

BOMBARDIER® ATV

2004

SHOP
MANUAL

DS 650TM
DS 650TM BAJA
DS 650TM BAJA X



2 1 9 1 0 0 1 7 4

Shop Manual 2004

DS 650™

DS 650™ BAJA

DS 650™ BAJA X

BOMBARDIER
RECREATIONAL PRODUCTS



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SAFETY NOTICE

This manual has been prepared as a guide to correctly service and repair 2004 ATVs.

This edition was primarily published to be used by ATV mechanic technicians who are already familiar with all service procedures relating to Bombardier made vehicles. Mechanic technicians should attend continuous training courses given by Bombardier Training Department.

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

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

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

The content depicts parts and/or procedures applicable to the particular product at its time of 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 Bombardier, after manufacturing the product.

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

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

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

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

WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in serious injury or death.

CAUTION: Denotes an instruction which, if not followed, may damage the ATV and/or 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.

However, Bombardier 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.

WARNING

Torque wrench tightening specifications must be strictly adhered to. Locking devices (ex.: locking tab, elastic stop nut, 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.

INTRODUCTION

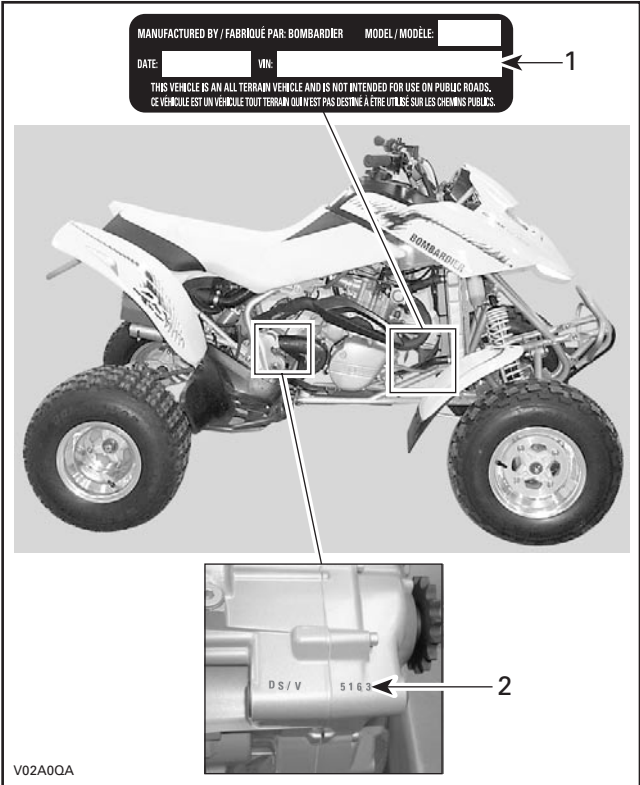
INTRODUCTION

This *Shop Manual* covers the following Bombardier made 2004 ATVs:

2004 Models

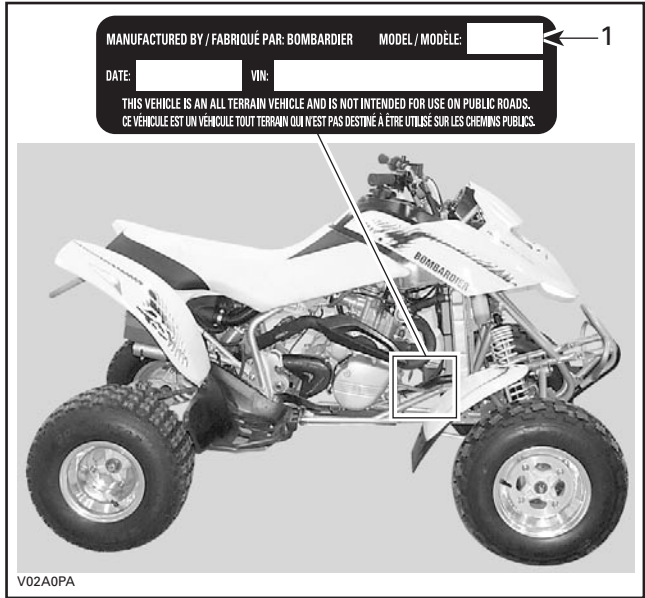
DS 650™	7717
DS 650™ Baja	7718
DS 650™ Baja X	7995
DS 650™ Intl	7719
DS 650™ Baja Intl	7720
DS 650™ Baja X Intl	7997

VEHICLE AND ENGINE SERIAL NUMBER LOCATION



TYPICAL

- 1. Vehicle
- 2. Engine



TYPICAL

- 1. Model number

ARRANGEMENT OF THE MANUAL

The manual is divided into 12 major sections:

- 01 SERVICE TOOLS AND SERVICE PRODUCTS
- 02 MAINTENANCE
- 03 ENGINE
- 04 FUEL SYSTEM
- 05 ELECTRICAL
- 06 DRIVE TRAIN
- 07 STEERING SYSTEM
- 08 SUSPENSION
- 09 BRAKES
- 10 BODY/FRAME
- 11 TECHNICAL DATA
- 12 WIRING DIAGRAMS

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

LIST OF ABBREVIATIONS USED IN THIS MANUAL

A	ampere
amp	ampere
Ah	ampere-hour
AC	alternate current
BDC	bottom dead center
BTDC	before top dead center
°C	degree Celsius
cm	centimeter
cm ²	square centimeter
cm ³	cubic centimeter
DC	direct current
°F	degree Fahrenheit
fl. oz	fluid ounce
ft	foot
GRD	ground
hal.	halogen
I.D.	inside diameter
IDI	induction discharge ignition
imp. oz	imperial ounce

in	inch
in ²	square inch
in ³	cubic inch
k	kilo (thousand)
kg	kilogram
km/h	kilometer per hour
kPa	kilo pascal
L	liter
lb	pound
lbf	pound (force)
LH	left hand
m	meter
MAG	magneto
Max.	maximum
Min.	minimum
mL	milliliter
mm	millimeter
MPH	mile per hour
N	newton
N.A.	not applicable
no.	number
00.0	continuity
O.L.	overload (open circuit)
O.D.	outside diameter
OPT	optional
oz	ounce
P/N	part number
PSI	pound per square inch
PTO	power take off
RPM	revolution per minute
Sp. Gr.	specific gravity
TDC	top dead center
U.S. oz	ounce (United States)
V	volt
Vac	volt (alternative current)

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

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.

Illustration number for publishing process.

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

Document number for publishing process.

Page numbering system:
03: ENGINE section
05: CYLINDER AND HEAD subsection
1: First page of this subsection

Page heading indicates section and subsection detailed.

Subsection title indicates beginning of the subsection.

Exploded view assists you in identifying parts and related positions.

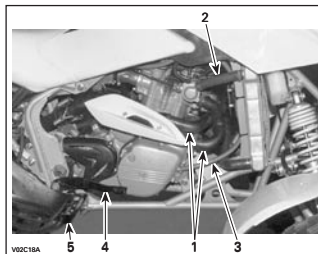
Bold face number indicates special procedure concerning this part.

TYPICAL PAGE

Section 03 ENGINE

Subsection 02 (REMOVAL AND INSTALLATION)

- footrest (refer to BODY)
- engine pinion no. 2 (refer to Engine Pinion section)



RH SIDE OF ENGINE

1. Exhaust pipes
2. Radiator inlet hose
3. Oil line
4. Brake pedal
5. Footrest

- carburetor and carburetor adaptor (refer to **CARBURETOR AND AIR INTAKE SILENCER**)
 - gearshift pedal **no. 9**.
- Unscrew neutral switch connector.

Removal

Remove the upper support bracket no. 10 completely.



Install engine lifting tool (P/N 529 035 610) then, install a hoist.

Remove:

- upper engine support bolt **no. 11** ←
- lower bolts **no. 12** retaining the engine support **no. 13** on either side, then, remove supports
- front lower mounting bolt **no. 14**
- rear lower mounting bolt **no. 15**
- rear upper mounting bolt **no. 16**.

Remove engine from vehicle.

Installation

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

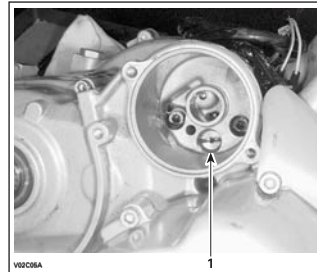
Reattach cables, hoses, wiring harness, etc.

Adjust clutch cable.

Bleed rear brake.

Before to start th

Unfasten pressure bleeding screw.



BEHIND OIL FILTER

1. *Bleeding screw*

Unscrew and remove one spark plug.

Turn engine using starter until oil emerges in filter chamber.

Tighten pressure bleeding screw.

Install oil filter.

This operation activated the oil pump. Check if vehicle runs correctly.

Call-outs for —
above illustration.

Reference to look-up a certain section and subsection.
In this case it concerns carburetor and air intake silencer.

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

- Subtitle indicates main procedure to be carried-out.

INTRODUCTION

GENERAL INFORMATION

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

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

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

ILLUSTRATIONS AND PROCEDURES

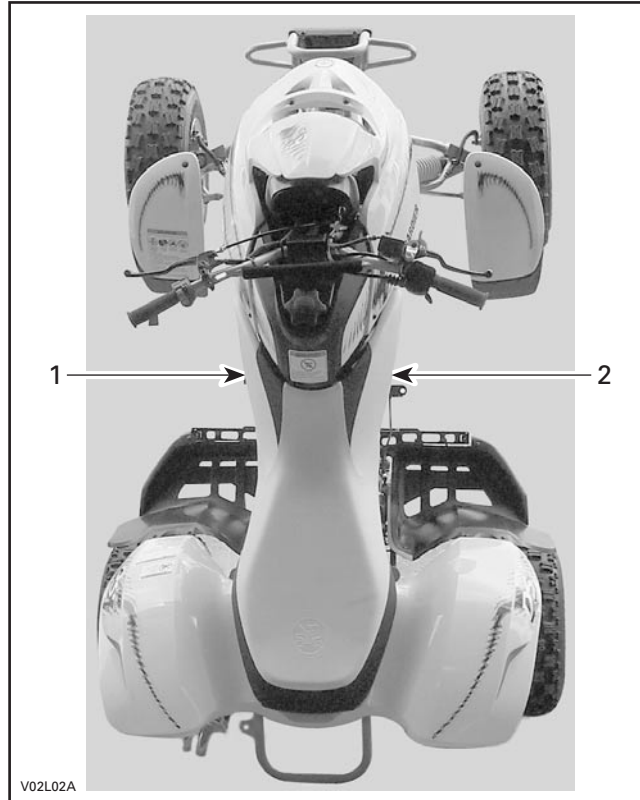
Illustrations and photos show the typical construction of the different assemblies and, in all cases, may not reproduce the full detail or exact shape of the parts shown, however, they represent parts that have the same or a similar function.

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 interrelated, 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.

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



1. Left
2. Right

SELF-LOCKING FASTENERS PROCEDURE

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

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

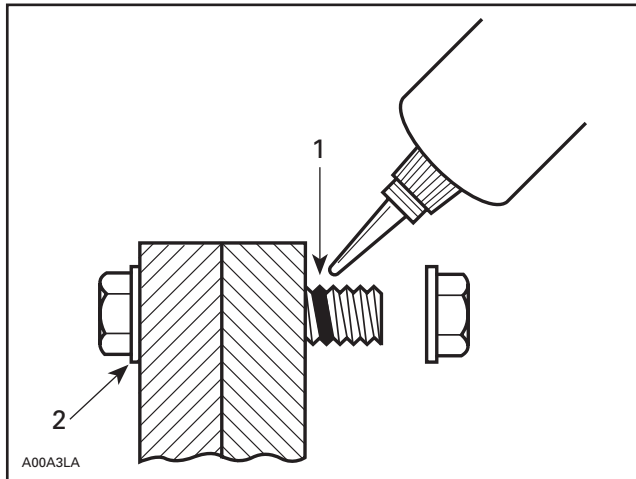
LOCTITE APPLICATION PROCEDURE

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

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

Threadlocker

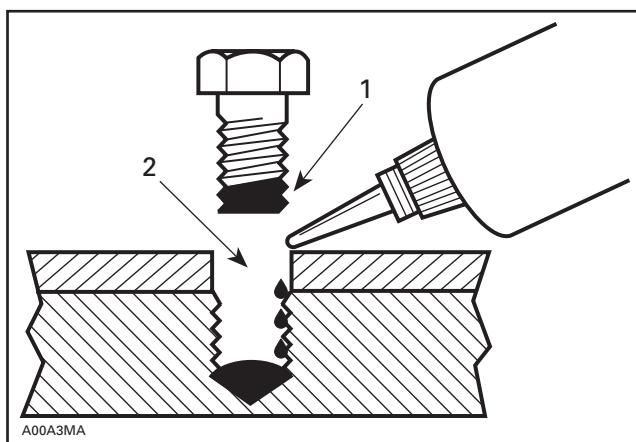
Uncovered Holes (bolts and nuts)



1. Apply here
2. Do not apply

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

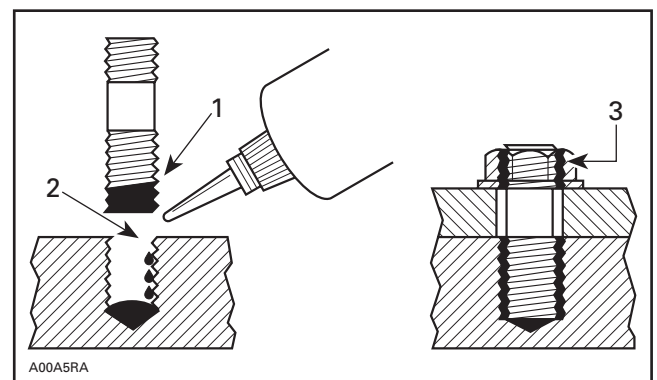
Blind Holes



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

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

Stud in Blind Holes

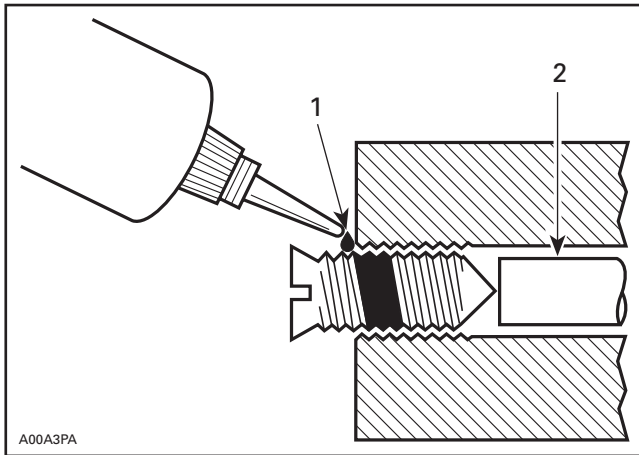


1. On threads
2. On threads and in the hole
3. Onto nut threads

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

INTRODUCTION

Adjusting Screw



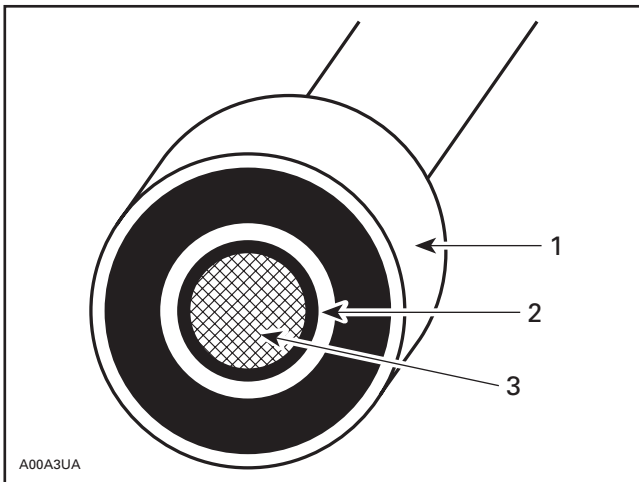
1. Apply here
2. Plunger

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

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

Mounting on Shaft

Mounting with a Press



1. Bearing
2. Proper strength Loctite
3. Shaft

Standard

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

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

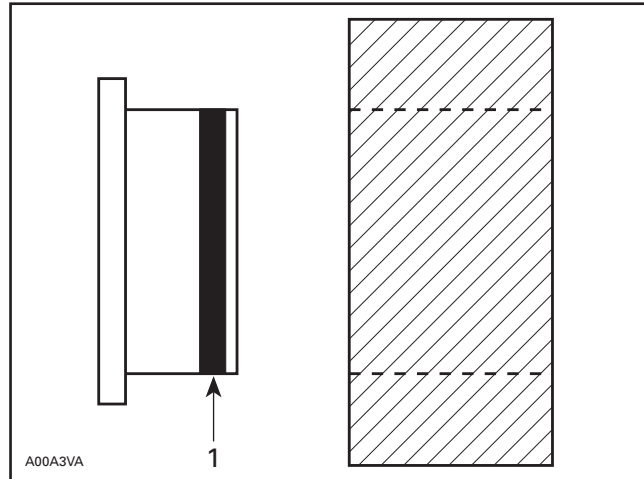
3. DO NOT use anti-seize Loctite or any similar product.
4. No curing period is required.

Mounting in Tandem

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

Case-In Components

Metallic Gaskets



1. Proper strength Loctite

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

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

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

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

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

TIGHTENING TORQUES

Tighten fasteners to torque mentioned in exploded views and text. When they are not specified refer to following tables. The tables also give the metric conversion.

WARNING

Torque wrench tightening specifications must be strictly adhered to.

Locking devices (ex.: locking tab, elastic stop nut, 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 and bolts in accordance with the following procedure:

1. Manually screw all screws, bolts and/or nuts.
2. 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.

3. Torque at the recommended torque value.

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

TIGHTENING TORQUE		STRENGTH GRADE			
		GRADE 5.8	GRADE 8.8	GRADE 10.9	GRADE 12.9
DIMENSION	M4	1.5 to 2 N•m (13 to 18 lbf•in)	2.5 to 3 N•m (22 to 27 lbf•in)	3.5 to 4 N•m (31 to 35 lbf•in)	4 to 5 N•m (35 to 44 lbf•in)
	M5	3 to 3.5 N•m (27 to 31 lbf•in)	4.5 to 5.5 N•m (40 to 47 lbf•in)	7 to 8.5 N•m (62 to 75 lbf•in)	8 to 10 N•m (71 to 89 lbf•in)
	M6	6.5 to 8.5 N•m (58 to 75 lbf•in)	8 to 12 N•m (71 to 106 lbf•in)	10.5 to 15 N•m (93 to 133 lbf•in)	16 N•m (12 lbf•ft)
	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)

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

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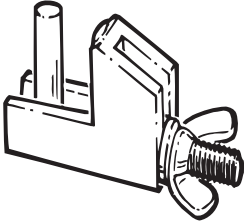
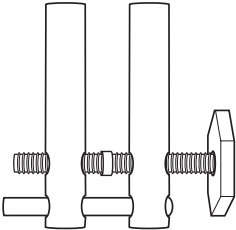
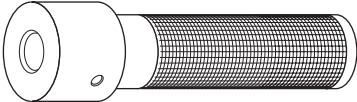
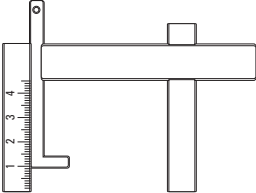
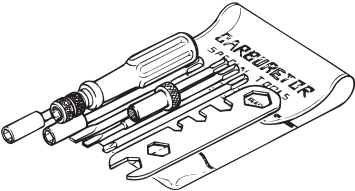
SERVICE TOOLS

This is a list of tools to properly service ATV vehicles. If you need to replace or add to your tool inventory, these items can be ordered through the regular parts channel.

Following mention points out new tool: 

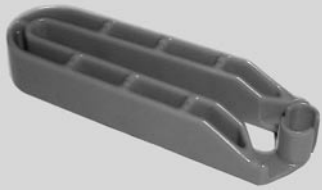
Section 01 SERVICE TOOLS AND SERVICE PRODUCTS

Subsection 02 (SERVICE TOOLS)

	All Models	MANDATORY		All Models	RECOMMENDED
Small Hose Pincher 295 000 076			Valve Spring Compressor 529 035 724		
					
Large Hose Pincher 529 032 500	All Models	RECOMMENDED	Insertion Jig Handle 420 877 650		
					
Fuel System Pressure Tester 529 033 100			Vacuum/Pressure Pump 529 021 800		
					
Low Speed Screw Adjuster 529 035 732	All Models	RECOMMENDED	Leak Down Tester 529 035 661		
					
Float Level Gauge 529 035 520					
					
Carburetor Kit 404 112 000					

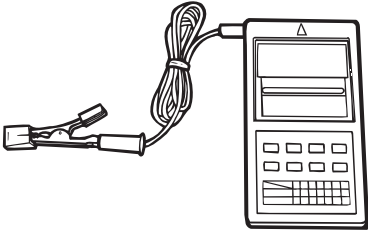
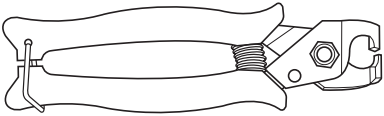
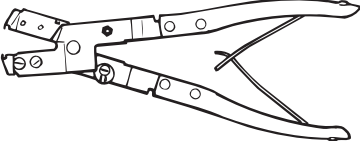
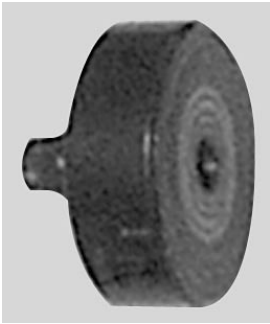
Section 01 SERVICE TOOLS AND SERVICE PRODUCTS

Subsection 02 (SERVICE TOOLS)

 Multimeter 529 035 868			 Terminal Remover Snap-On TT660-4		
 Oil Pressure Adapter 529 035 652			 Shock Tool 529 035 636		
 Oil Pressure Gauge 529 035 709			NEW  Handle Grip Insertion Tool 529 035 897	All Models	
 Connection Tool 529 035 714			NEW  Crimp Plier 529 035 730		
		RECOMMENDED			RECOMMENDED

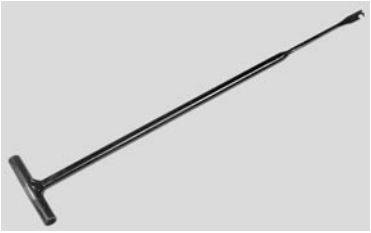
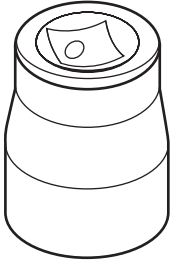
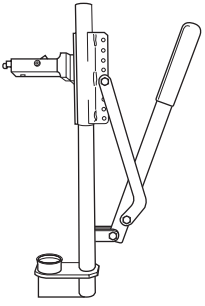
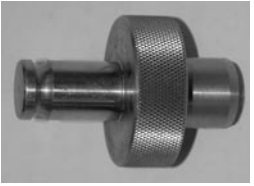
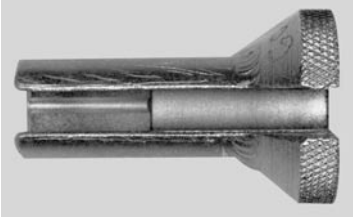
Section 01 SERVICE TOOLS AND SERVICE PRODUCTS

Subsection 02 (SERVICE TOOLS)

		RECOMMENDED
Digital/Inductive Type Tachometer 529 014 500		
	DS 650/Baja/X Youth models Outlander 330 Outlander 400 Quest 500/650 Traxter	
		
Cable Luber 529 035 738		
	DS 650/Baja/X Outlander 330 Outlander 400 Quest 500/650 Rally 200	MANDATORY
Crankshaft Locking Bolt 529 035 617		
	DS 650/Baja/X Outlander 330 Outlander 400 Quest 500/650 Rally 200	RECOMMENDED
Valve Stem Seal Pliers Snap-On YA 8230		
		
Valve Spring Compressor Cup 529 035 764		
	Caillau Pliers 295 000 054	MANDATORY
	CV Boot Clamp Installation and Removal Tool 295 000 069	
	Crankshaft Protector 420 876 557	
	Flywheel Puller 529 035 748	

Section 01 SERVICE TOOLS AND SERVICE PRODUCTS

Subsection 02 (SERVICE TOOLS)

 Exhaust Spring Installer/Remover 529 035 401	DS 650/Baja/X Outlander 330 Outlander 400 Quest 500/650 Traxter	RECOMMENDED	 41 mm Socket PROTO 5541	Outlander 330 Outlander 400 Quest 500/650 Traxter	MANDATORY
 Shock Spring Disassembly Tool 529 035 504	Outlander 330 Outlander 400 Quest 500/650 Rally 200 Traxter	RECOMMENDED	 Hub Puller 529 035 612	Outlander 330 Outlander 400 Quest 500/650 Traxter	MANDATORY
 Needle Bearing Installer (main shaft in crankcase) 529 035 762	Outlander 330 Outlander 400 Quest 500/650 Rally 200	RECOMMENDED	 Differential Spanner Socket 529 035 649	Outlander 330 Outlander 400 Quest 500/650 Traxter	RECOMMENDED
			 Backlash Measurement Tool 529 035 665	Outlander 330 Outlander 400 Quest 500/650 Traxter	RECOMMENDED
			 Choke Nut Tool 529 035 660		RECOMMENDED

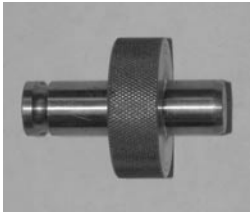
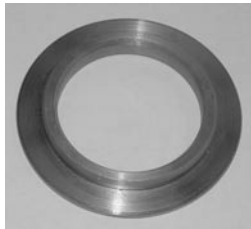
Section 01 SERVICE TOOLS AND SERVICE PRODUCTS

Subsection 02 (SERVICE TOOLS)

Oil Seal Installer (crankshaft oil seal on magneto cover) 529 035 759			Bevel Gear Lock Pin/Driven Clutch Expander 529 035 747		
	Outlander 330 Outlander 400 Quest 500/650 Traxter	RECOMMENDED		Outlander 330 Outlander 400 Quest 500/650	MANDATORY
Oil Seal Installer (shift shaft oil seal on magneto cover) 529 035 758					
			Driven Clutch Holding Tool 529 035 771		
Water Pump Ceramic Seal Installer 529 035 766					
	DS 650/Baja/X Outlander 330 Outlander 400	MANDATORY	Torque Angle Snap-On TA 36		
				Outlander 330 Outlander 400 Quest 500/650	RECOMMENDED
	DS 650/Baja/X Outlander 330 Quest 500/650	RECOMMENDED	Oil Seal Installer (crankshaft oil seal on crankcase) 529 035 760		
Valve Stem Seal Installer 529 035 687					

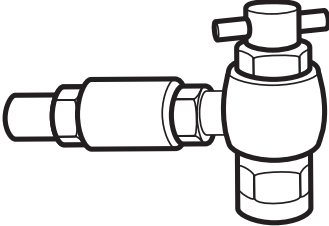
Section 01 SERVICE TOOLS AND SERVICE PRODUCTS

Subsection 02 (SERVICE TOOLS)

		RECOMMENDED		Rally 200 Traxter	MANDATORY
Needle Bearing Installer (bevel gear shaft in crankcase) 529 035 763			46 mm Socket for Crankshaft/ Driven Pulley 529 035 648		
	Outlander 330 Outlander 400 Quest 500/650		Magneto Cover Removal Tool 529 035 622		
		RECOMMENDED	UP to 2003 models 	DS 650/Baja/X	MANDATORY
Output Shaft Oil Seal Installer 529 035 941			64 mm (2-1/2 in) Crow-foot Rear Axle Nut 529 035 729		
					
Valve Guide Installer 529 035 853	Quest 500/650 Rally 200		Rear Axle Key 529 035 951		
		MANDATORY			
Blind Hole Bearing Puller Snap-On			Clutch Basket Holder 529 035 618		
	Quest 500/650 Traxter				
6 Pin Harness for Magneto 529 035 604					

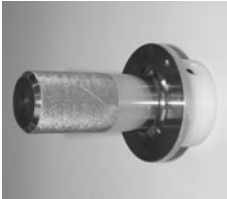
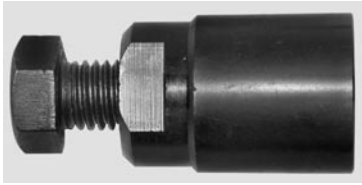
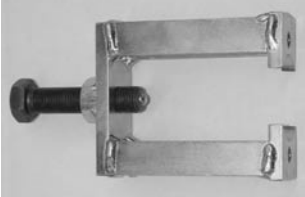
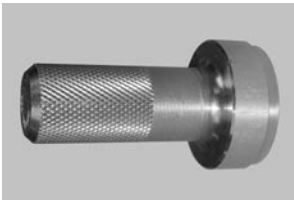
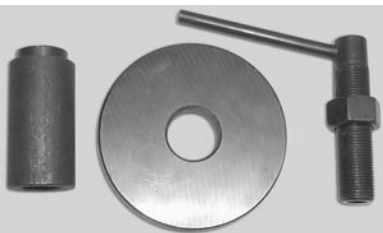
Section 01 SERVICE TOOLS AND SERVICE PRODUCTS

Subsection 02 (SERVICE TOOLS)

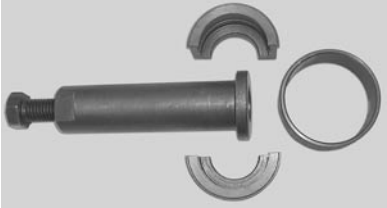
					
Front Hub Seal Installer 529 035 632			Front Knuckle Wear Ring Installer 529 035 637		
			UP to 2003 models		
Clutch Shaft Bearing Installer 529 035 691					
			Brake Hub Remover 529 035 695		
Clutch Shaft Seal Installer 529 035 693					
			Shock Charging Tool 529 035 570		
Ball Joint Guide 529 035 705					
			Gas fill tool kit (needle type) 503 190 102		
Ball Joint Drive 529 035 706					
UP to 2003 models			Rear Axle Wear Ring Installer 529 035 694		
					
Swing Arm Key 529 035 696					
					
Rear Hub Seal Installer 529 035 634					

Section 01 SERVICE TOOLS AND SERVICE PRODUCTS

Subsection 02 (SERVICE TOOLS)

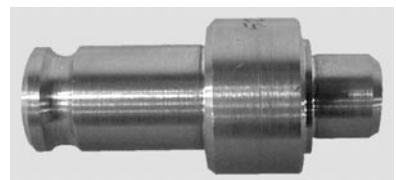
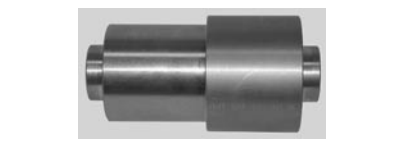
 Crankshaft Bushing Installer 529 035 689			 Magneto Puller (4-stroke engines) 529 035 798		MANDATORY
 Primary Crankshaft Gear Puller 529 035 624	DS 650/Baja/X	RECOMMENDED	 Crankshaft Bearing Puller (4-stroke engines) 529 035 791		
 Crankshaft Bushing Remover 529 035 688			 Valve Seat Remover/Installer (4-stroke engines) 529 035 794	Youth models	RECOMMENDED
<u>ILLUSTRATION NOT AVAILABLE</u> Flywheel Puller (4-stroke engines) 529 035 792	Youth models	MANDATORY	 Crankcase Puller (2-stroke engines) 529 035 796		
 Valve Gap Adjuster (4-stroke engines) 529 035 793			 Crankcase Installer (2-stroke engines) 529 035 797		
 Oil Filter Rotor Puller (4-stroke engines) 529 035 795					

Section 01 SERVICE TOOLS AND SERVICE PRODUCTS
Subsection 02 (SERVICE TOOLS)

	Youth models	RECOMMENDED		Outlander 330 Outlander 400	RECOMMENDED
					
	Outlander 330 Outlander 400	MANDATORY			
					
					
					
					

Section 01 SERVICE TOOLS AND SERVICE PRODUCTS

Subsection 02 (SERVICE TOOLS)

					
Balancer Shaft Oil Seal Installer 529 035 933			Wear Ring Installer (front drive shafts) 529 035 927		
				Outlander 330 Outlander 400	RECOMMENDED
Starter drive needle bearing installer 529 035 934			Wear Ring Installer (rear drive shafts) 529 035 915		
					
Oil Seal Protector 529 035 935			Adaptor Kit for Shock Spring Remover (P/N 529 035 504) 529 035 928		
	Outlander 330 Outlander 400	RECOMMENDED			
Trailing Arm Bearing Remover/Installer (wheel side) 529 035 918			Drive Clutch Holding Tool 529 035 745		
				Quest 500/650	MANDATORY
Trailing Arm Bearing Remover/Installer (frame side) 529 035 920			Bearing Alignment Tool 529 035 806		
					
Trailing Arm Bearing Removal Support 529 035 922					

Subsection 02 (SERVICE TOOLS)

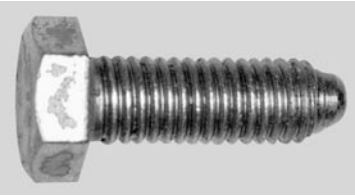
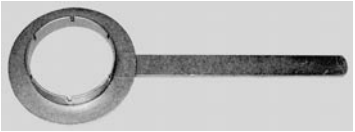
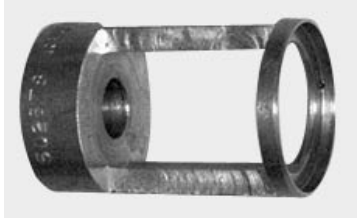
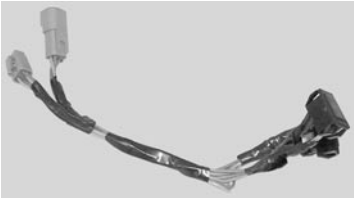
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Subsection 02 (SERVICE TOOLS)

RECOMMENDED

Section 01 SERVICE TOOLS AND SERVICE PRODUCTS

Subsection 02 (SERVICE TOOLS)

	Traxter	MANDATORY		Traxter	RECOMMENDED
Lifting Bar 529 035 610			Crimping Tool (for AMP connectors) 295 100 164		
					
Jumper for Self Diagnosis 529 035 605			Lifting Ring 529 035 644		
			UP to 2000 		
Crankshaft Locking Bolt 529 035 645			Front Suspension Spacer Bar 529 035 611		
					
Spanner Tool for Clutch Basket 529 035 647			Valve Spring Compressor Cup 529 035 725		
					
T-Harness for Solenoids Dianosis 529 035 653					

SERVICE PRODUCTS

This is a list of products to properly service ATV vehicles. If you need to replace or add to your tool inventory, these items can be ordered through the regular parts channel.

Following mention points out new tool: 

Section 01 SERVICE TOOLS AND SERVICE PRODUCTS

Subsection 03 (SERVICE PRODUCTS)

			
Loctite® 243 Medium-Strength Threadlocker (10 mL) (blue) 293 800 060		Loctite® 567 Pipe Sealant (250 mL) 293 800 013	
			
Loctite® 609 Retaining Compound Loctite RC (10 mL) (green) 413 703 100		Suspension Synthetic Grease (400 g) 293 550 033	
			
Loctite® Primer Primer N 128 g (5 oz) 293 800 041		Synthetic Grease (400 g) 293 550 010	
			
Loctite® Anti-Seize Lubricant (236 mL) 293 800 070		Bombardier ATV Tire Sealant (946 mL) 715 000 130	
			
		Brake Fluid DOT 4 (354 mL) 293 600 062	
	All Models		All Models

Section 01 SERVICE TOOLS AND SERVICE PRODUCTS

Subsection 03 (SERVICE PRODUCTS)



Bombardier Fuel Stabilizer
(12 x 8 oz)
413 408 600



BOMBARDIER LUBE
(12 x 14 oz)
293 600 016



Bombardier Premixed Coolant 50/50
- 37°C (- 35°F)
(16 x 1 L)
293 600 038



Bombardier Pulley Flange Cleaner
(320 g)
413 711 809



Bombardier Storage Oil
(350 g spray can)
(12 x 350 g)
Canada: 413 711 600
U.S.: 413 711 900



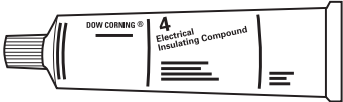
Bombardier Heavy Duty Cleaner
293 110 001 (400 g)
293 110 002 (4 L)

All Models

All Models

Section 01 SERVICE TOOLS AND SERVICE PRODUCTS

Subsection 03 (SERVICE PRODUCTS)

			DS 650/Baja/X Quest 500/650 Traxter
Bombardier Plastic & Vinyl Cleaner (6 x 1 L) 413 711 200		Loctite® 271 High Strength Threadlocker (10 mL) (red) 293 800 005	
	All Models		
Bombardier Synthetic 4-Stroke Oil 5W-40 (12 x 1 L) 293 600 039		Loctite® 277 High Strength Retaining Compound (10 mL) (red) 293 800 073	
Air Filter Cleaner (2 L) 293 600 059			
Air Filter Oil (1 L) 293 600 058		Loctite® 518 Paste Gasket Gasket Eliminator (50 mL) 293 800 038	
			
Silicone Dielectric Grease (3 oz) 293 550 004		Loctite® 384 Thermally Conductive Adhesive (300 mL) 293 800 099 CAUTION: This product must be stored at 5°C (41°F).	Rally 200
			
		Loctite® 5150 Clear Silicone Sealant (300 mL) 293 800 086	

Section 01 SERVICE TOOLS AND SERVICE PRODUCTS

Subsection 03 (SERVICE PRODUCTS)

 Bombardier Chaincase Oil (16 x 250 mL) 413 801 900	Rally 200	 Loctite® Chisel Gasket/Paint Remover 510 g (18 oz) 413 708 500	DS 650/Baja/X Quest 500/650 Rally 200 Traxter
 Bombardier Synthetic Chaincase Oil (12 x 355 mL) 413 803 300		 Cable Lubricant (400 g) 293 600 041	
 Loctite® 648 High Temperature and Strength Retaining Compound (5 mL) (green) 413 711 400	DS 650/Baja/X Outlander 330 Outlander 400 Rally 200 Traxter	 Synthetic Grease (60 g) 293 550 019	DS 650/Baja/X Outlander 330 Outlander 400 Quest 500/650 Traxter

Section 01 SERVICE TOOLS AND SERVICE PRODUCTS

Subsection 03 (SERVICE PRODUCTS)

		
High Temp RTV Silicone ULTRA COPPER (85 g) 413 800 090		
		
Kayaba shock absorber oil 293 600 035	DS 650/Baja/X	
		
Marvin shock absorber oil 503 190 103		
		
Loctite® 406 Instant Adhesive (must be used with tapered tip) (20 g) 293 800 095		Quest 500/650 Traxter
		
Smoothflow Tapered Tips 16ga #511 rtt-b (not sold by Bombardier), call EFD Inc, 1 800 556-3484		
		
Loctite® 5900 RTV Silicone Sealant (300 mL) 293 800 066		
		
Loctite® Maxi-Coat Heavy Duty Rustproofing (340 g) 293 800 105		Outlander 330 Outlander 400

Section 01 SERVICE TOOLS AND SERVICE PRODUCTS

Subsection 03 (SERVICE PRODUCTS)

 Loctite® 5910 Flange Sealant (300 mL) 293 800 081	Outlander 330 Outlander 400 Quest 500/650
--	--

 Molykote G-n Paste (50 g) 711 297 433	Rally 200 Traxter
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 Loctite® 515 Paste Gasket Gasket Eliminator (50 mL) 413 702 700	DS 650/Baja/X Traxter
--	----------------------------------

 Molykote PG 54 (10 g) 420 899 763	Outlander 330 Outlander 400 Traxter
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 Bombardier Differential Oil (946 mL) 293 600 043	Outlander 330 Outlander 400 Quest 500/650 Traxter
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 Molykote 111 (150 g) 413 707 000	DS 650/Baja/X Rally 200 Traxter
 Super Lube Grease 293 550 030	

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MAINTENANCE CHART

NOISE EMISSION CONTROL SYSTEM REGULATION

TAMPERING WITH NOISE CONTROL SYSTEM 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 02 MAINTENANCE

Subsection 02 (MAINTENANCE CHART)

MAINTENANCE CHART

I: Inspect, verify, clean, adjust, lubricate, replace if necessary C: Clean L: Lubricate R: Replace	INITIAL 10 HOURS OR 400 KM (250 M.)	EVERY 25 HOURS OR 1250 KM (800 M.)	EVERY 50 HOURS OR 2500 KM (1600 M.)	EVERY 100 HOURS OR 5000 KM (3100 M.) OR ONCE A YEAR	EVERY 200 HOURS OR 10000 KM (6200 M.) OR TWO YEARS	REFER TO THE SECTION
ENGINE/TRANSMISSION						
Engine/transmission oil level	EVERY INSPECTION					N.A.
Engine/transmission oil and filter	R		R			Maintenance/ Lubrication
Spark arrester				C		
Valve clearance	I			I		
Clutch lever	I		I			
Oil reservoir strainer					C	Lubrication
Engine mount fasteners	I			I		Removal and Installation
Exhaust system	I			I		
Condition of seals	I			I		N.A.
Coolant level	EVERY INSPECTION					
Coolant ①	I		I		R	Cooling System
Radiator cap/cooling system pressure test	I				I	
Radiator condition/cleanliness (radiator fines)	I		I			
Clutch and transmission operation				I		Clutch and/or Transmission
FUEL SYSTEM						
Air filter		C	R			Maintenance/ Lubrication
Fuel lines and connections	I			I		Fuel Circuit
Fuel tank strainer replacement					R	
Carburetor	I			I		Carburetor and Air Intake Silencer
ELECTRICAL						
Spark plugs	I			R		Ignition System
Battery connections	I			I		N.A.
Wiring harness, cables and lines	I			I		Instruments and Accessories
Ignition switch, engine stop switch and start button	I			I		
Lighting system (hi/lo intensity, brake light, head-lamp aiming, etc.)	I			I		
DRIVE TRAIN						
Drive chain lubrication	EVERY INSPECTION					Front Drive and Rear Axle
Drive chain adjustment						
Drive chain protector and roller condition						
Sprockets	I			I		
Wheel bearing	I		I	L		
Rear wheel hub					L	
Rear axle tightness (eccentric axle housing) bolts and brake hub locking nuts	I	I				

Section 02 MAINTENANCE

Subsection 02 (MAINTENANCE CHART)

I: Inspect, verify, clean, adjust, lubricate, replace if necessary C: Clean L: Lubricate R: Replace	INITIAL 10 HOURS OR 400 KM (250 M.)	EVERY 25 HOURS OR 1250 KM (800 M.)	EVERY 50 HOURS OR 2500 KM (1600 M.)	EVERY 100 HOURS OR 5000 KM (3100 M.) OR ONCE A YEAR	EVERY 200 HOURS OR 10000 KM (6200 M.) OR TWO YEARS	REFER TO THE SECTION
STEERING/CONTROL SYSTEMS						
Throttle/housing/cable	I		I			Steering/ Controls System
Handlebar fastener	I			I		
Steering system	I			I		
Tie rod ends	I		I			
Front wheel alignment	I			I		
Choke	I			I		Carburetor and Air Intake Silencer
Tire wear and pressure	EVERY INSPECTION					Maintenance/ Lubrication
Front wheel hub	EVERY INSPECTION					
Wheel nuts and studs	I		I			
Wear and condition of tires	I	I				
SUSPENSION						
Swing arm	I	I				Front Suspension and/or Rear Suspension
Swing arm lubrication	EVERY INSPECTION					
A-arm	I	I + L				
Ball joint boot	I	I				
Ball joint	I	I				
Shock absorber		I				
BRAKE						
Brake fluid front/rear	I	I			L	Hydraulic Brakes
Brake system (discs, hoses, etc.)				I		
Brake pads		I				
Brake line fittings	I	EVERY INSPECTION				
BODY/FRAME						
Engine area	C		C			N.A.
Chassis fasteners			I			
Skid plate and A-arm protectors	EVERY INSPECTION					Body and/or Frame
Seat latch			I			
Frame				I		

N.A.: Not Available

The initial maintenance is very important and must not be neglected.

① Every 50 hours, check coolant strength.

NOTE: Some riding conditions and hauling loads may result in requiring more frequent maintenance. Some items are part of the pre-operation checks and must always be performed prior to operating the vehicle.

MAINTENANCE/LUBRICATION

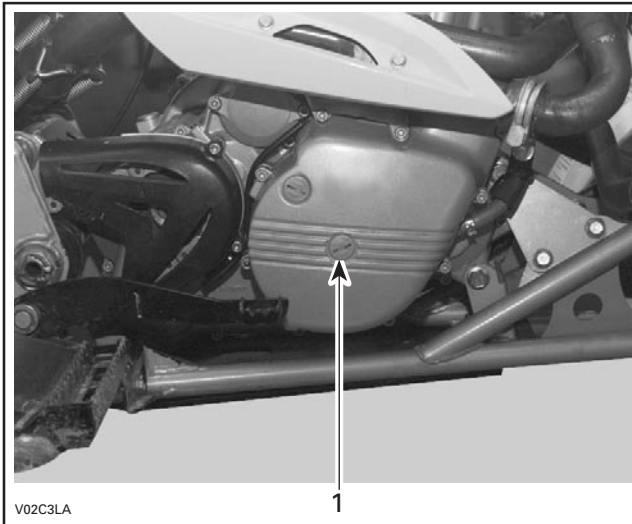
ADJUST VALVE CLEARANCE

Removal

Remove:

- fuel tank
- valve cover
- spark plugs.

Unfasten centre screw plug to right of engine housing cover.



RH SIDE OF VEHICLE

1. Remove this screw plug

Move crankshaft into TDC setting with an Allen key.
Use feeler gauge to check valve clearance and change adjusting plates if necessary.

VALVE CLEARANCE mm (in)	
SERVICE LIMIT	
Exhaust	0.10 to 0.15 (.004 to .006)
Intake	

Note down valve clearance recorded.

Unfasten socket head screw beside support for oil return and secure crankshaft with the crankshaft locking bolt (P/N 529 035 617).

NOTE: Check tightness with the allen key.

To adjust valves, remove the camshaft bridges and the camshafts.

Remove adjusting plates, blow clean with compressed air.

Installation

NOTE: Before installation, check thickness of adjusting plates with micrometer.

For installation, reverse the removal procedure.

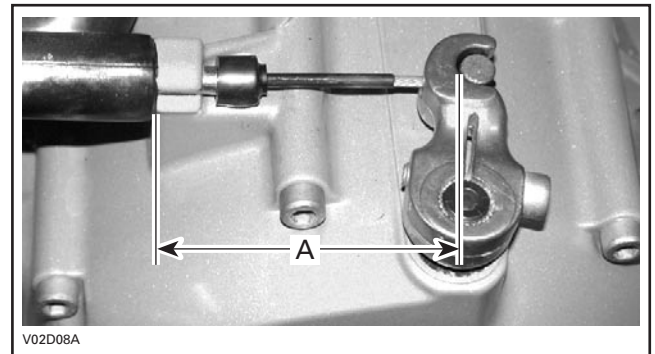
CLUTCH ADJUSTMENT

Loosen cable tension.

Adjust clutch release mechanism.

The release lever must locate on the spline in such a way that dimension A is obtained. See the following illustration.

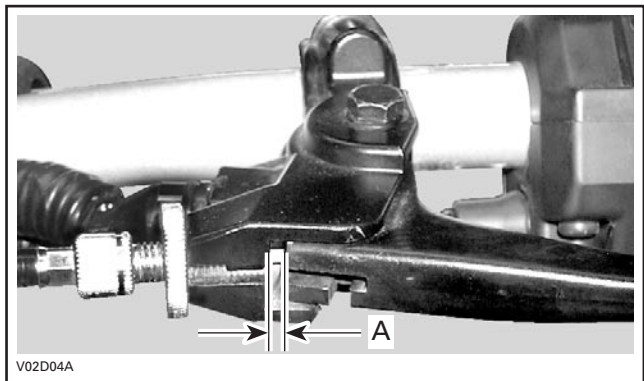
NOTE: If necessary, unscrew the Allen socket screw and withdraw release lever. Replace the lever at the appropriate position then tighten socket screw to 19 N•m (14 lbf•ft).



A. 68 to 75 mm (2-11/16 to 2-31/32 in)

Section 02 MAINTENANCE
Subsection 03 (MAINTENANCE/LUBRICATION)

Adjust cable free play.



A. $3.5 \pm 0.5 \text{ mm}$ ($9/64 \pm 1/64 \text{ in}$)

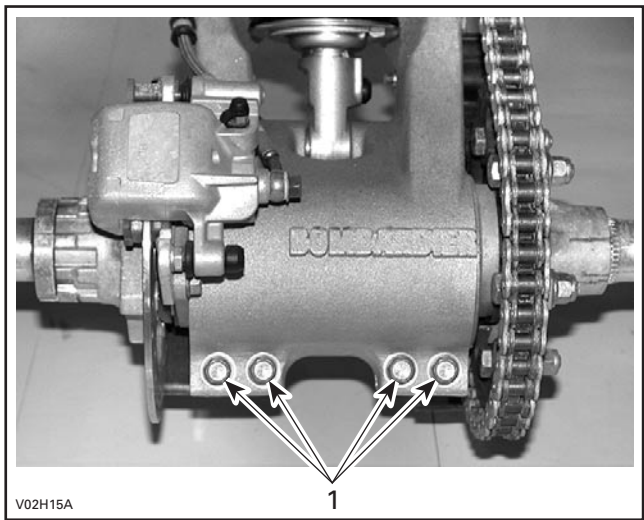
DRIVE CHAIN

Adjustment

NOTE: Always adjust drive chain with the driver, or equivalent weight, installed on the vehicle.

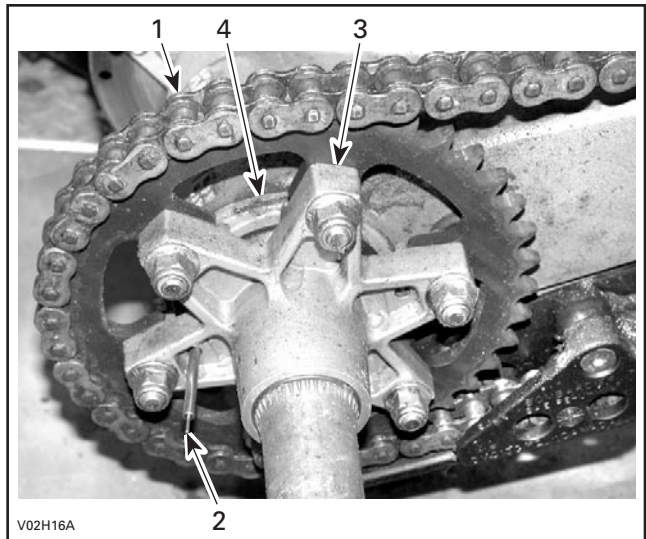
Select a level surface and set transmission to NEUTRAL.

Loosen rear axle lock bolts.



1. Rear axle lock bolts

Insert adjuster lock through rear hub and into eccentric axle housing.



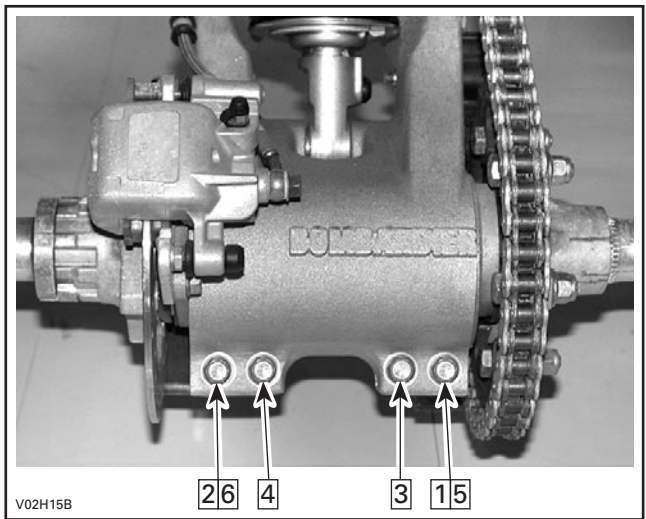
- 1. Drive chain
- 2. Adjuster lock
- 3. Sprocket hub
- 4. Eccentric axle housing

Turn the axle forward to increase or backward to decrease chain slack.

NOTE: Correct chain slack adjustment is 19 to 25.4 mm ($3/4$ to 1 in) at midway between sprockets.

Tighten the rear axle lock bolts to $23 \text{ N}\cdot\text{m}$ ($17 \text{ lbf}\cdot\text{ft}$).

Use the following sequence to tighten the rear axle lock bolts correctly.



Lift rear of vehicle (without driver or equivalent weight), by the frame or by the bumper, and re-check the chain slack. The chain slack should be 44.5 to 51 mm ($1\text{-}3/4$ to 2 in). If not, redo the drive chain adjustment.

Lubrication and Cleaning

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.

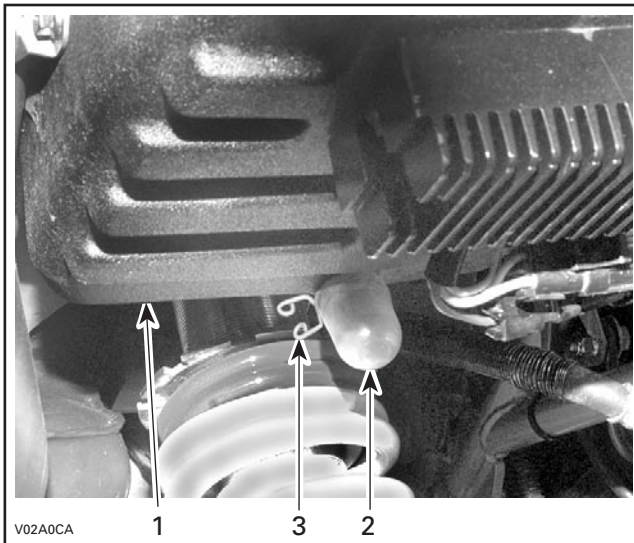
NOTE: Do not brush chain.

Lubricate only with the approved O-ring chain lubricant. Other commercial chain lubricants may contain solvent which could damage the O-rings.

AIR FILTER CLEANING/DRAINING

Air Filter Box Draining

Periodically inspect air filter box drain plug for liquid or deposits. Refer to the MAINTENANCE CHART.



1. Air filter box
2. Drain plug
3. Clamp

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

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

CAUTION: Do not start engine when a liquid is found in the drain tube.

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

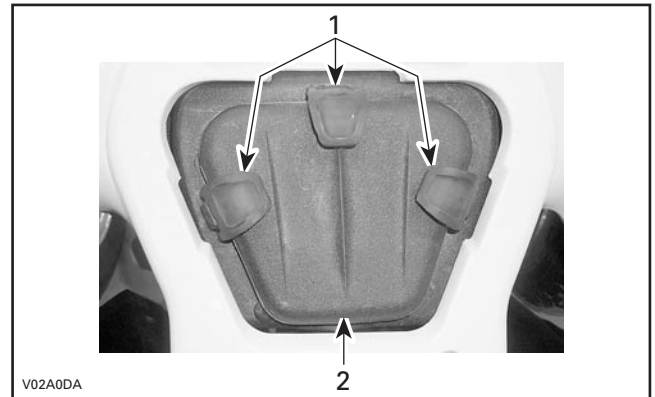
Remove air filter as explained below.

Air Filter Removal

CAUTION: Never remove or modify any component in the air box. Always use genuine parts or suitable equivalent when replacing air filter and foam. The engine carburation is calibrated to operate specifically with these components. Otherwise, engine performance degradation or damage can occur.

Remove seat.

Release latches and remove air filter box cover.

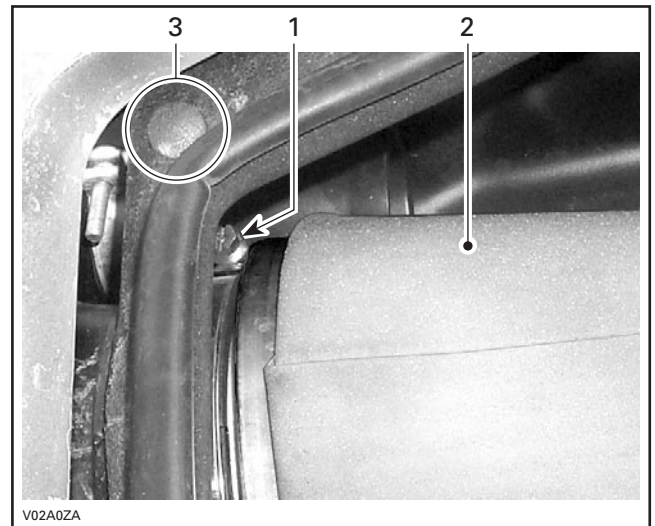


1. Latches
2. Air filter cover

Remove screw driver cap, push inside of air box.

Loosen screw on clamp and remove filter.

Remove foam.



1. Clamp
2. Air filter and foam
3. Screw driver cap

Pour cleaning solution (P/N 293 600 059 or an equivalent) into a bucket. Put the filter in to soak.

While filter soaks, clean inside of air box.

Section 02 MAINTENANCE

Subsection 03 (MAINTENANCE/LUBRICATION)

Rinse air filter and foam with warm water.

Squeeze foam to remove excess water. Let dry air filter and foam thoroughly.

If air filter element or foam is dirty, replace with a new one.

NOTE: Slight dust may be cleaned using a low-pressure airgun. Blow compressed air backward of operating air flow.

When the filter is dried, re-oil with air filter oil (P/N 293 600 058 or an equivalent).

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

BOLTS, FASTENERS AND NUTS

Check bolts, fasteners and nuts at the regular intervals.

Check that all bolts and nuts are tightened to the proper torque.

ENGINE OIL AND FILTER

Oil and Oil Filter Change

WARNING

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

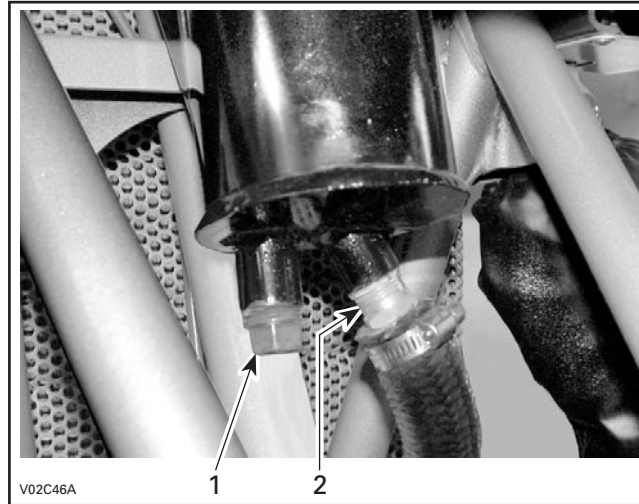
NOTE: Oil and filter are to be replaced at the same time. Oil change should be done with a warmed up engine.

Ensure vehicle is on a level surface.

Remove dipstick.

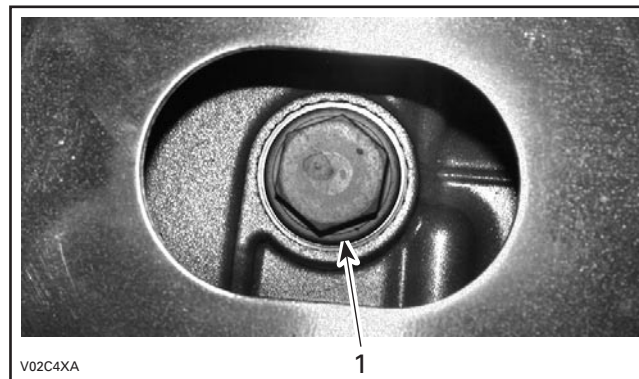
Clean the reservoir drain plug area.

Drain all oil from oil tank by removing oil tank drain plug. Wipe out any oil spillage.



1. Oil tank drain plug
2. Oil tank strainer

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



1. Oil drain plug

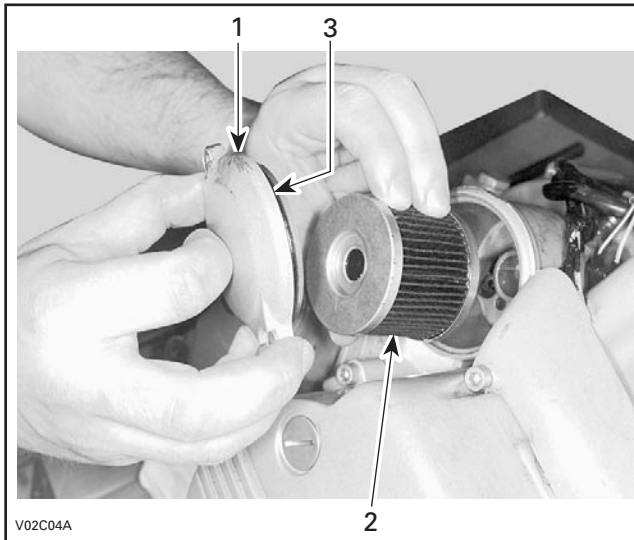
Wait a while to allow oil to flow out of oil filter.

Clean and reinstall oil tank drain plug. Torque to 20 N•m (15 lbf•ft).

Unscrew oil filter cover.

Remove oil filter and replace by a new.

NOTE: Check and change the O-ring, if necessary.



TYPICAL — RH SIDE OF ENGINE

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

Wipe out any oil spillage on engine.

Inspect gasket on engine drain plug and replace as necessary. Clean gasket area on engine and drain plug then reinstall plug. Torque to 30 N•m (22 lbf•ft).

Refill oil tank at the proper level with the recommended oil. Refer to TECHNICAL DATA for capacity.

NOTE: The same oil lubricates both engine and transmission. **Do not use synthetic oil, other than Bombardier brand name, any semi-synthetic oil or any special additives.** They affect the clutching calibration.

Start engine and let idle for a few minutes.

Check if the RED indicator lamp stays ON. If so, stop engine and bleed system by removing oil filter and bleeding screw. See procedure below.

Ensure oil filter area, hose and drain plug areas are not leaking.

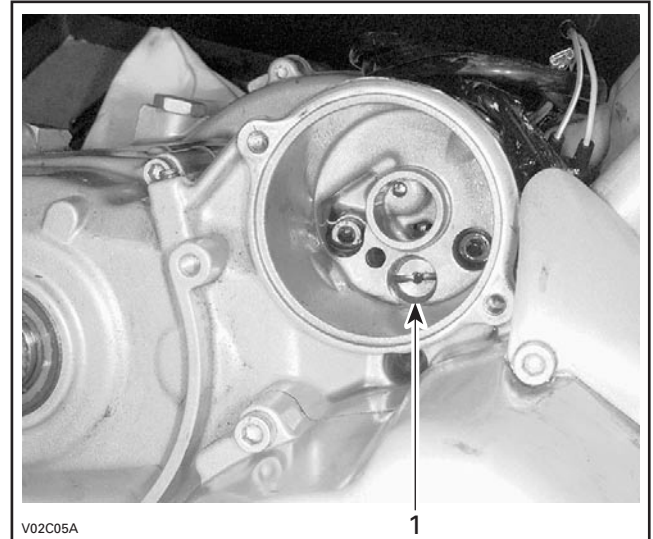
Stop engine and check oil level. Refill as necessary.

Dispose oil as per your local environmental regulations.

Bleeding Engine Oil Circuit

Remove oil filter.

Unfasten pressure bleeding screw.



BEHIND OIL FILTER

1. Bleeding screw

Unscrew and remove one spark plug.

Turn engine using starter until oil emerges in filter chamber.

Tighten pressure bleeding screw. Torque to 25 N•m (18 lbf•ft).

Install oil filter.

SPARK ARRESTER

The muffler must be periodically purged of accumulated carbon. See the MAINTENANCE CHART.

Removal

WARNING

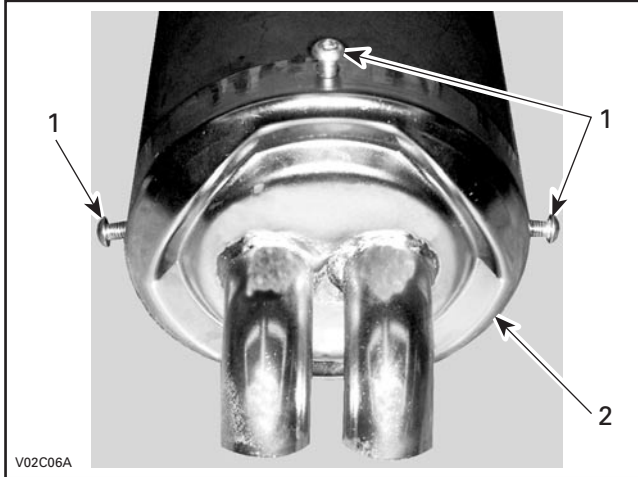
Never perform this operation immediately after the engine has been run because exhaust system is very hot. Wear eye protection and gloves. Respect all applicable laws and regulations.

Section 02 MAINTENANCE

Subsection 03 (MAINTENANCE/LUBRICATION)

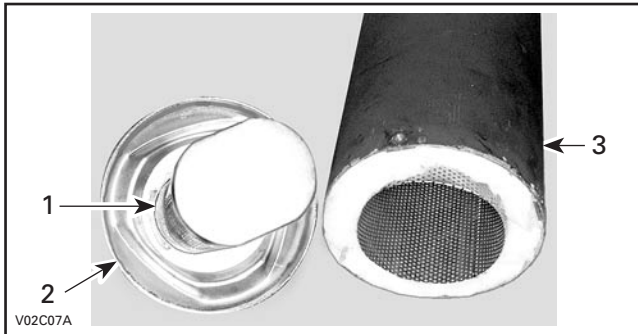
Remove:

- the screws retaining the spark arrester to the muffler



1. Screws
2. Spark arrester

- spark arrester and sealant joint



1. Spark arrester
2. Sealant joint
3. Muffler

- inner grill with wool.

Remove all carbon deposit in the muffler.

Remove carbon deposits from the spark arrester using a brush.

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

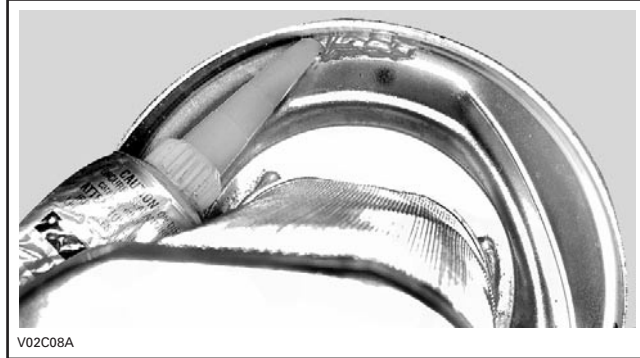
Installation

For installation, reverse the removal procedure, paying attention to the following details:

Check:

- wool and change if it deteriorate
- the spark arrester condition, it must be free of breaks and holes. Replace if necessary.

Remove the old sealant joint and replace by a new one. Use ULTRA COOPER sealant (P/N 293 800 090).



Be sure that insulating material is in place when inserting grill.

Align grill properly in bottom of muffler shell.

TIRES AND WHEELS

WARNING

When the tires are replaced, never install a bias tire with a radial tire. This combined application may create handling and/or stability problems.

Do not mix tires of different size and/or design on the same axle.

Front tire pairs or rear tire pairs must be the identical model and manufacturer.

For unidirectional tread pattern, ensure that the tires are installed in the correct direction of rotation.

The radial tires must be installed as a complete set.

Severe injury or death can result if you do not follow these instructions.

Tire Pressure

WARNING

Tire pressure greatly affects vehicle handling and stability. Under pressure may cause tire to deflate and rotate on wheel. Overpressure may burst the tire. Always follow recommended pressure. Since tires are low-pressure types, a manual pump should be used.

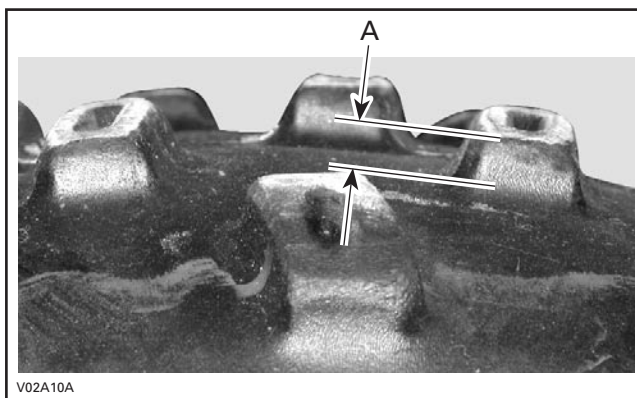
Check pressure when tires are cold before using the vehicle.

NOTE: Tire pressure changes with temperature and altitude. Recheck pressure if one of these conditions has changed.

TIRES PRESSURE		
RECOMMENDED	FRONT	REAR
	35 kPa (5 PSI)	35 kPa (5 PSI)
MINIMUM	21 kPa (3 PSI)	21 kPa (3 PSI)

Tire/Wheel Condition

Check tire for damage and wear. Measure thread height. It should be 4 mm (5/32 in) minimum. Replace if damaged or worn.



TYPICAL

A. 4 mm (5/32 in)

NOTE: Do not make a tire rotation. The front and rear tires have a different size. Besides, these tires are directional and their rotation must be kept in a specific direction for proper operation.

Wheel Removal

Untighten nuts then lift vehicle where needed. Place a support under vehicle. Remove nuts then withdraw wheel.

At installation, it is recommended to apply anti-seize lubricant on threads. Gently tighten nuts in a criss-cross sequence then apply a final torque of 53 N•m (39 lbf•ft).

ENGINE AREA

Check in the engine area, for leak or other damage. Clean mud, leaves, etc. from engine area.

STORAGE/PRESEASON PREPARATION

STORAGE

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

FUEL STABILIZER

A fuel stabilizer (P/N 413 408 600) can be added in fuel tank to prevent fuel deterioration and avoid draining fuel system for storage. Follow manufacturer's instructions for proper use.

If above fuel stabilizer is not used, drain fuel system including fuel tank and carburetor.

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

ENGINE LUBRICATION

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

Proceed as follows:

Place the vehicle on blocks to raise all four tires off the ground.

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

Stop the engine.

Change engine oil and filter. Refer to the section MAINTENANCE/LUBRICATION.

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

Restart engine and run at idle speed.

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

Remove spark plugs and spray storage oil into cylinder. Press start button, 1 or 2 seconds maximum, to lubricate cylinder.

Stop the engine and remove the battery. Store it in dry and cool place out of the sun.

Turn the fuel valve to OFF and drain carburetor.

Reinstall the spark plugs, foam, air filter and air box cover.

WARNING

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

RAGS IN AIR INTAKE AND EXHAUST SYSTEM

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

The air intake tubes are located under fuel tank cover.

NOTE: Remove those rags at preseason preparation.

VEHICLE CLEANING AND PROTECTION

Wash and dry the vehicle then remove any dirt or rust.

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

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

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

To clean the entire vehicle, including metallic parts, use Bombardier Cleaner (P/N 293 110 001 (400 g) or 293 110 002 (4 L)) or an equivalent like Simple Green® from Sunshine Markers Inc., available at hardware stores or at automotive parts retailer.

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

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

Section 02 MAINTENANCE

Subsection 04 (STORAGE/PRESEASON PREPARATION)

NOTE: 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.

COOLANT DENSITY

Test the density of the coolant 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.

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 or antifreeze will cause the system to freeze.

Change coolant if necessary.

Section 02 MAINTENANCE
Subsection 04 (STORAGE/PRESEASON PREPARATION)

PRESEASON PREPARATION

SYSTEM	PRESEASON OPERATIONS	TO BE PERFORMED BY		REFER TO
		CUSTOMER	DEALER	
ENGINE/ TRANSMISSION	Test Run Vehicle. Check Clutch and Transmission Operation		✓	N.A.
	Engine Oil and Filter Oil Replacement ①	✓		Maintenance/ Lubrication
	Coolant Replacement and Pressurization of System		✓	Cooling System
	Condition of Seals		✓	N.A.
	Spark Arrester		✓	Maintenance/ Lubrication
	Exhaust System Condition		✓	Removal and Installation
	Rags Removal (intake and exhaust) ②	✓		Maintenance/ Lubrication
FUEL SYSTEM	Fuel Line and Connectors Condition		✓	Fuel Circuit
	Carburetor Adjustment		✓	Carburetor and Air Intake Silencer
	Throttle and Choke Cable Inspection/Adjustment		✓	
	Air Filter Cleaning/Replacement	✓		Maintenance/ Lubrication
ELECTRICAL	Spark Plug Replacement ③	✓		Ignition System
	Battery Condition/Charging and Installation		✓	Starting System
	Starter Connections and Routing		✓	
	Operation of Lighting System	✓		Instruments and Accessories
DRIVE TRAIN	Drive Chain Lubrication	✓		Rear Axle
	Drive Chain Adjustment	✓		
	Drive Chain Protector Condition	✓		
	Sprockets Inspection	✓		
STEERING/ CONTROL SYSTEM	Steering System Inspection and Adjustment		✓	Steering/Controls System
	Handlebar Fastener Tightness		✓	
	Wheel Tightness		✓	
	Tire Pressure	✓		Maintenance/ Lubrication
	Tire Condition		✓	
SUSPENSION	Suspension System Inspection		✓	Front/Rear Suspension
	A-Arm Lubrication	✓		
	Bearing Condition		✓	
	Swing Arm Condition		✓	
BRAKES	Brake Fluid Change		✓	Hydraulic Brakes
	Brake Condition		✓	
BODY/FRAME	Frame and Skid Plate Condition		✓	Body and/or Frame
	Seat Latch		✓	

N.A.: Not available

① Replace oil and filter only if it has not been previously performed at the storage.

② Remove rags in intake and exhaust that were installed at the storage.

③ Before installing new spark plugs at preseason preparation, it is suggested to burn excess storage oil by starting the engine with the old spark plugs. Only perform this operation in a well-ventilated area.

