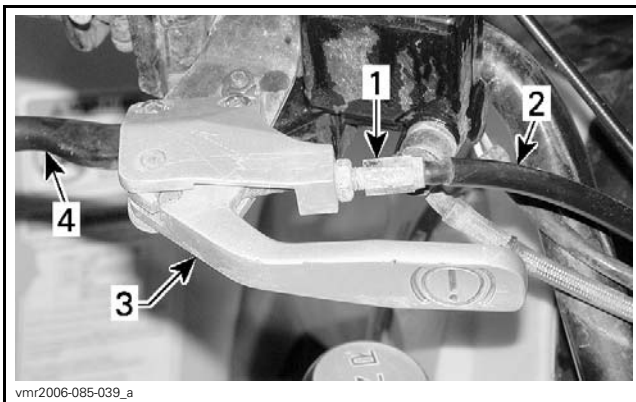
Screw adjusting bolt until it touches the caliper piston.

Tighten lock nut.

Apply parking brake and try to move vehicle. If a minor adjustment is required, use the adjuster on parking brake lever.

Removal

Screw in the parking brake cable adjuster on the RH handle lever.



1. Cable adjuster
2. Parking brake cable
3. Parking brake lever
4. RH handle brake lever

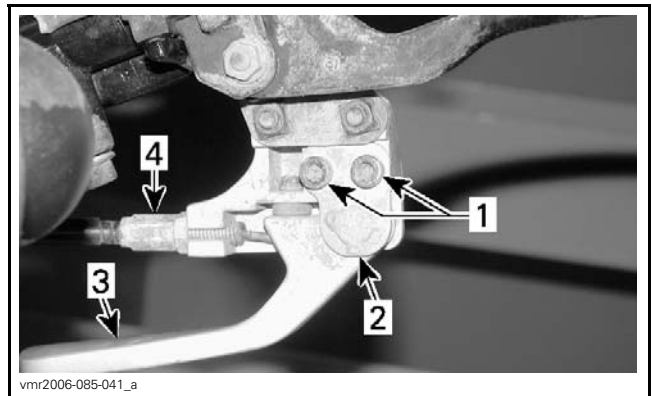
Disconnect cable from rear caliper.



Detach cable from swing arm and frame.

Unscrew socket screws under lever.

Remove lever plate and parking brake lever.



1. Socket screws
2. Lever plate
3. Parking brake lever
4. Cable adjuster

Detach the end of cable from lever.

Unscrew adjuster completely and remove cable from lever housing.

Remove parking brake cable from vehicle. Note routing for reinstallation.

Installation

The installation is the reverse of the removal procedure.

CALIPERS

Removal

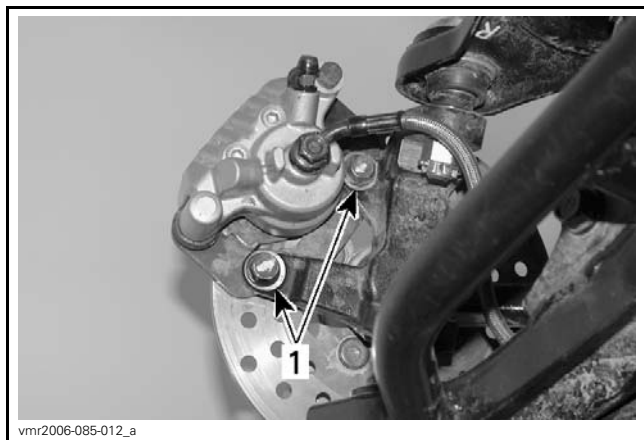
Front Calipers

Loosen wheel nuts, raise vehicle and support it securely then remove appropriate wheel.

Remove caliper bolts then the caliper.

Section 09 BRAKING SYSTEM

Subsection 01 (FRONT AND REAR BRAKES)



RH CALIPER SHOWN

1. Front caliper bolts

NOTE: If the caliper is not being removed from the vehicle as during brake pad replacement, simply hang the caliper with a piece of wire.

CAUTION: Do not let the caliper hang by the hose and do not stretch or twist the hose.

If the caliper is being removed for replacement, remove bolt retaining the Banjo fitting and its sealing washers. Remove the caliper from the vehicle and discard sealing washers.

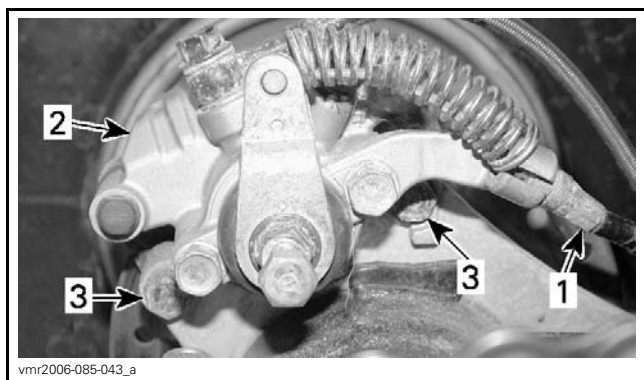
Catch spilled fluid with a rag. Attach the brake hose in a position to prevent the fluid from flowing out.

Rear Caliper

If the caliper is not being removed from the vehicle as during brake pad replacement, unscrew caliper bolts and hang the caliper with a piece of wire.

CAUTION: Do not let the caliper hang by the hose and do not stretch or twist the hose.

If the caliper is being removed for replacement, remove Banjo fitting and its sealing washers. Remove parking brake cable from caliper and unscrew caliper bolts. Remove the caliper from the vehicle and discard sealing washers.



1. Parking brake cable
2. Caliper
3. Caliper bolts

Inspection

Check piston for scratches, rust or other damages. If so, replace caliper.

Check brake pads. Refer to *BRAKE PAD* further in this section.

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. Torque Banjo fitting to 35 N•m (26 lbf•ft).

Install caliper in its original position. Torque caliper bolt to 27 N•m (20 lbf•ft).

Refill and bleed the braking system.

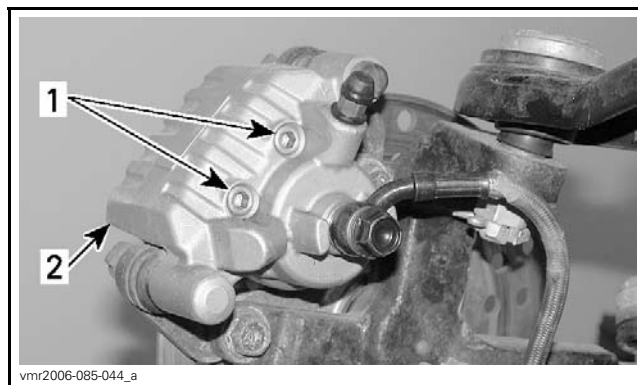
Adjust parking brake (rear caliper). Refer to *PARKING BRAKE*.

Check for leaks and make sure the brakes operate normally before driving.

BRAKE PADS

Removal

Loosen pad pins.



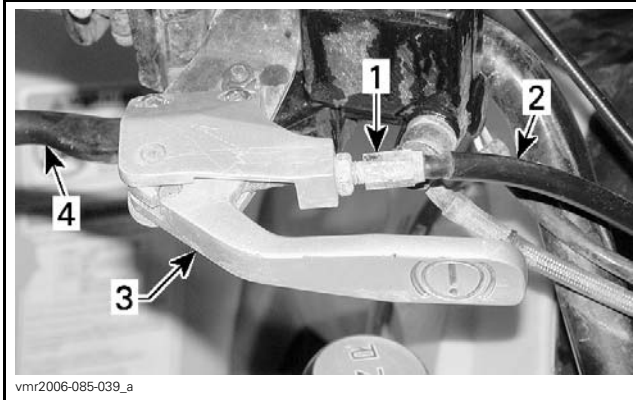
1. Pad pins
2. Caliper

Remove appropriate caliper. See procedure above.

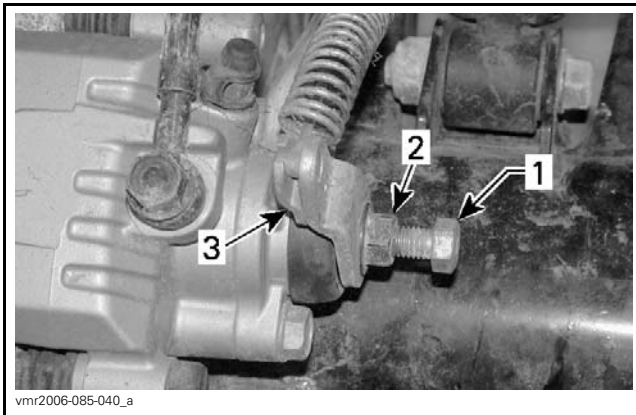
NOTE: For the rear caliper, screw parking brake cable adjuster and loosen adjusting bolt before working on caliper.

Section 09 BRAKING SYSTEM

Subsection 01 (FRONT AND REAR BRAKES)



1. Cable adjuster
2. Parking brake cable
3. Parking brake lever
4. RH handle brake lever



1. Adjusting bolt
2. Lock nut
3. Caliper brake lever

Remove pad pins.

Push piston all the way in to allow removal and installation of new pads.

Remove pads.

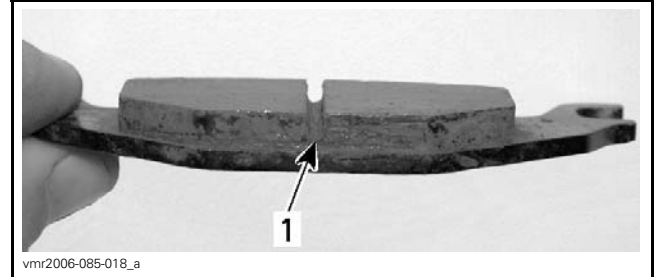
CAUTION: Do not let the caliper hang by the hose and do not stretch or twist the hose.

Inspection

CAUTION: Brake pads must always be replaced in pairs.

Measure brake pad lining thickness.

Brake pads must be replaced when lining is 2 mm (5/64 in) thick or less, or if the wear groove, on lining pad, is no longer visible.



1. Wear groove on pad lining

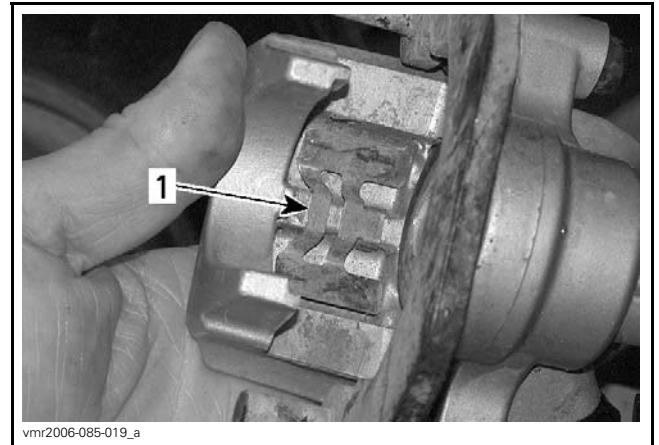
BRAKE PAD MINIMUM THICKNESS

2 mm (5/64 in)

Installation

Clean the visible portion of piston with clean brake fluid.

Make sure that pad spring is in position.



1. Pad spring

Install new brake pads and pad pins. Torque pad pins to 18 N•m (159 lbf•in).

Install brake caliper so the disc is positioned between pads.

After the job is completed, firmly depress the brake lever a few times to bring the pads in contact with the disc. The pads must rest flat on the disk.

Adjust parking brake. Refer to *PARKING BRAKE DEVICE*.

Check for leaks and make sure the brakes operate normally before driving.

Section 09 BRAKING SYSTEM
Subsection 01 (FRONT AND REAR BRAKES)

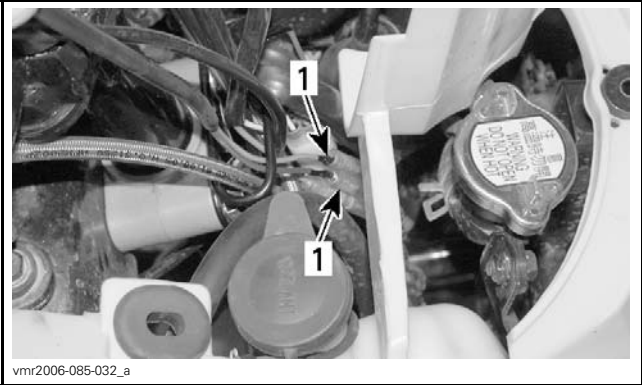
**MASTER-CYLINDERS OF
BRAKE LEVERS**

Removal

Master Cylinder of LH Rear Brake Lever

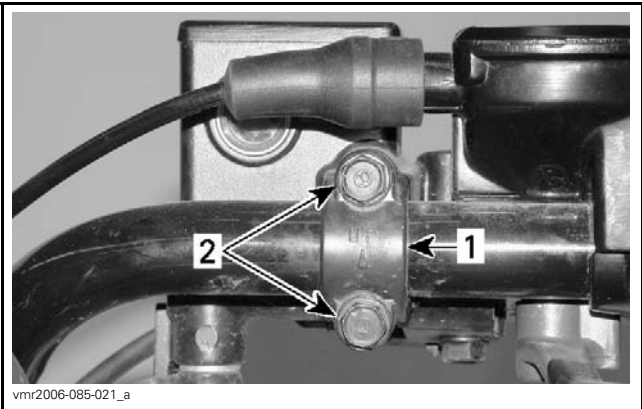
Drain the rear brake lever circuit. Refer to *BRAKE FLUID REPLACEMENT* in this section.

Remove banjo fitting and the sealing washers. Unplug brake light switch connectors. Note position of wires for reinstallation.



1. Brake light switch connectors

Unscrew master cylinder holder bolts.



