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First Edition, May 2006
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T100LAA001**

PREFACE

This Service Manual describes the technical features and servicing procedures for the **MXU 500**.

Section 1 contains the precautions for all operations stated in this manual. Read them carefully before any operation is started.

Section 2 is the removal/installation procedures for the frame covers which are subject to higher removal/installation frequency during maintenance and servicing operations.

Section 3 describes the inspection/adjustment procedures, safety rules and service information for each part, starting from periodic maintenance.

Sections 4 through 12 give instructions for disassembly, assembly and adjustment of engine parts. Section 13 through 16 is the removal/ installation of chassis. Section 17 through 21 states the testing and measuring methods of electrical equipment.

Most sections start with an assembly or system illustration and troubleshooting for the section. The subsequent pages give detailed procedures for the section.

The information and contents included in this manual may be different from the vehicle in case specifications are changed. KYMCO reserves the right to make changes at any time without notice and without incurring any obligation.

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KWANG YANG MOTOR CO., LTD.
OVERSEAS SALES DEPARTMENT
OVERSEAS SERVICE SECTION

1. GENERAL INFORMATION

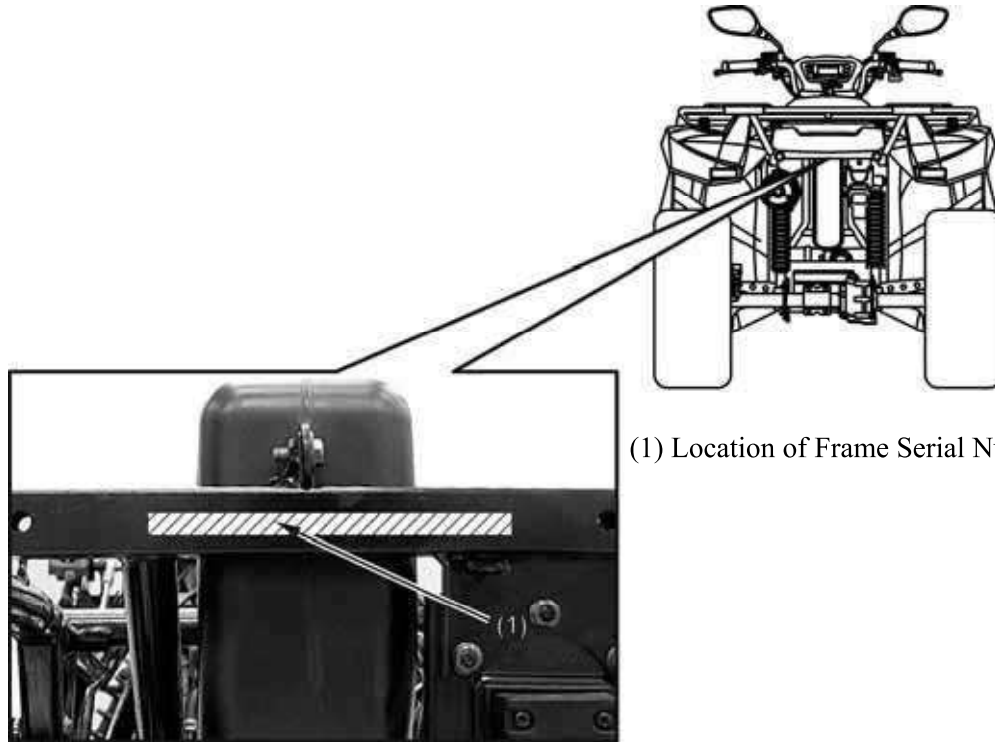
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GENERAL INFORMATION

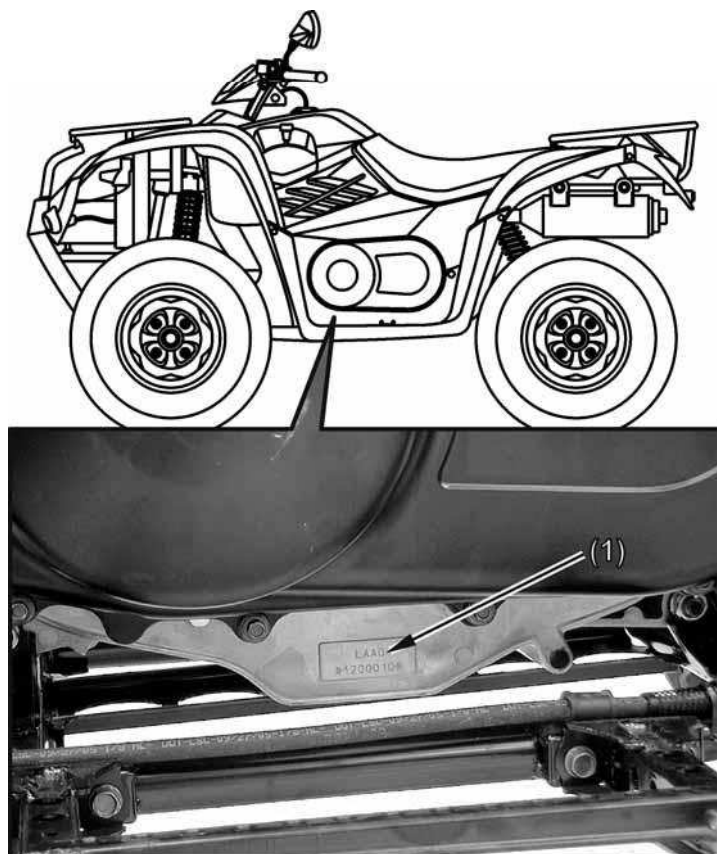
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1. GENERAL INFORMATION

SERIAL NUMBER



(1) Location of Frame Serial Number



(1) Location of Engine Serial Number

1. GENERAL INFORMATION

SPECIFICATIONS

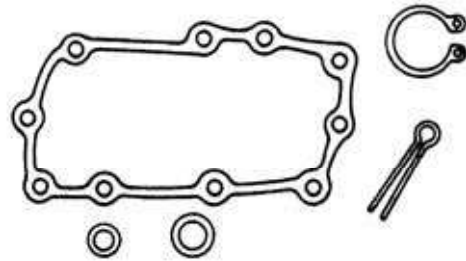
Model No.		LAA0	
Name & Type		MXU 500	
Overall length		2203 mm (88.12 in)	
Overall width		1223 mm (48.92 in)	
Overall height		1240 mm (49.6 in)	
Wheel base		1293 mm (51.72 in)	
Engine type		O.H.C.	
Displacement		498.5 cm ³ (30.48 cu-in)	
Fuel used		92# nonleaded gasoline	
Dry weight	Front wheel	154 kg (338.8 lbs)	
	Rear wheel	134 kg (294.8 lbs)	
	Total	288 kg (633.6 lbs)	
Curb weight	Front wheel	164 kg (360.8 lbs)	
	Rear wheel	144 kg (316.8 lbs)	
	Total	308 kg (648 lbs)	
Tires	Front wheel	25X8-12	
	Rear wheel	25X10-12	
Ground clearance		235 mm (9.4 in)	
Min. turning radius		3350 mm (134 in)	
Engine	Starting system		Electric/Recoil starter
	Type		Gasoline, 4-stroke
	Cylinder arrangement		Single cylinder
	Combustion chamber type		Semi-sphere
	Valve arrangement		O.H.C., chain drive
	Bore x stroke		92X75 mm (3.68X3 in)
	Compression ratio		10.5:1
	Compression pressure		15 kgf/cm ² (1500kPa, 213 psi)
	Intake valve (at 1mm lift)	Opens	5° BTDC
		Closes	45° ABDC
	Exhaust valve (at 1mm lift)	Opens	45° BBDC
		Closes	5° ATDC
	Valve clearance (cold)	Intake	0.1 mm (0.004 in)
		Exhaust	0.1 mm (0.004 in)
	Idle speed (rpm)		1500 rpm
	Cooling type		Liquid cooled

Lubrication System	Lubrication type		Forced pressure & Wet sump
	Oil pump type		Trochoid
	Oil filter type		Full-flow filtration
	Oil capacity		3.6 L (3.17 Imp qt, 3.82 Us qt)
Fuel System	Oil exchanging capacity		3 L (2.64 Imp qt, 3.18 Us qt)
	After draining and oil filter cartridge change		3.2 L (2.82 Imp qt, 3.39 Us qt)
Carburetor	Air cleaner type & No		Wet type element
	Fuel capacity		17 L (3.57 Imp gal, 4.42 US gal)
	Type		CVK
	Main jet	ON ROAD	#128
		OFF ROAD	#130
Slow jet		#40	
Choke jet		#90	
Ignition System	Type		Full transistor digital ignition
	Ignition timing		5°/1500 rpm
	Spark plug		CR7E (NGK)
	Spark plug gap		0.6~0.7mm (0.024~0.028 in)
Battery		Capacity	12V18AH
Drive Train	Clutch type		Wet, centrifugal automatic
	Clutch operation system		Automatic (V-belt)
	Primary reduction system		V-belt
	Secondary reduction system		Shaft drive
	High reduction ratio		3.76
	Low reduction ratio		6.464
Moving Device	Reverse ratio		5.31
	FR/RR tire rolling circumference		1995/1995 mm (79.8/79.8 in)
	Tire pressure	Front	0.28 kg/cm ²
		Rear	(28 Kpa, 3.2 psi)
	Turning angle	Left	36°
Right		36°	
Brake system type		Front	Disk brake
		Rear	Disk brake
Suspension type		Front	Double wishbone
		Rear	Link suspension
Frame type		Double cradle	

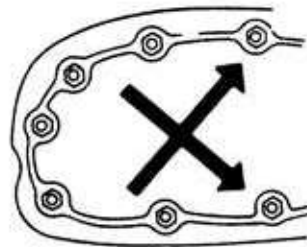
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SERVICE PRECAUTIONS

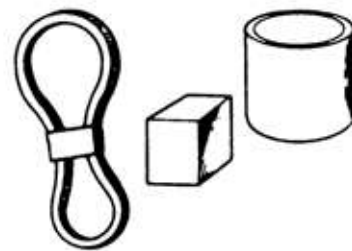
- Make sure to install new gaskets, O-rings, circlips, cotter pins, etc. when reassembling.



- When tightening bolts or nuts, begin with larger-diameter to smaller ones at several times, and tighten to the specified torque diagonally.



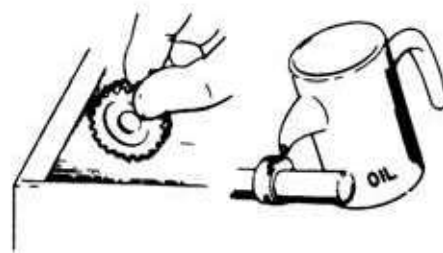
- Use genuine parts and lubricants.



- When servicing the motorcycle, be sure to use special tools for removal and installation.

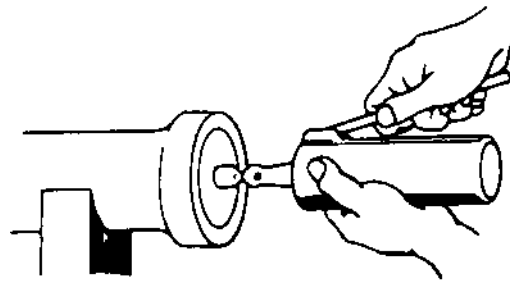


- After disassembly, clean removed parts. Lubricate sliding surfaces with engine oil before reassembly.

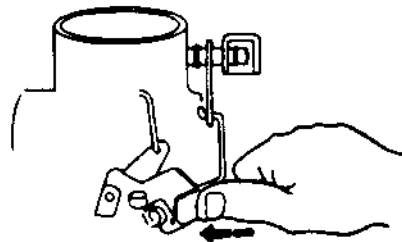


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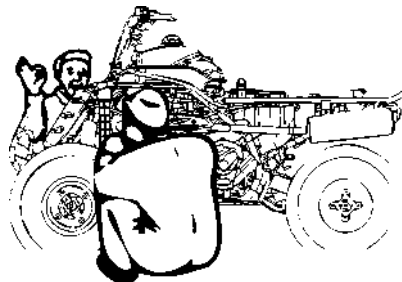
- Apply or add designated greases and lubricants to the specified lubrication points.



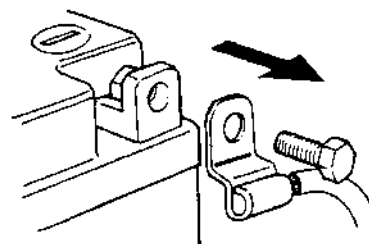
- After reassembly, check all parts for proper tightening and operation.



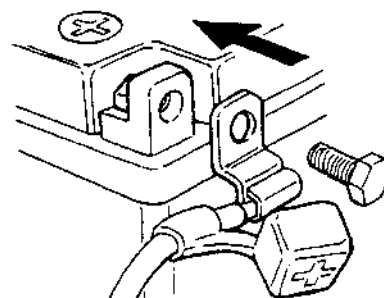
- When two persons work together, pay attention to the mutual working safety.



- Disconnect the battery negative (-) terminal before operation.
- When using a spanner or other tools, make sure not to damage the motorcycle surface.

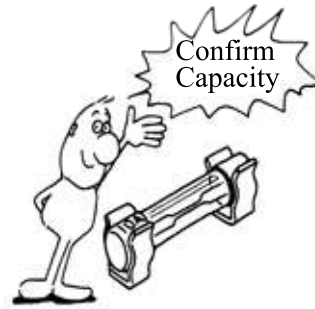


- After operation, check all connecting points, fasteners, and lines for proper connection and installation.
- When connecting the battery, the positive (+) terminal must be connected first.
- After connection, apply grease to the battery terminals.
- Terminal caps shall be installed securely.



1. GENERAL INFORMATION

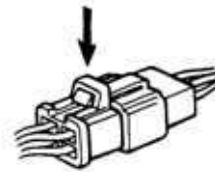
- If the fuse is burned out, find the cause and repair it. Replace it with a new one according to the specified capacity.



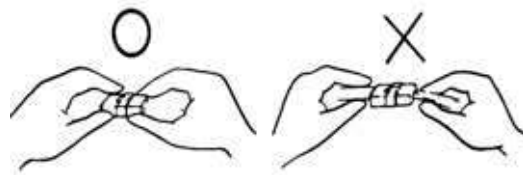
- After operation, terminal caps shall be installed securely.



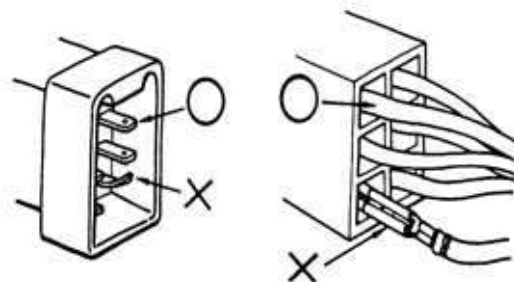
- When taking out the connector, the lock on the connector shall be released before operation.



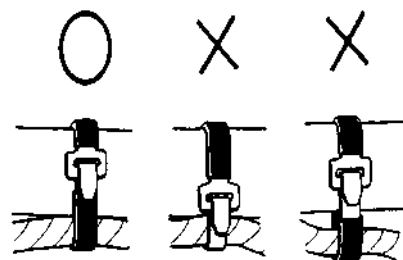
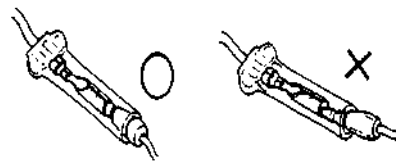
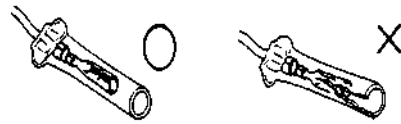
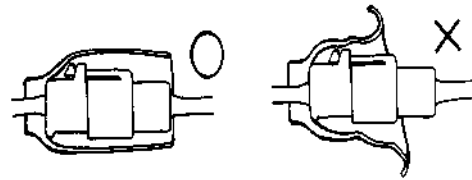
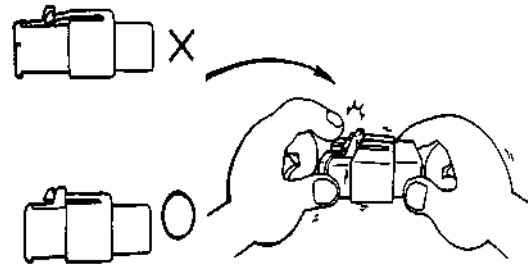
- Hold the connector body when connecting or disconnecting it.
- Do not pull the connector wire.



- Check if any connector terminal is bending, protruding or loose.

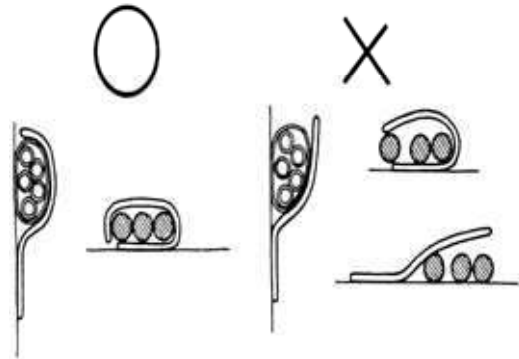


1. GENERAL INFORMATION



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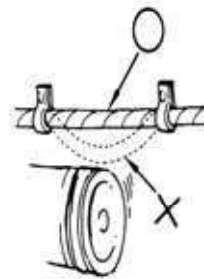
- After clamping, check each wire to make sure it is secure.



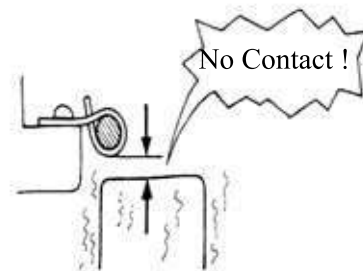
- Do not squeeze wires against the weld or its clamp.



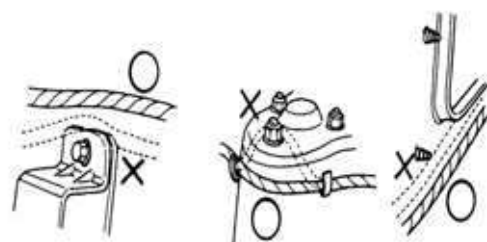
- After clamping, check each harness to make sure that it is not interfering with any moving or sliding parts.

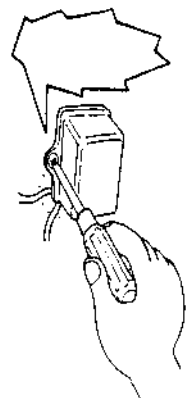
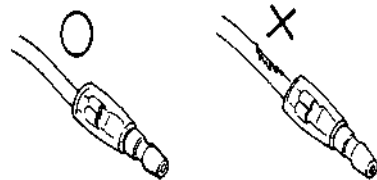
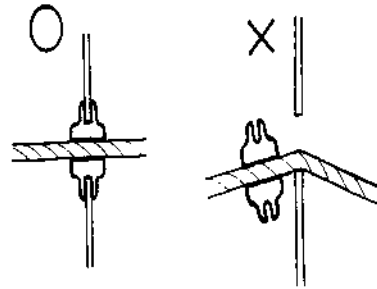
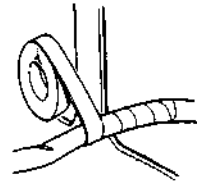
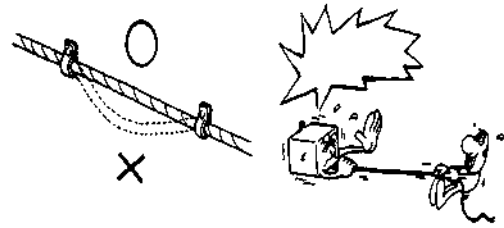


- When fixing the wire harnesses, do not make it contact the parts which will generate high heat.



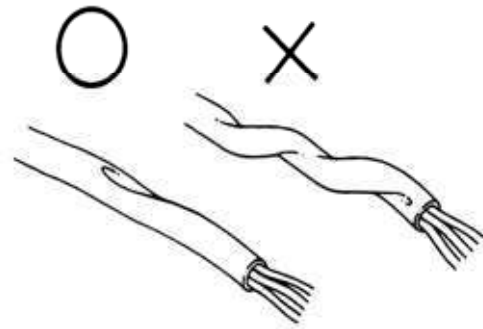
- Route wire harnesses to avoid sharp edges or corners. Avoid the projected ends of bolts and screws.
- Route wire harnesses passing through the side of bolts and screws. Avoid the projected ends of bolts and screws.



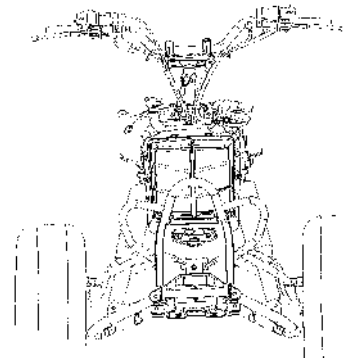


1. GENERAL INFORMATION

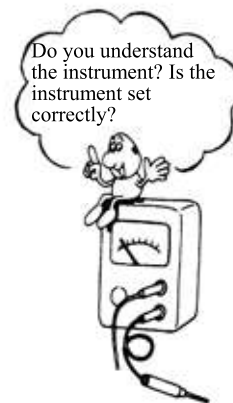
- After routing, check that the wire harnesses are not twisted or kinked.



- Wire harnesses routed along with handlebar should not be pulled tight, have excessive slack or interfere with adjacent or surrounding parts in all steering positions.



- When a testing device is used, make sure to understand the operating methods thoroughly and operate according to the operating instructions.



- Be careful not to drop any parts.



- When rust is found on a terminal, remove the rust with sand paper or equivalent before connecting.



1. GENERAL INFORMATION

■ Symbols:

The following symbols represent the servicing methods and cautions included in this service manual.



: Apply engine oil to the specified points. (Use designated engine oil for lubrication.)



: Apply grease for lubrication.



: Transmission Gear Oil (90#)



: Caution



: Warning

1. GENERAL INFORMATION

TORQUE VALUES

STANDARD TORQUE VALUES

Item	Torque kgf-m (N-m, lbf-ft)	Item	Torque kgf-m (N-m, lbf-ft)
5mm bolt and nut	0.5 (5, 3.6)	4mm screw	0.3 (3, 2.2)
6mm bolt and nut	1 (10, 7.2)	5mm screw	0.4 (4, 2.9)
8mm bolt and nut	2.2 (22, 16)	6mm screw, SH bolt	0.9 (9, 6.5)
10mm bolt and nut	3.5 (35, 25)	6mm flange bolt and nut	1.2 (12, 9)
12mm bolt and nut	5.5 (55, 40)	8mm flange bolt and nut	2.7 (27, 20)
14mm bolt and nut	7 (70, 50)	10mm flange bolt and nut	4 (40, 29)

Torque specifications listed below are for important fasteners.

ENGINE

Item	Q'ty	Thread dia. (mm)	Torque kgf-m (N-m, lbf-ft)	Remarks
MAINTENANCE:				
Spark plug	1	10	1.2 (12, 8.6)	
Tappet ADJ nut	4	5	0.9 (9, 6.5)	
Engine oil filter cap	1	30	1.5 (15, 11)	Apply oil
Engine oil filter cartridge	1	20	1 (10, 7.2)	Apply oil
Engine drain plug	1	12	2.5 (25, 18)	
LUBRICATION SYSTEM:				
Oil pump screw	1	4	0.3 (3, 2)	
Oil pipe bolt	2	16	3.5 (35, 25.2)	Apply oil
COOLING SYSTEM:				
Water pump bolt	2	6	1.3 (13, 9)	
Fan motor bolt	4	5	0.53 (5, 2.8)	
Fan motor switch	1	16	1.8 (17, 13)	

(Cont'd)

1. GENERAL INFORMATION

Item	Q'ty	Thread dia. (mm)	Torque kgf-m (N-m, lbf-ft)	Remarks
CYLINDER HEAD:				
Cylinder head bolt	4	10	4.8 (48, 34.6)	Apply oil
Cylinder head bolt	9	8	2.3 (23, 17)	Apply oil
Cylinder head nut	2	6	1 (10, 7)	
Cylinder head cover	4	6	1 (10, 7)	
Breather separator bolt	3	6	1.3 (13, 9)	
Cam chain tensioner bolt	2	6	1.2 (12, 8.6)	
Tensioner sealing bolt	1	10	1 (10, 7)	
Rocker arm shaft	2	18	4.5 (45, 32.4)	Apply oil
Chain guide pivot bolt	2	8	2 (20, 15)	
Water joint bolt	2	6	1.2 (12, 8.6)	
CYLINDER:				
Cylinder bolt	2	6	1 (10, 7.2)	
DRIVE/DRIVEN PULLEY:				
Drive pulley nut	1	20	14 (140, 100.8)	Apply oil
Wet clutch nut	1	25	14 (140, 100.8)	
Driven pulley nut	1	16	10 (100, 72)	Apply oil
Driven pulley assembly plate nut	1	36	7.5 (75, 54)	
TRANSMISSION:				
Crankcase bolt	19	6	1.2 (12, 8.6)	Apply oil
Drive bevel gear nut	1	20	14 (140, 100.8)	Apply oil
Driven bevel gear nut	1	20	14 (140, 100.8)	Apply oil
Stopper lever bolt	1	8	2.5 (25, 18)	
Stopper lever boss nut	1	12	3 (30, 21.6)	
Shift came stopper plug	1	20	4.8 (48, 35)	
Output shaft bearing nut	1	85	11 (110, 79.2)	Apply oil
Drive shaft bearing bolt	4	8	3 (30, 21.6)	
STARTER SYSTEM:				
Starter pulley nut	1	14	5.5 (55, 40)	

1. GENERAL INFORMATION

FRAME

Item	Q'ty	Thread dia. (mm)	Torque Kgf-m (N-m, lbf-ft)	Remarks
MAINTENANCE:				
Rear drive gear oil drain bolt	1	8	2 (20, 15)	
Rear drive gear oil filler cap	1	30	1.5 (15, 11)	
Rear drive gear oil level check bolt	1	8	2 (20, 15)	
Front drive gear oil drain bolt	1	14	3.2 (32, 23)	
Front drive gear oil filler cap	1	18	3.5 (35 25.5)	
Front drive gear oil level check bolt	1	6	1 (10, 7.2)	
Tie-rod adjusting nut	4	10	3.5 (35 25.5)	
Front wheel hub nut	2	18	7 (70, 50)	Castle nut
Rear wheel hub nut	2	16	10 (100, 72)	Castle nut
EXHAUST MUFFLER:				
Exhaust muffler mounting bolt	2	8	3.5 (35, 25)	
Exhaust pipe mounting nut	2	8	3.5 (35, 25)	
Exhaust muffler band bolt	1	8	2.1 (21, 15)	
ENGINE ASSEMBLY:				
Engine mounting bolt/nut	3	10	6 (60, 43.5)	
Engine hanger nut	4	8	3.5 (35, 25)	
DRIVE TRAIN:				
Front drive:			4.5 (45, 32.4)	
Front propeller shaft bolt	3	10	4 (40, 29)	
Front drive gear case mounting bolt	2	10	1.5 (15, 11)	Apply threebond: 1215
Shifting fork shaft plug	1	8	2.3 (23, 16.5)	Apply threebond: 1215
Front drive gear case bolt	9	8	2.3 (23, 16.5)	Apply threebond: 1215
2WD/4WD shift motor mounting bolt	1	8	1.2 (12, 8.5)	
2WD/4WD shift motor mounting bolt	2	6		
Rear drive:			5.5 (55, 40)	
Rear drive gear case mounting nut	8	10	5 (49, 36)	Apply threebond: 1215
Rear drive gear case bolt	2	10	2.5 (25, 19)	Apply threebond: 1215
Rear drive gear case bolt	6	8		

(Cont'd)

1. GENERAL INFORMATION

Item	Q'ty	Thread dia. (mm)	Torque Kgf-m (N-m, lbf-ft)	Remarks
STEERING SYSTEM:				
Handlebar holder bolt	4	8	2.5 (25, 18)	
Steering bracket	2	8	2.2 (22, 16)	
Steering column nut	1	14	7 (70, 50)	
Tie-rod ball joint nut	4	10	2.1 (21, 16)	Castle nut
WHEEL:				
Front wheel nut	8	10	6.5 (65, 46)	
Rear wheel nut	8	10	6.5 (65, 46)	
SUSPENSION:				
Front:				
Front swing arm bolt/nut	6	10	4.5 (45, 32)	
Knuckle ball joint nut	4	12	3 (30, 22)	Castle nut
Front shock absorber mount bolt/nut	4	10	4 (40, 29)	
Rear:				
Rear shock absorber mount bolt/nut	4	10	4 (40, 29)	
Right pivot bolt	1	30	11.8 (118, 85)	
Left pivot bolt	1	30	1.1 (11, 8)	
Left pivot lock nut	1	30	11.8 (118, 85)	
Axle housing mounting bolt/nut	8	10	5.5 (55, 40)	
BRAKE SYSTEM:				
Front brake disc bolt	8	8	3.5 (35, 25.2)	
Rear brake disc bolt	4	8	3.5 (35, 25.2)	
Brake caliper mounting bolt	8	8	3.2 (32, 24)	
Brake hose oil bolt	10	10	3.5 (35, 25)	
Master cylinder holder bolt	4	6	1.2 (12, 8.6)	
Brake pad mounting bolt	8	8	1.8 (18, 13)	
Bleed valve nut	5	6	0.6 (6, 4.32)	OFF ROAD: 4 Q'ty
Delay valve mounting bolt	2	6	1.2 (12, 8.6)	ON ROAD only
Delay valve plug	1	20	5 (50, 36)	ON ROAD only

1. GENERAL INFORMATION

SPECIAL TOOLS

Tool Name	Tool No.	Illustration (Note: the special tools may differ slightly from those shown in the figure of this manual.)
Oil seal and bearing installer	A120E00014	
Valve adjuster (Refer to the “VALVE CLEARANCE” section in the chapter 3.)	A120E00036	
Bearing puller	A120E00037	
Valve spring compressor (Refer to the “CYLINDER HEAD DISASSEMBLY/INSPECTION/ASSEMBLY” section in the chapter 8.)	A120E00040	
Universal holder (Refer to the “DRIVE PULLEY, DRIVE V-BELT AND DRIVEN PULLEYREMOVAL/INSPECTION/INSTALLATION” section and “CLUTCH REMOVAL/INSTALLATION” section in the chapter 10.)	A120E00056	
Drive pulley holder (Refer to the “DRIVE PULLEY, DRIVE V-BELT AND DRIVEN PULLEYREMOVAL/INSPECTION/INSTALLATION” section in the chapter 10.)	A120E00058	

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1. GENERAL INFORMATION

Tool Name	Tool No.	Illustration (Note: the special tools may differ slightly from those shown in the figure of this manual.)
Driven pulley holder (Refer to the “ DRIVEN PULLEY DISASSEMBLY/INSPECTION/ASSEMBLY ” section in the chapter 10.)	A120E00059	
Flywheel puller (Refer to the “ STARTER CLUTCH REMOVAL/INSPECTION/INSTALLATION ” section in the chapter 19.)	A120E00060	
Oil filter cartridge wrench (Refer to the “(Refer to the “ ENGINE OIL ” section in the chapter 3.)	A120E00061	
Output shaft bearing nut wrench (Refer to the “(Refer to the “ BEARING REPLACEMENT IN THE RIGHT CRANKCASE ” section in the chapter 11.)	A120E00066	
Lock nut wrench (Refer to the “ CLUTCH REMOVAL/INSTALLATION ” section in the chapter 10)	A120E00067	



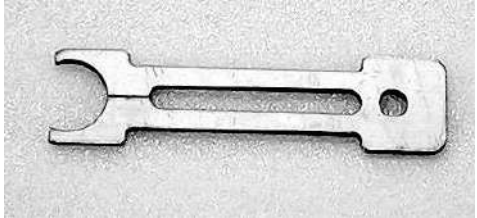
(Cont'd)

1. GENERAL INFORMATION

Tool Name	Tool No.	Illustration (Note: the special tools may differ slightly from those shown in the figure of this manual.)
Crankshaft bearing puller	A120E00068	
Ball joint remover (Refer to the “ STEERING KNUCKLE REMOVAL/INSPECTION/INSTALLATION ” section in the chapter 15)	A120F00012	
Left pivot lock nut wrench (Refer to the “ REAR SWING ARM REMOVAL/INSTALLATION ” section in the chapter 15)	A120F00013	
Joint yoke puller (Refer to the “ FRONT DRIVE DISASSEMBLY/INSPECTION/ASSEMBLY ” section in the chapter 13)	A120F00016	
Drive shaft puller (Refer to the “ FRONT DRIVE SHAFT REOMVAL/INSPECTION/INSTALLATION ” section in the chapter 13)	A120F00017	
Yoke bearing puller (Refer to the “ FRONT DRIVE DISASSEMBLY/INSPECTION/ASSEMBLY ” section in the chapter 13)	A120F00018	

(Cont'd)

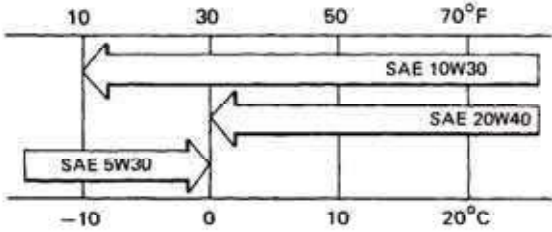
1. GENERAL INFORMATION

Tool Name	Tool No.	Illustration (Note: the special tools may differ slightly from those shown in the figure of this manual.)
Pinion bearing lock nut wrench (Refer to the “ REAR DRIVE DISASSEMBLY/INSPECTION/ASSEMBLY ” section in the chapter 13.)	A120F00020	
Pinion puller (Refer to the “ REAR DRIVE DISASSEMBLY/INSPECTION/ASSEMBLY ” section in the chapter 13.)	A120F00021	
C-ring remover (Refer to the “ FRONT DRIVE DISASSEMBLY/INSPECTION/ASSEMBLY ” section in the chapter 13)	A120F00022	

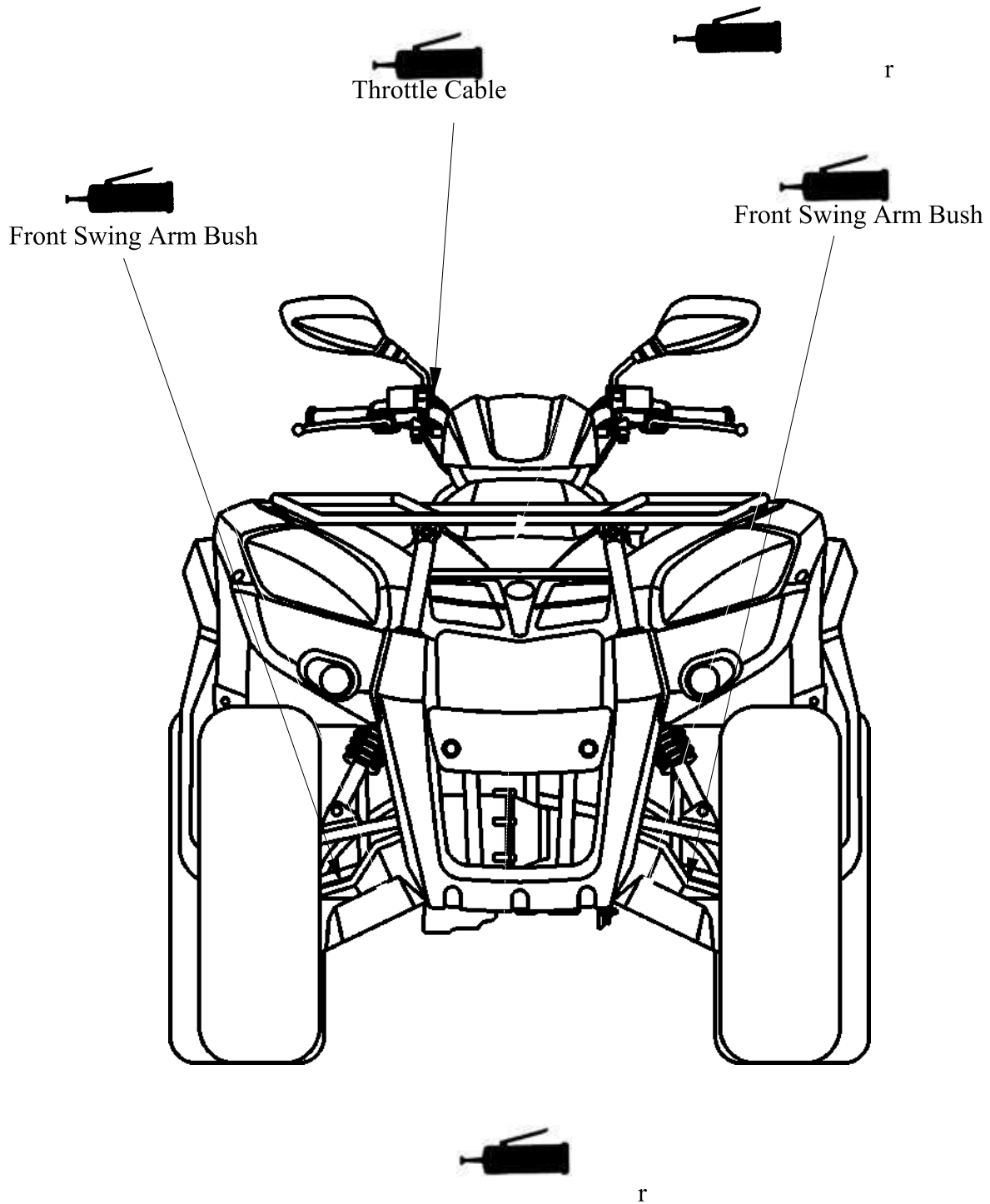
1. GENERAL INFORMATION

LUBRICATION POINTS

ENGINE

Lubrication Points	Lubricant
Valve guide/valve stem movable part Camshaft protruding surface Valve rocker arm friction surface Camshaft drive chain Cylinder lock bolt Piston surroundings and piston ring grooves Piston pin surroundings Cylinder inside wall Connecting rod/piston pin hole Connecting rod big end Clutch Crankshaft Balance shaft Crankshaft one-way clutch movable part Recoil starter pulley Oil pump drive chain Starter reduction gear Starter one-way clutch O-ring face Oil seal lip Output shaft Bevel gear Drive shaft Countershaft Main shaft Transmission gear shaft bearing part	<ul style="list-style-type: none"> •Genuine KYMCO Engine Oil (SAE5W-50) •API SJ Engine Oil 
Front drive gear and bearing part	Gear oil: SAE 90#
Rear drive gear and bearing part	Gear oil: SAE 80#

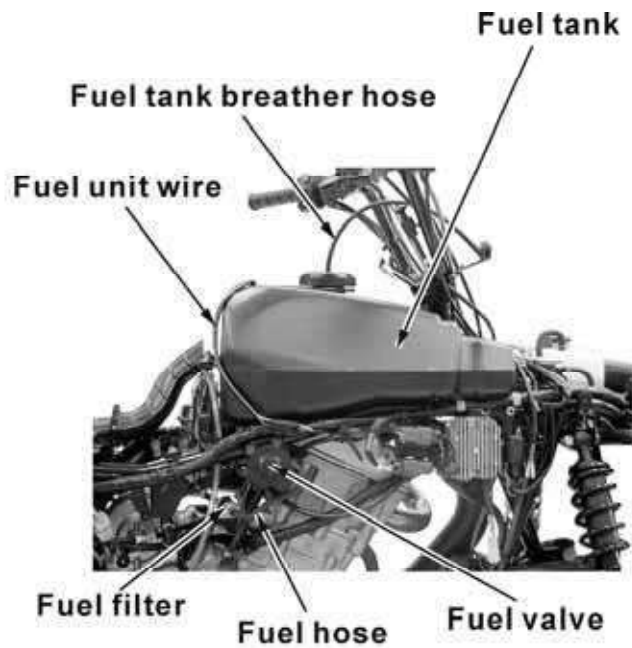
1. GENERAL INFORMATION



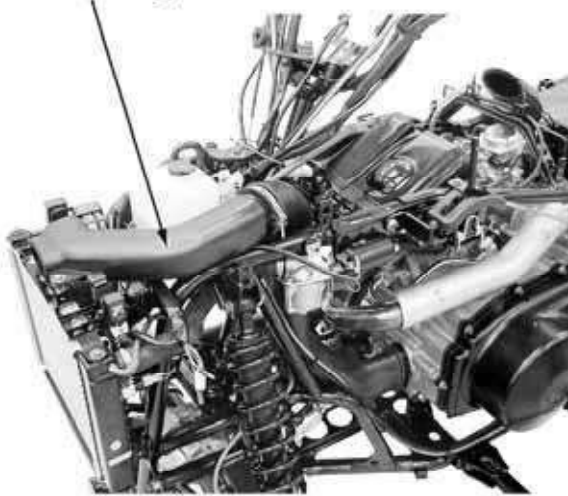
1. GENERAL INFORMATION

CABLE & HARNESS ROUTING

* Remove the fuel tank and fuel valve together (refer to the “**FUEL TANK**” section in the chapter 5).



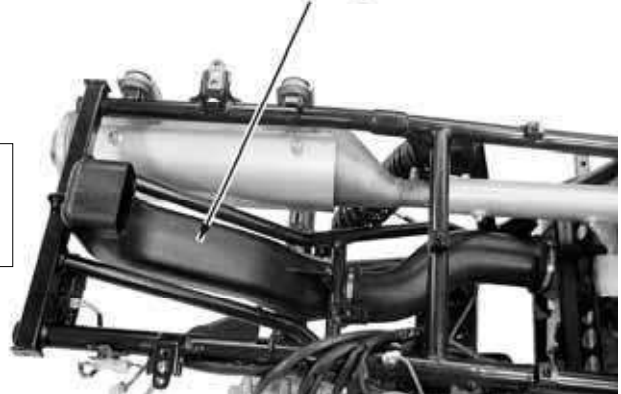
Front cooling duct



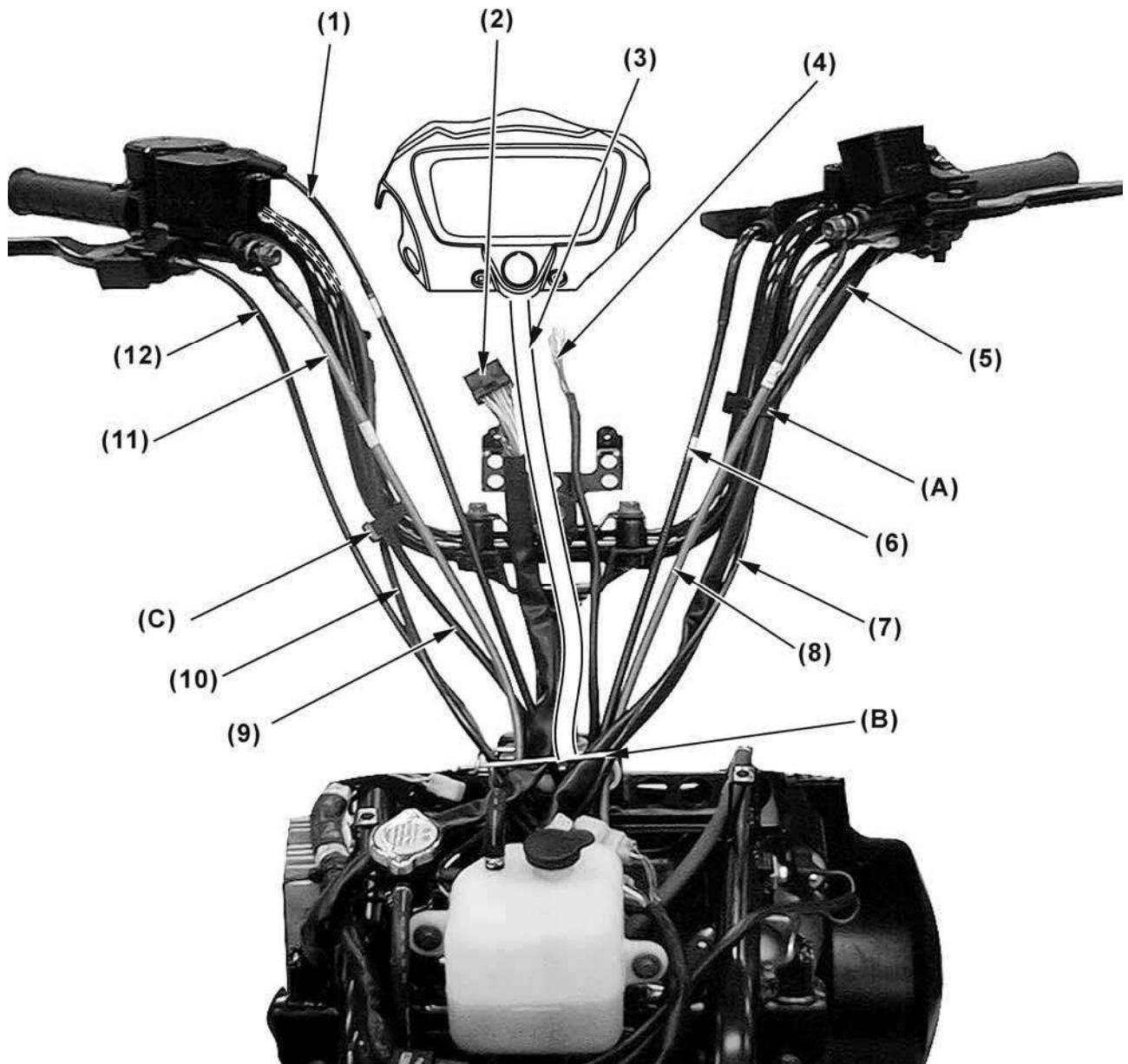
* Remove the front cooling duct (refer to the “**ENGINE REMOVAL**” section in the chapter 7).

* Remove the rear cooling duct (refer to the “**ENGINE REMOVAL**” section in the chapter 7).

Rear cooling duct



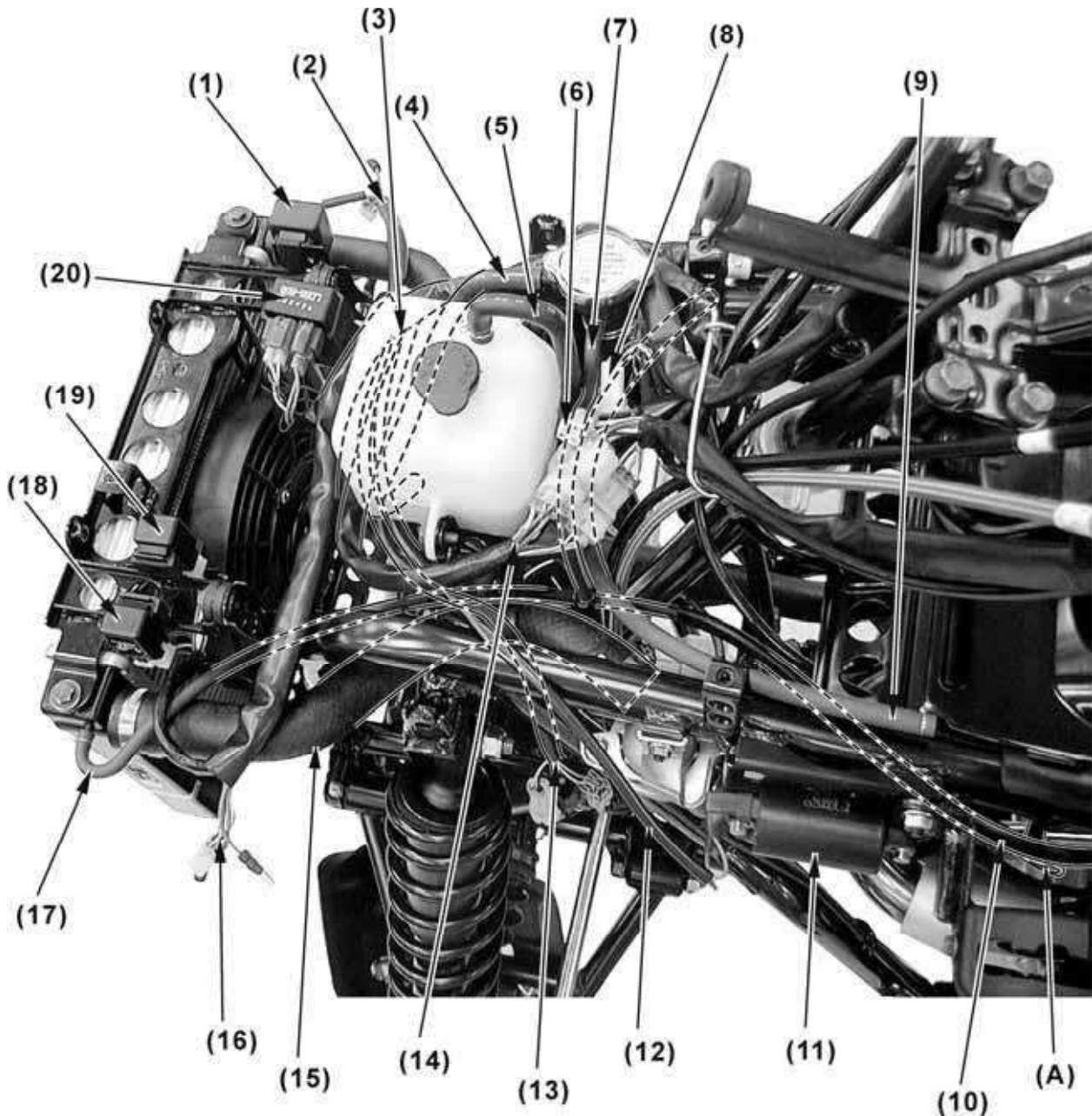
1. GENERAL INFORMATION



- | | |
|--|-----------------------------------|
| (1) Throttle cable | (7) Brake light switch wire |
| (2) Instrument connector | (8) Rear brake hose (Brake lever) |
| (3) Ignition switch wire | (9) 2WD/4WD switch wire |
| (4) Accessory socket connectors | (10) Choke cable |
| (5) Left handlebar switch | (11) Front brake hose |
| (6) Rear parking brake cable (ON ROAD) | (12) Brake light switch wire |

- (A) Pass the brake light switch wire and left handlebar switch wire through the band.
- (B) Pass the throttle cable, chock cable, brake light switch wires, 2WD/4WD switch wire, front brake hose, rear brake hose, instrument connector wire, accessory socket connector wire, rear parking brake cable (ON ROAD), left handlebar switch wire and ignition switch wire through the guide.
- (C) Pass the 2WD/4WD switch wire through the band.

1. GENERAL INFORMATION

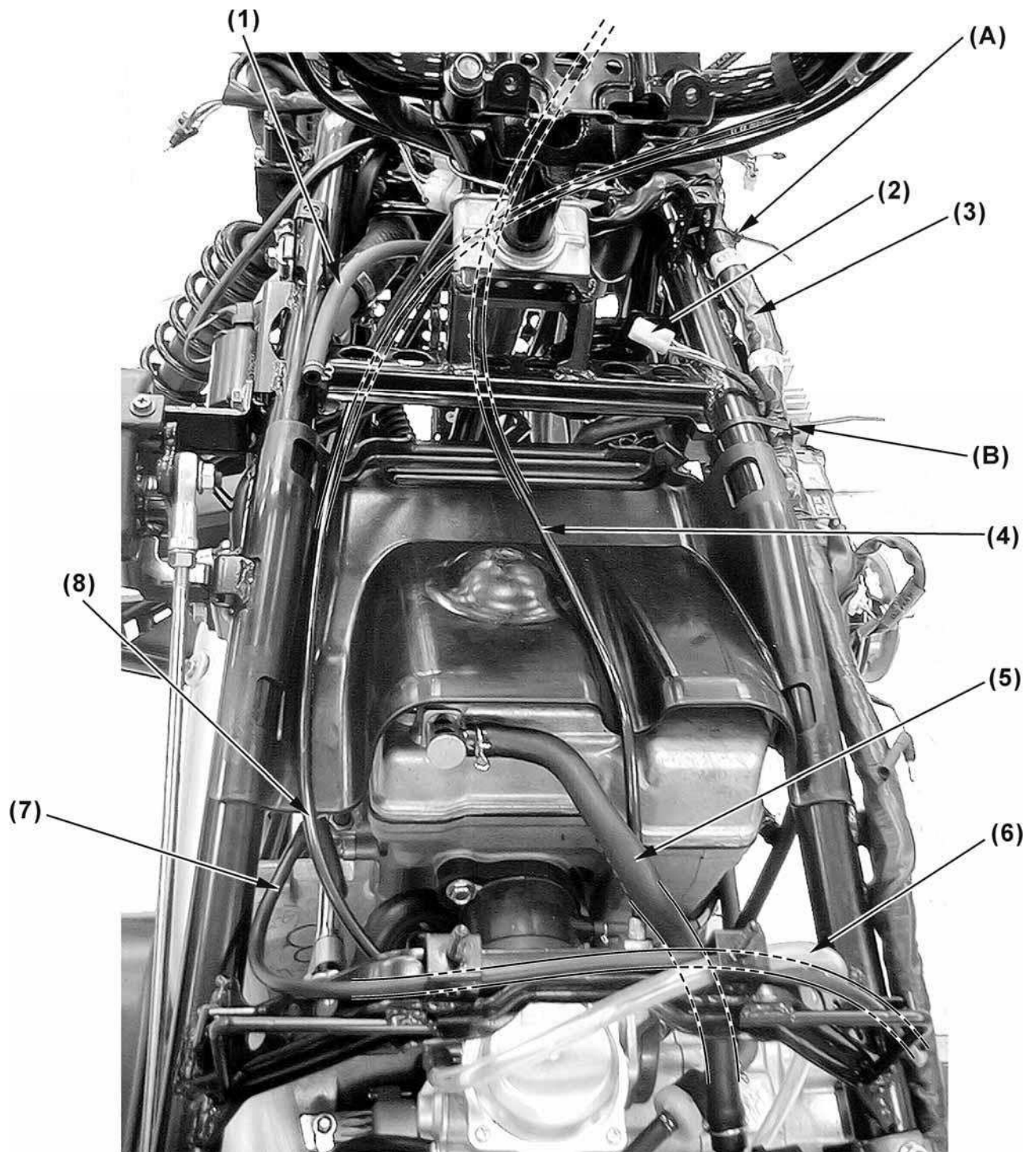


- | | |
|---|---------------------------------------|
| (1) Fan EMI filter | (12) Ignition coil wire |
| (2) Headlight connector | (13) 2WD /4WD start switch |
| Right front signal light connectors (ON ROAD) | /2WD/4WD motor connectors |
| (3) Harness wire | (14) Left handlebar switch connectors |
| (4) Siphon hose | (15) Upper radiator hose |
| (5) Over flow hose (Reserve tank) | (16) Headlight connector |
| (6) Ignition switch connector | Left front signal light |
| (7) Air bleed hose | connectors (ON ROAD) |
| (8) 2WD/4WD switch connector | (17) Air bleed hose |
| (9) Fuel tank flow hose (connect the fuel tank cover, Note) | (18) LO beam relay |
| (10) Air bleed hose | (19) HI beam relay |
| (11) Ignition coil | (20) 2WD/4WD change ECU |

(A) Pass the air bleed hose through the guide.

Note: The fuel tank flow hose may locate the frame right side for some model.

1. GENERAL INFORMATION



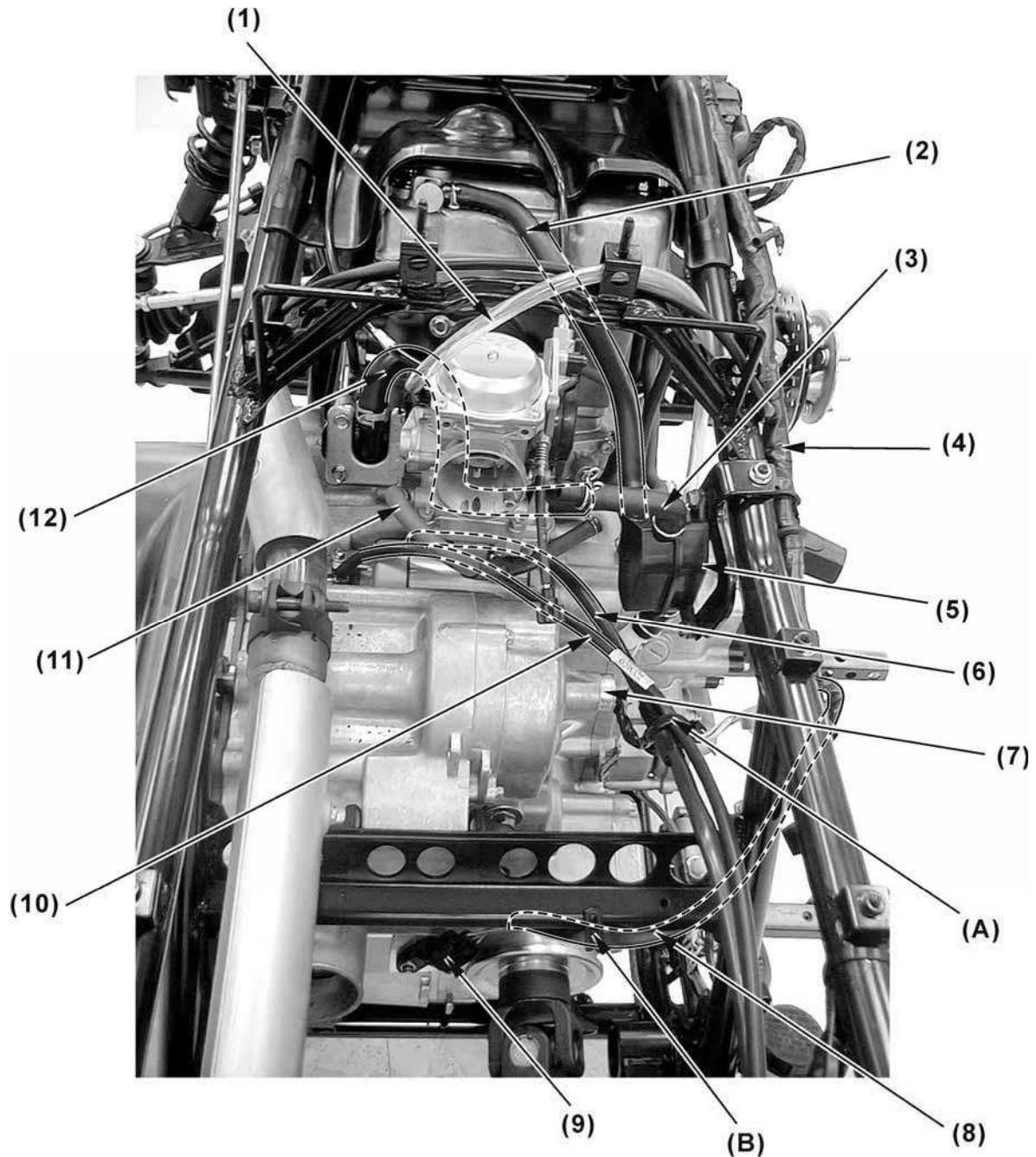
- (1) Fuel tank flow hose (connect the fuel tank cover, Note)
- (2) Hazard connector (ON ROAD)
- (3) Harness wire
- (4) Throttle cable

- (5) Crankcase breather hose
- (6) Over flow (carburetor)
- (7) Water temperature sensor wire
- (8) Choke cable

(A) Pass the harness wire through the band.
 (B) Pass the harness wire through the band.

Note: The fuel tank flow hose may locate the frame right side for some model.

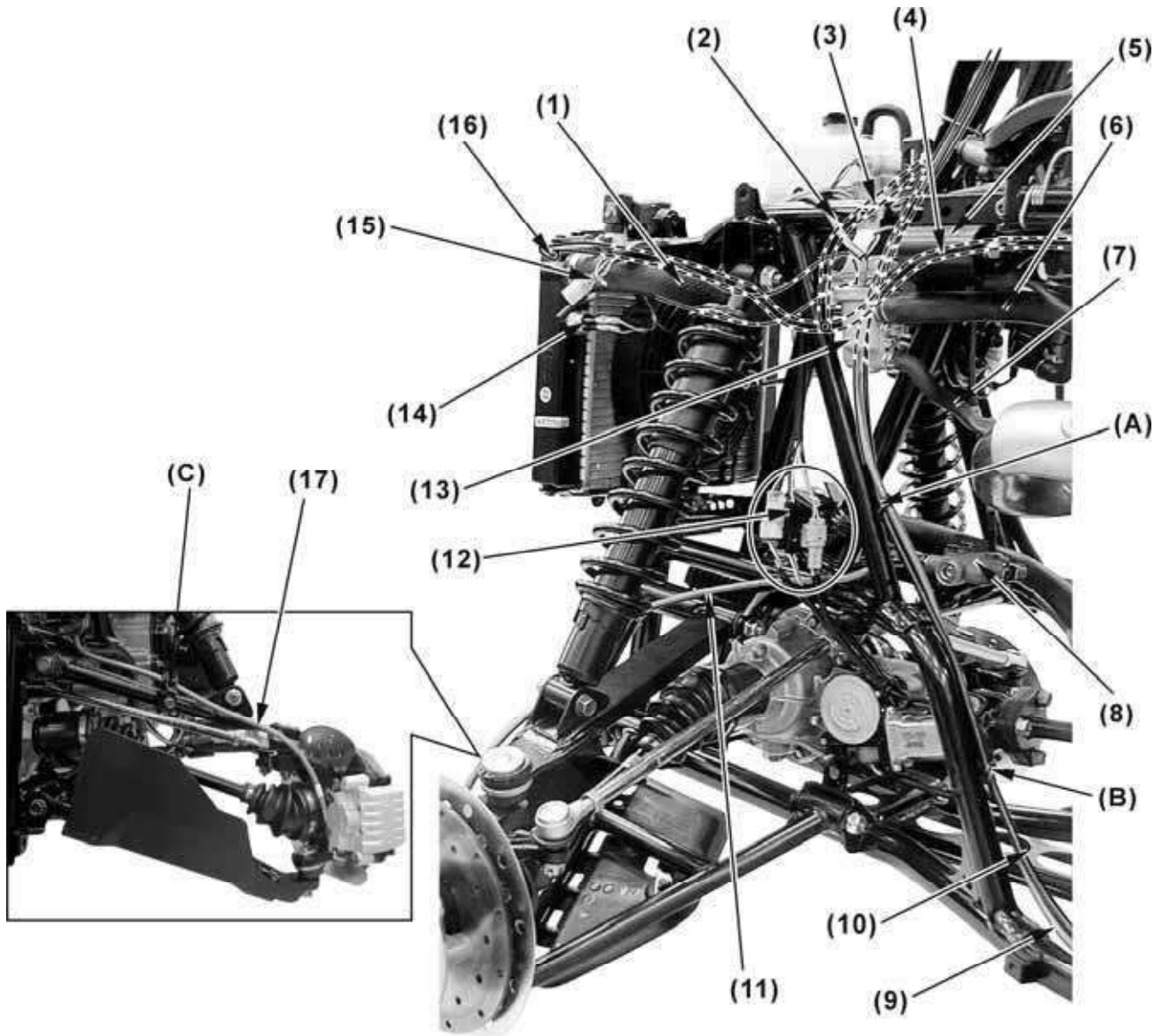
1. GENERAL INFORMATION



- | | |
|-------------------------------------|--------------------------------|
| (1) Over flow (carburetor) | (7) Gear position light switch |
| (2) Cranks case breather hose | (8) Speed sensor wire |
| (3) Cranks case breather hose | (9) Speed sensor |
| (4) Harness wire | (10) Engine ground cable |
| (5) Cranks case breather hose joint | (11) Fuel hose |
| (6) Starter motor cable | (12) AICV air supply hose |

(A) Pass the starter motor cable, engine ground cable and gear position light wire through the band.
 (B) Pass the speed sensor wire through the band.

1. GENERAL INFORMATION



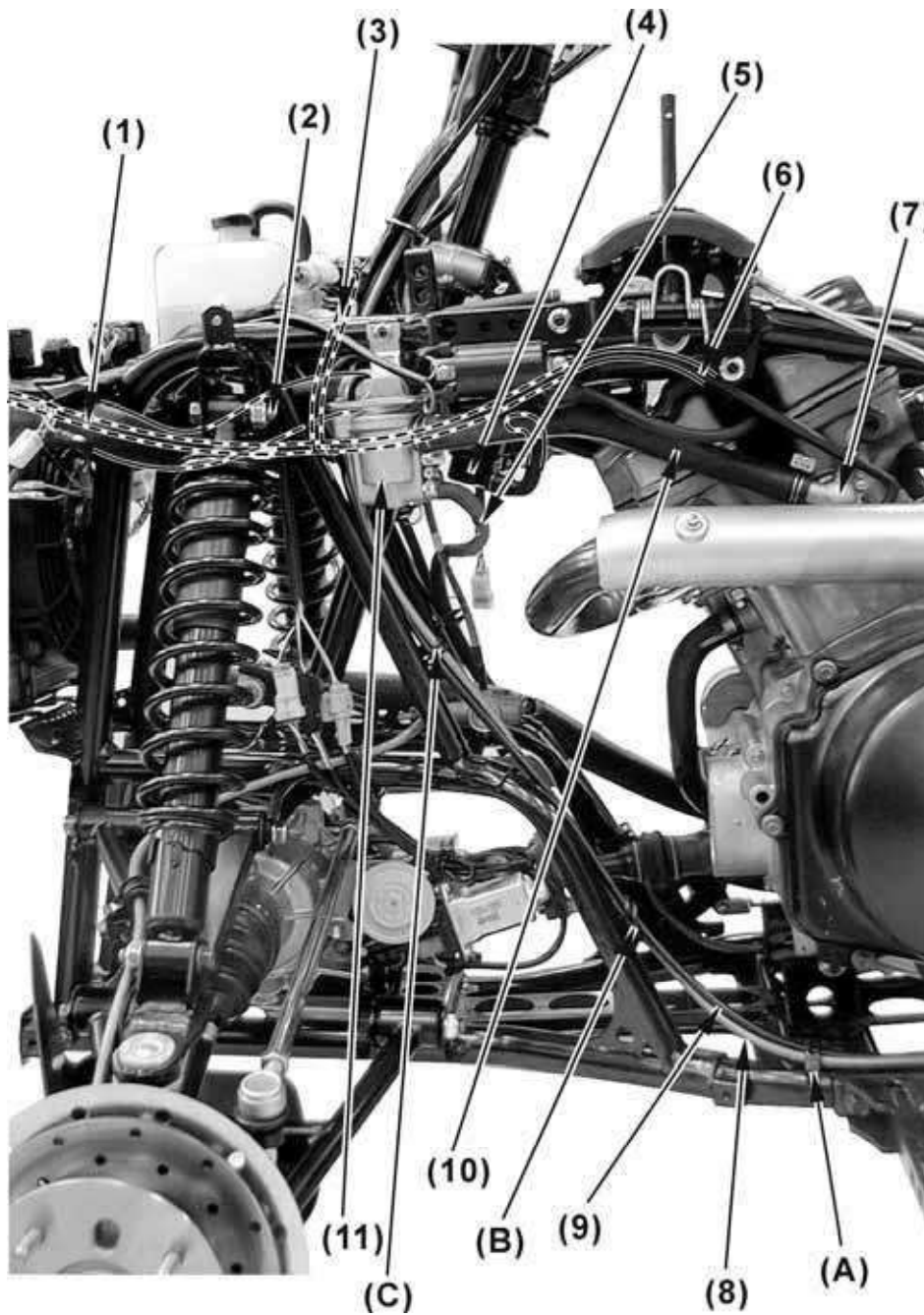
- | | |
|-----------------------------------|--|
| (1) Upper radiator hose | (10) Rear parking brake cable (ON ROAD) |
| (2) Ignition coil wire | (11) Front brake hose |
| (3) Air bleed hose | (12) 2WD /4WD start switch//2WD/4WD motor connectors |
| (4) Air bleed hose | (13) Thermostat |
| (5) Ignition coil | (14) Fan motor switch |
| (6) Water hose | (15) Headlight connector |
| (7) Water bypass hose | Left front turn signal light connectors (ON ROAD) |
| (8) Delay valve (ON ROAD) | (16) Air bleed hose |
| (8) Brake fluid joint (OFF ROAD) | (17) Front brake hose |
| (9) Rear brake hose (Brake lever) | |

(A) Pass the rear parking cable (ON ROAD) and rear brake hose through the guide.

(B) Pass the rear parking cable (ON ROAD) and rear brake hose through the guide.

(C) Pass the front brake hose through the guide.

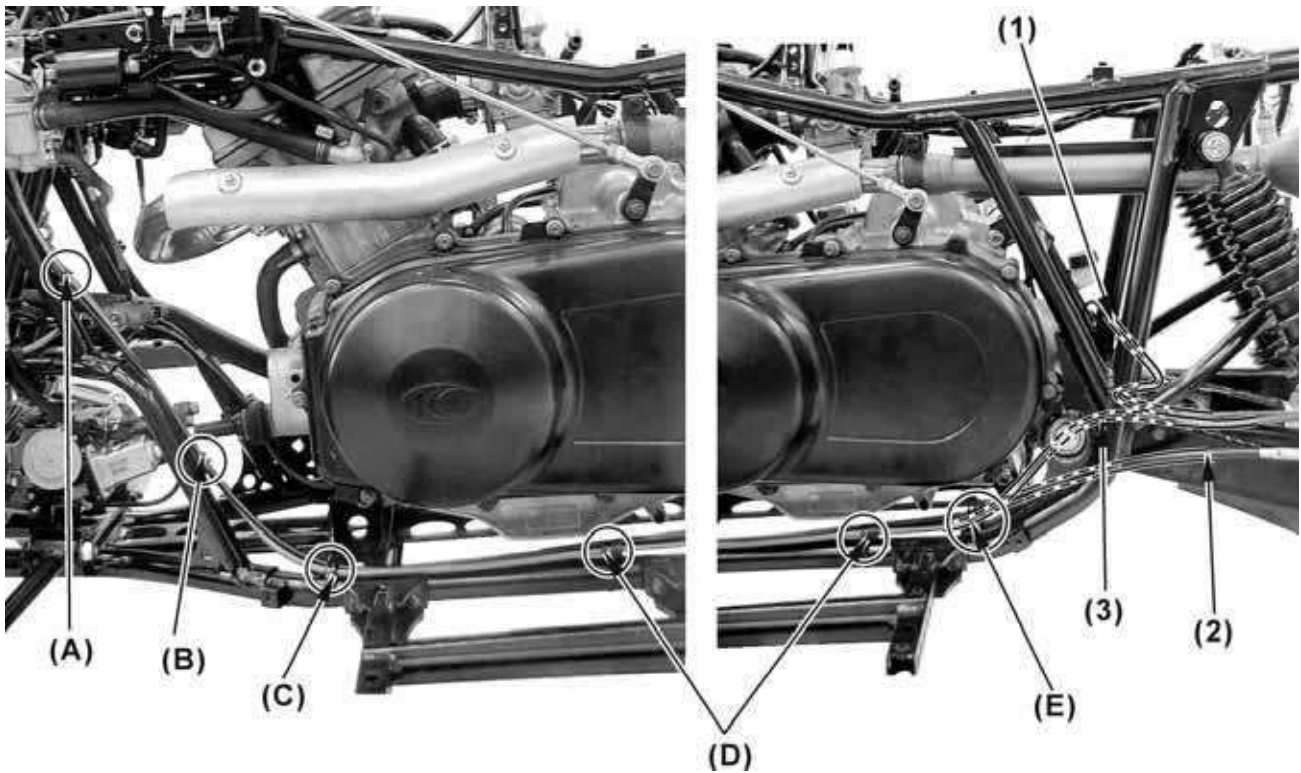
1. GENERAL INFORMATION



- | | |
|---------------------------------|--|
| (1) Air bleed hose | (7) Water joint |
| (2) Upper radiator hose | (8) Rear brake hose (Brake lever) |
| (3) Air bleed hose | (9) Rear parking brake cable (ON ROAD) |
| (4) AICV control solenoid valve | (10) Water hose |
| (5) Water bypass hose | (11) Thermostat |
| (6) Air bleed hose | |

Pass the rear parking brake and rear brake hose through the guide (A), (B) and (C).

1. GENERAL INFORMATION



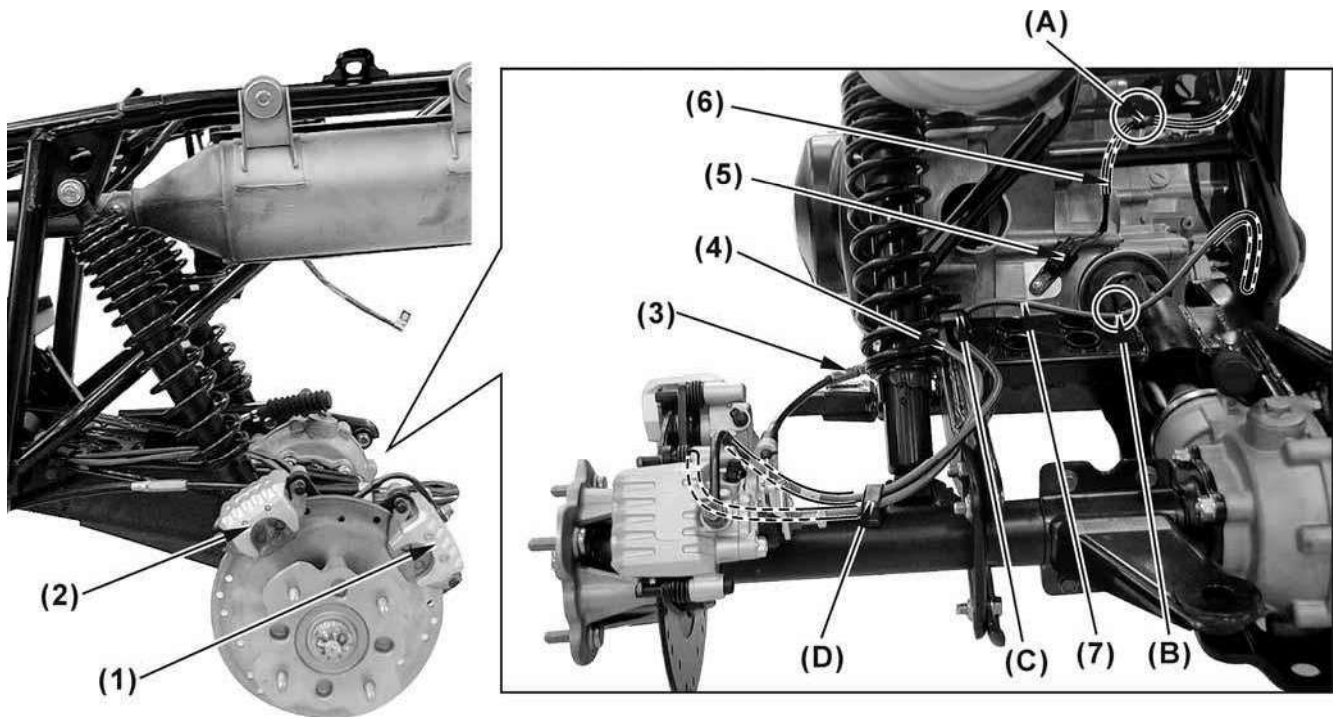
(1) Rear brake hose (Brake pedal)

(3) Rear brake hose (Brake lever)

(2) Rear parking brake cable (ON ROAD)

- Pass the rear parking brake cable (ON ROAD) and rear brake hose (Brake lever) through the guide (A), (B), (C), band (D) and guide (E).

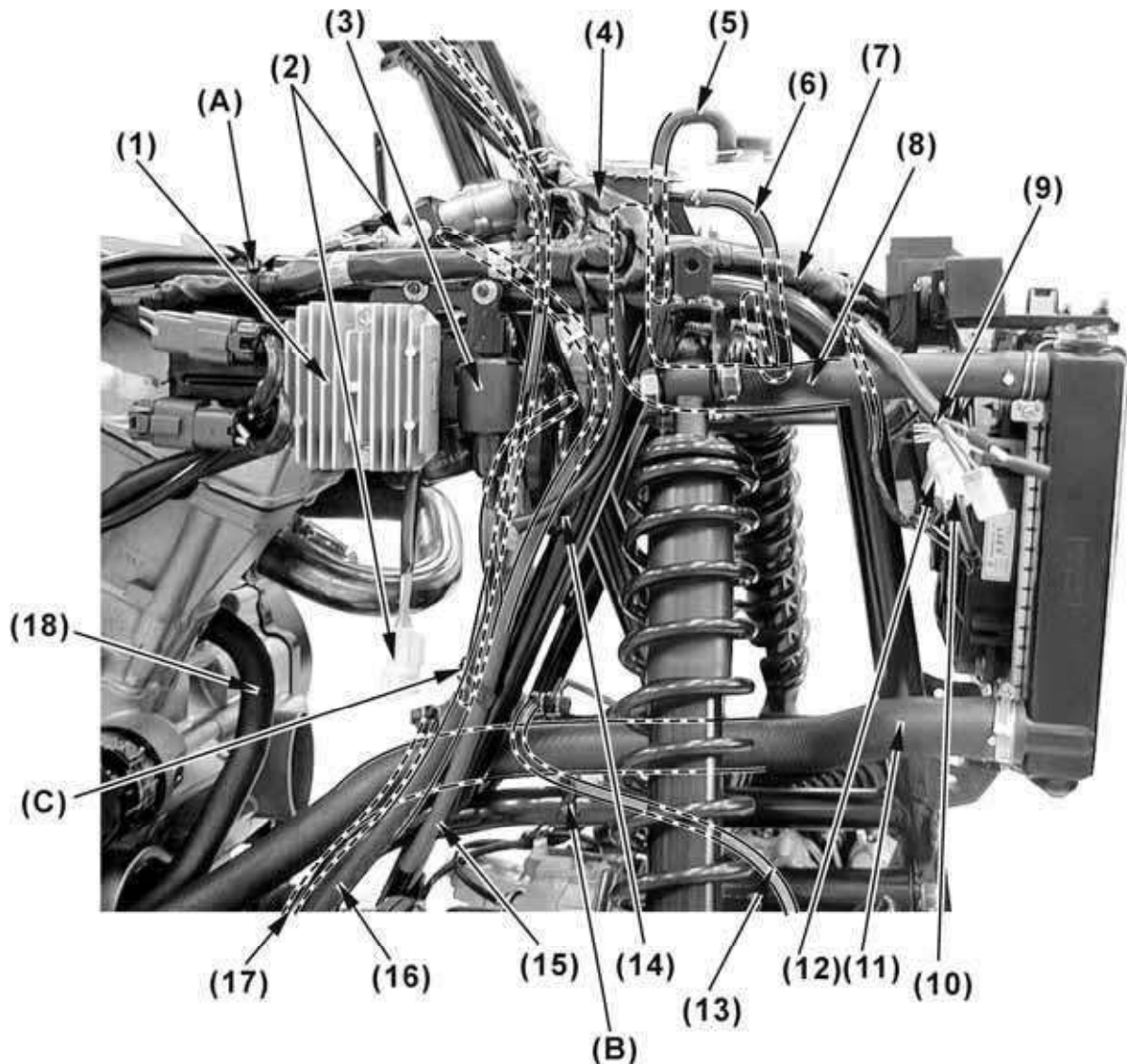
1. GENERAL INFORMATION



- | | |
|--|-----------------------------------|
| (1) Rear caliper (Brake pedal) | (5) Speed sensor |
| (2) Rear caliper (Brake lever) | (6) Speed sensor wire |
| (3) Rear parking brake cable (ON ROAD) | (7) Rear brake hose (Brake pedal) |
| (4) Rear brake hose (Brake lever) | |

- (A) Pass the speed sensor wire through the guide.
 (B) Pass the rear brake hose (Brake pedal) through the guide.
 (C) Pass the rear brake hose (Brake pedal) and rear brake hose (Brake lever) through the guide.
 (D) Pass the rear brake hose (Brake pedal) and rear brake hose (Brake lever) through the guide.

1. GENERAL INFORMATION



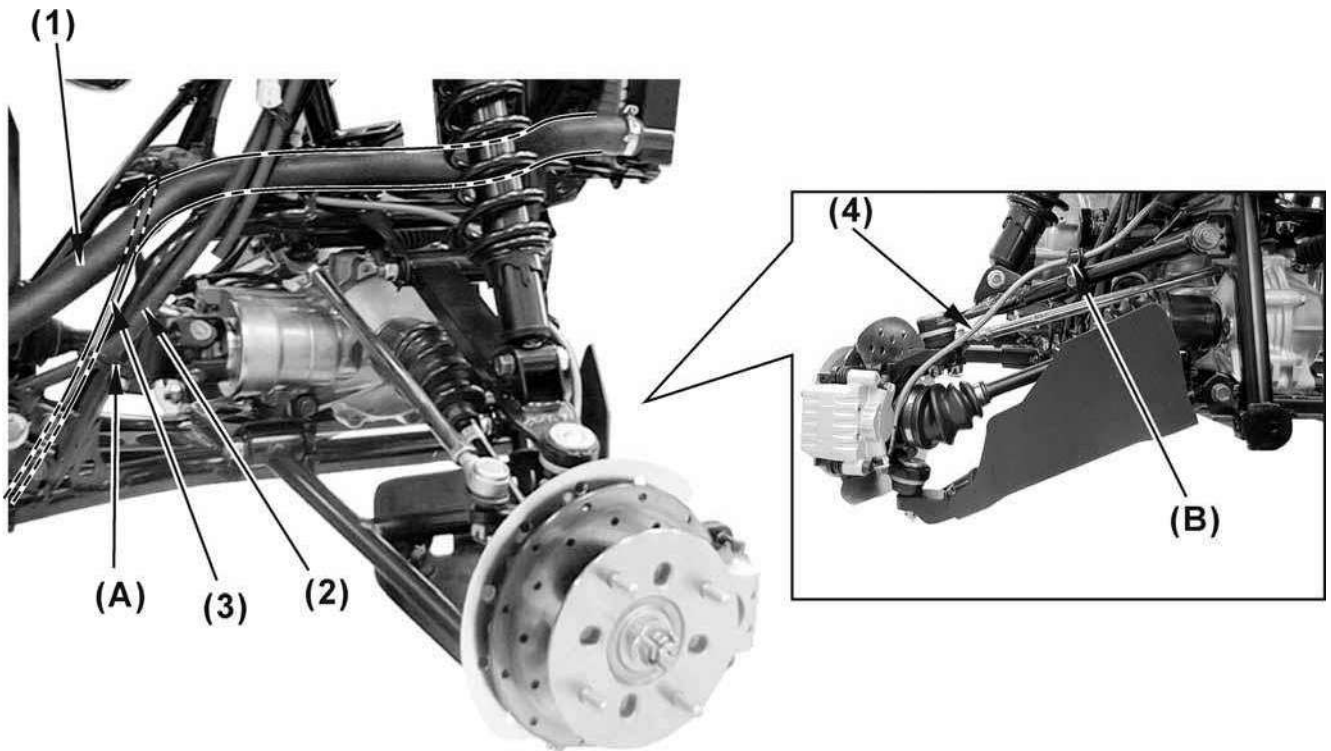
- | | |
|--|-------------------------------------|
| (1) Regulator/Rectifier | (10) Fan motor connector |
| (2) Hazard connector (ON ROAD) | (11) Low radiator hose |
| (3) Flasher relay (ON ROAD) | (12) EMI filter |
| (4) Instrument wire | (13) Front brake hose |
| (5) Over flow hose (reserve tank) | (14) Horn (ON ROAD) |
| (6) Siphon hose | (15) Fuel flow hose |
| (7) Harness wire | (16) Water bypass hose |
| (8) Coolant filler hose | (17) Combined brake hose (ON ROAD) |
| (9) Headlight connector | (18) water hose |
| Right front turn signal light connectors (ON ROAD) | |

(A) Pass the harness wire through the band.

(B) Pass the front brake hose through the guide.

(C) Pass the fuel flow hose and water bypass hose through the guide.

1. GENERAL INFORMATION

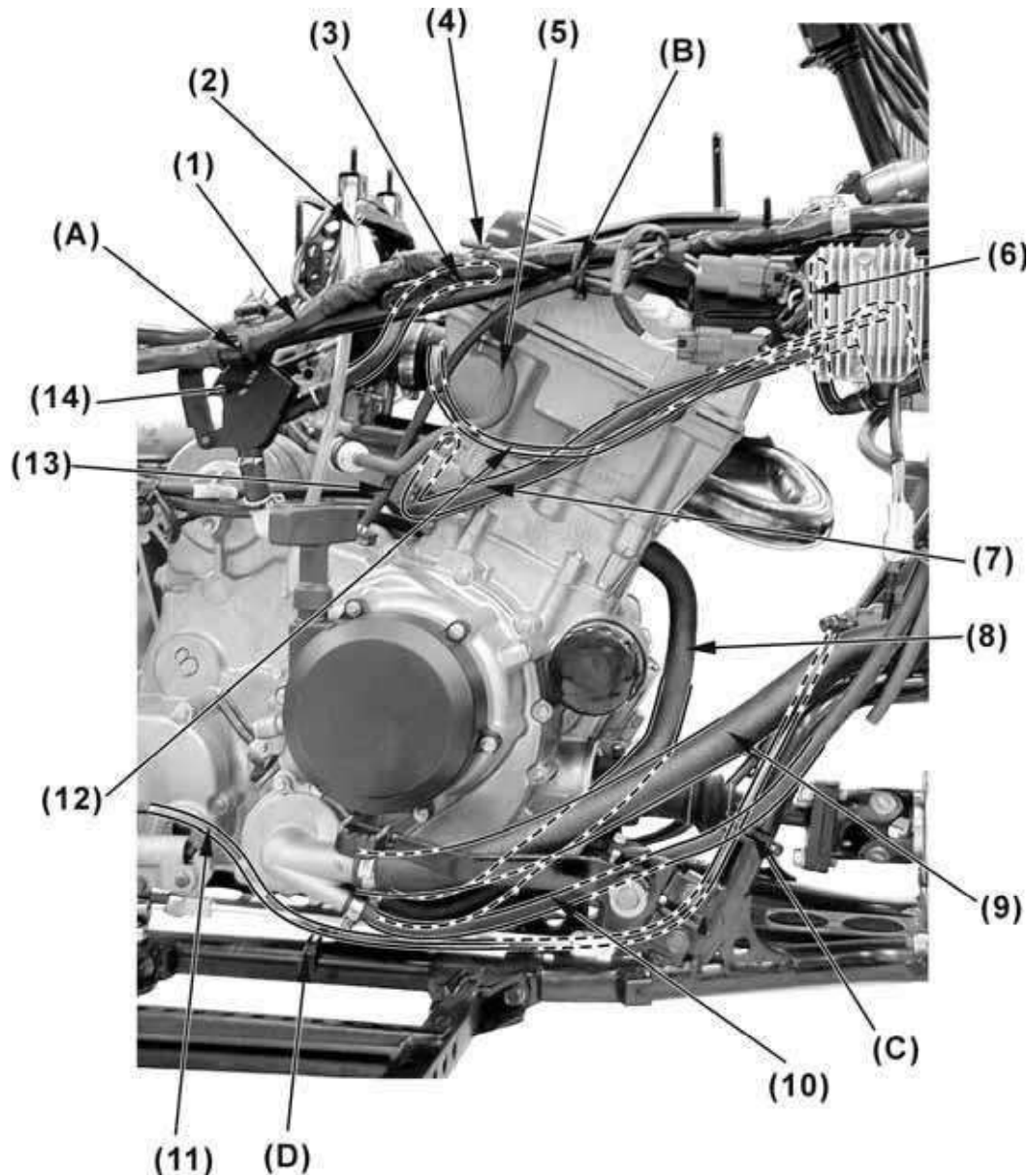


(1) Low radiator hose
(2) Water bypass hose

(3) Combined brake hose (ON ROAD)
(4) Front brake hose

(A) Pass the front brake hose (combined) and water bypass hose through the guide.
(B) Pass the front brake hose through the guide.

1. GENERAL INFORMATION



- | | |
|---------------------------------|------------------------------------|
| (1) Harness wire | (8) Water hose |
| (2) Over flow (carburetor) | (9) Low radiator hose |
| (3) Crankcase breather hose | (10) Water bypass hose |
| (4) Fuel unit connectors | (11) Combined brake hose (ON ROAD) |
| (5) Fuel hose | (12) AICV vacuum hose (Note) |
| (6) AICV air supply hose | (13) A.C.G. wire |
| (7) AICV air supply hose (Note) | (14) Crankcase breather housing |

(A) Pass the harness wire through the guide.

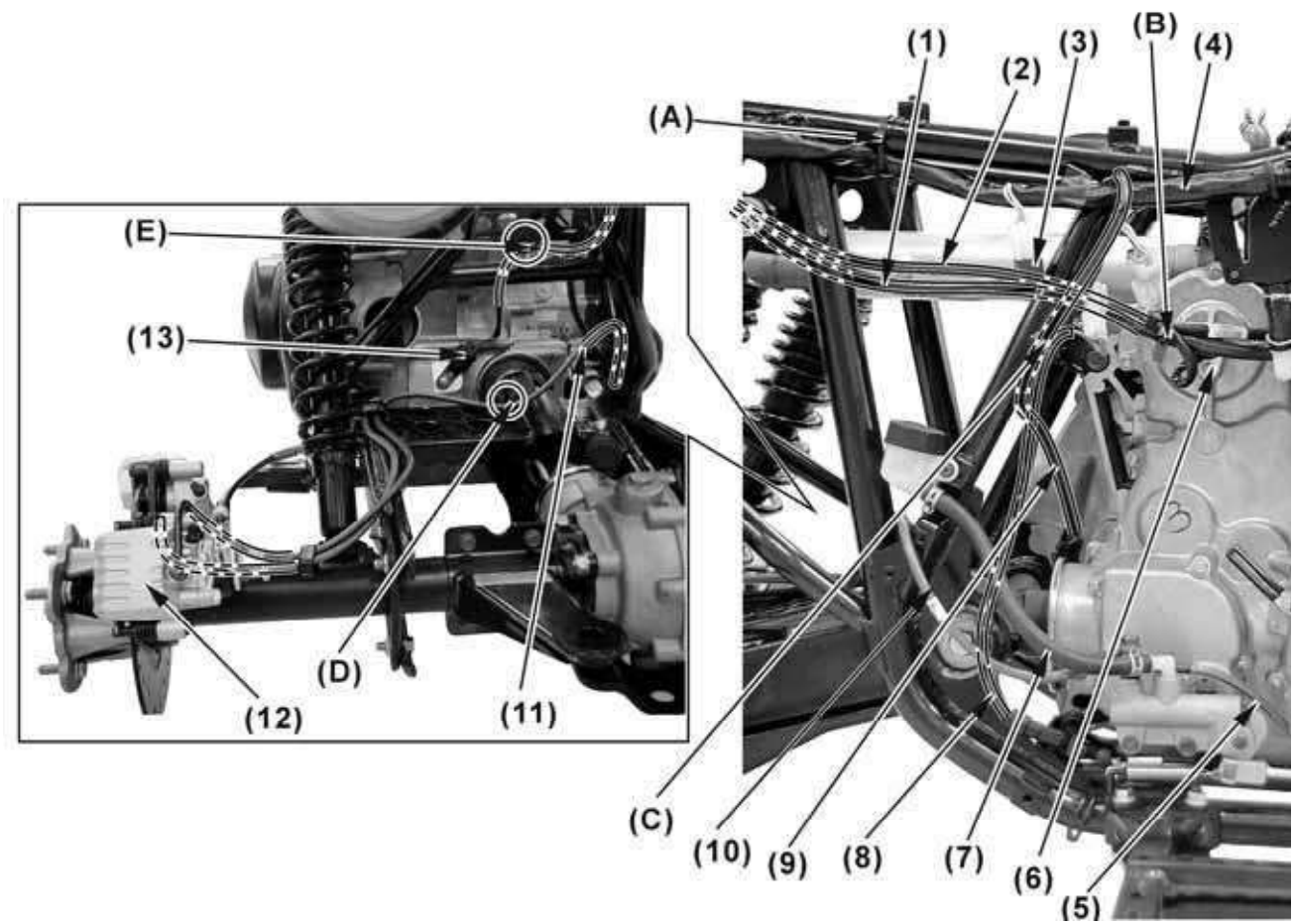
(B) Pass the A.C.G. wire through the guide.

(C) Pass the combined brake hose (ON ROAD) and water bypass hose through the guide.

(D) Pass the combined brake hose (ON ROAD) through the guide.

Note: Pass the AICV air supply hose and AICV vacuum hose through the guide (B).

1. GENERAL INFORMATION



- | | |
|-----------------------------------|------------------------------------|
| (1) Starter motor cable | (8) Brake light switch |
| (2) Engine ground cable | (9) Speed sensor wire |
| (3) Clutch diode | (10) Rear brake hose (Brake pedal) |
| (4) Harness wire | (11) Rear brake hose (Brake pedal) |
| (5) Combined brake hose (ON ROAD) | (12) Rear caliper (Brake pedal) |
| (6) Gear position light switch | (13) Speed sensor |
| (7) Brake fluid filler hose | |

(A) Pass the harness wire through the band.

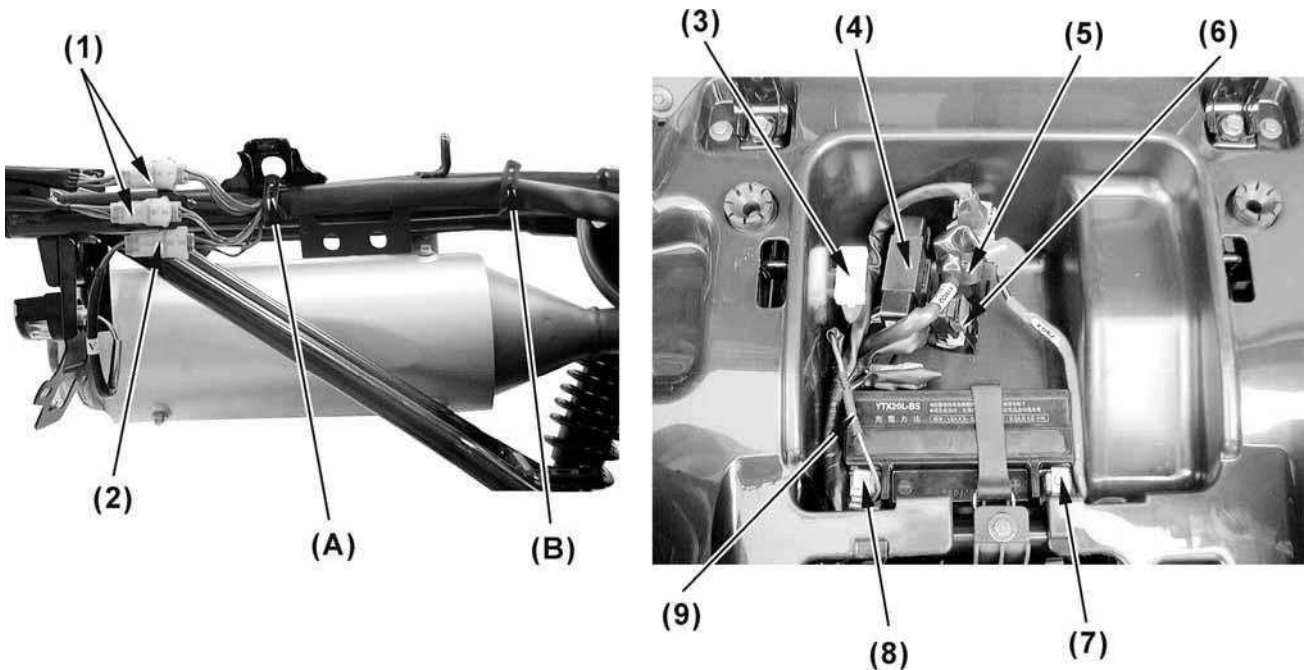
(B) Pass the gear position light switch wire, starter motor cable and engine ground cable through the band.

(C) Pass the speed sensor wire and brake light switch wire through the guide.

(D) Pass the rear brake hose (Brake pedal) through the guide.

(E) Pass the speed sensor wire through the guide.

1. GENERAL INFORMATION



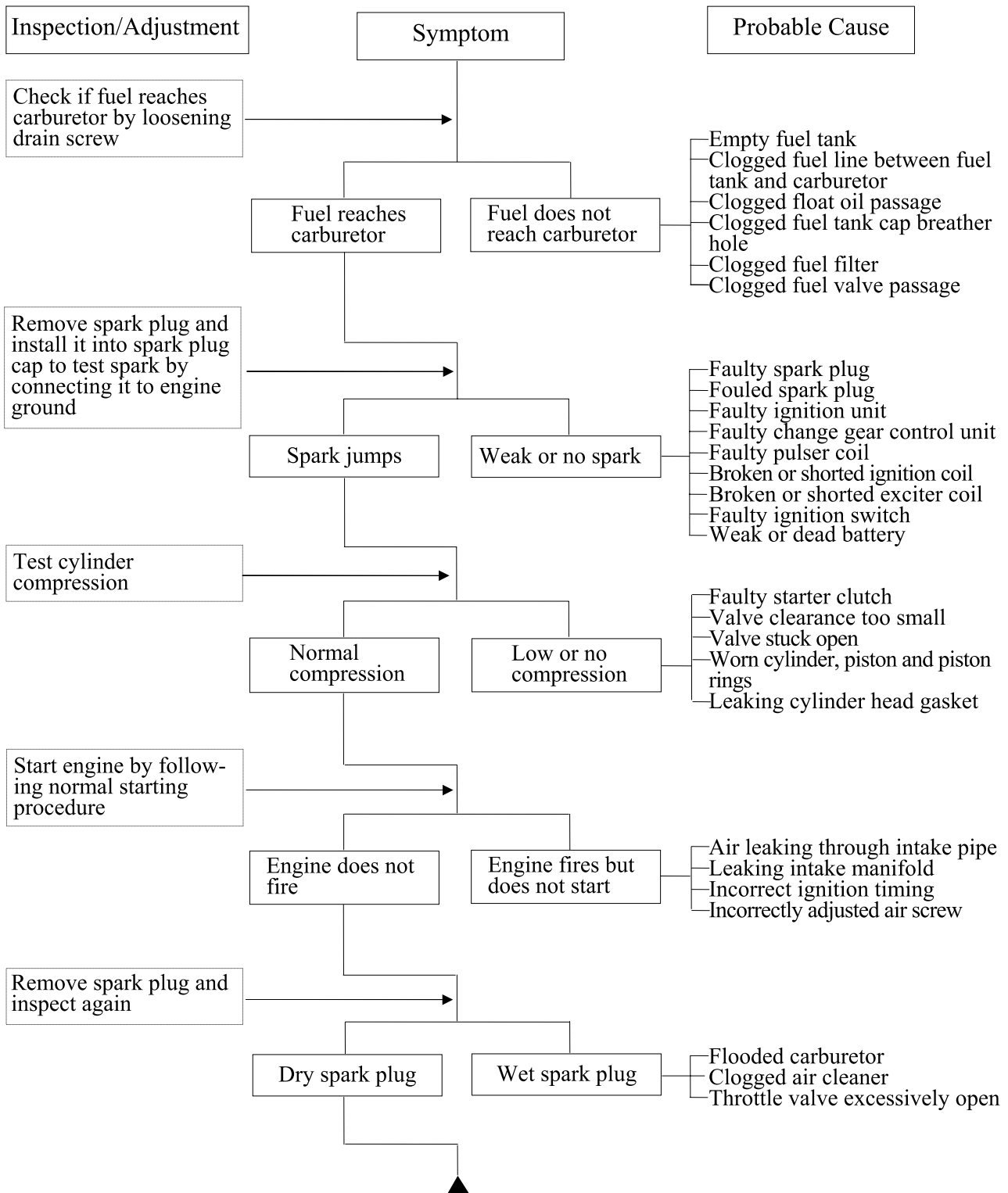
- (1) Taillight/Brake light/Rear turn signal light connectors (OFF ROAD)
- (1) Taillight/Brake light/Rear turn signal light connectors (ON ROAD)
- (2) License light connector (ON ROAD)
- (3) Fuse box
- (4) Ignition unit
- (5) Starter MAG
- (6) Starter relay
- (7) Positive terminal lead
- (8) Negative terminal lead
- (9) Frame ground wire

- Pass the harness wire through the guide (A) and (B).

1. GENERAL INFORMATION

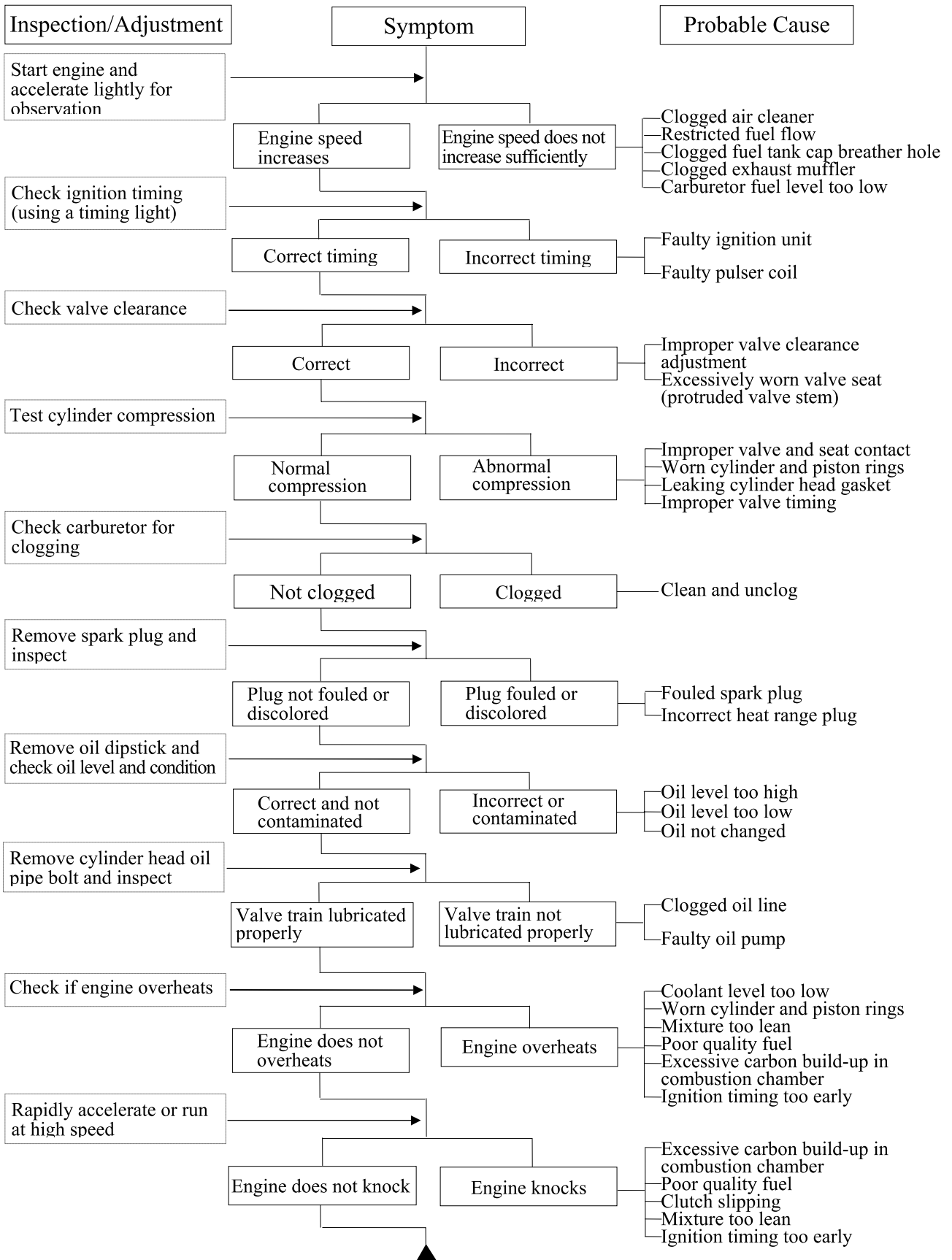
TROUBLESHOOTING

ENGINE WILL NOT START OR IS HARD TO START



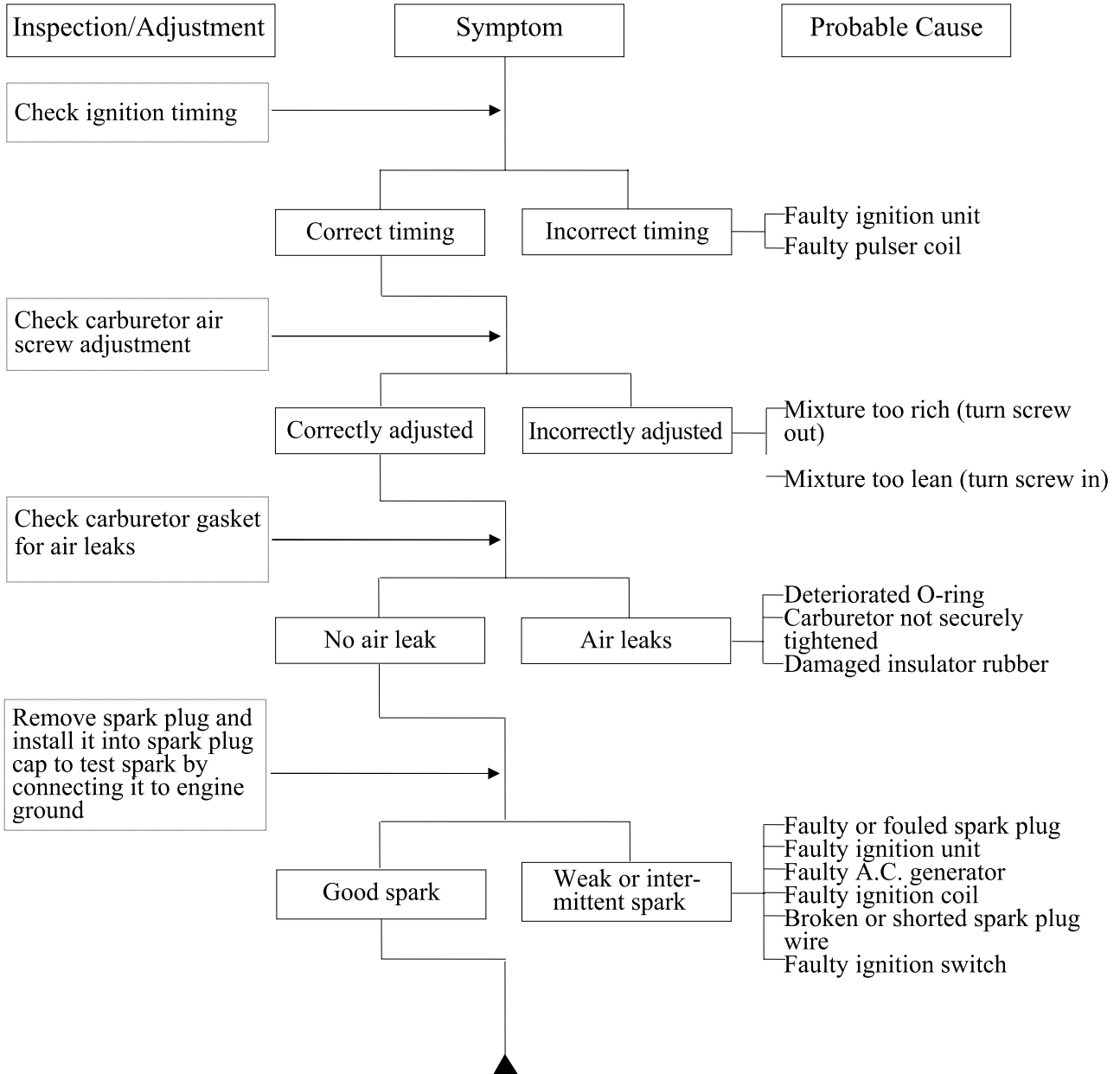
1. GENERAL INFORMATION

ENGINE LACKS POWER



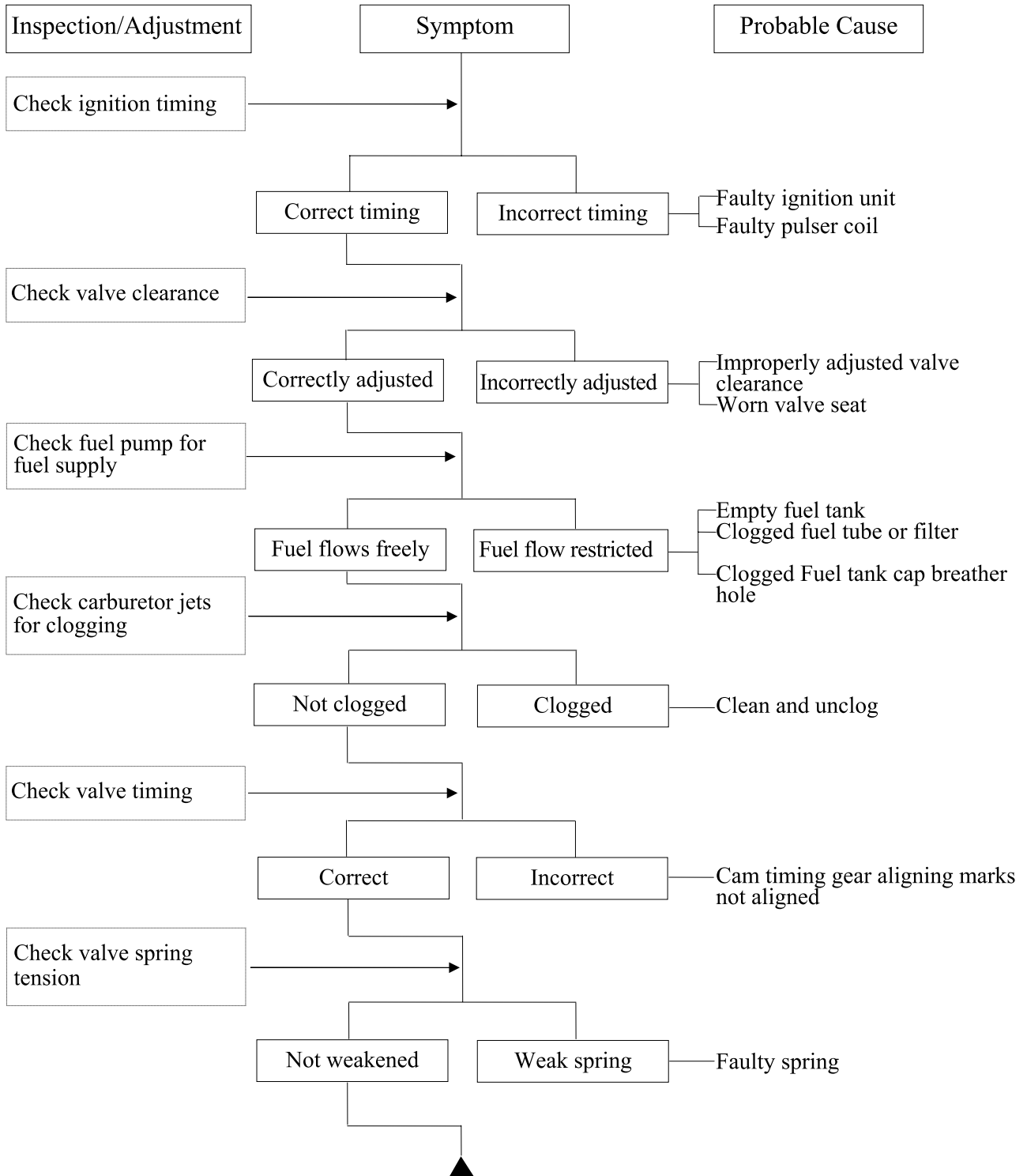
1. GENERAL INFORMATION

POOR PERFORMANCE (ESPECIALLY AT IDLE AND LOW SPEEDS)



1. GENERAL INFORMATION

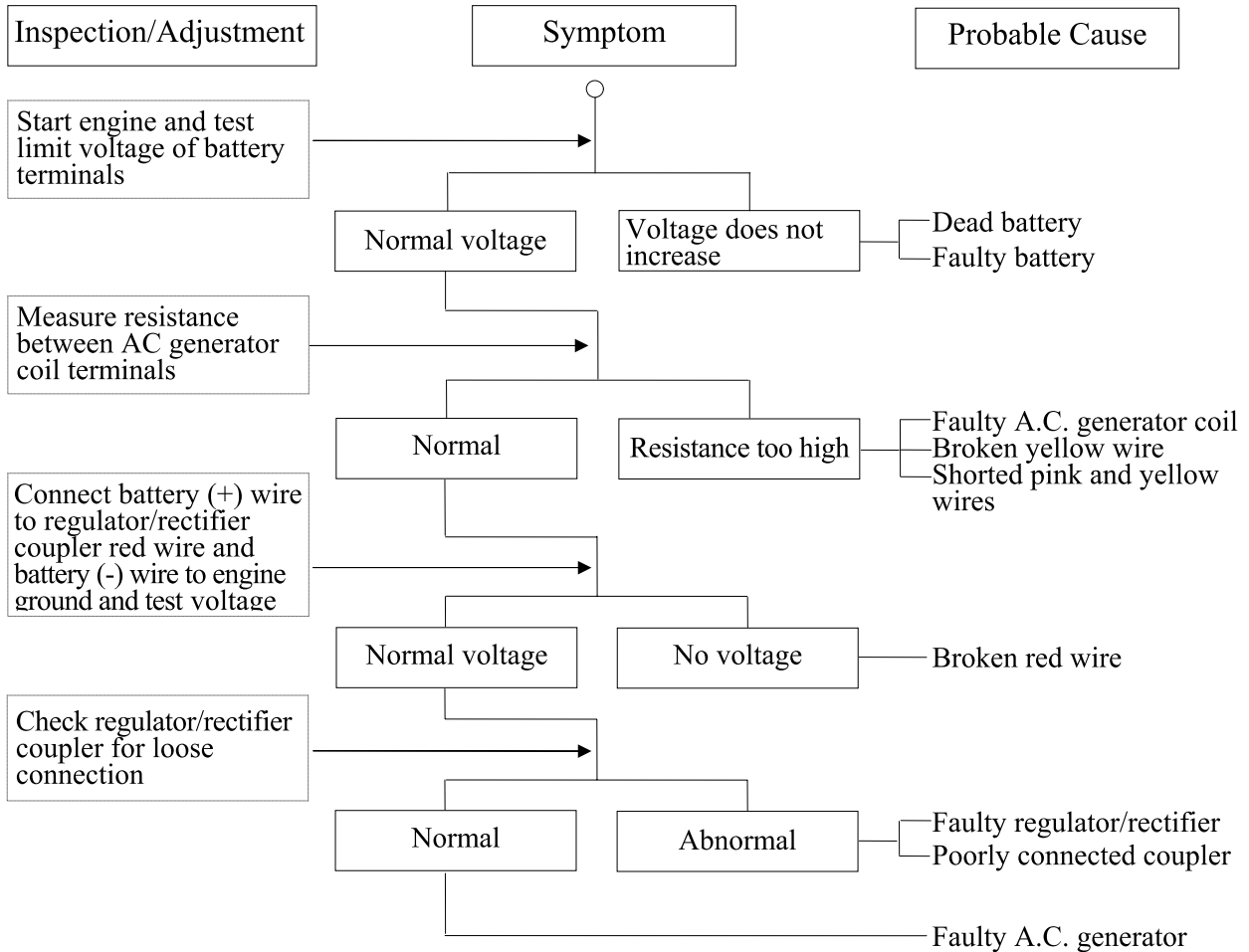
POOR PERFORMANCE (AT HIGH SPEED)



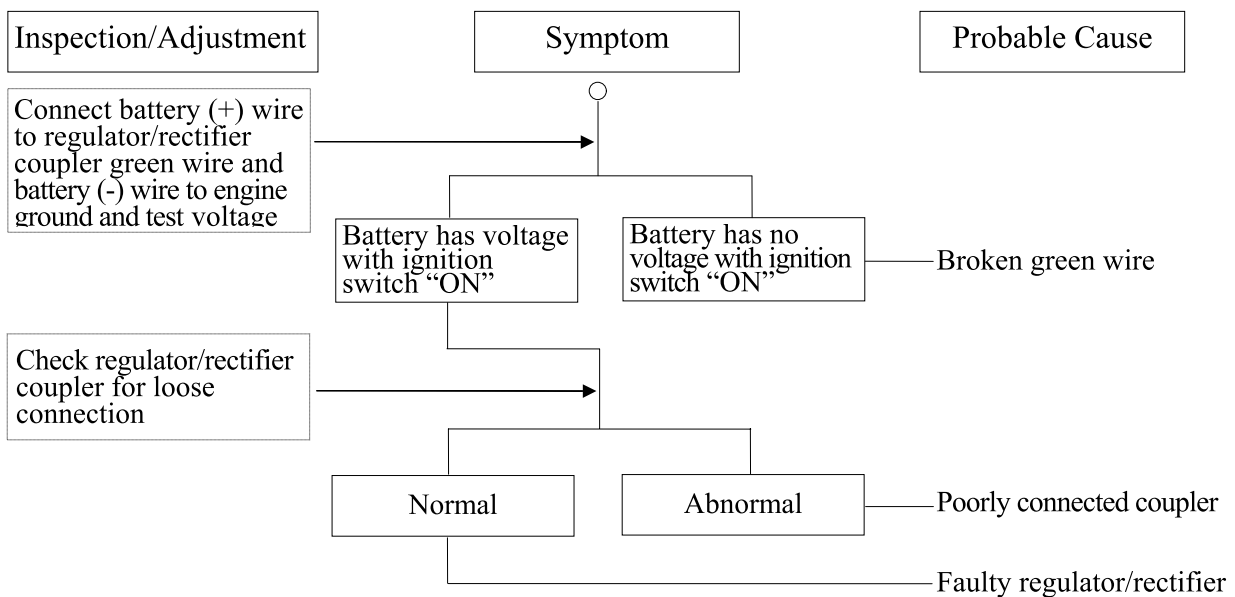
1. GENERAL INFORMATION

POOR CHARGING (BATTERY OVER DISCHARGING OR OVERCHARGING)

Undercharging

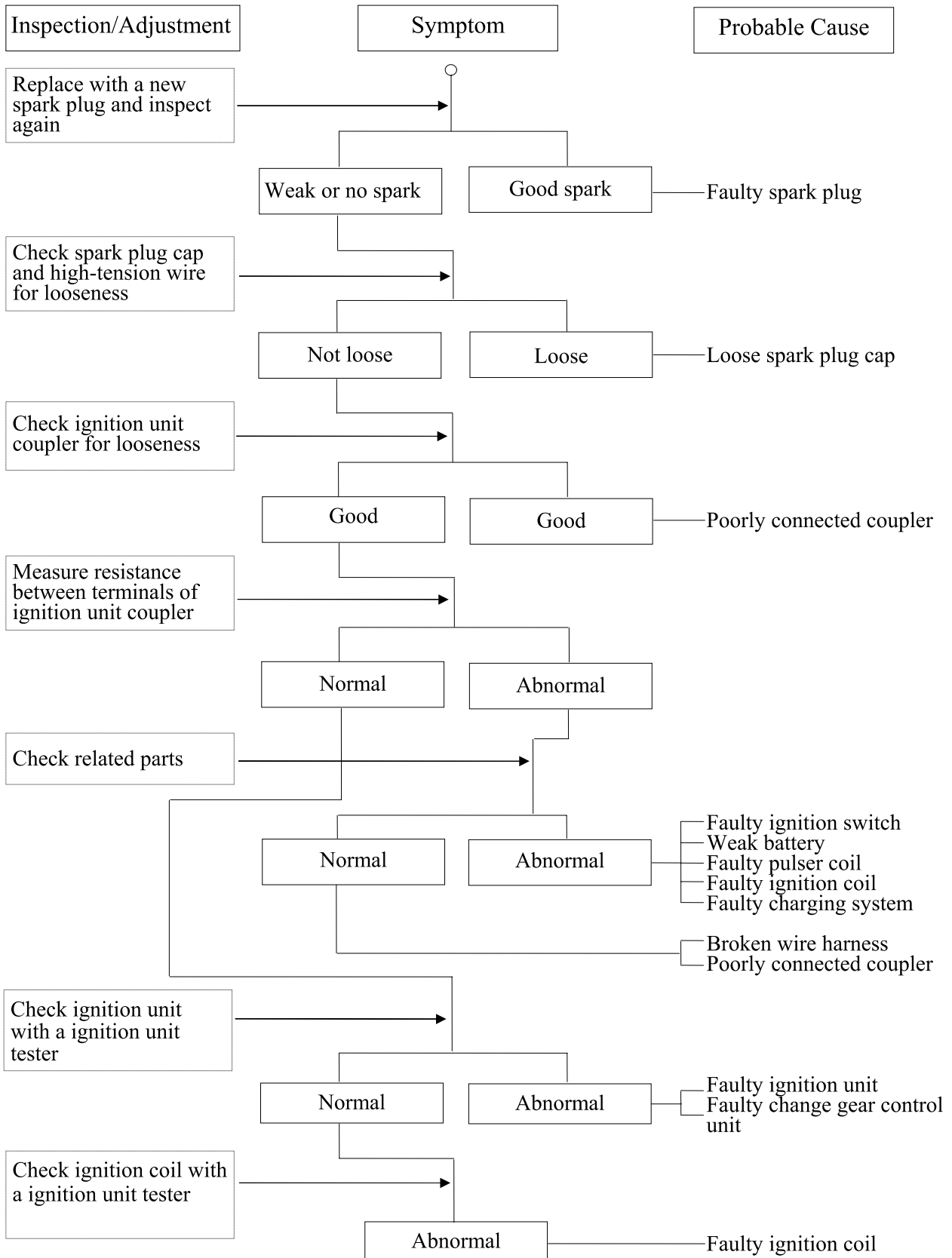


Overcharging



1. GENERAL INFORMATION

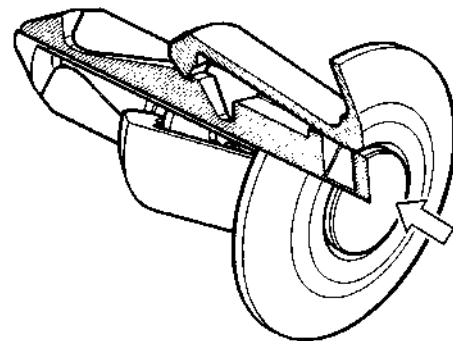
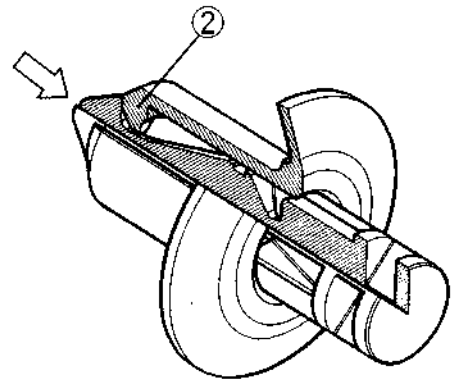
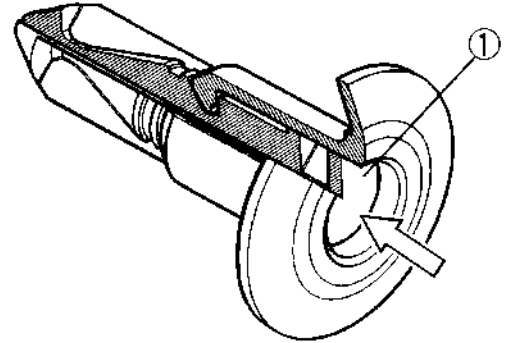
NO SPARK AT SPARK PLUG



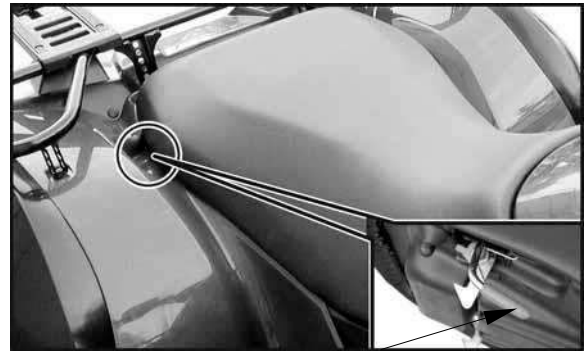
2. FRAME COVERS/EXHAUST MUFFLER

2. FRAME COVERS/EXHAUST MUFFLER

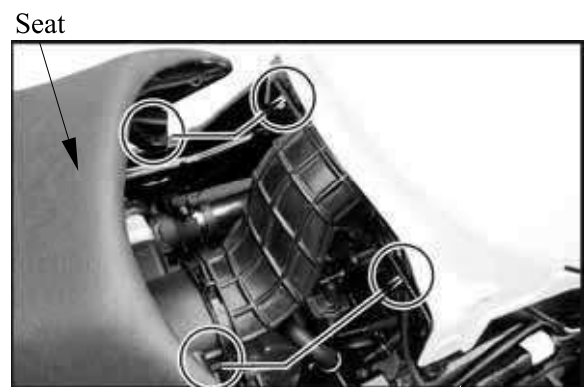
2. FRAME COVERS/EXHAUST MUFFLER



2. FRAME COVERS/EXHAUST MUFFLER



Lever

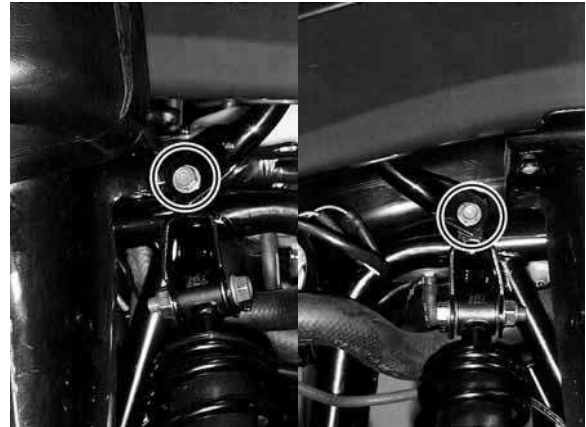


Seat



Front Cargo Rack

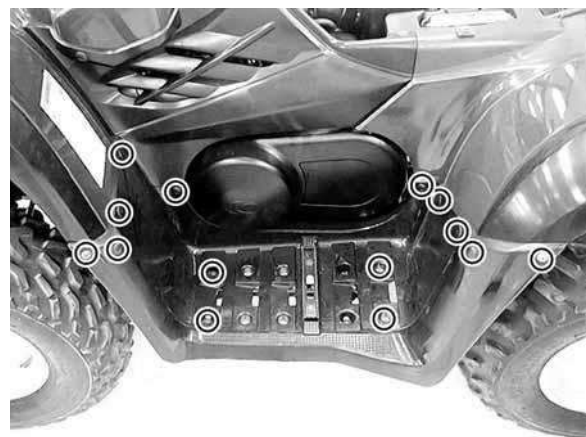
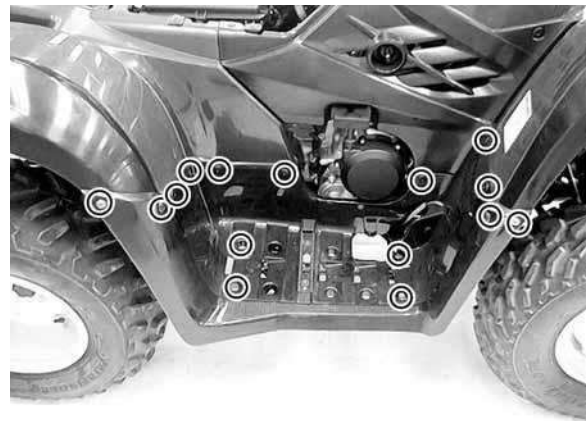
2. FRAME COVERS/EXHAUST MUFFLER



2. FRAME COVERS/EXHAUST MUFFLER



2. FRAME COVERS/EXHAUST MUFFLER



2. FRAME COVERS/EXHAUST MUFFLER

During removal, do not pull the joint claws forcedly to avoid damage.