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TROUBLESHOOTING

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

COOLING SYSTEM

SYMPTOM	HIGH ENGINE OPERATING TEMPERATURE.
CONDITION	NORMAL USE.
	1. Check coolant level. a. Coolant less than recommended level. <i>Refill.</i>
	2. Check temperature sensor for electrical/mechanical failure. a. Temperature sensor defective. <i>Replace.</i>
	3. Check thermostat (located on cylinder head). a. Thermostat defective (does not open when engine gets hot). <i>Replace thermostat.</i>
	4. Check weep hole (water pump housing area) if coolant leaks. a. Coolant leaking from weep hole means a damaged water pump rotary seal . <i>Replace rotary seal (refer to COOLING SYSTEM and MAGNETO COVER).</i>
	5. Check coolant bleeding screw on water pump housing. a. Screw looses and/or gasket ring is missing. <i>Retighten screw and/or place gasket ring.</i>
	6. Check condition of hoses and hose clamps fixation. a. Hoses are brittle and/or hard. <i>Replace.</i> b. Hose clamps are loose. <i>Retighten clamps.</i>
	7. Check condition of impeller located on the water pump shaft. a. Impeller wings broken and/or impeller thread is damaged. <i>Replace.</i>
	8. Check gasket(s) on water pump housing. a. Gasket on water pump housing leaks. <i>Retighten screws and/or replace gasket(s).</i>
	9. Check cylinder head and/or cylinder base gasket. a. Worn out gasket(s) is(are) causing water leakage. <i>Replace.</i>
	10. Check cooling fan and connection. a. Fan motor faulty. <i>Replace.</i> b. Wire harness is brittle or hard (no connection). <i>Replace.</i>

Section 03 ENGINE

Subsection 02 (TROUBLESHOOTING)

SYMPTOM	HIGH ENGINE OPERATING TEMPERATURE.
CONDITION	NORMAL USE.
	11. Check coolant drain screw on water pump housing (marked "Drain"). a. Copper ring on drain screw leaks. <i>Retighten screw and/or replace copper gasket ring.</i>
	12. Check intermediate gear(s) behind magneto cover. a. Worn out and/or broken gear(s) is (are) causing less coolant supply. <i>Replace worn out and/or broken gear(s) (refer to LUBRICATION/MAGNETO SYSTEM).</i>

MAGNETO SYSTEM

SYMPTOM	NO SPARK.
CONDITION	NORMAL USE.
	Test/Inspection
	1. Check spark plug electrode condition. a. Gap is too big. <i>Readjust gap (refer to TECHNICAL DATA).</i> b. Spark plug tip light grey and therefore heat range is too high. <i>Replace by Bombardier recommended spark plug (refer to TECHNICAL DATA).</i>
	2. Check ignition coils for damage and/or electrical failure. a. Ignition coils damaged. <i>Replace ignition coils.</i> b. Connector is corroded or ignition coils shows electrical failure. <i>Clean ignition coils area and replace ignition coils.</i> c. Wire harness is brittle or hard (no connection). <i>Replace.</i>
	3. Check wire harness for cracks or other damages. a. Harness shows electrical failure and/or other damages. <i>Replace wire harness.</i>
	4. Check magneto for damage and/or electrical failure. a. Windings of stator have electrical failure. <i>Replace magneto.</i> b. Connector on magneto is damaged and/or has electrical failure. <i>Repair and clean contacts of connector.</i>
	5. Check electronic module. a. Module shows electrical failure or violent damages. <i>Replace electronic module.</i> b. Connectors are corroded. <i>Clean and reconnect.</i> c. Electronic module has bad ground. <i>Clean metal surface for good ground.</i>
	6. Check engine stop switch position. a. Engine stop switch is in OFF position. <i>Place engine stop switch to RUN position.</i>

SYMPTOM	NO SPARK.
CONDITION	NORMAL USE.
	7. Check battery. - Battery shows less power. <i>Charge battery.</i> - Battery has electrical failure. <i>Replace battery.</i>
	8. Check condition of fuse(s). Faulty fuse(s). <i>Replace.</i>
	9. Check Trigger coil for damage and/or electrical failure. - Connector is corroded. <i>Clean and reconnect.</i> - Resistance value is out of specification (refer to TECHNICAL DATA). <i>Replace trigger coil.</i>

LUBRICATION

SYMPTOM	LOW OR NO OIL PRESSURE
CONDITION	NORMAL USE.
Test/Inspection 	1. Check oil level and search for leakage on crankcase and/or defective gaskets. - Crankcase is leaking due to damage. <i>Rebuild engine with new crankcase and gasket parts. Use Bombardier recommended oil (refer to TECHNICAL DATA).</i> - Crankcase is leaking due to loose screws. <i>Retighten screws with recommended torque.</i> - Sealing rings, O-rings and/or gaskets are brittle and/or hard or damaged. <i>Replace damaged parts.</i>
	2. Check oil drain plug on engine bottom. Plug is loosed and/or gasket ring is missing. <i>Retighten the plug and/or place gasket ring.</i>
	3. Check oil strainer cover on engine bottom. Screw(s) is(are) loose and/or gasket is damaged, brittle or hard. <i>Retighten screws and/or replace gasket.</i>
	4. Check weep hole if oil leaks. Oil leaking from weep hole means a damaged oil seal on water pump shaft. <i>Replace oil seal (refer to COOLING SYSTEM and MAGNETO COVER).</i>
	5. Check oil pressure switch function. Oil pressure switch damaged. <i>Replace oil pressure switch.</i>

Section 03 ENGINE

Subsection 02 (TROUBLESHOOTING)

SYMPTOM	LOW OR NO OIL PRESSURE
CONDITION	NORMAL USE.
 Test/Inspection	6. Check piston rings for heavy wear, breaking or incorrect installation. a. Piston rings worn out (blue coloured engine exhaust emission). <i>Replace piston rings (refer to CYLINDER AND HEAD).</i> b. Piston rings are broken (low compression). <i>Replace piston rings (refer to CYLINDER AND HEAD).</i>
	7. Check valve stem seal for leakage. a. Valve stem seal damaged and/or sealing lip is hard and/or brittle. <i>Replace all valve stem seals.</i>
	8. Check oil orifice(s) on the oil pump suction side. a. Oil orifice(s) is(are) clogged. <i>Clean from contamination. Replace oil and oil filter if necessary (refer to MAINTENANCE or LUBRICATION).</i>
	9. Check oil pump operation. a. Oil pump rotor is out of wear limit. <i>Replace oil pump shaft (refer to LUBRICATION).</i> b. Oil pump seized due to oil leakage and/or air inclusion. <i>Replace oil pump (refer to LUBRICATION).</i> c. Gears driving oil pump are broken or otherwise damaged. <i>Replace gears.</i> d. Incorrect oil being used. <i>Use Bombardier recommended oil (refer to TECHNICAL DATA).</i>
	10. Check oil pressure regulator valve (spring) function. a. Valve spring damaged (valve always open). <i>Replace spring.</i> b. Valve piston is stuck in oil pump housing. <i>Repair valve piston.</i>
	11. Check plain bearings in crankcase for heavy wear. a. Plain bearings out of specification (increased clearance). <i>Replace plain bearings.</i>

SYMPTOM	OIL CONTAMINATION (WHITE APPEARANCE)
CONDITION	NORMAL USE.
Test/Inspection 	1. Check weep hole if water and oil leaks. a. Leakage of oil/water mixture from bore means damaged water pump seal ring and rotary seal. <i>Replace sealing ring, rotary seal and refill with recommended oil and/or coolant (refer to COOLING SYSTEM and MAGNETO COVER).</i>
	2. Check cylinder head and/or cylinder base gasket. a. Gasket damaged or leaking. <i>Retighten cylinder head with recommended torque and/or replace gasket.</i>
	3. Check screws for torque. a. Screws not fixed. <i>Retighten screws with recommended torque and/or replace oil.</i>
	4. Check oil for particles (may indicate possible damages inside the engine). a. Oil contamination due to metal or plastic particles. <i>Replace possibly damaged parts. Use Bombardier recommended oil (refer to TECHNICAL DATA).</i>

CYLINDER AND HEAD

SYMPTOM	UNUSUAL ENGINE NOISE AND/OR VIBRATION IN IDLE SPEED.
CONDITION	NORMAL USE.
Test/Inspection 	1. Check operation of decompressor located on camshaft. a. Decompressor shaft sticks and/or torsion spring is damaged. <i>Replace spring and/or decompressor mechanism.</i>
	2. Check chain tensioner operation. a. Faulty chain tensioner. <i>Replace spring and/or mechanism.</i>

SYMPTOM	UNUSUAL ENGINE NOISE AND/OR VIBRATIONS WHILE OPERATING.
CONDITION	NORMAL USE.
Test/Inspection 	1. Check items 1 and 2 of UNUSUAL ENGINE NOISE AND/OR VIBRATION IN IDLE SPEED.
	2. Check noise coming from cylinder head area. a. Chain guide worn out. <i>Replace chain guide.</i> b. Stretched chain and/or worn out sprockets. <i>Replace chain and sprockets.</i> c. Sprocket screws got loose. <i>Retighten screws with recommended torque.</i>

Section 03 ENGINE

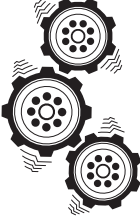
Subsection 02 (TROUBLESHOOTING)

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

CRANKSHAFT AND BALANCER SHAFT

SYMPTOM	UNUSUAL ENGINE NOISE AND/OR VIBRATIONS
CONDITION	NORMAL USE.
Test/Inspection 	1. Check for possible plain bearing failure. a. Oil pressure is out of specified values. <i>Replace damaged parts (refer to LUBRICATION).</i> b. Connecting rod small end bearing is damaged and/or out of specification. <i>Replace damaged and/or worn out part(s).</i> c. Connecting rod big end clearance is out of specification. <i>Replace damaged and/or worn out part(s).</i> d. Crankshaft plain bearing MAG/PTO side is damaged and/or out of specification. <i>Replace crankshaft and plain bearing MAG/PTO at the same time (refer to CRANKSHAFT).</i> 2. Check ball bearing(s) on balancer shaft end(s). a. Ball bearing(s) do(es) not move freely. <i>Replace bearing(s).</i> 3. Check if mark on balancer shaft corresponds with crankshaft position mark. a. Marks on balancer shaft and crankshaft are not aligned. <i>Readjust position of balancer shaft and crankshaft.</i> 4. Check thrust washer(s) on crankshaft MAG/PTO side. a. Thrust washer(s) is(are) missing on MAG and/or PTO side. <i>Fit thrust washer(s).</i>

GEARBOX

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

SYMPTOM	GEAR INDICATION FAILS
CONDITION	NORMAL USE.
Test/Inspection 	1. Check contact screws on MAG side for damage and/or wear. a. Shifting indicator switch pin is worn and/or otherwise damaged. <i>Replace shifting indicator switch.</i> b. Contact is corroded and/or contact screw for wire harness got loose. <i>Clean contact surface and retighten contact screw with recommended torque.</i> c. Isolating washer located on the shift drum is worn and/or damaged. <i>Replace isolating washer.</i> d. Wire harness has broken cables. <i>Replace wire harness.</i>
	2. Check connector condition and/or electronical system. a. Connector contact is corroded and/or otherwise damaged. <i>Clean connector(s) and/or replace wire harness if damaged.</i> b. Electrical system failed and/or otherwise damaged. <i>Repair and/or replace damaged part(s).</i>

Section 03 ENGINE

Subsection 02 (TROUBLESHOOTING)

SYMPTOM	GEAR(S) IS (ARE) HARD TO SHIFT.
CONDITION	NORMAL USE.
Test/Inspection 	1. Check shift drum and/or shift forks for wear and/or damages. a. Shift drum has worn out and/or damaged tracks. <i>Replace shift drum.</i> b. Shift fork(s) is (are) worn out and/or engagement pins are damaged. <i>Replace shift fork(s).</i> c. Shift fork(s) is (are) worn out and/or fork(s) is (are) damaged. <i>Replace shift fork(s).</i> d. Shift gear(s) is (are) worn out. <i>Replace shift gear(s).</i> e. Shift shaft teeth do not correspond with shift drum position. <i>Readjust shift shaft (refer to TRANSMISSION).</i>
	2. Check engine idle speed (choke in use). a. Idle speed is too high (CVT starts to work). <i>Adjust idle speed.</i> b. Choke is in use and increases the engine RPM. <i>Release choke.</i>

ENGINE GENERAL

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

SYMPTOM	ENGINE SUDDENLY TURNS OFF.
CONDITION	NORMAL USE.
	1. Check spark plug cap contact and/or cable. a. Spark plug cap loose. <i>Replug cap.</i> b. Spark plug cable melted and/or damaged. <i>Replace spark plug cable.</i>
	2. Check condition of spark plug (blue spark ideal). a. Red, jumping spark means a damaged spark plug. <i>Replace spark plug with appropriate heat range (refer to TECHNICAL DATA).</i> b. Condition of spark plug. <i>Readjust carburetor and/or replace spark plug.</i>
	3. Check fuel supply to engine intake. a. Fuel valve is switched off. <i>Turn on fuel valve.</i> b. Run out of fuel. <i>Turn fuel valve to "RES" position and refill (after refilling return the fuel valve to "ON" position).</i> c. Poor quality and/or wrong fuel. <i>Clean from contamination and use appropriate fuel (refer to TECHNICAL DATA).</i> d. Carburetor contaminated. <i>Clean jets and carburetor float chamber from contamination.</i> e. Fuel line clogged and/or bent. <i>Clean fuel supply from contamination and/or replace defective part(s).</i> f. Fuel supply insufficient at high RPM. <i>Clean fuel supply from contamination.</i>
	4. Perform engine leak test. Refer to ENGINE LEAK TEST procedure. Check for possible piston seizure. a. Damaged head gasket and/or seal and/or leaking inlet/exhaust valve(s). <i>Replace and/or repair defective parts.</i>
	5. "Four-corner" seizure of piston. a. Accelerating too fast when engine is cold. Piston expands faster than cylinder. <i>Replace pistons. Ask driver to refer to warm-up procedure in Operator's Guide.</i>
	6. Piston seizure (arrow to piston exhaust side). a. Spark plug heat range is too warm. <i>Install spark plug with appropriate heat range (refer to TECHNICAL DATA).</i> b. Improper ignition timing. <i>Replace failed part(s) in electrical system (electronic module).</i> c. Compression ratio is too high. <i>Install genuine parts.</i> d. Poor oil quality. <i>Use BOMBARDIER recommended oil.</i> e. Leaks at air intake manifold (engine gets too lean). <i>Retighten screws or replace air intake manifold.</i>

Section 03 ENGINE

Subsection 02 (TROUBLESHOOTING)

SYMPTOM	ENGINE SUDDENLY TURNS OFF.
CONDITION	NORMAL USE.
 Test/Inspection	7. Melted and/or perforated piston dome; melted section at ring end gap. a. When piston reaches TDC, mixture is ignited by heated areas in combustion chamber. This situation is due to an incomplete combustion of a poor oil quality. <i>Clean residue accumulation in combustion chamber and replace piston. Use Bombardier recommended oil.</i> b. Spark plug heat range is too high. <i>Install recommended spark plug (refer to TECHNICAL DATA).</i>
	8. Piston color is dark due to seizure on intake and exhaust sides. a. Cooling system leaks and lowers coolant level. <i>Tighten clamps or replace defective parts. Add antifreeze in cooling system until appropriate level is reached.</i>
	9. Cracked or broken piston. a. Cracked or broken piston due to excessive piston/cylinder clearance or engine overrevving. <i>Replace piston. Check piston/cylinder clearance (refer to CYLINDER AND HEAD).</i>
	10. Check piston rings and cylinder surface for grooves. a. Poor oil quality. <i>Use Bombardier recommended oil.</i> b. Contamination (like sand) through engine intake. <i>Replace defective part(s) and use new air filter.</i>
	11. Check crankshaft movement. a. Oil pump failure due to leak of oil. <i>Repair and replace defective parts and use Bombardier recommended oil.</i> b. Oil contamination due to clogged oil filter/oil sieve. Oil passes through bypass valve <i>Replace oil, replace defective part(s) (refer to MAINTENANCE CHART).</i>
	12. Check valve springs exhaust/inlet. a. Broken valve spring damages the cylinder head, valve(s), rocker arm(s)/piston/piston rings and conrod. <i>Replace defective part(s).</i>
	13. Check if fuel supply is too less at high RPM. a. Fuel line is contaminated and/or bent. <i>Clean and/or replace defective part(s).</i>

SYMPTOM	ENGINE DOES NOT OFFER MAXIMUM POWER AND/OR DOES NOT REACH MAXIMUM OPERATING RPM.
CONDITION	NORMAL USE.
	1. Check items of ENGINE SUDDENLY TURNS OFF.
	2. Check air intake system. a. Air filter is clogged due to contamination. <i>Replace air filter.</i>
	3. Check spark plug condition and/or gap. a. Fouled spark plug or wrong spark plug gap. <i>Readjust gap and clean spark plug or replace.</i>
	4. Check spark plug type. a. Improper spark plug heat range. <i>Install recommended spark plug (refer to TECHNICAL DATA).</i>
	5. Perform engine leak test. Refer to ENGINE LEAK TEST procedure. Check for possible piston seizure. a. Damaged head gasket and/or seal and/or leaking inlet/exhaust valve(s). <i>Replace and/or repair defective parts.</i>
	6. Check for water in fuel or contaminated fuel by other products (kerosene, diesel, etc.). a. There is water in fuel or contaminated fuel. <i>Drain fuel system, search for leakage and refill it with appropriate fuel.</i>
	7. Check engine compression. a. Worn piston(s) and/or piston ring(s). <i>Replace (refer to CYLINDER AND HEAD).</i>

SYMPTOM	ENGINE TURNS OVER BUT FAILS TO START.
CONDITION	NORMAL USE.
	1. Check if single-spark ignition coil fits on spark plug (refer to ENGINE DOES NOT START-NO SPARK AT SPARK PLUG).
	2. Check spark plug. a. Define spark plug (no spark) or wrong spark plug gap. <i>Readjust gap and clean spark plug or replace.</i>
	3. Check for fuel on spark plug. a. Flooded engine (spark plug wet when removed). <i>Do not overchoke. Remove wet spark plug, turn ignition switch to OFF and crank engine several times. Install clean dry spark plug. Start engine following usual starting procedure.</i>
	4. Check engine compression. a. Insufficient engine compression. <i>Replace defective part(s) (ex.:piston, ring(s), etc.).</i>
	5. During cold weather check engine decompressor (located on camshaft). a. Centrifugal weight spring is not engaged and/or damaged. <i>Readjust spring or replace centrifugal weight if damaged.</i>

Section 03 ENGINE

Subsection 02 (TROUBLESHOOTING)

SYMPTOM	HIGH ENGINE OPERATING TEMPERATURE.
CONDITION	NORMAL USE.
Test/Inspection 	1. Check if cooling system shows any failure (see COOLING SYSTEM). a. System is leaking. <i>Repair and/or replace damaged part(s).</i>
	2. Check function of lubrication system (see LUBRICATION). a. Lubrication is not working properly. <i>Repair and/or replace damaged part(s).</i>
	3. Check air leakage on engine intake. a. Leaks. <i>Repair or replace.</i>
	4. Check condition and heat range of spark plug. a. Melted spark plug tip or inadequate heat range. <i>Replace.</i>

SYMPTOM	STARTER TURNS, BUT ENGINE DOES NOT CRANK.
CONDITION	NORMAL USE.
Test/Inspection 	1. Check gear condition on electric starter. a. Worn and/or damaged starter gear. <i>Replace electric starter and/or starter drive.</i>
	2. Check condition of starter pinion gear. a. Worn and/or damaged starter pinion and/or ring gear. <i>Replace starter drive and/or drive pulley fixed half.</i>
	3. Check engine stop switch. a. Engine stop switch set to OFF position. <i>Place switch to RUN position.</i>
	4. Check gear position. a. The transmission is not on NEUTRAL position. <i>Select NEUTRAL position or press the clutch lever.</i>

SYMPTOM	ENGINE DOES NOT START - NO SPARK AT SPARK PLUG (SEE MAGNETO SYSTEM).
CONDITION	AT ENGINE CRANKING.
	1. Verify spark plug condition. a. Defective, improperly set, worn out, fouled. <i>Identify source of problem and correct. Replace spark plug.</i>
	2. Verify ignition coils resistance with an ohmmeter. a. Defective part. <i>Replace ignition coil(s).</i>
	3. Verify trigger coil resistance with an ohmmeter and connector condition. a. Defective coil. Corroded connector terminal. <i>Replace magneto. Clean terminals and apply silicone dielectric grease.</i>
	4. Verify condition of ignition coils. a. Mechanically damaged part. Vibration problem. Electrically damaged part. <i>Replace ignition coil(s).</i>
	5. Verify condition of trigger coil. a. Mechanically damaged part. Vibration problem. Electrically damaged part. <i>Replace trigger coil and/or tighten mounting screw(s).</i>
	6. Check magneto for damage and/or electrical failure. a. Windings of stator have electrical failure (no charging causes an empty battery). <i>Replace magneto.</i>

SYMPTOM	THE CLUTCH "SLIPS".
CONDITION	NORMAL USE.
Test/Inspection	1. Check clutch discs condition. a. Clutch discs worn or distorted. <i>Replace.</i>
	2. Check clutch springs condition. a. Clutch springs exhausted. <i>Replace.</i>
	3. Check clutch adjustment. a. Clutch cable is not adjusted correctly. <i>Adjust and lubricate.</i>
	4. Verify engine oil. a. Engine oil is not to specifications. <i>Drain engine oil and refill with the recommended oil.</i>

Section 03 ENGINE

Subsection 02 (TROUBLESHOOTING)

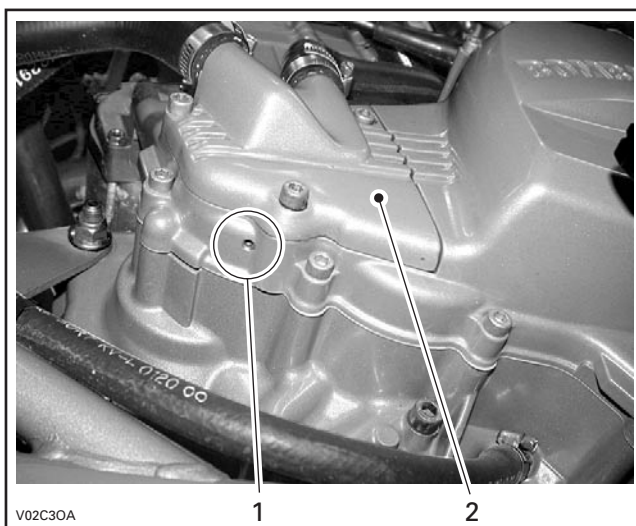
SYMPTOM	THE CLUTCH DOES NOT "DISENGAGE".
CONDITION	NORMAL USE.
Test/Inspection	1. Verify engine oil. a. Engine oil is not to specifications. <i>Drain engine oil and refill with the recommended oil.</i>
	2. Check clutch discs condition. a. Clutch discs stuck together. <i>Clean or replace.</i> b. Clutch discs or support plate distorted. <i>Replace.</i>
	3. Check clutch cable or clutch release mechanism adjustment. a. Clutch cable or clutch release mechanism not adjusted correctly <i>Adjust clutch cable and/ or clutch release mechanism. see MAINTENANCE or CLUTCH Section.</i>

LEAK TEST

VERIFICATION

Before performing the cylinder leak test, verify the following:

- clamp(s) tightness
- radiator and hoses condition
- oily contamination on leak indicator hole (under water pump cover) means a damaged oil seal on water pump shaft



1. Leak indicator hole
2. Water pump cover

- coolant out of leak indicator hole means a damaged seal on water pump shaft (refer to COOLING SYSTEM)
- coolant escaping from water pump housing means damaged gasket(s) and/or loosened screws (refer to COOLING SYSTEM).

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

LEAK TEST PROCEDURE

PREPARATION AND TEST

NOTE: The following procedures should be done with a cold engine.

Disconnect battery.

WARNING

Always respect this order for disassembly; disconnect BLACK (-) cable first. Electrolyte or fuel vapors can be present in engine compartment and a spark may ignite them and possibly cause personal injuries.

Unplug and remove one spark plug only.

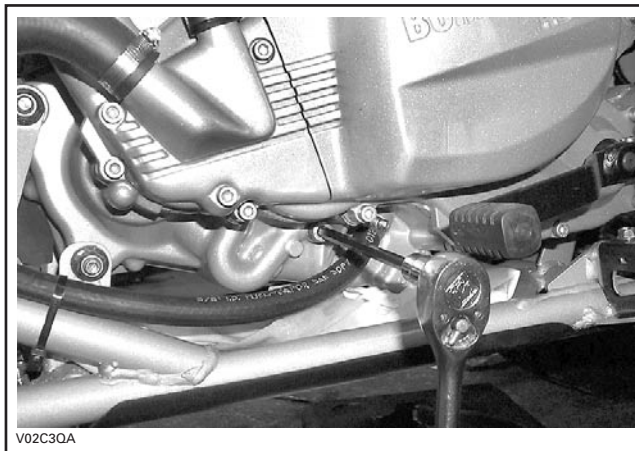
On RH side, remove center plug on MAG cover.



Section 03 ENGINE

Subsection 03 (LEAK TEST)

On LH side, remove the larger socket screw then quickly install the crankshaft locking bolt (P/N 529 035 617) to avoid oil leakage. Do not tighten.



NOTE: A little quantity of engine oil will come out of the hole. After leak test, check oil level and refill if necessary.

Using an Allen key through the MAG cover, bring crankshaft to TDC, compression stroke.



Torque the crankshaft locking bolt to lock crankshaft.

Remove radiator cap and dipstick.

Connect leak tester to adequate air supply.

Set needle of measuring gauge to zero.

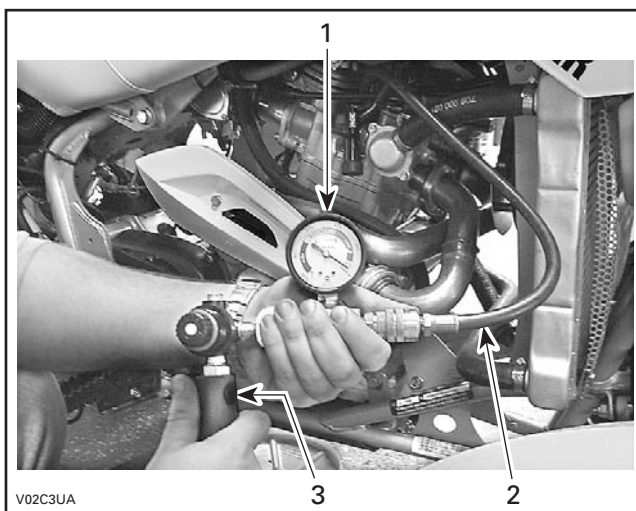


NOTE: Each tester will have specific instruction on the gauge operation and required pressure.

Install gauge adapter into previously cleaned spark plug hole.



Supply combustion chamber with air pressure.



1. Leak tester
2. Adequate adapter for spark plug hole
3. Air supply hose

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

LEAKAGE PERCENTAGE	ENGINE CONDITION
0% to 7%	Excellent condition.
8% to 15%	Fair condition; proceed with tuned up or adjustment.
16% to 30%	Poor condition; engine will run and performance might be down in some cases.
30% and higher	Very poor condition, diagnose and repair engine.

DIAGNOSE

Listen for air leaks:

- air escaping from spark plug means poor spark plug tightness or defective spark plug gasket
- air escaping from intake means leaking intake valve
- air escaping from exhaust means leaking exhaust valve
- air/oil escaping from crankcase means damaged gasket and/or loosened screws (refer to CRANKSHAFT/BALANCER SHAFT)
- air bubbles out of radiator means leaking cylinder head gasket
- air/coolant escaping from cylinder/head means damaged gasket(s) and/or loosened screws. (refer to CYLINDER AND HEAD)
- air escaping into crankcase area means excessively worn cylinder and/or broken piston rings.

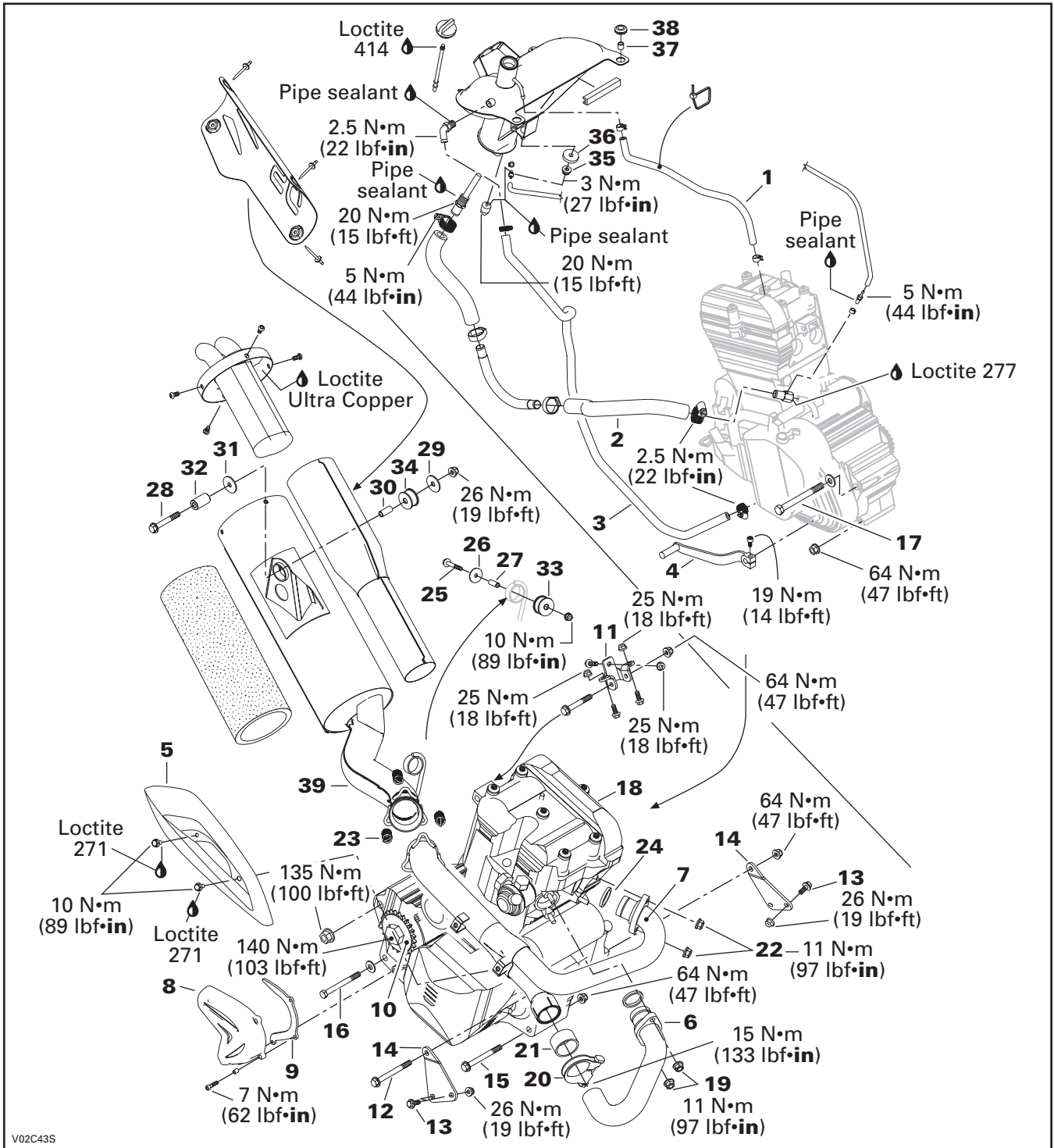
NOTE: For all the check mentioned above see the appropriate engine section to diagnose and repair the engine.

INSTALLATION

NOTE: At reassembly, use the torque values and Loctite products from the exploded views (refer to particular engine sections).

For installation, reverse the preparation procedure.

REMOVAL AND INSTALLATION



Section 03 ENGINE

Subsection 04 (REMOVAL AND INSTALLATION)

GENERAL

For installation, use the torque values and Loctite products from the exploded views. Clean threads before using Loctite when installing the screws.

ENGINE REMOVAL

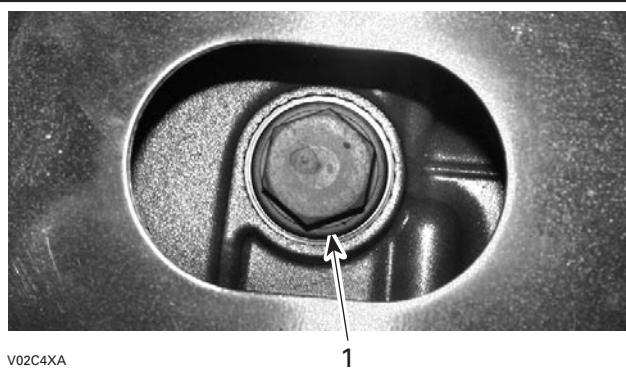
Vehicle Preparation

Close fuel valve.

Drain engine oil and engine coolant by drain plugs.

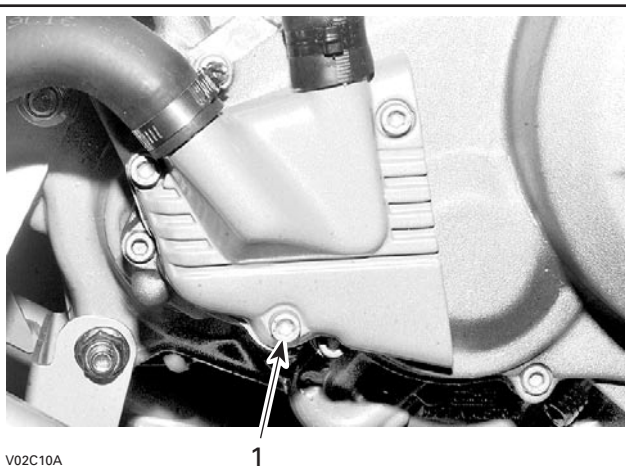
WARNING

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



UNDER ENGINE

1. Engine oil plug



LH SIDE OF ENGINE

1. Engine coolant plug

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

WARNING

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

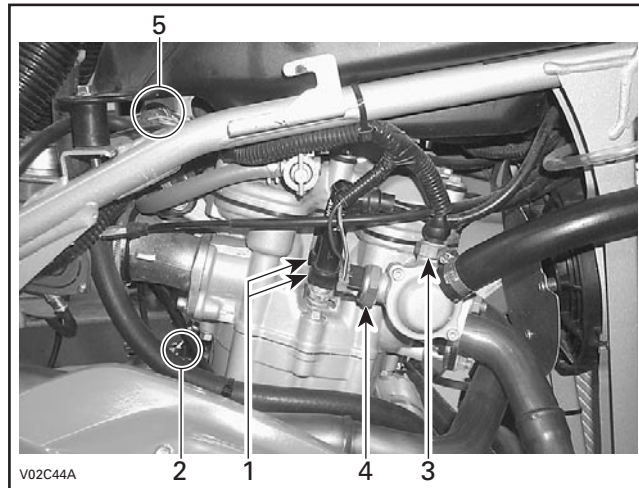
Remove:

- seat
- front facia
- fuel tank (refer to FUEL CIRCUIT).

Engine Preparation

Unplug:

- spark plug cables
- oil pressure sensor, on the top of oil filter housing
- temperature sensor and temperature sender, located near thermostat housing
- magneto and trigger coil wiring harness connectors.



1. Spark plug cables
2. Oil pressure sensor
3. Temperature sensor
4. Temperature sender
5. Magneto and trigger coil connectors

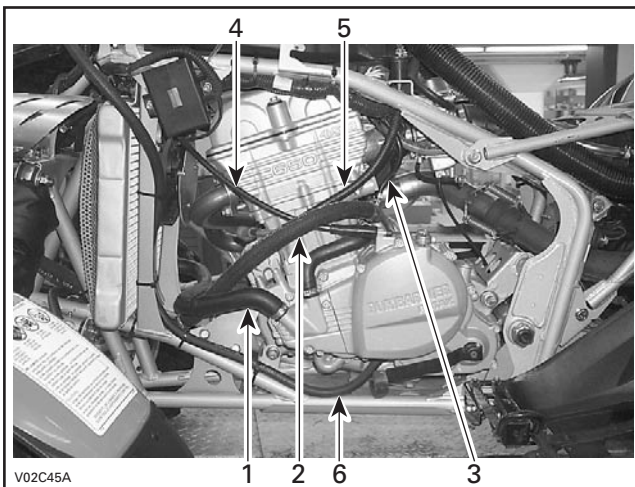
On left side of vehicle, remove or disconnect the following items:

- oil tank vent **no. 1** on the top of engine
- radiator outlet hose
- oil inlet hose **no. 2**
- self-bleeding line
- clutch cable

Section 03 ENGINE

Subsection 04 (REMOVAL AND INSTALLATION)

- starter cable
- oil outlet hose **no. 3**
- gearshift pedal **no. 4**.

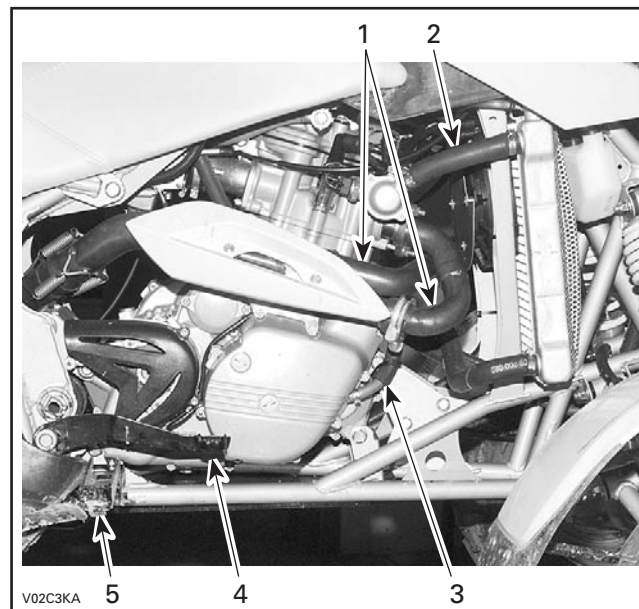


LH SIDE OF ENGINE

1. Radiator outlet hose
2. Oil inlet hose
3. Self-bleeding line
4. Clutch cable
5. Starter cable
6. Oil outlet hose

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

- exhaust pipe shield **no. 5**, exhaust pipes **no. 6** and **no. 7** (refer to EXHAUST SYSTEM section)
- radiator inlet hose
- oil line vent hose
- brake pedal (refer to HYDRAULIC BRAKES)
- RH footrest (refer to BODY)
- countershaft sprocket cover **no. 8**
- metallic chain guard **no. 9**
- countershaft sprocket **no. 10** (refer to COUNTERSHAFT SPROCKET section)



RH SIDE OF ENGINE

1. Exhaust pipes
2. Radiator inlet hose
3. Vent oil line
4. Brake pedal
5. Footrest

- carburetor and carburetor adaptor (refer to CARBURETOR AND AIR INTAKE SILENCER)

Unscrew neutral switch connector.

Removal

Remove the upper support bracket **no. 11** completely.



Section 03 ENGINE

Subsection 04 (REMOVAL AND INSTALLATION)

Install engine lifting tool (P/N 529 035 610) then, install a hoist.

Remove:

- upper engine support bolt **no. 12**
- lower bolts **no. 13** retaining the engine support **no. 14** on either side, then, remove supports
- front lower mounting bolt **no. 15**
- rear lower mounting bolt **no. 16**
- rear upper mounting bolt **no. 17**.

Remove engine **no. 18** from vehicle.

ENGINE INSTALLATION

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

Reattach cables, hoses, wiring harness, etc.

Adjust clutch cable.

Bleed rear brake.

Before starting engine, remove oil filter.

Unfasten pressure bleeding screw.

COUNTERSHAFT SPROCKET

Removal

Slack drive chain.

Remove countershaft sprocket cover **no. 8** and metallic chain guard **no. 9**.

Select the first gear.

Unlock tab washer then, unscrew the retaining nut.

NOTE: Discard the tab washer.

Remove countershaft sprocket **no. 10** and drive chain together.

Inspection

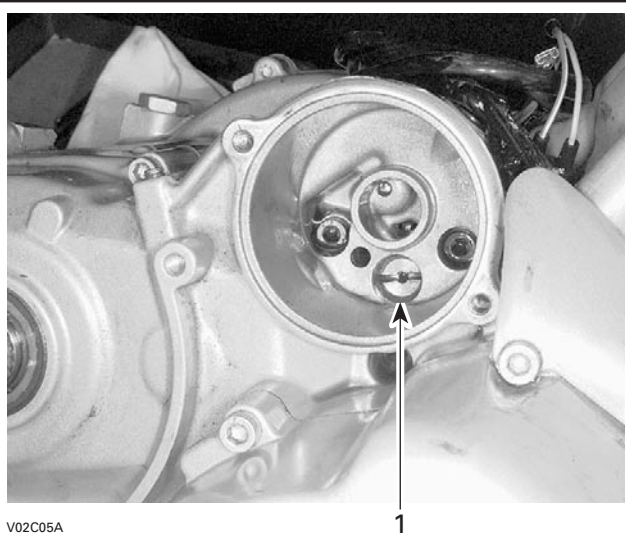
Check sprocket for wear or other damage. Replace if necessary.

Installation

CAUTION: Replace chain and sprocket together to prevent rapid chain and sprocket wear. Install a new tab washer each time the sprocket is removed.

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

Install countershaft sprocket with lips on the engine side.



BEHIND OIL FILTER

1. Bleeding screw

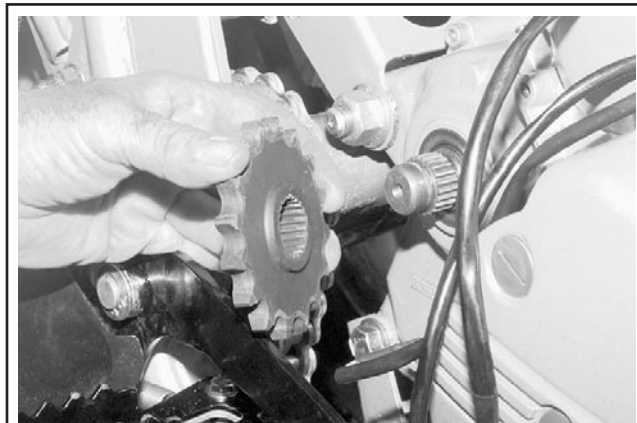
Unscrew and remove one spark plug.

Turn engine using starter until oil emerges in filter chamber.

Tighten pressure bleeding screw. Torque to 25 N•m (18 lbf•ft).

Install oil filter.

This operation activated the oil pump. Check if vehicle runs correctly.



NOTE: Install the countershaft sprocket with the chain assembly.

Install tab washer then retaining nut.

Torque retaining nut to 140 N•m (103 lbf•ft), then lock tab washer.

Adjust drive chain. Refer to MAINTENANCE.

EXHAUST SYSTEM

WARNING

Never touch exhaust system components immediately after the engine has been run because these components are very hot.

Exhaust Pipe Removal

RH Exhaust Pipe

Remove heat shield **no. 5**.
Remove exhaust pipe nuts **no. 19**.
Unscrew exhaust clamp **no. 20**.
Pull exhaust pipe **no. 6** forward.
Remove pipe gasket **no. 21**.

LH Exhaust Pipe

Remove RH exhaust pipe.
Remove exhaust pipe nuts **no. 22**.
Remove springs **no. 23** retaining exhaust pipe **no. 7** and muffler **no. 39**. Use exhaust spring installer/remover (P/N 529 035 401).
Pull exhaust pipe forward.
Remove pipe gasket **no. 24**.

Exhaust Pipe Installation

RH Exhaust Pipe

For installation, reverse the removal procedure, pay attention to the following details.
Use a new exhaust pipe gasket and make sure that it is properly installed.
Tighten flange nuts, making sure RH exhaust pipe is properly aligned inside LH exhaust pipe.

LH Exhaust Pipe

For installation, reverse the removal procedure, pay attention to the following details.
Use a new exhaust pipe gasket and make sure that it is properly installed.
Install flange nuts, making sure exhaust pipe is properly aligned inside muffler ball socket then install retaining springs after pushing muffler forward in exhaust pipe. Do not torque yet.
Install RH exhaust pipe.
Torque all flange nuts.

Muffler Removal

Remove exhaust pipes **no. 6** and **no. 7**.
Remove screw **no. 25**, washer **no. 26** and spacer **no. 27**.
Under rear fender, remove screw **no. 28**, washer **no. 29**, bushing **no. 30**, another washer **no. 31** and spacer **no. 32**.
Remove muffler **no. 39**.

Muffler Installation

For installation, reverse the removal procedure.
NOTE: Check rubber bushings **nos. 33** and **34** for cracks or other damages, change if necessary.

OIL TANK

Removal

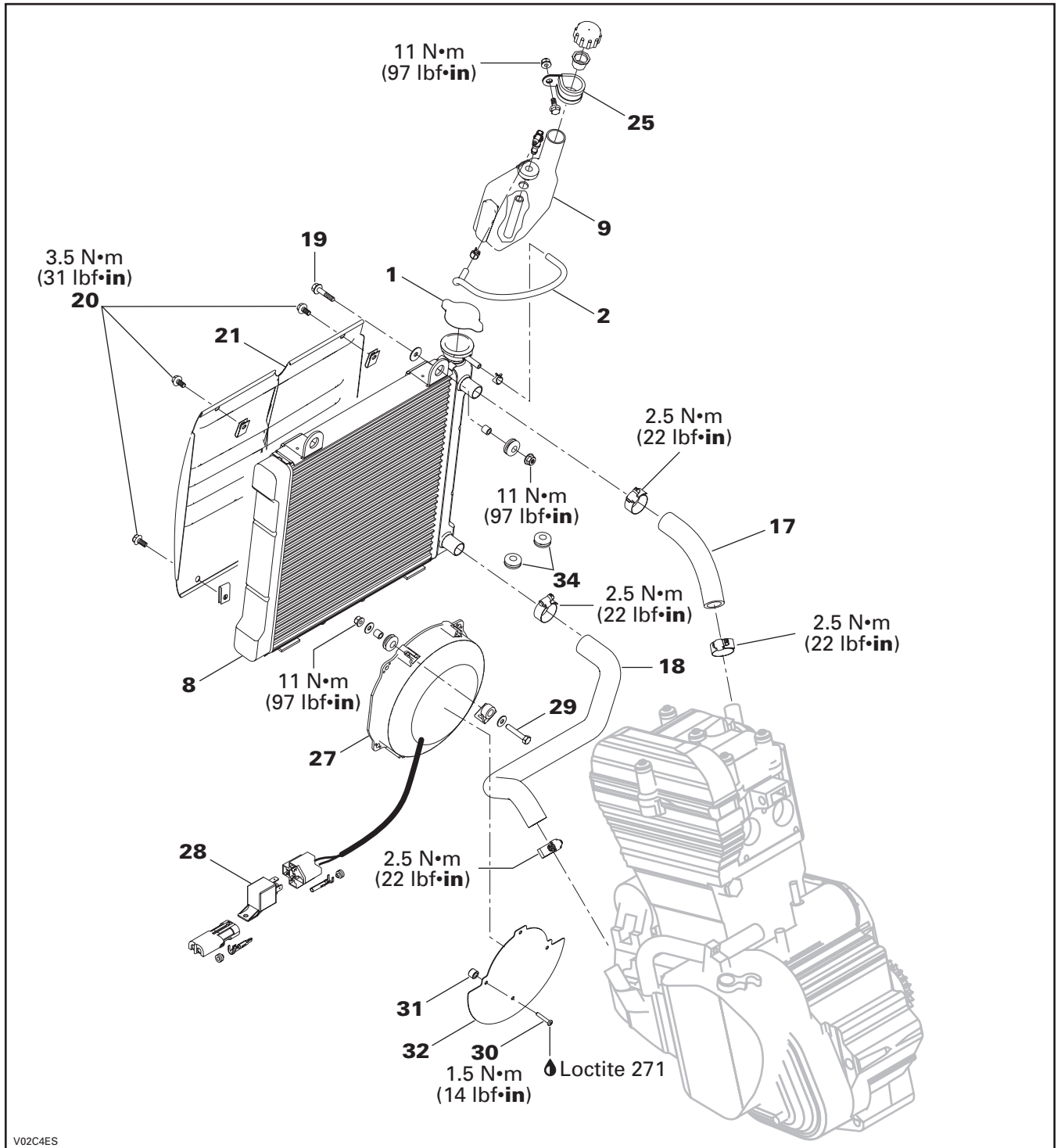
Remove front facia. Refer to BODY.
Remove head light. Refer to ACCESSORIES.
Drain engine oil.
Remove:
– oil inlet hose **no. 2**
– oil outlet hose **no. 3**
– oil tank vent **no. 1**.
Unscrew bolts retaining oil tank and fuel tank cover to the frame.
Unscrew nut **no. 35** under oil tank.
Pull oil tank.

Installation

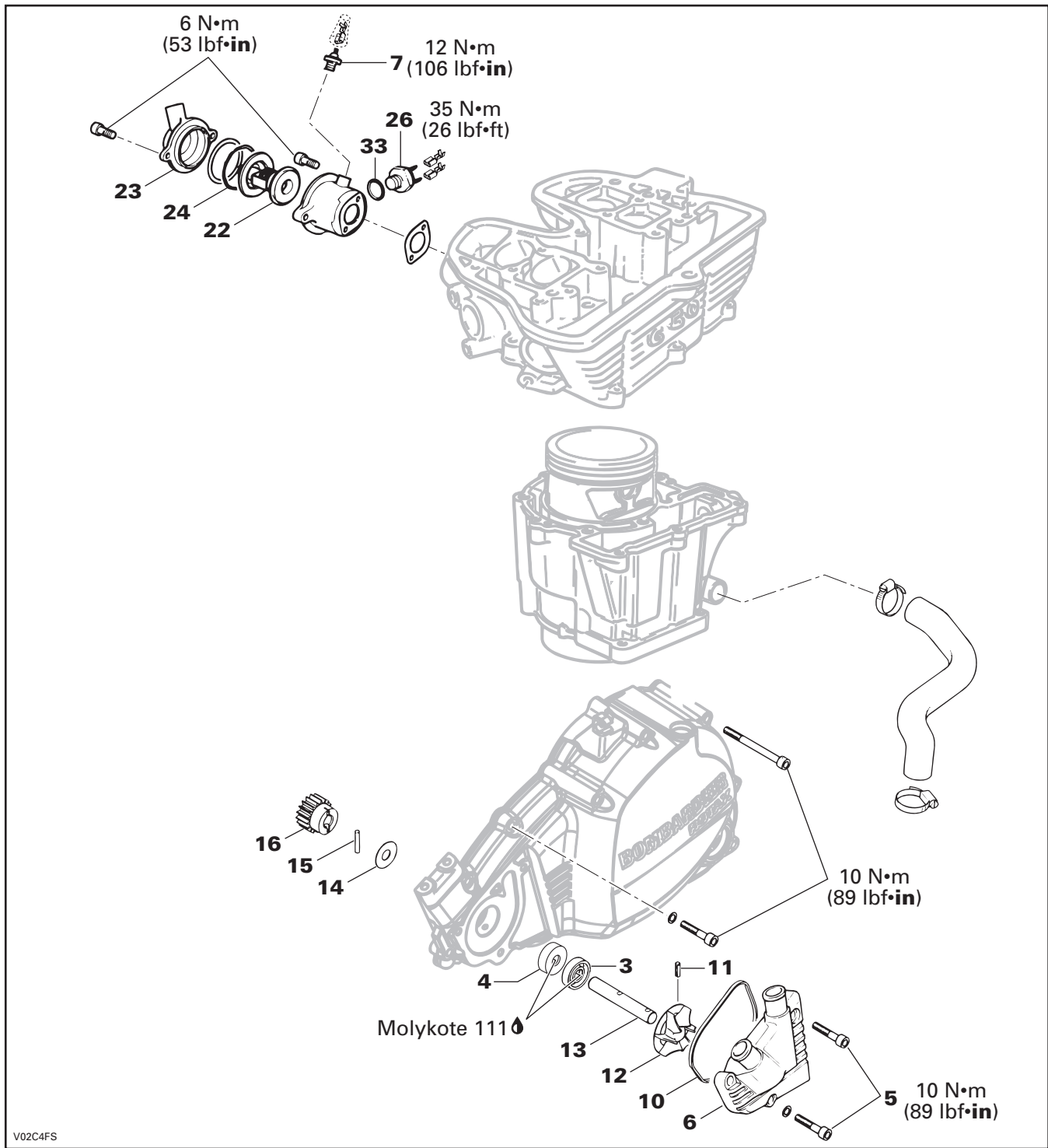
For installation, reverse the removal procedure. Pay attention to the following details.
Install rubber washer **no. 36** between oil tank and frame.
Do not forget spacers **no. 37** in the grommets **no. 38**.
Bleed engine if necessary. Refer to MAINTENANCE.

COOLING SYSTEM

RADIATOR



WATER PUMP



V02C4FS

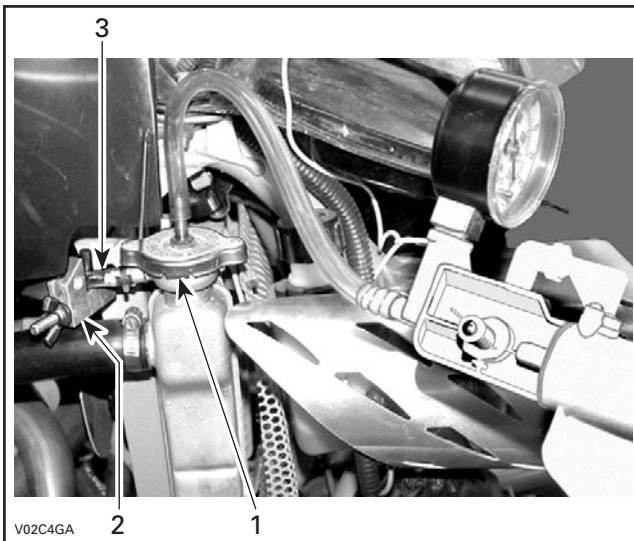
COOLING SYSTEM LEAK TEST

WARNING

To prevent burning yourself, do not remove the radiator cap or loosen the engine drain plug if the engine is hot.

Remove radiator pressure cap **no. 1**.

Install special plug (radiator cap) (P/N 529 021 400) and hose pincher (P/N 529 009 900) on overflow hose **no. 2**. Pressurize all system through coolant reservoir to 103 kPa (15 PSI).



1. Special radiator plug
2. Hose pincher
3. Overflow hose

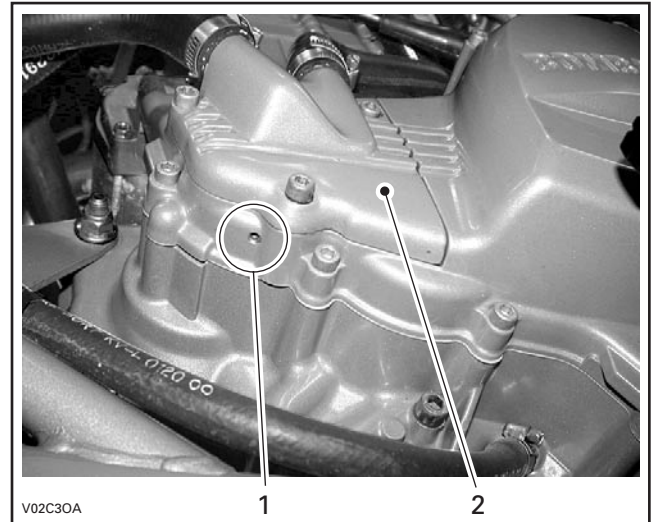
Check all hoses, radiator and cylinder/base for coolant leaks. Spray a soap/water solution and look for air bubbles.

INSPECTION

Check general condition of hoses and clamp tightness.

Check the weep hole if there is oil or water.

NOTE: Water indicates a damaged seal **no. 3**. Oil out of the weep hole indicates a non working oil seal **no. 4**.



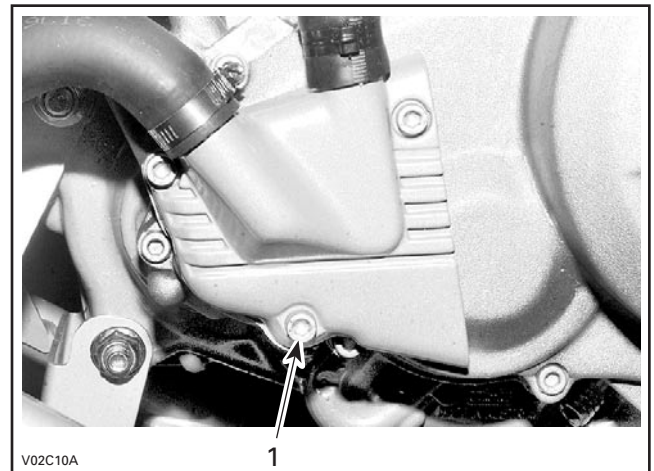
1. Weep hole
2. Water pump housing

DRAINING THE SYSTEM

WARNING

Never drain or refill cooling system when engine is hot.

To drain cooling system, unscrew cooling plug **no. 5** on water pump cover **no. 6** and remove radiator pressure cap **no. 1**.



1. Cooling plug

Section 03 ENGINE

Subsection 05 (COOLING SYSTEM)

COOLING SYSTEM REFILLING

Recommended Coolant

Use a blend of 50% antifreeze with 50% water.

CAUTION: To prevent rust formation or freezing condition, always replenish the system with 50% antifreeze and 50% water. Pure antifreeze without water freezes. Always use ethylene-glycol antifreeze containing corrosion inhibitors specifically recommended for aluminum engines.

System Capacity

Refer to TECHNICAL DATA.

Refilling Procedure

With vehicle on a flat surface, engine cold, remove the temperature sensor **no. 7** on the top of thermostat housing. Fill radiator **no. 8** until coolant get out by the temperature sensor hole. Install the temperature sensor and continue the cooling system filling by the radiator. Fill coolant tank **no. 9** up to cold level mark. Install radiator pressure cap. Run engine for brief period then stop engine. Refill up to mark, if necessary.

When engine has completely cooled down, recheck coolant level in radiator **no. 8** and coolant tank **no. 9** and top up if necessary.

Check coolant concentration (freezing point) with proper tester.

PRESSURE CAP

Check if radiator pressure cap **no. 1** pressurizes the system. If not, install a new 110 kPa (16 PSI) radiator pressure cap (do not exceed this pressure).

WATER PUMP

Removal

Drain coolant.

Remove water pump cover **no. 6** from water pump with O-ring **no. 10**.

Drive out spring pin **no. 11** and remove impeller **no. 12**.

Remove left engine housing cover.

Remove shaft **no. 13** by pulling inwards.

Remove thrust washer **no. 14**, needle pin **no. 15** and gear **no. 16**.

Press out sealing rings **no. 3** and **no. 4**.

Inspection

Check shaft **no. 13** for traces of sealing rings and replace if necessary.

Check if the O-ring **no. 10** in water pump cover is brittle, hard or otherwise damaged.

Installation

For installation, reverse the removal procedure.

NOTE: Do not drive spring pin into impeller until engine housing cover has been installed.

Drive internal sealing ring **no. 4** firmly into place.

Fill cavity between sealing rings with Molykote 111 paste.

Drive external sealing ring **no. 3** into place with the relevant adapter until flush with the race.

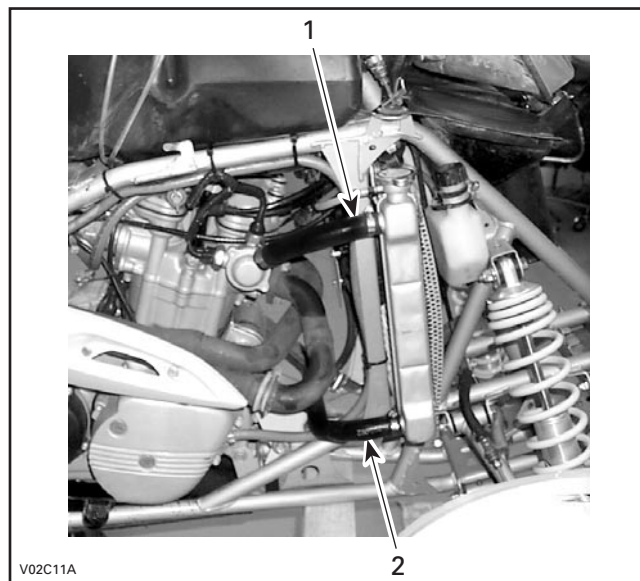
RADIATOR

Removal

Drain cooling system.

Remove:

- front facia (refer to BODY)
- inlet **no. 17** and outlet **no. 18** hoses



1. Radiator inlet hose
2. Radiator outlet hose

- overflow hose **no. 2**
 - headlight
 - ignition coils
 - radiator protector
 - radiator mounting bolts **no. 19** on the top.
- Pull radiator **no. 8** out of frame by the RH side.

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.

Installation

For installation, reverse the removal procedure.

Refill radiator.

NOTE: Do not forget rubber bushings **no. 34** under radiator.

RADIATOR PROTECTOR

Removal

Remove screws **no. 20** retaining protector **no. 21** on radiator.

Inspection

Check protector air passage for damage.
Remove insects, mud or other obstructions with compressed air or low pressure water.

Installation

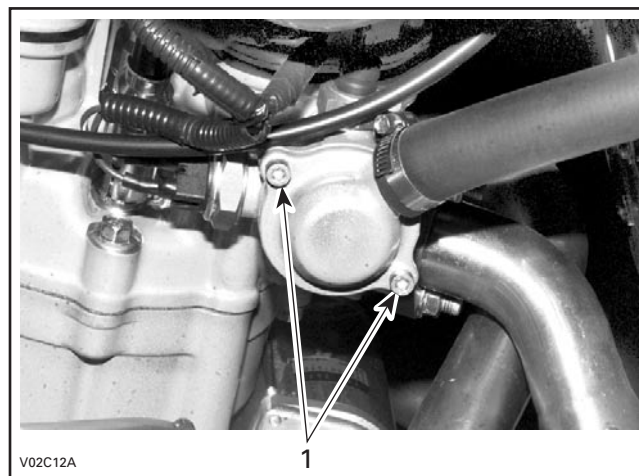
For installation, reverse the removal procedure.

THERMOSTAT

The thermostat **no. 22** is a single action type.

Removal

The thermostat is located on the RH side of engine.
Unfasten cover **no. 23** from thermostat housing.



RH SIDE OF ENGINE

1. Remove screws

Pull out thermostat. Catch spilled coolant.

Remove O-ring **no. 24**. Check O-ring for damage and change if necessary.

Test

To check thermostat, put in water and heat water. Thermostat should begin to open when water temperature reaches 75°C (167°F).

Installation

For installation, reverse the removal procedure.

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

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

COOLANT TANK

Overflow Coolant Tank

The coolant expands as the temperature (up to 100 - 110°C (212 - 230°F)) and pressure rise in the system. If the limiting system working pressure cap is reached 110 kPa (16 PSI), the pressure relief valve in the pressure cap is lifted from its seat and allows coolant to flow through the overflow hose into the overflow coolant tank.

Removal

Remove overflow hose **no. 2**.

Unfasten the hose anchor **no. 25** retaining coolant tank.

Empty coolant tank.

Section 03 ENGINE

Subsection 05 (COOLING SYSTEM)

Installation

The installation is the reverse of the removal procedure.

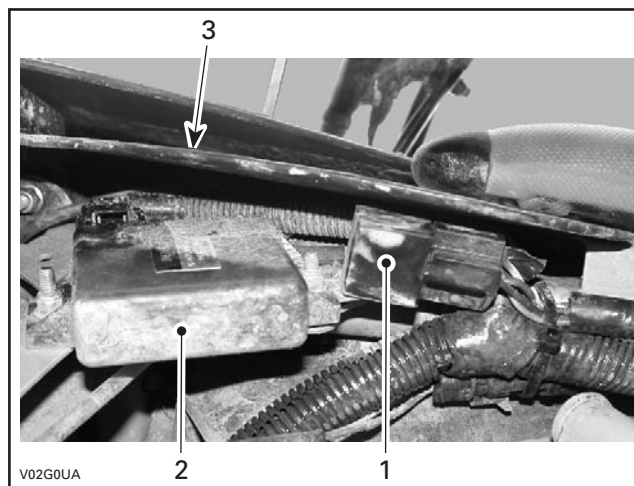
FAN AND HEAT SHIELD

Test

Unplug temperature switch connectors.

Install a jumper wire end between both connectors. Turn ignition key ON.

- fan relay no. 28
(Baja model only, see procedure below)



1. Fan relay
2. Electronic box
3. Fuel tank cover

- wiring harness and connectors.

If the fan does not work after all tests, replace it.

Fan Relay Testing Procedure

Baja Model Only

The relay is located near the electronic box, on the left side of vehicle.

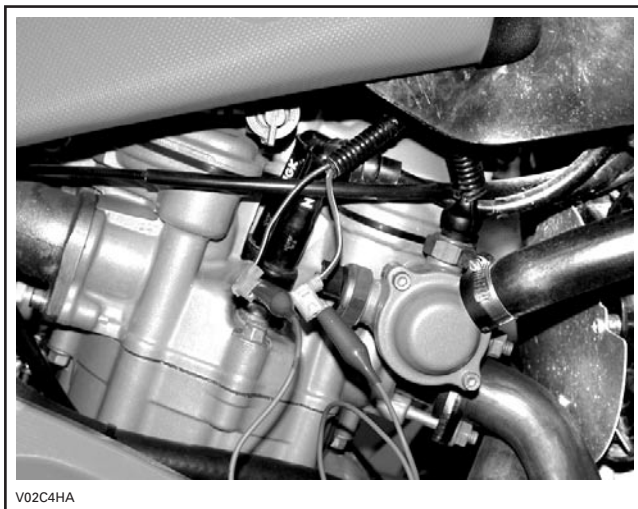
Use the following points to check the fan relay.

Remove relay.

Jump the temperature switch connectors, install another jumper between RED/VIOLET and BLACK wires of relay connector.

Replace the relay if the fan works properly.

If the fan does not work, check wiring harness and connectors. Replace fan if necessary.

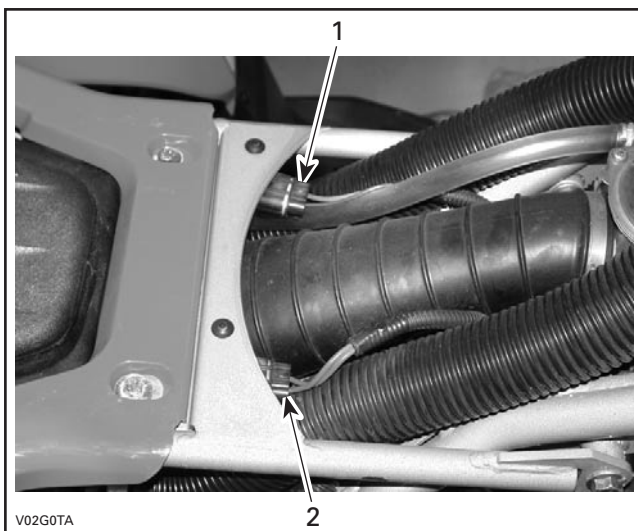


If the fan works correctly:

- Check temperature switch **no. 26**. Refer to TEMPERATURE SWITCH section.

If the fan **no. 27** does not work, check:

- fuse

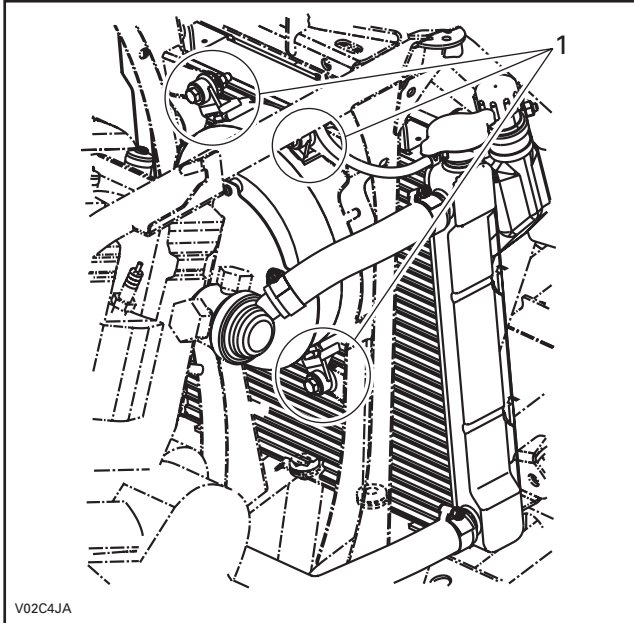


1. Fan (15 A)
2. Charging system (25 A)

Fan Removal

Unscrew bolts **no. 29**, and pull fan in exhaust direction.

NOTE: The exhaust can be removed to allow an easy access to the fan.



1. Remove bolts (two bolts on each side)

Unplug fan connector.

Fan Installation

For the installation, reverse the removal procedure.

Heat Shield Removal

Remove fan.

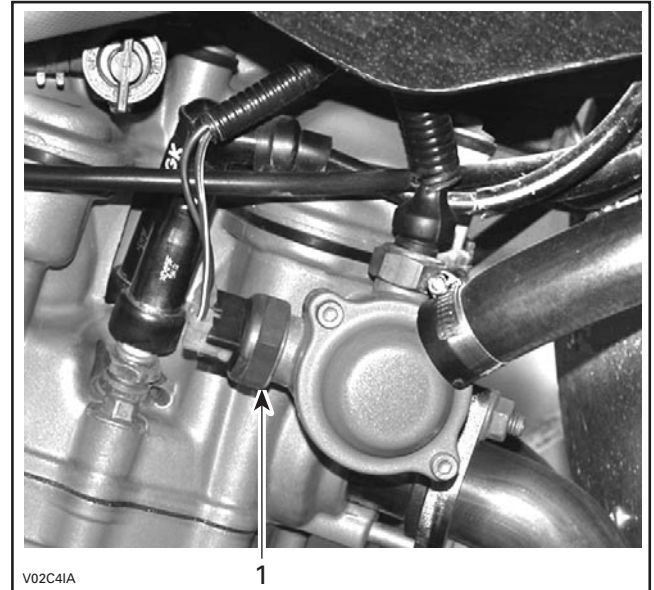
Remove bolts **no. 30** and spacers **no. 31** retaining heat shield **no. 32**.

Heat Shield Installation

The installation is the reverse of the removal procedure.

NOTE: Apply Loctite 271 on threads.

TEMPERATURE SWITCH



1. Temperature switch

Removal

Unplug temperature switch connectors.

Unscrew temperature switch **no. 26**.

Test

Using a multimeter, measure the resistance between both temperature switch connectors.

The multimeter should indicate an infinite resistance (O.L.), if not change the temperature switch.

If the resistance is infinite (O.L.), heat the temperature sender, above 95°C (203°F). The resistance should be 0.1 Ω . If not, change the temperature sender.

Installation

The installation is the reverse of the removal procedure, paying attention to the following detail.

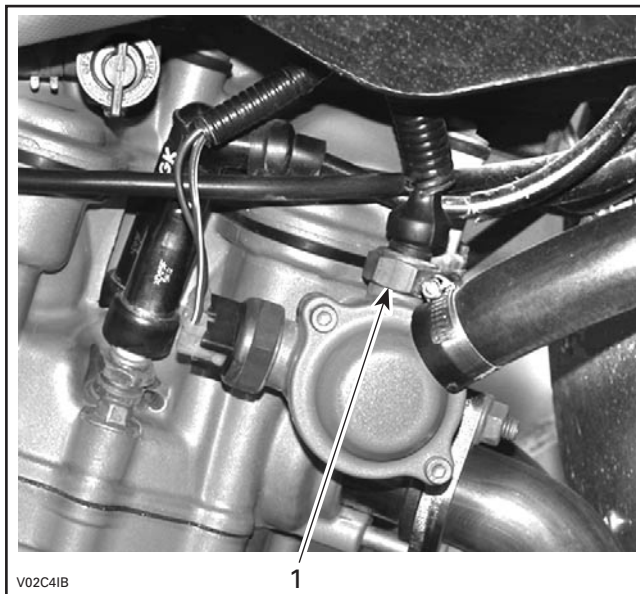
Check gasket **no. 33** and change if necessary.

CAUTION: Do not apply any product on the threads or on the gasket.

Section 03 ENGINE

Subsection 05 (COOLING SYSTEM)

TEMPERATURE SENSOR



1. Temperature sensor

Removal

Unplug temperature sensor connector.

Unscrew temperature sensor **no. 7**.

Test

Using a multimeter, measure the resistance between connector on the top of temperature sensor and threads.

The multimeter should indicate an infinite resistance (O.L.), if not change the temperature sensor.

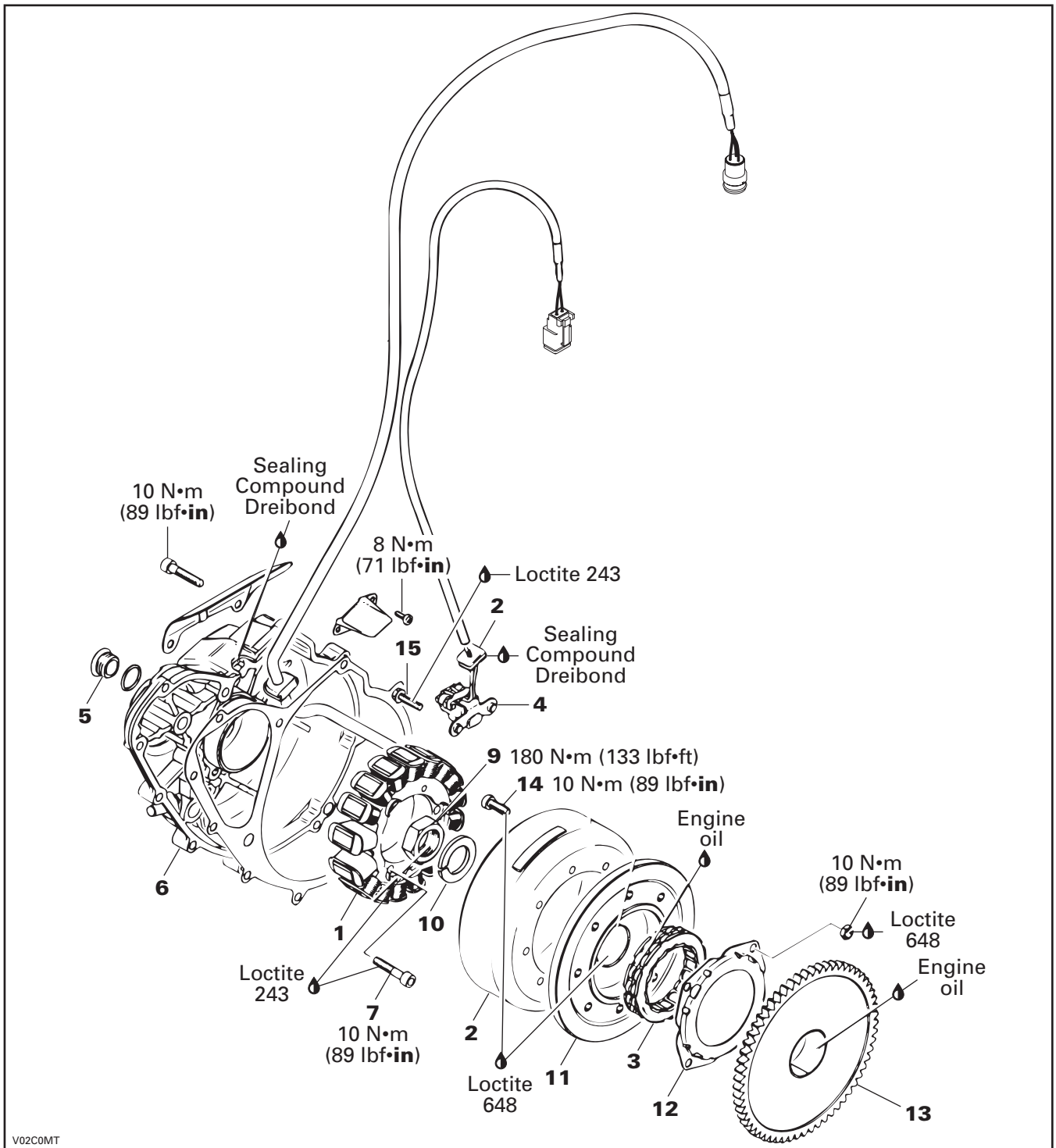
If the resistance is infinite (O.L.), heat the temperature sensor, above 115°C (239°F). The resistance should be 0.1 Ω . If not, change the temperature sensor.

Installation

The installation is the reverse of the removal procedure.

CAUTION: Do not apply any product on the threads.

MAGNETO SYSTEM



Section 03 ENGINE

Subsection 06 (MAGNETO SYSTEM)

GENERAL

WARNING

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

The engine removal is not necessary to work on the magneto system.

At installation, use torque values and Loctite products from the exploded view. Clean threads before using Loctite products when installing screws.

STATOR

WARNING

Never disconnect harness on ignition system while engine is running.

Removal

To reach the stator **no. 1**, unfasten socket screws on ignition cover.

Unfasten central screw plug **no. 5**, screw in the handle (P/N 529 035 622) and remove ignition cover **no. 6**.

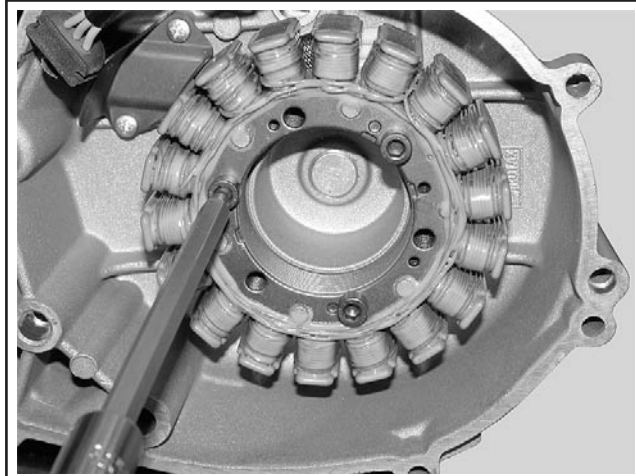


RH SIDE

Remove gasket.

NOTE: Clean all metal component in a non-ferrous metal cleaner. Use Bombardier gasket remover (P/N 413 708 500) or suitable equivalent.

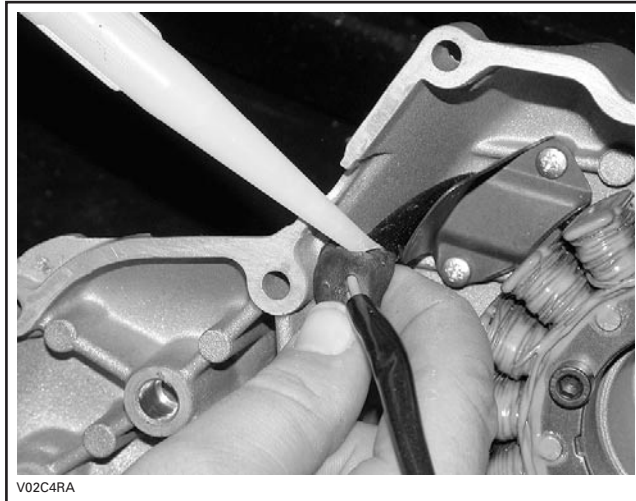
Remove all socket screws **no. 7** retaining stator to ignition cover then pull stator.



Installation

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

Seal rubber grommet **no. 8** on electrical line with sealing compound Dreibond (P/N 420 297 906).



Screw handle in center bore.

Fit ignition cover and screw down.

Unfasten handle and install screw plug in ignition cover.

NOTE: Install a new gasket on ignition cover.

ROTOR

Removal

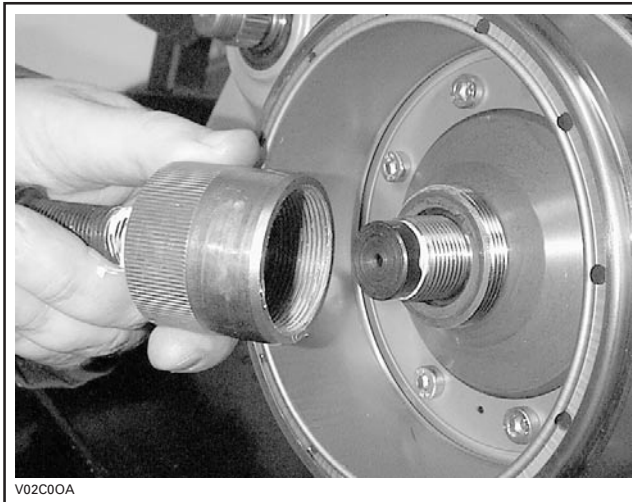
Lock crankshaft with locking bolt (P/N 529 035 617). Refer to CRANKSHAFT/BALANCER SHAFT.

Remove ignition cover **no. 6**.

Unscrew nut **no. 9** retaining rotor **no. 2**.

Remove lock washer **no. 10**.

Install magneto puller (P/N 420 976 235) and crankshaft protector (P/N 420 876 557) then remove rotor.



Installation

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

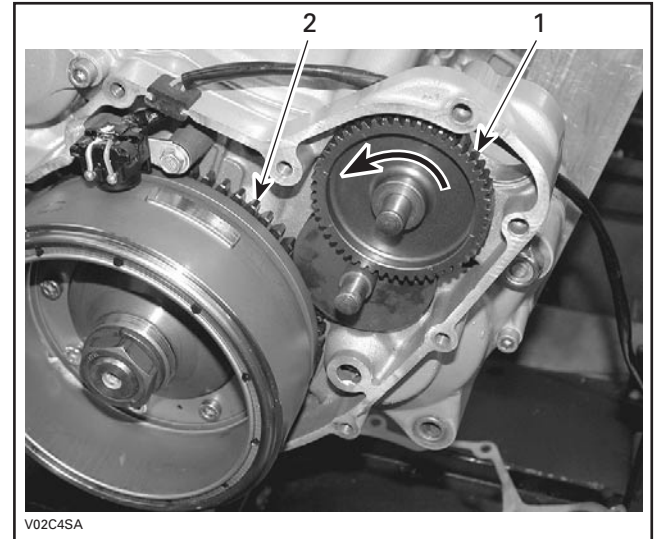
Apply light coat of Loctite 648 to taper on rotor hub **no. 11**.

CAUTION: Taper on crankshaft and rotor must be free of grease.

Oil sprag clutch **no. 3** in sprag clutch housing **no. 12**.

Slide rotor onto crankshaft. The woodruff key and groove must be aligned in one line.

Rotate starter double gear counterclockwise to enable the sprag clutch **no. 3** to slide on the collar of sprag clutch gear **no. 13**.



1. Starter double gear
2. Sprag clutch gear

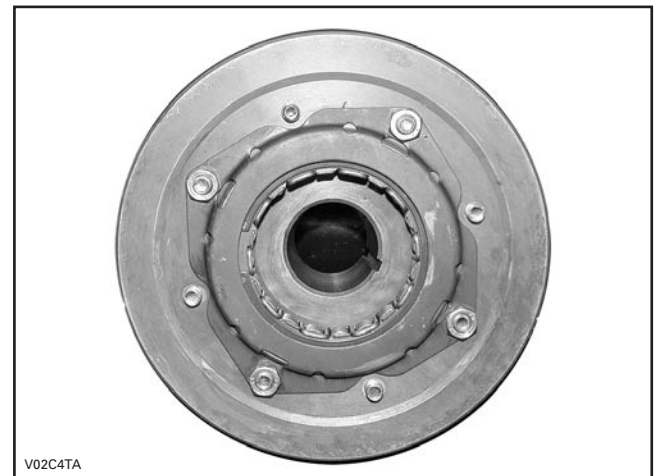
Install lock washer and nut on crankshaft end. Apply Loctite 243 on threads. Torque to 180 N•m (133 lbf•ft).

SPRAG CLUTCH

Removal

Remove rotor **no. 2**.

Unscrew all socket screws **no. 14** retaining rotor and sprag clutch housing **no. 12**.



Remove sprag clutch **no. 3** from sprag clutch housing.

Section 03 ENGINE

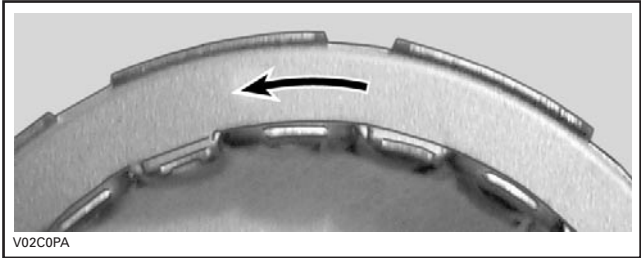
Subsection 06 (MAGNETO SYSTEM)

Installation

For installation, reverse the removal procedure.

NOTE: Apply engine oil on sprag clutch.

Install sprag clutch. The arrow should be visible.



TRIGGER COIL

Test

Refer to IGNITION SYSTEM for the proper procedure.

Removal

Remove the ignition cover **no. 6**.

Unscrew taptite screws **no. 15** retaining trigger coil **no. 4** to housing then remove trigger coil.

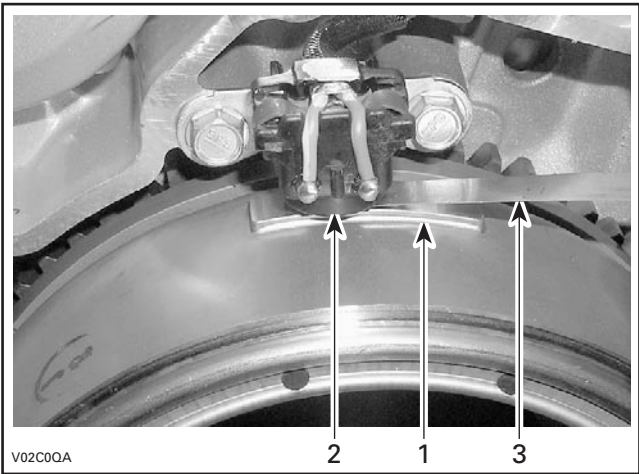
Installation

Coat rubber grommet **no. 8** of trigger coil with sealing compound Dreibond (P/N 420 297 906) and install in housing.

Secure trigger coil with taptite screws and fix screws with Loctite 243.

Twist rotor **no. 2** until guide piece faces towards trigger coil.

Use feeler gauge to measure gap between guide piece and trigger coil.



- 1. Guide piece
- 2. Trigger coil
- 3. Feeler gauge

GAP BETWEEN GUIDE PIECE AND TRIGGER COIL	0.75 ± 0.25 mm (.03 ± .01 in)
--	----------------------------------

If necessary, correct gap by bending the retaining plate.

Coat rubber grommet on trigger coil and line from magneto in ignition cover beside sealing face with sealing compound Dreibond (P/N 420 297 906).

Fit gasket.

ROTOR HUB

The rotor hub **no. 11** is located behind the rotor.

Removal

Remove:

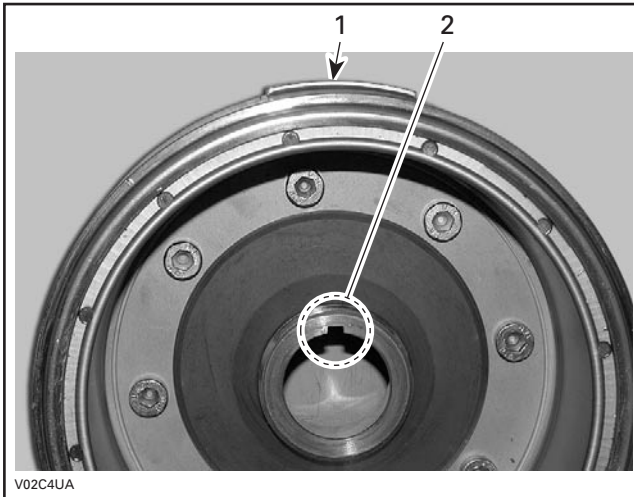
- rotor **no. 2**
- sprag clutch housing **no. 12** and sprag clutch **no. 3**
- socket screws **no. 14** retaining rotor and rotor hub assembly.