1. Master cylinder holder
2. Bolts

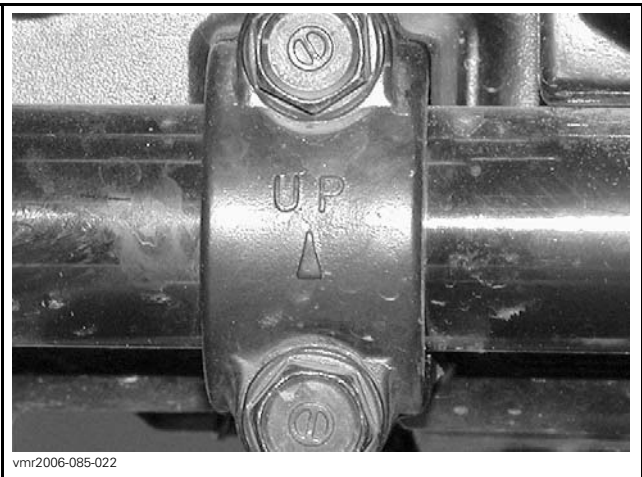
Remove master cylinder of front brake lever.

Installation

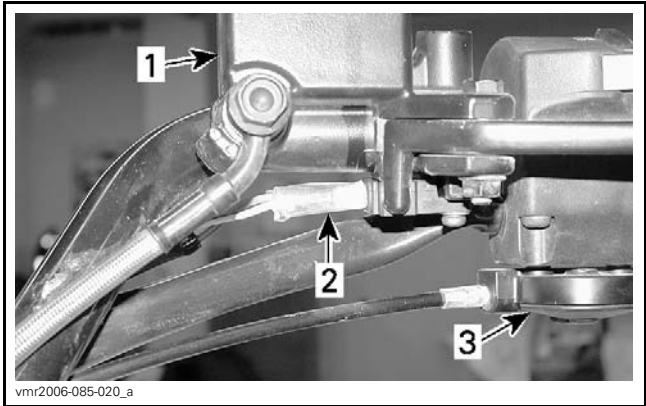
Master Cylinders of Front or Rear Brake Levers

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

Install the master cylinder holder with the arrow in the proper position.

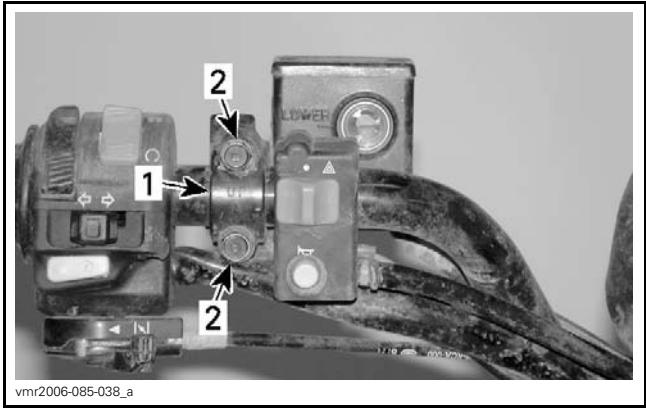


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1. Brake fluid reservoir
2. Brake light switch connectors
3. Choke lever

Unscrew master cylinder holder bolts.



1. Master cylinder holder
2. Bolts

Remove master cylinder of rear brake lever.

Master Cylinder of RH Front Brake Lever

Drain the front brake circuit. Refer to *BRAKE FLUID REPLACEMENT* in this section.

Remove banjo fitting and the sealing washers. Unplug brake light switch connectors. The connectors are located under front cover. Note position of wires for reinstallation.

Master Cylinder of LH Rear Brake Lever

Refill rear brake lever circuit.

Bleed rear brake system.

⚠ WARNING

Bleed rear brake lever and rear brake pedal circuits before riding vehicle.

Master Cylinder of RH Front Brake Lever

Refill and bleed front brake circuit.

⚠ WARNING

Bleed front brake circuit before riding vehicle.

REAR BRAKE PEDAL

Inspection

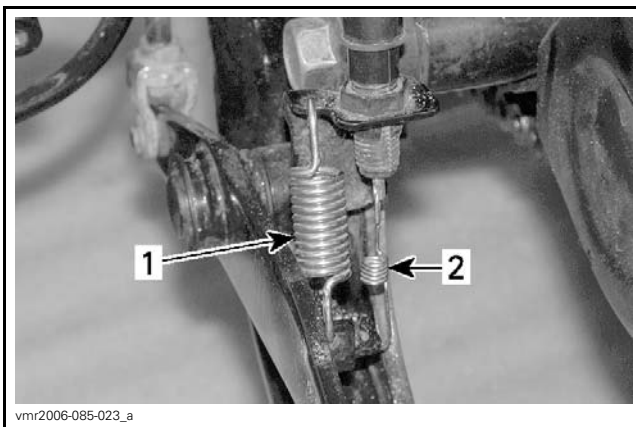
Check rear brake pedal for cracks or distortion. Replace if necessary.

Check brake pedal spring for distortion. Replace if necessary.

Removal

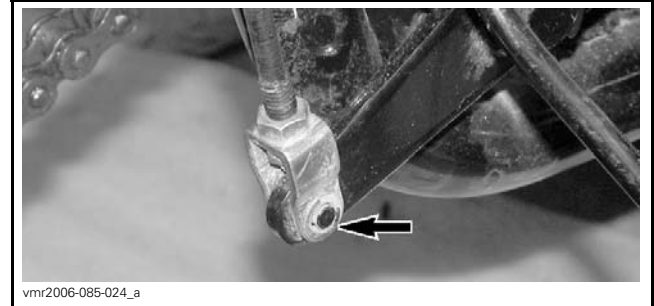
Remove the RH footrest. Refer to *BODY*.

Detach brake pedal spring and brake pedal switch spring.

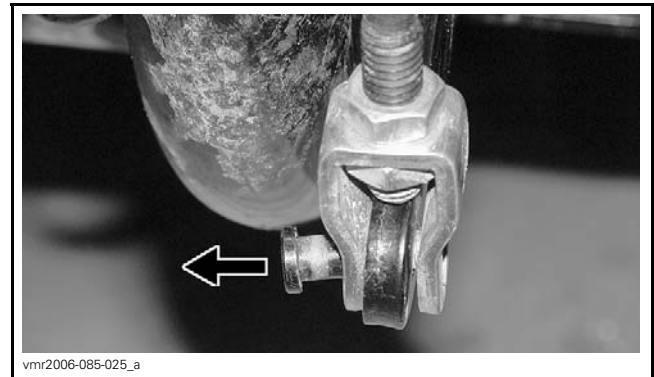


1. Brake pedal spring
2. Brake pedal switch spring

Remove E-clip holding yoke to the end of rear brake pedal.



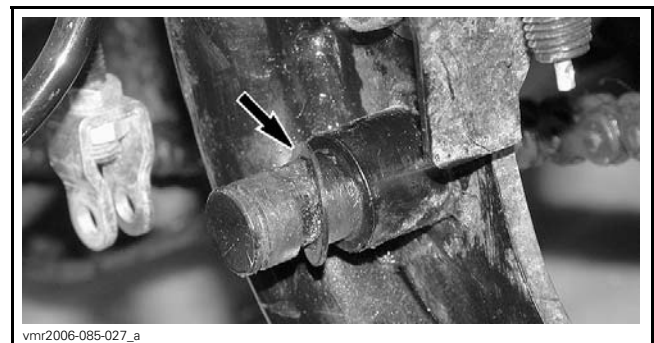
Then, remove pin to separate yoke and rear brake pedal.



Remove the big E-clip retaining rear brake pedal to frame.



Pull rear brake pedal and remove the washer.



Installation

The installation is the reverse of the removal procedure.

Section 09 BRAKING SYSTEM

Subsection 01 (FRONT AND REAR BRAKES)

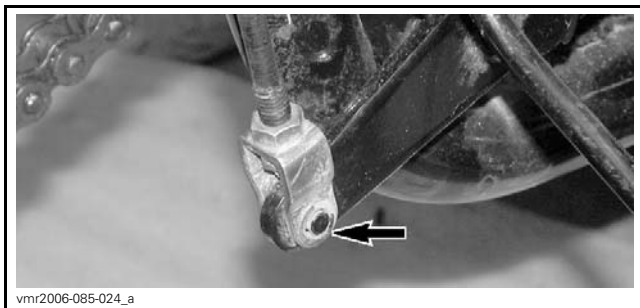
Apply suspension synthetic grease (P/N 293 550 033) on shaft before installing rear brake pedal.

MASTER CYLINDER OF REAR BRAKE PEDAL

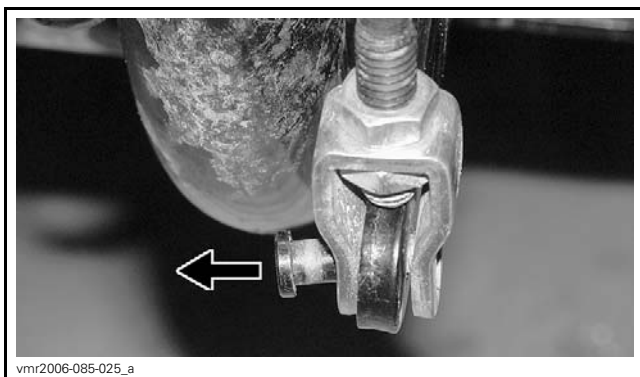
Removal

Drain rear brake pedal circuit. Refer to *BRAKE FLUID REPLACEMENT* in this section.

Remove E-clip holding yoke to the end of rear brake pedal.



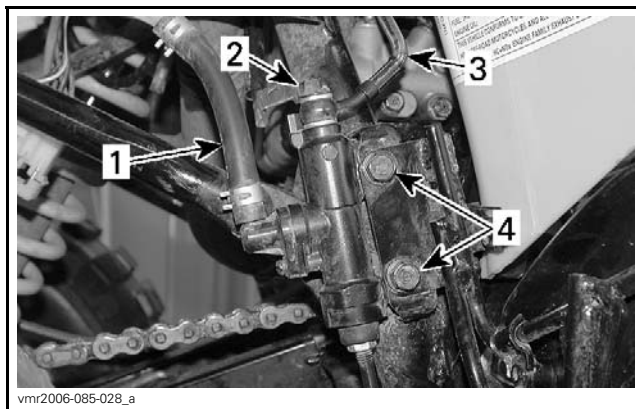
Then, remove pin to separate yoke and rear brake pedal.



Unplug brake fluid reservoir hose from master cylinder.

Remove Banjo fitting that attach brake hose to the top of master cylinder. Discard sealing washers and catch spilled fluid with a rag.

Remove bolts securing master cylinder to frame.



1. Brake fluid reservoir hose
2. Banjo fitting
3. Brake hose
4. Master cylinder bolts

Installation

For installation, reverse the removal procedure.

Refill and bleed the rear brake pedal circuit.

WARNING

Bleed rear brake pedal circuit before riding vehicle.

FRONT BRAKE PRESSURE CONTROL VALVE

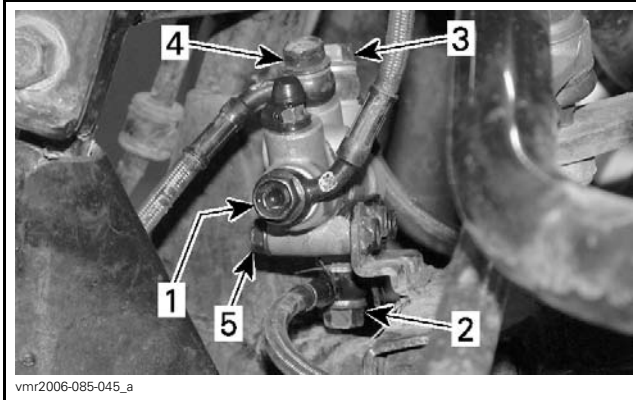
Removal

Loosen wheel nuts, raise vehicle and support it securely then remove wheel on right side.

Drain front brake. Refer to *BRAKE FLUID REPLACEMENT*.

Disconnect the four (4) brake hoses. Discard sealing washers and catch spilled fluid with a rag.

Unscrew bolts securing pressure control valve to frame.



1. From RH front brake lever
2. Toward the RH caliper
3. Toward the LH caliper
4. Toward the rear brake pressure control valve
5. Pressure control valve bolt

Installation

The installation is the reverse of the removal procedure.

Refill and bleed braking system.

WARNING

Bleed braking system before riding vehicle.

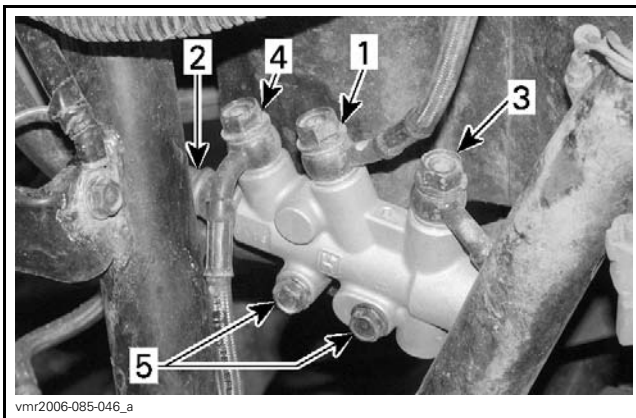
REAR BRAKE PRESSURE CONTROL VALVE

Removal

Remove rear fender. Refer to *BODY*.

Disconnect the four (4) brake hoses. Discard sealing washers and catch spilled fluid with a rag.

Unscrew bolts securing pressure control valve to frame.



1. From LH rear brake lever
2. From rear master cylinder
3. From the front brake pressure control valve
4. Toward rear caliper
5. Pressure control valve bolts

Installation

The installation is the reverse of the removal procedure.

Refill and bleed braking system.

WARNING

Bleed braking system before riding vehicle.

BRAKE DISCS

Inspection

Brake discs can be inspected without removing them from the vehicle.

NOTE: To verify the front brake discs, raise vehicle and support it securely. Remove wheels.

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 and rear	2 mm (5/64 in)
----------------	----------------

Replace disc if not within specifications.

CAUTION: Brake discs should never be machined.

Turn the brake disc and check warpage.

MAXIMUM DISC WARPAGE

Front	0.1 mm (1/32 in)
Rear	

Removal

Front Brake Disc

Remove caliper. Refer to *CALIPER* in this section.