During removal, do not pull the joint claws forcedly to avoid damage.



Fuel Tank Breather Hose

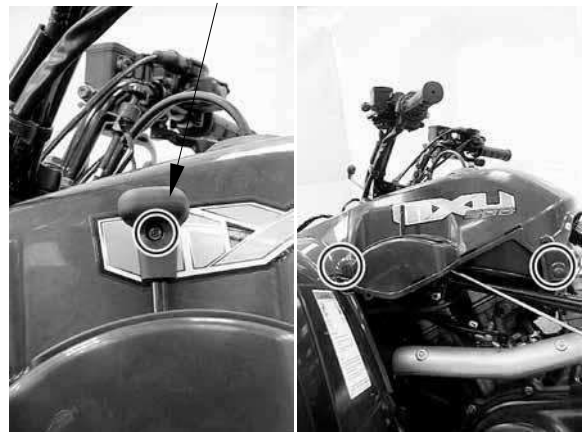
2. FRAME COVERS/EXHAUST MUFFLER

Instrument Connector Accessory Socket



r

Drive Select Grip

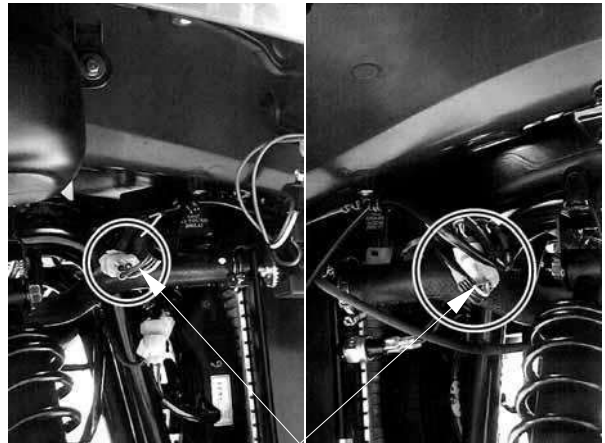


Fuel Tank Cap/Seal

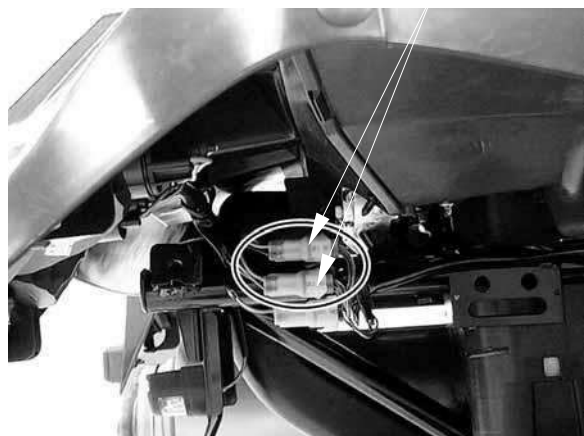
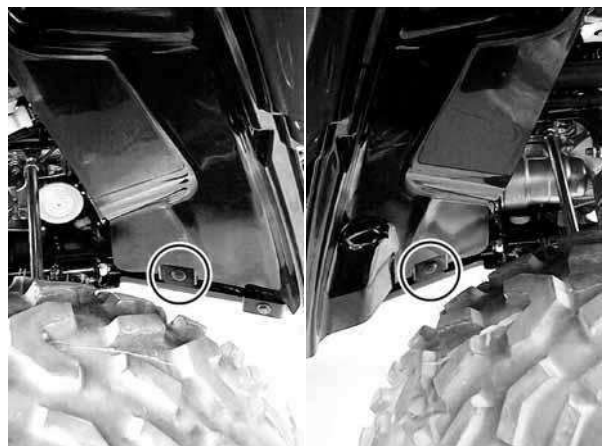


Put on the fuel tank cap after removing the cover to prevent duct, mud, etc. from entering the fuel tank

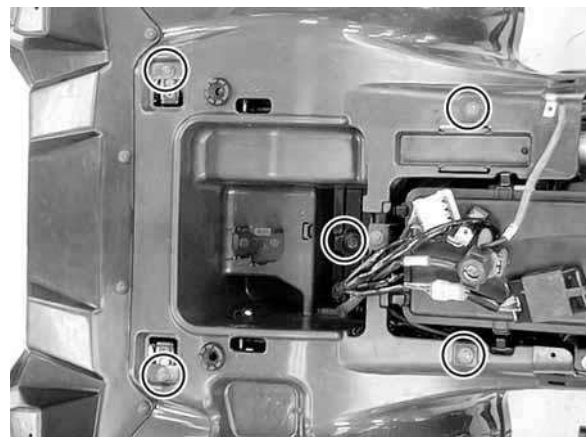
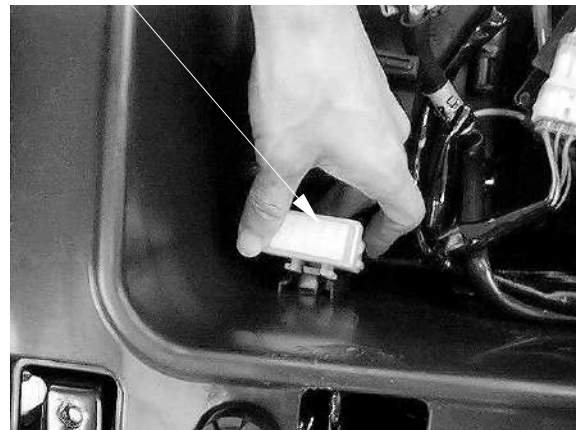
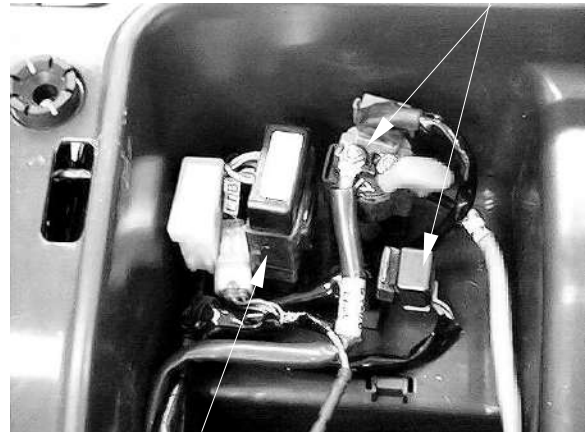
2. FRAME COVERS/EXHAUST MUFFLER



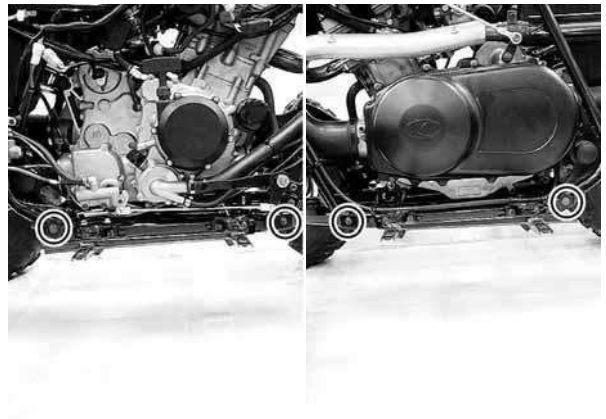
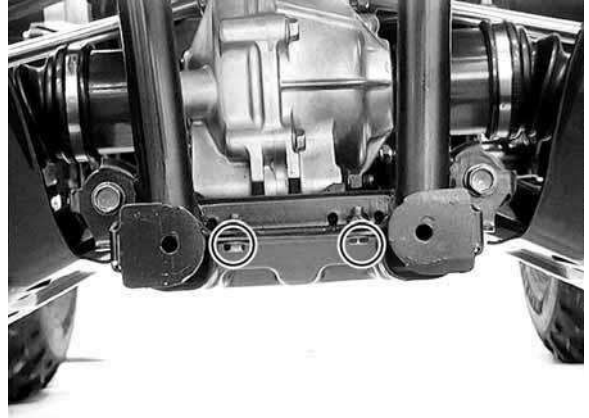
Turn Signal Lights/Headlights Connectors.



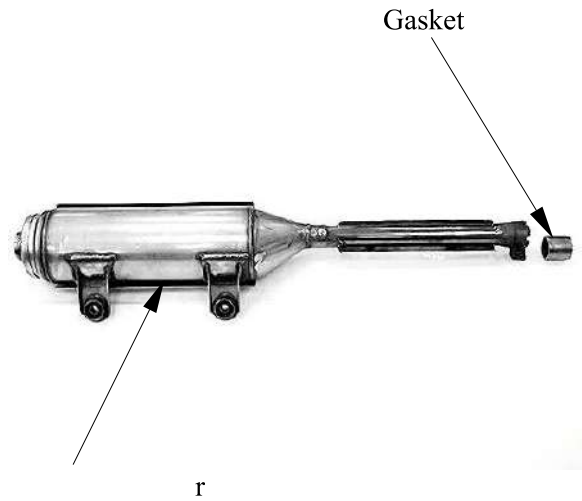
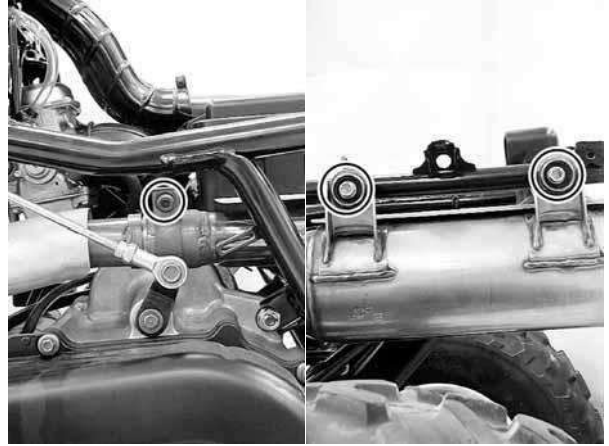
2. FRAME COVERS/EXHAUST MUFFLER



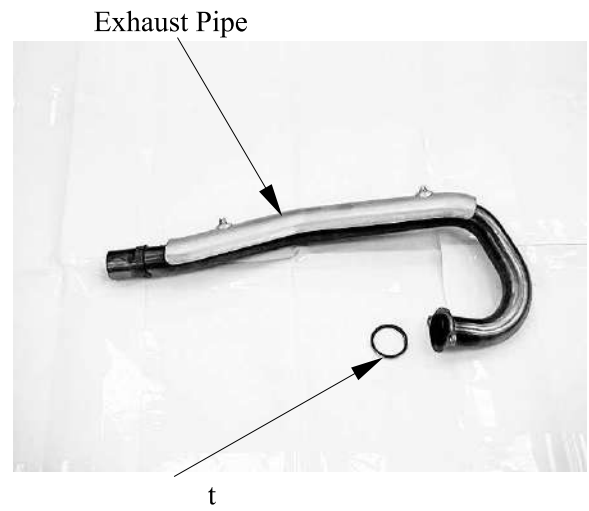
2. FRAME COVERS/EXHAUST MUFFLER



2. FRAME COVERS/EXHAUST MUFFLER



2. FRAME COVERS/EXHAUST MUFFLER



Be sure to install a new exhaust gasket.

3. INSPECTION/ADJUSTMENT

3. INSPECTION/ADJUSTMENT

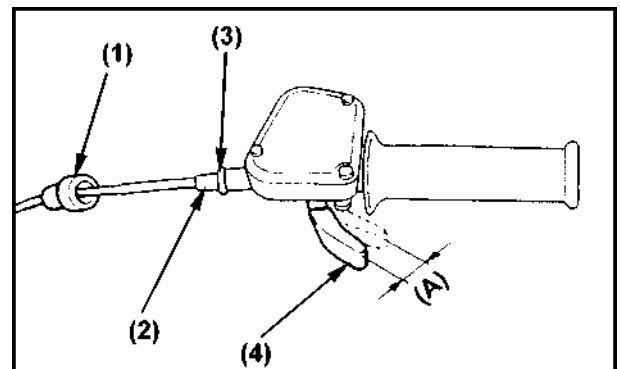
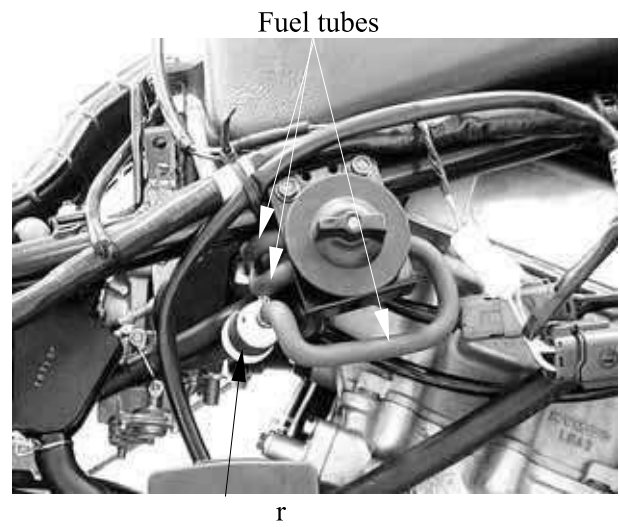
3. INSPECTION/ADJUSTMENT

3. INSPECTION/ADJUSTMENT

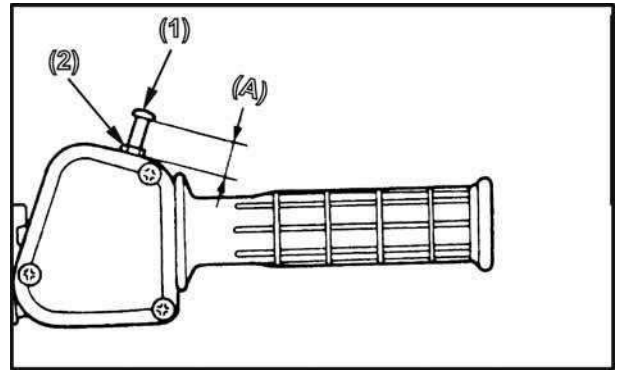
ITEM	WHICHEVER COMES FIRST ROUTINE	INITIAL			EVERY		
		mi	100	600	1200		
		Km	150	1000	2000		
		MONTH	1	6	12		
Engine oil	•Replace (Warm engine before draining).		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		
Oil strainer	•Clean. •Replace if necessary.		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		
Engine oil filter cartridge	•Replace		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		
Front drive gear oil	•Check oil level/oil leakage •Replace every 12 months.		<input type="radio"/>			<input type="radio"/>	
Rear drive gear oil	•Check oil level/oil leakage •Replace every 12 months.		<input type="radio"/>			<input type="radio"/>	
Air filter element (for engine and *V-belt compartment)	•Clean. (More often in wet or dusty areas.) •Replace if necessary.			<input type="radio"/>	<input type="radio"/>		
Carburetor	•Check idle speed/starter operation. •Adjust if necessary.		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		
Cylinder head cover breather system	•Check breather hose for cracks or damage. •Replace if necessary.			<input type="radio"/>	<input type="radio"/>		
Spark plug	•Check condition. •Adjust gap and clean. •Replace if necessary.		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		
Fuel line	•Check fuel hose for cracks or damage. •Replace if necessary.			<input type="radio"/>	<input type="radio"/>		
Valves	•Check valve clearance. •Adjust if necessary.		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		
Brake	•Check operation and brake fluid. •Replace brake pad if necessary.		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		
Coolant	•Check coolant leakage. •Replace if necessary. •Replace coolant every 24 months.		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		
V-belt	•Check operation. •Replace if damage or excessive wear.		<input type="radio"/>		<input type="radio"/>		
Exhaust system	•Check leakage. •Retighten if necessary. •Replace gasket if necessary.			<input type="radio"/>	<input type="radio"/>		
Spark arrester	•Clean			<input type="radio"/>	<input type="radio"/>		
Wheels	•Check balance/damage/runout. •Replace if necessary.		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		
Wheel bearings	•Check bearing assembly for looseness/damage. •Replace if damaged.		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		
Steering system	•Check operation. •Replace if damaged. •Check toe-in. •Adjust if necessary.		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		
Drive shaft boots	•Check operation. •Replace if damaged.			<input type="radio"/>	<input type="radio"/>		
Suspension	•Check operation. •Correct if necessary.			<input type="radio"/>	<input type="radio"/>		
Knuckle shafts/ Steering shaft	•Lubricate every 6 months.			<input type="radio"/>	<input type="radio"/>		
Fittings and Fasteners	•Check all chassis fittings and fasteners. •Correct if necessary.		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		

3. INSPECTION/ADJUSTMENT

* Do not smoke or allow flames or sparks in your working area.



3. INSPECTION/ADJUSTMENT

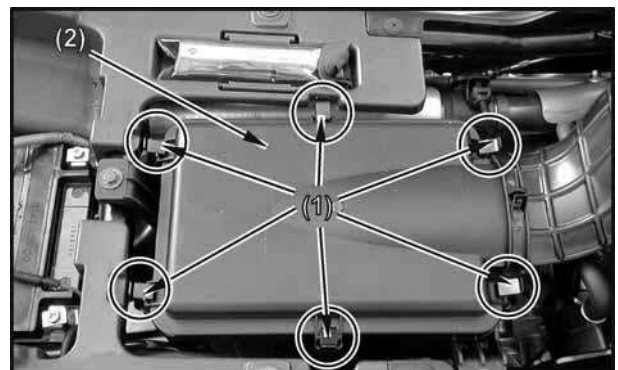


⚠ WARNING

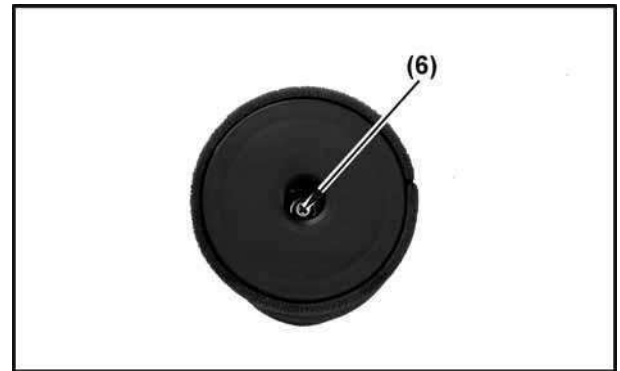
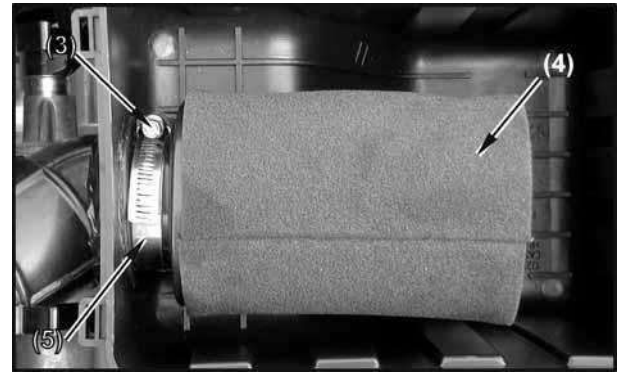
POTENTIAL HAZARD
Improper adjustment of the speed limiter and throttle.

WHAT CAN HAPPEN
The throttle cable could be damaged. Improper throttle operation could result. You could lose control, have an accident or be injured.

HOW TO AVOID THE HAZARD
Do not turn the speed adjuster out more than 13 mm (0.52 in). Always make sure the throttle lever free play is adjusted to 1.0~4.0 mm (0.04~0.16 in).



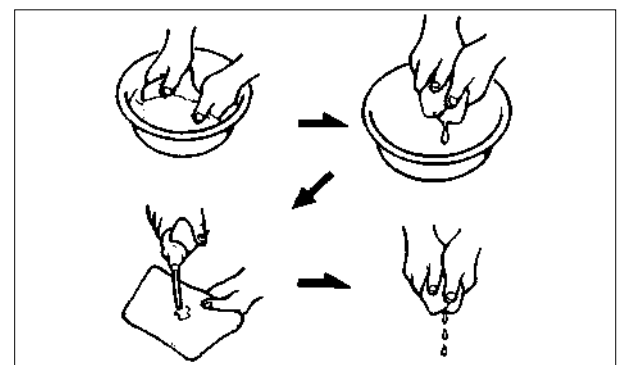
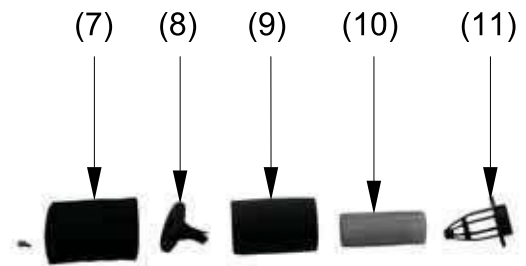
3. INSPECTION/ADJUSTMENT



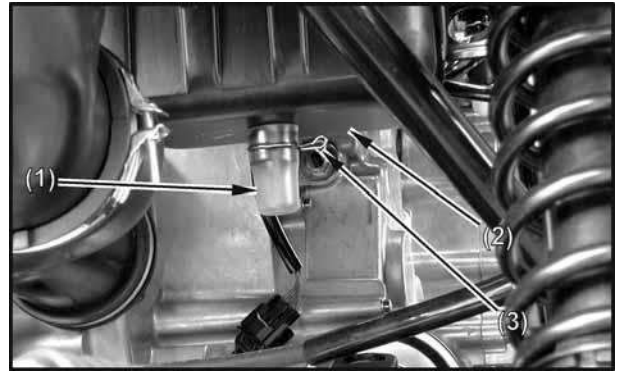
* Use parts cleaning solvent only. Never use gasoline or low flash point solvents which may lead to a fire or explosion.

* Do not twist or wring out the foam element. This could damage the foam material.

* The element should be wet but not dripping.



3. INSPECTION/ADJUSTMENT

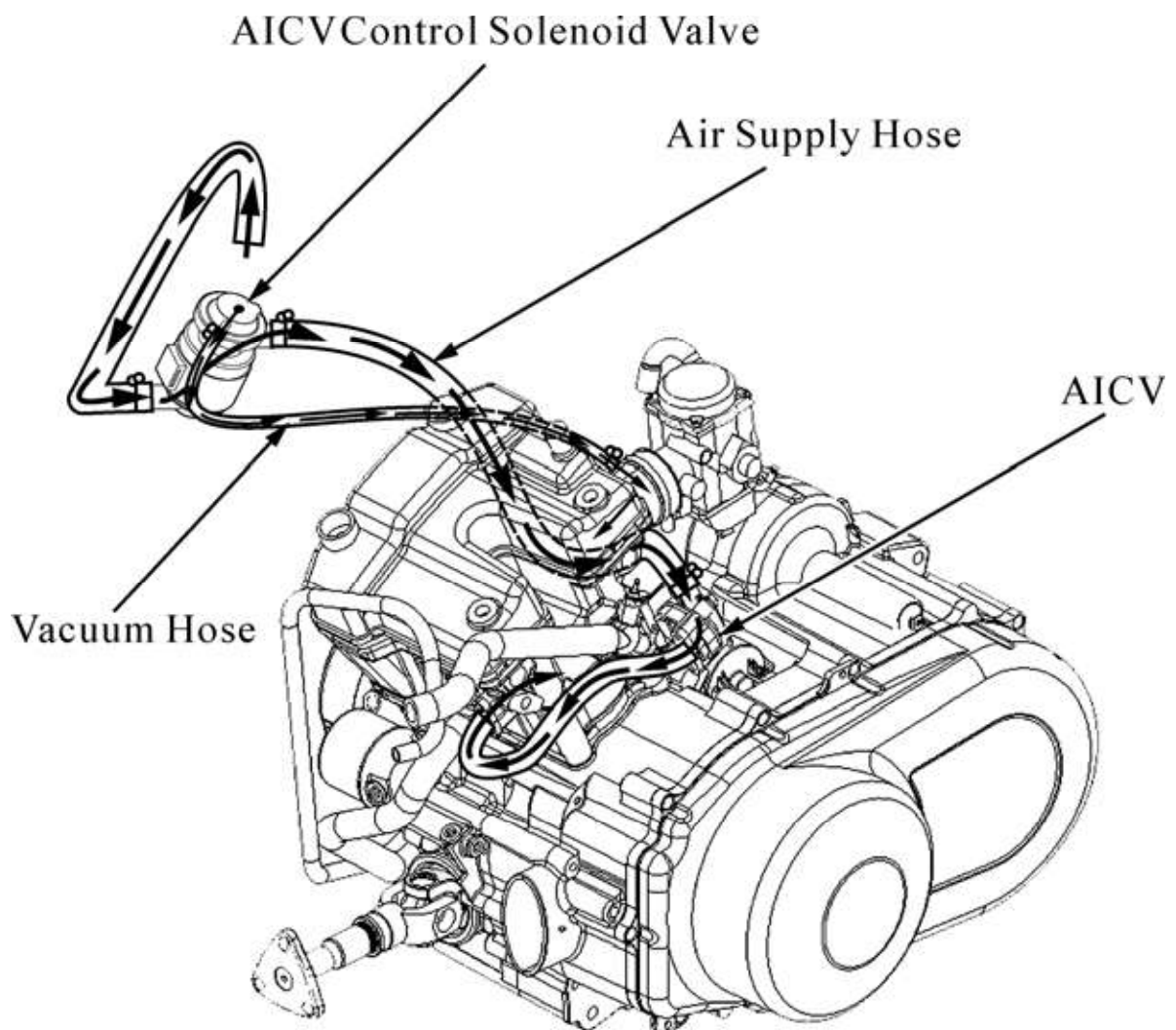


Air Filter



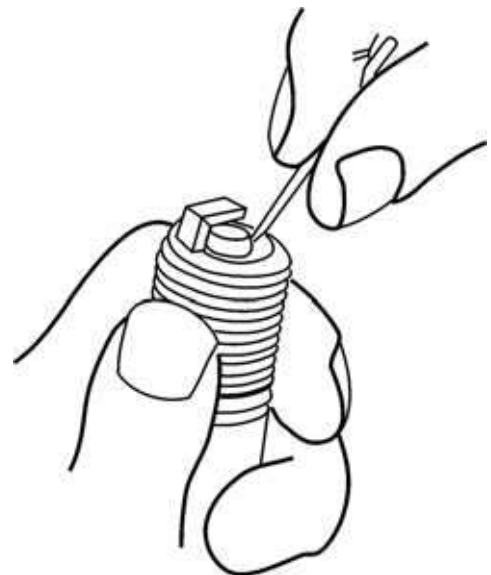
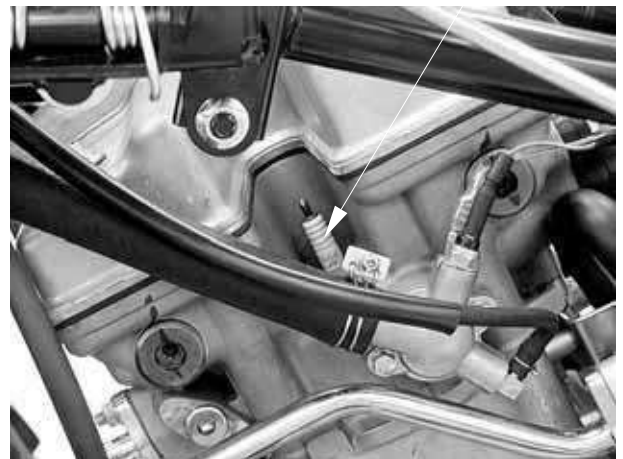
Air Filter

3. INSPECTION/ADJUSTMENT

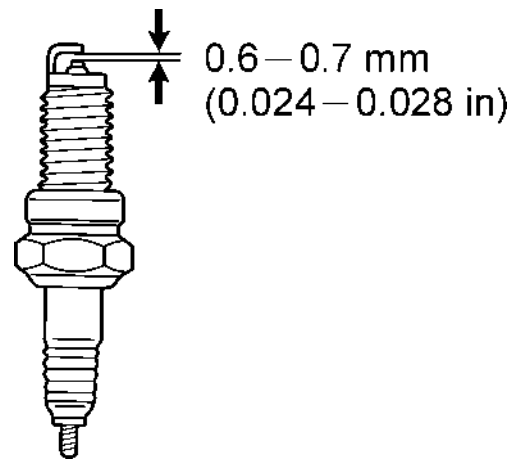


3. INSPECTION/ADJUSTMENT

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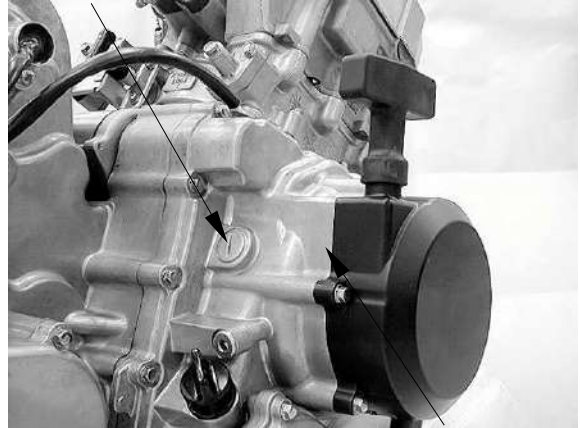
3. INSPECTION/ADJUSTMENT



3. INSPECTION/ADJUSTMENT

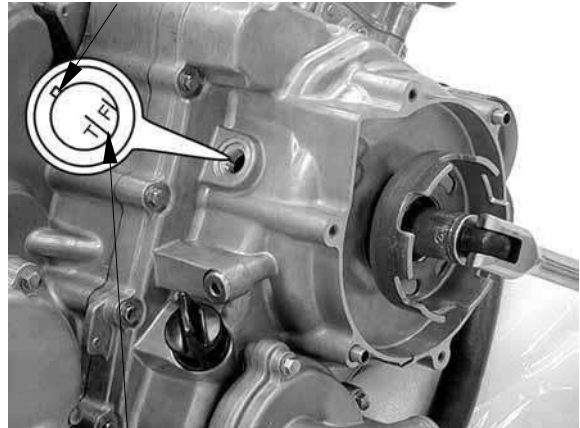
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Timing Hole Cap/O-ring



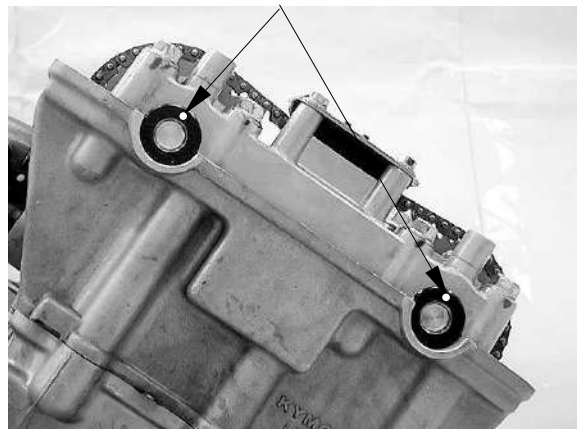
Crankshaft Hole Cap/O-ring

Index Mark



"T" Mark

Punch Marks



3. INSPECTION/ADJUSTMENT

Wrench Thickness Gauge Valve Adjusting



Lock Nut

* The engine must be warm for accurate idle speed inspection and adjustment.

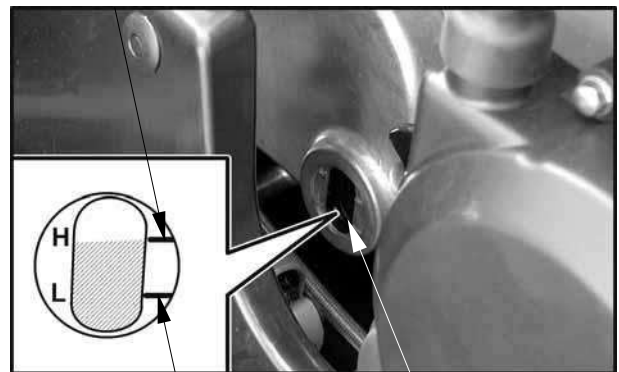


3. INSPECTION/ADJUSTMENT

Compression Gauge



Upper Level

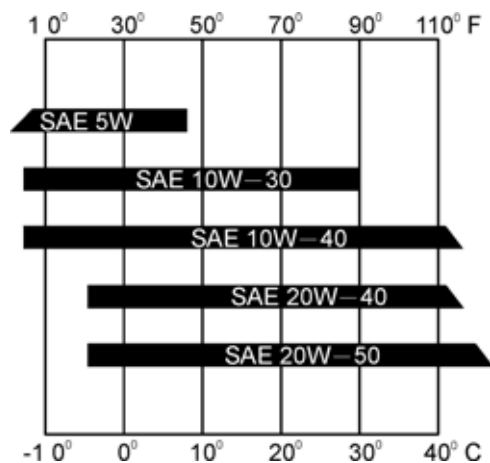


Lower Level

Inspection Window

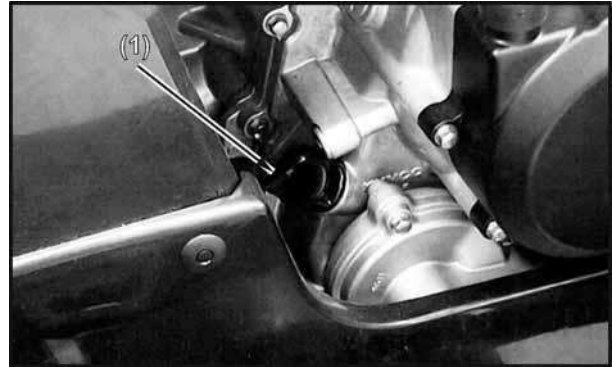
* Run the engine for 2~3 minutes and check the oil level after the engine is stopped for 2~3 minutes.

* Other viscosities shown in the chart may be used when the average temperature in your riding area is within the indicated range.

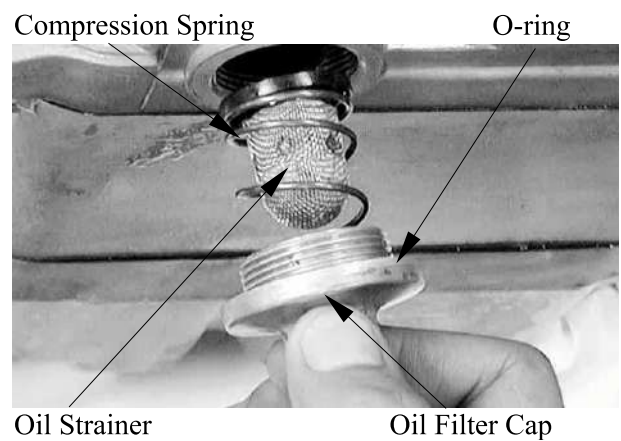
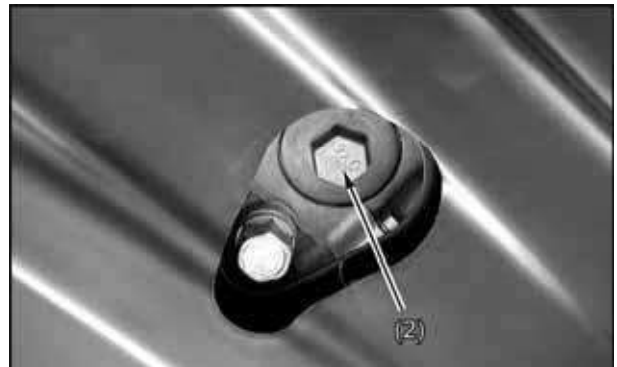


3. INSPECTION/ADJUSTMENT

* Be sure no foreign material enters the crankcase.

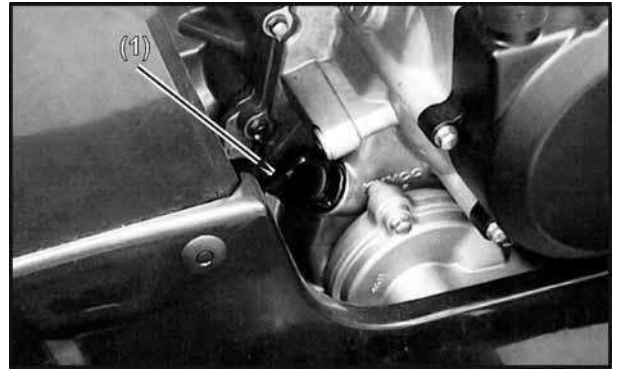


* The engine oil will drain more easily while the engine is warm.



3. INSPECTION/ADJUSTMENT

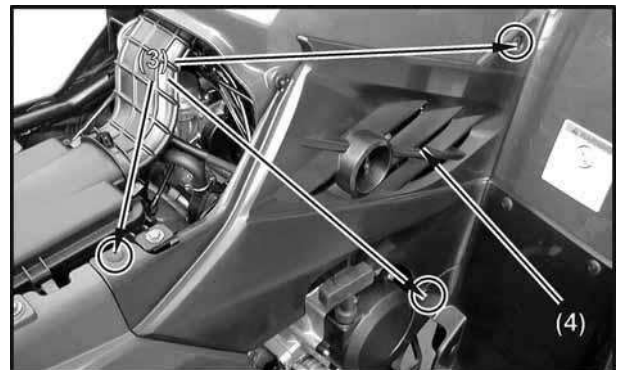
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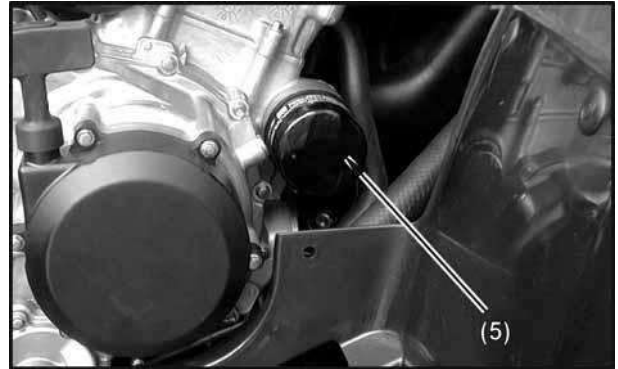
* The engine oil will drain more easily while the engine is warm.



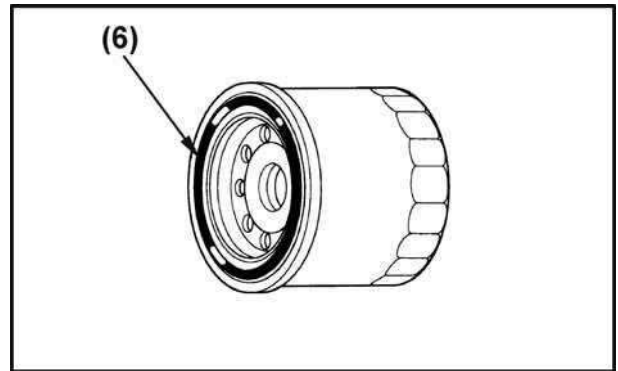
* Skip steps 6 to 10 if the oil filter cartridge is not being replaced.



3. INSPECTION/ADJUSTMENT

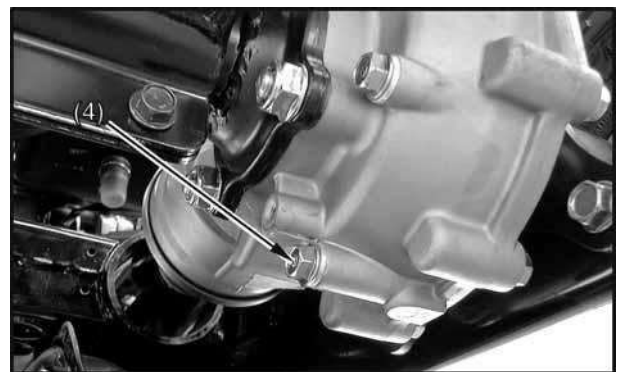
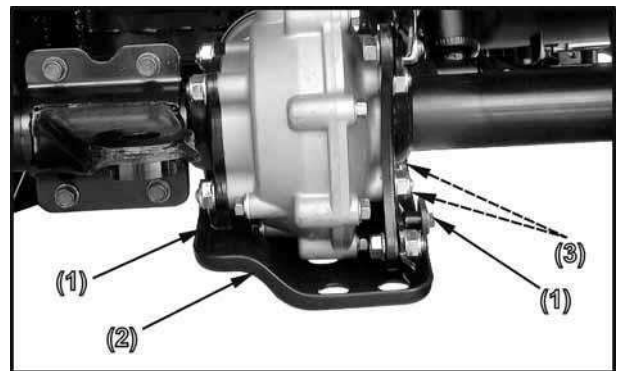
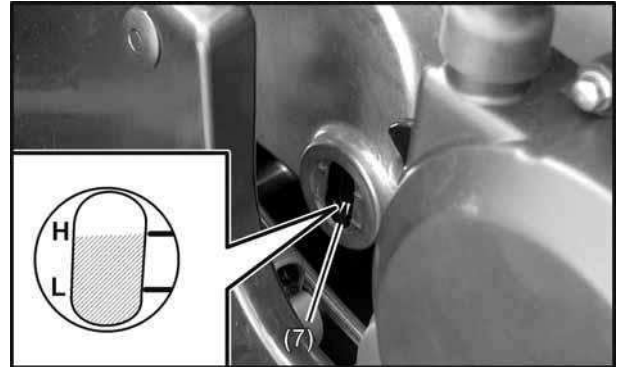


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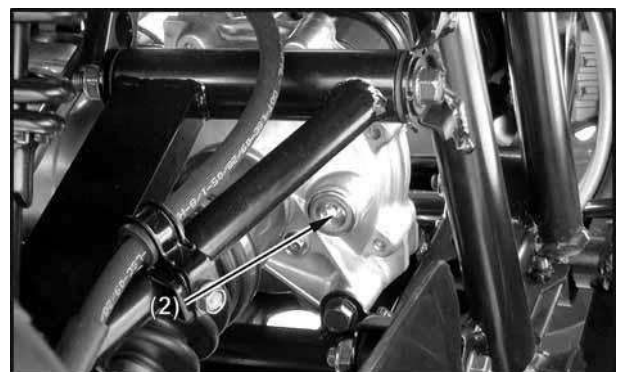
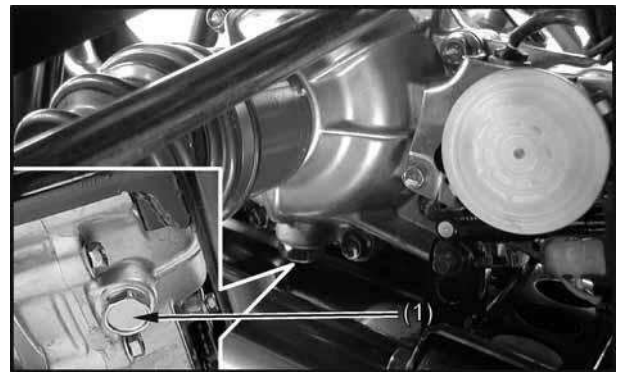
* Be sure no foreign material enters the crankcase.

3. INSPECTION/ADJUSTMENT



3. INSPECTION/ADJUSTMENT

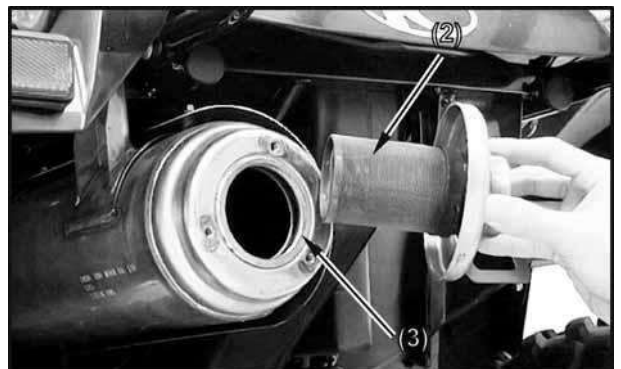
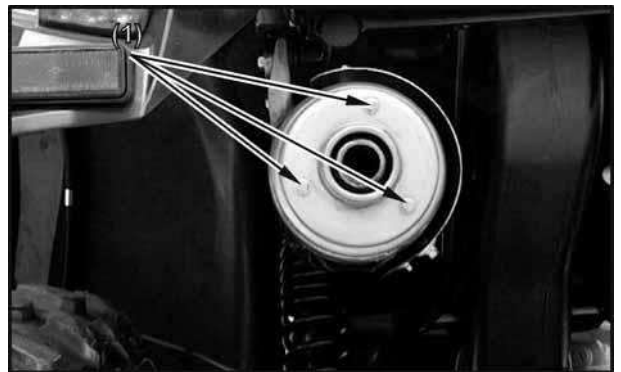
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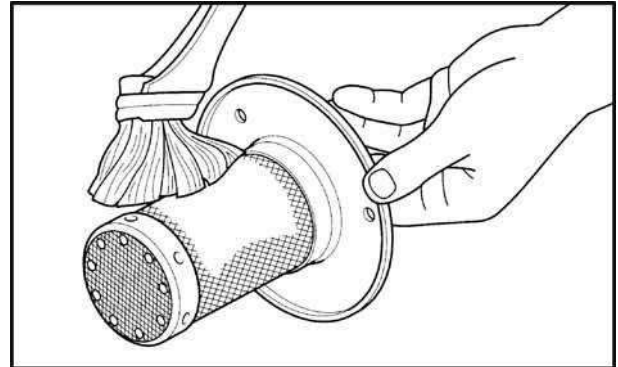
3. INSPECTION/ADJUSTMENT



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3. INSPECTION/ADJUSTMENT



⚠ WARNING

POTENTIAL HAZARD

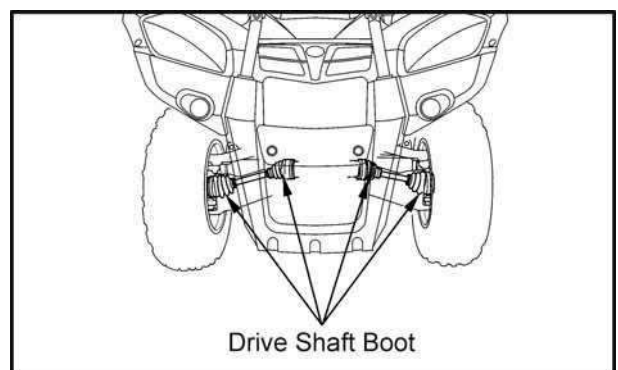
Improper cleaning of the spark arrester.
Hot exhaust system.

WHAT CAN HAPPEN

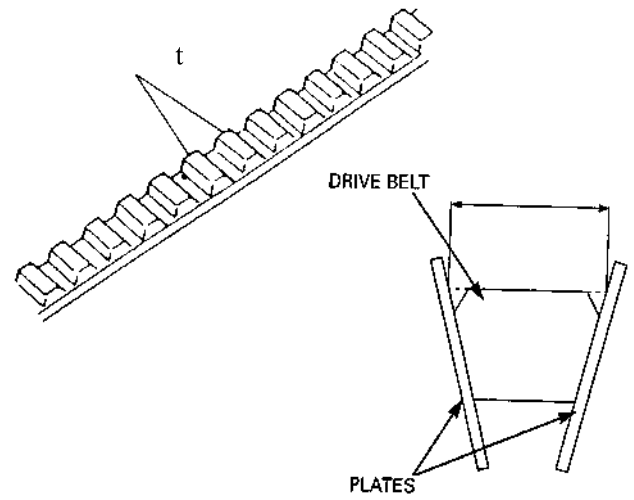
Could injure the eyes.
Could cause burns.
Could cause carbon monoxide poisoning,
possibly leading to death.
Could start a fire

HOW TO AVOID THE HAZARD

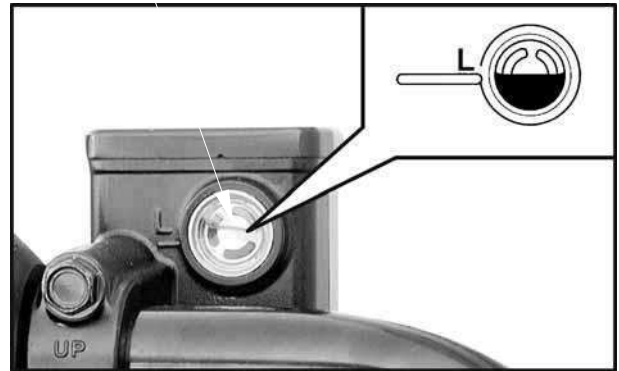
When cleaning the spark arrester:
Always let the exhaust system cool prior to
touching exhaust components
Do not start the engine when cleaning the
exhaust system.



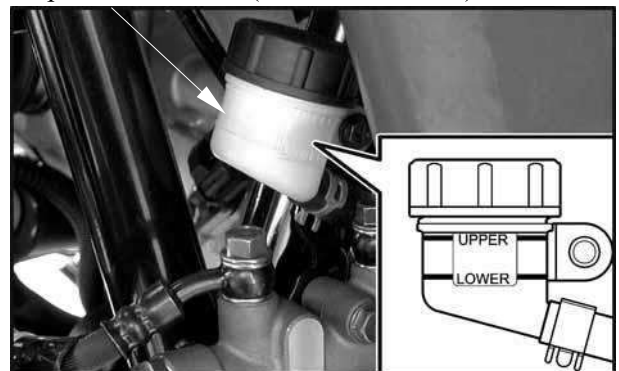
3. INSPECTION/ADJUSTMENT



3. INSPECTION/ADJUSTMENT



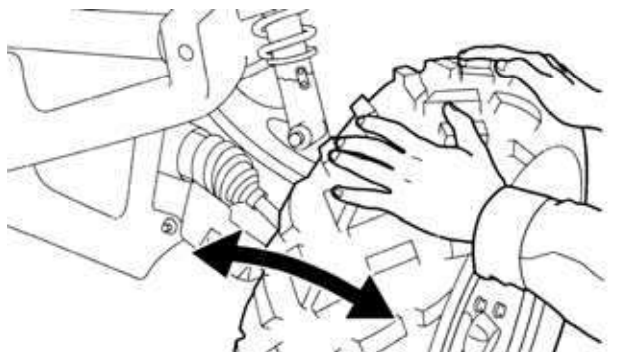
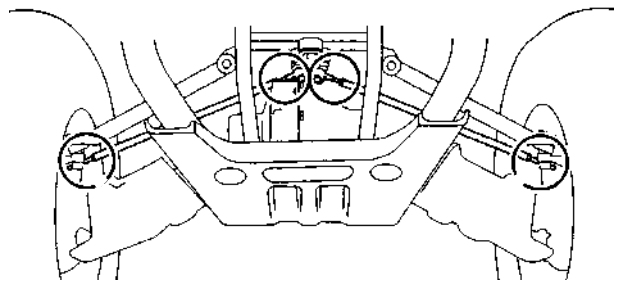
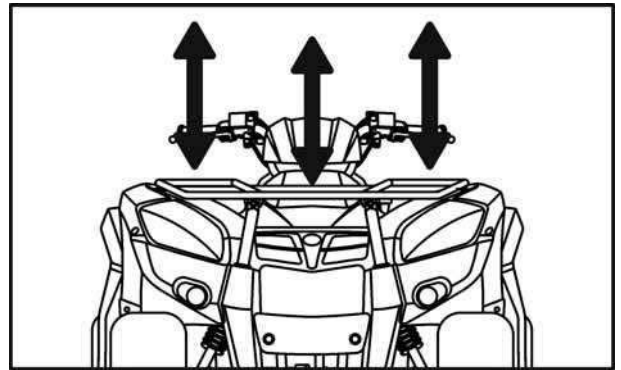
Inspection Window (Rear Brake Pedal)



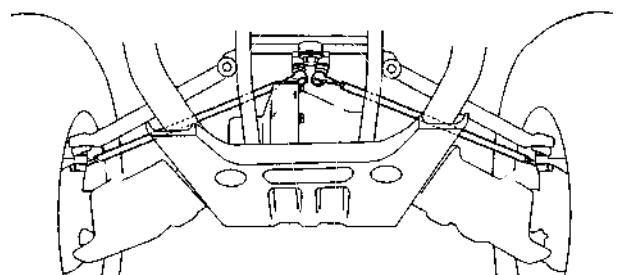
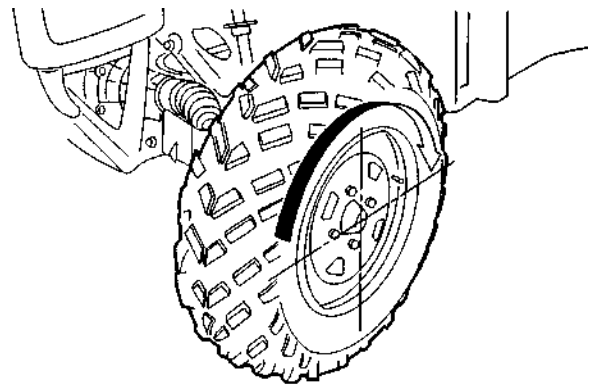
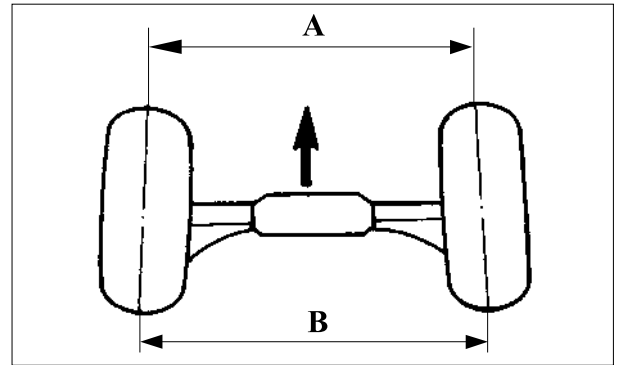
Adjust Screws



3. INSPECTION/ADJUSTMENT



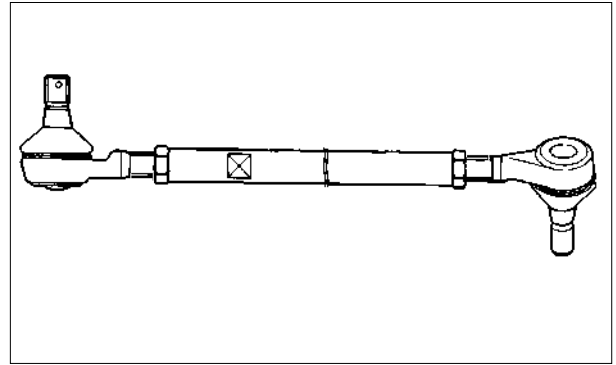
3. INSPECTION/ADJUSTMENT



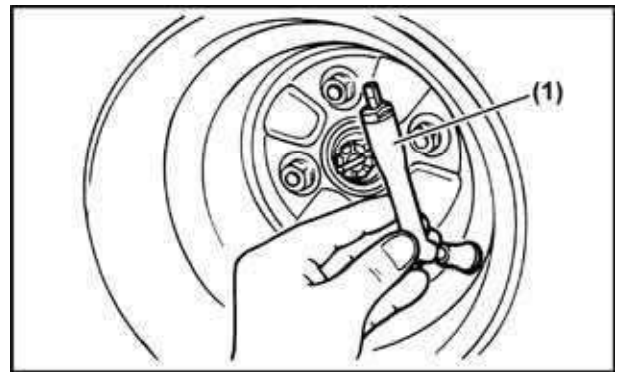
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3. INSPECTION/ADJUSTMENT

* The threads on both rod-end must be of the same length.



* Tire pressure should be checked when tires are cold.

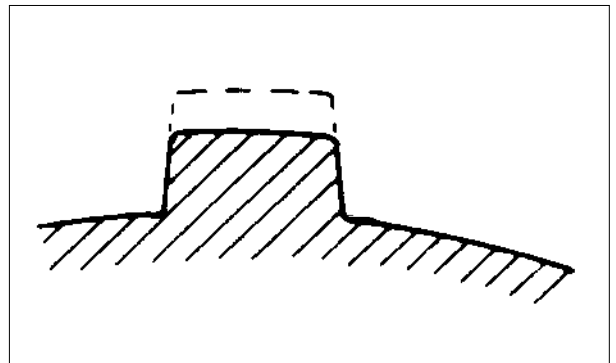


3. INSPECTION/ADJUSTMENT



Rear Axle Nut

* It is dangerous to ride with a worn out tire. When a tire wear is out of specification, replace the tire immediately.



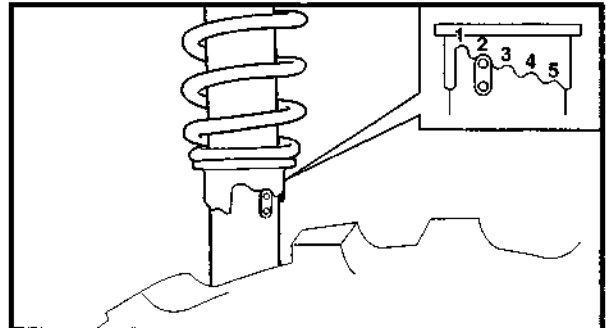
- *
- Never attempt even small repairs to the wheel.
 - Ride conservatively after installing a tire to allow it to seat itself properly on the rim.

3. INSPECTION/ADJUSTMENT

*

spring preload to the same setting.
 Uneven adjustment can cause poor
 handling and loss of stability.

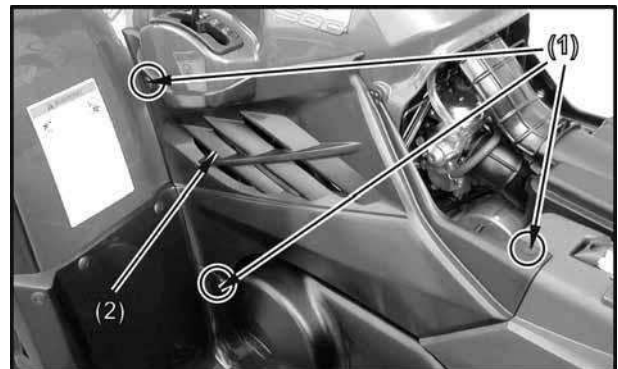
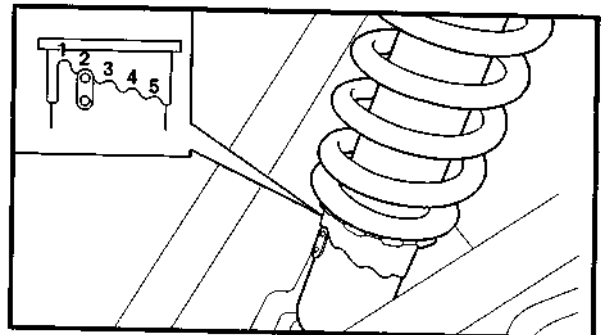
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spring preload to the same setting.
 Uneven adjustment can cause poor
 handling and loss of stability.

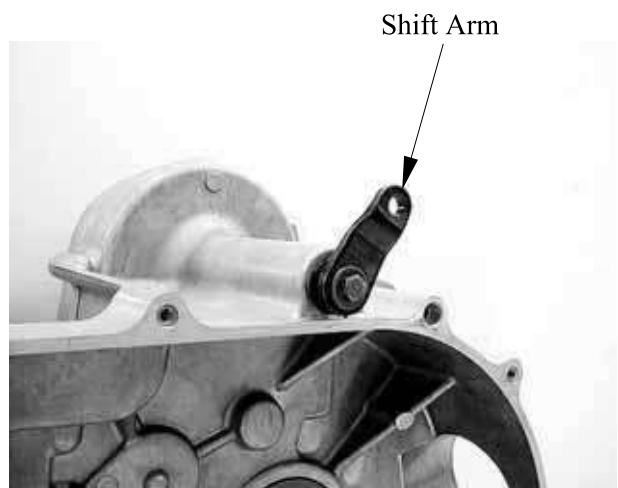
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3. INSPECTION/ADJUSTMENT



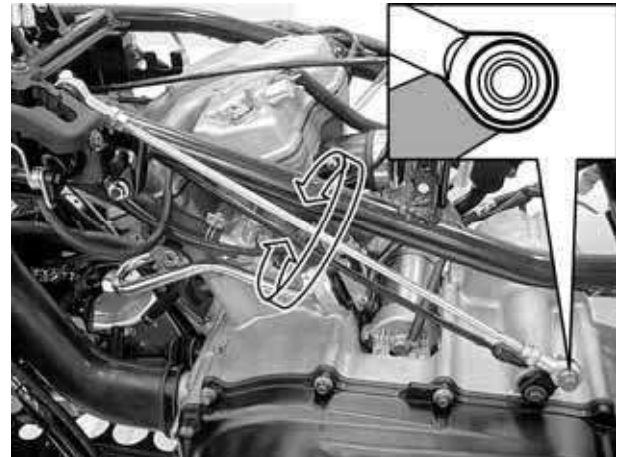
Bolt/Nut



Shift Arm

3. INSPECTION/ADJUSTMENT

- * When align the joint ball in the rod with the hole on the shift arm. Always keep the joint ball original position, do not turn the joint ball.



- * Damaged cable sheath may cause corrosion and interfere with the cable movement. An unsafe condition may result so replace such cable as soon as possible.

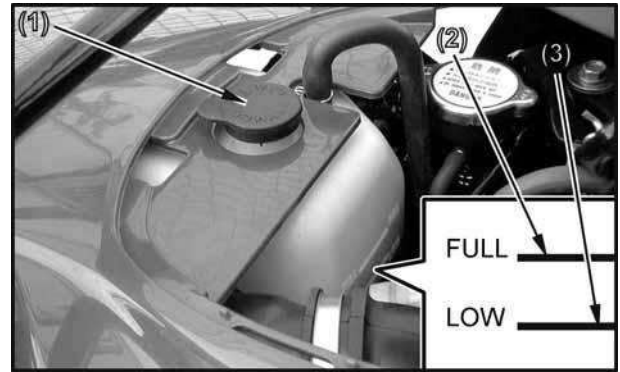
- * Hold cable end high and apply several drops of lubricant to cable.

Lock Nut



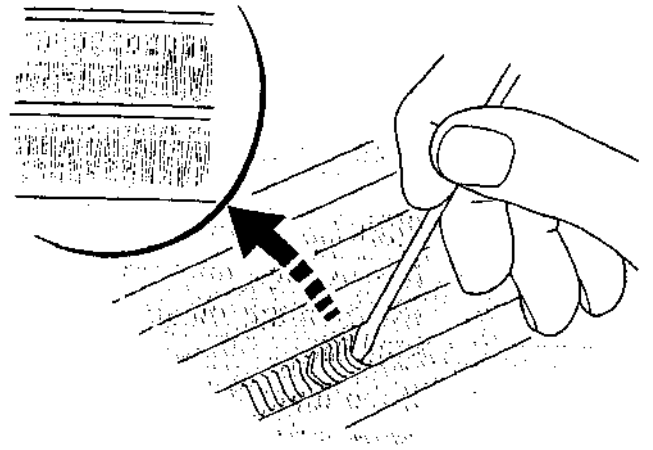
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3. INSPECTION/ADJUSTMENT

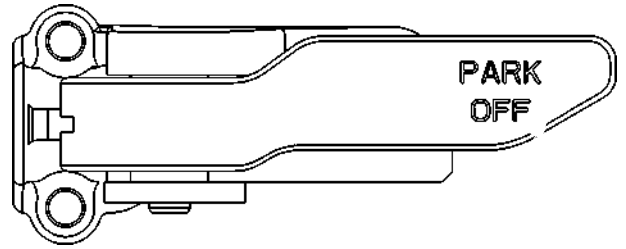


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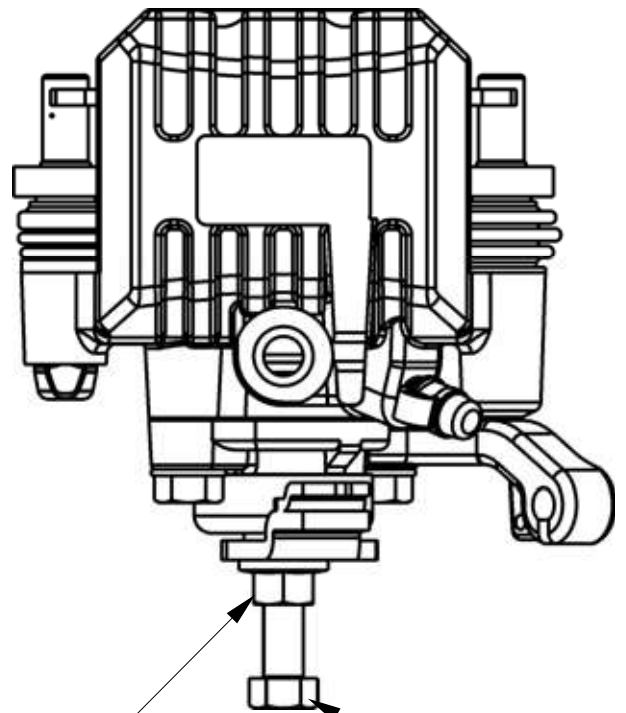
3. INSPECTION/ADJUSTMENT



3. INSPECTION/ADJUSTMENT



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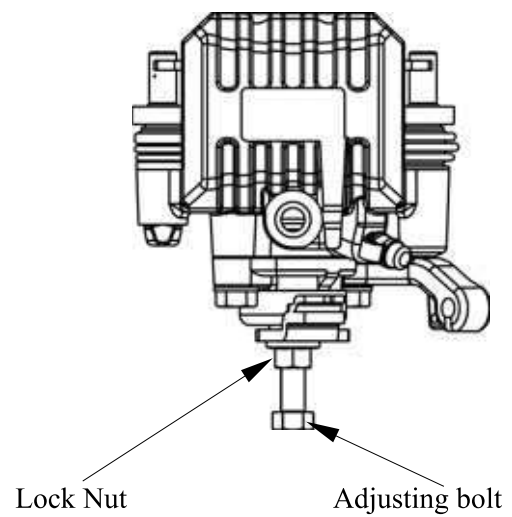
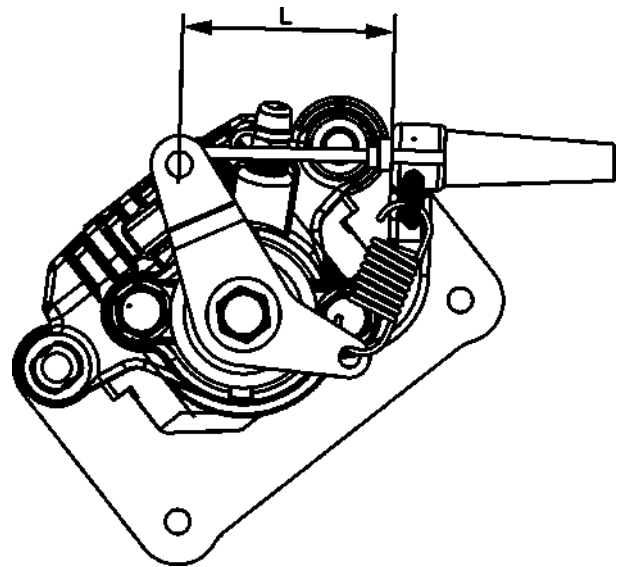
Lock Nut

Adjusting bolt

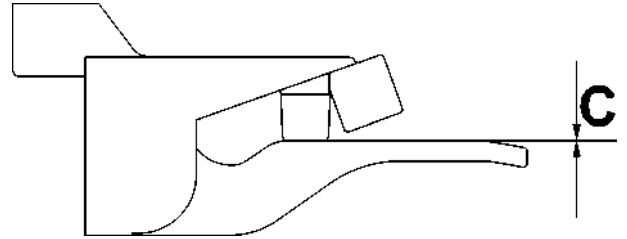
3. INSPECTION/ADJUSTMENT



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3. INSPECTION/ADJUSTMENT



4. LUBRICATION SYSTEM

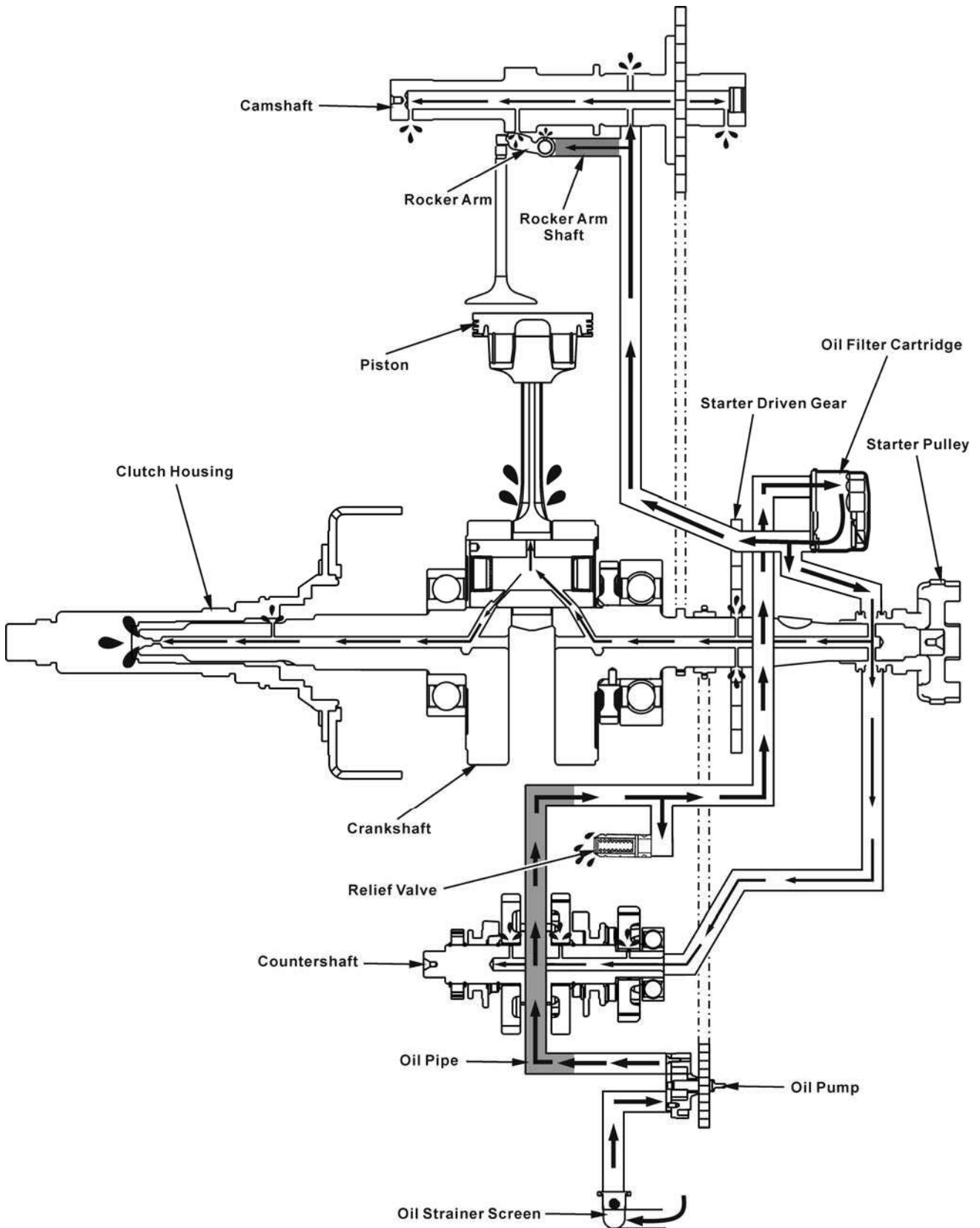
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LUBRICATION SYSTEM

LUBRICATION SYSTEM DIAGRAM -----	4- 1
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LUBRICATION CHECK HOLE -----	4- 4
OIL PUMP REMOVAL/INSPECTION/INSTALLATION-----	4- 5
OIL PUMP DISASSEMBLY/INSPECTION/ASSEMBLY -----	4- 9
RIGHT CRANKCASE COVER DISASSEMBLY/ASSEMBLY ----	4-12
OIL PRESSURE RELIEF VALVE-----	4-14
OIL PIPE REMOVAL/INSTALLATION-----	4-15

4. LUBRICATION SYSTEM

LUBRICATION SYSTEM DIAGRAM



4. LUBRICATION SYSTEM

SERVICE INFORMATION

GENERAL INSTRUCTIONS

- The oil pump service may be done with the engine installed in the frame.
- When removing and installing the oil pump use care not to allow dust or dirt to enter the engine.
- If any portion of the oil pump is worn beyond the specified service limits, replace the oil pump as an assembly.
- After the engine has been installed check that there are no oil leaks and that oil pressure is correct.

SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Engine oil capacity	At draining	3 liter (2.64 Imp qt, 3.18 Us qt)	—
	At disassembly	3.6 liter (3.17 Imp qt, 3.82 Us qt)	—
	At draining and oil filter cartridge change	3.2 liter (2.82 Imp qt, 3.39 Us qt)	—
Recommended engine oil		KYMCO 4-stroke oil or equivalent motor oil API service classification SJ Viscosity: SAE 5W-50	—
Oil pump rotor	Tip clearance	0.15 (0.006) max	0.2 (0.008)
	Body clearance	0.15 – 0.2 (0.006 – 0.008)	0.25 (0.01)
	Side clearance	0.04 – 0.09 (0.0016 – 0.0036)	0.12 (0.0048)

TORQUE VALUES

Oil pump screw	0.3 kgf-m (3 N-m, 2 lbf-ft)	
Oil strainer screen cap	1.5 kgf-m (15 N-m, 11 lbf-ft)	Apply oil to the threads and seating surface.
Oil filter cartridge	1 kgf-m (10 N-m, 7 lbf-ft)	Apply oil to the threads and seating surface.
Oil pipe bolt	3.5 kgf-m (35 N-m, 25.2 lbf•ft)	Apply oil to the threads and seating surface.

Special tool:

Oil seal & bearing drive A120E00014

4. LUBRICATION SYSTEM

TROUBLESHOOTING

Oil level low

- Oil consumption
- External oil leak
- Worn piston ring
- Incorrect piston ring installation
- Worn valve guide or seal

Oil contamination (White appearance)

- From coolant mixing with oil
 - Faulty water pump mechanical seal
 - Faulty head gasket
 - Water leak in crankcase

No oil pressure

- Oil level too low
- Oil pump drive chain broken
- Oil pump drive sprocket broken
- Oil pump damaged (pump shaft)
- Internal oil leak

Low oil pressure

- Pressure relief valve stuck open
- Clogged oil filter and strainer screen
- Oil pump worn or damaged
- Internal oil leak
- Incorrect oil being used
- Oil level too low

High oil pressure

- Pressure relief valve stuck closed
- Plugged oil filter, gallery, or metering orifice
- Faulty oil pump

Seized engine

- No or low oil pressure
- Clogged oil orifice/passage
- Internal oil leak
- Non-recommended oil used

Oil contamination

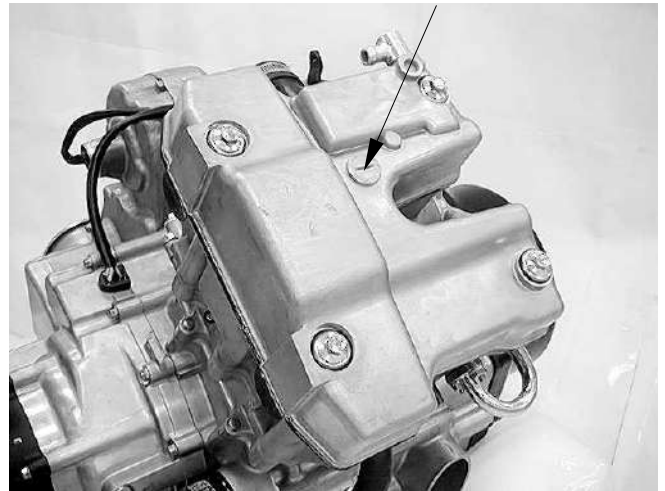
- Deteriorated oil
- Faulty oil filter
- Worn piston ring (White appearance with water or moisture)
 - Damaged water pump mechanical seal
 - Damaged head gasket
 - Oil relief not frequent enough

4. LUBRICATION SYSTEM

LUBRICATION CHECK HOLE

Remove the check hole plug/O-ring.
Start the engine.
Check the oil gushed from the hole. If not,
stop the engine immediately and determine
the cause.

Check Hole Plug/O-ring



4. LUBRICATION SYSTEM

OIL PUMP REMOVAL/INSPECTION/ INSTALLATION

REMOVAL

Remove the flywheel and driven gear (refer to the “**STARTER CLUTCH REMOVAL/INSPECTION/INSTALLATION**” section in the chapter 19).

Remove the two bolts and oil pump drive chain guide.

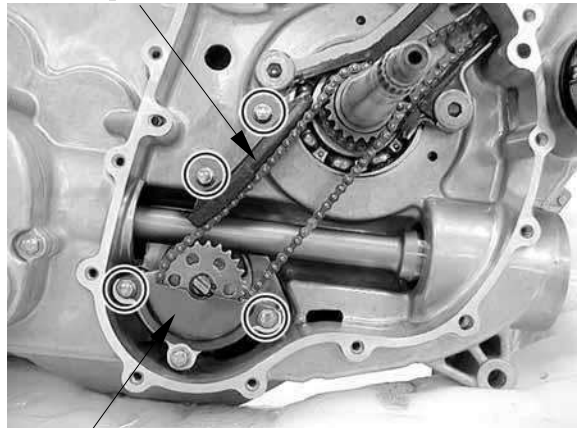
Remove the two bolts and oil separator cover.

When removing and installing the oil pump, use care not to allow dust or dirt to enter the engine..

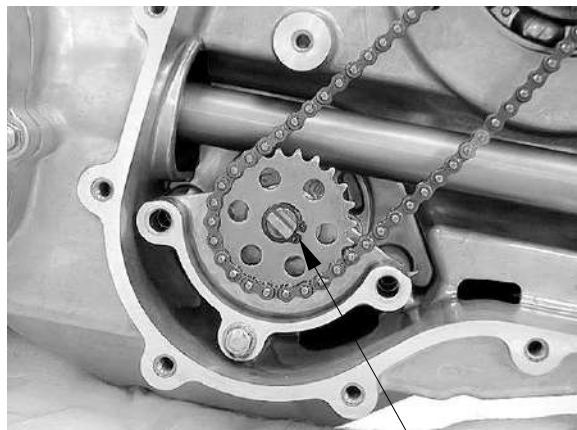
Remove snap ring.

Remove the oil pump driven gear, then remove the oil pump drive chain.

Oil Pump Drive Chain Guide

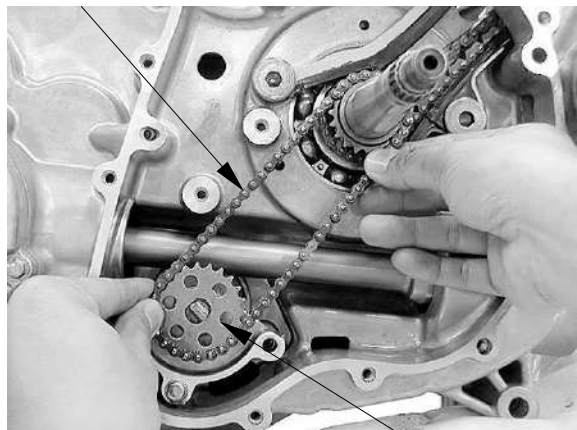


Oil Separator Cover



Snap Ring

Drive Chain



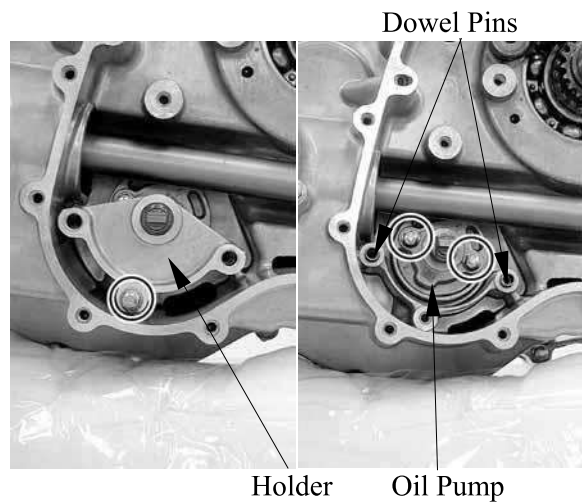
Driven Gear

4. LUBRICATION SYSTEM

Remove a bolt and then remove the oil pump holder.

Remove the two dowel pins.

Remove the two bolts and then remove the oil pump.



INSPECTION

Oil pump drive chain guide

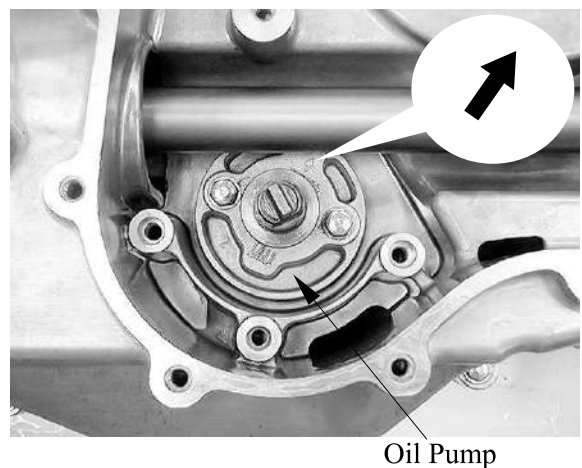
Inspect the drive chain slipper surface of the drive chain guide for wear or damage.



INSTALLATION

Install the oil pump.

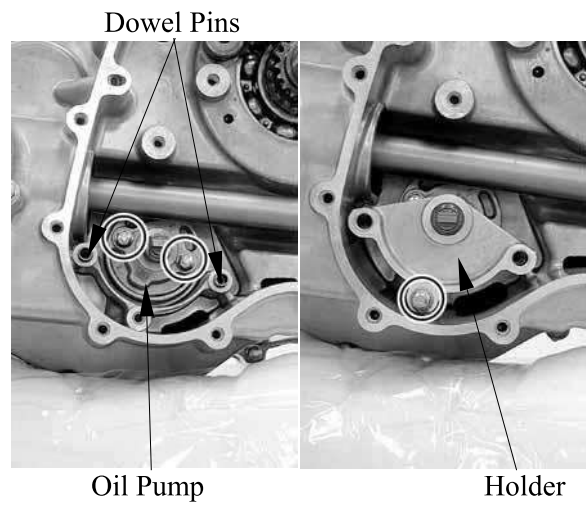
Make sure the pump shaft rotates freely and arrow on the oil pump is upside.



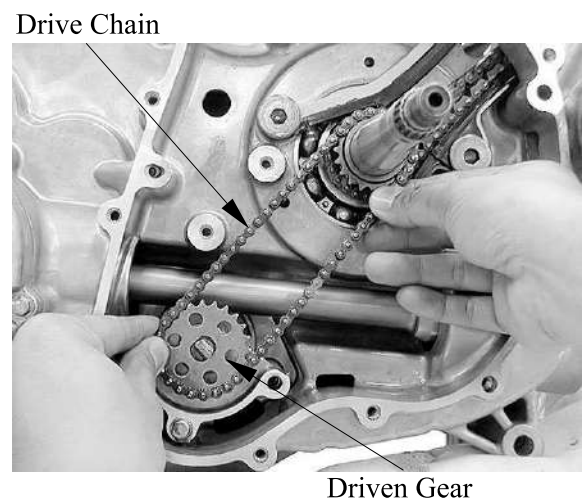
4. LUBRICATION SYSTEM

Install and tighten the two bolts securely.
Install two dowel pins

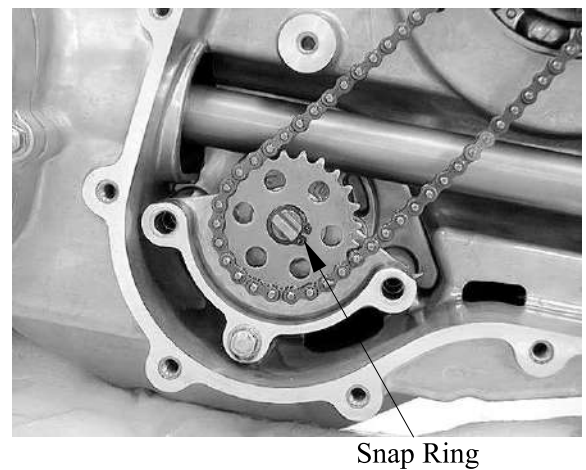
Install the holder, then install a bolt but do not tighten.



Install the driven gear and drive chain.



Install the snap ring.

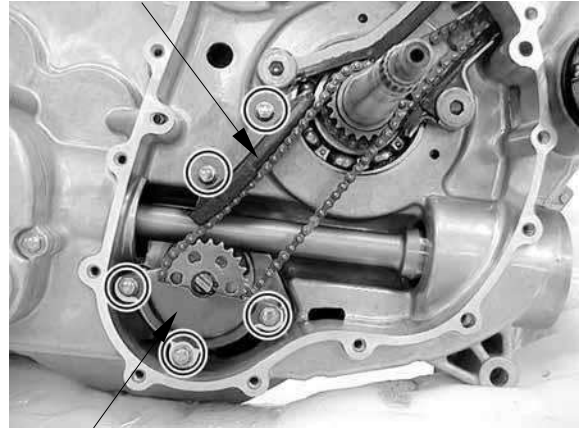


4. LUBRICATION SYSTEM

Install the chain guide, then install and tighten the two bolts securely.

Install the oil separator cover, then install and tighten the three bolts in a crisscross pattern in 2 or 3 steps.

Oil Pump Drive Chain Guide



Oil Separator Cover

4. LUBRICATION SYSTEM

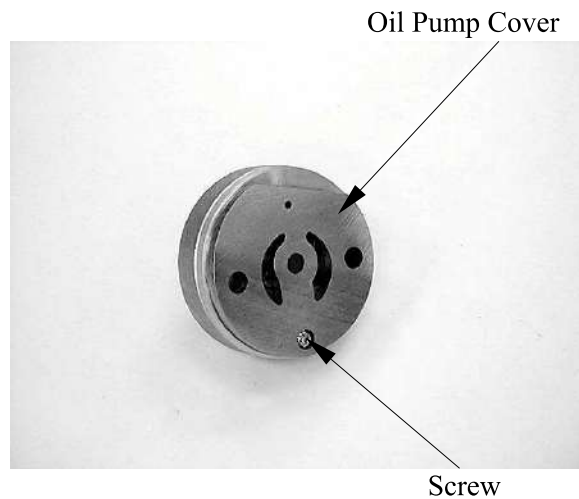
OIL PUMP DISASSEMBLY/INSPECTION/ ASSEMBLY

DISASSEMBLY

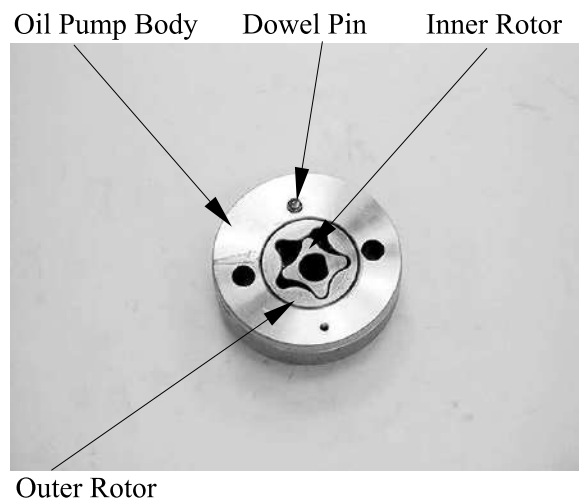
Remove the oil pump shaft.



Remove the screw and oil pump cover.



Remove the dowel pin, oil pump outer rotor and inner rotor.



4. LUBRICATION SYSTEM

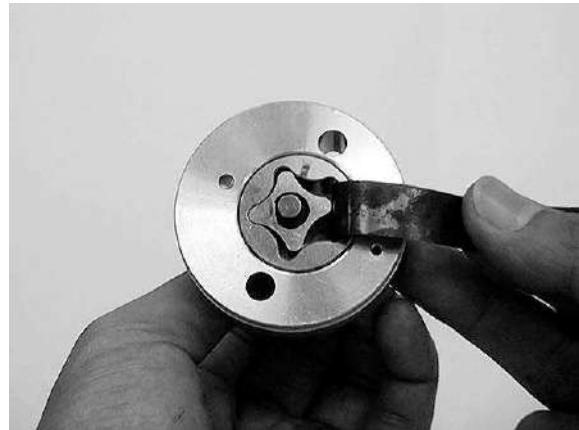
INSPECTION

Temporarily install the oil pump shaft.
Install the outer and inner rotors into the oil pump body.

Measure the tip clearance.

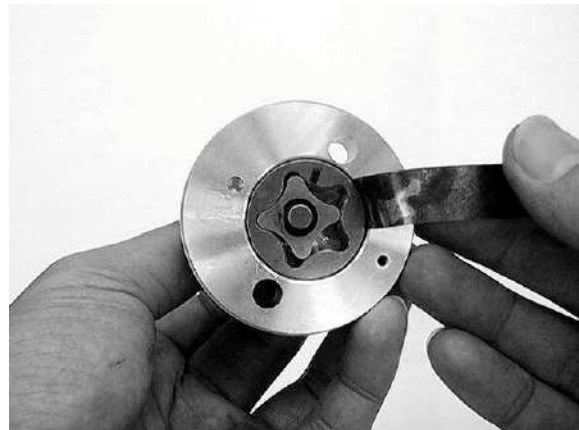
Service limit: 0.2 mm (0.008 in)

Measure at several points and use the largest reading to compare the service limit.



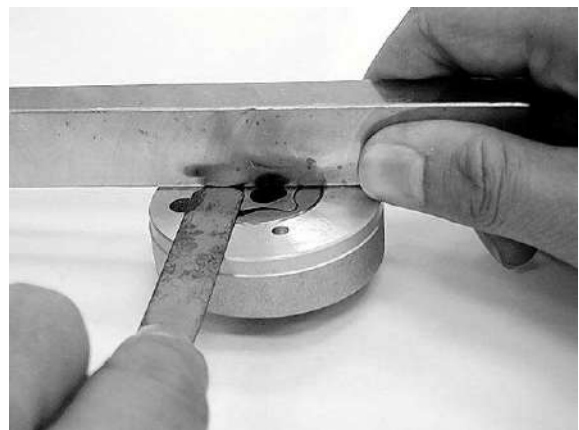
Measure the pump body clearance.

Service limit: 0.25 mm (0.01 in)



Measure the side clearance with the straight edge and feeler gauge.

Service limit: 0.12 mm (0.0048 in)



4. LUBRICATION SYSTEM

ASSEMBLY

Dip all parts in clean engine oil.

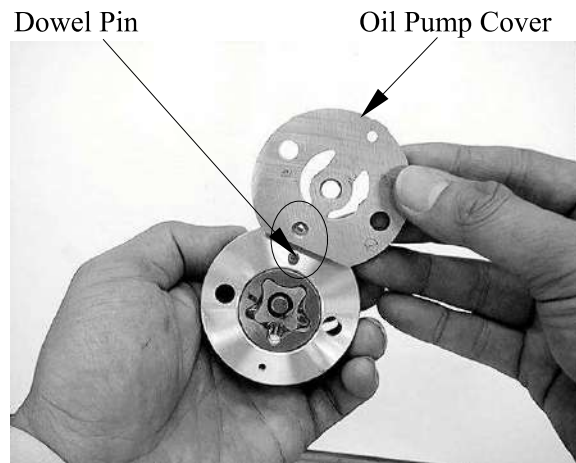
Install the outer rotor into the oil pump body.

Install the inner rotor into the outer rotor.

Install the oil pump shaft.

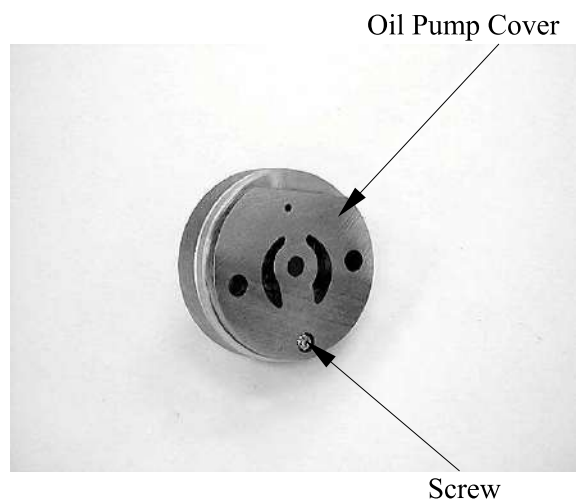
Install the dowel pin onto the oil pump body.

Install the oil pump cover onto the oil pump body by aligning the dowel pin.



Install and tighten the screw to the specified torque.

Torqur: 3 N•m (0.3kgf•m, 2 lbf•ft)

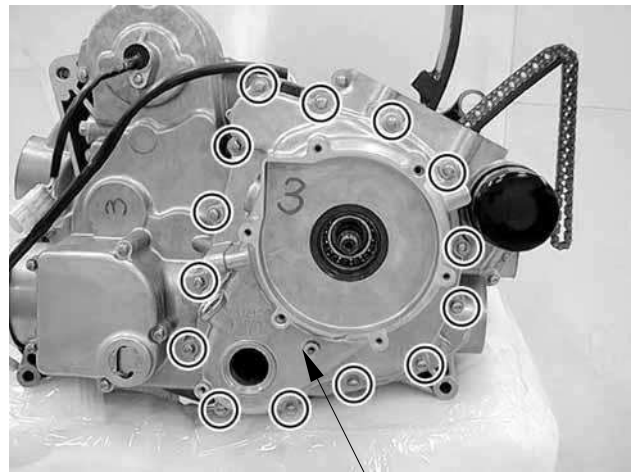


4. LUBRICATION SYSTEM

RIGHT CRANKCASE COVER DISASSEMBLY/ASSEMBLY

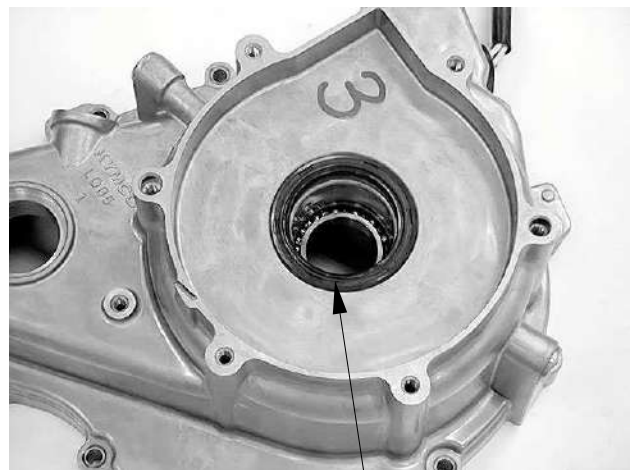
DISASSEMBLY

Remove the right crankcase cover (refer to the “ALTERNATOR STATOR REMOVAL/INSPECTION/INSTALLATION” in the chapter 17)



Right Crankcase Cover

Remove the oil seal.



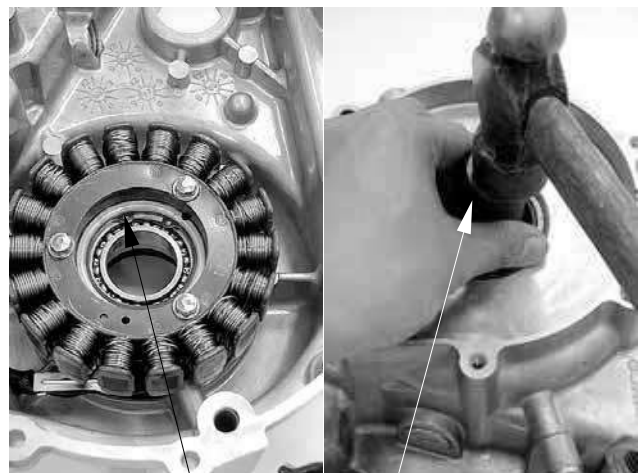
Oil Seal

Remove the snap ring.

Remove the bearing by using the special tool.

Special tool:

Oil seal & bearing drive A120E00014



Snap Ring

Bearing Drive

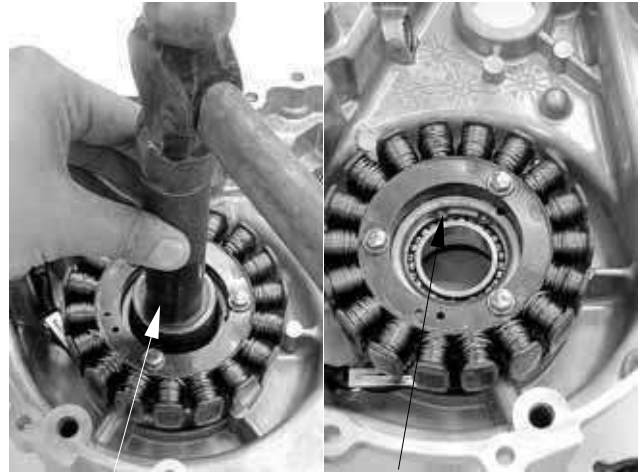
4. LUBRICATION SYSTEM

ASSEMBLY

Install a new bearing by using the special tool.

Special tool:

Oil seal & bearing drive A120E00014



Bearing Drive

Snap Ring

Install a new oil seal.



Oil Seal

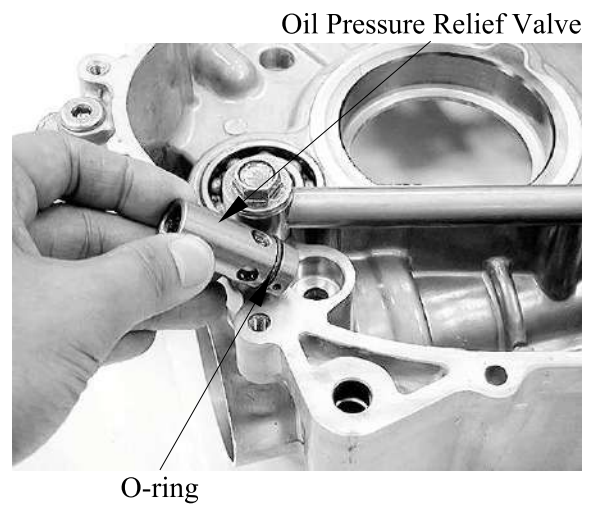
4. LUBRICATION SYSTEM

OIL PRESSURE RELIEF VALVE

REMOVAL

Remove the right crankcase (refer to the “**RIGHT CRANKCASE REMOVAL/INSTALLATION**” section in the chapter 11).

Remove the pressure relief valve and O-ring from the right crankcase.

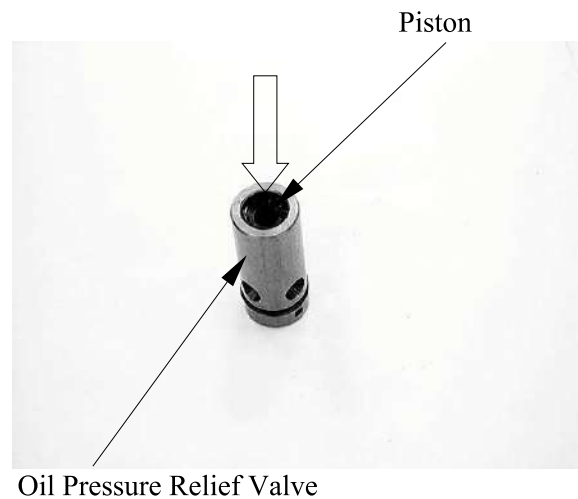


INSPECTION

Check the operation of the pressure relief valve by pushing on the piston.

INSTALLATION

Apply oil to a new O-ring and install the pressure relief valve groove, and install the relief valve to the right crankcase.



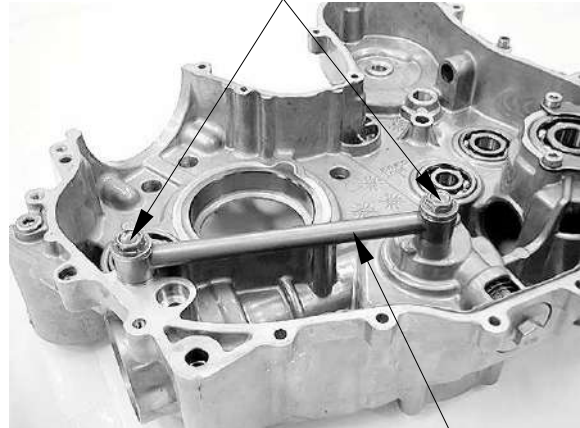
4. LUBRICATION SYSTEM

OIL PIPE REMOVAL/INSTALLATION

REMOVAL

Remove the two bolts, washers (on the oil pipe), oil pipe and washers (under oil pipe).