Separate rotor hub from rotor.

Installation

Reinstall all parts.

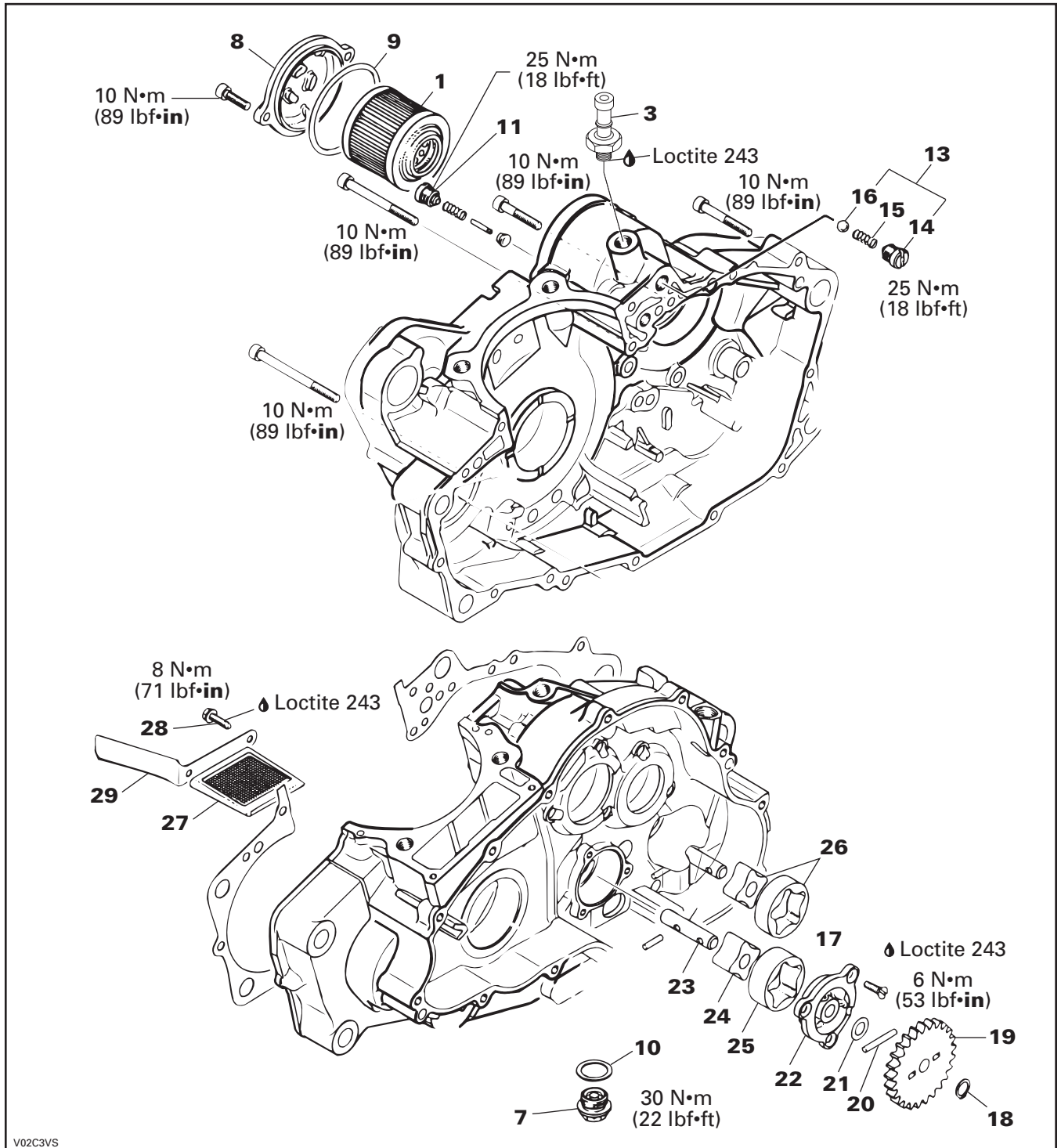
Before torque, check if the protrusion of rotor is aligned with the key way in the center of rotor hub.



- 1. Rotor protrusion
- 2. Rotor hub key way

LUBRICATION SYSTEM

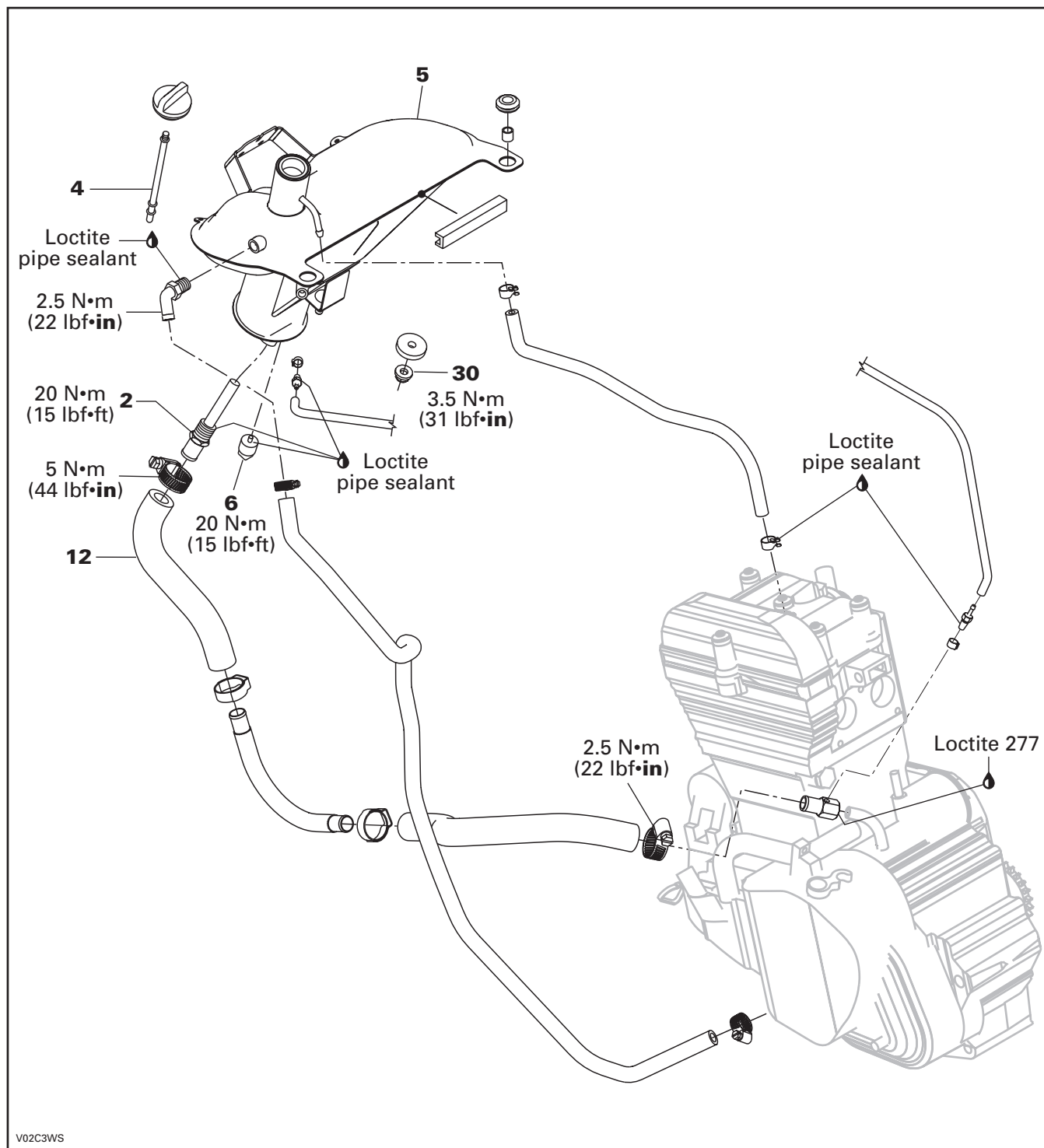
ENGINE LUBRICATION



Section 03 ENGINE

Subsection 07 (LUBRICATION SYSTEM)

OIL TANK



GENERAL

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

Oil and oil filter **no. 1** must be replaced at the same time and oil tank strainer **no. 2** must be cleaned too. Oil change, oil filter replacement and oil tank strainer cleaning should be done with a warm engine.

WARNING

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

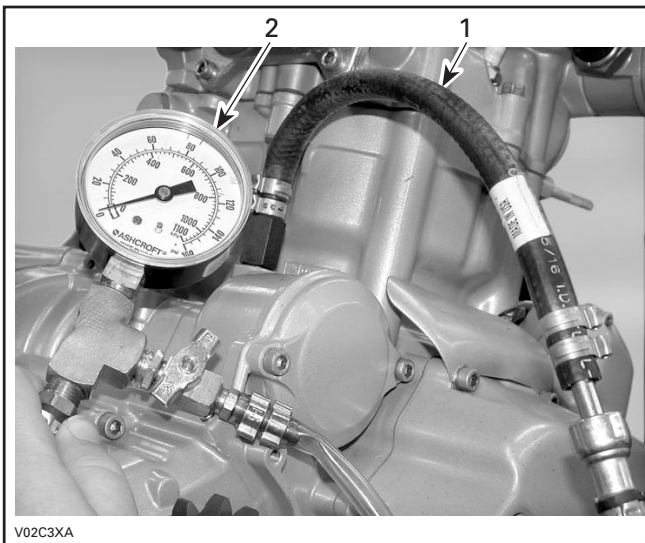
Dispose oil and filter as per your local environmental regulations.

At installation, use torque values and Loctite products from the exploded view. Clean threads before using Loctite products when installing screws.

ENGINE PRESSURE TEST

NOTE: The engine pressure test should be done with a warm engine and with the recommended oil at the proper level.

Remove the oil pressure switch **no. 3** above oil filter and install the engine oil pressure adapter (P/N 529 035 652) and the oil pressure gauge (P/N 529 035 709).



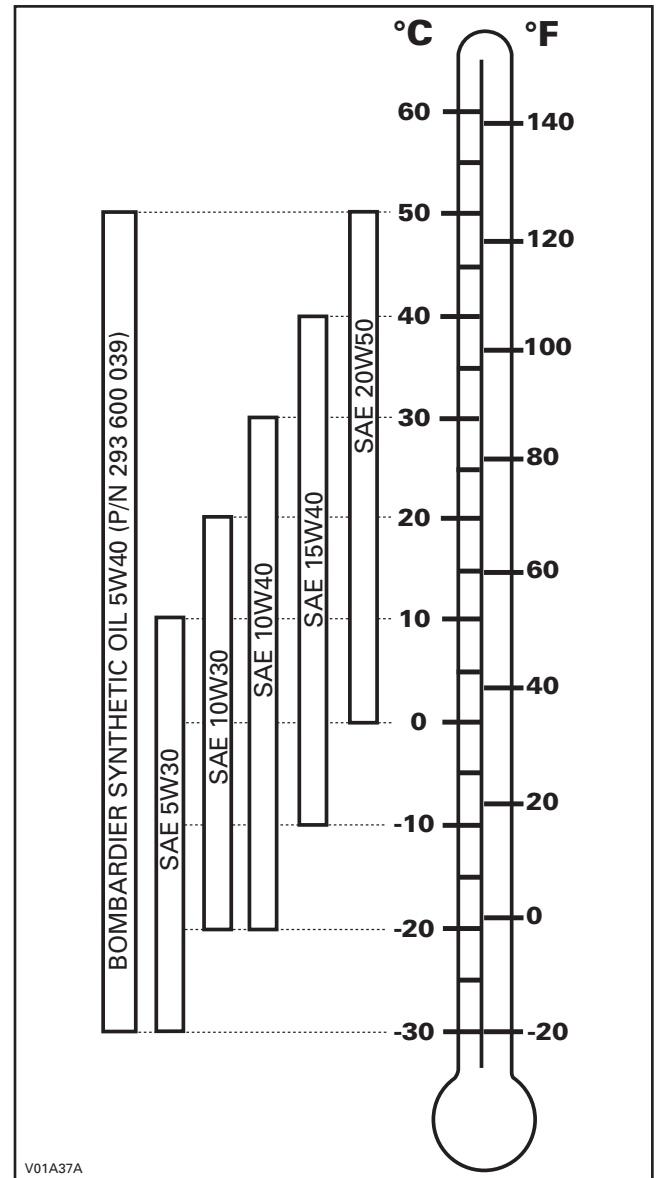
1. Oil pressure adapter
2. Oil pressure gauge

The engine pressure should be 50 kPa (7 PSI) minimum at idle and 300 kPa (44 PSI) at 6000 RPM.

NOTE: The maximum oil pressure is 600 kPa (87 PSI).

If the engine pressure is out of specifications, check the points described in TROUBLESHOOTING section.

OIL CHANGE AND OIL FILTER REPLACEMENT



Ensure vehicle is on a level surface.

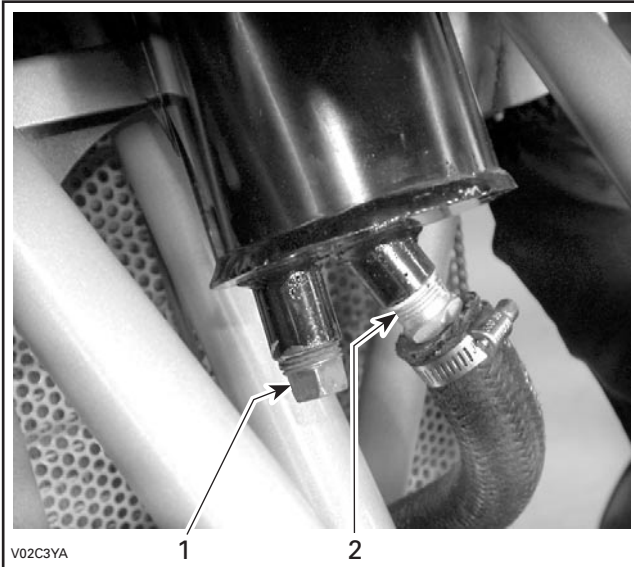
Remove dipstick **no. 4**.

Clean the reservoir drain plug area.

Section 03 ENGINE

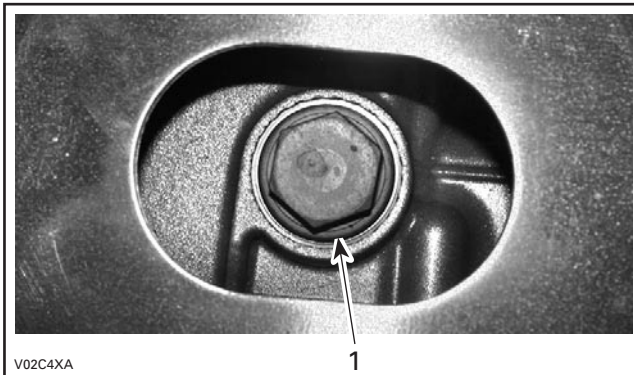
Subsection 07 (LUBRICATION SYSTEM)

Drain all oil from oil tank **no. 5** by removing oil tank drain plug **no. 6**. Wipe out any oil spillage.



1. Oil tank drain plug
2. Oil tank strainer

Place a drain pan under the engine drain plug area.
Unscrew engine drain plug **no. 7**.

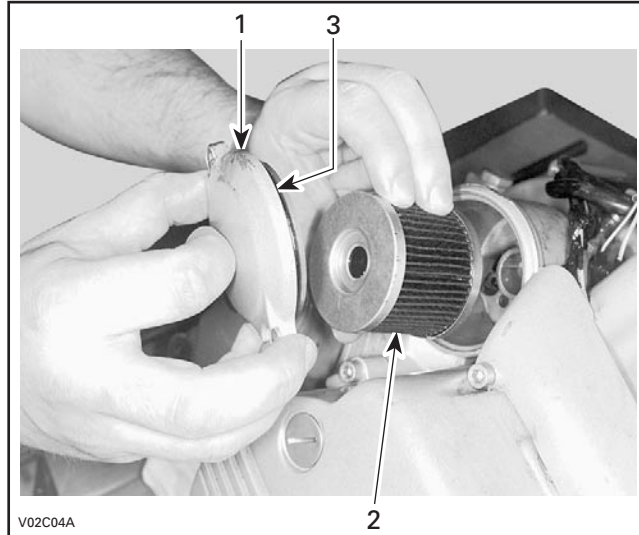


UNDER VEHICLE

1. Oil drain plug

Wait a while to allow oil to flow out of oil filter.
Unscrew oil filter cover **no. 8**.
Remove oil filter and replace by a new.

NOTE: Check and change O-ring **no. 9**, if necessary.



TYPICAL — RH SIDE OF VEHICLE

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

Wipe out any oil spillage on engine.

Change gasket **no. 10** on engine drain plug. Clean gasket area on engine and drain plug then reinstall plug. Refill oil tank at the proper level with the recommended oil. Refer to TECHNICAL DATA for capacity.

Start engine and let idle for a few minutes. Ensure oil filter area, hoses and drain plug areas are not leaking.

Check if the RED indicator lamp stays ON, if so, stop engine and bleed system by removing oil filter and bleeding screw **no. 11**. Refer to BLEEDING ENGINE OIL CIRCUIT below.

If the RED indicator light turns OFF, the system is good.

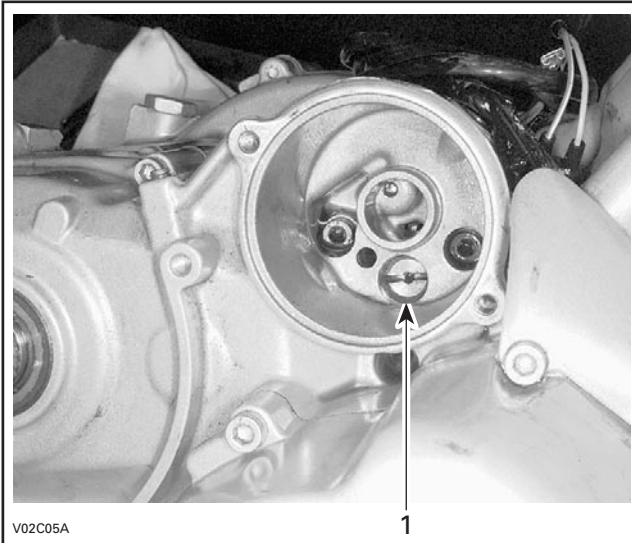
Stop engine and recheck oil level. Refill as necessary.

Dispose oil as per your local environmental regulations.

Bleeding Engine Oil Circuit

Remove oil filter **no. 1**.

Unfasten bleeding screw **no. 11**.



BEHIND OIL FILTER

1. Bleeding screw

Unscrew and remove one spark plug.

Turn engine using starter until oil emerges in filter chamber.

Install bleeding screw.

Install oil filter.

OIL TANK STRAINER

The oil tank strainer **no. 2** is located under oil tank **no. 5**.

Removal

Ensure vehicle is on a level surface.

Drain oil tank.

Remove hose **no. 12** under oil tank.

Unscrew and remove oil tank strainer.

Cleaning and Inspection

Clean oil tank strainer with a parts cleaner then use an air gun to dry it.

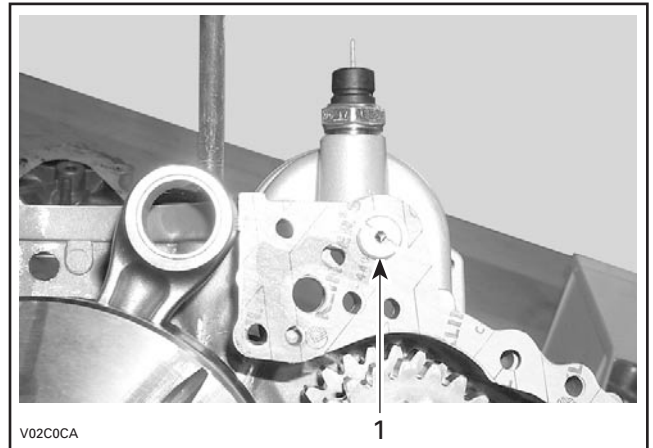
Installation

For installation, reverse the removal procedure.

NOTE: Apply Loctite pipe sealant on oil tank strainer threads.

ENGINE OIL PRESSURE REGULATOR

The engine oil pressure regulator **no. 13** is located in magneto side of the crankcase housing.



1. Engine oil pressure regulator

Removal

Separate both crankcase housings. Refer to CRANKSHAFT/BALANCER SHAFT section.

Remove plug screw **no. 14**, compression spring **no. 15** and ball **no. 16**.

Inspection

Check compression spring for squareness or other damage.

Installation

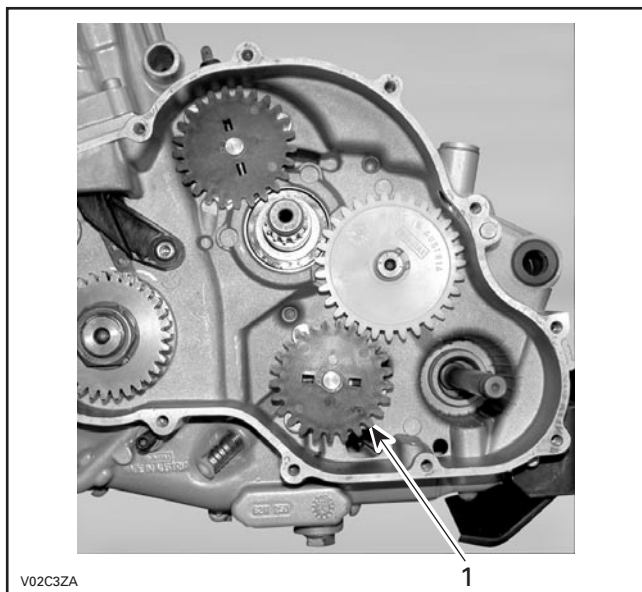
For installation, reverse the removal procedure.

Section 03 ENGINE

Subsection 07 (LUBRICATION SYSTEM)

RETURN OIL PUMP

The return oil pump **no. 17** is located on the clutch side of the crankcase housing.



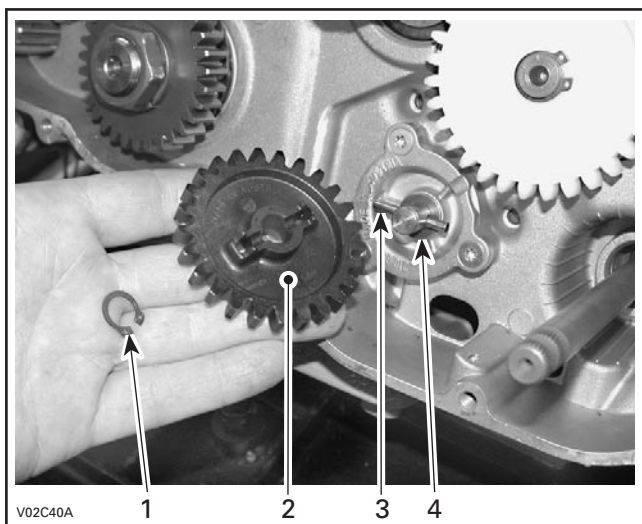
1. Return oil pump

Removal

Remove clutch. Refer to CLUTCH.

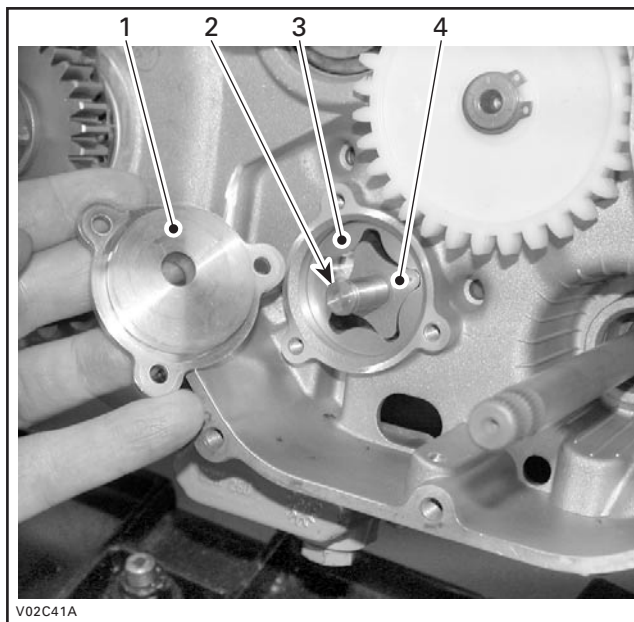
Remove:

- snap ring **no. 18**
- oil pump gear **no. 19**
- needle pin **no. 20**
- thrust washer **no. 21**



1. Snap ring
2. Oil pump gear
3. Needle pin
4. Thrust washer

- oil pump cover **no. 22**
- oil pump shaft **no. 23**
- oil pump rotor **no. 24**
- inner rotor **no. 25**.

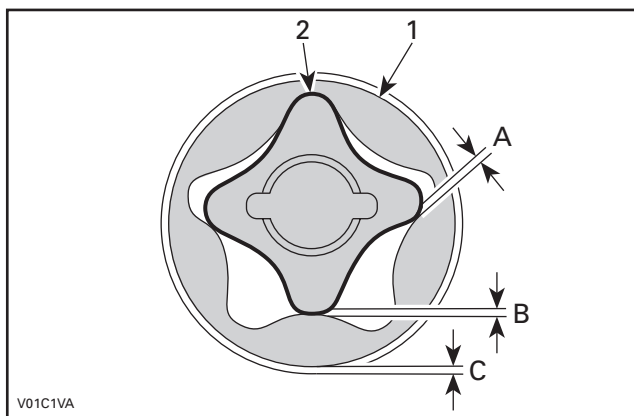


1. Oil pump cover
2. Oil pump shaft
3. Oil pump rotor
4. Inner rotor

Inspection

Inspect oil pump for marks or other damages, specially scratches in crankcase between inlet and outlet parts.

Using a feeler gauge, measure the clearance between oil pump rotor and inner rotor.



1. Oil pump rotor
2. Inner rotor

OIL PUMP ROTOR AND INNER ROTOR CLEARANCE	
SERVICE LIMIT	
A	0.25 mm (0.009 in)
B	
C	

Measure oil pump rotor thickness and oil pump rotor bore depth.

Difference between measurements should not exceed 0.25 mm (0.009 in). If so, replace oil pump rotor.

Installation

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

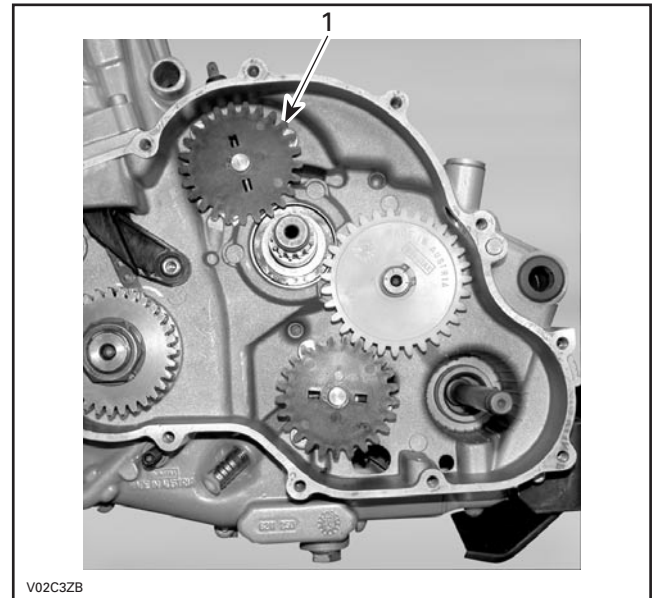
Markings on inner rotor and oil pump rotor must be visible.



Coat inner rotor and oil pump rotor with oil.

PRESSURE OIL PUMP

The pressure oil pump **no. 26** is located near the return oil pump.



1. Pressure oil pump gear

For removal, inspection and installation, use the same procedures that return oil pump.

ENGINE OIL STRAINER

The engine oil strainer **no. 27** is located between both crankcase housings.

Removal

Separate both crankcase housings. Refer to CRANKSHAFT/BALANCER SHAFT section.

Unscrew the bolts **no. 28** retaining the oil strainer guide **no. 29**.

Cleaning and Inspection

Clean engine oil strainer with a parts cleaner then use an air gun to dry it.

Check engine oil strainer for damage and change if necessary.

Installation

For installation, reverse the removal procedure.

Section 03 ENGINE

Subsection 07 (LUBRICATION SYSTEM)

OIL TANK

The oil tank is located under front fascia, near the headlight.

Removal

Drain oil tank.

Remove the front fascia.

Unscrew headlight then disconnect and remove it.

Remove nut **no. 30**.

Unscrew bolts retaining fuel tank cover and oil tank to the frame.

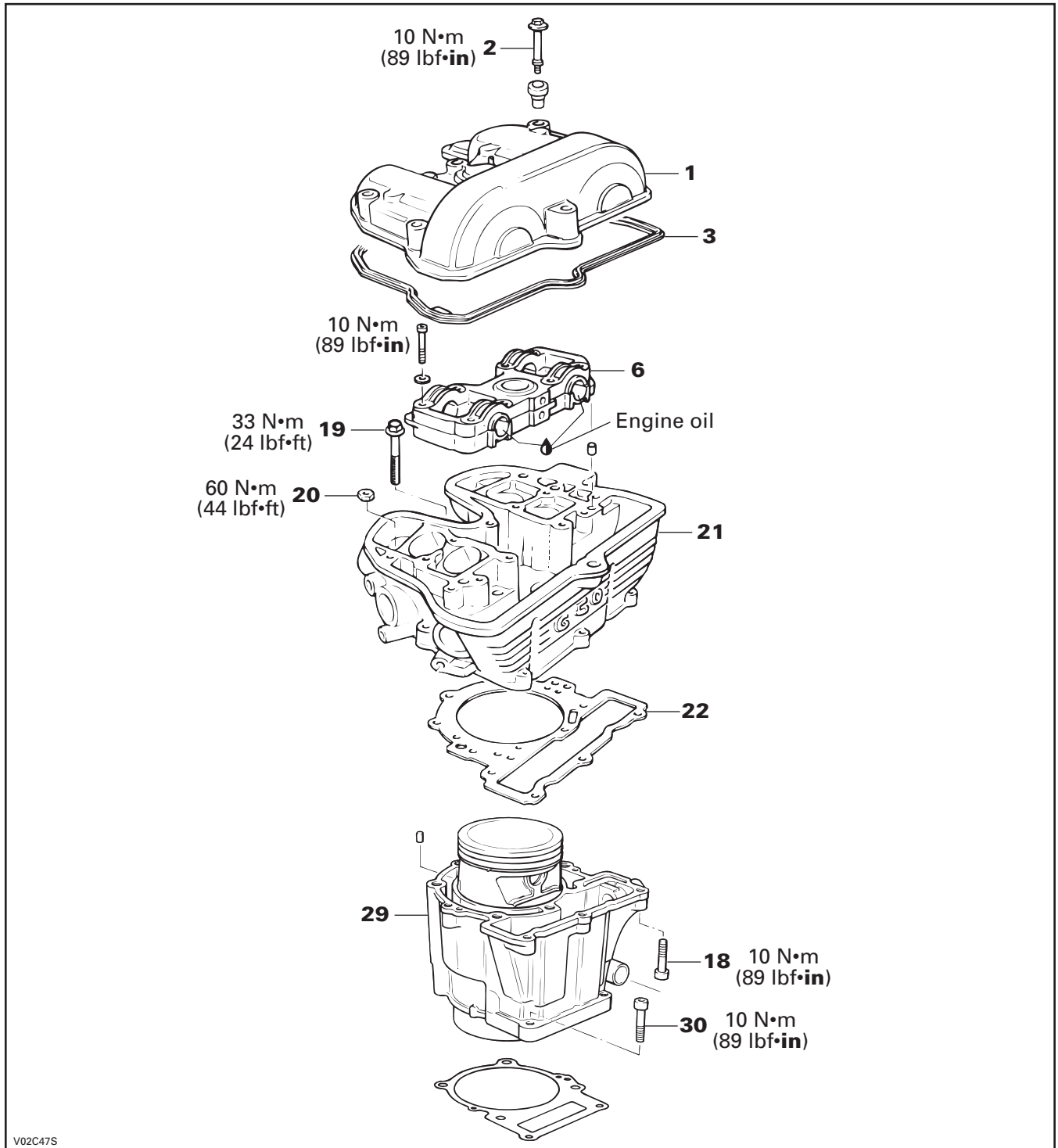
Unplug all hoses then remove oil tank.

Installation

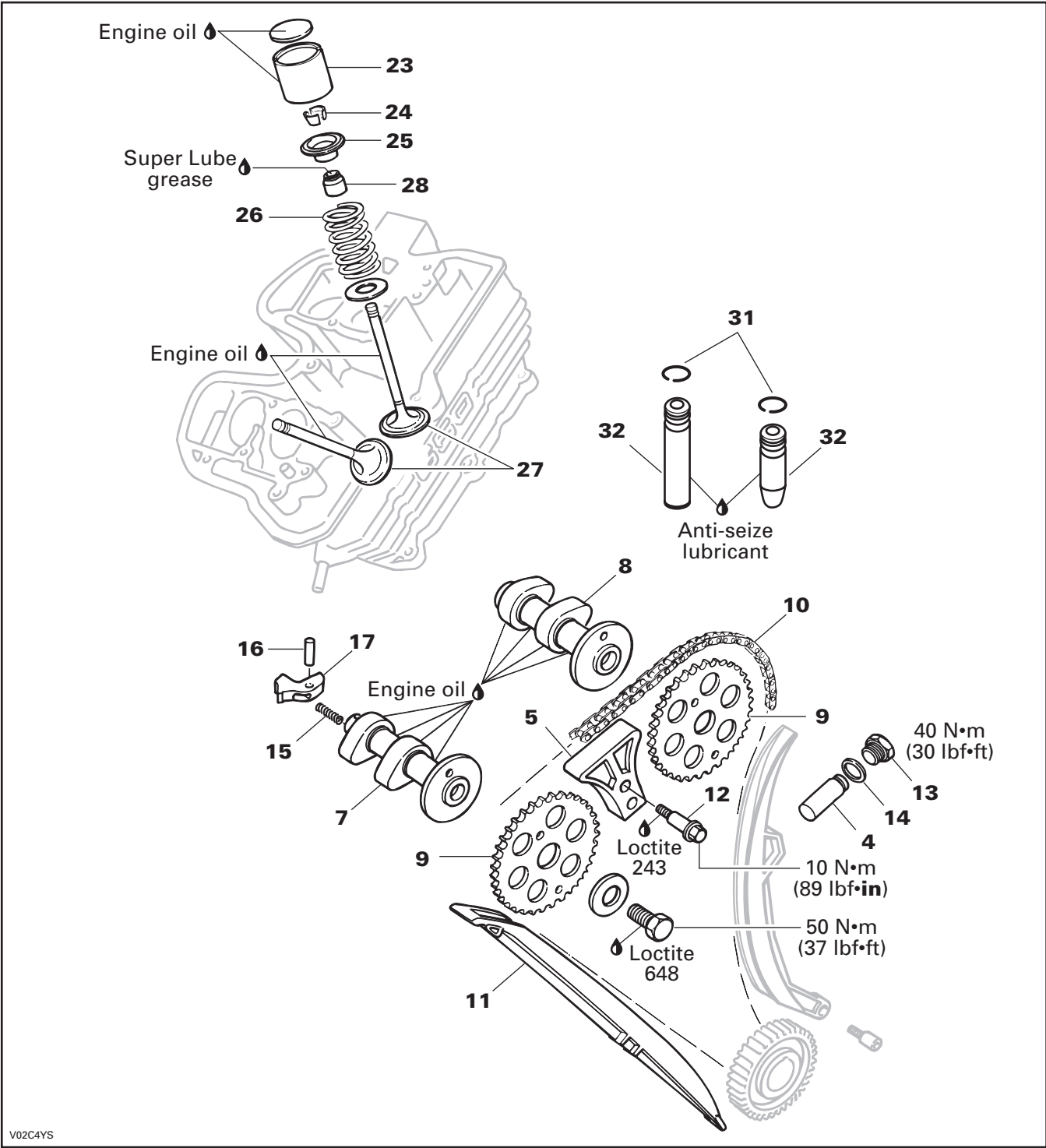
The installation is the reverse of the removal procedure.

CYLINDER AND HEAD

CYLINDER AND HEAD



VALVE



V02C4YS

GENERAL

NOTE: When diagnosing an engine problem, always perform the cylinder leak test. This will help pin-point a problem. Refer to the instructions included with your leak tester and LEAK TEST section for procedures.

Always place the vehicle on a level surface.

NOTE: For a better understanding, the following illustrations are taken with engine out of vehicle. To perform the following instructions, it is not necessary to remove engine from vehicle.

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

WARNING

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

Even if the removal of many parts is not necessary to reach another part, it is recommended to remove these parts in order to check them.

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 (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, (eg: valves, springs, etc.), it is strongly recommended to note their position (PTO, MAG side) 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 (eg: 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 if you grouped the parts of the same assembly at disassembly). Besides, since used parts have matched together during the engine operation, they will keep their matched fit when you reassemble them together within their "group".

CYLINDER HEAD COVER

Removal

Remove fuel tank. Refer to FUEL CIRCUIT section.

Remove the breather hose on the top of cylinder head cover **no. 1**.

Unscrew all bolts **no. 2** retaining the cover.

Remove the cover with the gasket **no. 3**.

Inspection

Check the cylinder head cover for cracks or other damages.

Check if the gasket is brittle, hard or otherwise damaged.

Replace all defective parts.

Installation

Reinstall the cover. To do this, reverse the removal procedure.

Take care that the gasket is located properly into the groove in the cover.

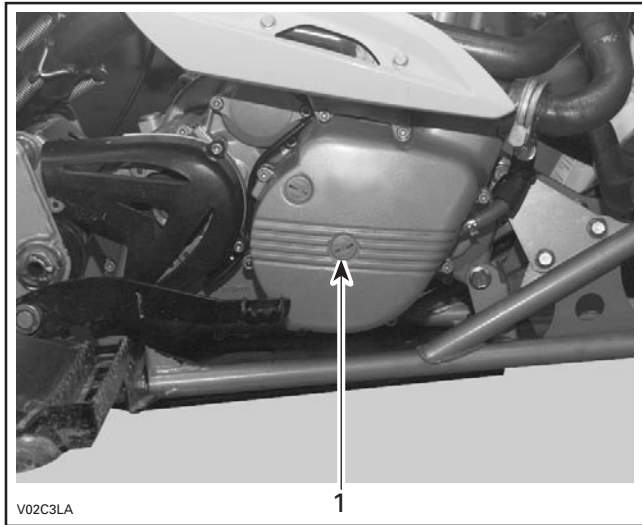
ADJUST VALVE CLEARANCE

Removal

Remove:

- fuel tank
- valve cover
- spark plugs.

Unfasten centre screw plug to right of engine housing cover.



RH SIDE OF VEHICLE
1. Remove this screw plug

Move crankshaft into TDC setting with an Allen key.
Use feeler gauge to check valve clearance and change adjusting plates if necessary.

VALVE CLEARANCE	
SERVICE LIMIT	
Exhaust	0.10 to 0.15 mm (.004 to .006 in)
Intake	

Note down valve clearance recorded.
Unfasten socket head screw beside support for oil return and secure crankshaft with the crankshaft locking bolt (P/N 529 035 617).
NOTE: Check tightness with the allen key.
To adjust valves, remove the camshaft bridges and the camshafts.
Remove adjusting plates, blow clean with compressed air.

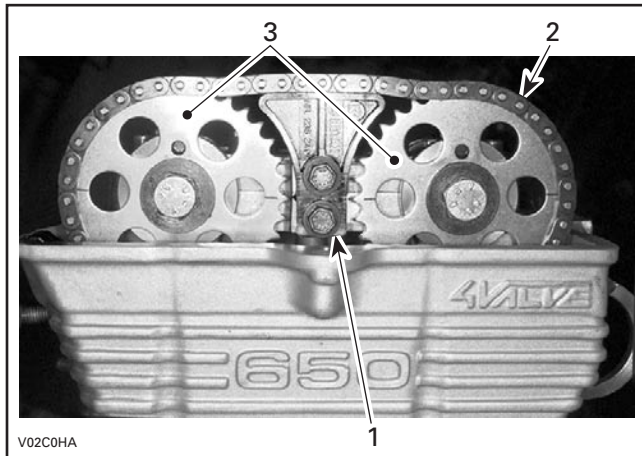
Installation

NOTE: Before installation, check thickness of adjusting plates with micrometer.
For installation, reverse the removal procedure.

CAMSHAFT

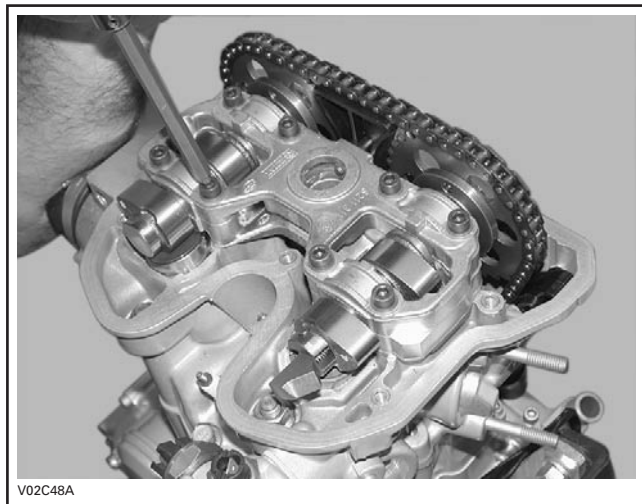
Removal

Using the crankshaft locking bolt (P/N 529 035 617), lock the crankshaft into TDC setting. Refer to CRANKSHAFT/BALANCER SHAFT section.
Remove cylinder head cover no. 1.
Remove chain tensioner no. 4.
Unfasten chain guide no. 5.



1. Chain guide
2. Timing chain
3. Timing gears

Remove the upper section of camshaft carrier no. 6.

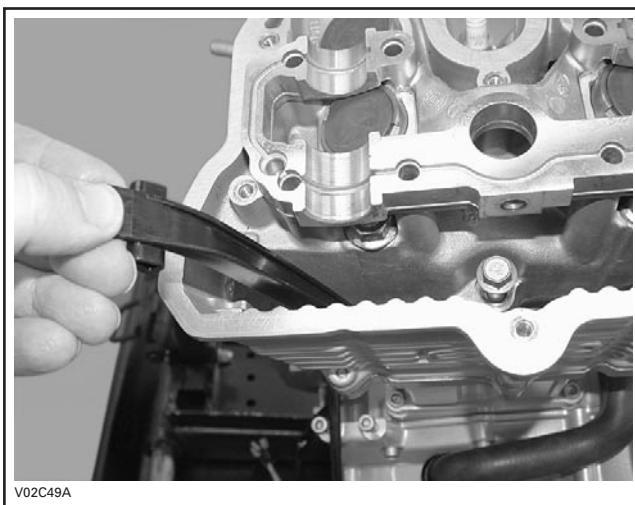


Remove camshafts **no. 7** and **no. 8** with timing gears **no. 9**.

NOTE: Unfasten timing gears only if they need to be replaced.

Secure timing chain **no. 10** with a retaining wire.

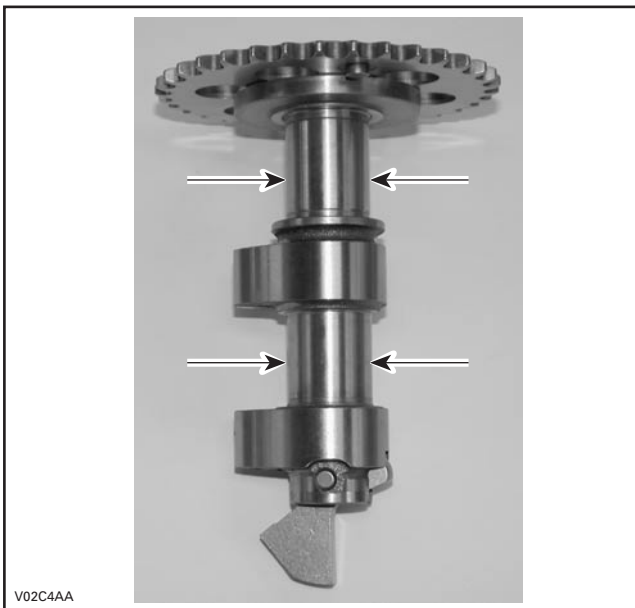
Remove front chain rail **no. 11**.



Inspection

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

Measure camshaft base circle diameter and lobe height, using a micrometer.



CAMSHAFT DIAMETER

MINIMUM	21.950 mm (.864 in)
---------	---------------------



CAMSHAFT LOBE HEIGHT

SERVICE LIMIT	39.7 mm (1.56 in)
---------------	-------------------

Measure clearance between camshaft and camshaft carriers, using the plastic feeler gauge.

NOTE: The plastic feeler gauge is available at automotive parts retailer.

Tighten camshaft carrier to specified torque.

Unfasten camshaft carrier and determine clearance using comparative scale.

I.D. DIAMETER OF CAMSHAFT CARRIER

MAXIMUM	22.040 mm (.868 in)
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CLEARANCE BETWEEN CAMSHAFT AND CAMSHAFT CARRIER

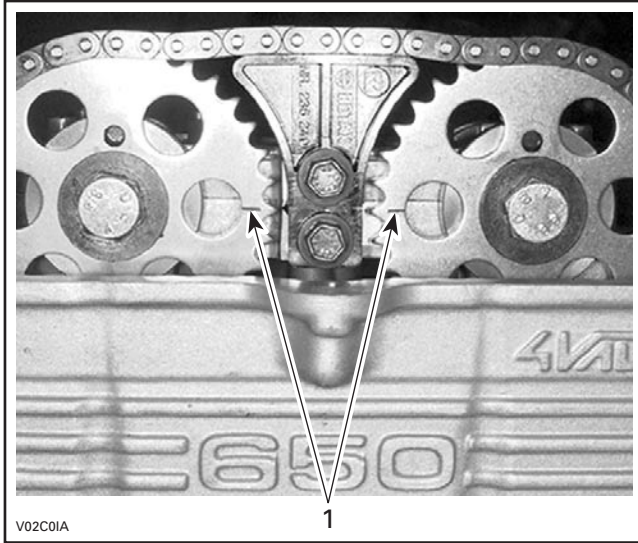
MAXIMUM	0.09 mm (.004 in)
---------	-------------------

Section 03 ENGINE

Subsection 08 (CYLINDER AND HEAD)

Installation

CAUTION: Install the timing gears so that the markings on the gears must be aligned and so that the dowel pin on each camshaft must be located on the top, as shown in the next illustration.



1. Align marks

Tighten screws **no. 12** for chain guide with Loctite 243, hand tight.

Fit upper section of camshaft carrier and tighten down.

Check valve clearance. Refer to MAINTENANCE/LUBRICATION.

Install chain tensioner **no. 4** and tighten screw **no. 13** with sealing ring **no. 14**.

Install cylinder head cover with gasket.

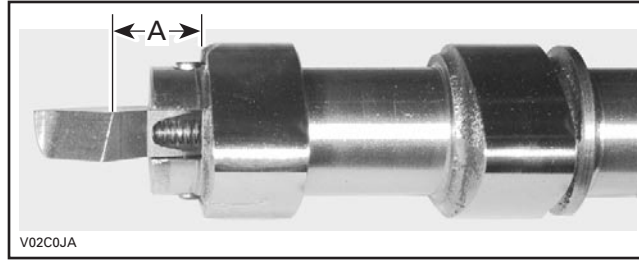
Unscrew and remove crankshaft locking bolt. Install the screw plug with sealing ring. Torque to 24 N•m (18 lbf•ft).

CENTRIFUGAL DECOMPRESSOR

Inspection

Hold down exhaust camshaft **no. 7** in horizontal position with cam tips facing downwards.

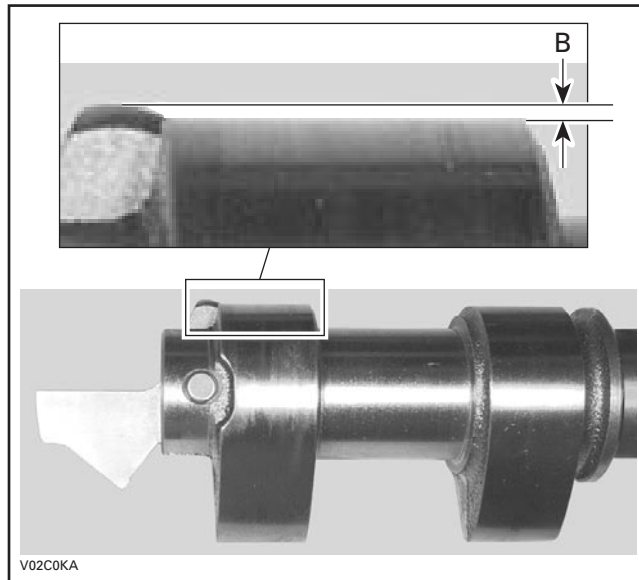
The spring **no. 15** must press the lever upwards to dimension "A", replace spring if necessary.



A. 11.5 mm (.45 in)

NOTE: Never stretch spring since this alters the defined spring force.

When activated, the amount of lifting arm protruding over the cam pitch circle must not be less than dimension "B".



B. 0.4 mm (.0157 in)

Disassembly

Remove the exhaust camshaft **no. 7**.

Press shaft **no. 16** out of centrifugal weight **no. 17**.

Assembly

Reassemble in the reverse order of disassembly. Paying attention to the following detail.

If the centrifugal decompressor was dismantled, **ALWAYS** replace the spring.

After assembly, check if the centrifugal weight moves smoothly.

CYLINDER HEAD

Removal

Remove:

- engine from vehicle
(refer to INSTALLATION AND REMOVAL)
- starter (refer to STARTING SYSTEM)
- camshafts
- chain guide **no. 5**
- socket screws **no. 18**
- bolts **no. 19**
- nuts **no. 20**.

Remove cylinder head **no. 21** and gasket **no. 22**.

Inspection

Check for crack between valve seats or other damage, if so, replace cylinder head.

Installation

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

Fitting cylinder head gasket.

Slide timing chain through chain duct.

First, tighten nuts **no. 20** crosswise.

Install and torque bolts **no. 19**.

Tighten socket screws **no. 18** on cylinder base.

Install camshafts.

VALVE SPRING

Removal

Remove:

- cylinder head **no. 21**
- valve tappet **no. 23**.

Compress valve spring, use a spring compressor (P/N 529 035 724) and compressor cup (P/N 529 035 725).

Remove valve cotters **no. 24**.

Remove spring compressor, valve spring retainer **no. 25** and valve spring **no. 26**.

Inspection

Check valve spring for rust or corrosion and free length.

VALVE SPRING FREE LENGTH	
SERVICE LIMIT	44.5 mm (1-3/4 in)

Installation

For installation, reverse the removal procedure.

VALVE

Removal

Remove valve spring **no. 26**.

Push the valve stem then pull valve **no. 27** out of cylinder head.

Inspection

Valve Clearance

Refer to MAINTENANCE/LUBRICATION.

Valve

Inspect valve surface, check for abnormal stem wear and bending. If so, replace by a new one.

Valve Stem

Check valve stem for wear or friction surfaces, if so, replace parts.

Measure valve stem in three places, using a micrometer.

VALVE STEM DIAMETER	
SERVICE LIMIT	
Exhaust	5.935 mm (.233 in)
Intake	5.95 mm (.234 in)

Change valve if valve stem is out of specification.

Valve Face and Seat

Check valve face and seat for burning, pitting and other signs of damage.

Apply some lapping compound to valve face and work valve on its seat with a lapping tool.

Measure valve face contact width.

NOTE: The location of contact area should be in center of valve face.

Section 03 ENGINE

Subsection 08 (CYLINDER AND HEAD)

Measure valve seat width, using a caliper.

VALVE SEAT CONTACT WIDTH	
SERVICE LIMIT	
Exhaust	1.8 mm (.07 in)
Intake	1.6 mm (.06 in)

If valve seat contact width is too wide, too narrow or has spots, the seat must be ground or cylinder head replaced.

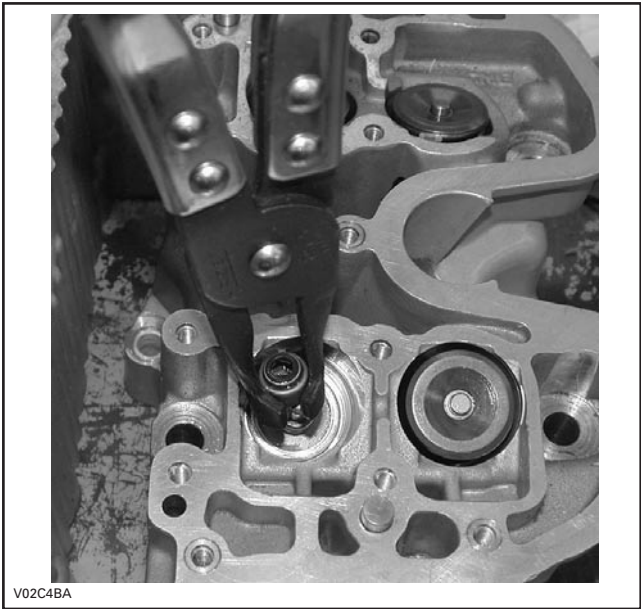
Installation

Install valve.
NOTE: Remove assembly sleeve once again.
Install valve spring and valve plate spring.
NOTE: Install valve tappets with a small amount of grease to facilitate assembly.

VALVE STEM SEAL

Removal

Remove valve.
Remove valve stem seal **no. 28** with a special pliers such as Snap-On YA 8230.



Inspection

Inspection of valve stem seals is not needed as new seals should always be installed whenever a cylinder head is disassembled.

Installation

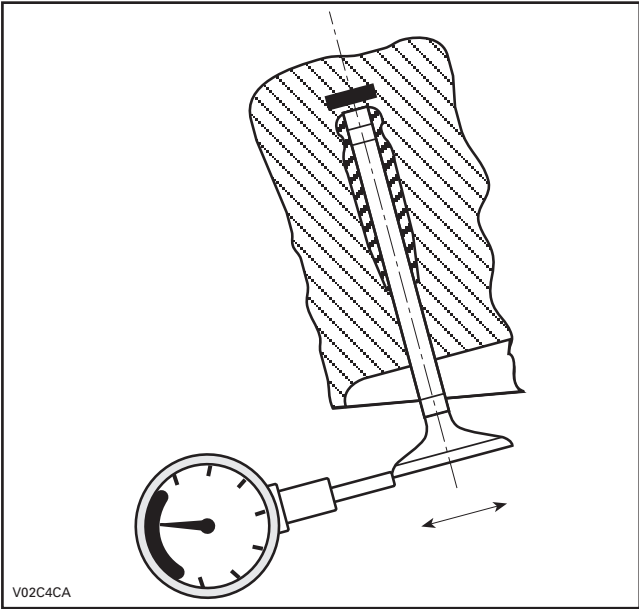
For installation, reverse the removal procedure.

VALVE GUIDE

Inspection

Insert a new valve in valve guide until it contacts the seal.
NOTE: Clean valve guide to remove carbon deposits before measuring.

Measure the maximum tilt clearance with a dial gauge placed as shown in the following illustration.



TILT CLEARANCE	
MAXIMUM	0.04 mm (.016 in)

I.D. VALVE GUIDE	
SERVICE LIMIT	
Exhaust	6.080 mm (.239 in)
Intake	

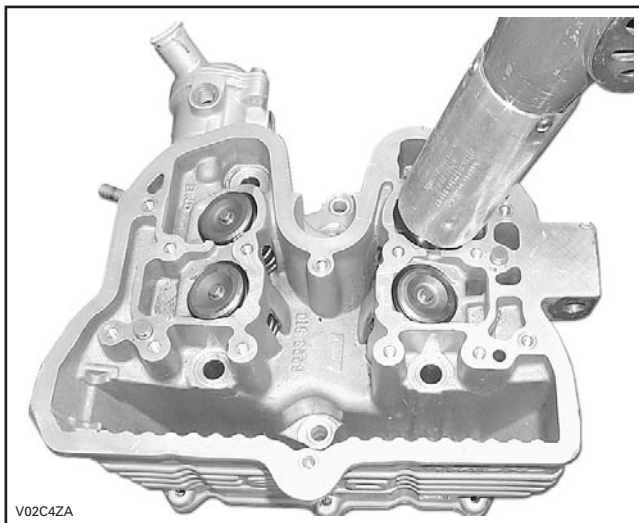
Valve Guide Removal

Remove:

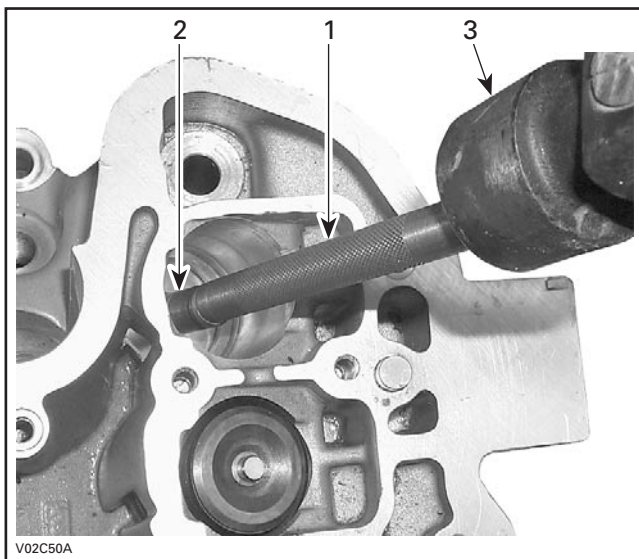
- cylinder head (see CYLINDER HEAD above)
- valve spring (see VALVE SPRING above)
- valve (see VALVE above).

NOTE: Clean valve guide area from contamination before removal.

Heat the valve guide area using a heat gun for approximately 10 minutes to 100°C (212°F).



Using valve guide remover/installer (P/N 529 035 852), remove valve guide **no. 32**.



1. Valve guide remover/installer
2. Valve guide
3. Hammer

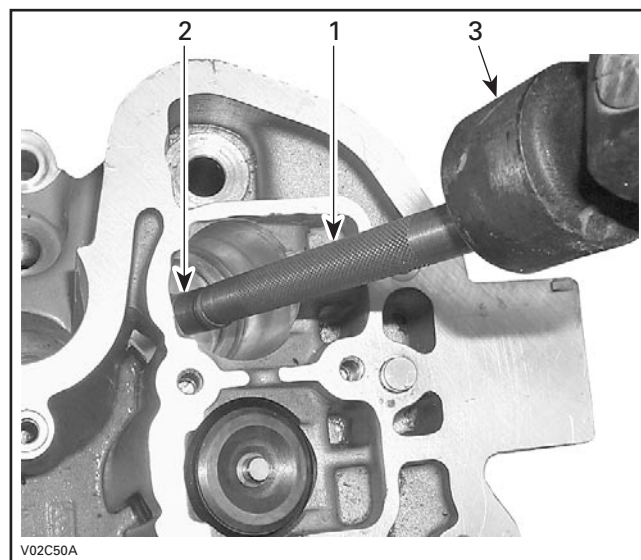
Installation

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

Clean the valve guide bore before reinstalling the valve guide into cylinder head.

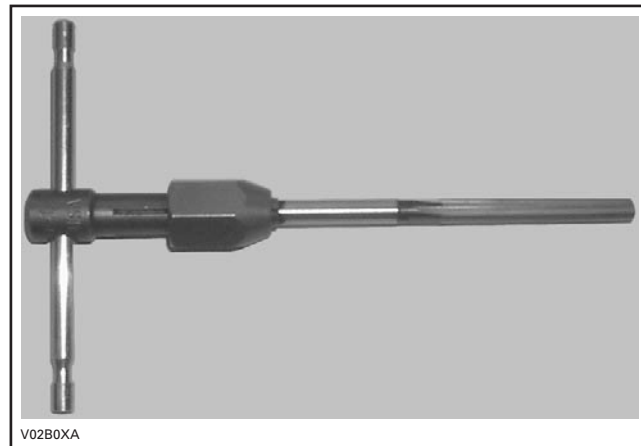
Install circlip **no. 31** on the valve guide

Use valve guide remover/installer (P/N 529 035 852) to install valve guide **no. 32**.



1. Valve guide remover/installer
2. Valve guide
3. Hammer

Valve guide to be grinded in diameter by using a hand reamer.



HAND REAMER

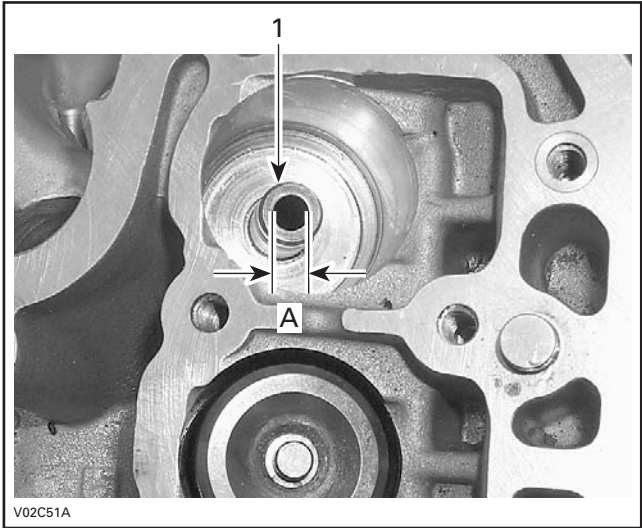
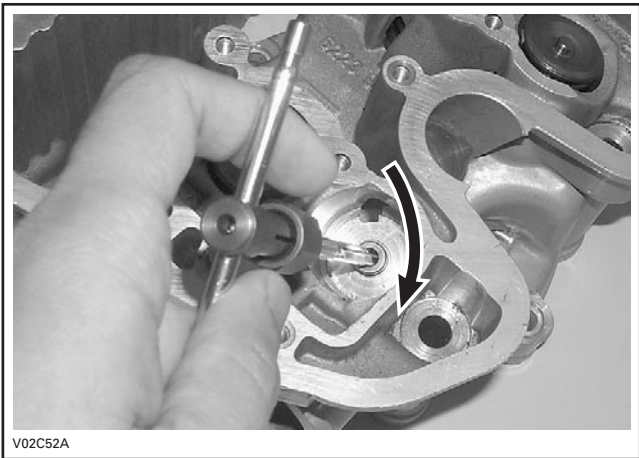
Section 03 ENGINE
Subsection 08 (CYLINDER AND HEAD)

Hand reamer (F1111 Hand Reamer 6H7) ordering and other information can be obtained from the following company:

TITEX PRECISION CUTTING TOOLS

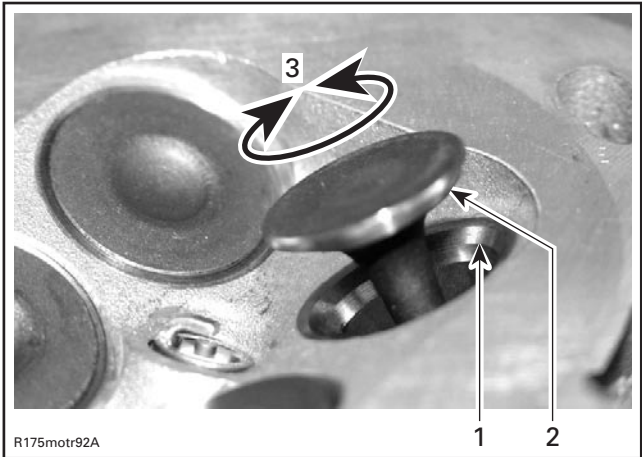
TITEX USA
301 Industrial Avenue,
Crystal Lake, IL 60012
Tel.: 1 (815) 4592040
Toll-free: 1 800 262-2436
Fax: 1 (413) 774-2110
e-mail: titex.usa@sandvik.com
www.titex.com

NOTE: Use cutting oil and ensure to turn reamer the right way (clockwise) as shown below.



1. Valve guide
A. Valve guide diameter

Apply some lapping compound to valve face and work valve on its seat with a lapping tool.



TYPICAL
1. Valve seat
2. Valve face (contact surface to valve seat)
3. Turn valve while pushing again cylinder head

NOTE: Ensure to seat valves properly. Apply marking paste to ease checking contact pattern.

I.D. VALVE GUIDE	
SERVICE LIMIT	
Exhaust	6.080 mm (.239 in)
Intake	

CYLINDER

Removal

Remove:

- cylinder head **no. 21**, if necessary

NOTE: If the cylinder head does not have to be disassembled, do not separate cylinder head from cylinder **no. 29**.

- water cooling hose from cylinder
- socket screws **no. 30** retaining cylinder to the crankcase housing.

Pull cylinder.

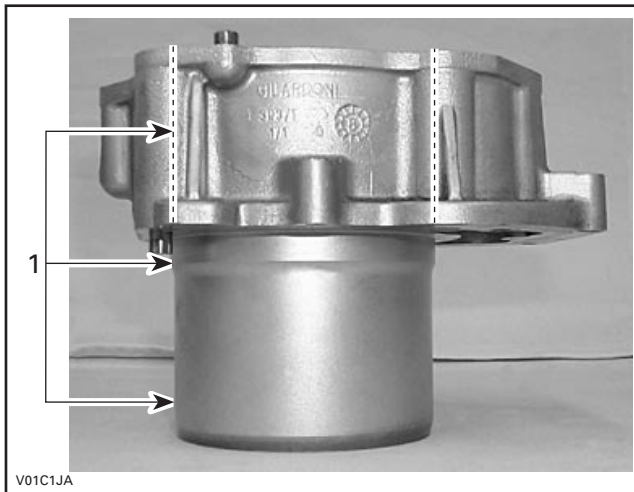
Inspection

Cylinder

Check cylinder for cracks, scoring, rust and wear ridges on the top and bottom of the cylinder.

Cylinder Taper

Measure cylinder diameter 16 mm (5/8 in) from top of cylinder then half-way through and finally at 13 mm (1/2 in) from bottom.



TYPICAL

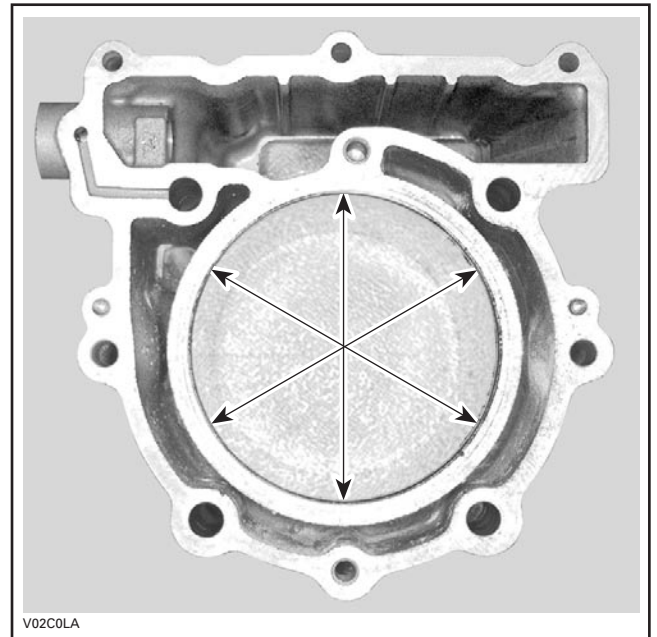
1. Measure at three points

Difference between measurements should not exceed 0.10 mm (.004 in). If so, replace cylinder.

CYLINDER BORE CLEARANCE	
SERVICE LIMIT	100.03 mm (3.9382 in)

Cylinder Out of Round

Measure cylinder bore at distance of 60 mm (2-3/8 in) from the upper edge with an internal micrometer at three points. Difference between measurements should not exceed 0.10 mm (.004 in). If so, replace cylinder.



Installation

Coat piston rings with oil and slide the ring compressor over piston rings from above, allowing piston to protrude approximately 2 mm (3/32 in) from ring compressor.

Slide timing chain through chain duct, then slide cylinder over piston.

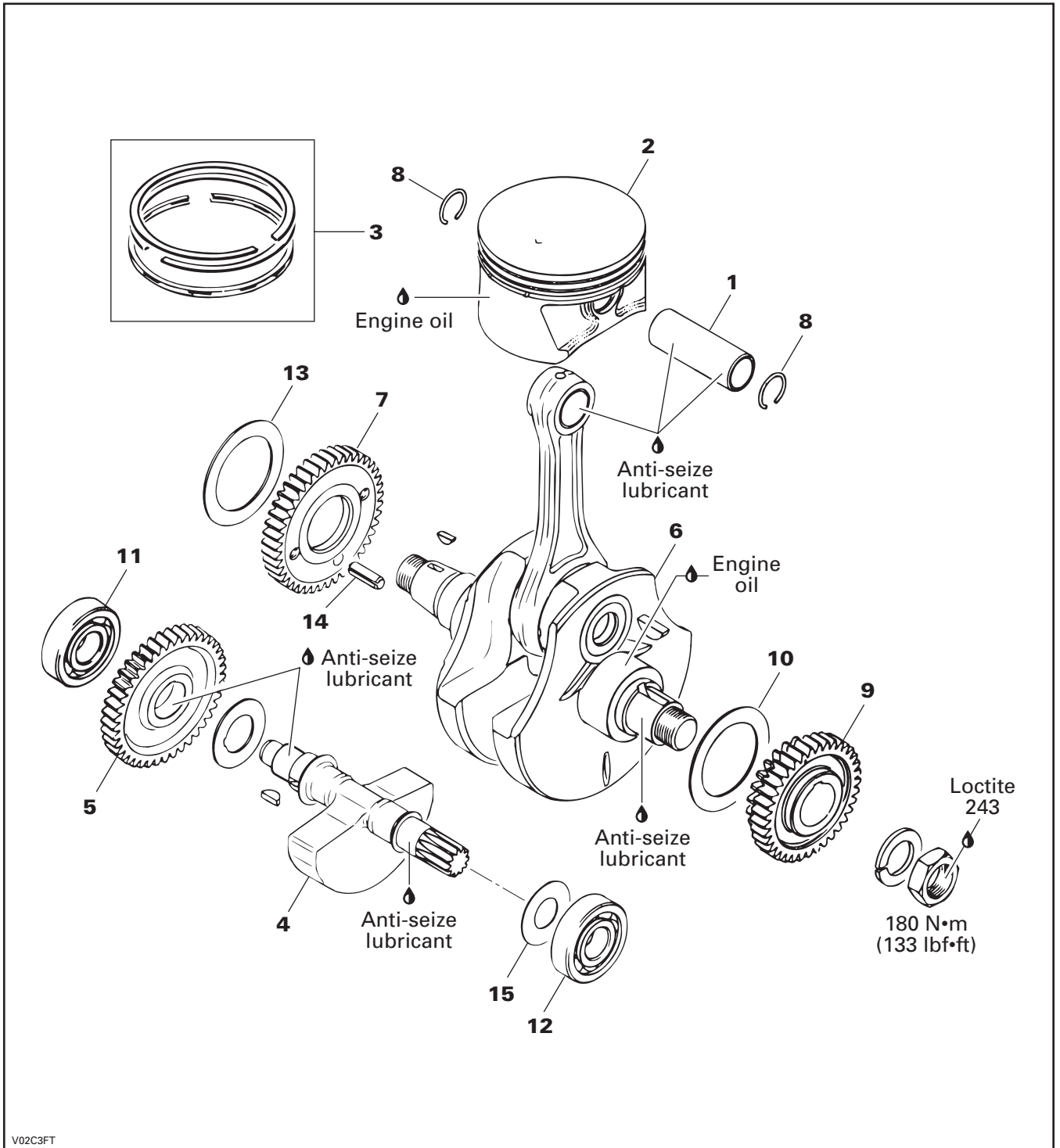
Remove the ring compressor.

Secure cylinder on crankcase housing with the socket screws **no. 30**. Do not torque yet.

Fit cylinder head then torque nuts and bolts.

Torque socket screws.

CRANKSHAFT/BALANCER SHAFT



PISTON PIN

Removal

Remove engine. Refer to REMOVAL AND INSTALLATION.

Remove cylinder. Refer to CYLINDER AND HEAD.

Place a rag under piston **no. 2**.

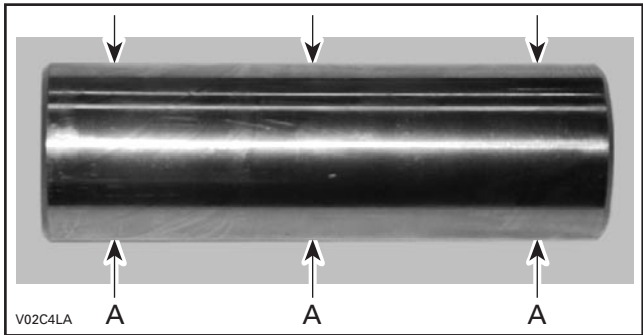


Remove one piston pin circlip **no. 8** then press out piston pin **no. 1**.

Inspection

Check piston pin for crack or other damage.

Measure piston pin with a micrometer.



A. Piston pin diameter

PISTON PIN DIAMETER	
SERVICE LIMIT	21.98 mm (.865 in)

Installation

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

Apply anti-seize lubricant on the piston pin.

Insert piston pin into piston and connecting rod.

Secure piston pin with a new piston pin circlip.

NOTE: Do not align the end gap of the piston pin circlips with the cutout in the piston bore.



PISTON

Removal

Remove piston pin **no. 1**.

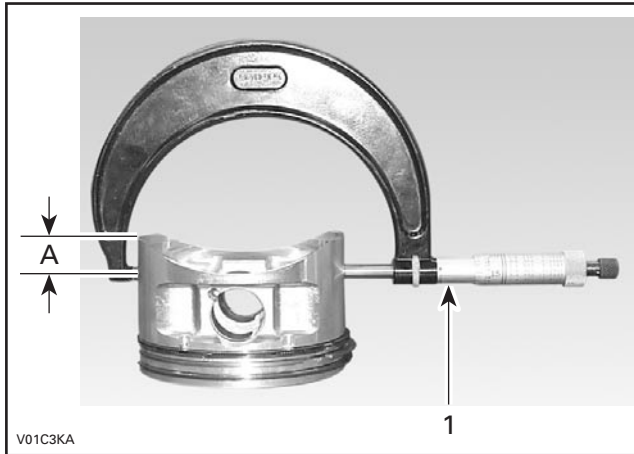
Detach piston from connecting rod.

NOTE: Mark base of piston on exhaust end.

Inspection

Inspect piston for scoring, cracking or other damages.

Using a micrometer, measure piston at 16 mm (5/8 in) perpendicularly (90°) to piston pin axis.



TYPICAL

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

The measured dimension should be as described in the previous table. If not, replace piston.

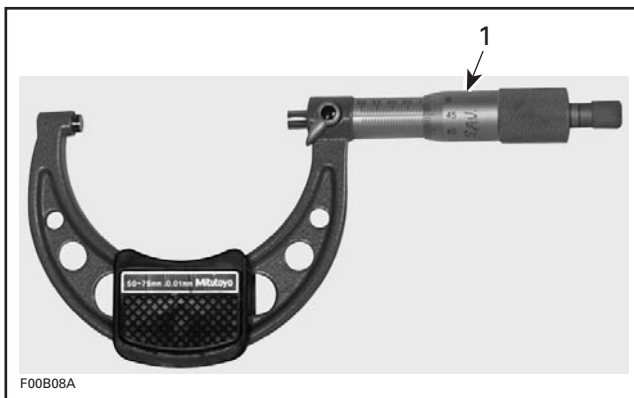
PISTON MEASUREMENT	
SERVICE LIMIT	99.94 mm (3.9346 in)

Piston/Cylinder Clearance

PISTON/CYLINDER CLEARANCE	
SERVICE LIMIT	0.09 mm (.004 in)

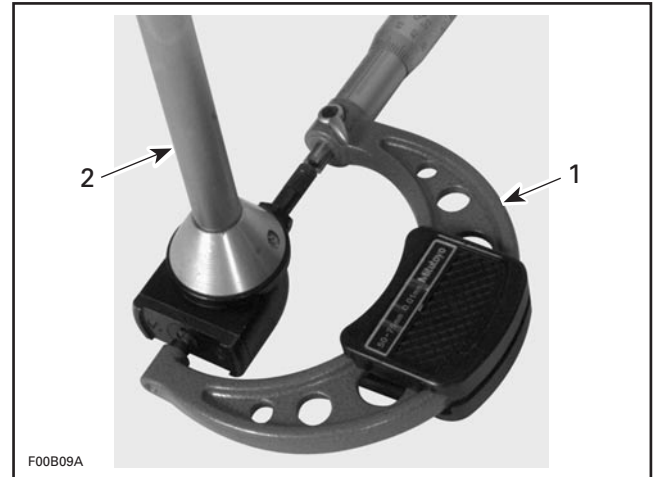
NOTE: Make sure used piston is not worn. See PISTON MEASUREMENT table above.

Adjust and lock a micrometer to the piston dimension.

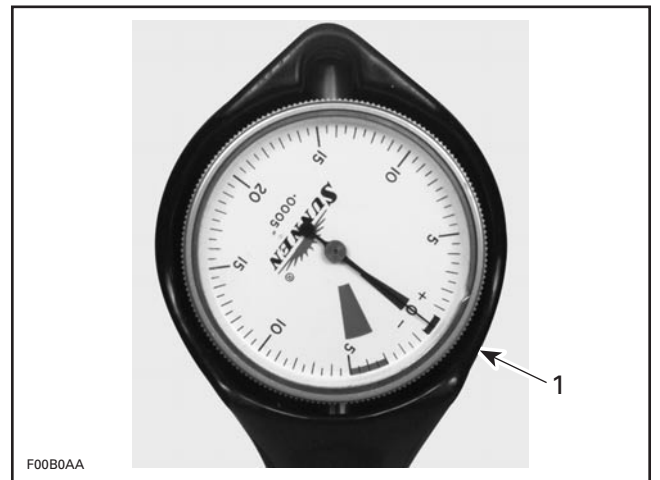


1. Micrometer set to the piston dimension

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



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



TYPICAL

1. Indicator set to 0 (zero)

Position the dial bore gauge at 16 mm (5/8 in) below cylinder top edge, measuring perpendicularly (90°) to piston pin axis.

Read the measurement on the cylinder bore gauge. The result is the exact piston/cylinder wall clearance. If clearance exceeds specified tolerance, replace cylinder or rebore. See previous table.

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

Section 03

ENGINE

Subsection 09 (CRANKSHAFT/BALANCER SHAFT)

Installation

For installation, reverse the removal procedure.

NOTE: Install piston with removal mark (on base of piston) in direction of exhaust end.

PISTON RINGS

Inspection

Piston Ring/Piston Groove Clearance

Using a feeler gauge measure each piston ring/piston groove clearance. If the clearance is too large, the piston should be replaced.

PISTON RING/PISTON CLEARANCE	
SERVICE LIMIT	0.15 mm (.006 in)

Piston Ring End Gap

PISTON RING END GAP	
SERVICE LIMIT	1.0 mm (.040 in)

Position piston ring 16 mm (5/8 in) from top of cylinder.

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

Using a feeler gauge, check piston ring end gap. Replace piston ring, if gap exceeds specified tolerance. See above table.

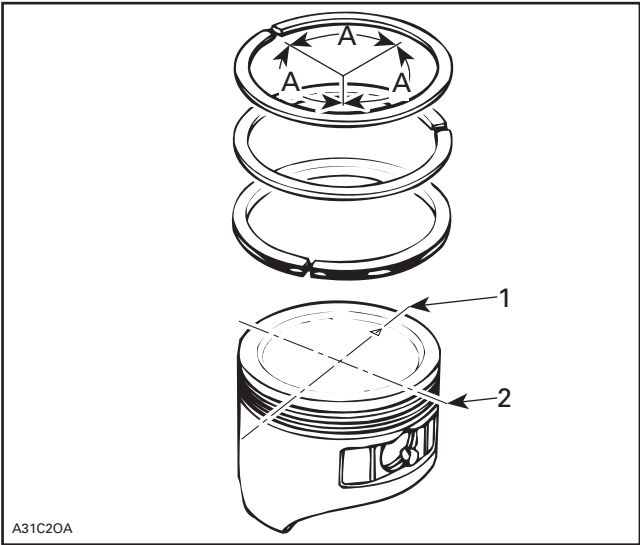
Installation

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

NOTE: Use a piston ring expander to prevent breakage during installation. The oil ring must be installed by hand.

Check that rings rotate smoothly after installation.

Space the piston ring end gaps 120° apart and do not align the gaps with the piston pin bore or the thrust side axis.