Remove front wheel hub. Refer to *STEERING AND FRONT SUSPENSION*.

Unscrew brake disc screws. Heat up brake disc around screws to facilitate removal.

Rear Brake Disc

Remove brake hub. Refer to *REAR SUSPENSION AND AXLE*.

Unscrew brake disc screws. Heat up brake disc around screws to facilitate removal.

Section 09 BRAKING SYSTEM
Subsection 01 (FRONT AND REAR BRAKES)

Installation

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

Torque brake disc screws in accordance with the following table.

TORQUE FOR BRAKE DISC SCREWS	
Front brake disc	41 N•m (30 lbf•ft)
Rear brake disc	29 N•m (21 lbf•ft)

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 the appropriate brake circuit.

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.

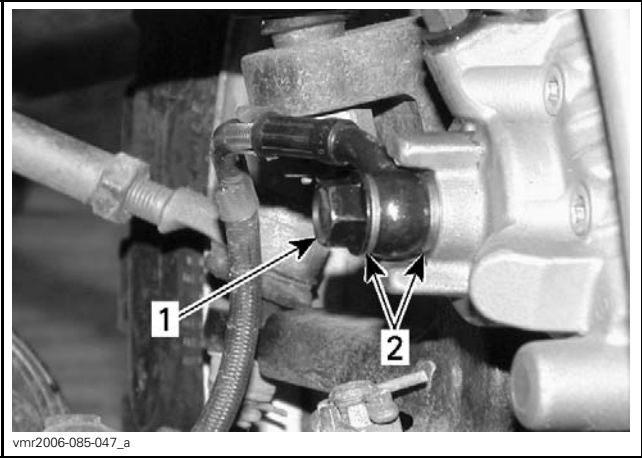
Disconnect any retaining clips or brackets holding the hose and remove the defective part(s).

Installation

Install the new hose.

Make sure the piece will not rub against any other part.

When there is a Banjo fitting securing the hoses to the calipers, pressure control valve or to master cylinders, always replace sealing washers with new ones.



FRONT CALIPER SHOWN
1. Banjo fitting
2. Sealing washers

Install any retaining clips or brackets.

Refill and bleed brake circuit(s).

BRAKE LIGHT SWITCHES

NOTE: There is a brake light switch for each lever and the pedal.

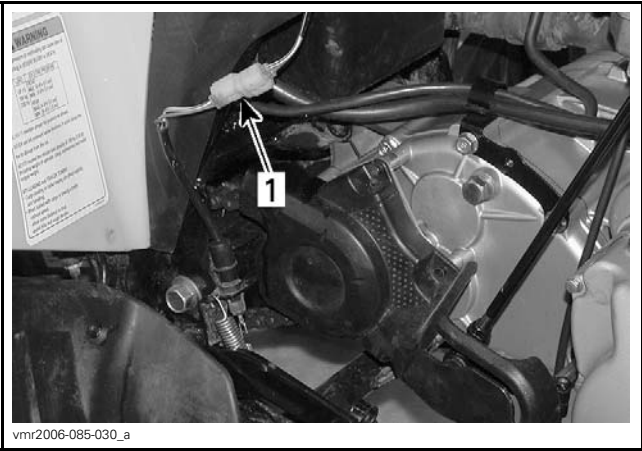
Inspection

Check switch for dirt or corrosion. Make sure it is operating properly.

Depress brake pedal and check for brake light to turn on. Repeat with each brake lever.

Test

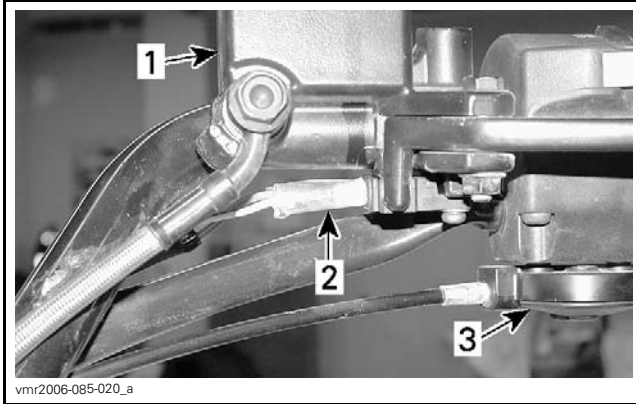
Disconnect switch connector(s).



REAR BRAKE PEDAL
1. Brake pedal switch connector

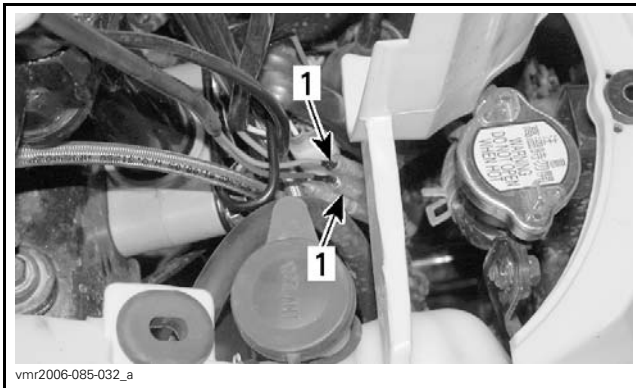
Section 09 BRAKING SYSTEM

Subsection 01 (FRONT AND REAR BRAKES)



LH REAR BRAKE LEVER

1. LH rear brake fluid reservoir
2. Brake light switch connectors
3. Choke lever



RH FRONT BRAKE LEVER

1. Brake light switch connectors

Check switch operation as follows.

SWITCH	SWITCH POSITION	WIRES/PINS		RESISTANCE
Brake pedal	Firmly pulled	BLACK	GREEN/YELLOW	0.2 Ω max.
	Released			Infinite (0L.)
LH rear brake lever	Firmly pushed	Switch pins		0.2 Ω max.
	Released			Infinite (0L.)
RH front brake lever	Firmly pushed	BLACK	GREEN/YELLOW	0.2 Ω max.
	Released			Infinite (0L.)

If brake pedal switch is defective, replace with a new one.

If a brake lever switch is defective, replace brake lever.

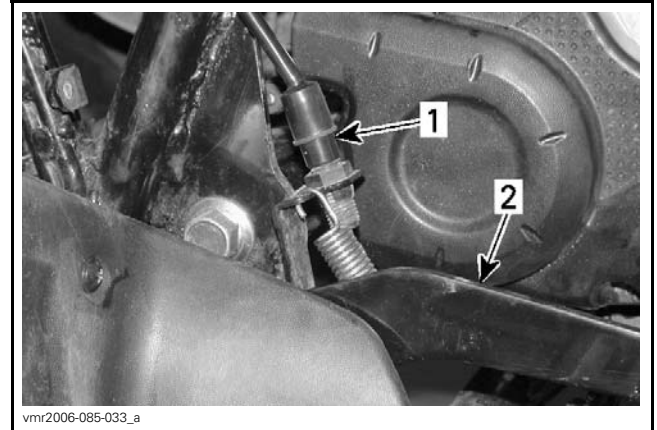
Removal

Front and Rear Brake Levers

The brake light switches on brake levers are not available in spare parts. Replace brake levers.

Rear Brake Pedal

The brake pedal switch is located over brake pedal.

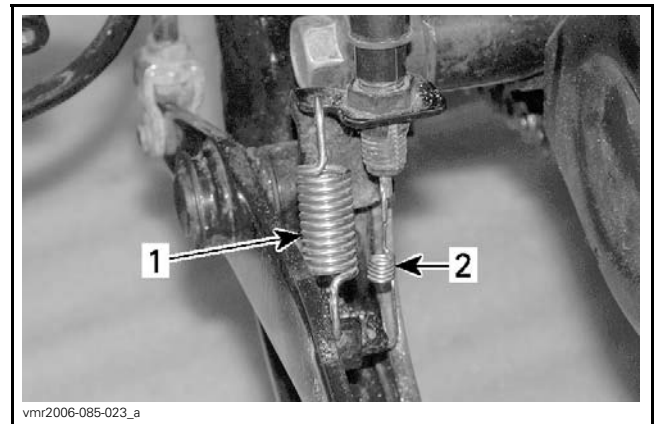


1. Brake pedal switch
2. Brake pedal

The brake pedal switch cannot be adjusted.

Disconnect switch connector.

Remove brake pedal switch spring from brake pedal.



1. Brake pedal spring
2. Brake pedal switch spring

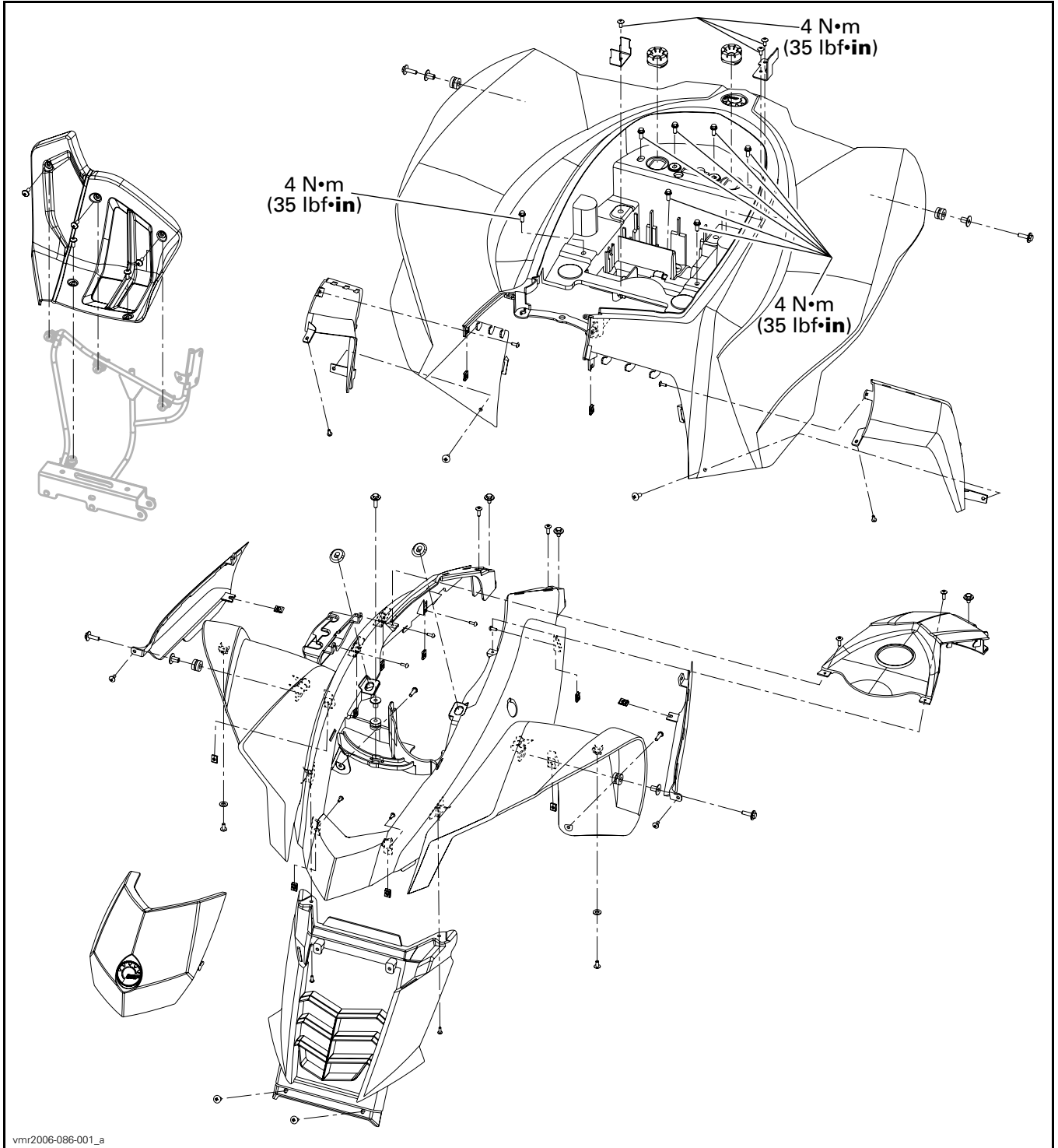
Unscrew brake pedal switch from its support.