Bolts/Washers (on the oil pipe)



Oil Pipe/Washer (under oil pipe)

INSTALLATION

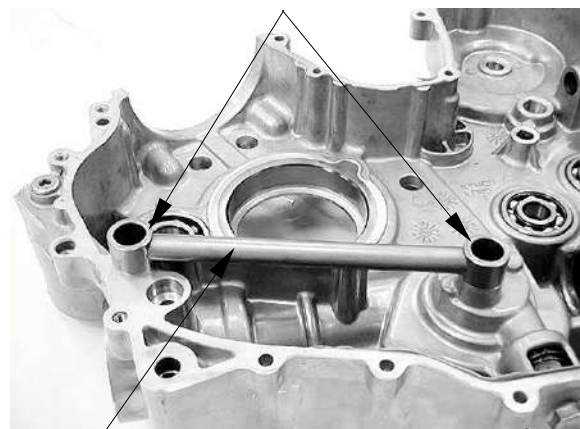
Install the inner washers on the right crankcase.

Washers



Install the oil pipe with the thick side face upward.

Thick Side

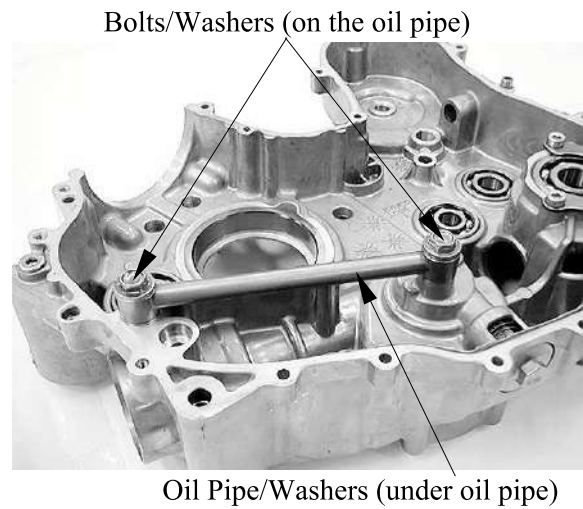


Oil Pipe

4. LUBRICATION SYSTEM

Apply clean engine oil to the bolts, then install the outer washers and two bolts. Tighten the two bolts to the specified torque.

Torque: 3.5 kgf-m (35 N-m, 25.2 lbf•ft)



5. FUEL SYSTEM

5

FUEL SYSTEM

SERVICE INFORMATION-----	5- 2
TROUBLESHOOTING-----	5- 3
FUEL TANK -----	5- 4
FUEL VALVE -----	5- 4
CARBURETOR REMOVAL/CHOKE INSPECTION/INSTALLATION--	5- 7
CARBURETOR DISASSEMBLY/INSPECTION/ASSEMBLY -----	5- 9
AIR CLEANER HOUSING-----	5-19
PAIR SOLENOID VALVE -----	5-20

5. FUEL SYSTEM

SERVICE INFORMATION

GENERAL INSTRUCTIONS



Gasoline is very dangerous. When working with gasoline, keep sparks and flames away from the working area.
Gasoline is extremely flammable and is explosive under certain conditions. Be sure to work in a well-ventilated area.

- Do not bend or twist control cables. Damaged control cables will not operate smoothly.
- When disassembling fuel system parts, note the locations of O-rings. Replace them with new ones during reassembly.
- Before float chamber disassembly, loosen the drain screw to drain the residual gasoline into a clean container.
- After the carburetor is removed, plug the intake manifold side with a clean shop towel to prevent foreign matters from entering.
- When cleaning the carburetor air and fuel jets, the O-rings and diaphragm must be removed first to avoid damage. Then, clean with compressed air.
- When the machine is not used for over one month, drain the residual gasoline from the float chamber to avoid erratic idling and clogged slow jet due to deteriorated fuel.

SPECIFICATIONS

Item		Standard
Type		CVK
I.D. No.		L88A ATKF
Bore size		φ36.5 mm (φ1.46 in)
Float level		17 mm (0.67 in)
Main jet No.	ON ROAD	#128
	OFF ROAD	#130
Slow jet No.		#40
Choke jet No.		#90
Idle speed		1500±100 rpm
Throttle grip free play		3~5 mm (0.12~0.2 in)
Pilot screw opening		1 1/4±1/2

5. FUEL SYSTEM

TROUBLESHOOTING

Engine cranks but won't start

- No fuel in tank
- No fuel to carburetor
- Cylinder flooded with fuel
- No spark at plug
- Clogged air cleaner
- Intake air leak
- Improper throttle operation

Engine idles roughly, stalls or runs poorly

- Excessively used choke
- Ignition malfunction
- Faulty carburetor
- Poor quality fuel
- Lean or rich mixture
- Incorrect idle speed

Misfiring during acceleration

- Faulty ignition system
- Faulty carburetor

Backfiring at deceleration

- Float level too low
- Incorrectly adjusted carburetor
- Faulty exhaust muffler

Engine lacks power

- Clogged air cleaner
- Faulty carburetor
- Faulty ignition system

Lean mixture

- Clogged carburetor fuel jets
- Float level too low
- Intake air leak
- Clogged fuel tank cap breather hole
- Kinked or restricted fuel line

Rich mixture

- Float level too high
- Clogged air jets
- Clogged air cleaner

5. FUEL SYSTEM

FUEL TANK

REMOVAL



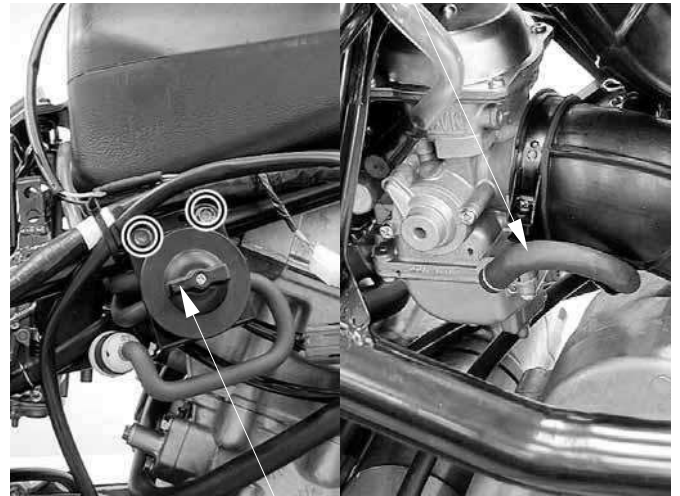
Remove the seat, right and left side frame cover and fuel tank cover (refer to the “**FRAME COVERS**” section in the chapter 2).

Switch the fuel valve “OFF”.
Remove the 2 mounting bolts.
Disconnect the fuel tube from carburetor.

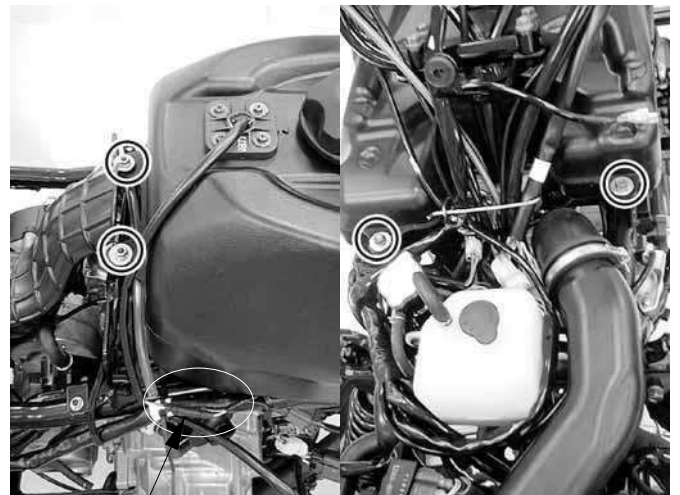
Disconnect the fuel unit connectors.
Remove the two bolts and two nuts from the fuel tank, then remove the fuel tank.

INSTALLATION

Fuel tank installation is in the reverse order of removal.



Fuel Valve



Fuel Unit Connectors

FUEL VALVE

REMOVAL

- *
 - Keep sparks and flames away from the work area.
 - Drain gasoline into a clean container.

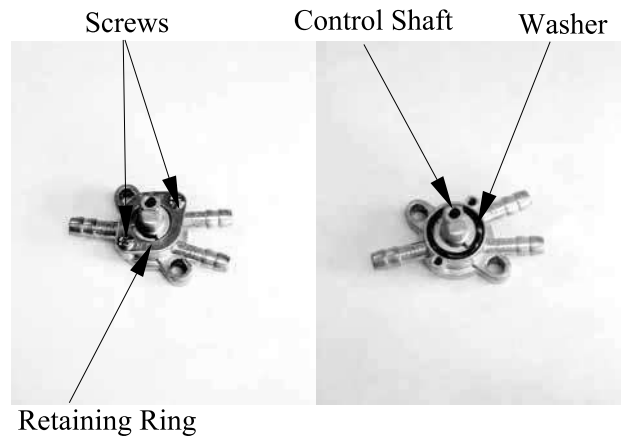
Remove the screw and then remove control switch.
Disconnect all fuel tubes and remove the two screws, then remove fuel valve.



5. FUEL SYSTEM

DISASSEMBLY

Remove the two screws on the retaining ring and then remove retaining ring.
Remove the washer and control shaft.

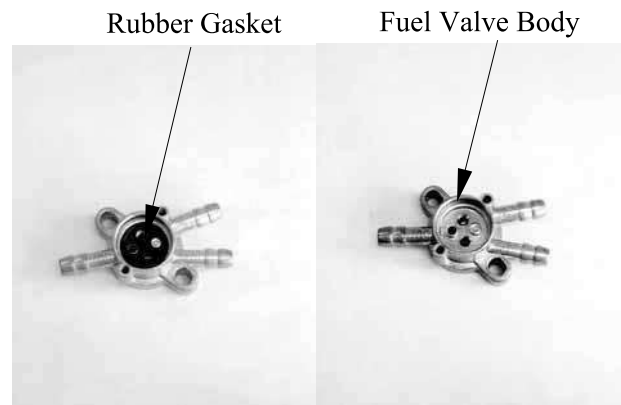


Remove the rubber gasket from the fuel valve body.

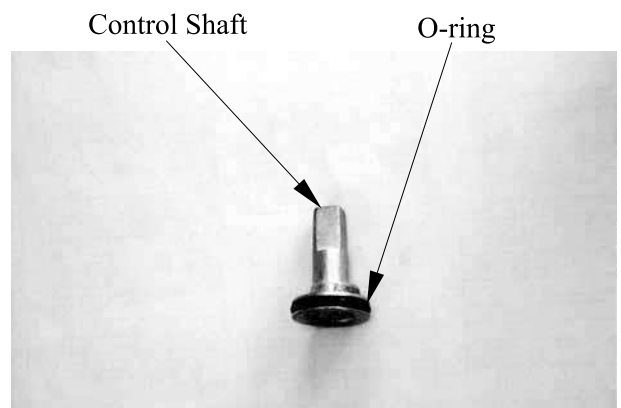
INSPECTION

Inspect the fuel valve body for dirt and clog.
Clean if necessary.

Replace the rubber gasket with new ones if they are damaged or deteriorated.



Replace the O-ring with a new one if they are damaged or deteriorated.

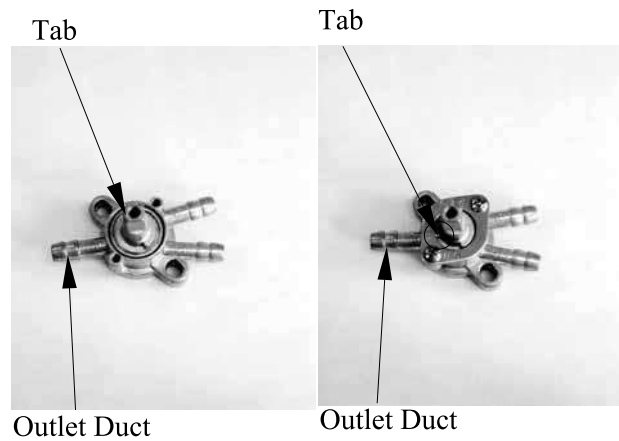


5. FUEL SYSTEM

ASSEMBLY

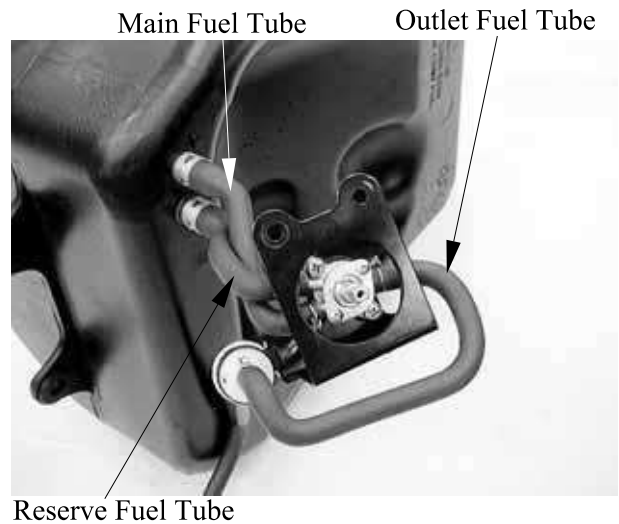
Reverse the “DISASSEMBLY” procedures. Install rubber gasket, control shaft, washer and retaining ring.

- *
- Aligning the tab on the control shaft with the outlet duct in the fuel valve body.
 - Aligning the tab on the retaining ring with the outlet duct in the fuel valve body.

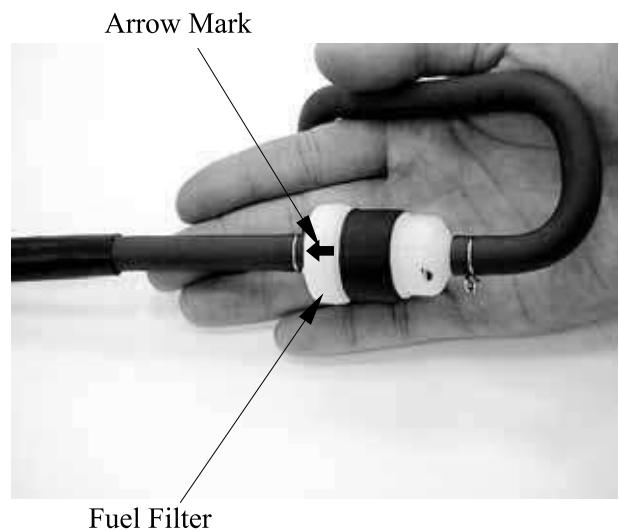


INSTALLATION

Reverse the “REMOVEAL” procedures. Connect all fuel tube.



Install the fuel filter with the arrow mark facing forward.



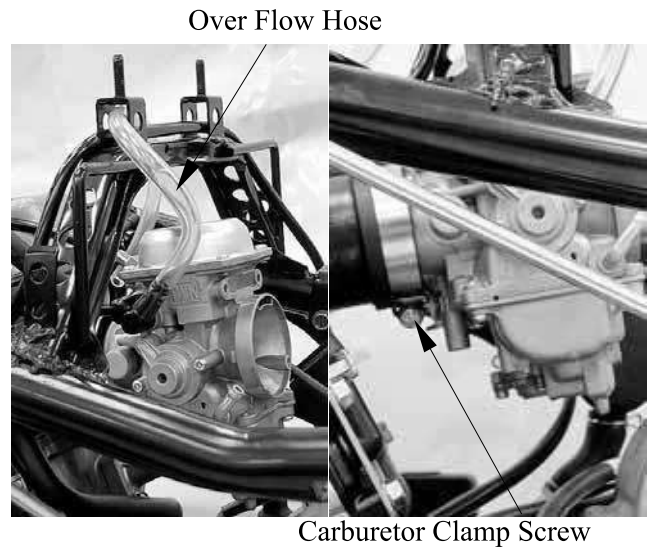
5. FUEL SYSTEM

CARBURETOR REMOVAL/CHOKE INSPECTION/INSTALLATION

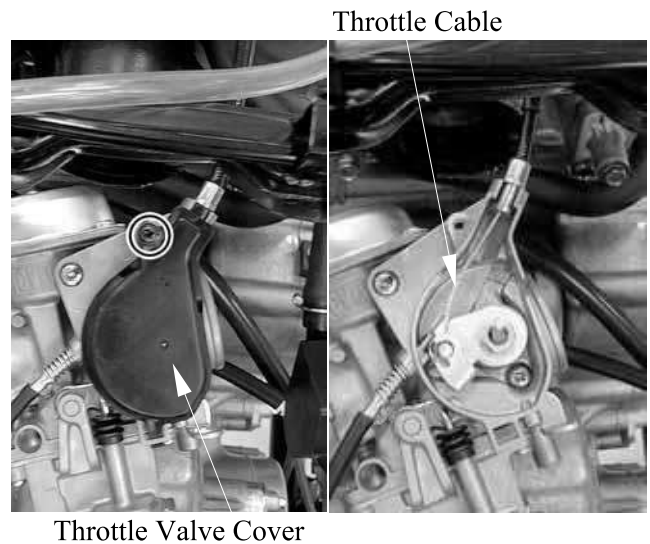
REMOVAL

Remove the fuel tank (refer to the “**FUEL TANK**” section in this chapter).
Remove the air cleaner housing (refer to the “**AIR CLEANER HOUSING**” section in this chapter).

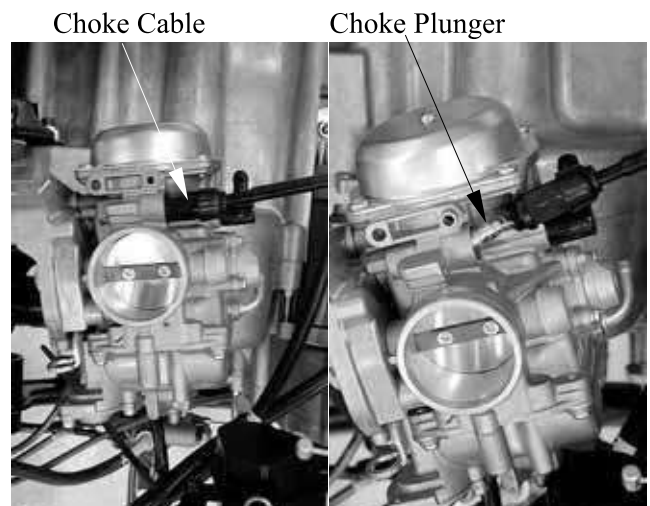
Disconnect the over flow hose.
Loosen the carburetor clamp screw, then remove carburetor from intake pipe.



Remove a screw, then remove the throttle valve cover.
Disconnect the throttle cable from carburetor.



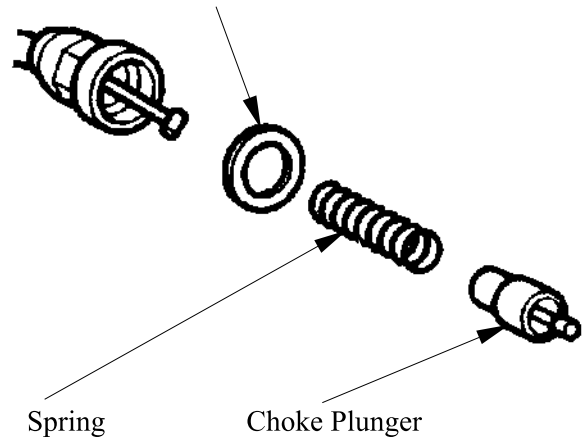
Remove the choke cable/choke plunger from carburetor, then remove the carburetor.



5. FUEL SYSTEM

CHOKE INSPECTION

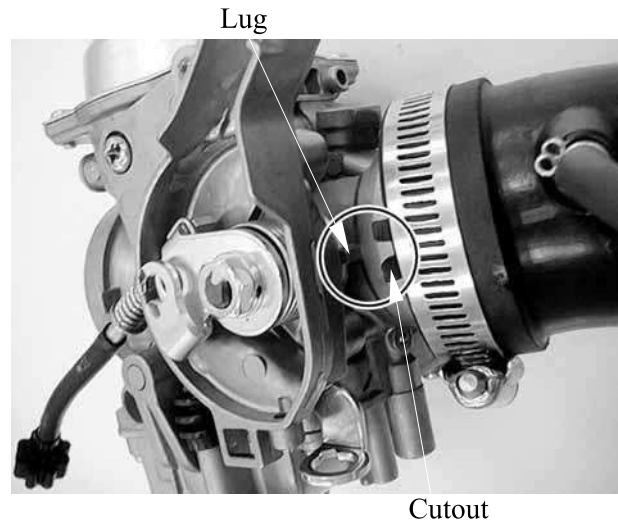
Inspection the choke plunger, spring and O-ring for bends, wear or damage.



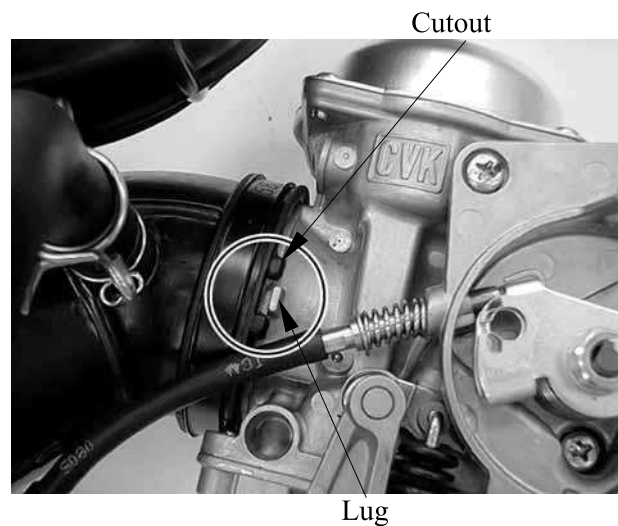
INSTALLATION

Installation is in the reverse order of removal.

- * Make sure the lug on the carburetor into the cutout on the intake pipe.



- * Make sure the lug on the carburetor into the cutout on the air cleaner hose.



5. FUEL SYSTEM

CARBURETOR DISASSEMBLY/INSPECTION/ ASSEMBLY

DISASSEMBLY

Remove the carburetor (refer to the “CARBURETOR REMOVAL/CHOKE INSPECTION/INSTALLATION” section in this chapter).

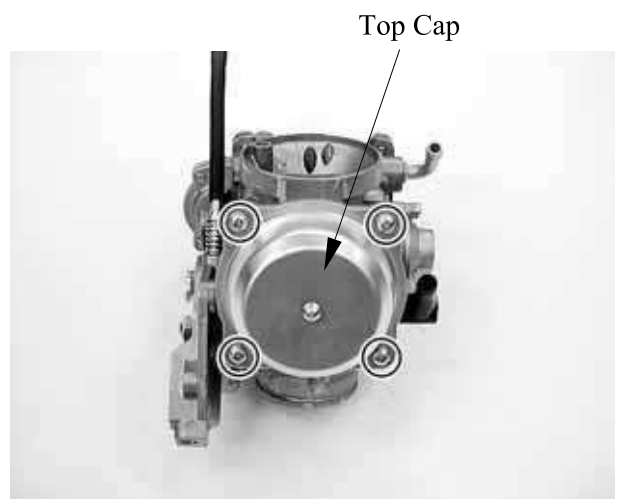
Loosen the drain screw to drain the gasoline from the float chamber.

- *
 - Keep sparks and flames away from the work area.
 - Drain gasoline into a clean container.
 - Do not loosen or tighten the painted bolts and screws of the carburetor. Loosening or tightening them can cause throttle and piston valve synchronization failure.

Remove the four screws and top cap

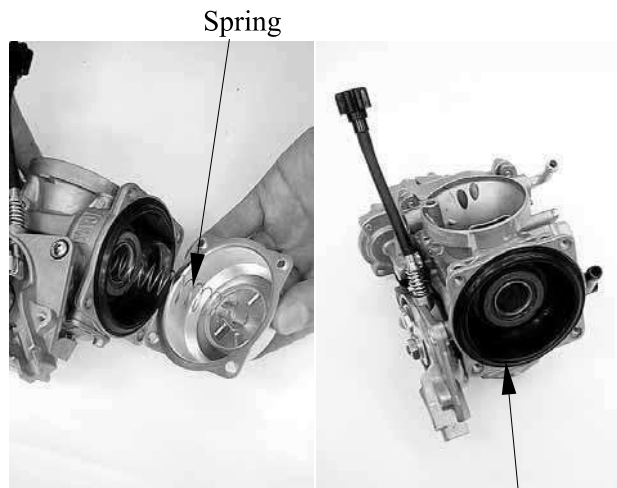


Fuel Drain Plug



Top Cap

Remove the spring and piston valve.

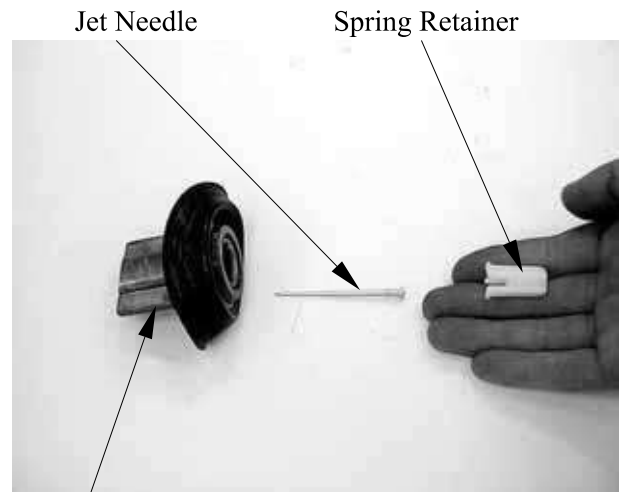


Spring

Piston Valve

5. FUEL SYSTEM

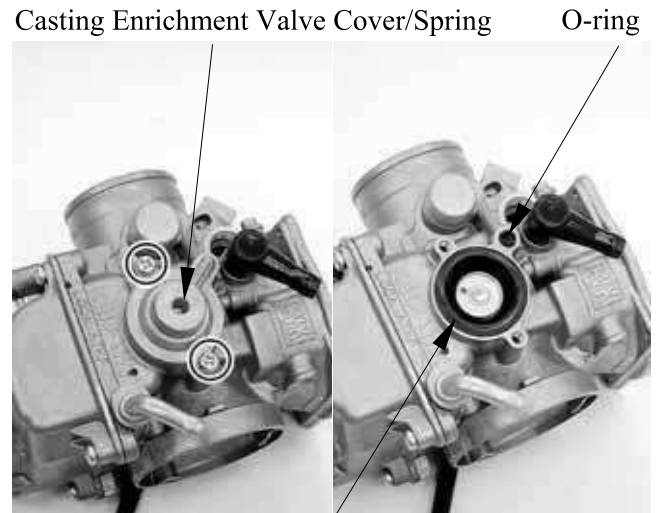
Remove the spring retainer, jet needle.



Piston Valve

Remove the two screws and casting enrichment valve cover and then take out the spring.

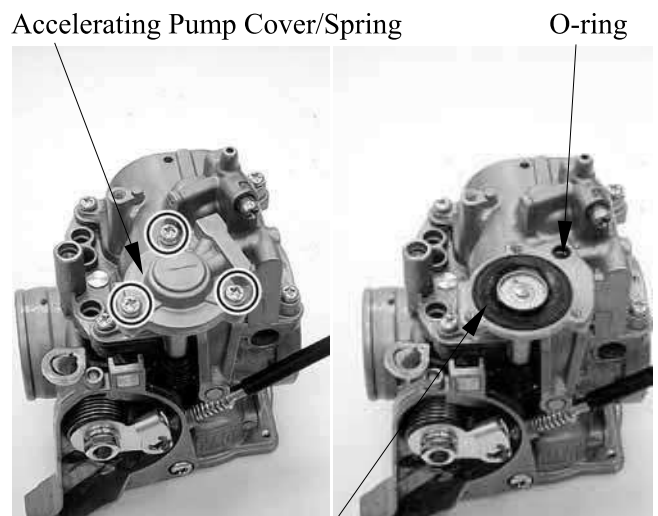
Remove the casting enrichment valve and O-ring.



Casting Enrichment Valve

Remove the three screws and accelerating pump cover and then take out the spring.

Remove the accelerating pump and O-ring.



Accelerating Pump Diaphragm

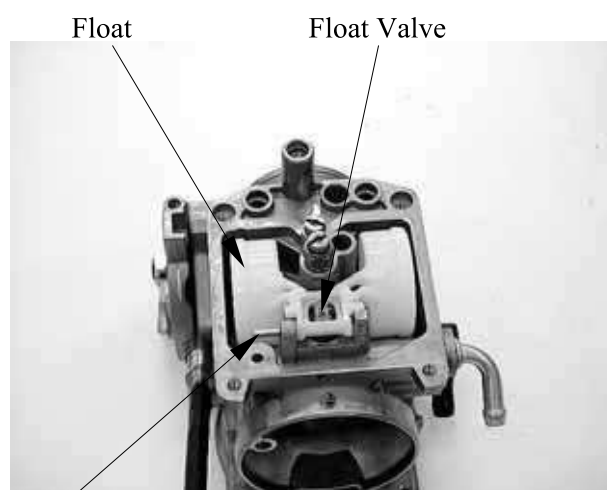
5. FUEL SYSTEM

Remove the four screws and float chamber.



Float Chamber

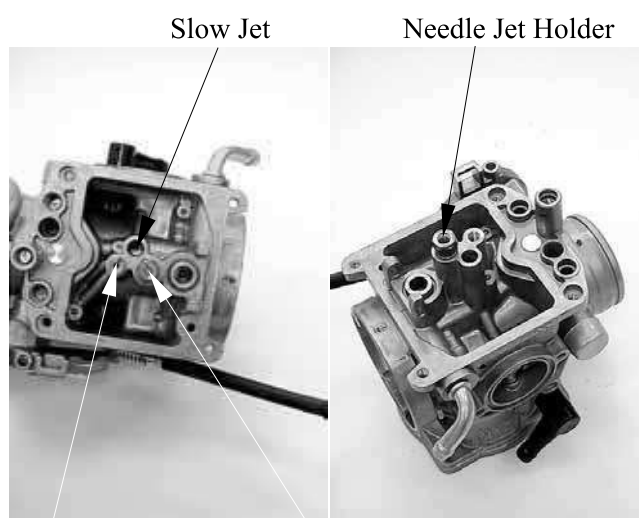
Pull float pin outs, then remove the float and float valve.



Float Valve

Remove the slow jet.
Remove choke jet.
Remove main jet.

Remove the needle jet holder.



Choke Jet

Main Jet

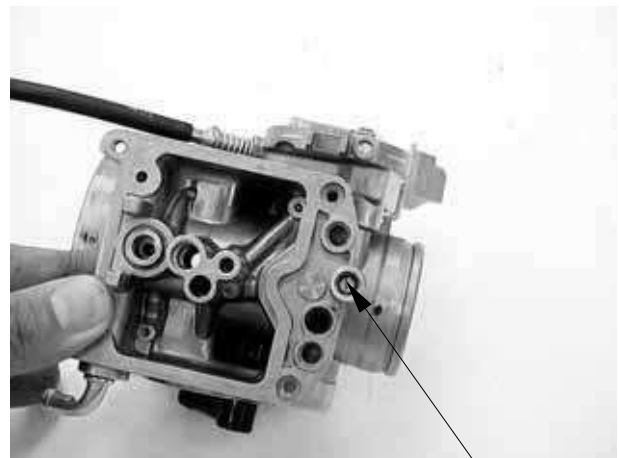
5. FUEL SYSTEM

Remove the needle jet.



Remove the pilot screw, spring, washer and O-ring.

* Before pilot screw removal, slowly turn the pilot screw clockwise and count the number of turns until the screw is lightly seated. Make a note of how many turns were made so the screw can be reset correctly.



Pilot Screw

5. FUEL SYSTEM

INSPECTION

CARBURETOR BODY/JETS CLEANING

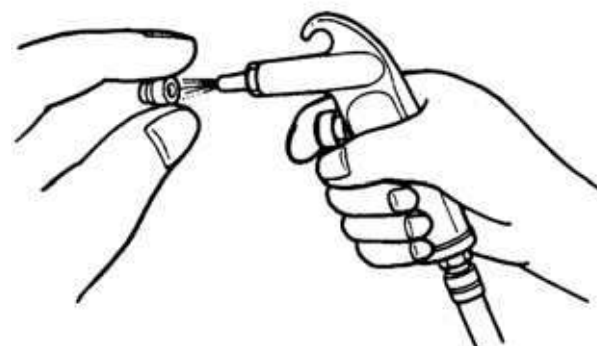
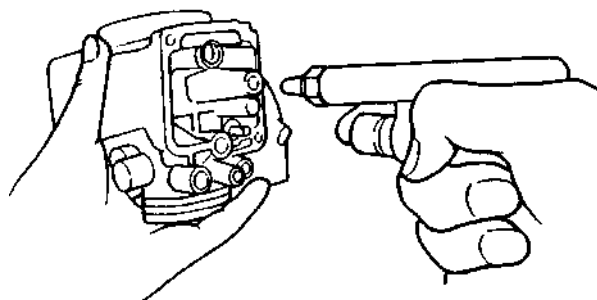
Check carburetor body and each jet for wear or damage.

Clean all jets with a spray-type carburetor cleaner and dry them using compressed air.

Clean all circuits of the carburetor thoroughly-not just the perceived problem area.

Clean the circuits in the carburetor body with a spray-type cleaner and allow each circuit to soak, if necessary, to loosen dirt and varnish. Blow the body dry using compressed air.

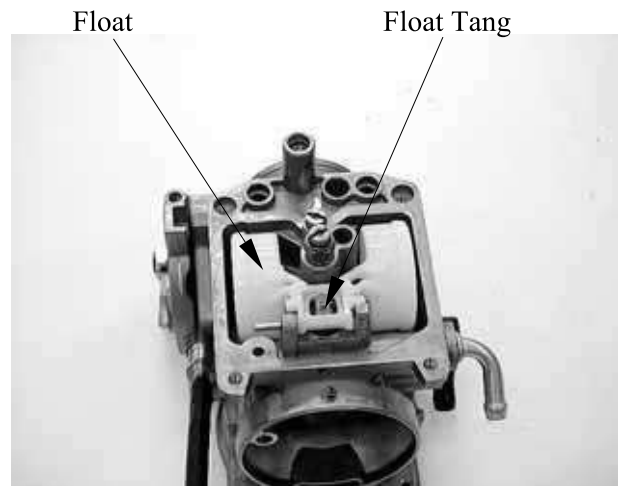
*



After cleaning, reassemble the carburetor with new seals.

5. FUEL SYSTEM

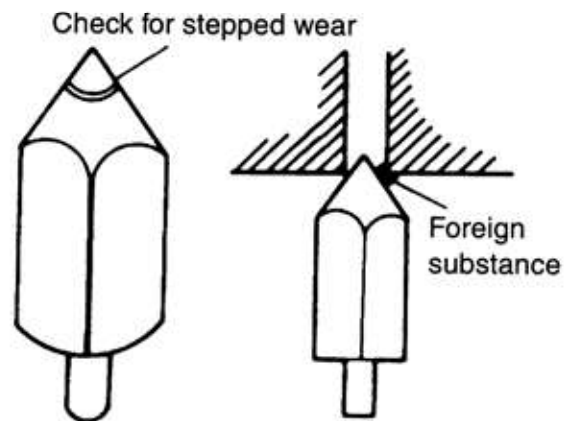
Check the float and float tang for deformation or damage.



Check the float valve and valve seat for foreign substance, clogging or damage.

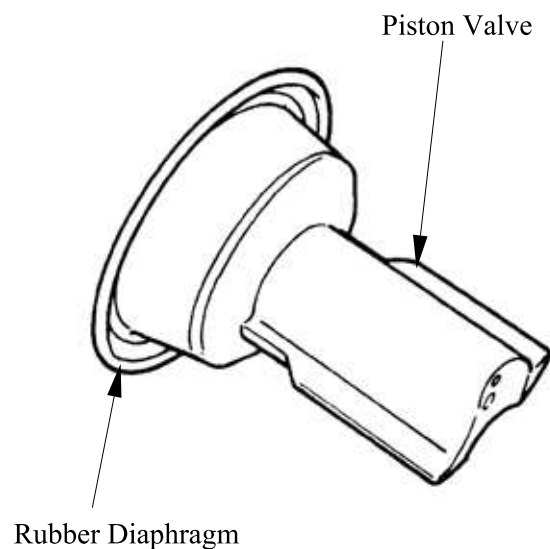
Check the tip of the float valve, where it contacts the valve seat, for stepped wear or contamination.

Check the operation of the float valve.

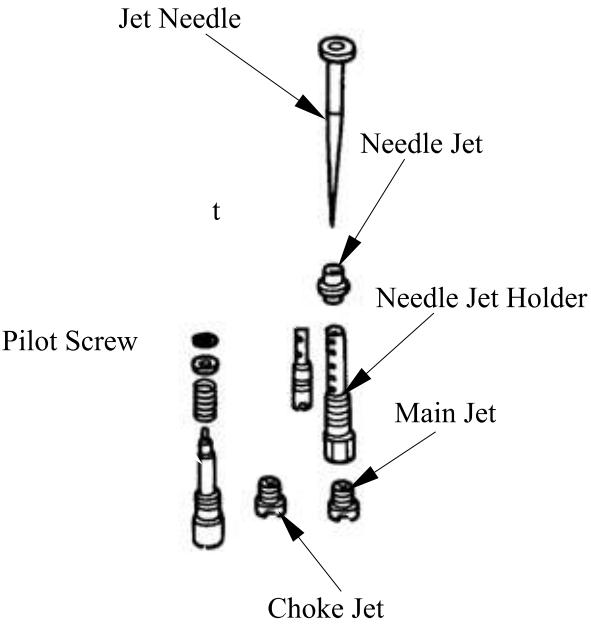
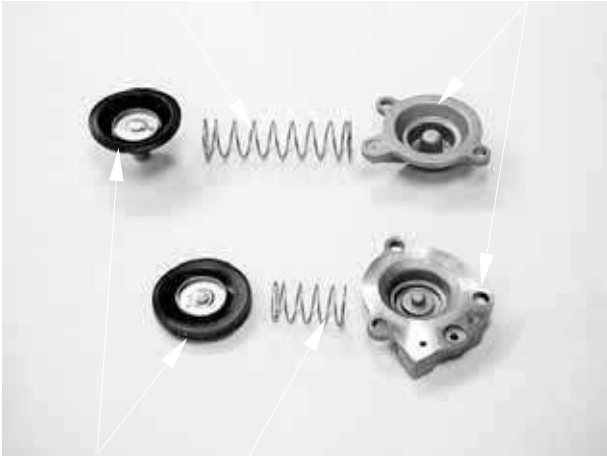
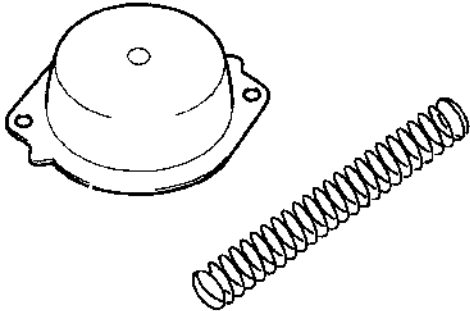


Check the piston valve for scratches, wear and damage.

Check the rubber diaphragm for tears.



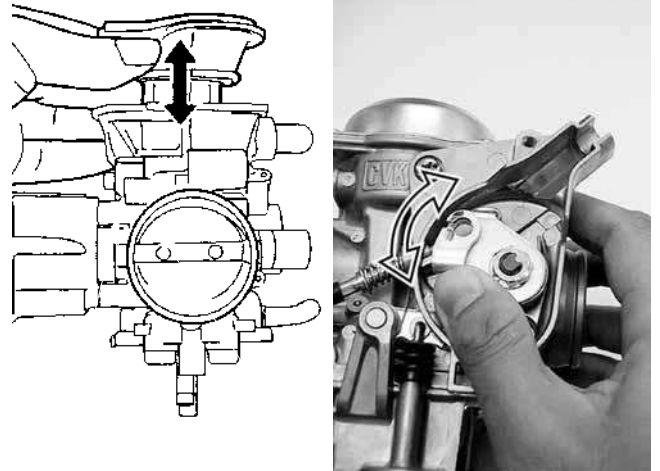
5. FUEL SYSTEM



5. FUEL SYSTEM

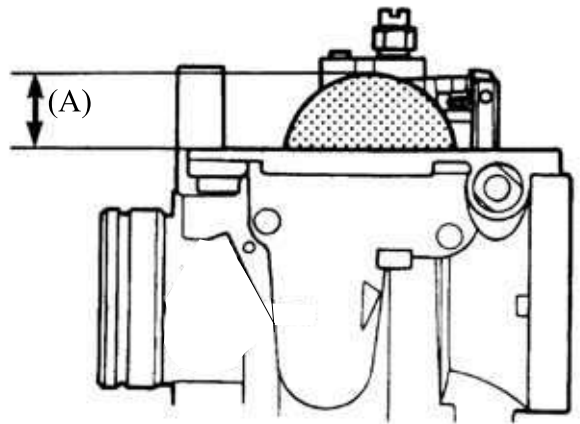
Insert the piston valve into the carburetor body, and check for free movement. If stick is found, replace the part with a new one.

Check throttle valve for free movement.
If stick is found, replace the part with a new carburetor.



Check the float level after checking the float valve, valve seat and float.

Set the carburetor so that the float valve end just contacts the float arm lip. Make sure the float valve tip is securely in contact with the valve seat.
Measure the float level with the float level gauge.



Float level (A): 17 mm (0.67 in)

Bend the tongue as necessary to bring the float height (A) to the specified level.

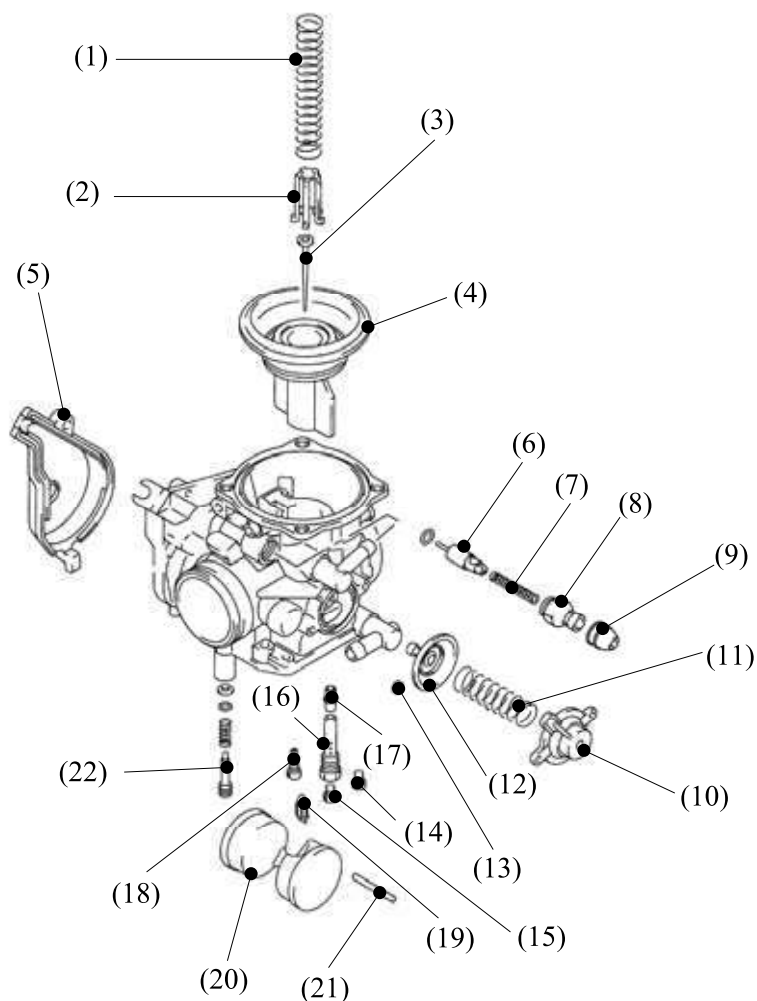
5. FUEL SYSTEM

ASSEMBLY

Carburetor reassembly can be performed in the reverse order of disassembly. When reassembling, carefully observe the following instructions.

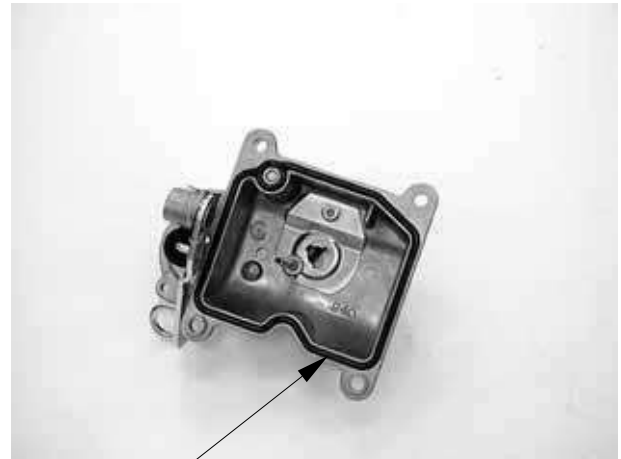
- *
- Assemble the parts taking consideration of their function.
 - Before assembling, wash all of the parts in a clean petroleum based solvent.
 - Replace O-rings and seals with new ones.
 - After cleaning, reinstall the pilot screw to the original setting by turn the screw in until it lightly seats, and then backing it out the same number of turns counted during disassembly.

- (1) Spring
- (2) Retainer
- (3) Jet needle
- (4) Piston valve
- (5) Cover
- (6) Choke plug
- (7) Spring
- (8) Guide holder
- (9) Cap
- (10) Cover
- (11) Spring
- (12) Casting enrichment valve
- (13) O-ring
- (14) Choke jet
- (15) Main jet
- (16) Needle jet holder
- (17) Needle jet
- (18) Slow jet
- (19) Float valve
- (20) Float
- (21) Float pin
- (22) Pilot screw



5. FUEL SYSTEM

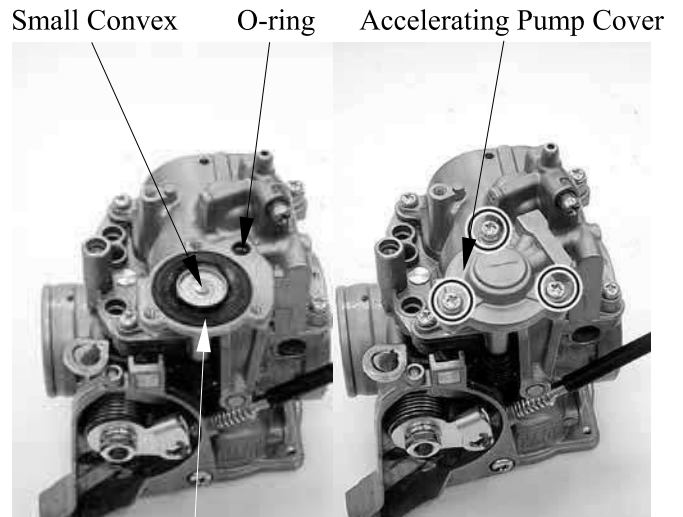
Fit a new O-ring in to the float chamber groove securely.



O-ring

Assemble the accelerating pump diaphragm and new O-ring.

* Install the accelerating pump diaphragm with the small convex facing



Accelerating Pump Diaphragm

5. FUEL SYSTEM

AIR CLEANER HOUSING

REMOVAL/INSTALLATION

Remove the seat and side covers (refer to the “**FRAME COVERS**” section in the chapter 2).

Loosen the carburetor-to-air cleaner connecting tube band screw.



Remove the clip and disconnect the crankcase breather hose from the crankcase. Remove the mounting bolts and then remove the air cleaner housing from the carburetor and the intake duct.

Installation is in the reverse order of removal.



Breather Hose

5. FUEL SYSTEM

PAIR SOLENOID VALVE

REMOVAL/INSTALLATION

Disconnect air supply hose and vacuum hose from the air solenoid valve, then remove the air solenoid valve from frame.



Installation is in the reverse order of removal.



6. COOLING SYSTEM

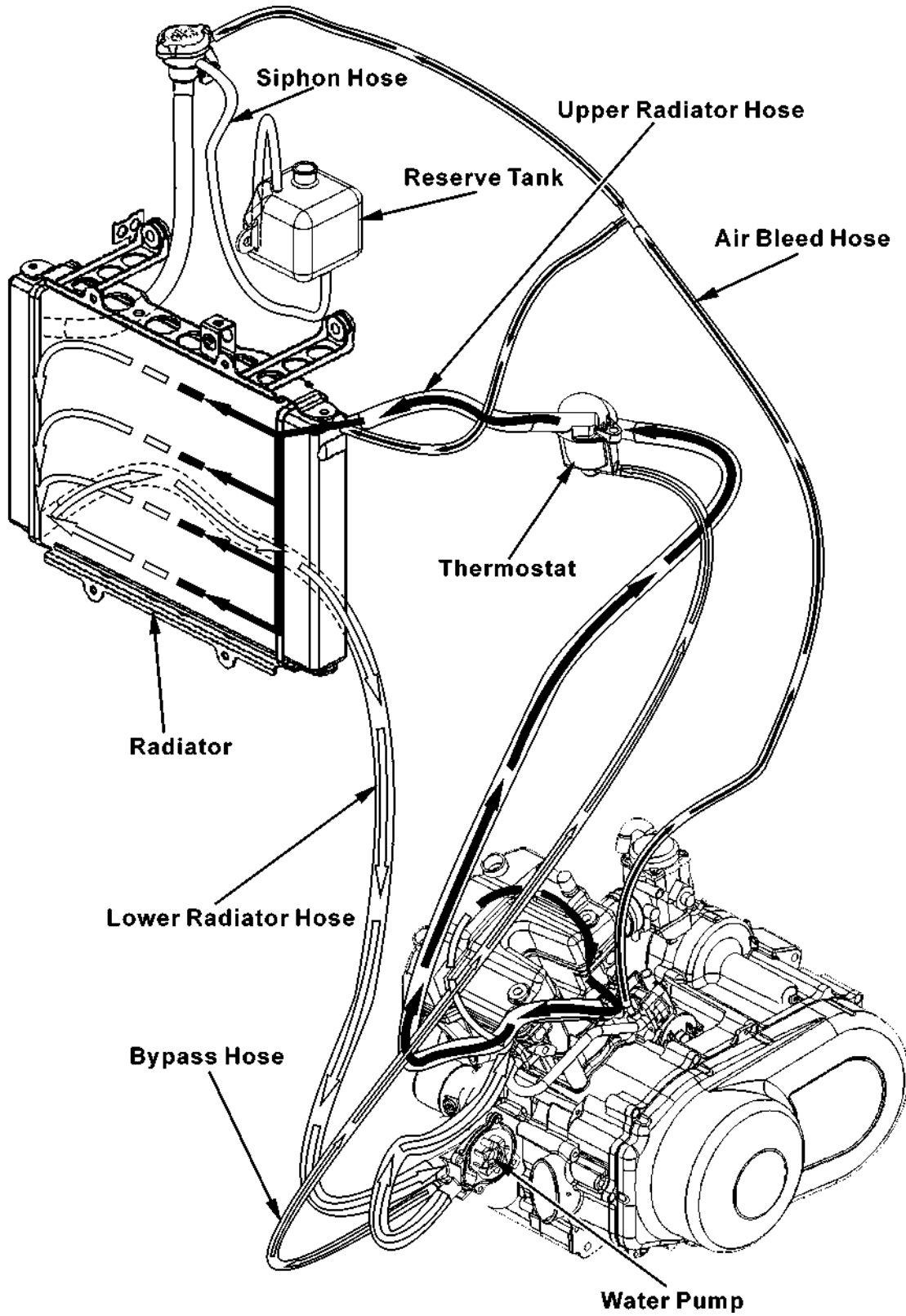
COOLING SYSTEM



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COOLING SYSTEM TESTING-----	6- 5
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WATER PUMP -----	6-11
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6. COOLING SYSTEM

SYSTEM FLOW PATTERN



6. COOLING SYSTEM

SERVICE INFORMATION

GENERAL INSTRUCTIONS

WARNING:

Removing the radiator cap while the engine is hot can allow the coolant to spray out, seriously scalding you. Always let the engine and radiator cool down before removing the radiator cap.

CAUTION:

Radiator coolant is toxic. Keep it away from eyes, mouth, skin and clothes.

- If any coolant gets in your eyes, rinse them with water and consult a physician immediately.
- If any coolant is swallowed, induce vomiting, gargle and consult a physician immediately.
- If any coolant gets on your skin or clothes, rinse thoroughly with plenty of water.

NOTE:

Use coolant with silicate inhibitors may cause premature wear of water pump seals or blockage of radiator passages. Using tap water may cause engine damage.

- This section covers service of the cooling system.
- Add coolant at the reserve tank. Do not remove the radiator cap except to refill or drain the system.
- All cooling system services can be done with the engine in the frame.
- Avoid spilling coolant on painted surfaces.
- After servicing the system, check for leaks with a cooling system tester.

SPECIFICATIONS

ITEM		SPECIFICATIONS
Coolant capacity	Radiator and engine	2 liter (2.1 US qt, 1.76 Imp qt)
	Reserve tank	0.45 liter (0.47 US qt, 0.39 Imp qt)
Radiator cap relief pressure		90 kPa (0.9 kgf/cm ² , 12.8 psi)
Thermostat	Begin to open	80 - 84°C (176 - 183°F)
	Fully open	95°C (203°F)
	Valve lift	8 mm (0.3 in) minimum
Standard coolant concentration		1:1 mixture with soft water

6. COOLING SYSTEM

COOLANT GRAVITY CHART

Temp. Coolant concentration	0	5	10	15	20	25	30	35	40	45	50
5%	1.009	1.009	1.008	1.008	1.007	1.006	1.005	1.003	1.001	0.009	0.997
10%	1.018	1.107	1.017	1.016	1.015	1.014	0.013	1.011	1.009	1.007	1.005
15%	1.028	1.027	1.026	1.025	1.024	1.022	1.020	1.018	1.016	1.014	1.012
20%	1.036	1.035	1.034	1.033	1.031	1.029	1.027	1.025	1.023	1.021	1.019
25%	1.045	1.044	1.043	1.042	1.040	1.038	1.036	1.034	1.031	1.028	1.025
30%	1.053	1.051	1.051	1.049	1.047	1.045	1.043	1.041	1.038	1.035	1.032
35%	1.063	1.062	1.060	1.058	1.056	1.054	1.052	1.049	1.046	1.043	1.040
40%	1.072	1.070	1.068	1.066	1.064	1.062	1.059	1.056	1.053	1.050	1.047
45%	1.080	1.078	1.076	1.074	1.072	1.069	1.056	1.063	1.062	1.057	1.054
50%	1.086	1.084	1.082	1.080	1.077	1.074	1.071	1.068	1.065	1.062	1.059
55%	1.095	1.093	1.091	1.088	1.085	1.082	1.079	1.076	1.073	1.070	1.067
60%	1.100	1.098	1.095	1.092	1.089	1.086	1.083	1.080	1.077	1.074	1.071

COOLANT MIXTURE (WITH ANTI-RUST AND ANTI-FREEZING EFFECTS)

Freezing Point	Mixing Rate	KYMCO SIGMA Coolant Concentrate	Distilled Water
-9	20%		
-15	30%	425cc	975cc
-25	40%		
-37	50%		
-44.5	55%		

Cautions for Using Coolant:

- Use coolant of specified mixing rate. (The mixing rate of 425cc KYMCO SIGMA coolant concentrate + 975cc distilled water is 30%.)
- Do not mix coolant concentrate of different brands.
- Do not drink the coolant which is poisonous.
- The freezing point of coolant mixture shall be 5 lower than the freezing point of the riding area.

6. COOLING SYSTEM

TORQUE VALUES

Water pump cover bolt	1.3 kgf-m (13 N-m, 9 lbf-ft)
Fan motor bolt	0.53 kgf-m (5 N-m, 3.8 lbf-ft)
Fan motor switch	1.8 kgf-m (17 N-m, 13 lbf-ft)

TROUBLESHOOTING

Engine temperature too high

- Faulty radiator cap
- Faulty temperature gauge or thermosensor
- Air in system
- Thermostat stuck closed
- Insufficient coolant
- Passages blocked in radiator, hoses or water jacket
- Faulty cooling fan motor
- Faulty fan motor switch
- Faulty water pump

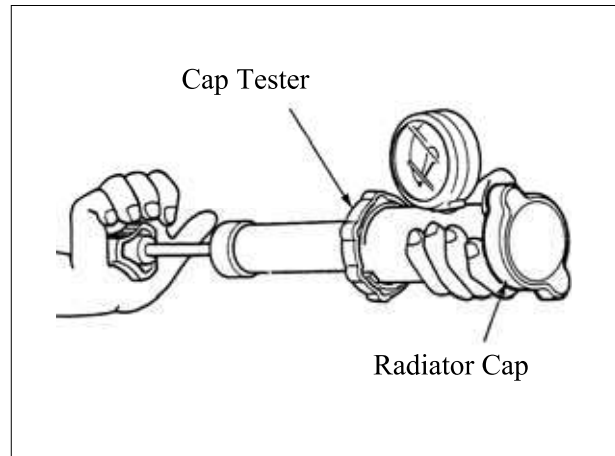
Engine temperature too low

- Faulty temperature gauge or thermosensor
- Thermostat stuck open
- Faulty fan motor switch

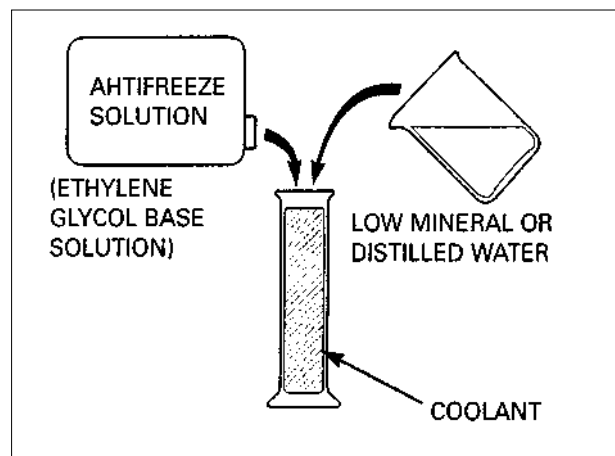
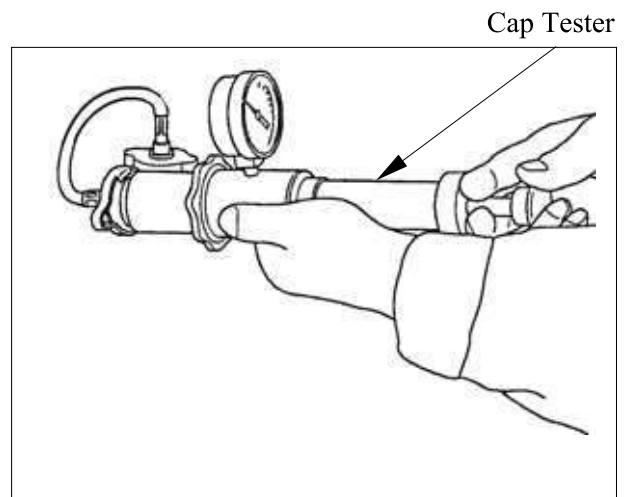
Coolant leak

- Faulty water pump mechanical seal
- Deteriorated O-rings
- Faulty radiator cap
- Damaged or deteriorated cylinder head gasket
- Loose hose connection or clamp
- Damaged or deteriorated hoses

6. COOLING SYSTEM



Before installing the cap in the tester, wet the sealing surface.



6. COOLING SYSTEM

REPLACEMENT/AIR BLEEDING

Remove the front center cover and right footboard (refer to the “**FRAME COVERS**” section in the chapter 2).

When filling the system or reserve tank with coolant (checking the coolant level), place the machine in a vertical position on a flat, level surface.

Remove the radiator cap.

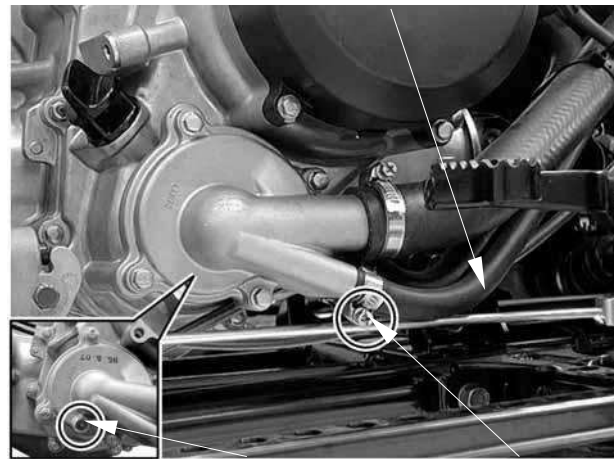
Radiator Cap



Loosen the hose band

Disconnect the bypass hose from water pump or remove the drain plug and drain the coolant from the system.

Bypass Hose



Drain Plug

Band

Remove the reserve tank cap and drain the coolant from the reserve tank.

Reconnect the bypass hose securely.

Reserve Tank Cap



Reserve Tank

6. COOLING SYSTEM

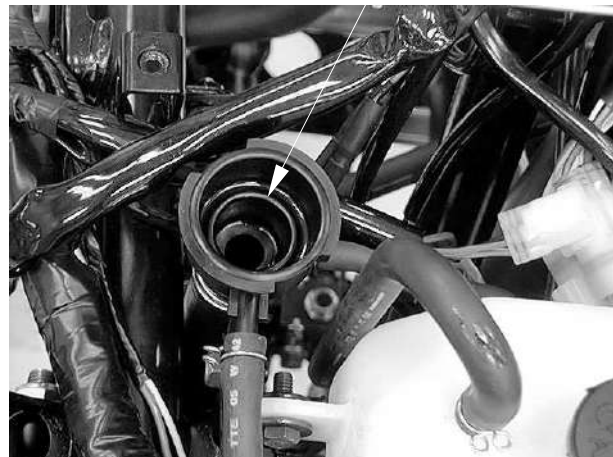
Place the machine on a flat, level surface.
Fill the reserve tank to the upper level
(FULL) line.

Reserve Tank Cap



Fill the system with the recommended
coolant through the filler opening up to the
filler neck.

Filler Neck



Bleed air from the system as follow:

1. Start the engine and let it idle for 2–3 minutes.
2. Snap the throttle three to four times to bleed air from the system.
3. Stop the engine and add coolant to the proper level if necessary. Reinstall the radiator cap.
4. Check the level of coolant in the reserve tank and fill to the upper level if it is low.

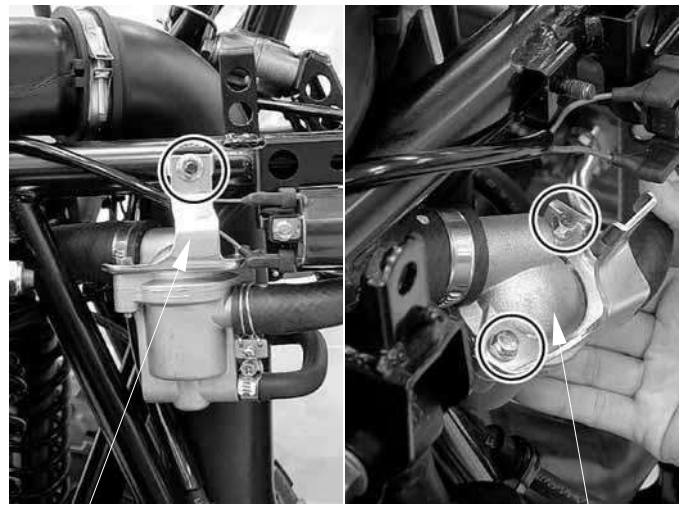
6. COOLING SYSTEM

THERMOSTAT

REMOVAL

Remove the nut and thermostat housing stay from the frame.

Remove the bolts, housing stay and thermostat housing cover.



Housing stay

Thermostat Housing Cover

Remove the O-ring from the housing cover.
Remove the thermostat.

Thermostat



O-ring

Thermostat



6. COOLING SYSTEM

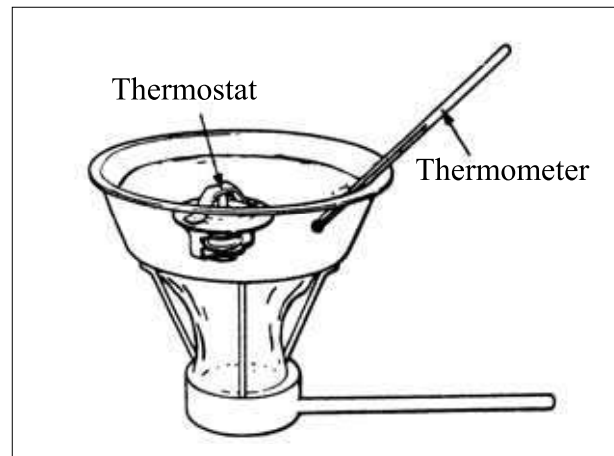
INSPECTION

Visually inspect the thermostat for damage.

Heat the water with an electric heating element to operating temperature for five minutes.

Suspend the thermostat in heated water to check its operation.

- Keep flammable materials away from the electric heating element.
- Do not let the thermostat or thermometer touch the pan, or you will get false readings.



Replace the thermostat if the valve stays open at room temperature, or if it respond at temperatures other than those specified.

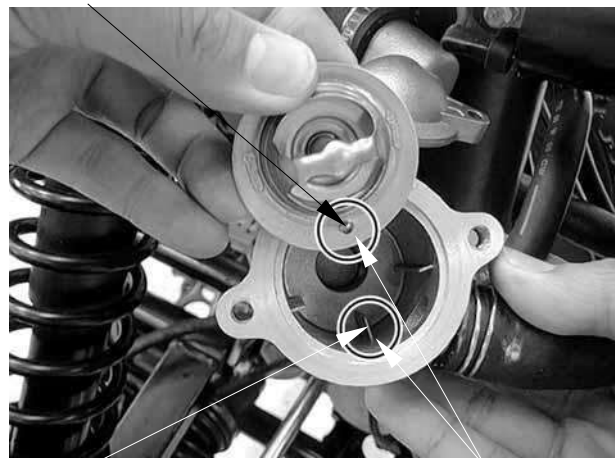
Thermostat begin to open:
80–84°C (176–183°F)

Valve lift:
8 mm (0.3 in) minimum at 95°C (203°F)

INSTALLATION

Install the thermostat into the housing with its air bleed hole facing up and aligning bleed hole with the tab in the housing.

Air Bleed Hole



Tab

Align

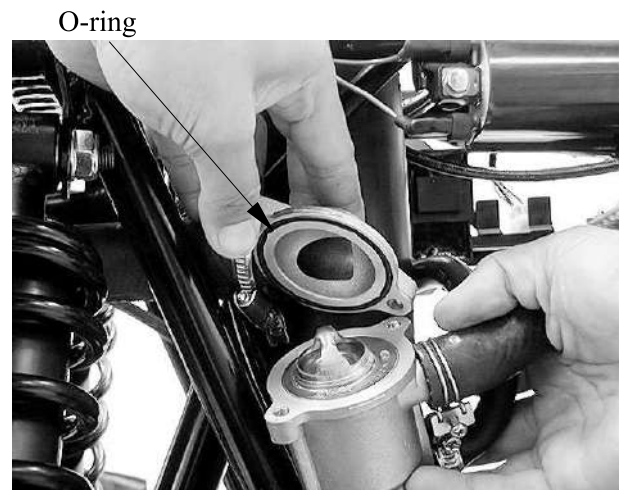
6. COOLING SYSTEM

Install a new O-ring into the housing cover groove.

Install the housing cover and housing stay to the housing.
Tighten the bolts securely.

Install the housing stay to the frame.
Tighten the nut securely.

Fill the system with recommended coolant and bleed the air (refer to the “**COOLANT REPLACEMENT**” section in this chapter).



6. COOLING SYSTEM

WATER PUMP

MECHANICAL SEAL INSPECTION

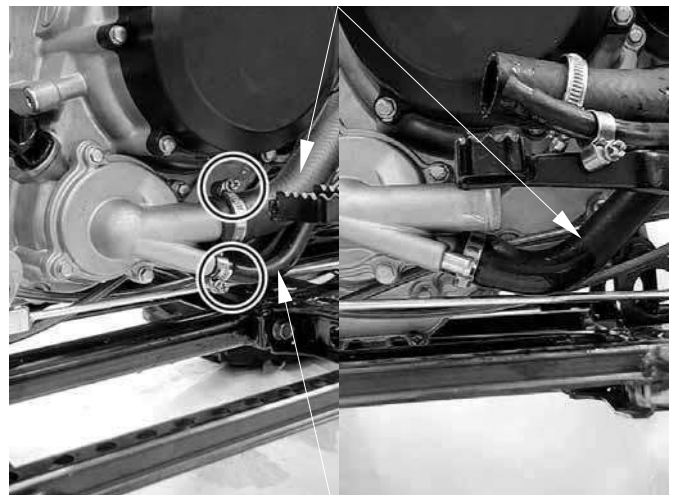
Inspect the coolant leakage.

If there is leakage, the mechanical seal is defective, and water pump body should be replaced.

REMOVAL

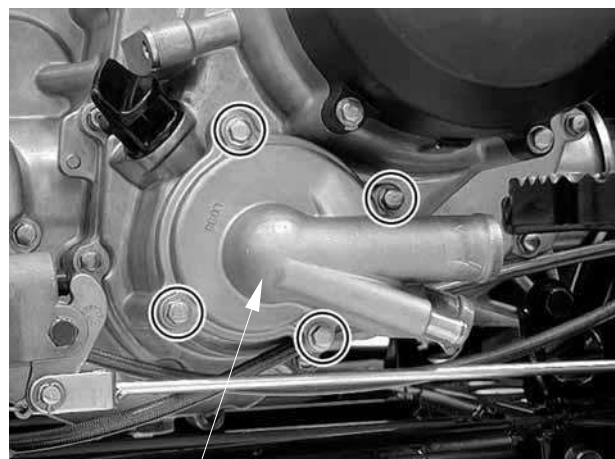
Drain the coolant (refer to the “**COOLANT REPLACEMENT**” section in this chapter).

Loosen the hose bands and disconnect the lower radiator hoses and bypass hose from the water pump.



Bypass Hose

Remove the four bolts and water pump cover and O-ring.

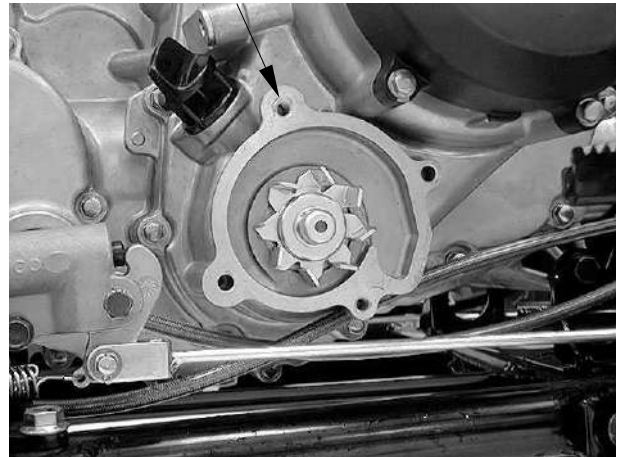


Water Pump Cover/O-ring

6. COOLING SYSTEM

Remove the water pump body from the crankcase.

Water Pump Body

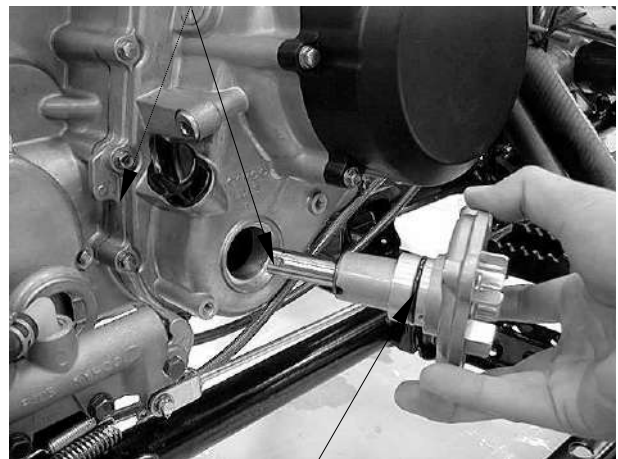


INSTALLATION

Apply engine oil to a new O-ring and install it onto the stepped portion of the water pump.

Install the water pump into the crankcase while aligning the water pump shaft groove with oil pump shaft end.

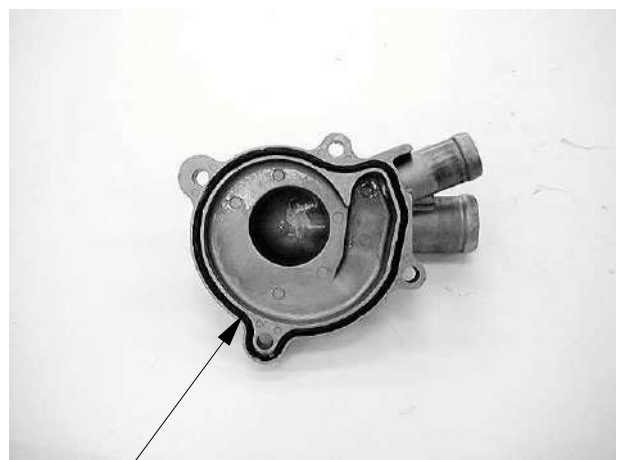
Align



O-ring

Align the mounting bolt holes in the water pump and crankcase and make sure the water pump is securely installed.

Install a new O-ring into the groove in the water pump cover.

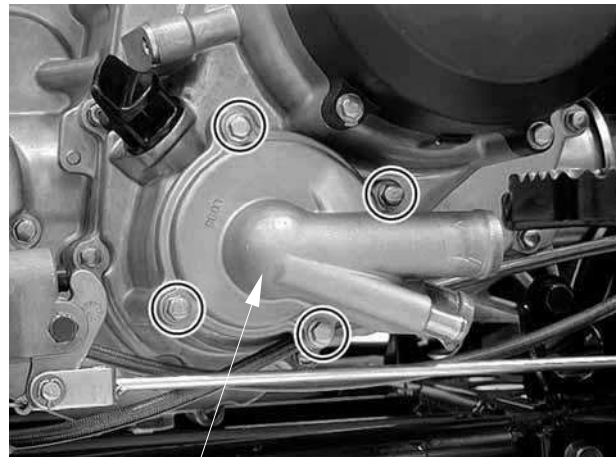


O-ring

6. COOLING SYSTEM

Install the water pump cover and tighten the bolts to the specified torque.

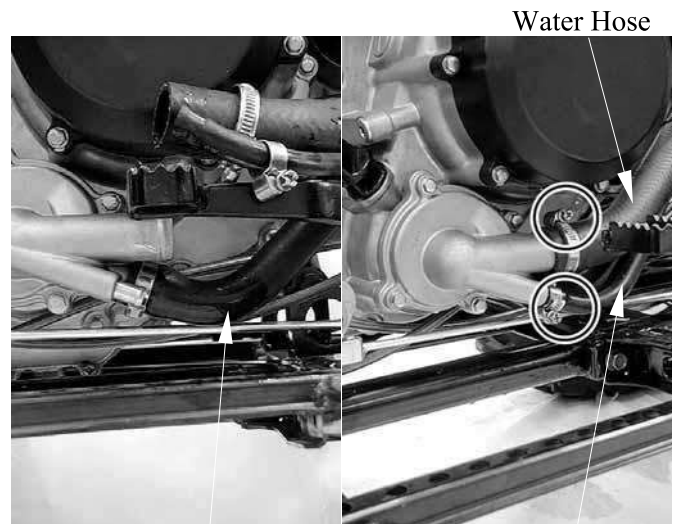
Torque: 1.3 kgf-m (13 N-m, 9 lbf-ft)



Water Pump Cover/O-ring

Connect the water hoses and bypass hose, then tighten the hose bands.

Fill the system with recommended coolant and bleed the air (refer to the “**COOLANT REPLACEMENT**” section in this chapter).



Water Hose

Bypass Hose

6. COOLING SYSTEM

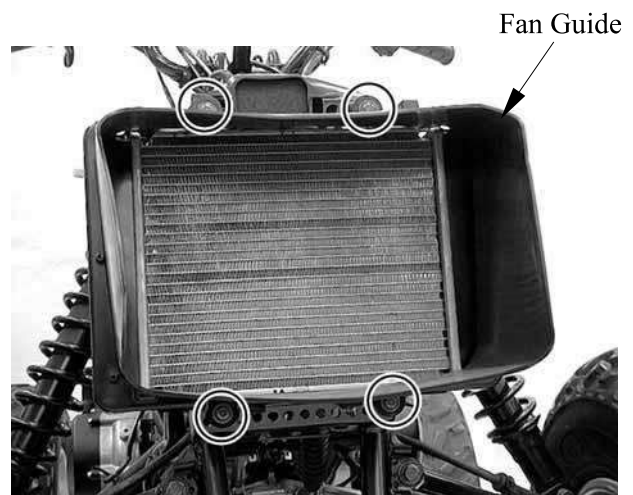
RADIATOR

REMOVAL

Drain the coolant (refer to the “**COOLANT REPLACEMENT**” section in this chapter).

Remove the front fender (refer to the “**FRAME COVERS**” section in the chapter 2).

Remove the four mounting bolt from fan guide and then remove fan guide.



Loosen the hose bands and disconnect the radiator lower water hose, water filler hose, bleed hose and upper water hose from the radiator.

Disconnect the fan switch connectors.

Water Filler Hose

Upper Water Hose



Lower Water Hose

Bleed Hose

Fan Motor SW

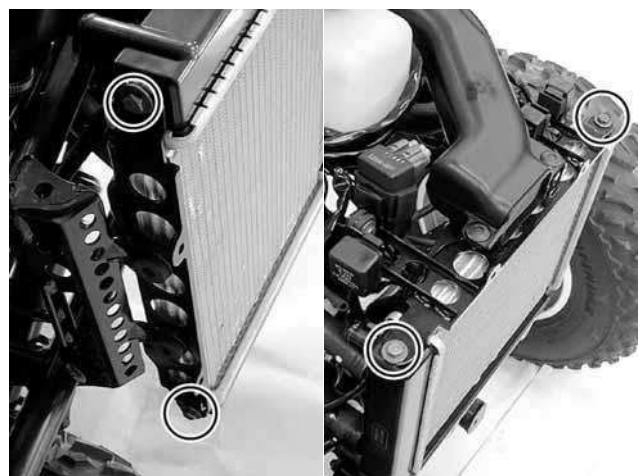
Remove the two mounting bolts under radiator and two mounting bolts on the radiator, then remove radiator.

Be careful not to damage the radiator core.

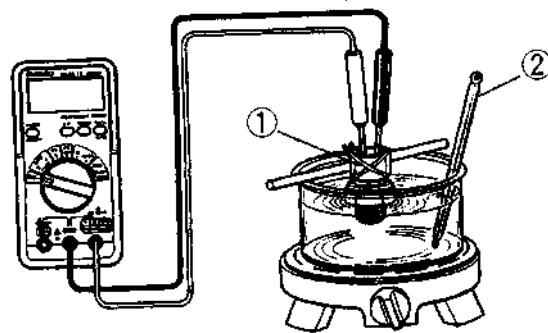
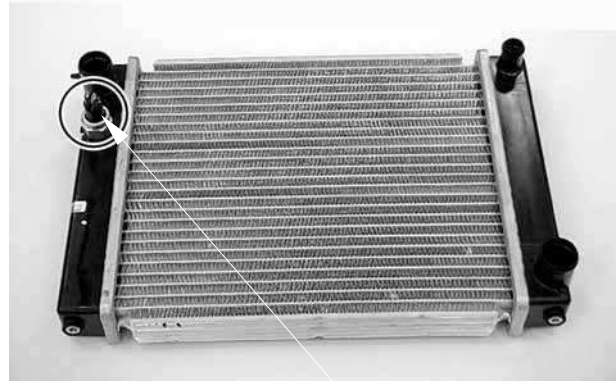
INSTALLATION

Installation is in the reverse order of removal.

Fill the system with recommended coolant and bleed the air (refer to the “**COOLANT REPLACEMENT**” section in this chapter).



6. COOLING SYSTEM



- Replace the O-ring a new one.
- Do not coat grease to the O-ring.

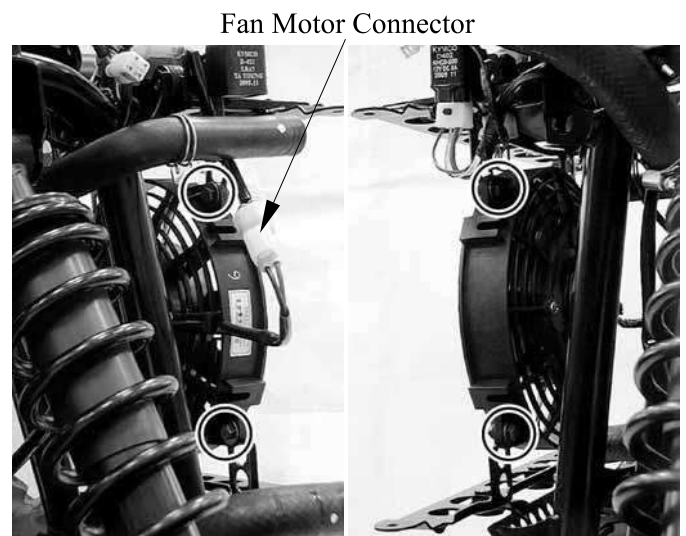
6. COOLING SYSTEM

FAN MOTOR

REMOVAL

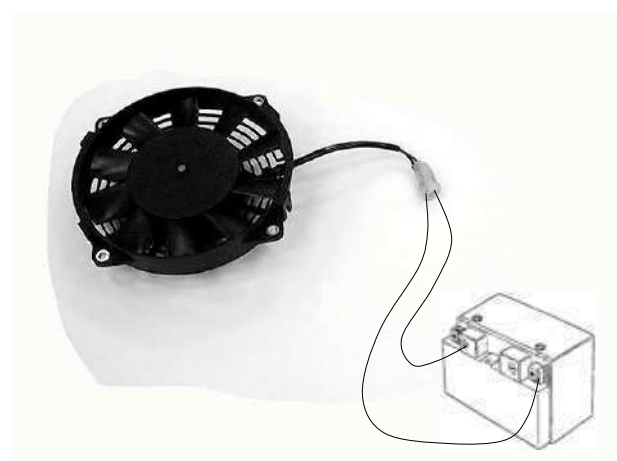
Remove the front fender (refer to the “**FRAME COVERS**” section in the chapter 2)

Disconnect the fan motor connector.
Remove the four mounting bolts and then remove the fan motor



INSPECTION

Check the fan motor to operate using an available battery.



INSTALLATION

Installation is in the reverse order of removal.

6. COOLING SYSTEM

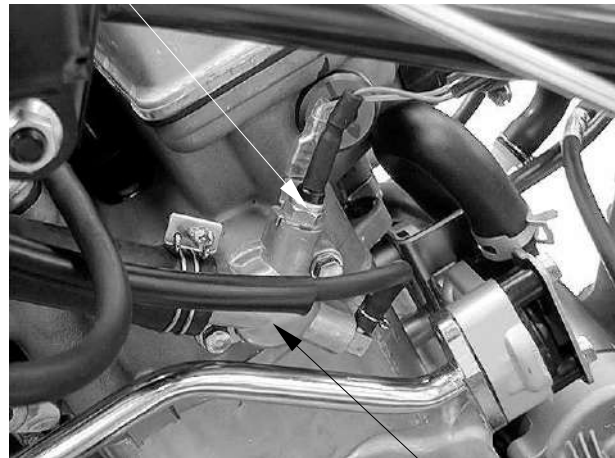
WATER TEMPERATURE SENSOR

Remove the right side body cover and right footboard (refer to the “**FRAME COVERS**” section in the chapter 2).

Disconnect the water temperature sensor connector.

Remove the water temperature sensor from the water joint.

Water Temperature Sensor



Water joint

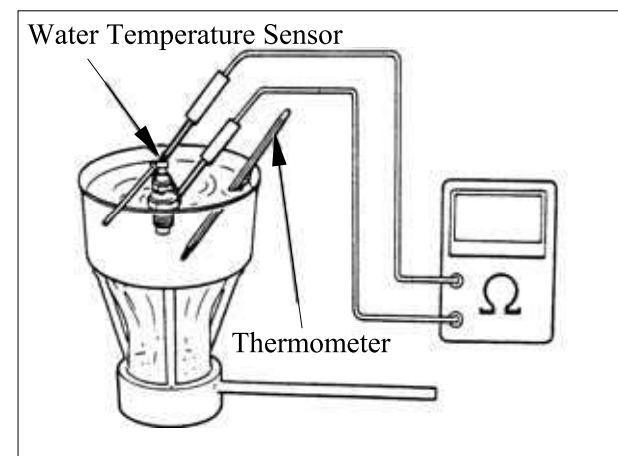
INSPECTION

Connect the water temperature sensor to the ohmmeter and dip it in oil contained in a pan which is placed on an electric heater.

Gradually raise oil temperature while reading the thermometer in the pan and the ohmmeter connected. If the resistance measured is out of specification, replace the temperature gauge with a new one.

Temperature	Standard resistance
50°C	123.9– 478.9 Ω
100°C	26– 29.3 Ω

- Handle the water temperature sensor carefully as it is vulnerable to impact.
- Do not allow the water temperature sensor and the thermometer to come in contact with the bottom of the pan.



After the water temperature sensor has been installed, fill coolant and perform air bleeding (refer to the “**COOLANT REPLACEMENT**” section in this chapter).

INSTALLATION

With thread lock applied to the threaded part, tighten the water temperature sensor.

Torque: 0.8 kgf-m (8 N-m, 5.8 lbf-ft)

6. COOLING SYSTEM

RADIATOR RESERVE TANK

REMOVAL

Remove the front fender (refer to the “**FRAME COVERS**” section in the chapter 2).

Remove the two mounting bolts and then remove the radiator reserve tank from frame.



Open the reserve tank cap and drain the coolant from the reserve tank.

Disconnect the siphon hose.

INSTALLATION

Installation is in the reverse order of removal.

Pour the recommended coolant to the upper level line with the center stand applied



Siphon Hose

7. ENGINE REMOVAL/INSTALLATION

ENGINE REMOVAL

SERVICE INFORMATION----- 7- 1
ENGINE REMOVAL ----- 7- 2
ENGINE INSTALLATION ----- 7- 8



7. ENGINE REMOVAL/INSTALLATION

SERVICE INFORMATION

GENERAL INSTRUCTIONS

- A floor jack or other adjustable support is required to support and maneuver the engine.
Be careful not to damage the machine body, cables and wires during engine removal.
- Use shop towels to protect the machine body during engine removal.
- The following components require engine removal for serviced with the engine installed in the frame.
 - Oil pump (Chapter 4)
 - Water pump (Chapter 6)
 - Cylinder head (Chapter 8)
 - Cylinder/Piston (Chapter 9)
 - Drive and driven pulleys/clutch (Chapter 10)
 - Alternator/Starter clutch (Chapter 17 and 19)
- The following components require engine removal for service.
 - Transmission (Chapter 11)
 - Crankshaft/Crankcase/Balance shaft (Chapter 12)

TORQUE VALUES

Engine mounting bolt/nut	6 kgf-m (60 N-m, 43.5 lbf-ft)
Engine hanger nut	3.5 kgf-m (35 N-m, 25 lbf-ft)
Front propeller shaft bolt	4.5 kgf-m (45 N-m, 32.5 lbf-ft)

7. ENGINE REMOVAL/INSTALLATION

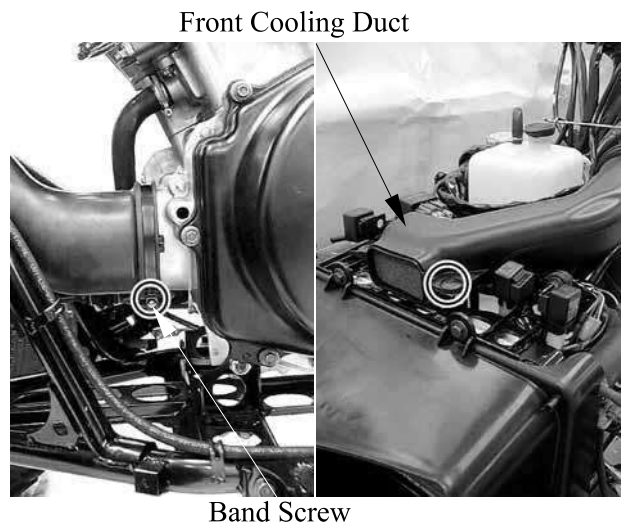
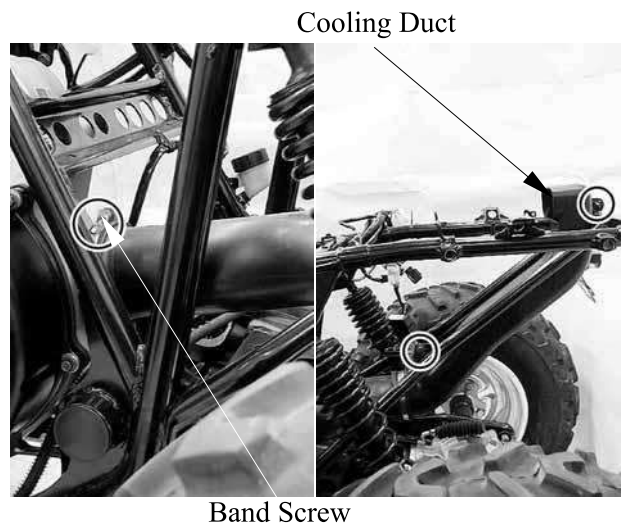
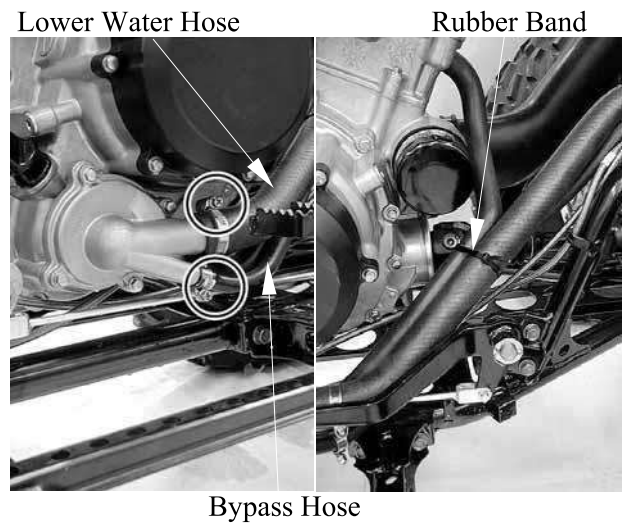
ENGINE REMOVAL

Drain engine oil (refer to the “ENGINE OIL” section in the chapter 3).
 Remove frame covers and exhaust pipe (refer to the “FRAME COVERS” section in the chapter 2).
 Drain the engine coolant (refer to the “COOLANT REPLACEMENT” section in this chapter).
 Remove the air cleaner housing and carburetor (refer to the “CARBURETOR REMOVAL/CHOKE INSPECTION/INSTALLATION” and “AIR CLEANER HOUSING” sections in the chapter 5).

Disconnect the lower water hose and bypass hose from water pump cover.
 Cut the rubber band off on the water hose.

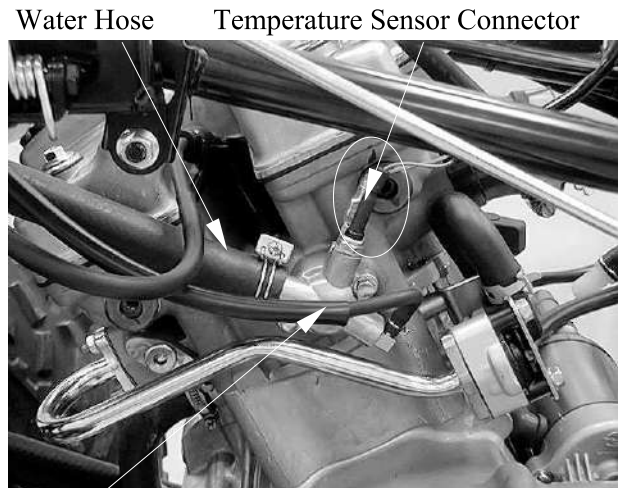
Loosen the band screw and remove the two mounting bolts from the rear cooling duct, then remove the rear cooling duct.

Loosen the band screw and remove the fastener from the front cooling duct, then remove the front cooling duct.



7. ENGINE REMOVAL/INSTALLATION

Disconnect the water hose, bleed hose and water temperature sensor connectors from water joint.



Remove the spark plug cap and disconnect the AICV air supply hose from cylinder head.



Remove the bolt/nut from drive select rod. Remove the mounting nuts from the drive select lever guide, then remove the guide and rod.



7. ENGINE REMOVAL/INSTALLATION

Disconnect the breather hose from cylinder head cover and remove the mounting nut from breather housing holder, then remove the breather housing.

Breather Hose



Disconnect the vacuum hose from intake pipe.
Slide the rubber sleeve back to expose the starter motor wire nut.
Remove the starter motor cable nut for disconnect the starter motor cable.
Remove the bolt and then disconnect the engine ground cable from starter motor.

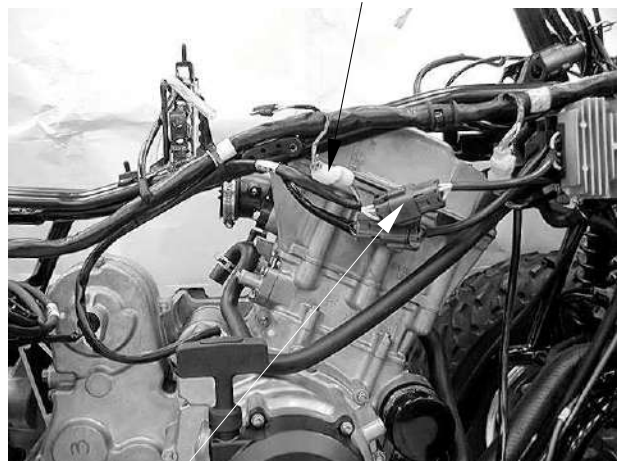
Vacuum Hose Starter Cable



Rubber Sleeve Engine Ground Cable

Remove the A.C. Generator and ignition pulse generator connectors.

Ignition Pulse Generator



A.C. Generator Connector

7. ENGINE REMOVAL/INSTALLATION

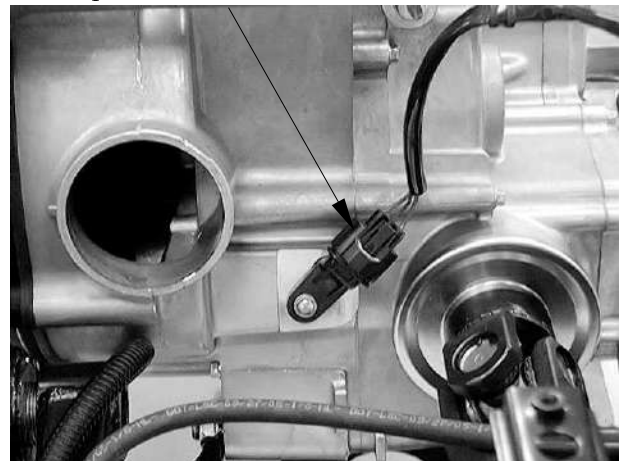
Disconnect the gear indicator light switch connector.



Gear Indicator Light Switch Connector

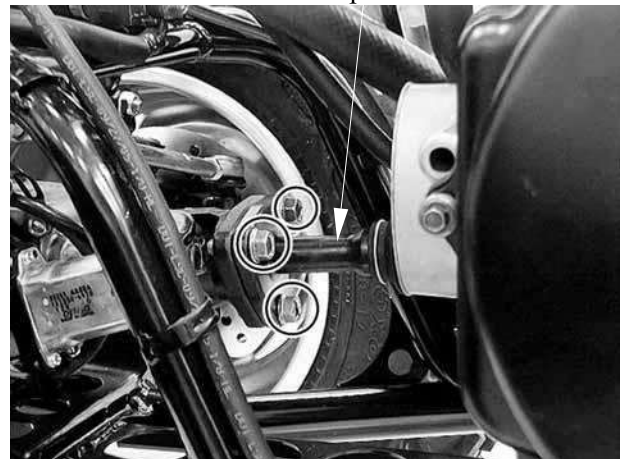
Disconnect the speed sensor connector.

Speed Sensor Connector



Remove the bolts and then remove the front propeller shaft from the engine assembly.

Front Propeller Shaft



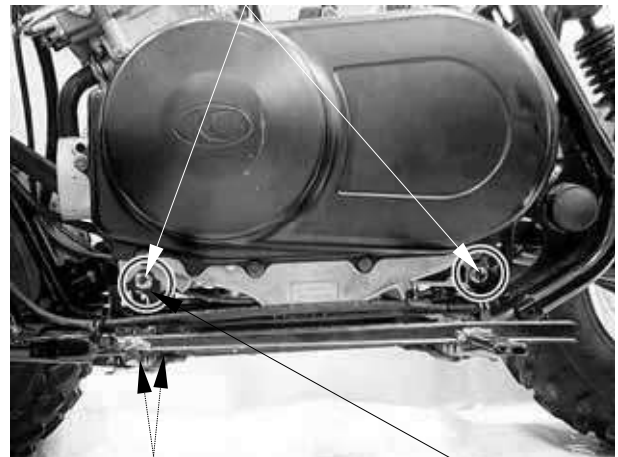
7. ENGINE REMOVAL/INSTALLATION

Remove the front lower engine mounting bolt/nut.

Remove the four nuts under right and left engine hangers, then remove the engine hangers.

Remove the rear lower engine mounting bolt/nut.

Lower Engine Mounting Bolt/Nut



Engine Hanger Nuts

Engine Hanger

Remove the upper engine mounting bolt/nut.



Rise the engine front side and move the engine forward, then remove the engine from the frame by disengaging the rear drive gear case.



7. ENGINE REMOVAL/INSTALLATION

Tap the rear propeller shaft with rubber hammer and remove the rear propeller shaft from the engine assembly.

Take care not to lose the compression spring in the rear drive gear case end.

Rear Propeller Shaft



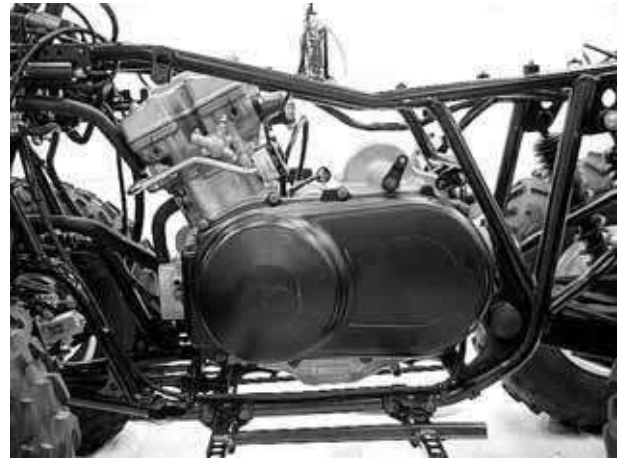
Lower the cylinder head and rise the engine rear side, then move the engine from the frame left side.



7. ENGINE REMOVAL/INSTALLATION

ENGINE INSTALLATION

Install the engine assembly into the frame.

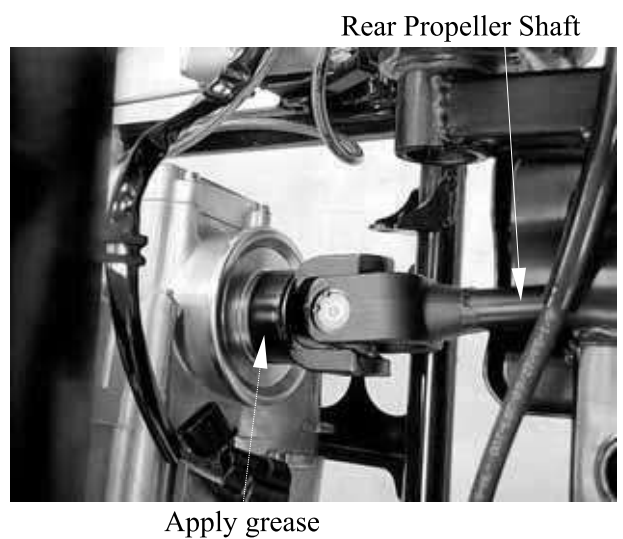


Apply lightweight lithium-soap base grease to the rear propeller shaft splines.



Install the rear propeller shaft into the engine assembly.

Apply lightweight lithium-soap base grease to the rear output shaft splines.



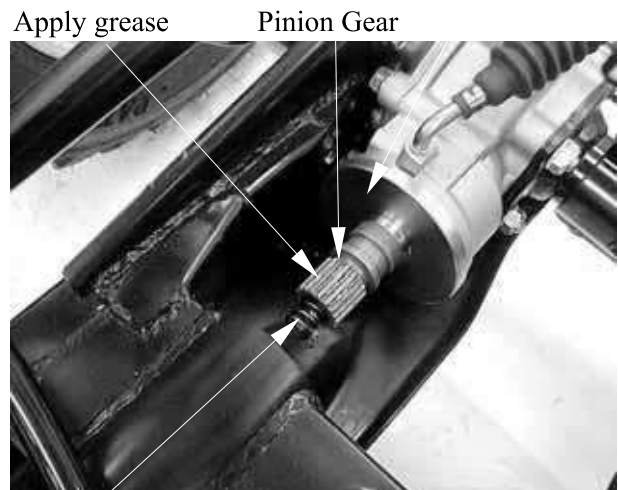
7. ENGINE REMOVAL/INSTALLATION

Install the compression spring into the pinion gear.

Apply lightweight lithium-soap base grease to the pinion gear splines.

Move the engine rearward and engage the rear propeller shaft into the pinion gear.

Install the joint boot securely.



Compression Spring

Install the upper engine mounting bolt and nut loosely.



Lower Engine Mounting Bolt/Nut

Install the rear lower engine mounting bolt and nut loosely.

Install the engine hangers and four engine hanger nuts loosely.

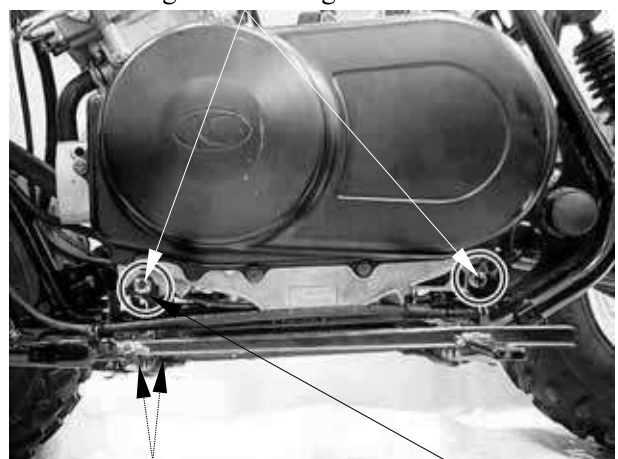
Install the front lower engine mounting bolt and nut loosely.

Tighten the four engine hanger nuts to the specified torque.

Torque: 3.5 kgf-m (35 N-m, 25 lbf-ft)

Tighten the all engine mounting bolts and nuts to the specified torque.

Torque: 6 kgf-m (60 N-m, 43.5 lbf-ft)



Engine Hanger Nuts

Engine Hanger

7. ENGINE REMOVAL/INSTALLATION

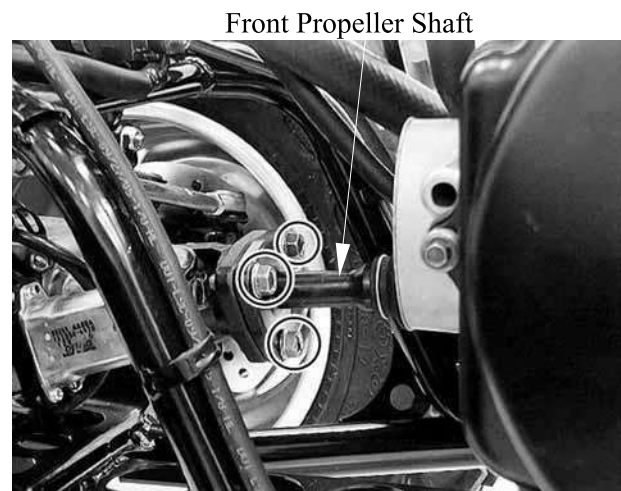
Apply lightweight lithium-soap base grease to the front propeller shaft splines and front output splines.



Install the front propeller shaft into the engine assembly.
Install and tighten the three new bolts to specified torque.

Always install the bolts with the new ones.

Torque: 4.5 kgf-m (45 N-m, 32.5 lbf-ft)



Install the front cooling duct.

Make sure the lug on the left crankshaft case into the cutout on the front cooling duct.



7. ENGINE REMOVAL/INSTALLATION

Install the rear cooling duct.

Make sure the lug on the left crankshaft case into the cutout on the rear cooling duct.

Install the removed parts in the reverse order of removal.

Route the water hoses, wire and cable properly (refer to the “**CABLE & HARNESS ROUTING**” section in the chapter 1).

Adjusting the following items:

- Engine oil (refer to the “**ENGINE OIL**” section in the chapter 3).
- Engine coolant (refer to the “**COOLANT REPLACEMENT**” section in this chapter).



8. CYLINDER HEAD/VALVES

CYLINDER HEAD/VALVES

SCHEMATIC DRAWING -----	8- 1
SERVICE INFORMATION-----	8- 2
TROUBLESHOOTING-----	8- 3
CYLINDER COMPRESSION TEST -----	8- 4
CYLINDER HEAD COVER REMOVAL/INSTALLATION-----	8- 5
CYLINDER HEAD COVER DISASSEMBLY/ASSEMBLY-----	8- 6
CAMSHAFT REMOVAL/INSPECTION/INSTALLATION -----	8- 7
ROCKER ARMS REMOVAL/INSPECTION/INSTALLATION ----	8-15
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CYLINDER HEAD DISASSEMBLY/INSPECTION/ASSEMBLY -	8-24
CAM CHAIN REMOVAL/INSPECTION/INSTALLATION -----	8-28

8. CYLINDER HEAD/VALVES

SERVICE INFORMATION

GENERAL INSTRUCTIONS

- The cylinder head can be serviced with the engine installed in the frame. Coolant in the radiator and water jacket must be drained first.
- When assembling, apply molybdenum disulfide grease or engine oil to the valve guide movable parts and valve arm sliding surfaces for initial lubrication.
- The valve rocker arms are lubricated by engine oil through the cylinder head engine oil passages. Clean and unclog the oil passages before assembling the cylinder head.
- After disassembly, clean the removed parts and dry them with compressed air before inspection.
- After removal, mark and arrange the removed parts in order. When assembling, install them in the reverse order of removal.

SPECIFICATIONS

Unit: mm (in)

Item		Standard	Service Limit
Valve clearance (cold)	IN	0.1 mm (0.004 in)	—
	EX	0.1 mm (0.004 in)	—
Cylinder head compression pressure		15 kg/cm ² (1500 kPa, 213 psi)	—
Cylinder head warpage		—	0.05 (0.002)
Camshaft runout		—	0.05 (0.002)
Camshaft cam height	IN	37.2614 (1.4905)	37.11 (1.4844)
	EX	37.0084 (1.4803)	36.86 (1.4744)
Valve rocker arm I.D.	IN	10 (0.4)~10.015 (0.4006)	10.1 (0.404)
	EX	10 (0.4)~10.015 (0.4006)	10.1 (0.404)
Valve rocker arm shaft O.D.	IN	9.975 (0.399)~9.99 (0.3996)	9.9 (0.396)
	EX	9.975 (0.399)~9.99 (0.3996)	9.9 (0.396)
Rocker arm to shaft clearance		0.009 (0.0004)~0.042 (0.0017)	0.1 (0.004)
Valve stem O.D.	IN	4.975 (0.199)~4.99 (0.1996)	4.925 (0.197)
	EX	4.955 (0.1982)~4.97 (0.1988)	4.915 (0.1966)
Valve guide I.D.	IN	5 (0.2)~5.015 (0.2006)	5.03 (0.2012)
	EX	5 (0.2)~5.015 (0.2006)	5.03 (0.2012)
Valve stem-to-guide clearance	IN	0.01 (0.004)~0.037 (0.0015)	0.08 (0.0032)
	EX	0.03 (0.0012)~0.057 (0.0023)	0.1 (0.004)

8. CYLINDER HEAD/VALVES

TORQUE VALUES

Cylinder head bolt (1 – 4)	4.8 kgf-m (48 N-m, 35 lbf-ft)	Apply engine oil to threads
Cylinder head bolt (5 – 13)	2.3 kgf-m (23 N-m, 17 lbf-ft)	Apply engine oil to threads
Cylinder head nut	1 kgf-m (10 N-m, 7 lbf-ft)	
Cylinder head cover bolt	1 kgf-m (10 N-m, 7.2 lbf-ft)	
Breather separator bolt	1.3 kgf-m (13 N-m, 9 lbf-ft)	
Cam chain tensioner bolt	1.2 kgf-m (12 N-m, 8.6 lbf-ft)	
Tensioner sealing bolt	1 kgf-m (10 N-m, 7 lbf-ft)	
Rocker arm shaft	4.5 kgf-m (45 N-m, 32 lbf-ft)	
Cam chain guide pivot bolt	2 kgf-m (20 N-m, 15 lbf-ft)	
Water joint bolt	1.2 kgf-m (12 N-m, 8.6 lbf-ft)	

SPECIAL TOOLS

Valve spring compressor	A120E00040
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TROUBLESHOOTING

- The poor cylinder head operation can be diagnosed by a compression test or by tracing engine top-end noises.

Poor performance at idle speed

- Compression too low

Compression too low

- Incorrect valve clearance adjustment
- Burned or bend valves
- Incorrect valve timing
- Broken valve spring
- Poor valve and seat contact
- Leaking cylinder head gasket
- Warped or cracked cylinder head
- Poorly installed spark plug

Compression too high

- Excessive carbon build-up in combustion chamber

White smoke from exhaust muffler

- Worn valve stem or valve guide
- Damaged valve stem oil seal

Abnormal noise

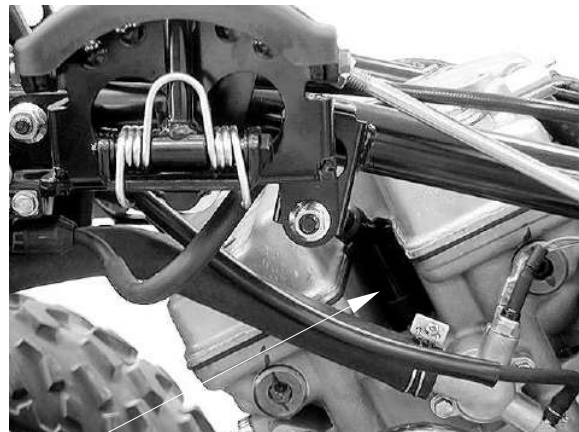
- Incorrect valve clearance adjustment
- Sticking valve or broken valve spring
- Damaged or worn camshaft
- Worn cam chain tensioner
- Worn camshaft and rocker arm

8. CYLINDER HEAD/VALVES

CYLINDER COMPRESSION TEST

Warm up the engine to normal operating temperature.

Stop the engine and remove the spark plug cap and remove the spark plug (refer to the “SPARK PLUG” section in the chapter 3).



Park Plug Cap

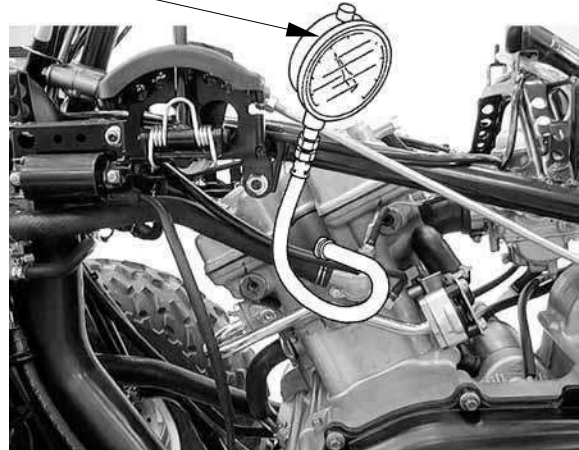
Install a compression gauge into the spark plug hole.

Open the throttle all the way and crank the engine with the starter motor until the gauge reading stops rising.

The maximum reading is usually reached 4 – 7 seconds.

* To avoid discharging the battery, do not operate the starter motor for more than seven seconds.

Compression Gauge



Compression pressure:

15 kg/cm² (1500 kPa, 213 psi)

Low compression can be caused by:

- ♦ Blown cylinder head gasket
- ♦ Improper valve adjustment
- ♦ Valve leakage
- ♦ Worn piston ring or cylinder

High compression can be caused by:

- ♦ Carbon deposits in combustion chamber or on piston head

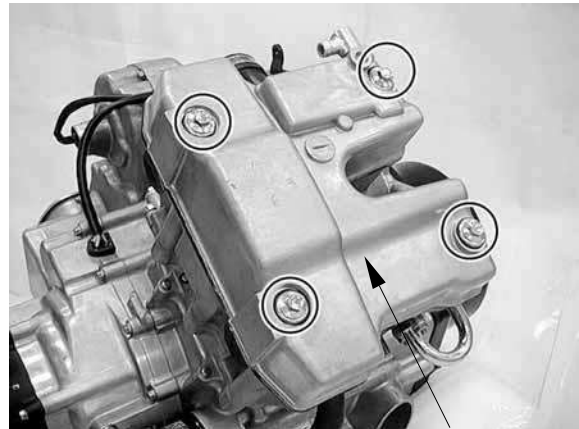
8. CYLINDER HEAD/VALVES

CYLINDER HEAD COVER REMOVAL/INSTALLATION

REMOVAL

Disconnect the crankcase breather hose from the cylinder head cover (refer to the “ENGINE REMOVAL” section in the chapter 7).

Remove the four bolts/rubber washers and cylinder head cover.



Cylinder Head Cover

Remove the cylinder head cover packing.

INSTALLATION

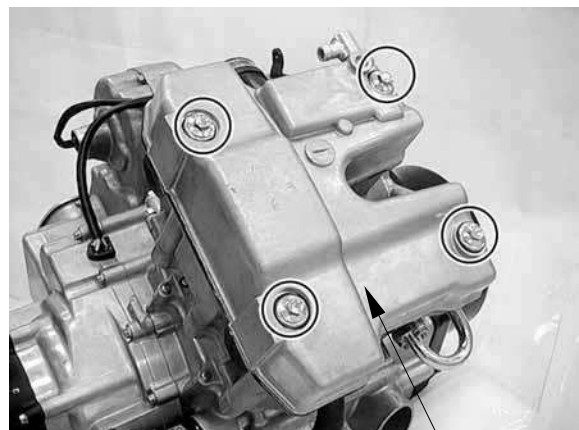
Apply fluid gasket (threebond: 1215) to the mating surface of the cylinder head cover, then install the packing.