- 1. DO NOT align ring gap with piston thrust side axis
- 2. DO NOT align ring gap with piston pin bore axis
- A. 120°

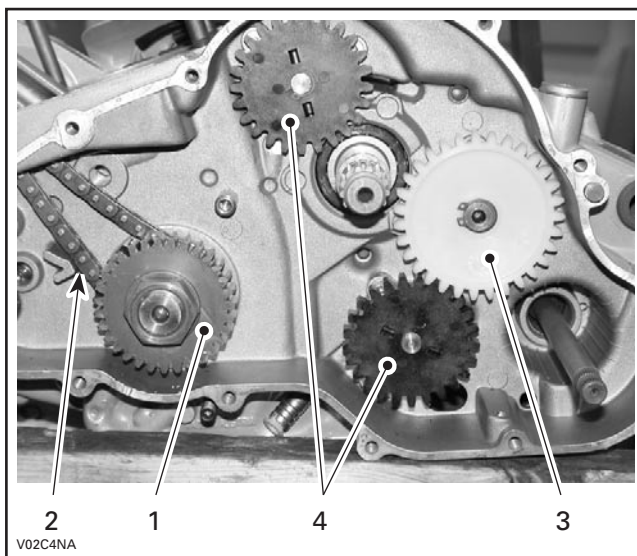
BALANCER SHAFT

Removal

- Remove:
- engine from vehicle (refer to REMOVAL AND INSTALLATION)
 - cylinder (refer to CYLINDER AND HEAD)
 - piston no. 2.

Clutch Side

- Remove:
- clutch (refer to CLUTCH)
 - double drive gear no. 9 and timing chain
 - oil pump intermediate gear.

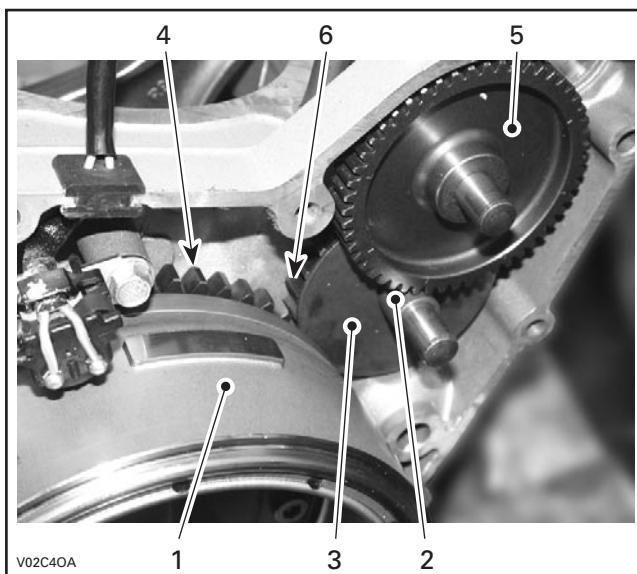


1. Double drive gear
2. Timing chain
3. Oil pump intermediate gear
4. Oil pump gears

Magneto Side

Remove:

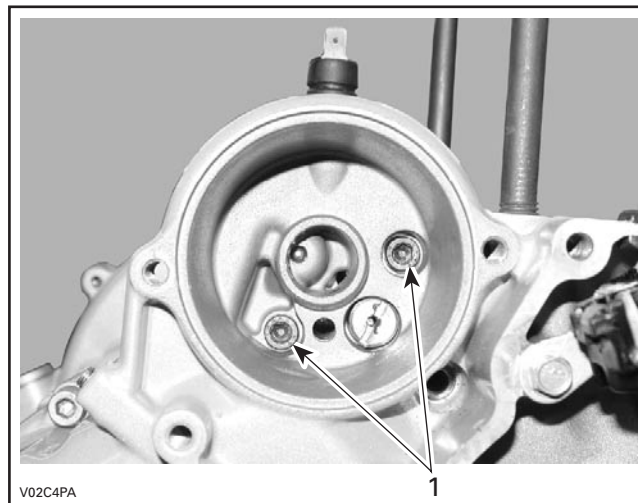
- rotor (refer to MAGNETO SYSTEM)
- spacer
- thrust washer
- sprag clutch gear
- starter double gear
- idle gear (behind thrust washer)



1. Rotor
2. Spacer
3. Thrust washer
4. Sprag clutch gear
5. Starter double gear
6. Idle gear

- oil filter
- all bolts retaining housing.

NOTE: Do not forget the bolts inside the oil filter housing.



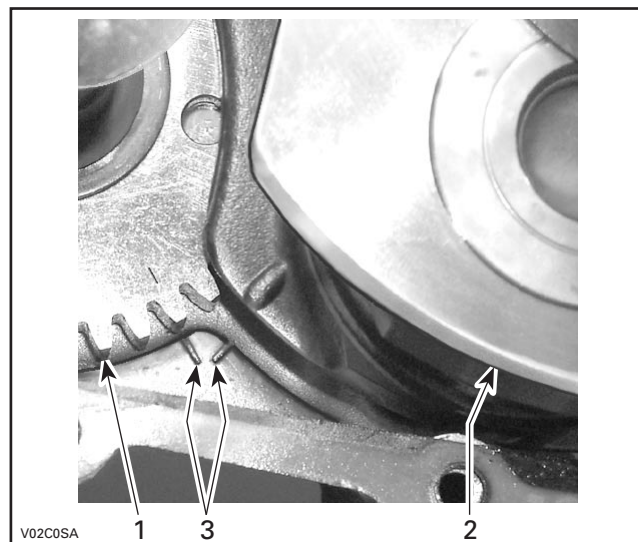
1. Bolts to be removed

Lift up clutch side of engine housing, striking alternate gentle blows with plastic hammer on mainshaft, countershaft and balancer shaft to ensure that these remain on magnet side.

CAUTION: Do not tilt engine housing; this can cause damage to bearing cup.

Remove shims **no. 10** and **no. 15** on crankshaft and balancer shaft.

Align marks on balancer shaft and crankshaft with marks on housing.



1. Balancer shaft
2. Crankshaft
3. Marks on housing

Section 03 ENGINE

Subsection 09 (CRANKSHAFT/BALANCER SHAFT)

First lift out crankshaft, then balancer shaft.

NOTE: Take care of spacer discs on crankshaft.

Inspection

Check balancer shaft bearings **nos. 11** and **12** in front and rear housing for excessive play and smooth operation. Replace if necessary.

Installation

Install balancer shaft in engine housing, mark must be aligned with mark on housing.

Coat thrust washer **no. 13** with oil and install in crankshaft.

Rotate crankshaft before installing so that mark is aligned with mark on housing.

Fit gasket.

NOTE: Coat bearing points on shafts. Recenter crankshaft and balancer shaft if either housing, crankshaft or balancer shaft were replaced. See RECENTER CRANKSHAFT.

BALANCER GEAR

Removal

Mount balancer shaft in vise with protective jaws. Using a suitable puller, remove the balancer gear **no. 5**.

Inspection

Check gears teeth for damage. Change if necessary.

Installation

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

Heat balancer gear to 80°C (176°F).

CRANKSHAFT

Removal

Use the same removal procedure that balancer shaft.

Inspection

Crankshaft Bearing Radial Play

Measure bearing journal diameter. The minimum diameter for bearing journal is 47.975 mm (1.888 in). If the measure exceeds specified tolerance, replace the crankshaft.

Measure the interior diameter of the crankshaft bushing.

Subtract bearing journal diameter from inside bushing diameter. The result is the main bearing radial play. If the measure exceeds specified tolerance, replace the crankshaft and/or bushing.

CRANKSHAFT BEARING RADIAL PLAY	
SERVICE LIMIT	0.10 mm (.004 in)

Connecting Rod Big End Axial Play

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

CONNECTING ROD BIG END	
SERVICE LIMIT	
Axial play	0.80 mm (.031 in)

Connecting Rod/Piston Pin Clearance

Measure piston pin. Compare to inside diameter of connecting rod.

CONNECTING ROD SMALL END DIAMETER	
SERVICE LIMIT	22.04 mm (.868 in)

PISTON PIN BORE CLEARANCE	
SERVICE LIMIT	0.06 mm (.002 in)

Installation

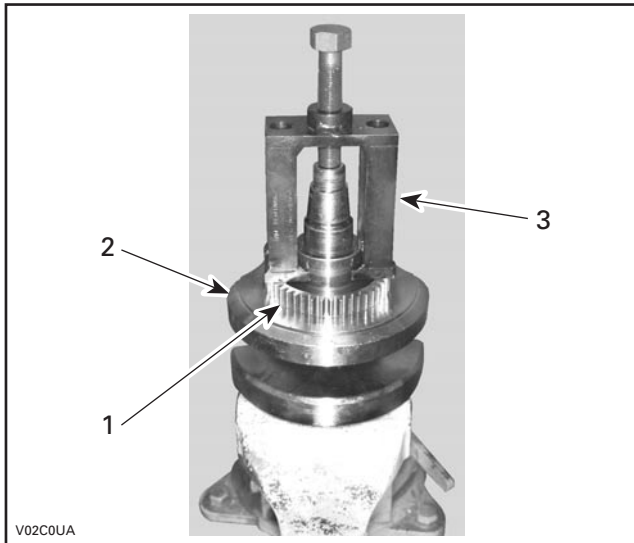
For installation, refer to balancer shaft installation.

COUNTER GEAR

Removal

Clamp crankshaft in vise with protective jaws.

Using extractor (P/N 529 035 624) extract counter gear.



1. Counter gear
2. Crankshaft
3. Extractor

Inspection

Check counter gear teeth for damage. Replace if necessary.

Installation

Heat counter gear to 140°C (284°F).

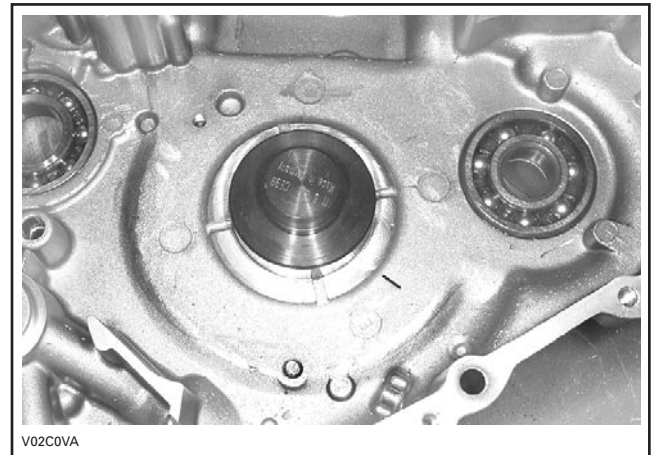
CAUTION: The roller pin **no. 14** must not protrude from bore in counter gear; this is the support face for the thrust washer.

CRANKSHAFT BUSHING

Removal

Heat engine housing to 100°C (212°F).

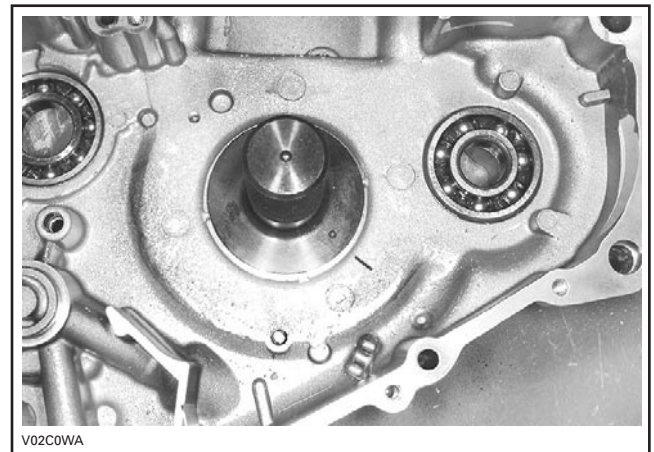
Drive out bushing with punch (P/N 529 035 688).



Installation

Heat engine housing to 100°C (212°F).

Coat bushing with Klueber grease (P/N 711 297 616) and drive home with punch (P/N 529 035 689), striking from inside.



CAUTION: Mark position of oil hole in bushing on housing. Align mark on punch with mark on housing. Bushing must be inset behind oil holes. The notch on the bushing should always face the balancer shaft.

BALL BEARINGS IN HOUSING

Removal

Heat output shaft in the housing to 80°C (176°F).

Using a suitable slide hammer, extract ball bearing.

Installation

Place the housing in oven to 100°C (212°F).

Section 03 ENGINE

Subsection 09 (CRANKSHAFT/BALANCER SHAFT)

NOTE: The sealed ends of the cage must point outwards.

RECENTER CRANKSHAFT

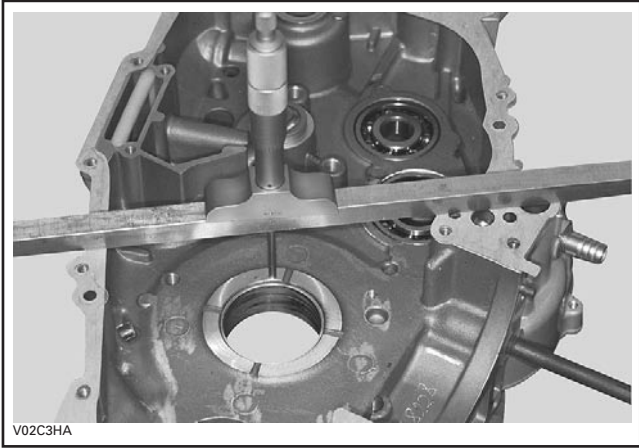
NOTE: Only fit shim on clutch end. On magneto side, the washer is always 1.0 mm (.04 in).

Place crankshaft into right engine housing (magneto side). Do not install shim on clutch side.

Using depth gauge, measure distance between crank web and housing joint. This is the dimension "B".



Determine dimension between compressed gasket in left engine housing (clutch side) and washer contact face. This is the dimension "A".



Subtract dimension "B" from dimension "A", the result is the end float of crankshaft plus shim thickness.

Select suitable shim to ensure the correct end float is obtained.

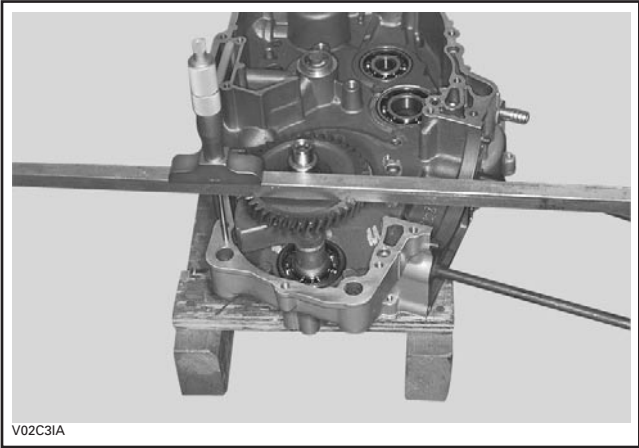
END FLOAT OF CRANKSHAFT	0.1 to 0.3 mm (.004 to .012 in)
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RECENTER BALANCER SHAFT

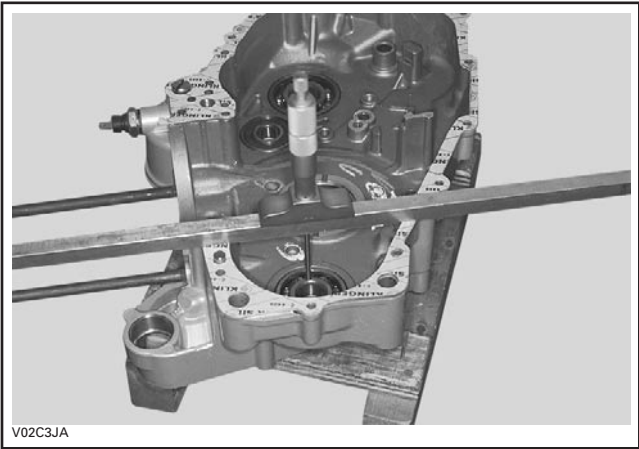
NOTE: Only fit shim on clutch end.

Place balancer shaft into left engine housing (clutch side). Do not install shim on clutch side.

Using depth gauge, measure distance between the top of balancer gear and housing joint. This is the dimension "B".



Determine dimension between compressed gasket in right engine housing (magneto side) and inner ring of bearing. This is the dimension "A".

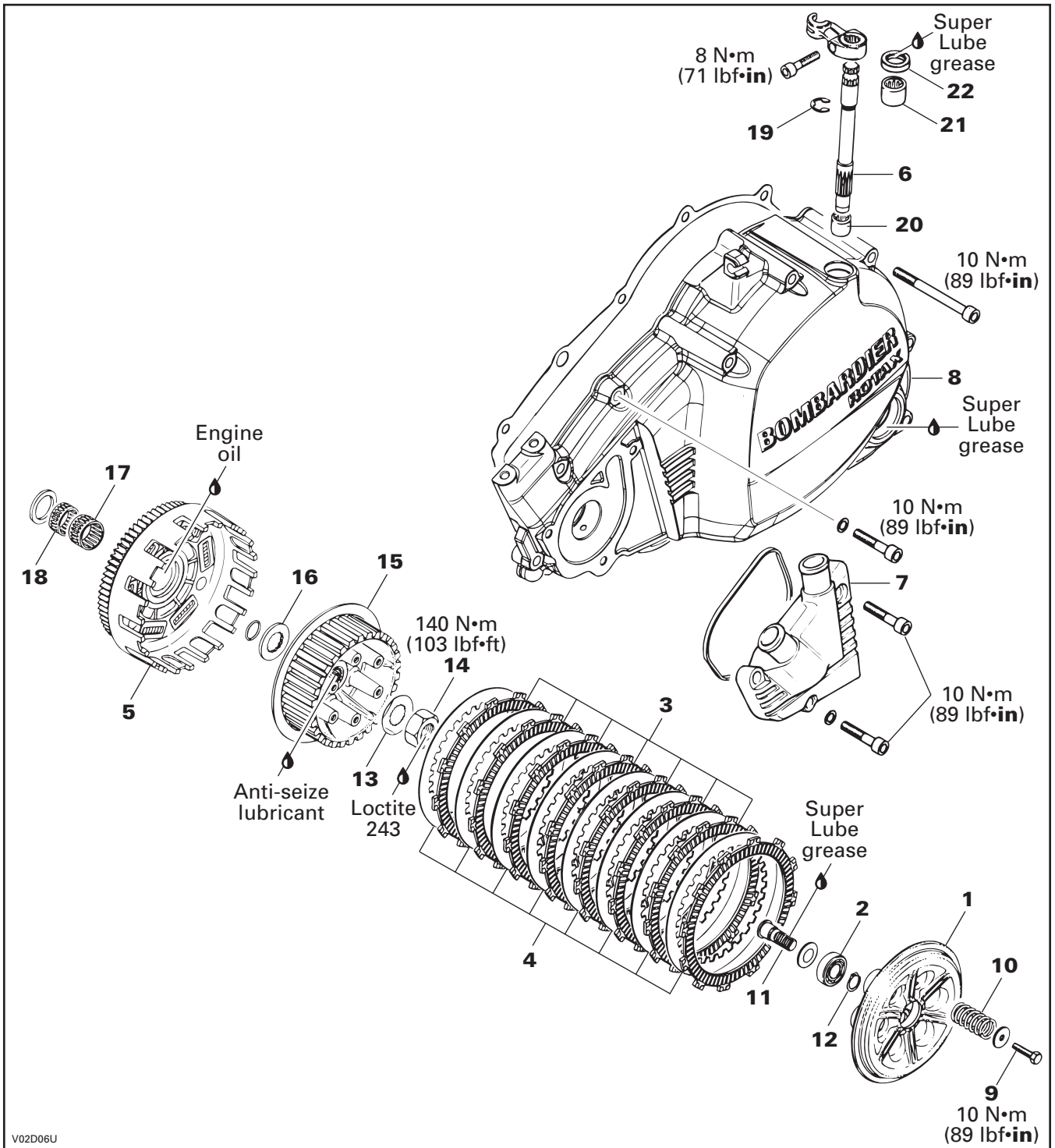


Subtract dimension "B" from dimension "A", the result is the end float of balancer shaft plus shim thickness.

Select suitable shim to ensure the correct end float is obtained.

END FLOAT OF BALANCER SHAFT	0.1 to 0.3 mm (.004 to .012 in)
-----------------------------	------------------------------------

CLUTCH



Section 03 ENGINE

Subsection 10 (CLUTCH)

GENERAL

At installation, use torque values and Loctite products from the exploded view. Clean threads before using Loctite products when installing screws.

NOTE: For a better understanding, the following illustrations are taken with engine out of vehicle. To perform the following instructions, it is not necessary to remove engine from vehicle.

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

WARNING

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

When the repair is done. Test drive to confirm all is working well. If the test drive is good, perform a change of engine oil.

CLUTCH ADJUSTMENT

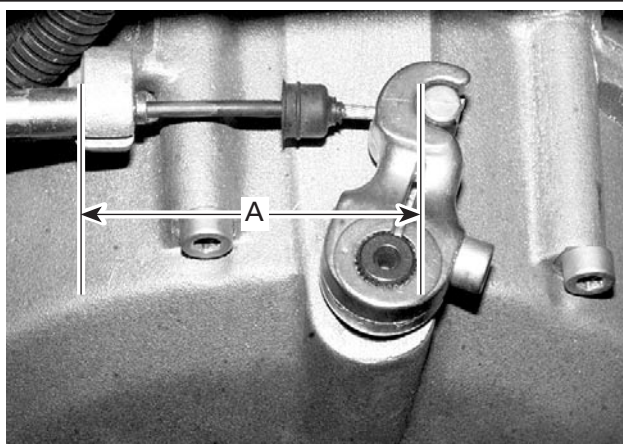
The clutch adjustment is necessary after any works in the clutch system.

Loosen cable tension.

Adjust clutch release mechanism.

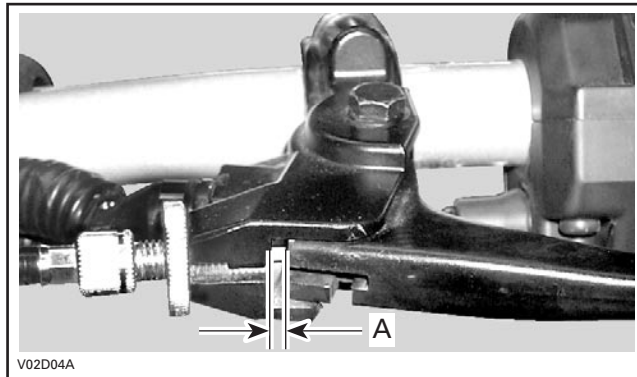
The release lever must locate on the spline in such a way that dimension A is obtained. See the following illustration.

NOTE: If necessary, unscrew the Allen socket screw and remove release lever. Replace the lever at the appropriate position then tighten socket screw to 8 N•m (71 lbf•in).



A. 68 to 75 mm (2-11/16 to 2-31/32 in)

Adjust cable free play.



A. 3.5 ± 0.5 mm (9/64 $\pm$ 1/64 in)

CLUTCH COVER

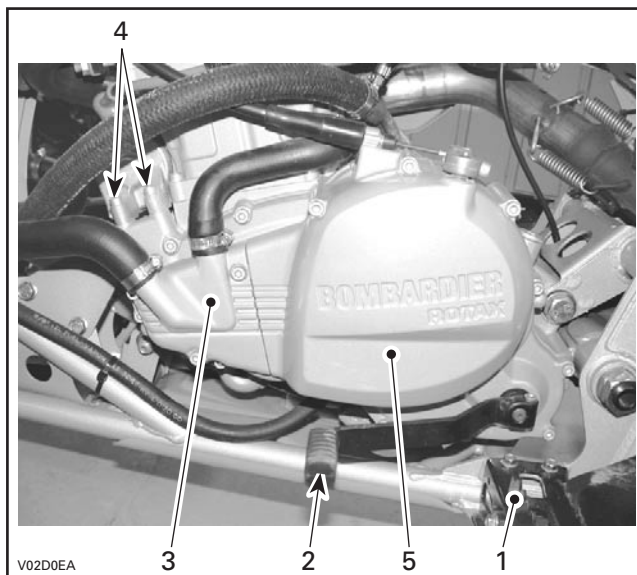
Removal

Drain engine oil and coolant.

Detach clutch cable.

Remove:

- LH footpeg
- shifting pedal
- water pump cover
- starter bolts
- all bolts retaining clutch cover
- clutch cover no. 8.



1. Footpeg
2. Shifting pedal
3. Water pump cover
4. Starter bolts
5. Clutch cover

Installation

For installation, reverse the removal procedure.

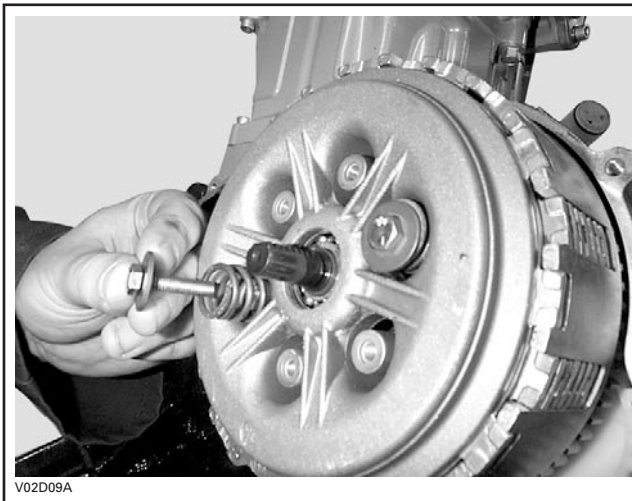
NOTE: Place the clutch actuator rack **no. 11** in line with the clutch release lever. Do not force the clutch cover. The pressure plate bearing may come out of pressure plate.

PRESSURE PLATE

Removal

Remove clutch cover.

Unfasten screws **no. 9**, retaining clutch spring **no. 10** and pressure plate **no. 1**, crosswise.



Lift off pressure plate completely.

Inspection

Check pressure plate for crack or other damage. Change if necessary.

Installation

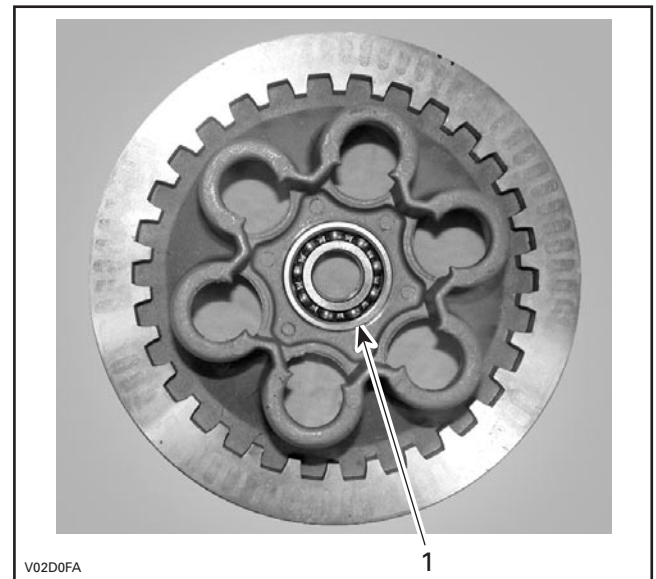
For installation, reverse the removal procedure.

CAUTION: Never pull clutch release lever backwards. The pressure plate bearing may come out of pressure plate.

PRESSURE PLATE BEARING

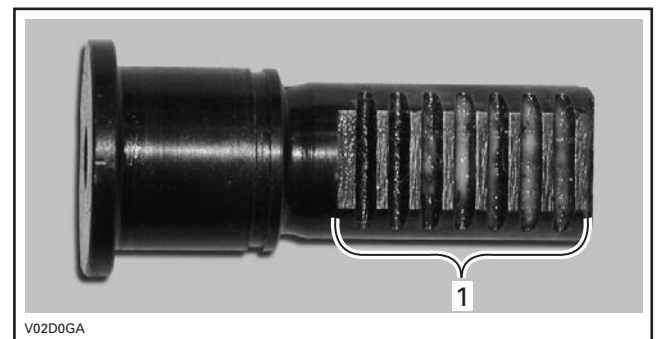
Inspection

Check the pressure plate bearing **no. 2** for excessive play and smooth operation. Replace if necessary.



1. Pressure plate bearing

Check spline on clutch actuator rack **no. 11**. Change if necessary.



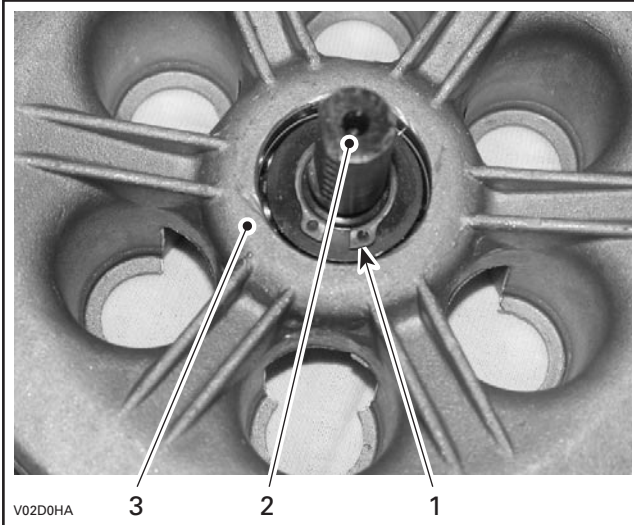
1. Splines of clutch actuator rack

Section 03 ENGINE

Subsection 10 (CLUTCH)

Disassembly

Remove the retaining ring no. 12 with retaining ring pliers.



1. Retaining ring
2. Clutch actuator rack
3. Pressure plate

Heat pressure plate to 80°C (176°F) then remove pressure plate bearing.

Assembly

For assembly, reverse the disassembly order.

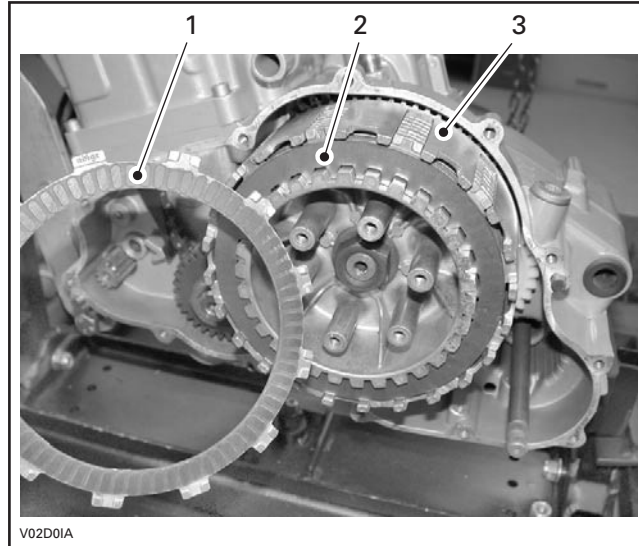
CAUTION: Never pull clutch release lever backwards. The pressure plate bearing may come out of pressure plate.

FRICION DRIVE PLATE, STEEL DRIVEN PLATE AND CLUTCH BASKET

Disassembly

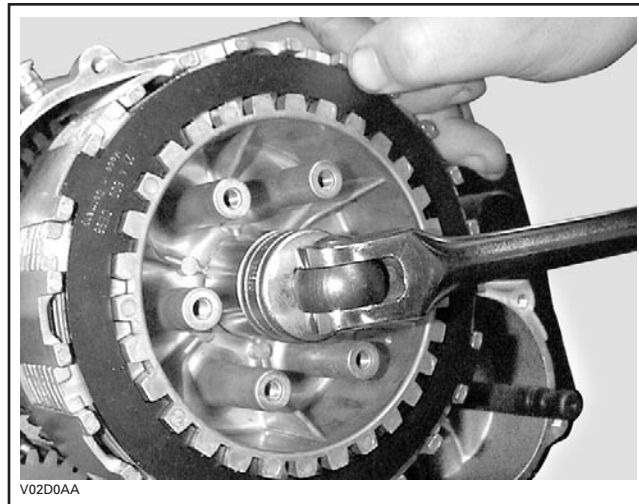
Remove the pressure plate no. 1.

Remove friction drive plates no. 3 and steel driven plates no. 4 from clutch basket no. 5.



1. Friction drive plate
2. Steel driven plate
3. Clutch basket

Unlock the tab washer no. 13 then install spanner tool for clutch basket (P/N 529 035 618).



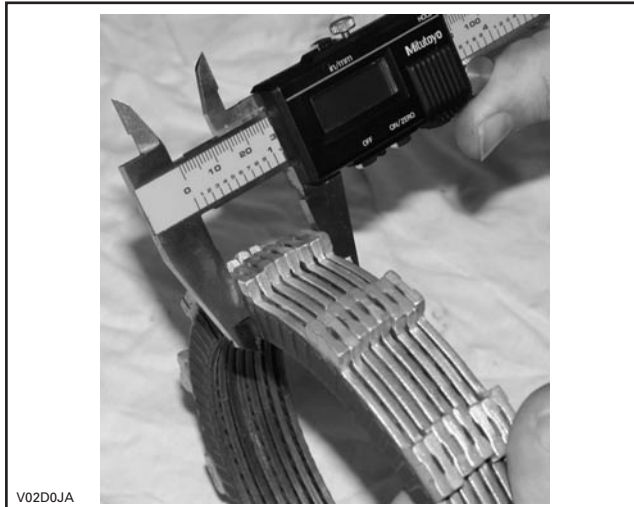
Unscrew the clutch lock nut no. 14 then remove tab washer.

Remove clutch hub no. 15, clutch basket including thrust washer no. 16 and needle bearings no. 17 and no. 18.

Inspection

Friction Drive Plate

Measure the package of friction drive plate thickness.



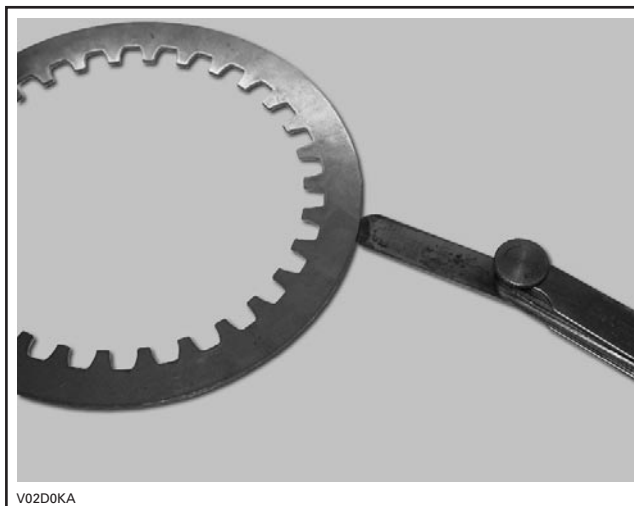
Friction drive plates must be replaced when thickness is 27.5 mm (1.0827 in) thick or less for the whole package.

FRICTION DRIVE PLATE MINIMUM THICKNESS FOR THE WHOLE PACKAGE	27.5 mm (1.0827 in)
---	------------------------

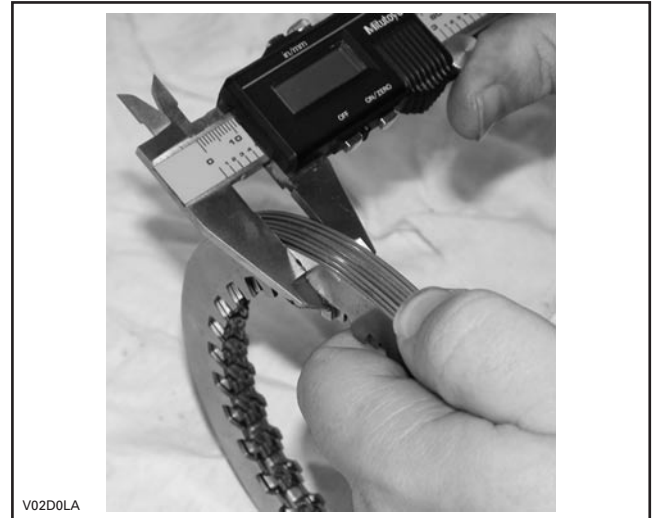
The friction drive plate maximum warpage should fall through a slot of 3.75 mm (.148 in).

Steel Driven Plate

The steel driven maximum warpage should fall through a slot of 1.63 mm (.064 in).



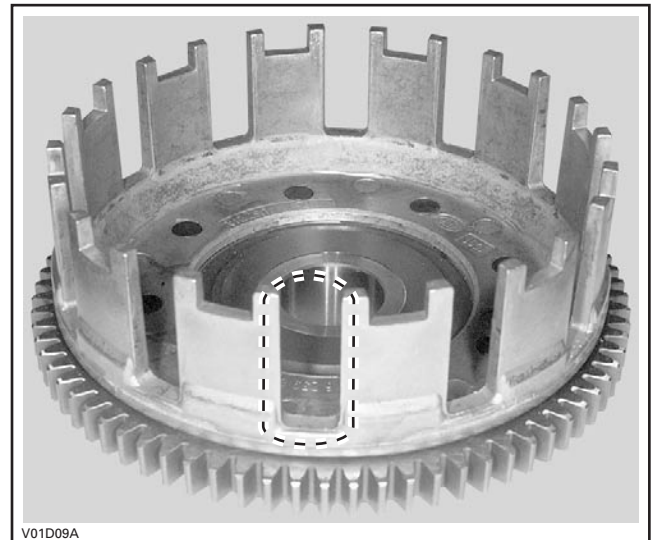
The wear limit of the whole package is 11.5 mm (.453 in).



Clutch Basket

Check slots of clutch basket for damage or wear caused by friction drive plates.

Change if necessary.



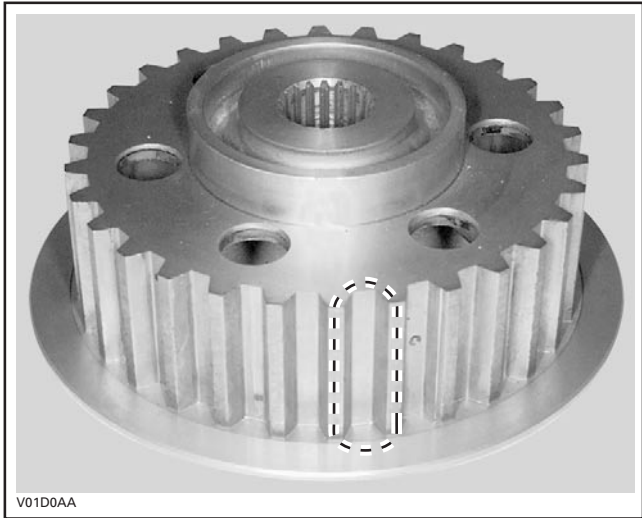
TYPICAL

Section 03 ENGINE

Subsection 10 (CLUTCH)

Clutch Hub

Check grooves of clutch hub for damage or wear caused by steel driven plates.

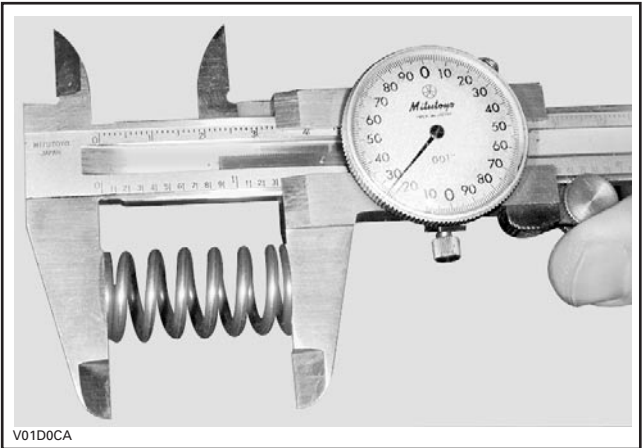


TYPICAL

Clutch Spring

Measure each clutch springs free length.

CLUTCH SPRING MINIMUM LENGTH	43 mm (1.69 in)
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TYPICAL

Assembly

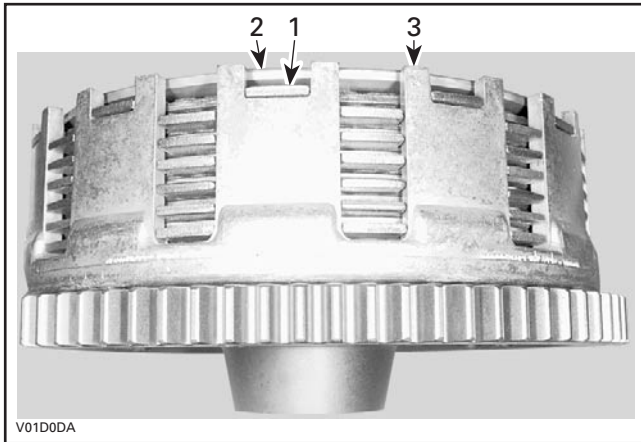
Assembly in the reverse sequence of disassembly.
Pay attention to the following details.

Install the needle bearings.

NOTE: Install small needle bearing underneath.

Coat spline on countershaft with Loctite anti-seize.
First, install steel driven plate, then friction drive plate in alternate order.

NOTE: Place the last friction drive plate in short slots of clutch basket.



- 1. Last friction drive plate
- 2. Retaining plate
- 3. Clutch basket

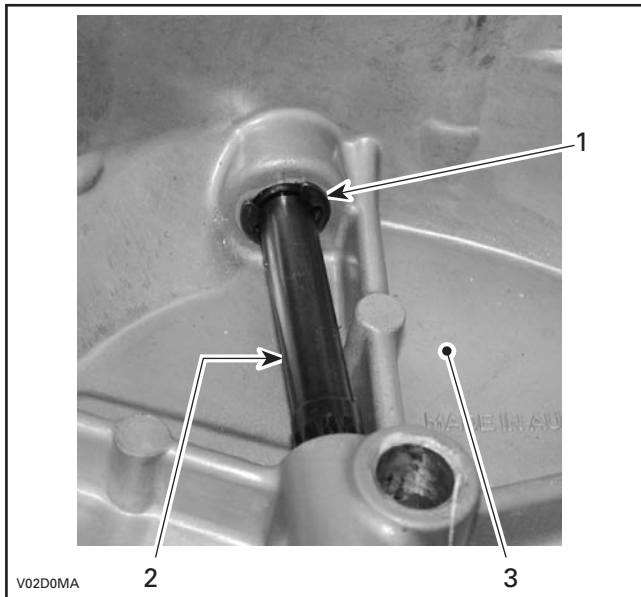
CLUTCH RELEASE SHAFT

Removal

Detach clutch cable.

Remove clutch cover.

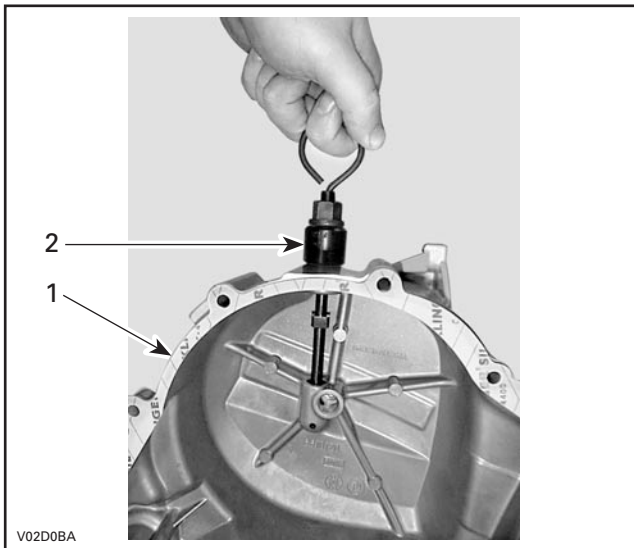
Remove the retaining ring no. 19.



- 1. Retaining ring
- 2. Clutch release shaft
- 3. Clutch cover

Withdraw clutch release shaft from housing.

With the extractor (P/N 529 035 690), remove both needle bearings nos. 20 and 21, and seal no. 22 together.



1. Clutch cover
2. Extractor

NOTE: With a heat gun, heat the clutch cover near bearings area.

Installation

Drive in lower and upper needle bearing together using the punch (P/N 529 035 691).



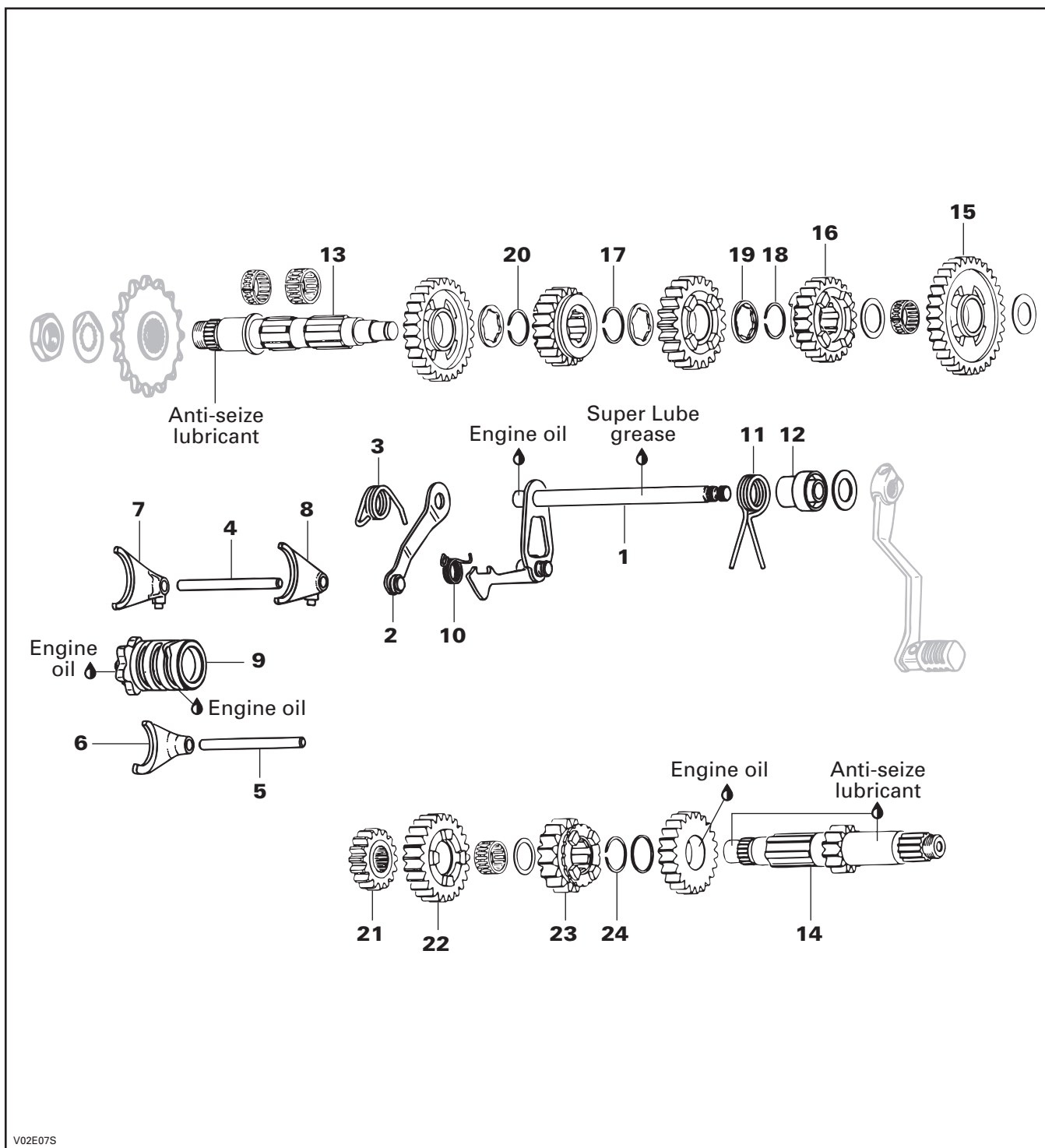
Insert clutch release shaft.

Using punch (P/N 529 035 693), drive in seal.

Install clutch cover and do not forget gasket.

CAUTION: Never pull clutch release lever backwards. The pressure plate bearing may come out of pressure plate.

TRANSMISSION



SHIFTING MECHANISM

Removal

Remove engine from vehicle. Refer to REMOVAL AND INSTALLATION.

Separate both crankcase housings. Refer to CRANKSHAFT/BALANCER SHAFT.

Press shift pawl slightly outwards and withdraw shift shaft **no. 1** with shift pawl.

Remove index lever **no. 2** and index spring **no. 3**.

Remove shift fork shafts **nos. 4** and **5** from shift forks **nos. 6, 7** and **8**.

Swivel shift forks outwards and remove.

Withdraw shift drum **no. 9**.

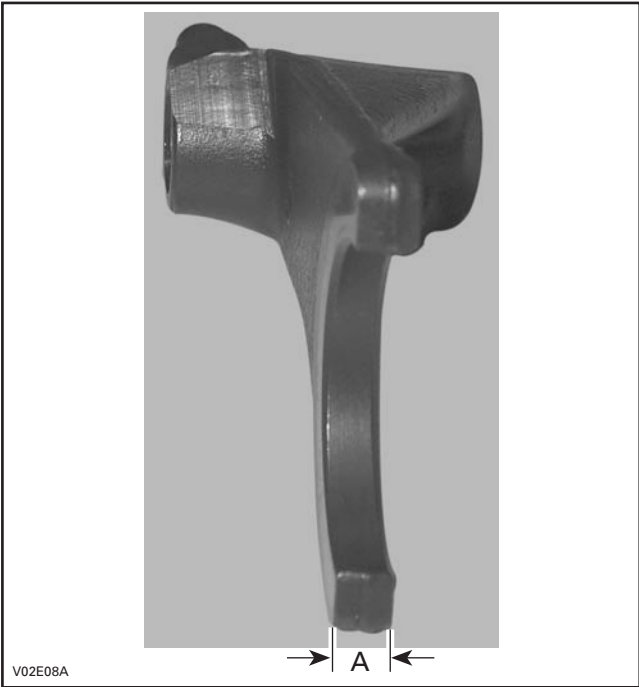
Inspection

Check for:

- worn or scored shifting forks
- rounded engagement dogs and slots
- bent shift forks
- bent shift fork shafts
- worn tracks on shift drum.

Measure the shift fork claw thickness.

SHIFT FORK CLAW THICKNESS	
SERVICE LIMIT	3.45 mm (.136 in)

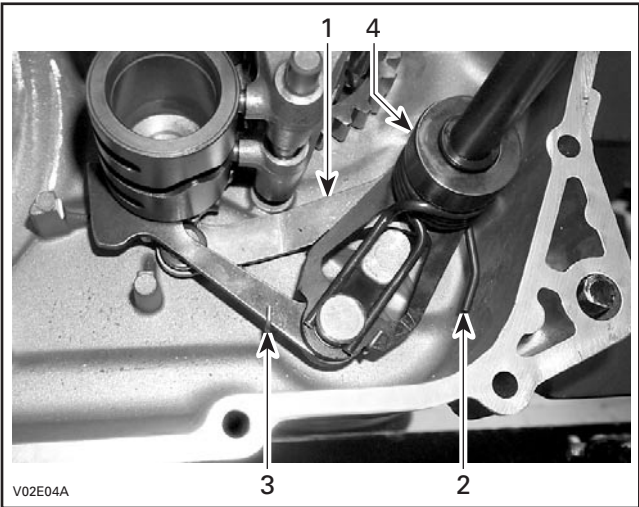


A. Shift fork claw thickness

Measure the O.D. of the shift fork shaft in three places using an outside micrometer.

O.D. OF SHIFT FORK SHAFT	
SERVICE LIMIT	5.85 mm (.230 in)

Installation



- 1. Index lever
- 2. Index spring
- 3. Pawl spring
- 4. Sleeve

Install index lever **no. 2** with index spring **no. 3** in housing.

Attach pawl spring **no. 10** to pawl.

Insert shift shaft **no. 1** in housing and secure index lever.

Slide spring **no.11** and sleeve **no. 12** onto shift shaft.

Attach spring to shift shaft pivot.

Insert shift fork **no. 6** in selector gear of clutch shaft.

Install shift fork shaft **no. 5** with the selector fork in the direction of the crankshaft.

Insert shift fork **no. 7** and **no. 8** in the corresponding selector gears of the mainshaft.

Install shift fork shaft **no. 4** with the shift forks outwards.

Install shift drum **no. 9** in the idle setting.

Press back index lever and shift pawl and install the shift drum.

Move index lever and shift pawl into mesh.

Check transmission function: shift up and down through all gears, checking that the detent in all gears disengages smoothly from the shift pawl.

Assemble engine.

Once again, shift up and down through all gears, slowly allowing selector lever to return to its original position. The clicking noise of the engaging shift pawl must be clearly audible.

Install engine.

TRANSMISSION

Removal

Remove the shifting mechanism. Refer to the above section.

Remove shift fork shafts **nos. 4** and **5**.

Swivel shift forks **nos. 6, 7** and **8** outwards and remove.

Withdraw shift drum **no. 9**.

Using a plastic mallet, tap mainshaft **no. 13** to assist withdrawing mainshaft together with clutch shaft **no. 14**.

NOTE: Before removal withdraw the separate gears **nos. 15** and **16** from mainshaft.

Disassembly

Mainshaft

Using special pliers slide circlip **no. 17** slightly backwards to remove circlip **no. 18** which is secured by the angled ring **no. 19**.

Remove gears.

Remove circlip **no. 20** and withdraw gear.

CAUTION: Retaining ring must not be over-stretched.

Clutch Shaft

Remove gear **nos. 21, 22** and **23**.

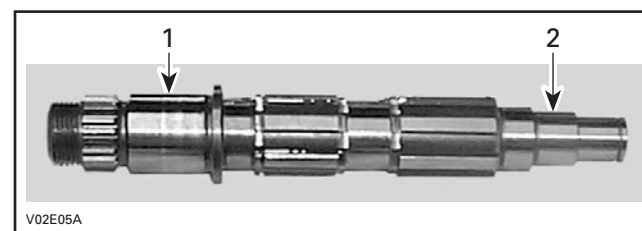
Remove circlip **no. 24** with special pliers.

Remove gear.

Inspection

Check mainshaft for wear.

MAINSHAFT	
SERVICE LIMIT	
Magneto end	24.98 mm (.98 in)
Clutch side	16.98 mm (.67 in)
Run-out	0 mm (0 in)



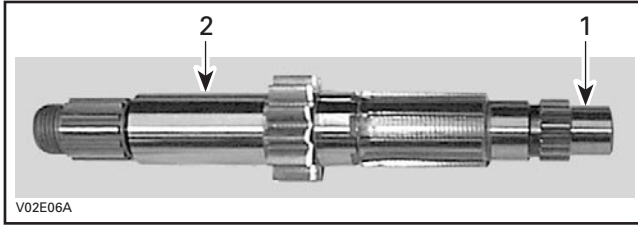
1. Magneto end
2. Clutch side

Check clutch shaft for wear.

CLUTCH SHAFT	
SERVICE LIMIT	
Magneto end	16.98 mm (.67 in)
Clutch side	24.97 mm (.98 in)
Run-out	0 mm (0 in)

Section 03 ENGINE

Subsection 11 (TRANSMISSION)



- 1. *Magneo end*
- 2. *Clutch side*

Check all bearings, bearing points, tooth flanks, taper grooves and annular grooves. Annular grooves must have sharp edges.

Replace gears only together with the corresponding meshing gears.

NOTE: Always replace circlips and install using special pliers.

Assembly and Installation

For assembly and installation, reverse the disassembly and removal procedures. Pay attention to the following details.

Install clutch shaft and mainshaft together, and coat main bearing points with Loctite anti-seize.

Seat shafts fully home by tapping them into place with a plastic hammer.

NOTE: Before installation of the transmission shafts, remove crankshaft to simplify assembly operation.

Install the shifting mechanism.

TRANSMISSION SHAFT BEARINGS

Removal

Heat left or right engine housing to 80 - 100°C (170 - 212°F).

Using the suitable bearing extractor to remove bearings.

Tap out the mainshaft sealing ring from the inside.

Installation

Place new bearings in a freezer for 10 minutes before installation.

Place left or right engine housing in oven to 100°C (212°F) to ease bearings installation.

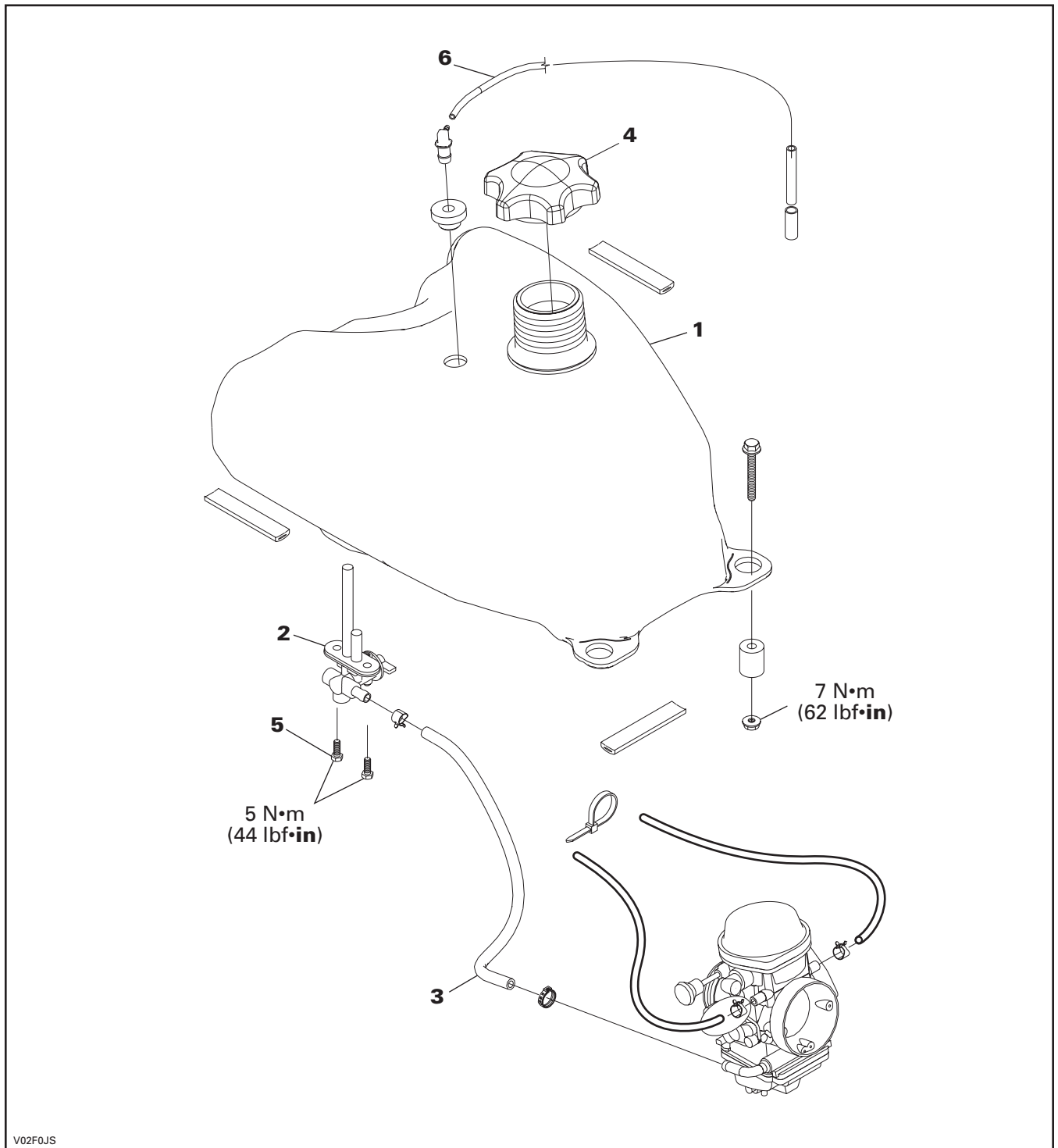
NOTE: Always replace the mainshaft sealing ring by a new one.

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FUEL CIRCUIT



Section 04 FUEL SYSTEM

Subsection 02 (FUEL CIRCUIT)

FUEL LINE

When replacing fuel line, be sure to use hoses as available from Bombardier parts department. This will ensure continued proper and safe operation.

WARNING

Replace any damaged, leaking or deteriorated fuel line. Use of improper fuel line could compromise fuel system integrity.

WARNING

When draining a fuel tank or whenever a fuel line is disconnected, obstruct line with a hose pincher (P/N 295 000 076) or equivalent device. Fuel is flammable and explosive under certain conditions. Ensure work area is well ventilated. Do not smoke or allow open flames or sparks in the vicinity.

WARNING

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

CAUTION: Whenever working on fuel system, always verify for water or dust infiltration in reservoir.

FUEL TANK

Draining

Turn fuel valve **no. 2** to the position OFF.

Obstruct line **no. 3** with a hose pincher (P/N 295 000 076) then disconnect fuel line from carburetor.

Place fuel line in a reservoir, turn fuel valve on REVERSE and remove hose pincher.

NOTE: To accelerate fuel tank **no. 1** draining and ensure complete draining, remove cap **no. 4**.

When the fuel tank is empty, turn valve OFF.

Removal

Drain fuel tank.

Remove following items from body. Refer to BODY for complete detailed procedure:

- seat
- front facia
- fuel tank cover.

Inspection

Inspect fuel tank for any damage or cracks which may result in fuel leaks. If so, replace tank by a new.

Installation

Reverse removal procedure, however pay attention to the following:

Check so that the vent hose is not pinched.

Perform fuel system pressurization as described further in this section.

FUEL VALVE

Removal

Remove fuel tank.

Place fuel tank on the side.

Unscrew bolts **no. 5** retaining fuel valve to fuel tank.

Remove fuel valve.

Inspection

Check strainer on each end of fuel valve rods. If one strainer is damaged, change fuel valve.

Check gasket between fuel valve and fuel tank for damage. If so, replace by a new.

Installation

For installation, reverse the removal procedure.

Clean strainer on each end of fuel valve rods.

Perform fuel system pressurization as described in the following procedure.

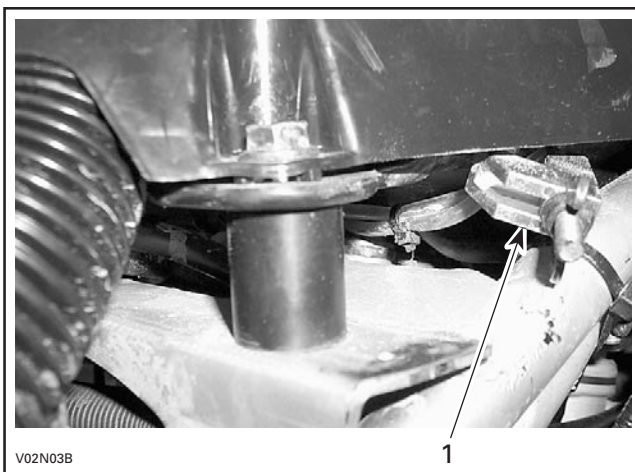
FUEL SYSTEM PRESSURIZATION

Fill up fuel tank **no. 1**.

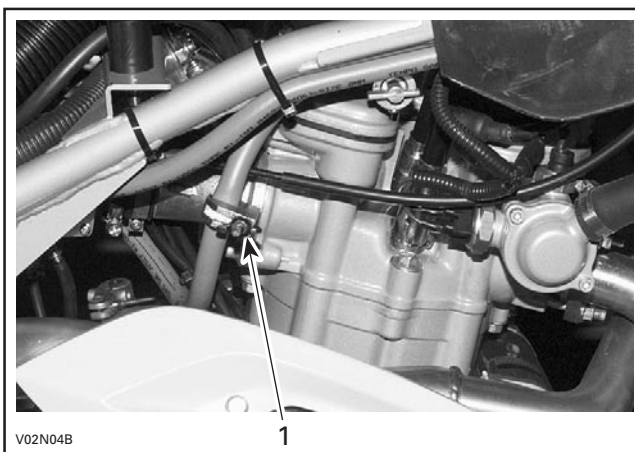
Remove seat.

Install on fuel tank the special cap included in the fuel and oil system tester kit (P/N 529 033 100).

Install hose pinchers (P/N 295 000 076) on fuel tank vent line **no. 6** and on the outlet hose **no. 3** at carburetor, as shown in the following photos.

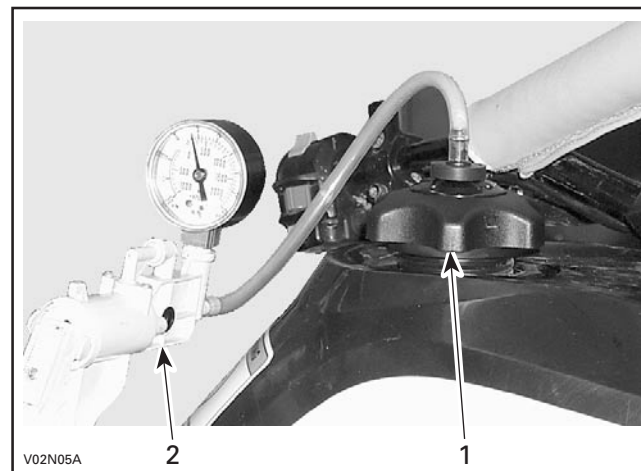


1. Hose pincher installed on fuel tank vent line



1. Hose pincher installed on fuel pump outlet

Using air pump (P/N 529 021 800) inject air into fuel tank. See next photo.



1. Special cap on tank
2. Air pump

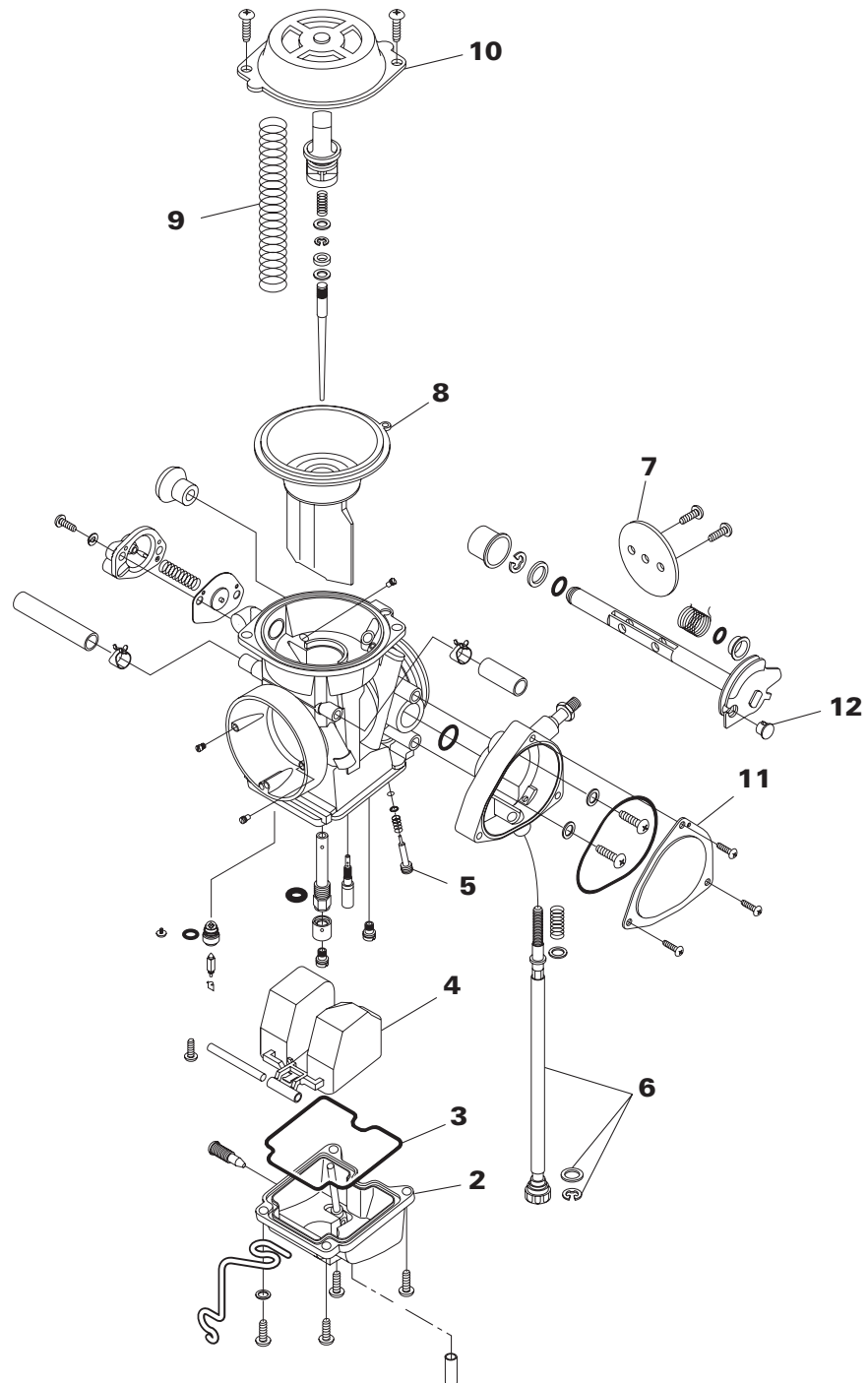
Pressurize fuel system to 21 kPa (3 PSI). That pressure must not drop during 3 minutes.

If pressure drops, locate fuel leak(s) and repair/replace leaking component(s).

To ease locating leak(s) at fuel tank vent fitting or fuel cap spray soapy water on components, bubbles will indicate leak location(s).

CARBURETOR AND AIR INTAKE SILENCER

CARBURETOR



V02F0BS

Subsection 03 (CARBURETOR AND AIR INTAKE SILENCER)

Engine

1.2 N·m (10 lbf·in)

0.6 N·m (5 lbf·in)

0.6 N·m (5 lbf·in)

2.5 N·m (22 lbf·in)

10 N·m (89 lbf·in)

10 N·m (89 lbf·in)

1.2 N·m (10 lbf·in)

Super Lube grease

13

22

14

17

19

20

23

24

25

26

27

28

15

16

18

1

GENERAL

Before performing any job on fuel system, always disconnect BLACK (-) cable from battery.

WARNING

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

CARBURETOR

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

Removal

Remove seat.

Loosen both carburetor and air box clamps.

Unplug all hoses from carburetor no. 1.

NOTE: To ease reinstallation, mark all hoses before unplugging.

Turn carburetor to place the throttle cable housing on top, then remove the throttle cable. Refer to THROTTLE CABLE further in this section.

Pull out carburetor.

Cleaning and Inspection

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

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

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

WARNING

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

Check the diaphragm for crack or other damages. Replace if necessary.

Carburetor Float Level Adjustment

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

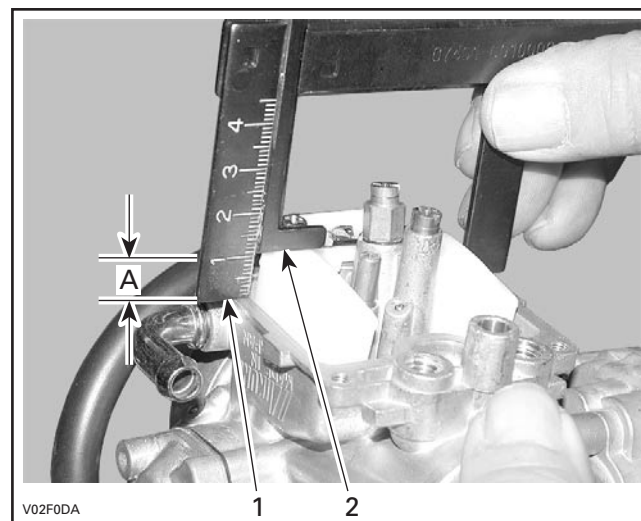
- Remove float bowl no. 2 and gasket no. 3 from carburetor.
- Make sure that float arm no. 4 is symmetric, not distorted.

With carburetor chamber up side down:

- 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 vertical and in line with main jet hole.

Ensure that both float level gauge tips are properly positioned on carburetor body and that "L" arm is leaning on float with compressing valve spring.

Refer to following photos for proper float level gauge positioning and to TECHNICAL DATA for proper level.



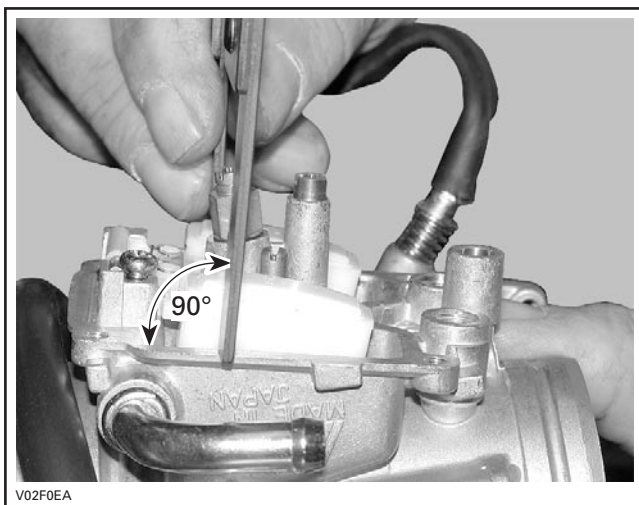
TYPICAL

- 1. Gauge tips
- 2. "L" arm
- A. Height

Section 04 FUEL SYSTEM

Subsection 03 (CARBURETOR AND AIR INTAKE SILENCER)

Carburetor Adjustments



TYPICAL — GAUGE ALIGNED WITH MAIN JET

To adjust height, bend the contact tab of float arm until the specified height is reached.

CAUTION: When adjusting lever, do not pry it. This will apply pressure on needle and damage valve seat/needle.

Installation

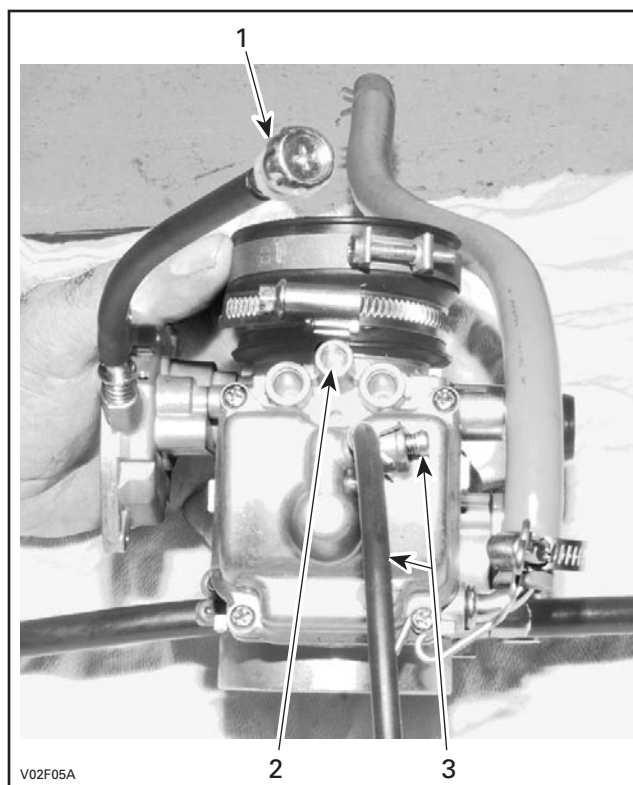
To install carburetor on engine, inverse removal procedure, as described:

- Inspect throttle cable housing prior to installation.
- Reinstall and adjust throttle cable, then side cover. Refer to CARBURETOR ADJUSTMENTS.
- Reinstall carburetor on engine.

When reinstalling carburetor on engine, pay attention to the following:

CAUTION: The carburetor adaptor must be checked for cracks and/or damage. At assembly, the carburetor adaptor must be perfectly matched with the carburetor and intake adaptor or severe engine damage will occur.

Install clamps in a way that their tightening bolts are staggered, not aligned.



BOTTOM VIEW

1. Idle speed screw
2. Pilot screw
3. Drain tube and screw

Pilot Screw Preliminary Adjustment

NOTE: The pilot screw no. 5 is factory pre-set. Adjustment is not necessary unless the carburetor is overhauled or replaced.

Completely close the **pilot screw** (until a slight seating resistance is felt) then back off as specified.

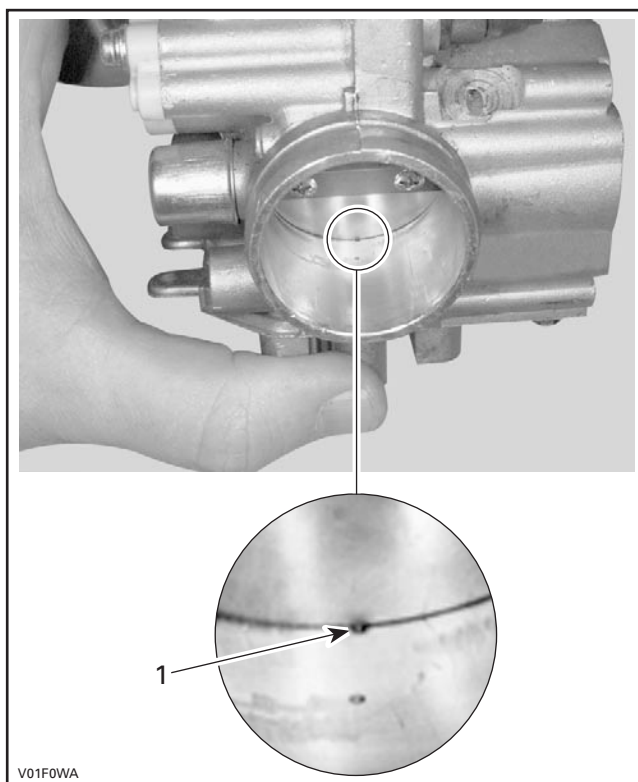
Refer to TECHNICAL DATA for specifications.

Section 04 FUEL SYSTEM

Subsection 03 (CARBURETOR AND AIR INTAKE SILENCER)

Idle Speed Preliminary Adjustment

Adjust idle speed screw **no. 6** to 1-1/2 turn or so that throttle valve **no. 7** closes bypass hole by half, as shown in the next photo.



TYPICAL

1. Bypass hole closes to halfway

Idle Speed Adjustment

Start engine and allow it to warm then adjust idle speed to specifications by turning **idle speed screw** clockwise to increase engine speed or counterclockwise to decrease it.

NOTE: Use the digital induction tachometer (P/N 529 014 500). Turn tachometer wire around spark plug wire, about 4 or 5 turns, for the best measure.

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

Refer to TECHNICAL DATA for idle speed specifications.

Pilot Screw Adjustment

NOTE: The pilot screw is factory pre-set. Adjustment is not necessary unless the carburetor is overhauled or replaced. Warm the engine to operating temperature.

Turn the pilot screw clockwise until you hear the engine misses or decreases air speed, then turn counterclockwise until the engine again misses or decreases air speed.

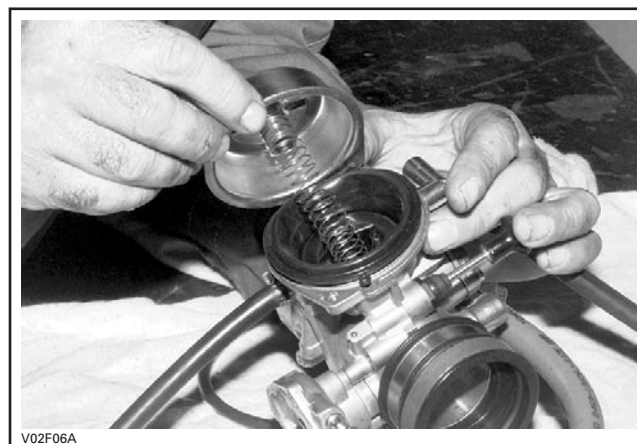
Center the pilot screw exactly between these two extreme positions.

If idle speed changes after adjustment of the pilot screw, readjust the idle speed screw.

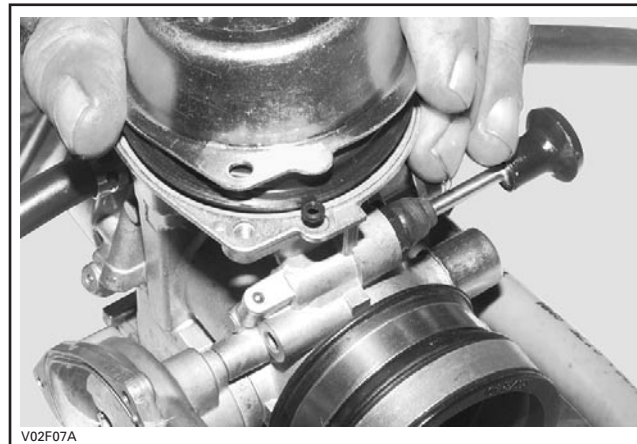
Diaphragm Installation

Carefully replace diaphragm **no. 8** in its original position.

Make sure spring **no. 9** is located properly in carburetor cover **no. 10** before screwing.



NOTE: Check and place correctly the indexation lob.



Section 04 FUEL SYSTEM

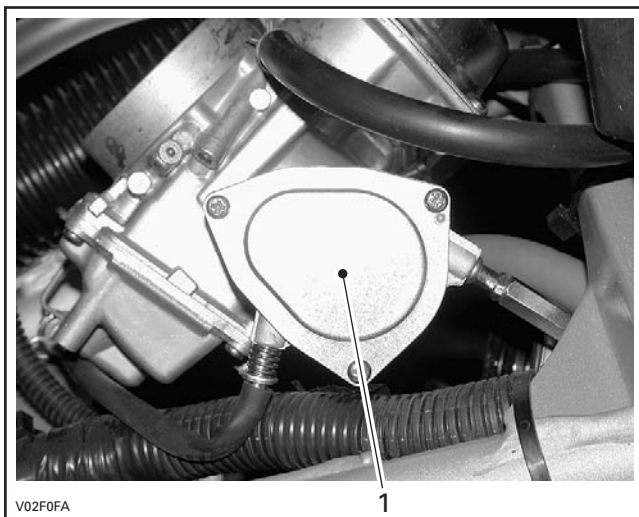
Subsection 03 (CARBURETOR AND AIR INTAKE SILENCER)

THROTTLE CABLE

NOTE: To ease reinstallation, take note cable routing.