Installation

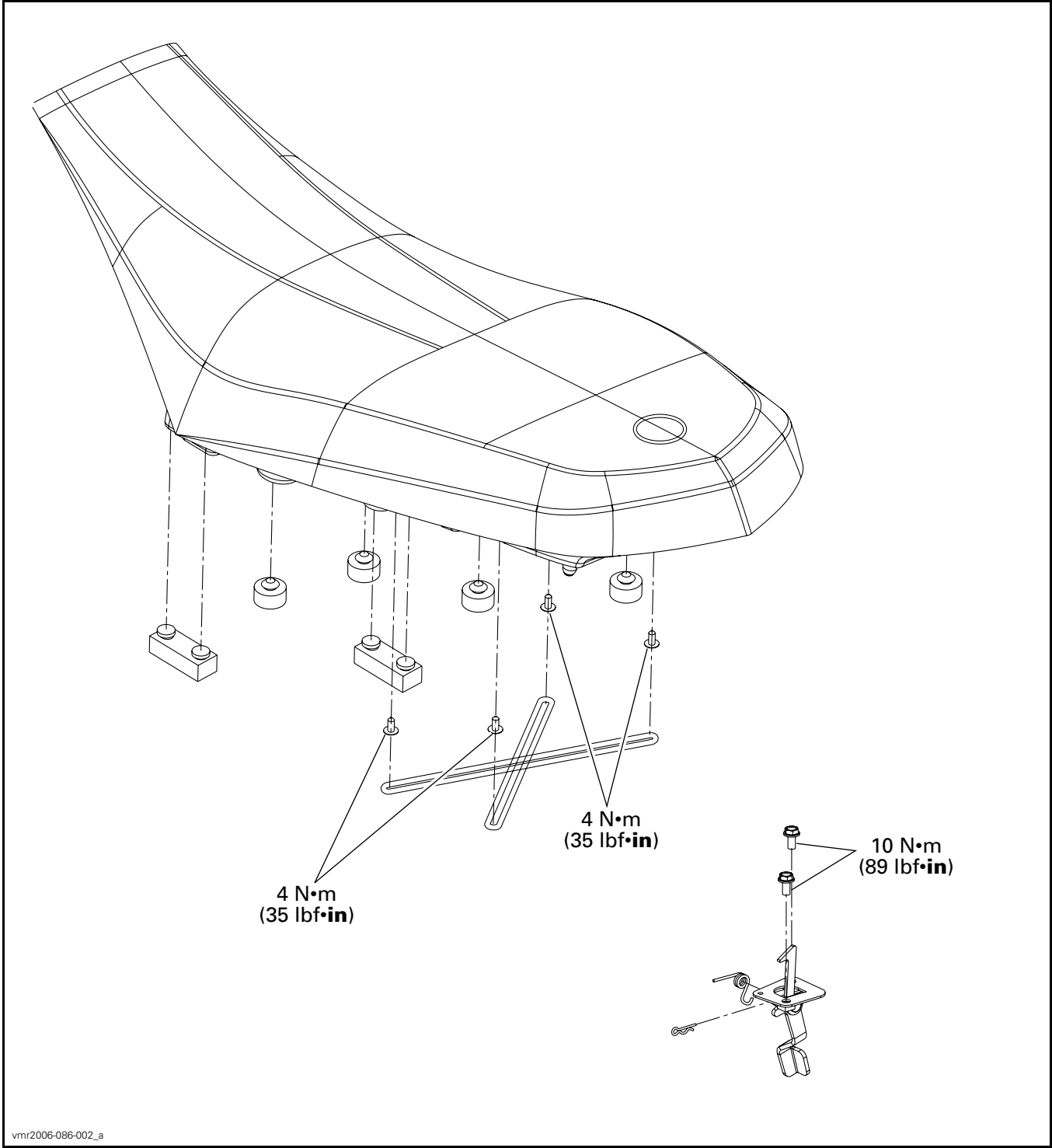
For installation, reverse the removal procedure.

BODY

BODY



SEAT



PARTS REPLACEMENT

DECAL

To remove a decal; heat old decal with a heat gun and peel off slowly.

Using isopropyl alcohol, clean the surface and dry thoroughly.

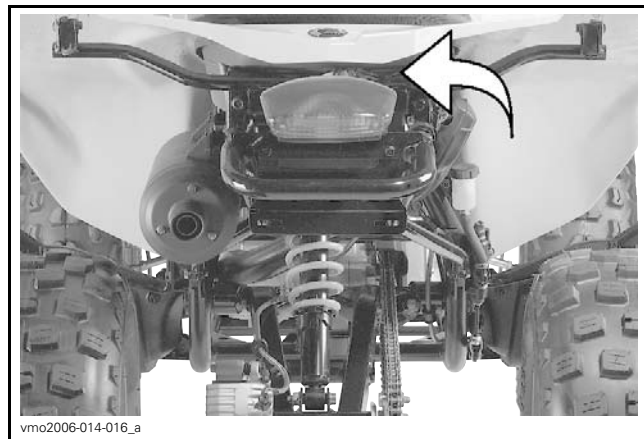
Apply liquid soap to new decal and carefully position the decal. Using a sponge or a squeegee, remove the air bubbles and surplus water working from the center toward the edges. Allow to air dry.

CAUTION: Do not apply isopropyl alcohol or solvent directly on decals. Use only in a well ventilated area.

SEAT

Removal

Unlock seat using latch lever located underneath the rear fender.

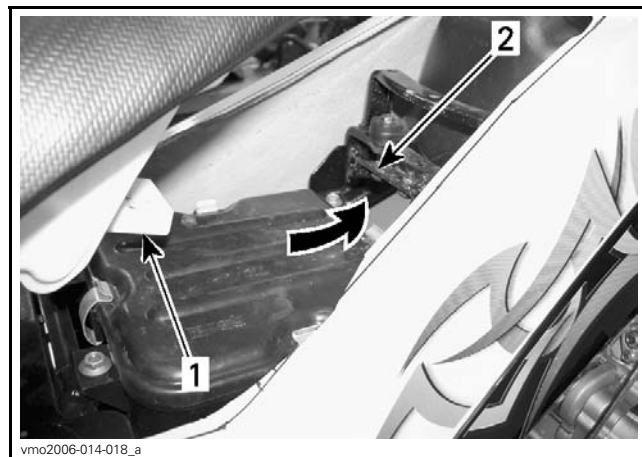


TYPICAL

Gently lift rear of seat while pulling rearward to release.

Installation

Insert seat tab into frame hook.



1. Tab
2. Hook

When seat rests in its position, firmly push seat down to latch.

NOTE: A distinctive snap will be felt. Double check that the seat is secure by giving it a tug to confirm proper latching.

WARNING

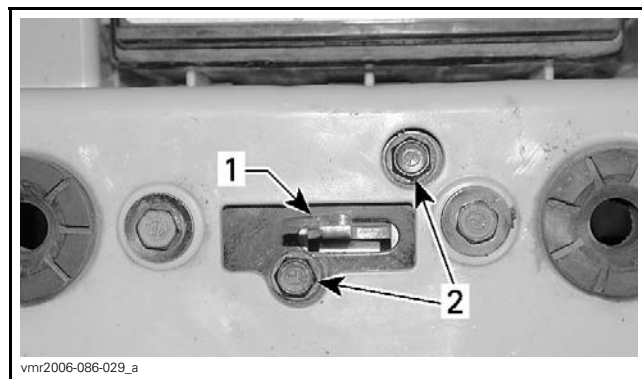
Make sure seat is securely latched before riding.

SEAT LATCH

Removal

Remove seat.

Unscrew seat latch bolts.



1. Seat latch
2. Seat latch bolts

Remove seat latch.

Installation

The installation is the reverse of the removal procedure.

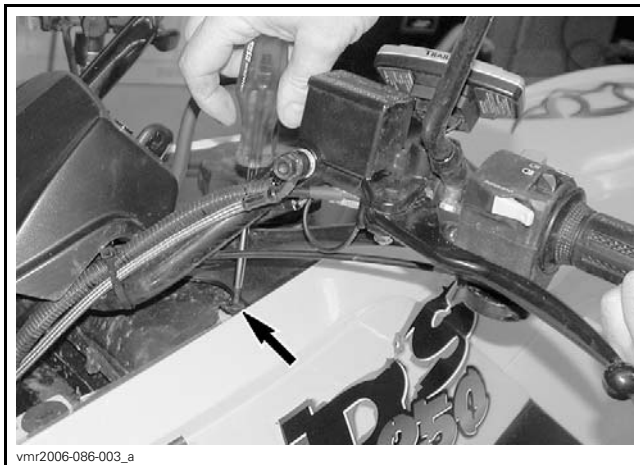
Section 10 BODY/FRAME

Subsection 01 (BODY)

FUEL TANK COVER

Removal

Remove screws near handlebar. One on each side.



Remove seat.

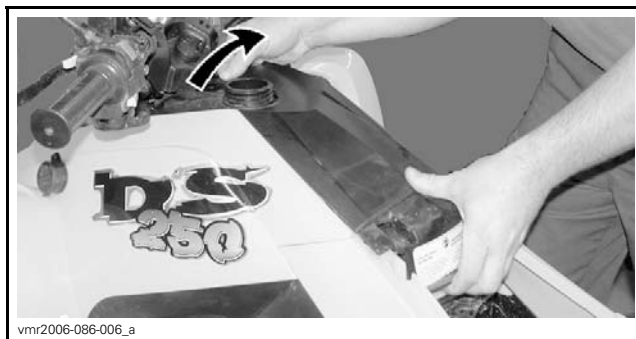
Unscrew bolt securing fuel tank cover and front fender to frame.



Remove fuel tank cap.



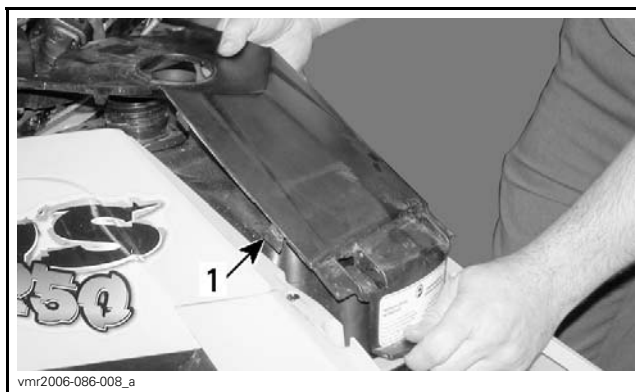
Lift the front of cover.



Lift until cover is over the fuel tank neck.



Move the fuel tank cover rearward to unlock the tabs.



1. Fuel tank cover tab

Remove fuel tank cover and install fuel tank cap.

Installation

The installation is the reverse of removal procedure.

FRONT COVER

Removal

Pull the top of front cover. Pull strongly.



Installation

The installation is the reverse of removal procedure.

RADIATOR SHIELD

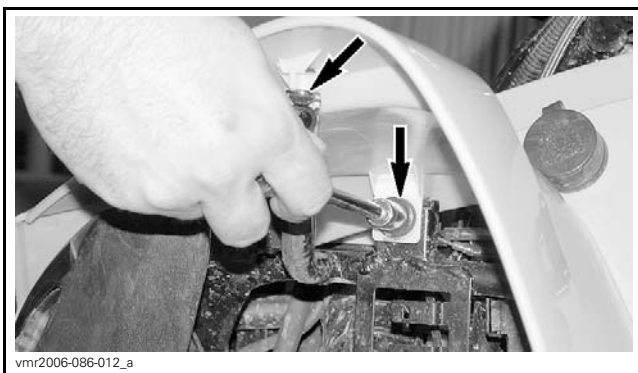
Removal

Remove front cover. See procedures above.

Unscrew bolt near radiator cap.



Unscrew bolts and screws securing front fender to frame and fender support (left side only).



Remove screws at the bottom of front fender (left side only).



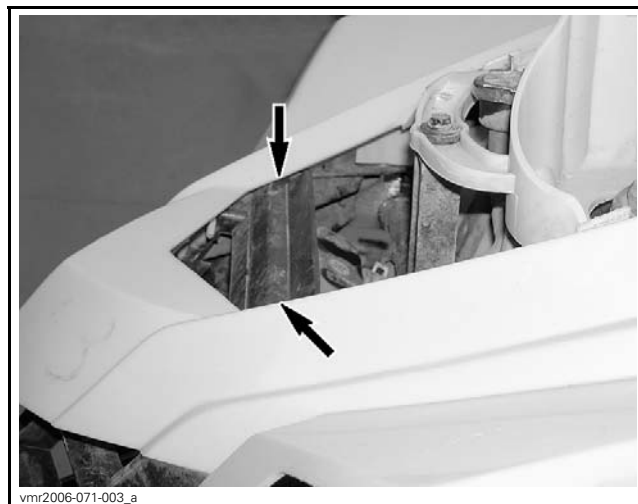
Remove screw joining front and rear side panels (left side only).



Remove screws at the bottom of radiator shield.

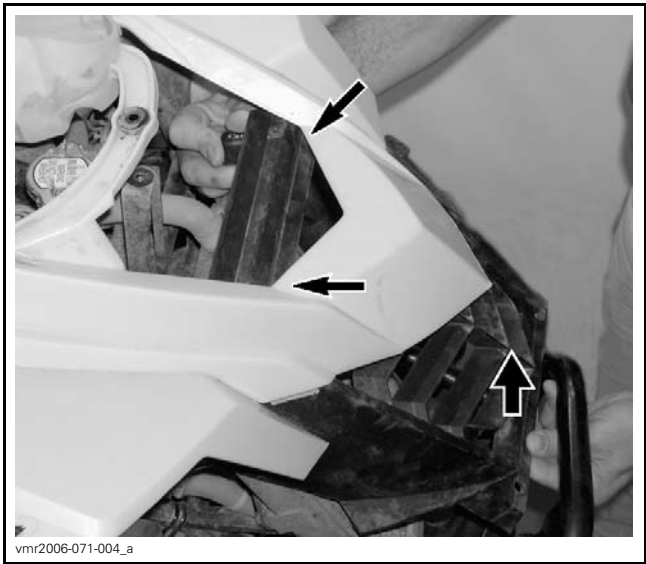


Remove screws from radiator shield.



Section 10 BODY/FRAME
Subsection 01 (BODY)

Raise bottom of radiator shield to gain access to screw heads and hold to remove them. Pull out radiator shield.



Installation

The installation is the reverse of the removal procedure.

FRONT FENDER

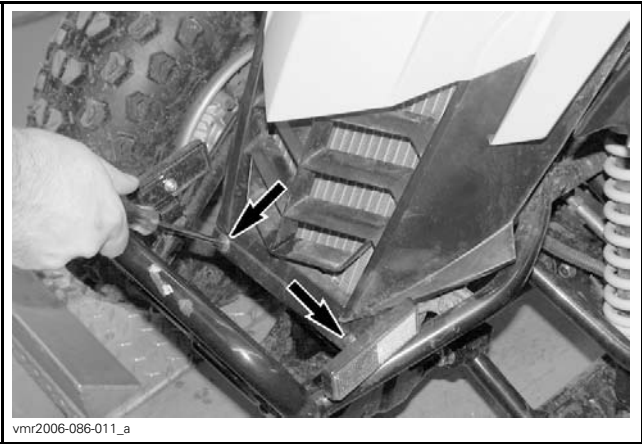
Removal

Remove front cover, seat and fuel tank cover. See procedures above.

Unscrew bolt near radiator cap.



Remove screws at the bottom of radiator shield.