Cylinder Head Cover Packing



Install the cylinder head cover.
Install and tighten the four bolts/rubber washers to the specified torque in a crisscross pattern.

Torque: 1 kgf-m (10 N-m, 7.2 lbf-ft)



Cylinder Head Cover

8. CYLINDER HEAD/VALVES

CYLINDER HEAD COVER DISASSEMBLY/ASSEMBLY

DISASSEMBLY

Remove the three bolts and breather separator.



Remove the gasket.

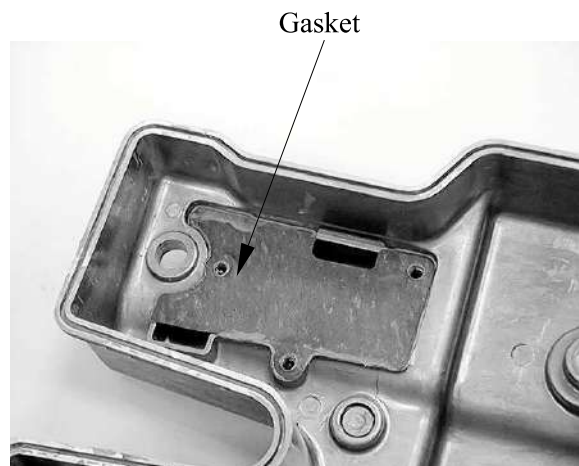
ASSEMBLY

Assembly is in the reverse order of disassembly.

Torque:

Breather separator bolt:

1.3 kgf-m (13 N-m, 9 lbf-ft)



8. CYLINDER HEAD/VALVES

CAMSHAFT REMOVAL/INSPECTION/ INSTALLATION

REMOVAL

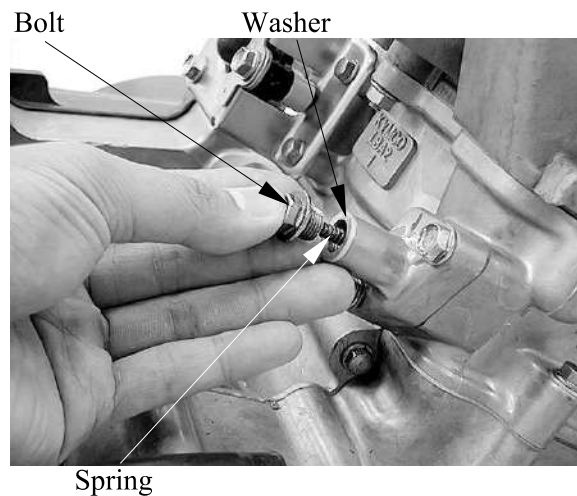
Remove the cylinder head cover (refer to the “**CYLINDER HEAD COVER REMOVAL/INSTALLATION**” section in this chapter).

Turn the crankshaft clockwise and align the “T” mark on the flywheel with the index mark on the right crankcase cover (refer to the “**VALVE CLEARANCE**” section in the chapter 3).

Remove the cam chain tensioner lifter sealing bolt, spring and sealing washer.

Remove the two bolts, cam chain tensioner and gasket.

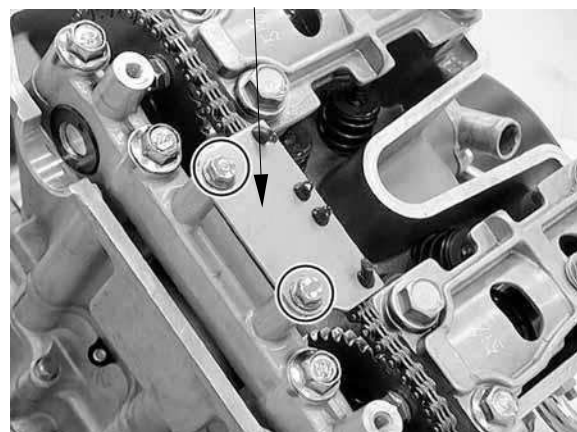
Remove the two bolts and cam chain guide.



Cam Chain Tensioner/Gasket

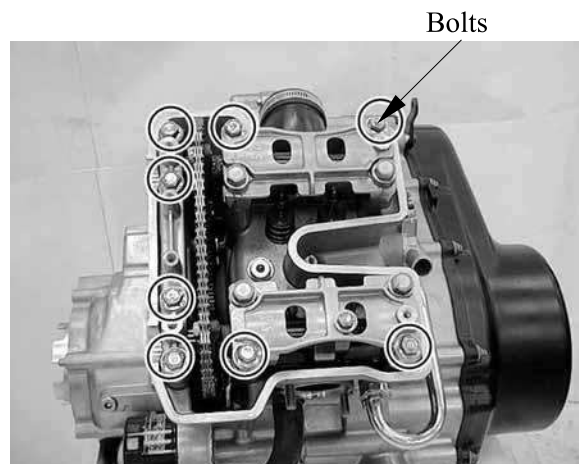


Cam Chain Guide



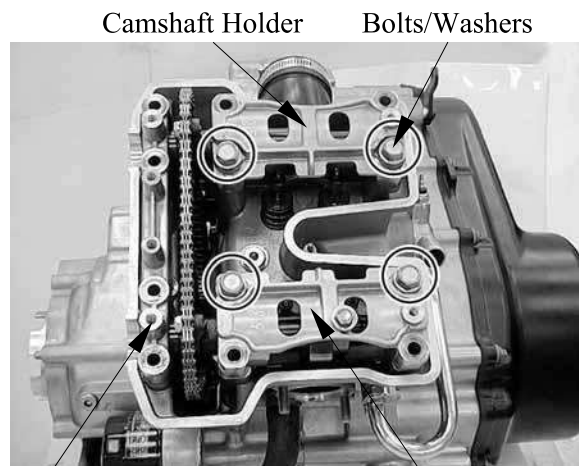
8. CYLINDER HEAD/VALVES

Loosen and remove the eight camshaft holder bolts in a crisscross pattern in several steps.



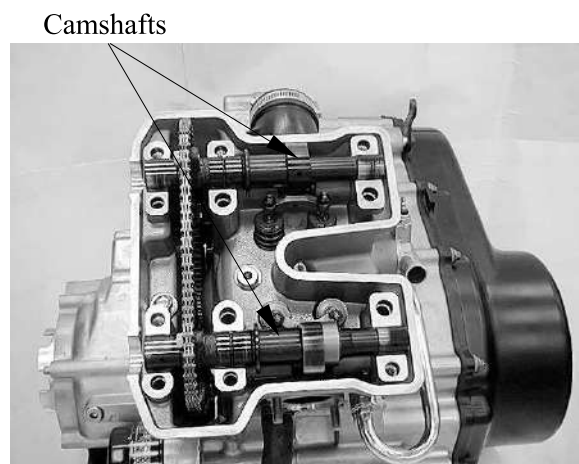
Loosen and remove the four camshaft holder bolts/washers in a crisscross pattern in several steps, then remove the camshaft holders.

* Suspend the cam chain with a piece of wire to prevent the chain from falling into the crankcase.



Camshaft Holder Camshaft Holder

Remove the camshafts.



8. CYLINDER HEAD/VALVES

INSPECTION

Cam chain guide

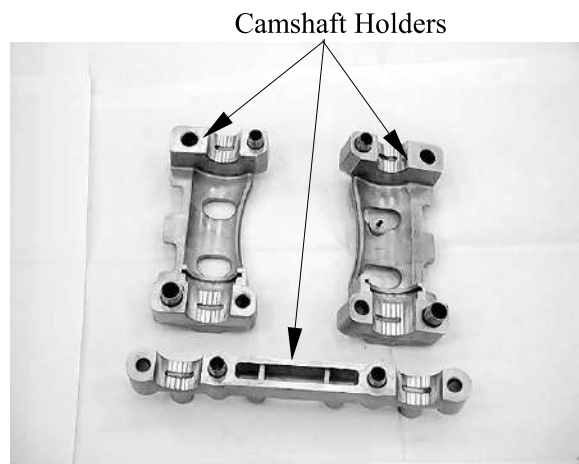
Inspect the cam chain slipper surface of the cam chain guide for wear or damage.



Camshaft holder

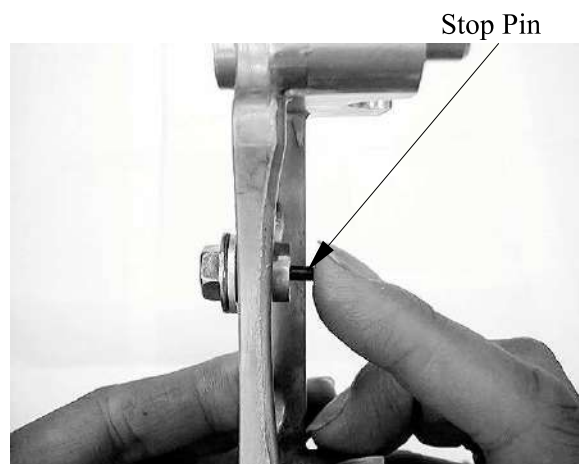
* Always replace the camshaft holder and cylinder head in pairs

Inspect the camshaft surface of each camshaft holder for scoring, scratches, or evidence of insufficient lubrication.



Check the stop pin spring on the exhaust camshaft holder for damage.

Replace the stop pin assembly with a new one if the spring is damaged.

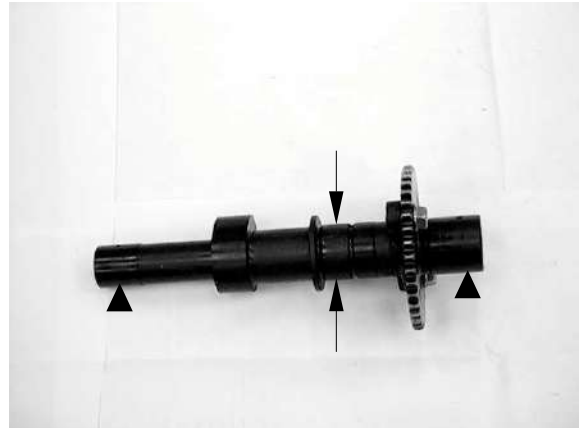


8. CYLINDER HEAD/VALVES

Camshaft

Support both ends of the camshaft with V-blocks and check the camshaft runout with a dial gauge.

Service limit: 0.05 mm (0.002 in)



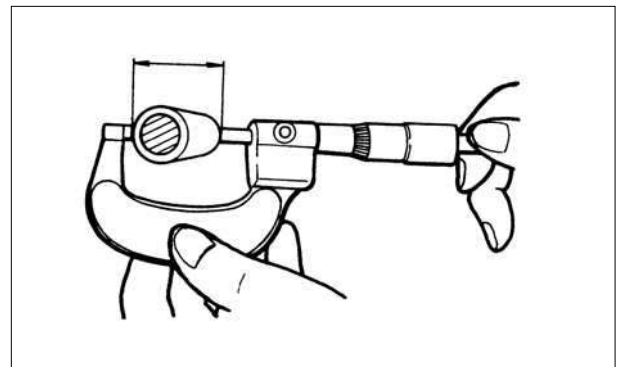
Inspect camshaft lobes for pitting/scratches/blue discoloration.

Measure the cam lobe height.

Service Limits: IN : 37.11 mm (1.4844 in)

EX: 36.86 mm (1.4744 in)

If any defects are found, replace the camshaft with a new one, then inspect lubrication system.



Check the decompression system by turning the decompressor cam on the exhaust camshaft.

You should be able to turn the decompressor cam clockwise smoothly, but the decompressor should not turn counterclockwise.



8. CYLINDER HEAD/VALVES

Cam chain tensioner

Check the one-way cam operation (tensioner)

Unsmooth operation → Replace.



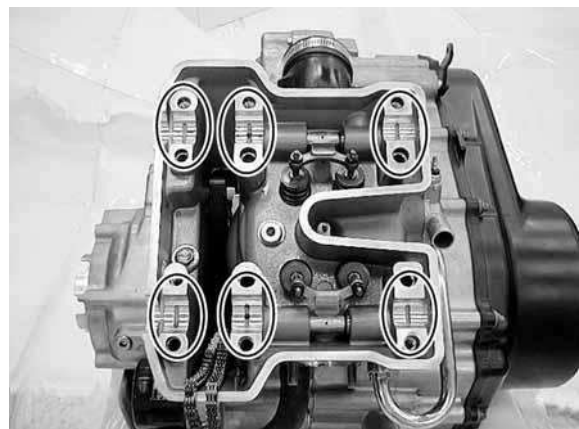
INSTALLATION

Turn the crankshaft clockwise, align the “T” mark on the flywheel with the index mark on the right crankcase cover (refer to the “**VALVE CLEARANCE**” in chapter 3).

Apply molybdenum disulfide oil to the camshaft journals of the camshaft holder.



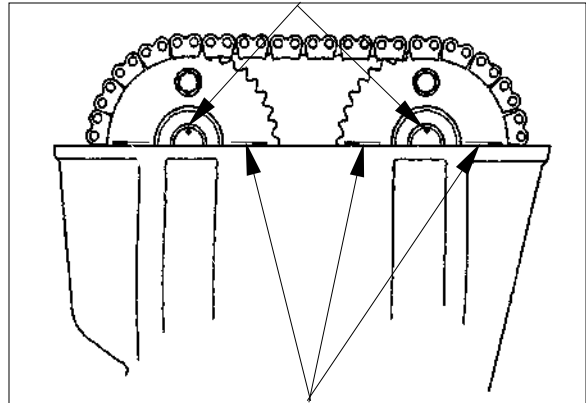
Apply molybdenum disulfide oil to the camshaft journals of the cylinder head.



8. CYLINDER HEAD/VALVES

Install the cam chain over the cam sprockets and then install the intake and exhaust camshafts.

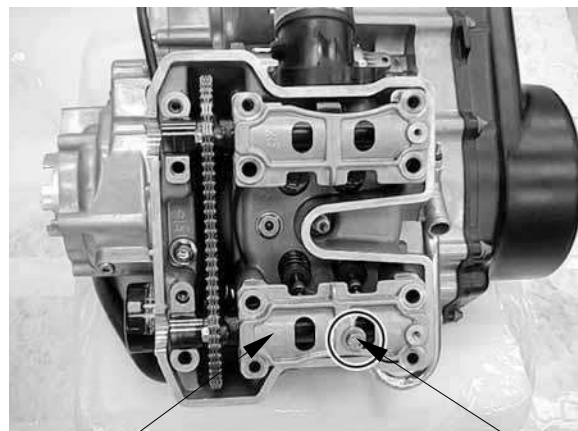
*



Install intake and exhaust camshaft holders to the correct locations.

*

Install each camshaft holders to the correct locations.
 "IN": no stop pin.
 "EX": has a stop pin.



Exhaust Camshaft Holder

Stop Pin

8. CYLINDER HEAD/VALVES

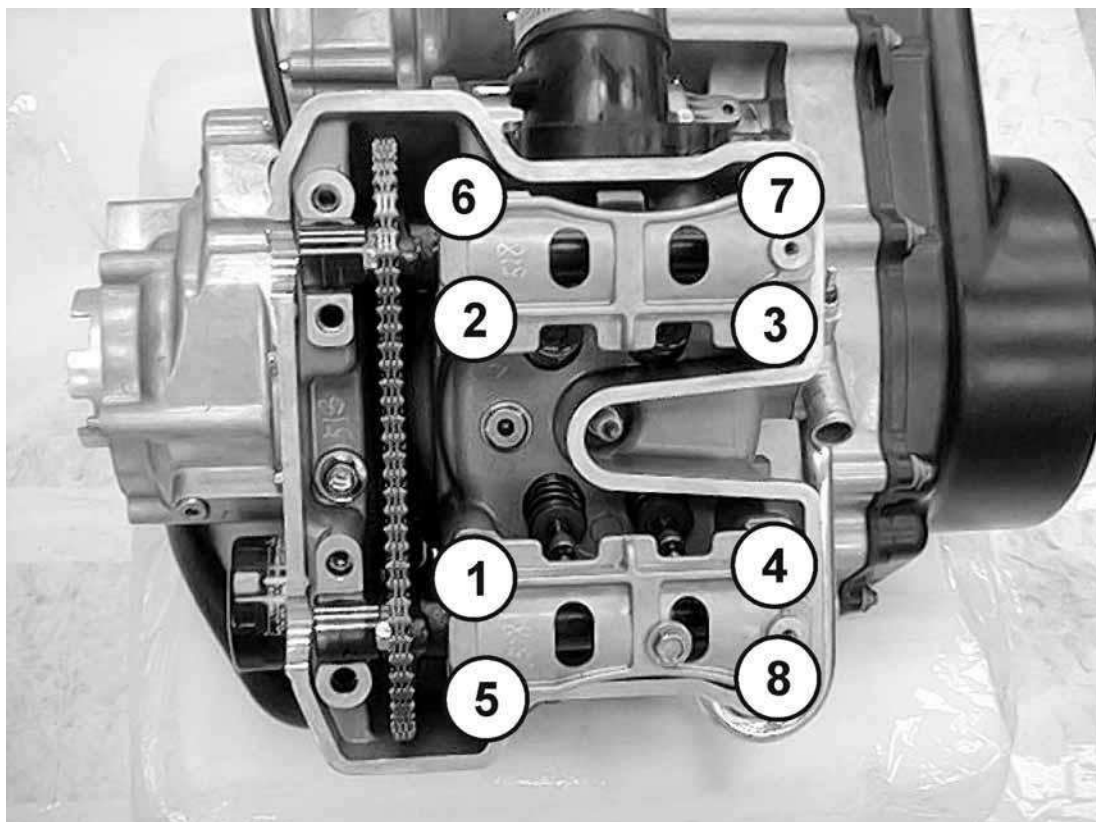
Apply engine oil to cylinder head bolt (No. 1 – 8) threads.

Install the four bolts (No. 5 – 8).

Install the four bolts/washers (No. 1 – 4).

Tighten the holder bolts (No. 1 – 8) in a crisscross pattern in five steps to the specified torque as follow diagram.

Tighten the bolts to the specified torque in sequence									
kgf-m (N-m, lbf-ft)									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	
Step 1	2.4 (24, 17)	←	←	←	1.2 (12, 9)	←	←	←	
Step 2	3.8 (38, 27)	←	←	←	2.3 (23, 17)	←	←	←	
Step 3	4.8 (48, 35)	←	←	←					



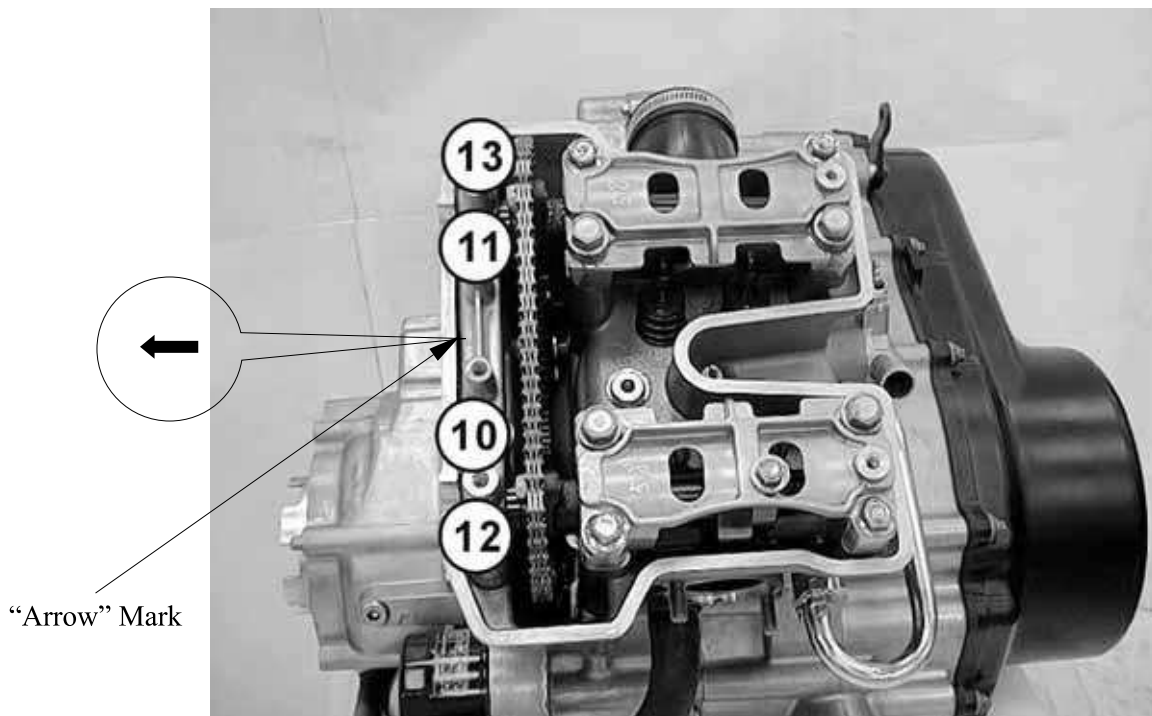
8. CYLINDER HEAD/VALVES

Apply engine oil to cylinder head bolt (No. 10 – 13) threads.

Install the common camshaft holder by arrow mark facing outside.

Install and tighten the holder bolts (No. 10 – 13) in a crisscross pattern in five steps to the specified torque as follow diagram.

Tighten the bolts to the specified torque in sequence								
kgf-m (N-m, lbf-ft)								
	(10)	(11)	(12)	(13)				
Step 4	1.2 (12, 9)	←	←	←				
Step 5	2.3 (23, 17)	←	←	←				



8. CYLINDER HEAD/VALVES

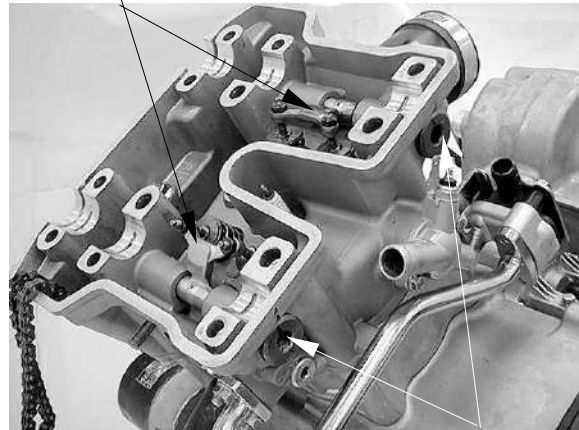
ROCKER ARMS REMOVAL/INSPECTION/ INSTALLATION

REMOVAL

Remove the camshafts (refer to the “CAMSHAFT REMOVAL/INSPECTION/INSTALLATION” section in this chapter).

Remove the rocker arm shafts and washers, then remove the rocker arms.

Rocker Arms



Rocker Arm Shafts/Washers

INSPECTION

Rocker arm shaft

Inspect the rocker arm shaft for blue discoloration or grooves.

If any defects are found, replace the rocker arm shaft with a new one, then inspect lubrication system.

Measure each rocker arm shaft O.D.

Measure the I.D. of each rocker arm.

Measure arm to shaft clearance.

Replace as a set if out of specification.

Service limits: 0.1 mm (0.004 in)

Inspect the rocker arm bore, cam lobe contact surface and adjuster surface for wear/pitting/scratches/blue discoloration.

If any defects are found, replace the rocker arm shaft with a new one, then inspect lubrication system.

Measure each rocker arm shaft O.D.

Measure the I.D. of each rocker arm.

Measure arm to shaft clearance.

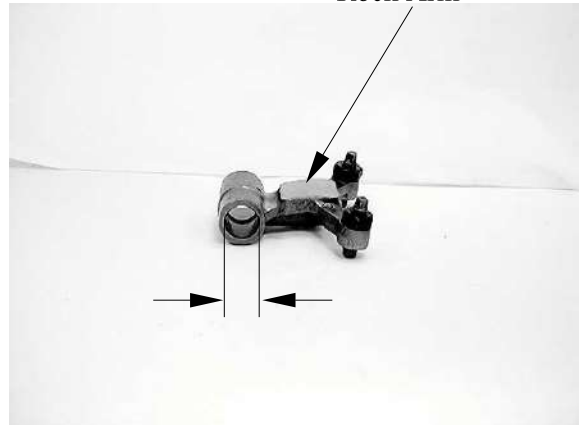
Replace as a set if out of specification.

Service limits: 0.1 mm (0.004 in)

Rocker Arm Shaft



Rock Arm



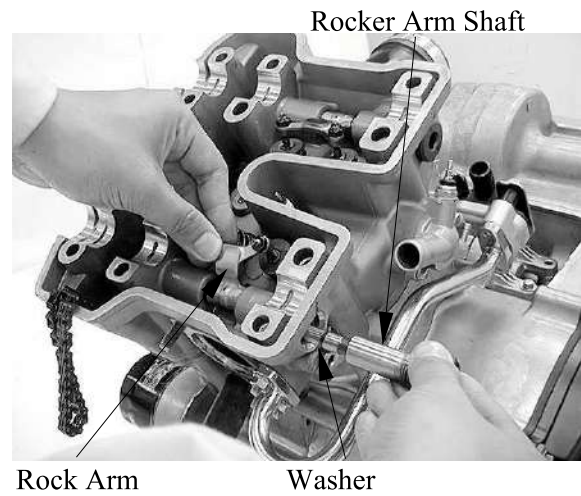
8. CYLINDER HEAD/VALVES

INSTALLATION

Apply engine oil to the rocker arms and rocker arm shafts

Install the rocker arms, rocker arm shafts and washers.
Tighten the rocker arm shaft to the specified torque.

Torque: 4.5 kgf-m (45 N-m, 32 lbf-ft)



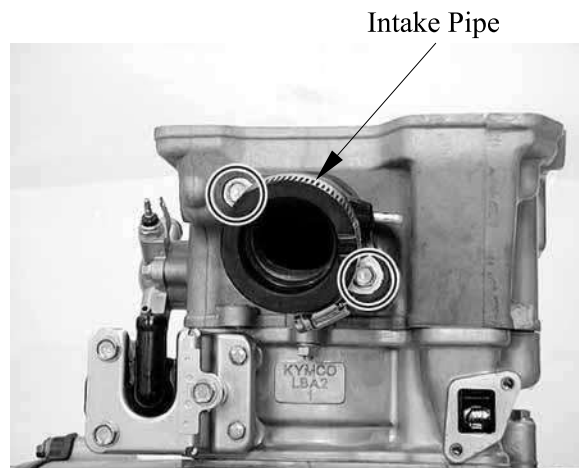
8. CYLINDER HEAD/VALVES

CYLINDER HEAD REMOVAL/INSTALLATION

* Always replace the camshaft holder and cylinder head in pairs

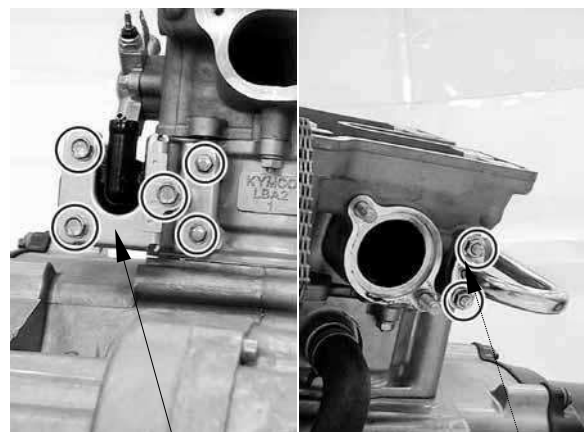
Remove the camshafts (refer to the “CAMSHAFT REMOVAL/INSPECTION/INSTALLATION” section in this chapter)

Remove the two bolts and intake pipe.



Remove the five bolts, then remove the pair reed valve cover and holder.

Remove the two nuts, then remove the pair reed valve and gasket.



Pair Reed Valve Cover/Holder

Gasket

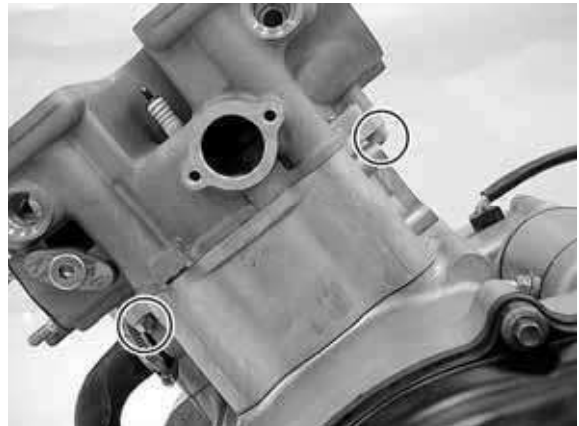
Remove the two bolts, water joint, gasket and water stop collar.



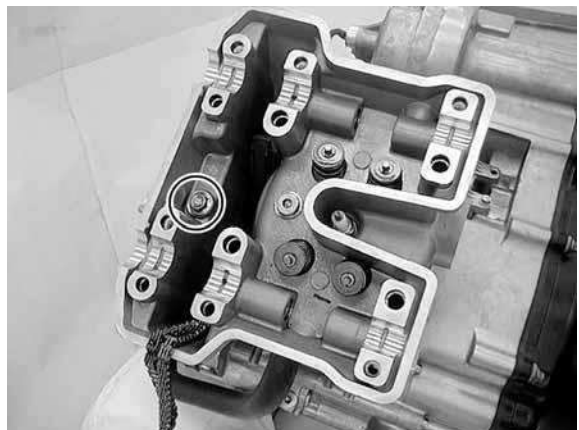
Water Joint/Gasket/Water Stop Collar

8. CYLINDER HEAD/VALVES

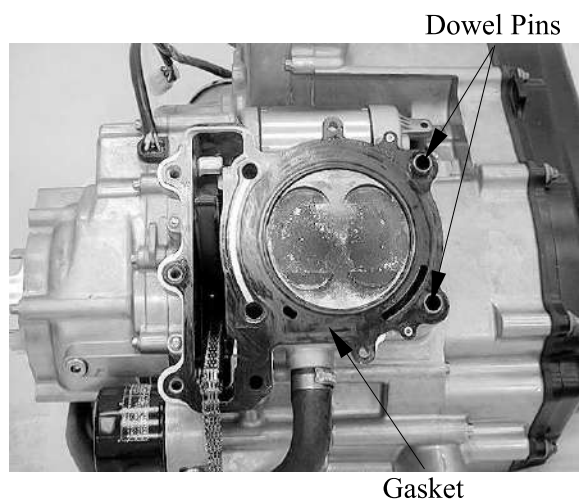
Remove the two nuts under the cylinder head.



Remove the bolt and then remove the cylinder head.



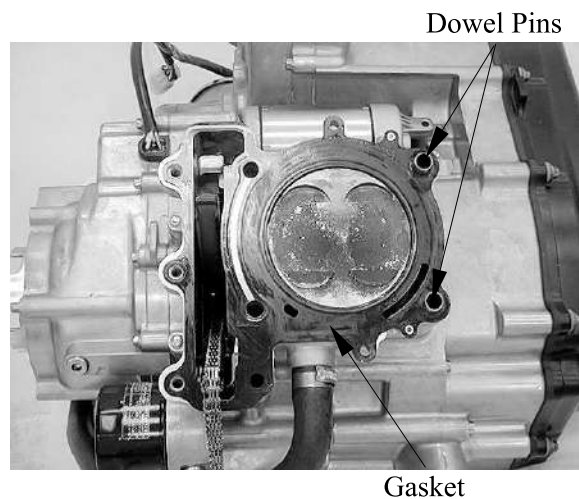
Remove the dowel pins and gasket.



8. CYLINDER HEAD/VALVES

INSTALLATION

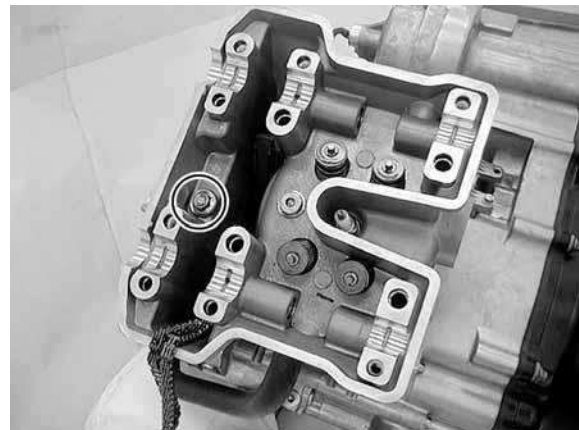
Install the dowel pins and new gasket as shown.



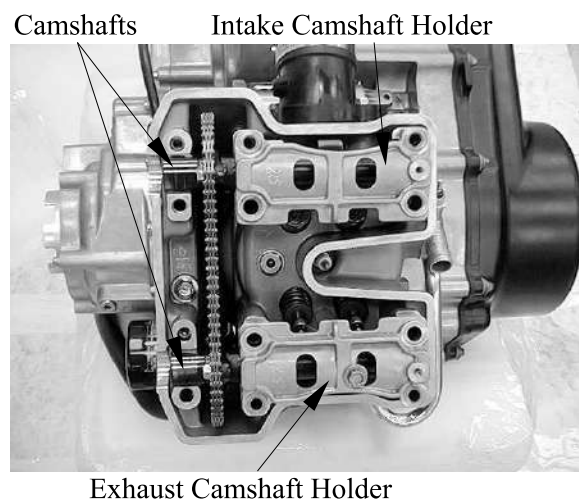
Install the cylinder head.

Apply engine oil to the cylinder head bolt (9) threads.

Install the bolt (9) but do not tighten it.



Install the camshafts, intake camshaft holder and exhaust camshaft holder (refer to the “**CAMSHAFT REMOVAL/INSPECTION/INSTALLATION**” section in this chapter).



8. CYLINDER HEAD/VALVES

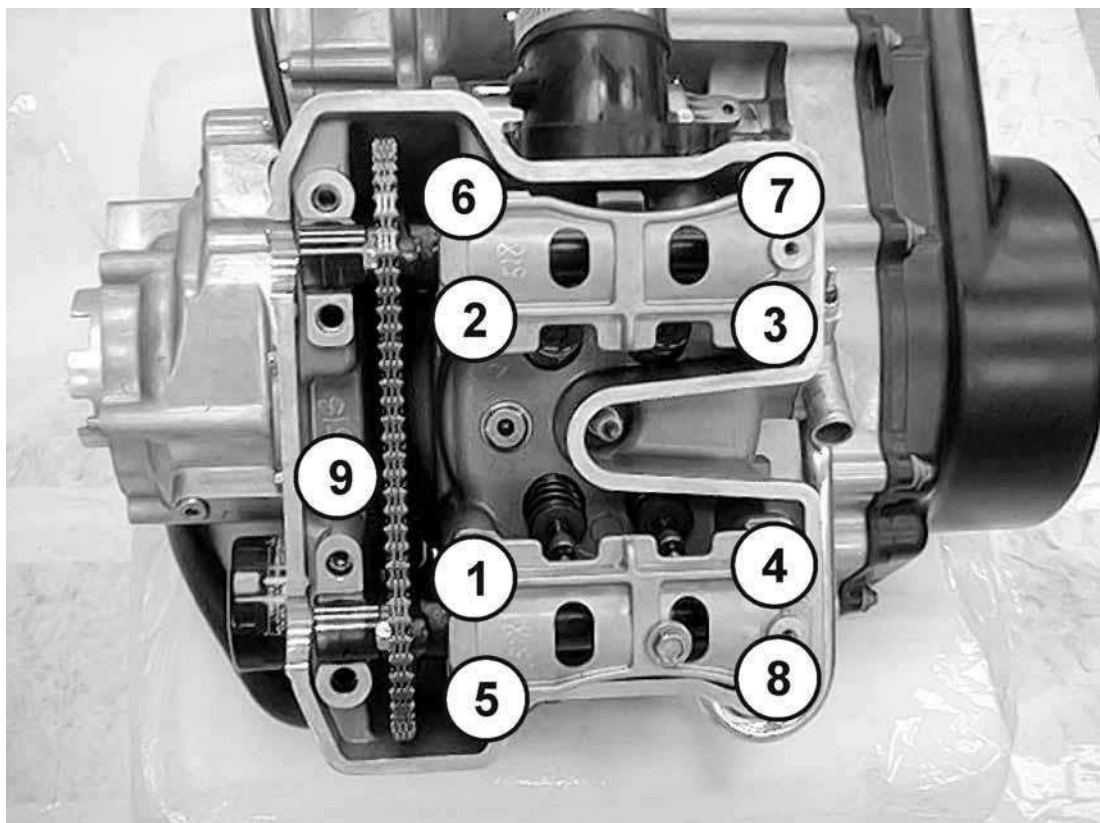
Apply engine oil to cylinder head bolt (No. 1 – 8) threads.

Install the four bolts (No. 5 – 8).

Install the four bolts/washers (No. 1 – 4).

Tighten the holder bolts (No. 1 – 9) in a crisscross pattern in five steps to the specified torque as follow diagram.

Tighten the bolts to the specified torque in sequence									
kgf-m (N-m, lbf-ft)									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Step 1	2.4 (24, 17)	←	←	←	1.2 (12, 9)	←	←	←	←
Step 2	3.8 (38, 27)	←	←	←	2.3 (23, 17)	←	←	←	←
Step 3	4.8 (48, 35)	←	←	←					



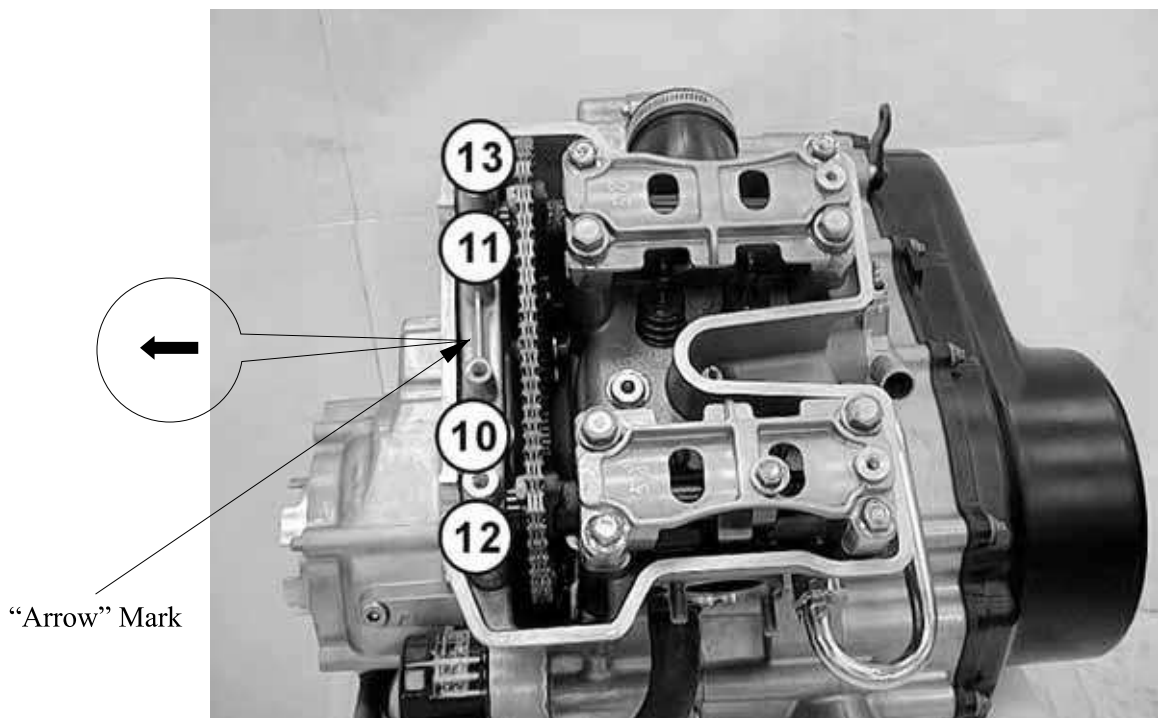
8. CYLINDER HEAD/VALVES

Apply engine oil to cylinder head bolt (No. 10 – 13) threads.

Install the common camshaft holder by arrow mark facing outside.

Install and tighten the holder bolts (No. 10 – 13) in a crisscross pattern in five steps to the specified torque as follow diagram.

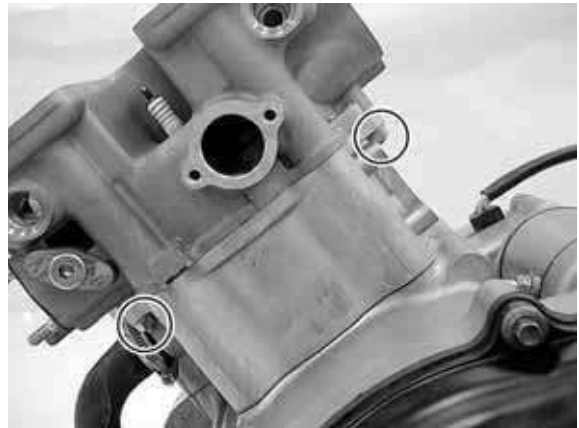
Tighten the bolts to the specified torque in sequence								
kgf-m (N-m, lbf-ft)								
	(10)	(11)	(12)	(13)				
Step 4	1.2 (12, 9)	←	←	←				
Step 5	2.3 (23, 17)	←	←	←				



8. CYLINDER HEAD/VALVES

Install and tighten the two nuts under the cylinder head to the specified torque.

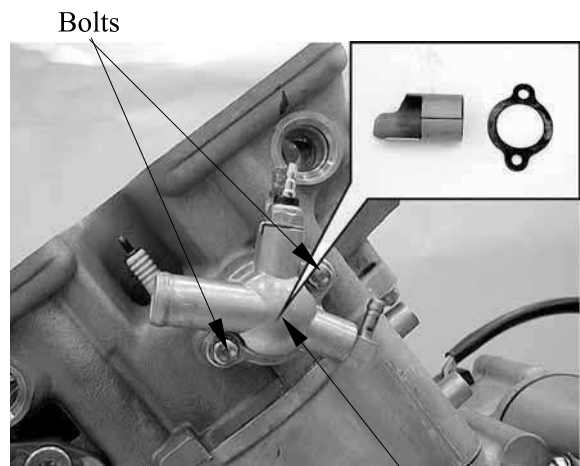
Torque: 1 kgf-m (10 N-m, 7 lbf-ft)



Install the water stop collar, gasket and water joint.

Install and tighten the two bolts to the specified torque.

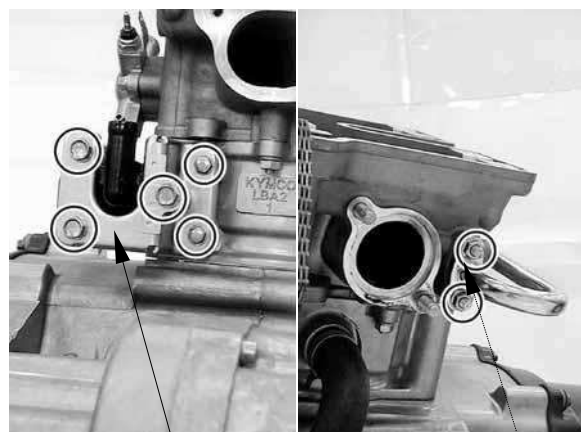
Torque: 1.2 kgf-m (12 N-m, 8.6 lbf-ft)



Water Joint/Gasket/Water Stop Collar

Install gasket and pair reed valve.

Install and tighten the five bolts and two nut securely.



Pair Reed Valve Cover/Holder

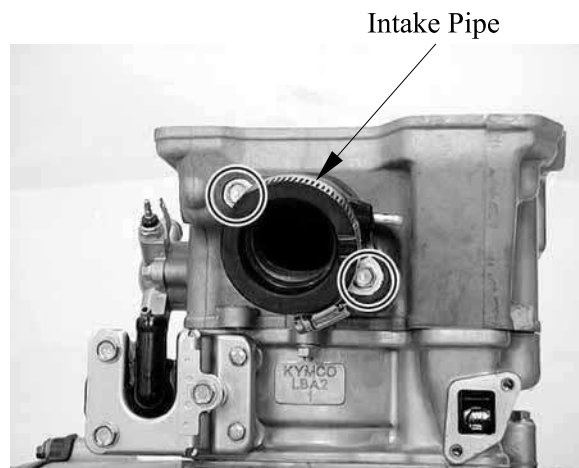
Gasket

8. CYLINDER HEAD/VALVES

Install the new O-ring onto the intake pipe.



Install the intake pipe and tighten the two bolts securely.



8. CYLINDER HEAD/VALVES

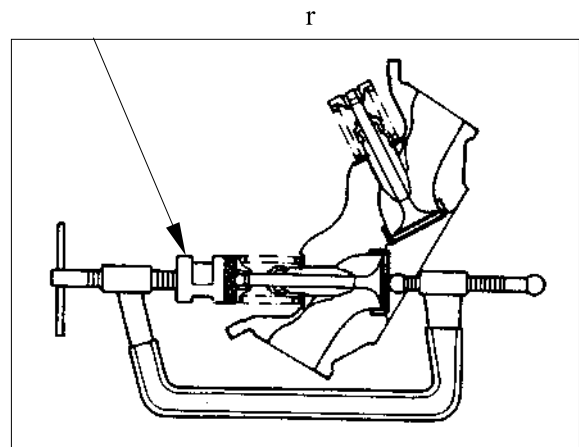
CYLINDER HEAD DISASSEMBLY/INSPECTION/ ASSEMBLY

Remove the cylinder head (refer to the “CYLINDER HEAD REMOVAL/INSTALLATION” section in this chapter).

Remove the valve spring cotters, retainers, springs, spring seats, oil seals and valves using a valve spring compressor.

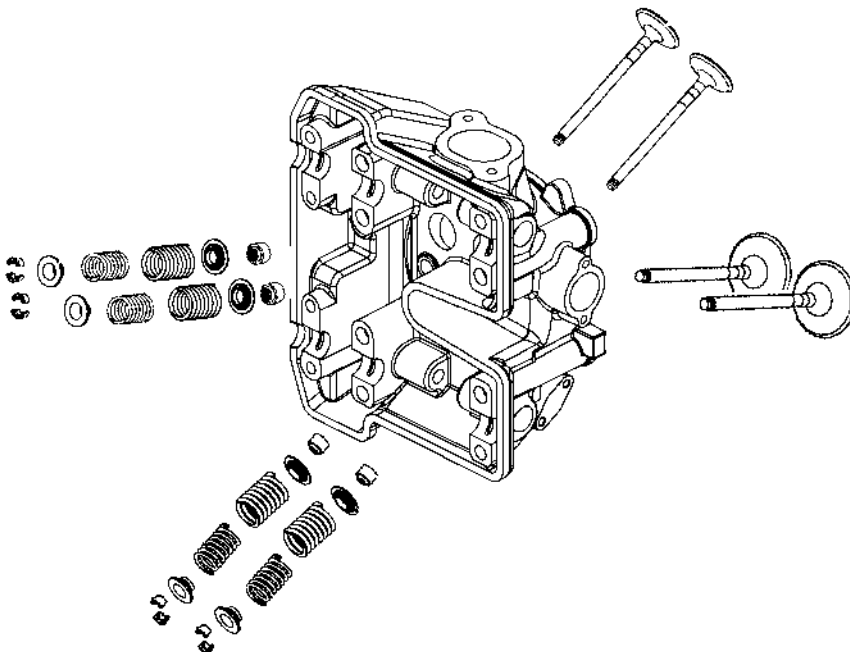
*

- Be sure to compress the valve springs with a valve spring compressor.
- Mark all disassembled parts to ensure correct reassembly.



Special tool:

Valve Spring Compressor A120E00040



8. CYLINDER HEAD/VALVES

INSPECTION

Valve /Valve guide

Inspect each valve for bending, burning, scratches or abnormal stem wear.
If any defects are found, replace the valve with a new one.

Check valve movement in the guide.

Measure each valve stem O.D.

Measure each valve guide I.D.

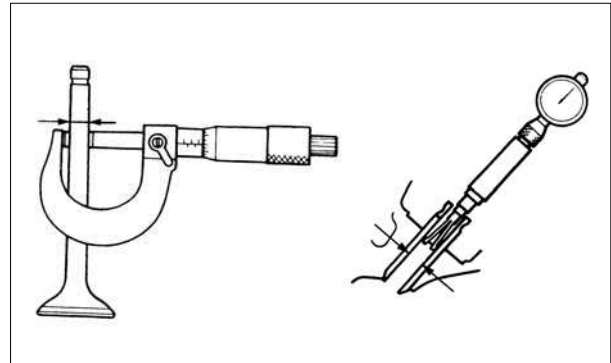
Subtract each valve stem O.D. from the corresponding guide I.D. to obtain the stem-to-guide clearance.

Service limits:

IN: 0.08 mm (0.0032 in)

EX: 0.1 mm (0.004 in)

* If the stem-to-guide clearance exceeds the service limits, replace the cylinder head is necessary.

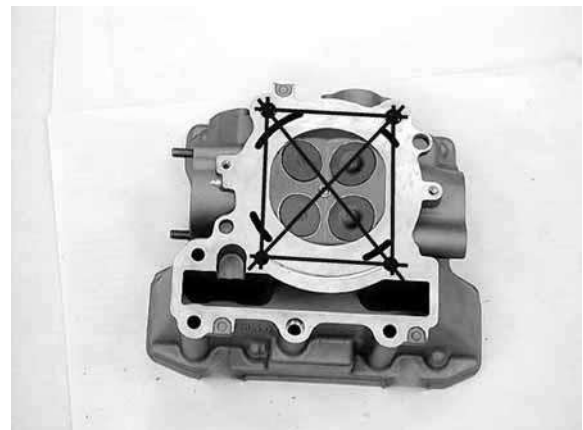


Cylinder head

Check the spark plug hole and valve areas for cracks.

Check the cylinder head for warpage with a straight edge and feeler gauge.

Service Limit: 0.05 mm (0.002 in)



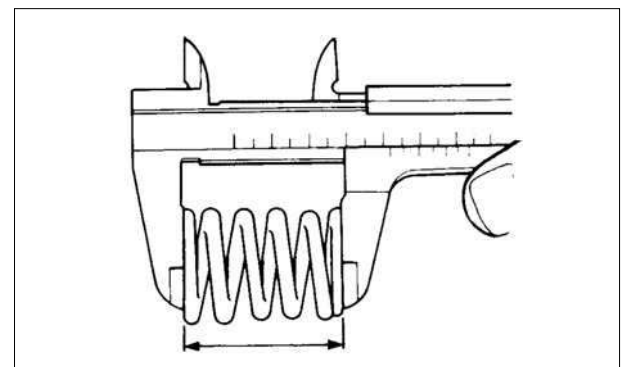
Valve spring

Measure the free length of the inner and outer valve springs.

Service Limit:

Inner: 33.4 mm (1.336 in)

Outer: 38 mm (1.52 in)



8. CYLINDER HEAD/VALVES

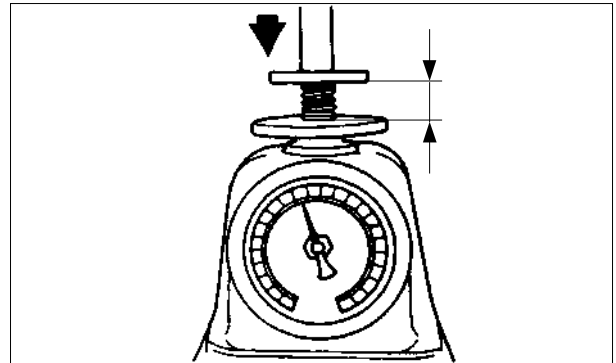
Measure compressed force (valve spring) and installed length.

Replace if out of specification.

Standard:

Inner: 3.5 kg (at 28.7 mm, 1.148 in)

Outer: 13 kg (at 31.43 mm, 1.2572 in)



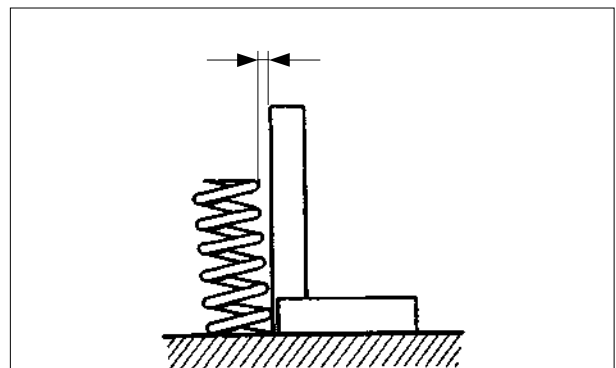
Measure the spring tilt.

Replace if out of specification.

Standard:

Inner: 1.2 mm (0.048)

Outer: 1.2 mm (0.048)

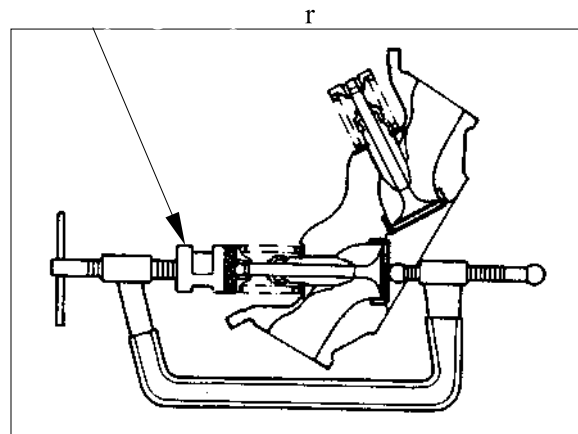


ASSEMBLY

Install the valve spring seats and oil seal.

* Be sure to install new oil seal.

Lubricate each valve with engine oil and insert the valves into the valve guides. Install the valve springs and retainers. Compress the valve springs using the valve spring compressor, then install the valve cotters.



* • When assembling, a valve spring compressor must be used.
• Install the cotters with the pointed ends facing down from the upper side of the cylinder head.

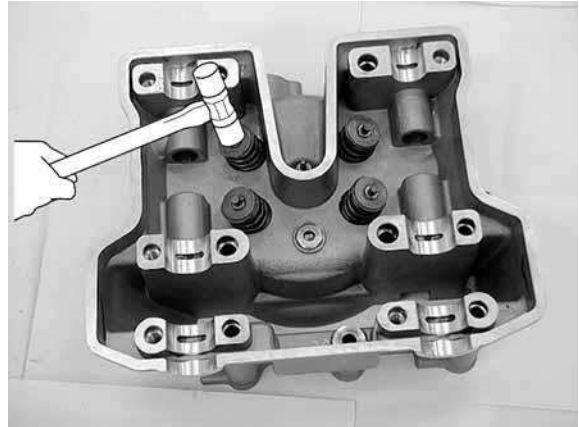
Special tool:

Valve Spring Compressor A120E00040

8. CYLINDER HEAD/VALVES

Tap the valve stems gently with a plastic hammer for 2~3 times to firmly seat the cotters.

* Be careful not to damage the valves.



8. CYLINDER HEAD/VALVES

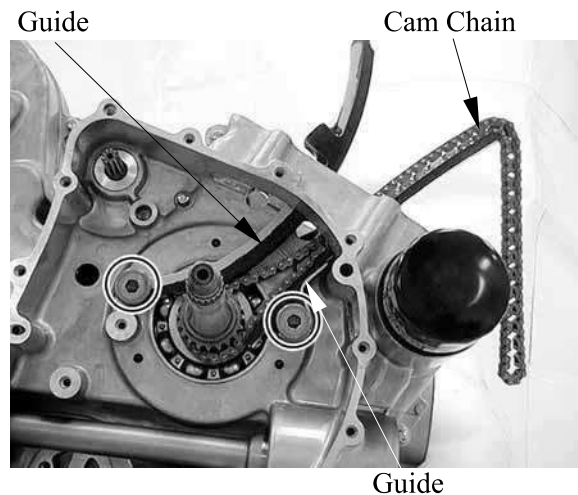
CAM CHAIN REMOVAL/INSPECTION/ INSTALLATION

REMOVAL

Remove the cylinder (refer to the “**CYLINDER AND PISTON REMOVAL/INSPECTION/INSTALLATION**” section in the chapter 9). Remove the oil pump drive chain (refer to “**OIL PUMP REMOVAL/INSTALLATION**” section in the chapter 4).

Remove the cam chain from the right crankcase.

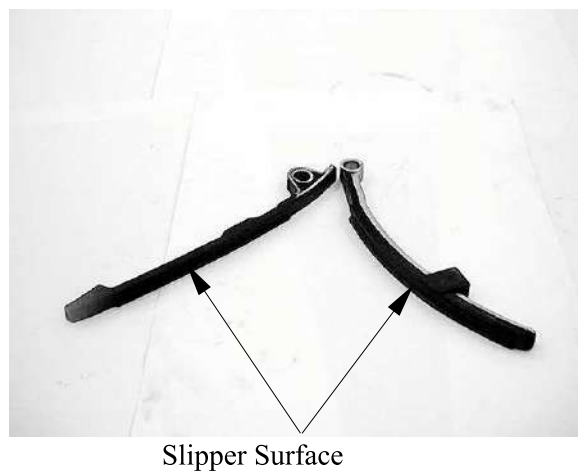
Remove the two bolts and cam chain guides.



INSPECTION

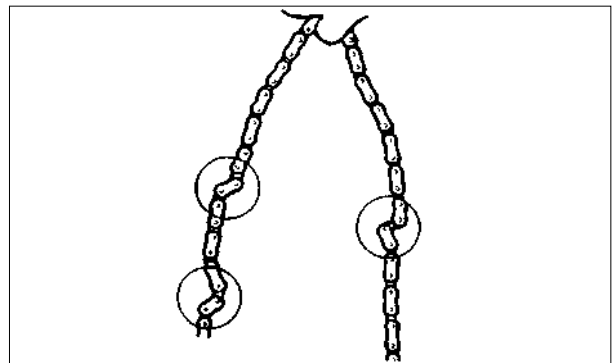
Cam chain guide

Inspect the cam chain slipper surface of the cam chain guide for wear or damage.



Cam chain

Inspect the cam chain for cracks or stiff.



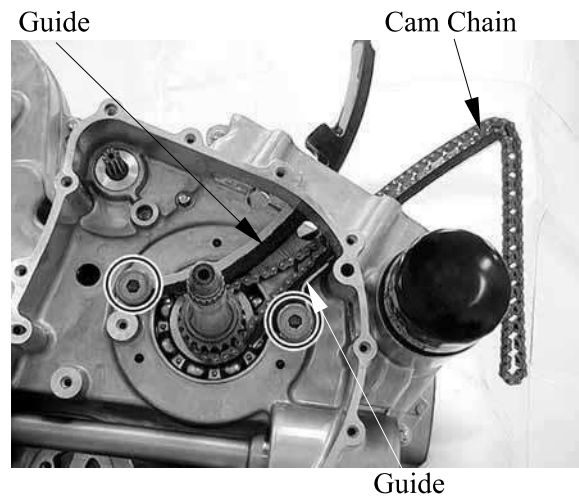
8. CYLINDER HEAD/VALVES

INSTALLATION

Installation is in the reverse order of removal.

Install the cam chain guides to the right crankcase and tighten the bolts to the specified torque.

Torque: 2 kgf-m (20 N-m, 15 lbf-ft)

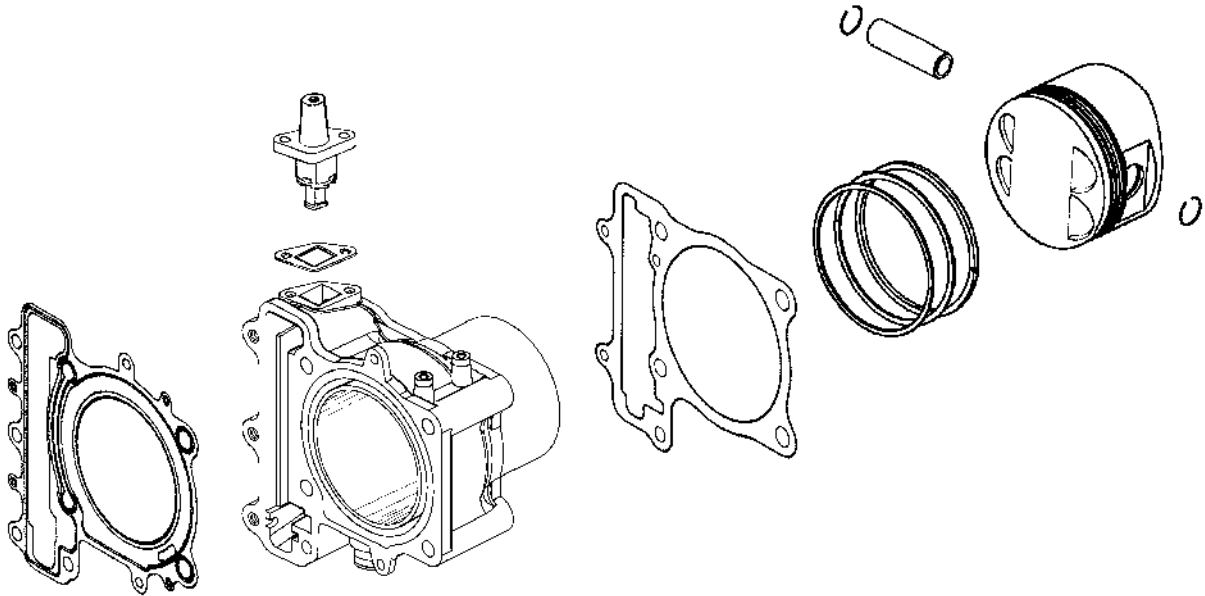


9. CYLINDER/PISTON

CYLINDER/PISTON

SCHEMATIC DRAWING -----	9-1
SERVICE INFORMATION-----	9-2
TROUBLESHOOTING-----	9-2
CYLINDER AND PISTON REMOVAL/INSPECTION/ INSTALLATION -----	9-3

9. CYLINDER/PISTON

SCHEMATIC DRAWING

9. CYLINDER/PISTON

SERVICE INFORMATION

GENERAL INSTRUCTIONS

- The cylinder and piston can be serviced with the engine installed in the frame.
- When installing the cylinder, use a new cylinder gasket and make sure that the dowel pins are correctly installed.
- After disassembly, clean the removed parts and dry them with compressed air before inspection.

SPECIFICATIONS

Unit: mm (in)

Item		Standard	Service Limit	
Cylinder	I.D.	92.005 (3.6802)~92.015 (3.6806)	92.1 (3.684)	
	Warpage	0.01 (0.0004)	0.05 (0.002)	
	Cylindricity	0.01 (0.0004)	0.1 (0.004)	
	True roundness	0.01 (0.0004)	0.1 (0.004)	
Piston, piston ring	Ring-to-groove clearance	top	0.03 (0.0012)~0.065 (0.0026)	0.08 (0.003)
		Second	0.015 (0.0006)~0.05 (0.002)	0.065 (0.0026)
	Ring end gap	top	0.15 (0.006)~0.3 (0.012)	0.5 (0.02)
		Second	0.03 (0.012)~0.45 (0.018)	0.65 (0.026)
		Oil side rail	0.2 (0.008)~0.7 (0.028)	1 (0.04)
	Piston O.D.	91.96 (3.6784)~91.98 (3.6793)	91.9 (3.676)	
	Piston O.D. measuring position	10 mm from bottom of skirt	—	
	Piston-to-cylinder clearance	0.01 (0.0004)~0.045 (0.0018)	0.1 (0.004)	
Piston pin hole I.D.	22.002 (0.8801)~22.008 (0.8803)	22.04 (0.8816)		
Piston pin O.D		21.994 (0.8798)~22 (0.88)	21.96 (0.8784)	
Piston-to-piston pin clearance		0.002 (0.0001)~0.014 (0.0006)	0.02 (0.001)	
Connecting rod small end I.D. bore		22.016 (0.8806)~22.034 (0.8814)	22.06 (0.8824)	

TORQUE VALUES

Cylinder bolt 1 kgf-m (10 N-m, 7.2 lbf-ft)

TROUBLESHOOTING

- When hard starting or poor performance at low speed occurs, check the crankcase breather for white smoke. If white smoke is found, it means that the piston rings are worn, stuck or broken.

Compression too low or uneven compression

- Worn or damaged cylinder and piston rings
- Worn, stuck or broken piston rings

Compression too high

- Excessive carbon build-up in combustion chamber or on piston head

Excessive smoke from exhaust muffler

- Worn or damaged piston rings
- Worn or damaged cylinder and piston

Abnormal noisy piston

- Worn cylinder, piston and piston rings
- Worn piston pin hole and piston pin
- Incorrectly installed piston

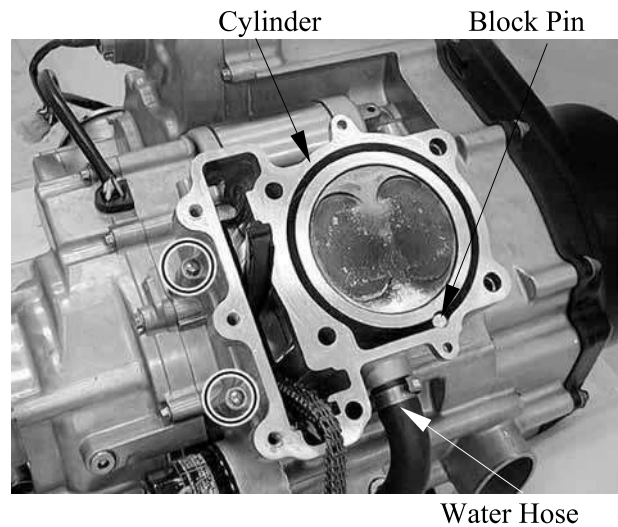
9. CYLINDER/PISTON

CYLINDER AND PISTON REMOVAL/INSPECTION/ INSTALLATION

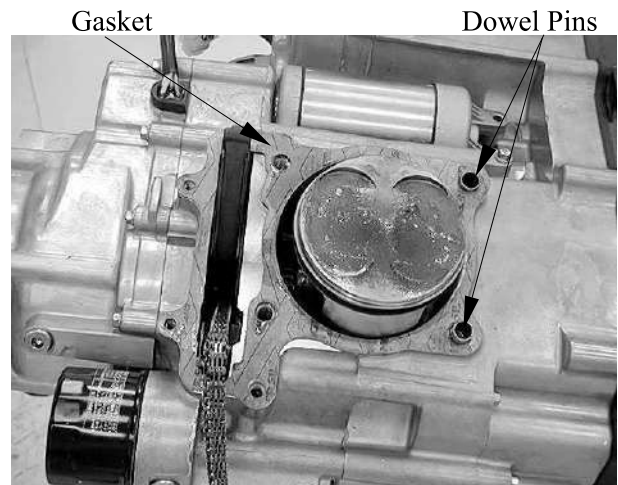
REMOVAL

Remove the cylinder head (refer to “**CYLINDER HEAD REMOVAL/INSTALLATION**” section in the chapter 8).

Take the block pin out.
Remove the water hose from the cylinder.
Remove the two cylinder bolts/washers.
Remove the cylinder.



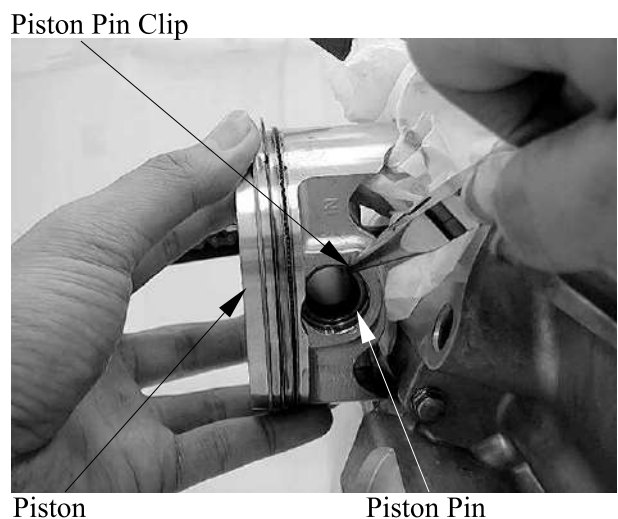
Remove the dowel pins and gasket.



Remove the piston pin clip.

Place a clean shop towel in the crankcase to keep the piston pin clip from falling into the crankcase.

Press the piston pin out of the piston and remove the piston.



9. CYLINDER/PISTON

Spread each piston ring and remove it by lifting up at a point opposite the gap

- * Do not damage the piston ring by spreading the ends too far.

Clean carbon deposits from the piston ring grooves.



INSPECTION

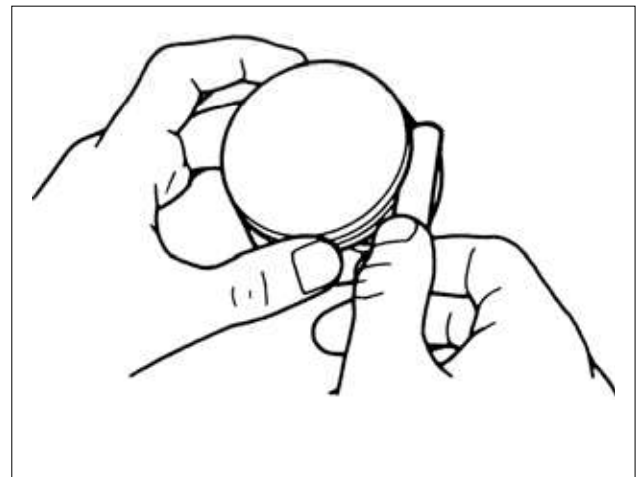
Piston ring

Inspect the piston rings for movement by rotating the rings. The rings should be able to move in their grooves without catching.

Push the ring until the outer surface of the piston ring is nearly flush with the piston and measure the ring-to-groove clearance.

Service Limits:

Top: 0.08 mm (0.003 in)
2nd: 0.065 mm (0.0026 in)



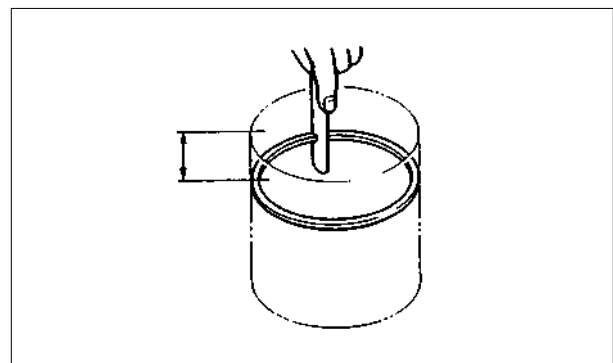
Insert each piston ring into the bottom of the cylinder squarely.

- * Use the piston head to push each piston ring into the cylinder.

Measure the piston ring end gap.

Service Limit:

Top: 0.5 mm (0.02 in)
2nd: 0.65 mm (0.026 in)
Oil ring: 1 mm (0.04 in)



9. CYLINDER/PISTON

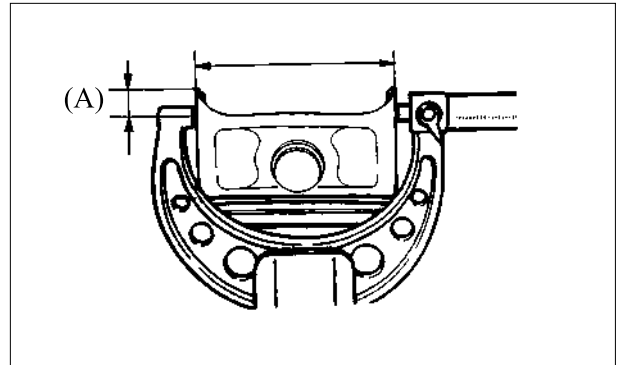
Piston/Piston pin

Measure the piston O.D. at the point (A) from the bottom and 90° to the piston pin hole.

Service Limit:

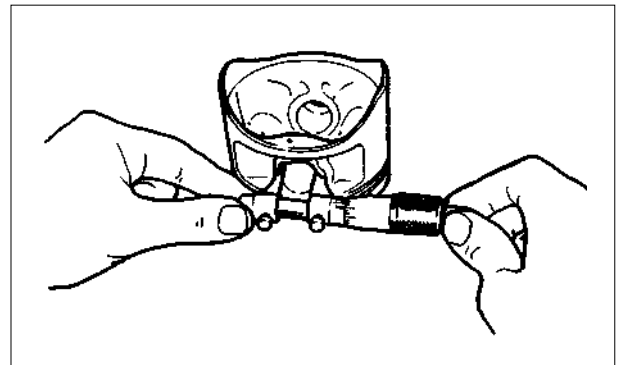
91.9 mm (3.676 in) at (A): 10 mm

Calculate the cylinder-to-piston clearance.



Measure the piston pin hole. Take the maximum reading to determine the I.D..

Service Limit: 22.04 mm (0.8816 in)

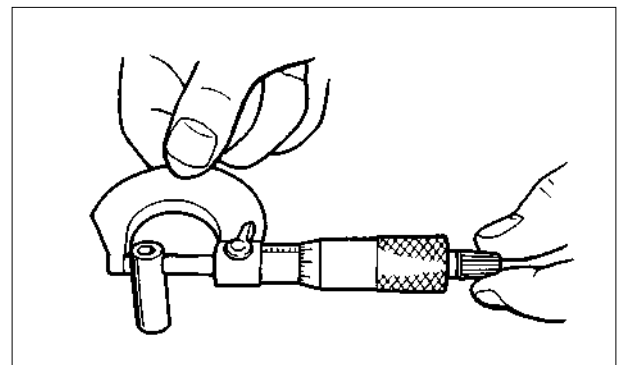


Measure the piston pin O.D. at piston and connecting rod sliding areas.

Service Limit: 21.96 mm (0.8784 in)

Measure the piston-to-piston pin clearance.

Service Limit: 0.02 mm (0.001 in)



9. CYLINDER/PISTON

Cylinder

Check the cylinder for warpage with a straight edge and feeler gauge in the directions shown.

Service Limit: 0.05 mm (0.002 in)



Check the cylinder wall for wear or damage. Measure and record the cylinder I.D. at three levels in an X and Y axis. Take the maximum reading to determine the cylinder wear.

Service Limit: 92.1 mm (3.684 in)

Calculate the piston-to-cylinder clearance. Take a maximum reading to determine the clearance.

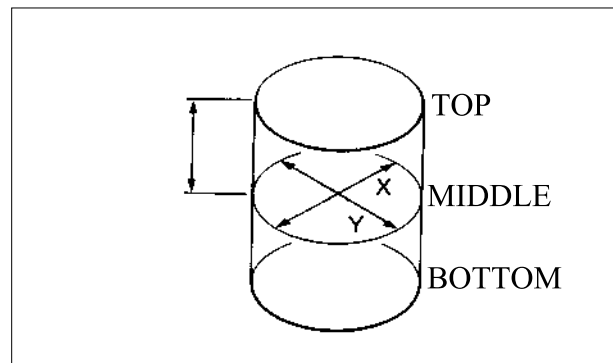
Service Limit: 0.1 mm (0.004 in)

Calculate the taper and out-of-round at three levels in an X and Y axis. Take the maximum reading to determine them.

Service Limit:

Taper: 0.1 mm (0.004 in)

Out-of-round: 0.1 mm (0.004 in)



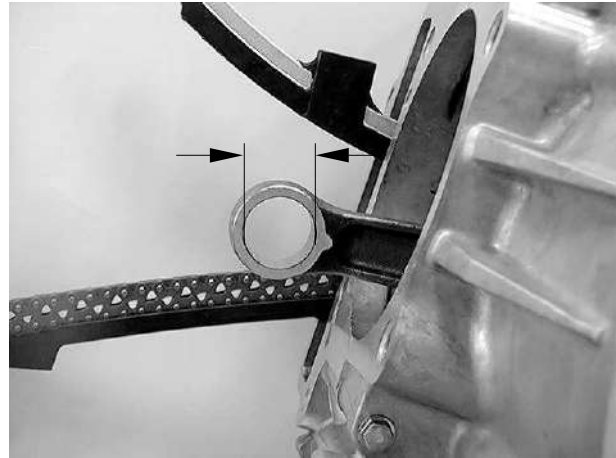
9. CYLINDER/PISTON

Measure the connecting rod small end I.D..

Service Limit: 22.06 mm (0.8824 in)

Calculate the connecting rod-to-piston pin clearance.

Service Limit: 0.06 mm (0.002 in)



INSTALLATION

Piston ring

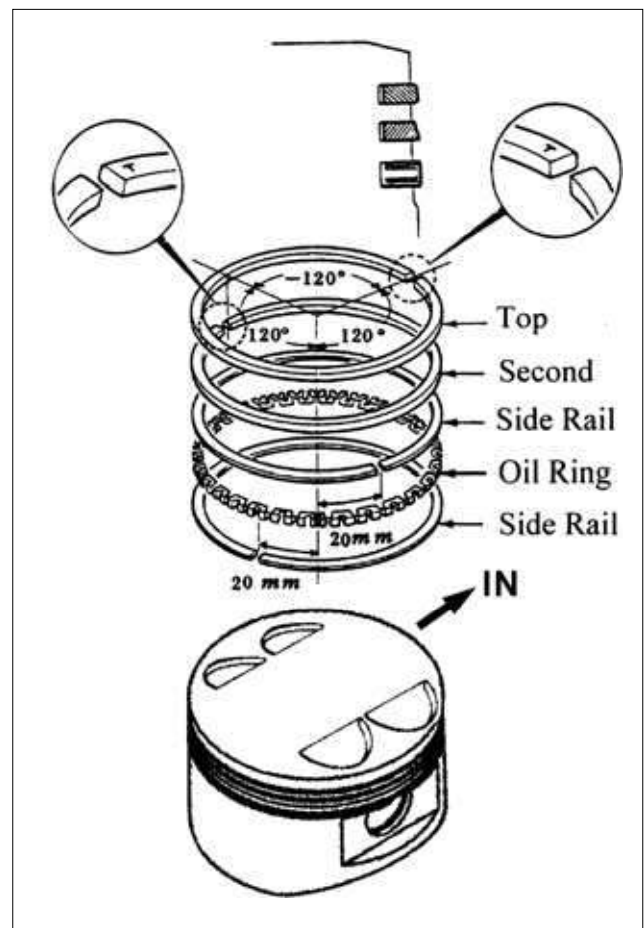
Carefully install the piston rings into the piston ring grooves with the markings facing up.

* Be careful not to damage the piston and rings.

- ♦ Do not confuse the top and second rings.
- ♦ To install the oil ring, install the oil ring, then install the side rails.

Stagger the piston ring end gaps 120° degrees apart from each other.

Stagger the side rail end gaps as shown.



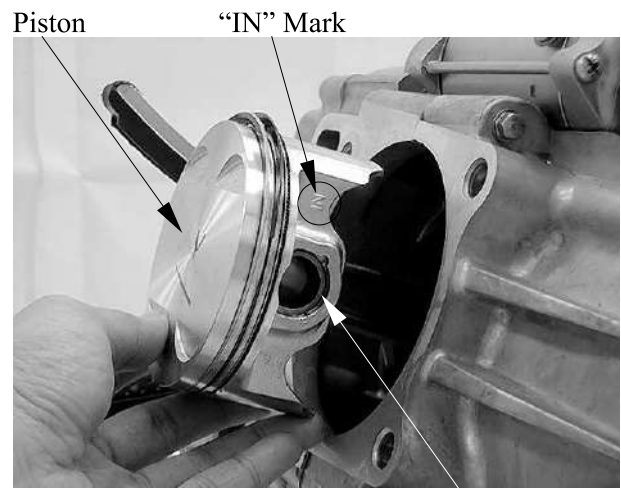
9. CYLINDER/PISTON

Cylinder/Piston

Clean any gasket material from the cylinder mating surfaces of the crankcase and oil passage.

Apply engine oil to the piston pin.
Apply engine oil to the connecting rod small end and piston pin hole.

Install the piston with the “IN” mark face intake side and piston pin.

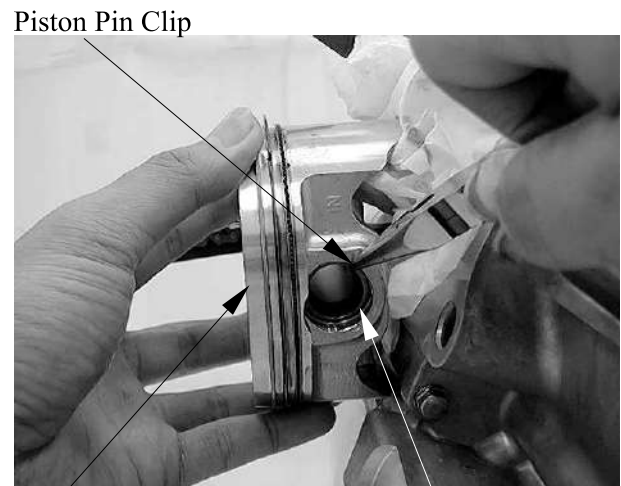


Piston Pin

Place a clean shop towel over the crankcase prevent the clip from falling into the crankcase.

Install the new pin clip.

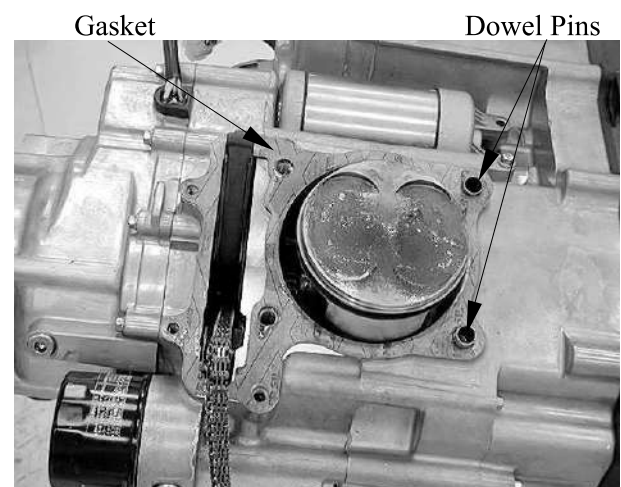
- * ♦ Make sure that the piston pin clips are seated securely.
- ♦ Do not align the piston pin clip end gap with the piston cut-out



Piston

Piston Pin

Install the dowel pins and gasket.



9. CYLINDER/PISTON

Apply engine oil to the cylinder wall, piston and piston ring outer surfaces.

Pass the cam chain through the cylinder and install the cylinder over the piston.

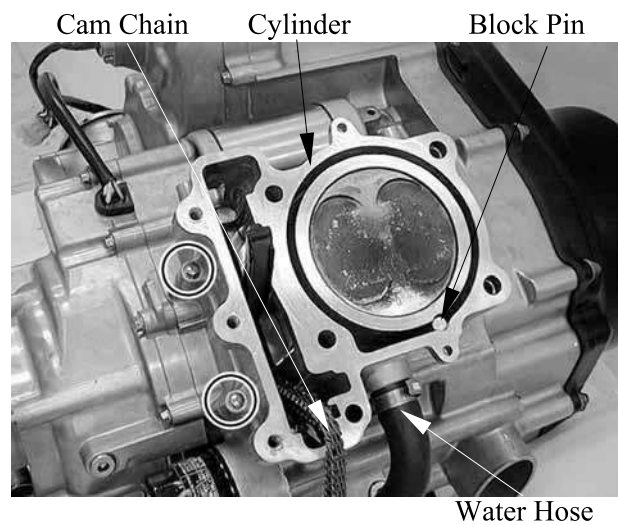
* Be careful not to damage the piston rings and cylinder walls.

Install the two cylinder bolts/washers and after the cylinder head and holders has installed (refer to the “**CYLINDER HEAD REMOVAL/INSTALLATION**” section in the chapter 8), then tighten the two cylinder bolts to specified torque.

Torque: 10 N•m (1 kgf•m, 7 lbf•ft)

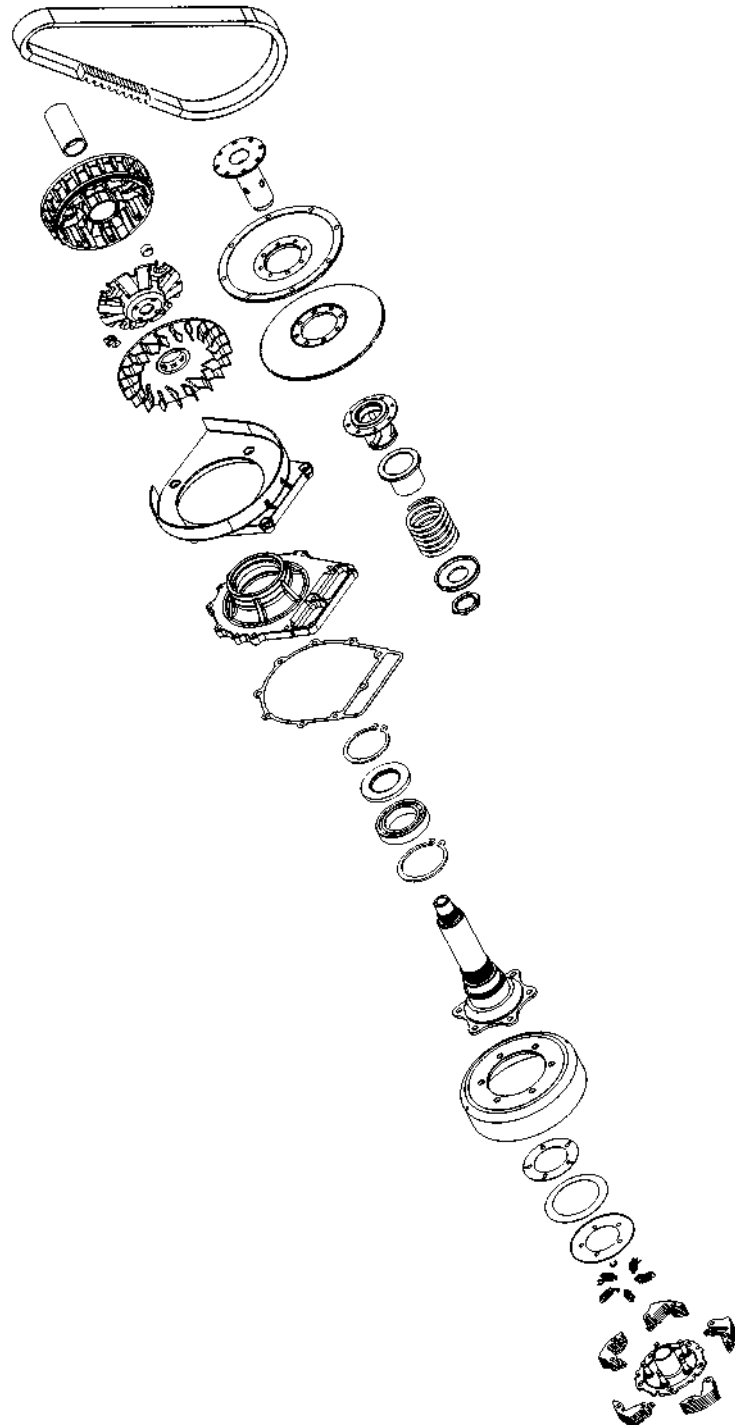
Install the block pin.

Connect the water hose.



10. DRIVE PULLEY/DRIVEN PULLEY/CLUTCH

10. DRIVE PULLEY/DRIVEN PULLEY/CLUTCH



10. DRIVE PULLEY/DRIVEN PULLEY/CLUTCH

m	Standard	Service Limit
Drive belt width	34.1 (1.364)	30.8 (1.232)
Clutch shoe thickness	1.5 (0.06)	1 (0.04)
Driven pulley spring	124.3 (4.972)	121.3 (4.852)
Weight roller O.D.	29.9 (1.196)~30.1 (1.204)	29.5 (1.18)

TORQUE VALUES

Drive pulley nut	14 kgf-m (140 N-m, 100.8 lbf-ft)	Apply oil to the threads
Clutch nut	14 kgf-m (140 N-m, 100.8 lbf-ft)	
Driven pulley nut	10 kgf-m (100 N-m, 72 lbf-ft)	Apply oil to the threads
Driven pulley assembly plate nut	7.5 kgf-m (75 N-m, 54 lbf-ft)	

SPECIAL TOOLS

Oil seal & bearing install	A120E00014
Bearing puller	A120E00037
Y-type holder	A120E00056
Drive pulley holder	A120E00058
Driven pulley spring compressor	A120E00059
Lock nut wrench	A120E00067

TROUBLESHOOTING

Engine starts but ATV won't move

- Worn drive belt
- Broken ramp plate
- Worn or damaged clutch lining
- Broken driven face spring

Engine stalls or ATV creeps

- Broken clutch weight spring

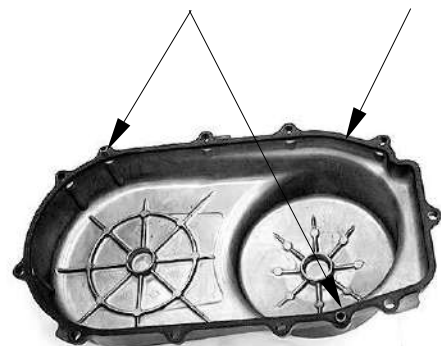
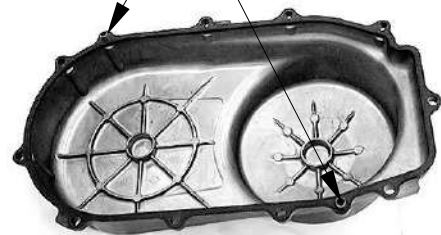
Lack of power

- Worn drive belt
- Weak driven face spring
- Worn weight roller
- Faulty driven face

10. DRIVE PULLEY/DRIVEN PULLEY/CLUTCH



Dowel Pins

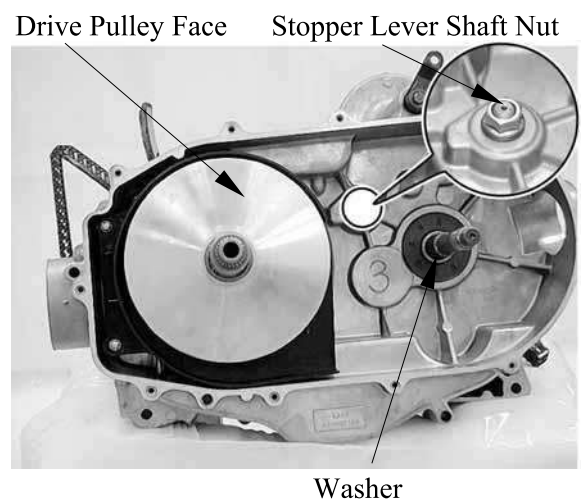
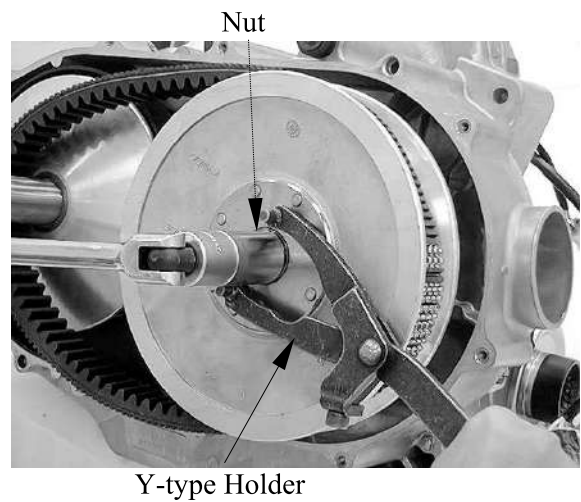
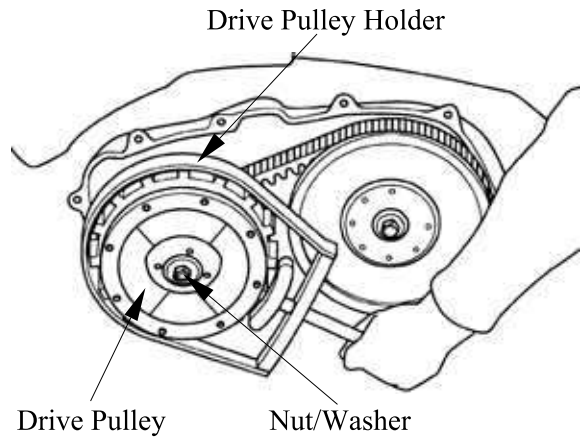


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10. DRIVE PULLEY/DRIVEN PULLEY/CLUTCH

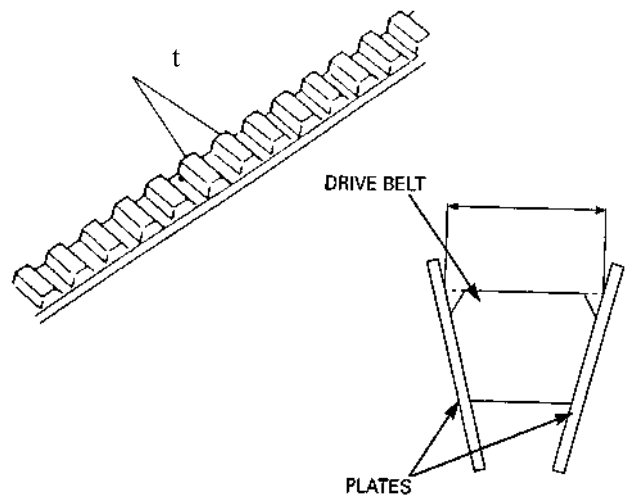
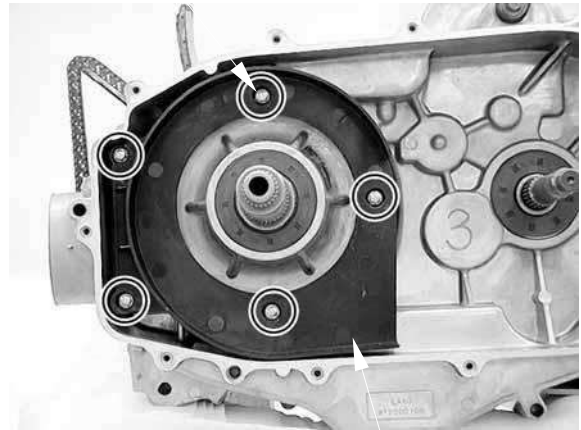


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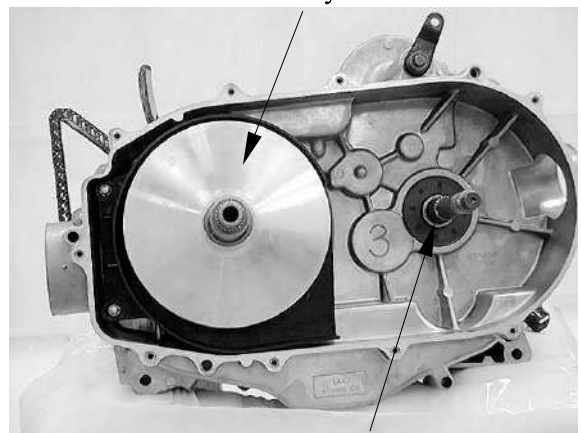


* Do not loosen the stopper lever shaft nut, it may cause stopper lever bolt loosen. To tighten the stopper lever bolt must remove the crankcase (refer to the “TRANSMISSION REMOVAL/INSPECTION/INSTALLATION” section in the chapter 11).

10. DRIVE PULLEY/DRIVEN PULLEY/CLUTCH



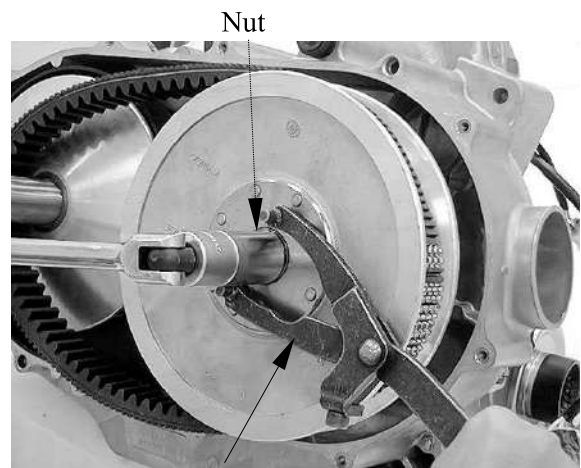
Drive Pulley Face



r

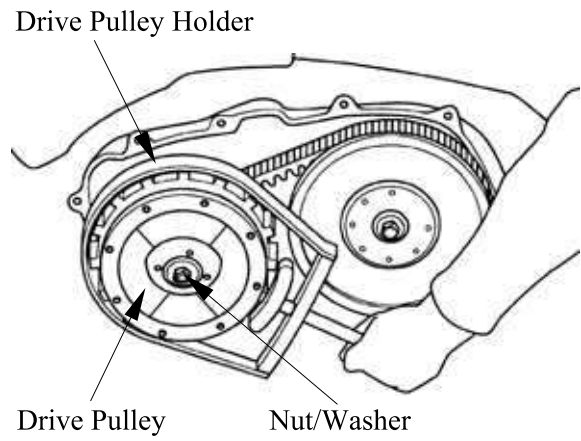
10. DRIVE PULLEY/DRIVEN PULLEY/CLUTCH

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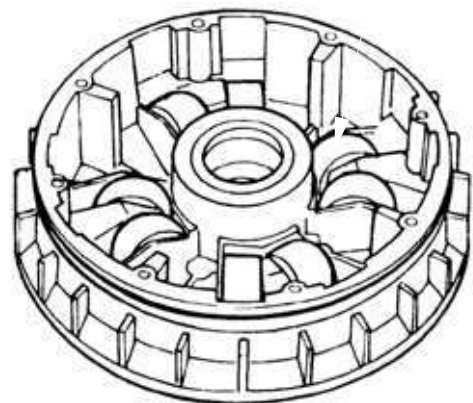
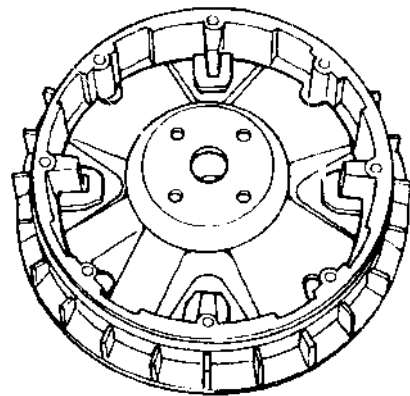


10. DRIVE PULLEY/DRIVEN PULLEY/CLUTCH

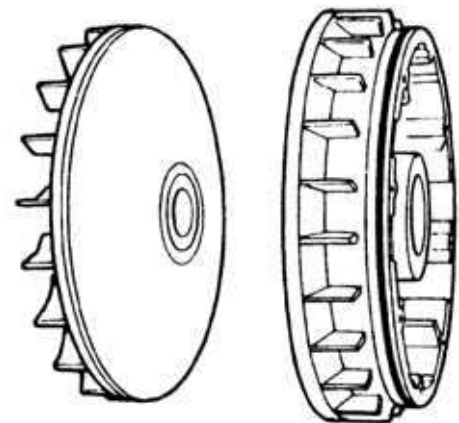
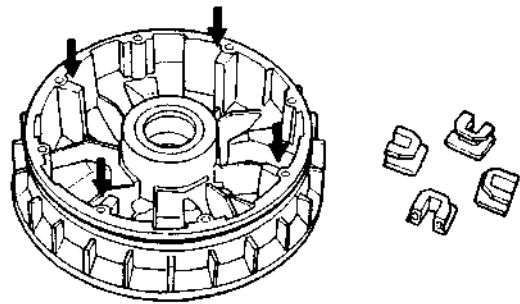
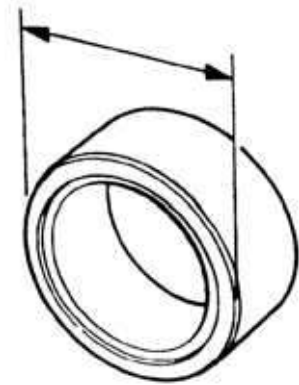
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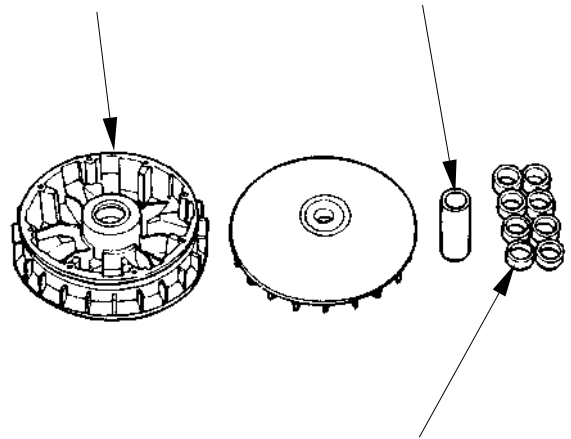
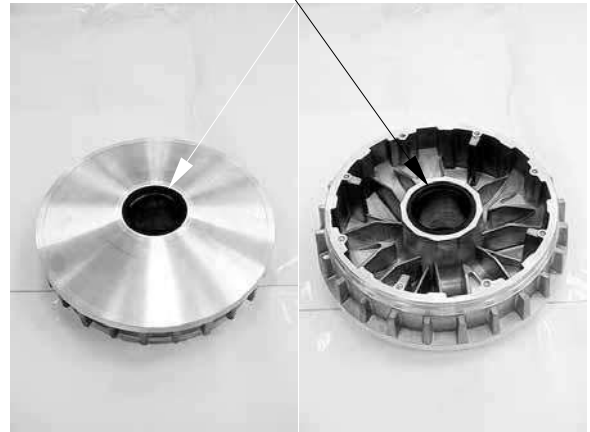
10. DRIVE PULLEY/DRIVEN PULLEY/CLUTCH



10. DRIVE PULLEY/DRIVEN PULLEY/CLUTCH

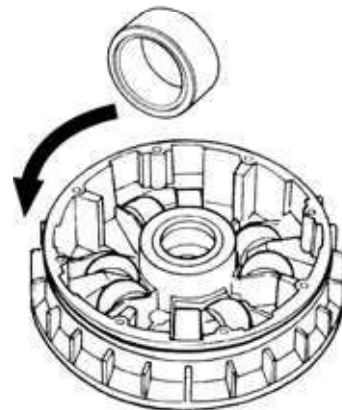


10. DRIVE PULLEY/DRIVEN PULLEY/CLUTCH

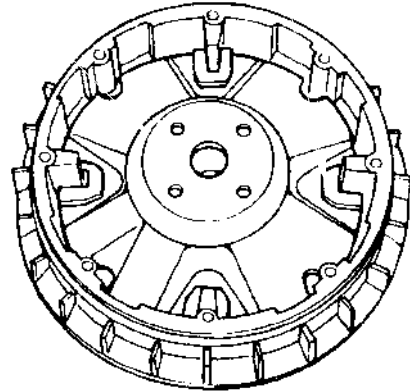


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* The direction of all weight rollers is the same. The thin side is towards to counterclockwise.



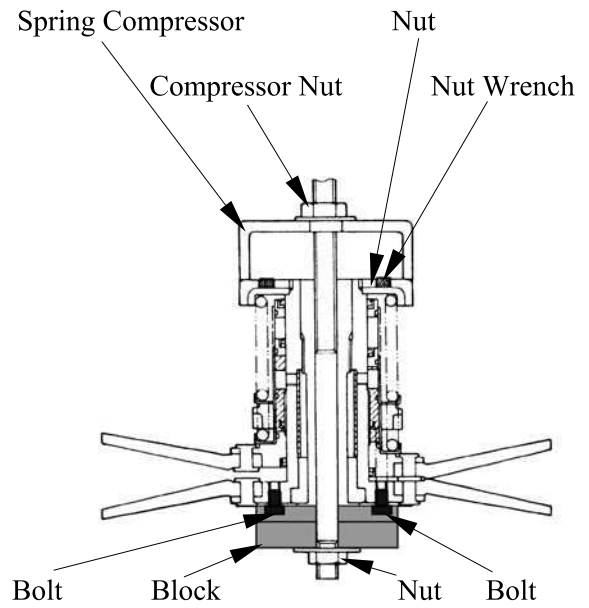
10. DRIVE PULLEY/DRIVEN PULLEY/CLUTCH



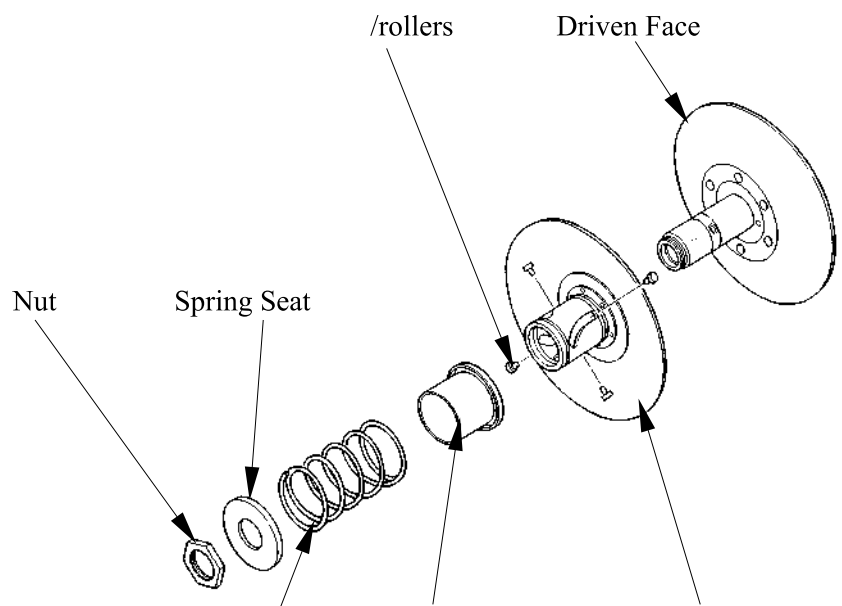
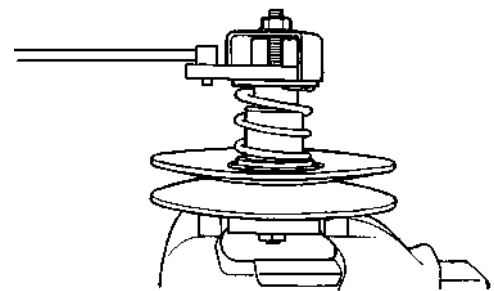
Drive Face Boss



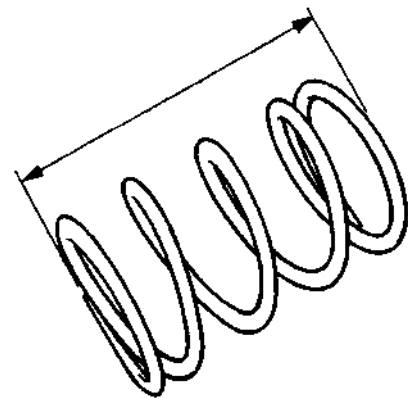
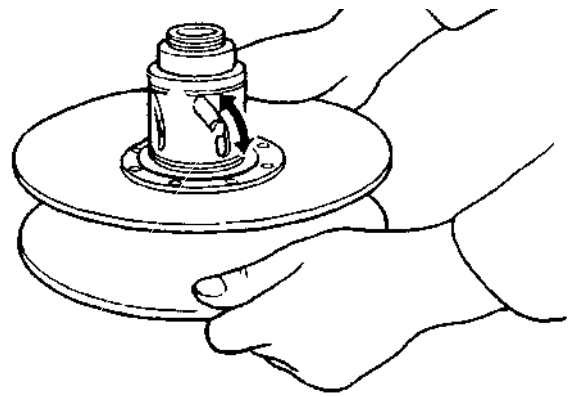
10. DRIVE PULLEY/DRIVEN PULLEY/CLUTCH



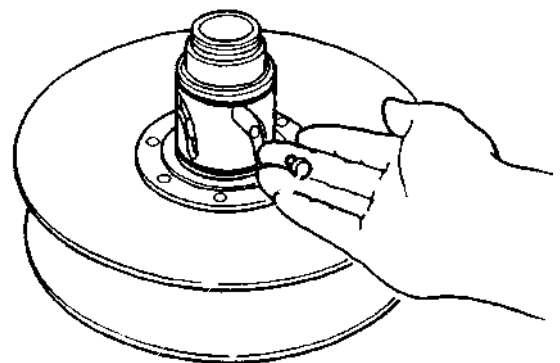
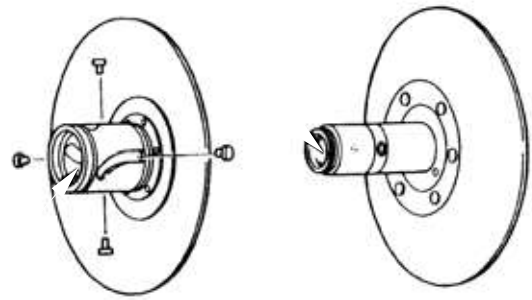
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10. DRIVE PULLEY/DRIVEN PULLEY/CLUTCH

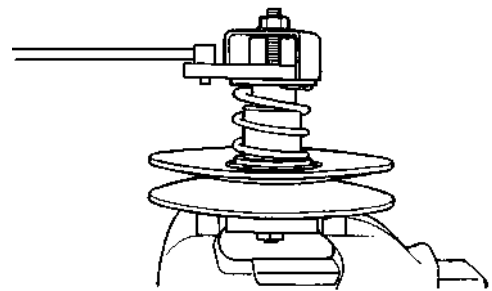
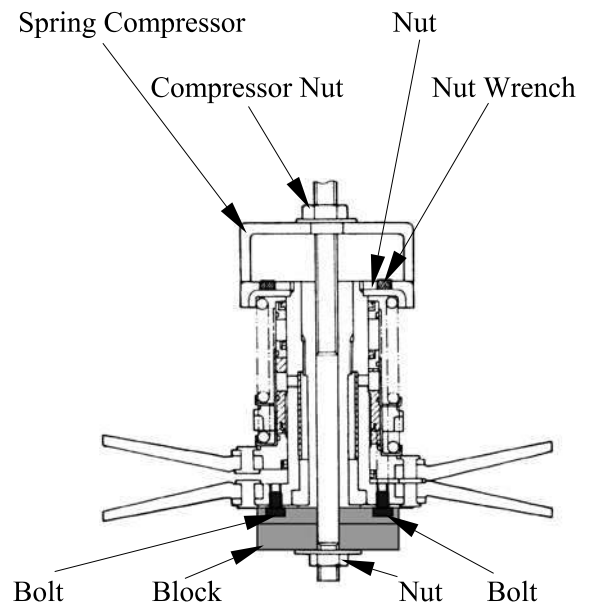


10. DRIVE PULLEY/DRIVEN PULLEY/CLUTCH



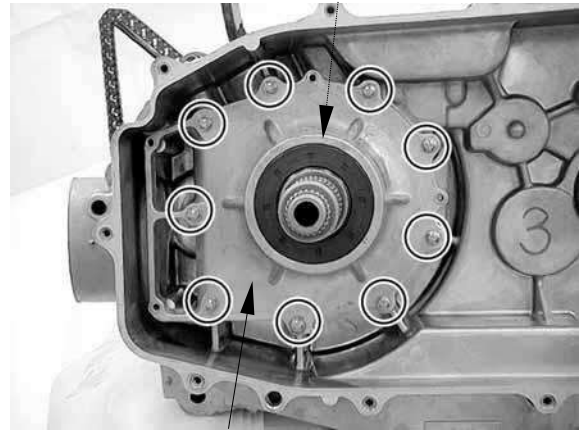
10. DRIVE PULLEY/DRIVEN PULLEY/CLUTCH

- * d
- spring compressor to the driven pulley assembly.
- Place the block in a vise and secure it.
 - Tighten the spring compressor nut and compress the spring.
 - Install the nut and tighten it to the specified torque with the nut wrench.
 - Remove the spring compressor and nut wrench.