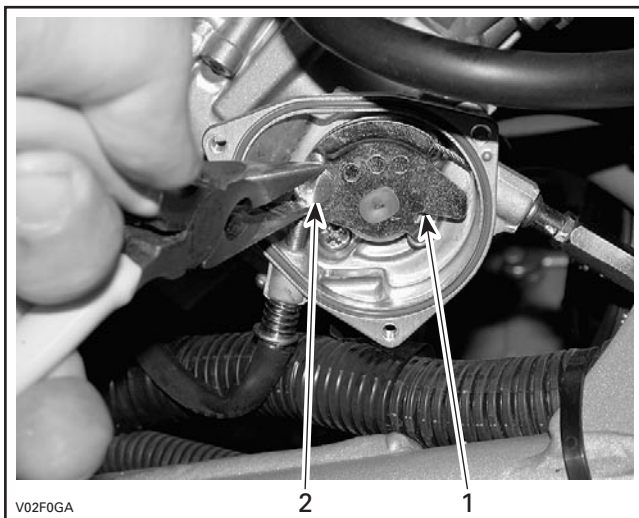
Removal

Remove carburetor side cover **no. 11**.



1. Carburetor side cover

Using thumb, release tension on throttle lever. With long nose pliers, rotate cable end bushing **no. 12** so that cable aligns with throttle lever recess, then lift cable end. See next photo.



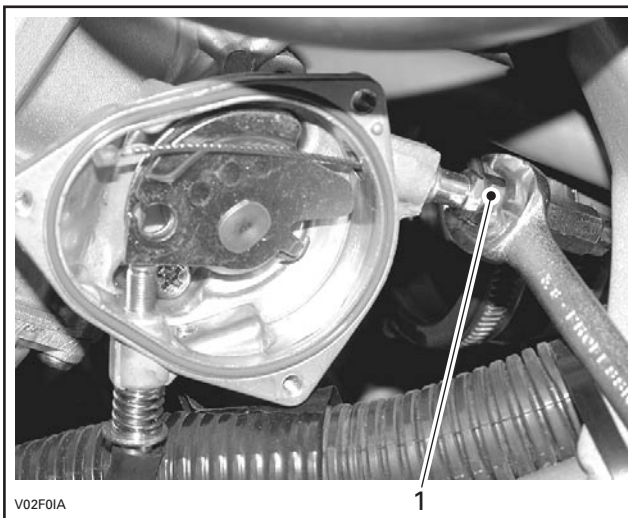
1. Release tension on throttle lever
2. Cable end bushing

Separate cable end bushing from throttle cable end, as shown in the next photo. Keep bushing.



REMOVE CABLE END BUSHING

Loosen throttle cable nut.



1. Loosen this nut

Pull cable out from carburetor.

Before adjusting the throttle cable, adjust idle speed (preliminary adjustment).

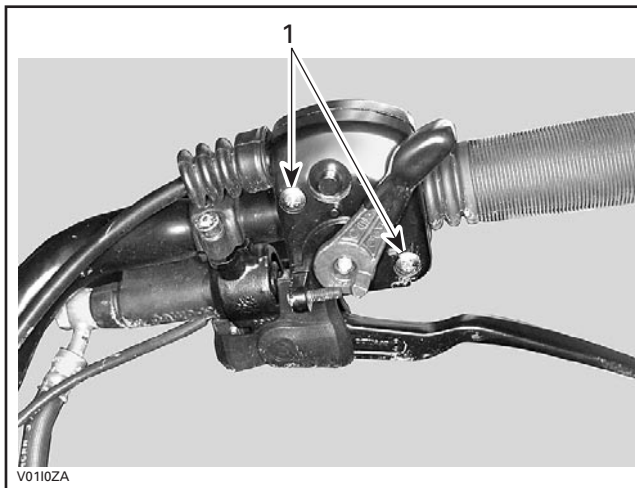
On the carburetor, loosen lock nut and adjust throttle cable.

Retorque lock nut.

Throttle Cable Lubrication

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

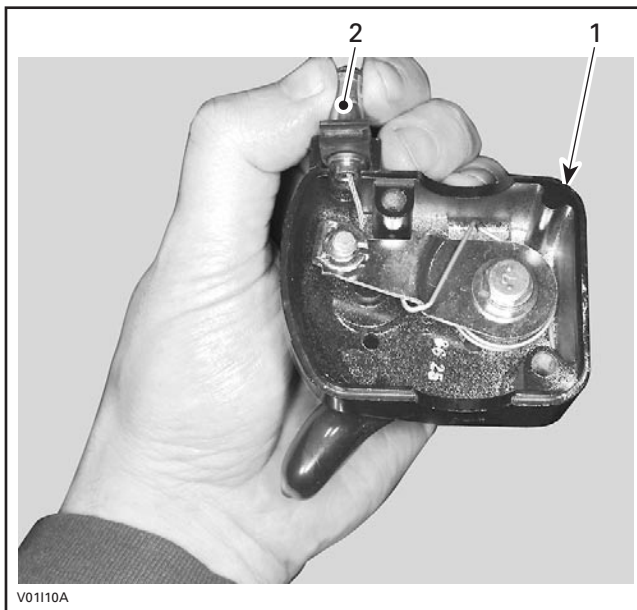
Open the throttle lever.



1. Remove screws

Remove:

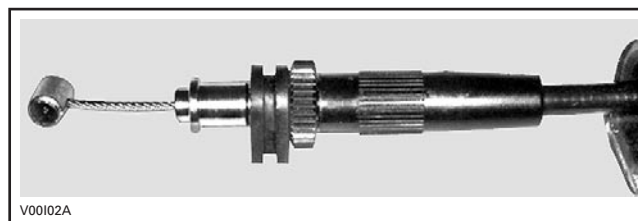
- the cable from the throttle lever



1. Throttle handle housing
2. Throttle cable

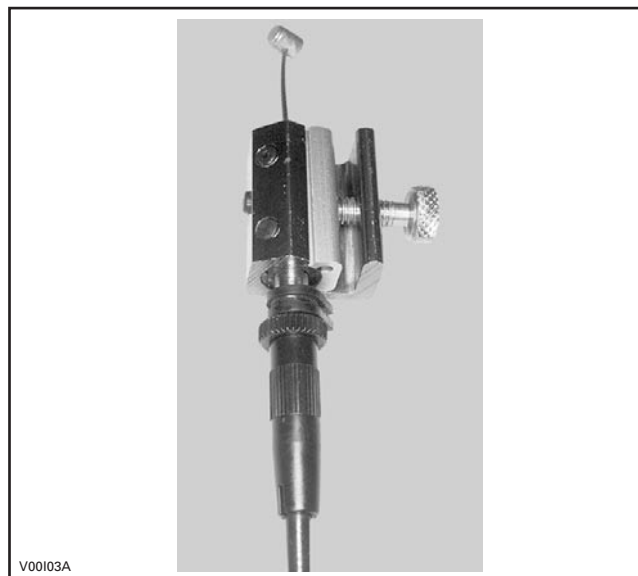
NOTE: Slide cable in clip slot and remove the end of cable from clip.

- the seal on the throttle cable.



Remove the carburetor side cover.

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



Insert the needle of lubricant can on the cable luber hole.

⚠ WARNING

Always wear eye protection and gloves when you lubricate a cable.

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

Put the lubricant until it passes through the cable.
Reinstall the cable.

Spray a little quantity of lubricant on the throttle lever mechanism then close the housing.

Adjust the throttle lever.

Throttle Lever Adjustment

Slide rubber protector back to expose throttle cable adjuster.

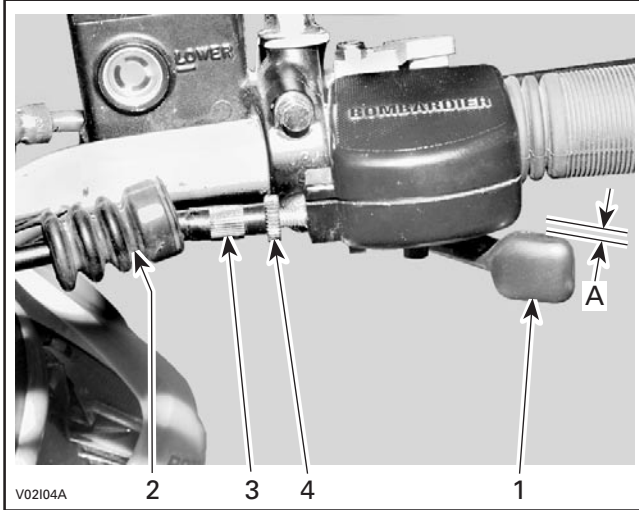
Loosen lock nut then turn the adjuster to obtain correct throttle lever free play.

Section 04 FUEL SYSTEM

Subsection 03 (CARBURETOR AND AIR INTAKE SILENCER)

NOTE: Measure throttle free play at the tip of throttle lever.

Tighten lock nut and reinstall protector.



- 1. Throttle lever
- 2. Protector
- 3. Cable adjuster
- 4. Lock nut
- A. 3 to 8 mm (1/8 to 5/16 in)

AIR INTAKE SILENCER

Air Filter Box

Removal

Remove:

- seat
- air box cover **no. 13**
- air filter **no. 14**
- rectifier located under air filter box.

Disconnect the air intake tube **no. 15** from carburetor.

Unplug from air intake tube, the hose **no. 16** on the LH side.

Unscrew clamps **no. 17** retaining the vent hoses **no. 18** to the deflectors **no. 19**.

Unscrew bolts **no. 20**.

Pull air filter box **no. 21** out of frame with air intake tube.

Inspection

Check air filter box for cracks or other damages. Change air filter box if necessary.

Check air filter box latches **no. 22** for cracks or other damages. Change the air filter box latches if necessary.

Installation

For installation, reverse the removal procedure.

Air Intake Tube

Removal

Remove air filter box.

Separate air intake tube **no. 15** from air filter box.

Inspection

Check air intake tube for cracks or other damages. Change it if necessary.

Installation

For installation, reverse the removal procedure.

Carburetor Adaptor

Removal

Remove carburetor.

Unscrew clamp **no. 23**.

Separate the carburetor adaptor **no. 24** from the intake adaptor **no. 25**.

Inspection

Check carburetor adaptor for cracks or other damages. Change it if necessary.

Installation

For installation, reverse the removal procedure.

Intake Adaptor

Removal

Remove carburetor.

Unscrew socket screws **no. 26** and washers **no. 27** then remove intake adaptor **no. 25**.

Inspection

Check intake adaptor for cracks or other damages, change if necessary.

Check O-rings **no. 28** and change if necessary.

Installation

For installation, reverse the removal procedure.

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Section 05

ELECTRICAL

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OVERVIEW

GENERAL OPERATION INFORMATION

The electrical system consists of different sub-systems where some are inter-related:

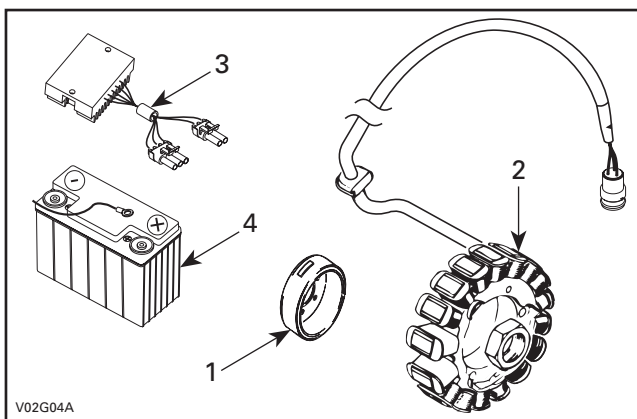
- charging system
- starting system
- ignition system
- accessories.

The following gives an outline of each components.

CHARGING SYSTEM

It 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 3-phase, delta wound stator on 18 poles.

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



1. Magneto flywheel
2. Stator
3. Voltage regulator/rectifier
4. Battery

Voltage Regulator/Rectifier

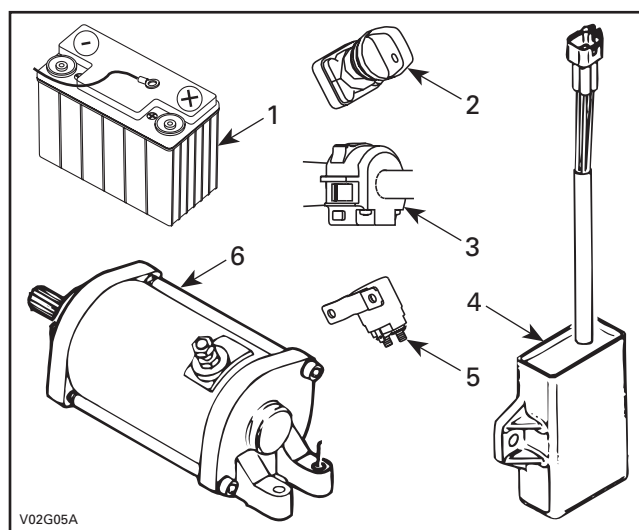
A 3-phase full-wave series-type voltage regulator/rectifier receives the AC voltage and rectifies (converts) it into DC. The voltage is also regulated to a maximum of 14.7 ± 0.4 volts (DC).

Battery

The battery supplies the entire vehicle. Therefore, DC current only is used in the entire electrical system.

STARTING SYSTEM

When ignition switch is turned on and start button is pressed, a signal is sent to the starting solenoid. The battery then supplies the starter through the starting solenoid to start the engine.



TYPICAL

1. Battery
2. Ignition switch
3. Start button
4. Electronic module
5. Solenoid
6. Electric starter

Engine can be started in any gear (from 1 to 5).

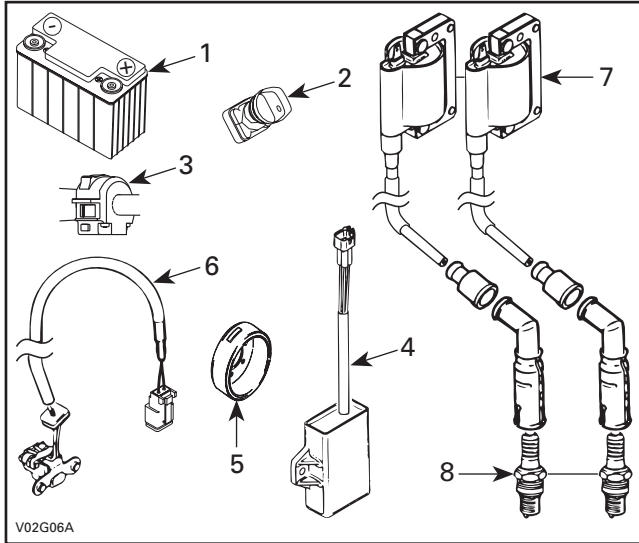
Transmission must be on NEUTRAL or the clutch lever pulled in to allow engine starting.

Section 05 ELECTRICAL

Subsection 02 (OVERVIEW)

IGNITION SYSTEM

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



TYPICAL

1. Battery
2. Ignition switch
3. Start button
4. Electronic module
5. Magneto flywheel
6. Trigger coil
7. Ignition coils
8. Spark plugs

Battery/Ignition Switch

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

Start Button

Besides enabling the starting system, the start button enables the ignition system.

Magneto Flywheel/Trigger Coil

The magneto flywheel features one projection mark that works with the trigger coil. The trigger coil sends the signals to the electronic module to be processed for the ignition system.

Ignition Coils/Spark Plugs

The ignition coil receives its signal from the electronic module. The ignition coil steps up the input voltage for the CDI system and the end result is firing of the spark plugs. It is two coils that provides a separate spark to each spark plug.

ACCESSORIES

The battery supplies the DC current to all accessories.

GENERAL TESTING/TROUBLESHOOTING INFORMATION

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 one which is in good condition.

IMPORTANT: When having to solve 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. Check solidity (close to battery) and related-circuit fuse condition with an ohmmeter (visual inspection could lead to false results). Also visually examine harness and connections.

CAUTION: It is recommended to always disconnect the battery when replacing any electric or electronic parts.

⚠ WARNING

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

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

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

⚠ WARNING

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

Before replacing any electric or electronic part(s), always check electrical connections. Make sure that they are very tight and they make good contact and that they are corrosion-free. The voltage and current might be too weak to go through dirty wire pins. Check carefully if posts show signs of moisture, corrosion or if they look dull. Clean pins properly and then coat them with silicon-based dielectric grease or other appropriate lubricant (except if otherwise specified) when reassembling them. See connectors information below.

IMPORTANT: In usual electric circuit, the battery supplies a switch which then supplies the electric consumer. Therefore the switch opens and closes the positive side of the circuit. Take this into account when troubleshooting the electrical system.

Pay attention to grounding wires.

Checking for Shorts Between 2 Wires

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

Make sure to isolate circuit wires 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 (0 L). Otherwise, there is a short circuit between both wires. We must therefore identify and correct the fault.

FUSES LOCATION

If a fuse is damaged, replace it by one of the same rating.

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

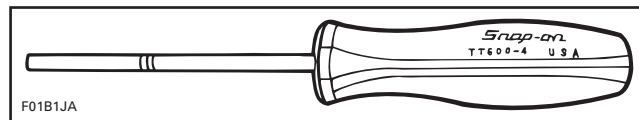
Fuses are located under seat, between engine and air box.



1. Fan (15 A)
2. Main (25 A)

SERVICING PACKARD CONNECTORS

To remove terminal from Packard connector housing, use Snap-on TT600-4 tool.



SERVICING DEUTSCH CONNECTORS

Waterproof Connector Housing

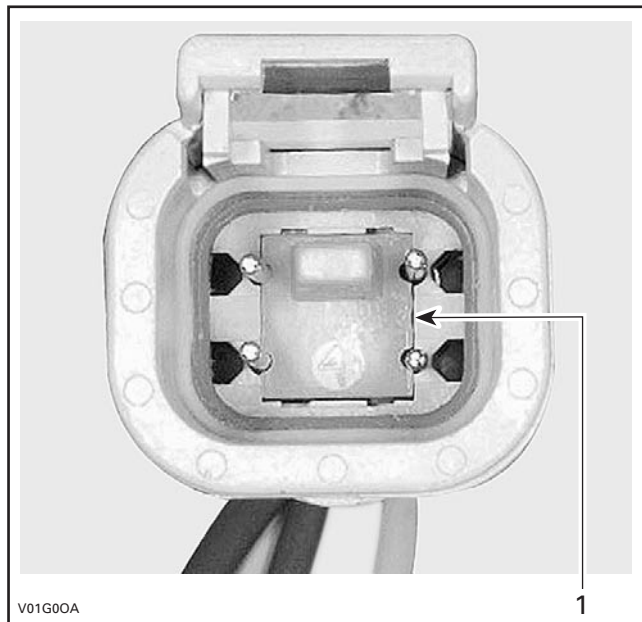
Female and Male Connector Housing

To remove:

- Using a long nose pliers, pull out the lock.

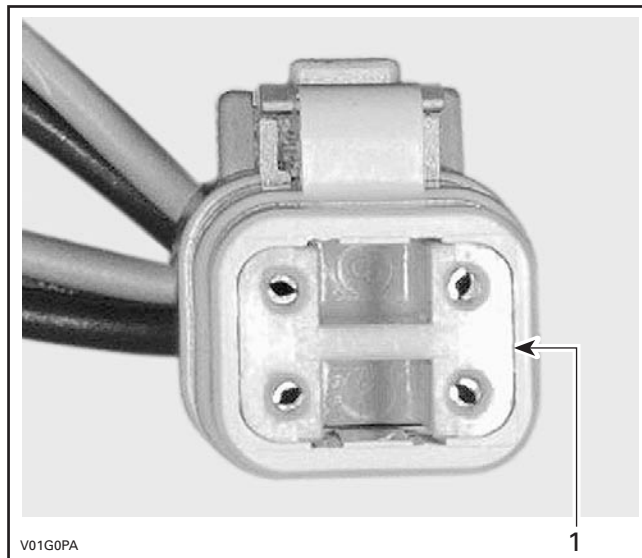
Section 05 ELECTRICAL

Subsection 02 (OVERVIEW)



FEMALE HOUSING

1. Female lock

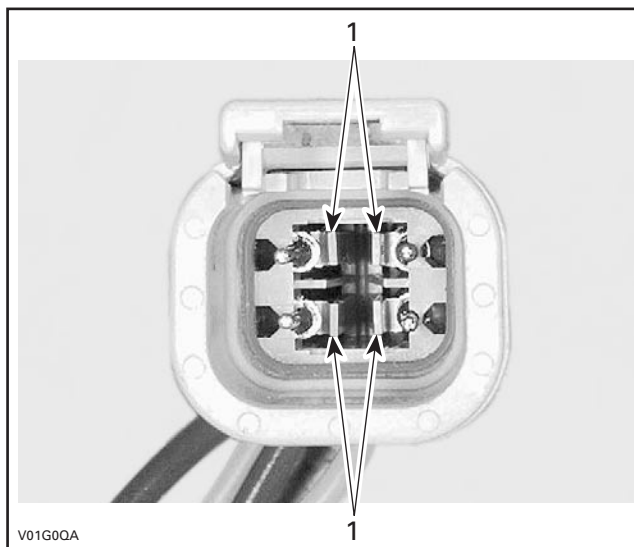


MALE HOUSING

1. Male lock

NOTE: Before extraction, push wire forward to relieve pressure on retaining tab.

- Insert a 4.8 mm (.189 in) wide screwdriver blade inside the front of the contact cavity.
- Pry back the retaining tab while gently pulling wire back until contact is removed.



FEMALE CONNECTOR HOUSING

1. Retaining tab

To install:

- For insertion of signal contact, make sure the lock is removed.
- Insert contact into appropriate circuit cavity and push as far as it will go.
- Pull back on the contact wire to be sure the retention fingers are holding the contact.
- After all required contacts have been inserted, the lock must be installed.

CAUTION: Never apply dielectric grease on contacts in plug connector. The use of dielectric grease will make the seal swell and move out of the connector. Do not lubricate.

IDENTIFICATION OF MAJOR CONNECTOR PINS

	DEUTSCH
PACKARD	

CHARGING SYSTEM

TESTING PROCEDURE

NOTE: First, ensure that battery is in good condition prior to performing the following test using a current inductive ammeter such as Snap-on MT 110.

If the battery is regularly discharged, check main (25 amp) fuse condition.

The voltage regulator/rectifier could be the culprit of a blown fuse. To check, simply disconnect the voltage regulator/rectifier from the circuit.

If the fuse still burns, check for a defective wire.

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

Voltage Regulator/Rectifier

STATIC TEST: CONTINUITY

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

DYNAMIC TEST

Current Test

Proceed as follows:

- Start engine.
- Lay an inductive ammeter on positive cable of battery.
- Bring engine to approximately 3500 RPM.

Depending on battery charge, current reading should be approximately **5 amperes**. If not, check magneto output prior to concluding that voltage regulator/rectifier is faulty.

Voltage Test

Proceed as follows:

- Start engine.
- Connect a multimeter to battery posts. Set multimeter to Vdc scale.
- Bring engine to approximately 3500 RPM.

If multimeter reads over 15 volts, voltage regulator/rectifier is defective. Replace it.

NOTE: Whatever the voltmeter type used (peak voltage or RMS), the voltage must not exceed 15 V. A faulty voltage regulator/rectifier will allow voltage to exceed 15 V as engine speed is increased.

NOTE: If the battery will not stay charged, the problem can be any of the charging circuit components. If these all check good, you would be accurate in assuming the problem to be in the voltage regulator/rectifier.

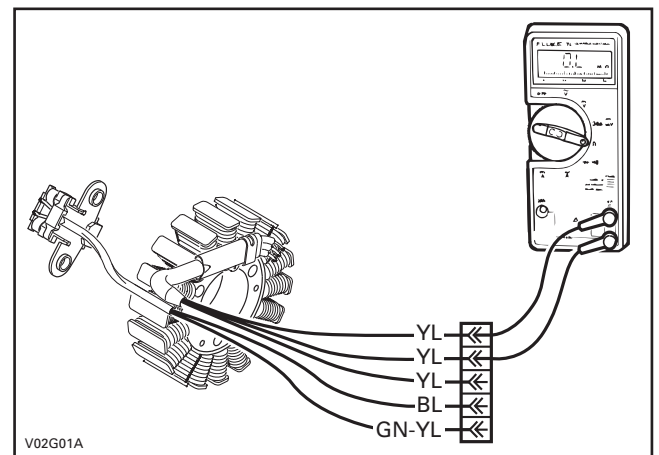
If there is no charging at the battery with the preceding voltage test, the following test can also be performed.

NOTE: If the voltage regulator/rectifier is within the specification, the wiring harness between the voltage regulator/rectifier and battery is defective. If the voltage regulator/rectifier is out of specification and the stator test good, the voltage regulator/rectifier is defective.

Stator

STATIC TEST: CONTINUITY

1. Disconnect the magneto wiring harness connector. With the recommended multimeter, place the 2 meter test probes onto the stator wire leads AC-1 and AC-2 of the stator. The resistance should be between 0.1 Ω and 1.0 Ω .

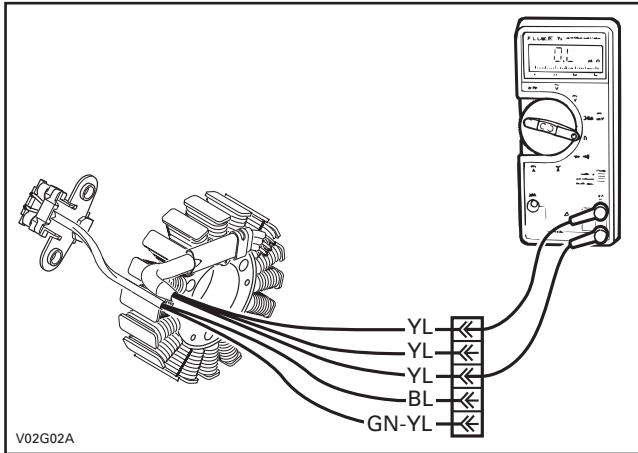


TYPICAL

Section 05 ELECTRICAL

Subsection 03 (CHARGING SYSTEM)

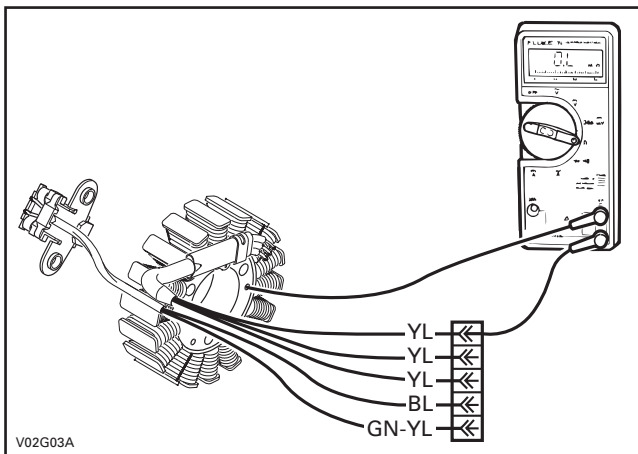
2. Place either meter test probe into the remaining stator lead (AC-3) and note the resistance (same as step no. 1). If the readings are out of specification, the stator will need to be replaced.



TYPICAL

STATIC TEST: INSULATION

With the stator leads disconnected, insert either meter test probe onto AC-1 and ground the other meter test probe to the engine or the stator iron core and note the reading. There should be no continuity (infinity) between the stator insulated coils and ground. If there is a reading, the stator coils and/or the wiring from the coils is grounded and needs to be replaced/repared respectively.



TYPICAL

DYNAMIC TEST

1. Unplug magneto wiring harness connector.
2. On magneto side, connect test probes of the multimeter to two of the YELLOW wires.
3. Set multimeter to Vac scale.
4. Start engine. The obtained value should be between 10 and 12 Vac.
5. Repeat operation 3 times.
6. If the stator is out of specification, replace it.

STARTING SYSTEM

BATTERY

TROUBLESHOOTING

SYMPTOM: DISCHARGED OR WEAK BATTERY	
CAUSE	REMEDY
1. Battery posts and/or cable terminal oxidized.	Clean and coat with dielectric grease.
2. Loose or bad connections.	Check wiring and connector cleanliness, damaged or short circuit.
3. Faulty battery (doesn't keep a full charge loose rectifier).	Replace.
4. Main system fuse burnt or faulty voltage regulator/rectifier.*	First check charging system. If it is in good condition replace fuse or rectifier.
5. Faulty charging system generator coil.*	Replace.

* To test charging system, refer to CHARGING SYSTEM.

BATTERY TESTING

There are 2 types of battery tests: unloaded and loaded. An unloaded test is made on a battery without discharging current. It is the simplest and commonly used. However, be aware that the voltage test can be good while the battery has not enough power to start the engine. A load test gives more accuracy of the battery condition.

Unload Test

Check charge condition using a multimeter.

With a multimeter, voltage readings appear instantly to show the state of charge. Always respect polarity. A fully charged battery will have a reading of 12.6 Vdc.

Load Test

This is the best test of battery condition under a starting load. Use a load testing device that has an adjustable load.

Apply a load of 3 times the ampere-hour rating of the battery. At 14 seconds into the test, check battery voltage; if battery is in good condition, it will have at least 10.5 Vdc.

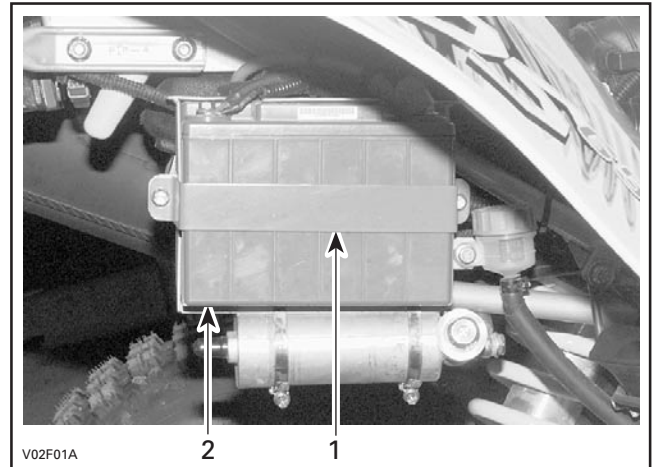
REMOVAL

Disconnect BLACK (-) cable first then positive cable.

WARNING

Always respect this order for disassembly; disconnect BLACK (-) cable first. Electrolyte or fuel vapors can be present in engine compartment and a spark may ignite them and possibly cause personal injuries.

Remove bolts retaining battery holder from rack.



1. Battery holder
2. Rack

CLEANING

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

Remove corrosion (if so) from battery cable terminals and battery posts using a firm wire brush. Rinse with clear water and dry well.

Section 05 ELECTRICAL

Subsection 04 (STARTING SYSTEM)

INSPECTION

Visually inspect battery casing for cracks or other possible damage. If casing is damaged, replace battery and thoroughly clean battery rack with water and baking soda.

Inspect battery rack mounting.

Inspect battery posts for security of mounting.

BATTERY STORAGE

If the battery is in storage or used infrequently, disconnect the battery cables to eliminate drain from electrical equipment. Charge the battery every two weeks.

For extended storage, remove the battery from vehicle and charge to 100%. Charge the battery every month if stored at temperature below 16°C (60°F). If stored in a warm area, above 16°C (60°F), charge every two weeks. Make sure battery is stored out of reach of children.

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.

Store battery on a wooden shelf in a cool dry place. Such conditions reduce self-discharging to a minimum.

ACTIVATION OF A NEW BATTERY

WARNING

Never charge or boost battery while installed on vehicle.

1. Connect a 10 A battery charger until the battery is fully charged.
2. Disconnect battery charger.
3. Test battery state of charge. Use a multimeter.

NOTE: It is recommended to verify the battery charge once a month. If necessary, fully charge battery.

INSTALLATION

Reinstall battery in vehicle. Fasten battery holder.

WARNING

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

STARTING SYSTEM TROUBLESHOOTING

SYMPTOM	CAUSE	REMEDY
Starter does not turn.	Ignition switch is in the OFF position.	Turn switch in the ON position.
	Engine stop switch is in the OFF position.	Place the engine stop switch to run position.
	Burnt fuse.	Check main fuse and wiring condition.
	Transmission is not set on Neutral.	Set transmission in Neutral or squeeze the clutch lever.
	Poor contact of battery terminal(s) or ground cable connections.	Clean and tighten terminal(s).
	Weak battery.	Recharge battery.
	Poor contact or open circuit of: start button, engine stop switch, ignition switch or starting solenoid.	Check and replace defective part.
	Neutral switch is defective.	Check neutral switch and wiring condition.
	Clutch switch is defective.	Check clutch switch and wiring condition.
	Engine mechanical problem (ensure that other electric components are good).	Check and replace defective part.
Starter turns; but does not crank the engine.	Poor contact of battery terminal(s).	Clean and tighten terminal(s).
	Poor battery ground cable connection.	Clean and tighten.
	Burnt or poor contact of solenoid switch contact disc.	Replace starting solenoid.
	Poor contact of brush.	Straighten commutator and brush or replace electric starter.
	Burnt commutator.	Turn commutator in a lathe or replace electric starter.
	Worn commutator segments.	Undercut mica or replace electric starter.
	Shorted armature.	Replace electric starter.
	Weak brush spring tension.	Replace electric starter.
	Weak magnet.	Replace electric starter.
	Worn bushings.	Replace electric starter.
	Weak battery.	Recharge or replace battery.
Starter turns, but overrunning clutch pinion does not mesh with ring gear.	Worn clutch pinion gear.	Replace electric starter.
	Defective clutch.	Replace electric starter.
	Poor movement of clutch on splines.	Replace electric starter.
	Worn clutch bushing.	Replace electric starter.
	Worn ring gear.	Recharge ring gear.
Starter motor keeps running.	Shorted starting solenoid switch winding.	Replace starter solenoid.
	Melted solenoid contacts.	Replace starter solenoid.
	Sticking or defective starter clutch.	Lubricate or replace electric starter.

STARTING SYSTEM TESTS

GENERAL

First ensure the problem is not related to engine mechanical components. Then, test the starting system.

Causes of troubles are not necessarily related to starter but may be due to a burnt fuse faulty battery, start button, ignition switch, engine stop switch, starting solenoid, electrical cables or connections or the electronic module.

Check these components before removing starter. Consult also the STARTING SYSTEM TROUBLESHOOTING table above for a general view of possible problems.

WARNING

To avoid the possibility of short circuit while working on starter, always disconnect the battery.

Fuses

Make sure the main fuse is in good condition. If the fuse tests good, continue the next tests.

Battery

To check battery condition, refer to BATTERY above. If it tests good, continue the next tests.

Ignition Switch

A quick test to validate it is working. Turn the ignition switch ON then place the headlight switch in ON position. If the lights turn on, the ignition switch is good. Otherwise, refer to IGNITION SYSTEM for testing procedure. If it tests good, continue the next tests.

Engine Stop Switch

If engine does not turn when placing engine stop switch to RUN and pressing the start button, test the engine stop switch as follows.

Remove the front facia (refer to BODY) and unplug the multi-function switch connector.

Using a multimeter, measure the resistance between the following wires.

POSITION	WIRE	RESISTANCE
Switch to OFF	BLACK and BLACK/WHITE	1 Ω max.
Switch to RUN		Infinite (0.L)

Replace multi-function switch if defective.

If switch tests good, check wiring. If it tests good, continue the next tests.

Start Button

If engine does not turn when pressing the start button, test the switch as follows.

Remove the front facia and unplug the multi-function switch connector.

Using a multimeter, measure the resistance between the following wires.

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

Replace multi-function switch if defective.

If switch tests good, check wiring going to electronic module. If it tests good, continue the next tests.

Starting Solenoid

NOTE: Solenoid is located on frame, behind battery rack.

Ensure the solenoid receives electric current as follows. Using a multimeter, measure the voltage between the YELLOW/RED and YELLOW/BLACK wires when pressing the start button with the ignition key turned ON.

NOTE: Disconnect wires from solenoid.

If solenoid does not properly receive current, the electronic module can be suspected. See ELECTRONIC MODULE section below.

If solenoid receives current, test the solenoid as follows.

Disconnect large cables from solenoid.

Inspect connections and clean as necessary. Solenoid condition can be checked with an ohmmeter. Install test probes on large connectors of solenoid. Measure resistance when current is applied to small connectors; if it is more than a few ohms, replace solenoid.

If solenoid test good, check the electric starter. If starter test good, the electronic module can be suspected. See ELECTRONIC MODULE below.

Electrical Cables or Connections

Check all connections, cables and wires. Tighten any loose cables. Replace any chafe wires/cables. If wiring and connectors are good, check the electric starter. See below.

Electric Starter

Using boosting cables, carefully supply current from the battery directly to the starter. Connect the BLACK (-) cable first. Then connect the remaining jump cable from the battery then to the starter.

If starter now turns ensure the cables/connections from battery to solenoid and to starter are in good condition. If they test good, the electronic module can be suspected. See ELECTRONIC MODULE below.

If starter does not turn, check for mechanical problems in the starter.

Electronic Module

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

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 essentially 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 trouble may arise if starter is not properly aligned.

Torque starter screws to 10 N•m (89 lbf•in).

Connect the RED (+) cable to the starter and torque nut to 6 N•m (53 lbf•in). Apply dielectric grease on terminal and nut.

First connect RED (+) cable to battery then connect the BLACK (-) cable.

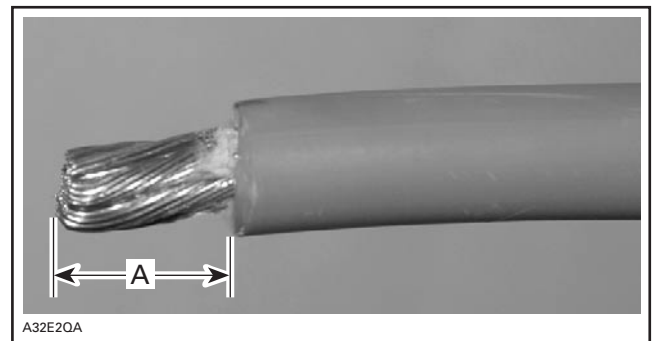
⚠ WARNING

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.

CABLE TERMINAL INSTALLATION

Carefully strip the wire approximately to 12 mm (1/2 in) in length, using a wire stripping tool or sharp blade/knife.



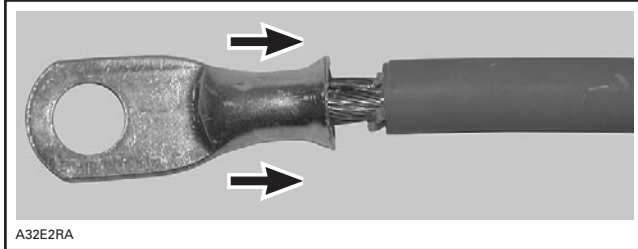
A. 12 mm (1/2 in)

NOTE: Make sure not to cut wire strands while stripping the wire.

Section 05 ELECTRICAL

Subsection 04 (STARTING SYSTEM)

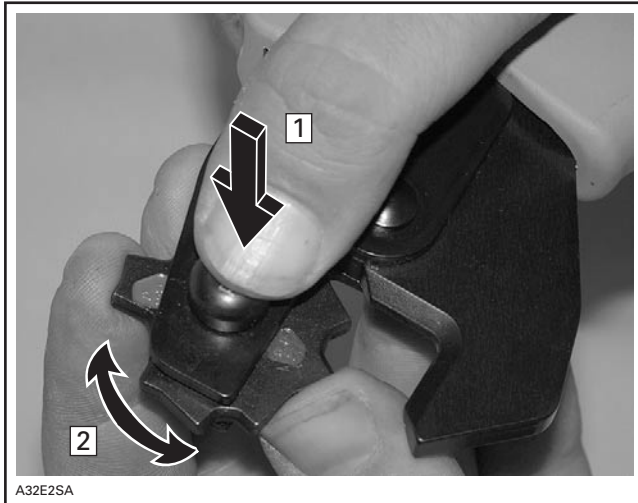
Install the appropriate terminal on the wire according to the requirement. Refer to appropriate parts catalog.



INSTALLATION OF TERMINAL

Follow the instructions provided with the crimp plier (P/N 529 035 730) to select the proper position of the tool.

NOTE: Different wires require different crimp plier settings, so make sure to follow the instruction supplied with the tool.



POSITIONING THE CRIMP PLIER

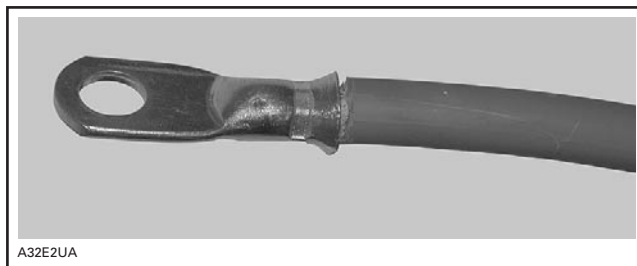
Step **1**: Press

Step **2**: Rotate

After positioning the crimp plier, crimp the terminal already installed on wire.



CRIMPING OF WIRE



PROPERLY CRIMPED WIRE

To verify, if the wire is properly crimped, hold the wire with one hand and the terminal with the other and pull with some force.

CAUTION: Never weld the wire to the terminal. Welding can change the property of the wire and it can become brittle and break.

Install the protective heat shrink rubber tube (P/N 278 001 692) on the terminal. Heat the heat shrink rubber tube using the heat gun so that it grasps the wire and the terminal.

CAUTION: Make sure that the protective heat shrink rubber tube has been properly installed and no part of wire is exposed.

IGNITION SYSTEM

IGNITION SYSTEM TESTING PROCEDURE

GENERAL

Ignition Problems

When dealing with ignition problems, the following items should be checked in this order. After one item has been checked and it is found not to be the problem, continue with the next item:

1. main fuse condition
2. spark occurrence
3. battery condition
4. ignition switch
5. trigger coil
6. ignition coil
7. electronic module.

Intermittent Ignition Problems

In dealing with intermittent problems there is no easy diagnosis. For example, problems that occur only at normal engine operating temperature have to be tested under similar conditions.

In most cases of temperature and/or vibration failure, only parts replacement might solve the problem as most of these failures return to normal when engine is not running.

Multiple Problems

There is always the possibility of more than one faulty part. If after a component has been replaced, the problem still persists, carefully repeat the complete test procedure to find the other faulty part.

IGNITION SYSTEM TEST

Safety Precautions

WARNING

To prevent powerful electric shocks while cranking engine, neither touch any electronic ignition components (ignition coil, high tension wire, wire harness, etc.) nor tester lead clips. Also make sure that tester leads do not touch any metallic object.

Main Fuse Condition

Check main fuse condition. Replace burnt fuse as necessary.

Spark Occurrence

Remove one spark plug and connect to its cable. While holding the spark plug against a metallic part of the engine, start the engine. Look for a spark at the spark plug tip. Proceed the same with the other spark plug. Replace defective spark plug.

NOTE: If a spark plug is found defective, replace both spark plugs at the same time.

Both spark plugs must be checked individually. If one works and the other doesn't, try another spark plug.

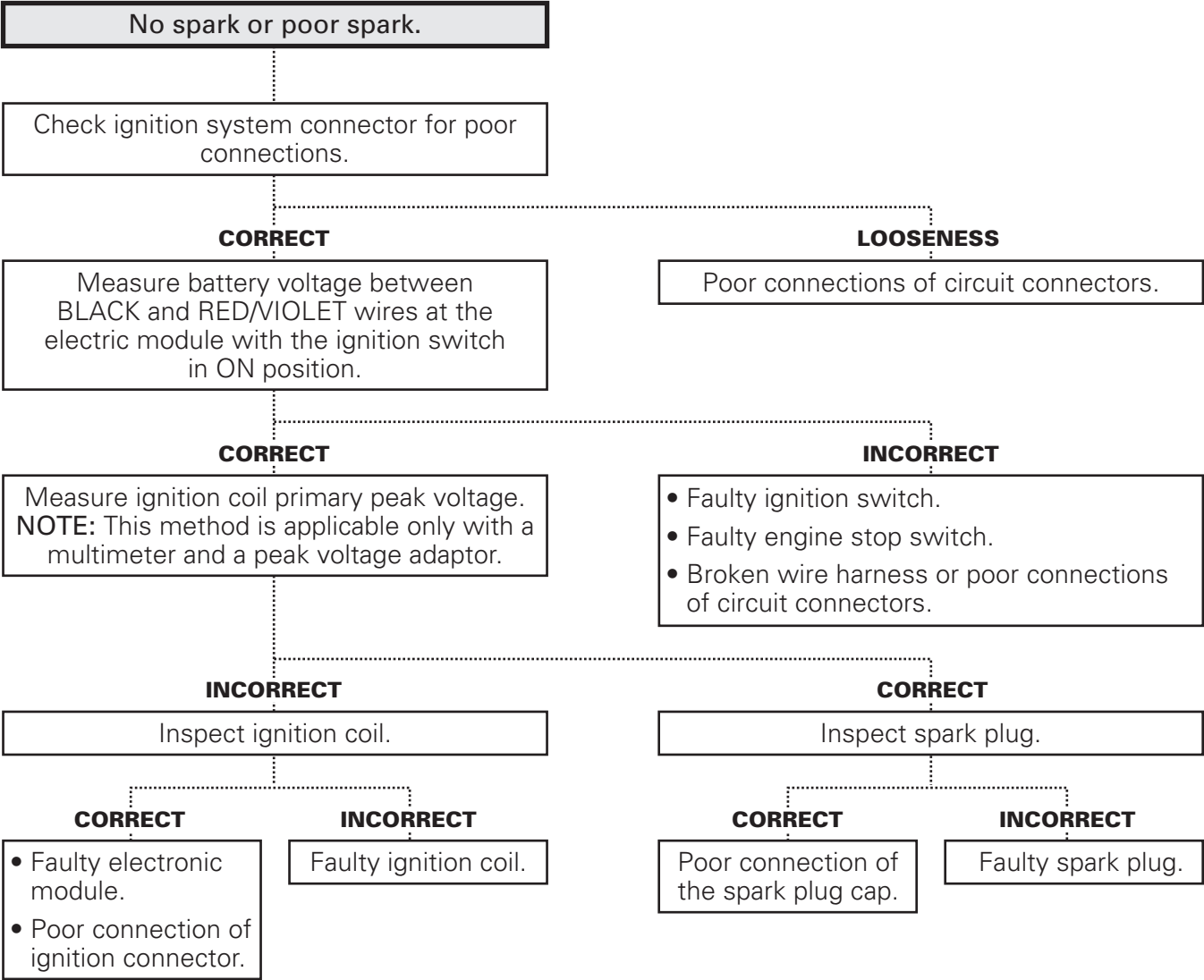
Keep in mind that a spark plug might test good this way while not being able to work properly under combustion chamber mixture and pressure.

If known good spark plug(s) does(do) not work, continue the other tests.

NOTE: Spark occurrence can be checked with a tester such as Superex Canada Ltd (P/N 15-785) or the equivalent.

TROUBLESHOOTING

NOTE: Check that the transmission is in NEUTRAL position and the engine stop switch is in “RUN” position. Check that main fuse is not burned and if battery is fully-charged before diagnosing.



Battery Condition

A battery must be present in the vehicle to allow the ignition system to work. Also, at least 8 V is required for proper operation. Check battery voltage.

Ignition switch

A quick test to validate it is working. Turn the ignition switch ON then place the headlight switch in ON position. If the headlight turn on, the ignition switch is good.

Test

Disconnect ignition switch.

Measure voltage between RED supply wire and the battery ground. If voltage is lower than battery voltage, test the wiring. If voltage is good, test switch.

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

POSITION	WIRE	RESISTANCE
OFF	WHITE and BROWN	Infinite (0.L)
ON	WHITE and BROWN	0.6 Ω max.

Replace switch if defective.

If switch is good, continue the next tests.

Trigger Coil Voltage Testing

NOTE: The trigger coil is not adjustable.

STATIC TEST: CONTINUITY

Check resistance with a high-sensitivity ohmmeter.

1. Disconnect the Deutsch 2-pin connector. Refer to OVERVIEW.
2. Connect multimeter probes to the GREEN/YELLOW wire and to the BLUE wire.
3. Measure resistance; it should be between 190 - 300 ohms.

DYNAMIC TEST

1. Disconnect the Deutsch 2-pin connector.
2. Connect one of the multimeter probes to the GREEN/YELLOW wire and the other to the engine, then bring selector switch to $\tilde{V}$ and scale to 00.0^{Vac}.

3. Press START button, note result. The obtained value should be between 0.4 and 0.7 Vac. Repeat operation 3 times.

4. If the trigger coil is out of specification, replace it. If it tests good continue the next tests.

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 the ignition coil may be necessary as a test.

Primary Winding

Disconnect the wire connector on the primary side of the ignition coil.

Using a multimeter, check the resistance between the terminal and the ignition coil body ground.

The resistance should be between 0.2 and 0.5 Ω at 20°C (68°F).

If not within specification, replace the ignition coil.

If the ignition coil test good, check the power supply on the electronic module.

There should be 12 Vdc between the RED/VIOLET and BLACK/WHITE wires.

If there is no voltage, either the electronic module or the wiring harness is defective.

Secondary Winding

Due to the integrated diode, it is not possible to take any resistance measurement.

The output voltage should not be less than 12 kV (12 000 V).

The ignition coil outlet caps and the spark plug caps include a resistance. They should be checked prior to replacing a suspected ignition coil.

Measure resistance between ignition coil terminals and spark plug caps. The obtained value should be between 6 and 13 K Ω . If resistance is good, continue check. If not, change spark plug wires.

DYNAMIC TEST

An ignition coil tester available from after-market tool/equipment suppliers can be used.

CAUTION: Do NOT use coil tester on metal work bench. Follow manufacturer instructions.

If the ignition coil is out of specification, replace it. If it tests good ensure the wiring and connectors are in good condition then continue the next tests.

Subsection 05 (IGNITION SYSTEM)

V06G06A

NEGATIVE (-) TESTER LINE

	A	B	C	D	E	F
A		2.18 MΩ	2.18 MΩ	UP to- ∞	2.18 MΩ	2.18 MΩ
B	O.L.		2590 Ω	UP to- ∞	2590 Ω	5.58 KΩ
C	O.L.	2590 Ω		UP to- ∞	0.02 Ω	2965 Ω
D	O.L.	UP to ∞	UP to ∞		UP to ∞	UP to ∞
E	O.L.	2590 Ω	0.02 Ω	UP to- ∞		2960 Ω
F	O.L.	5.68 KΩ	2977 Ω	UP to- ∞	2977 Ω	

POSITIVE (+) TESTER LINE

TEST

NOTE: On the multimeter, set measuring range from 1 K Ω – 10 K Ω . Make sure that positive and negative tester probes are installed on the appropriate wires.

		NEGATIVE (-) TESTER LINE				
	COLORS	BL	WH	OR	RD	BK
POSITIVE (+) TESTER LINE	BL		O	O	O	O
	WH	O		O	O	O
	OR	X	Δ		Δ	X
	RD	O	O	O		O
	BK	O	O	O	O	

O: Open circuit, value/pointer change continuously
X: No open circuit, value/pointer do not register any change
Δ: Value/pointer changer and move to ∞

IGNITION TIMING

It is impossible to check the ignition timing with a timing lamp because there is no access window or mark.

SPARK PLUG

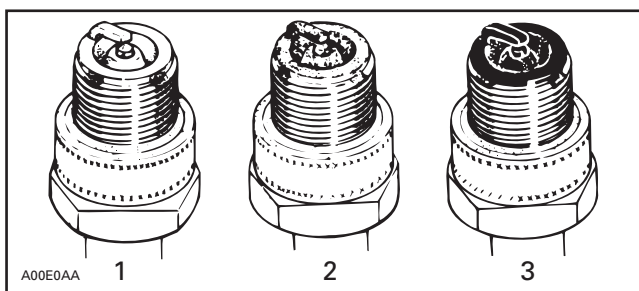
DISASSEMBLY

Unplug the spark plug cable
Unscrew the spark plug one turn.
Clean the spark plug and cylinder head with pressurized air then completely unscrew.

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.

SPARK PLUG ANALYSIS



TYPICAL

1. Overheated (light grey, white)
2. Normal (light brown, brown)
3. Fouled (black, wet or dry, dark deposits, grey, melted coating)

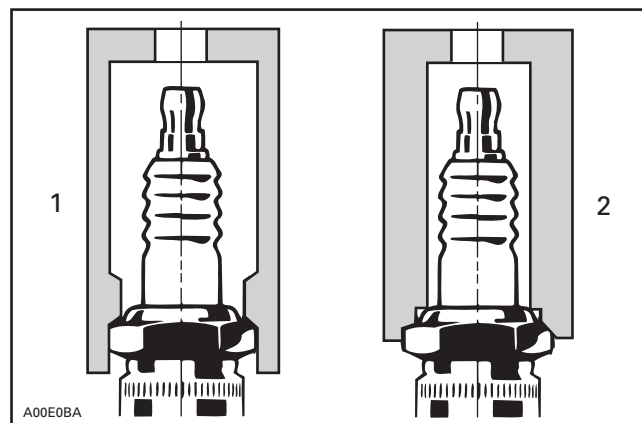
The plug face reveals the condition of the engine, operating condition, method of driving and fuel mixture. For this reason it is advisable to inspect the spark plug at regular intervals, examining the plug face (i.e. the part of the plug projecting into the combustion chamber).

SPARK PLUG INSTALLATION

CAUTION: Always use the recommended spark plug.

Prior to installation make sure that contact surfaces of the cylinder head and spark plug are free of grime.

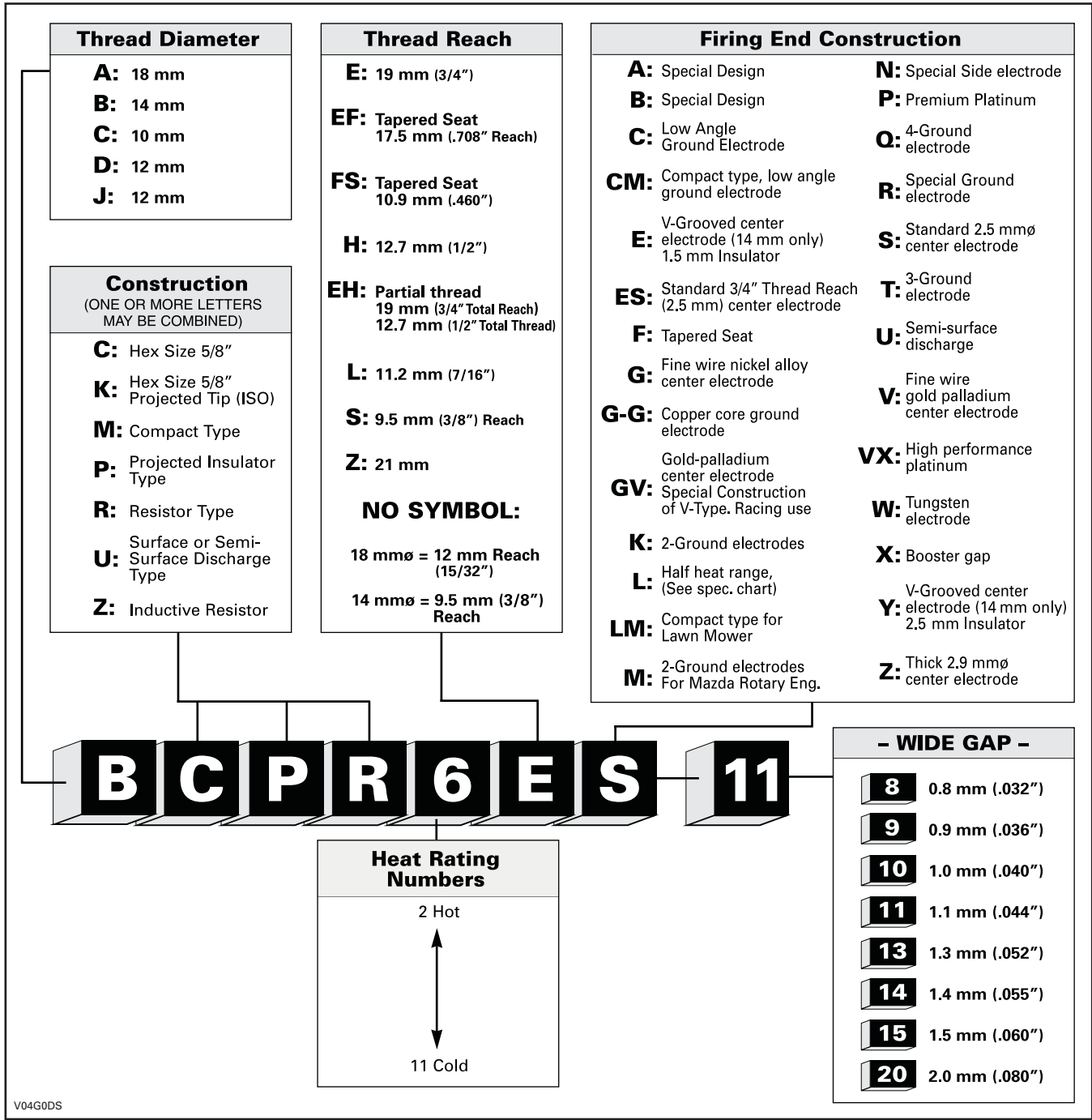
1. Using a wire feeler gauge, set electrode gap according to the following chart.
2. Apply anti-seize lubricant over the spark plug threads to prevent possible seizure.
3. Hand screw spark plug into cylinder head and tighten with a torque wrench and a proper socket.



1. Proper socket
2. Improper socket

4. Torque spark plug to 20 N•m (15 lbf•ft).

NGK SPARK PLUG SYMBOL EXPLANATION



ACCESSORIES

REMOVAL AND INSTALLATION

CAUTION: It is recommended to always disconnect the battery when replacing any electric or electronic parts.

HEADLAMP

Bulb Replacement

Remove front facia.

Remove rubber boot.



Push and turn counterclockwise bulb retaining ring then remove it.

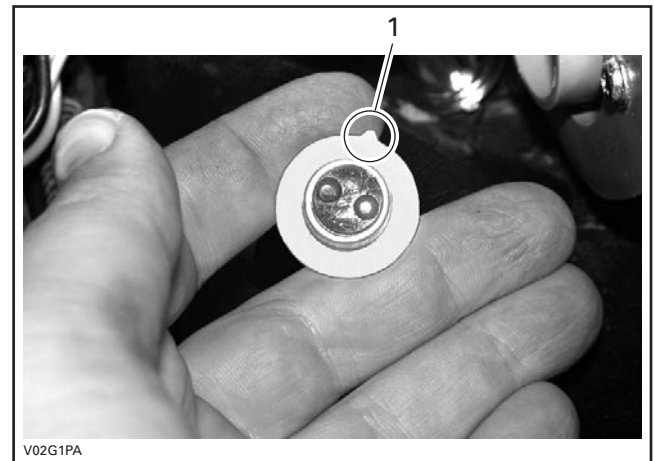


Detach bulb and replace.



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

NOTE: Align the bulb socket tab with the notch in the headlamp housing.



1. Bulb socket tab

Removal

Remove front facia and dashboard. Refer to BODY. Unscrew the bolts retaining headlamp then unplug the connector.

Installation

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

Section 05 ELECTRICAL

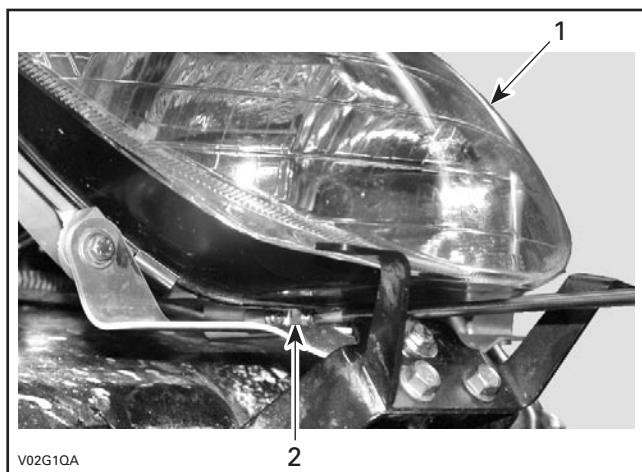
Subsection 06 (ACCESSORIES)

Beam Aiming Adjustment

Adjust beam aiming as follows:

Remove the front facia.

Using a long screwdriver, turn the adjusting screw clockwise to lift the inside of headlamp and counterclockwise to go down it.



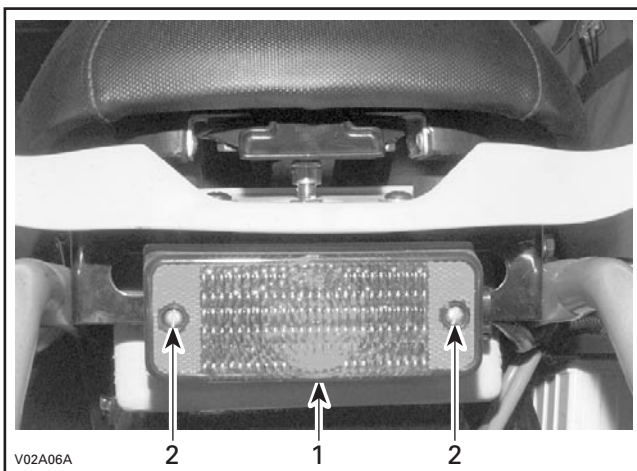
1. Headlamp
2. Adjustment screw

Adjust beam height to your convenience then re-install the front facia.

TAILLIGHT

Bulb Replacement

Unscrew lens screws to expose bulb.



1. Lens
2. Screws

Push bulb in and hold while turning counterclockwise to release.

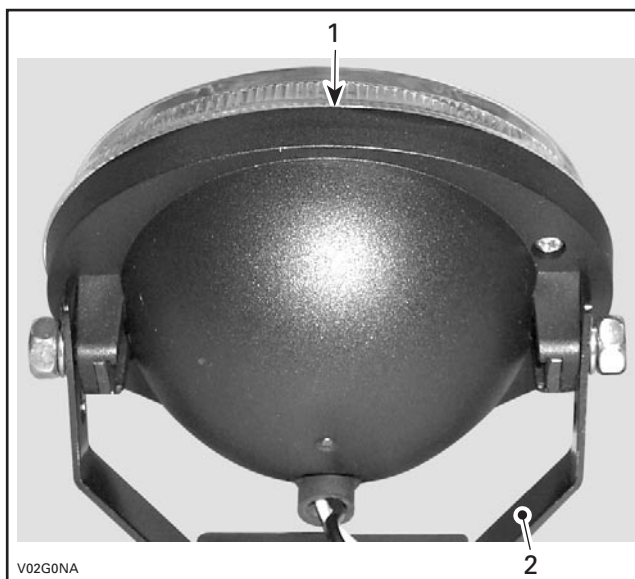
Install the new bulb by first pushing in while turning clockwise.

AUXILIARY HEADLAMP

Baja and Baja X Models

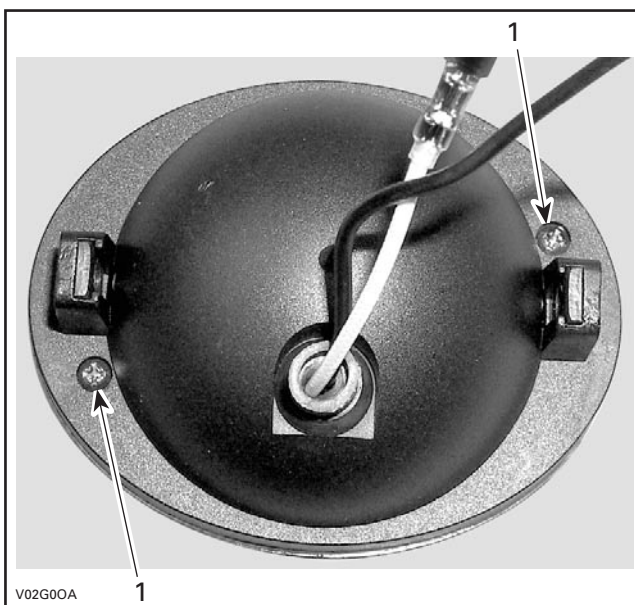
Bulb Replacement

Disconnect the auxiliary headlamp then remove it from support.



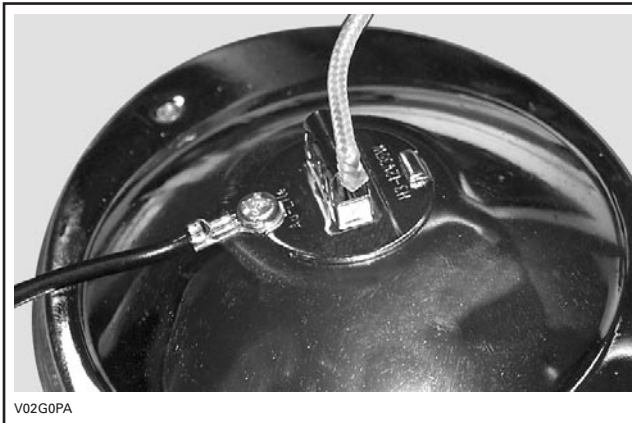
1. Auxiliary headlamp
2. Support

Remove the back cover of auxiliary headlamp.

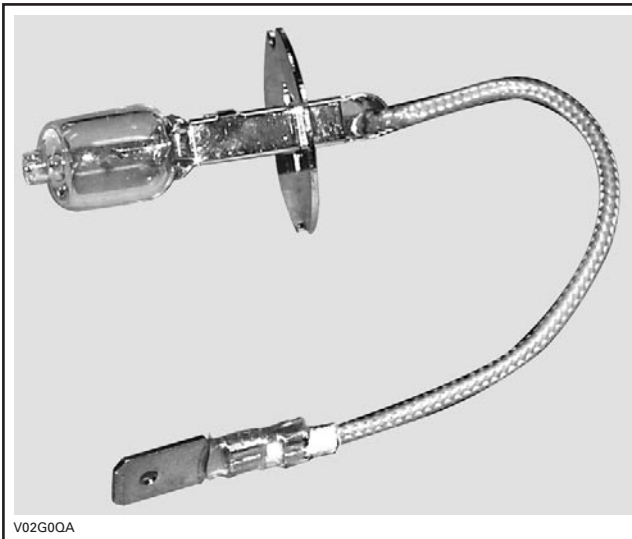


1. Remove these screws

Remove the screw retaining the BLACK wire.



Detach bulb and replace.



BULB WITH WIRE ASSEMBLY

NOTE: ALWAYS USE A 35 WATTS BULB. If the 55 watts bulb is used, the regulator might not be able to recharge the battery properly.

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

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.

TACHOMETER

Baja and Baja X Models

Bulb Replacement

The bulb in the tachometer is not replaceable. If the tachometer bulb is burnt, replace the tachometer.

Removal

Remove dashboard.

Unplug wires under tachometer.

Push the tachometer out of dashboard.

Installation

The installation is the reverse of removal procedure.

NOTE: Make sure the retainer is inserted between the tachometer and the rubber grommet.

IGNITION SWITCH

Test

Refer to IGNITION SYSTEM.

Removal

Lift the dashboard and unscrew the ignition switch nut.

Unplug the switch connectors.

Installation

For the installation, reverse the removal procedure.

INDICATOR LIGHTS

Test

Refer to TESTS section.

Removal

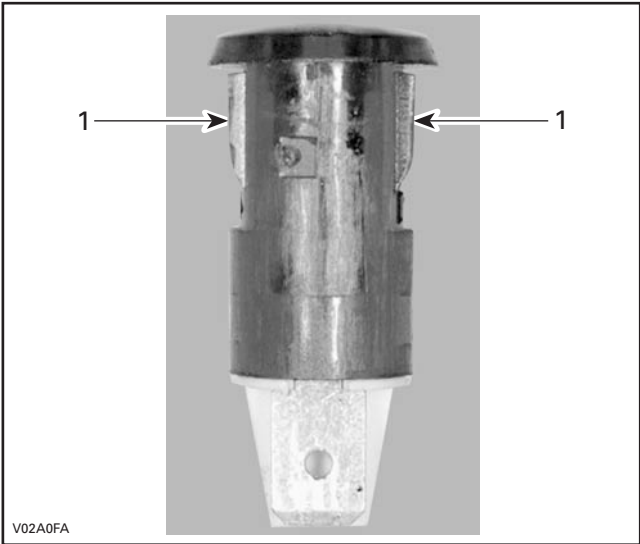
Remove dashboard.

Unplug wires on indicator lamp.

Section 05 ELECTRICAL

Subsection 06 (ACCESSORIES)

Press both tabs then push indicator lamp out of hole.



1. Tabs

Installation

For the installation, reverse the removal procedure.

NOTE: The LED have polarity. Make sure to reconnect the RED/VIOLET wire on the positive (+) tab.

TESTS

COOLING FAN OPERATION TEST

Unplug the temperature sender connectors.
Install a jumper wire end in each connector. Turn key ON. Replace the fan if it does not work.

HEADLAMP

Start the engine.
Using a multimeter, measure the voltage between GREEN and BLACK wires at LOW beam and between BLUE and BLACK wires at HI beam.
The obtained value should be between 12 and 14.5 Vdc.

- No voltage:
 - Check wiring condition and HI-LO switch.
- Voltage is good:
 - Change headlamp.

MULTI-FUNCTION SWITCH

Unplug connector located near oil tank, under front facia.

Using a multimeter, measure the resistance between the following wires.

POSITION	WIRE	RESISTANCE
Switch OFF	RED/VIOLET and GREEN	Infinite (0.L)
Switch OFF	RED/VIOLET and BLUE	Infinite (0.L)
Switch to LO	RED/VIOLET and GREEN	0.4 Ω max.
Switch to HI	RED/VIOLET and BLUE	0.4 Ω max.

Replace switch if defective.

INDICATOR LIGHTS

Remove steering cover.

Neutral Indicator Light (GREEN)

Unplug the neutral indicator light connectors.
Put the RED probe of the multimeter to the positive (+) connector on the LED and the black probe to the other connector.
Select the testing diodes/continuity function on the multimeter.

NOTE: Do not use Ω function to check LED.
The measure should be between 1.6 and 2.0.

- LED is good:
 - Check wiring condition.
 - Check neutral switch. Refer to TRANSMISSION.
- LED is burned:
 - Change indicator light.

Engine Indicator Light (RED)

Unplug the engine indicator light connectors.
Test LED with a multimeter. Refer to NEUTRAL INDICATOR LIGHT for proper procedure.

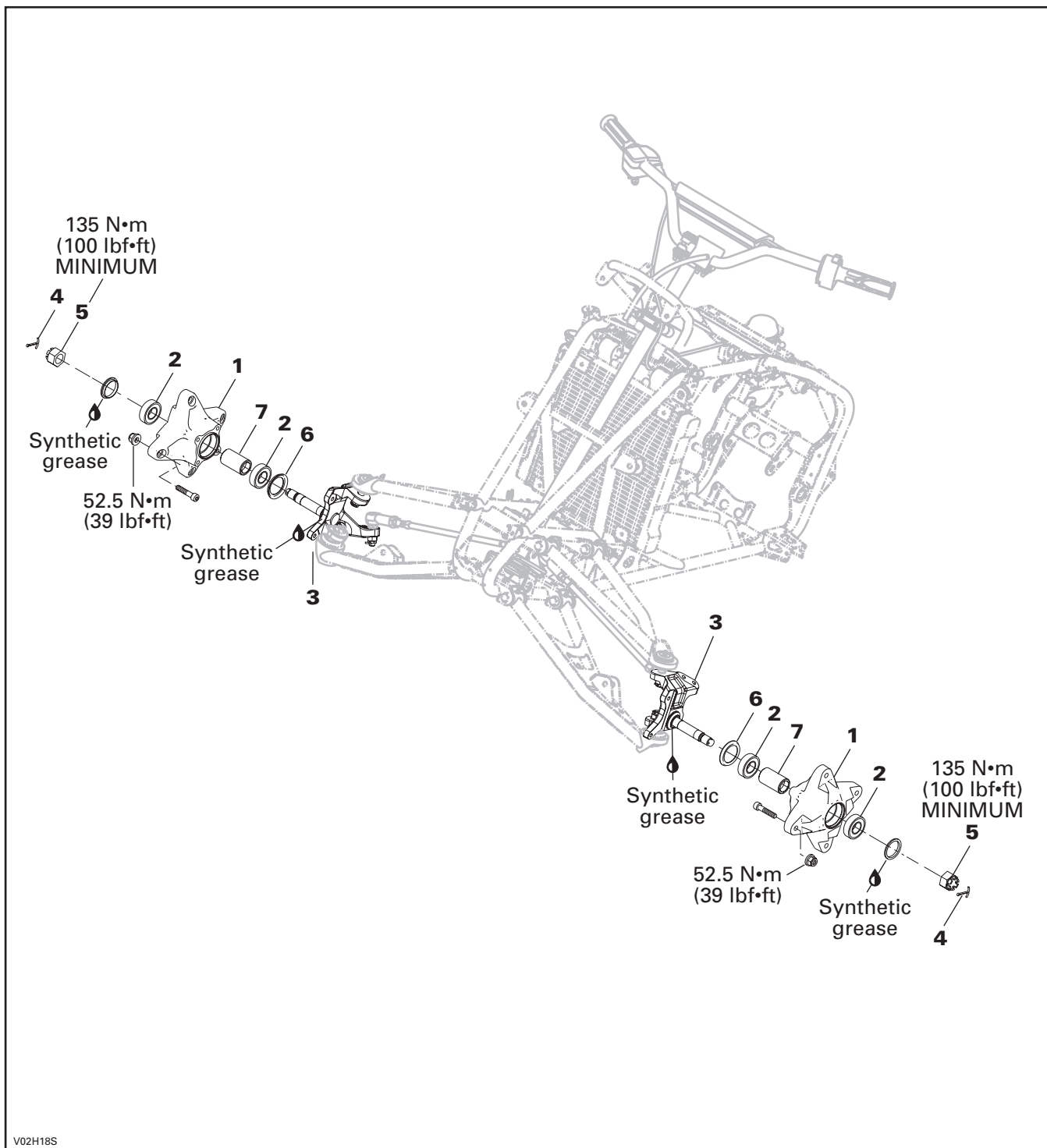
- LED is good:
 - Check wiring condition.
 - Check oil sensor. Refer to LUBRICATION SYSTEM.
 - Check temperature sensor. Refer to COOLING SYSTEM.
- LED is burned:
 - Change indicator light.

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FRONT DRIVE



V02H18S

Section 06 DRIVE TRAIN

Subsection 02 (FRONT DRIVE)

GENERAL

For installation, use the torque values and Loctite products from the exploded views. Clean threads before using Loctite when installing the screws.

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 replaced.

WHEEL HUB

Lift the front of vehicle and install jack stands under the frame to support the front of vehicle off the ground.

Removal

Remove:

- wheel
- wheel cap
- cotter pin **no. 4** (discard)
- castellated nut **no. 5**
- caliper (refer to HYDRAULIC BRAKES)
- wheel hub **no. 1** with brake disc

NOTE: Use a plastic hammer if necessary.

- brake disc from wheel hub
(refer to HYDRAULIC BRAKES).

Inspection

Check hub for cracks or other damage. Replace as necessary.

Installation

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

Apply grease to wear ring located on the knuckle.

Install a new seal into wheel hub until it is flush with hub surface.

Tighten castellated nut to the specific torque and further tighten until its grooves align with cotter pin hole.

Install a new cotter pin. Both ends of cotter pin must be folded.

CAUTION: Make sure each end of cotter pin does not protrude too far and rubs against the wheel cap.

Reinstall wheel cap.

WHEEL HUB BEARING

Inspection

Check inner race of each bearing **no. 2** with a finger. The bearing should turn smoothly and quietly.

Check if bearing outer race fits tightly in the hub.

Remove and discard bearings if races do not turn smoothly and quietly or if they fit loosely in hub. Replace bearings and hub if bearings fit loosely into hub.

NOTE: Replace wheel hub bearings in pairs. Do not reuse old bearings.

Removal

Remove seal **no. 6** (discard).

Place wheel hub in vise.

Insert a punch into the inside bushing **no. 7**.

Place the end of punch on the inside bushing lips and drive bearing out of wheel hub.



TYPICAL

Remove the inside bushing **no. 7** and drive out the outer bearing.

Installation

Drive in a new bearing squarely until it is fully seated.

Install inside bushing and drive the outer new bearing squarely until it is fully seated.

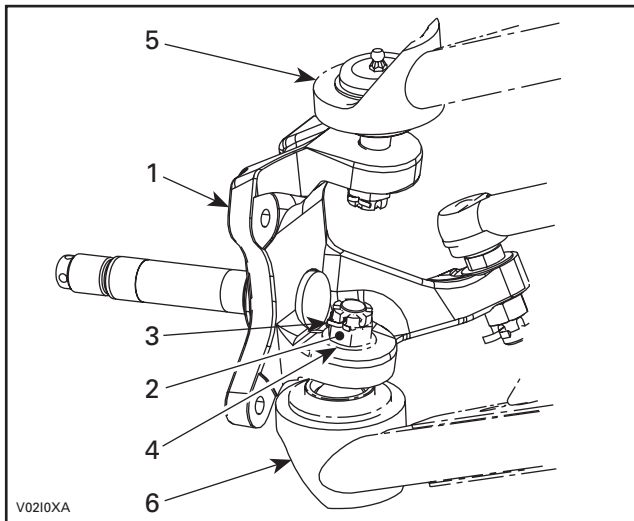
Install a new seal.

KNUCKLE

Removal

Remove:

- wheel hub
- tie-rod from knuckle
(refer to STEERING AND CONTROLS SYSTEM)
- cotter pins from the upper and lower A-arm ball joints (discard cotter pins)
- castellated nuts
- hardened washer.



1. Knuckle
2. Castellated nut
3. Cotter pin
4. Hardened washer
5. Upper A-arm
6. Lower A-arm

Use a ball joint remover and detach upper and lower A-arm from knuckle.

CAUTION: Never hit the knuckle with a hammer.

Inspection

Check knuckle for damage, cracks or pitting. Replace as necessary.

Installation

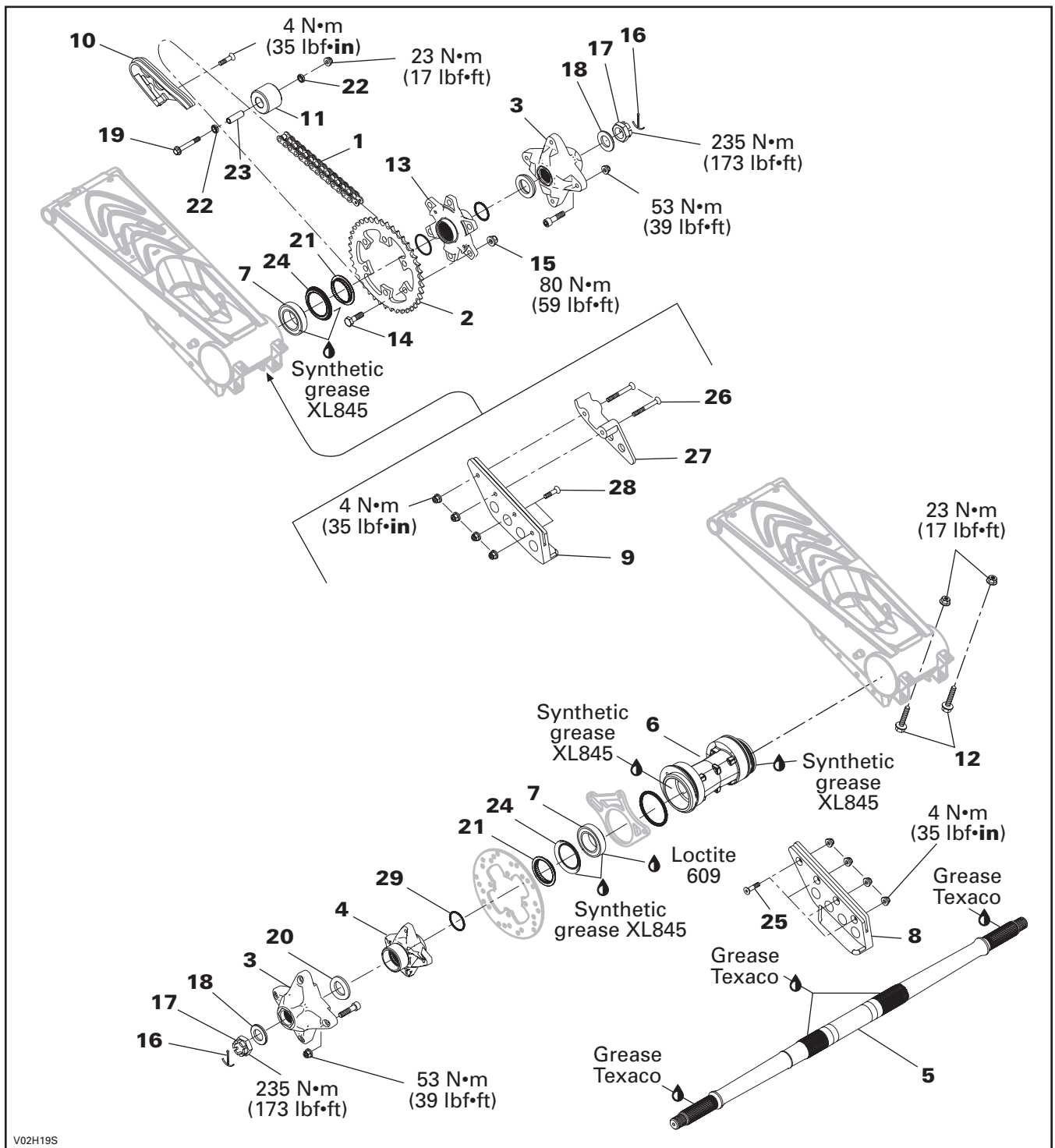
The installation is the reverse of the removal procedure. However, pay attention to the following details.