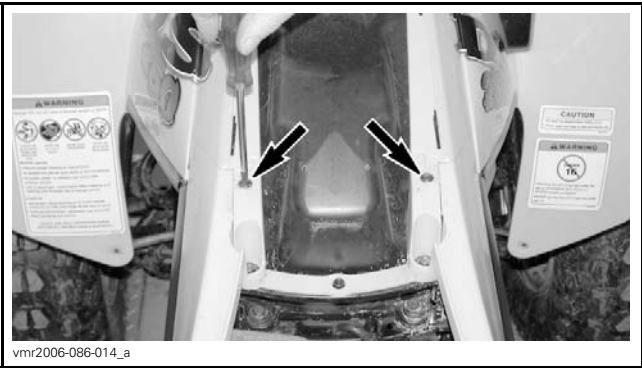
Unscrew bolt and screw securing front fender to frame and fender support (one on each side).



Remove screws at the bottom of front fender (same on both sides).



Remove screws that attach front fender and rear fender.



Unscrew bolts holding front fender and rear fender to frame.



Remove shifter handle.



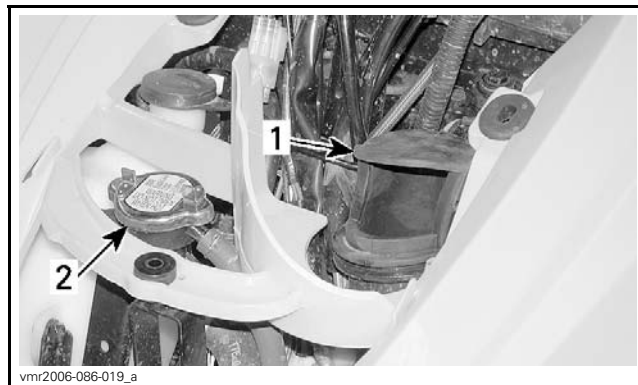
Remove screw joining front and rear side panels (one on each side).



Using a flat screwdriver, unlock and separate front fender and rear fender.

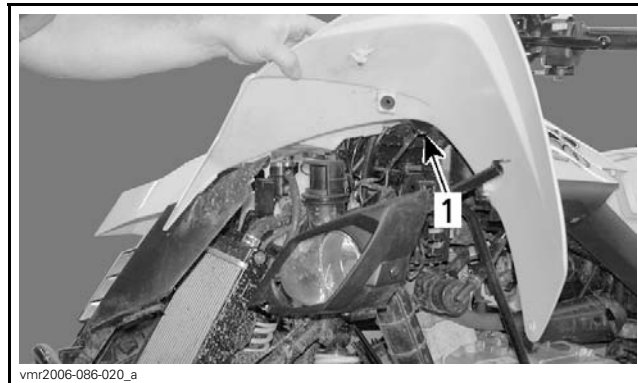


Remove CVT air inlet hose from the front fender.



1. CVT air inlet hose
2. Radiator cap

Lift front fender and disconnect the power outlet connectors.



1. Power outlet

Lift the front fender over shifter shaft.

Section 10 BODY/FRAME
Subsection 01 (BODY)



Carefully, remove the front fender.



Installation

The installation is the reverse of removal procedure.

REAR FENDER

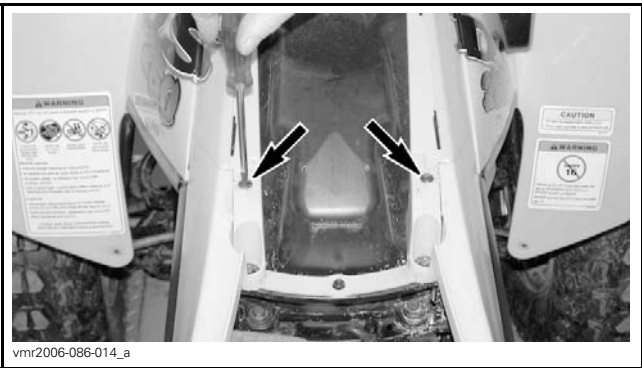
Removal

Remove seat and fuel tank cover. See procedures above.

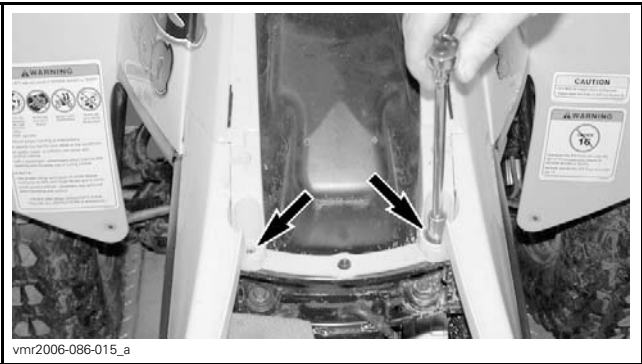
Remove screws at the bottom of rear fender (one on each side).



Remove screws that attach front fender and rear fender.



Unscrew bolts holding front fender and rear fender to frame.



Remove screws under front fender side panels.



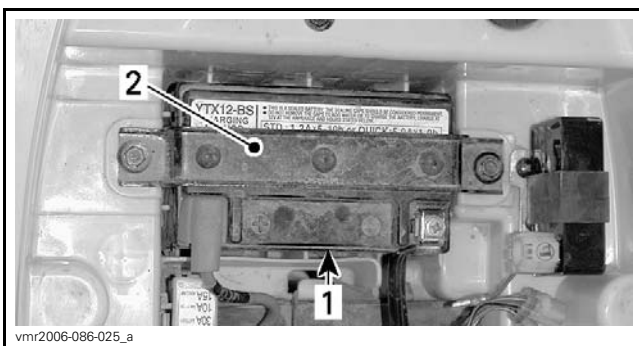
Using a flat screwdriver, unlock and separate front fender and rear fender.



Disconnect ignition module connectors.

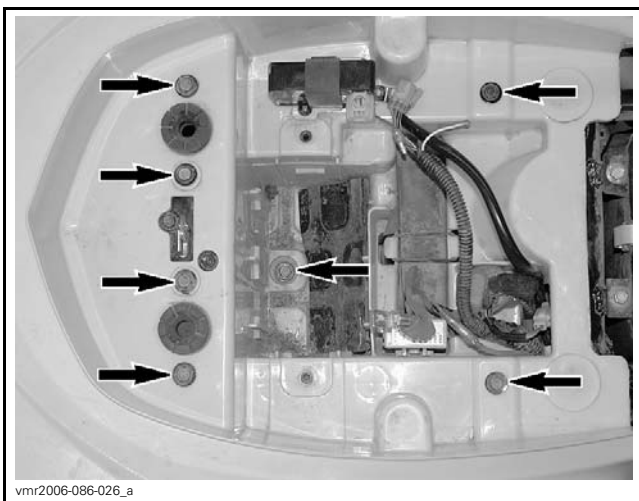


Remove battery retaining plate and battery. Refer to *CHARGING SYSTEM*.

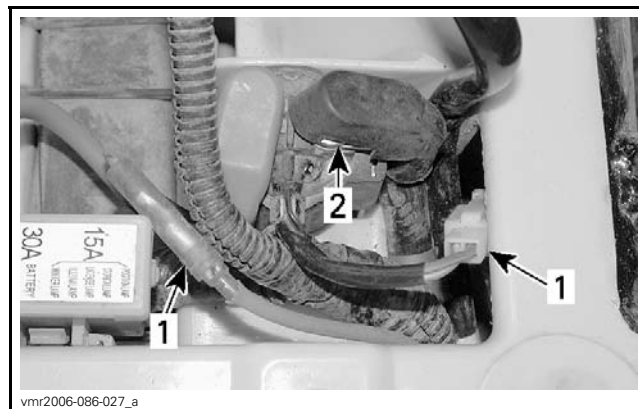


1. Battery
2. Battery retaining plate

Remove bolts securing rear fender to frame.



Disconnect starting solenoid connectors then remove the BLACK wire from the solenoid.



1. Starting solenoid connectors
2. BLACK wire on solenoid

Remove starting solenoid from vehicle.

Unlatch the fuse box from fender.

Slide fuse box and wires through the fender opening.

Disconnect rear light.

Lift rear fender and remove it.

Installation

The installation is the reverse of removal procedure.

FOOTREST

Removal

Remove screws retaining footrest to its support.



Installation

The installation is the reverse of removal procedure.

Section 10 BODY/FRAME

Subsection 01 (BODY)

CLEANING

SEAT

It is recommended to clean the seat with a solution of warm soapy water, using a soft clean cloth.

CAUTION: Avoid use of harsh detergents such as strong soaps, degreasing solvents, abrasive cleaners, paint thinners, etc. that may cause damage to the seat cover.

PLASTIC

Clean the vehicle thoroughly, removing all dirt and grease accumulation.

To clean use a soft clean cloth and either soapy water or isopropyl alcohol.

To remove grease, oil or glue use isopropyl alcohol.

CAUTION: Do not apply isopropyl alcohol or acetone directly on decals.

CAUTION: The following products must not be used to clean or wax any of the plastic components used on the vehicles:

- gasoline
- brake fluid
- kerosene
- diesel fuel
- lighter fluid
- varsol
- naphtha
- acetone
- strong detergents
- abrasive cleaners
- waxes containing an abrasive or a cleaning agent in their formula.

Apply wax without abrasive agent on glossy finish only. Protect the vehicle with a cover to prevent dust accumulation during storage.

CAUTION: If for some reason the vehicle has to be stored outside, it is preferable to cover it with an opaque tarpaulin. This will prevent the sun rays from affecting the plastic components and the vehicle finish.

REPAIR

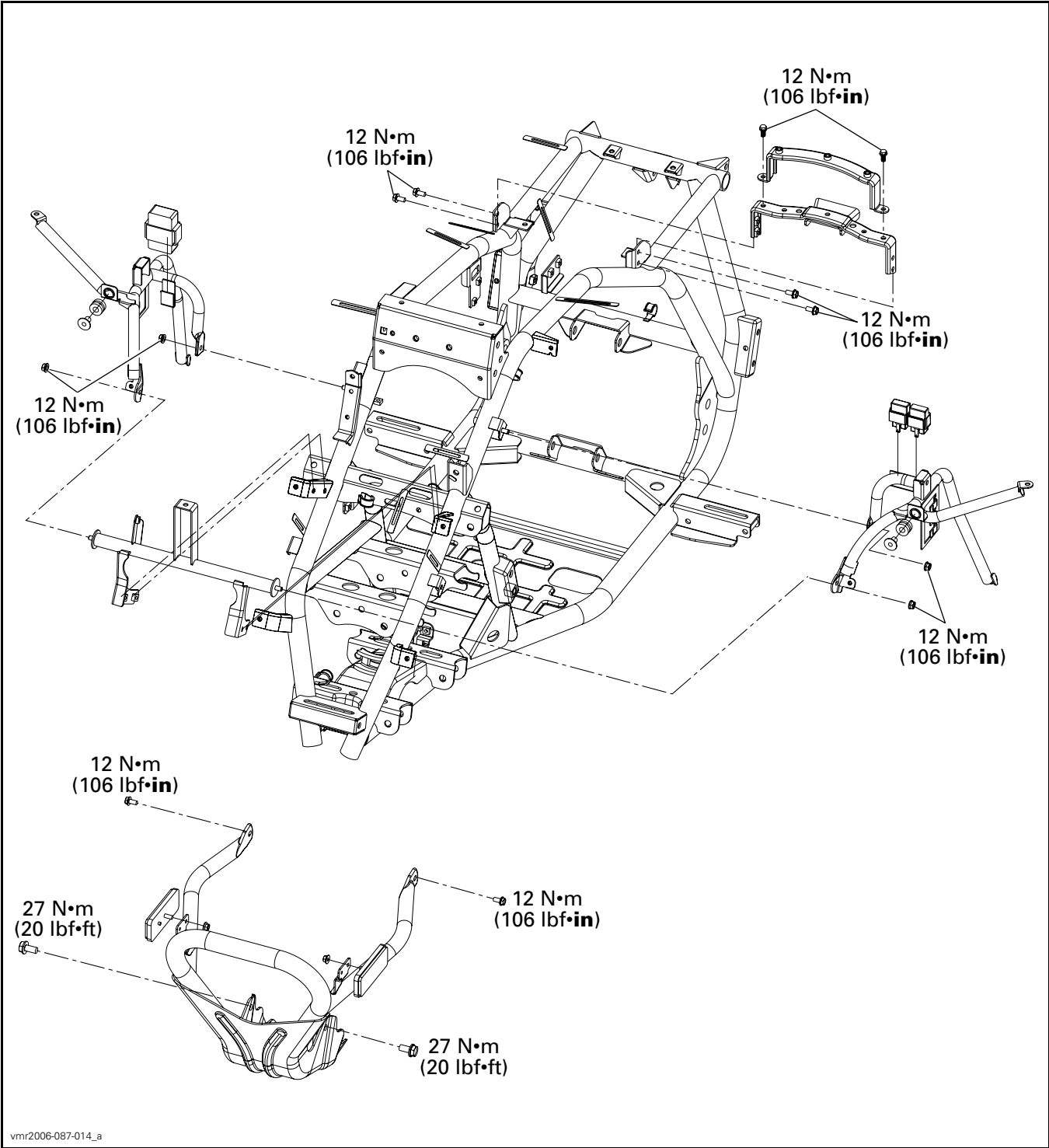
PLASTIC REPAIR

No plastic part on the vehicle is repairable. Change all defective parts.