10. DRIVE PULLEY/DRIVEN PULLEY/CLUTCH

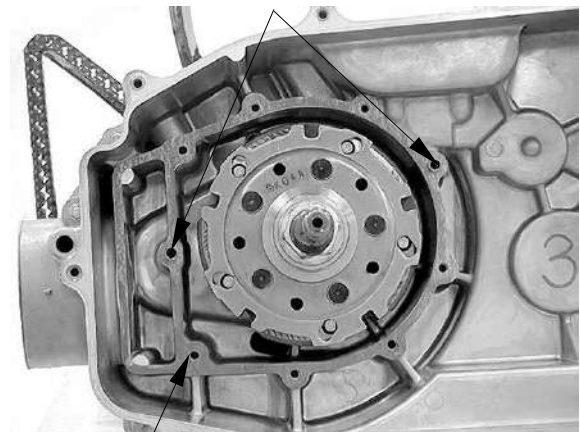
One-way Clutch Bearing



Clutch Housing Assembly

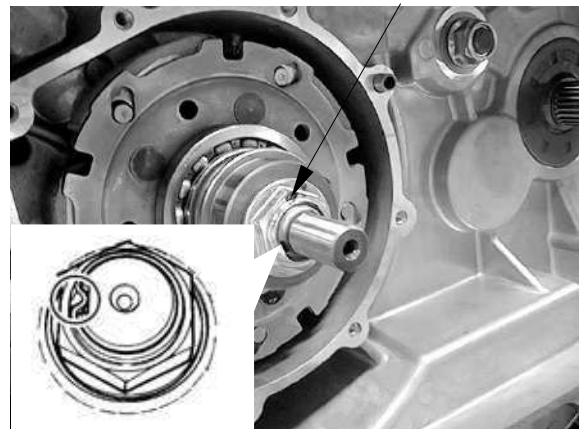
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Dowel Pins

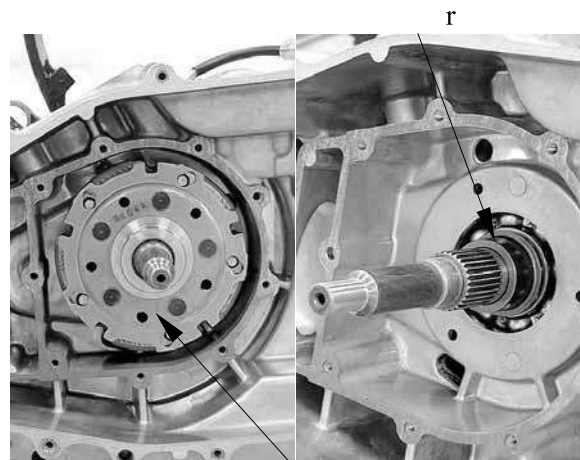
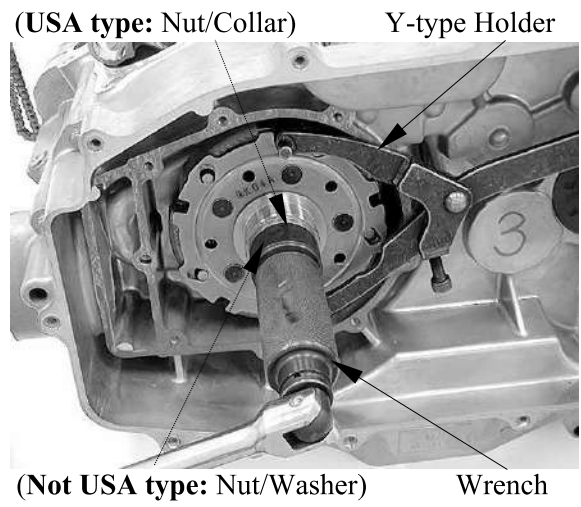


Gasket

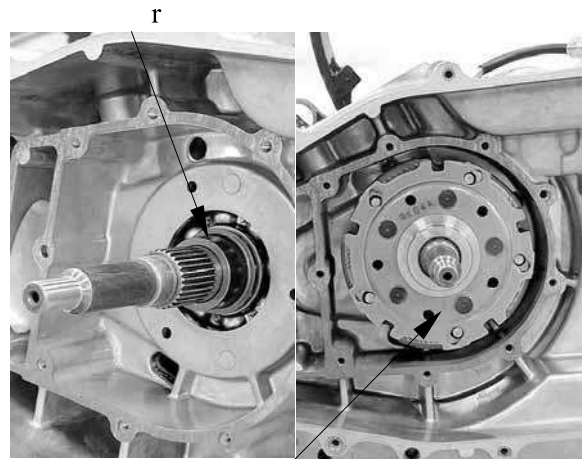
Nut



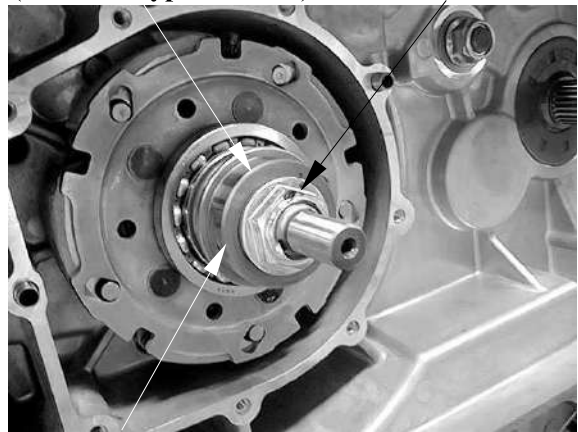
10. DRIVE PULLEY/DRIVEN PULLEY/CLUTCH



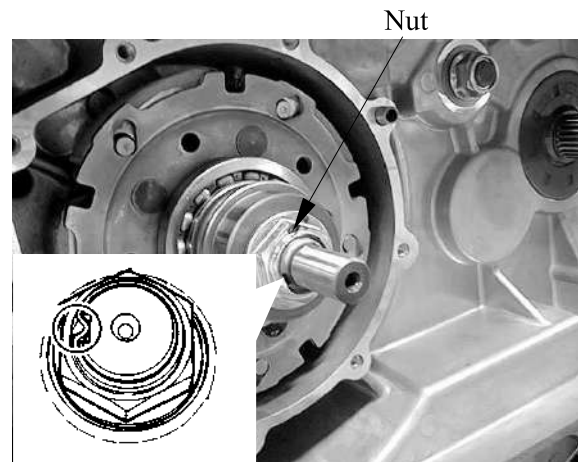
10. DRIVE PULLEY/DRIVEN PULLEY/CLUTCH



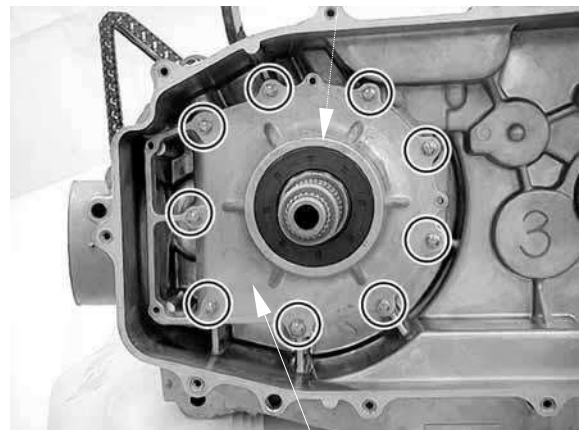
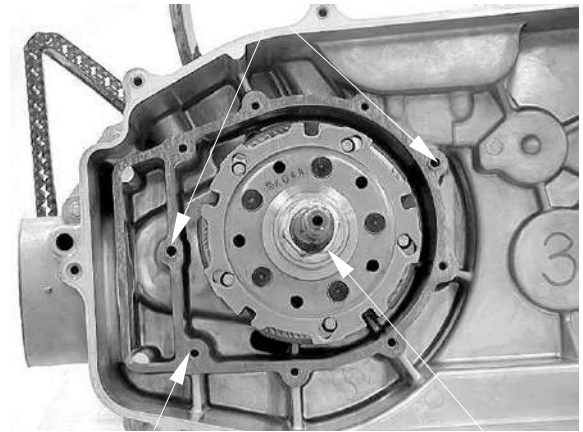
(Not USA type: Washer)



(USA type: Collar)



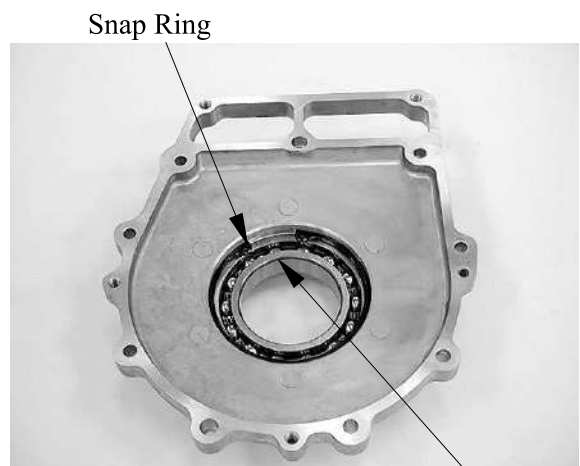
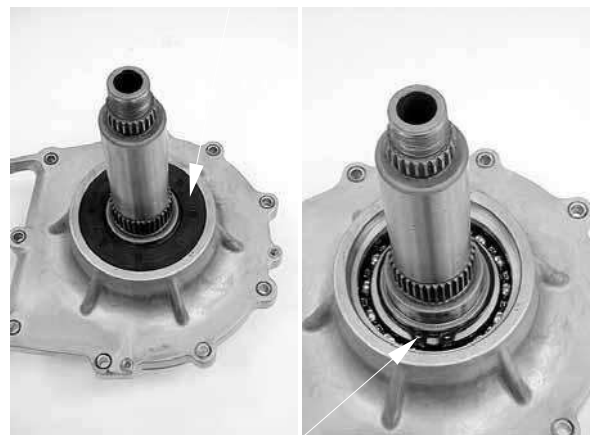
10. DRIVE PULLEY/DRIVEN PULLEY/CLUTCH



10. DRIVE PULLEY/DRIVEN PULLEY/CLUTCH



One-way Clutch Bearing



Snap Ring

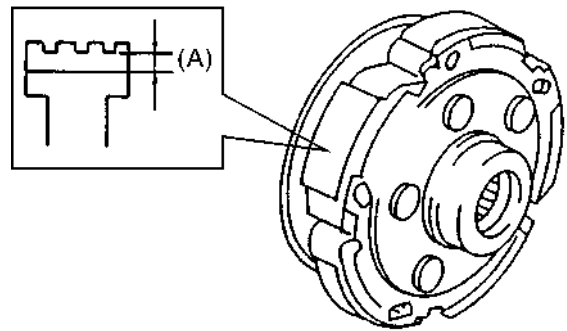
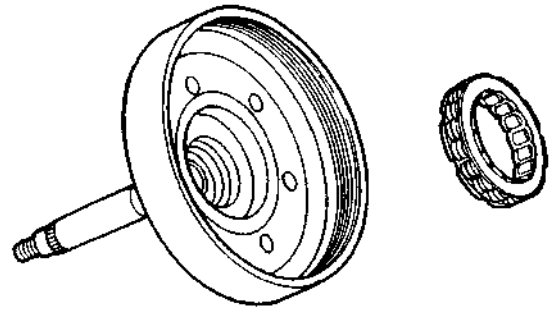
Bearing

10. DRIVE PULLEY/DRIVEN PULLEY/CLUTCH

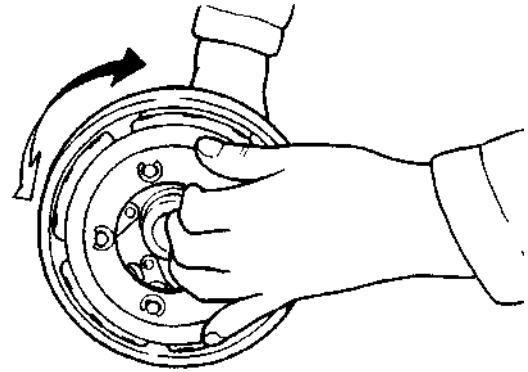


10. DRIVE PULLEY/DRIVEN PULLEY/CLUTCH

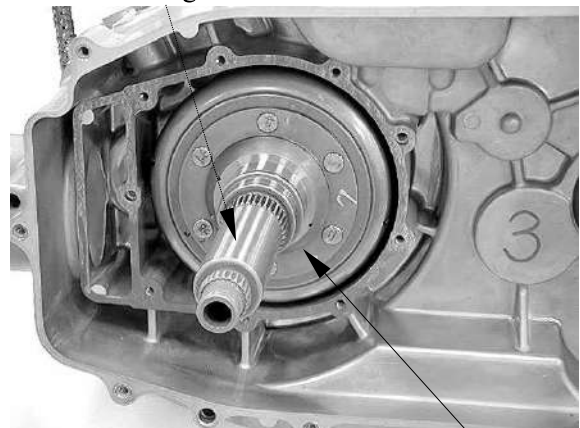
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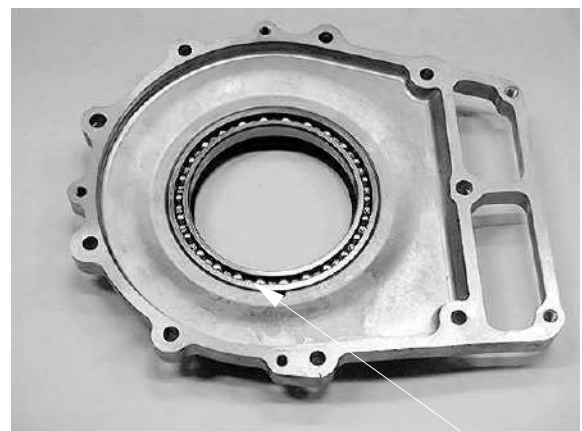
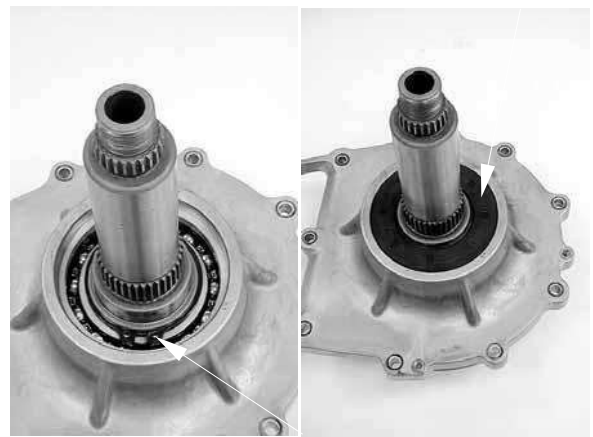
10. DRIVE PULLEY/DRIVEN PULLEY/CLUTCH



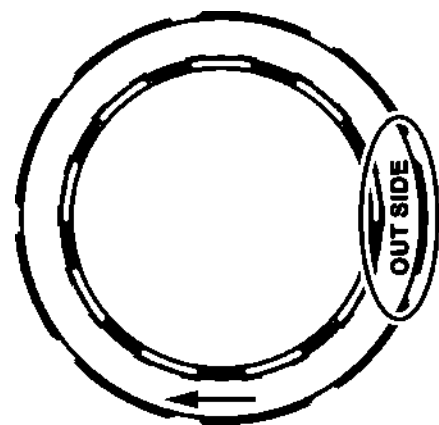
Needle Bearing



10. DRIVE PULLEY/DRIVEN PULLEY/CLUTCH



10. DRIVE PULLEY/DRIVEN PULLEY/CLUTCH

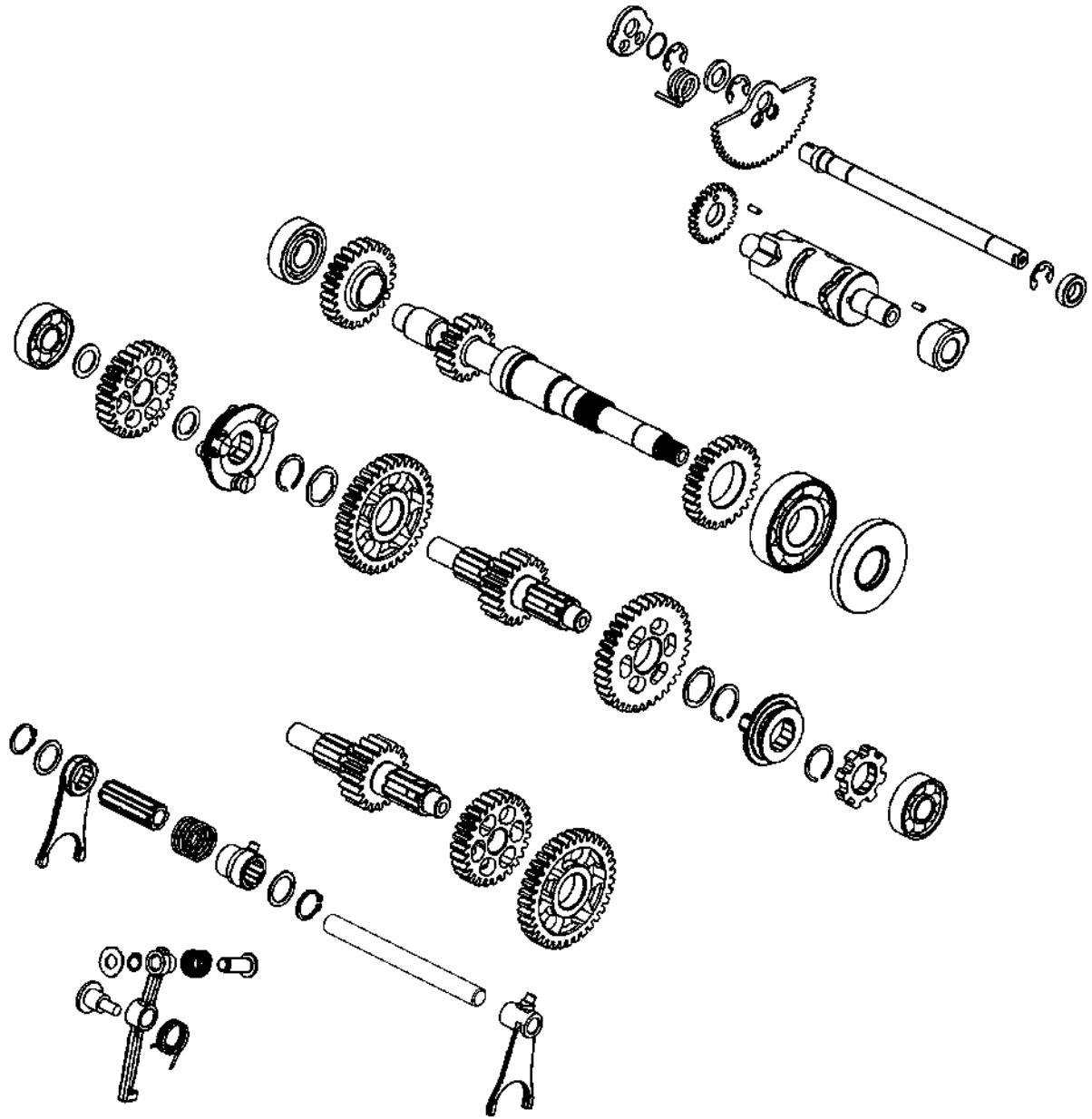


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FINAL REDUCTION/TRANSMISSION SYSTEM

SERVICE INFORMATION-----	11- 2
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11.FINAL REDUCTION/ TRANSMISSION SYSTEM



SERVICE INFORMATION

GENERAL INSTRUCTIONS

- The bevel gear and output shaft can be serviced with the engine installed in the frame.

SPECIAL TOOL

Y-type holder	A120E00056
Bearing puller	A120E00037
Bearing drive	A120E00014
Nut wrench	A120E00066

TORQUE VALUES

Crankcase bolt	1.2 kgf-m (12 N-m, 8.6 lbf-ft)	Apply engine oil
Drive bevel gear nut	14 kgf-m (140 N-m, 100.8 lbf-ft)	Apply engine oil
Driven bevel gear nut	14 kgf-m (140 N-m, 100.8 lbf-ft)	Apply engine oil
Stopper lever boss nut	3 kgf-m (30 N-m, 21.6 lbf-ft)	
Stopper lever bolt	2.5 kgf-m (25 N-m, 18 lbf-ft)	
Shift cam stopper plug	4.8 kgf-m (48 N-m, 35 lbf-ft)	
Output shaft bearing nut	11 kgf-m (110 N-m, 79.2 lbf-ft)	Apply engine oil

TROUBLESHOOTING

Engine starts but motorcycle won't move

- Damaged transmission
- Seized or burnt transmission

Oil leaks

- Oil too rich
- Worn or damaged oil seal

SECONDARY DRIVE/DRIVEN BEVEL GEAR REMOVAL/INSPECTION/INSTAL LATION

REMOVAL

Drain engine oil into a clean container. (Refer to the “ENGINE OIL” section in the chapter 3).

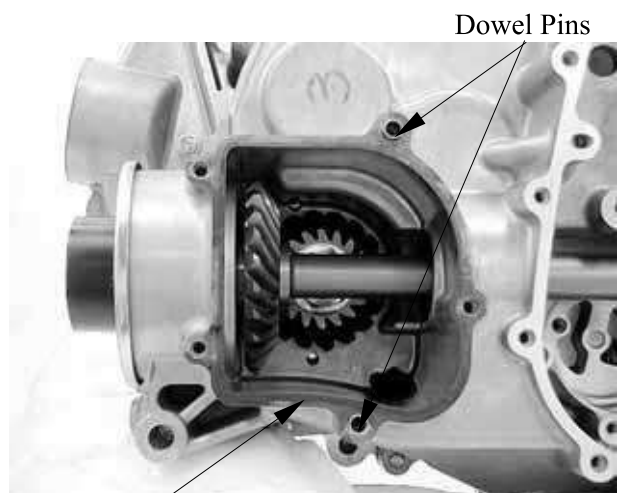
Move the engine assembly forward (refer to the “ENGINE REMOVAL” section in the chapter 6) or remove the rear propeller (refer to the “REAR PROPELLER SHAFT DISASSEMBLY/INSPECTION/ASSEMBLY” section in the chapter 13).

Remove the five bolts, then remove the bevel gear case cover.

Remove the two dowel pins and gasket.



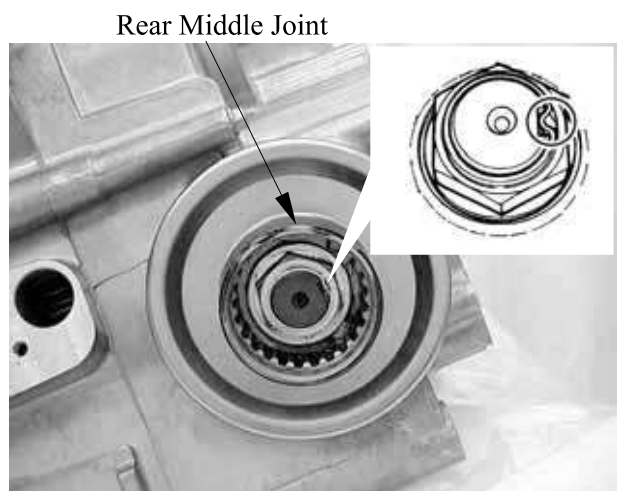
Bevel Gear Case Cover



Gasket

Dowel Pins

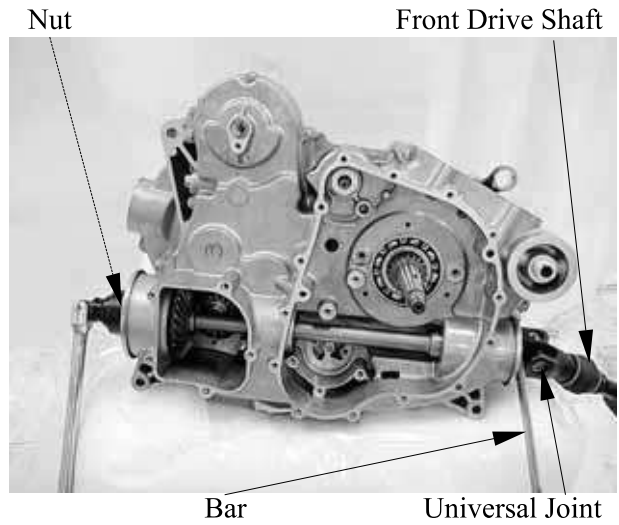
Using a chisel, unlock the nut in the rear middle joint.



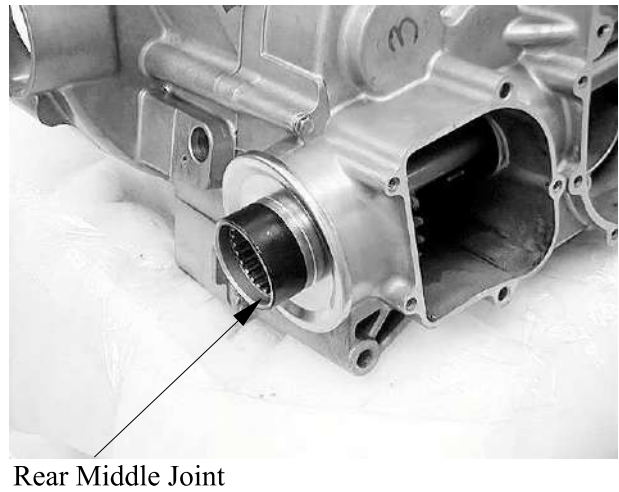
Rear Middle Joint

11.FINAL REDUCTION/ TRANSMISSION SYSTEM

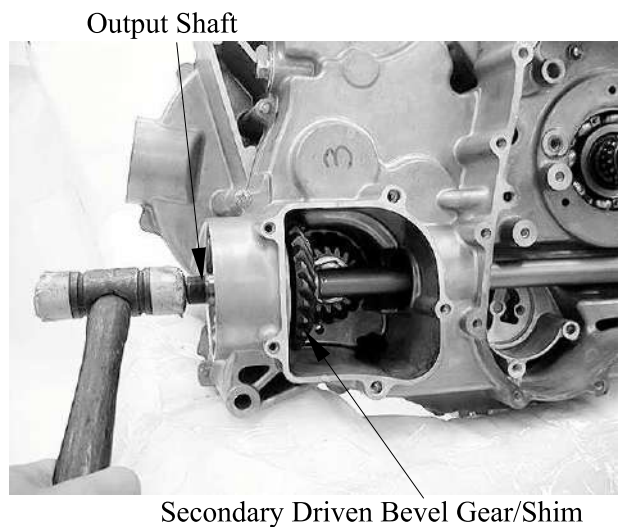
Install the front drive shaft.
Hold universal joint nut by using a suitable bar, then remove the rear propeller shaft nut.



Remove the rear middle joint.



Tap the output shaft by using a rubber hammer, then remove the output shaft, secondary driven bevel gear and shim.



11.FINAL REDUCTION/ TRANSMISSION SYSTEM

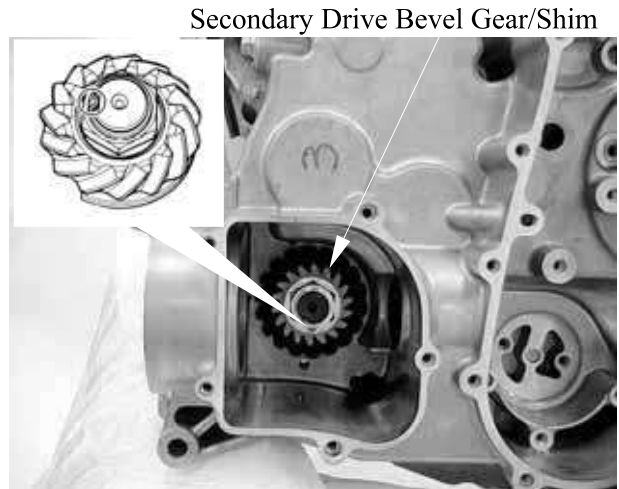
Using a chisel, unlock the nut.

Hold the driven pulley by using the special tool (refer to the “DRIVE PULLEY, DRIVE V-BELT AND DRIVEN PULLEY REMOVAL/INSPECTION/INSTALLATION” section in the chapter 10), then remove the nut.

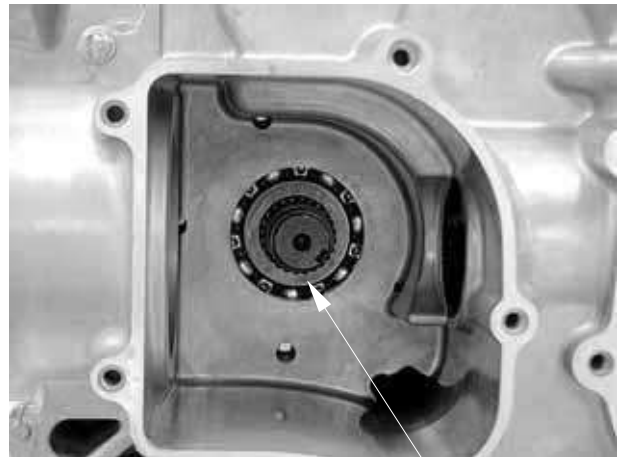
Special tool:

Y-type holder A120E00056

Remove the secondary drive bevel gear.



Remove the shim.



INSPECTION

Check the drive/driven bevel gear teeth for pitting, galling and wear.



11.FINAL REDUCTION/ TRANSMISSION SYSTEM

Inspect the rear middle joint splines for wear or damage.



Inspect the output shaft splines for wear or damage.



INSTALLATION

Install the shim and secondary drive bevel gear.

Holder the driven pulley by using the special tool, then install and tighten the nut to the specified torque.

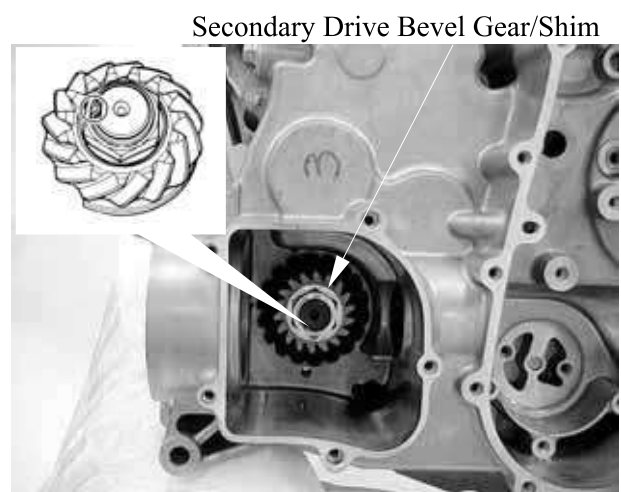
Torque:

14 kgf-m (140 N-m, 100.8 lbf-ft) Apply oil

Special tool:

Y-type holder A120E00056

Stake the nut with a center punch.



11.FINAL REDUCTION/ TRANSMISSION SYSTEM

Install the output shaft, secondary driven bevel gear and shim

Install the rear middle joint.

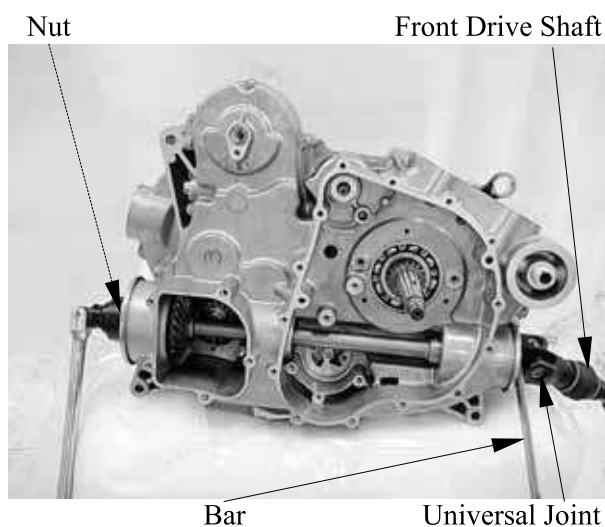
Install the front drive shaft.

Hold universal joint nut by using a suitable bar, then install and tighten the rear middle joint nut to the specified torque.

Torque:

14 kgf-m (140 N-m, 100.8 lbf-ft) Apply oil

Remove the front drive shaft.

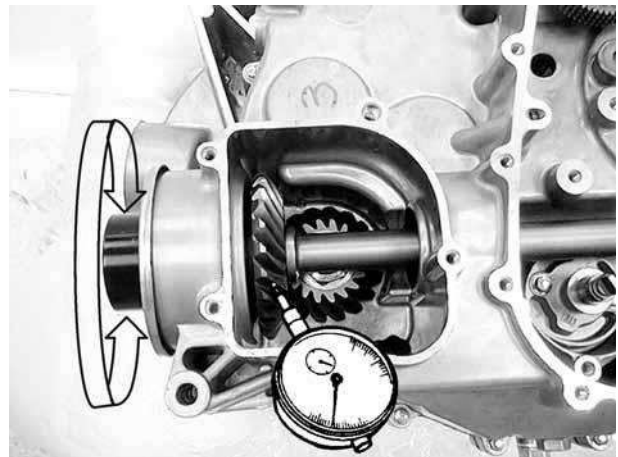


11.FINAL REDUCTION/ TRANSMISSION SYSTEM

SECONDARY GEAR SHIMS ADJUSTMENT

Set a dial gauge on the driven bevel gear as shown.

Measure the backlash by turning the rear propeller shaft in each direction, reading the total backlash on the dial gauge. If the backlash is not within specification, the shim must be changed and the backlash should be rechecked until correct. Refer to the chart for appropriate shim thickness.



Bevel gear backlash

Standard: 0.03 - 0.15 mm (0.001 – 0.006 in)

Adjust the backlash by referring to the chart at the right and using the thickness of the removed shims as a guide.

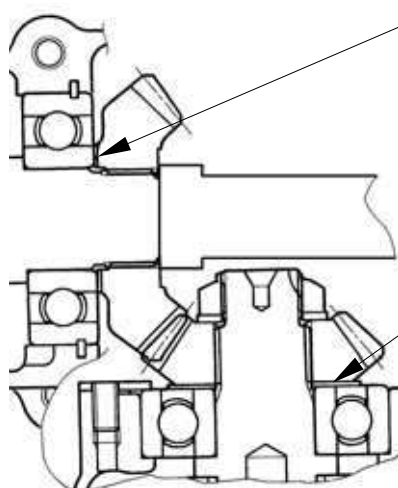
Backlash	Shim adjustment
Under 0.03 mm (0.001 in)	Decrease shim thickness
0.03 – 0.15 mm (0.001 – 0.006 in)	Correct
Over 0.15 mm (0.006 in)	Increase shim thickness

Drive/Driven bevel gear shims:

- A: 0.6 mm (0.024 in)**
- B: 0.65 mm (0.026 in)**
- C: 0.7 mm (0.028 in)**
- D: 0.75 mm (0.03 in)**
- E: 0.8 mm (0.032 in)**
- F: 0.85 mm (0.034 in)**
- G: 0.9 mm (0.036 in)**
- H: 0.95 mm (0.038 in)**
- I: 1 mm (0.04 in)**
- J: 1.05 mm (0.042 in)**
- K: 1.1 mm (0.044 in)**
- L: 1.15 mm (0.046 in)**

Secondary Driven Bevel Gear Shim

Secondary Drive Bevel Gear Shim



TOOTH CONTACT

After backlash adjustment is carried out, the tooth contact must be checked. Pay attention to the following procedures:

- Remove the driven bevel gear.
- Clean and degrease several teeth of the drive and driven bevel gears.
Apply a coating of machinist's layout dye or paste to several teeth of the driven bevel gear.
- Install the driven bevel gear.
- Rotate the rear propeller shaft several turns in both directions.
- Remove the driven bevel gear and inspect the coated teeth of the drive bevel gear. The tooth contact pattern should be as shown in (1), (2) and (3).
- If tooth contact is found to be correct (example (2)), then to complete installation.

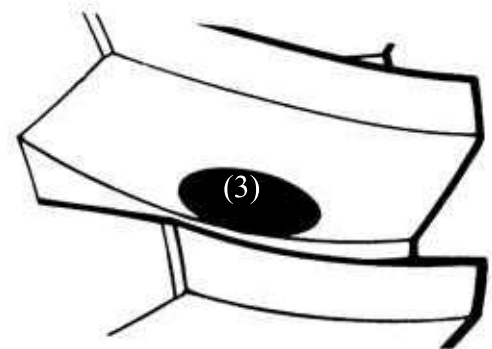
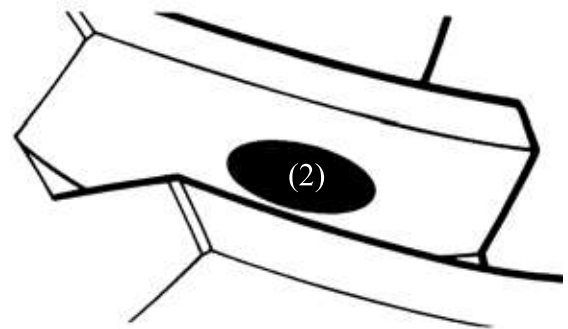
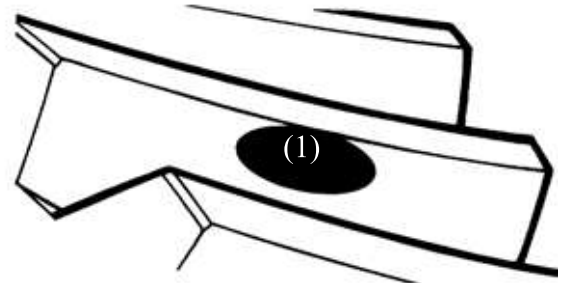
(1): Incorrect (contact at tooth top)

(2): Correct

(3): Incorrect (contact at tooth root)

- If tooth contact is found to be incorrect (examples (1) and (3)), the shim thickness between the drive bevel gear and driven bevel gear must be changed and the tooth contact rechecked until correct.

Make sure to check the backlash after the tooth contact has been adjusted, since it may have changed. Adjust the tooth contact and backlash until they are both within specification. If the correct tooth contact cannot be maintained when adjusting the backlash, replace the drive and driven bevel gears.



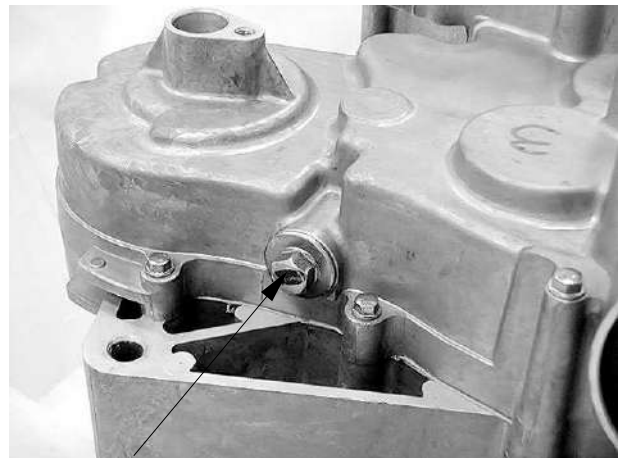
Tooth contact	Drive bevel gear shim adjustment	Driven bevel gear shim adjustment
Contact at tooth top	Increase shim thickness	Increase shim thickness
Contact at tooth root	Decrease shim thickness	Decrease shim thickness

RIGHT CRANKCASE REMOVAL/INSTALLATION

REMOVAL

Remove the cam chain (refer to the “**CAM CHAIN REMOVAL/INSPECTION/INSTALLATION**” section in the chapter 8)
Remove the secondary drive and driven bevel gear (refer to the “**SECONDARY DRIVE/DRIVEN BEVEL GEAR REMOVAL/INSPECTION/INSTALLATION**” section in this chapter).

Remove the stopper plug and washer.



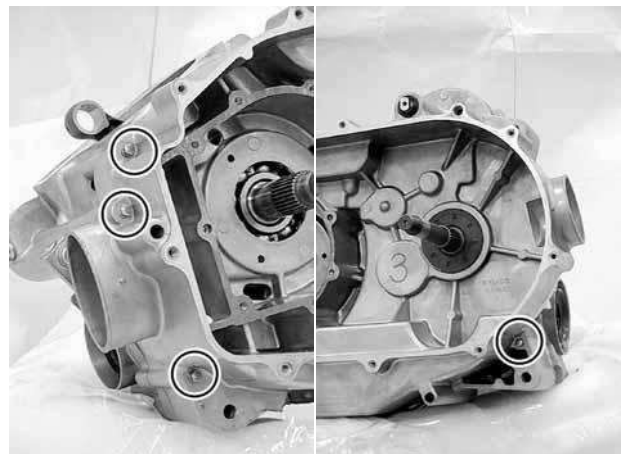
Stopper Plug

Remove the spring and shift cam stopper.



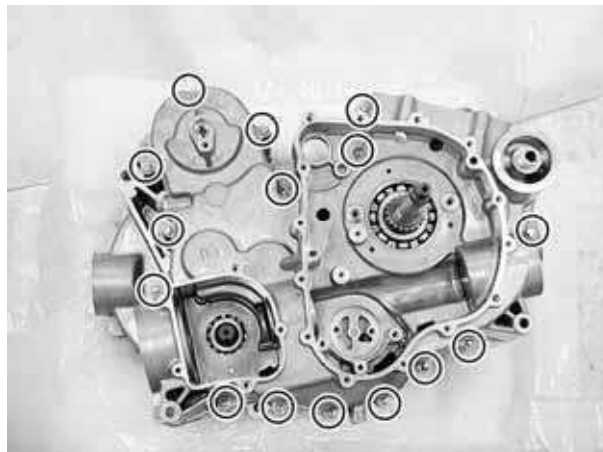
Spring

Remove the four bolts from left crankcase.



11.FINAL REDUCTION/ TRANSMISSION SYSTEM

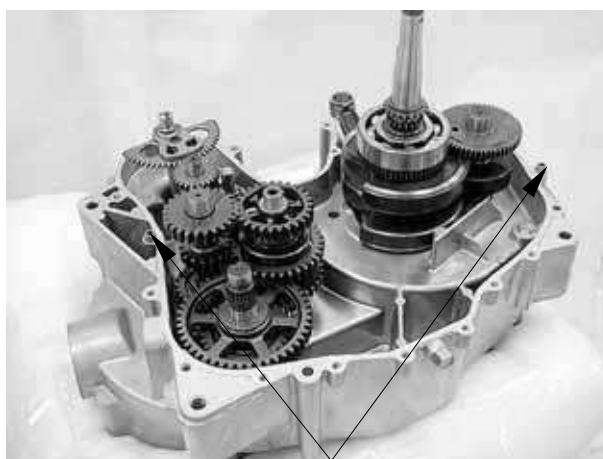
Remove the fifteen bolts from right crankcase.



Remove the two dowel pins.

INSTALLATION

Apply a light but thorough coating of liquid gasket (Threebond 1215 or equivalent) to all crankcase mating surfaces except the oil passage area.

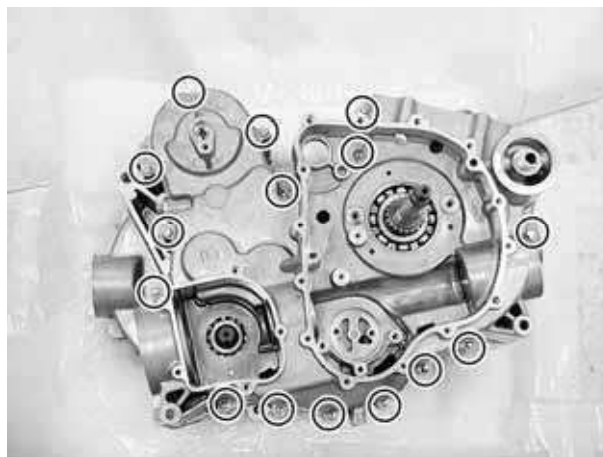


Dowel Pins

Install the right crankcase and tighten the bolts in a crisscross pattern in 2 or 3 steps.

Torque:

1.2 kgf-m (12 N-m, 8.6 lbf-ft) Apply oil

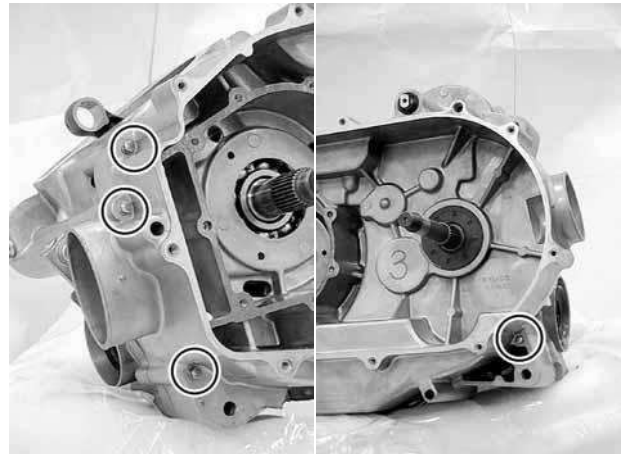


11.FINAL REDUCTION/ TRANSMISSION SYSTEM

Install and tighten the bolts in a crisscross pattern in 2 or 3 steps

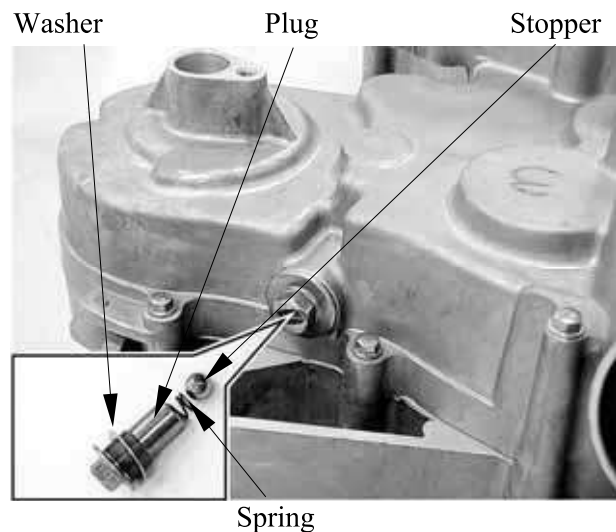
Torque:

1.2 kgf-m (12 N-m, 8.6 lbf-ft) Apply oil



Install the stopper, spring, washer and plug.
Tighten the stopper plug to the specified torque.

Torque: 4.8 kgf-m (48 N-m, 35 lbf-ft)



BEARING REPLACEMENT IN THE RIGHT CRANKCASE

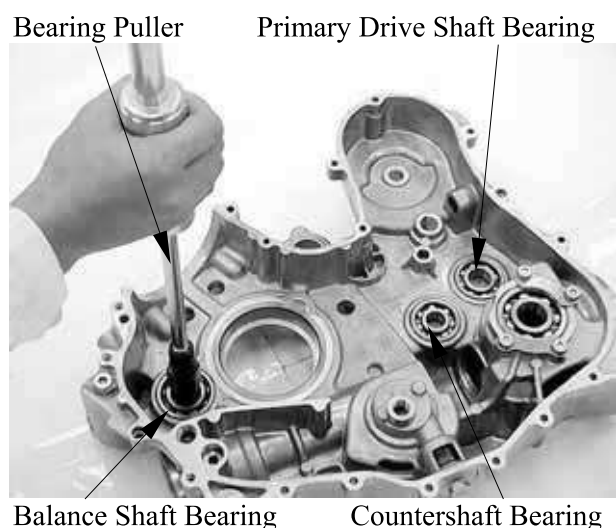
BALANCE SHAFT/COUNTERSHAFT/ PRIMARY DRIVE SHAFT BEARING REPLACEMENT

Remove the balance shaft/countershaft/primary drive shaft bearing by using the special tool.

Special tool:

Bearing puller

A120E00037



11.FINAL REDUCTION/ TRANSMISSION SYSTEM

Install the new balance shaft/countershaft/primary drive shaft bearing by using the special tool.

Special tool:

Bearing driver

A120E00014

Bearing Drive

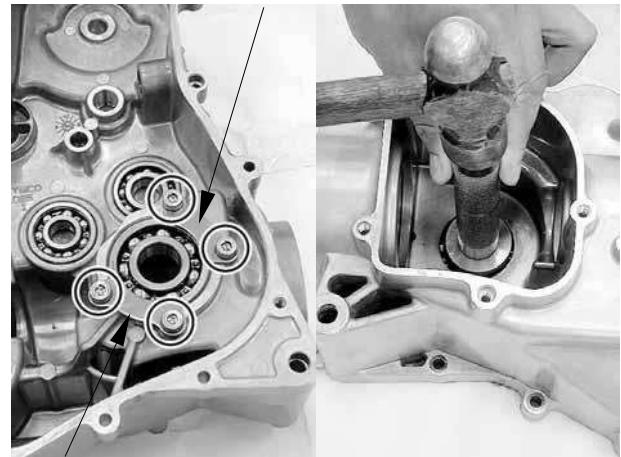


DRIVE SHAFT BEARING REPLACEMENT

Remove the four bolts and two set plates.

Remove the bearing.

Set Plate



Set Plate

Install the new bearing by using the special tool.

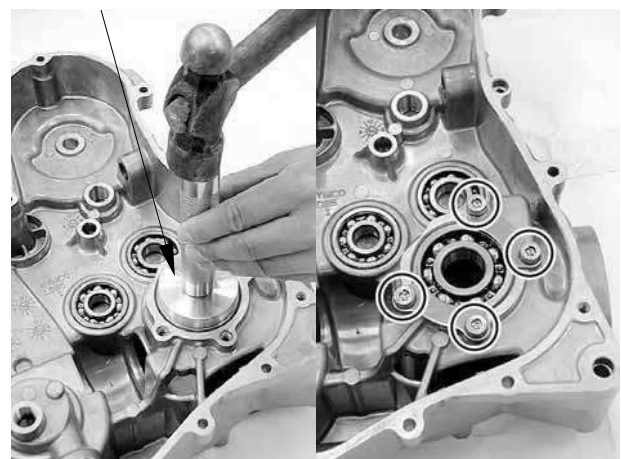
Special tool:

Bearing driver

A120E00014

Install the set plates and tighten the new bolts.

Bearing Driver



11.FINAL REDUCTION/ TRANSMISSION SYSTEM

OUTPUT SHAFT FRONT/REAR BEARING REPLACEMENT

The output shaft bearings can be replaced when the crankcase is assembly.

Rear Side Bearing



Front Side Bearing

REAR SIDE BEARING

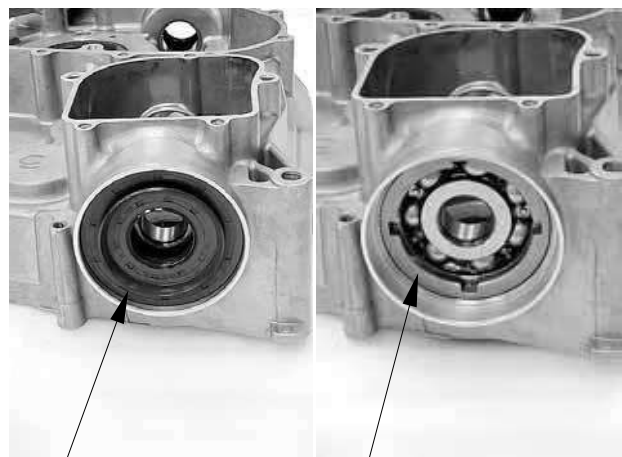
Remove the oil seal.

Remove the nut by using the special tool.

Special tool:

Nut wrench

A120E00066



Oil Seal

Nut

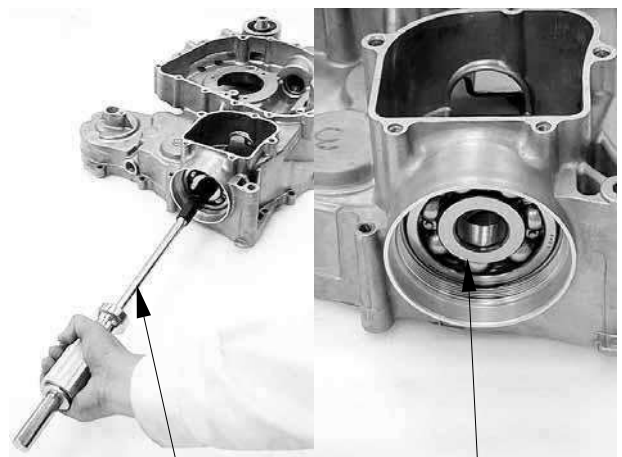
Remove the bearing by using the special tool.

Special tool:

Bearing Puller

A120E00037

Install the new bearing.



Bearing Puller

Bearing

11.FINAL REDUCTION/ TRANSMISSION SYSTEM

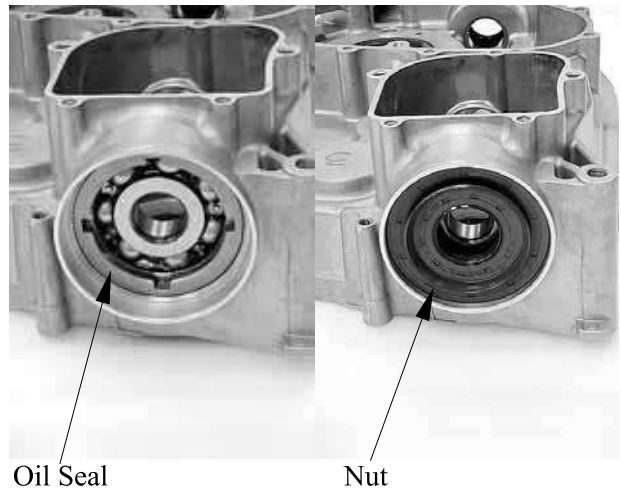
Install and tighten the nut to the specified torque by using the special tool.

Torque: 11 kgf-m (110 N-m, 79.2 lb-ft)

Special tool:

Nut wrench A120E00066

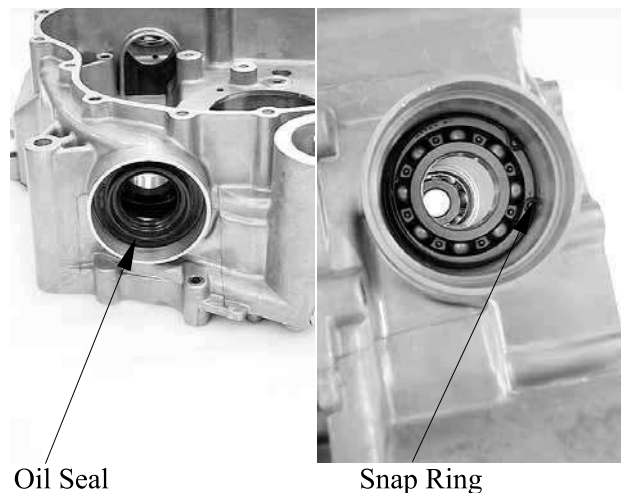
Apply clean engine oil to the new oil seal lip then install the oil seal.



FRONT SIDE BEARING

Remove the oil seal.

Remove the snap ring.



Remove the bearing by using the special tool.

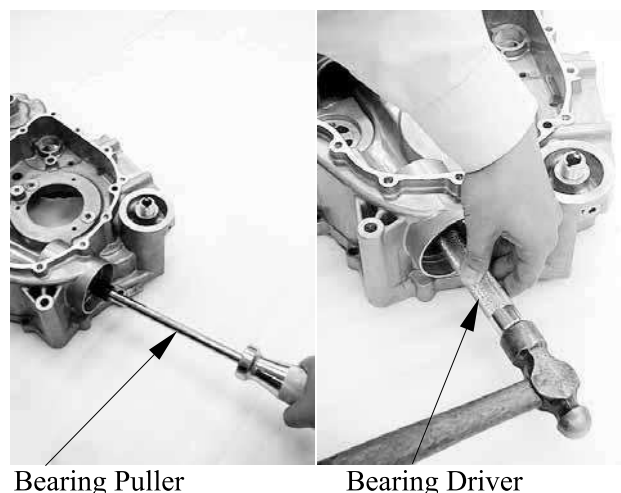
Special tool:

Bearing Puller A120E00037

Install the new bearing by using the special tool.

Special tool:

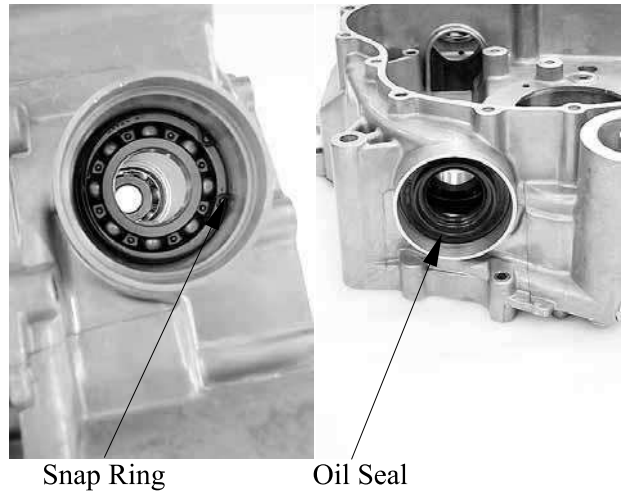
Bearing driver A120E00014



11.FINAL REDUCTION/ TRANSMISSION SYSTEM

Install the snap ring.

Apply clean engine oil to the new oil seal lip
then install the new seal.

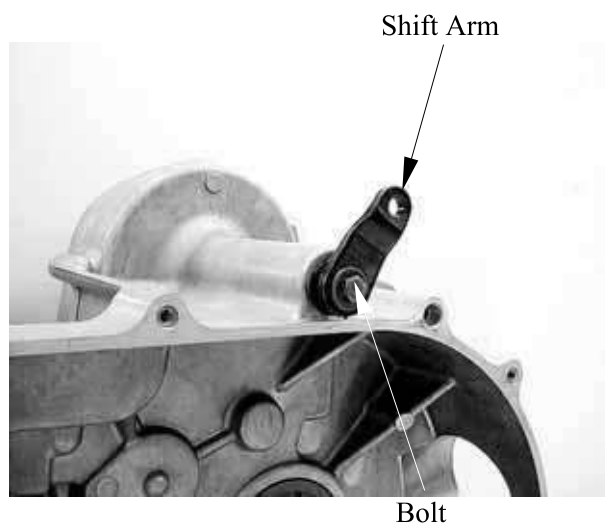


TRANSMISSION REMOVAL/INSPECTION/ INSTALLATION

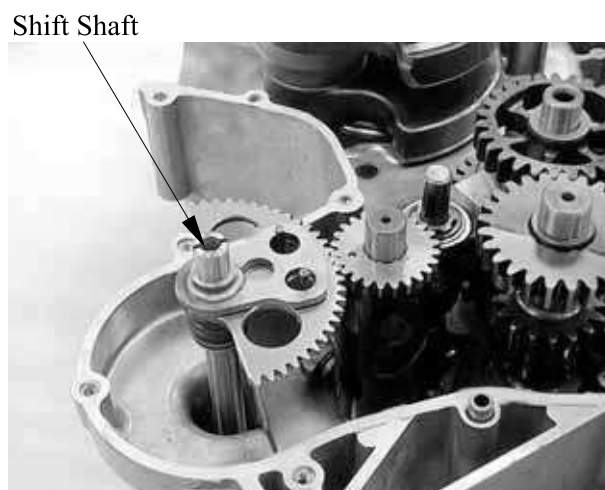
REMOVAL

Remove the bolt and then remove the shift arm.

Remove the right crankcase (refer to the “**RIGHT CRANKCASE REMOVAL/INSTALLATION**” section in this chapter)



Remove the shift shaft.

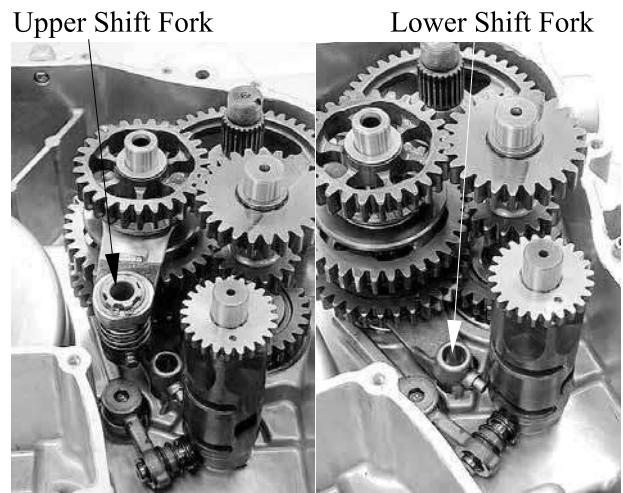


Remove the transmission guide bar.

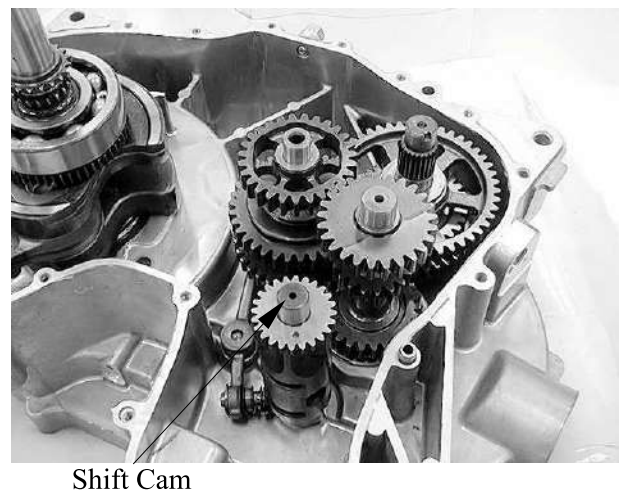


11.FINAL REDUCTION/ TRANSMISSION SYSTEM

Remove the upper shift fork.
Remove the lower shift fork.



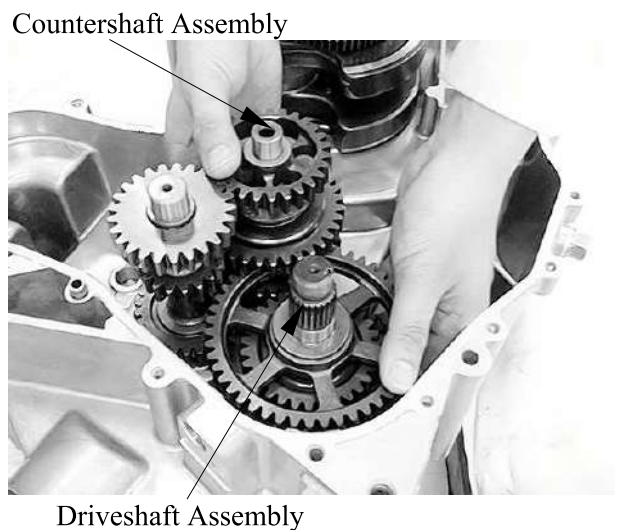
Remove the shift cam.



Remove the countershaft and driveshaft as an assembly.

Disassemble the countershaft and the driveshaft.

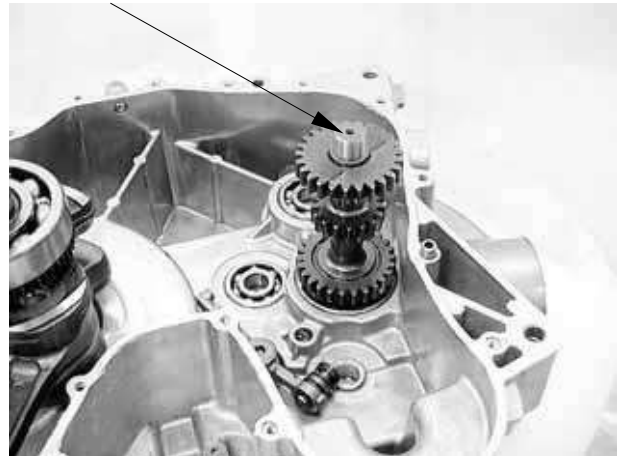
Keep track of the disassembled parts (gears, washer and clip) by stacking them on a tool or slipping them onto a piece of wire.



11.FINAL REDUCTION/ TRANSMISSION SYSTEM

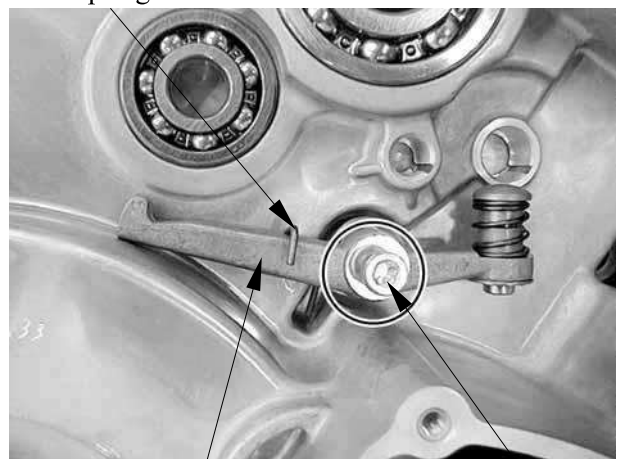
Remove the primary drive shaft.

Primary Drive Shaft



Remove the bolt/washer, then remove the stopper lever and spring.

Spring



Stopper Lever

Bolt/Washer

INSPECTION

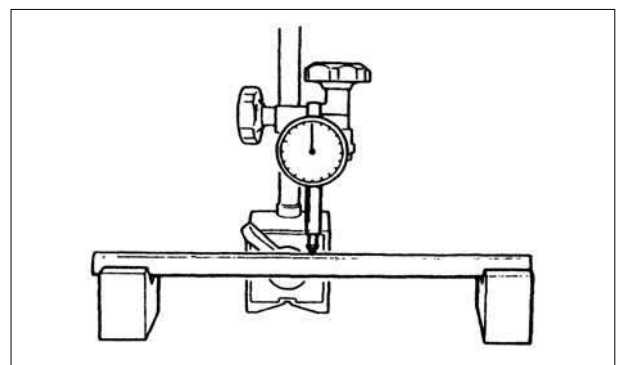
Guide bar

Measure the guide bar runout.
Out of specification → Replace.

Service Limit:

Less than 0.03 mm (0.0012 in)

Do not attempt to straighten a bent guide bar.



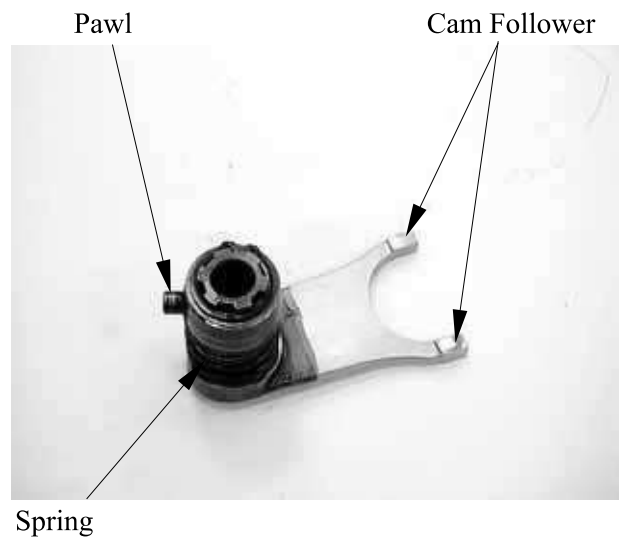
Upper shift fork

Inspect the shift fork cam follower and shift fork pawl.

Scoring/beads/wear → Replace a set.

Inspection the spring.

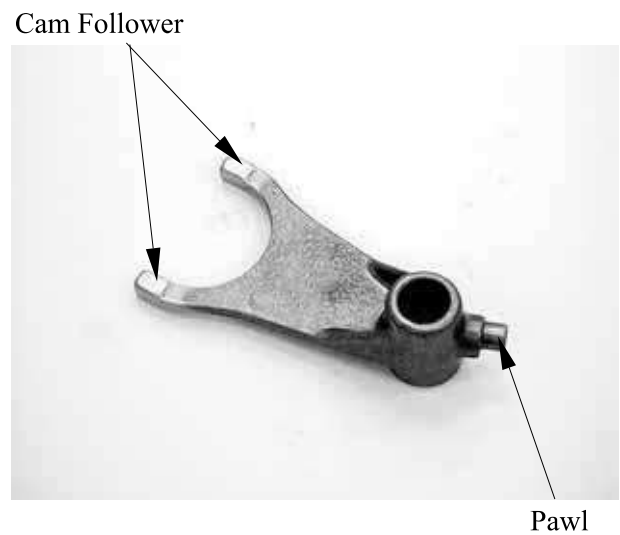
Cracks or damage → Replace a set..



Lower shift fork

Inspect the shift fork cam follower and shift fork pawl.

Scoring/beads/wear → Replace.



Primary drive shaft

Check the gear teeth for blue discoloration, pitting or wear.



Stopper lever

Check the stopper lever pawl for bends, damage or wear.

Inspect the spring for cracks or damage.

Spring



Stopper Lever Pawl

Check the shift cam groove and shift cam gear.

Wear or damage → Replace.



Inspect shift shaft gear.

Damage → Replace.

Inspect shift shaft.

Damage/bends/wear → Replace.

Check the return spring for fatigue or damage.



11.FINAL REDUCTION/ TRANSMISSION SYSTEM

INSTALLATION

Make sure the shaft nut specified torque in the V-belt compartment while holds the stopper lever shaft.

Torque: 3 kgf-m (30 N-m, 21.6 lbf-ft)

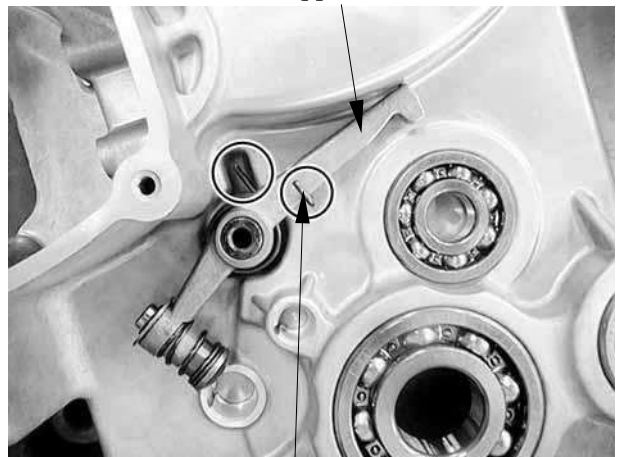
Stopper Lever Shaft



Nut

Hook the spring onto the hook part of the stopper lever, squeeze the spring in to the groove of the left crankcase.

Stopper Lever

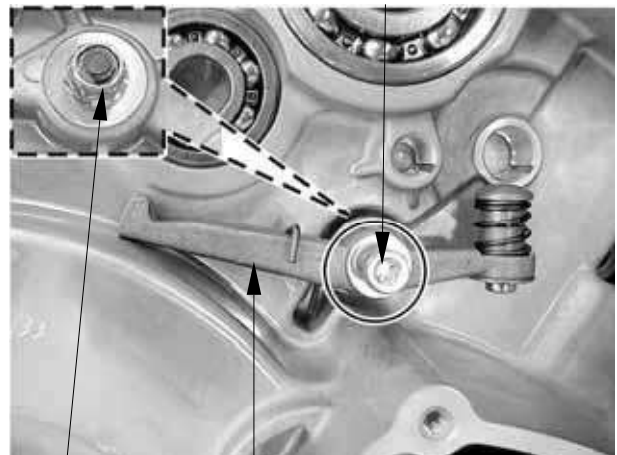


Spring

Install the washer and a new bolt.
Tighten the bolt to the specified torque while holds the shaft nut in the drive V-belt compartment.

Torque: 2.5 kgf-m (25 N-m, 18 lbf-ft)

Bolt/Washer



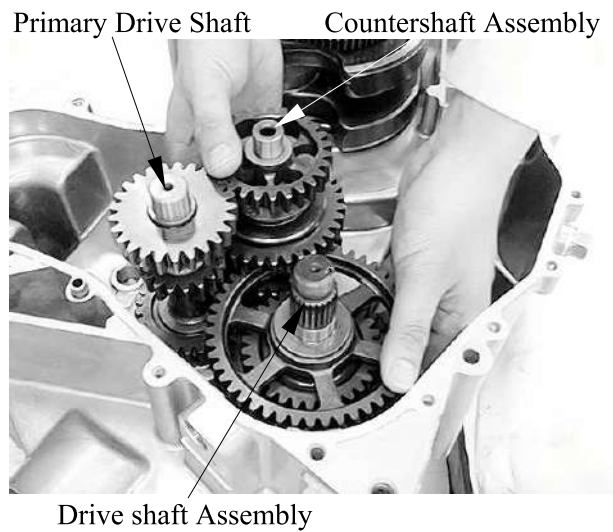
Shaft Nut

Stopper Lever

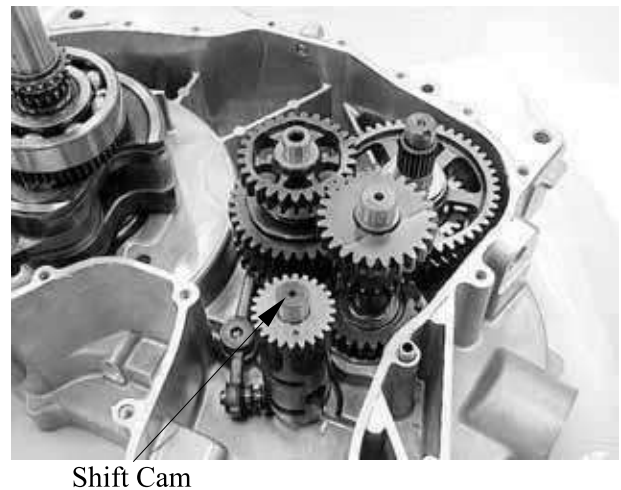
11.FINAL REDUCTION/ TRANSMISSION SYSTEM

Apply clean engine oil to the countershaft assembly, driveshaft assembly and primary drive shaft.

Install the primary drive shaft.
Install the countershaft and drive shaft assemblies as a set into the left crankcase.



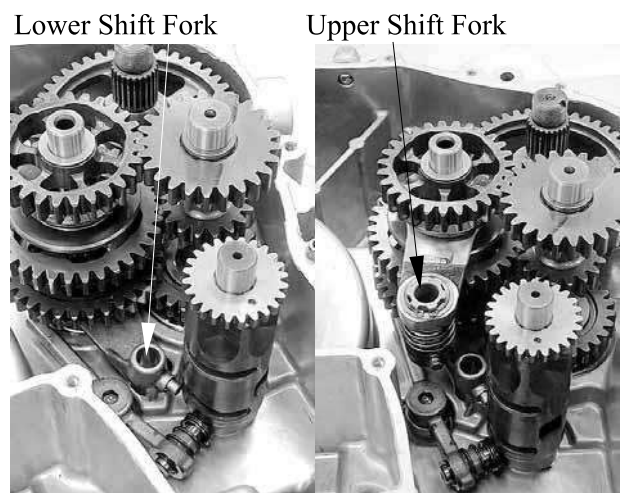
Apply clean engine oil to the shift cam, then install the shift cam.



Apply clean engine oil to the gearshift fork, sliding surface and gearshift fork pawl.

Install the lower gearshift fork into the clutch dog (countershaft) and shift cam grooves with its "LDB5" mark facing down.

Install the upper gearshift fork into the clutch dog (countershaft) and shift cam grooves with its "LDB5" mark facing up.



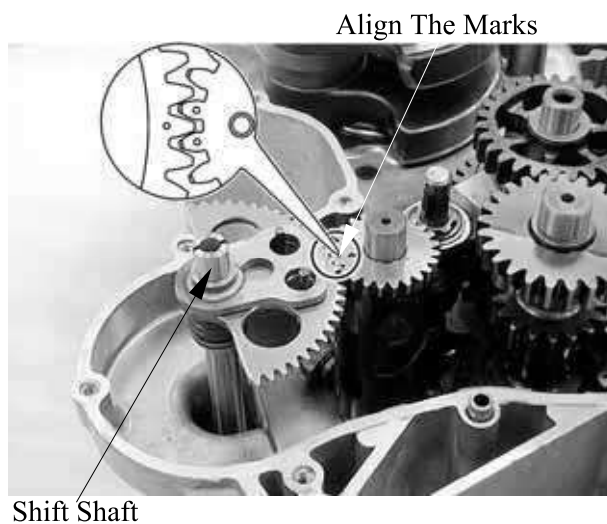
11.FINAL REDUCTION/ TRANSMISSION SYSTEM

Apply clean engine oil to the guide bar,
install the guide bar.



Install the shift shaft.

Align the mark on the shift shaft gear
with the mark on the shift cam gear.



Check the transmission operation.
Unsmooth operation → Repair.



11.FINAL REDUCTION/ TRANSMISSION SYSTEM

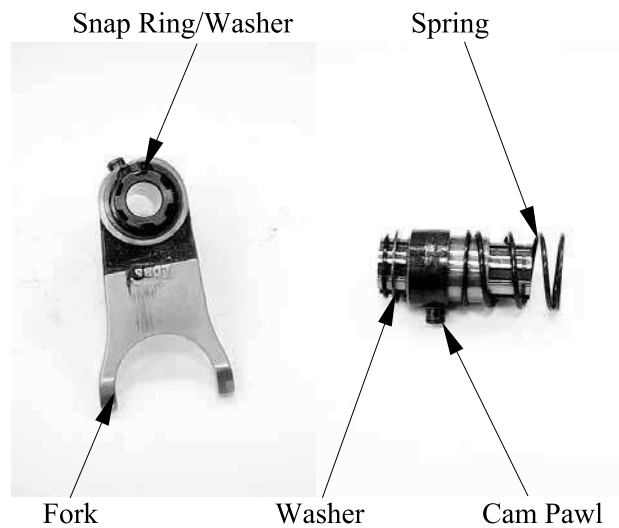
UPPER SHIFT FORK DISASSEMBLY/ASSEMBLY

DISASSEMBLY

Remove the upper shift fork (refer to the “TRANSMISSION REMOVAL/INSPECTION/ INSTALLATION” section in this chapter)

Remove the snap ring, washer and fork.

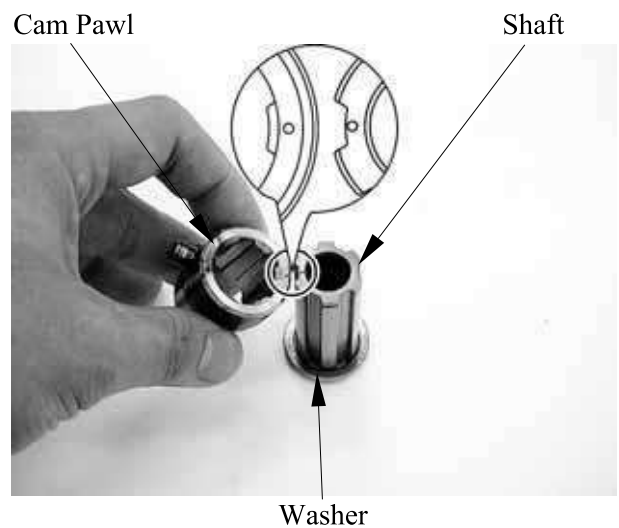
Remove the spring, cam pawl and washer.



ASSEMBLY

Install the washer and cam pawl.

Align the mark on the cam pawl with the mark on the shaft.

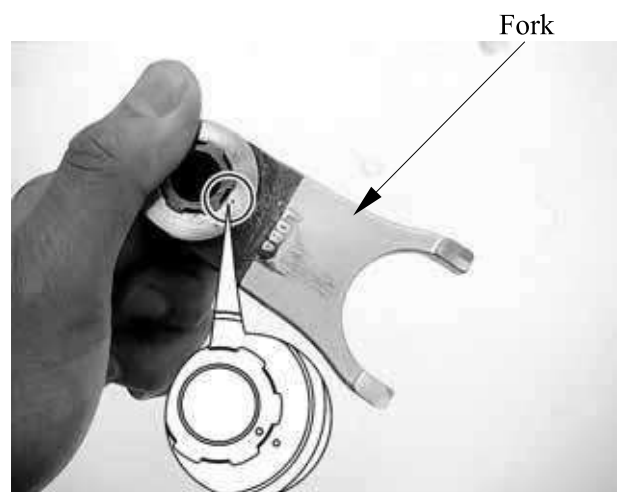


Install the spring.

Install the fork.

Align the mark on the fork with the mark on the shaft.

Install the washer and snap ring.



11.FINAL REDUCTION/ TRANSMISSION SYSTEM

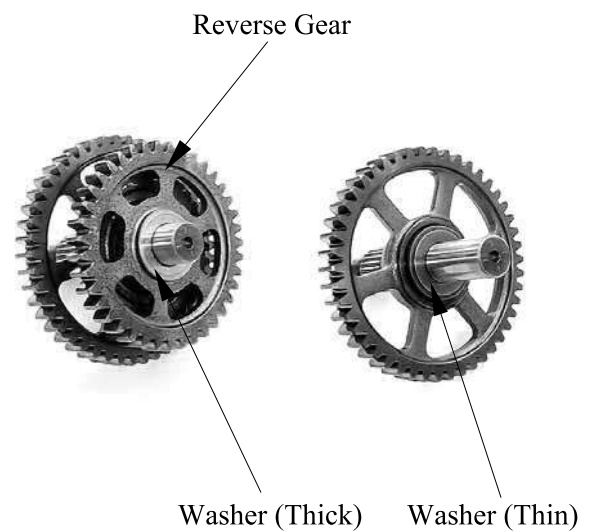
DRIVE SHAFT DISASSEMBLY/ASSEMBLY/ INSPECTION

DISASSEMBLY

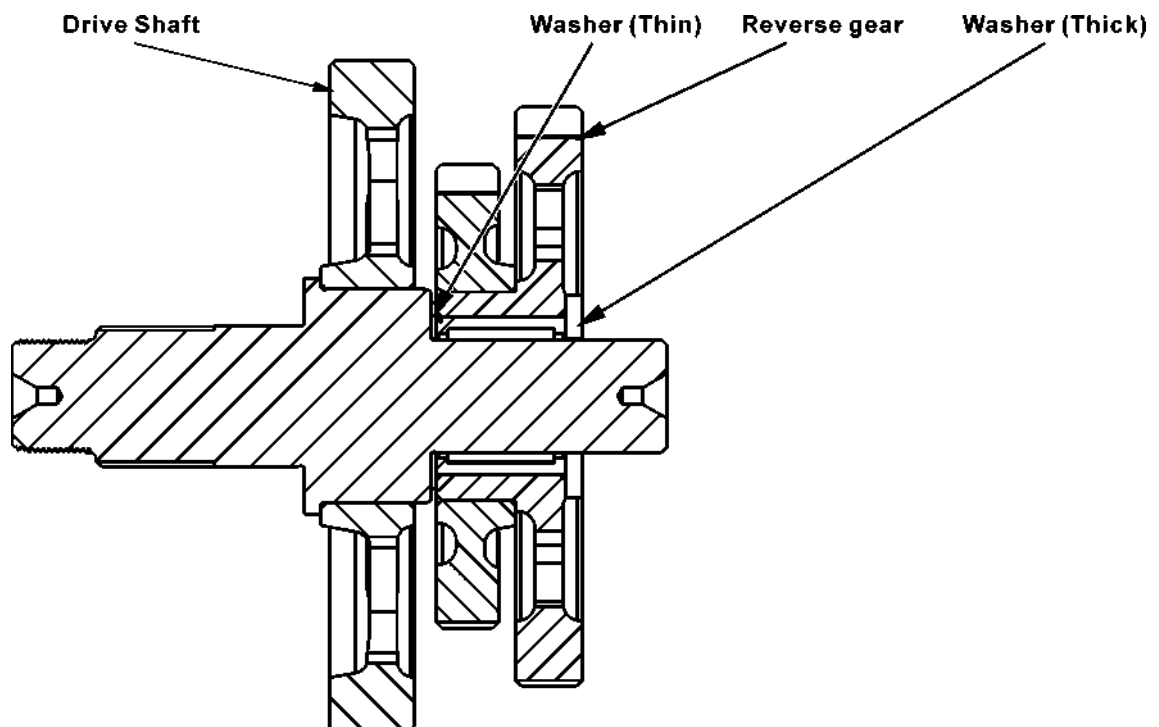
Remove the drive shaft assembly (refer to the “TRANSMISSION REMOVAL/INSPECTION/ INSTALLATION” section in this chapter).

Remove the washer (thick) and reverse gear.

Remove the washer (thin).



ASSEMBLY/INSPECTION



Inspect the gear teeth.
Blue discoloration/pitting/wear → Replace.

Inspect the needle bearing in the reverse gear.
Wear/damage → Replace.

11.FINAL REDUCTION/ TRANSMISSION SYSTEM

COUNTERSHAFT DISASSEMBLY/ASSEMBLY/ INSPECTION

DISASSEMBLY

Remove the countershaft assembly (refer to the “TRANSMISSION REMOVAL/INSPECTION/ INSTALLATION” section in this chapter).

Remove the washer and high drive gear.

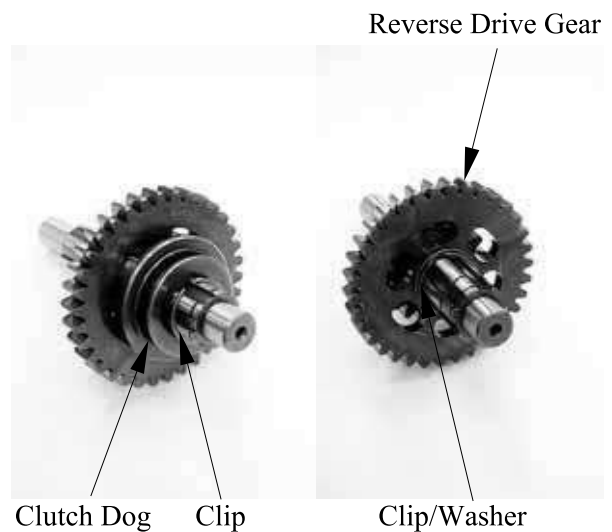
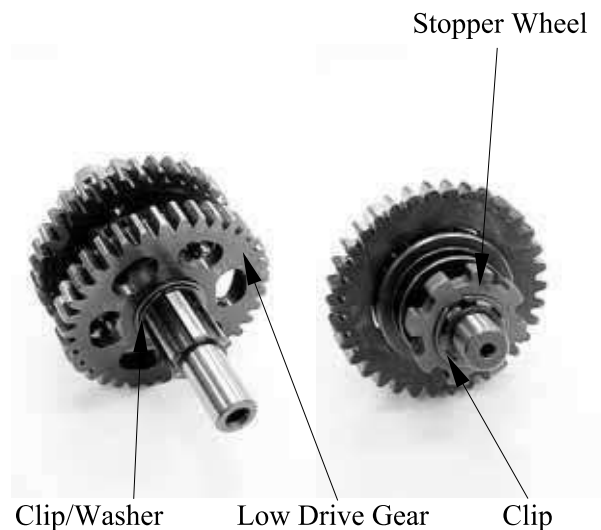
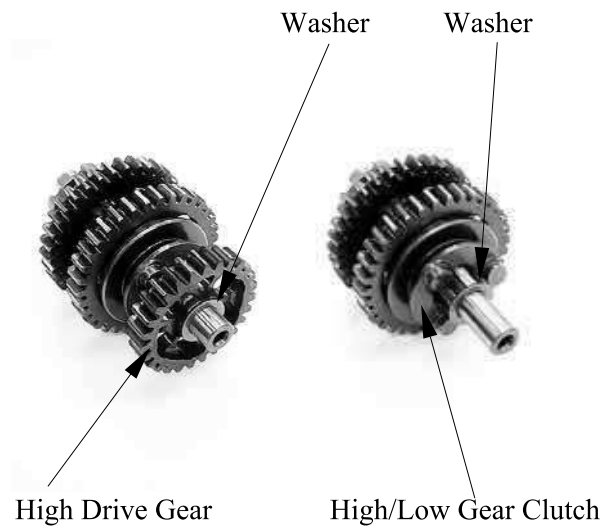
Remove the high/low gear clutch dog

Remove the clip, then remove the washer and low drive gear.

Remove the clip, then remove the stopper wheel.

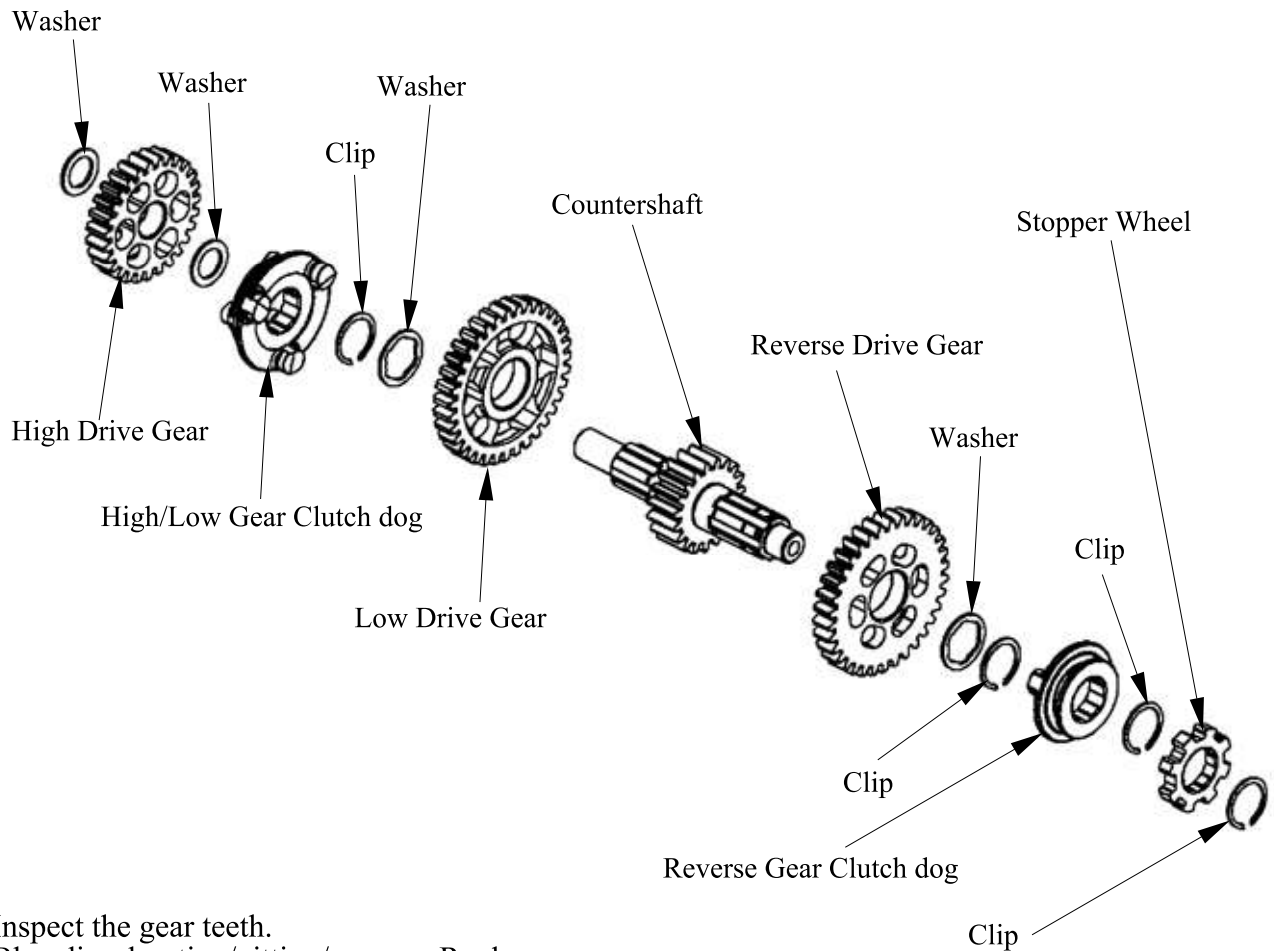
Remove the clip, then remove reverse gear clutch dog.

Remove the clip, then remove the washer and reverse drive gear.



11.FINAL REDUCTION/ TRANSMISSION SYSTEM

ASSEMBLY/INSPECTION



Inspect the gear teeth.
Blue discoloration/pitting/wear → Replace.

Inspect the mated dogs.
Rounded edges/cracks/missing portions
→ Replace.

12.LEFT CRANKSCASE/CRANKSHAFT/ BALANCE SHAFT

MXU 500

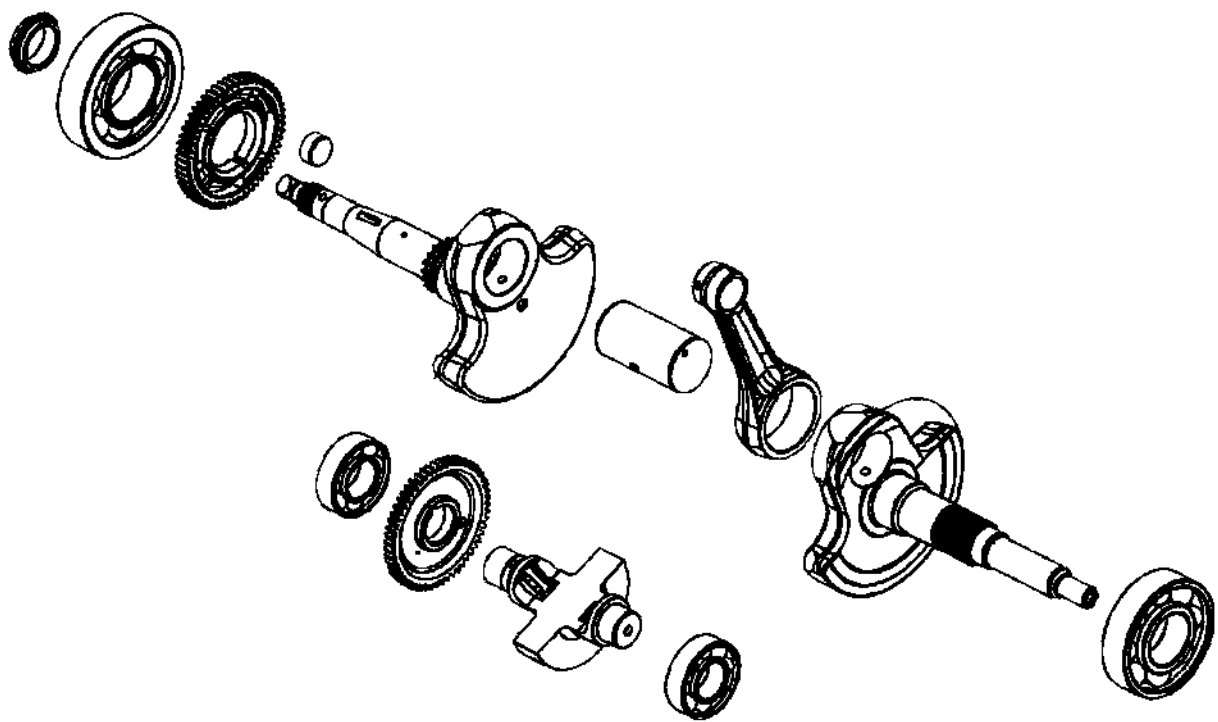
LEFT CRANKCASE/CRANKSHAFT/ SHAFT

BALANCE

SERVICE INFORMATION-----	12- 2
TROUBLESHOOTING-----	12- 2
CRANK SHAFT AND BALANCE SHAFT REMOVAL/INSPECTION/INSTALLATION -----	12- 3
BEARING/OIL SEAL REPLACEMENT IN THE LEFT CRANKCASE-----	12- 6

12.LEFT CRANKCASE/CRANKSHAFT/ BALANCE SHAFT

MXU 500



12.LEFT CRANKSCASE/CRANKSHAFT/ BALANCE SHAFT

MXU 500

SERVICE INFORMATION

GENERAL INSTRUCTIONS

- This section covers crankcase separation to service the crankshaft. The engine must be removed for this operation.
- The following parts must be removed before separating the crankcase.
 - Cylinder head (⇒Chapter 8)
 - Cylinder/piston (⇒Chapter 9)
 - Drive and driven pulleys (⇒Chapter 10)
 - A.C. generator (⇒Chapter 17)
 - Starter clutch (⇒Chapter 19)
 - Oil pump (⇒Chapter 4)

SPECIFICATIONS

Unit: mm (in)

	Item	Standard	Service Limit	
Crankshaft	Connecting rod big end side clearance	Not USA type	0.01 ~ 0.4 (0.002 ~ 0.016)	0.6 (0.024)
		USA type	0.3 ~ 0.6 (0.012 ~ 0.024)	0.8 (0.032)
	Connecting rod big end radial clearance		0 ~ 0.008 (0 ~ 0.00032)	0.05 (0.002)
	Run out		—	0.1 (0.004)

TROUBLESHOOTING

Excessive engine noise

Excessive bearing play

12.LEFT CRANKCASE/CRANKSHAFT/ BALANCE SHAFT

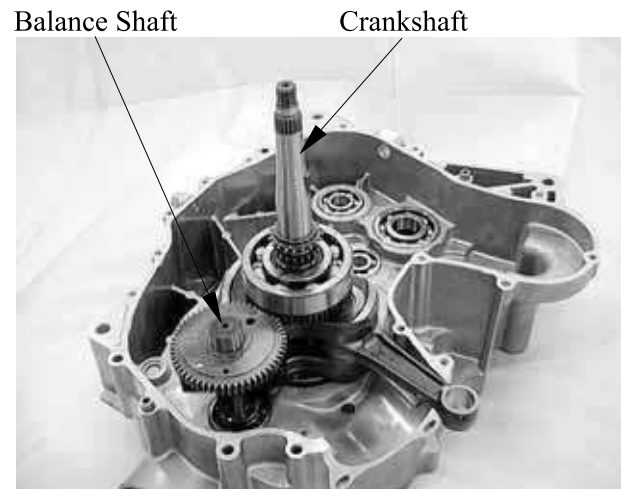
MXU 500

CRANKSHAFT AND BALANCE SHAFT REMOVAL/INSPECTION/ INSTALLATION

REMOVAL

Remove the right crankcase (refer to the “**RIGHT CRANKCASE REMOVAL/INSTALLATION**” section in the chapter 11).

Remove the crankshaft and balance shaft together.



INSPECTION

Balance shaft

Inspect the balance shaft gear teeth.
Burr/chips/roughness/wear → Replace.



Crankshaft inspection

Inspect the crankshaft gear teeth.
Burr/chips/roughness/wear → Replace.

Measure the connecting rod small end I.D.

Service Limit (replace if over):
22.06 mm (0.8824 in)



12.LEFT CRANKSCASE/CRANKSHAFT/ BALANCE SHAFT

MXU 500

Measure the connecting rod small end free play (A).

Out of specification:

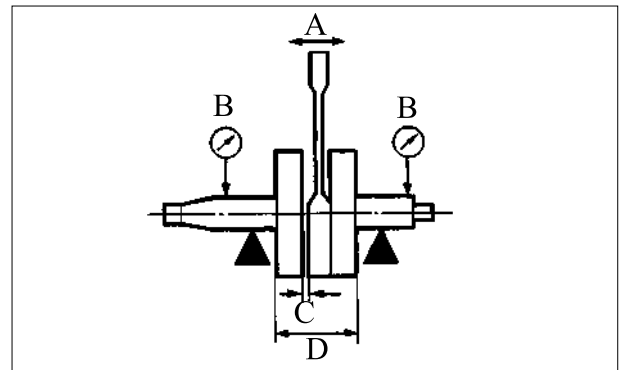
0.8 ~ 1 mm (0.032 ~ 0.04 in)

→ Replace the crankshaft.

Measure the crankshaft run out (B).

Service Limit (replace if over):

0.1 mm (0.004 in)



Measure the connecting rod big end side clearance (C).

Service Limit (replace if over):

Not USA type: 0.6 mm (0.024 in)

USA type : 0.8 mm (0.032 in)

Measure the crank width (D).

Out of specification:

72 ~ 72.05 mm (2.88 ~ 2.882 in)

→ Replace the crankshaft.

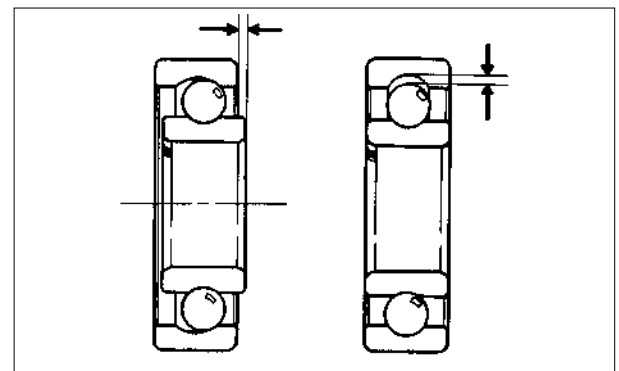
Turn the crankshaft bearings and check for excessive play.

Measure the crankshaft bearing play.

Service Limit (replace if over):

Axial : 0.2 mm (0.008 in)

Radial : 0.05 mm (0.002 in)



12.LEFT CRANKCASE/CRANKSHAFT/ BALANCE SHAFT

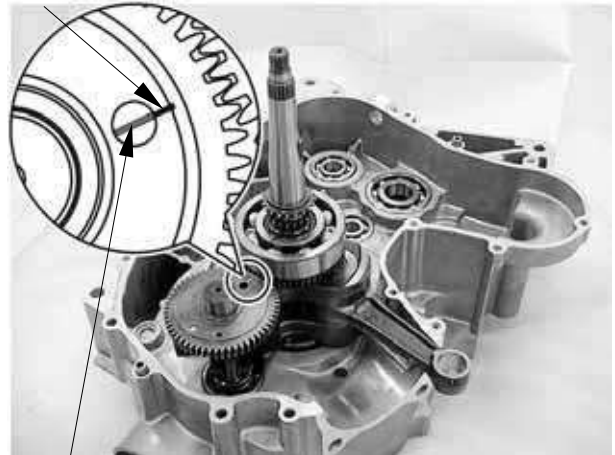
MXU 500

INSTALLATION

Install the balance shaft and crankshaft into the left crankcase.

- * Align the mark on the balance shaft with the mark on the crankshaft.

Mark (on the Balance Shaft)



Mark (on the Crankshaft)

12.LEFT CRANKSCASE/CRANKSHAFT/ BALANCE SHAFT

MXU 500

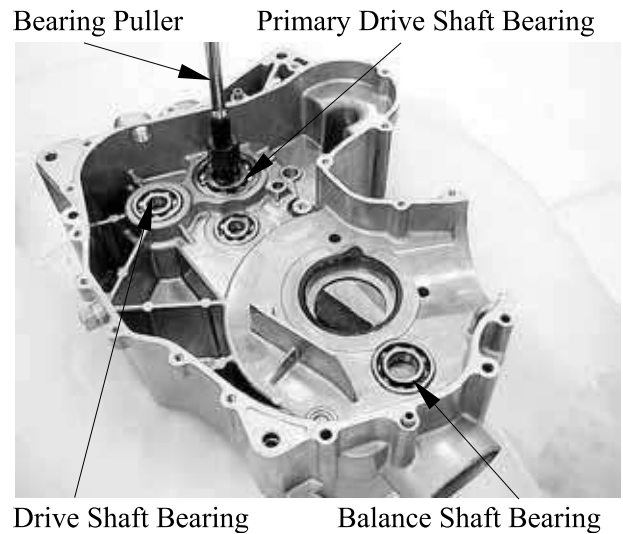
BEARING/OIL SEAL REPLACEMENT IN THE LEFT CRANKCASE

BALANCE SHAFT/COUNTERSHAFT/ PRIMARY DRIVE SHAFT/BALANCE SHAFT BEARING REPLACEMENT

Remove the balance shaft/countershaft/primary drive shaft /drive shaft bearing by using the special tool.

Special tool:

Bearing puller A120E00037



Install the new bearing by using the special tool.

Special tool:

Bearing driver A120E00014

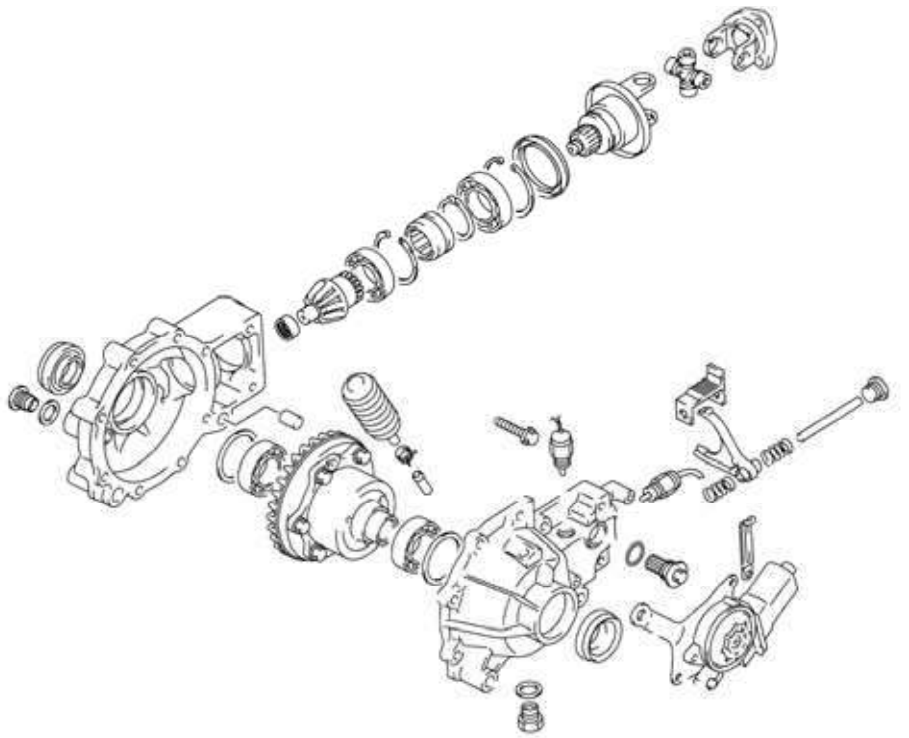


Check the oil seals
Wear or damage → replace



13. DRIVE TRAIN

13. DRIVE TRAIN



13. DRIVE TRAIN

13. DRIVE TRAIN

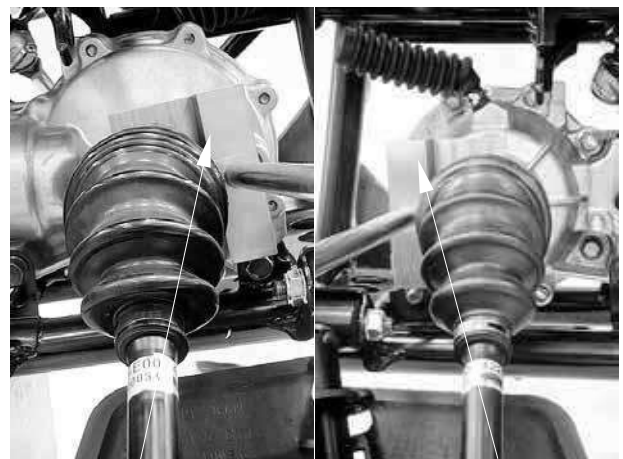


t

If it is difficult to remove the front drive shaft by hand, use the special tools.

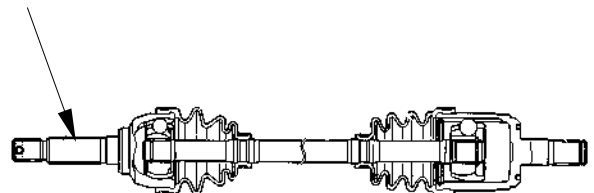
Special tool:

Drive shaft remover A120F00017

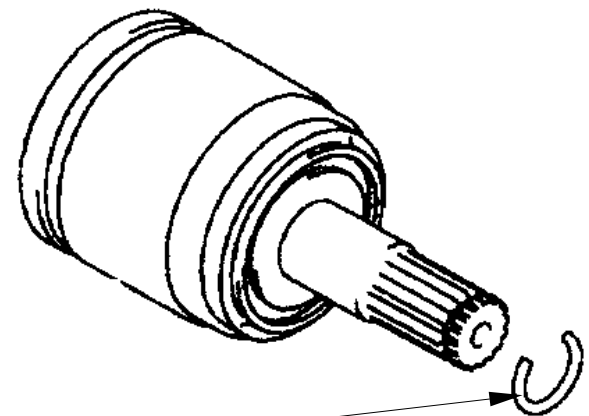
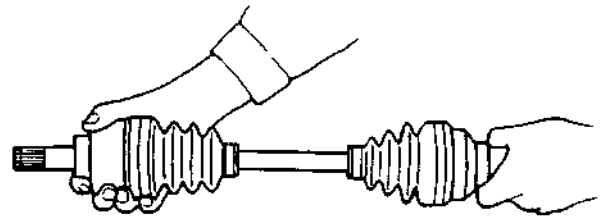


Special Tool

Special Tool



13. DRIVE TRAIN



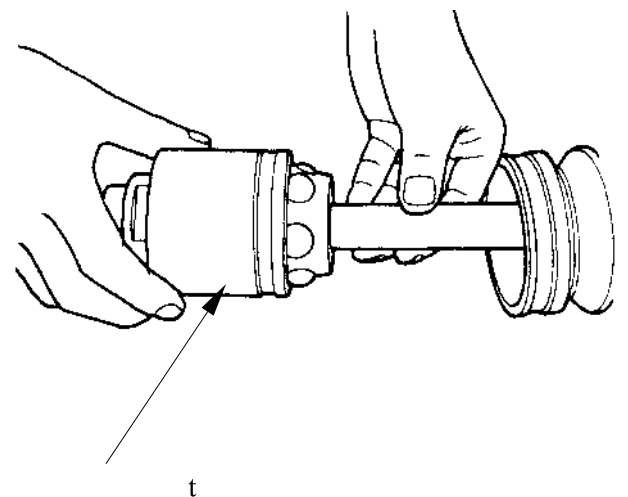
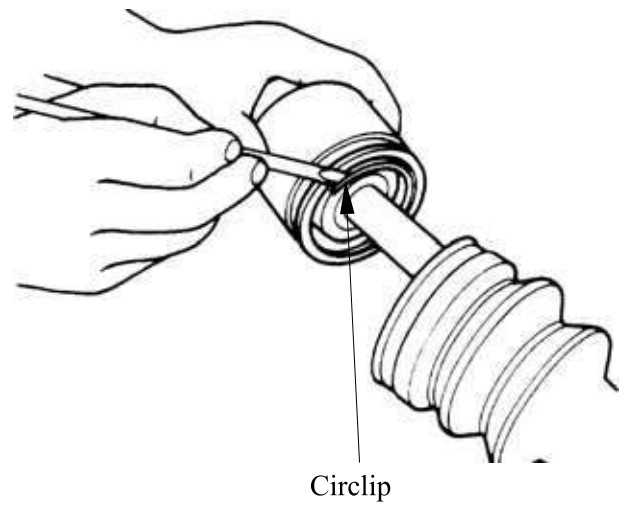
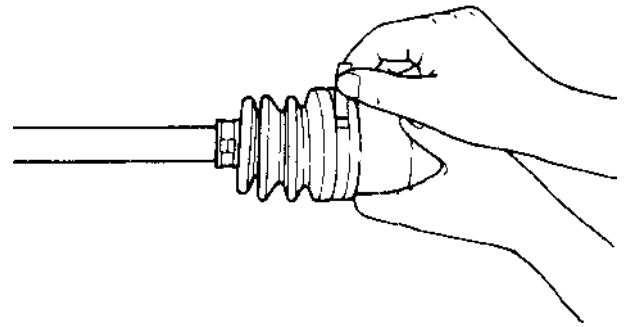
Circlip

- Be careful not to damage the oil seal in the front drive gear case.
- After installing drive shaft, check the circlip is seated properly by pulling the case side joint lightly.

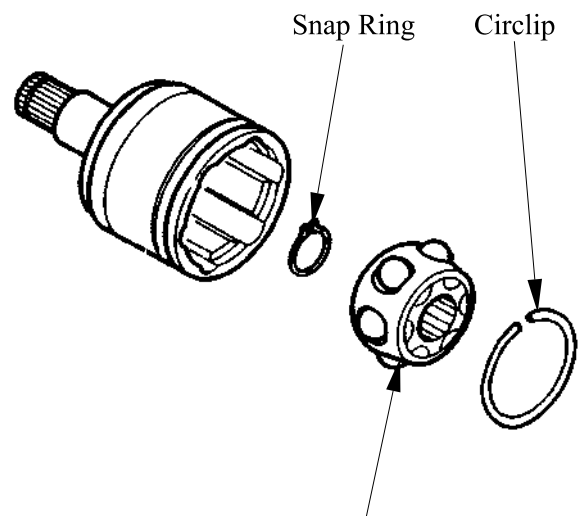
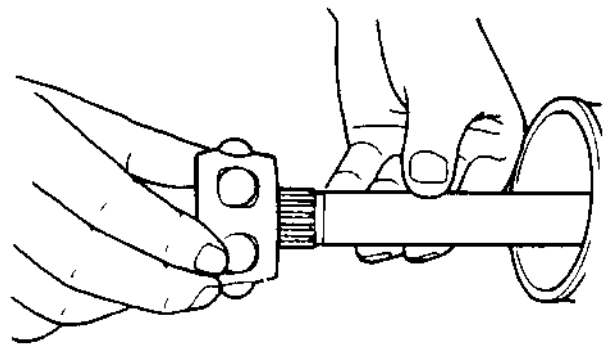
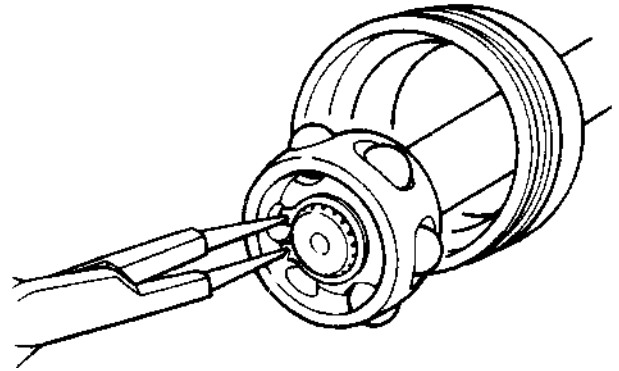


Case Side Joint

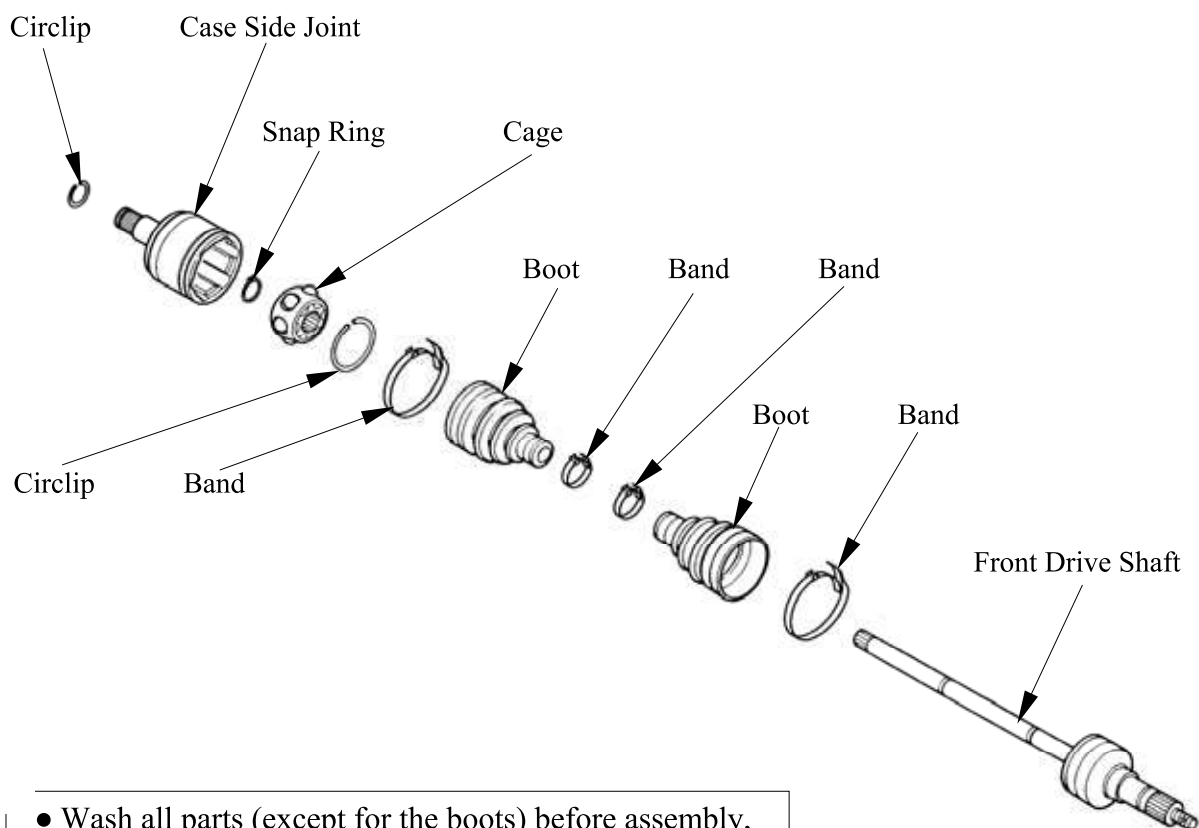
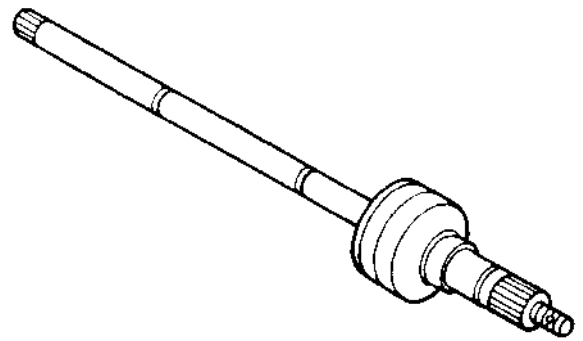
13. DRIVE TRAIN



13. DRIVE TRAIN

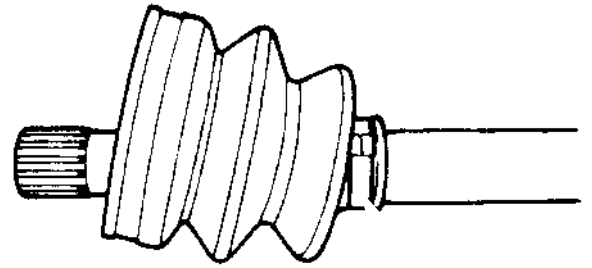


13. DRIVE TRAIN



- Wash all parts (except for the boots) before assembly, clean the inside and outside of the boot with a cloth.
- Do not wash the boots in any commercially available degreaser, such as gasoline or kerosene. Washing in a degreaser causes deterioration of the boot.