Install knuckle onto the upper and lower A-arms with hardened washer and castellated nut.

Tighten castellated nut to the specific torque and further tighten until its grooves align with the next cotter pin hole.

Install a new cotter pin. Both ends of cotter pin must be folded.

REAR AXLE



V02H19S

Section 06 DRIVE TRAIN

Subsection 03 (REAR AXLE)

GENERAL

For installation, use the torque values and Loctite products from the exploded views. Clean threads before using Loctite when installing the screws.

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.

CAUTION: During installation, make sure every part is free from old grease and dirt. This allows for a clean re-assembly and will avoid premature wear caused by dirt contamination.

After each job, ride the vehicle for a few minutes and make sure the job is successful; i.e. axle is not loose, chain is not rubbing on any part or making noise, rear brake operates correctly, etc.

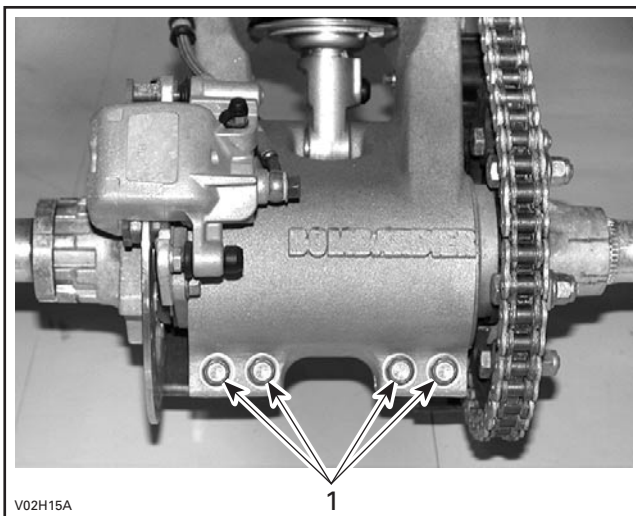
DRIVE CHAIN

Adjustment

NOTE: Always adjust drive chain with the driver, or equivalent weight, seated on the vehicle.

Select a level surface and set transmission to NEUTRAL.

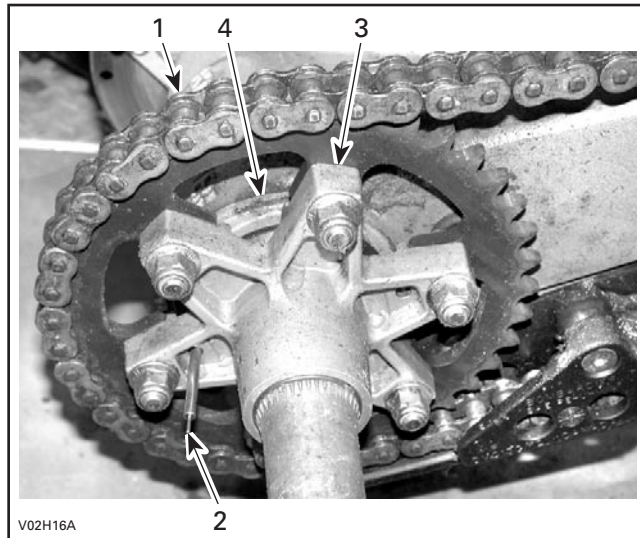
Loosen rear axle lock bolts.



1. Rear axle lock bolts

Insert adjuster lock (from the vehicle's tool kit) through rear hub and into eccentric axle housing.

Turn the axle forward to increase or backward to decrease chain free play.



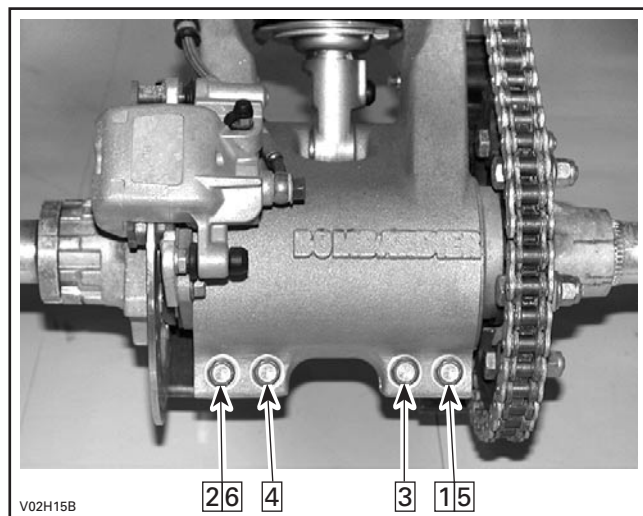
TYPICAL

1. Drive chain
2. Adjuster lock
3. Sprocket hub
4. Eccentric axle housing

NOTE: Correct chain free play adjustment is 19 to 25.4 mm (3/4 to 1 in) midway between sprockets.

Tighten the rear axle lock bolts to 23 N•m (17 lbf•ft).

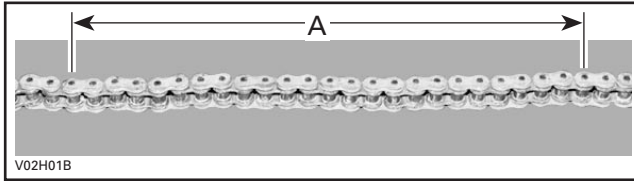
Use the following sequence to tight the rear axle lock bolts correctly.



Lift rear of vehicle (without driver), by the frame or by the bumper, and recheck the chain free play. The chain free play should be 44.5 to 51 mm (1-3/4 to 2 in). If not, redo the drive chain adjustment.

Inspection

With the drive chain **no. 1** installed on vehicle and the free play adjusted correctly, measure the distance between a span of 13 links from pin center to pin center.



A. 403 mm (15-7/8 in)

Change drive chain if the distance exceeds the service limits.

CAUTION: Replace chain, engine sprocket and rear sprocket together to prevent rapid chain and sprockets wear. Install a new tab washer each time the engine sprocket is removed.

Removal

Lift the rear of vehicle and install jack stands under the frame to support the rear of vehicle off the ground.

Remove metallic chain guard on engine.

Remove chain protector **no. 9**.

Loosen rear axle lock bolts **no. 12**.

Insert adjuster lock through hub axle and into eccentric axle housing.

Turn the axle forward.

Remove adjuster lock.

Detach the swing arm from the frame. Refer to REAR SUSPENSION.

Remove drive chain from rear sprocket **no. 2** and engine sprocket.

Installation

Installation is the reverse of the removal.

Adjust drive chain. Refer to ADJUSTMENT for the proper procedure.

SLIDER-SHOE

Removal

Remove swing arm. Refer to REAR SUSPENSION.

Remove slide-shoe.

Installation

Installation is the reverse of the removal.

CHAIN ROLLER

Removal

Unscrew bolt **no. 19** retaining the chain roller **no. 11**.

Remove the chain roller with ball bearings **no. 22** and bushing **no. 23**.

Installation

For installation, reverse the removal procedure.

REAR WHEEL HUB

Removal

Lift rear of vehicle and install jack stands under the frame to support the rear of vehicle off the ground.

NOTE: Use the same procedure for both wheel hubs.

Apply rear brake.

CAUTION: Do not use the transmission to lock the rear axle. Do not use an impact pneumatic tool to loosen nuts. Because of the high tightening torque, impacts might damage the bearings.

Remove rear wheel.

Remove cap, cotter pin **no. 16** and unscrew castellated nut **no. 17**. Discard the cotter pin.

Remove hardened washer **no. 18**.

Pull out wheel hub **no. 3**.

Remove spacer **no. 20**.

Inspection

Check wheel hub for cracks splines wear or other damage. Change if necessary.

Section 06 DRIVE TRAIN

Subsection 03 (REAR AXLE)

Installation

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

Apply synthetic grease (P/N 293 550 019) on splines.

IMPORTANT: Do not apply grease on axle threads.

Install wheel hub.

Put the washer and nut in place.

Torque nut to 220 N•m (162 lbf•ft).

NOTE: If, after applying the proper torque to the nut, the cotter pin cannot be inserted in its hole, continue tightening until slot aligns without exceeding 250 N•m (184 lbf•ft).

Install a new cotter pin. Both ends of cotter pins must be folded over nut.

Reinstall cap.

Install both rear wheels and tighten nuts to 53 N•m (39 lbf•ft) in a criss-cross sequence.

CAUTION: Always use the recommended wheel nuts (P/N 732 610 084). Using a different nut could cause damages to the rim.

Put vehicle back on the ground.

Adjust chain tension. Refer to DRIVE CHAIN above.

REAR SPROCKET

Removal

Lift rear of vehicle and install jack stands under the frame to support the rear of vehicle off the ground.

Remove RH rear wheel and wheel hub **no. 3**.

Unfasten bolts **no. 14** and nuts **no. 15** retaining chain sprocket **no. 2** to rear sprocket hub.

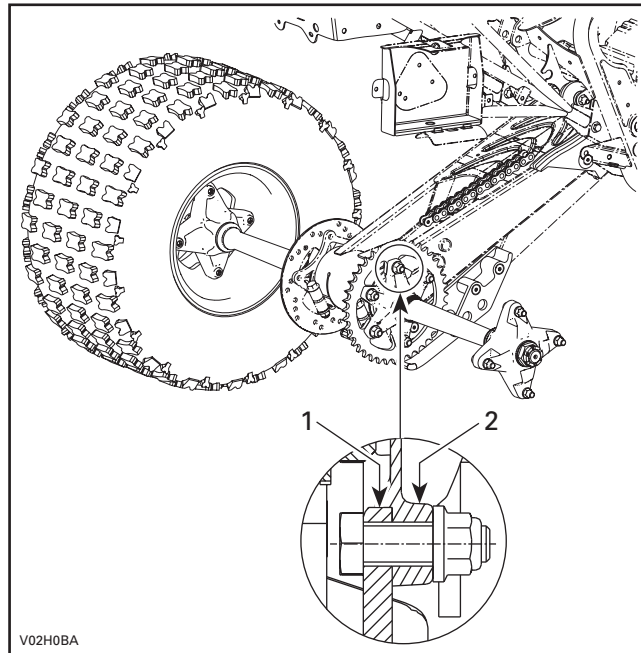
Remove chain sprocket.

Installation

CAUTION: Replace chain, engine sprocket and rear sprocket together to prevent rapid chain and sprockets wear. Install a new tab washer each time the engine sprocket is removed.

For installation, reverse the removal procedure.

Install sprocket with the flat side on hub side.



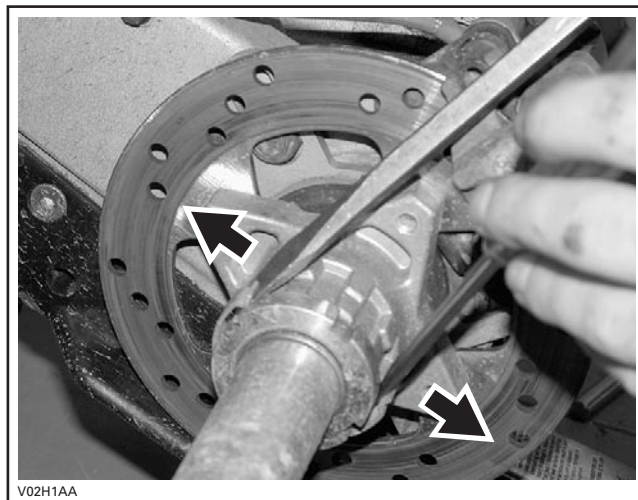
1. Sprocket
2. Sprocket hub

BRAKE DISC HUB

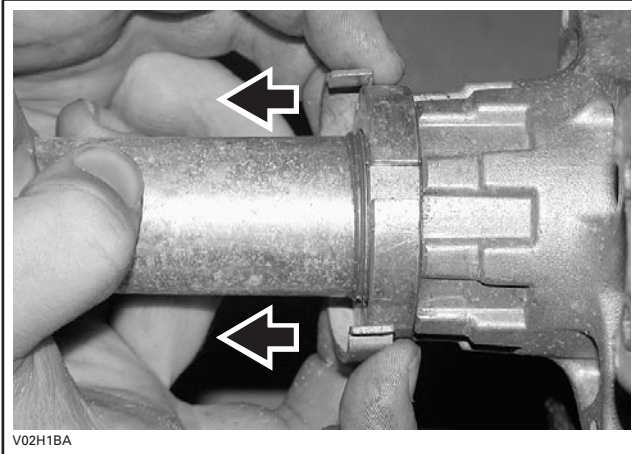
Removal

Remove the left wheel hub and spacer **no. 20**.

Using 2 screwdrivers, gently pry out the ends of the locking tab just enough to release them from their notches. Then, slide locking tab out as shown.

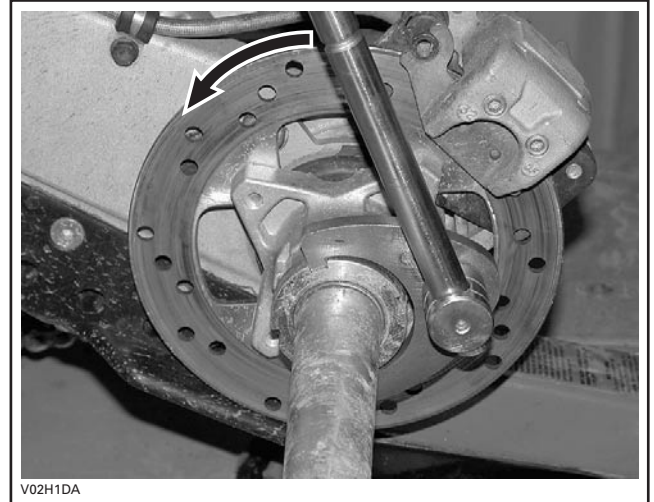


CAUTION: Do not try to “open” the ends to release the locking tab. It would impair its efficiency. To remove it, slide it out.



Place transmission on first gear and/or apply rear brake.

Use rear axle key (P/N 529 035 951) to loosen brake hub locking nut.



Release rear brake.

Remove caliper and place it on the swing arm. Refer to HYDRAULIC BRAKES.

Slide out the brake disc hub. Remove brake disc. Refer to HYDRAULIC BRAKES.

Remove O-ring **no. 29**.

Inspection

Check brake disc hub for cracks or other damage. Replace if necessary.

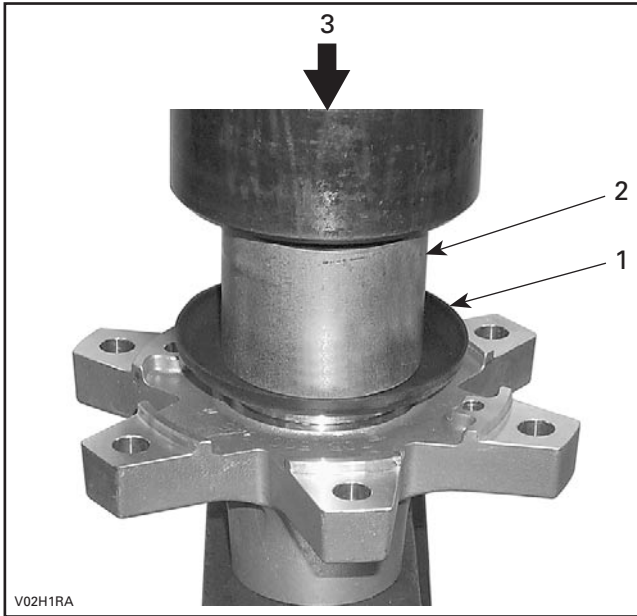
Check for worn splines and free play on the rear axle splines.

Check if wear ring **no. 21** is worn or damaged. If the ring is grooved, it must be replaced. Remove old ring and, using tool P/N 529 035 694, press a new one in place.

Press the wear ring on the hub until it bottoms.

Section 06 DRIVE TRAIN

Subsection 03 (REAR AXLE)



1. Wear ring
2. Tool (P/N 529 035 694)
3. Press until it bottoms

If the brake disc hub has been damaged, replace it too.

Check for distorted or enlarged locking tab. If so, replace with a new one.

Installation and Bearing Preload

It is very important to set the correct amount of preload on the brake hub nut to properly apply the preload to the rear axle bearings.

Clean splines of rear axle and hubs with pulley flange cleaner (P/N 413 711 809).

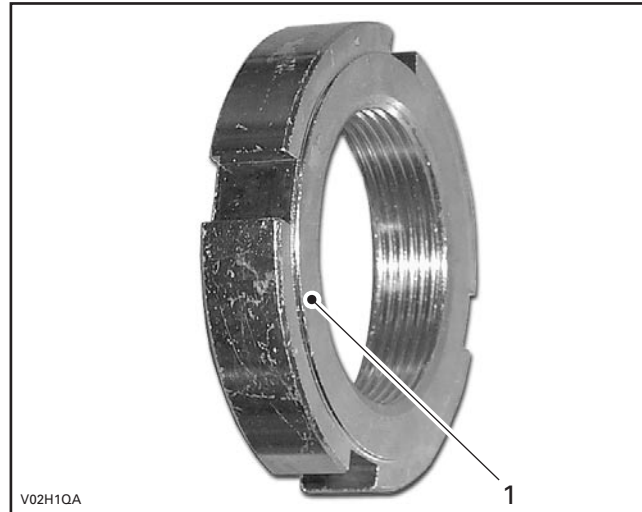
Install a new O-ring **no. 29**.

Apply synthetic grease (P/N 293 550 019) on splined region of the axle.

IMPORTANT: Do not apply grease on axle threads.

Slide the brake disc hub over the axle.

Install the nut. Pay attention to position the flanged side of nut against the hub.



1. Flanged side against brake hub

Temporarily tighten nut by hand.

Install brake caliper and tighten bolts to 25 N•m (18 lbf•ft).

Place transmission on first gear and/or apply rear brake.

Use rear axle key (P/N 529 035 951) to tighten brake hub locking nut.

Ensure to install the tool perpendicularly (90°) to torque wrench **to apply the proper torque to the nut.**

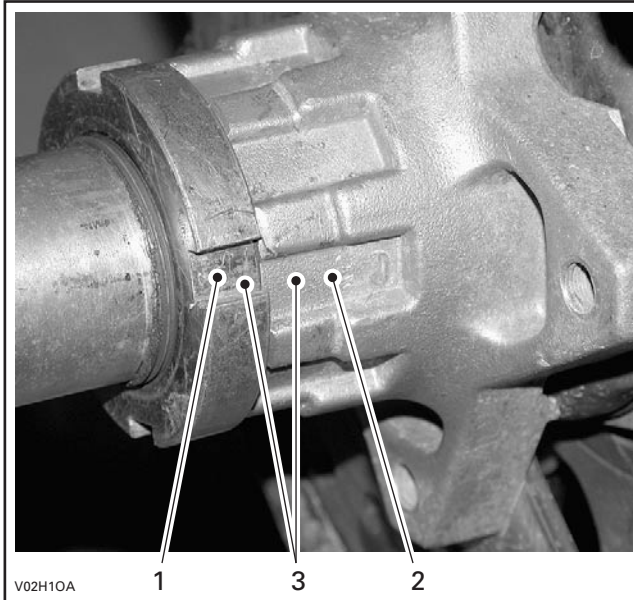


1. Tool perpendicular (90°) to torque wrench

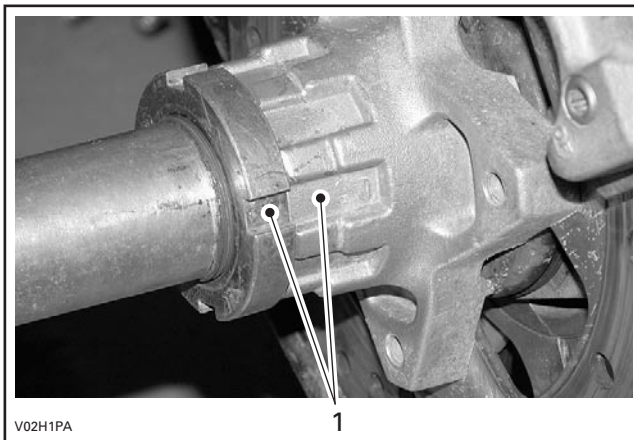
CAUTION: Not installing the tool as shown will change the torque applied to the nut. Proper torque and tightening sequence are important.

To properly set the parts, first apply a preload torque of 92 N•m (68 lbf•ft). Then, loosen nut and apply a torque of 28 N•m (21 lbf•ft).

NOTE: If slots of nut are not properly aligned with slots of disc hub, continue tightening nut until slots align without exceeding 35 N•m (26 lbf•ft).



1. Slot of nut
2. Slot of brake hub
3. If not aligned, continue tightening



1. Slots aligned. Do not exceed 35 N•m (26 lbf•ft)

Slide locking tab over nut and insert properly in slots.

Release rear brake.

Install rear wheel hub (refer to procedure mentioned above).

REAR AXLE

Removal

Lift rear of vehicle and install jack stands under the frame to support the rear of vehicle out off the ground.

Remove rear wheels.

Loosen chain. Refer to DRIVE CHAIN above.

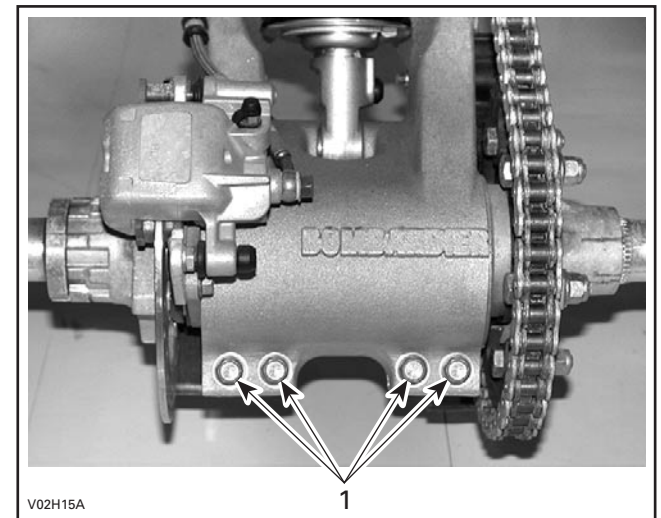
Remove the LH wheel hub **no. 3** and brake disc hub **no. 4**.

Remove protector **no. 8**.

Unscrew the 6 bolts retaining the sprocket to its sprocket hub.

Separate the sprocket from the sprocket hub and place it away with the chain over the swing arm tube. This will ease the removal and the insertion of the axle into the swing arm because the chain will not be in the way.

Loosen the locking bolts on the swing arm used to set the chain tension.



1. Rear axle lock bolts

Slide out the axle from the right side of the swing arm. If the vehicle ran with failed bearings, it may have damaged many parts around the bearing area. It is possible that the axle will not slide out easily if the bearings are seized on it.

Section 06 DRIVE TRAIN

Subsection 03 (REAR AXLE)

Inspection

Check axle for bending, torsion or other damage. Change if necessary.

Check axle for spots of rust. A spot of rust indicates a possible damage to axle. Change axle if necessary.

If bearings are seized on the axle, the axle must be replaced or its surface cleaned. Bearings must still have a slide fit on the axle, otherwise it will result in a faulty re-assembly and a failure may occur. Bearing races on the axle must be in good condition.

On sprocket hub side, check the wear ring where the seal runs. It must be in good condition. Check for grooves or excessive wear. If the ring is grooved, it must be replaced. Remove old ring and, using tool P/N 529 035 694, press a new one into place. If the sprocket hub has been damaged, replace it too.

Installation

Insert the axle assembly into the chain first, then into the swing arm from the right side.

Install the brake disc hub and wheel hub.

CAUTION: It is important to follow the preload procedure to avoid seal and bearing damage. Refer to BRAKE DISC HUB for the procedure.

Install sprocket and tighten bolts to 61 N•m (45 lbf•ft).

Install protector no. 8.

Install both rear wheels and tighten nuts to 53 N•m (39 lbf•ft) in a criss-cross sequence.

CAUTION: Always use the recommended wheel nuts (P/N 732 610 084). Using a different nut could cause damages to the rim.

Perform drive chain adjustment. Refer to DRIVE CHAIN above.

REAR SPROCKET HUB

Removal

CAUTION: Removing rear sprocket hub from rear axle will permanently damage the hub splines. Do not remove hub needlessly.

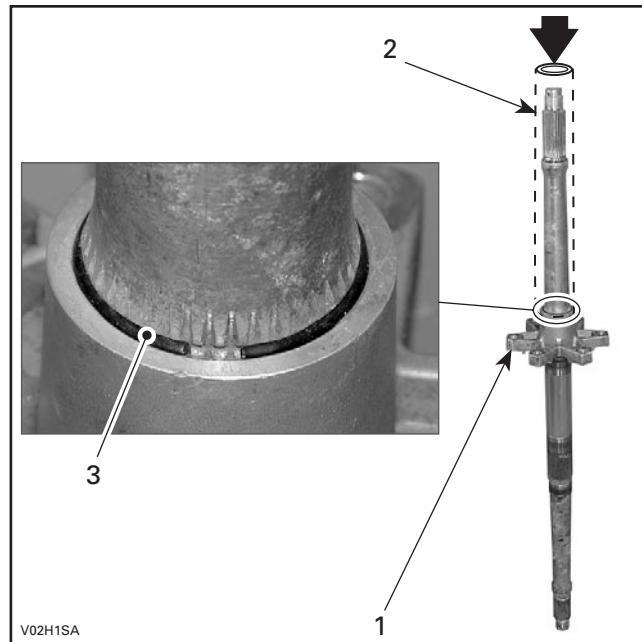
Remove rear axle. Refer to REAR AXLE below.

NOTE: The wear ring can be removed without removing the sprocket hub. Use 2 large screwdrivers each side of wear ring and pry it out. Discard ring.

Remove the RH wheel hub.

Using an appropriate steel tube as a pusher, press the hub down approximately 2 mm (.080 in) to allow C-clip removal.

NOTE: Heat sprocket hub in the center area to allow hub displacement.



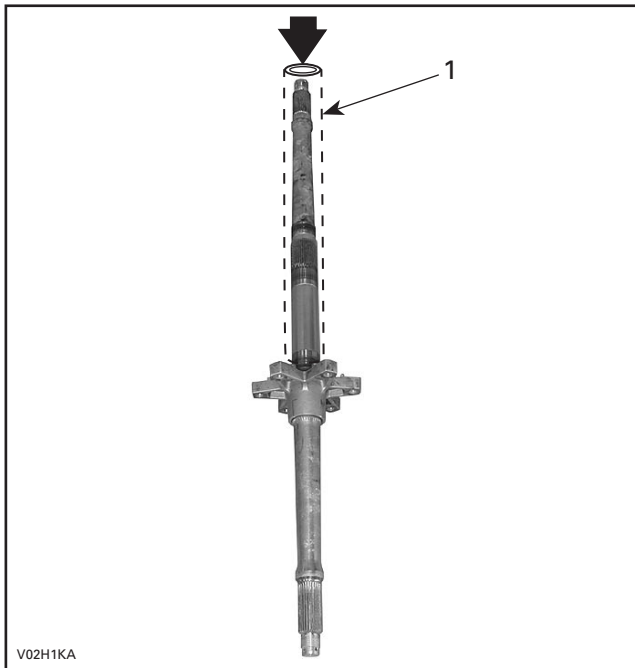
1. Rear sprocket hub
2. Steel tube used as a pusher
3. C-clip

Pull tube out and remove C-clip.

⚠ WARNING

Wear asbestos gloves to handle the parts to protect your hands from the heated parts.

Turn rear axle upside down.
Press the hub out of rear axle.



1. Steel tube used as a pusher

Discard hub.

Installation

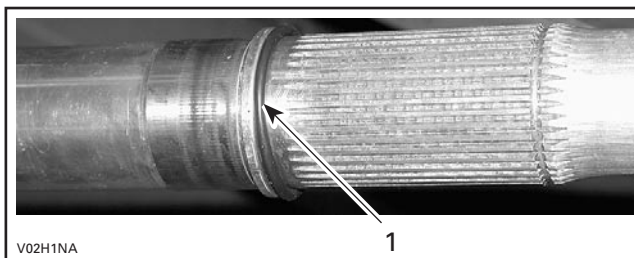
CAUTION: Never reinstall a removed sprocket hub. Always install a new one.

Install a new wear ring on sprocket hub. Using an appropriate steel tube as a pusher, press the wear ring on the hub until it bottoms.

NOTE: The wear ring could be installed after sprocket hub installation.

Clean rear axle splines with pulley flange cleaner (P/N 413 711 809).

Install a new O-ring on rear axle and properly seat against the axle flange.



1. Push the new O-ring against the flange

Apply some synthetic grease (P/N 293 550 019) on splines.

IMPORTANT: Do not apply grease on axle threads.

Using the same steel tube as for removal, press hub until the C-clip groove allows C-clip insertion.

CAUTION: Be careful not to press more than needed. Otherwise, the O-ring might be damaged.

Install C-clip.

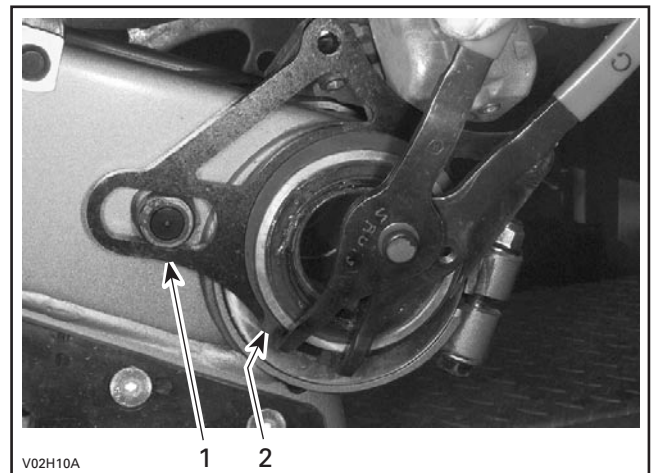
Press hub in the opposite direction until hub bottoms on the C-clip.

ECCENTRIC AXLE HOUSING

Removal

Remove the rear axle.

Remove the snap ring retaining the caliper bracket.



1. Caliper bracket
2. Snap ring

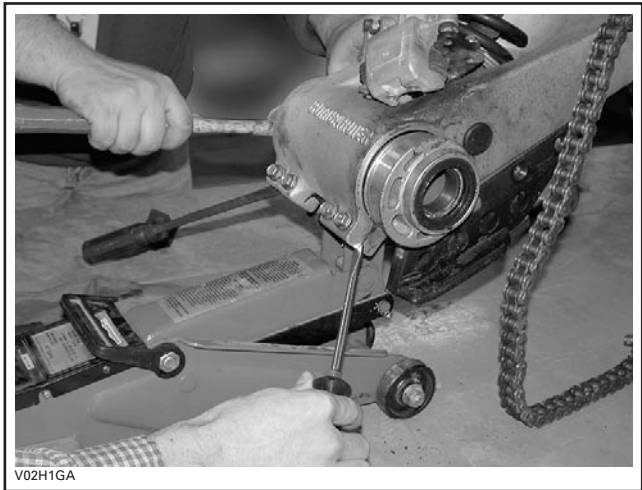
Remove the caliper bracket by pulling it out.

Slide out the eccentric axle housing from the right side of the swing arm.

Dirt inside the swing arm may cause resistance during removal procedure. Carefully spread swing arm split using screwdrivers.

Section 06 DRIVE TRAIN
Subsection 03 (REAR AXLE)

CAUTION: Be careful not to damage the seal between surfaces.



Use a soft tool to hammer out the eccentric axle housing if required. Seal leakage will occur after assembly if its bore is dented.

Inspection

Look at the eccentric axle housing for damage. The bore must be free of scratches in order to receive new bearings and seals.

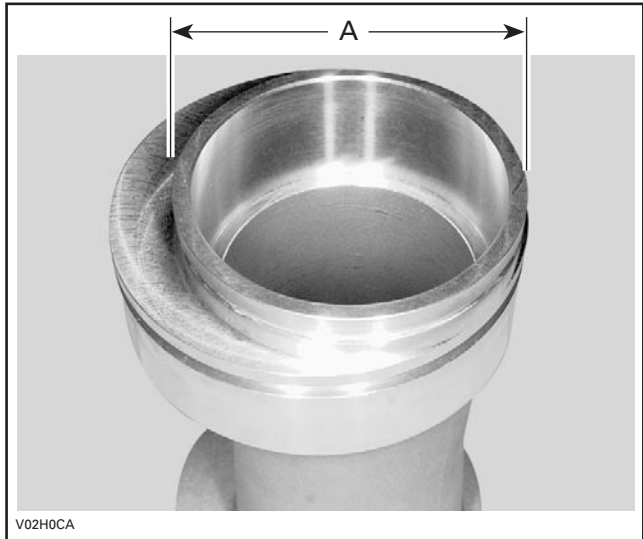
Check for worn diameter where the caliper bracket seats.

Inspect O-ring condition where the caliper bracket seats.



Inspect rubber seal condition between the split surfaces of swing arm.

ECCENTRIC AXLE LH O.D.	
SERVICE LIMIT	75 mm (2.95 in)



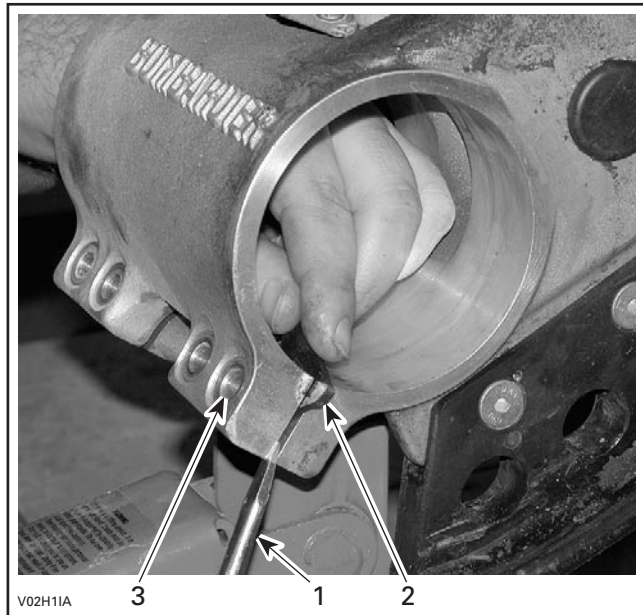
A. 75 mm (2.95 in)

Installation

Installation is the reverse of the removal.

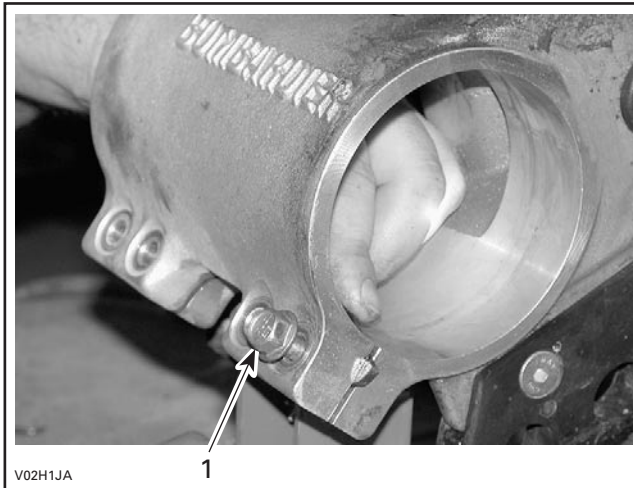
If rubber seal has been removed, install it as follows.

- Carefully spread swing arm split using a screwdriver.
- Insert seal in one corner of the split.



1. Pry here to spread the split
2. Insert seal in one corner
3. Align seal hole with swing arm hole

- Align its hole with swing arm hole then insert a screw to retain the seal in place.



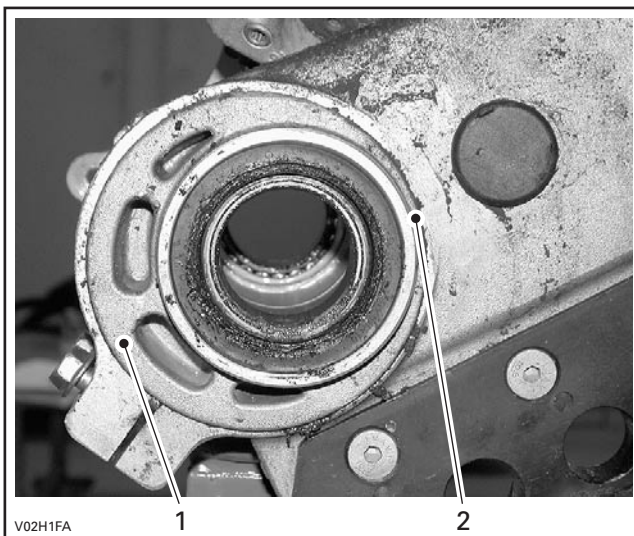
1. Install a screw to retain seal in place

- Spread the other corner of swing arm.
- Place the seal in the split.
- Install remaining screws. Keep screws loose.

Do not apply any lubricant on contact surfaces of the eccentric axle housing and swing arm. Otherwise the chain tension will not remain adjusted.

Carefully slide the eccentric axle housing in the swing arm; the snap ring groove side of the eccentric axle housing goes toward left side.

Ensure to position the eccentric as shown.



1. Eccentric axle housing
2. Position thin side here

Install caliper bracket in place.

Install the circlip into the groove of the eccentric axle housing.

NOTE: Make sure it is fully seated.

Install all other parts.

CAUTION: It is important to follow the preload procedure to avoid seal and bearing damage. Refer to BRAKE DISC HUB for the procedure.

ECCENTRIC AXLE BEARINGS

Inspection

The eccentric axle bearings should turn smoothly and quietly. If not, change the bearings.

If bearings are seized on the axle, the axle must be replaced or its surface cleaned. Bearings must still have a slide fit on the axle, otherwise it will result in a faulty re-assembly and a failure may occur. Bearing races on the axle must be in good condition.

Removal

NOTE: Bearings and seals must be replaced if removed.

Pry out drive axle seals **no. 24**. Be careful not to damage seal bore or eccentric axle housing.

Use a punch and drive bearings cup outward from opposite end of housing.

Installation

The seal and bearing must be pressed into a dry bore. Use the Pulley flange cleaner (P/N 413 711 809) to make sure the bore is free of grease where the bearing and seal go.

Place new bearings in a freezer for 10 minutes before installation.

Apply Loctite 609 (P/N 413 703 100) in axle housing on the bearing contact area. Press the new race into the eccentric axle housing. To ease the assembly, it is possible to heat the eccentric axle housing at 100°C (212°F), 30 minutes in oven.

⚠ WARNING

Clean all grease, outside and inside, from eccentric housing before putting in oven.

Using a bearing packer, pack the bearing with Bombardier Sea-Doo® bearing grease (P/N 293 550 010).

Section 06 DRIVE TRAIN

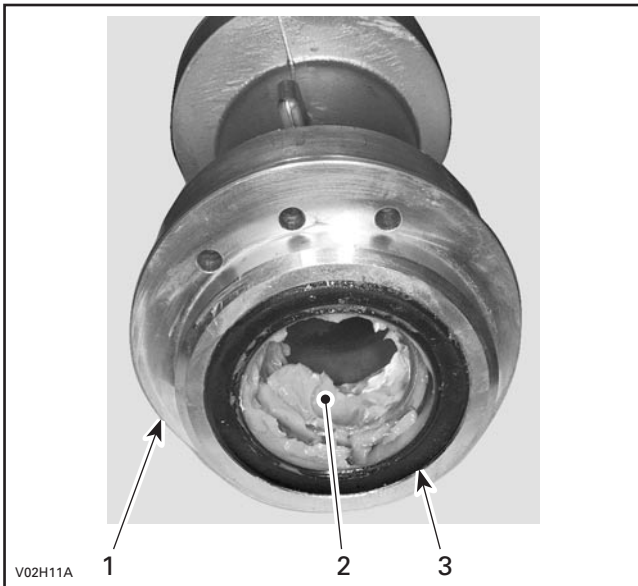
Subsection 03 (REAR AXLE)

Apply grease to the race in the eccentric axle housing.

CAUTION: If the seal is pressed into a slippery bore, it will misalign or pop out when the vehicle will be running, which will lead to bearing failure.

Press the seal in place. Properly installed, it is flush with the edge of the eccentric axle housing.

Apply grease on seal lips and fill the area between the bearing and the seal.



TYPICAL

1. Eccentric axle housing
2. Packed with grease
3. Seal installed flush with edge of eccentric axle housing

Install all other parts.

CAUTION: The preload procedure is very important to avoid seals and bearings damages. Refer to BRAKE DISC HUB for the procedure.

PROTECTORS

Removal

LH Protector

Remove brake disc hub with brake disc.

Unfasten socket head screws **no. 25**.

Remove LH protector **no. 8** from swing arm.

RH Protector

Remove:

- sprocket hub on rear hub
- socket head screws **no. 26** retaining the chain protector **no. 27** to the RH protector **no. 9**
- the other socket head screws **no. 28** retaining RH protector to swing arm
- RH protector from swing arm.

Installation

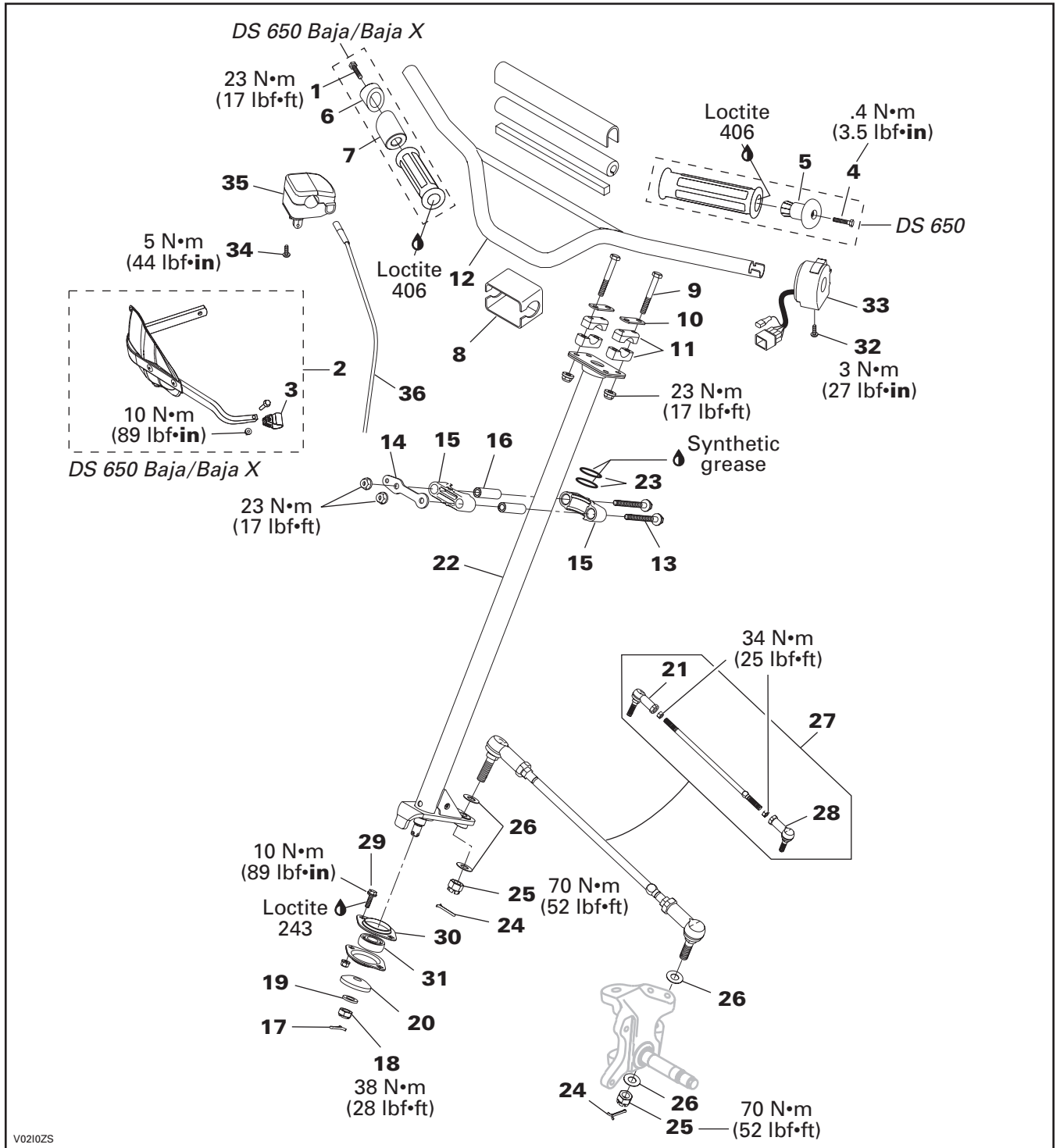
For installation, reverse the removal procedure.

CAUTION: The preload procedure is very important to avoid seals and bearings damages. Refer to BRAKE DISC HUB for the procedure.

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STEERING SYSTEM



Section 07 STEERING SYSTEM

Subsection 02 (STEERING SYSTEM)

GENERAL

For installation, use the torque values and Loctite products from the exploded views. Clean threads before using Loctite when installing the screws.

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.

HANDLEBAR GUARD

Removal

Baja and Baja X Models

Remove:

- handle grip screw **no. 1** at the end of handlebar guard **no. 2**

NOTE: Discard the handlebar grip screw.

- handlebar guard arm bracket **no. 3**.

Installation

The installation is the reverse of removal procedure.

NOTE: Install a new handlebar grip screw.

HANDLEBAR GRIP

Removal

DS 650 Models

Remove:

- throttle lever and/or multi-function switch from handlebar
- screw **no. 4**
- end cap **no. 5**.

Baja and Baja X Models

Remove:

- handlebar guard **no. 2**
- adjusting sleeve **no. 6**
- tightening sleeve **no. 7**.

All Models

NOTE: If handlebar grip needs to be replaced, the grip can be cut with a knife for removal.

Insert the open side of a 23 mm (7/8 in) wrench against the inner end of grip.

Using a plastic hammer, tap on the side of the wrench end to make the grip sliding out.

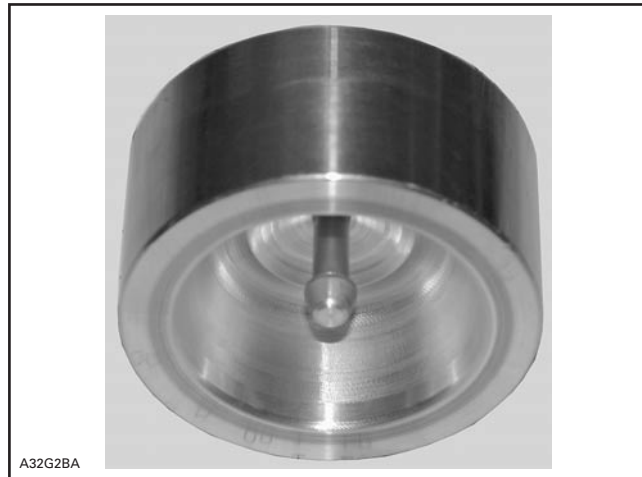
Installation

Clean handlebar ends and inside of handlebar grip with pulley flange cleaner (P/N 413 711 809). Let dry before installation.

WARNING

Handlebar end and inside of handlebar grip must be clean and dry before installing handlebar grip to ensure proper installation.

Use the insertion tool (P/N 529 035 897) to properly install handlebar grip.



CAUTION: Installing handlebar grip without the special tool is likely to damage it.

Position the insertion tool at the outside end of grip.

Using a plastic hammer, tap on tool to push grip on. Continue to tap until grip bottoms.

Install all other removed parts.

HANDLEBAR

Removal

Remove:

- steering cover **no. 8**
- steering clamp mounting bolts **no. 9**, reinforcements **no. 10** and steering clamps **no. 11**
- handlebar **no. 12**.

NOTE: Remove throttle lever, multi-function switch and handlebar guards from the handlebar if it is replaced with a new one.

Inspection

Inspect the handlebar for damage, cracks or bending, replace if any problem is detected.

Installation

For the installation, reverse the removal procedure.

STEERING COLUMN

Removal

Top Side

Remove:

- front facia and dashboard (refer to BODY)
- handlebar
- fuel tank (refer to FUEL CIRCUIT)

NOTE: Do not remove fuel tank completely, separate fuel tank from frame only. Do not remove fuel lines.

- headlamp (refer to ACCESSORIES)
- oil tank (refer to REMOVAL AND INSTALLATION)
- half housing bolts **no. 13**
- stopper plates **no. 14**
- half housings **no. 15**
- housing bushings **no. 16**.

Bottom Side

Remove:

- cotter pin **no. 17** (discard)
- castellated nut **no. 18**
- flat washer **no. 19**
- washer **no. 20**
- tie-rod ends **no. 21** from the steering column **no. 22**. Refer to TIE-ROD section.

Pull steering column.

Inspection

Inspect steering column for cracks, bending or other damages. Replace if any problem is detected.

Check if the O-rings **no. 23** are brittle, hard or otherwise damaged. Replace if necessary.

Check steering column bearing for excessive play and smooth operation. Replace if necessary. See further in this section for the proper procedure.

Installation

For the installation, reverse the removal procedure.

NOTE: Install new cotter pin. Both ends of cotter pin must be folded.

TIE-ROD

Removal

Place the vehicle on jack stands and remove front wheel(s).

Remove front fender with fender support. Refer to BODY.

Remove cotter pins **no. 24** (discard), castellated nuts **no. 25** and hardened washers **no. 26**.

Remove tie-rod **no. 27**.

CAUTION: Never tap the knuckle with a hammer.

Inspection

Inspect tie-rod ends **no. 21** and **no. 28** for wear or looseness, if excessive, replace.

Check for cracks on rubber boot.

Installation

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

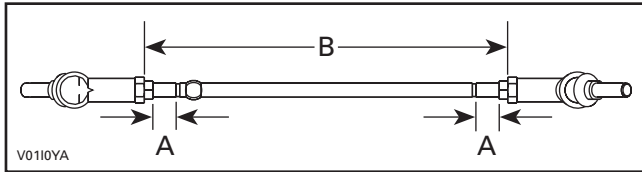
At the time of the reinstallation or the new tie-rod(s) installation, screw threaded end of tie-rod into ball joint.

NOTE: Match the corresponding left or right threads of tie rod end with ball joint.

Section 07 STEERING SYSTEM

Subsection 02 (STEERING SYSTEM)

The maximum length for tie-rod groove to ball joint end must be the value **A** in the following chart:



MODEL		A	B
DS	mm	20 ± 5	311 ± 1
	in	25/32 ± .197	12-1/4 ± .039

Before installing tie-rods, ensure that both heads of tie-rod ends are aligned. If the heads are not aligned, the tie-rod end play and its durability will be greatly reduced.

Install new cotter pin. Both ends of cotter pin must be folded.

Perform the toe-out adjustment.

Toe Adjustment

Place vehicle on level surface.

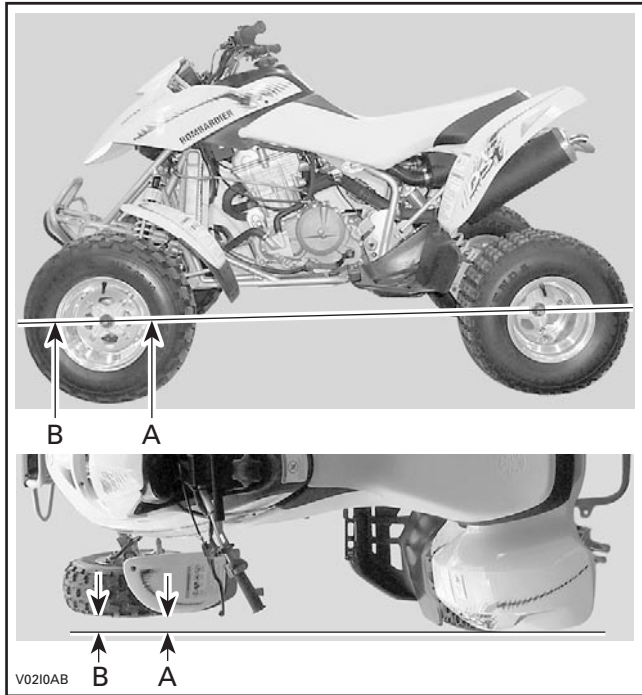
Check that handlebar is straight.

Use a long rule and check if the rear and front wheels are aligned.

Adjust alignment with tie-rod.

Adjust toe-out to 0.5 ± 0.5 mm (.0197 ± .0197 in) on each side.

NOTE: Take measure on the rim.



A - B = 0.5 ± 0.5 mm (.0197 ± .0197 in) on each side

STEERING COLUMN BEARING

Removal

Place vehicle on jack stands and remove front wheels.

Remove steering column.

Remove bolts **no. 29** and first bearing flange **no. 30**.

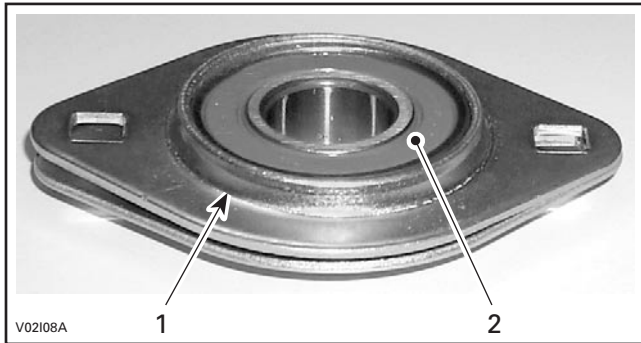
Remove bearing **no. 31**.

Installation

For installation, reverse the removal procedure.

Pay attention to the following detail.

Place flanged collar toward outside.



1. Flanged collar
2. Bearing

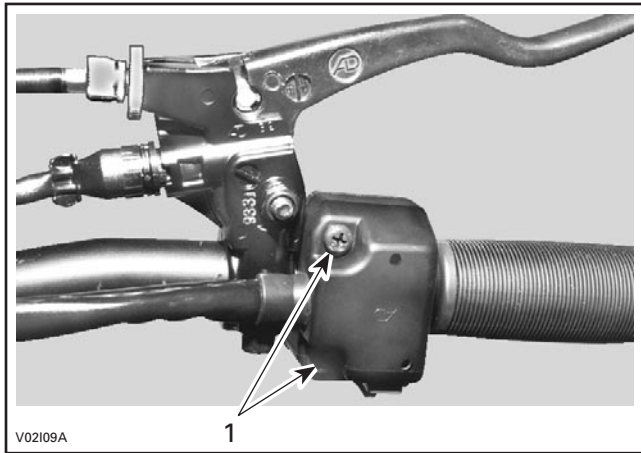
MULTI-FUNCTION SWITCH

Test

Refer to ACCESSORIES.

Removal

Remove screws **no. 32** under multi-function switch **no. 33**.



TYPICAL
1. Remove the screws

Separate multi-function switch from handlebar.
Remove front fascia. Refer to BODY.
Unplug multi-function switch connector.

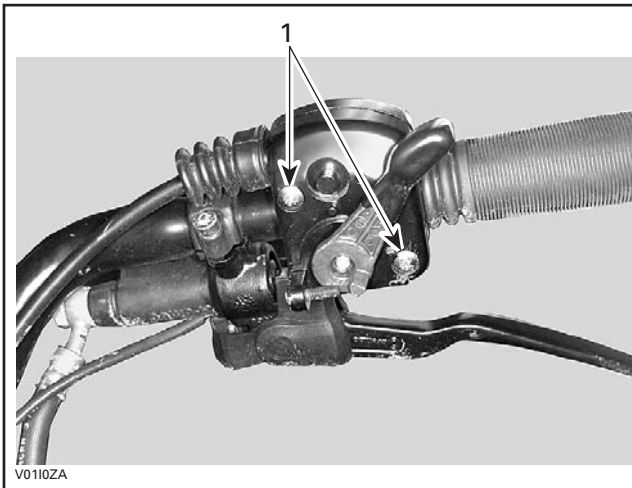
Installation

For installation, reverse the removal procedure.

THROTTLE HANDLE

Removal

Remove screws **no. 34** under throttle handle **no. 35**.

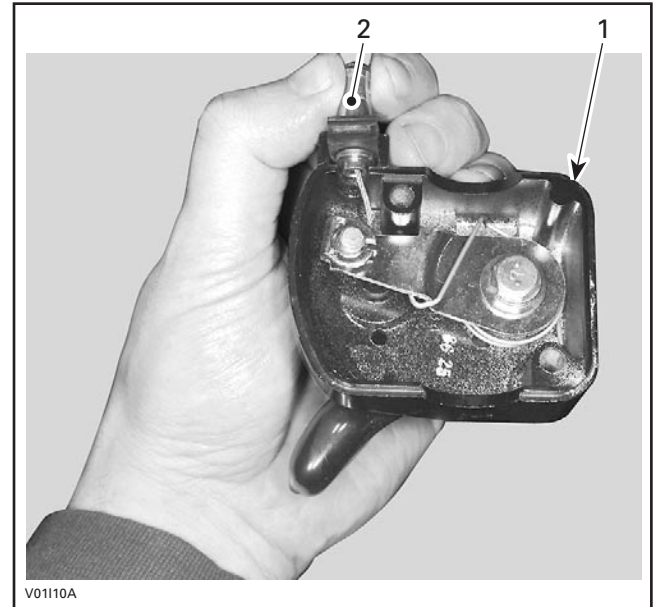


TYPICAL

1. Remove screws

Separate throttle handle from handlebar.

Unscrew the locking nut of the cable adjuster then screw the adjuster to release the cable tension.
Remove throttle cable **no. 36** from housing.



TYPICAL

1. Throttle handle housing
2. Throttle cable

Slide cable in clip slot and remove the end of the cable from clip.

Installation

For installation, reverse the removal procedure.

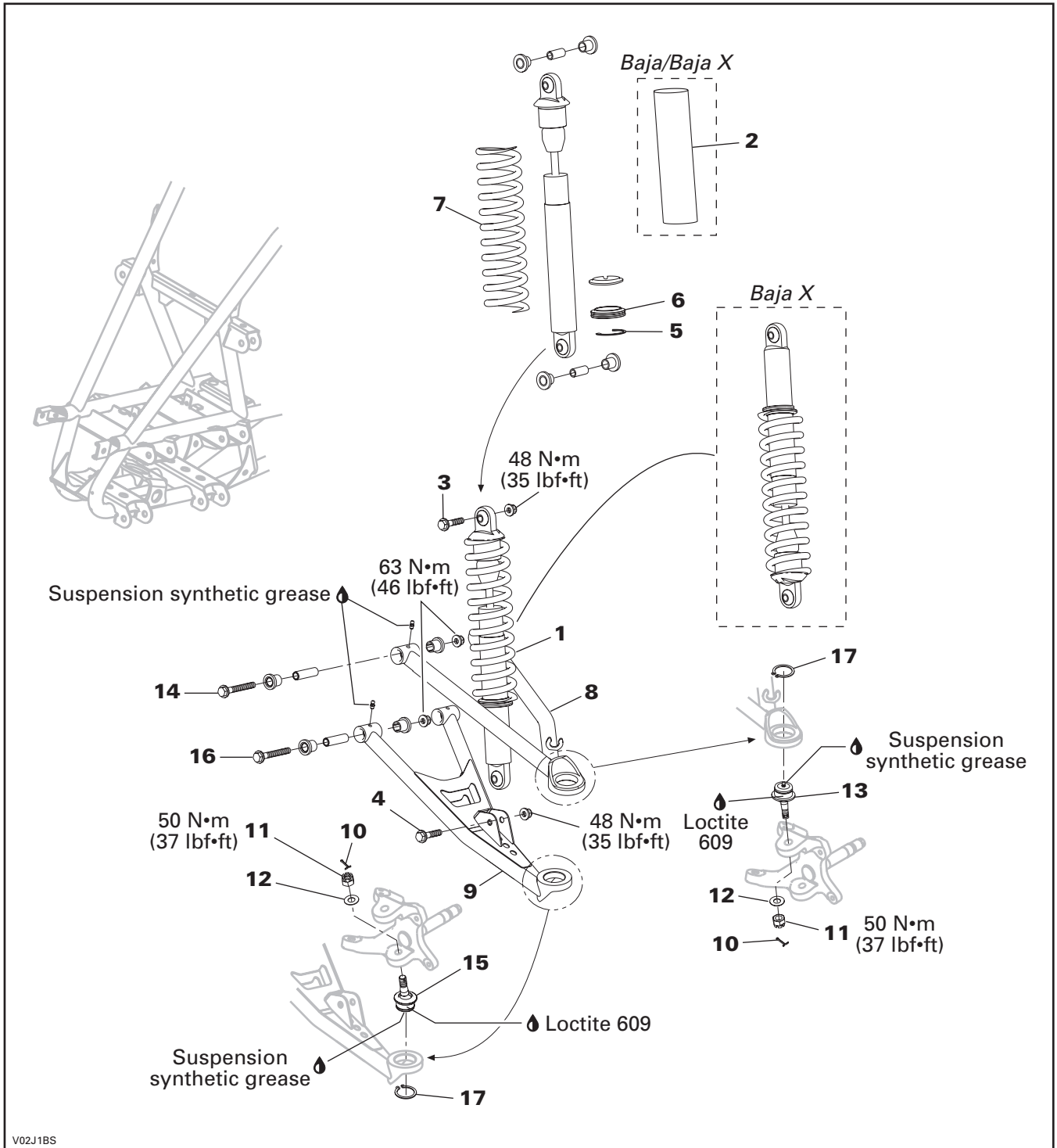
Refer to CARBURETOR AND AIR INTAKE SILENCER for adjustment procedure.

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FRONT SUSPENSION



Section 08 SUSPENSION

Subsection 02 (FRONT SUSPENSION)

GENERAL

CAUTION: The Baja and Baja X models are equipped with shocks absorber protectors. Open or remove them if the vehicle is used intensively or if the ambient temperature is high. Otherwise, shock absorber performance degradation or damage can occur.

NOTE: On Baja X models, do not remove the shock absorber protectors if the vehicle is used in a stony area.

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 (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.

CAUTION: When reinstalling the brake line, install new screws with regular M6 threads. Reinstalling self-tapping screws would damage the A-arm threads.

SHOCKS ABSORBER ASS'Y

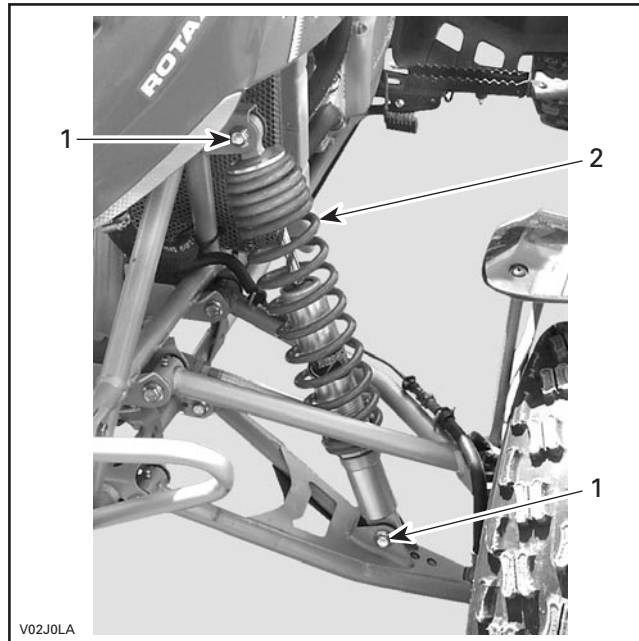
Removal

Lift front of vehicle and install jack stands under the frame to support the vehicle off the ground.

NOTE: Lift up vehicle high enough to have the wheel off the ground.

On **Baja** and **Baja X** models, remove the shock absorber protector **no. 2**.

Remove lower bolt **no. 4** then upper bolt **no. 3** of shock.



1. Remove bolts
2. Front shock assembly

Disassembly

WARNING

The shock absorber on **Baja X** models contains high pressure nitrogen gas. **Do not attempt to disassemble before removing the pressure.** Dispose of gas and oil as per your local environmental regulations.

Remove snap ring **no. 5** under spring seat **no. 6**.

Unscrew the spring seat completely and remove the spring **no. 7**.

Inspection

Inspect the spring for damage. Replace if necessary.

Inspect shock for oil leakage. Extend and compress the piston several times over its entire stroke.

Check piston rod for excessive wear or pitting.

Check that it moves smoothly and with uniform resistance with its rod upwards. Any of the following conditions will denote a defective shock:

- A skip or hang back when reversing stroke at mid travel.
- Seizing or binding condition 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.
On both ends, check the bushings for excessive wear or other damages. Replace bushings in pair.

Assembly and Installation

For assembly and installation, reverse the disassembly and removal procedures. Pay attention to the following details.

Extend the piston before installing spring, spring seat and snap ring.

On **Baja and Baja X models**, reinstall the shock protector, make sure not to block venting holes.

On **Baja X models**, reinstall piston rod of shock absorber to the bottom lower A-arm.

Adjustment

WARNING

Adjust both springs to the same load. Uneven adjustment can cause poor handling and loss of stability, and/or control, and increase the risk of an accident.

Preload Adjustment

Shorten the spring for a firmer ride and rough road condition.

Lengthen the spring for a light load and a smooth road condition.

SHOCK ABSORBER REBUILDING

Baja X Models

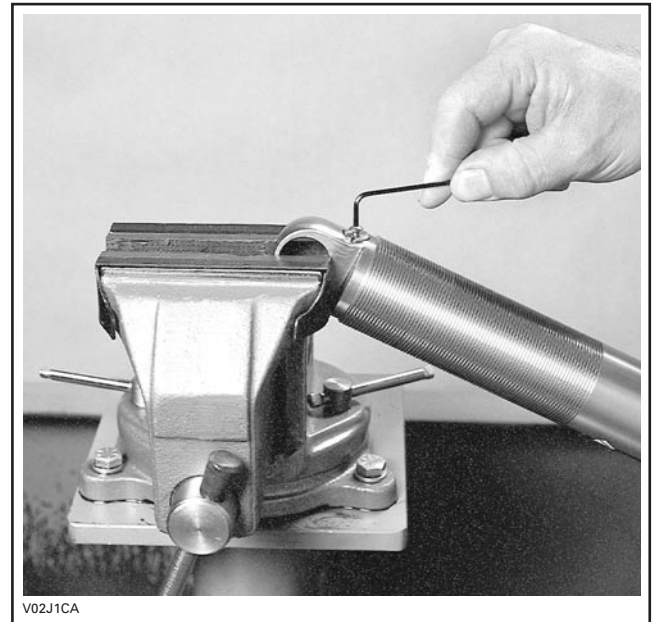
Remove spring and adjuster. See SHOCK ABSORBER ASS'Y above.

Disassembly

Clean all the parts prior to disassembling.

Tightly secure the shock absorber bottom eyelet in a vise with soft jaws.

CAUTION: Never clamp on shock absorber body.
Remove screw on top of valve.



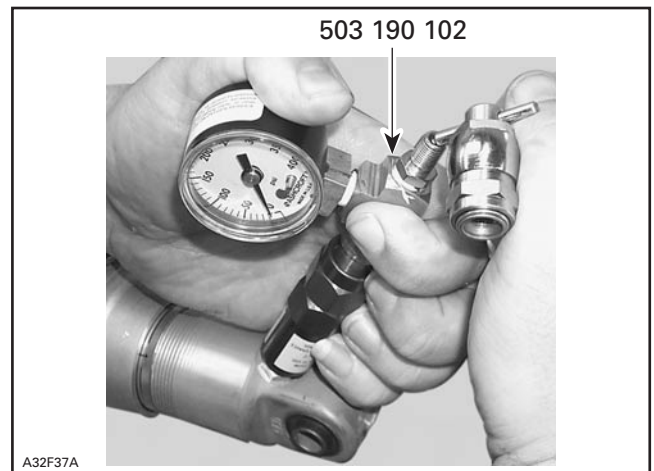
Place the needle guide of gas refill needle type shock tool (P/N 503 190 102) on the shock valve.

WARNING

Whenever working with high pressure gas, use eye wear protection. Never direct gas pressure toward anybody. Allow gas to escape before removing components.

Press the detente pin and push forward the needle assembly very slowly towards rubber of needle valve.

Push on shock tool valve center rod to release gas pressure.



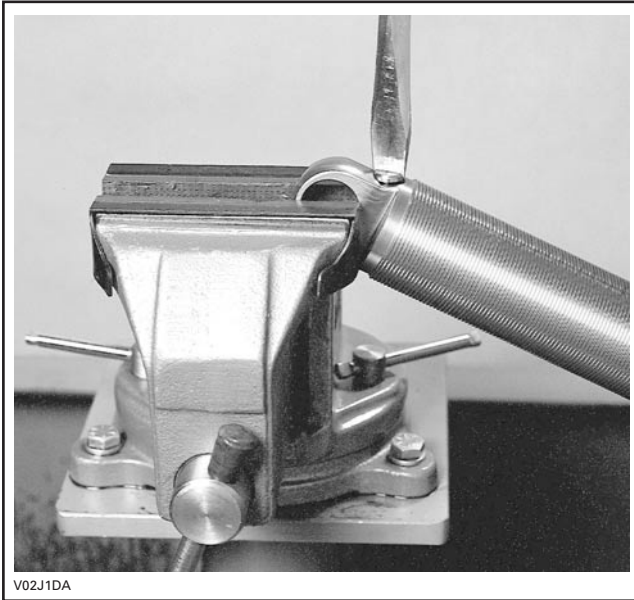
Section 08 SUSPENSION

Subsection 02 (FRONT SUSPENSION)

NOTE: If an oil mist occurs, it is an indication of a faulty sealing of the floating piston either caused by wear of shock absorber or floating piston sealing.

Remove tool from shock.

Remove valve from shock absorber.



Using an appropriate open wrench, unscrew shock absorber seal carrier cover.



Gently pull piston rod out. Remove slowly to reduce oil spillage and prevent piston seal damage on body threads. Wrap body in a rag to capture oil overflow while removing piston rod.

Empty oil from shock absorber. Ensure to dispose oil according to your local environmental regulations.

Remove floating piston as follows.

Hold a rag over shock absorber end to catch floating piston. Allow room for parts to leave shock absorber. Using compressed air pressure in valve hole, carefully push piston out.



Clean inner walls of shock absorber and reservoir with pulley flange cleaner (P/N 413 711 809). Be careful not to splash O-rings, piston and seals etc. Dry parts with compressed air.

Inspection

Check the following:

- Compression bumpers for chipping, cracking or missing.
- O-rings for nicks, cuts or cracks.
- Piston rod for straightness, wear, nicks or burrs.
- Seal carrier and rod seals.
- Piston seal ring for wear.
- Valve discs for kinks or waves.
- Inner walls of shock absorber and reservoir for scratches, burrs or excessive wear.
- Floating piston seal for wear, cuts, chipped or nicked edges.
- Inner wall of shock absorber for excessive wear in working area of floating piston.

Replace any defective/worn part.

Valving

Rebound stack:

Ø32 x t0.30

Ø28 x t0.30

Ø25 x t0.15

Ø18 x t0.10

Compression stack:

Ø28 x t0.38

Ø32 x t0.30

Ø33 x t0.25

Ø18 x t0.30

Ø33 x t0.3

Piston:

1 - Ø2.4

Assembly

Tightly secure the shock absorber base in a vise with soft jaws.

Apply shock absorber oil on floating piston seal.

Reinstall floating piston into damper body (ensure that valve is still removed).

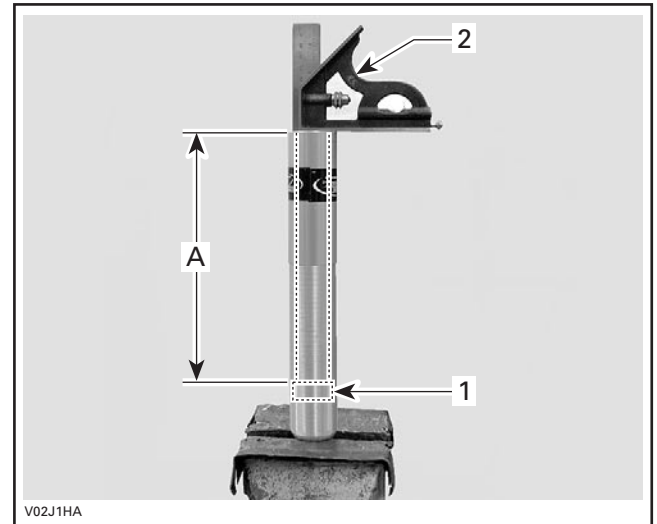
Ensure to install hollow side of piston as shown.



1. Hollow side here

CAUTION: Failure to install floating piston correctly could result in shock damage.

Using a machinist square, position floating piston at 204 mm (8.0 in) from top.



1. Floating piston
2. Machinist square
A. 204 mm (8.0 in) from top

Apply grease on O-ring and reinstall valve.

Bleeding

Pour Ryde FX slide high performance lube (P/N 503 190 103) in shock absorber. Fill shock absorber up to bottom of threads.

CAUTION: Use new oil only. Do not reuse the same oil. Do not use any other oil.

Allow a few minutes for air bubbles to surface.

NOTE: Although we do not measure the exact amount of oil added, approximately 185 mL (6.3 U.S. oz) will be used.

Wrap shock absorber in a rag to capture oil overflow while installing piston rod.

Apply shock absorber oil on piston seal ring.

Carefully insert piston rod in shock absorber.

CAUTION: Pay attention not to damage piston seal on shock absorber threads.

Push seal carrier down, close to piston.

Section 08 SUSPENSION

Subsection 02 (FRONT SUSPENSION)

Slowly push piston into shock absorber to prevent displacement of the floating piston. Apply a short stroke of slight up and down movement to allow air to pass through piston stack assembly.

Gently tap with a clean soft hammer on the shock eye to dislodge air trapped in the submerged piston.



Be careful not to drive the shaft any deeper into the oil than it is necessary to just cover the shim stack. Be also careful to maintain oil above piston stack. Otherwise repeat the operation.

Seal carrier assembly can now be screwed into body. This should be done slowly to minimize floating piston displacement.

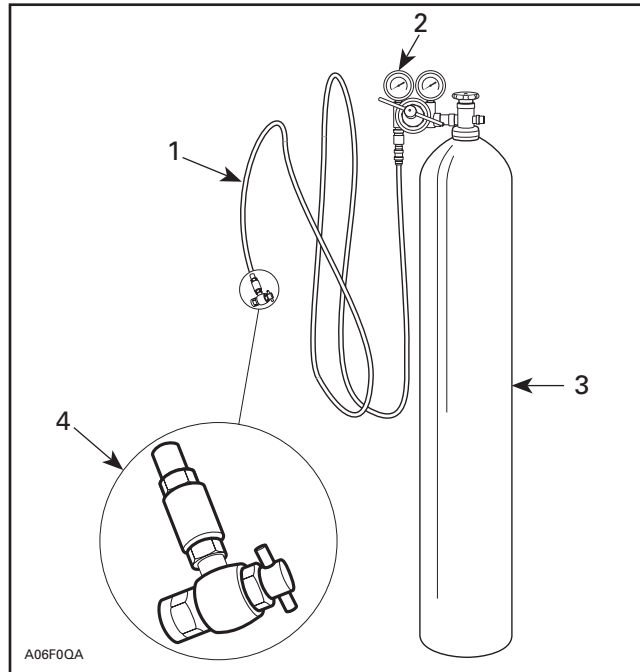
After the seal carrier is completely installed, avoid pushing the piston rod into the body until the nitrogen charge is added.

Using an appropriate open wrench, torque seal carrier cover to 75 N•m (55 lbf•ft).

WARNING

Do not use any other type of gas than Nitrogen (N₂).

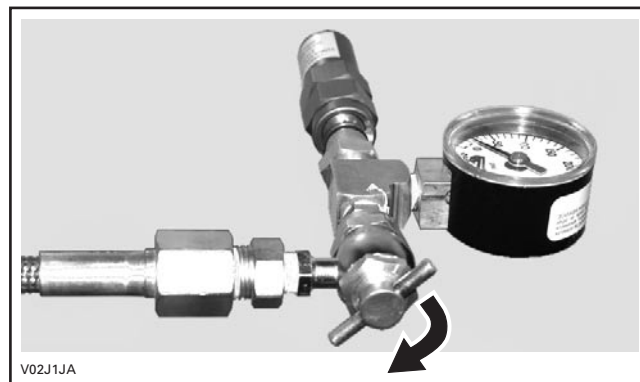
Use the gas shock valve tool (P/N 529 035 570) and tightly install it to the nitrogen tank.



1. High pressure hose
2. Two stage regulator
3. High pressure cylinder filled with industrial grade nitrogen (N₂)
4. Gas shock valve tool

Proceed as follows:

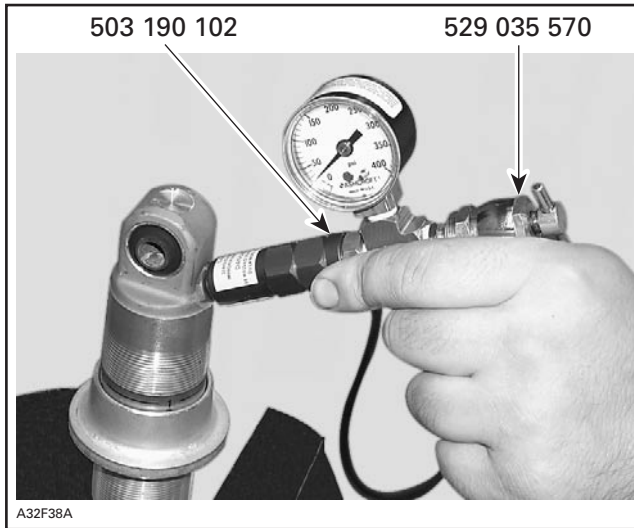
1. Adjust nitrogen tank regulator to 0 kPa (0 PSI).
2. Install the gas refill needle type shock tool (P/N 503 190 102) on gas shock valve tool
3. Turn tappet valve of gas shock valve tool clockwise up to the end.



4. Place the needle guide of gas refill tool on the shock valve. While depressing the detente pin of the gas refill tool and pushing forward the needle assembly, insert the needle through the rubber core of the pressure valve assembly of the shock. Ensure to firmly keep the tool sat squarely on shock valve.

Section 08 SUSPENSION

Subsection 02 (FRONT SUSPENSION)



NOTE: For replacement of the needle or filling the shock, carefully follow the instructions provided with the gas refill needle type tool kit (P/N 503 190 102).

5. Open nitrogen tank valve and gradually set pressure of regulator to 2068 kPa (300 PSI), this gas pressure will restore the correct pressure of the shock absorber.

WARNING

Stay away from shock absorber when applying pressure to avoid possible projected out components that might have been improperly installed.

CAUTION: Do not exceed the recommended pressure value.

6. Wait a little so that pressure stabilizes.
7. Unscrew tappet valve of gas shock valve tool counterclockwise.
8. Quickly pull off the refill needle type shock tool from shock absorber valve.
9. Close nitrogen tank valve.

Shock absorber gas pressure cannot be confirmed by using a pressure gauge. The volume of gas in the shock is very small, and the amount lost during gauge installation will lower the pressure too much and would require refilling.

Carefully inspect shock absorber for gas or oil leaks. Any leak must be corrected before continuing.

Stroke the piston rod to ensure full travel and smooth compression and rebound action. If the shaft moves in or out erratically or if you hear a gurgling sound, this could indicate air is trapped inside. If the piston rod does not move or has partial travel then it may be hydraulically or mechanically locked. In either event the shock must be rebuilt again.

Reinstall screw on top of valve.

Reinstall spring and adjuster then perform adjustments. See SHOCK ABSORBER ASS'Y.