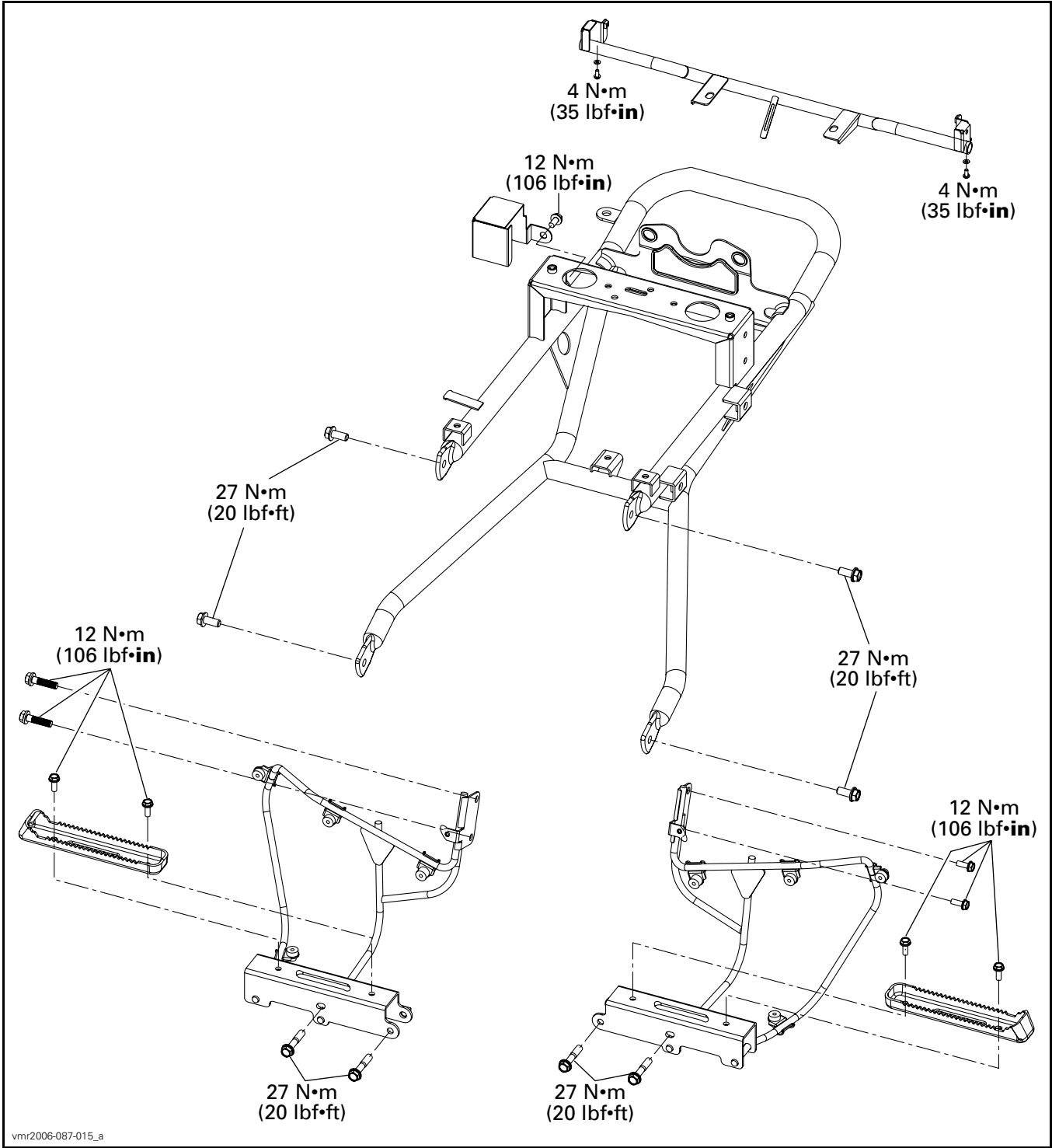
FRAME

SERVICE PRODUCTS

Description	Part Number	Page
XP-S Lube	293 600 016	249



Section 10 BODY/FRAME
Subsection 02 (FRAME)



GENERAL

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

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.

Clean frame with appropriate cleaners and rinse thoroughly.

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 such as XP-S Lube (P/N 293 600 016).

Welding

WARNING

Welding should be performed by a professional solder and limited to areas that are not safety related, such as steering, footrests, suspension, etc.

- 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 electronic module connector. Also unplug the BLACK (-) cable from the battery 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 to the repair area.

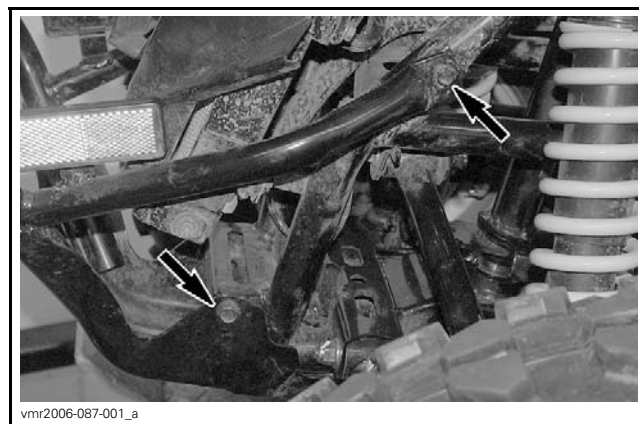
CAUTION: If welding is to be done near plastic material, it is recommended to remove the part from the area or to protect it with aluminum foil to prevent damage.

PROCEDURES

FRONT BUMPER

Removal

Remove bolts that attach front bumper to the frame. Two (2) on each sides.



Pull bumper forward to remove it.

Installation

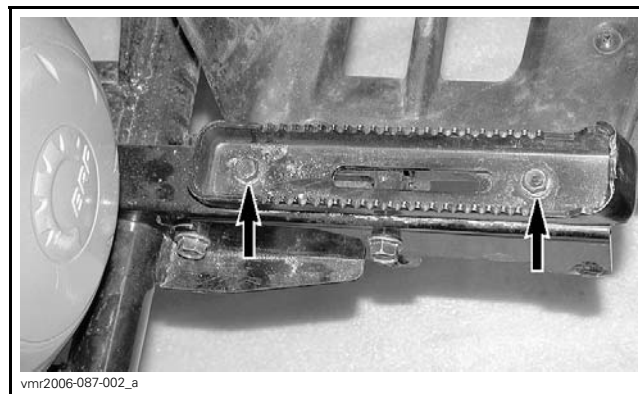
The installation is the reverse of the removal procedure.

NOTE: Install all bolts before torquing them.

FOOTPEG

Removal

Remove the both screws holding footpeg to footrest.



Installation

For installation, reverse the removal procedure.

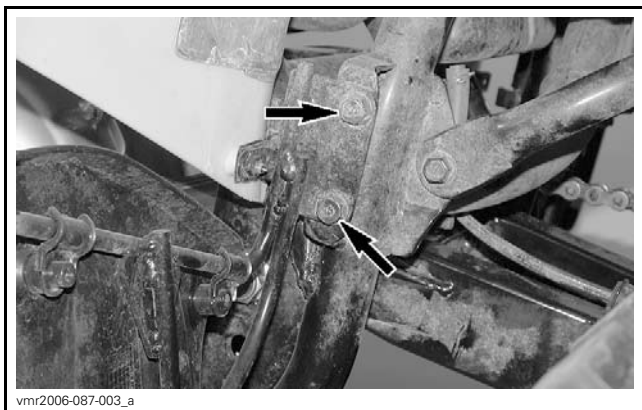
Section 10 BODY/FRAME

Subsection 02 (FRAME)

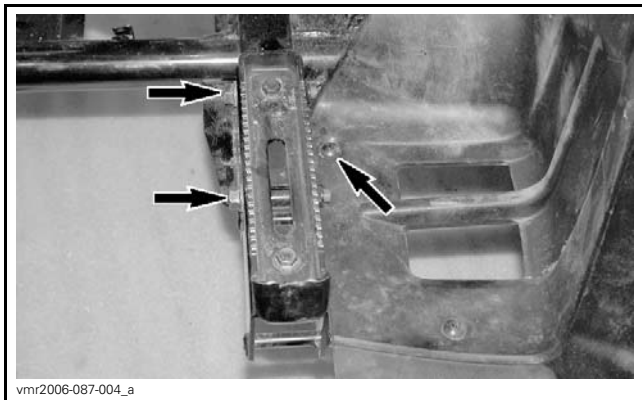
FOOTREST SUPPORT

Removal

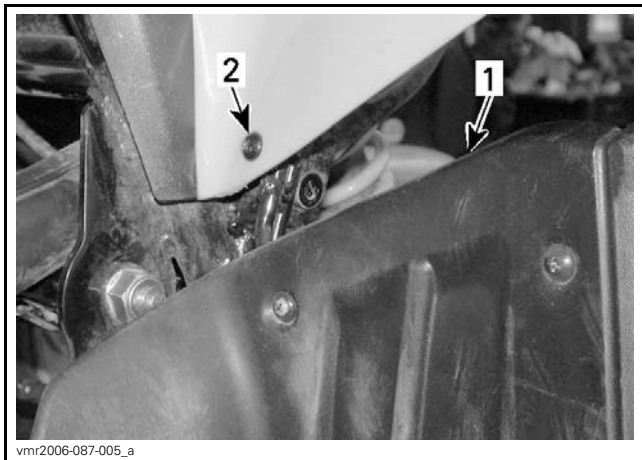
Behind footrest, remove bolts that attach footrest support to frame.



Remove bolts located in front of footrest and the screw near engine.



Remove the bottom screw attaching rear fender to footrest support.



1. LH footrest
2. Bottom screw of rear fender

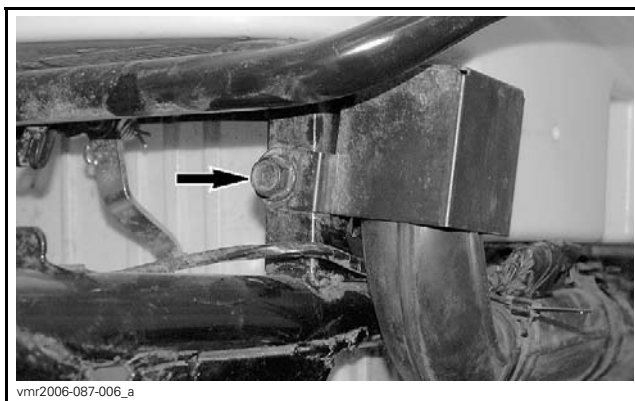
Installation

The installation is the reverse of the removal procedure.

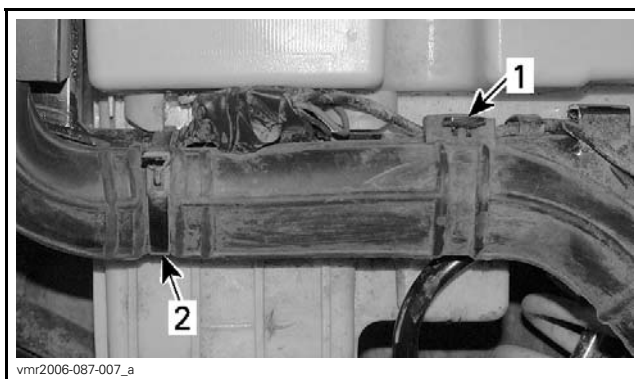
REAR FRAME EXTENSION

Removal

Remove protective box bolt.



Detach the CVT air outlet hose from its attachment, then cut the locking tie.



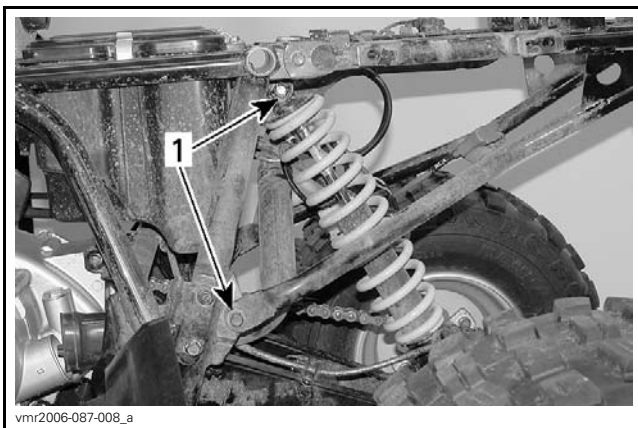
1. Detach hose here
2. Cut locking tie

Remove the rear fender. Refer to *BODY*.

Remove muffler. Refer to *EXHAUST SYSTEM*.

Unplug and remove tail light from vehicle.

The rear frame extension is secured with four (4) bolts. Unscrew them to remove the extension.



LEFT SIDE SHOWN

1. Rear frame extension bolts

Installation

To install the rear frame extension, reverse the removal procedure.

FRONT FENDER SUPPORT

Removal

NOTE: Use the same procedure for right or left supports.

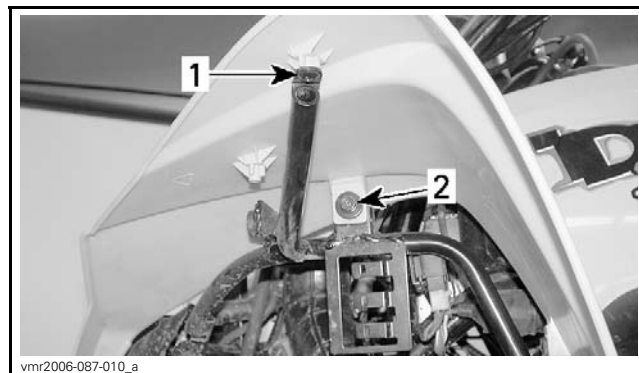
Unscrew the bottom screw of front fender securing it to support.



LH SIDE OF FRONT FENDER SHOWN

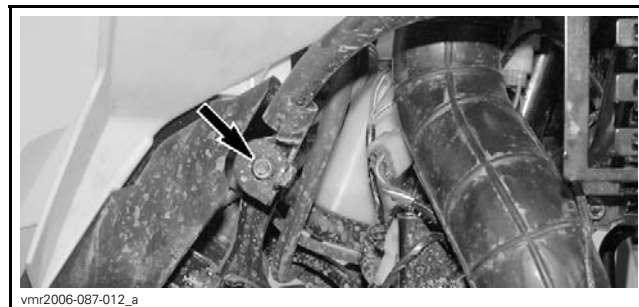
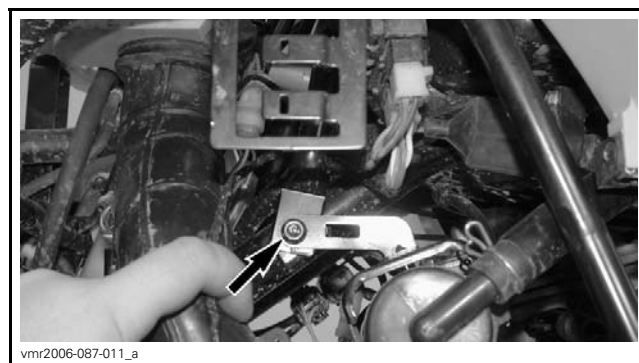
Remove the headlamp. Refer to *LIGHTS AND ACCESSORIES*.