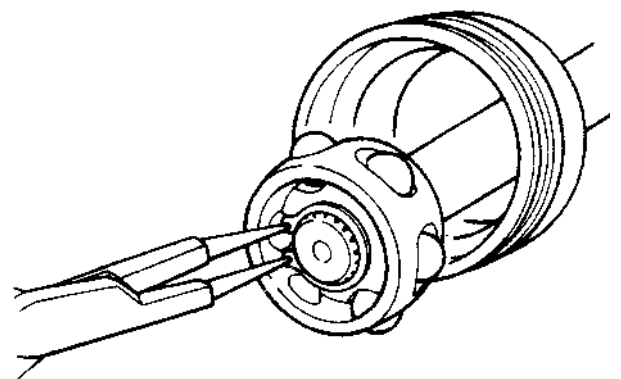
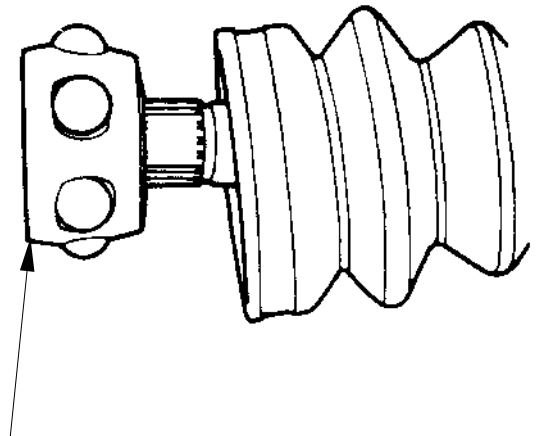
13. DRIVE TRAIN



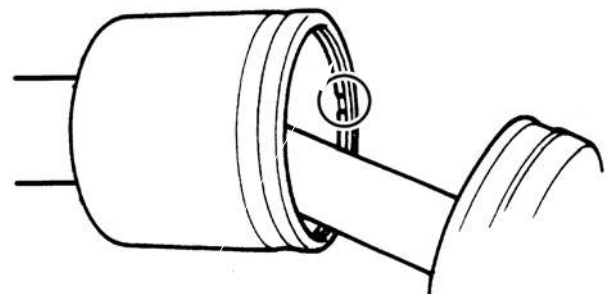
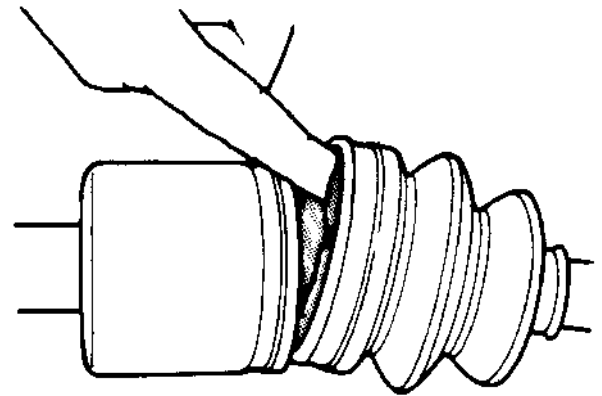
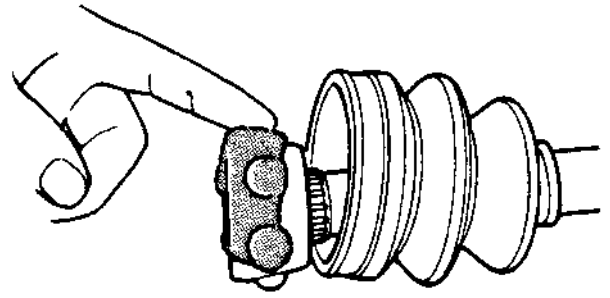
side facing the shaft end.

r

Cage

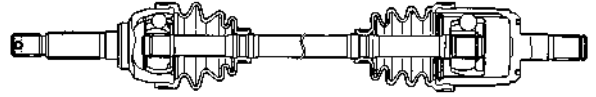


13. DRIVE TRAIN



Locate the opening of the circlip so that the opening is not lined up with a ball.

13. DRIVE TRAIN



13. DRIVE TRAIN



13. DRIVE TRAIN



Front Propeller Shaft



13. DRIVE TRAIN



Always install the bolts with the new ones.



Front Propeller Shaft

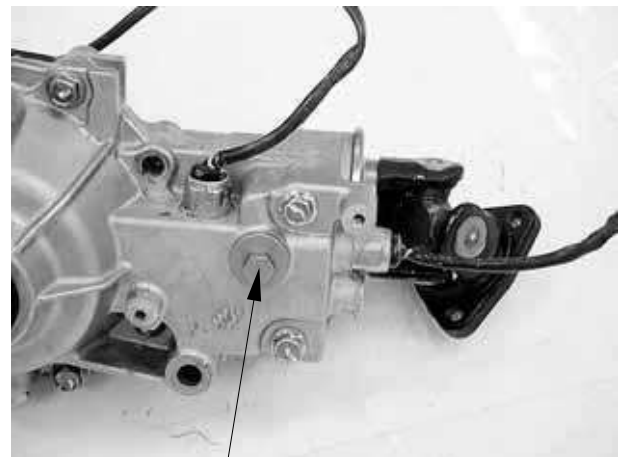


13. DRIVE TRAIN



Shifting Motor Assembly

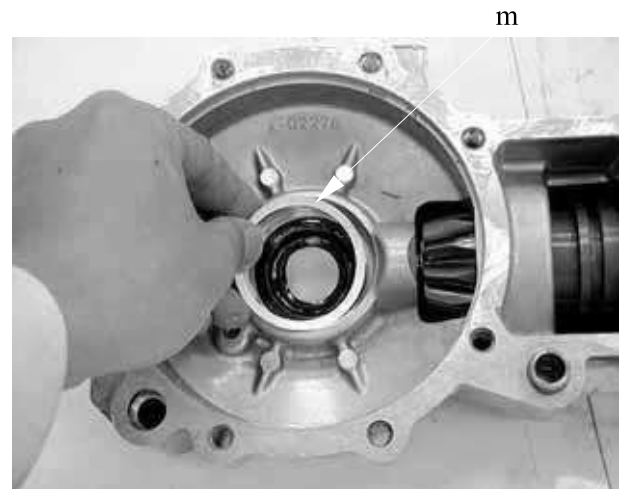
The shifting pinion is not a bolt or screw, do not remove it with a wrench.



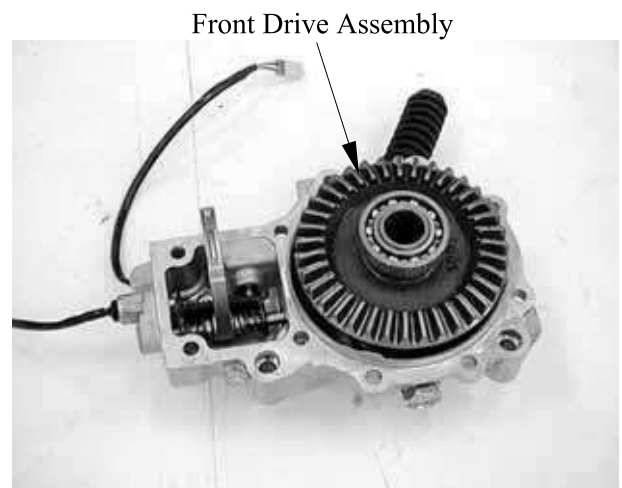
2WD/4WD shifting Pinion



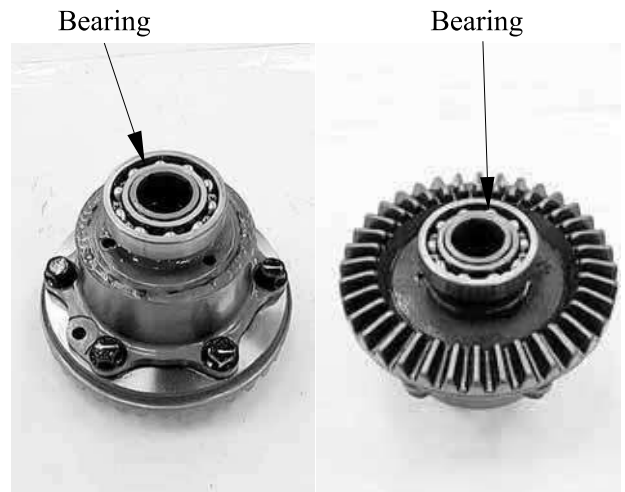
13. DRIVE TRAIN



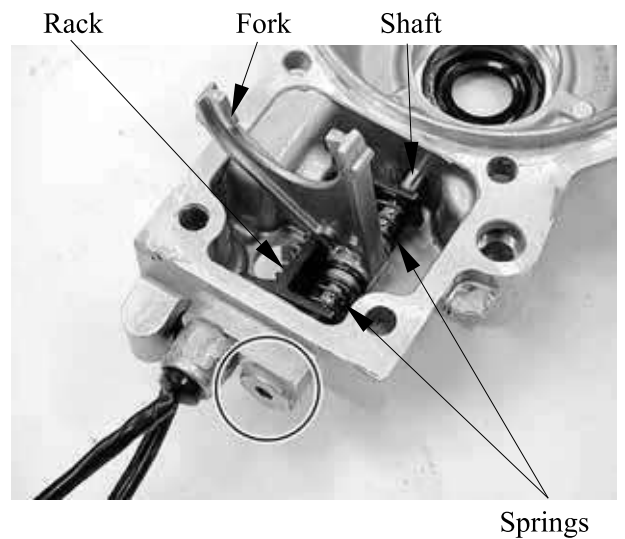
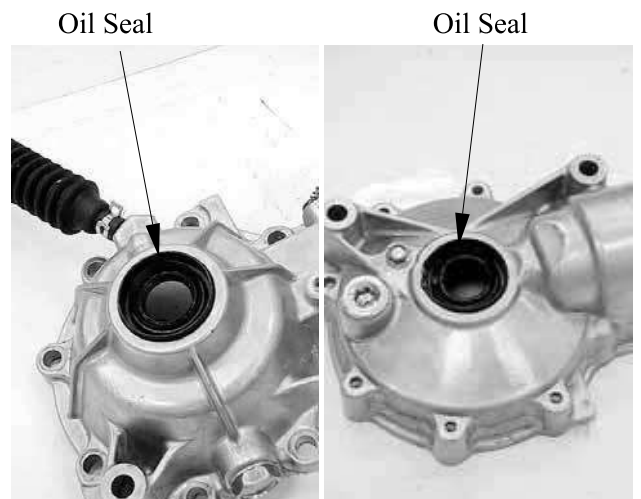
- Do not attempt to disassembly the front drive assembly.
- The front drive is available only as an assembly.



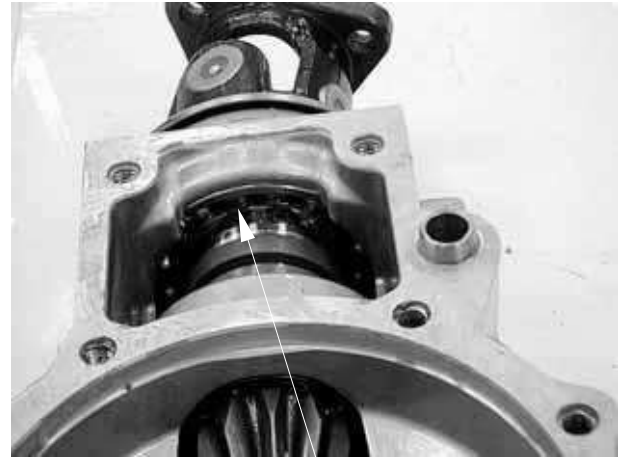
13. DRIVE TRAIN



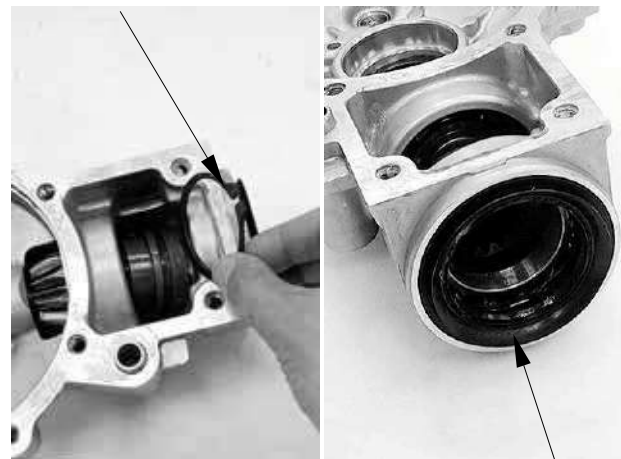
- If there is no abnormal condition, the oil seal removal is not necessary
- The removed oil seal must be replaced with a new one.



13. DRIVE TRAIN



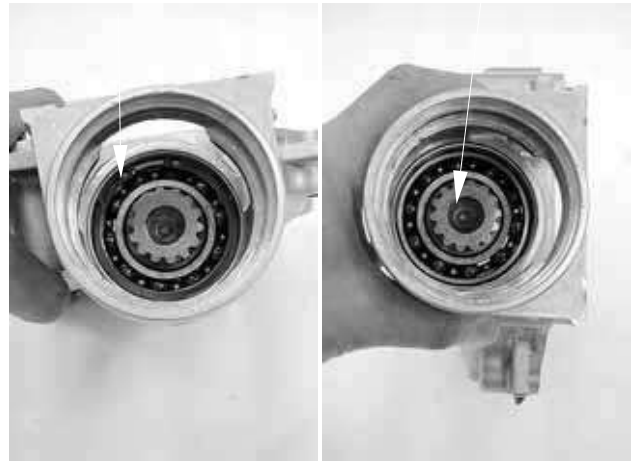
Snap Ring



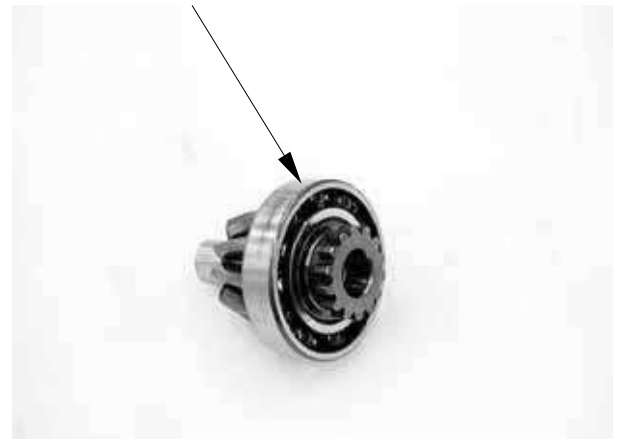
Oil Seal

- If there is no abnormal condition, the oil seal removal is not necessary
- The removed oil seal must be replaced with a new one.

13. DRIVE TRAIN

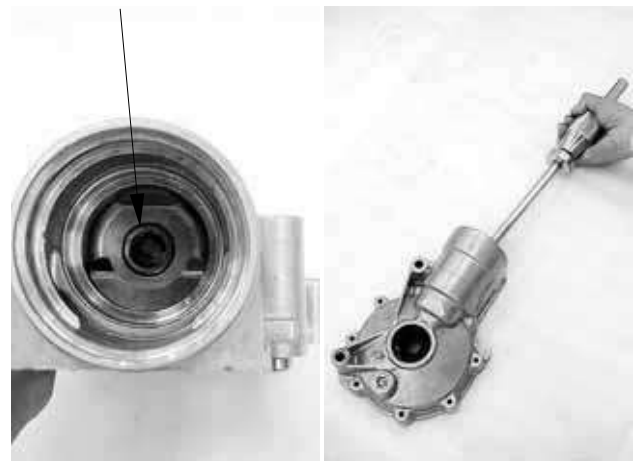


13. DRIVE TRAIN



- If there is no abnormal condition, the bearing removal is not necessary
- The removed bearing must be replaced with a new one.

Bearing



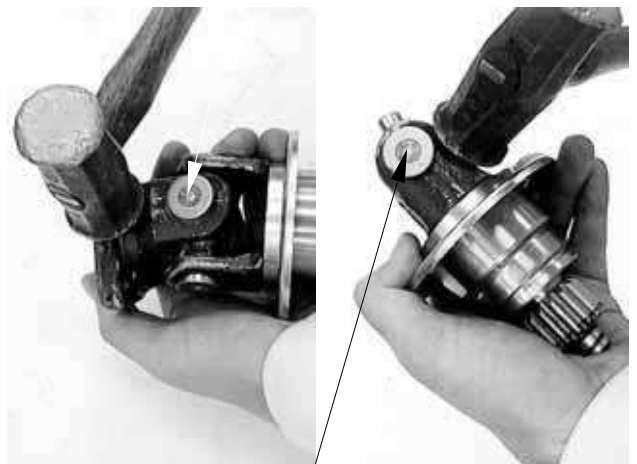
Replace the removed C-ring with a new one.



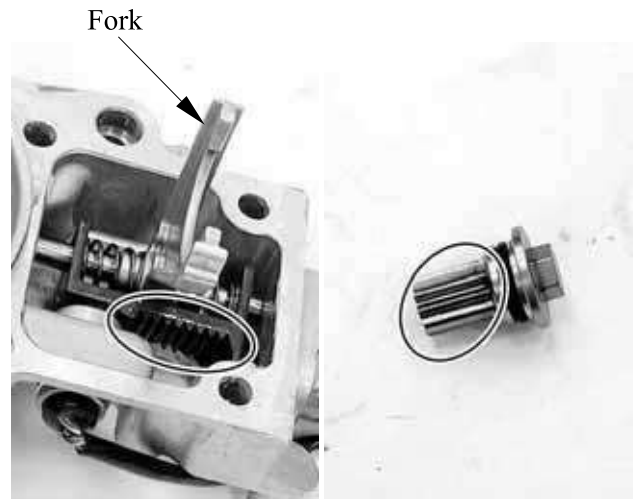
13. DRIVE TRAIN



Special Tool



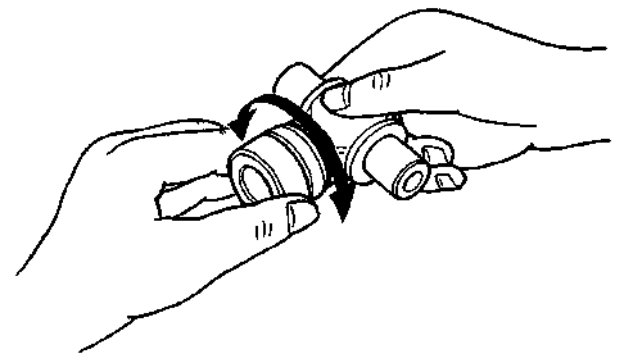
13. DRIVE TRAIN



13. DRIVE TRAIN



13. DRIVE TRAIN



13. DRIVE TRAIN

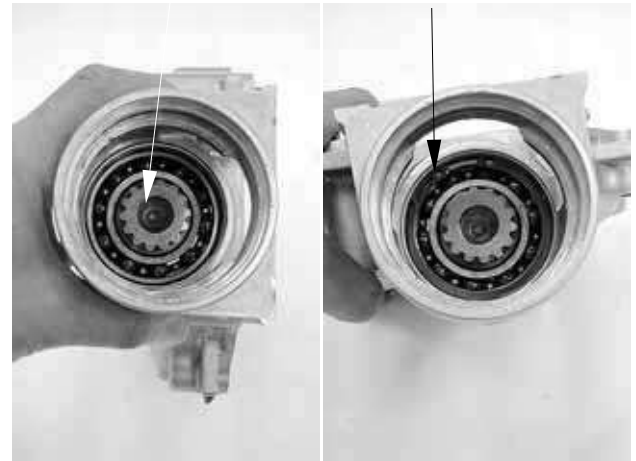


13. DRIVE TRAIN

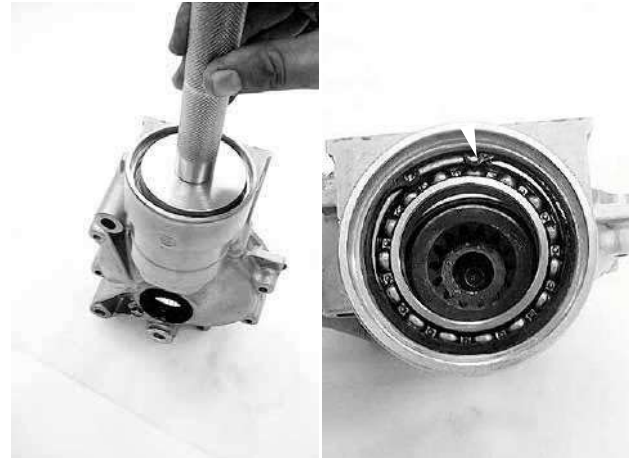


/Bearing

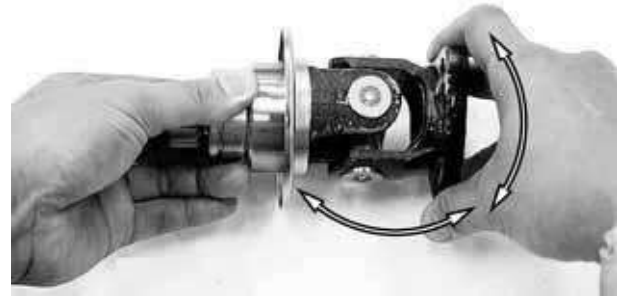
Snap Ring



13. DRIVE TRAIN



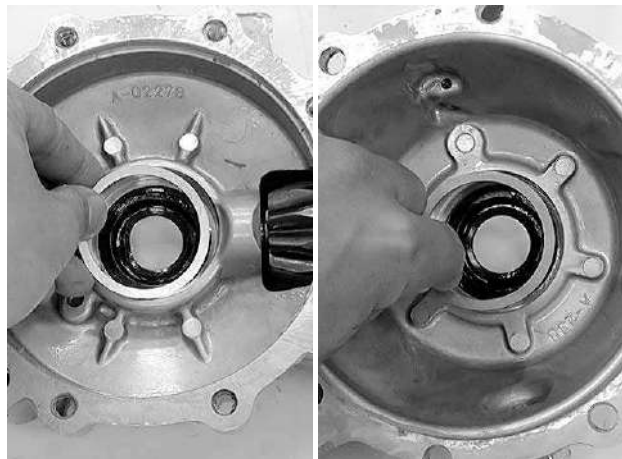
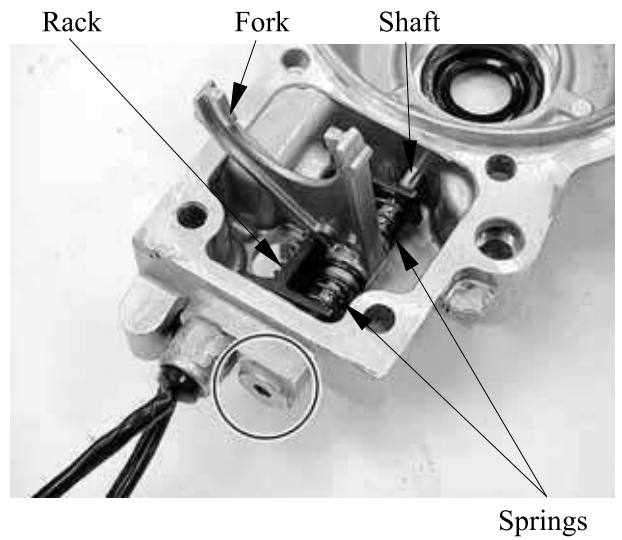
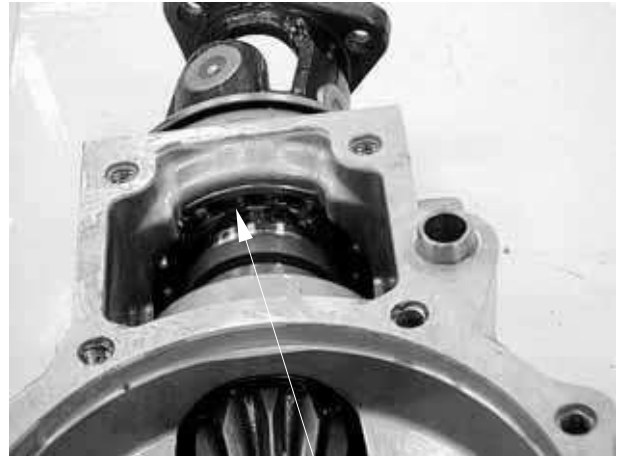
13. DRIVE TRAIN



Snap Ring



13. DRIVE TRAIN



13. DRIVE TRAIN

After the backlash and tooth contact have been checked or adjusted, apply a sealant to the mating surface of the case.

Front Drive Assembly



- After the backlash and tooth contact have been checked or adjusted, apply three bond: 1215 to the case bolts.
- It is important to turn the pinion while tightening the bolts. If the ring gear shim is too thick, the gears will lock after only light tightening.



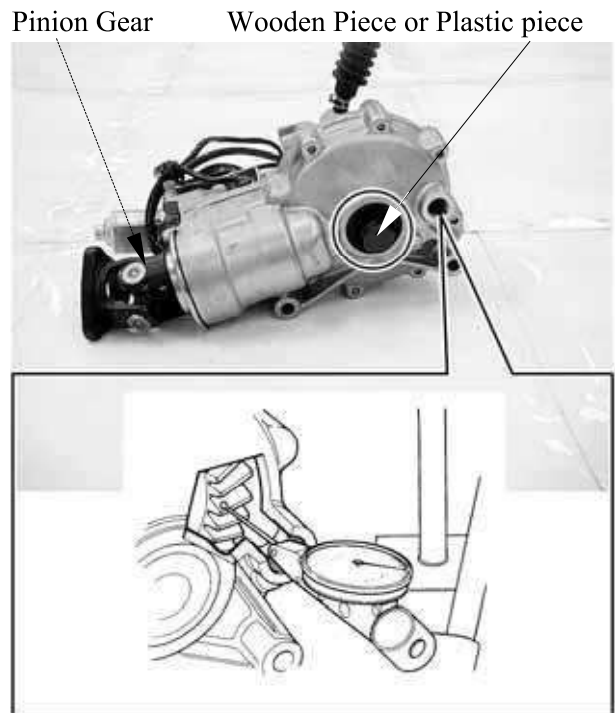
13. DRIVE TRAIN



Shifting Motor Assembly

13. DRIVE TRAIN

gear case.



Shim thickness
0.7 mm (0.0276 in)
0.75 mm (0.0295 in)
0.8 mm (0.0315 in)
0.85 mm (0.0335 in)
0.9 mm (0.0354 in)
0.95 mm (0.0374 in)
1 mm (0.0394 in)
1.05 (0.0413 in)
1.1 mm (0.0433 in)
1.15 mm (0.0453 in)
1.2 mm (0.0472 in)
1.25 mm (0.0492 in)
1.3 mm (0.0512 in)
1.35 mm (0.0531 in)
1.4 mm (0.0551 in)
1.45 mm (0.0571 in)

Adjust the backlash by referring to the chart at the right and using the thickness of the removed shims as a guide.

Backlash	Shim adjustment
Under 0.05 mm (0.002 in)	Increase shim thickness
0.05 – 0.1 mm (0.002 – 0.004 mm)	Correct
Over 0.1 mm (0.004 in)	Decrease shim thickness

13. DRIVE TRAIN

- Do not install the left side shim(s) at this time.
- Apply a small quantity of grease to the solder to prevent them from falling



- Do not apply a sealant to the mating surface of the gear case.
- Do not apply a sealant to the case bolts.



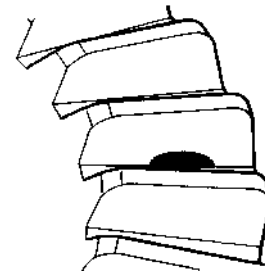
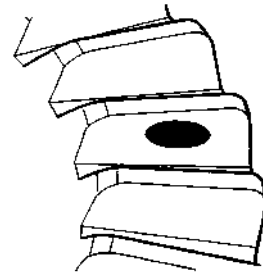
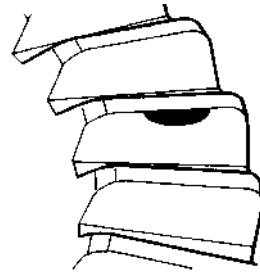
It is important to turn the pinion while tightening the bolts. If the ring gear shim is too thick, the gears will lock after only light tightening.

13. DRIVE TRAIN



Shim thickness
0.7 mm (0.0276 in)
0.75 mm (0.0295 in)
0.8 mm (0.0315 in)
0.85 mm (0.0335 in)
0.9 mm (0.0354 in)
0.95 mm (0.0374 in)
1 mm (0.0394 in)
1.05 (0.0413 in)
1.1 mm (0.0433 in)
1.15 mm (0.0453 in)
1.2 mm (0.0472 in)
1.25 mm (0.0492 in)
1.3 mm (0.0512 in)
1.35 mm (0.0531 in)
1.4 mm (0.0551 in)
1.45 mm (0.0571 in)

13. DRIVE TRAIN

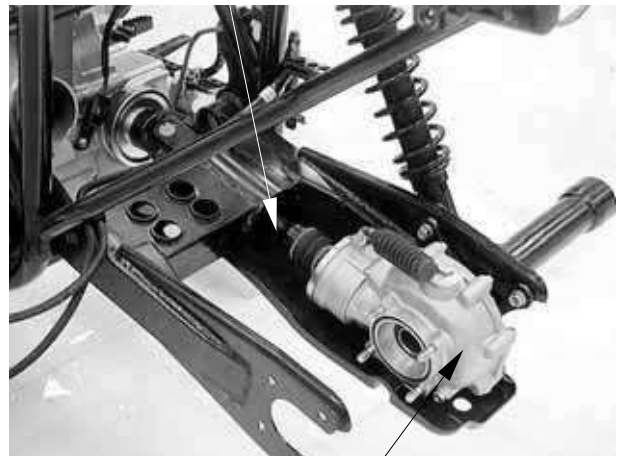


Make sure to check the backlash and shim thickness after the tooth contact has been adjusted, since it may have changed. Adjust the tooth contact and backlash until they are both within specification. If the correct tooth contact cannot be maintained when adjusting the backlash, replace the pinion gear and ring gear as a set.

13. DRIVE TRAIN



Rear Propeller Shaft



Rear Drive Assembly

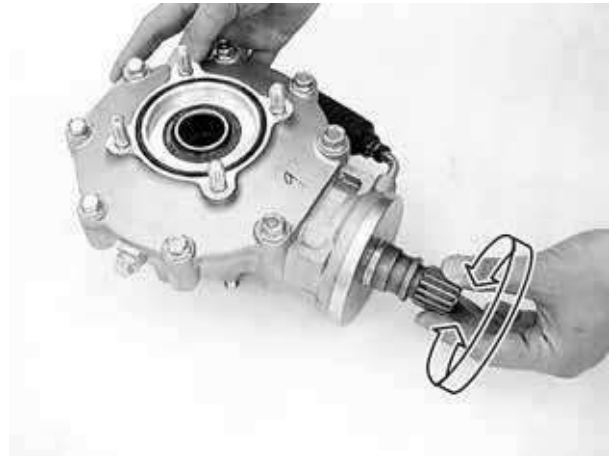
Do not lose the compression spring.

Rear Propeller Shaft



Compression Spring

13. DRIVE TRAIN



13. DRIVE TRAIN



Rear Propeller Shaft

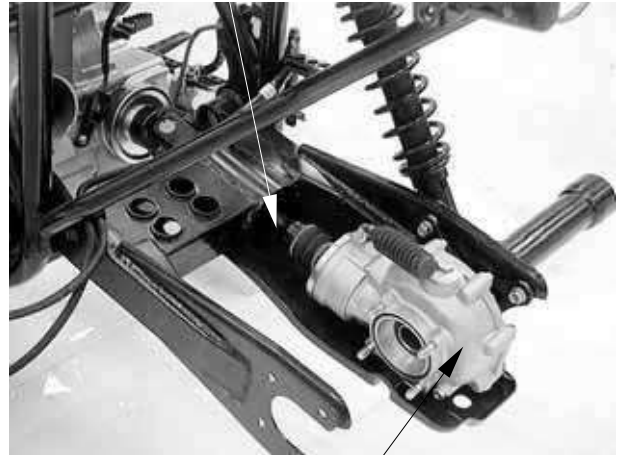


Apply lightweight lithium-soap base grease to the rear output shaft splines.



13. DRIVE TRAIN

Rear Propeller Shaft

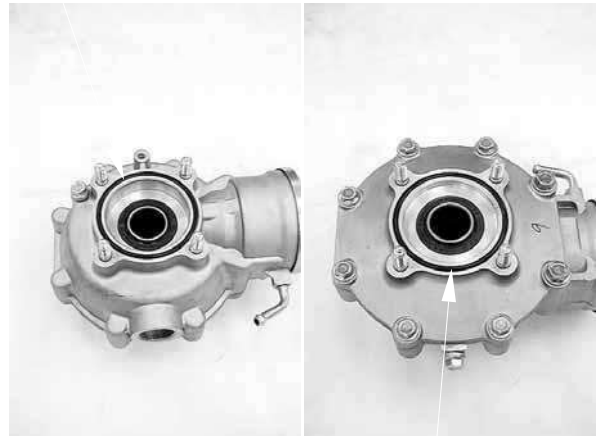


Rear Drive Assembly



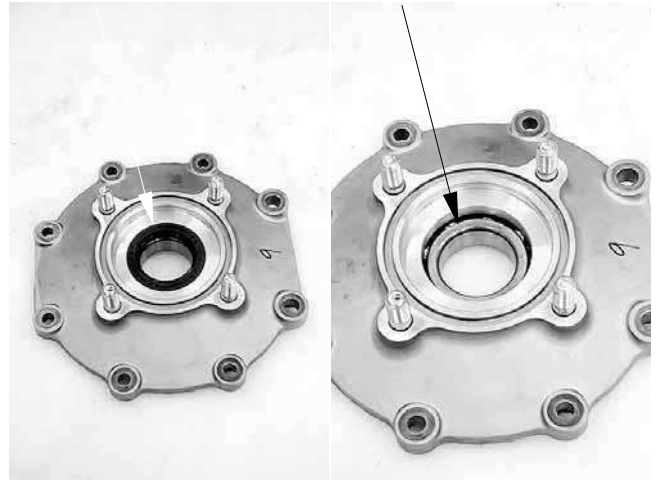
13. DRIVE TRAIN

O-ring (Case)



13. DRIVE TRAIN

- If there is no abnormal condition, the oil seal or bearing removal is not necessary
- The removed oil seal and bearing must be replaced with new ones.

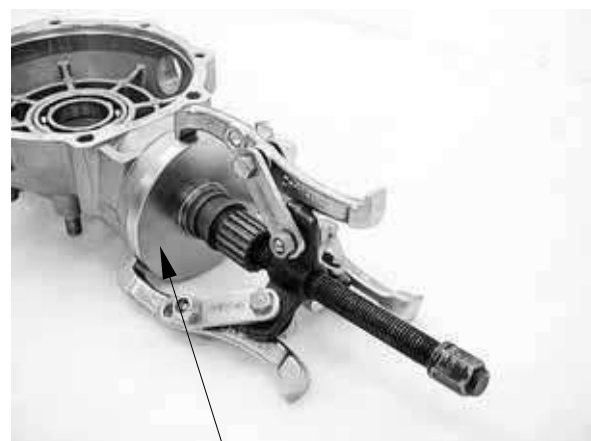
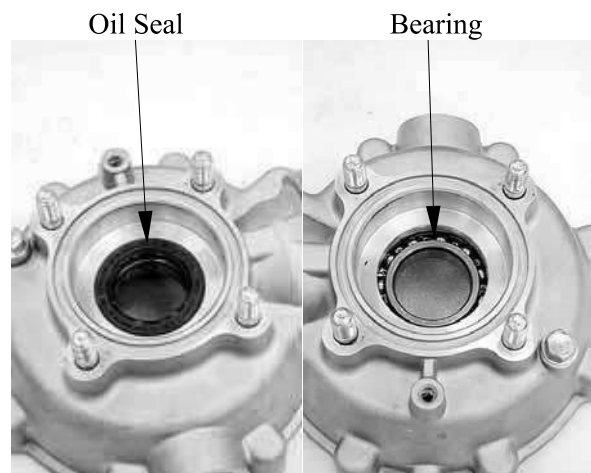


13. DRIVE TRAIN

m

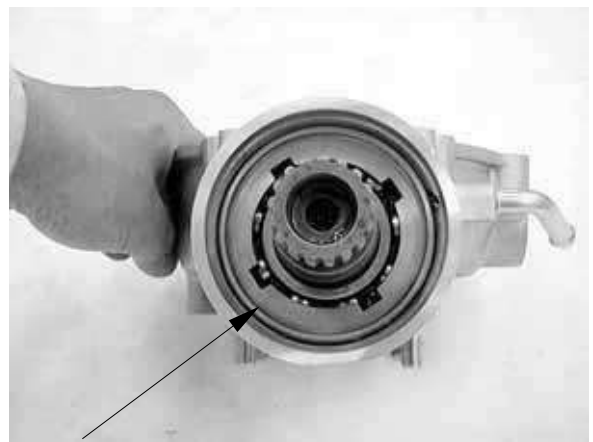


- If there is no abnormal condition, the oil seal or bearing removal is not necessary
- The removed oil seal and bearing must be replaced with new ones.



Water Proof Plate

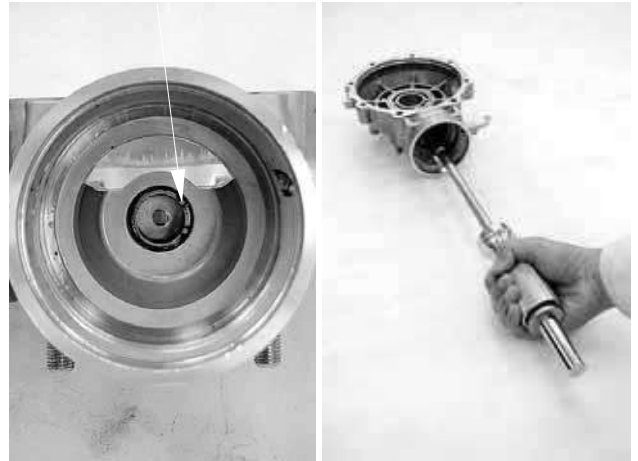
13. DRIVE TRAIN



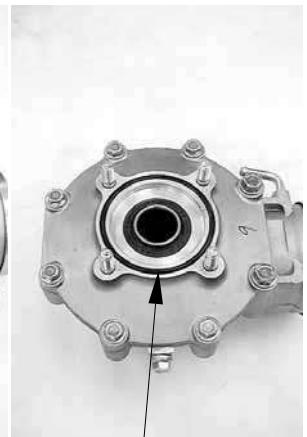
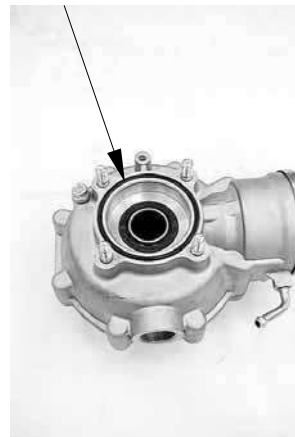
Bearing Lock Nut



13. DRIVE TRAIN

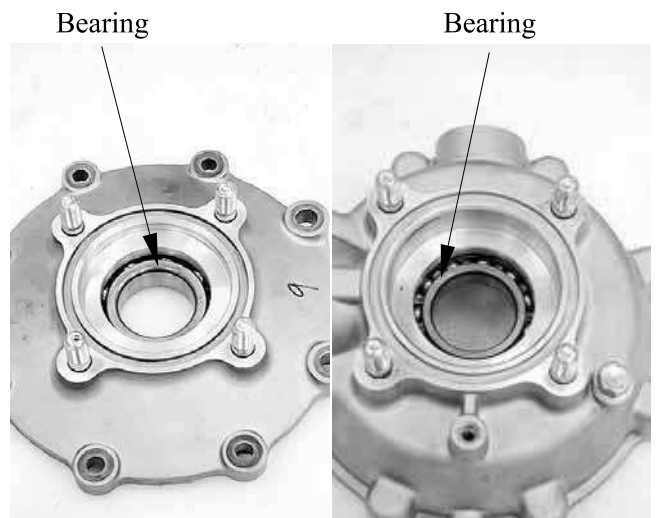


O-ring (Case)

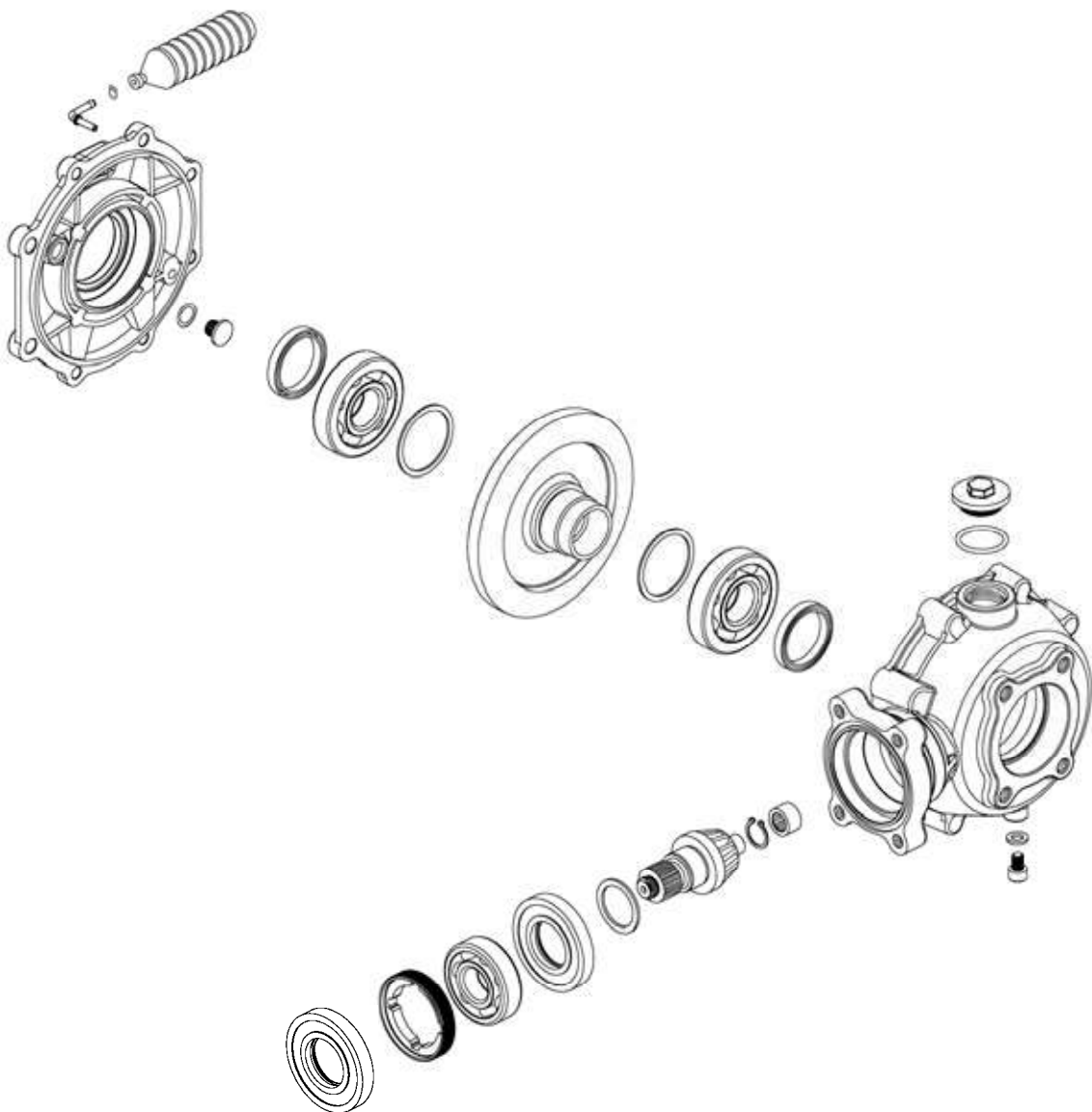


O-ring (Cover)

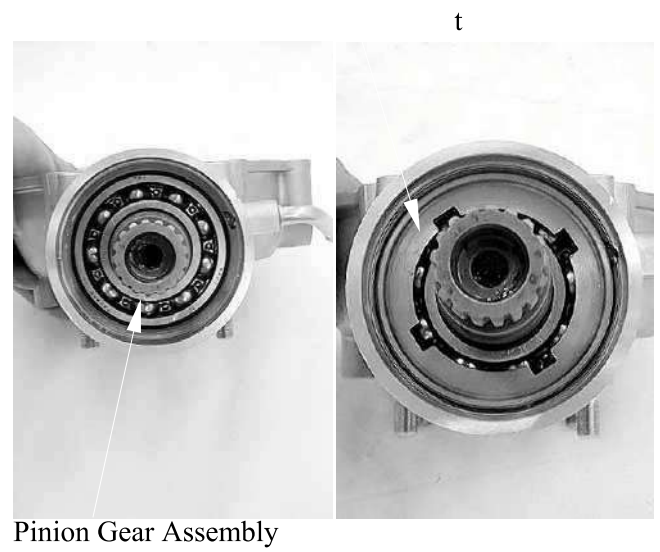
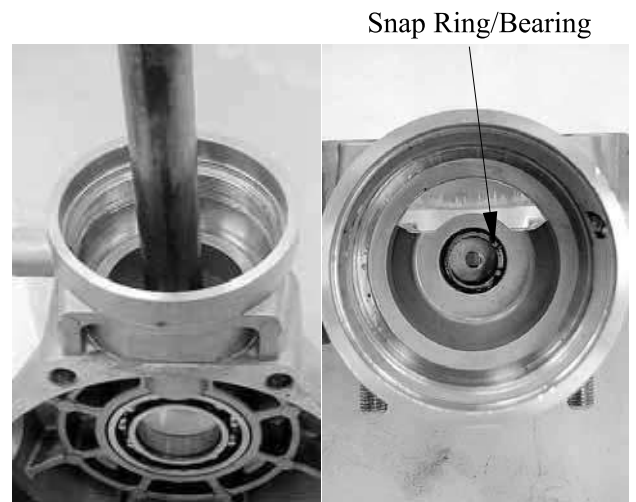
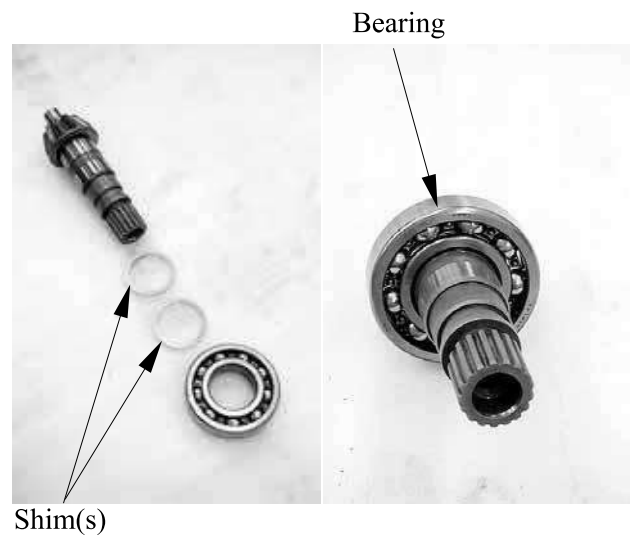
13. DRIVE TRAIN



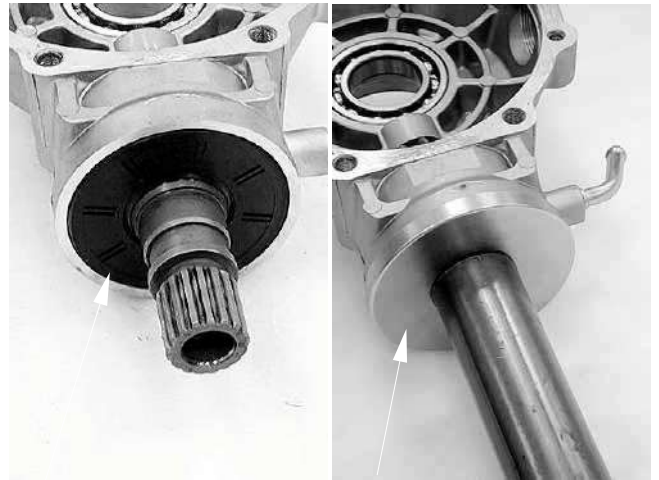
13. DRIVE TRAIN



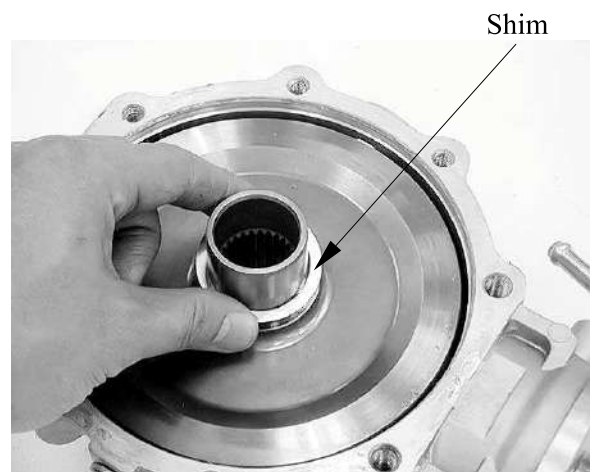
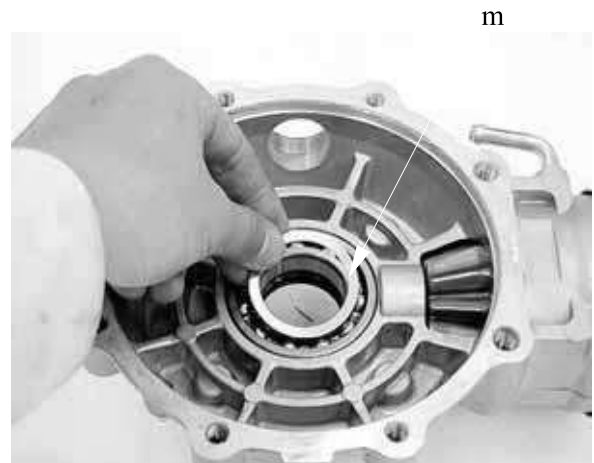
13. DRIVE TRAIN



13. DRIVE TRAIN



13. DRIVE TRAIN



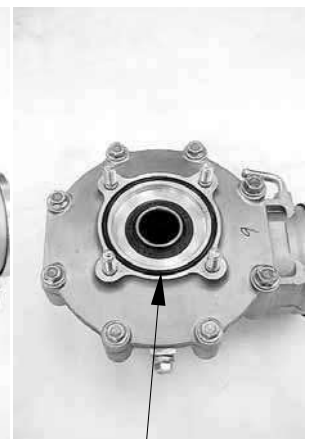
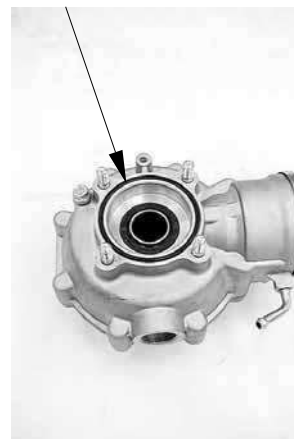
13. DRIVE TRAIN

After the backlash and tooth contact have been checked or adjusted, apply a sealant to the mating surface of the case.



- After the backlash and tooth contact have been checked or adjusted, apply three bond: 1215 to the case bolts.
- It is important to turn the pinion while tightening the bolts. If the ring gear shim is too thick, the gears will lock after only light tightening.

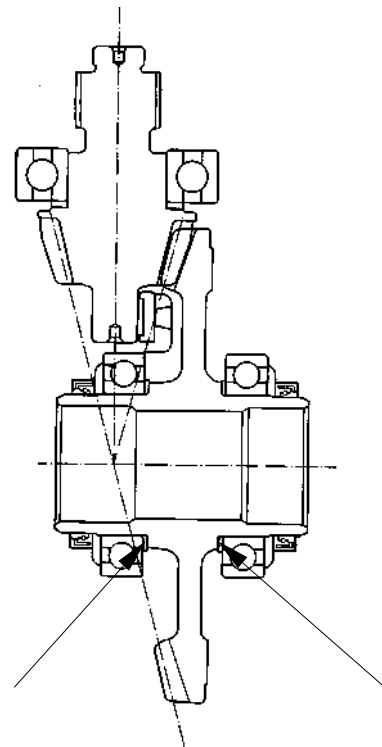
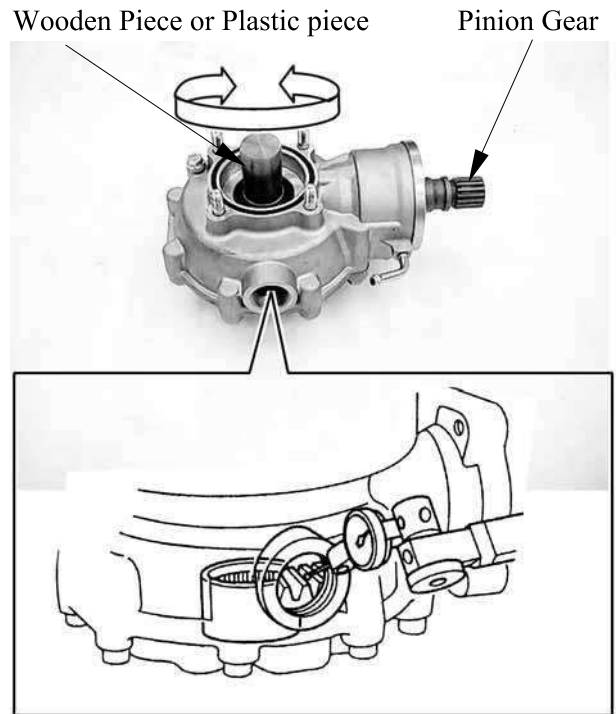
O-ring (Case)



O-ring (Cover)

13. DRIVE TRAIN

gear case.



m

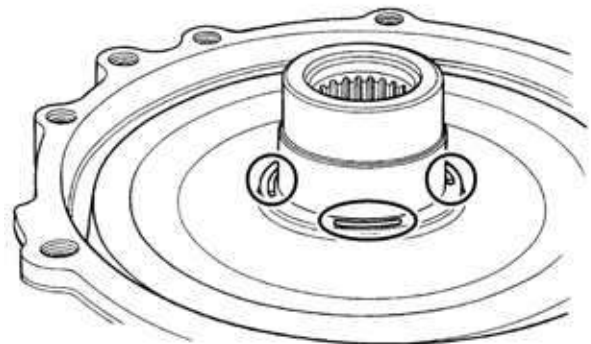
13. DRIVE TRAIN

Adjust the backlash by referring to the chart at the right and using the thickness of the removed shims as a guide.

Backlash	Shim adjustment
Under 0.05 mm (0.002 in)	Increase shim thickness
0.05 – 0.25 mm (0.002 – 0.01 mm)	Correct
Over 0.25 mm (0.01 in)	Decrease shim thickness

Right/Left Shim thickness	
A	1.55 mm (0.062 in)
B	1.5 mm (0.06 in)
C	1.45 mm (0.058 in)

- Do not install the right side shim(s) at this time.
- Apply a small quantity of grease to the solder to prevent them from falling



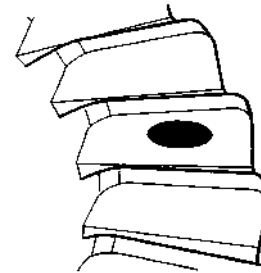
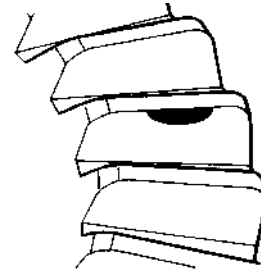
At this time, it is not necessary to apply a sealant to the mating surface of the gear case.

13. DRIVE TRAIN

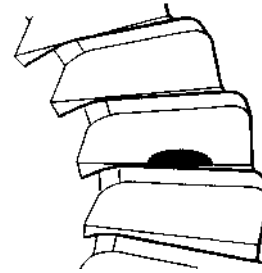


Right/Left Ring Gear Shim thickness	
A	1.55 mm (0.062 in)
B	1.5 mm (0.06 in)
C	1.45 mm (0.058 in)

13. DRIVE TRAIN



gear case cover's O-ring.



13. DRIVE TRAIN

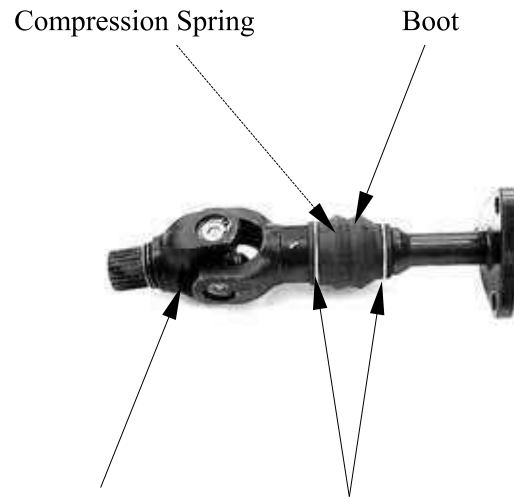
d
shim thickness after the tooth contact has been adjusted, since it may have changed. Adjust the tooth contact and backlash until they are both within specification. If the correct tooth contact cannot be maintained when adjusting the backlash, replace the pinion gear and ring gear as a set.

Pinion Gear Shim thickness	
A	2.05 mm (0.081 in)
B	2 mm (0.079 in)
C	1.95 mm (0.077 in)

13. DRIVE TRAIN



Front Propeller Shaft

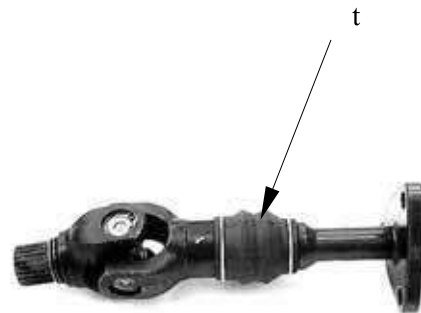


Snap Ring

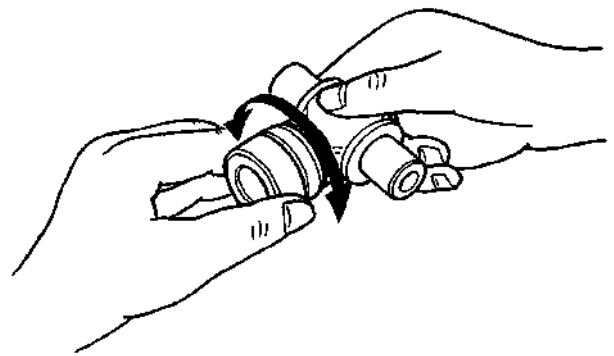


13. DRIVE TRAIN

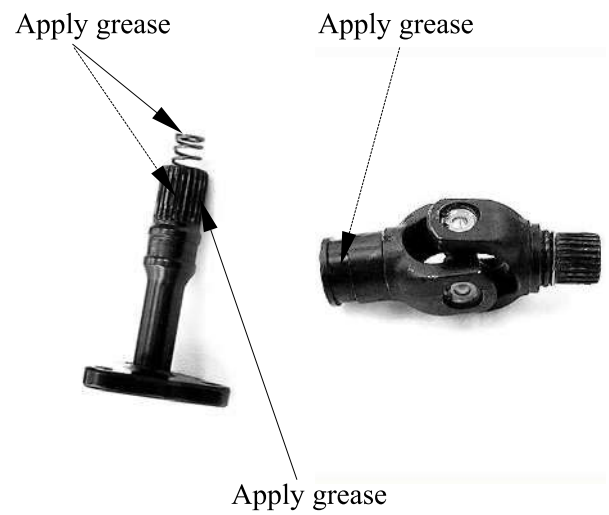
- If there is no abnormal condition, the dust seal or bearing removal is not necessary.
- The removed dust seal and bearing must be replaced with new ones.



13. DRIVE TRAIN

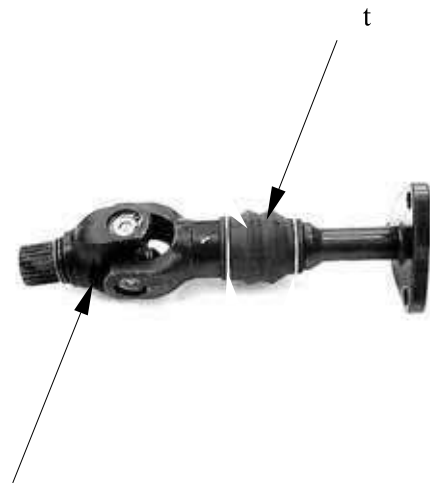


13. DRIVE TRAIN



13. DRIVE TRAIN

The dust boot should be fastened with the spring ring at the grooves in the propeller shaft.



13. DRIVE TRAIN



Snap Ring

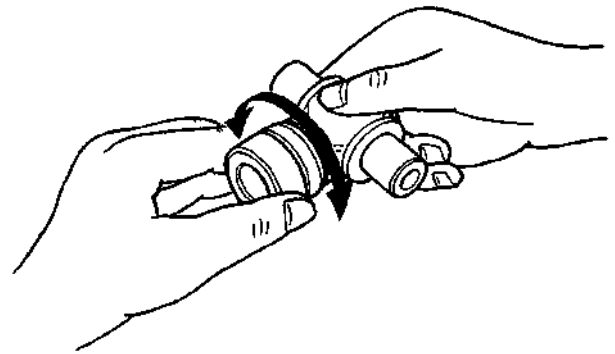


13. DRIVE TRAIN

- If there is no abnormal condition, the dust seal or bearing removal is not necessary.
- The removed dust seal and bearing must be replaced with new ones.



13. DRIVE TRAIN



13. DRIVE TRAIN



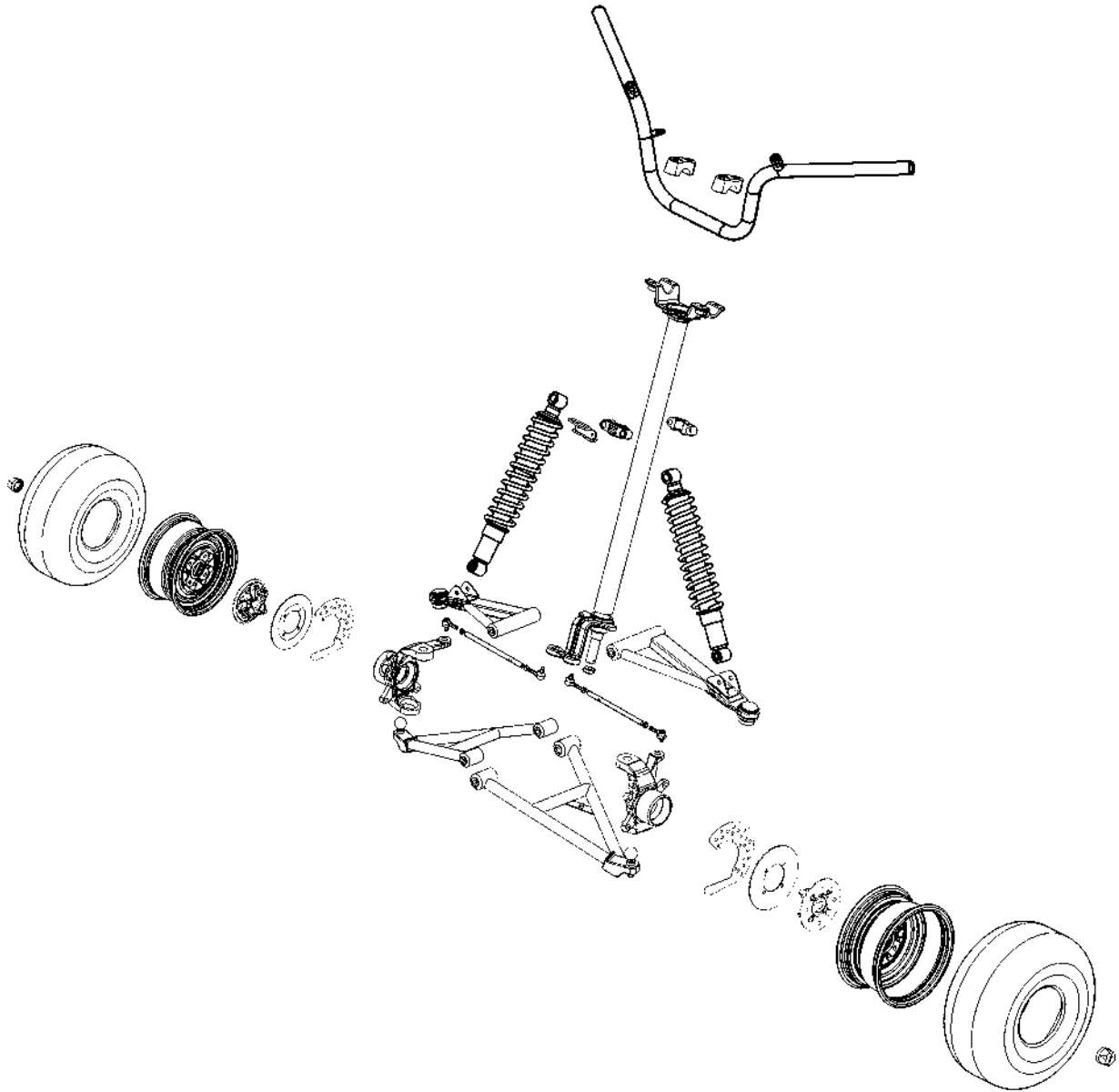
The dust boot should be fastened with the spring ring at the groove in the propeller shaft.



**FRONT WHEEL/FRONT SUSPENSION STEERING
SYSTEM**

SERVICE INFORMATION-----	14- 2
TROUBLESHOOTING-----	14- 3
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14. FRONT WHEEL/FRONT SUSPENSION STEERING SYSTEM



14. FRONT WHEEL/FRONT SUSPENSION/ STEERING SYSTEM

SERVICE INFORMATION

GENERAL INSTRUCTIONS

- Jack the machine front wheel off the ground and be careful to prevent the machine from falling down.
- During servicing, keep oil or grease off the brake disk
- Inspect the brake system before riding.

SPECIFICATIONS

Unit: mm (in)

Item		Standard	Service Limit
Front wheel rim run out	Radial	—	2 (0.08)
	Axial	—	2 (0.08)
Tie rod length		379.75±0.25 (15.19±0.01)	—
Rod-end (tie rod) angle		180°	—

TORQUE VALUES

Steering column nut	7 kgf-m (70 N-m, 50 lbf-ft)	
Front swing arm nut	4.5 kgf-m (45 N-m, 32 lbf-ft)	
Front wheel nut	6.5 kgf-m (65 N-m, 46 lbf-ft)	
Front wheel hub nut	7 kgf-m (70 N-m, 50 lbf-ft)	Castle nut
Knuckle ball joint nut	3 kgf-m (30 N-m, 22 lbf-ft)	Castle nut
Tie-rod ball joint nut	2.1 kgf-m (21 N-m, 16 lbf-ft)	Castle nut
Tie-rod adjusting nut	3.5 kgf-m (35 N-m, 25.5 lbf-ft)	
Front shock absorber mount bolt	4 kgf-m (40 N-m, 29 lbf-ft)	
Handlebar holder bolt	2.5 kgf-m (25 N-m, 18 lbf-ft)	
Steering bracket	2.2 kgf-m (22 N-m, 16 lbf-ft)	

SPECIAL TOOLS

Oil seal and bearing driver	A120E00014
Ball joint remover	A120F00012

14. FRONT WHEEL/FRONT SUSPENSION STEERING SYSTEM

TROUBLESHOOTING

Hard steering (heavy)

- Insufficient tire pressure

Steers to one side or does not track straight

- Uneven front shock absorbers
- Bent front arm
- Bent steering knuckle

Front shock absorber noise

- Slider bending
- Loose arm fasteners
- Lack of lubrication

Front wheel wobbling

- Bent rim
- Excessive wheel bearing play
- Bent spoke plate
- Faulty tire
- Improperly tightened axle nut

Soft front shock absorber

- Weak shock springs
- Insufficient damper oil

14. FRONT WHEEL/FRONT SUSPENSION/ STEERING SYSTEM

FRONT WHEEL REMOVAL/INSPECTION/ INSTALLATION

REMOVAL

Place the machine on a level place.
Remove four nuts from front wheel.

Elevate the front wheels by placing a
suitable stand under the frame.

Support the machine securely so there is
no danger of it falling over.

Remove the wheel and wheel hub nut cap
together.



Wheel Hub Nut Cap

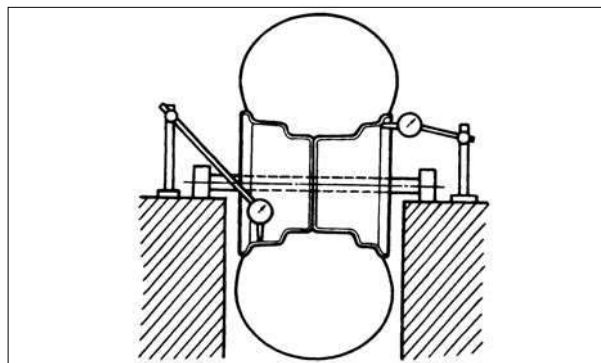
INSPECTION

Measure the wheel run out.
Replace wheel or check bearing play if out
of specification

Rim run out limits:

Vertical: 2 mm (0.08 in)

Lateral: 2 mm (0.08 in)

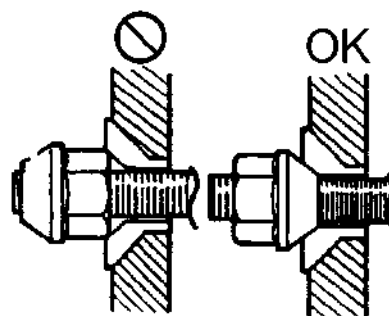


INSTALLATION

When reinstalling a wheel, tighten the
wheel nuts in a crisscross (rather than a
circular) pattern.

Torque: 6.5 kgf-m (65 N-m, 46 lbf-ft)

Be sure the tapered side of the wheel nuts
face the wheel rim.



14. FRONT WHEEL/FRONT SUSPENSION STEERING SYSTEM

FRONT WHEEL HUB REMOVAL/INSPECTION/ INSTALLATION

REMOVAL

Place the machine on a level place.
Remove the front wheel (refer to the
“**FRONT WHEEL
REMOVAL/INSPECTION/
INSTALLATION**” section in this chapter)
Elevate the front wheels by placing a
suitable stand under the frame.

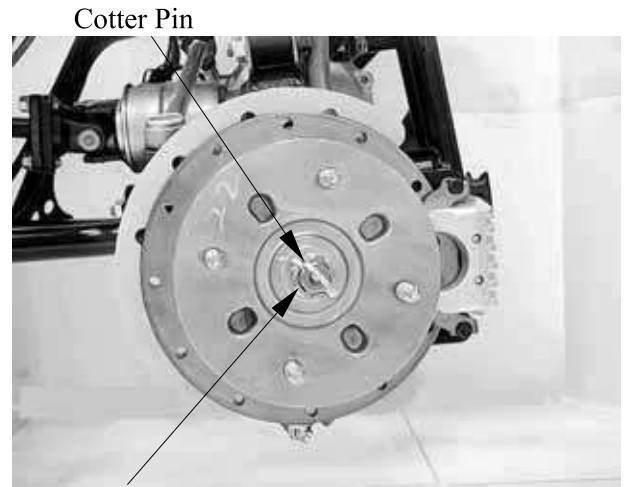
**Support the machine securely so there
is no danger of it falling over.**

Remove the cotter pin.

Apply the front brake and then remove nut,
washer and front wheel hub.

INSPECTION

Check the wheel hub for cracks or damage.
Check the wheel hub splines for wear or
damage.



Nut/Washer



14. FRONT WHEEL/FRONT SUSPENSION/ STEERING SYSTEM

INSTALLATION

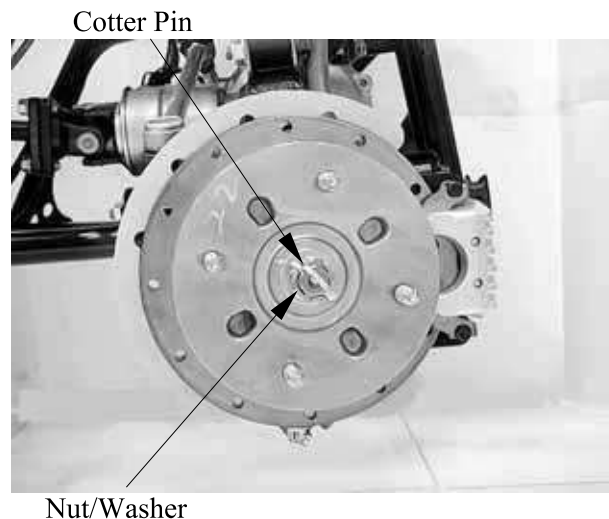
Install the wheel hub, washer and nut.

Apply grease onto the wheel hub splines.

Apply the front brake and then tighten the nut to the specified torque.

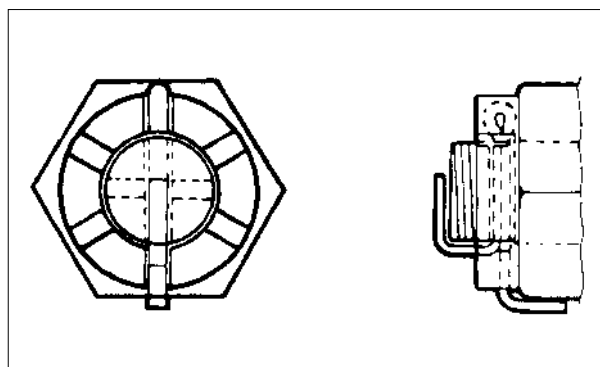
Torque: 7 kgf-m (70 N-m, 50 lbf-ft)

Install the cotter pin and band ends of cotter pin.



- Do not apply oil to the seat of the nut.
- Do not loosen the wheel hub nut after torque tightening. If the wheel hub nut groove is not aligned with the cotter pin hole, align groove with the hole by tightening up on the wheel hub nut.

Always use a new cotter pin.



14. FRONT WHEEL/FRONT SUSPENSION STEERING SYSTEM

FRONT SHOCK ABSORBER REMOVAL/INSPECTION/ INSTALLATION

REMOVAL

Remove the front shock absorber upper mount and lower mount bolts/nuts, then remove the front shock absorber.



Shock Absorber

INSPECTION

Inspect the shock absorber rod.

Bends/damage → Replace the shock absorber assembly.

Inspect the shock absorber.

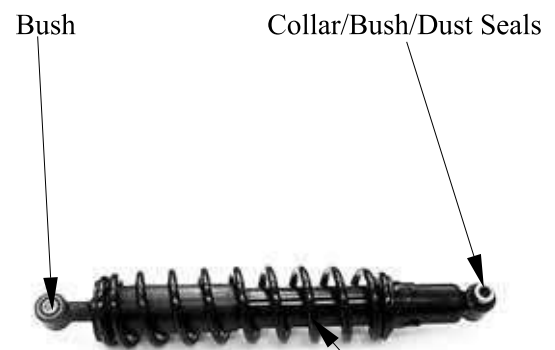
Oil leaks → Replace the shock absorber assembly.

Inspect the spring of the shock absorber by move the spring up and down.

Fatigue → Replace the shock absorber assembly.

Inspect bushes, collar and dust seals.

Wear/damage → Replace.

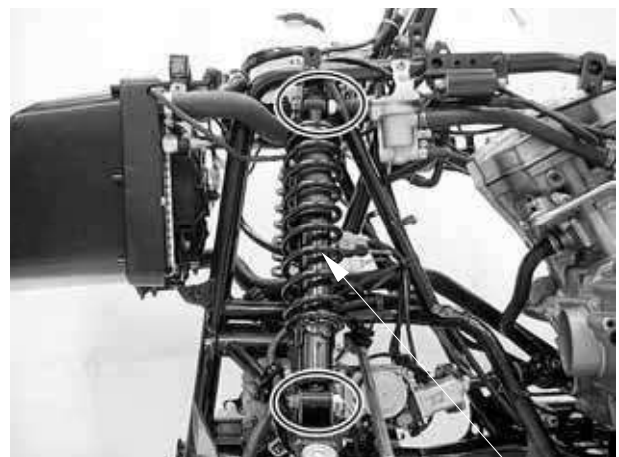


Shock Absorber

INSTALLATION

Apply the grease onto the bushes, then install the shock absorber and tighten the upper mount and lower mount bolts/nuts to the specified torque.

Torque: 4 kgf-m (40 N-m, 29 lbf-ft)



Shock Absorber

14. FRONT WHEEL/FRONT SUSPENSION/ STEERING SYSTEM

STEERING KNUCKLE REMOVAL/INSPECTION/ INSTALLATION

REMOVAL

Elevate the front wheels by placing a suitable stand under the frame.

Support the machine securely so there is no danger of it falling over.

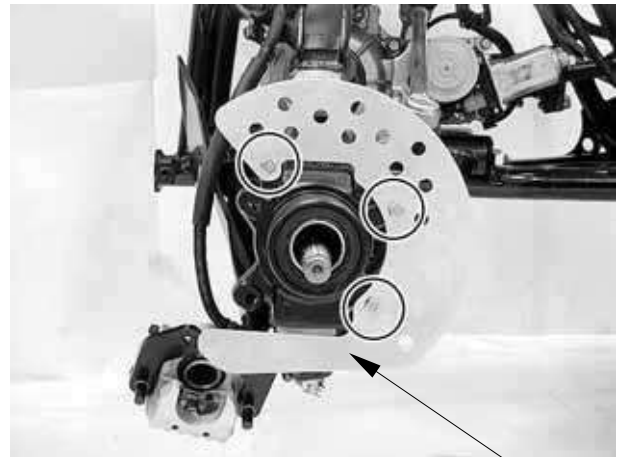
Remove the front wheel hub (refer to the “**FRONT WHEEL HUB REMOVAL/INSPECTION/INSTALLATION**” section in this chapter)

Remove the three bolts and brake disc protection plate.

Remove the cotter pin and nut from the tie-rod end.

Remove the cotter pin and nut from the upper arm end.

Remove the cotter pin and nut from the steering knuckle end.



Plate



Steering Knuckle

14. FRONT WHEEL/FRONT SUSPENSION STEERING SYSTEM

Release the tie-rod ball joint/upper arm ball joint off the knuckle, using the special tool according to the following instructions.

Special tool:

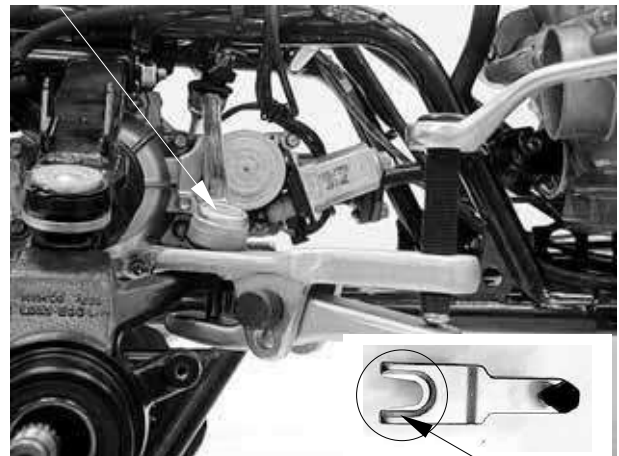
Ball joint remover A120F00012

Apply grease to the ball joint remover at the point shown.

This will ease installation of the tool and prevent damage to the pressure bolt threads. Insert the jaws carefully, making sure that you do not damage the ball joint boot. Adjust the jaw spacing by turning the pressure bolt.

Tighten the pressure bolt with a wrench

Tie-rod



Apply grease

Upper Arm



Apply grease

Release the ball joints of the steering knuckle, using the special tool according to the following instructions.

Special tool: Ball joint remover F012

Apply grease to the ball joint remover at the point shown.

This will ease installation of the tool and prevent damage to the pressure bolt threads. Insert the jaws carefully, making sure that you do not damage the ball joint boot. Adjust the jaw spacing by turning the pressure bolt.

Tighten the pressure bolt with a wrench until the ball joint stud pops loose.

Remove the knuckle from the upper and lower arms

Steering Knuckle



Apply grease

14. FRONT WHEEL/FRONT SUSPENSION/ STEERING SYSTEM

INSPECTION

Inspect the knuckle end boot for wear or damage.

If any damages are found, replace the knuckle end with a new one.



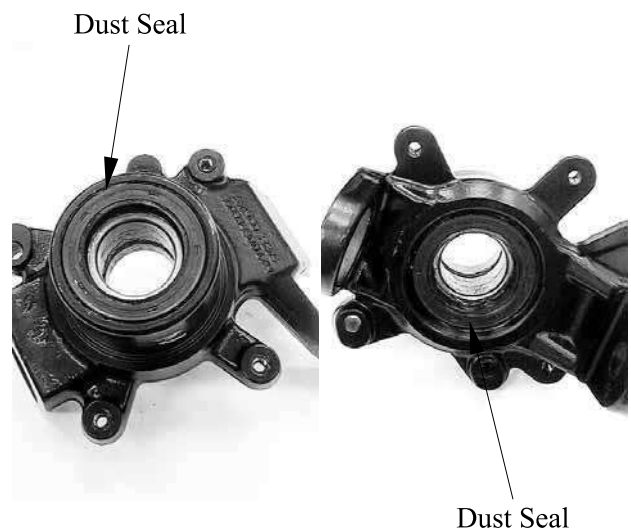
Inspect the brake disc protection plate for damage.

If any damages are found, replace the brake disc protection plate with a new one.



Inspect the dust seal lips for wear or damage.

If any damages are found, replace the dust seal with a new one.



14. FRONT WHEEL/FRONT SUSPENSION STEERING SYSTEM

INSTALLATION

Apply lightweight lithium-soap base grease to the bearings of the steering knuckle and lips of the dust seal before install the steering knuckle.

Install the steering knuckle onto the upper and lower front arms and tighten the nuts to the specified torque.

Torque: 3 kgf-m (30 N-m, 22 lbf-ft)

Install the all cotter pins and band ends of cotter pins.

Always use a new cotter pin.

Install the tie-rod onto the steering knuckle and tighten the nut to the specified torque.

Torque: 2.1 kgf-m (21 N-m, 16 lbf-ft)

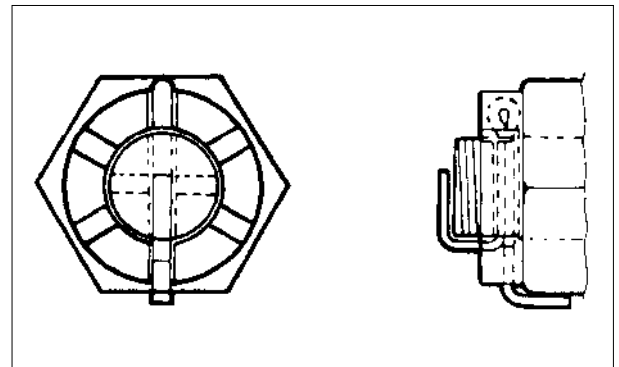
Install the cotter pin and band end of cotter pin.

Always use a new cotter pin.

- Do not apply oil to the seat of the nuts.
- Do not loosen the nuts after torque tightening. If the nuts groove is not aligned with the cotter pins hole, align groove with the hole by tightening up on the nuts.



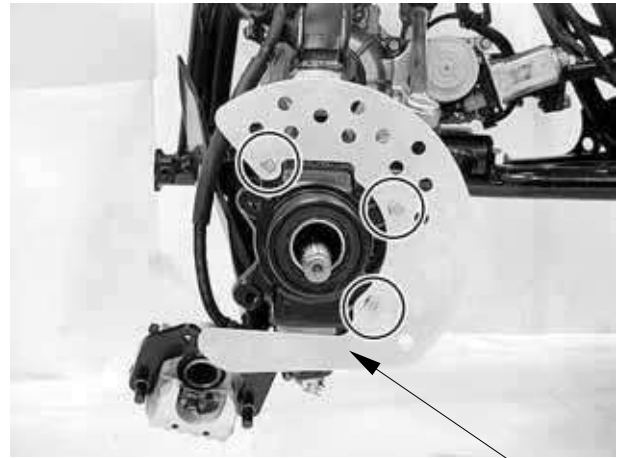
Steering Knuckle



14. FRONT WHEEL/FRONT SUSPENSION/ STEERING SYSTEM

KYMCO
MXU 500

Install the brake disc protection plate and then tighten the three bolts securely.



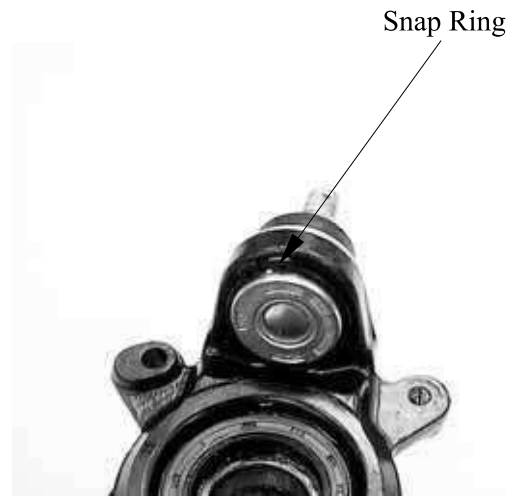
Plate

14. FRONT WHEEL/FRONT SUSPENSION STEERING SYSTEM

STEERING KNUCKLE DISASSEMBLY/ASSEMBLY

DISASSEMBLY

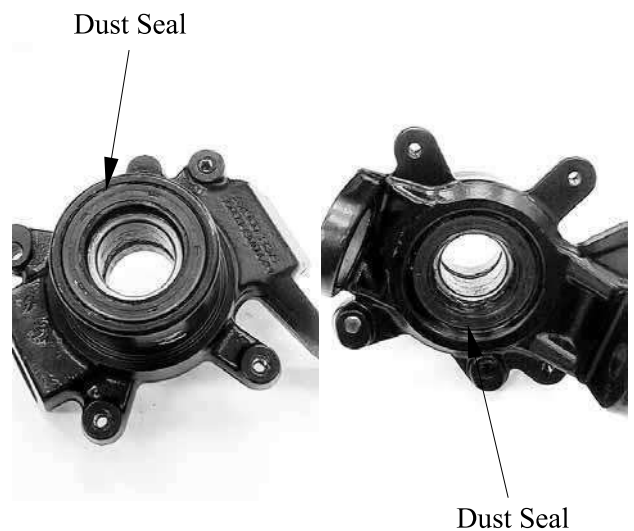
Remove the steering knuckle (refer to the “STEERING KNUCKLE REMOVAL/INSPECTION/INSTALLATION” section in this chapter)



Remove the knuckle end by using the appropriate collar.



Remove the dust seals.



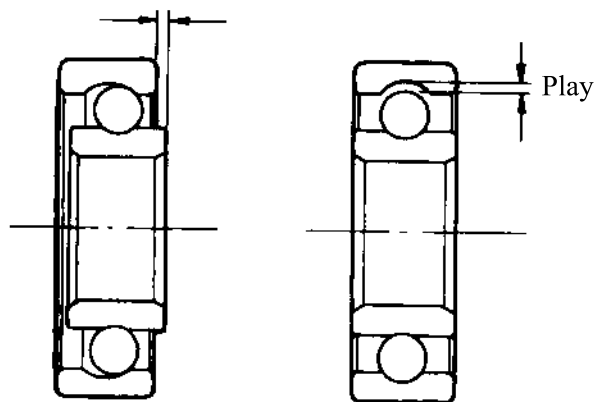
14. FRONT WHEEL/FRONT SUSPENSION/ STEERING SYSTEM

Inspect the inner race play of the bearing by hand while it is in the steering knuckle.

Rotate the inner race by hand to inspect for abnormal noise and smooth rotation.

If there is anything unusual, replace the bearing with a new one.

Make sure to check bearing in the same manner.



Remove the bearings using the appropriate bar, then remove the spacer.



ASSEMBLY

Apply lightweight lithium-soap base grease to the new bearings of the steering knuckle and lips of the new dust seal before install them.



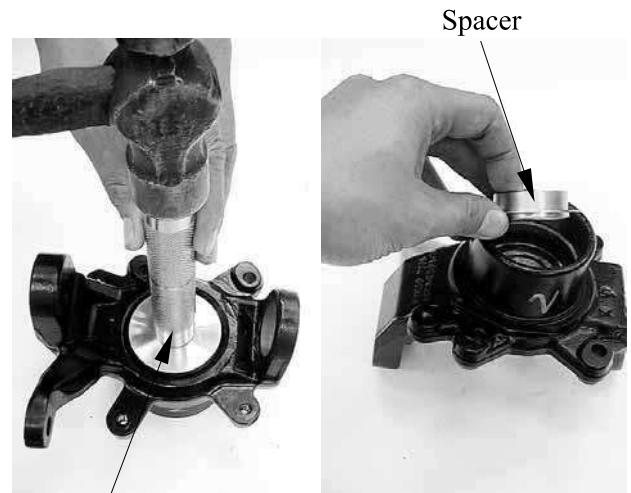
14. FRONT WHEEL/FRONT SUSPENSION STEERING SYSTEM

Install the new inner bearing by using the special tool.

Special tool:
Oil seal and bearing driver A120E00014

Install the spacer into the steering knuckle.

Make sure the long side of the spacer faces the outer bearing



Bearing Driver

Install the new outer bearing by using the special tool.

Special tool:
Oil seal and bearing driver A120E00014



Bearing Driver

Install the new dust seals by using the special tool.

Special tool:
Oil seal and bearing driver A120E00014

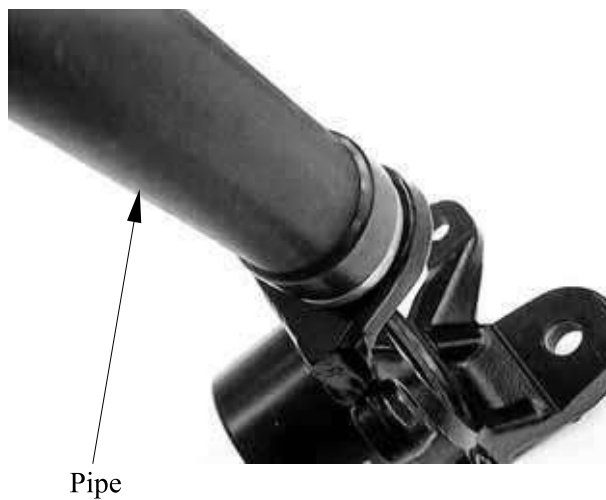


Dust Seal

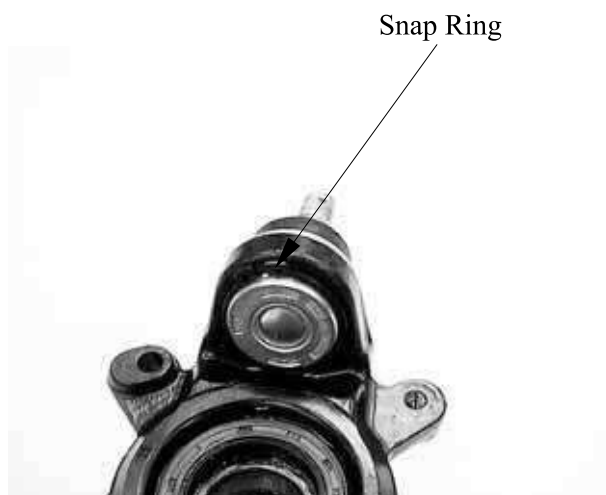
14. FRONT WHEEL/FRONT SUSPENSION/ STEERING SYSTEM

KYMCO
MXU 500

Install the steering knuckle end by using a
appropriate pipe.



Install the snap ring.



14. FRONT WHEEL/FRONT SUSPENSION STEERING SYSTEM

FRONT ARMS INSPECTION/REMOVAL/ INSTALLATION

INSPECTION

Remove the brake disc protection plate (refer to the “**STEERING KNUCKLE REMOVAL/INSPECTION/INSTALLATION**” section in this chapter)
Remove the front shock absorber (refer to the “**FRONT SHOCK ABSORBER REMOVAL/INSPECTION/INSTALLATION**” section in this chapter).



Steering Knuckle

Remove the cotter pin and nut from the upper arm end.

Remove the cotter pin and nut from the steering knuckle end.

Remove the upper arm and steering knuckle ends (refer to the “**STEERING KNUCKLE REMOVAL/INSPECTION/INSTALLATION**” section in this chapter).

Check the front upper arm bracket of the frame.

If bent, cracked or damaged, repair or replace the frame.

Check the tightening torque of the front upper arm securing nut.

Torque: 4.5 kgf-m (45 N-m, 32 lbf-ft)

Check the front upper arm side play by moving it from side to side.

If side play noticeable, replace the inner bushes as a set.



14. FRONT WHEEL/FRONT SUSPENSION/ STEERING SYSTEM

Check the front upper arm vertical movement by moving it up and down. If vertical movement is tight, binding or roughs, replace the inner bushes as a set.



Check the front lower arm bracket of the frame.

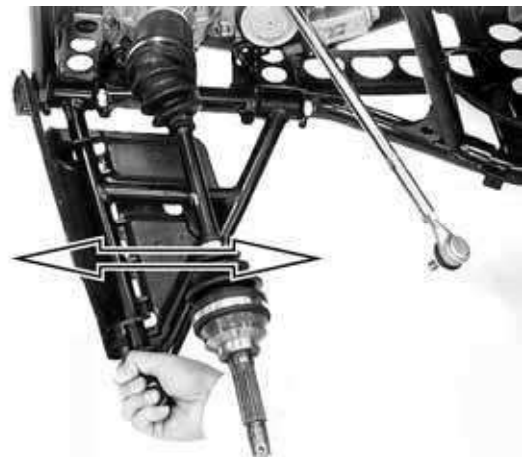
If bent, cracked or damaged, repair or replace the frame.

Check the tightening torque of the front lower arm securing nuts.

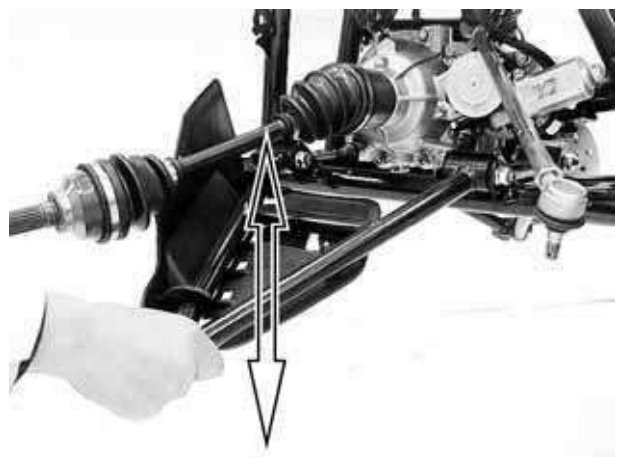
Torque: 4.5 kgf-m (45 N-m, 32 lbf-ft)

Check the front lower arm side play by moving it from side to side.

If side play noticeable, replace the inner bushes as a set.



Check the front lower arm vertical movement by moving it up and down. If vertical movement is tight, binding or roughs, replace the inner bushes as a set.

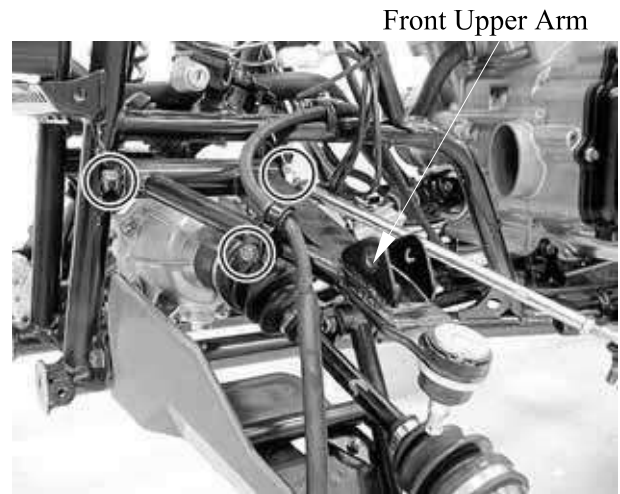


14. FRONT WHEEL/FRONT SUSPENSION STEERING SYSTEM

REMOVAL

Remove the bolt on the hose clamp and then remove the brake hose from front upper arm.

Remove the mounting bolt/nut from the front upper arm, then remove the front upper arm.



Remove the mounting two bolts/nuts from the front lower arm, then remove the front lower arm.

INSTALLATION

Apply the grease onto the bushes.

Install the front lower arm/front upper arm and bolts onto the frame.
Install and tighten the nuts to the specified torque.

Torque: 4.5 kgf-m (45 N-m, 32 lbf-ft)



14. FRONT WHEEL/FRONT SUSPENSION/ STEERING SYSTEM

FRONT ARMS DISASSEMBLY/INSPECTION/ ASSEMBLY

DISASSEMBLY

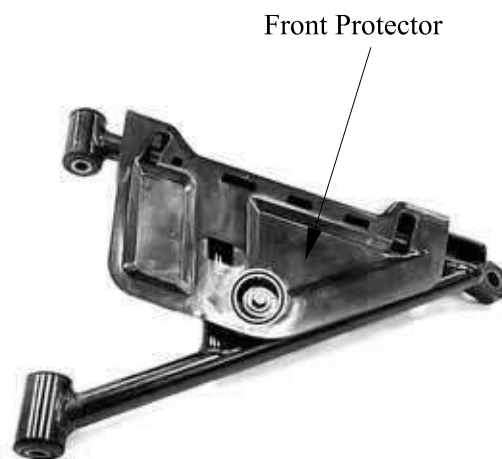
Upper arm

Remove the snap ring.
Remove the upper arm end by using a
appropriate collar.



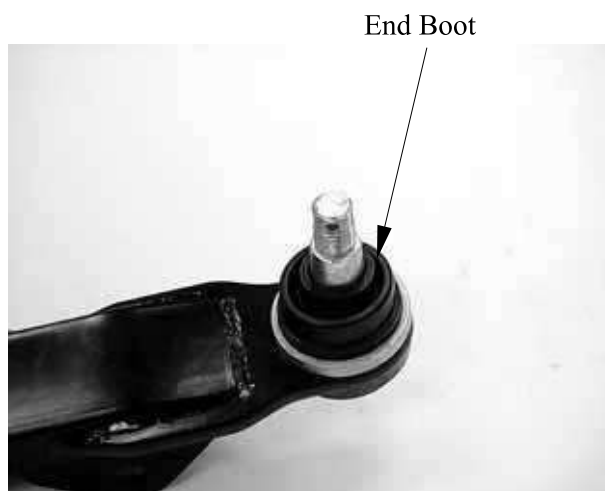
Lower arm

Remove the bolt and then remove the front
protector.



INSPECTION

Inspect the upper arm end boot for wear or
damage.
If any damages are found, replace the upper
arm end with a new one.



14. FRONT WHEEL/FRONT SUSPENSION STEERING SYSTEM

Inspect the front upper arm.
Cracks/bends/damage →Replace.

Do not attempt to straighten a bent arm, this may dangerously weaken the arm.

Inspect bushes.
Wear/damage →Replace.

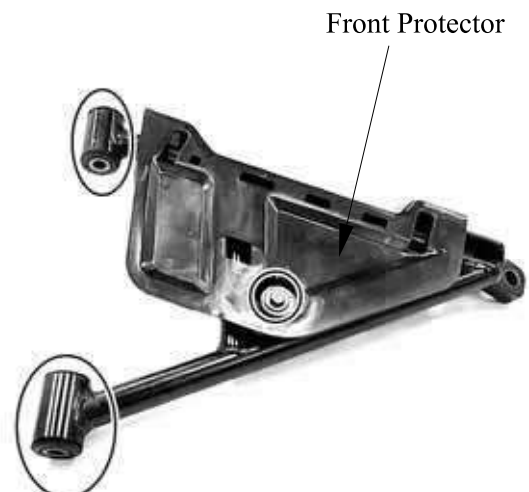


Inspect the front lower arm.
Cracks/bends/damage →Replace.

Do not attempt to straighten a bent arm, this may dangerously weaken the arm.

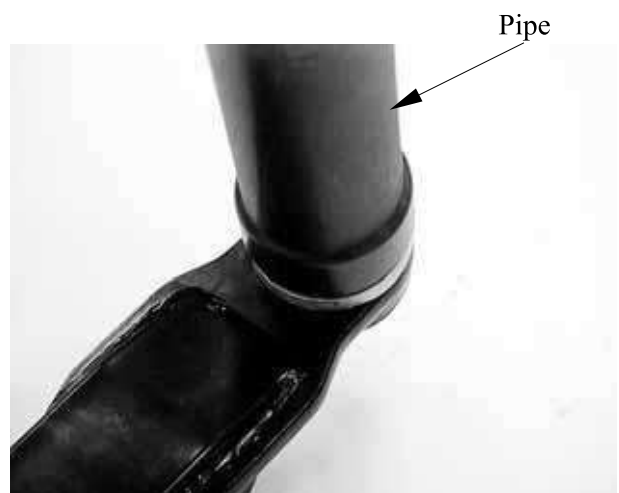
Inspect bushes.
Wear/damage →Replace.

Inspect the front protector for damage.
If any damages are found, replace the front protector with a new one.



ASSEMBLY

Install the upper arm end by using a appropriate pipe.



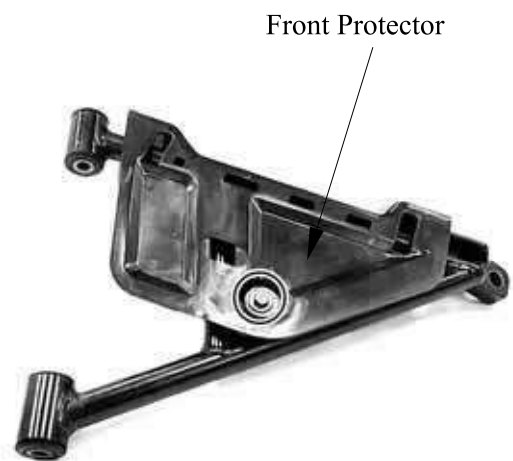
14. FRONT WHEEL/FRONT SUSPENSION/ STEERING SYSTEM

KYMCO
MXU 500

Install the snap ring.



Install the front protector, then install and tighten the bolt securely.



14. FRONT WHEEL/FRONT SUSPENSION STEERING SYSTEM

TIE-ROD REMOVAL/INSPECTION/ INSTALLATION

REMOVAL

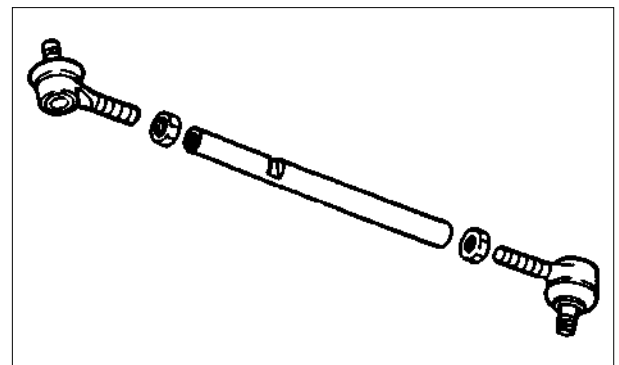
Remove the cotter pin and nut from tie-rod end steering knuckle side (refer to the “STEERING KNUCKLE REMOVAL/INSPECTION/INSTALLATION” section in this chapter).

Remove the cotter pin and nut from tie-rod end steering column side.

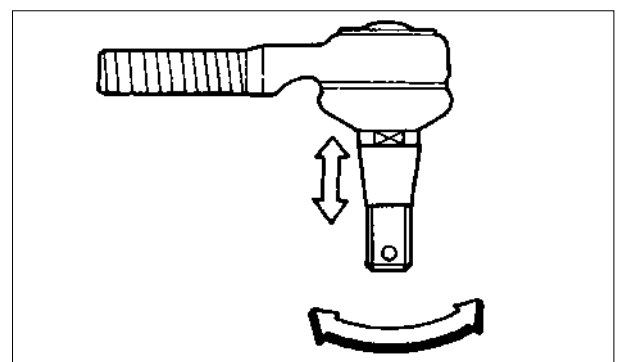


INSPECTION

Inspect the tie-rod.
Bend/damage → Replace



Check the tie-rod end movement.
Tie-rod end exists free play or turns roughly
→ Replace
Check the tapered surface of the tie-rod.
Pitting/wear/damage → Replace



14. FRONT WHEEL/FRONT SUSPENSION/ STEERING SYSTEM

Adjustment steps:

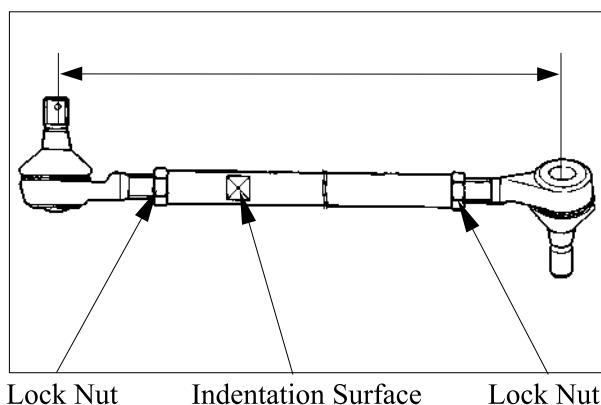
(The following procedures are done on both tie-rods, right and left.)

Loosen the lock nuts.

Adjust the tie-rod length by tuning both tie-rod ends.

Tie rod length:

379.75±0.25 mm (15.19±0.01 in)

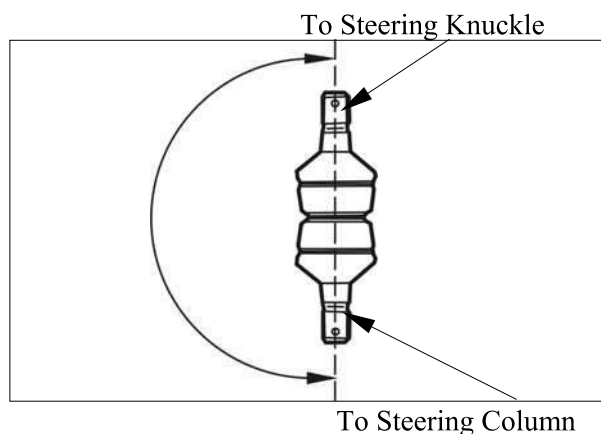


Set the rod-end (steering column side) in an angle where the indentation surface of the tie-rod is parallel to the rod-end shaft, and then tighten the lock nut.

Torque: 3.5 kgf-m (35 N-m, 25.5 lbf-ft)

Set the other rod-end (steering knuckle side) in an angle as shown (right-hand tie-rod and left-hand tie-rod), and then tighten the lock nut.

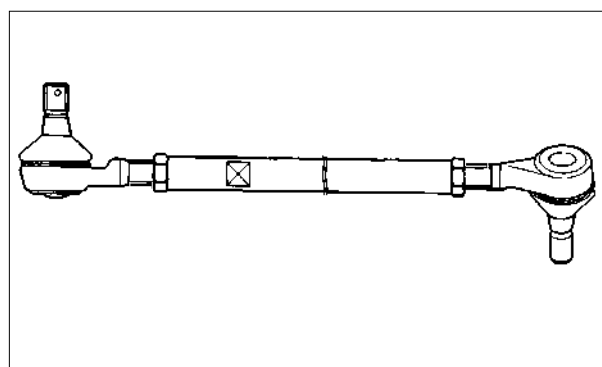
Rod-end (tie rod) angle: 180°



Torque: 3.5 kgf-m (35 N-m, 25.5 lbf-ft)

After making adjustment on both tie rods be sure to mark them R and L for identification.

The threads on both rod-end must be of the same length.



14. FRONT WHEEL/FRONT SUSPENSION STEERING SYSTEM

INSTALLATION

Install the tie-rod end onto the steering knuckle and steering column, then tighten the nuts.

Torque:

Steering knuckle side:

2.1 kgf-m (21 N-m, 16 lbf-ft)

Steering column side:

2.1 kgf-m (21 N-m, 16 lbf-ft)

Be sure that the rod-end on the indentation surface side is connected to the steering knuckle.

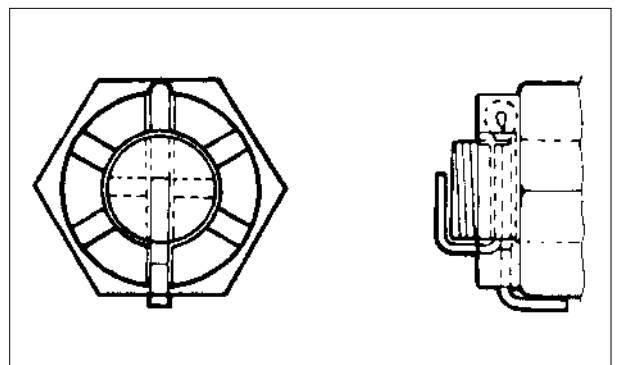


Install the all cotter pins and band ends of cotter pins.

Always use a new cotter pin.



- Do not apply oil to the seat of the nuts.
- Do not loosen the nuts after torque tightening. If the nuts groove is not aligned with the cotter pins hole, align groove with the hole by tightening up on the nuts.



14. FRONT WHEEL/FRONT SUSPENSION/ STEERING SYSTEM

HANDLEBAR REMOVAL/INSPECTION/ INSTALLATION

REMOVAL

Remove the frame cover (refer to the “FRAME COVERS” section in the chapter 2).

Remove the two bolts and then remove left master cylinder from the handlebar. Remove the band and then remove the brake light switch wire from the handlebar.

Remove the two screws and then remove the left handlebar switch from the handlebar.

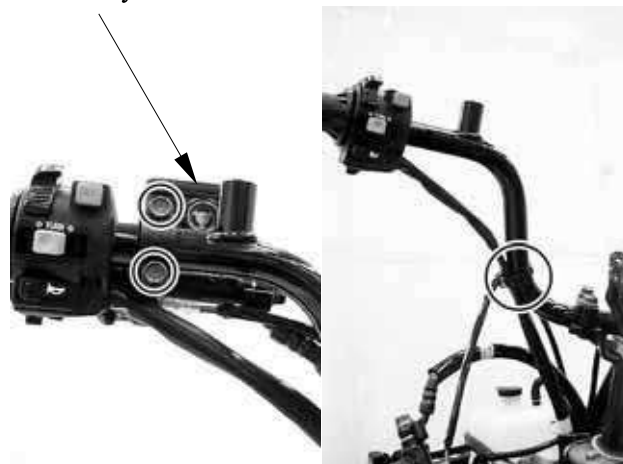
Remove the two screws and then remove the throttle lever assembly.

Remove the nut then remove the choke knob from the handlebar.

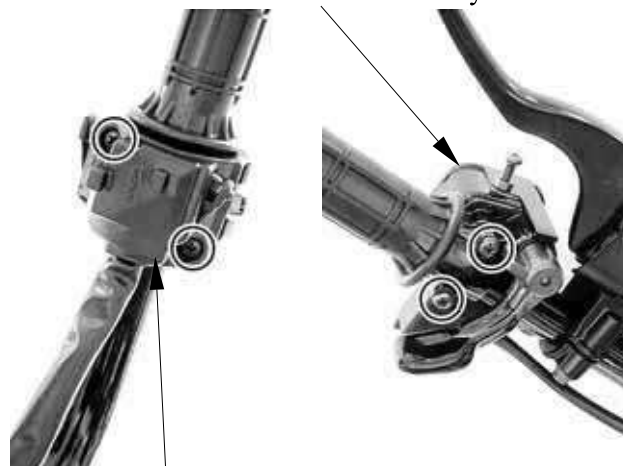
Remove the band and then remove the brake light wire and 2WD/4WD select switch wire from the handlebar.

Remove the two bolts and then remove the master right cylinder from the handlebar.

Master Cylinder



Throttle Lever Assembly

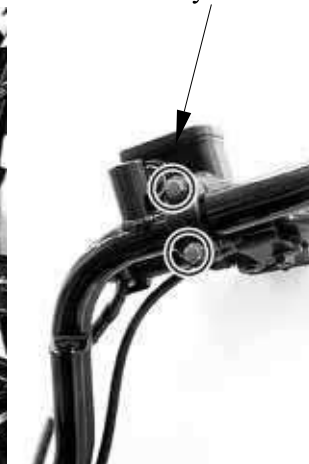


Left Handlebar Switch

Choke Knob



Master Cylinder



14. FRONT WHEEL/FRONT SUSPENSION STEERING SYSTEM

Remove the four bolts, then remove the handlebar holders



Handlebar Holders

INSPECTION

Inspect the handlebar.
Cracks/bends/damage → Replace.