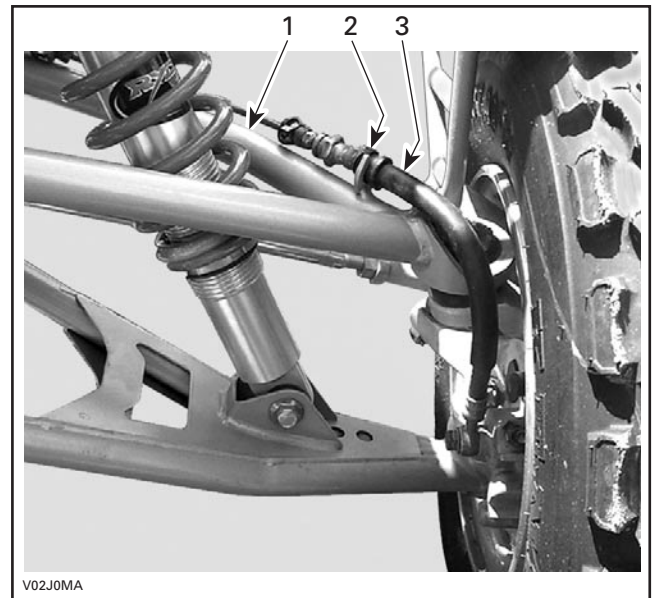
UPPER A-ARM

Removal

NOTE: Both upper **no. 8** and lower **no. 9** A-arms can be removed without removing the tie rods.

Detach brake hose from upper A-arm.

Discard screws.



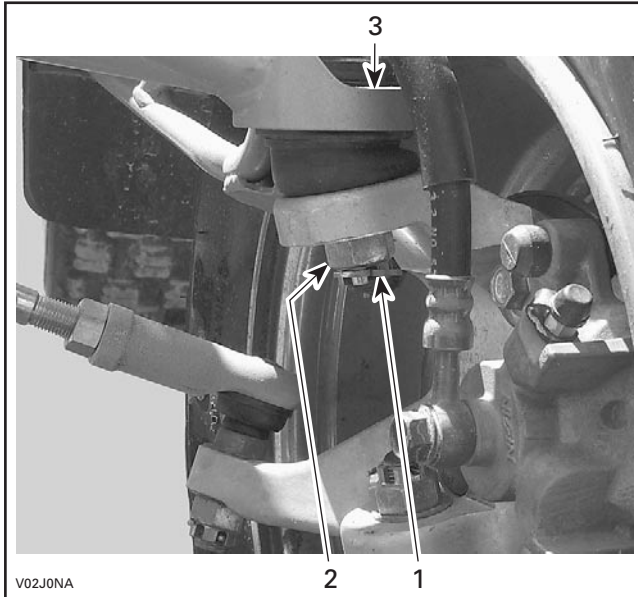
TYPICAL

1. Upper A-arm
2. Detach brake hose from tubing
3. Brake hose

Section 08 SUSPENSION

Subsection 02 (FRONT SUSPENSION)

Remove cotter pin no. 10 (discard), castellated nut no. 11 and hardened washer no. 12 from upper ball joint no. 13.



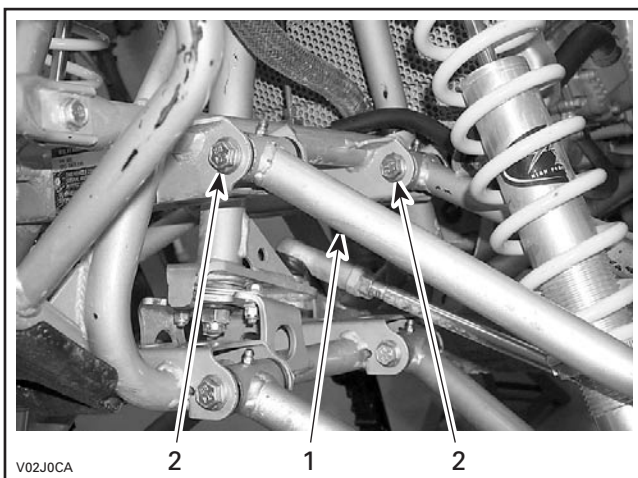
1. Remove cotter pin
2. Castellated nut
3. Upper ball joint

Remove wheel(s).

Use a ball joint remover and detach upper A-arm from knuckle.

CAUTION: Never tap the knuckle with a hammer.

Remove bolts no. 14 retaining upper A-arm to frame.



1. Upper A-arm
2. Remove bolts

Remove upper A-arm no. 8 from vehicle.

Inspection

Check upper A-arm for cracks, pitting, distortion or other damages. Replace as required.

Inspect pivot bushings for wear or damages.

Replace pivot bushings if necessary.

Check ball joint bellows on upper A-arm for cracks or any other damage and inspect ball joint stud for damages. Ensure stud is moving freely. Refer to BALL JOINT section below.

Installation

Position upper A-arm and install bolts no. 14 and nuts.

Torque nuts to 63 N•m (46 lbf•ft).

Attach upper A-arm to knuckle. Install hardened washer no. 12 and castellated nut no. 11.

Tighten castellated nut to 50 N•m (37 lbf•ft) and further tighten until its grooves align with cotter pin hole.

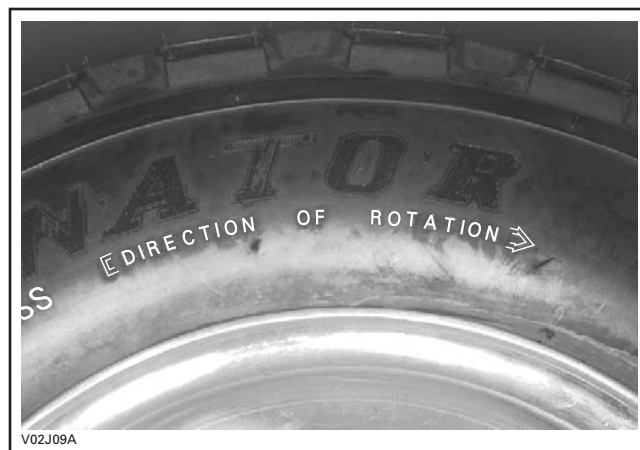
Install a new cotter pin. Both ends of cotter pins must be folded.

Secure brake hose to upper A-arm.

CAUTION: When reinstalling the brake line, install new screws with regular M6 threads. Reinstalling self tapping screws would damage the A-arm threads.

Install wheel(s).

NOTE: Do not interchange left and right tires. Check direction of rotation mark on tires.



DIRECTION OF ROTATION

Torque wheel nuts to 53 N•m (39 lbf•ft) in a criss-cross sequence.

Grease each A-arm pivot.

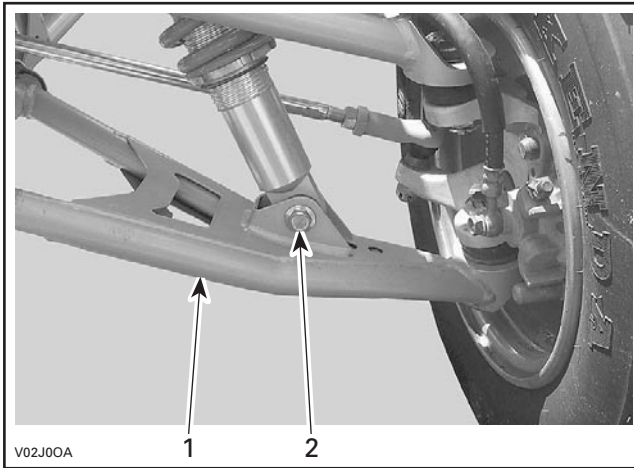
LOWER A-ARM

Removal

Remove cotter pin **no. 10** (discard), castellated nut **no. 11** and hardened washer **no. 12** retaining lower A-arm **no. 9** to ball joint **no. 15** on the knuckle.

Remove wheel(s).

Remove bolt **no. 4** retaining the shock absorber **no. 1** to lower A-arm **no. 9**.



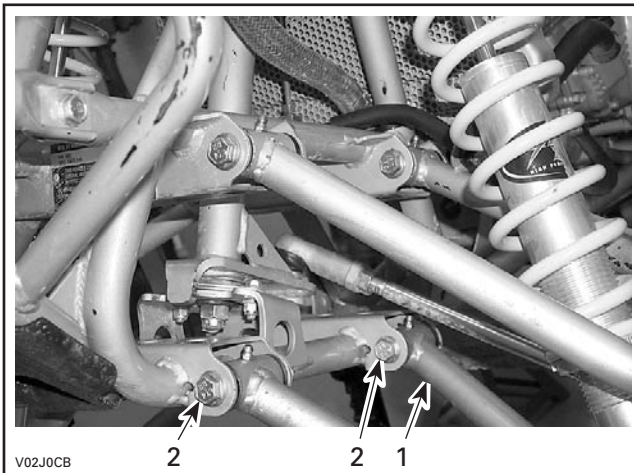
1. Lower A-arm
2. Remove nut and bolt

Use a ball joint remover and detach knuckle from the lower A-arm.

CAUTION: Never tap the knuckle with a hammer.

Remove A-arm protector (if so equipped).

Remove nuts and bolts **no. 16** retaining lower A-arm to frame.



1. Lower A-arm
2. Remove nuts and bolts

Remove lower A-arm from vehicle.

Inspection

Check lower A-arm for cracks, distortion or other damages. Replace as required.

Inspect pivot bushings for wear or damages.

Replace pivot bushings if necessary.

Check ball joint bellows on lower A-arm for cracks or any other damage and inspect ball joint stud for damages. Ensure stud is moving freely. Refer to BALL JOINT section below.

Installation

For assembly, reverse the disassembly procedure. However, pay attention to the following.

Position lower A-arm and install bolts **no. 16** and nuts.

Torque nuts to 63 N•m (46 lbf•ft).

Attach lower A-arm to knuckle. Install hardened washer **no. 12** and castellated nut **no. 11**.

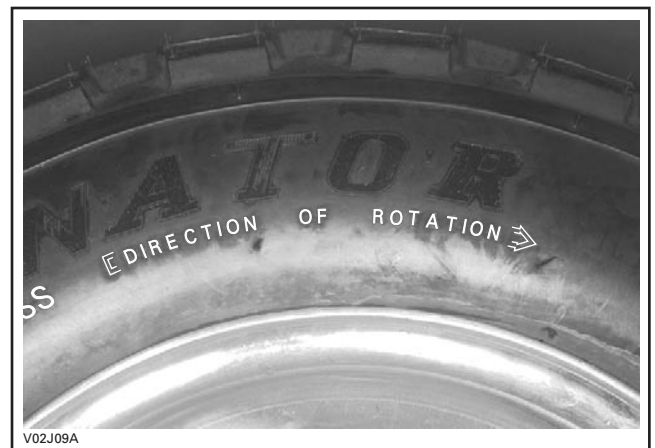
Reinstall A-arm protector (if so equipped).

Tighten castellated nut to 50 N•m (37 lbf•ft) and further tighten until its grooves align with cotter pin hole.

Install a new cotter pin. Both ends of cotter pins must be folded.

Install wheel(s).

NOTE: Do not interchange left and right tires. Check direction of rotation mark on tires.



DIRECTION OF ROTATION

Torque wheel nuts to 53 N•m (39 lbf•ft) in a criss-cross sequence.

Grease each A-arm pivot.

Section 08 SUSPENSION

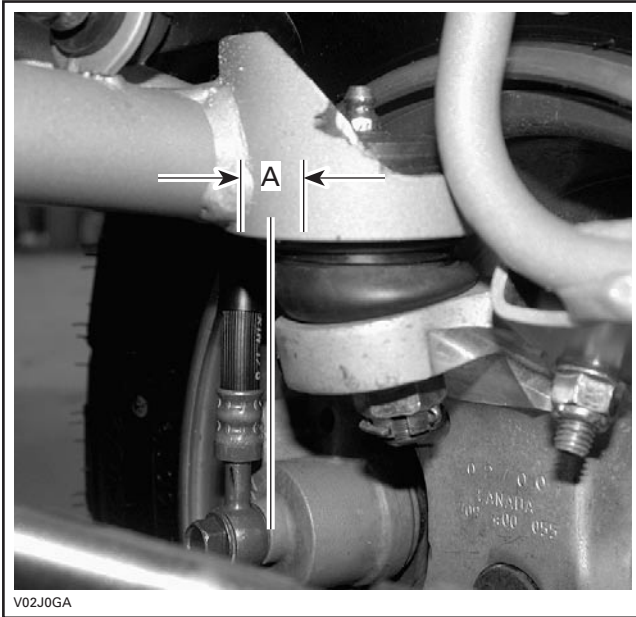
Subsection 02 (FRONT SUSPENSION)

BALL JOINT

Inspection

Upper Ball Joint

Take the top of tire and check upper ball joint lateral play, by push and pull. The maximum lateral play should be 1.5 mm (.060 in). If the lateral play is out of specification, change the ball joints **no. 13**.



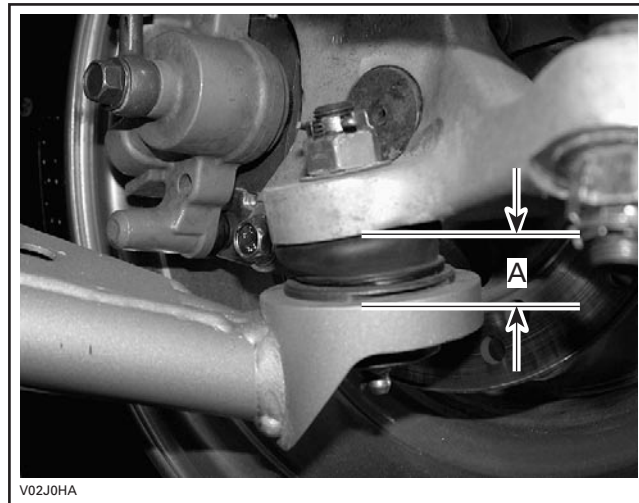
UPPER BALL JOINT LATERAL PLAY

A. Maximum lateral play 1.5 mm (0.060 in)

Lower Ball Joint

Place a jack under A-arm and raise vehicle high enough to have the wheel off the ground.

Take tire by the bottom and lift it up. The maximum axial play should be 1.5 mm (.060 in). If the axial play is out of specification, change the lower ball joints **no. 15**.

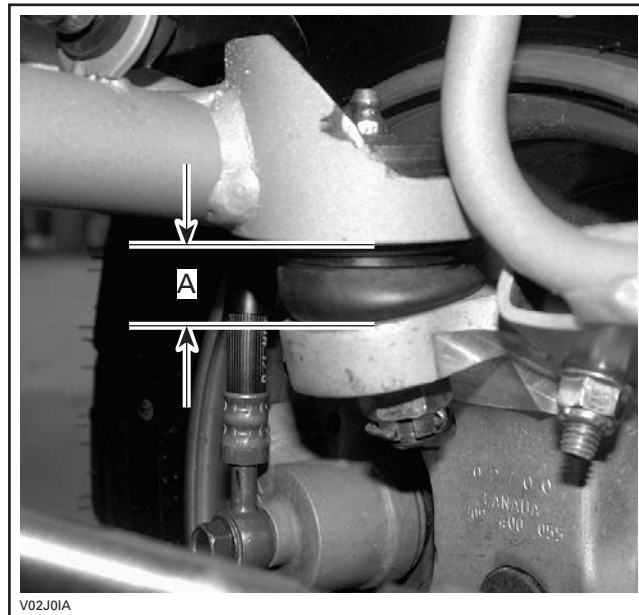


LOWER BALL JOINT AXIAL PLAY

A. Maximum axial play (measurement A + 1.5 mm (.060 in))

Upper Ball Joint

Move the upper A-arm vertically. The maximum axial play should be 1.5 mm (.060 in). If the axial play is out of specification, change the upper ball joints.



UPPER BALL JOINT AXIAL PLAY

A. Maximum axial play (measurement A + 1.5 mm (.060 in))

Check ball joint bellows for cracks or any other damage and inspect ball joint stud for damages. Ensure stud is moving freely. Replace ball joint if necessary.

NOTE: It is recommended to change both left or right ball joints at the same time.

Install a new circlip.

Removal

Remove upper or lower A-arm.

Remove the circlip no. 17.

Extract the ball joint.

Installation

CAUTION: The ball joints have an oblong shape and therefore must be properly installed in their oblong openings in the A-arms. Use the appropriate template, supplied at the end of this section to ensure proper orientation of the ball joint relative to the A-arm.

NOTE: Use the same tools for the lower and upper ball joints.

Attach template page on a light cardboard.

Cut the templates.

Right/Left Lower Ball Joints

NOTE: Use the same template for the lower RH and LH ball joints.

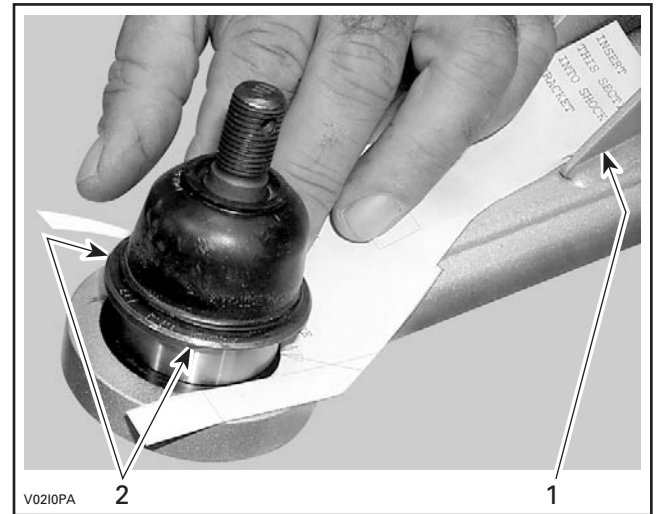
Apply a layer (0.3 mL) of Loctite 609 on the outside diameter of new ball joint (surface that contacts arm). Wipe any excess.

Insert the ball joint into the template with the correct orientation. Flat grooves of ball joint must be in contact with the flat sides of the template.



1. Flat grooves

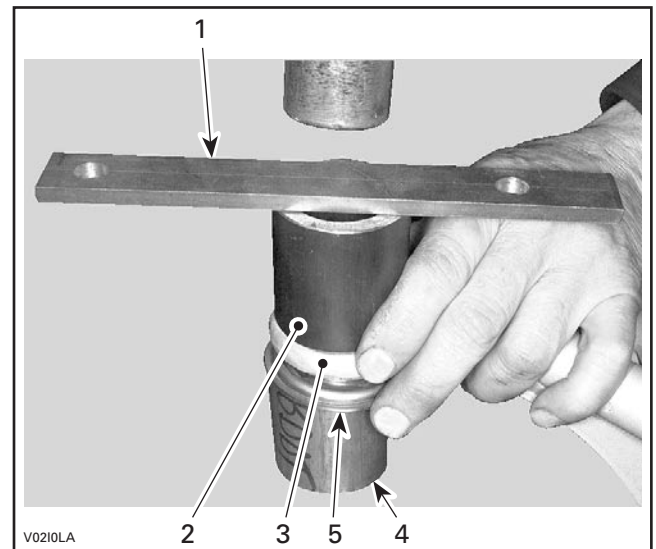
Place the ball joint and the template on the A-Arm and orient it into place, the narrow section of the template aligns inside the shock bracket.



1. Shock bracket
 2. Flat grooves

Remove the template and keep the orientation of the ball joint.

Use both ball joint drivers (P/N 529 035 705 and P/N 529 035 706) and a press machine to press the ball joint in place. A hammer may also be used but care should be taken.



1. Flat bar
 2. Driver
 3. Arm
 4. Driver
 5. Tab lock

NOTE: Be sure that the flat groove is perpendicular to rotation axis before mounting.

Section 08 SUSPENSION

Subsection 02 (FRONT SUSPENSION)

Right/Left Upper Ball Joints

Bend the template down, at the mark indicated.

Insert the ball joint into the template with the correct orientation. Flat grooves of ball joint must be in contact with the flat sides of the template.

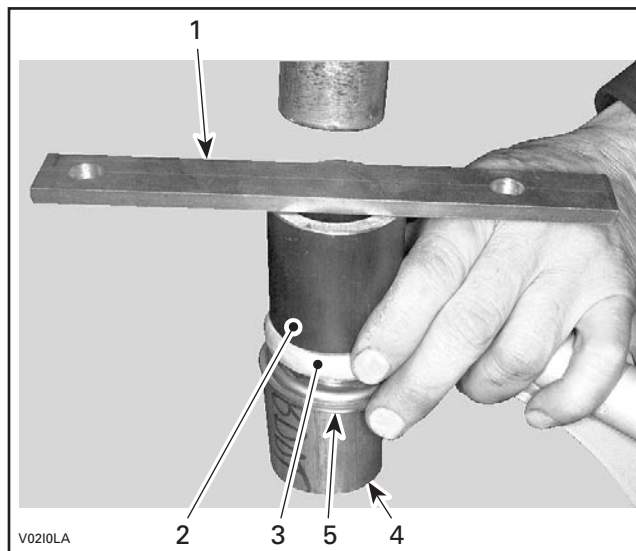
Place the ball joint and the template on the A-Arm and orient it in the way that the bent section of the template is between the two tubes of the A-arm.



1. Flat grooves

Remove the template and keep the orientation of the ball joint.

Use both ball joint drivers (P/N 529 035 705 and P/N 529 035 706) and a press machine to press the ball joint in place. A hammer may also be used but care should be taken.



1. Flat bar
2. Driver
3. Arm
4. Driver
5. Flat groove

NOTE: Be sure that the flat groove is perpendicular to rotation axis before mounting.

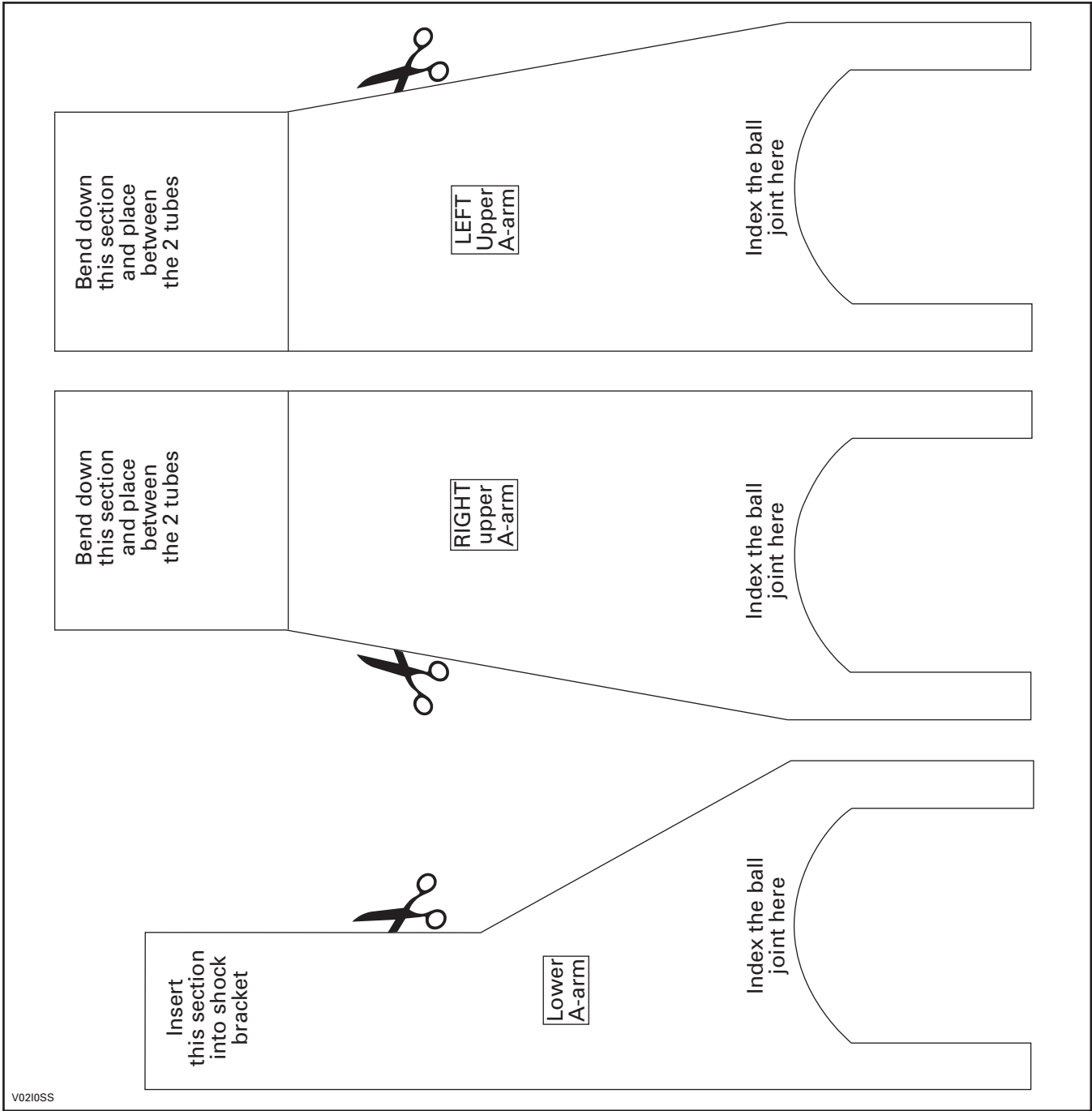
Secure ball joint with its snap ring.

Reinstall all removed parts with supplied new cotter pins.

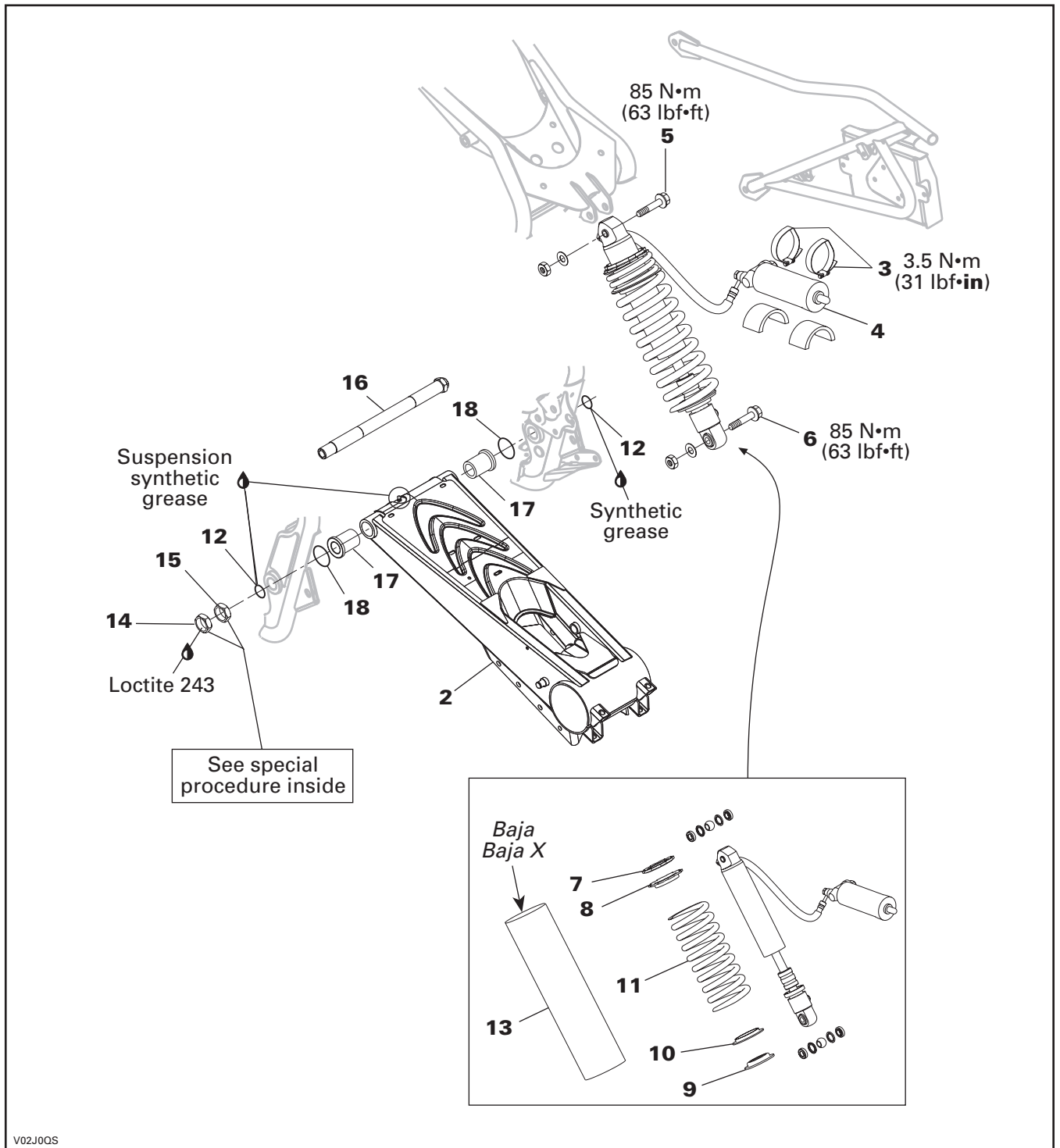
CAUTION: Insure that washer is in place before installing castellated nut.

Grease the new ball joints.

Section 08 SUSPENSION
Subsection 02 (FRONT SUSPENSION)



REAR SUSPENSION



Section 08 SUSPENSION

Subsection 03 (REAR SUSPENSION)

GENERAL

CAUTION: The Baja and Baja X models are equipped with shocks absorber protectors. Open or remove them if the vehicle is used intensively or if the ambient temperature is high. Otherwise, shock absorber performance degradation or damage can occur.

For installation, use the torque values and Loctite products from the exploded views. Clean threads before using Loctite when installing the screws.

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.

SHOCK ABSORBER ASS'Y

Removal

Lift rear of vehicle until rear shock absorber no. 1 is fully extended.

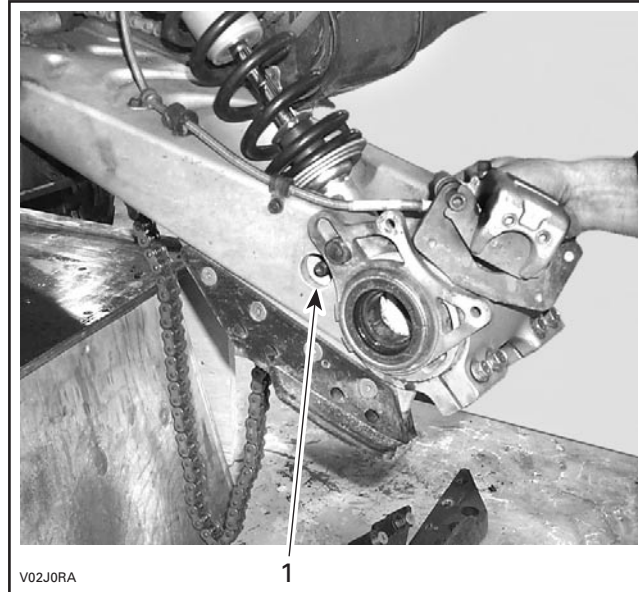
Install a jack stand or a block under the frame to support the vehicle.

Unscrew clamps no. 3 retaining the reservoir no. 4.

Remove upper bolt no. 5 retaining shock absorber.

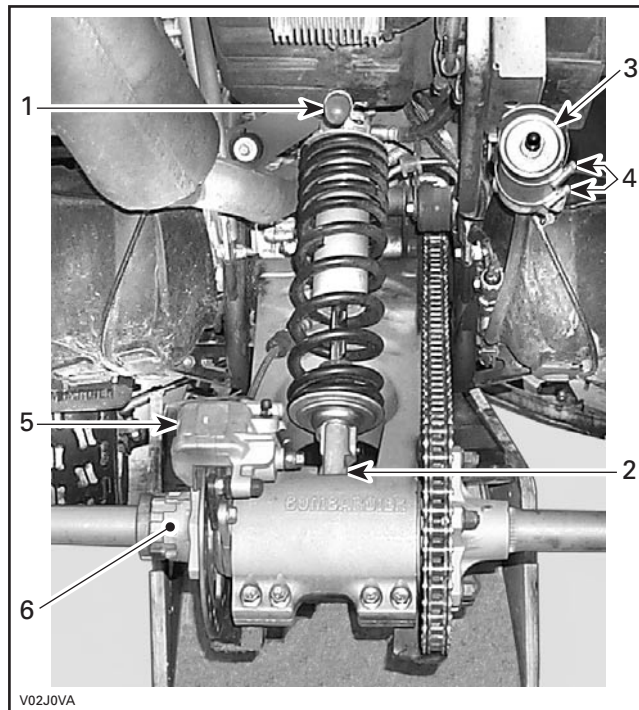
Remove brake caliper and move aside. Unlock disc brake hub and slide it aside to gain access to lower bolt of shock absorber. Loosen chain and remove rear sprocket. Refer to REAR AXLE.

Remove LH and RH access plugs of shock absorber lower bolt.



1. LH plug removed to access shock absorber bolt

Unscrew the lower bolt no. 6.



TYPICAL

1. Upper bolt and nut
2. Lower bolt and nut
3. Reservoir
4. Clamps
5. Brake caliper
6. Disc brake hub

Disassembly

WARNING

The shock absorber contains high pressure nitrogen gas. **Do not attempt to disassemble before removing the pressure.** Dispose of gas as per your local environmental regulations.

On **Baja models** and **Baja X**, remove the shock absorber protector **no.13**.

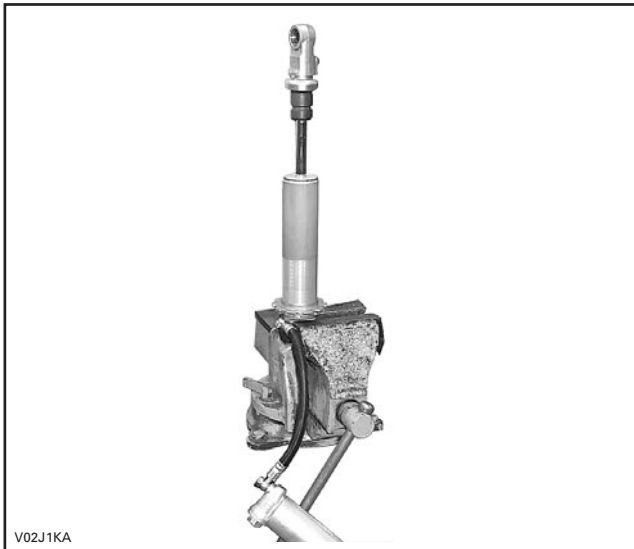
Unscrew the adjusting nuts **nos. 7 and 8**.

Remove spring stopper **no. 9** and spring seat **no. 10**.

Remove spring **no. 11**.

Inspection

Secure the shock absorber body end in a vise with its rod upward.



Check shock absorber body for leaks, dents, abnormal wear and piston rod dents or bend. Replace any defective part.

Fully compress piston rod. When released, it should extend smoothly.

Pay attention to the following conditions that will denote a defective shock absorber:

- a skip or a hang back when reversing stroke at mid travel
- seizing or binding condition except at extreme end of either stroke
- oil leakage
- a gurgling noise, after completing one full compression stroke.

Rebuilt if any fault is present.

Assembly and Installation

For assembly and installation, reverse the disassembly and removal procedures.

On **Baja** and **Baja X models**, reinstall the shock absorber protector, make sure not to block venting holes.

Adjustment

WARNING

The shock absorber contains high pressure nitrogen gas. **Do not attempt to disassemble before removing the pressure.** Dispose of gas as per your local environmental regulations.

Gas Pressure

Refer to SHOCK ABSORBER REBUILDING below.

Spring Preload

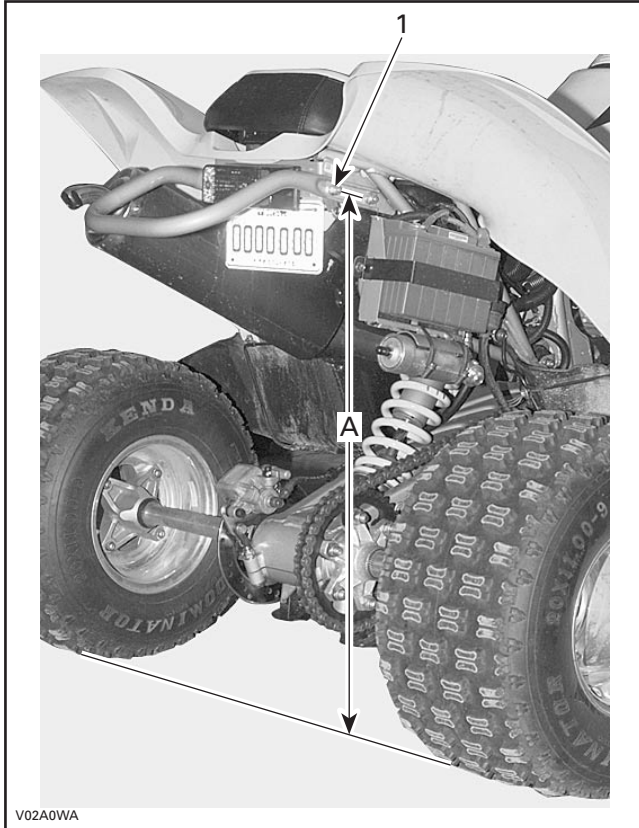
Spring preload may vary from rider to rider depending upon their weight. Preload can be changed by setting the two adjusting nuts up or down to compress the spring to different lengths. Shortening or lengthening the spring length will increase or decrease the preload.

Section 08 SUSPENSION

Subsection 03 (REAR SUSPENSION)

Before adjusting the spring preload, first measure the ATV's height, without rider, from the rear bumper nut to the ground.

NOTE: Lift the vehicle by the rear bumper. The shock should be fully extended.



1. Rear bumper nut
A. Measure between rear bumper nut and ground

Next, sit the rider with gear on the ATV and measure the distance between the same two points.

CAUTION: Add all other loads and accessories before measuring the height of the vehicle with the rider on. Do not exceed the total vehicle load allowed.

Calculate the difference between the two lengths. If the vehicle's height decreases more than 127 mm (5 in), increase the preload by 3 mm (1/8 in) increments. If the vehicle's height decreases of less than 102 mm (4 in), decrease the preload by 3 mm (1/8 in) increments. The optimum adjustment range is between 102 mm (4 in) and 127 mm (5 in) but, for heavier or more aggressive riders, it could be between 76 mm (3 in) and 102 mm (4 in).

Preload Adjustment:

To reduce:

- Turn the shock spring adjuster counterclockwise for a light load and smooth condition.

To increase:

- Turn the shock spring adjuster clockwise for a firmer ride and rough conditions.

Rebound Damping:

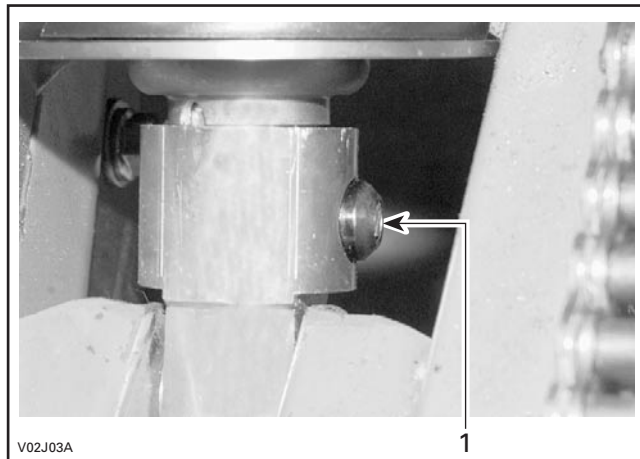
NOTE: It is recommended to turn the adjuster one click at a time and then to test the effect.

To reduce:

- Turn the shock adjuster counterclockwise for a light load and smooth conditions.

To increase:

- Turn the shock adjuster clockwise for a firmer ride and rough conditions.



BOTTOM OF SHOCK ABSORBER

1. Adjuster

Compression Damping:

NOTE: It is recommended to turn the adjuster one click at a time and then to test the effect.

To reduce:

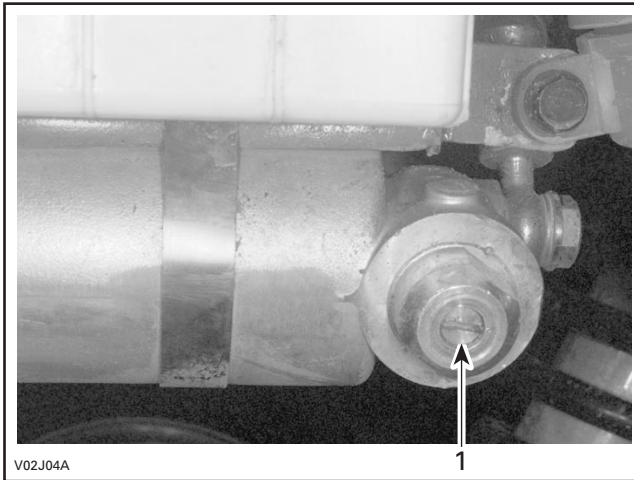
- Turn the reservoir adjuster counterclockwise for a light load and smooth conditions.

To increase:

- Turn the reservoir adjuster clockwise for a firmer ride and rough conditions.

Section 08 SUSPENSION

Subsection 03 (REAR SUSPENSION)



RESERVOIR END

1. Adjuster

SHOCK ABSORBER REBUILDING

Remove spring and adjuster. See SHOCK ABSORBER ASS'Y above.

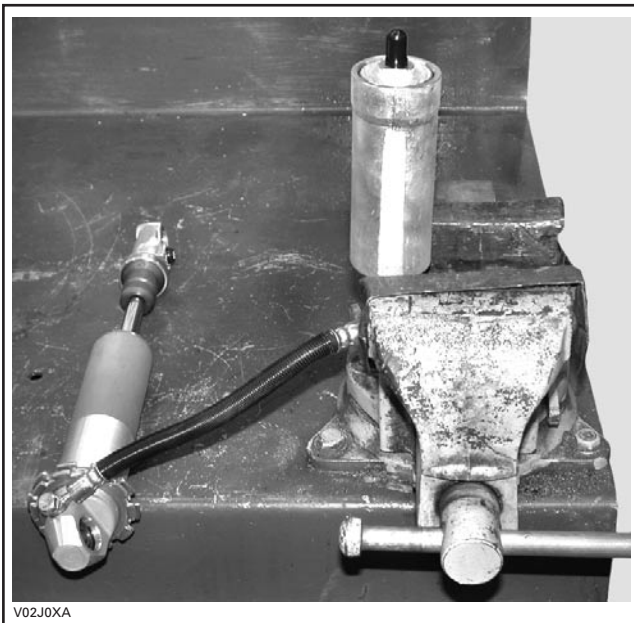
Disassembly

Clean all the parts prior to disassembling.

Turn compression and rebound adjusters counter-clockwise so that their valves are the most open.

Reservoir

Gently secure the reservoir in a vise with soft jaws.



CAUTION: Never clamp on reservoir.

Unscrew valve cap from reservoir.

⚠ WARNING

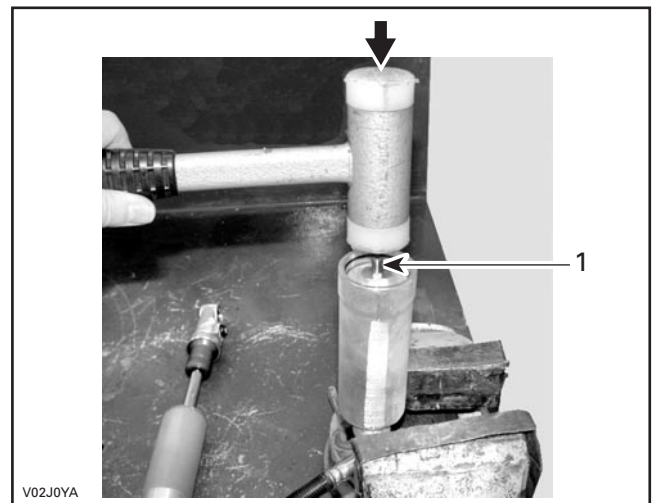
Whenever working with high pressure gas, use eye wear protection. Never direct gas pressure toward anybody. Release gas pressure before removing components.

Place a rag over valve to protect against possible mist and to prevent gas being directed towards someone. Using a small tool, press valve pin to release pressure. Ensure to completely empty the reservoir.

NOTE: If a mist of oil is sprayed, it indicates that the bladder is damaged.

Remove valve pin.

Using a clean soft hammer, gently tap down reservoir cover just enough to free the C-clip. Using a small tool, remove the C-clip.



1. Gently tap cover down to free C-clip



1. C-clip

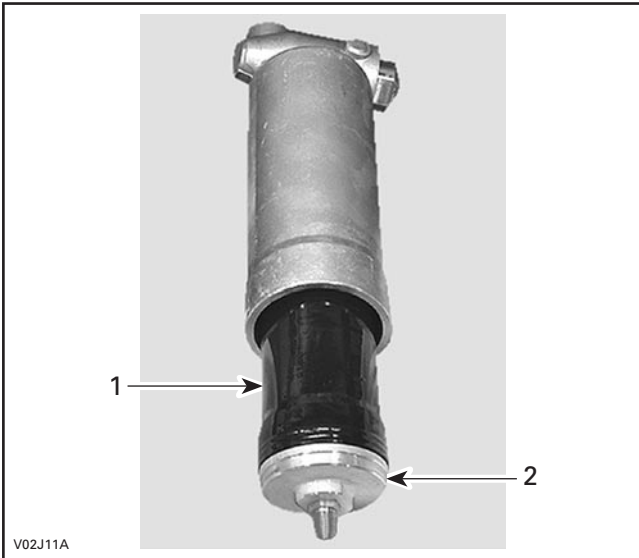
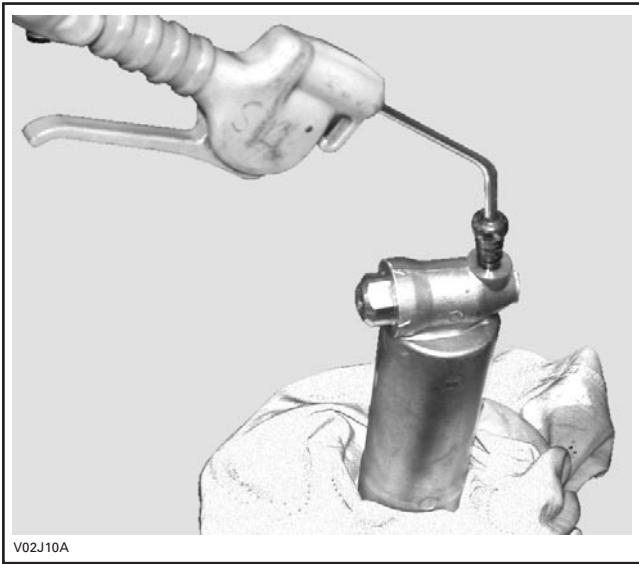
Section 08 SUSPENSION
Subsection 03 (REAR SUSPENSION)

CAUTION: Be careful not to scratch inside wall of reservoir or C-clip. Also be careful not to distort the C-clip.

Empty oil from reservoir. Dispose of oil according to your local environmental regulations.

Note position of hose and detach hose from reservoir.

Hold a rag over reservoir end to catch bladder and its cover. Allow room for parts to leave reservoir. Using compressed air pressure in hose hole, carefully push bladder out.



- 1. Bladder
- 2. Cover

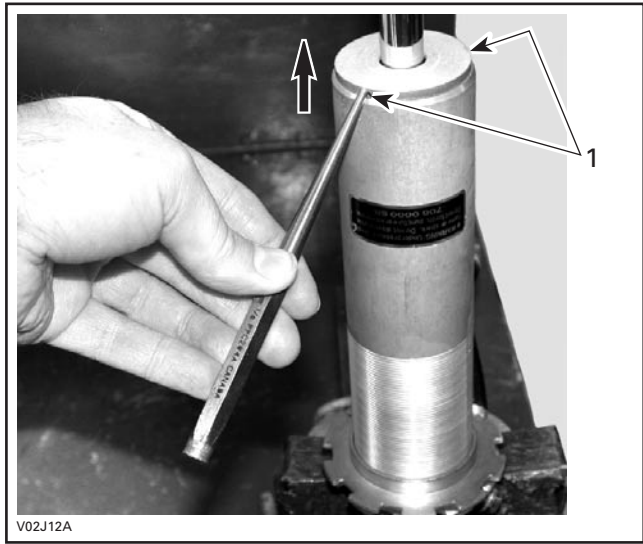
Shock Absorber

Tightly secure the shock absorber bottom eyelet in a vise with soft jaws.

Push piston down to empty shock absorber.

Note position of hose and detach hose from shock absorber.

Using a suitable punch in the cover holes, gently punch cover out alternating each side.

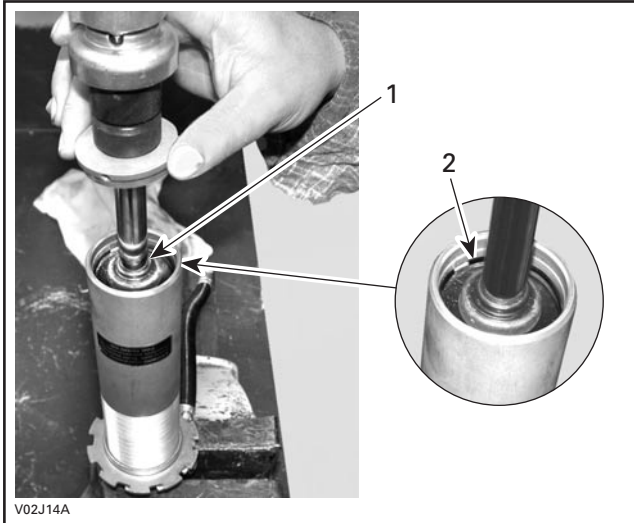


- 1. Punch out alternating each side



- 1. Cover and its holes

Using a suitable punch, gently punch seal carrier ass'y down alternating each side. Push down just enough to free the C-clip. Using a small tool, remove the C-clip.



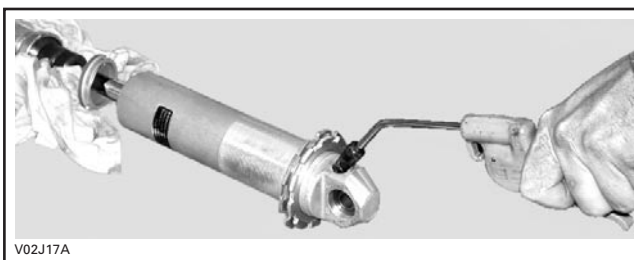
1. Gently push seal carrier ass'y down to free C-clip
2. C-clip

CAUTION: Be careful not to scratch inside wall of shock absorber or C-clip. Also be careful not to distort the C-clip.

Gently pull piston rod out. Remove slowly to reduce oil spillage and prevent piston seal damage on body groove. Wrap body in a rag to collect oil overflow while removing piston rod.

NOTE: If piston rod is hard to remove, use compressed air as described below.

Hold a rag over shock absorber end to catch piston rod. Allow room for parts to leave shock absorber. Using compressed air pressure in hose hole, carefully push piston rod out.



Empty oil from shock absorber.

Clean inner walls of shock absorber and reservoir with Pulley flange cleaner (P/N 413 711 809). Be careful not to splash O-rings, piston and seals etc. Dry parts with compressed air.

Inspection

Check the following:

- Compression bumpers for chipping, cracking or missing.
- O-rings for nicks, cuts or cracks.
- Piston rod for straightness, wear, nicks or burrs.
- Seal carrier and rod seals.
- Piston seal ring for wear.
- Valve discs for kinks or waves.
- Inner walls of shock absorber and reservoir for scratches, burrs or excessive wear.
- Bladder for tears, cracks or holes.

Replace any defective/worn part.

Valving

Rebound stack:

Ø36 x t0.30 x 10

Ø22 x t0.30 x 1

Compression stack:

Ø40 x t0.25 x 9

Ø22 x t0.20 x 1

Ø40 x t0.25 x 12

Ø22 x t0.30 x 2

Piston:

1 - Ø2.0

Assembly

Turn compression and rebound adjusters counter-clockwise so that their valves are the most open.

Reinstall hose to shock absorber and reservoir. Ensure to position properly.

Tightly secure the shock absorber base in a vise with soft jaws.

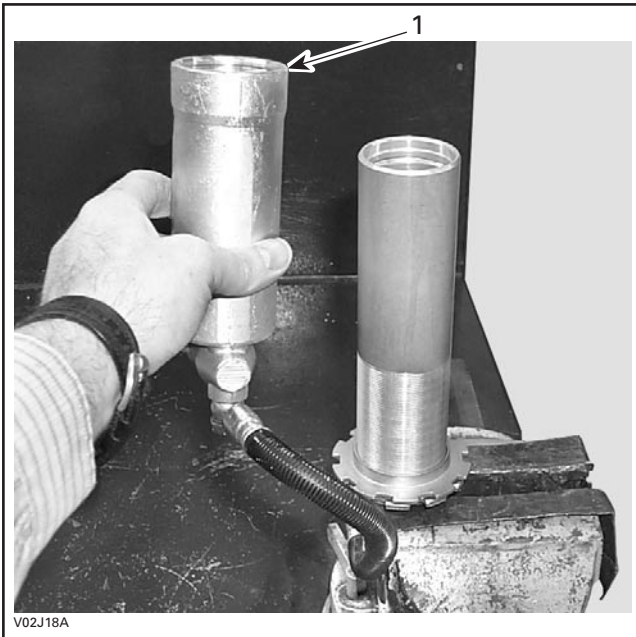
Bleeding

Hold reservoir higher than shock absorber and pour Kayaba shock absorber oil (P/N 293 600 035) in reservoir. Half fill reservoir.

CAUTION: Use new oil only. Do not reuse the oil. Only use the recommended oil.

Section 08 SUSPENSION

Subsection 03 (REAR SUSPENSION)

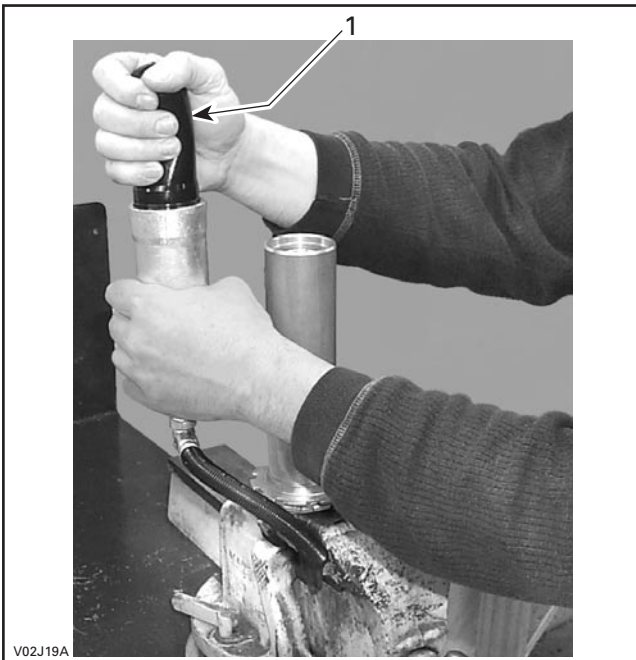


1. Hold reservoir higher than shock absorber

Half fill shock absorber with recommended oil.

NOTE: Although we do not measure the exact amount of oil added, approximately 317 mL (10.7 U.S. oz) will be used.

Temporarily install bladder upside down on reservoir. Push down enough to have a tight seal. Squeeze bladder to pump oil towards shock absorber. Ensure enough oil remains in reservoir.



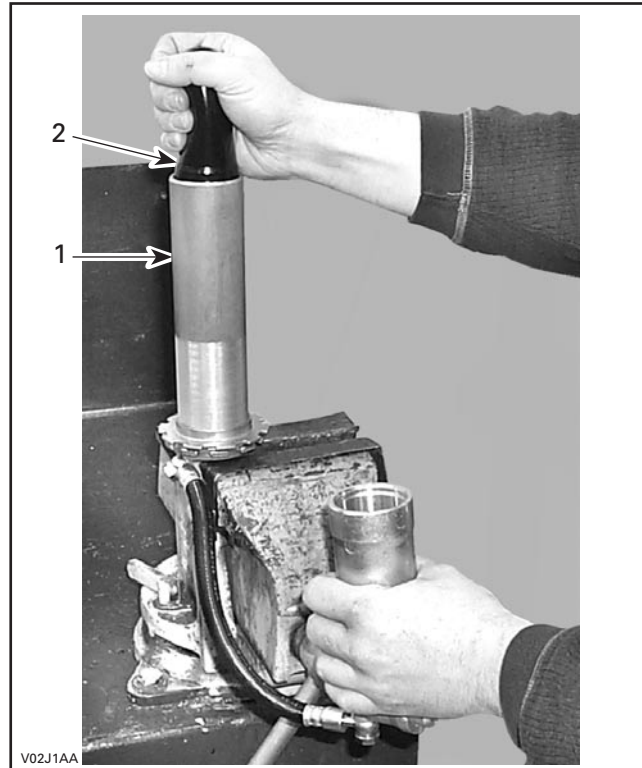
PUMP BLADDER TO BLEED HOSE

1. Bladder installed upside down

Air will escape in shock absorber. Repeat the pumping twice.

Hold reservoir lower than shock absorber.

Temporarily install bladder upside down on shock absorber. Push down enough to have a tight seal. Squeeze bladder to pump oil towards reservoir. Ensure enough oil remain in shock absorber.



PUMP BLADDER TO BLEED HOSE

1. Hold reservoir higher than shock absorber
2. Bladder installed upside down

Air will escape in reservoir if present. Repeat the pumping twice.

Reservoir

Add oil in reservoir to half-fill.

Wrap reservoir in a rag to collect oil overflow while installing bladder.

Lightly apply shock absorber oil outside of bladder and install bladder/cover ass'y in reservoir. Ensure some oil flows out to be sure there is no air trapped inside reservoir.

Push cover down just enough to secure C-clip.

WARNING

If C-clip is not properly locked, parts might be projected out when filling with high pressure nitrogen.

Section 08 SUSPENSION

Subsection 03 (REAR SUSPENSION)

Reinstall valve pin in reservoir valve.

Shock Absorber

Wrap shock absorber in a rag to collect oil overflow while installing piston rod.

Apply shock absorber oil on piston seal ring.

Pour oil in shock absorber so that it is filled to 3/4.

Carefully insert piston rod in shock absorber.

CAUTION: Be careful not to damage piston seal on shock absorber edge.

Slowly push piston into shock absorber to prevent compressing the bladder. Apply a short stroke of slight up and down movement to allow air to pass through piston stack assembly.

Gently tap with a clean soft hammer on the shock eye to dislodge air trapped in the submerged piston.

Be careful not to drive the shaft any deeper into the oil than it is necessary to just cover the piston stack. Be also careful to maintain oil above piston stack. Otherwise repeat the operation.

Fill shock absorber up to 10 mm (3/8 in) below circlip groove.

Seal carrier assembly can now be pushed into body. This should be done slowly ensuring some oil flows out to ensure no air is trapped inside shock absorber. Push down just enough to secure C-clip.

After the seal carrier is completely installed, avoid pushing the piston rod into the body until the nitrogen charge is added.

WARNING

If C-clip is not properly locked, parts might be projected out when filling with high pressure nitrogen.

Reinstal cover.

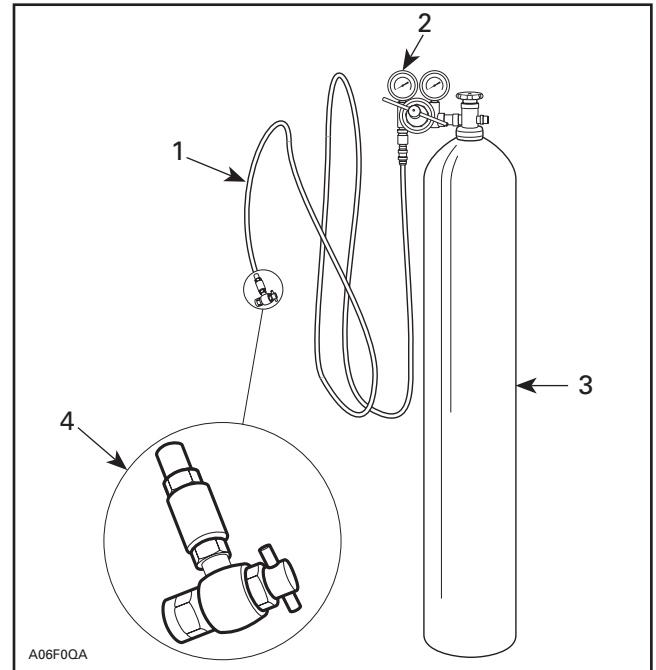
Nitrogen (N₂) can now be added in the reservoir.

Gas Pressure

WARNING

Do not use any other type of gas than Nitrogen (N₂).

Use the Gas shock valve tool (P/N 529 035 570) and tightly install it to the nitrogen tank.

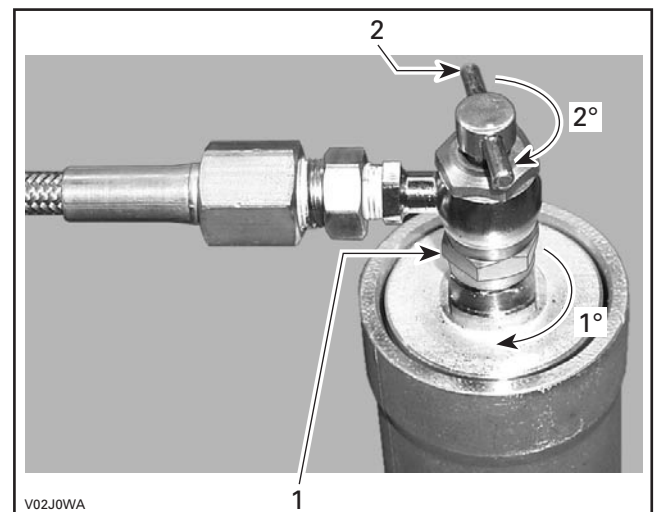


1. High pressure hose
2. Two stage regulator
3. High pressure cylinder filled with industrial grade nitrogen (N₂)
4. Gas shock valve tool

Proceed as follows:

NOTE: Proceeding this way and using the recommended tool will prevent any pressure leak of shock absorber when removing valve tool. When removing valve tool, the leaking sound comes from the remaining nitrogen in tank hose.

1. Adjust nitrogen tank regulator to 0 kPa (0 PSI).
2. Tightly screw gas shock valve tool to reservoir valve. Turn its tap clockwise up to the end.



1. Valve tool
2. Valve tool tap

Section 08 SUSPENSION

Subsection 03 (REAR SUSPENSION)

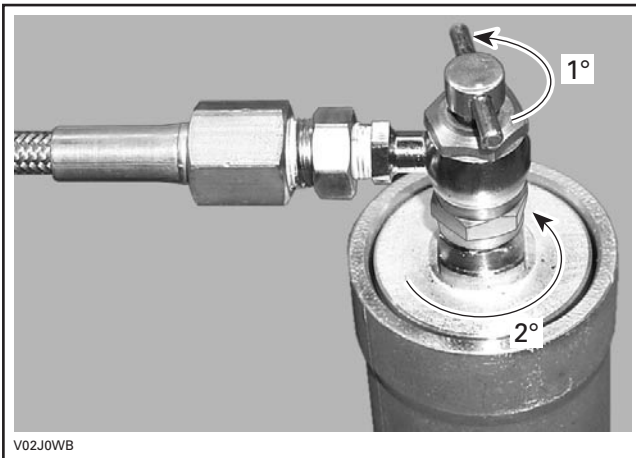
3. Open nitrogen tank valve and gradually set regulator pressure to 980 kPa (142 PSI), this gas pressure will restore the correct pressure into the reservoir.

WARNING

When filling the reservoir with gas, keep away from shock absorber to avoid being harmed by parts which, if improperly installed, could be ejected by gas pressure.

CAUTION: Do not exceed the recommended pressure value.

4. Wait a little for pressure to stabilize.
5. Unscrew tap counterclockwise.



6. Close nitrogen tank valve.
7. Remove gas shock valve tool from shock absorber reservoir.

Reservoir gas pressure cannot be tested with a pressure gauge. The volume of gas in the shock being very small, the amount lost during gauge installation would lower the pressure too much, which would require refilling.

Carefully inspect shock absorber and reservoir for gas or oil leaks. Any leak must be corrected before continuing.

Stroke the piston rod to ensure full travel and smooth compression and rebound action. If the shaft moves in or out erratically or if you hear a gurgling sound, this could indicate air is trapped inside shock absorber. If the piston rod does not move or has partial travel then it may be hydraulically locked. In either event, the shock must be rebuilt again.

Reinstall valve cap.

Reinstall spring and adjuster, then perform adjustments. See shock absorber ASS'Y.

SWING ARM

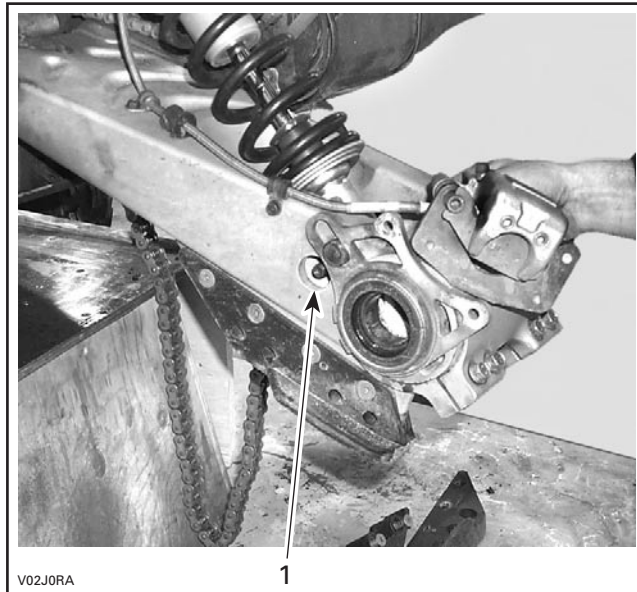
Removal

Lift rear of vehicle until rear shock absorber is fully extended.

Install a jack stand or a block under the frame to support the vehicle.

Remove LH wheel, LH wheel hub, brake caliper and disc brake hub. Loosen chain and remove rear axle towards RH side. Remove eccentric axle housing. Refer to REAR AXLE.

Remove LH and RH access plugs of shock absorber lower bolt.



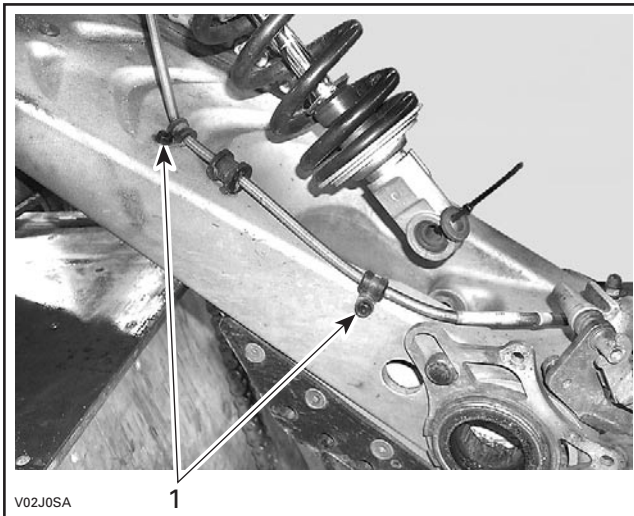
1. LH plug removed to access shock absorber bolt

Remove lower bolt **no. 6** retaining shock.

Raise bottom of shock absorber and brake caliper then temporarily fasten to vehicle body with a cord.

Section 08 SUSPENSION

Subsection 03 (REAR SUSPENSION)



1. Unfasten from swing arm

Detach brake line from swing arm.

Discard screws.

On the LH side, unscrew both nuts **no. 14** and **no. 15**.

Remove the swing arm shaft **no. 16**.

Pull swing arm **no. 2** out of frame.

Inspection

Check condition of swing arm. Inspect for distortion, bending, pitting, cracks or other damage. Replace swing arm with a new one if damaged.

Check condition of bushings **no. 17** with their needle bearings and O-rings **nos. 18** and **12**. Change if necessary.



1. Bushing with its bearing

Ensure bushings **no. 17** are well seated against swing arm. Otherwise, press them until they bottom.

Check condition of swing arm shaft **no. 16**. With your finger nail, feel bearing contact surface of shaft. If any irregular surface is found, replace shaft.

Measure shaft diameter on bearing contact surface. If it is lower than 19.7 mm (.776 in), replace shaft.

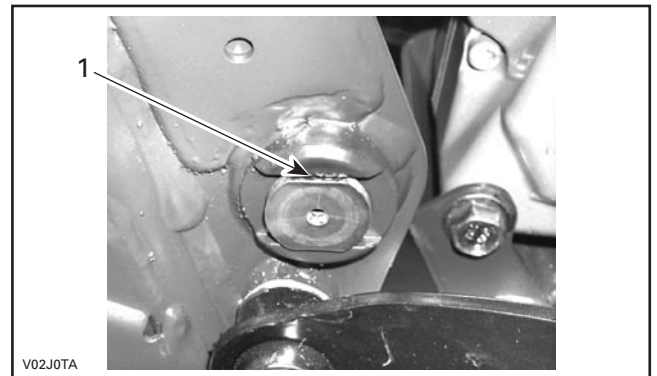
Installation

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

Insert O-rings **no. 12** in the groove into frame.

Place O-rings **no. 18** on bushings **no. 17** then install the swing arm.

Install the swing arm shaft **no. 16** then push the O-rings **no. 18** between frame and bushings. Ensure the flat sides of shaft are well positioned in frame.



1. Ensure shaft is well inserted in frame

Install the nut **no. 15**. Torque to 90 N•m (66 lbf•ft) then, unscrew the nut a quarter turn.

NOTE: Check if the swing arm moves freely.

Apply Loctite 243 and install the other nut **no. 14**. Torque to 90 N•m (66 lbf•ft).

NOTE: Hold the first nut with a key when the second nut is torqued.

CAUTION: When reinstalling the brake line, install new screws with regular M6 threads. Reinstalling self tapping screws would damage the swing arm threads.

Install rear shock and rear axle.

Apply grease through grease fitting.

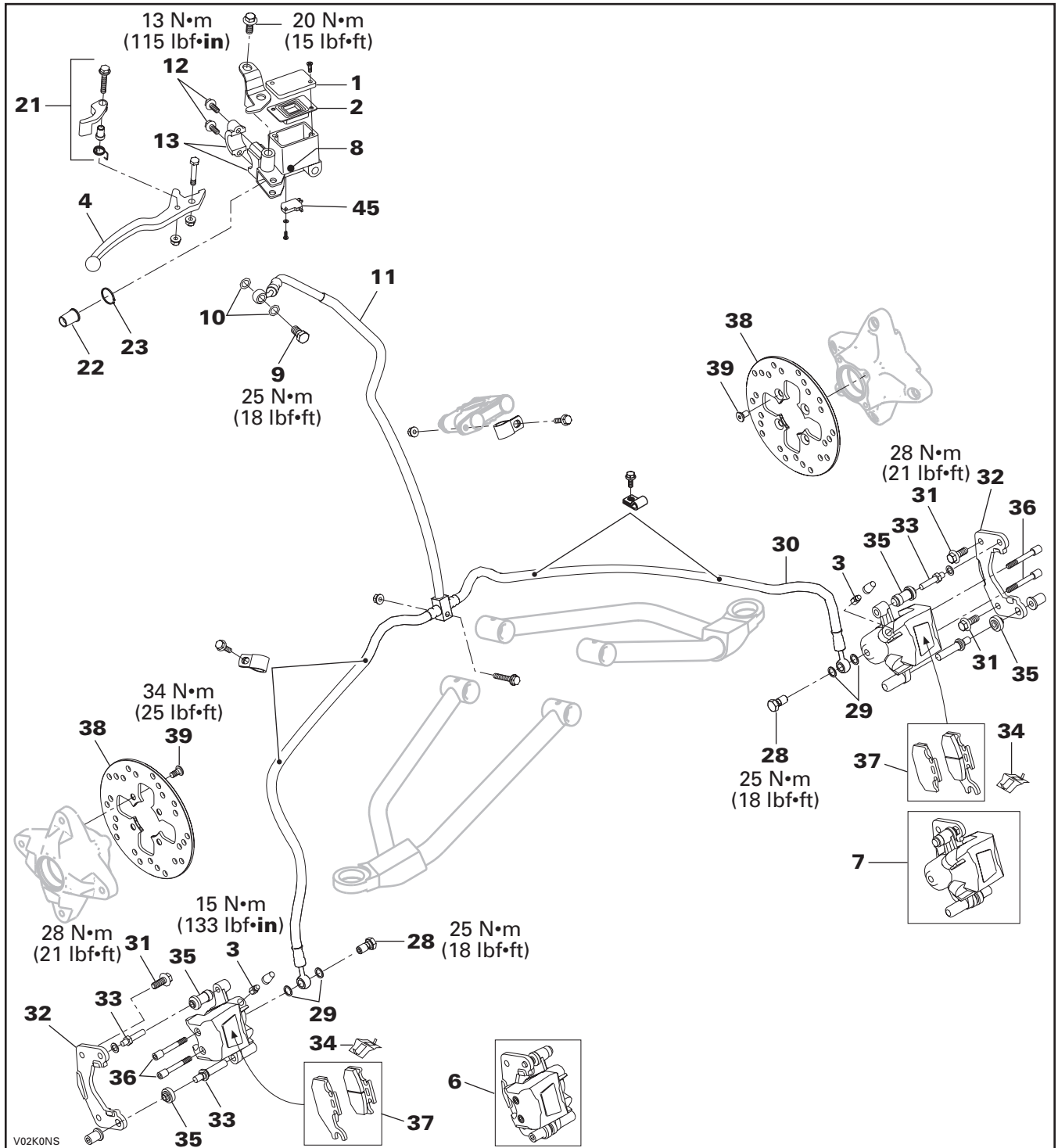
Adjust shock absorber preload and damping then adjust drive chain.

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HYDRAULIC BRAKES

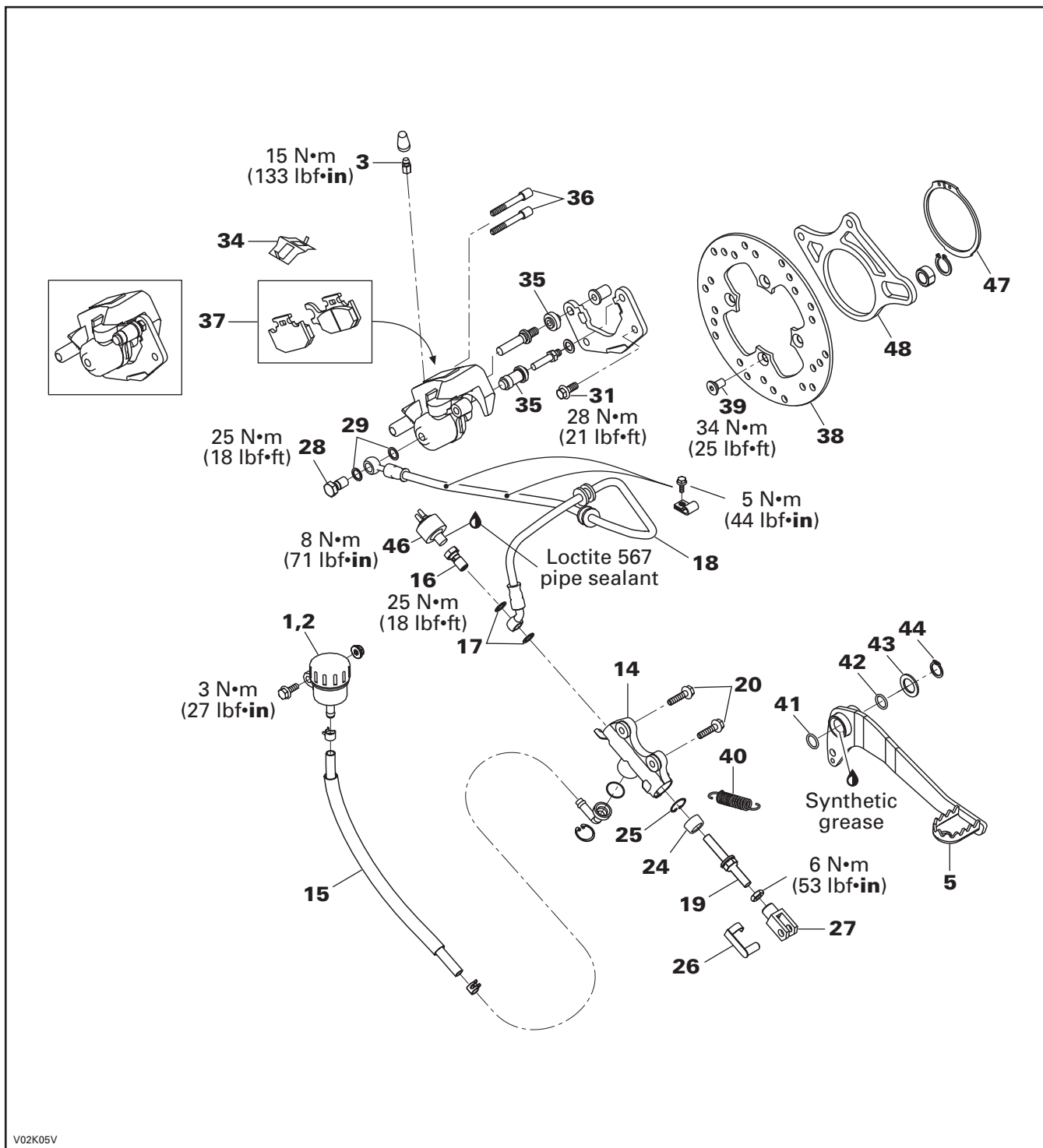
FRONT BRAKES



Section 09 BRAKES

Subsection 02 (HYDRAULIC BRAKES)

REAR BRAKE



V02K05V

GENERAL

For installation, use the torque values and Loctite products from the exploded views. Clean threads before using Loctite when installing the screws.

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.

CAUTION: Avoid spilling brake fluid on plastic, rubber or painted parts. Protect these parts with a rag when servicing brake system.

HYDRAULIC BRAKES SYSTEM

The brake system consists of two separate circuits. Each system has its own master cylinder and reservoir.

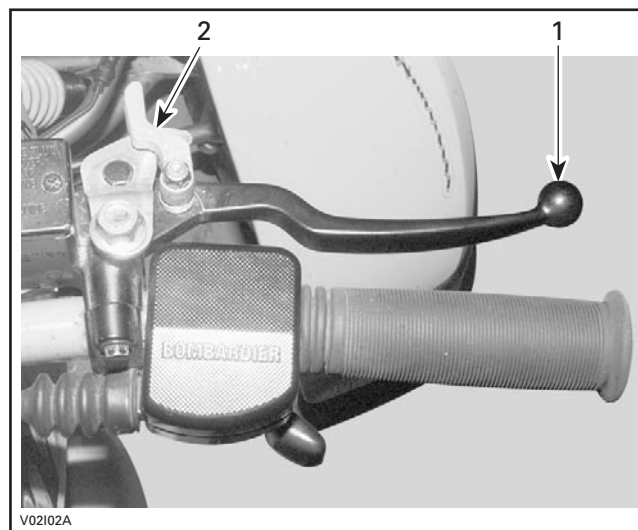
Both front and rear brakes are disc type.

WARNING

Periodically check the brake hoses for damages or leaks. Repair any damage before operating the vehicle.

Parking Brake

The parking brake operates the front brakes only. It is activated by a locking mechanism on RH brake lever.



1. RH brake lever
2. Locking mechanism

Brake Fluid Replacement

CAUTION: To avoid serious damage to the braking system, do not use fluids other than the recommended one, nor mix different fluids for topping.

Brake Fluid Draining (front and rear brake)

Remove reservoir cover no. 1 with diaphragm no. 2.

Connect bleed hose to bleed valve no. 3.

Loosen bleed valve and pump brake lever no. 4 or brake pedal no. 5 until no more fluid flows out of bleed valve.

Brake Fluid Filling and Bleeding

Close bleed valve.

Fill reservoir with DOT 4 brake fluid.

CAUTION: Do not mix different types of brake fluid. Use only DOT 4 brake fluid from a sealed container. Do not use brake fluid taken from old or already opened containers.

Install a commercial available brake bleeder to brake valve. See the manufacturer's operating instructions.

Pump brake bleeder and loosen bleed valve. Close bleed valve and refill reservoir when the fluid level is low.

Section 09 BRAKES

Subsection 02 (HYDRAULIC BRAKES)

NOTE: Check fluid level often to prevent air from being pumped into the system.

Repeat the procedures until air bubbles don't appear in bleed hose.

NOTE: For the front brake system, switch to LH and RH caliper. Turn handle bar to full RH side when bleeding right caliper **no. 6** and turn to the LH side for the left caliper **no. 7**. This helps the bleeder to reach air into the caliper.

Close bleed valves and operate brake lever **no. 4** or brake pedal **no. 5**. If it still feels spongy, bleed system again.

Fill reservoir to the upper level with DOT 4 brake fluid.

Install diaphragm and cover on reservoir.

If brake bleeder is not available, use the following procedure.

Install a tube to bleed valve.

Open bleeder. Fill reservoir and pump lever until fluid freely flows out of the tube.

Close bleed valve.

Pump up system pressure with brake lever or brake pedal until lever or pedal resistance is felt.

Squeeze brake lever or depress brake pedal, open bleed valve and then close it.

NOTE: Do not release brake lever or brake pedal until bleed valve has been closed. For the front brake system, switch to LH and RH caliper. Turn handle bar to full RH side when bleeding right caliper **no. 6** and turn to the LH side for the left caliper **no. 7**. This helps the bleeder to reach air into the caliper.