Remove screw and bolt attaching the top of fender to the support and frame.



1. Retaining screw
2. Retaining bolt

Remove nuts retaining the support to the frame.



Remove all components attached on the support.

Installation

Reverse the removal procedure.

REAR FENDER SUPPORT

Removal

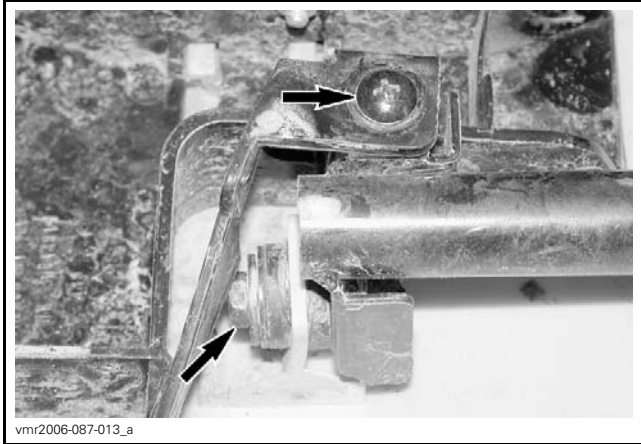
Remove rear fender. Refer to *BODY*.

Turn rear fender upside down.

Remove screws retaining rear fender support to fender.

Section 10 BODY/FRAME

Subsection 02 (FRAME)



Installation

The installation is the reverse of the removal procedure.

DS 250

VEHICLE MODEL				DS 250	
				NORTH AMERICA MODEL	EUROPEAN MODEL
ENGINE					
Engine type				4-stroke, Single Over Head Camshaft (SOHC), liquid cooled	
Starting system				Electric	
Number of cylinder(s)				1	
Number of valves				4 valves with mechanical adjustment	
Bore		Standard	mm (in)	71 (2.8)	
Stroke			mm (in)	63 (2.5)	
Displacement			cm ³ (in ³)	249.4 (15.22)	
Compression ratio				10.6:1	
Air filter type				Sponge wet type	
Exhaust system		Type		Single output	
		Spark arrester		USDA Forest Service approved	—
Valve clearance	Intake		mm (in)	0.08 to 0.12 (.0031 to .0047)	
	Exhaust		mm (in)	0.13 to 0.17 (.0051 to .0067)	
Valve stem outer diameter	Intake	New	mm (in)	4.975 to 4.990 (.1968 to .1973)	
		Service limit	mm (in)	4.900 (.1980)	
	Exhaust	New	mm (in)	4.950 to 4.975 (.1968 to .1973)	
		Service limit	mm (in)	4.900 (.1980)	
Valve guide internal diameter		New	mm (in)	5.00 to 5.012 (.1968 to .1973)	
		Service limit	mm (in)	5.030 (.1980)	
Clearance between valve stem and guide	Intake	New	mm (in)	0.010 to 0.050 (.0004 to .0015)	
		Wear limit	mm (in)	0.080 (.0032)	
	Exhaust	New	mm (in)	0.025 to 0.062 (.0010 to .0024)	
		Wear limit	mm (in)	0.100 (.0039)	
Valve spring free length	Inner	New	mm (in)	38.7 (1.525)	
		Service limit	mm (in)	35.2 (1.389)	
	Outer	New	mm (in)	40.4 (1.590)	
		Service limit	mm (in)	36.9 (1.453)	
Valve seat width			mm (in)	1.6 (.063)	
Piston measurement		New	mm (in)	70.430 to 70.480 (2.7728 to 2.7748)	
		Wear limit	mm (in)	70.380 (2.7709)	
Piston/cylinder clearance		New nominal	mm (in)	0.010 to 0.040 (.0004 to .0016)	
		Wear limit	mm (in)	0.100 (.0039)	

Section 11 TECHNICAL SPECIFICATIONS

Subsection 01 (DS 250)

VEHICLE MODEL				DS 250	
				NORTH AMERICA MODEL	
ENGINE (con'd)					
Piston pin hole diameter		New nominal	mm (in)	17.002 to 17.008 (.6694 to .6696)	
		Wear limit	mm (in)	17.020 (.6701)	
Piston pin diameter		New	mm (in)	16.994 to 17.000 (.6691 to .6693)	
		Wear limit	mm (in)	16.960 (.6677)	
Piston pin bore clearance		New	mm (in)	0.002 to 0.014 (.0001 to .0006)	
		Wear limit	mm (in)	0.020 (.0008)	
Piston ring type			1st	Upper compression ring	
			2nd	Lower compression ring	
			3rd	Oil scraper ring	
Piston ring end gap	Upper compression ring	New	mm (in)	0.15 to 0.30 (.006 to .012)	
		Wear limit	mm (in)	0.50 (.06)	
	Lower compression ring	New	mm (in)	0.30 to 0.45 (.012 to .018)	
		Wear limit	mm (in)	0.65 (.026)	
	Oil scraper ring	New	mm (in)	0.15 to 0.30 (.006 to .012)	
Piston/ring groove clearance		New	mm (in)	0.015 to 0.050 (.0006 to .0020)	
		Wear limit	mm (in)	0.090 (.0035)	
Rocker arm bore diameter		New	mm (in)	11.982 to 12.000 (.4717 to .4724)	
		Wear limit	mm (in)	12.080 (.4756)	
Rocker arm shaft diameter		New	mm (in)	11.966 to 11.984 (.4711 to .4718)	
		Wear limit	mm (in)	11.936 (.4699)	
Cylinder head warpage		Wear limit	mm (in)	0.050 (.002)	
Cylinder warpage		Wear limit	mm (in)	0.050 (.002)	
Cylinder bore		New	mm (in)	70.995 to 71.015 (2.7951 to 2.7959)	
		Wear limit	mm (in)	71.100 (2.7992)	
Cam lobe	Intake	New	mm (in)	34.880 (1.3732)	
		Wear limit	mm (in)	34.860 (1.3724)	
	Exhaust	New	mm (in)	34.740 (1.3677)	
		Wear limit	mm (in)	34.725 (1.3671)	
Crankshaft deflection		Wear limit	mm (in)	0.100 (.0039)	
Crankshaft journal diameter	MAG side	New	mm (in)	35.008 to 35.021 (1.3783 to 1.3788)	
	PTO side	New	mm (in)	30.006 to 30.019 (1.1813 to 1.1818)	
Connecting rod big end diameter		New	mm (in)	41.003 to 41.011 (1.6143 to 1.6146)	
		Wear limit	mm (in)	41.021 (1.6150)	
Connecting rod big end clearance		New	mm (in)	0.100 to 0.400 (.0039 to .0157)	
		Wear limit	mm (in)	0.600 (.0236)	

Section 11 TECHNICAL SPECIFICATIONS

Subsection 01 (DS 250)

VEHICLE MODEL			DS 250	
			NORTH AMERICA MODEL	EUROPEAN MODEL
ENGINE (con'd)				
Connecting rod big end axial play	New	mm (in)	0.00 to 0.008 (.000 to .0003)	
	Wear limit	mm (in)	0.050 (.002)	
Connecting rod small end diameter	New	mm (in)	17.016 to 17.034 (.6699 to .6706)	
	Wear limit	mm (in)	17.064 (.6718)	
Starting clutch gear inner diameter	New	mm (in)	25.026 to 25.045 (.9853 to .9860)	
	Wear limit	mm (in)	25.050 (.9862)	
Starting clutch gear outer diameter	New	mm (in)	42.192 to 42.208 (1.6611 to 1.6617)	
	Wear limit	mm (in)	42.100 (1.6575)	
ELECTRICAL				
Magneto/generator			338 W @ 5000 RPM	
Ignition system type			CDI (Capacitor Discharge Ignition)	
Ignition timing			Not adjustable	
Spark plug	Quantity		1	
	Make and type		NGK CR8E	
	Gap	mm (in)	0.8 (.03)	
Trigger coil		Ω	445.5 to 544.5	
Battery charging coil		Ω	0.315 to 0.385	
Ignition coil	Primary	Ω	0.189 to 0.231 @ 20°C (68°F)	
	Secondary	kΩ	6.54 to 9.66 @ 20°C (68°F) with spark plug cap 2.79 to 3.41 @ 20°C (68°F) without spark plug cap	
Engine RPM limiter	Forward		8450 ± 1500	
	Reverse		4000	
Battery	Type		Dry type battery	
	Voltage		12 volts	
	Nominal rating		10 A•h	
Headlamp			2 x 31.5 W	2 x 35 W
Taillight			1 x 5/21 W	
Turn signal light			N.A.	4 x 21 W
Indicator lamps	Temperature		1.7 W	1.7 W
	Neutral Pilot		1.7 W	1.7 W
	Reverse Pilot		1.7 W	1.7 W
	Forward		—	1.7 W
	High beam		—	1.7 W
	Turn pilot		—	1.2 W
Fuses	Fan		10 A	
	Headlamp		15 A	
	Other lights		15 A	
	Main fuse		30 A	

Section 11 TECHNICAL SPECIFICATIONS

Subsection 01 (DS 250)

VEHICLE MODEL			DS 250	
			NORTH AMERICA MODEL	EUROPEAN MODEL
CARBURETION				
Carburetor	Type		KEHIN with manual choke	
	Model		PTG-23	
Idle engine speed		RPM	1700 ± 100	
Main jet			105	110
Pilot jet			35	35
Needle jet			2.6	2.6
Jet needle			NB5G	NB5E
Clip position			4	2
Choke plunger position			Variable	
Adjustment	Throttle cable		1 to 3 mm (.039 to .118 in)	
	Preliminary pilot screw turn		2 turns	
	Float level		14.8 mm (.5827 in)	
Fuel	Type		Regular unleaded gasoline	
	Octane no.		87 (Ron + Mon)/2 inside North America 91 RON outside North America	91 RON
LUBRICATION				
Type			Forced circulation and splashing	
Oil filter			No oil filter on this engine	
Clearance between inner and outer rotors	New	mm (in)	0.15 (.006)	
	Wear limit	mm (in)	0.20 (.008)	
Clearance between outer rotor and pump body	New	mm (in)	0.15 to 0.20 (.006 to .008)	
	Wear limit	mm (in)	0.25 (.0098)	
Clearance between inner rotor side face and pump body	New	mm (in)	0.04 to 0.09 (.0016 to .0035)	
	Wear limit	mm (in)	0.12 (.0047)	
TRANSMISSION				
Transmission type			CVT (Continuously Variable Transmission) HI range, neutral and reverse	
Shift fork shaft diameter	New	mm (in)	11.982 to 12.000 (.4717 to .4724)	
	Wear limit	mm (in)	11.970 (.4713)	
Shift fork bore diameter	New	mm (in)	12.016 to 12.043 (.4731 to .4741)	
	Wear limit	mm (in)	12.010 (.4728)	
Shift fork claw thickness	New	mm (in)	5.930 to 6.000 (.2335 to .2362)	
	Wear limit	mm (in)	5.730 (.2256)	

Section 11 TECHNICAL SPECIFICATIONS

Subsection 01 (DS 250)

VEHICLE MODEL			DS 250	
			NORTH AMERICA MODEL	EUROPEAN MODEL
CVT				
Belt width	New	mm (in)	24.000 (.9449)	
	Wear limit	mm (in)	22.50 (.8858)	
• Drive Pulley				
Sliding sheave spacer diameter	New	mm (in)	29.946 to 29.980 (1.1790 to 1.1803)	
	Wear limit	mm (in)	29.926 (1.1782)	
Inner diameter of sliding sheave bushing	New	mm (in)	30.000 to 30.040 (1.1811 to 1.1827)	
	Wear limit	mm (in)	30.060 (1.1835)	
Outside diameter of roller	New	mm (in)	19.500 to 20.000 (.7677 to .7874)	
	Wear limit	mm (in)	19.000 (.7480)	
• Driven Pulley				
Centrifugal clutch lining thickness	New	mm (in)	6.000 (.2362)	
	Wear limit	mm (in)	3.000 (.1181)	
Clutch drum inner diameter	New	mm (in)	144.850 to 145.150 (5.7027 to 5.7146)	
	Wear limit	mm (in)	145.450 (5.7264)	
Spring free length	New	mm (in)	102.400 (4.0315)	
	Wear limit	mm (in)	97.400 (3.8346)	
Fixed sheave shaft outside diameter	New	mm (in)	40.950 to 40.990 (1.6122 to 1.6138)	
	Wear limit	mm (in)	40.930 (1.6114)	
Sliding sheave inside diameter	New	mm (in)	41.000 to 41.050 (1.6142 to 1.6161)	
	Wear limit	mm (in)	41.070 (1.6169)	
COOLING				
Coolant			BRP premixed coolant or ethyl glycol/water mix (50% coolant, 50% distilled water). Use coolant specifically designed for aluminum engines	
Fan (thermostatic switch)	Opening temperature		98°C ± 3°C (208°F ± 37°F)	
Engine thermostat	Opening temperature		82°C to 95°C (180°F to 203°F)	
Radiator cap opening pressure			90 kPa (13 PSI)	
DRIVE TRAIN				
Rear axle			Chain driven/solid axle	
Rear axle ratio			2.53:1	
STEERING				
Turning radius			3.5 m (138 in) at low speed	
Total toe (vehicle on ground)		mm (in)	3 (.118), each side (showroom position)	
Camber angle			0.7° (not adjustable)	
Tie-rod total length		mm (in)	332 (13.071)	

Section 11 TECHNICAL SPECIFICATIONS

Subsection 01 (DS 250)