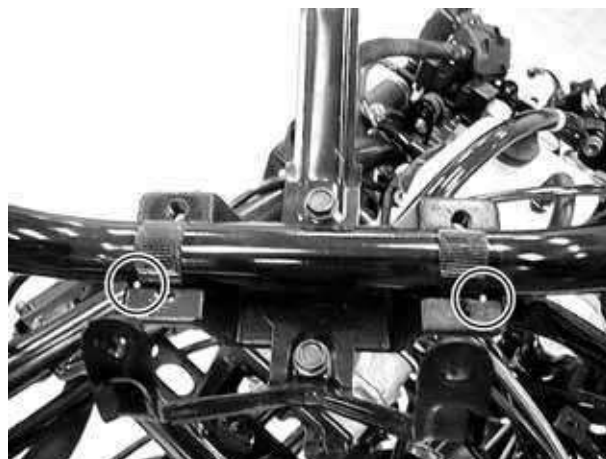


INSTALLATION

Install handlebar and handlebar holder, then tighten the four bolts.

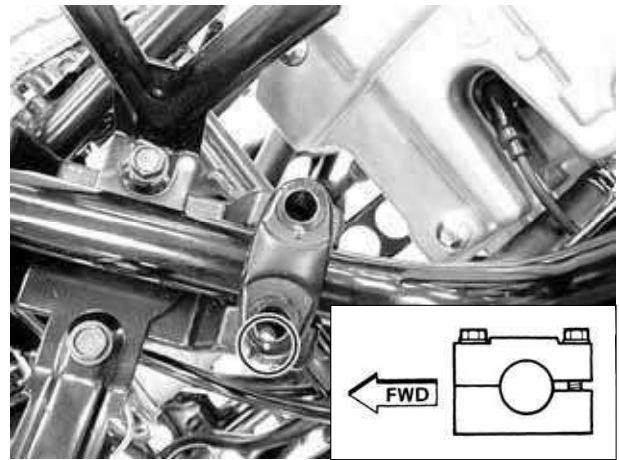
Torque: 2.5 kgf-m (25 N-m, 18 lbf-ft)

Align the mark on the handlebar with the lower handlebar holder surface.



14. FRONT WHEEL/FRONT SUSPENSION/ STEERING SYSTEM

- Be sure the handlebar holder mark face to front.
- First tighten the bolts on the front side of the handlebar holder, and then tighten the bolts on the rear side.



Install the handlebar switch by aligning the pin on the handlebar switch with the hole in the handlebar and then tighten the two screws securely.



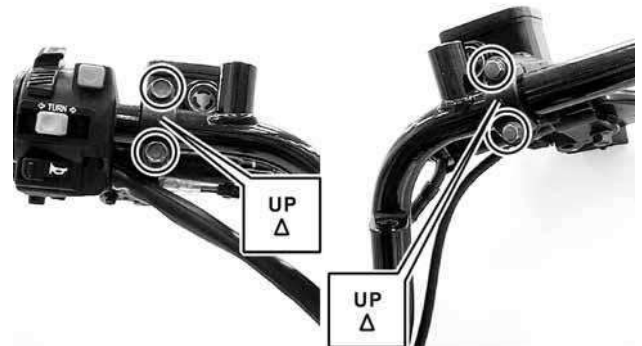
Place the right and left brake master cylinder on the handlebar and install the master cylinder holder with the “UP” mark facing up, aligning the punch mark on the handlebar with the holder joint seam. First tighten the upper bolt and then tighten the lower blot.

Torque: 1.2 kgf-m (12 N-m, 8.6 lbf-ft)



14. FRONT WHEEL/FRONT SUSPENSION STEERING SYSTEM

KYMCO
MXU 500



Install the throttle assembly by aligning the upper holder lip with the mark in the handlebar and then install the lower holder and tighten the two screws securely.



14. FRONT WHEEL/FRONT SUSPENSION/ STEERING SYSTEM

STEERING COLUMN REMOVAL/INSPECTION/ INSTALLATION

REMOVAL

Remove frame covers (refer to the “**FRAME COVERS**” section in the chapter 2).

Remove the tie-rods (refer to the “**TIE-ROD REMOVAL/INSPECTION/INSTALLATION**” section in this chapter).

Remove the handlebar (refer to the “**HANDLEBAR REMOVAL/INSPECTION/INSTALLATION**” section in this chapter).

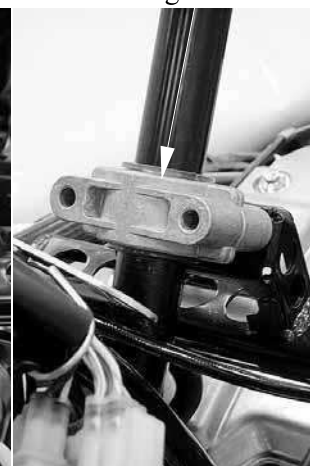
Remove the two bolts and remove the cable holder.

Remove the steering brackets and dust seal.

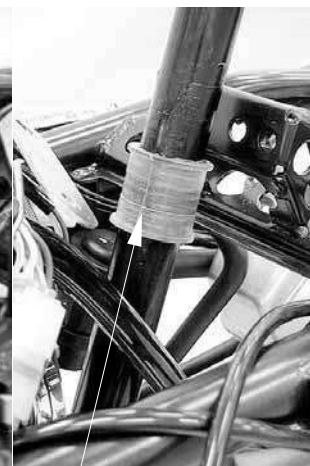
Cable Holder



Steering Bracket



Steering Bracket



Dust Seal

14. FRONT WHEEL/FRONT SUSPENSION STEERING SYSTEM

Remove the cotter pin and nut from the steering column under the frame body, then remove steering column.



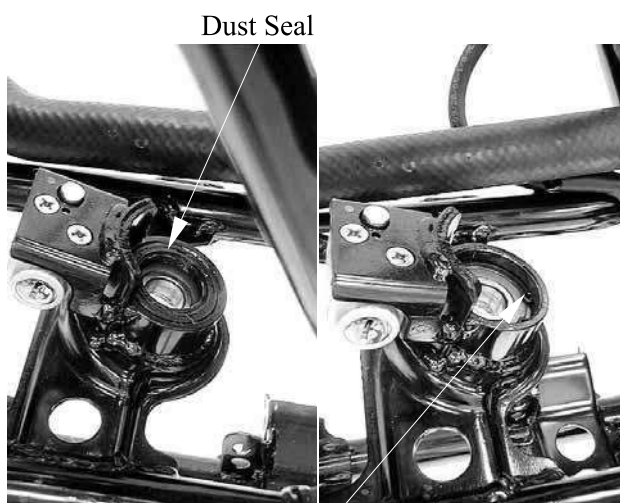
Remove the collar and dust seal.



Collar

Dust Seal

Remove the dust seal.
Remove the snap ring.



Dust Seal

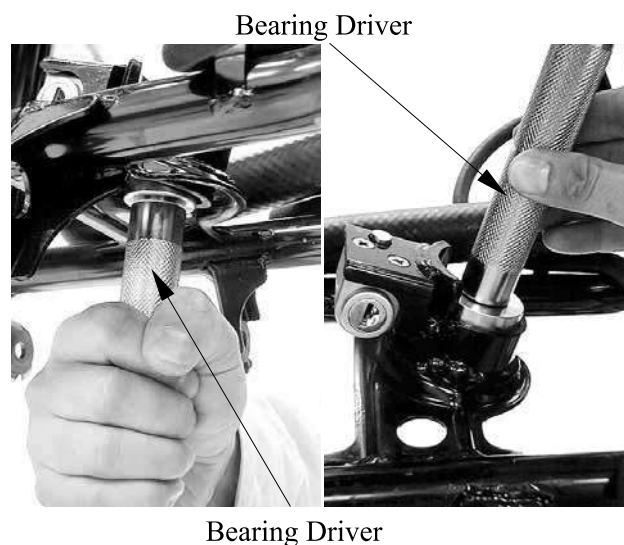
Snap Ring

14. FRONT WHEEL/FRONT SUSPENSION/ STEERING SYSTEM

Replace the bearing by using the special tool.

Special tool:

Oil seal and bearing driver A120E00014



INSPECTION

Inspect the steering column.
Bends/damage → Replace.

Do not attempt to straighten a bent steering column, this may dangerously weaken the steering column.

Inspect the steering brackets and oil seal.
Wear damage → Replace.



INSTALLATION

Apply the grease onto the collar, dust seals, and bearing.

Install the steering column and collar, then tighten the nut under the frame body.

Torque: 7 kgf-m (70 N-m, 50 lbf-ft)

Install the cotter pin and band ends of cotter pin.

Always use a new cotter pin.



14. FRONT WHEEL/FRONT SUSPENSION STEERING SYSTEM

 **KYMCO**
MXU 500

Install the dust seal, steering brackets and cable holder.
Install and tighten the two bolts to the specified torque.

Torque: 2.2 kgf-m (22 N-m, 16 lbf-ft)

Steering Bracket



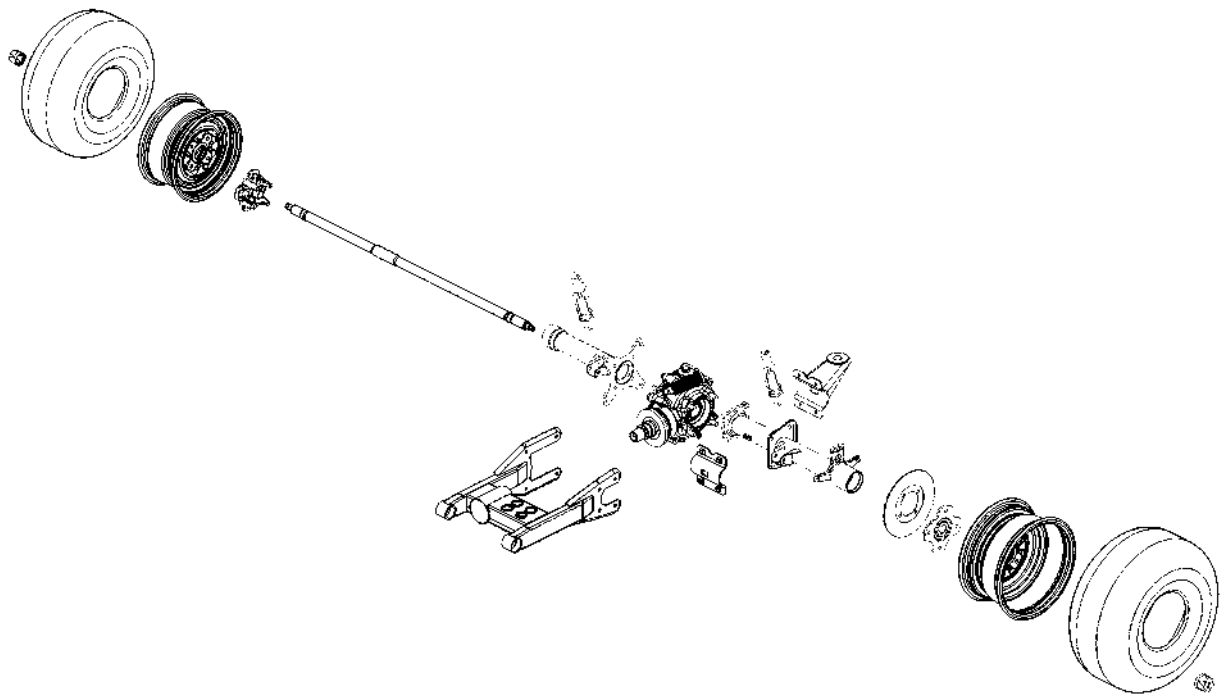
Cable Holder



REAR WHEEL/AXLE/SHOCK ABSORBER/SWING ARM

SERVICE INFORMATION-----	15- 2
TROUBLESHOOTING-----	15- 2
REAR WHEEL REMOVAL/INSPECTION/INSTALLATION -----	15- 3
REAR WHEEL HUB REMOVAL/INSPECTION/ INSTALLATION -----	15- 4
REAR SHOCK ABSORBER REMOVAL/INSPECTION/ INSTALLATION -----	15- 6
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REAR AXLE HOUSING REMOVAL/INSPECTION/INSTALLATION -----	15- 8
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15. REAR WHEEL/AXLE/SHOCK ABSORBER/SWING ARM



15. REAR WHEEL/AXLE/SHOCK ABSORBER/SWING ARM

SERVICE INFORMATION

GENERAL INSTRUCTIONS

- Jack the machine front wheel off the ground and be careful to prevent the machine from falling down.
- During servicing, keep oil or grease off the brake disk
- Inspect the brake system before riding.

SPECIFICATIONS

Unit: mm (in)

Item		Standard	Service Limit
Rear wheel	Radial	—	2 (0.08)
	Axial	—	2 (0.08)

TORQUE VALUES

Rear wheel nut	6.5 kgf-m (65 N-m, 46 lbf-ft)
Rear shock absorber upper mount bolt	4 kgf-m (40 N-m, 29 lbf-ft)
Rear shock absorber lower mount bolt	4 kgf-m (40 N-m, 29 lbf-ft)
Rear wheel hub nut	10 kgf-m (100 N-m, 72 lbf-ft)
Right pivot bolt	11.8 kgf-m (118 N-m, 85 lbf-ft)
Left pivot bolt	1.1 kgf-m (11 N-m, 8 lbf-ft)
Left pivot lock nut	11.8 kgf-m (118 N-m, 85 lbf-ft)
Final gear case mounting bolt	5.5 kgf-m (55 N-m, 40 lbf-ft)
Axle housing mounting bolt	5.5 kgf-m (55 N-m, 40 lbf-ft)

SPECIAL TOOLS

Oil seal & bearing driver	A120E00014
Lock nut wrench	A120F00013

TROUBLESHOOTING

Rear wheel wobbling

- Bent rim
- Faulty tire
- Axle not tightened properly

Soft rear shock absorber

- Weak shock absorber spring
- Faulty damper

15. REAR WHEEL/AXLE/SHOCK ABSORBER/SWING ARM

REAR WHEEL REMOVAL/INSPECTION/ INSTALLATION

REMOVAL

Place the machine on a level place.
Remove four nuts from rear wheel.

Elevate the rear wheels by placing a suitable stand under the frame.

Support the machine securely so there is no danger of it falling over.

Remove the rear wheel and wheel hub nut cap together.



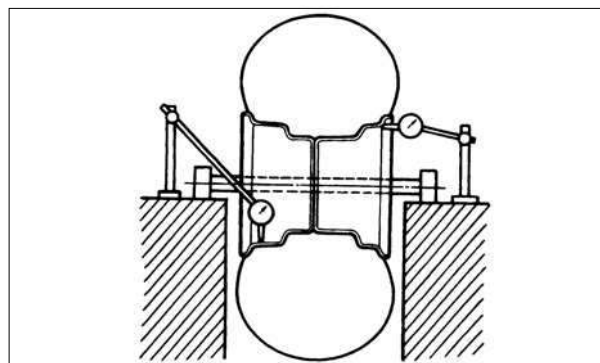
INSPECTION

Measure the wheel run out.
Replace wheel or check bearing play if out of specification

Rim run out limits:

Vertical: 2 mm (0.08 in)

Lateral: 2 mm (0.08 in)

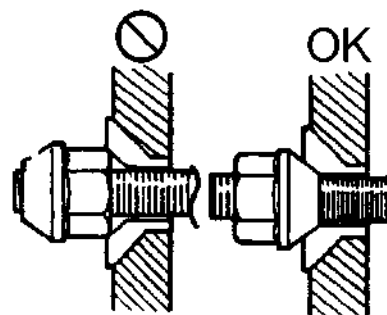


INSTALLATION

When reinstalling a wheel, tighten the wheel nuts in a crisscross (rather than a circular) pattern.

Torque: 6.5 kgf-m (65 N-m, 46 lbf-ft)

Be sure the tapered side of the wheel nuts face the wheel rim.



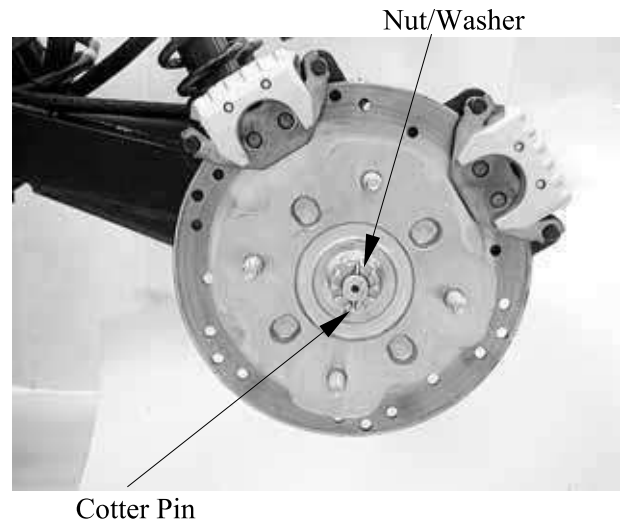
15. REAR WHEEL/AXLE/SHOCK ABSORBER/SWING ARM

REAR WHEEL HUB REMOVAL/INSPECTION/ INSTALLATION

REMOVAL

Place the machine on a level place.
Remove the rear wheel (refer to the “**REAR WHEEL REMOVAL/INSPECTION/INSTALLATION**” section in this chapter)
Elevate the rear wheels by placing a suitable stand under the frame.

Support the machine securely so there is no danger of it falling over.



Remove the cotter pin.

Apply the rear brake and then remove nut and rear wheel hub.

INSPECTION

Check the wheel hub for cracks or deamage.
Check the wheel hub splines for wear or damage.

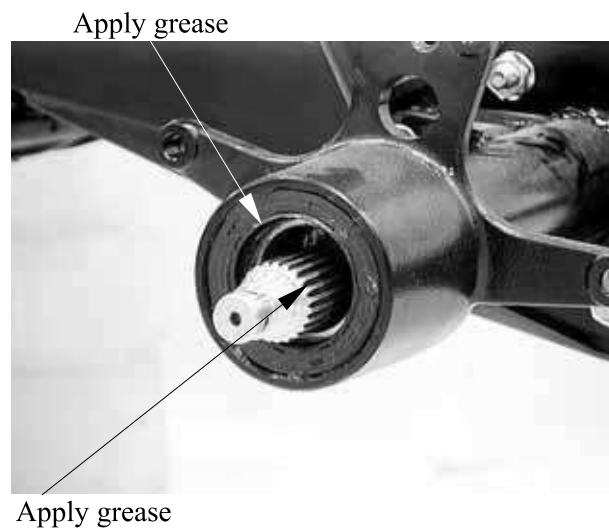


15. REAR WHEEL/AXLE/SHOCK ABSORBER/SWING ARM

INSTALLATION

Install the wheel hub and nut.

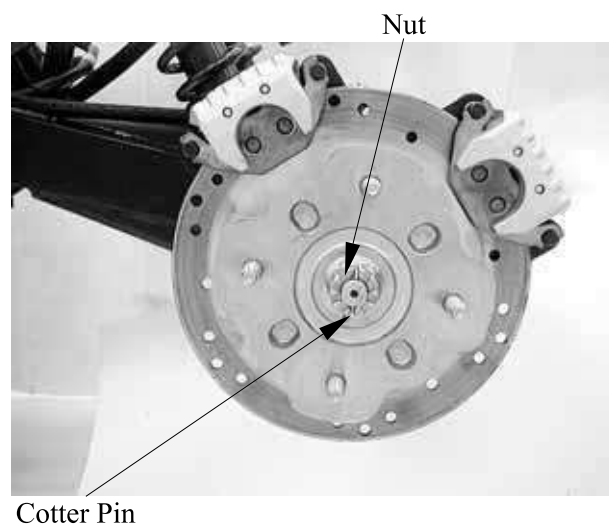
Apply lightweight lithium-soap base grease onto the wheel hub splines, rear axle splines and dust seal lips of the axle housing.



Apply the front brake and then tighten the nut to the specified torque.

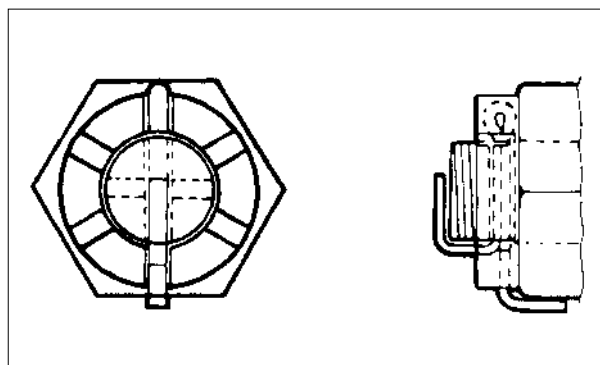
Torque: 10 kgf-m (100 N-m, 72 lbf-ft)

Install the cotter pin and band ends of cotter pin.



- Do not apply oil to the seat of the nut.
- Do not loosen the wheel hub nut after torque tightening. If the wheel hub nut groove is not aligned with the cotter pin hole, align groove with the hole by tightening up on the wheel hub nut.

Always use a new cotter pin.



15. REAR WHEEL/AXLE/SHOCK ABSORBER/SWING ARM

REAR SHOCK ABSORBER REMOVAL/INSPECTION/ INSTALLATION

REMOVAL

Remove the rear shock absorber upper mount nut and washer.

Remove the lower mount bolt/nut, then remove the rear shock absorber.



INSPECTION

Inspect the shock absorber rod.

Bends/damage → Replace the shock absorber assembly.

Inspect the shock absorber.

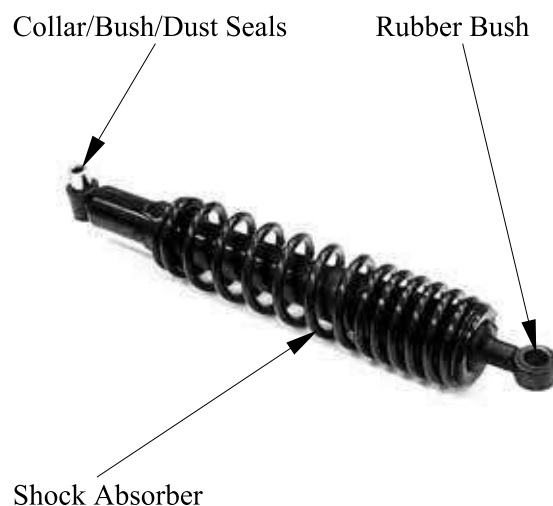
Oil leaks → Replace the shock absorber assembly.

Inspect the spring of the shock absorber by move the spring up and down.

Fatigue → Replace the shock absorber assembly.

Inspect bushes, collar and dust seals.

Wear/damage → Replace.



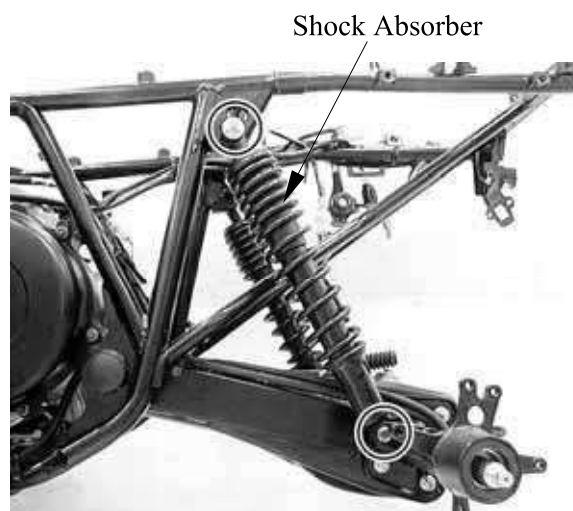
INSTALLATION

Apply the grease onto the bushes then install the shock absorber and tighten the lower mount bolt/nut to the specified torque.

Torque: 4 kgf-m (40 N-m, 29 lbf-ft)

Install and tighten the upper mounting nut to the specified torque.

Torque: 4 kgf-m (40 N-m, 29 lbf-ft)



15. REAR WHEEL/AXLE/SHOCK ABSORBER/SWING ARM

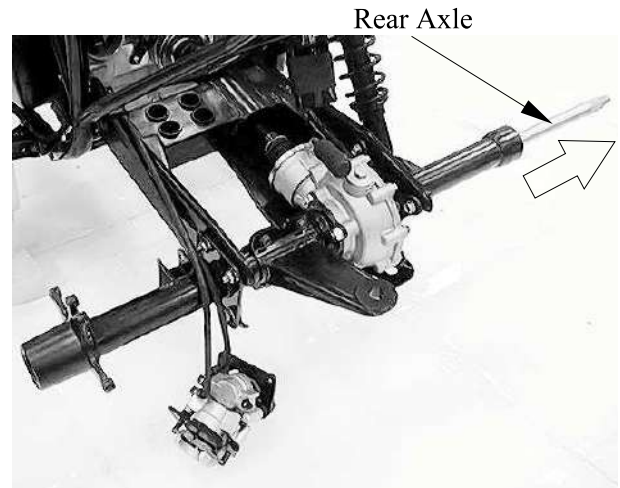
REAR AXLE REMOVAL/INSPECTION/ INSTALLATION

REMOVAL

Remove the rear wheel hubs (refer to the “**REAR WHEEL HUB REMOVAL/INSPECTION/INSTALLATION**” section in this chapter).

Remove the rear axle from axle housing right side.

Tap the axle and with a rubber hammer, this will avoid damage the axle thread.



INSPECTION

Check the axle splines for wear or damage.

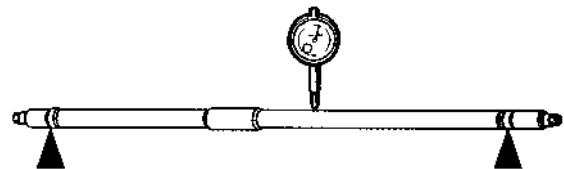
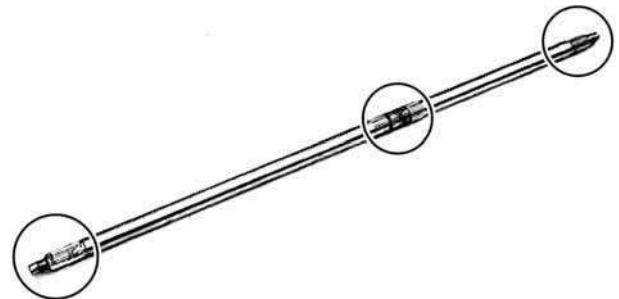
Set the axle in V-blocks and measure the runout with a dial indicator.

Axle runout is 1/2 the total indicator reading.

Service limit: 3 mm (0.12 in)

INSTALLATION

Apply lightweight lithium-soap base grease to the rear axle splines, then install the rear axle into the housing from right.



15. REAR WHEEL/AXLE/SHOCK ABSORBER/SWING ARM

REAR AXLE HOUSING REMOVAL/INSPECTION/ INSTALLATION

REMOVAL

Remove the rear axle (refer to the “**REAR AXLE REMOVAL/INSPECTION/INSTALLATION**” section in this chapter).

Remove the bolt from skid plate under the left axle housing.



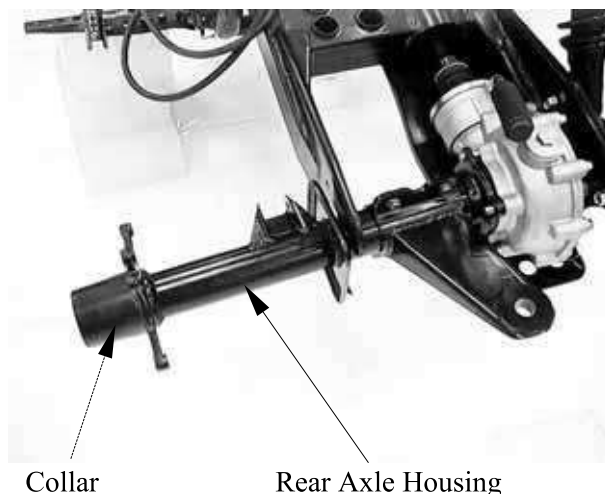
Remove the four nuts/bolts from the left housing (attaching the rear swing arm).

Remove the four nuts from the left housing (attaching the rear drive case).



Remove the left rear axle housing from the rear drive case.

Do not lose the axle collar in the left rear axle housing.



15. REAR WHEEL/AXLE/SHOCK ABSORBER/SWING ARM

Remove the rear drive case assembly (refer to the “**REAR DRIVE REMOVAL/INSPECTION/INSTALLATION**” section in the chapter 13).

Remove the four nuts/bolts from right housing.
Remove the shock absorber lower mounting bolt/nut, then remove the right rear axle housing.



Right Rear Axle Housing

INSPECTION

Inspect the rear axle housing for distortion or damages.
If any damages are found, replace the rear axle housing.

Inspect the dust seal lips for wear or damage.
If any damages are found, replace a new one.

Inspect the inner race play of the bearing by hand while it is in the rear axle housing.
Rotate the inner race by hand to inspect for abnormal noise and smooth rotation.
If there is anything unusual, replace the bearing with a new one.

Left Rear Axle Housing



Bearings/Dust Seal

Right Rear Axle Housing



Bearing/Dust Seal

15. REAR WHEEL/AXLE/SHOCK ABSORBER/SWING ARM

INSTALLATION

Install the right rear axle housing and four bolts onto the rear swing arm.

Install and tighten the four nuts to the specified torque in a crisscross pattern in 2 or 3 steps.

Torque: 5.5 kgf-m (55 N-m, 40 lbf-ft)

Install rear shock absorber and lower mounting bolt onto the right axle housing.

Install and tighten the lower mounting nut to the specified torque

Torque: 5.5 kgf-m (55 N-m, 40 lbf-ft)

Install the rear drive case assembly onto the right rear axle housing (refer to the “**REAR DRIVE CASE ASSEMBLY REMOVAL/INSPECTION/INSTALLATION**” section in the chapter 13).

Install the left rear axle housing onto the rear drive case assembly.

Do not lose the axle collar in the left rear axle housing.

Install and tighten the four nuts/bolts (attaching the rear swing arm) to the specified torque in a crisscross pattern in 2 or 3 steps.

Torque: 5.5 kgf-m (55 N-m, 40 lbf-ft)

Install and tighten the four nuts (attaching the rear drive assembly) to the specified torque in a crisscross pattern in 2 or 3 steps.

Torque: 5.5 kgf-m (55 N-m, 40 lbf-ft)

Install and tighten the bolt at the skid plate securely.



Right Rear Axle Housing



Skid Plate

15. REAR WHEEL/AXLE/SHOCK ABSORBER/SWING ARM

REAR AXLE HOUSING DISASSEMBLY/ASSEMBLY

DISASSEMBLY/ASSEMBLY

Remove the rear axle housing (refer to the “REAR AXLE HOUSING REMOVAL/INSPECTION/INSTALLATION” section in this chapter).

Left rear axle housing

Remove the rear axle collar from axle housing.



Collar

Remove the dust seal from the axle housing.

Remove the snap ring from the axle housing.



Dust Seal

Remove the two bearings using the proper shaft.



15. REAR WHEEL/AXLE/SHOCK ABSORBER/SWING ARM

Apply lightweight lithium-soap base grease to the new bearings of the axle housing and lips of the new dust seal before install them.



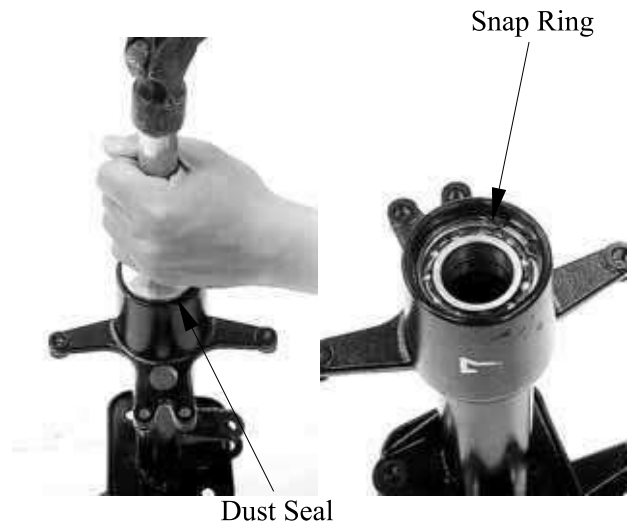
Install the new bearings by using the special tool.

Special tool:

Oil seal & bearing driver A120E00014

Install the snap ring.

Install a new dust seal.



Install the rear axle collar into the axle housing.

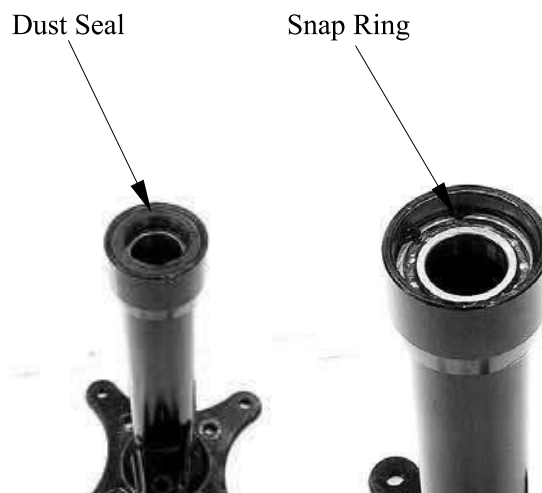


15. REAR WHEEL/AXLE/SHOCK ABSORBER/SWING ARM

Right rear axle housing

Remove the dust seal from the axle housing.

Remove the snap ring from the axle housing.



Remove the bearing using the proper shaft.



Apply lightweight lithium-soap base grease to the new bearings of the axle housing and lips of the new dust seal before install them.



15. REAR WHEEL/AXLE/SHOCK ABSORBER/SWING ARM

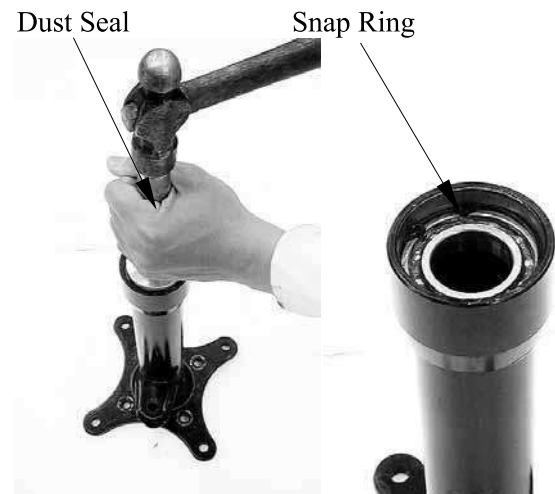
Install the new bearing by using the special tool.

Special tool:

Oil seal & bearing driver A120E00014

Install the snap ring.

Install a new dust seal.



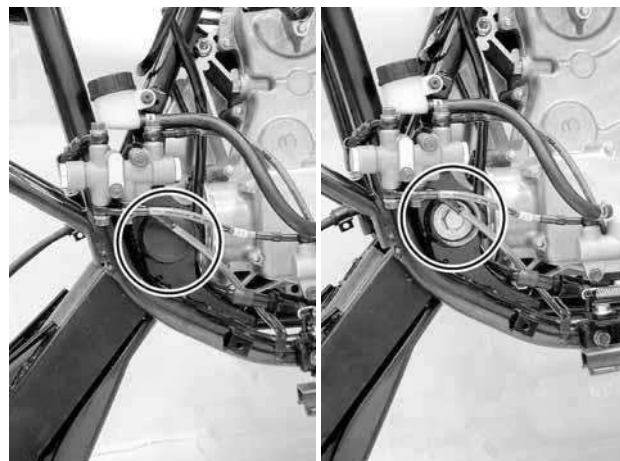
15. REAR WHEEL/AXLE/SHOCK ABSORBER/SWING ARM

REAR SWING ARM REMOVAL/INSTALLATION

REMOVAL

Remove the rear axle housing (refer to the “**REAR AXLE HOUSING REMOVAL/INSPECTION/INSTALLATION**” section in this chapter).

Remove the swing arm pivot bolt cap.
Remove the right pivot bolt.



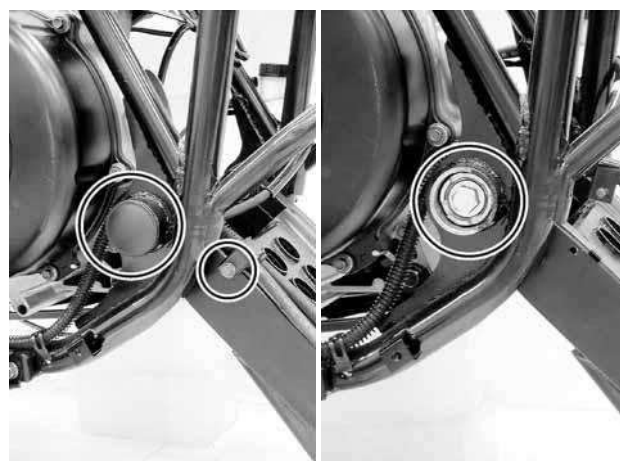
Remove the bolt and band, then remove the rear brake fluid hoses from swing arm.

Remove the swing arm pivot bolt cap.
Remove the left pivot lock nut using the special tool.

Special tool:

Lock nut wrench A120F000013

Remove the left pivot adjusting bolt.



15. REAR WHEEL/AXLE/SHOCK ABSORBER/SWING ARM

INSTALLATION

Install the right pivot bolt and the left pivot adjusting bolt.

Tighten the right pivot bolt to the specified torque.

Actual: 11.8 kgf-m (118 N-m, 85 lbf-ft)

Tighten the left pivot adjusting bolt to the specified torque.

Torque: 1.1 kgf-m (11 N-m, 8 lbf-ft)

Move the swing arm up and down several times to seat the pivot bearings.
Retighten the pivot bolts to the same torque.

Install the left pivot lock nut.
Tighten the lock nut while holding the left pivot adjusting bolt to the specified torque.

Special tool:

Lock nut wrench A120F00013

Torque:

Actual: 11.8 kgf-m (118 N-m, 85 lbf-ft)

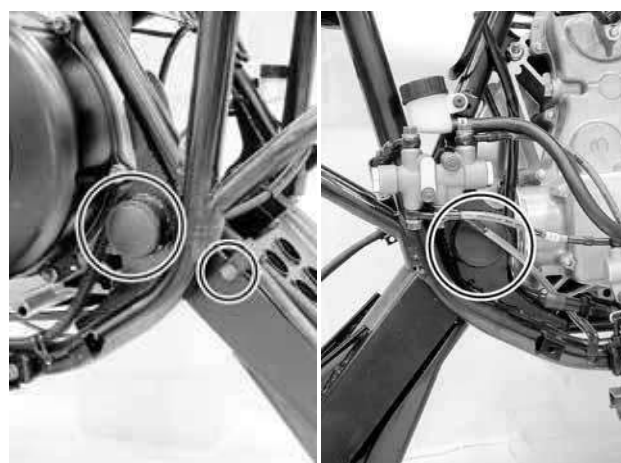
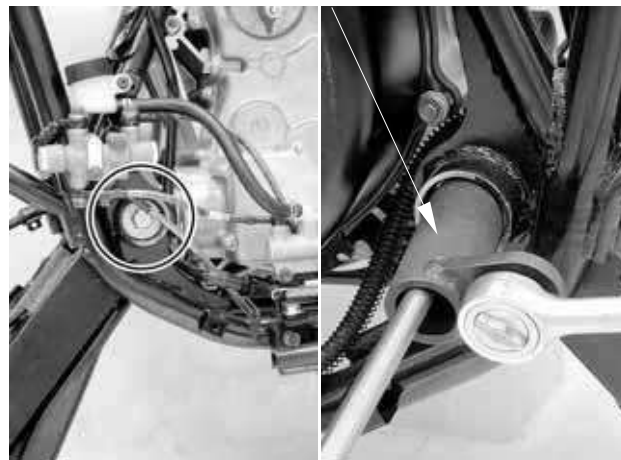
Special tool indicated:

10.5 kgf-m (105 N-m, 76 lbf-ft)

Install the brake fluid hose band and tighten the bolt securely.

Install the pivot bolt caps.

Lock Nut Wrench



15. REAR WHEEL/AXLE/SHOCK ABSORBER/SWING ARM

REAR SWING ARM DISASSEMBLY/INSPECTION/ ASSEMBLY

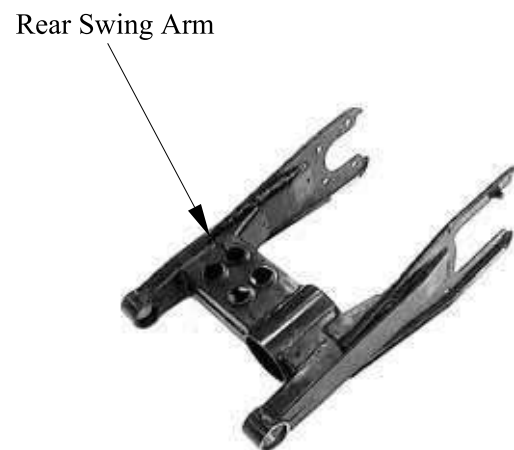
DISASSEMBLY/INSPECTION

Remove the three bolts and then remove the skid plate from swing arm.

Inspect the skid plate for damage.
If any damages are found, replace the skid plate with a new one.

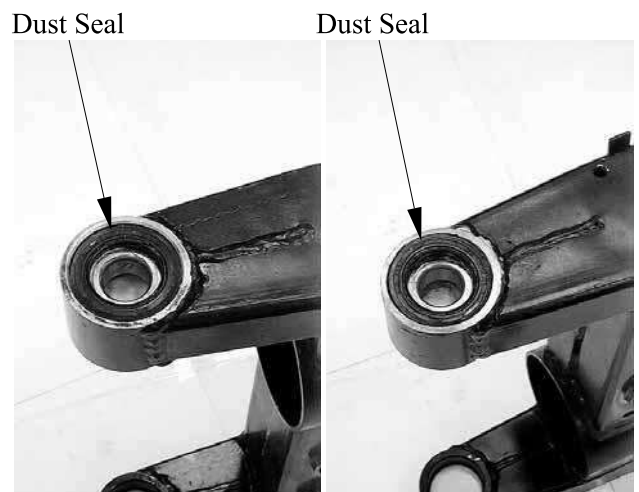


Inspect the swing arm for distortion or damage.
If any damage are found, replace the swing arm with a new one.



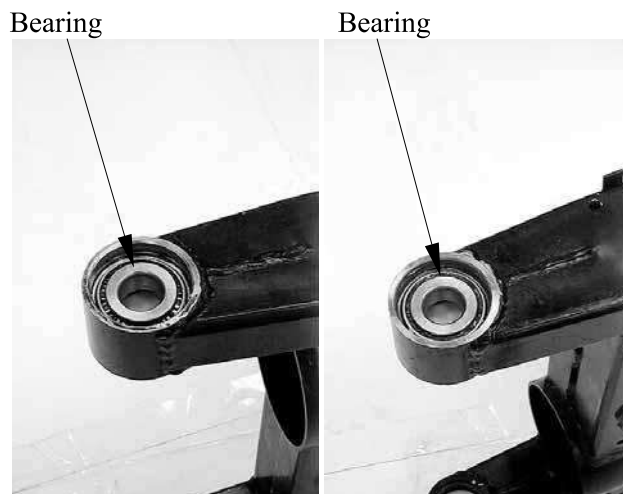
Inspect the dust seals for wear or damage.
If any damages are found, replace them with new ones.

Remove the dust seals.

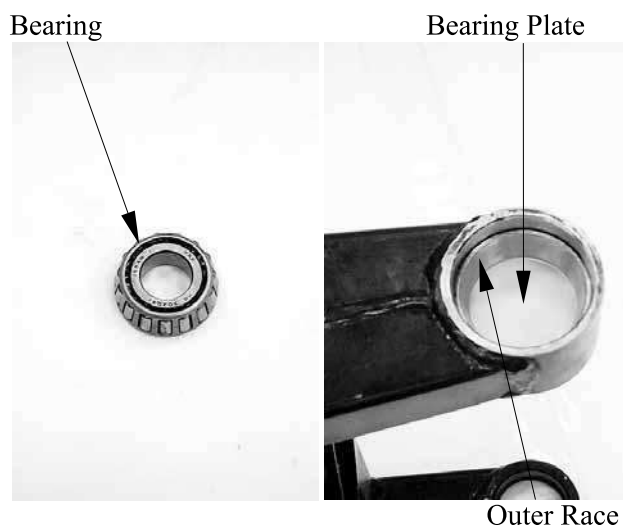


15. REAR WHEEL/AXLE/SHOCK ABSORBER/SWING ARM

Remove the bearings.

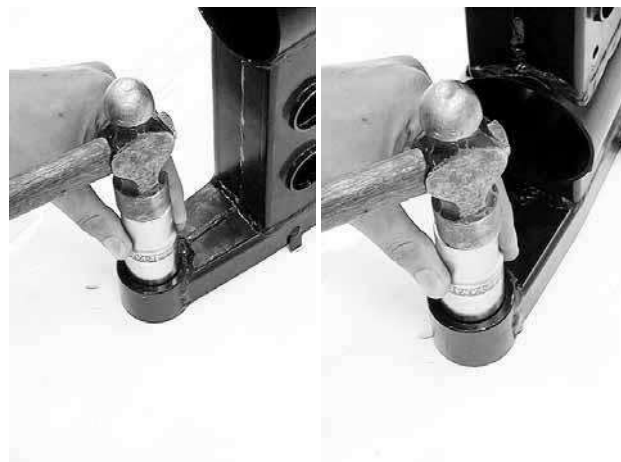


Inspect the swing arm bearings, outer races and bearing plates, if any damages are found, replace the them with new ones.



Remove the swing arm bearings outer races and bearing plates by using a proper pipe.

The removed dust seal, bearing, outer race and bearing plate must be replaced with new ones.



15. REAR WHEEL/AXLE/SHOCK ABSORBER/SWING ARM

ASSEMBLY

Install the new swing arm bearing outer race and its new plate to the swing arm by using the special tool.

Special tool:

Oil seal & bearing driver A120E00014

When installing the bearing plate, make sure that the bulge of bearing plate faces inside.

Bearing Plate



Bearing Outer Race

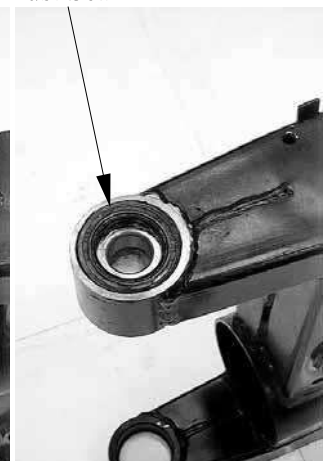


Apply lightweight lithium-soap base grease to the swing arm bearings and lips of dust seals, then install them into the swing arm.

Dust Seal



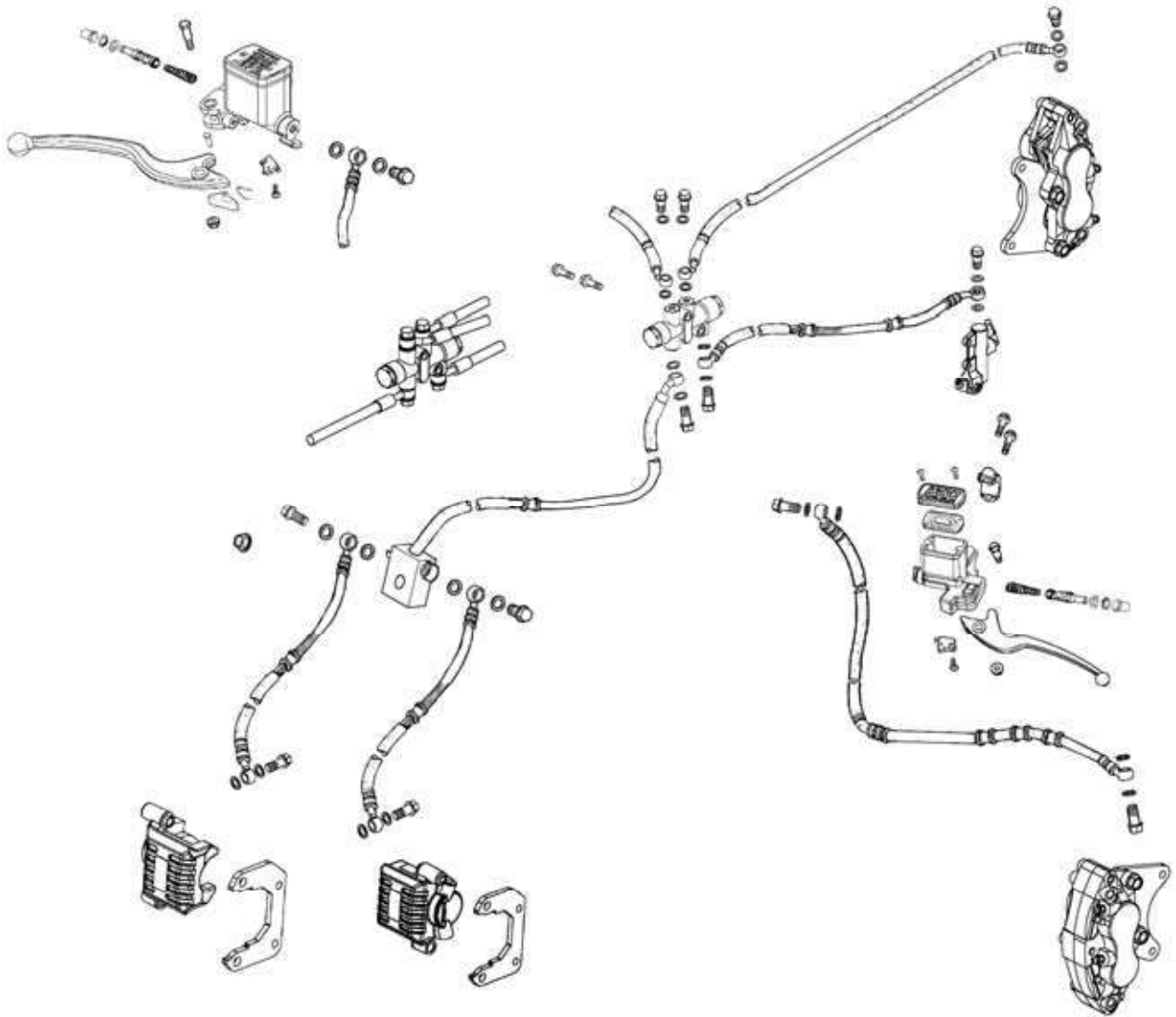
Dust Seal



16. BRAKE SYSTEM

16

16. BRAKE SYSTEM



16. BRAKE SYSTEM

m	Standard	Service Limit
Brake disk thickness	3.8~4.2 (0.152~0.168)	3 (0.12)
Brake disk runout	—	0.3 (0.012)

TORQUE VALUES

Caliper mounting bolt	3.2 kgf-m (32 N-m, 25 lbf-ft)
Brake pad mounting bolt	1.8 kgf-m (18 N-m, 13 lbf-ft)
Brake disc bolt	3.5 kgf-m (35 N-m, 25.2 lbf-ft)
Bleed valve nut	0.6 kgf-m (6 N-m, 4.32 lbf-ft)
Brake hose bolt	3.5 kgf-m (35 N-m, 35 lbf-ft)
Master cylinder mounting bolt	1.2 kgf-m (12 N-m, 8.6 lbf-ft)
Delay valve mounting bolt	1.2 kgf-m (12 N-m, 8.6 lbf-ft)
Delay valve plug	5 kgf-m (50 N-m, 36 lbf-ft)

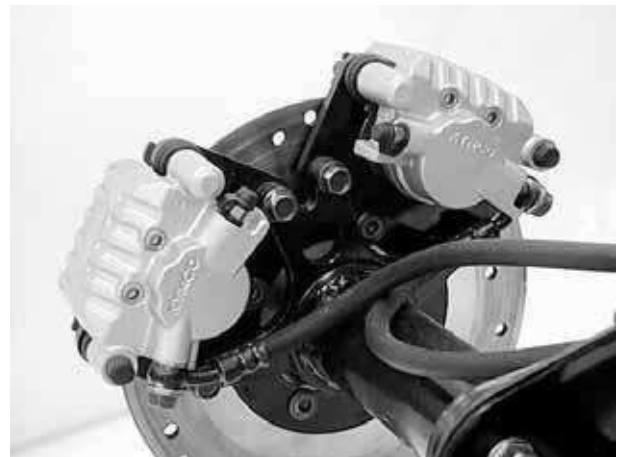
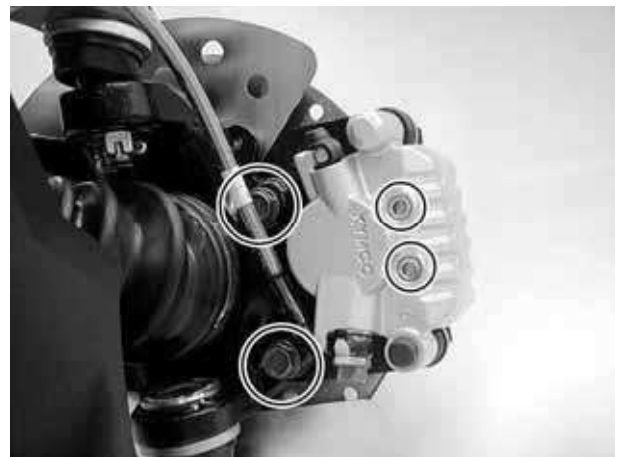
16. BRAKE SYSTEM

16. BRAKE SYSTEM

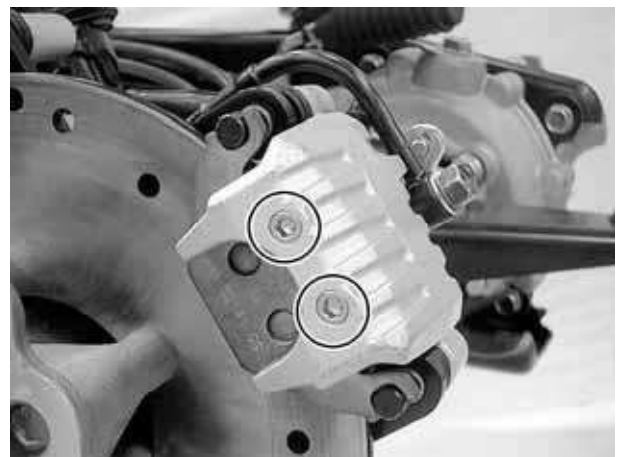
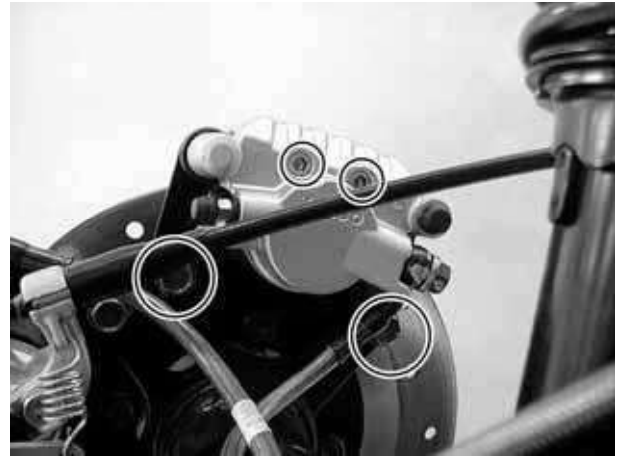
- Do not operate the brake lever during or after brake pad removal.
- Replace the brake pads as a set, otherwise braking performance will be adversely affected.



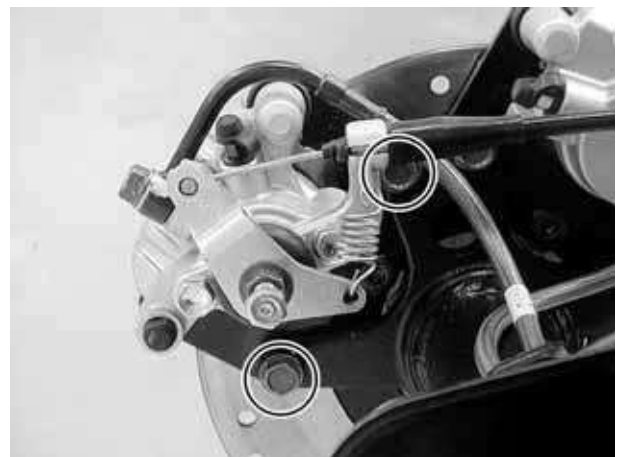
16. BRAKE SYSTEM



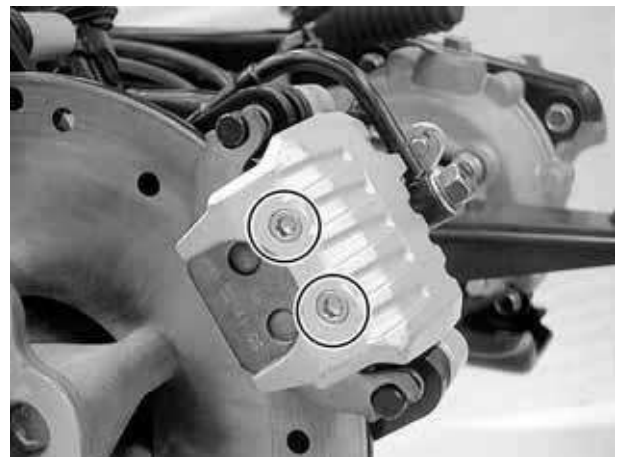
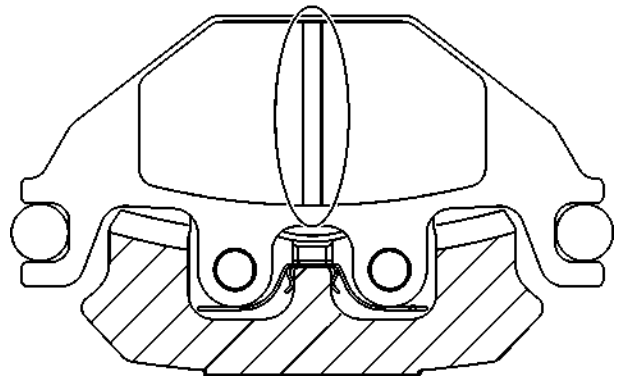
16. BRAKE SYSTEM



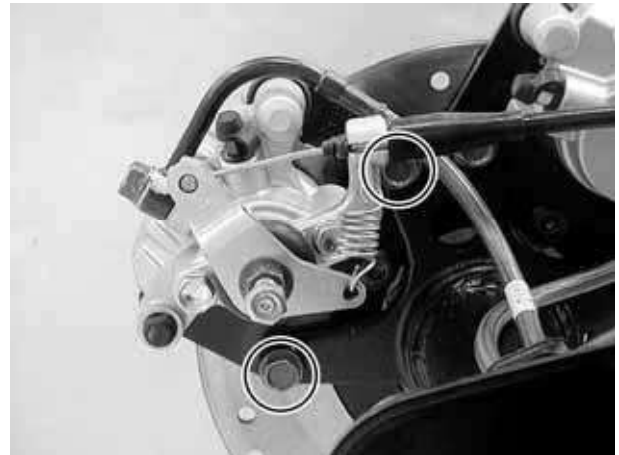
- Do not operate the brake lever during or after brake pad removal.
- Replace the brake pads as a set, otherwise braking performance will be adversely affected.



16. BRAKE SYSTEM



16. BRAKE SYSTEM



16. BRAKE SYSTEM



Brake Disc

16. BRAKE SYSTEM



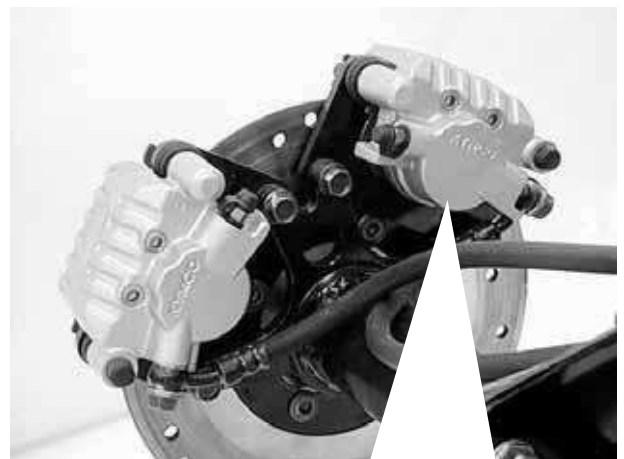
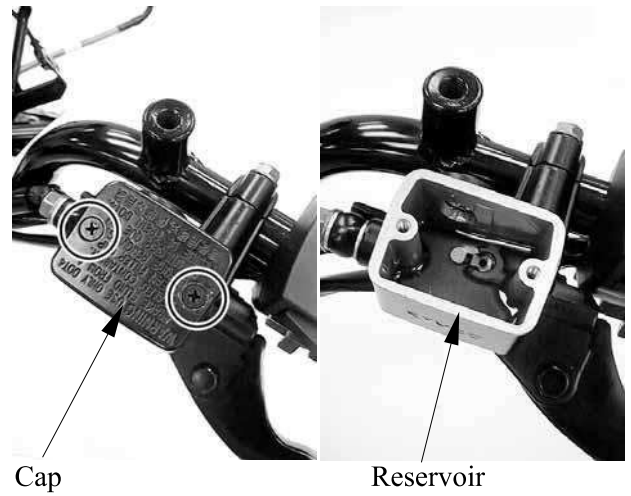
Brake Disc

16. BRAKE SYSTEM

16. BRAKE SYSTEM



16. BRAKE SYSTEM



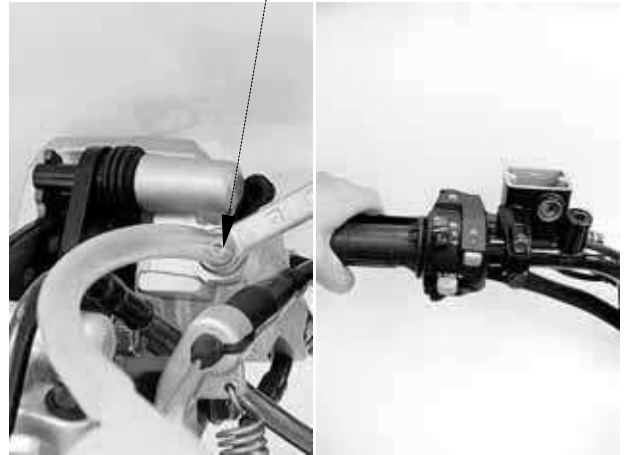
- When drawing brake fluid with the syringe, the brake fluid level should be kept over 1/2 of the brake reservoir height.
- Use only the recommended brake fluid.



Bleed Valve

16. BRAKE SYSTEM

Bleed Valve



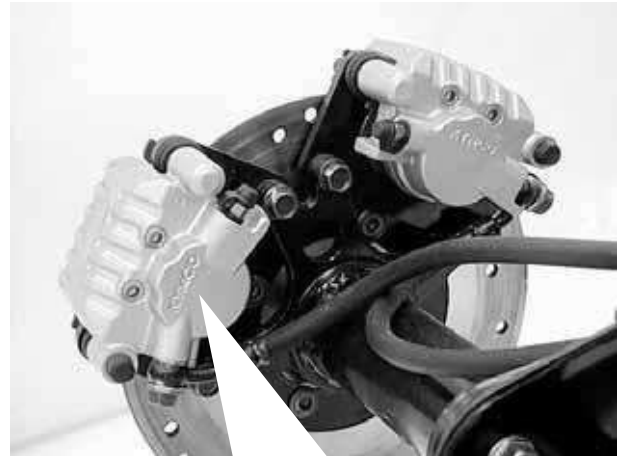
Cap

Reservoir



Use shop towels to cover plastic parts and coated surfaces to avoid damage caused by splash of brake fluid.

16. BRAKE SYSTEM

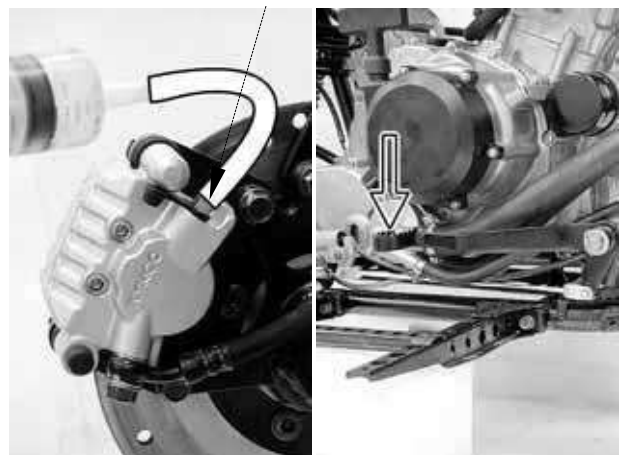


- When drawing brake fluid with the syringe, the brake fluid level should be kept over 1/2 of the brake reservoir height.
- Use only the recommended brake fluid.



Bleed Valve

Bleed Valve



When bleeding air from the brake system, the brake fluid level should be kept over 1/2 of the brake reservoir height.

16. BRAKE SYSTEM

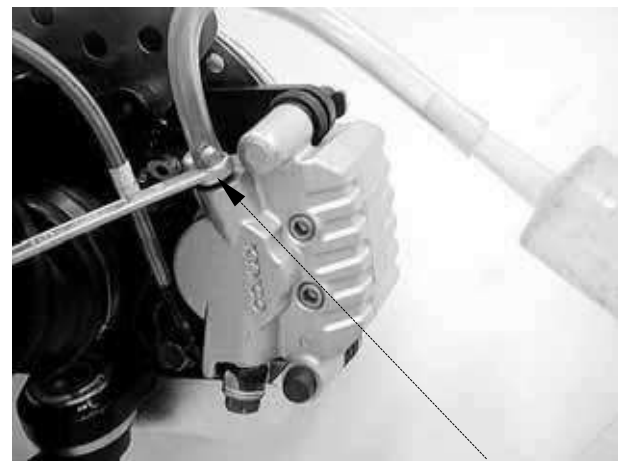
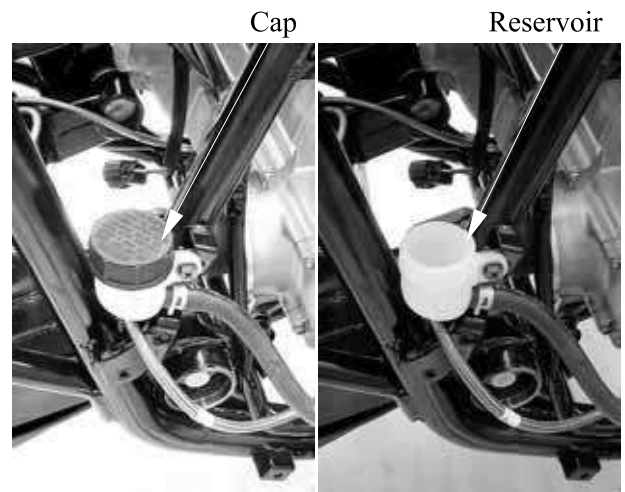
Cap



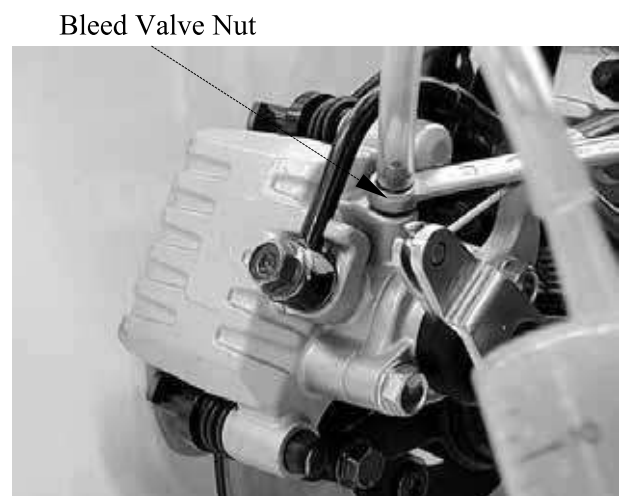
Bleed Valve



16. BRAKE SYSTEM



Bleed Valve Nut



16. BRAKE SYSTEM

r



Bleed Valve



- When drawing brake fluid with the syringe, the brake fluid level should be kept over 1/2 of the brake reservoir height (front brake lever).
- Use only the recommended brake fluid.

Reservoir



16. BRAKE SYSTEM



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- When drawing brake fluid with the syringe, the brake fluid level should be kept over 1/2 of the brake reservoir height (brake pedal).
- Use only the recommended brake fluid.

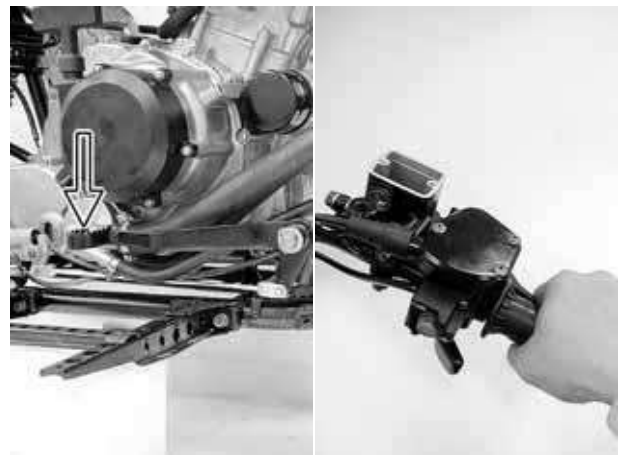
Bleed Valve Nut



- When drawing brake fluid with the syringe, the brake fluid level should be kept over 1/2 of the brake reservoir height (brake pedal).
- Use only the recommended brake fluid.

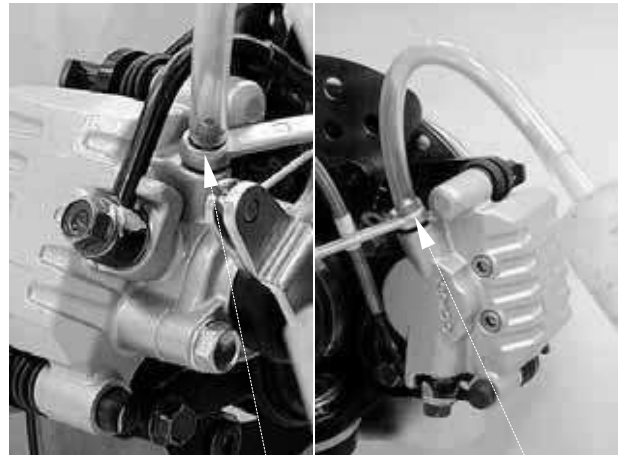
16. BRAKE SYSTEM

Bleed Valve



16. BRAKE SYSTEM

When bleeding air from the brake system, the brake fluid level should be kept over 1/2 of the brake reservoir height (brake pedal).

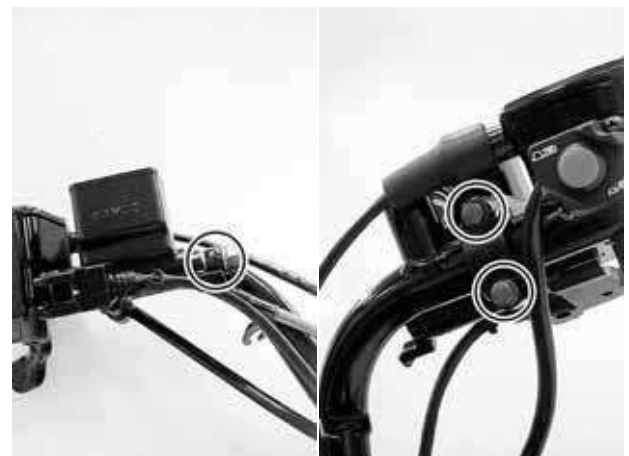


16. BRAKE SYSTEM



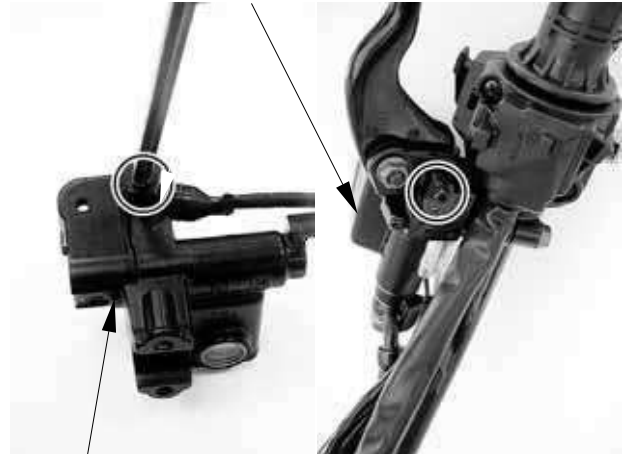
Brake Lever

When removing the brake fluid hose bolt, be sure to place towels under the hose and plug the hose end to avoid brake fluid leakage and contamination.



16. BRAKE SYSTEM

Rear Brake Master Cylinder

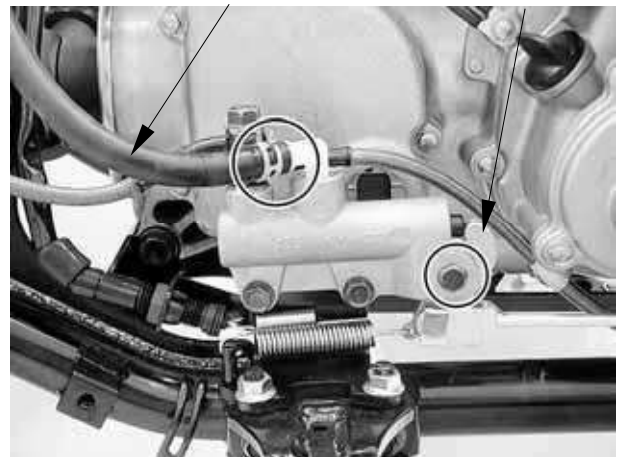


r

Do not splash brake fluid onto any rubber, plastic and coated parts. When working with brake fluid, use shop towels to cover these parts.

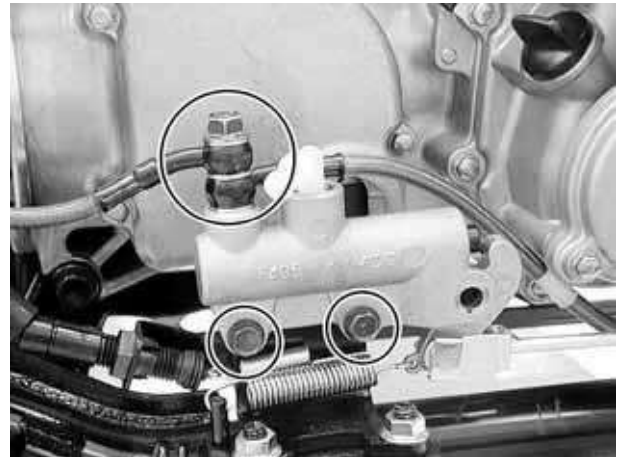
Fluid Hose

Brake Arm



16. BRAKE SYSTEM

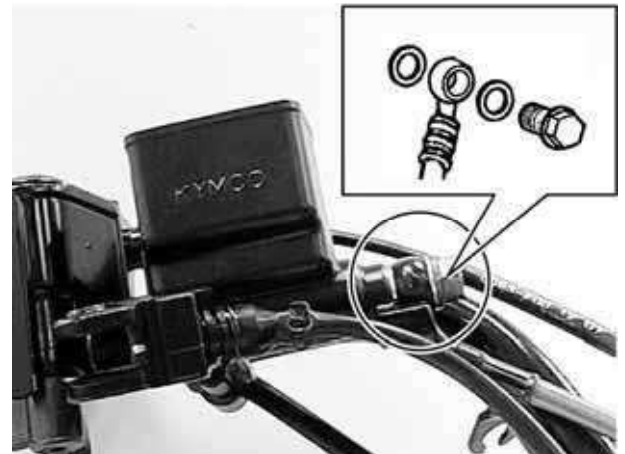
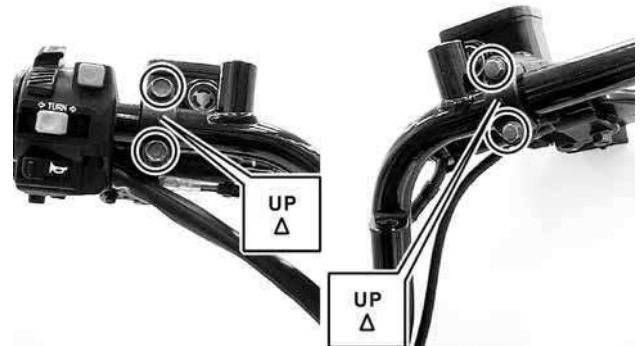
When removing the brake fluid hose bolt, be sure to place towels under the hose and plug the hose end to avoid brake fluid leakage and contamination.



16. BRAKE SYSTEM

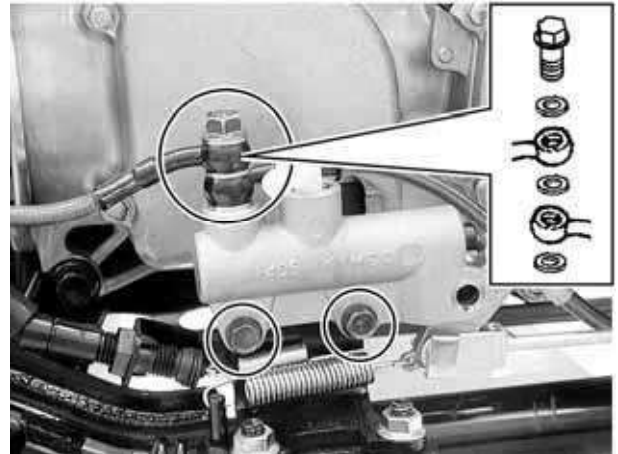
ON ROAD TYPE:

Refer to the “**REAR PARKING SYSTEM**” section in this chapter to install the left master cylinder holder.

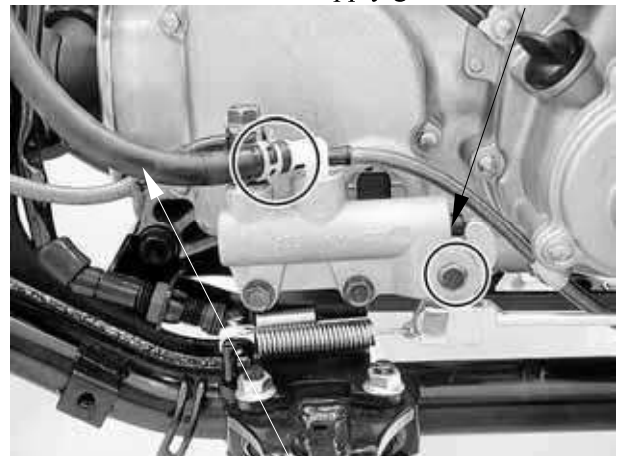


Apply grease to the dust boot

16. BRAKE SYSTEM

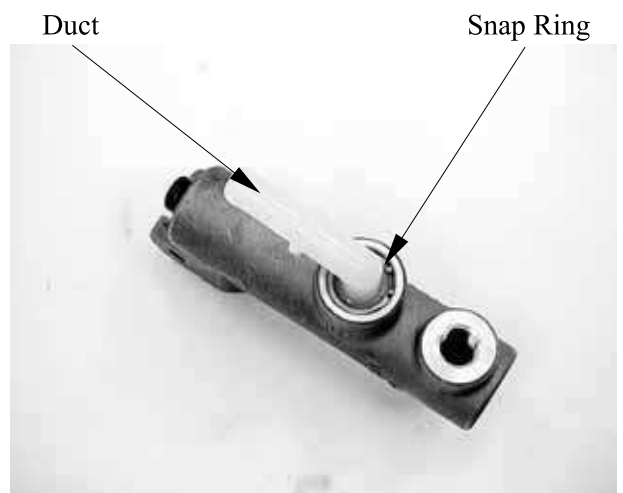
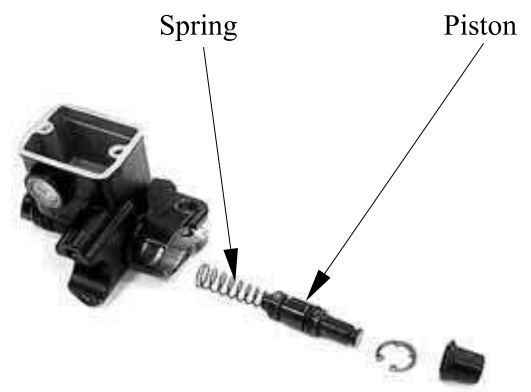
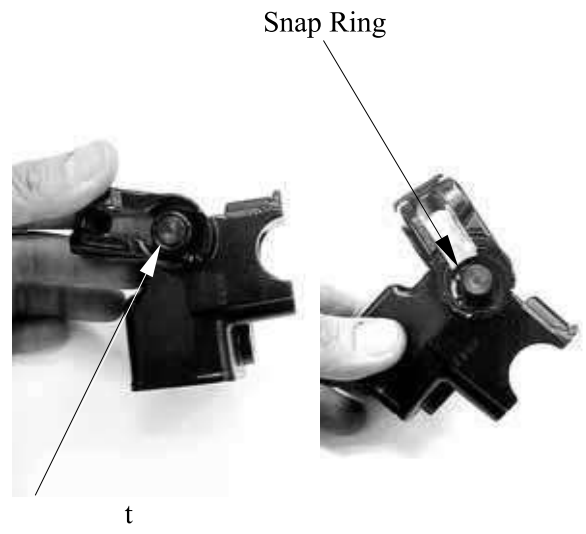


Apply grease to dust boot

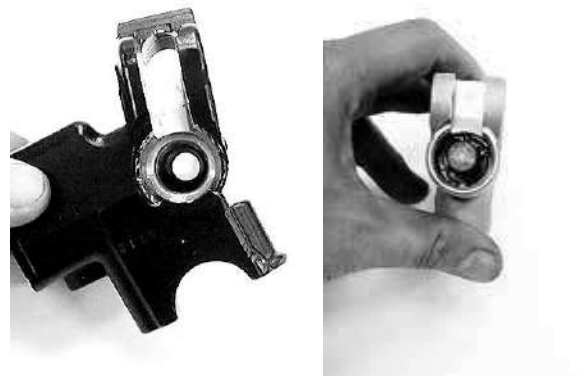
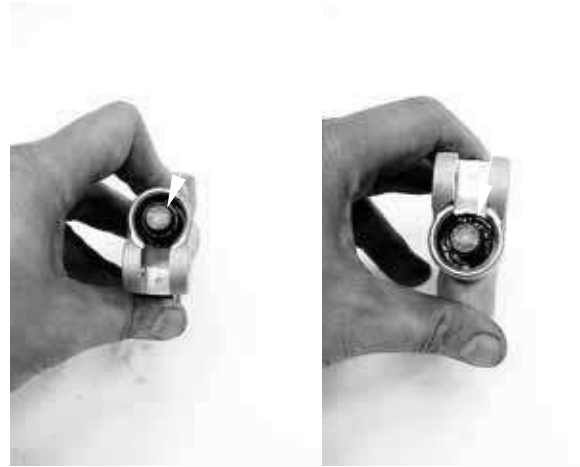


Fluid Hose

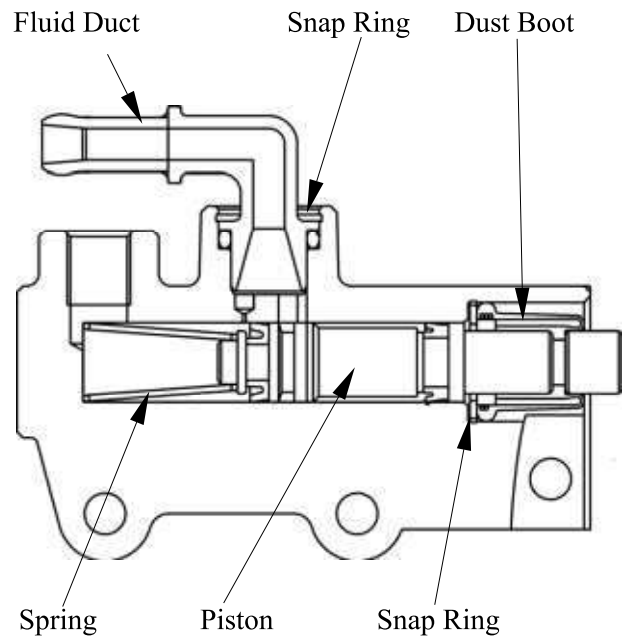
16. BRAKE SYSTEM



16. BRAKE SYSTEM

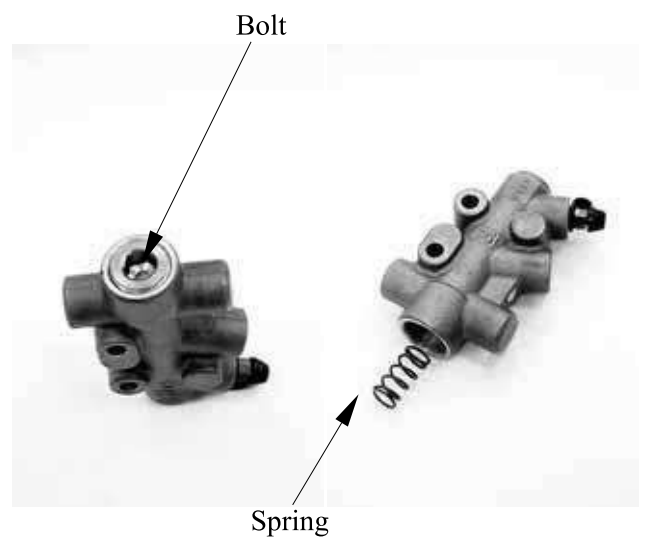


16. BRAKE SYSTEM

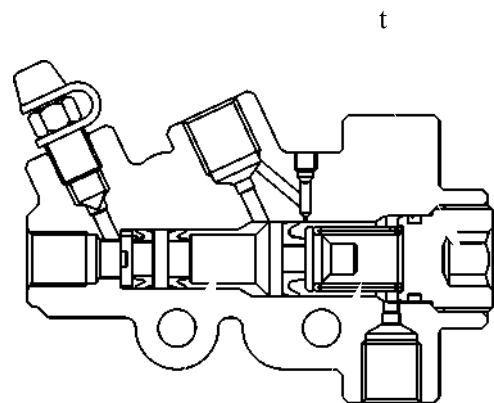


16. BRAKE SYSTEM

When removing the brake fluid hose bolt, be sure to place towels under the hose and plug the hose end to avoid brake fluid leakage and contamination.



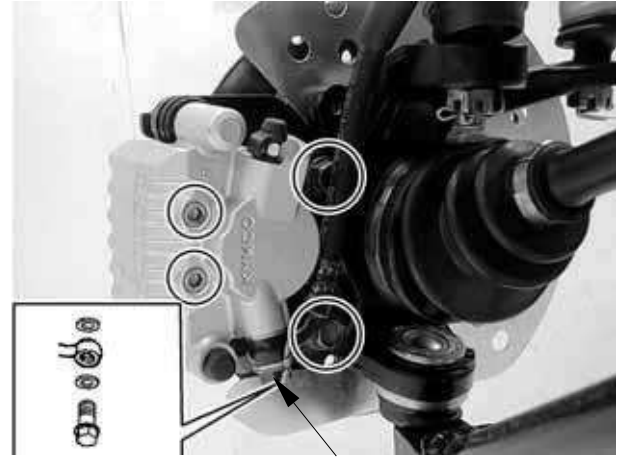
16. BRAKE SYSTEM



16. BRAKE SYSTEM

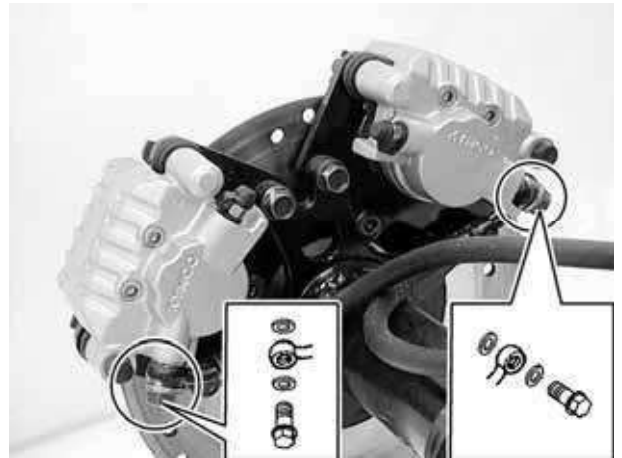
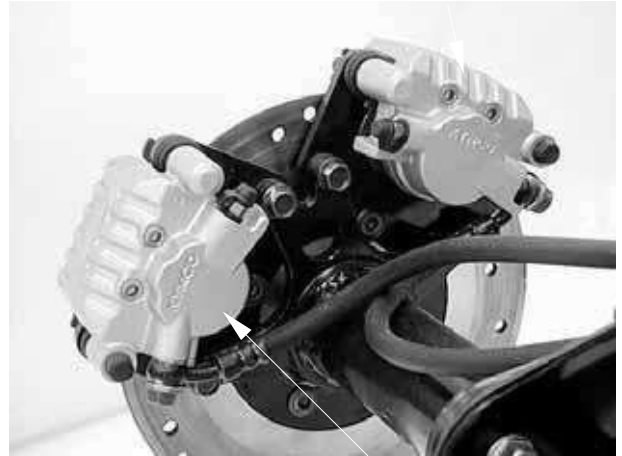


16. BRAKE SYSTEM

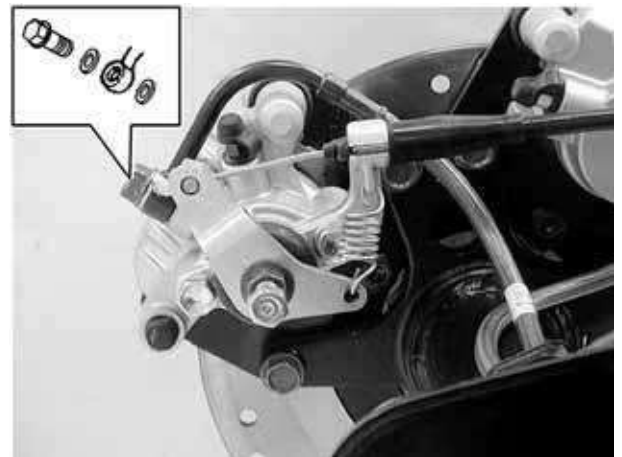
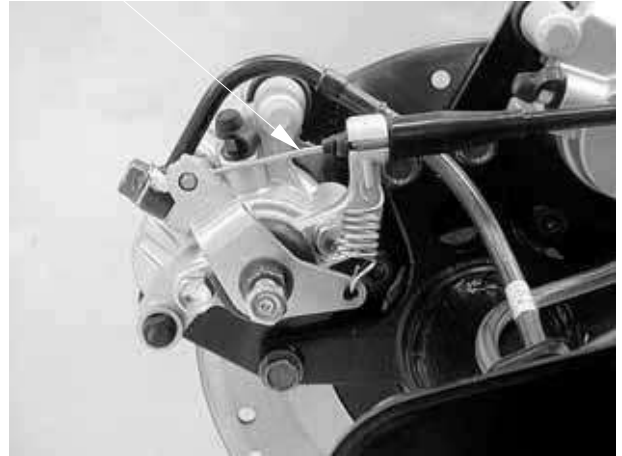


Fluid Hose Bolt/Washers

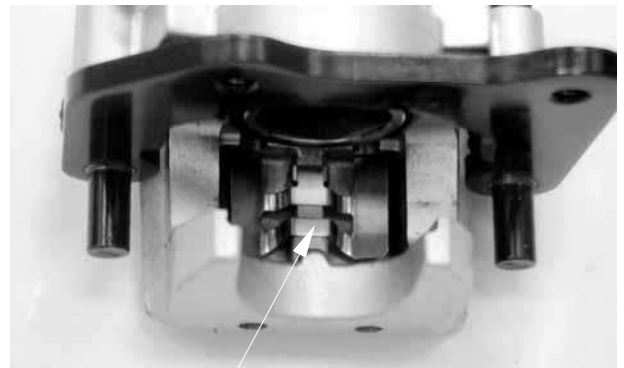
16. BRAKE SYSTEM



16. BRAKE SYSTEM



16. BRAKE SYSTEM



16. BRAKE SYSTEM



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* Be careful not to damage the piston surface.



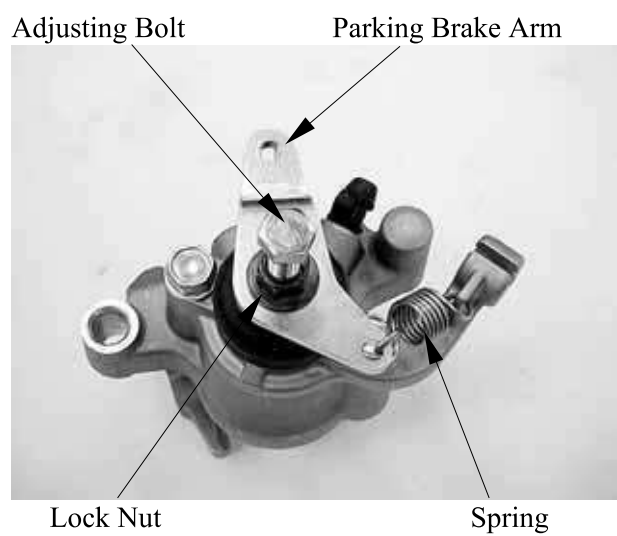
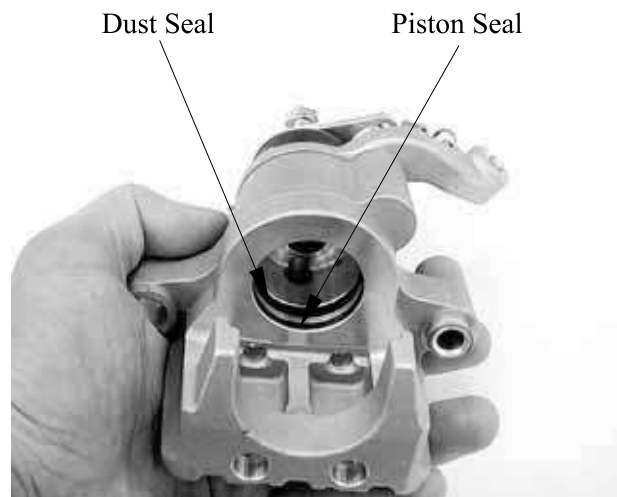
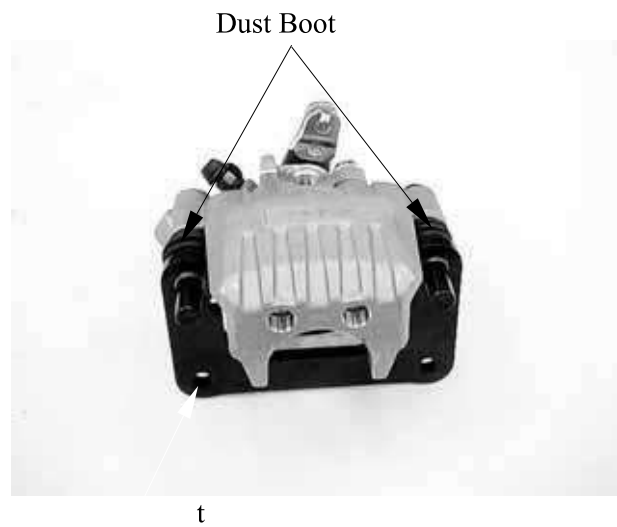
16. BRAKE SYSTEM



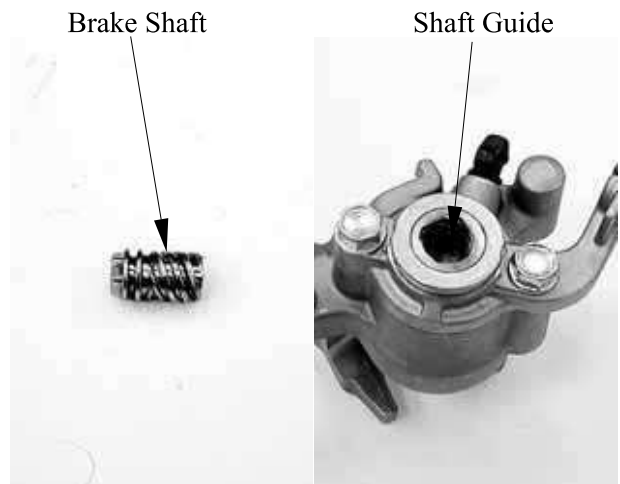
16. BRAKE SYSTEM



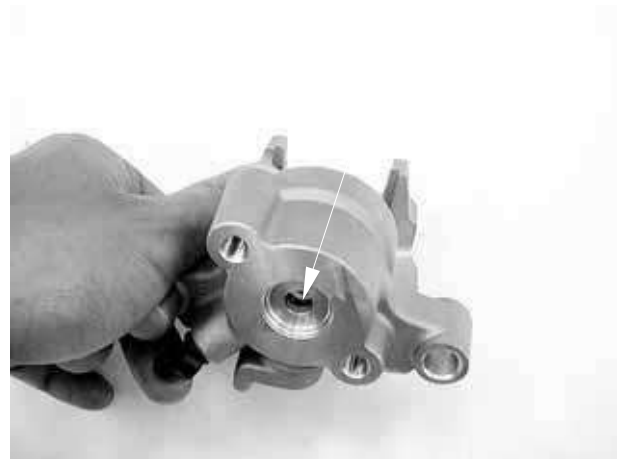
16. BRAKE SYSTEM



16. BRAKE SYSTEM



16. BRAKE SYSTEM

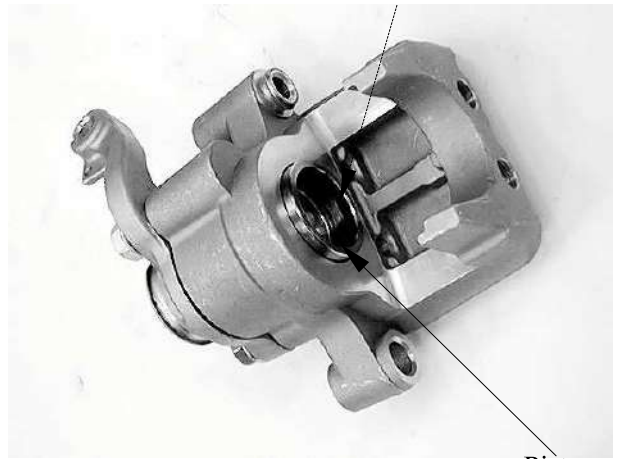


16. BRAKE SYSTEM

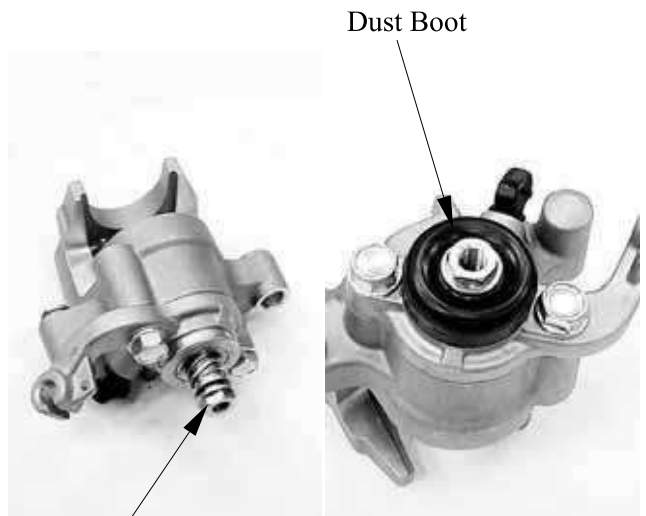
Parking Brake Case



Piston Seal/Dust Seal



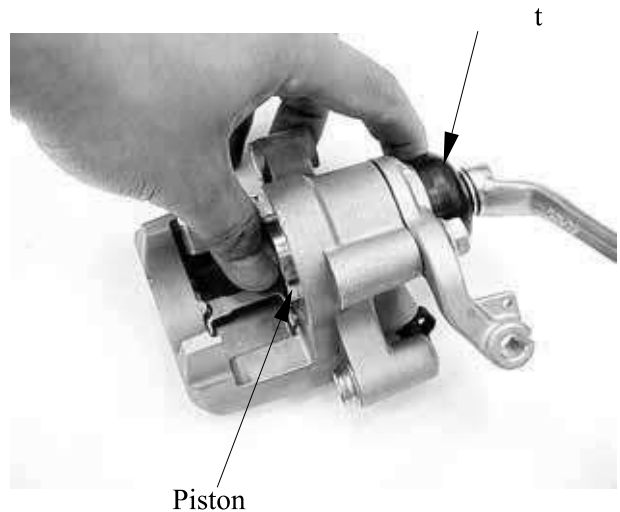
Piston



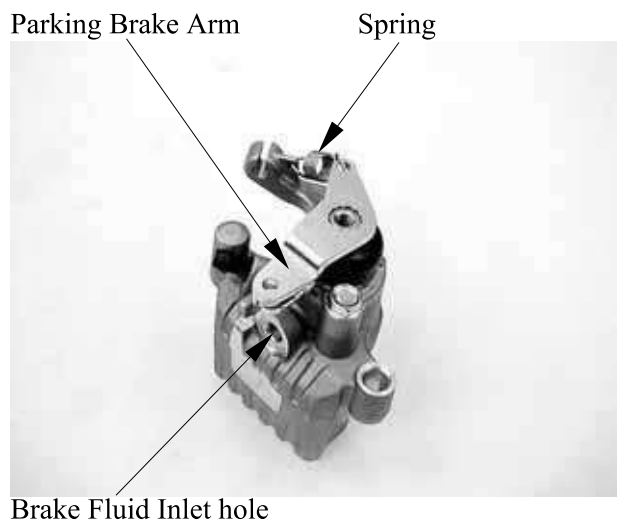
Brake Shaft

Dust Boot

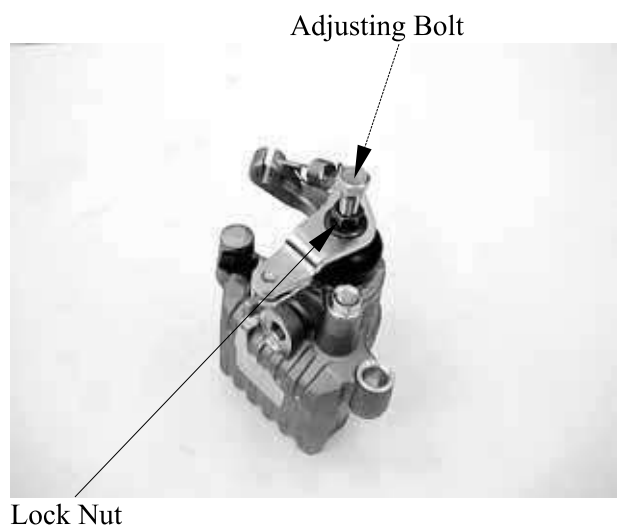
16. BRAKE SYSTEM



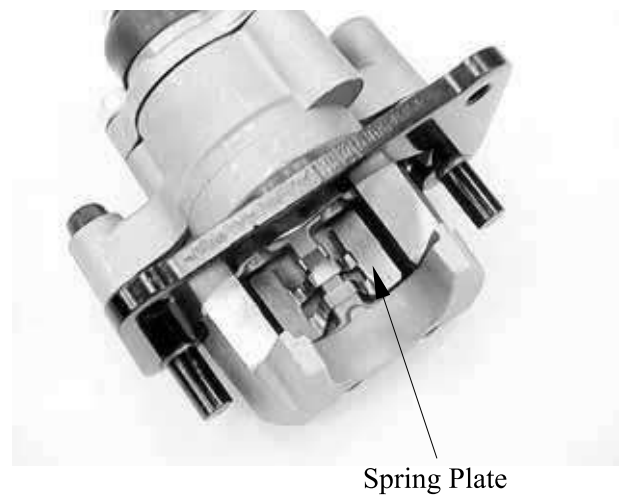
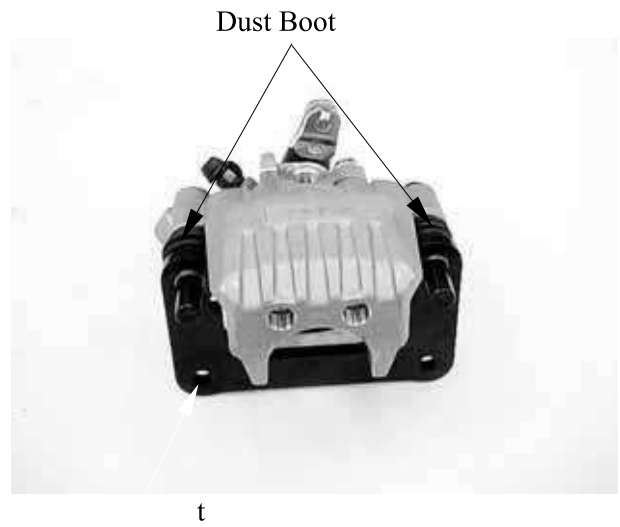
Align the parking brake arm with the brake fluid inlet hole as shown.



Do not turn in the adjusting too much and do not tighten the lock nut.



16. BRAKE SYSTEM



17. BATTERY/CHARGING SYSTEM

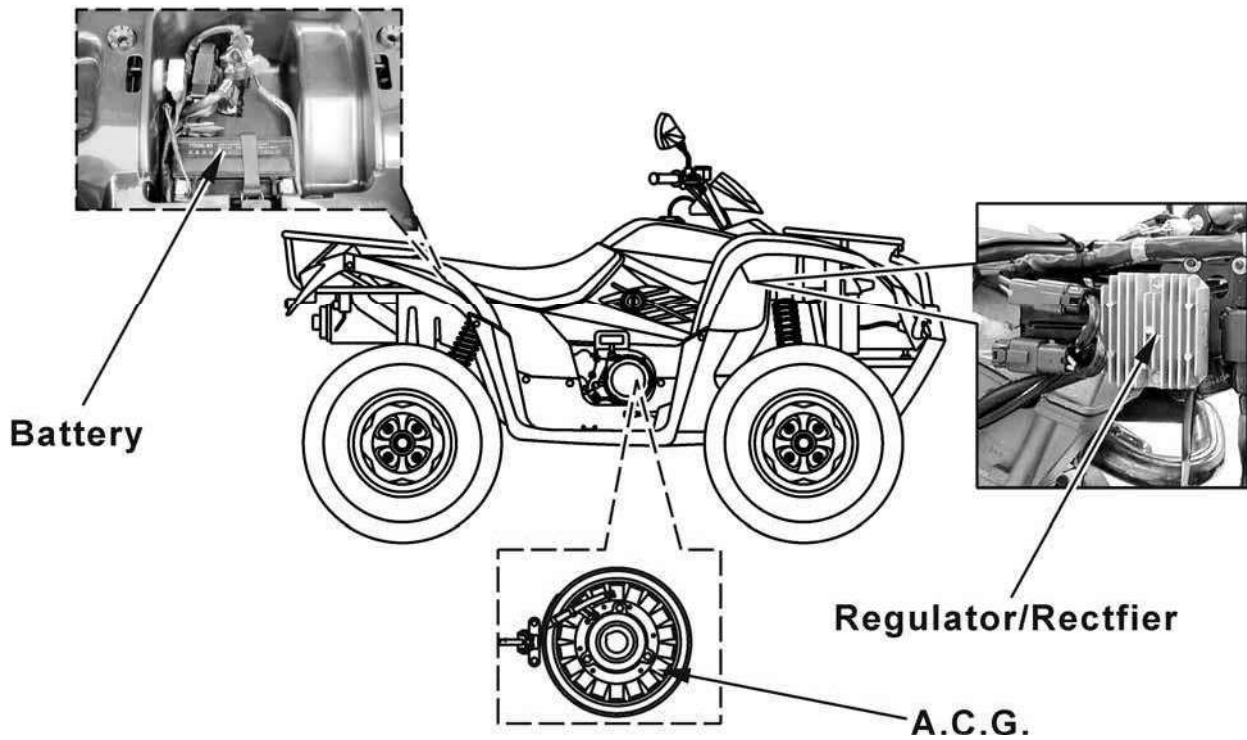
17

BATTERY/CHARGING SYSTEM

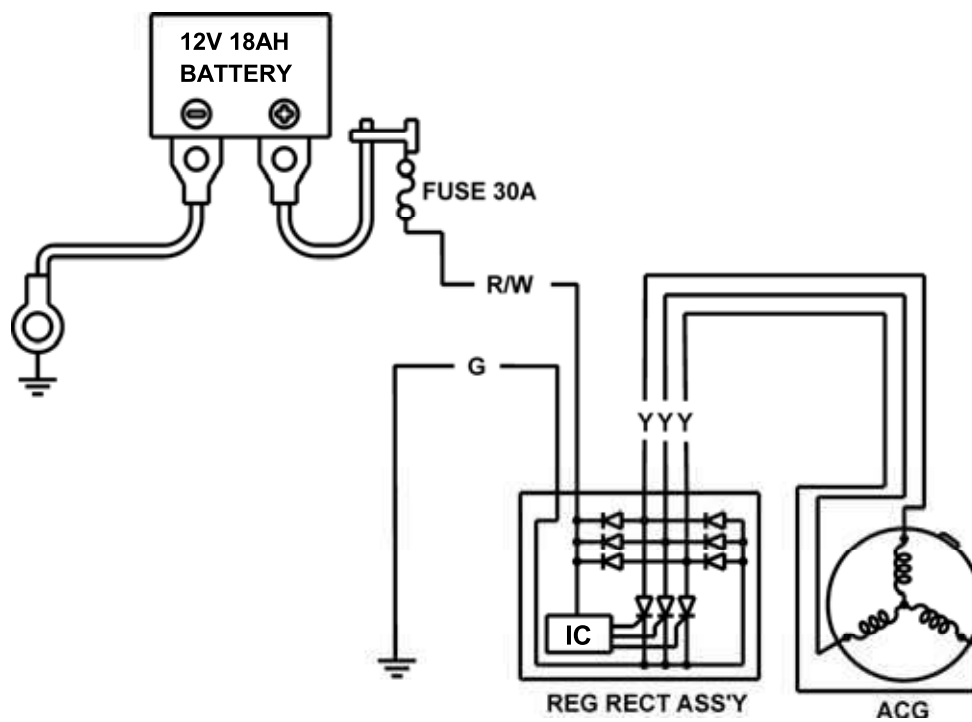
CHARGING SYSTEM LAYOUT/CHARGING CIRCUIT -----	17- 1
SERVICE INFORMATION-----	17- 2
TROUBLESHOOTING-----	17- 4
BATTERY -----	17- 5
CHARGING SYSTEM INSPECTION -----	17- 6
ALTERNATOR CHARGING COIL-----	17- 7
REGULATOR/RECTIFIER-----	17- 8
ALTERNATOR STATOR REMOVAL/INSPECTION/ INSTALLATION -----	17-11

17. BATTERY/CHARGING SYSTEM

CHARGING SYSTEM LAYOUT



CHARGING CIRCUIT



17. BATTERY/CHARGING SYSTEM

SERVICE INFORMATION

GENERAL

CAUTION

- The battery gives off explosive gases; keep sparks, flames and cigarettes away. Provide adequate ventilation when charging.
- The battery contains sulfuric acid (electrolyte). Contact with skin or eyes may cause severe burns. Wear protective clothing and a face shield.
 - If electrolyte gets on your skin, flush with water.
 - If electrolyte gets in your eyes, flush with water for at least 15 minutes and call a physician immediately.
- Electrolyte is poisonous.
 - If swallowed, drink large quantities of water or milk and call your local Poison Control Center or physician immediately, **KEEP OUT OF REACH OF CHILDREN.**

- Always turn off the ignition switch before disconnecting any electrical component.
- Some electrical components may be damaged if terminals or connectors are connected or disconnected while the ignition switch is turned to “ON” and current is present.
- For extended storage, remove the battery, give it a full charge, and store it in a cool, dry place.
- For a battery remaining in a shorted vehicle, disconnect the negative battery cable from the battery.
- The battery caps should not be removed. Attempting to remove the sealing caps from the cells may damage the battery.
- The maintenance free battery must be replaced when it reaches the end of its service life.
- The battery can be damaged if overcharged or undercharged, or if left to discharge for long period. These same conditions contribute to shortening the “life span” of the battery. Even under normal use, the performance of the battery deteriorates after 2-3 years.
- Battery voltage may recover after battery charging, but under heavy load, the battery voltage will drop quickly and eventually die out. For this reason, the charging system is often suspected as the problem. Battery overcharge often results from problems in the battery itself, which may appear to be an overcharging symptom. If one of the battery cells is shorted and battery voltage does not increase, the regulator/rectifier supplies excess voltage to the battery. Under these conditions, the electrolyte level goes down quickly.
- Before troubleshooting the charging system, check for proper use and maintenance of the battery. Check if the battery is frequently under heavy load, such as having the headlight and taillight on for long periods of time without riding the vehicle.
- The battery self-discharge when the vehicle is not in use, for this reason, charge the battery every 2 weeks to prevent sulfate from occurring.
- Filling a new battery with electrolyte will produce some voltage, but in order to achieve its maximum performance, always charge the battery. Also, the battery life is lengthened when it is initially charged.
- When checking the charging system, always follow the steps in the troubleshooting flow chart (page 17-4)

17. BATTERY/CHARGING SYSTEM

BATTERY CHARGING

- This model comes with a maintenance free (MF) battery. Remember the following about MF batteries.
 - Use only the electrolyte that comes with the battery.
 - Use all of the electrolyte
 - Seal the battery properly
 - Never open the seals again
- For battery charging, do not exceed the charging current and time specified on the battery. Using excessive current or extending the charging time may damage the battery.

SPECIFICATIONS

ITEM		SPECIFICATIONS	
Battery	Capacity	12V – 18 Ah	
	Current leakage	0.5 Ma max.	
	Voltage (20°C/68°F)	Full charged	13.0 – 13.2 V
		Needs charging	Below 12.3 V
	Charging current	Normal	1.8 A/5 – 10 h
Quick		9 A/1 h	
Alternator	Capacity	310 – 400 W/5000 rpm	
	Charging coil resistance (20°C/68°F)	0.1 – 0.3 Ω	

17. BATTERY/CHARGING SYSTEM

TROUBLESHOOTING

Battery is damaged or weak

Remove the battery.
Check the battery condition.