Release brake lever or brake pedal slowly.

Repeat the procedures until air bubbles don't appear in tube and lever or pedal is stiff.

MASTER CYLINDER

Removal

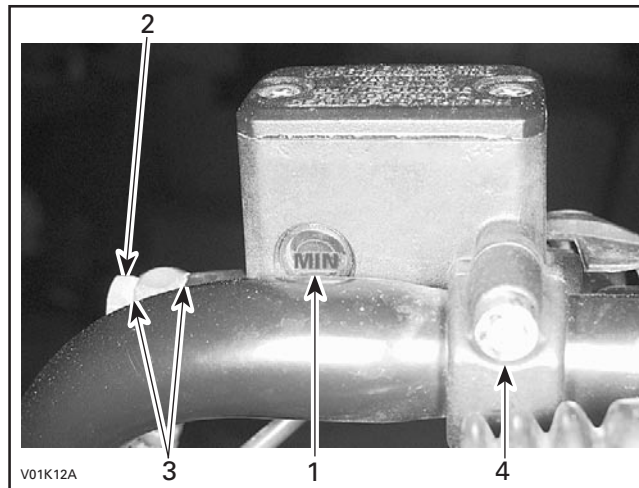
Front Brakes

Drain brake fluid from master cylinder **no. 8**.

Remove Banjo bolt **no. 9** and sealing washers **no. 10** retaining brake hose **no. 11** to master cylinder.

Discard sealing washers.

Remove screws **no. 12** from master cylinder holder **no. 13** and remove master cylinder from handlebar.



TYPICAL

1. Oil level mark
2. Bolt
3. Sealing washers
4. Remove screws

Rear Brake

Remove RH foot protector. Refer to BODY.

Unplug brake switch connectors from rear brake switch **no. 46**.

Drain brake fluid from rear master cylinder **no. 14**.

Disconnect flexible hose **no. 15** from master cylinder and plug the end to avoid brake fluid spillage.

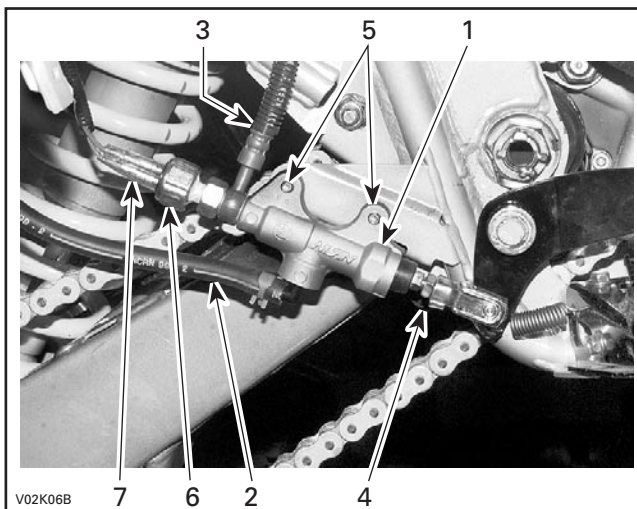
NOTE: At this time, check hoses and fittings for damages or leaks.

Remove banjo fitting **no. 16** and sealing washers **no. 17** retaining brake hose **no. 18** to master cylinder.

Discard sealing washers.

Unhook push rod **no. 19** from brake pedal **no. 5**.

Remove bolts **no. 20** retaining master cylinder to frame.



1. Master cylinder
2. Flexible hose
3. Rear brake hose
4. Push rod
5. Remove bolts
6. Rear brake switch
7. Rear brake switch connectors

Disassembly

Front Master Cylinder

Remove brake lever **no. 4** and locking mechanism **no. 21** for parking brake.

Remove piston boot **no. 22**, snap ring **no. 23**, master piston and spring.

Rear Master Cylinder

Remove boot **no. 24** from master cylinder.

Remove snap ring **no. 25** and push rod **no. 19** using snap ring pliers.

Remove master piston and spring.

Inspection and Lubrication

Discard any remaining fluid inside reservoir.

Clean reservoirs, master pistons and master cylinders thoroughly with clean brake fluid.

Check:

- boots **nos. 22** and **24** for cracks
- springs for damage
- piston cups for wear, deterioration or damage

- master cylinders and pistons for scoring, scratches or other damage.

Change part(s) if necessary.

Check locking pin **no. 26** for excessive wear, replace if necessary.

NOTE: If master cylinder is damaged or leaking, replace as an assembly.

Assembly

Front Master Cylinder

Coat master piston and piston cups with clean brake fluid.

Install:

- spring onto master piston
- master piston into master cylinder
- snap ring into groove in the master cylinder
- boot into master cylinder and the groove in piston.

Apply silicone grease to the brake lever contacting surface of the piston.

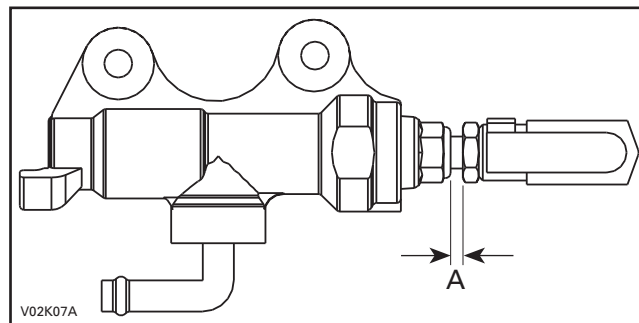
Install brake lever and locking mechanism.

NOTE: Apply silicone grease on lever pivot bolt.

Rear Master Cylinder

For the rear master cylinder use the same procedure that front master cylinder, however pay attention to the following:

If push rod yoke **no. 27** is reinstalled, adjust push rod length, see the following illustration.



A. $3 \pm 1 \text{ mm}$ ($1/8 \pm 1/32 \text{ in}$)

Installation

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

NOTE: Always replace with standard screw, if ever the brake hose retaining clip taptite screw has been removed.

Section 09 BRAKES

Subsection 02 (HYDRAULIC BRAKES)

Front Brakes

Place the master cylinder **no. 8** on the handlebar. Position cylinder holding bracket with the UP mark upward.

Install bolts and tighten loosely.

With the handlebar in straight ahead position, position cylinder reservoir parallel to the ground. Tighten upper bolt in first then lower bolt.



TYPICAL

Connect brake hose **no. 11** to master cylinder with Banjo bolt **no. 9** and new sealing washers.

Bleed front brake system.

Check for leaks and make sure the brakes operate normally before driving.

Rear Brake

Install master cylinder to frame.

Install rear brake hose **no. 18** to master cylinder using new sealing washers.

Connect flexible hose from master cylinder.

Fill up reservoir with clean brake fluid.

CAUTION: Do not mix different types of brake fluid. Use only DOT 4 brake fluid from a sealed container. Do not use brake fluid taken from old or already opened containers.

Bleed rear brake system.

Check for leaks and make sure the brakes operate normally before driving.

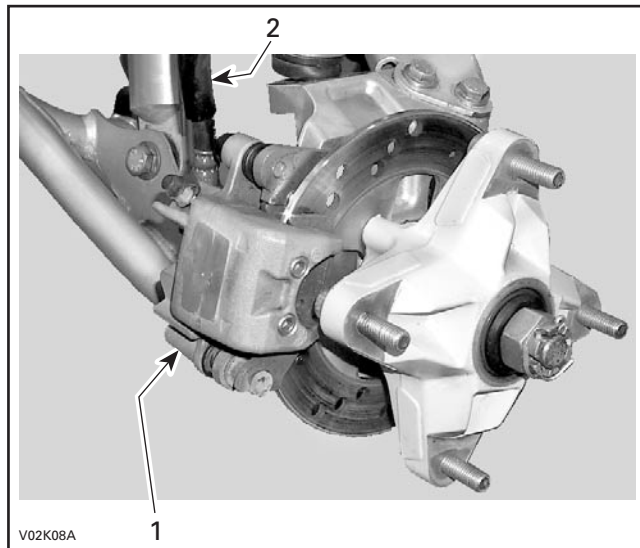
CALIPER

Removal

Loosen wheel nuts.

Raise vehicle and support it securely.

Remove wheels.



RH FRONT BRAKE

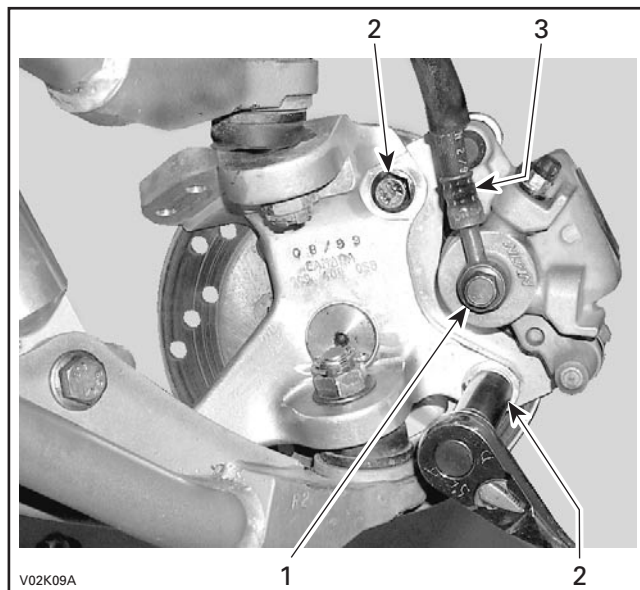
1. Caliper
2. Brake hose

Drain brake fluid from brake system.

Remove Banjo bolt **no. 28** with sealing washers **no. 29** and detach brake hose **no. 18** or **no. 30** from caliper.

Catch spilled fluid with a rag.

Unscrew bolts **no. 31** retaining caliper to knuckle and remove caliper. Discard bolts.



TYPICAL

1. Remove Banjo bolt and washers
2. Unscrew bolts
3. Brake hose

Disassembly

Remove brake pads, see the following section.

Remove:

- caliper bracket **no. 32**
- slide pins **no. 33**
- pad spring **no. 34**.

Place rag over piston.

Place caliper body with piston down and apply small squirts of air pressure to the fluid inlet to remove piston.

WARNING

Do not use high pressure air or bring nozzle too close to inlet.

Remove piston seal.

CAUTION: Be careful not to damage piston sliding surface.

Clean piston grooves, caliper cylinder and piston with clean brake fluid.

Clean slide pins with brake cleaner and a rag.

Inspection

If boots **no. 35** are deteriorated or hard, replace by the new ones.

Check caliper cylinder and piston for scratches, rust or other damages. If so, replace caliper.

Assembly

Coat piston seal with clean brake fluid and install it into piston grooves in caliper.

Coat piston with clean brake fluid and install into cylinder with the closing toward caliper body.

Apply silicone grease into sliding bores and install slide pins.

NOTE: Make sure that rubber boots **no. 35** are correctly installed in slide pins grooves.

Install pad spring, caliper bracket and pads.

Installation

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

Use new sealing washers when installing Banjo bolt retaining brake hose to caliper.

Install caliper to knuckle with the new self-locking bolts.

If hose was disconnected, bleed the brakes.

Check for leaks and make sure the brakes operate normally before driving.

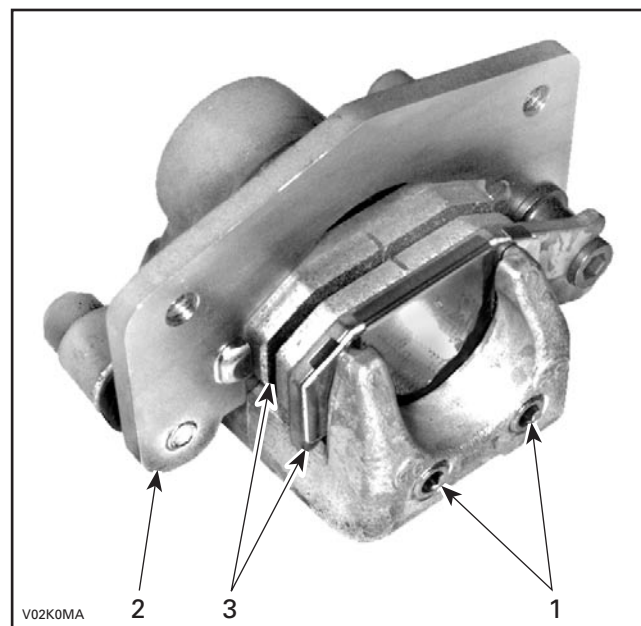
BRAKE PADS

Removal

Raise vehicle and support it securely.

Remove wheels.

Loosen pad pins **no. 36**.



TYPICAL

1. Pad pins
2. Caliper bracket
3. Pads

Remove caliper from knuckle.

CAUTION: Don't let the caliper hang by the hose and don't stretch or twist the hose.

It's very important to clean remaining O.D. of piston out from caliper with brake fluid before pushing the piston back in. Make sure the piston is free of any contaminant and is shiny.

Push piston all the way in to allow installation of new pads.

Section 09 BRAKES

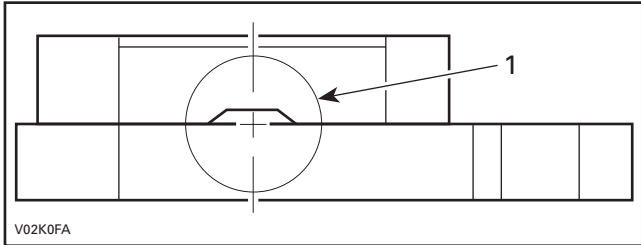
Subsection 02 (HYDRAULIC BRAKES)

Unscrew pad pins and remove pads no. 37.
Discard pad pins.

Inspection

CAUTION: Do not clean brake pads in petroleum based solvent. Use brake system cleaner. Soiled brake pads must be replaced by new ones.

Measure brake pad lining thickness.
Brake pads must be replaced when lining is 1 mm (1/32 in) thick or less, or, look at the hollow places on both sides on the pad lining.
There are four hollow places on one set of brake pads. When the pad wear reaches one of the hollow places, the pad change is necessary even if the pad wear does not reach another hollow place.



1. Hollow place

BRAKE PAD LINING MINIMUM THICKNESS	1 mm (1/32 in)
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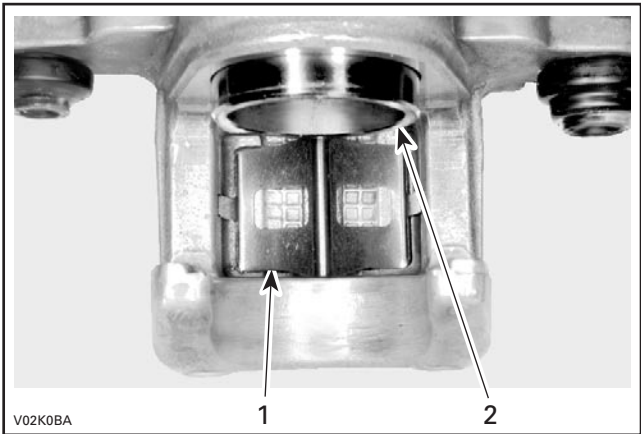
CAUTION: Brake pads must always be replaced in pairs.

 **WARNING**

Avoid getting oil or grease on brake pads. Contaminated brake pads can affect stopping capacities. Discard any contaminated pads.

Installation

For installation, reverse the removal procedure. Paying attention to the following details.
Make sure that pad spring no. 34 is in position.



1. Pad spring
2. Piston

Install new brake pads.
Install new pad pins by pushing in the pads against pad spring to align pad slots in the pads and caliper body.
Install brake caliper so the disc is positioned between pads.
NOTE: Be careful not to damage pads and that pads are correctly inserted in their location.
After the job is completed, firmly depress the brake lever a few times to bring the pads in contact with the disc.
Check for leaks and make sure the brakes operate normally before driving. The pads must rest flat on the disc.

BRAKE DISC

Inspection

 **WARNING**

A contaminated brake disc reduces stopping power. Clean a contaminated disc with a high quality brake degreasing agent.

Brake discs no. 38 can be inspected without removing from the vehicle.
Raise vehicle and support it securely. Remove wheels and visually inspect disc surfaces for scratches or grooves. Make sure to check both sides of disc.

Measure thickness of the disc. Minimum thickness is 3.5 mm (.13 in).

Replace disc if not within specifications.

CAUTION: Brake discs should never be machined.

Turn the disc by hand and check run out.

DISC MINIMUM THICKNESS	3.5 mm (.13 in)
MAXIMAL DISC RUN OUT	0.5 mm (.02 in)

Removal

Front Brake Disc

Remove caliper as described previously.

After removing the caliper, suspend it out of the way.

CAUTION: Do not let the caliper hang by the hose and don't stretch or twist the hose.

Wheel hub has to be removed from vehicle to replace brake disc Refer to FRONT DRIVE.

Remove screws **no. 39** retaining brake disc **no. 38** to wheel hub. Discard screws.

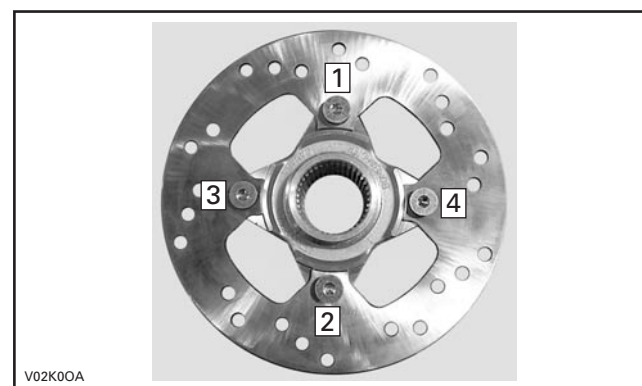
NOTE: Heat up disc around screws to facilitate removal.

Rear Brake Disc

Refer to REAR AXLE for brake hub removal instructions.

Installation

Install brake disc on hub and tighten in a criss-cross sequence.



Install new self-locking screws **no. 39** and torque them.

BRAKE LEVER

Removal and Installation

Use the same procedure than the front master cylinder.

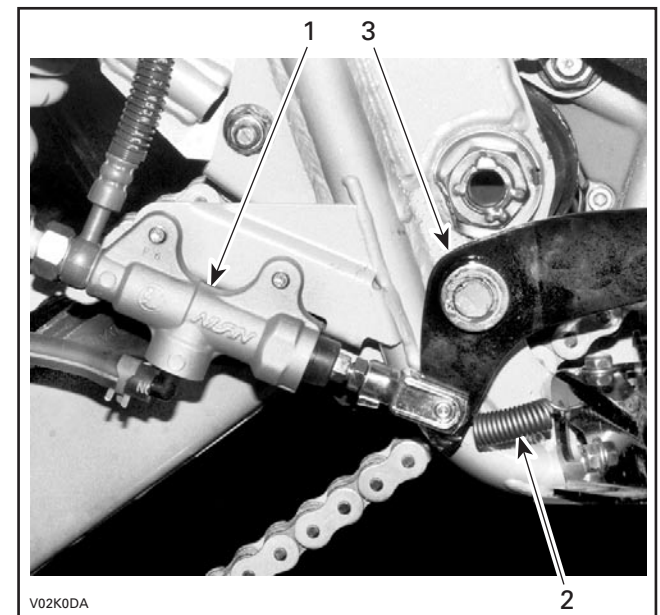
BRAKE PEDAL

Removal

Remove RH side foot protector.

Refer to BODY for removal procedure.

Unhook the return spring **no. 40**.



1. Master cylinder
2. Return spring
3. Brake pedal

Remove circlip **no. 41**, washer **no. 42** and O-ring **no. 43** then remove pedal **no. 5** from pivot.

Remove the O-ring **no. 44** on the pivot.

NOTE: Clean O-ring and pivot pin with BOMBARDIER LUBE (P/N 293 600 016).

Installation

For installation, reverse the removal procedure.

Check O-rings for damage, change if necessary. Apply synthetic grease (P/N 293 550 010).

Section 09 BRAKES

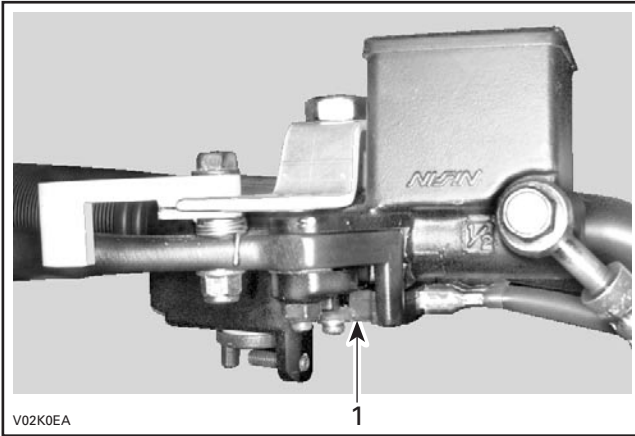
Subsection 02 (HYDRAULIC BRAKES)

BRAKE LIGHT SWITCH

Removal

Front Brake Light Switch

The front brakes switch **no. 45** is located on the master cylinder and cannot be adjusted. Check that switch is securely installed and operates rear light properly.



1. Front brake light switch

Rear Brake Light Switch

The rear brake switch is located on the rear master cylinder banjo fitting **no. 16**.

The rear brake light switch **no. 46** cannot be adjusted.

Remove RH foot protector. Refer to BODY for removal procedure.

Disconnect connectors.

Unscrew rear brake light switch **no. 46** from banjo fitting **no. 16**. Catch spilled fluid with a rag.

Installation

For installation, reverse the removal procedure.

NOTE: Apply pipe sealant on threads.

Bleed the brake system.

REAR CALIPER BRACKET

Removal

Remove brake hub. Refer to REAR AXLE.

Remove the large circlip **no. 47**.

Pull the caliper bracket **no. 48**.

Inspection

Check for wear or other damage on the O-ring, eccentric bearing carrier and on the bracket. Replace parts if free play is excessive.

Installation

For installation, reverse the removal procedure.

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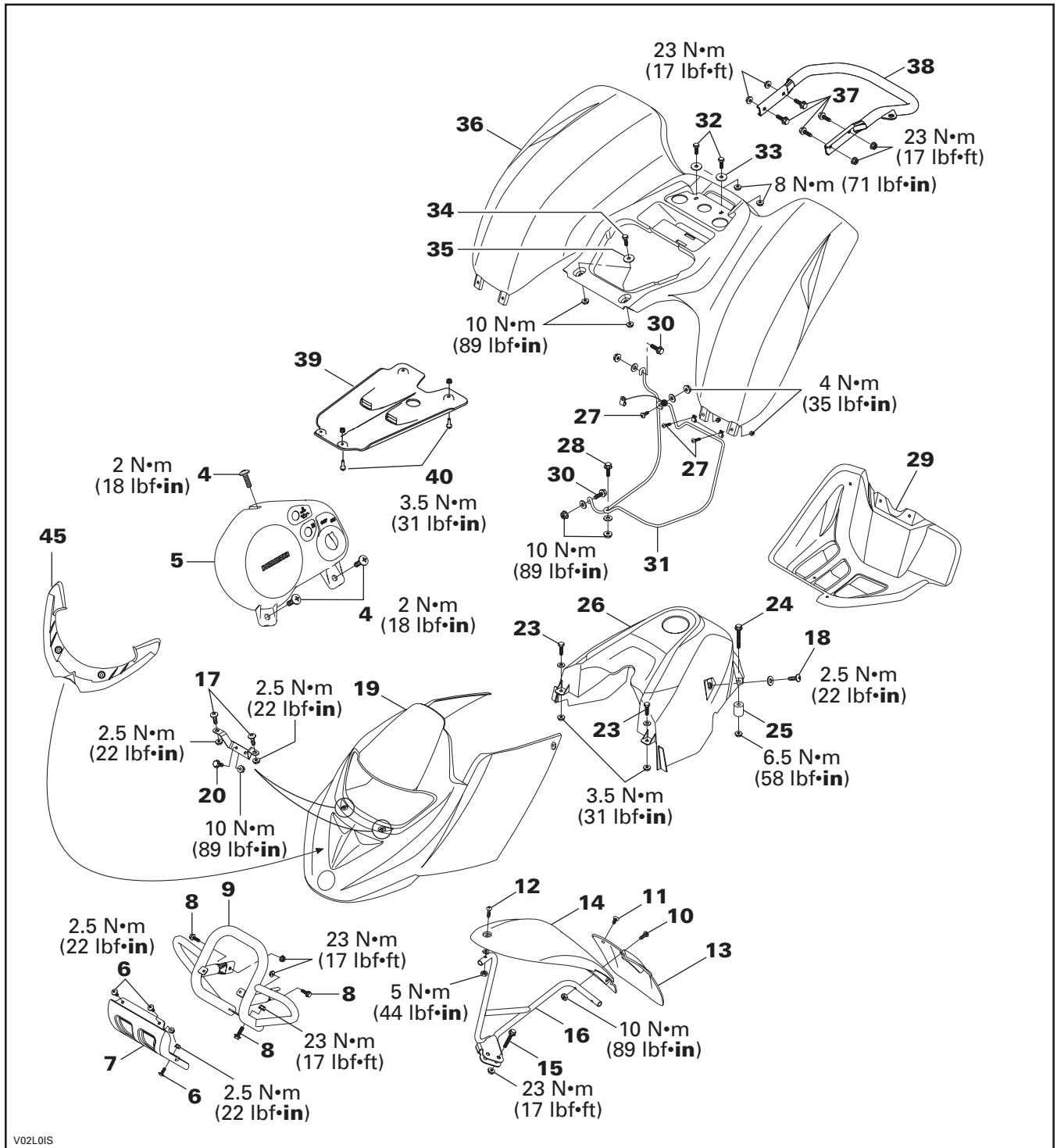
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BODY

BODY PARTS

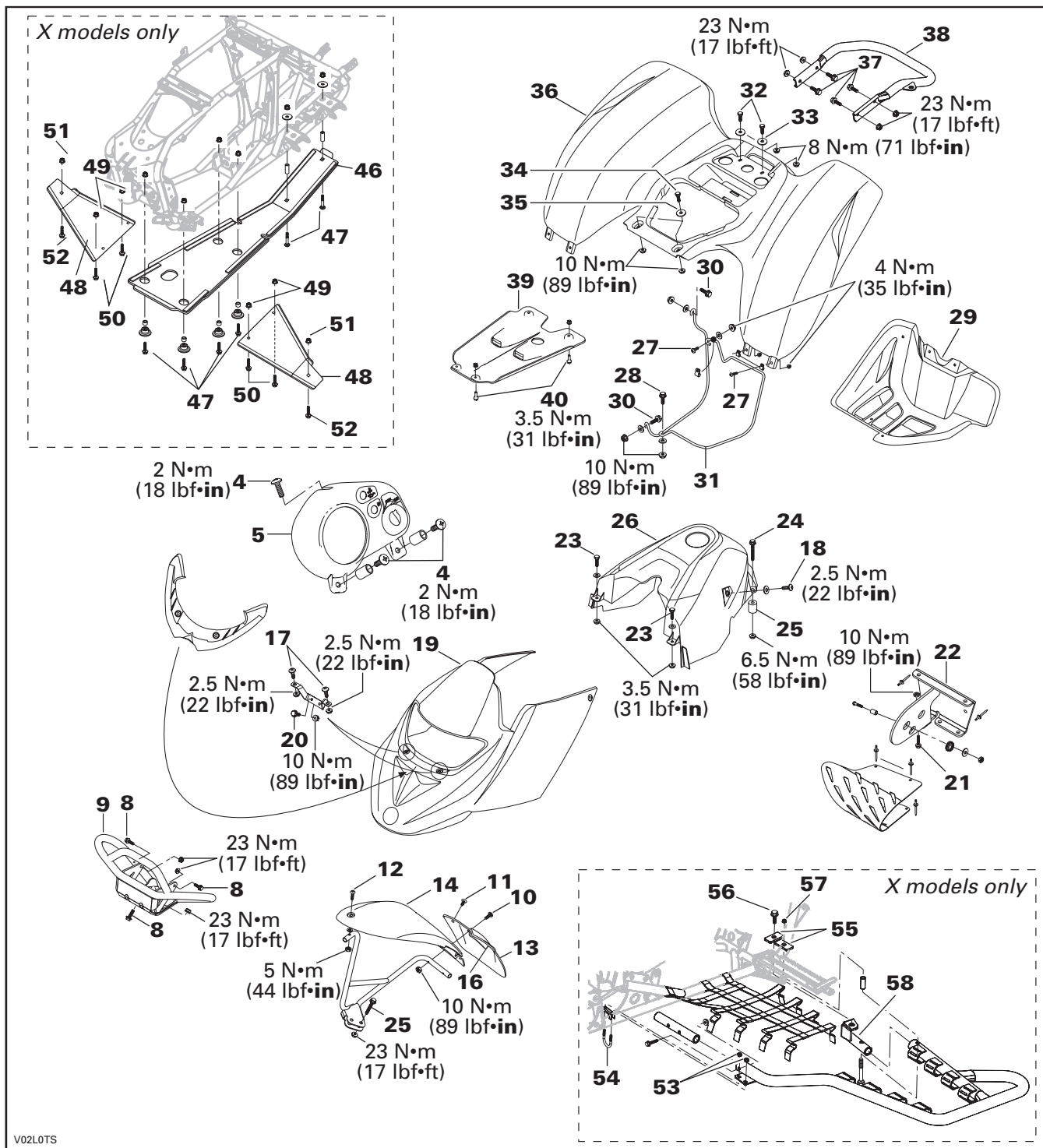
DS 650 Models



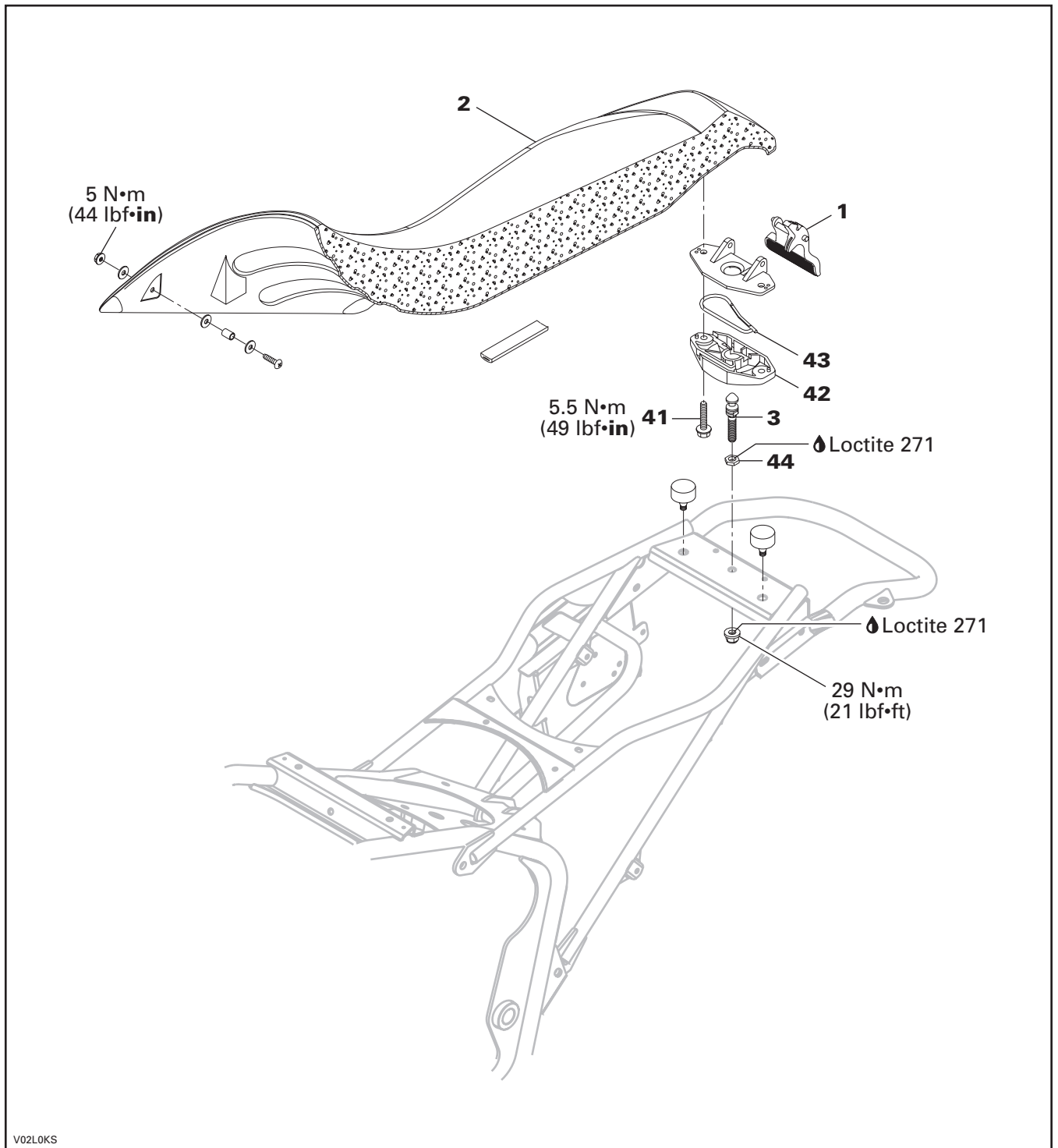
Section 10 BODY/FRAME

Subsection 02 (BODY)

DS 650 Baja and Baja X Models



SEAT



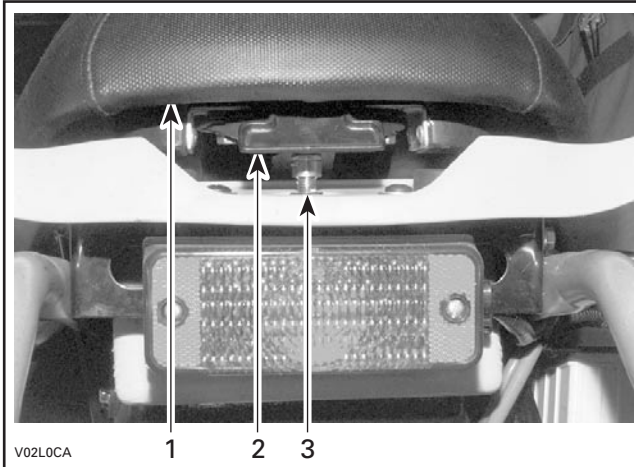
Section 10 BODY/FRAME

Subsection 02 (BODY)

SEAT

Removal

Pull latch lever **no. 1** upward while gently lifting rear of seat **no. 2**. Continue lifting movement until you can release the front retaining devices, then, completely remove seat.



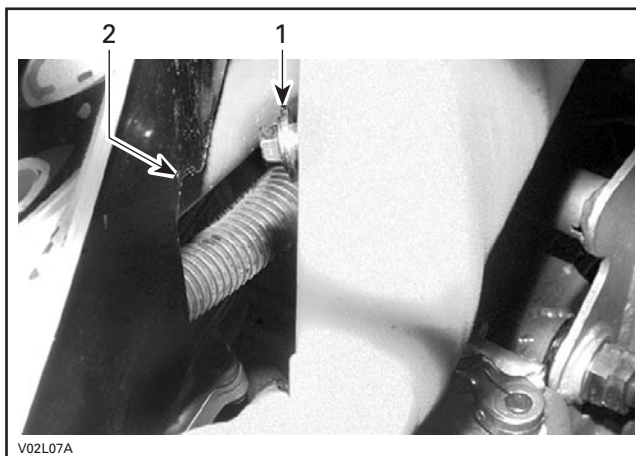
1. Seat
2. Latch
3. Seat lock pin

Installation

Insert seat front tabs into hooks. Pull latch lever to insert it over the seat lock pin **no. 3**. Release latch lever then firmly push on rear of the seat to relatch.

WARNING

Make sure both front tabs are properly hooked on frame before riding.



1. Seat front tab
2. Body hook

WARNING

Periodically, verify the seat lock pin and tighten if needed. Make sure seat is securely latched before riding.

DASHBOARD

Removal

Remove screws **no. 4**.

Lift dashboard **no. 5**.

Disconnect:

- ignition switch
- indicator lamps
- tachometer (**Baja models**).

Remove dashboard completely.

Installation

Installation is the reverse order of removal.

FRONT SKID PLATE/FRONT BUMPER

Removal

Front Skid Plate

DS 650 Models

Remove screws **no. 6**.

Front Bumper

Remove front skid plate **no. 7** (**DS 650 models**).

Remove bolts **no. 8** then the front bumper **no. 9**.

Installation

Installation is the reverse order of removal.

MUDGUARD/FRONT FENDER/SUPPORT

Removal

Mudguard

Remove screws **no. 10** and dart **no. 11**.

Front Fender

Remove screws **nos. 10 and 12**.

Front Fender Support

If necessary, remove mudguard **no. 13** and front fender **no. 14**.

Remove bolts **no. 15** retaining the support **no. 16** to the knuckle.

Installation

For the installation, reverse the removal procedure.

FRONT FACIA

Removal

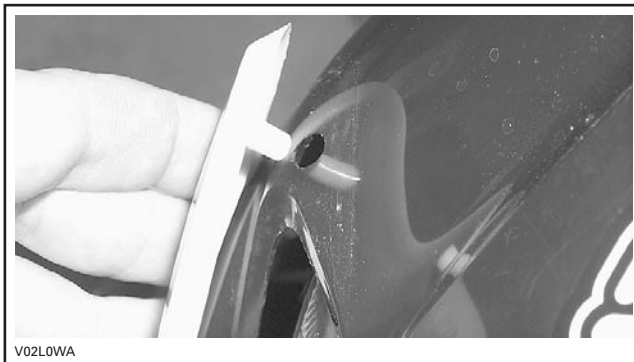
Remove screws **no. 17** under headlamp.



Remove screws **no. 18** on each side of fuel tank cover.



If required, remove the headlamp cover **no. 45**.



Remove the front fascia **no. 19**.

Installation

Installation is the reverse order of removal.

FRONT FACIA BRACKET

⚠ WARNING

Never perform this operation immediately after the engine has been run because the oil tank can be very hot. Wait until oil tank is warm.

Removal

Remove the front fascia.

Unscrew the bolts **no. 20** retaining the front fascia bracket to the oil tank.

Installation

For the installation, reverse the removal procedure.

AUXILIARY HEADLAMP SUPPORT

Baja Models

Removal

Remove:

- front fascia
- bolt **no. 21** retaining the auxiliary headlamp support **no. 22** to the upper bracket of shock absorber.

Disconnect the auxiliary headlamps.

Installation

For installation, reverse the removal procedure.

FUEL TANK COVER

⚠ WARNING

Never perform this operation immediately after the engine has been run because the oil tank can be very hot. Wait until oil tank is warm.

Removal

Remove:

- seat
- front fascia
- fuel tank cap.

Section 10 BODY/FRAME

Subsection 02 (BODY)

On the front side, unscrew the bolts **no. 23** retaining the fuel tank cover and oil tank.

On the rear side, unscrew the bolts **no. 24** and remove spacers **no. 25**.

Pull fuel tank cover **no. 26** and fuel tank backward then remove fuel tank cover.

Installation

Installation is the reverse order of removal.

FOOT PROTECTOR/FOOT PROTECTOR SUPPORT

Removal

Foot Protector

Unfasten screws **nos. 27** and **28** then remove foot protector **no. 29**.

Foot Protector Support

Remove foot protector.

Unscrew bolts **no. 30** retaining support **no. 31** to the frame.

Installation

Installation is the reverse order of removal.

NOTE: Install all bolts before torquing.

REAR FENDER

Removal

Remove:

- seat
- screws **no. 32** and washers **no. 33** near the lock pin **no. 3**
- screws **no. 34** and washers **no. 35** located in front of air box cover
- screws **no. 27** retaining foot protector to rear fender **no. 36**.

Installation

Installation is the reverse order of removal.

REAR BUMPER

Removal

Remove screws **no. 37** then the screw retaining rear bumper **no. 38** and muffler.

Installation

Installation is the reverse order of removal.

ENGINE SKID PLATE

Inspection

The skid plate protects the engine. Check for damage, cracks or looseness.

Change if skid plates **no. 39** and **no. 46** are damaged or cracked.

Removal

All Models

Under vehicle, remove bolts **no. 40**.

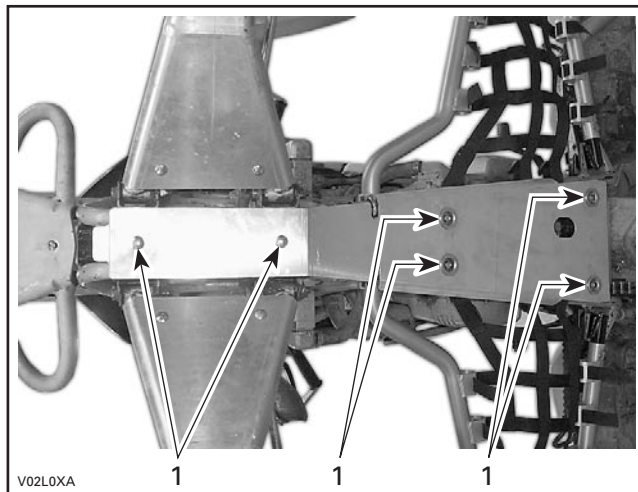
Baja X Models only

WARNING

Engine and muffler must be cold and fuel valve must be shut off before removing the skid plate. Otherwise, serious injuries may occur.

To remove skid plate **no. 46**, lift front of vehicle completely until it rests on its back wheels and rear bumper, vertically; secure it safely in this position.

Remove the bolts **no. 47** to remove the skid plate **no. 46**.



1. Bolts to be removed

Installation

All Models

Installation is the reverse of the removal.

NOTE: Install all bolts before torquing.

Baja X Models only

Installation is the reverse of the removal but pay attention to the following:

- align skid plate **no. 46** then secure it starting with middle square hole; tighten loosely
- then secure in this sequence: forward square hole, forward round holes and rearward round holes; tighten loosely
- validate proper positioning of skid plate, then torque all bolts and nuts
- safely lower vehicle back on the ground.

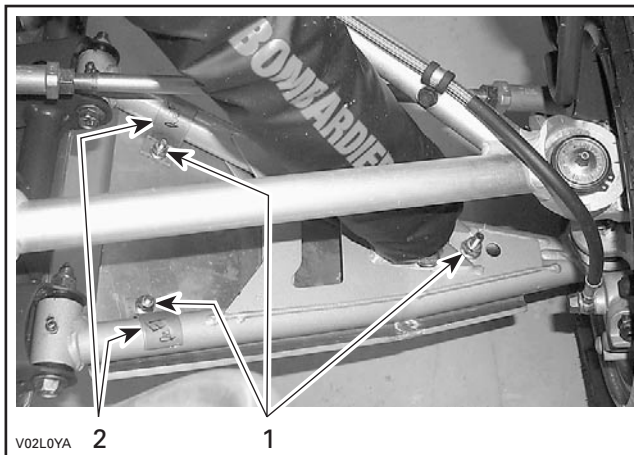
A-ARM PROTECTOR PLATE

Removal

Baja X Models only

Procedure for RH and LH side is the same.

Remove the A-arm protector retaining nuts **no. 49**, and **no. 51** and U-clamps.



1. Nuts to be removed
2. U-Clamps

Remove the A-arm protector plate **no. 48**.

Inspection

Check the A-arm protector plate for damage or cracks. Replace if necessary.

Installation

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

Position A-arm protector **no. 48** under A-arms. On frame side, install U-clamps over the A-arm tubing and fasten with bolts **no. 50** and nuts **no. 49**. Do not tighten yet.

On wheel side, secure with a bolt **no. 52** and a nut **no. 51**.

Fully turn the handlebar into both directions and check for interference.

Fully compress front suspension and check for interference.

Adjust as necessary, secure in place and torque fasteners.

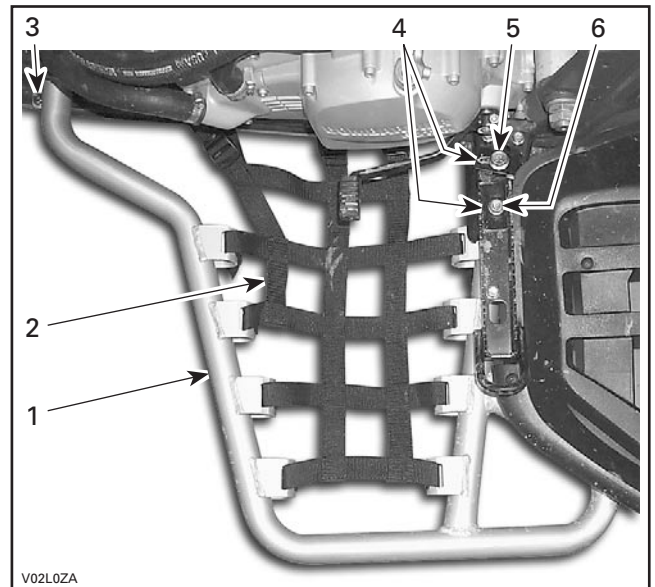
NERF BAR

Removal

⚠ WARNING

Engine and muffler must be cold before removing the nerf bar. Otherwise, serious injuries may occur.

Baja X Models only



1. Nerf bar tube
2. Net strap
3. U-bolt and nuts
4. Short plate
5. Bolt
6. Nut

Unfasten the net strap and slide it out from the frame.

Remove nuts **no. 53** and U-bolt **no. 54**.

Remove short plates **no. 55**, bolt **no. 56**, and nut **no. 57**. Slide out the nerf bar assembly and secure the tube **no. 58**.

NOTE: The procedure for LH and RH side nerf bar is the same.

Section 10 BODY/FRAME

Subsection 02 (BODY)

Inspection

Check nerf bar for cracks or bents and net strap for wear. Change or repair as required.

Installation

Installation is essentially the reverse of removal procedure but pay attention to the following:

After installing the net strap on the frame, make sure to tight it properly.

WARNING

Make sure the net is not too tight on nerf bar tube. Check for clearance by standing up on footpegs and moving feet in all directions. Feet must not interfere with nerf bar net. Otherwise, serious injuries may occur.

LATCH BASE/LATCH LEVER/SPRING

Removal

Latch Base

Remove bolts **no. 41** and separate latch base **no. 42** from latch lever **no. 1** and spring **no. 43**.

Latch Lever

Remove latch base.

Separate latch lever from spring.

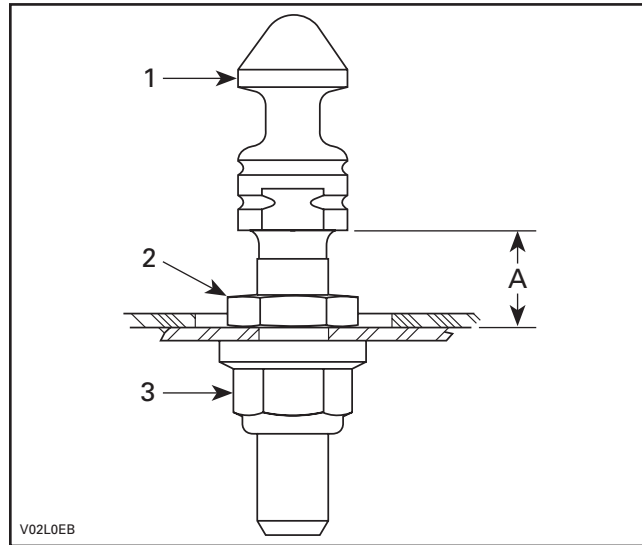
Spring

Remove latch base.

Separate spring from latch base and latch lever.

SEAT ADJUSTMENT

For lock pin **no. 3** adjustment, unscrew the lock pin nut **no. 44** and screw or unscrew the lock pin to the best height. See the following illustration.



1. Lock pin
2. Lock pin nut (apply Loctite 271)
3. Adjustment nut (apply Loctite 271)
- A. 14 ± 2 mm ($9/16 \pm 5/64$ in)

Torque the lock pin nut.

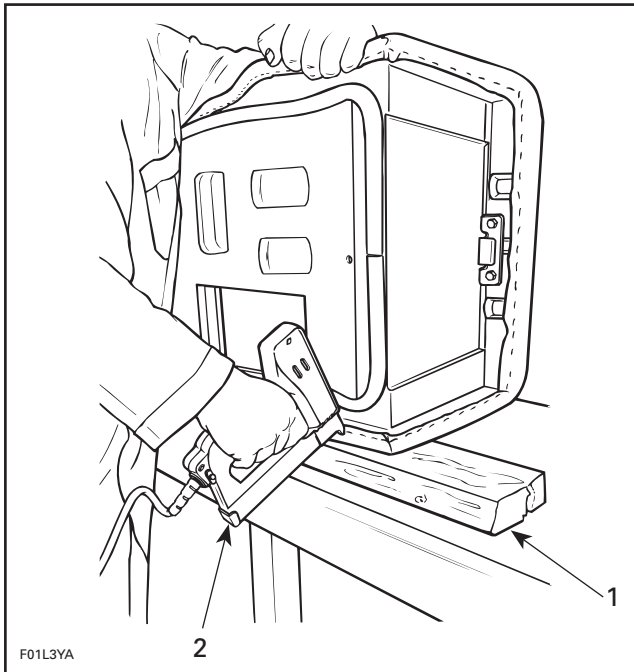
SEAT COVER REPLACEMENT

Remove the old seat cover. Check the foam and replace if necessary.

Install staples with an electric tacker such as Arrow tacker no. ETN-50 or with a manual tacker such as Arrow tacker no. T-50.

NOTE: For an easier installation, it's highly recommended to use an electric tacker.

Ensure that the seat rests firmly against a hard surface such as a piece of wood. This is done to get the staples completely pushed in place.



TYPICAL

1. Piece of wood
2. ETN-50 (electric) or T-50 (manual)

After cover installation cut the excess of material all around the seat.

SEAT CLEANING

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.

DECALS REPLACEMENT

Removal

Using a heat gun warm up one end of decal for a few seconds until decal can roll off when rubbing with your finger.

Pull decal slowly and when necessary apply more heat to ease removal on the area that has to be peeled off.

If decal tears while pulling off, it has to be heated for a few seconds longer. If decal tends to stretch while pulling off, stop heating and wait a few seconds to let it cool, then peel it off.

Installation

There are 2 types of decals used on ATV's. One has a protective film on back side and the other has a protective film on both sides. They are used on 2 types of materials; plastic and metal.

Decals Having a Protective Film on Back Side Only

These decals usually contain written information (ex.: warning).

Clean surface with a good solvent such as ACRYLIC CLEAN DX 330 from PPG or equivalent (refer to manufacturer instructions).

Using a pencil and the decal as a template, mark the area where decal will be located.

Remove half of the decal back protective film and align decal with marks. Start sticking it from center and remove the other half of the film to stick it completely. Carefully squeegee decal beginning at center and working outward using, firm, short, overlapping strokes.

Decals Having a Protective Film on Both Sides

These decals usually contain graphics.

Installation on Plastic

Clean surface with isopropyl alcohol.

Using a pencil and the decal as a template, mark the area where decal will be located.

Apply an activator (P/N 293 530 036) to prepare the surface using a clean cloth. After a few seconds, when the activator evaporates, the surface is ready.

CAUTION: Do not use soapy water to locate decal on plastic parts.

Remove back protective film from decal and carefully align decal with marks. When well aligned squeegee decal beginning at center and working outward using firm, short, overlapping strokes.

PLASTIC MAINTENANCE/REPAIR

MAINTENANCE

Clean the vehicle thoroughly, removing all dirt and grease accumulation.

To clean use a soft clean cloth and either soapy water or isopropyl alcohol.

To remove grease, oil or glue use isopropyl alcohol.

CAUTION: Do not apply isopropyl alcohol or acetone directly on decals.

Section 10 BODY/FRAME

Subsection 02 (BODY)

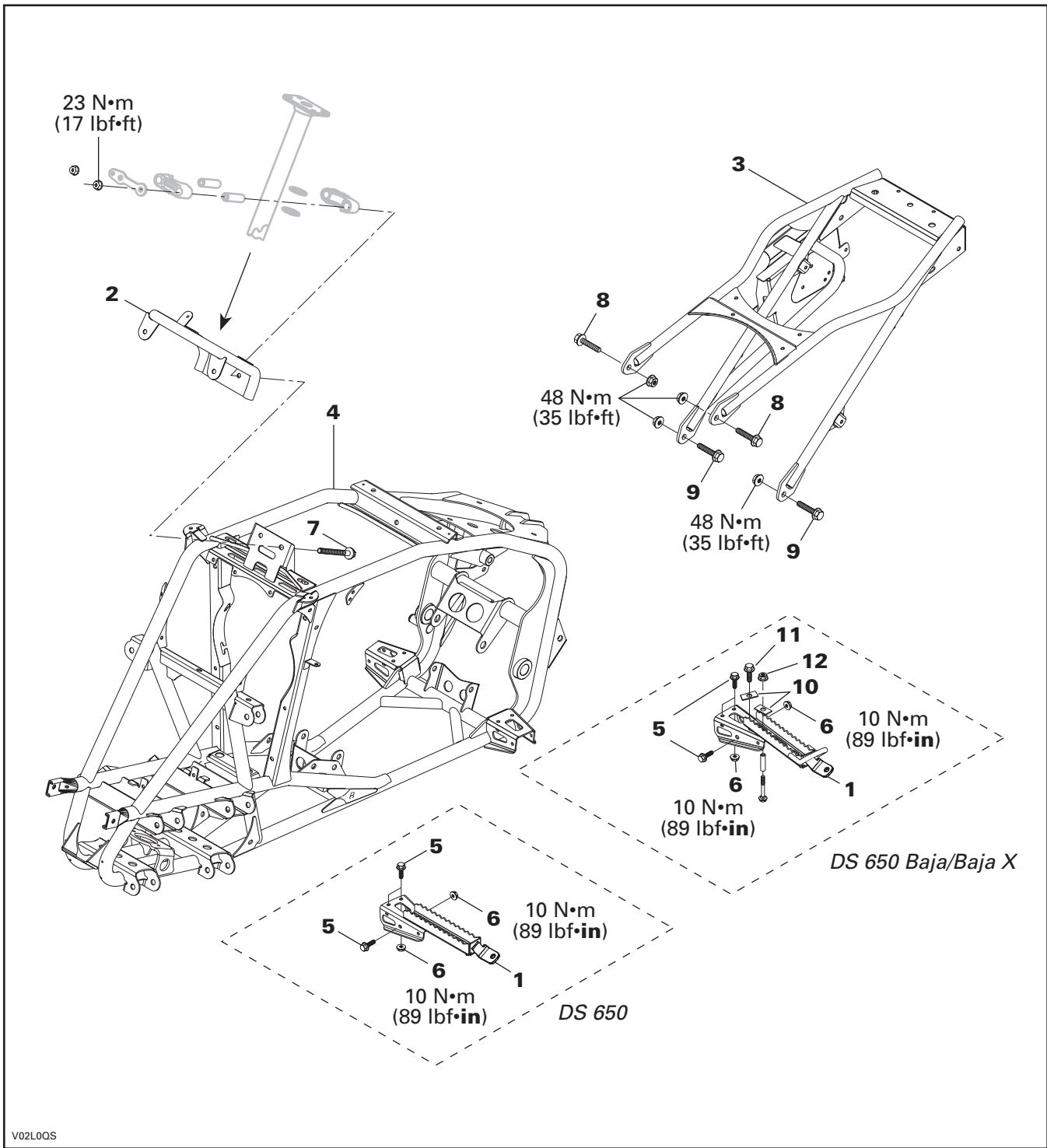
CAUTION: The following products must not be used to clean or wax any of the plastic components used on the vehicles:

- 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.

REPAIR

The plastic parts are produced in high density polyethylene (HDPE) or in low density polyethylene (LDPE). These materials are not repairable.

FRAME



Section 10 BODY/FRAME

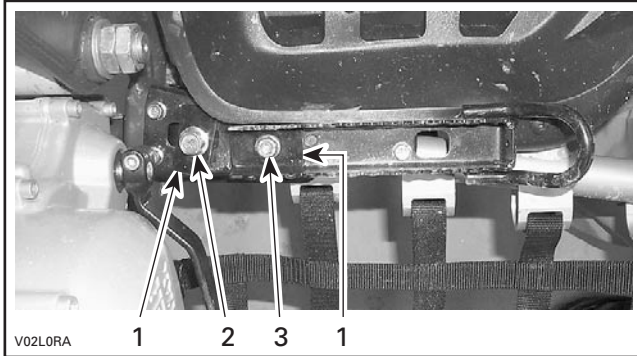
Subsection 03 (FRAME)

FOOTPEG

Removal

Baja X Models

Remove short plates **no. 10**, bolt **no. 11** and nut **no. 12**.



- 1. Short plates
- 2. Bolt
- 3. Nut

All Models

Unfasten foot protector supports from footpeg **no. 1** by removing mounting flanged bolts **no. 5** and flanged nuts **no. 6**.

Inspection

Check for cracks or bent plate. Change or repair if necessary.

Installation

Installation is essentially the reverse of removal procedure. Pay attention to align the nerf bar, during installation on Baja X Models.

DASHBOARD SUPPORT

Removal

Remove:

- dashboard (refer to BODY)
- fuel tank (refer to FUEL CIRCUIT)
- headlight (refer to ACCESSORIES)
- handle bar
(refer to STEERING/CONTROL SYSTEM)
- half housing bolts **no. 7**, stopper plates, half housings and housing bushings retaining steering column
(refer to STEERING/CONTROL SYSTEM).

Pull out the dashboard support **no. 2**.

Inspection

Check for cracks or bent tube. Change or repair if necessary.

Installation

For installation, reverse the removal procedure.

REAR FRAME EXTENSION

Removal

Remove:

- rear fender (refer to BODY)
- battery, starting solenoid and all wire attached to frame extension
- muffler (refer to REMOVAL AND INSTALLATION)
- rear shock absorber reservoir
(refer to REAR SUSPENSION)
- rear brake fluid reservoir and brake hoses
(refer to HYDRAULIC BRAKES)
- upper bolts of foot protectors supports
(refer to BODY)
- air intake silencer (refer to CARBURETOR AND AIR INTAKE SILENCER)
- brake light.

Unscrew bolts **nos. 8** and **9** retaining rear extension frame **no. 3** to the frame **no. 4**.

Inspection

Check for cracks, bent tube or other damage. Repair or change if necessary.

Installation

Installation is the reverse of removal procedure.

NOTE: On the RH side, the lower bolt **no. 9** must be installed with the head inside the frame.

FRAME

Removal

Remove all parts. Refer to the proper sections.

Installation

For installation, reverse the removal procedure.

Cleaning

Clean frame no. 4 and rear extension frame no. 3 with appropriate cleaners and rinse with high pressure hose.

Touch up all metal spots where paint has been scratched off. Spray all bare metal parts of vehicle with metal protector.

Welding

Steel Frame:

- electric welding
- amperage: 70 - 110 A
- voltage: 20 - 24 V
- rod: E-7014 (3/32 in).

CAUTION: Before performing electrical welding anywhere on the vehicle, unplug the electronic module. Also unplug the negative cable and the voltage regulator. This will protect the electronic module and battery against damage caused by flowing current when welding.

NOTE: Install the ground as close as possible to the repaired area.

CAUTION: If welding is to be done near plastic material, it is recommended to either remove the part from the area or to protect it with aluminum foil to prevent damage.

TECHNICAL DATA

SI* METRIC INFORMATION GUIDE

BASE UNITS			
DESCRIPTION		UNIT	SYMBOL
length		meter	m
mass		kilogram	kg
force		newton	N
liquid		liter	L
temperature		Celsius	°C
pressure		kilopascal	kPa
torque		newton•meter	N•m
speed		kilometer per hour	km/h
PREFIXES			
PREFIX	SYMBOL	MEANING	VALUE
kilo	k	one thousand	1 000
centi	c	one hundredth	0.01
milli	m	one thousandth	0.001
micro	μ	one millionth	0.000001
CONVERSION FACTORS			
TO CONVERT		TO †	MULTIPLY BY
in		mm	25.4
in		cm	2.54
in ²		cm ²	6.45
in ³		cm ³	16.39
ft		m	0.3
oz		g	28.35
lb		kg	0.45
lbf		N	4.4
lbf•in		N•m	0.11
lbf•ft		N•m	1.36
lbf•ft		lbf•in	12
PSI		kPa	6.89
imp. oz		U.S. oz	0.96
imp. oz		mL	28.41
imp. gal		U.S. gal	1.2
imp. gal		L	4.55
U.S. oz		mL	29.57
U.S. gal		L	3.79
MPH		km/h	1.61
Fahrenheit		Celsius	(°F - 32) ÷ 1.8
Celsius		Fahrenheit	(°C x 1.8) + 32

* The international system of units abbreviates SI in all languages.

† To obtain the inverse sequence, divide by the given factor. To convert "mm" to "in", divide by 25.4.

NOTE: Conversion factors are rounded off to 2 decimals for easier use.

Section 11 TECHNICAL DATA
Subsection 02 (ENGINE AND VEHICLE)

ENGINE AND VEHICLE

VEHICLE MODEL			DS 650	DS 650 BAJA	DS 650 BAJA X
ENGINE	Engine Type		4 Stroke, Double Overhead Camshaft, Bush Chain Drive, Liquid Cooled		
	Starting System		Electric (start in any gear with clutch applied or on neutral)		
	Number of Cylinder(s)		1		
	Number of Valves		4 Bucket Tappet-Operated Valves		
	Decompressor Type		Automatic		
	Bore	mm (in)	100 (3.94)		
	Stroke	mm (in)	83 (3.27)		
	Displacement	cm ³ (in ³)	652 (39.7)		
	Compression Ratio		9.7: 1		
	Intake Valve Opening		17° BTDC		
	Intake Valve Closing		45° ABDC		
	Exhaust Valve Opening		47° BBDC		
	Exhaust Valve Closing		15° ATDC		
	Valve Clearance When Engine Cold (maximum 35°C/95°F)	Exhaust/Intake	mm (in)	0.1 to 0.15 (.004 to .006)	
	Valve Length	Intake	mm (in)	90.91 and 90.76 (3.579 and 3.573)	
		Exhaust	mm (in)	90.65 and 90.05 (3.568 and 3.545)	
	Plate Diameter	Intake	mm (in)	36 (1.42)	
		Exhaust	mm (in)	31 (1.22)	
	Shaft Diameter	Intake	mm (in)	5.95 (.24)	
		Exhaust	mm (in)	5.935 (.23)	
	Valve Seat Angle	Intake	mm (in)	45°	
		Exhaust	mm (in)	30°	
	Piston Ring End Gap	New Minimum	mm (in)	0.2 (.008)	
		New Maximum	mm (in)	0.4 (.016)	
		Wear Limit	mm (in)	1 (.04)	
	Ring/Piston Groove Clearance	New Minimum	mm (in)	0.03 (.0012)	
		New Maximum	mm (in)	0.065 (.0026)	
		Wear Limit	mm (in)	0.15 (.006)	
	Piston/Cylinder Clearance	Wear Limit	mm (in)	0.09 (.004)	
	Cylinder	New Minimum	mm (in)	100 (3.9371)	
		New Maximum	mm (in)	100.012 (3.9376)	
		Wear Limit	mm (in)	100.03 (3.9382)	
	Crankshaft Balance Factor		%	47 ± 3	
Crankshaft Deflection		mm (in)	0.1 (.004)		
Connecting Rod Big End Axial Play	Wear Limit	mm (in)	0.8 (.794)		
Connecting Rod Small End I.D.	Wear Limit	mm (in)	22.04 (.868)		
Connecting Rod/Piston Pin Clearance	Wear Limit	mm (in)	0.06 (.002)		
Camshaft (intake and exhaust)	Bearing Point Ø	mm (in)	21.95 (.864)		
	Cam Height	mm (in)	39.7 (1.56)		
Timing Chain (gap from sealing face to piston of chain tensioner)		mm (in)	9.5 (.374)		
Lubrication		Dry Sump Lubrication by Oil Pump Replaceable Oil Filter			
Oil Filter		Main-Flow Type			
Air Filter Type		Cleanable Synthetic Panelette/Foam			
Exhaust System	Type	Bombardier, Stainless Header Pipe Painted Steel Muffler			
	Spark Arrester	USFS Approved			

Section 11 TECHNICAL DATA

Subsection 02 (ENGINE AND VEHICLE)

VEHICLE MODEL				DS 650	DS 650 BAJA	DS 650 BAJA X
ELECTRICAL	Magneto/Generator			290 W @ 6000 RPM		
	Ignition System Type			CDI (Capacitor Discharge Ignition)		
	Spark Plug	Make and Type		NGK DR8EA		
		Gap mm (in)		0.65 (.026)		
	Trigger Coil Ω			190 - 300		
	Battery Charging Coil Ω			0.3 @ 0.5		
	Ignition Coil	Primary Ω	0.4 to 0.9 @ 20°C (68°F)			
		Secondary kΩ	6 @ 13			
	Engine RPM Limiter			7700 (any gear in forward)	7900 (any gear in forward)	
	Battery	Type	Dry Battery Type			
		Voltage	12 Volts			
		Nominal Rating	13 A•h			
		Power Starter Output	0.9 KW			
	Head Lamp			30/30		
	Auxiliary Head Light			N.A.	2 x 35 W, H3	2 x 35 W, H3
	Taillight and Brake Light			8/27 W, 1157		
Fuse	Fan	15 A				
	Auxiliary Headlights	N.A.	15 A			
	Main	25 A				
CARBURATION	Carburetor	Type	Mikuni Constant Depression Type with Manual Choke			
		Model	BSR42-4			
	Idle Engine Speed RPM			1300 ± 100		
	Main Jet			165		
	Needle Jet			00		
	Jet Needle			6BCY22-60-4		
	Needle Valve and Seat			3.0 Hi Flow		
	Pilot Jet			40		
	Starter Jet No. 1 and No. 2 mm (in)			45 - Ø 2 (1.77 - Ø .079)		
	Main Air Jet			120		
	Pilot Air Jet No. 1			110		
	Pilot Air Jet No. 2 mm (in)			1.3 (.05)		
	Clip Position Number			4		
	Choke Plunger Position			2		
	Adjustment	Preliminary Pilot Screw Turn	Position for Maximum Speed at Idle			
		Idle Speed Preliminary Adjustment	At Least 1 Turn			
Float Level mm (in)		10 ± .5 (.394 ± .020)				
Fuel	Type	Super Unleaded Gasoline				
	Octane No.	91 (Ron + Mon)/2				
COOLING	Cooling Type			Liquid Cooled with Integrated Water Pump		
	Radiator			Front Mounted		
	Fan			Thermostatic		
	Fan Thermostat	Opening Temperature		90°C (205°F)		
		Closing Temperature		95°C (221°F)		
	Engine Thermostat	Opening Temperature		85°C (185°F)		
		Closing Temperature		75°C (167°F)		
	Radiator Cap Opening Pressure			110 kPa (16 PSI)		

Section 11 TECHNICAL DATA

Subsection 02 (ENGINE AND VEHICLE)

VEHICLE MODEL			DS 650	DS 650 BAJA	DS 650 BAJA X
TRANSMISSION	Transmission	Type	Integrated 5-Speed Constant Mesh Transmission		
	Clutch		1 Multi-Disc		
	Clutch Drum I.D.	mm (in)	145 (5.71)		
	Friction Plate Warpage (fall through a slot)	mm (in)	3.75 (.1476)		
	Friction Plate Wear Limit of the Whole Package	mm (in)	27.5 (1.0827)		
	Steel Driven Plate Warpage (fall through a slot)	mm (in)	1.63 (.0642)		
	Steel Driven Plate Wear Limit of the Whole Package	mm (in)	11.5 (.4528)		
	Clutch Spring Minimum Rate		27.4 mm @ 210 N (1.0787 in @ 47 lbf)		
	Clutch Spring Minimum Length	mm (in)	43 (1.69)		
DRIVE TRAIN	Drive Chain		Regina 530 ORT4		
	Engine Pinion	Teeth	16		
	Axle Sprocket	Teeth	40		
	Rear Axle		Shaft Driven/Solid Axle		
	Rear Axle Ratio		3.6: 1		
STEERING/ CONTROL	Turning Radius	mm (in)	3159 (124)		
	Total Toe-Out (vehicle on ground)	mm (in)	0.5 ± 0.5 (.0197 ± .0197)		
	Camber Angle/Caster Angle		0°/5.7°		
	Tie-Rod Maximum Length Unengaged	mm (in)	20 ± 5 (.787 ± .197)		
	Tie-Rod Maximum Length	mm (in)	452 (17.78)		
SUSPENSION	FRONT				
	Suspension Type		Independent Suspension — Double A-Arm		
	Suspension Travel mm (in)		305 (12)		
	Shock Absorber	Qty	2		
		Type	Oil	Oil/Gas	
	Spring Free Length mm (in)		368 (14.5)		
	Spring Color Code		Gold/Blue/Black	Gold/Green/Black	Green/Blue/Blue
	Front Preload Adjustment		Seat of Spring Threaded		
	REAR				
	Suspension Type		Rigid Swing Arm		
	Suspension Travel mm (in)		279.4 (11)		
	Shock Absorber	Qty	1		
		Type	Oil/Gas		
	Spring Free Length	Short mm (in)	52.7 (2.07)		
		Long mm (in)	251.5 (9.90)		
	Spring Color Code	Short	White/Yellow/Black	Silver/Yellow/Black	
		Long	Blue/Red/Red		
	Rear Preload Adjustment		Seat of Spring Threaded		
BRAKES	Front Brake	Qty	2 discs		
		Type	Hydraulic		
	Rear Brake	Qty	1 disc		
		Type	Hydraulic		
	Parking Device		RH Brake Lever Includes a Lock on Front Wheels		
	Lining Material		Metallic		
	Minimum Pad Thickness		1 mm (0.04 in) or Refer to the Mark on the Pad		
	Minimum Brake Disk Thickness mm (in)		3.5 (.138)		
	Maximum Brake Disk Warpage mm (in)		0.25 (.01)		
Caliper		Floating			

Section 11 TECHNICAL DATA

Subsection 02 (ENGINE AND VEHICLE)

VEHICLE MODEL				DS 650	DS 650 BAJA	DS 650 BAJA X			
TIRES AND WHEELS	TIRE								
	Pressure	Front	Recommended	34 kPa (5 PSI)					
			Minimum	21 kPa (3 PSI)					
		Rear	Recommended	34 kPa (5 PSI)					
			Minimum	21 kPa (3 PSI)					
	Minimum Tire Thread Depth			mm (in)			4 (0.16)		
	Size	Front			22 x 7 x 10				
		Rear			20 x 10 x 9				
	WHEELS								
Size	Front			10 x 5.5					
	Rear			9 x 8.5					
DIMENSION	Overall Length			mm (in)		1956 (77)	1968 (77.5)		
	Overall Width	Front	mm (in)		1232 (48.5)				
		Rear	mm (in)		1232 (48.5)				
	Overall Height			mm (in)		1206 (47.5)			
	Dry Weight			kg (lb)		225 (495)			
	Total Vehicle Load Allowed			kg (lb)		125 (275.5)			
	Wheel Base			mm (in)		1244 (49)			
	Wheel Track	Front	mm (in)		1048 (41)				
		Rear	mm (in)		978 (38.5)				
Front and Under Engine Ground Clearance			mm (in)		297 (11.7)				
Rear Rigid Axle Ground Clearance			mm (in)		120 (4.75)				
CAPACITIES	LIQUID								
	Fuel Tank			12 L (3.5 U.S. gal)					
	Fuel Tank Reserve			2.4 L (0.6 U.S. gal)					
	Engine/Transmission Oil	Capacity		3 L (0.8 U.S. gal)					
		Recommended		SAE 10W40, 4 Stroke Mineral Based Oil SG, SH or SJ or Bombardier synthetic oil 5W40 (P/N 293 600 039). Do Not Use Synthetic Oil, other than Bombardier brand name or any Synthetic Blend Oil. Refer to OIL VISCOSITY CHART for proper grade.					
	Hydraulics Brakes	Capacity		250 mL (8.5 U.S. oz)					
		Recommended		Brake Fluid DOT 4, ONLY					
	Cooling System	Capacity		1.75 L (0.58 U.S. gal)					
		Recommended		Use Coolant Specially Designed for Aluminum Engine					
Ethylene-Glycol Concentration				50%					

Section 11 TECHNICAL DATA
Subsection 02 (ENGINE AND VEHICLE)

VEHICLE MODEL			DS 650	DS 650 BAJA	DS 650 BAJA X
MATERIAL	Frame	Material	Steel		
		Color	Grey		
	Front/Rear Bumper	Material	Steel	Aluminum	
		Color	Grey	Aluminum	
	Front/Rear Fender	Material	High Density Polyethylene		
		Color	Yellow or Black	Orange	
	Fuel Tank Cover	Material	High Density Polyethylene		
		Color	Black		
	Steering Cover	Material	Foam and Vinyl		
		Color	Yellow or Black	Orange	
	Front Facia	Material	High Density Polyethylene		
		Color	Red	Black	
	Air Box and Cover	Material	Low Density Polyethylene		
		Color	Black		
	Mudguard	Material	Synprene		
		Color	Black		
	Seat Cover	Material	Vinyl		
		Color	Black/Orange		

Section 11 TECHNICAL DATA

Subsection 02 (ENGINE AND VEHICLE)

VEHICLE MODEL			DS 650	DS 650 BAJA	DS 650 BAJA X
TORQUE	ENGINE				
	Engine Support	M8		26 N•m (19 lbf•ft)	
		M10		64 N•m (47 lbf•ft)	
		M14		135 N•m (100 lbf•ft)	
	Spark Plug			20 N•m (15 lbf•ft)	
	Magnetto Nut			180 N•m (133 lbf•ft)	
	Starter			10 N•m (89 lbf•in)	
	Starter Red (+) Cable			6 N•m (53 lbf•in)	
	Oil Pressure Switch			12 N•m (106 lbf•in)	
	COOLING				
	Radiator Mount Screw/Nut			10 N•m (89 lbf•in)	
	Radiator Protector			1.5 N•m (13 lbf•in)	
	Temperature Sensor			22 N•m (16 lbf•ft)	
	Water Pump Cover			10 N•m (89 lbf•in)	
	Fan Mount Screw/Nut			11 N•m (97 lbf•in)	
	Temperature Sender			35 N•m (26 lbf•ft)	
	EXHAUST				
	Exhaust Pipe Nut			11 N•m (97 lbf•in)	
	Heat Shield Screws			10 N•m (89 lbf•in)	
	Exhaust Pipe Collar			15 N•m (133 lbf•in)	
	Muffler Support			26 N•m (19 lbf•ft)	
	Pipe Support			10 N•m (89 lbf•in)	
	FUEL				
	Carburetor Mounting Clamp	Engine Side		2.5 N•m (22 lbf•in)	
		Air Box Side			
	DRIVE TRAIN				
	Front Wheel Hub Nut			135 N•m (100 lbf•ft) (MINIMUM)	
	Rear Wheel Hub Nut			235 N•m (173 lbf•ft) (MINIMUM)	
	Rear Axle Adjusting Nut			Refer to REAR AXLE section for the proper torquing sequence.	
	Sprocket Protector			4 N•m (35 lbf•in)	
	Eccentric Axle Housing Bolts			44 N•m (32 lbf•ft)	
	Sprocket Nuts			80 N•m (59 lbf•ft)	
	Chain Roller			23 N•m (17 lbf•ft)	
	WHEEL				
	Wheel Nuts			53 N•m (39 lbf•ft)	
	STEERING/CONTROL				
	Tie Rod Ends			75 N•m (55 lbf•ft)	
	Steering Arm (castellated nut)			58 N•m (43 lbf•ft)	
	Steering Column Support Screws			23 N•m (17 lbf•ft)	
	Handlebar Screws			23 N•m (17 lbf•ft)	
	Flanged Bearing Bolts			10 N•m (89 lbf•in)	

Section 11 TECHNICAL DATA

Subsection 02 (ENGINE AND VEHICLE)

VEHICLE MODEL			DS 650	DS 650 BAJA	DS 650 BAJA X
TORQUE	SUSPENSION				
	Shock Absorber Bolt	Front	48 N•m (35 lbf•ft)		
		Rear	85 N•m (63 lbf•ft)		
	Rear Swing Arm LH First Nut		100 N•m (74 lbf•ft), Unscrew Nut a Quarter Turn		
	Rear Swing Arm LH Nut		100 N•m (74 lbf•ft)		
	Upper/Lower A-Arm Lock Nut		60 N•m (48 lbf•ft)		
	Ball Joint Nuts		50 N•m (37 lbf•ft) MINIMUM		
	BRAKE				
	Caliper Brake Screws		24 N•m (17 lbf•ft)		
	Brake Disk Screws		34 N•m (25 lbf•ft)		
	BODY/FRAME				
	Front Bumper		24 N•m (17 lbf•ft)		
	Rear Extension Frame		48 N•m (35 lbf•ft)		
	Footrest		10 N•m (89 lbf•in)		
	Skid Plate		4 N•m (35 lbf•in)		

WIRING DIAGRAMS

WARNING

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

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.

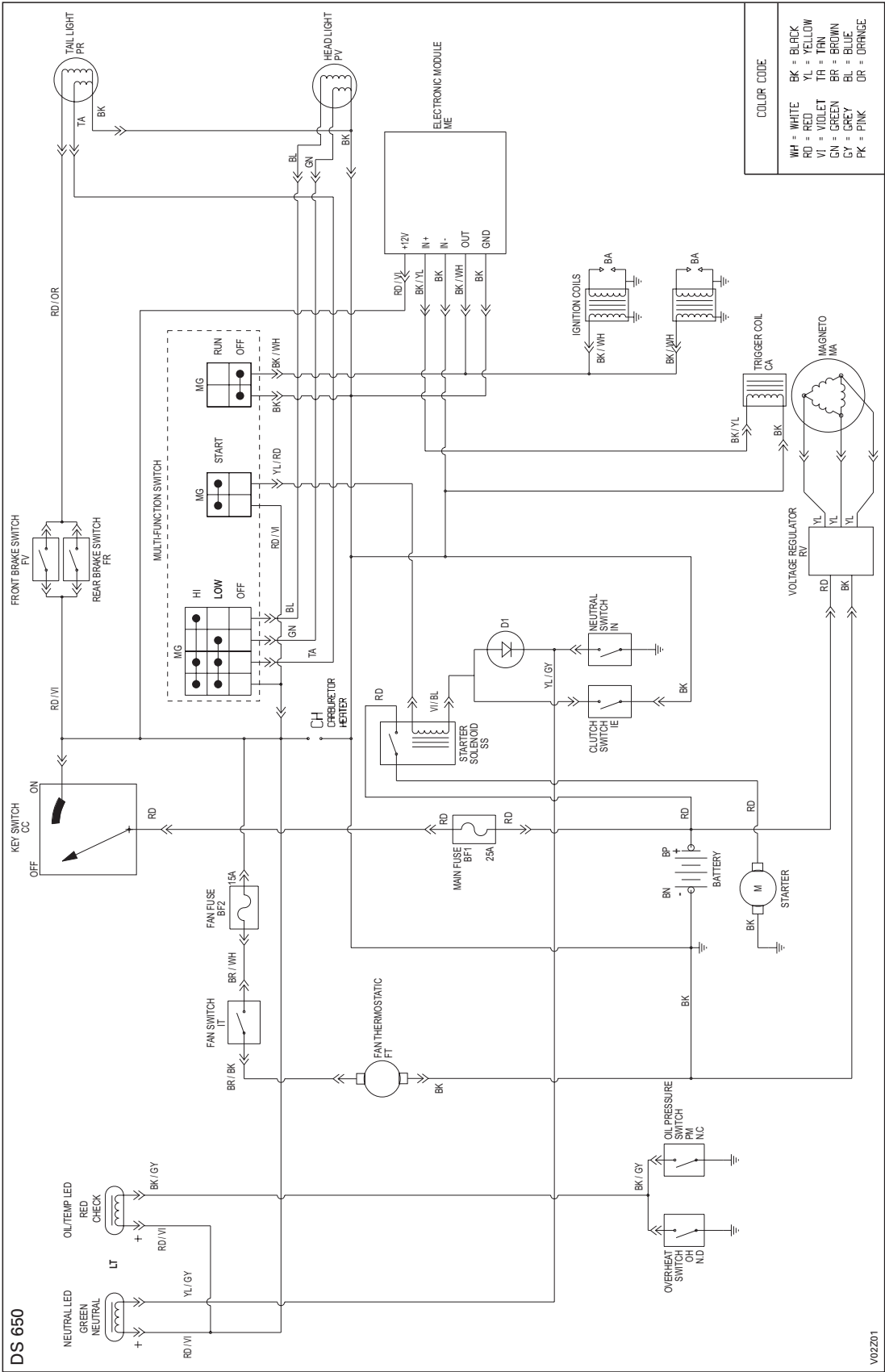
Example: YL/BK is a YELLOW wire with a BLACK stripe.

COLOR CODE			
BK	—	BLACK	PK — PINK
BL	—	BLUE	RD — RED
BR	—	BROWN	TA — TAN
GN	—	GREEN	VI — VIOLET
GY	—	GREY	WH — WHITE
OR	—	ORANGE	YL — YELLOW

Section 12 WIRING DIAGRAMS

Subsection 01 (WIRING DIAGRAMS)

DS 650



Subsection 01 (WIRING DIAGRAMS)

DS 650 Baja/Baja X