VEHICLE MODEL			DS 250	
			NORTH AMERICA MODEL	EUROPEAN MODEL
SUSPENSION				
• FRONT				
Suspension type			Independent suspension — double A-arms	
Suspension travel		mm (in)	125 (5)	
Shock absorber	Qty		2	
	Type		Oil	
Spring free length		mm (in)	246.3 (9.7)	
Front preload adjustment			—	
• REAR				
Suspension type			Rigid swing arm	
Suspension travel		mm (in)	167 (6.6)	
Shock absorber	Qty		1	
	Type		Oil	
Spring free length		mm (in)	310.5 (12.2)	
Rear preload adjustment			5 settings	
BRAKES				
Front brake	Qty		2, discs	
	Type		Hydraulic	
Rear brake	Qty		1, disc	
	Type		Hydraulic	
Parking brake			Brake lever lock on RH brake lever	Separate RH lock lever on handlebar
Caliper			Floating	
Lining material			Organic	
Minimum pad thickness		mm (in)	2.0 (.0787)	
Minimum brake disk thickness	New	mm (in)	3.5 (.1378)	
	Wear limit	mm (in)	2.0 (.0787)	
Maximum brake disk warpage		mm (in)	0.1 (.0039) maximum	
TIRES AND WHEELS				
• TIRE				
Pressure	Front	Recommended	34 kPa (5 PSI)	
		Minimum	26 kPa (3.8 PSI)	
	Rear	Recommended	34 kPa (5 PSI)	
		Minimum	26 kPa (3.8 PSI)	
Size	Front		22 x 7 – 10	
	Rear		20 x 11 – 9	
• WHEELS				
Size	Front		10 x 5.5	
	Rear		9 x 8	

Section 11 TECHNICAL SPECIFICATIONS

Subsection 01 (DS 250)

VEHICLE MODEL			DS 250	
			NORTH AMERICA MODEL	EUROPEAN MODEL
CAPACITIES				
• LIQUID				
Fuel tank			12 L (3.2 U.S. gal)	
Fuel tank reserve			2.8 L (2.96 U.S. quarts)	
Engine	Capacity		Replacement: 1.2 L (1.27 U.S. quarts) Disassembly: 1.4 L (1.48 U.S. quarts)	
	Recommended		Refer to the oil viscosity chart in the <i>LUBRICATION SYSTEM</i> section	
Gearbox	Capacity		Replacement: 800 mL (27 U.S. oz) Disassembly: 900 mL (30.4 U.S. oz)	
	Recommended		XP-S chaincase oil (P/N 413 801 900) or XP-S synthetic chaincase oil (P/N 413 803 300) or 85W-140	
Cooling system			1.2 L (1.27 U.S. quarts)	
• BODY				
Total vehicle load allowed			150 kg (330 lb) includes operator, all other loads and added accessories	
DIMENSIONS				
Dry weight		kg (lb)	219 (483)	
Overall length		m (in)	1.890 (74.4)	
Overall width		m (in)	1.055 (41.5)	
Overall height		m (in)	1.115 (43.9)	
Seat height		m (in)	813 (32)	
Wheel base		m (in)	1.180 (46.5)	
Wheel Track	Front	mm (in)	810 (32)	
	Rear	mm (in)	805 (31.7)	
Ground clearance (center of vehicle)		mm (in)	150 (5.9)	
Rear rigid axle ground clearance		mm (in)	220 (8.7)	

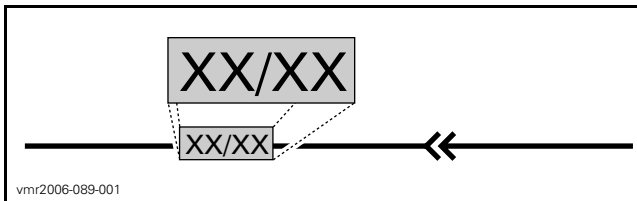
WIRING DIAGRAMS

SERVICE PRODUCTS

Description	Part Number	Page
dielectric grease	293 550 004	261

WIRE COLORS

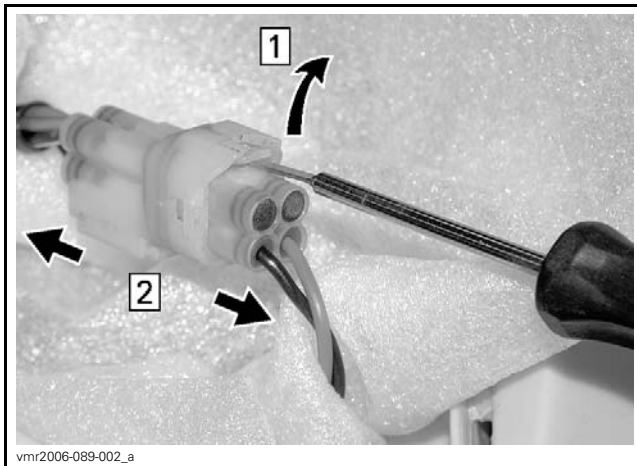
It identifies the color of a wire. When a 2-color scheme is used, the first color is the main color while the second color is the tracer color.



Example: YL/BK is a YELLOW wire with a BLACK stripe.

CONNECTORS

To release and disconnect a connector, proceed as follows.



Step 1: Lift tab and hold
Step 2: Pull connector apart

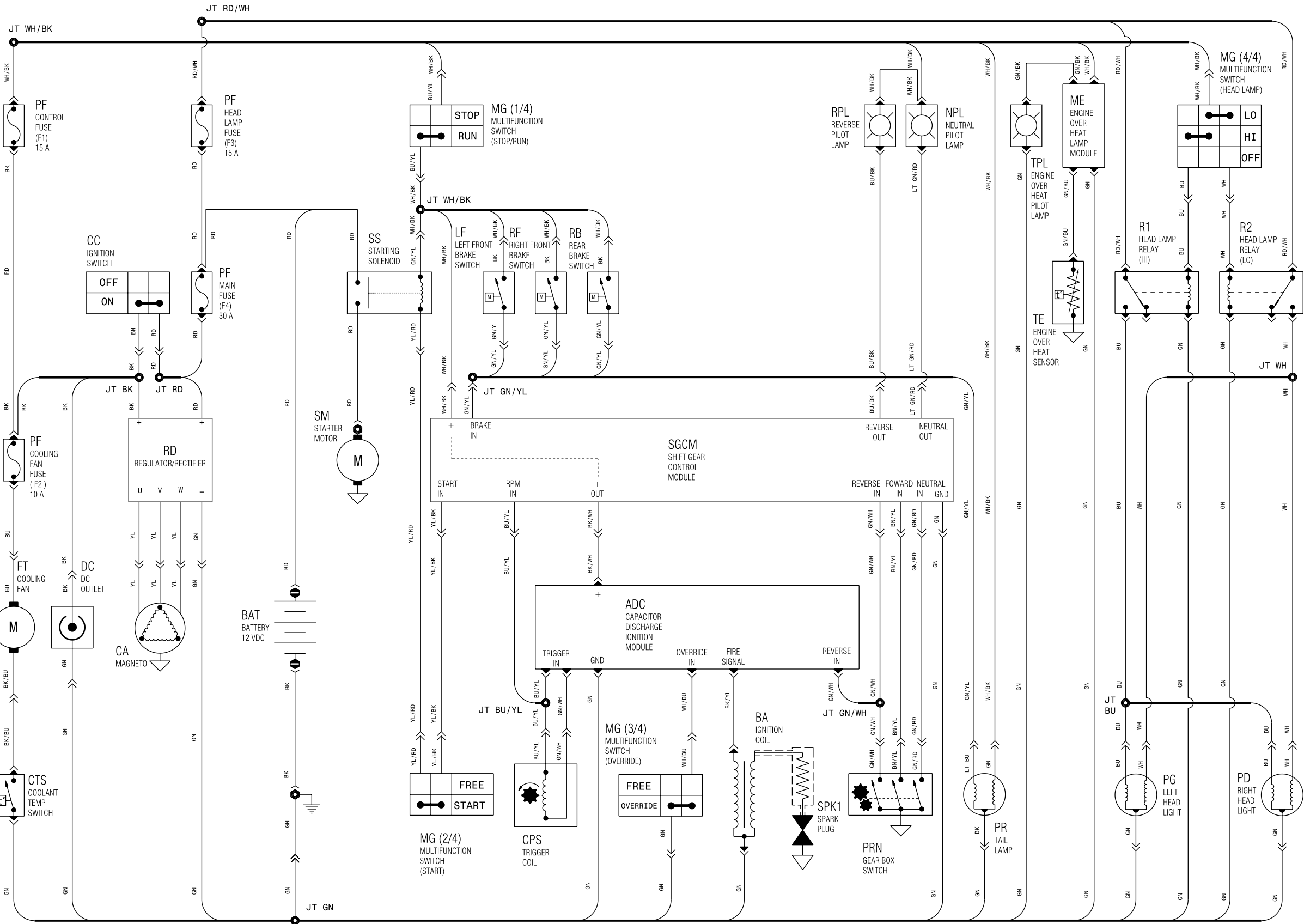
Before reconnecting connector, apply dielectric grease (P/N 293 550 004) on terminals.

⚠ WARNING

Ensure all terminals are properly crimped on the wires and all connectors are properly fastened.

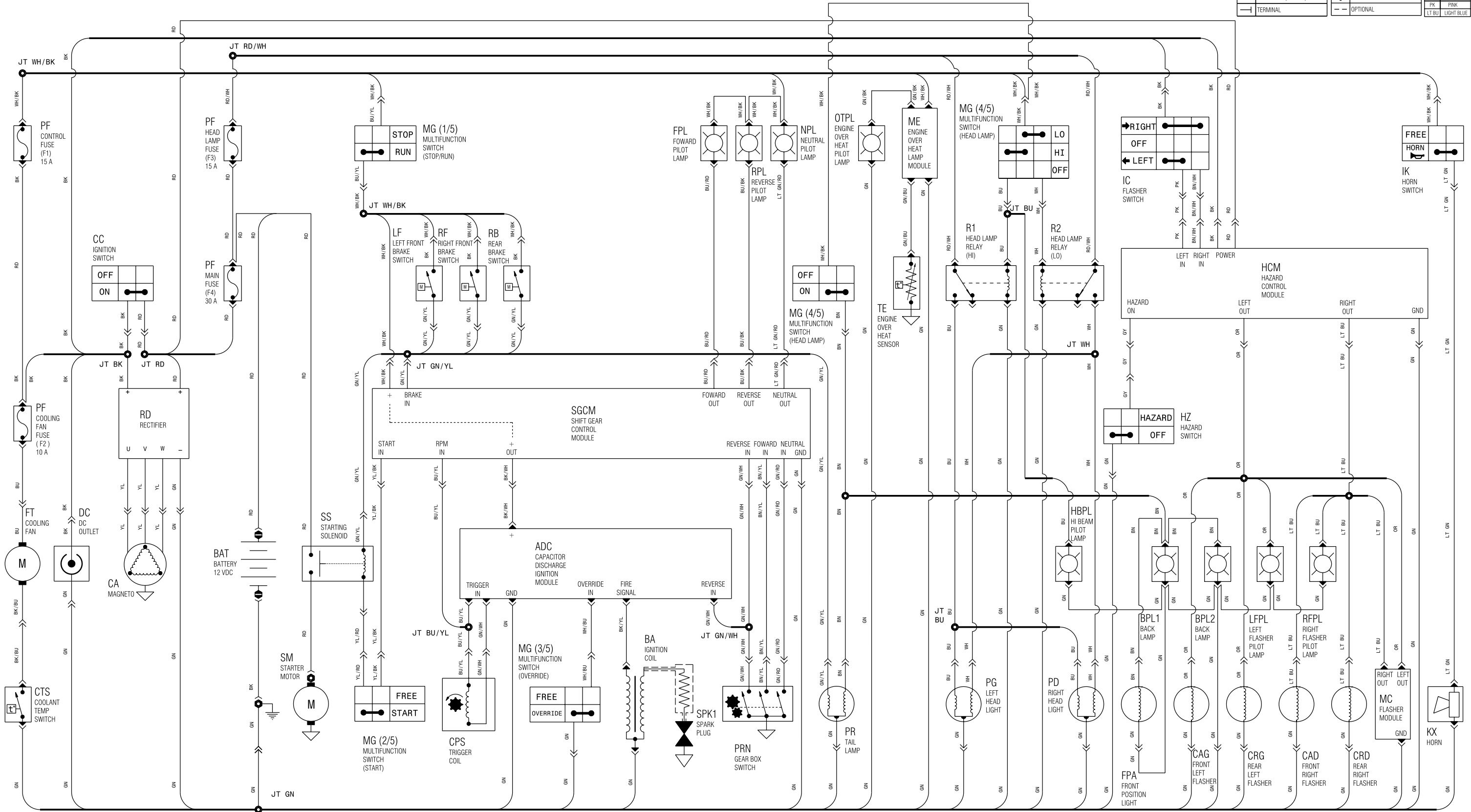
DS 250 2006 (ALL MODELS EXCEPT EUROPE MODELS)

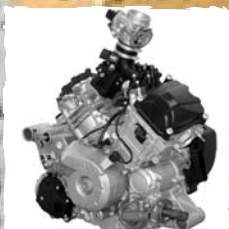
GENERAL SYSTEM



GENERAL SYSTEM

WELDED JOINT	FRAME GROUND	COLOR CODE
SHRINKED JOINT	ENGINE GROUND	BE BEIGE
CROSSED WIRE	PHILLIPS SCREW	BK BLACK
WIRE BUS	NUT CONNECTION	BU BLUE
SIMPLE CONDUCTOR WIRE	SPLICE CONNECTION	BN BROWN
FEMALE TERMINAL	SECTION OF MODULE	GN GREEN
MALE TERMINAL	COMPONENT CONNECTION	GY GREY
STEEL LINK (FRAME)	SLOTTED SCREW	OR ORANGE
TERMINAL	OPTIONAL	RD RED
		VI VIOLET
		YL YELLOW
		PK PINK
		LT BU LIGHT BLUE





219 100 236

CA

SHOP MANUAL ATV, DS 250 / ENGLISH
MANUEL DE RÉPARATION VTT, DS 250 / ANGLAIS

FAIT AU / MADE IN CANADA

U/M:P.C.