Correct



Install the battery.
Check the battery current leakage.

Specified current leakage: 0.5 Ma max

Correct



Check the alternator charging coil.

Standard: 0.1 – 0.3 Ω (20°C/68°F)

Correct



Measure and record the battery voltage using a digital multimeter.
Start the engine.
Measure the charging voltage.
Compare the measurements to result of the following calculation.

Measured voltage < measured charging voltage < 15.5 V

Incorrect



Perform the regulator/rectifier wire harness inspection.

Correct



•Faulty regulator/rectifier

— Incorrect —> •Faulty battery

— Incorrect —> Disconnect the regulator/rectifier connectors and recheck the battery current leakage.

Incorrect

Correct

•Faulty regulator/rectifier.

•Shorted wire harness.

•Faulty ignition switch.

— Incorrect —> •Faulty charging coil.

— Correct —> •Faulty battery.

— Incorrect —> •Open circuit in related wire.
•Loose or poor contacts of related terminal.
•Shorted wire harness

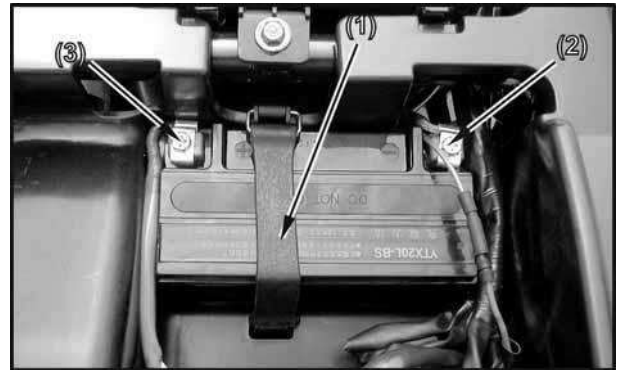
17. BATTERY/CHARGING SYSTEM

BATTERY

REMOVAL/INSTALLATION

Battery removal

1. Make sure the ignition switch is OFF.
2. Remove the seat (refer to the “**FRAME COVERS**” section in the chapter 2)
3. Release the rings and remove the rubber band (1).
4. Disconnect the negative (-) terminal lead (2) from the battery first, then disconnect the positive (+) terminal lead (3).
5. Remove the battery.



Battery installation

1. Install in the reverse order of removal.
2. After installing the battery, check to see if the battery cables are routed correctly.

After connecting the battery cables, coat the terminals with grease.

VOLTAGE INSPECTION

Remove the battery cover (see above).

Measure the battery voltage using a commercially available digital multi-meter.

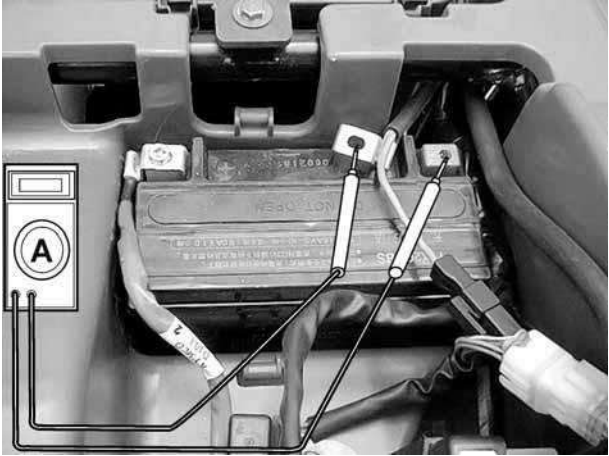
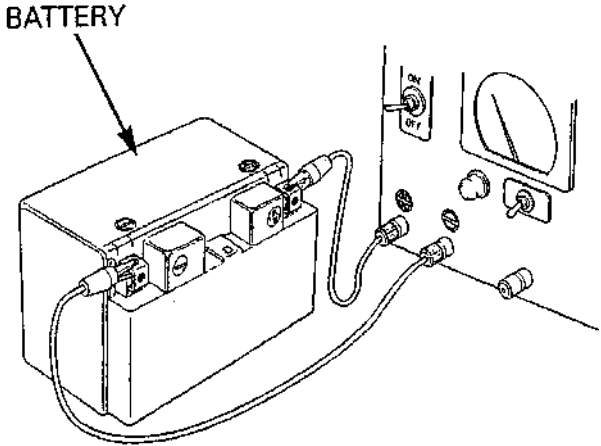
Voltage (20°C/68°C):

Fully charged: 13.0 13.2 V

Under charged: below 12.3 V



17. BATTERY/CHARGING SYSTEM

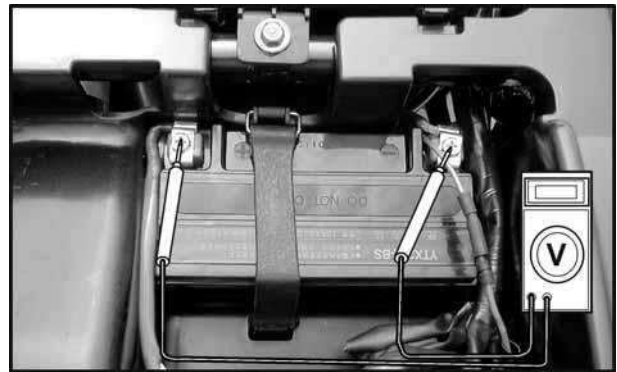


17. BATTERY/CHARGING SYSTEM

CHARGING VOLTAGE INSPECTION

Be sure that the battery is in good condition before performing this test.

Do not disconnect the battery or any cable in the charging system without first switching off the ignition switch. Failure to follow this precaution can damage the tester or electrical components.



Start the engine and warm it up to the operating temperature; stop the engine.

Connect the multi-meter between the positive and negative terminals of the battery.

To prevent short, make absolutely certain which are the positive and negative terminals or cable.

With the headlight on and turned to the high beam position, restart the engine.

Measure the voltage on the multi-meter when the engine runs at 5000 min-1 (rpm).

Standard:

Measured battery voltage (page 17-5) <

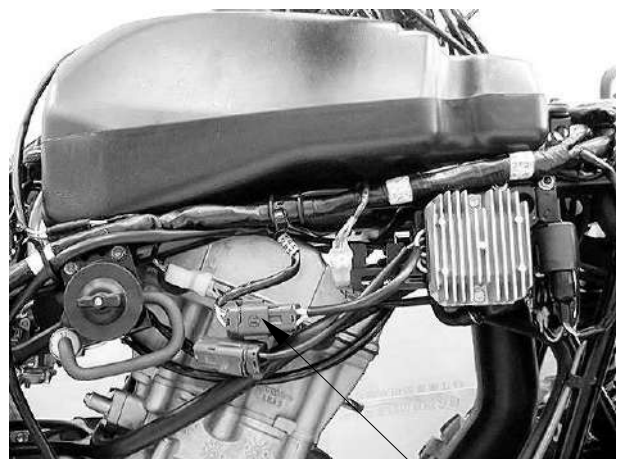
Measure charging voltage (see above) <

15 V

ALTERNATOR CHARGING COIL

INSPECTION

Disconnect the alternator connector.



Alternator Connector

17. BATTERY/CHARGING SYSTEM

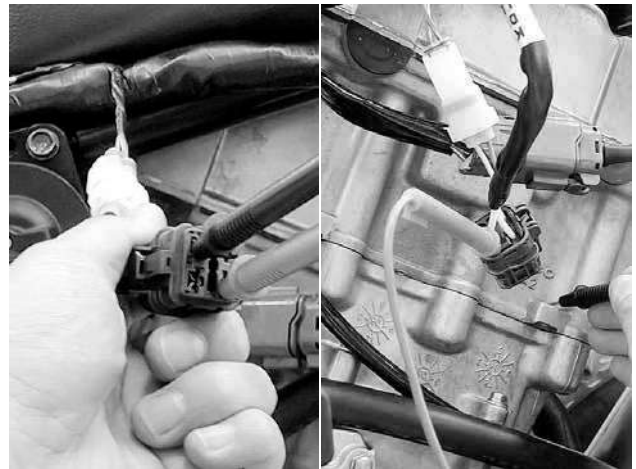
Measure the resistance between each Yellow wire terminals.

Standard: 0.1 – 0.3 Ω (20°C/68°F)

Check for continuity between each Yellow wire terminal of the alternator side connector and ground.

There should be no continuity.

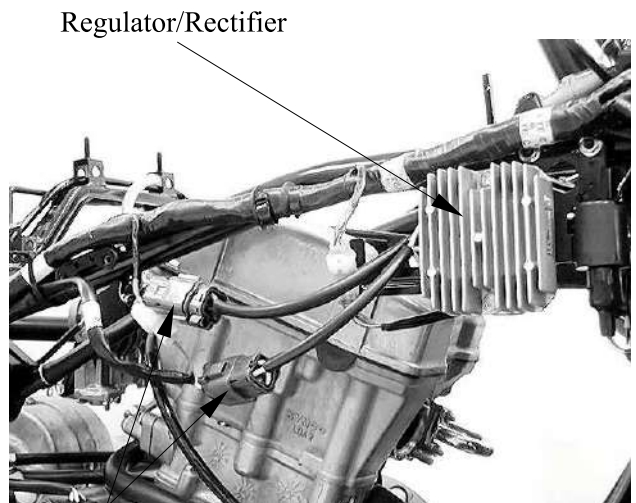
Replace the alternator stator if resistance is out of specification, or if any wire has continuity to ground.



REGULATOR/RECTIFIER

WIRE HARNESS INSPECTION

Disconnect the regulator/rectifier connectors. Check the connectors for loose contacts of corroded terminals.



Regulator/Rectifier Connectors

Battery line

Measure the voltage between the Red/White wire terminal and ground.

There should be battery voltage at all times.

Voltage feedback line

Measure the voltage between the black wire terminal and ground.

There should be battery voltage with the ignition switch “ON”, and no voltage with the ignition switch “OFF”.

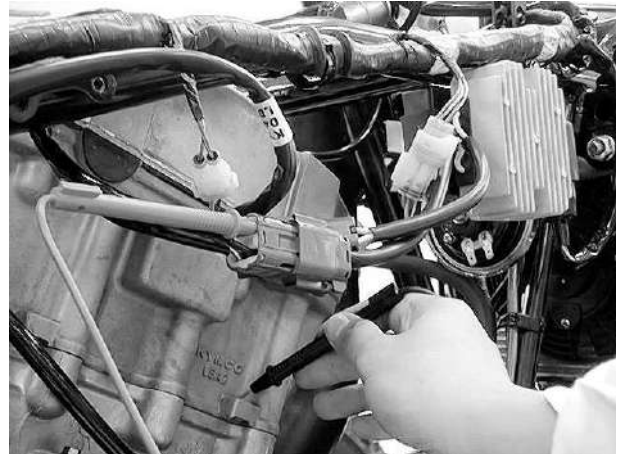


17. BATTERY/CHARGING SYSTEM

Ground line

Check the continuity between the Green wire terminal and ground.

There should be continuity at all times.



Charging coil line

Measure the resistance between each Yellow wire terminals.

Standard: 0.1 – 0.3 Ω (20°C/68°F)

Check for continuity between each Yellow wire terminal and ground.

There should be no continuity.



17. BATTERY/CHARGING SYSTEM

REMOVAL/INSTALLATION

Disconnect the regulator/rectifier connectors.

Remove the two bolts and then remove the regulator/rectifier.

Installation is in the reverse order of removal.

Regulator/Rectifier Connector



Regulator/Rectifier

17. BATTERY/CHARGING SYSTEM

ALTERNATOR STATOR REMOVAL/INSPECTION/ INSTALLATION

REMOVAL

Drain the engine oil (refer to the “ENGINE OIL” section in the chapter 3).

Disconnect the alternator stator connectors.

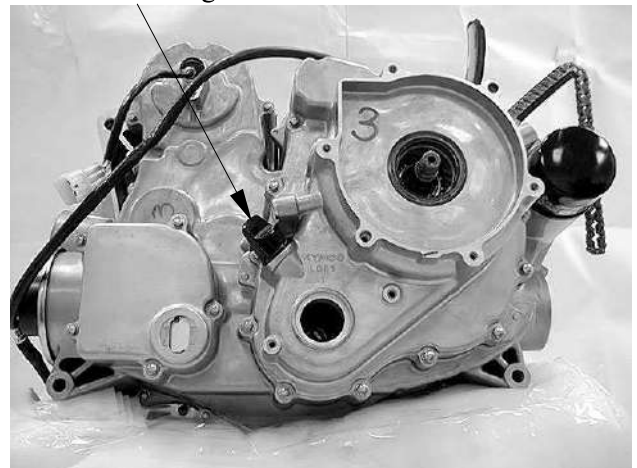


Alternator Stator Connectors

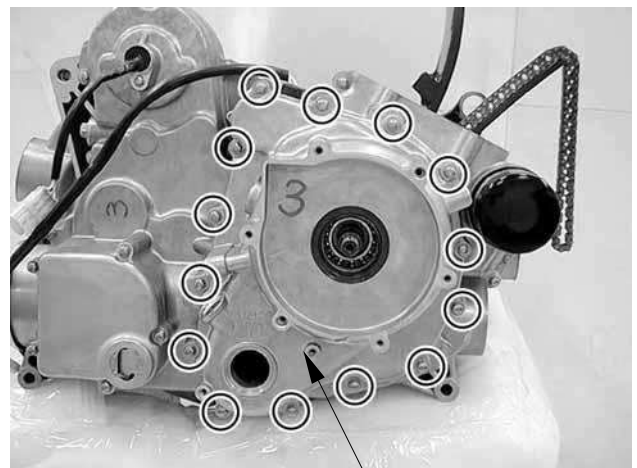
Remove the starter pulley (refer to the “STARTER PULLEY REMOVAL/INSPECTION/INSTALLATION” section in the chapter 19).

Remove the oil filler plug.

Oil Filler Plug

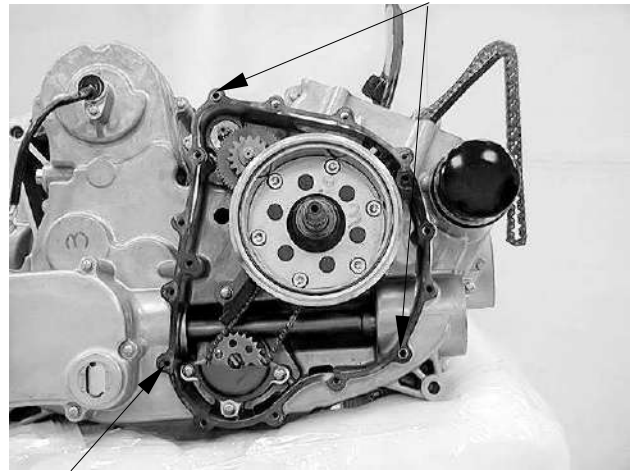


Remove the fourteen bolts and then remove the right crankcase cover.

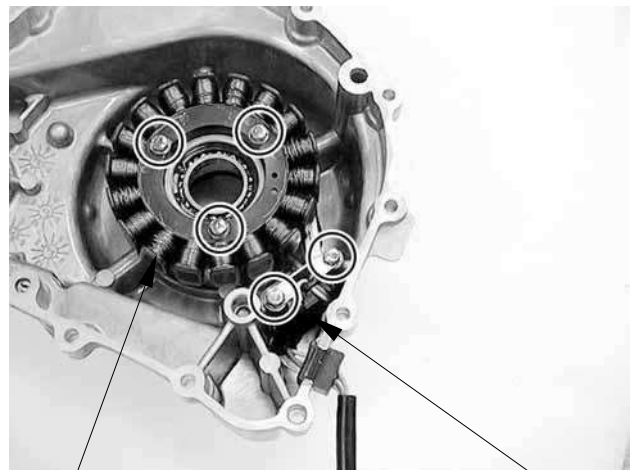


Right Crankcase Cover

17. BATTERY/CHARGING SYSTEM

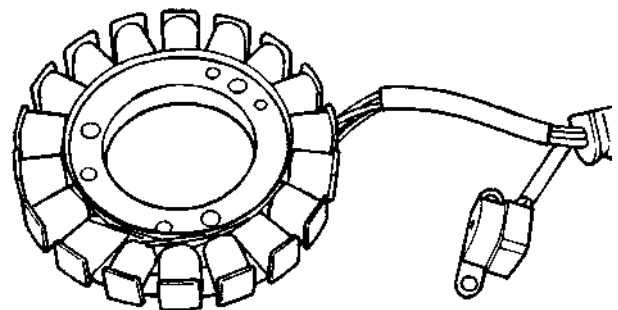


t



Stator

Pulse Coil



17. BATTERY/CHARGING SYSTEM

INSTALLATION

Install the stator and tighten the stator mount bolts to the specified torque.

Torque: 1.2 kgf-m (12 N-m, 9 lbf-ft)

Apply sealant to the grommet seating surface and install it to the cover groove properly.

Install the pulse coil and tighten mount bolts to the specified torque.

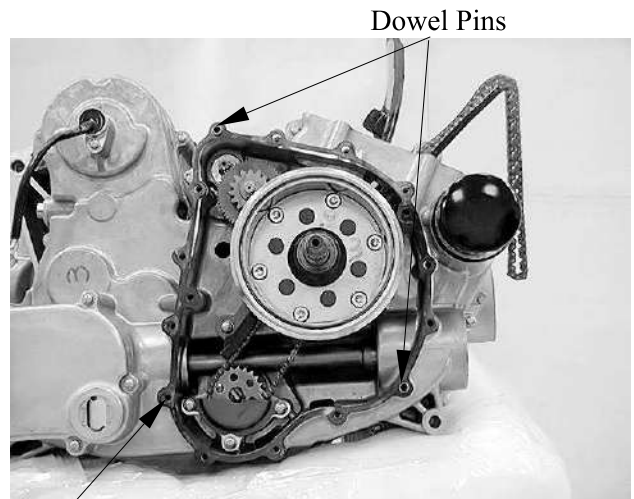
Torque: 1.2 kgf-m (12 N-m, 9 lbf-ft)



Stator Grommet Pulse

Clean the mating surfaces of the right crankcase and cover.

Install the dowel pins and gasket.

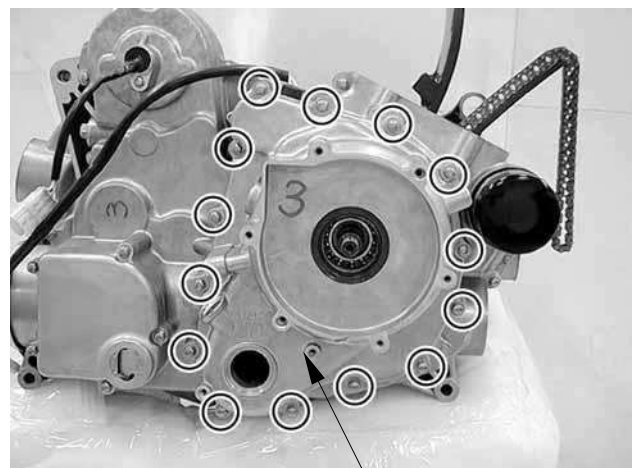


Gasket

Install the right crankcase cover and tighten the bolts in a crisscross pattern in 2 or 3 steps.

FLYWHEEL:

Refer to the “**STARTER CLUTCH REMOVAL/INSPECTION/INSTALLATION**” section in the chapter 19



Right Crankcase Cover

18. IGNITION SYSTEM

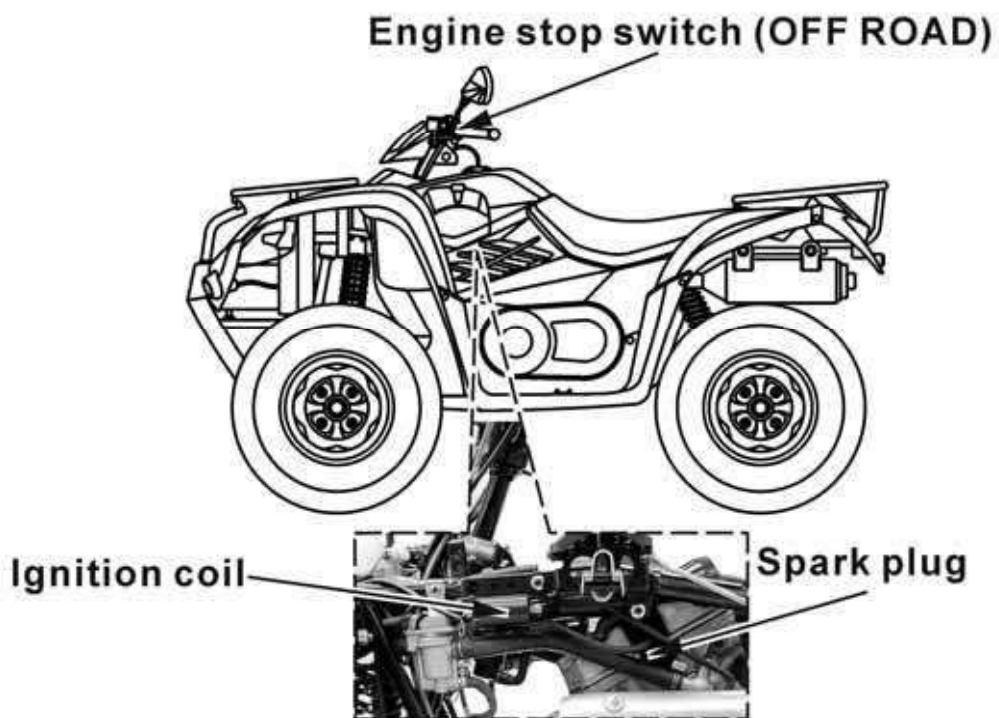
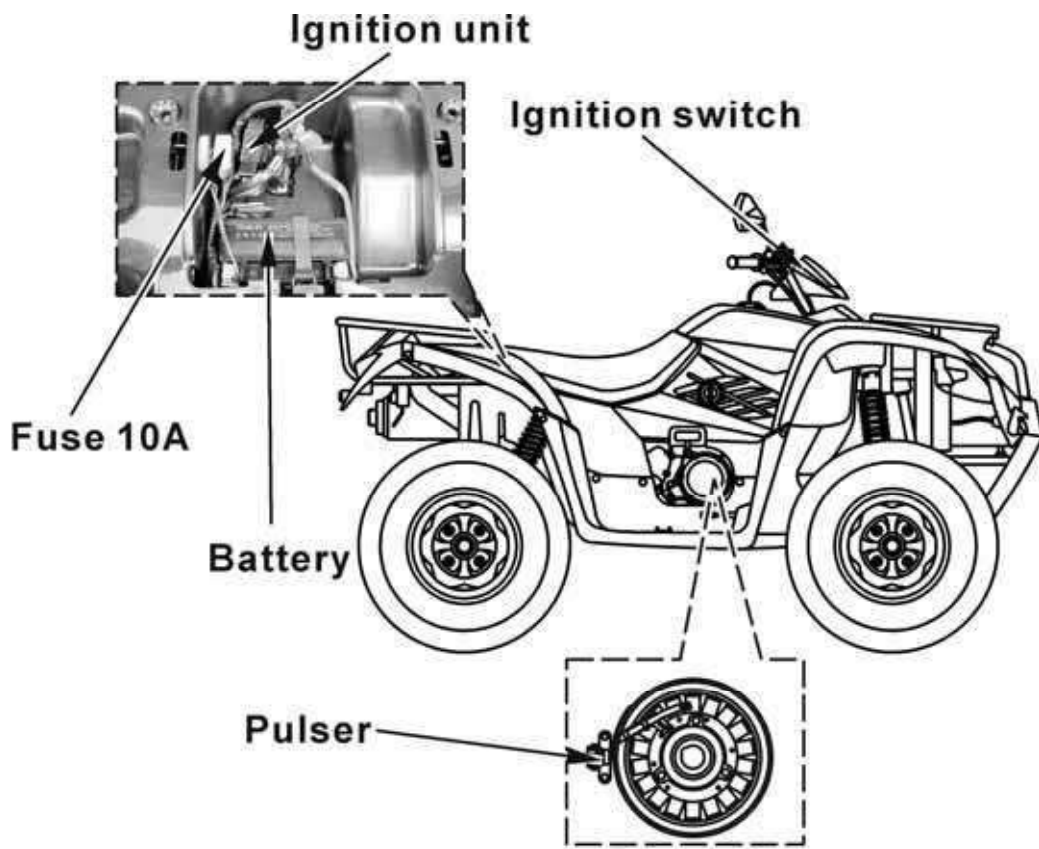
18

IGNITION SYSTEM

IGNITION SYSTEM LAYOUT-----	18-1
IGNITION CIRCUIT -----	18-2
SERVICE INFORMATION-----	18-3
TROUBLESHOOTING-----	18-4
IGNITION COIL INSPECTION -----	18-5
IGNITION CONTROL MODULE-----	18-6

18. IGNITION SYSTEM

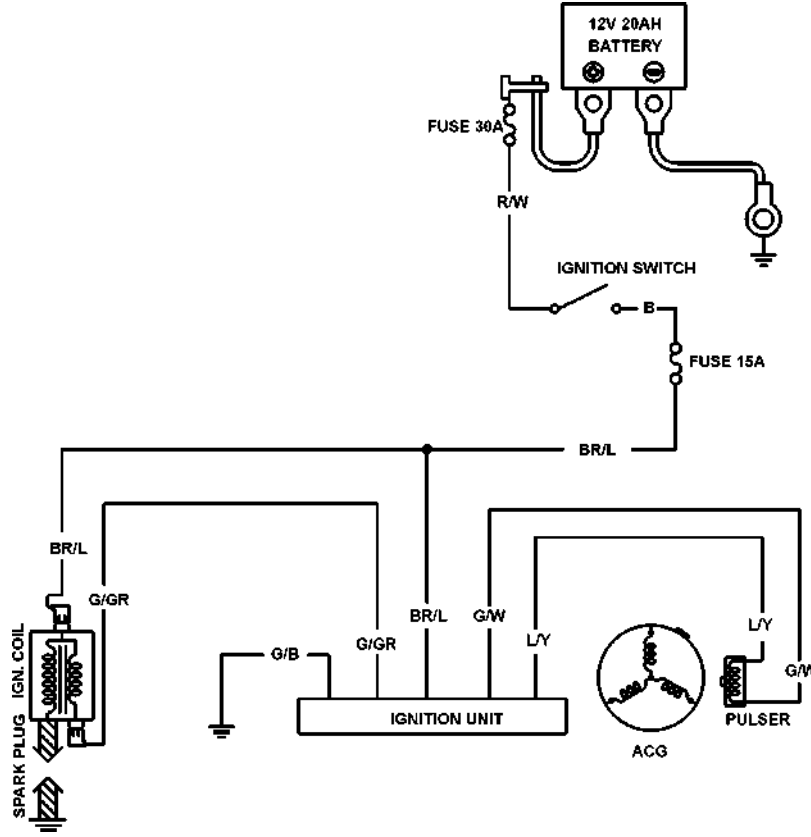
IGNITION SYSTEM LAYOUT



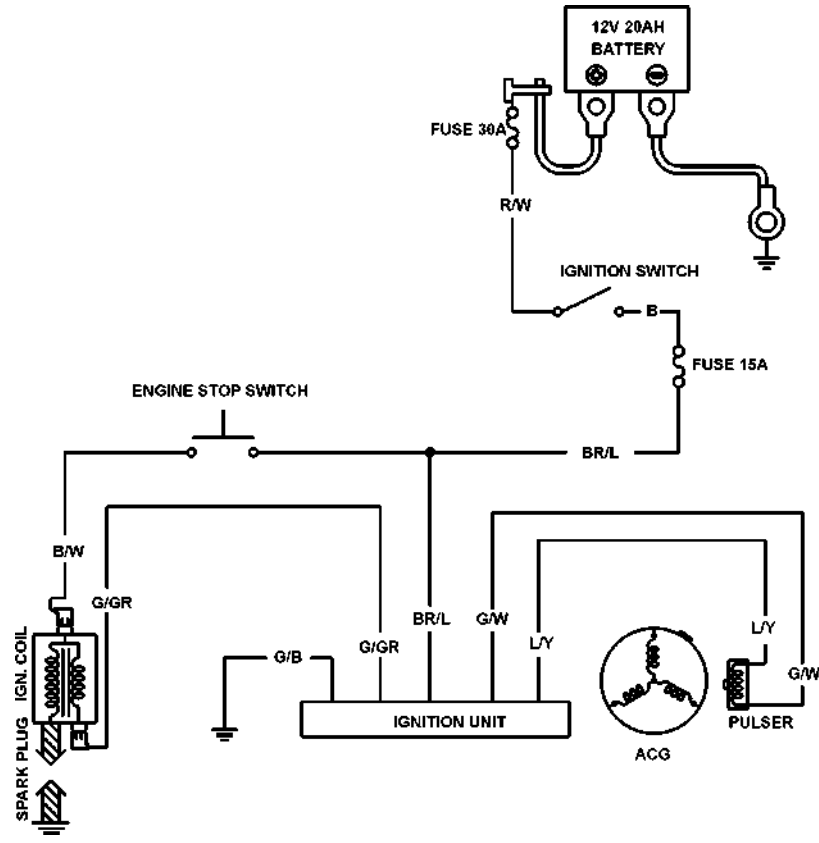
18. IGNITION SYSTEM

IGNITION CIRCUIT

(ON ROAD)



(OFF ROAD)



18. IGNITION SYSTEM

SERVICE INFORMATION

GENERAL INSTRUCTIONS

- Some electrical components may be damaged if terminals or connectors are connected or disconnected while the ignition switch is “ON” and current is present.
- When servicing the ignition system, always follow the steps in the troubleshooting on page 18-3.
- The ignition timing cannot be adjusted since the ignition control module is factory preset.
- The ignition control module may be damaged if dropped. Also, if the connector is disconnected when current is flowing, the excessive voltage may damage the ignition control module. Always turn off the ignition switch before servicing.
- A faulty ignition system is often related to poor connections. Check those connections before proceeding.
- Make sure the battery is adequately charged. Using the starter motor with a weak battery results in a slower engine cranking speed as well as no spark at the spark plug.
- Use a spark plug of the correct heat range. Using spark plug with an incorrect heat range can damage the engine.
- See section 17 for ignition pulse generator removal/installation.
- See section 20 for following components:
 - Ignition switch
 - Engine stop switch

SPECIFICATIONS

Item	Standard
Spark plug	NGK-CR7E
Spark plug gap	0.7 mm (0.028 in)
Ignition system	Full transistor digital ignition
Ignition timing	5°/1500 rpm

18. IGNITION SYSTEM

TROUBLESHOOTING

LOW PEAK VOLTAGE

- Cranking speed is too low (battery is undercharged).
- Poorly connected connectors or an open circuit in the ignition system.
- Faulty ignition-coil.
- Faulty ignition control module.

NO PEAK VOLTAGE

- Short circuit in engine stop switch or ignition switch wire.
- Faulty engine stop switch or ignition switch.
- Loose or poorly connected ignition control module connectors.
- Open circuit or poor connection in ground wire of the ignition control module.
- Faulty ignition pulse generator.
- Faulty ignition control module.

PEAK VOLTAGE IS NORMAL, BUT NO SPARK JUMPS AT THE PLUG

- Faulty spark plug or leaking ignition coil secondary current.
- Faulty ignition coil.

18. IGNITION SYSTEM

IGNITION COIL INSPECTION

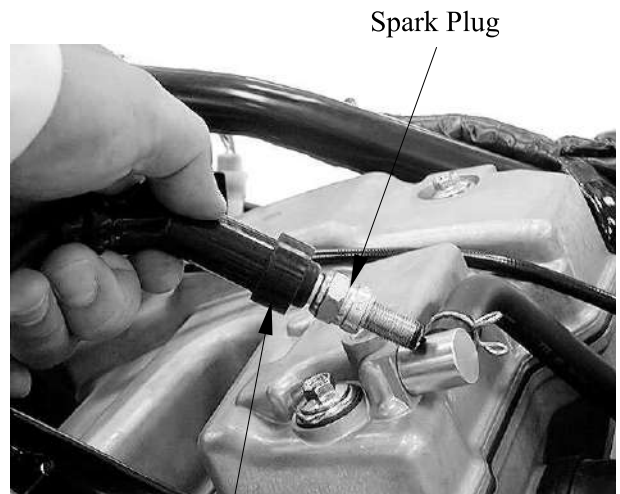
IGNITION COIL PRIMARY PEAK VOLTAGE

Check cylinder compression and check that the spark plug is installed correctly in the cylinder. Disconnect the spark plug cap from the spark plug.



Spark Plug Cap

Connect known good spark plug to the spark plug cap and ground the spark plugs to the cylinder as done in the spark test.



Spark Plug

Spark Plug Cap

Turn the ignition switch to “ON” and engine stop switch ON.

Turn the engine stop switch in RUN (OFF ROAD).

Connect the multi-meter (+) probe to the Brown/Blue wire and the multi-meter (-) to the body ground.

Check for initial voltage at this time.

The battery voltage should be measured.

If the initial voltage cannot be measured, check the power supply circuit.



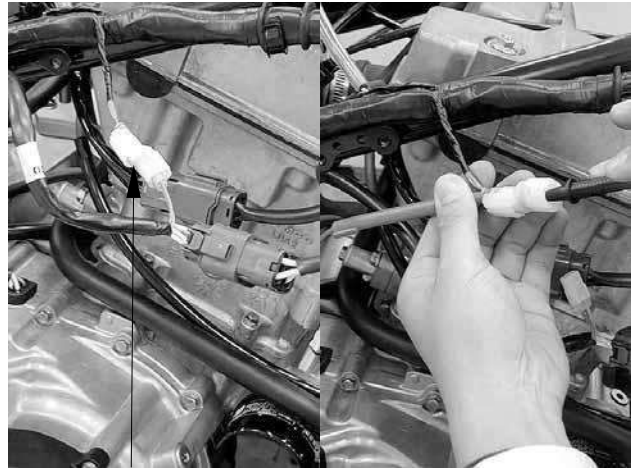
Ignition Coil

18. IGNITION SYSTEM

IGNITION PULSE GENERATOR INSPECTION

Disconnect the ignition pulse generator connector.
 Measure the ignition pulse generator resistance between the Green/White wire and Blue/Yellow wire.

Standard: $489 \pm 20\% \Omega$ (20°C/68°F)



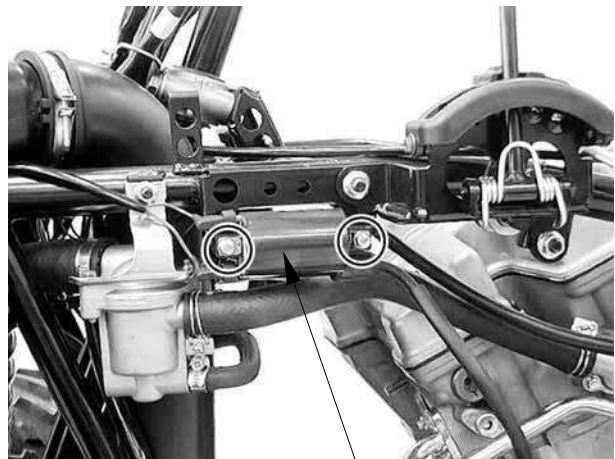
Ignition Pulse Generator Connector

IGNITION COIL REMOVAL/INSTALLATION

Disconnect the spark plug cap from the spark plug (page 18-4).

Disconnect the ignition coil primary connectors.
 Remove the two bolts and the ignition coil.

Installation is in the reverse order of removal.



Ignition Coil

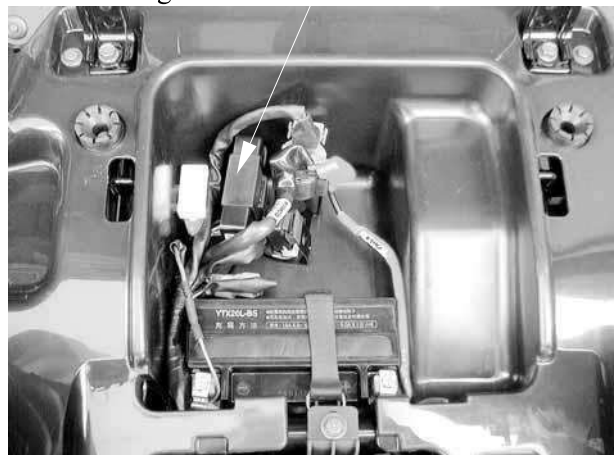
IGNITION CONTROL MODULE

REMOVAL/INSTALLATION

Remove the seat (refer to the “**FRAME COVERS**” section in the chapter 2).

Disconnect the ignition control module connectors and remove the ignition control module.

Ignition Control Module

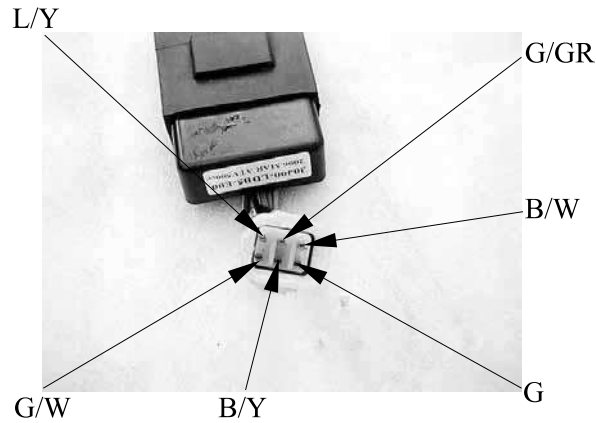


18. IGNITION SYSTEM

RESISTANCE INSPECTION

Measure the resistance between the terminals.

Due to the semiconductor in circuit, it is necessary to use a specified tester for accurate testing. Use of an improper tester in an improper range may give false readings.



Unit: Ω

(-) \ (+)	B/W	G/GR	L/Y	G/W	B/Y	G
B/W						
G/GR			6.7 M	6.7 M		6.7 M
L/Y				0.785 K		Continue
G/W			0.778 K			0.785 k
B/Y						
G			Continue	0.785 K		

19. STARTER SYSTEM

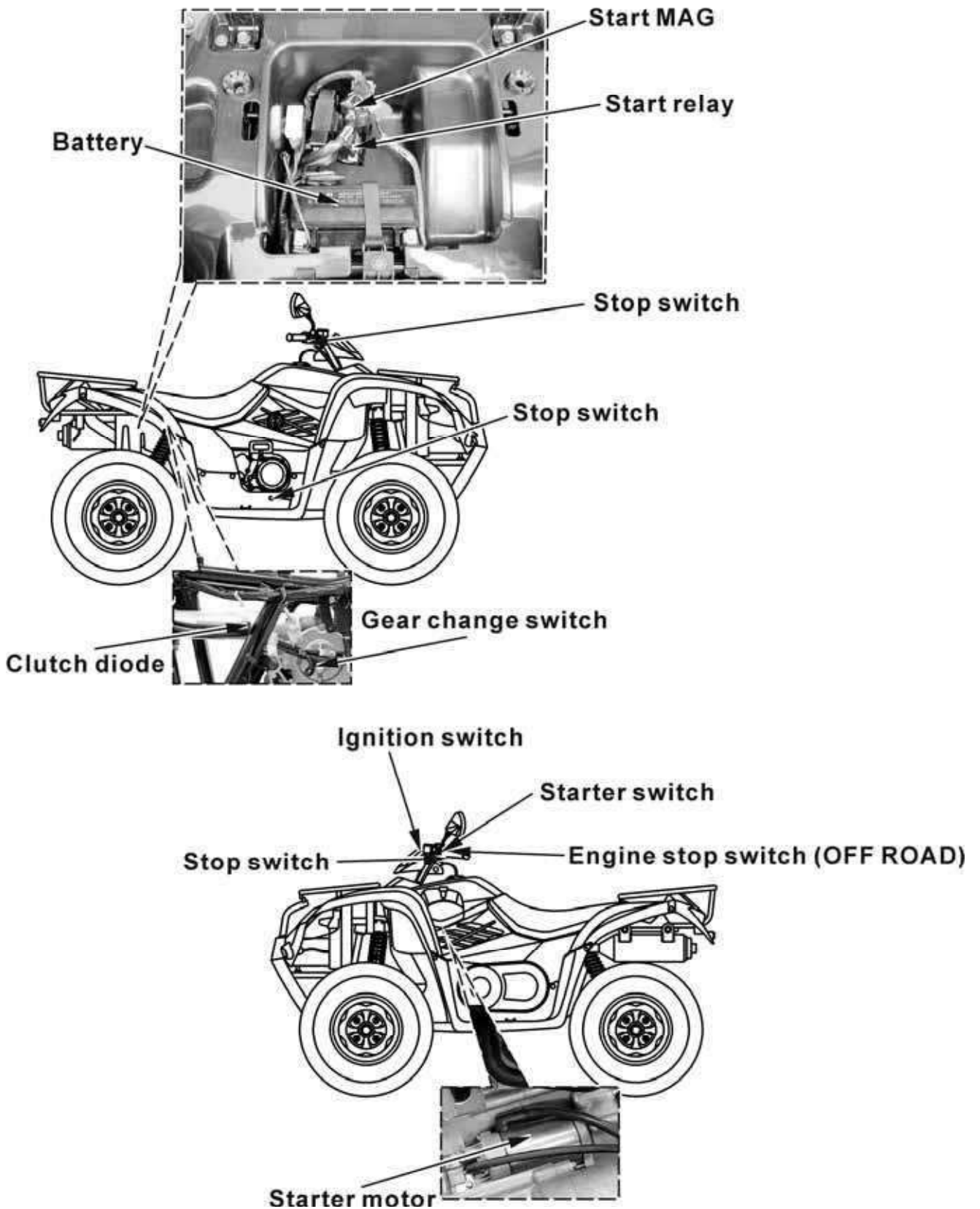
STARTER SYSTEM

19

STARTING SYSTEM LAYOUT -----	19- 1
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RECOIL STARTER REMOVAL/INSPECTION/ INSTALLATION -----	19- 9
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STARTER CLUTCH REMOVAL/INSPECTION/ INSTALLATION -----	19-20

19. STARTER SYSTEM

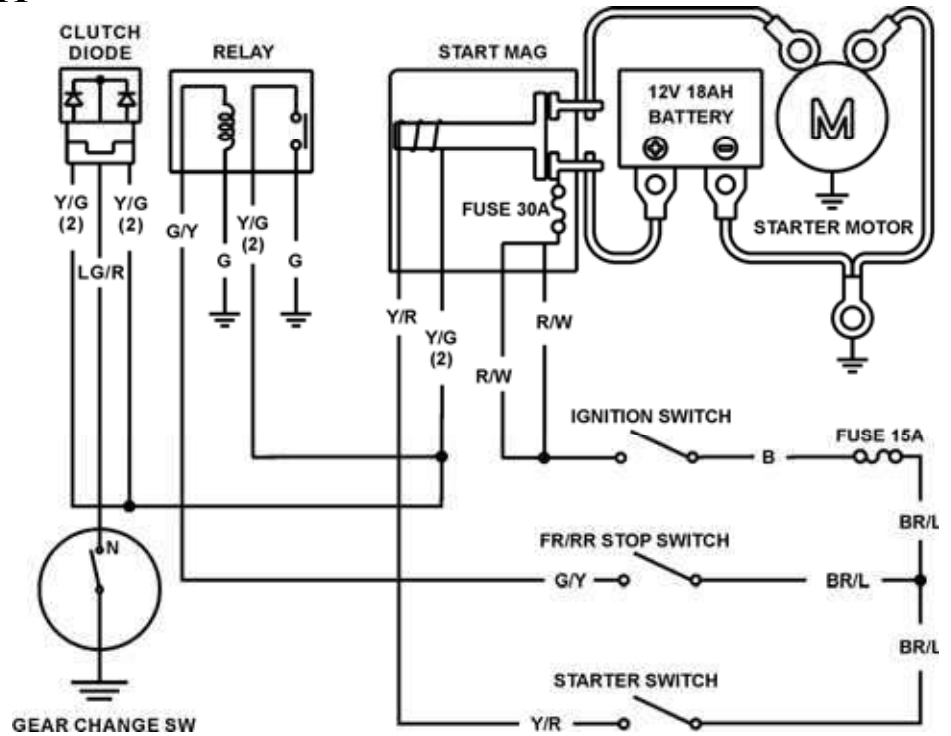
STARTING SYSTEM LAYOUT



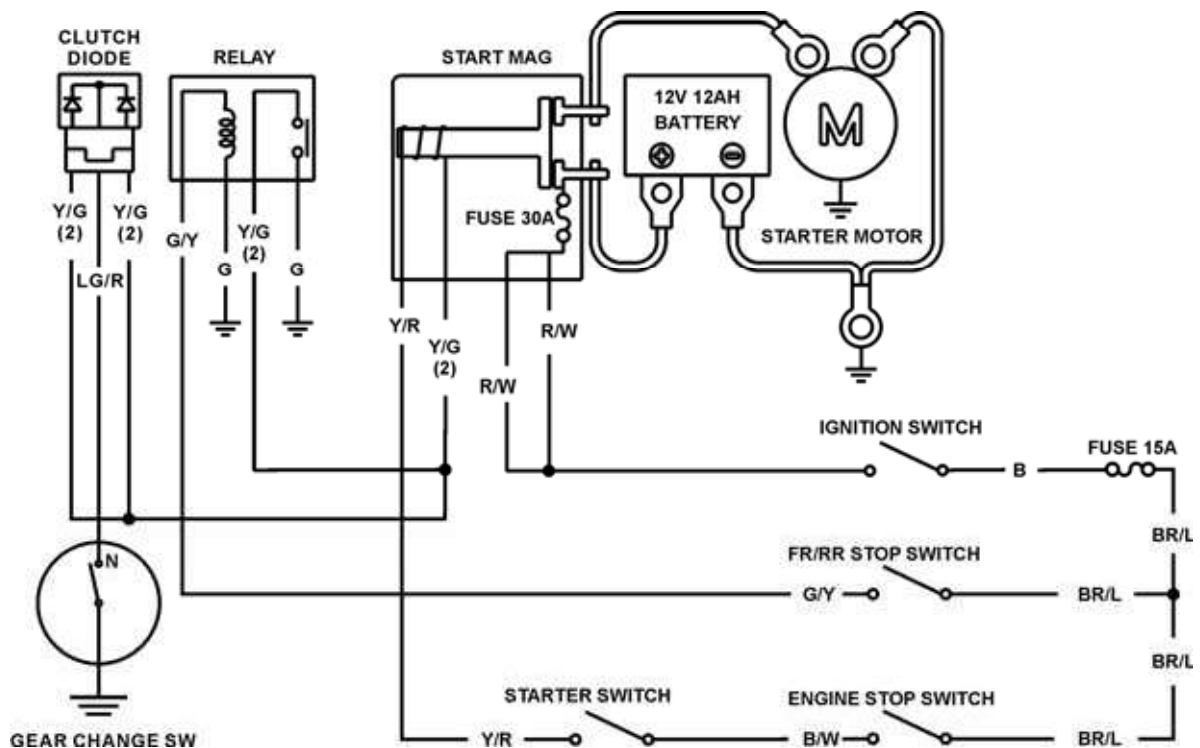
19. STARTER SYSTEM

STARTING CIRCUIT

(ON ROAD)



(OFF ROAD)



19. STARTER SYSTEM

SERVICE INFORMATION

GENERAL

- Always turn the ignition switch to “OFF” before servicing the starter motor. The motor could suddenly start, causing serious injury.
- The starter motor can be serviced with the engine in the frame.
- When checking the starter system, always follow the steps in the troubleshooting flow chart (page 19-2).
- A weak battery may be unable to turn the starter motor quickly enough, or supply adequate ignition current.
- If the current is kept flowing through the starter motor to turn it while the engine is not cranking over, the starter motor may be damaged.
- See section 20 for following components:
 - Ignition switch
 - Starter switch
 - Brake light switch

SPECIAL TOOL

Flywheel puller A120E00060

TORQUE

Starter pulley nut 5.5 kgf-m (55 N-m, 40 lbf-ft)

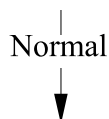
TROUBLESHOOTING

- Check for the following before troubleshooting:
 - Blown main fuse (30A) and sub fuse (15 A)
 - Loose battery and starter motor cable
 - Discharged battery
- The starter motor can turn with the following conditions:
 - Ignition switch ON
 - Engine stop switch in RUN (OFF ROAD)
 - Rear brake lever fully squeezed
 - Starter switch pushed

Starter motor will not turn

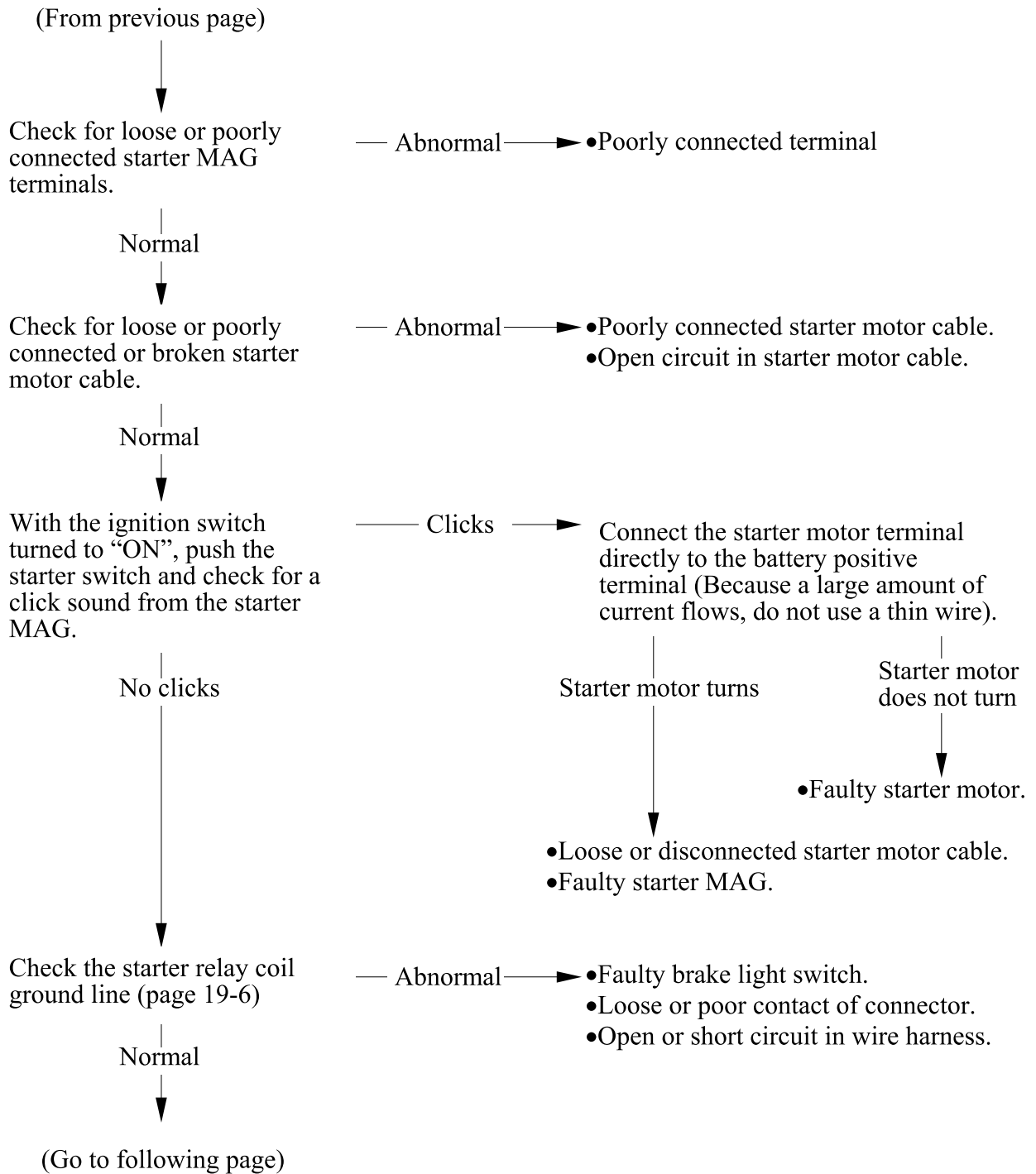
Check for loose or poorly connected battery terminals and opened or shorted battery cable.

— Abnormal —▶ • Poorly connected battery terminals.
 • Open or short circuit in battery.

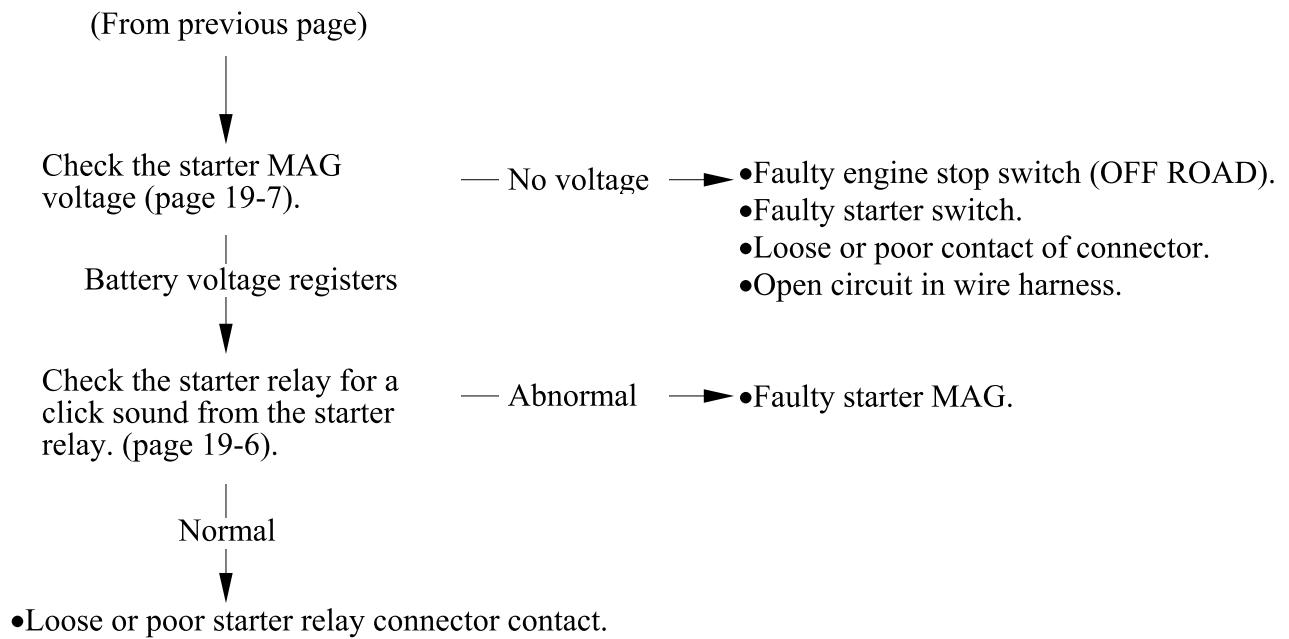


(Go to following page)

19. STARTER SYSTEM



19. STARTER SYSTEM



19. STARTER SYSTEM

STARTER MOTOR

INSPECTION

Disconnect the starter motor cable from the starter MAG.
 Turn the ignition switch to “ON”.
 Connect the starter motor cable directly to the battery positive terminal.
 If the starter motor does not turn, the starter motor is faulty.

Starter Motor Cable



REMOVAL

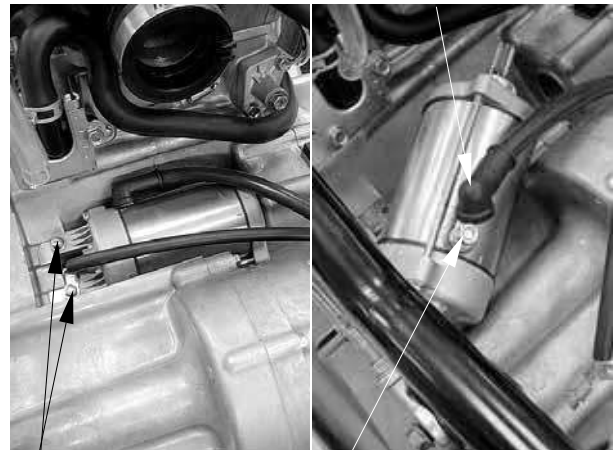
Remove the carburetor (refer to the “**CARBURETOR REMOVAL/CHOKE INSPECTION/INSTALLATION**” section in the chapter 5).

Turn the ignition switch turned to “OFF”

Remove the two mounting bolts and starter motor.

Release the rubber cap and remove the terminal nut to disconnect the starter motor cable from the starter motor.

Rubber Cap



Bolts

Nut

INSTALLATION

Coat a new O-ring with engine oil and install it into the starter motor groove.

Connect the starter motor cable to motor terminal with the terminal nut and tighten it.

Install the starter motor into the crankcase.

Install the two mounting bolts and tighten them securely.

O-ring



19. STARTER SYSTEM

STARTER RELAY SWITCH/STARTER MAG

INSPECTION

Turn the ignition switch to “ON”.

Squeeze the brake lever or pedal fully.
The coil is normal if the starter relay switch clicks.

Squeeze and hold the brake lever or pedal fully then push the starter switch.
The coil is normal if the starter MAG switch clicks.

If you do not hear the switch click. Inspect the relay switch and starter MAG using the procedure below.

GROUND LINE INSPECTION

Disconnect the starter relay switch connector.
Check for continuity between the Green wire terminal and ground.

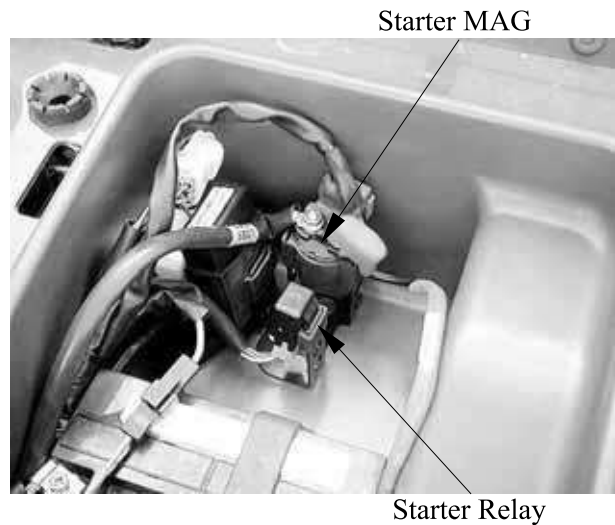
There should be continuity.

VOLTAGE INSPECTION

Connect the starter MAG connector.
Turn the ignition switch ON.

Measure the starter MAG Yellow/Red wire terminal and ground.

If the battery voltage appears only when the rear brake lever is squeezed fully (or the gear change switch in neutral) and starter switch is pushed, the circuit is normal.



19. STARTER SYSTEM

CONTINUTY INSPECTION

Disconnect the starter MAG switch connector and cables.

Connect a fully charged 12 V battery positive wire to the relay switch Yellow/Red wire terminal and negative wire to the Yellow/Green wire terminal.

There should be continuity between the cable terminals while the battery is connected, and no continuity when the battery is disconnected.



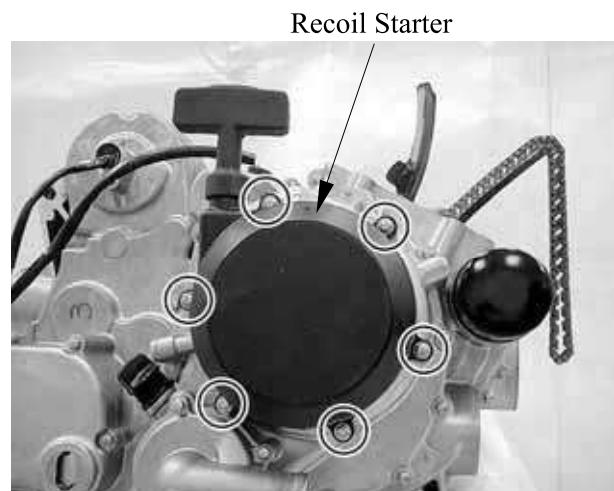
19. STARTER SYSTEM

RECOIL STARTER REMOVAL/INSPECTION/ INSTALLATION

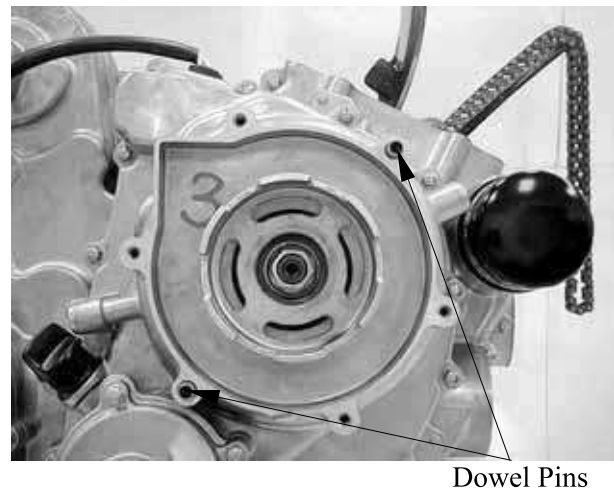
The recoil starter can not start the engine when the battery is removal.

REMOVAL

Remove the six bolts, then remove the recoil starter assembly.

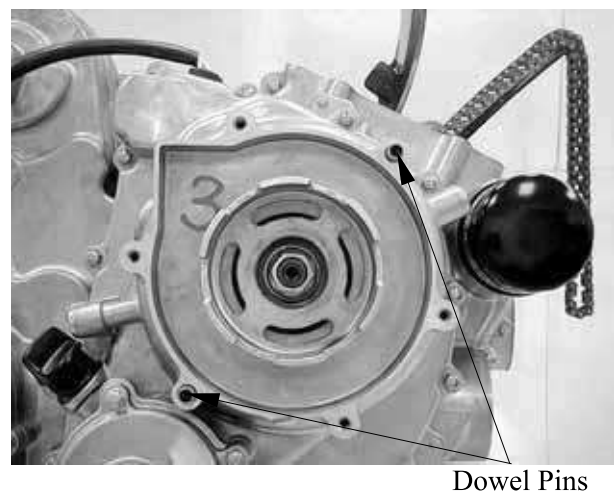


Remove the two dowel pins.



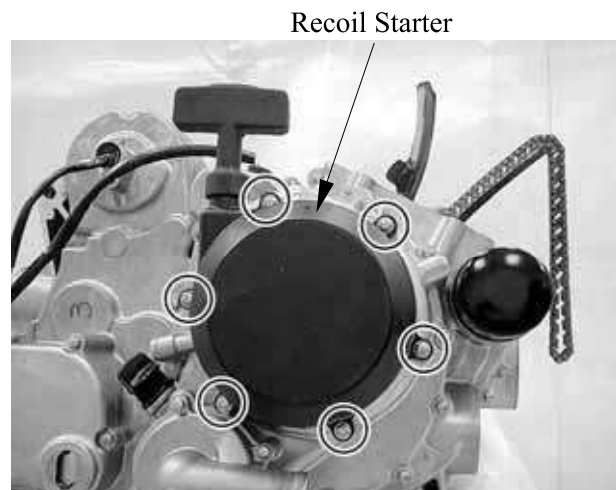
INSTALLATION

Install the dowel pins.



19. STARTER SYSTEM

Install the recoil starter assembly.
Install and tighten the six bolts diagonally.



19. STARTER SYSTEM

RECOIL STARTER HANDLE REPLACE

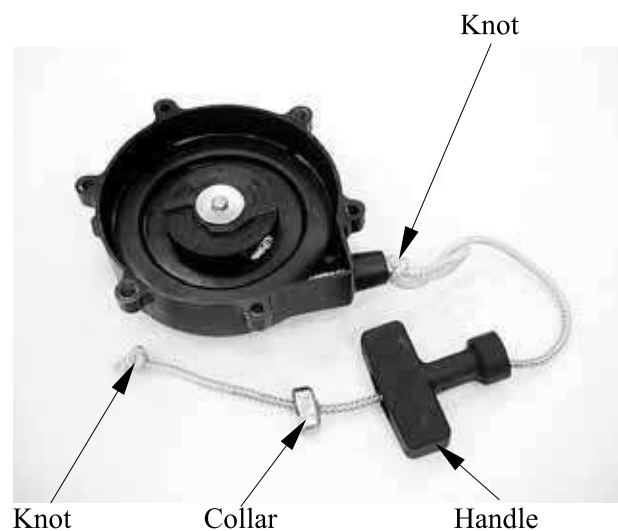
Remove the recoil starter assembly (refer to the “RECOIL STARTER REMOVAL/INSPECTION/INSTALLATION” section in this chapter).

Remove the cap on the handle.



Replace the handle.

Before untying the knot above the starter handle, make a knot in the rope so that the rope is not pulled into the housing.



19. STARTER SYSTEM

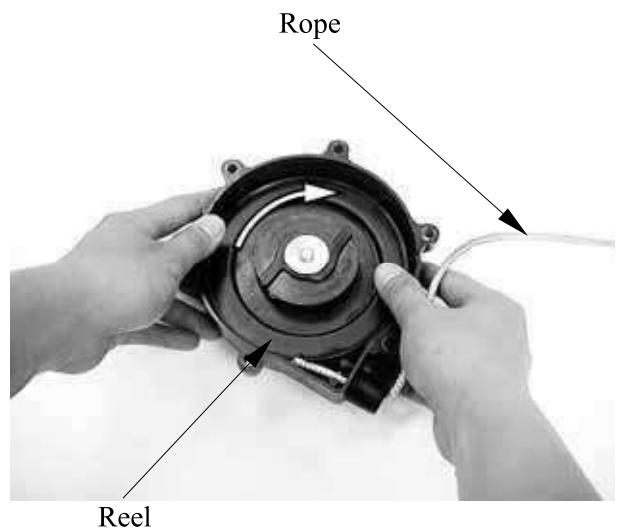
RECOIL STARTER DISASSEMBLY/INSPECTION/ ASSEMBLY

DISASSEMBLY

Remove the recoil starter assembly (refer to the “**RECOIL STARTER REMOVAL/INSPECTION/INSTALLATION**” section in this chapter).

Remove the handle (refer to the “**RECOIL STARTER HANDLE REPLACE**” section in this chapter).

Untying the knot, then turn the reel clockwise with the rope slowly.



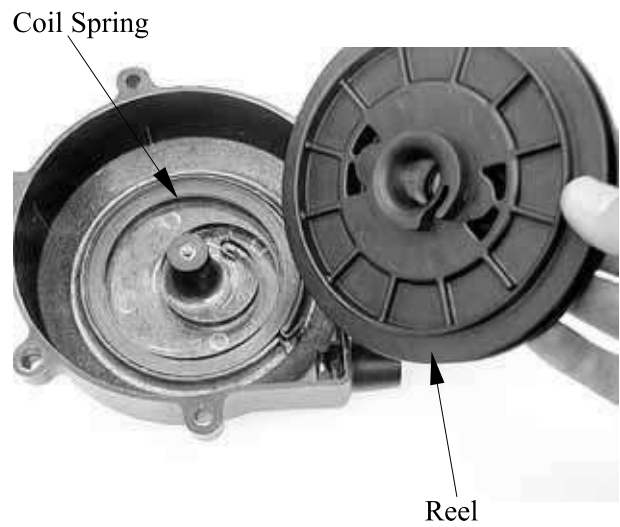
Remove the bolt and then remove the washer, friction plate and pawl spring.



19. STARTER SYSTEM

Remove the reel, then remove the coil spring.

Wear hand and eye protection when removing the reel, since the spring may quickly unwind and cause an injury.



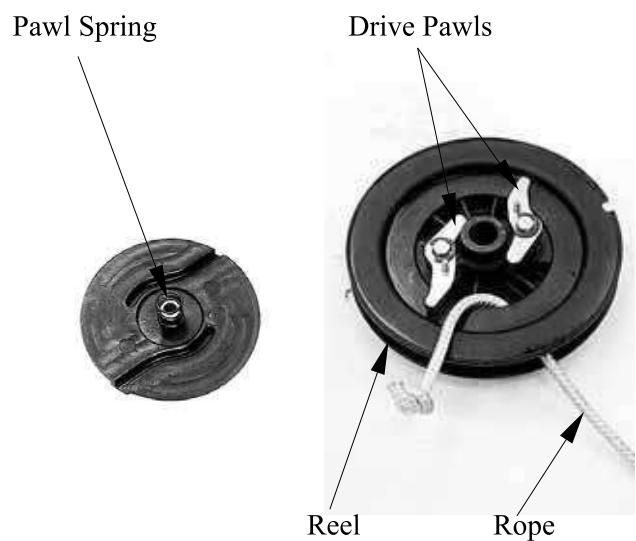
INSPECTION

Pull the rope and check that the ratchet is pushed out.



Inspect the rope, reel and drive pawl for wear or damage.

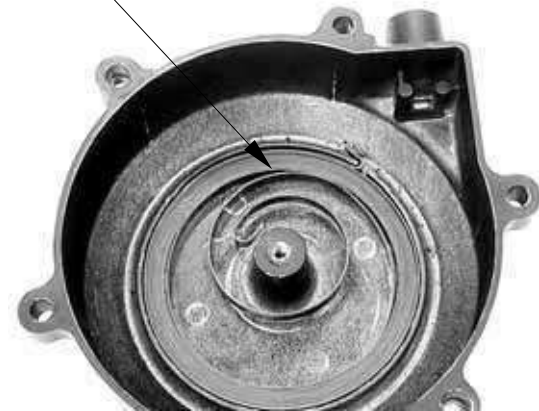
Inspect the pawl spring for fatigue.



19. STARTER SYSTEM

Inspect the coil spring for fatigue.

Coil Spring

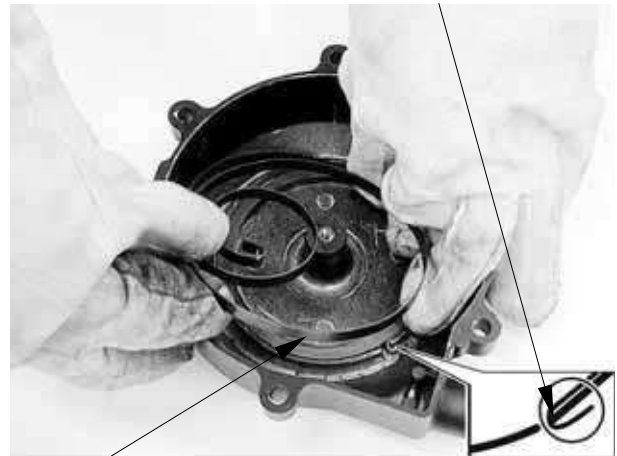


ASSEMBLY

Apply molybdenum disulfide grease to the coil spring, then install the coil spring.

- Wear hand and eye protection when installing the spring, since the spring may quickly unwind and cause and injury.
- Mesh the spring hook with the housing slit, then wind the housing to make the diameter of the spring smaller and the spring will be into the housing.

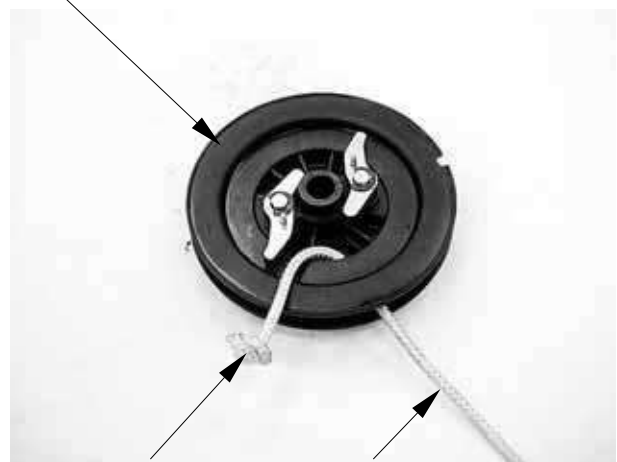
Hook



Coil Spring

Pass the rope through the reel and make a knot above the reel.

Reel



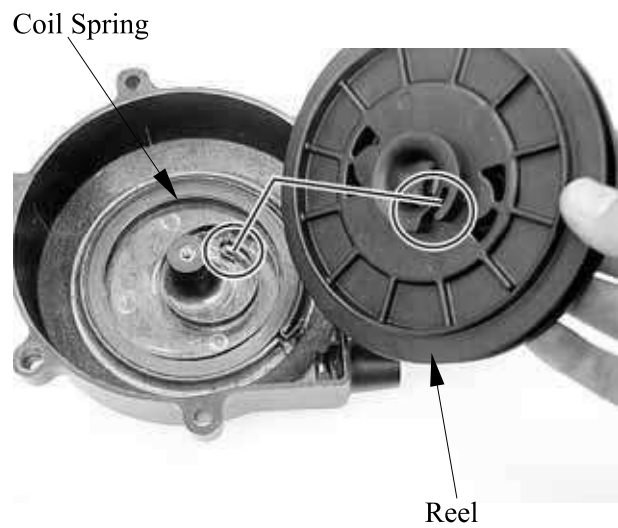
Knot

Rope

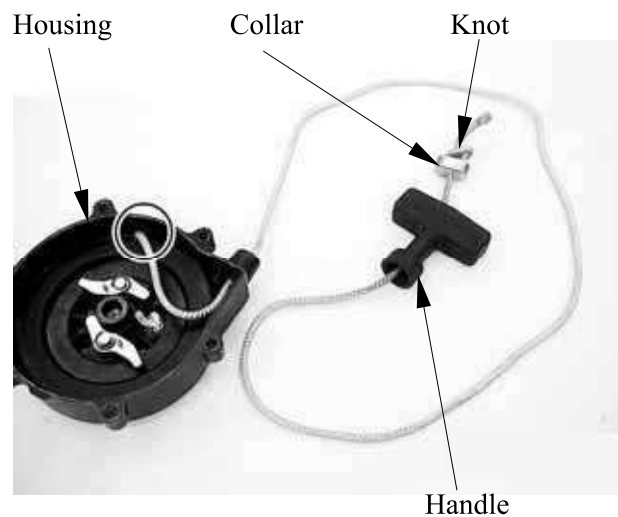
19. STARTER SYSTEM

Install the reel.

- Wear hand and eye protection when installing the reel, since the spring may quickly unwind and cause an injury.
- Engage the part of the reel with coil spring end.



Hook the rope onto the hook part of the reel, then pass the rope through the recoil starter housing, handle and collar. Make a knot above the collar.



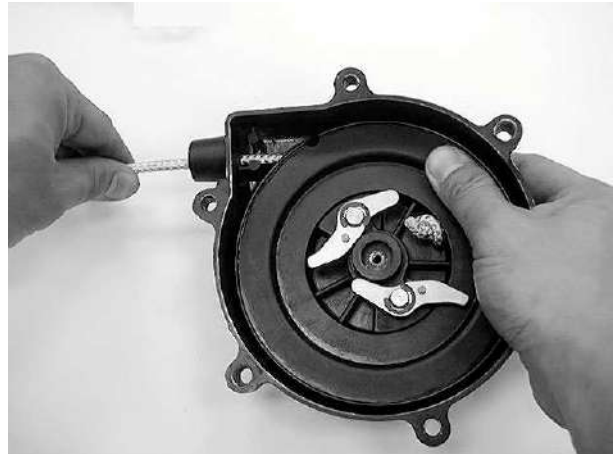
Hook the rope onto the hook part of the reel, turn the reel counterclockwise three or four times with the rope.

- Wear hand and eye protection when assembling the recoil starter, since the spring may quickly unwind and cause an injury.



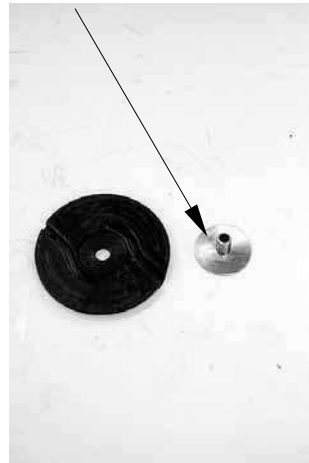
19. STARTER SYSTEM

Unhook the rope, then turn the reel clockwise with the rope slowly.



Apply molybdenum disulfide grease to the washer and friction plate.

Apply Grease



Apply Grease



Spring

Install the pawl spring, friction plate/washer.
Install and tighten the new bolt securely.

Bolt/Washer/Plate/Spring



19. STARTER SYSTEM

Pull the rope and check that the ratchet is pushed out.



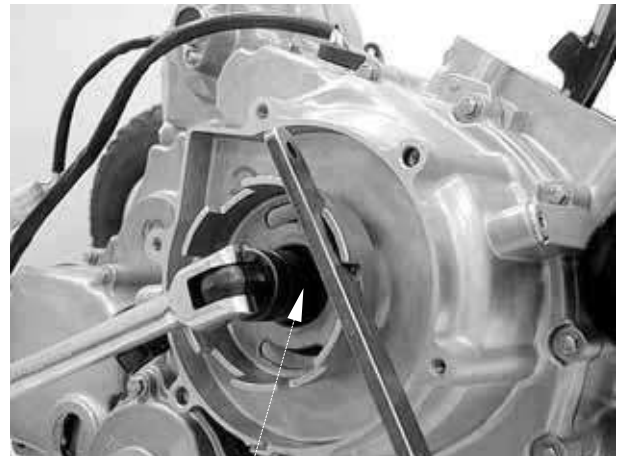
19. STARTER SYSTEM

STARTER PULLEY REMOVAL/INSPECTION/ INSTALLATION

REMOVAL

Remove the recoil starter assembly (refer to the “**RECOIL STARTER REMOVAL/INSPECTION/INSTALLATION**” section in this chapter).

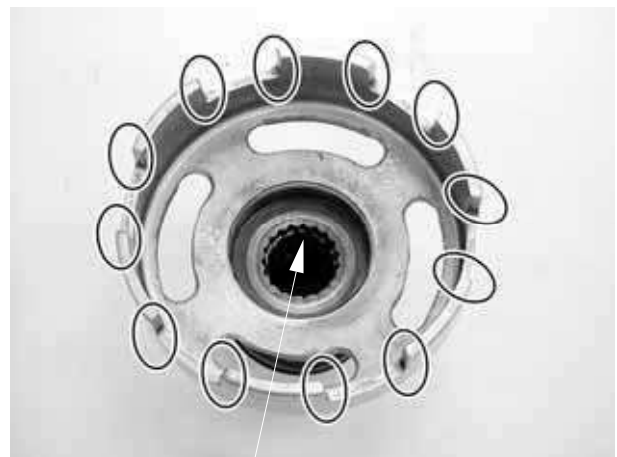
Remove the starter pulley nut by using a suitable bar.



Nut/Washer

INSPECTION

Inspect the starter pulley for cracks or pitting.
Inspect the O-ring for wear or damage.



O-ring

Inspect the oil stop ring for crack or damage.



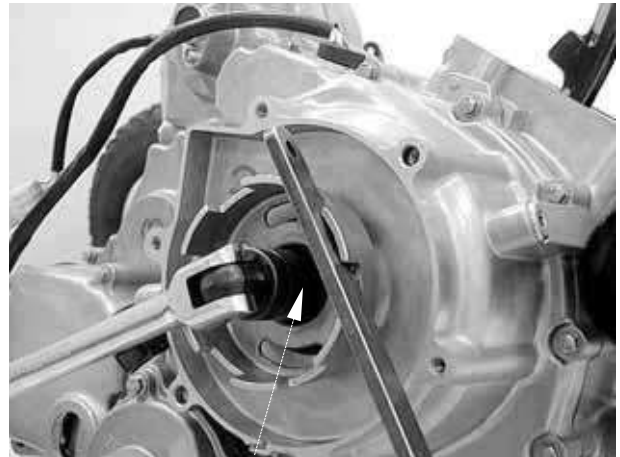
Oil Stop Ring

19. STARTER SYSTEM

INSTALLATION

Install the starter pulley and washer.
Install and tighten the nut to the specified torque by using suitable bar.

Torque: 5.5 kgf-m (55 N-m, 40 lbf-ft)



Nut/Washer

19. STARTER SYSTEM

STARTER CLUTCH REMOVAL/INSPECTION/ INSTALLATION

REMOVAL

Remove the right crankcase cover (refer to the “**ALTERNATOR STATOR REMOVAL/INSPECTION/INSTALLATION**” section in the chapter 17).

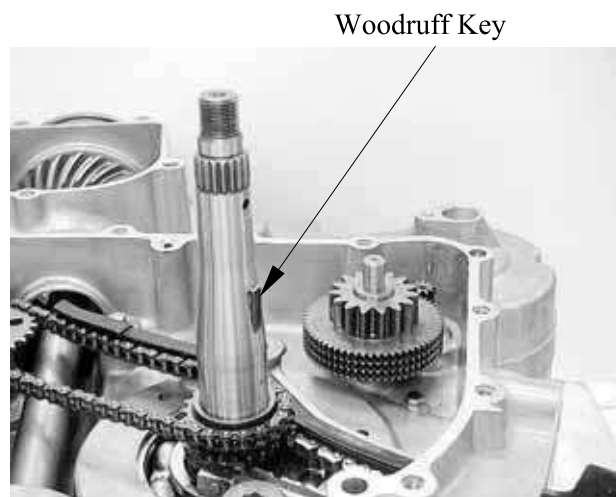
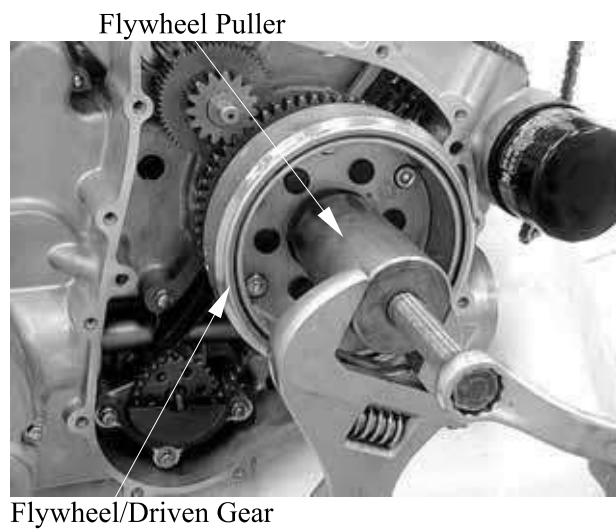
Remove the flywheel/driven gear by using the special tool.

Special tool:

Flywheel puller A120E00060

Remove the woodruff key.

Remove the reduction gear.



19. STARTER SYSTEM

INSPECTION

Check the operation of the sprag clutch by turning the driven gear. You should be able to turn the driven gear clockwise smoothly, but the gear should not turn counterclockwise.

Remove the starter driven gear by turning the driven gear.



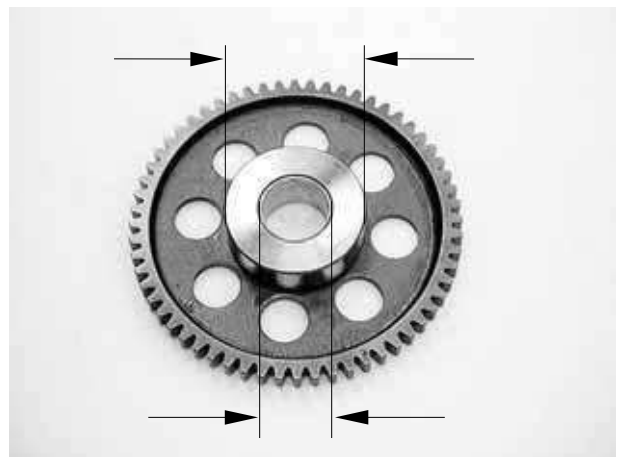
Check the starter driven gear teeth for wear or damage.

Measure the starter driven gear boss O.D..

Service limit: 57.7 mm (2.272 in)

Measure the starter driven gear bushing I.D..

Service limit: 27.1 mm (1.084 in)



Check the starter reduction gear teeth and shaft for wear or damage.



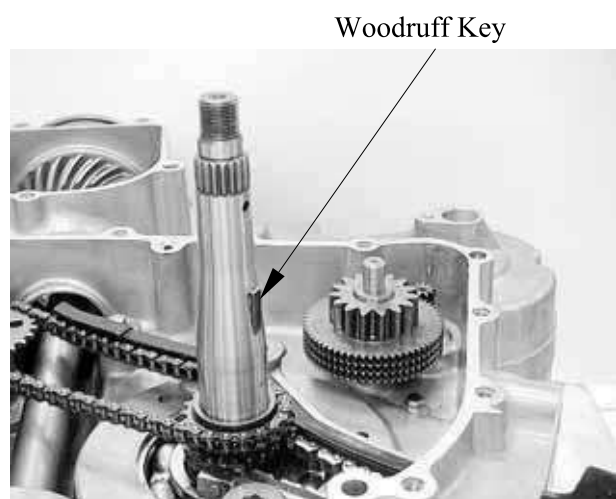
19. STARTER SYSTEM

INSTALLATION

Apply oil to the starter reduction gear.
Install the starter reduction gear to the right crankcase.



Install the woodruff key in the crankshaft key groove.



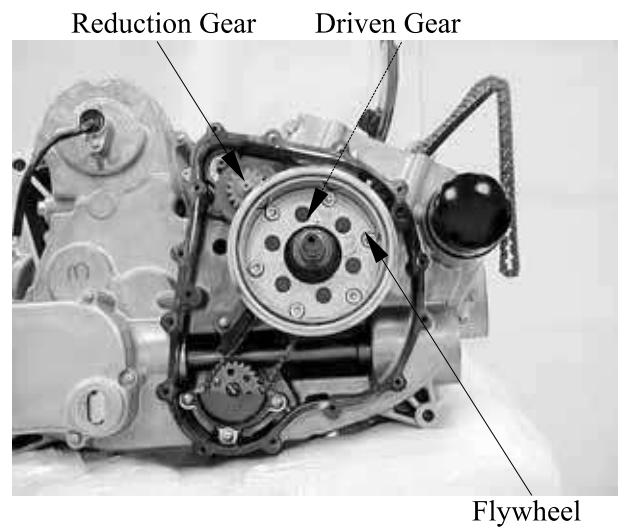
Apply molybdenum oil solution to the starter driven gear bushing.
Install the starter driven gear by turning the driven gear clockwise.



19. STARTER SYSTEM

Clean any oil from the tapered portion of the flywheel I.D.

Install the flywheel/driven gear onto the crankshaft, aligning the key way with woodruff key.



20. LIGHTS/SWITCHES

LIGHTS/SWITCHES

SERVICE INFORMATION-----	20- 1
BULBS REMOVAL-----	20- 2
HORN (ON ROAD)-----	20- 4
IGNITION SWITCH-----	20- 5
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GEAR INDICATOR SWITCH-----	20- 8
SPEED SENSOR-----	20- 9
2WD/4WD SELECTING SYSTEM-----	20-10
FUEL UNIT-----	20-13

20. LIGHTS/SWITCHES

SERVICE INFORMATION

- A continuity test can be made with the switches installed on the vehicle.
- All plastic connectors have locking tabs that must be released before disconnecting, and must be aligned when reconnecting.
- To isolate an electrical failure, check the continuity of the electrical path through the part. A continuity check can usually be made without removing the part from the vehicle. Simply disconnect the connectors and connect a continuity tester to the terminals or connections.

20. LIGHTS/SWITCHES

BULBS REMOVAL

HEADLIGHT

Disconnect the headlight wire connector.
Remove the rubber boot from the headlight case.

Headlight Connector



Rubber Boot

Relax the lock clip to remove the bulb and replace with a new one.

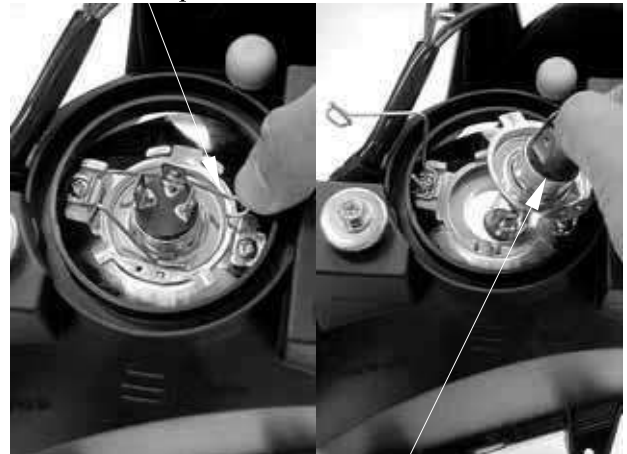
Install the bulb, aligning the bulb socket groove with the bulb tab and set the lock clip.

Connect headlight wire connector.

Install the rubber boot.

Install the front fender in the reverse order of removal.

Lock Clip



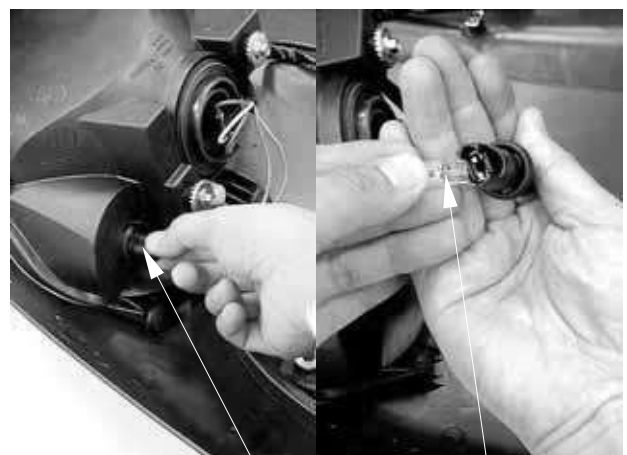
Bulb

POSITION LIGHT

Remove the bulb socket by pulling it out.

Remove the bulb.

Install the bulb in the reverse order of removal



Bulb Socket

Bulb

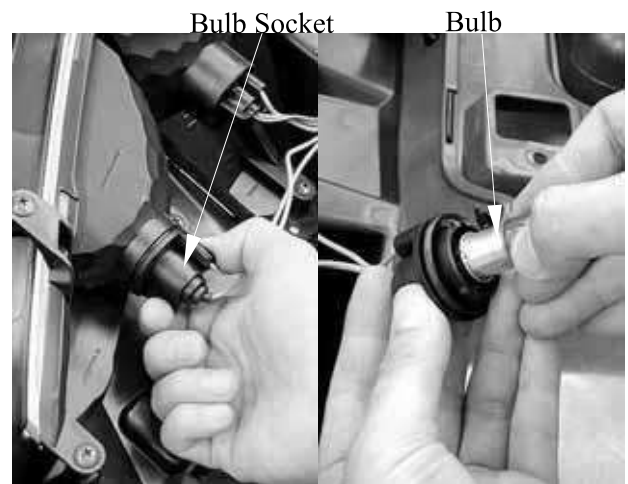
20. LIGHTS/SWITCHES

TAIL/BRAKE LIGHT

Remove the bulb socket by turning it counterclockwise.

Remove the bulb.

Install the bulb in the reverse order of removal.

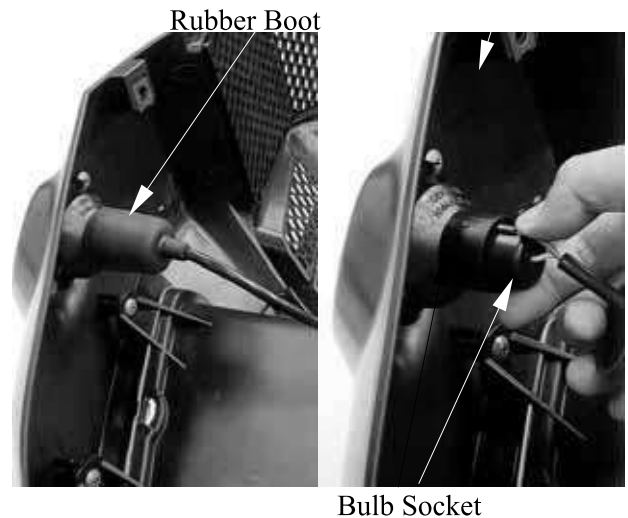


TURN SIGNAL LIGHT (ON ROAD)

FRONT

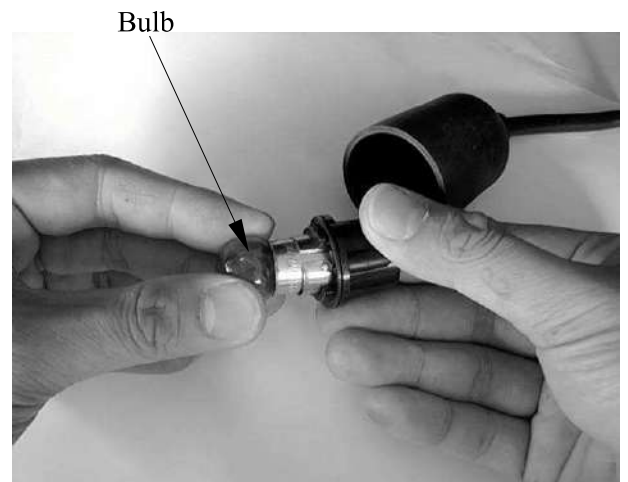
Remove the rubber boot from the turn signal light case.

Remove the bulb socket by turning it counterclockwise.



Remove the bulb.

Install the bulb in the reverse order of removal.



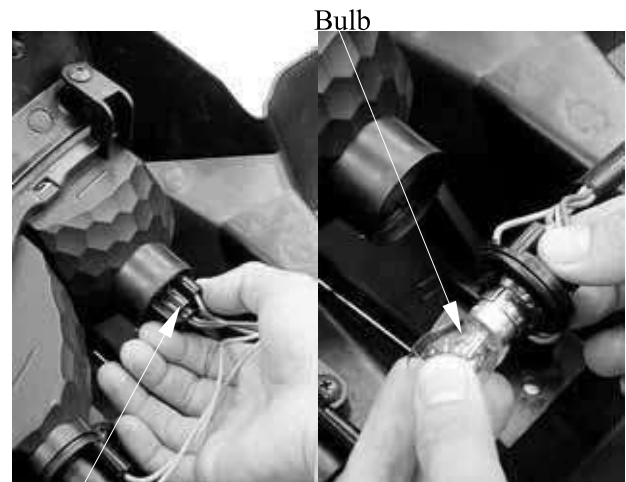
20. LIGHTS/SWITCHES

REAR

Remove the bulb socket by turning it counterclockwise.

Remove the bulb.

Install the bulb in the reverse order of removal.



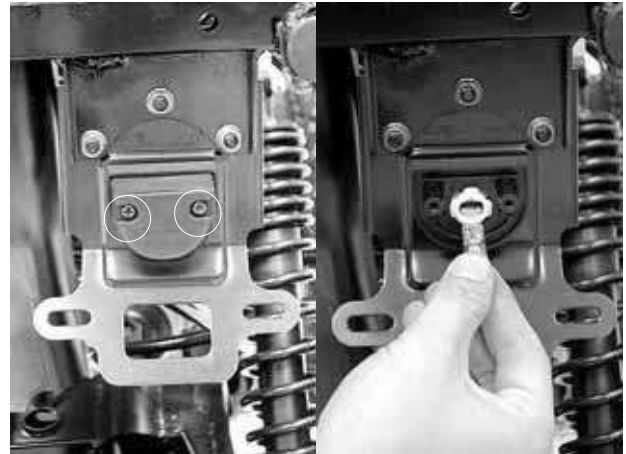
Bulb Socket

LICENCE LIGHT BULB (ON ROAD)

Remove the two screws and licence light cover.

Remove the bulb.

Install the bulb in the reverse order of removal



HORN (ON ROAD)

REMOVAL

Disconnect the horn wire leads.
Remove the bolt and remove horn.

INSTALLATION

The installation sequence is the reverse of removal.



Horn Wire Leads

Horn

20. LIGHTS/SWITCHES

IGNITION SWITCH

INSPECTION

Disconnect the ignition switch connectors.
(Refer to the “**FRAME COVER**” section in the chapter 2.)

Check for continuity between the switch side connector terminals in each switch position.

Continuity should exist between the color coded wires as right:

	IG	E	BAT1	BAT2	PO
OFF	○	○			
ON			○	○	
PO			○	○	○
COLOR	B/W	G	R	B	BR

REPLACEMENT

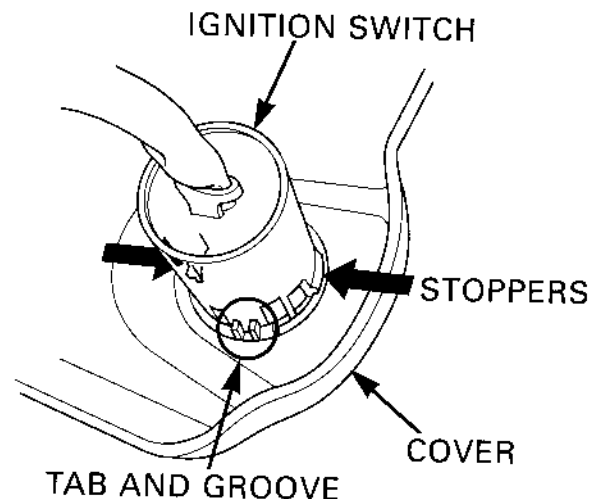
Release the switch wire from the wire clips on the steering shaft holder frame pipe.

Remove the meter cover (refer to the “**FRAME COVER**” section in the chapter 2).

Remove the ignition switch from the cover while pushing in the two stoppers.

Install a new ignition switch by aligning the locating tab with the groove in the cover.

Install the removed parts in the reverse order of removal.



HANDLEBAR SWITCH

INSPECTION

Remove front center cover (refer to the “**FRAME COVER**” section in the chapter 2).

Disconnect the connectors.

Check for continuity between the switch side connector terminals in each switch position.

Continuity should exist between the color coded wires as next page:

20. LIGHTS/SWITCHES

(ON ROAD)

HORN SW

	HO	BAT
FREE		
PUSH	○	○
COLOR	LG	B

WINKER SW

	R	L	WR
L		○	○
R	○		○
COLOR	SB	O	GR

START SW

	ST	C
FREE		
PUSH	○	○
COLOR	Y/R	Y/BR

LIGHT SW

	PO	LO	HI
☰	○		
☷	○	○	
☷	○		○
COLOR	BR/B	W	L

HAZARD SW

	BAT	HA
△	○	○
●		
COLOR	R/W	Y/B

2WD/4WD SW

	WR	2WD	4WD
2WD	○	○	
4WD	○		○
COLOR	BR/L	W/L	W/R



20. LIGHTS/SWITCHES

(OFF ROAD)

ENGINE STOP SW

	E	IG
	<input type="radio"/>	<input type="radio"/>
COLOR	BR/L	B/W

START SW

	ST	C
FREE		
PUSH	<input type="radio"/>	<input type="radio"/>
COLOR	Y/R	B/W

DIMMER SW

	HL	LO	HI
	<input type="radio"/>		
	<input type="radio"/>	<input type="radio"/>	
	<input type="radio"/>		<input type="radio"/>
COLOR	BR/B	W	L

PASSING SW

	ST	C
FREE		
PUSH	<input type="radio"/>	<input type="radio"/>
COLOR	BR/L	L

2WD/4WD SW

	WR	2WD	4WD
2WD	<input type="radio"/>	<input type="radio"/>	
4WD	<input type="radio"/>		<input type="radio"/>
COLOR	BR/L	W/L	W/R

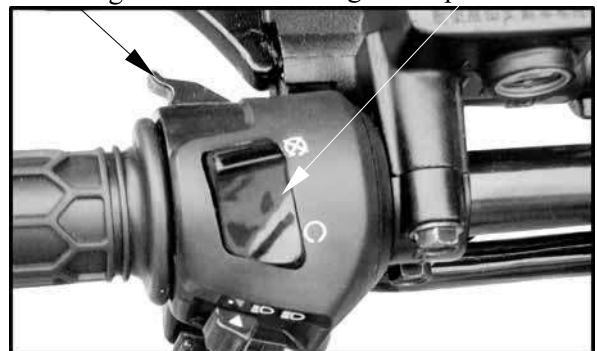
Dimmer Switch



Start Switch

Passing Switch

Engine Stop Switch



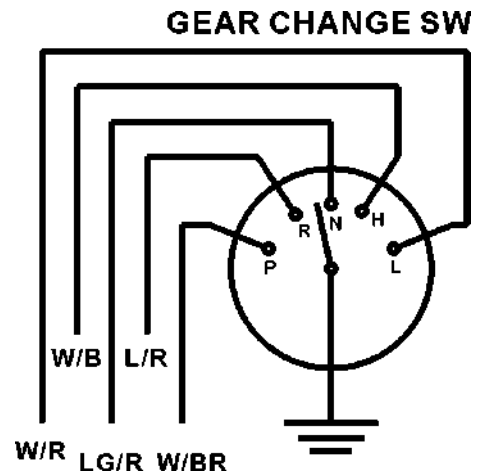
20. LIGHTS/SWITCHES

GEAR INDICATOR LIGHT SWITCHES

INSPECTION

Disconnect the gear indicator light switch wire connector.

Check for continuity between the switch side connector terminal and engine ground.

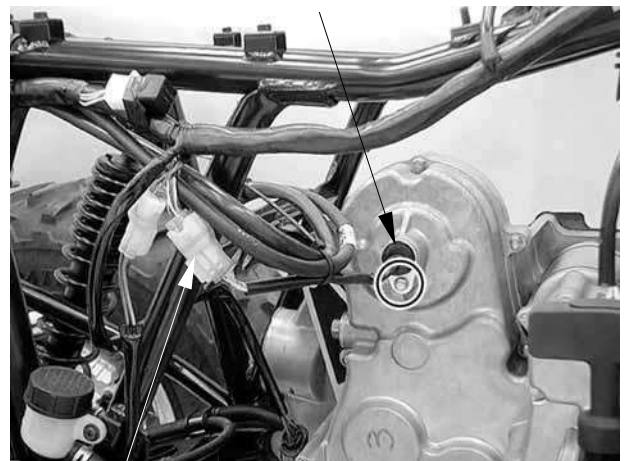


REPLACEMENT

Disconnect the gear indicator light switch connector.

Remove the bolt, then remove the gear indicator light switch and washer.

Gear Indicator Light Switch

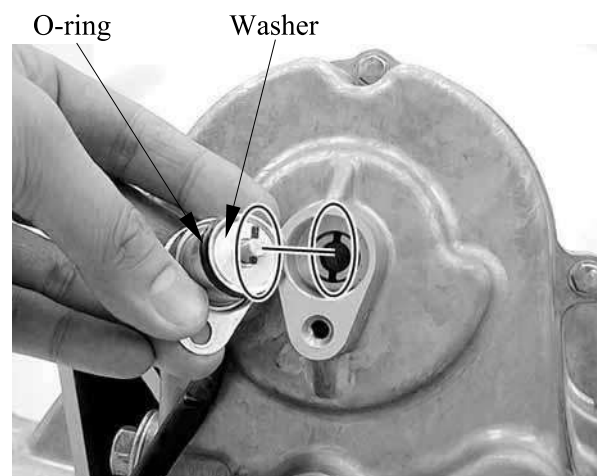


r

Install the washer and a new switch with a new O-ring (apply engine oil to O-ring).

Make sure that the lever on the gear indicator light switch correctly engages with the locating slot on the shift shaft.

Shift the drive select lever to check if the gear indicator light is correct.



20. LIGHTS/SWITCHES

SPEED SENSOR

Disconnect the connector.

Remove the bolt then remove the speed sensor.

If the speedometer, odometer or trip meter does not function properly. Inspect the connection of speed sensor connector.

If the connection is all right, replace the speedometer with a new one.

If the speedometer, odometer or trip meter still does not function properly, replace the speed sensor.



Speed Sensor

20. LIGHTS/SWITCHES

2WD/4WD SELECTING SYSTEM

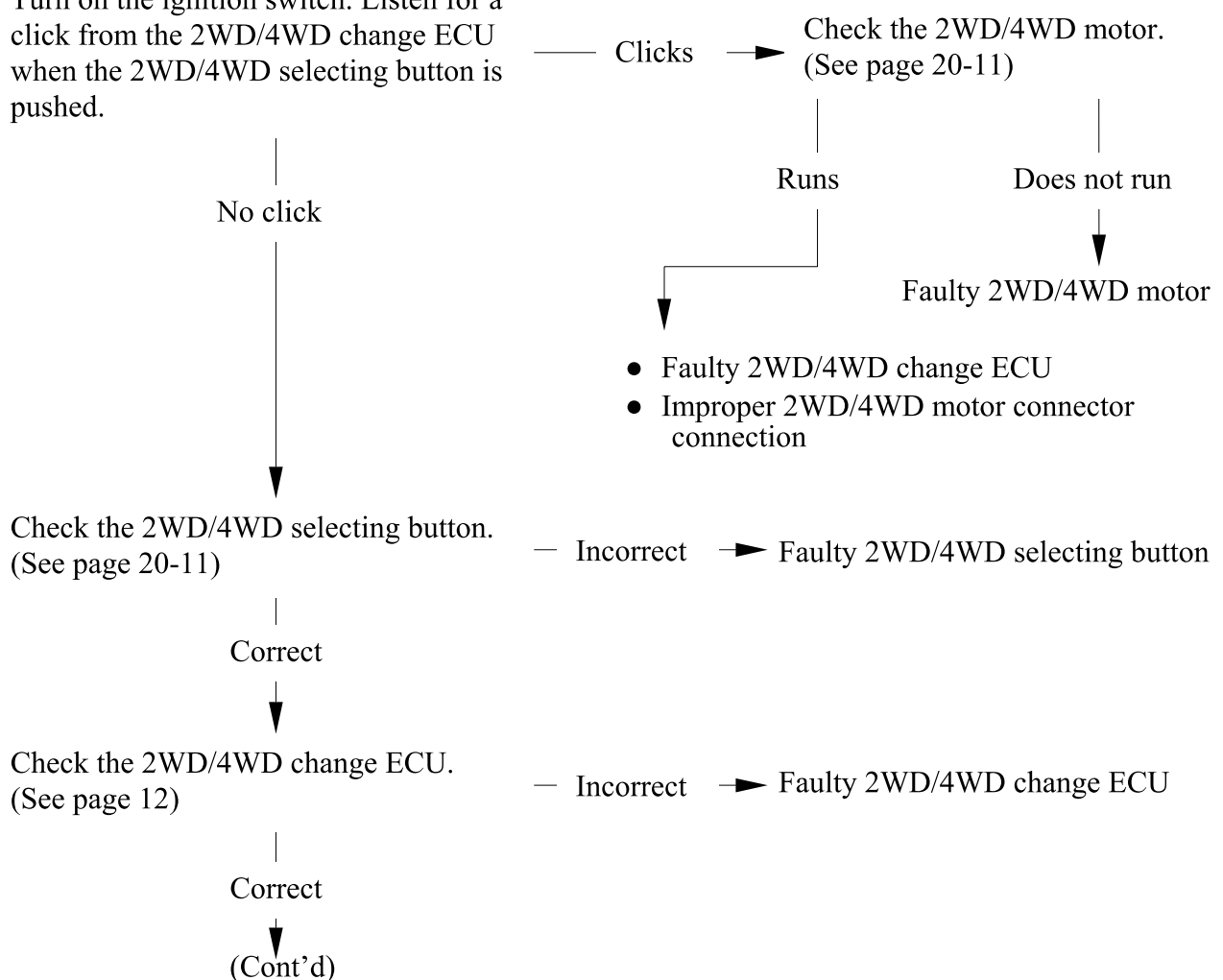
The 2WD/4WD selecting system consists of the following components:

- 2WD/4WD selecting button
- 2WD switch
- 4WD switch
- 2WD/4WD change ECU
- 2WD/4WD motor
- Battery

TROUBLESHOOTING

Does not shift to 2WD/4WD (2WD/4WD motor will not run.)

Turn on the ignition switch. Listen for a click from the 2WD/4WD change ECU when the 2WD/4WD selecting button is pushed.



20. LIGHTS/SWITCHES

Check the 2WD switch or 4WD switch.
(See page 12)

— Incorrect —> Faulty 2WD/ switch or 4WD switch

|
Correct
▼

Open circuit in wire harness

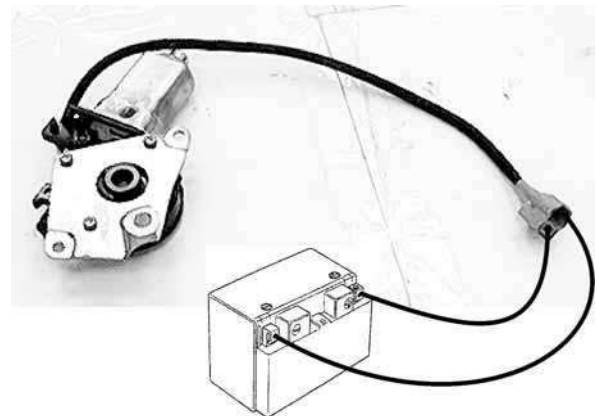
The 2WD/4WD motor runs, but does not shift to 2WD/4WD. Check the front drive sliding dog (refer to the “**FRONT DRIVE DISASSEMBLY/INSPECTION/ASSEMBLY**” section in the chapter 13).

INSPECTION

2WD/4WD motor

Remove the 2WD/4WD motor (refer to the “**FRONT DRIVE DISASSEMBLY/INSPECTION/ASSEMBLY**” section in the chapter 13).

Connect the 12 V battery to the 2WD/4WD motor lead wires as shown. If the motor does not run , replace the motor assembly with a new one.

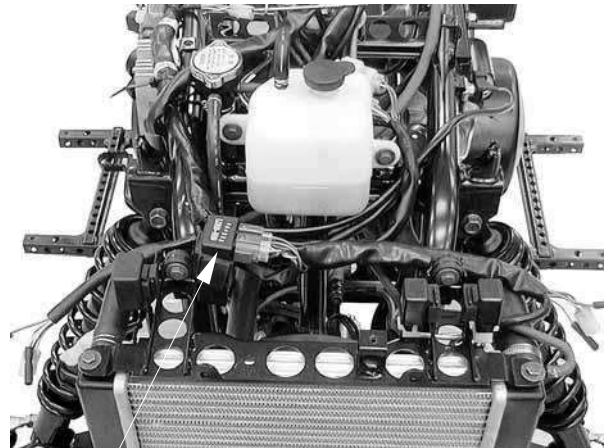


Install the 2WD/4WD motor and tighten the bolts to the specified torque (refer to the “**FRONT DRIVE DISASSEMBLY/INSPECTION/ASSEMBLY**” section in the chapter 13).

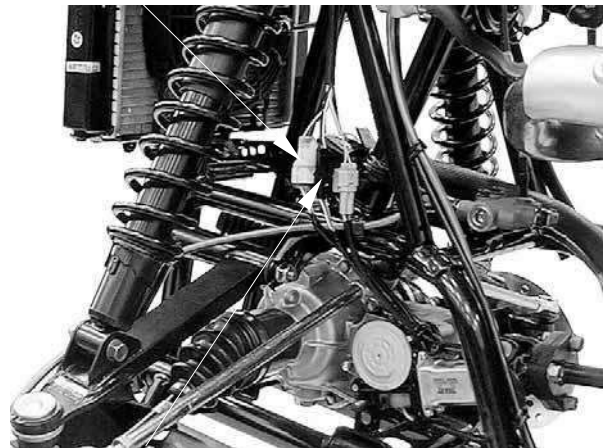
2WD/4WD selecting button

2WD/4WD SW			
	WR	2WD	4WD
2WD	○	○	
4WD	○		○
COLOR	BR/L	W/L	W/R



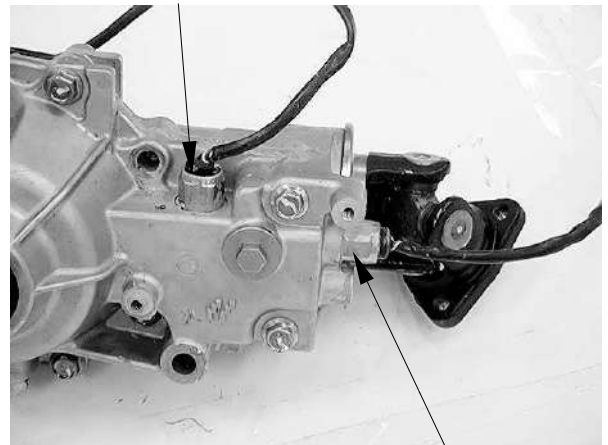


4WD Switch Connector (White)



2WD Switch Connector (Black)

4WD Switch Connector



2WD Switch Connector

2WD SW		
	2WD	BAT
OPEN		
SHORT	○—○	○—○
COLOR	W/L	B/L

4WD SW		
	4WD	BAT
OPEN		
SHORT	○—○	○—○
COLOR	W/R	B/R

20. LIGHTS/SWITCHES

Apply three bond: 1215 to the 2WD/4WD switches and tighten them to the specified torque.

Torque: 2.2 kgf-m (22 N-m, 16 lbf-ft)

FUEL UNIT

REMOVAL

Remove the fuel tank cover (refer to the “**FRAME COVERS**” section in the chapter 2).

Remove the fuel unit connectors.

Remove the four bolts, then remove the fuel unit from fuel tank.



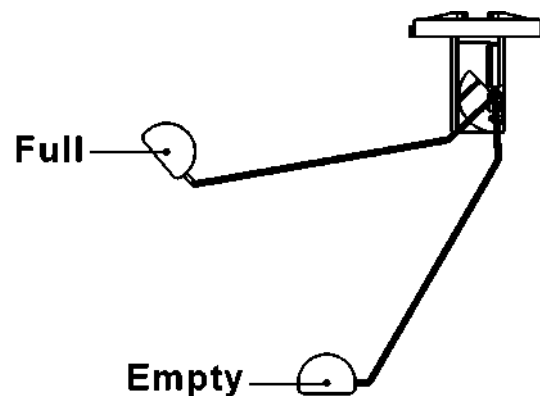
Fuel Unit Connectors

INSPECTION

Measure the resistance between the Yellow/White and Blue/White terminals of the fuel unit connector.

Standard (at 20°C/68°F):

Float at full position	1100 ± 33 Ω
Float at empty position	100 ± 3 Ω



INSTALLATION

Fuel unit installation is in the reverse order of removal.

Align the tab on the fuel unit with the mark on the fuel tank.



MXU 500 Wiring Diagram (ON ROAD Type)

