Kawasaki

KFX50

All Terrain Vehicle Service Manual

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All Terrain Vehicle Service Manual Supplement

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Foreword

This Kawasaki Service manual supplement information provides unique to the Kawasaki KSF50B7F, which is based on the KYMCO (KWANG YANG Motor Co., Ltd.). It must be used in conjunction with the other chapters of this manual. Read both this supplement and the base manual for complete information on proper service procedures for the model covered by this manual.

This manual is designed primarily for use by trained mechanics in a properly equipped shop. However, it contains enough detail and basic information to make it useful to the owner who desires to perform his own basic maintenance and repair work. A basic knowledge of mechanics, the proper use of tools, and workshop procedures must be understood in order to carry out maintenance and repair satisfactorily.

Whenever the owner has insufficient experience or doubts his ability to do the work, all adjustments, maintenance, and repair should be carried out only by qualified mechanics.

In order to perform the work efficiently and to avoid costly mistakes, read the text, thoroughly familiarize yourself with the procedures before starting work, and then do the work carefully in a clean area. Whenever special tools or equipment are specified, do not use makeshift tools or equipment. Precision measurements can only be made if the proper instruments are used.

For the duration of the warranty period, we recommend that all repairs and scheduled maintenance be performed in accordance with this service manual. Any owner maintenance or repair procedure not performed in accordance with this manual may void the warranty.

To get the longest life out of your motorcycle:

- Follow the Periodic Maintenance Chart in the Service Manual.
- Be alert for problems and non-scheduled maintenance.
- Use proper tools and genuine Kawasaki Vehicle parts. Special tools, gauges, and testers that are necessary when servicing Kawasaki vehicles are introduced by the Service Manual. Genuine parts provided as spare parts are listed in the Parts Catalog.
- Follow the procedures in this manual carefully. Don't take shortcuts.
- Remember to keep complete records of maintenance and repair with dates and any new parts installed.

How to Use This Manual

In preparing this manual, the product was divided into its major systems, and these systems became the manual's chapters. All information for a particular system from adjustment through disassembly and inspection is located in a single chapter.

The Table of Contents Index shows you all of the product's systems and assists in locating their chapters. Each chapter in turn has its own comprehensive contents.

For example, if you want ignition coil information, use the Table of Contents to locate the Ignition System chapter. Then, use the contents on the first page of the chapter to find the Ignition Coil section.

Whenever you see these WARNING and CAUTION symbols, heed their instructions! Always follow safe operating and maintenance practices.

⚠ WARNING

This warning symbol identified special instructions or procedures which, if not correctly followed, could result in personal injury, or loss of life.

CAUTION

This caution symbol identifies special instructions or procedures which, if not strictly observed, could result in damage to or destruction of equipment.

This manual contains the other symbols (in addition to WARNING and CAUTION) which will help you distinguish different types of information.

- Indicates a procedural step or work to be done.

General Information

Contents

SPECIFICATIONS

Items	KSF50B7F ~
Dimensions	
Overall Length	1 400 mm (55.12 in.)
Overall Width	880 mm (34.65 in.)
Overall Height	910 mm (35.83 in.)
Wheelbase	965 mm (37.99 in.)
Ground Clearance (at Rear Axle)	85 mm (3.35 in.)
Seat Height	635 mm (25.00 in.)
Dry Mass	105 kg (232 lb)
Curb Mass:	
Front	56 kg (123 lb)
Rear	53 kg (117 lb)
Fuel Tank Capacity	5.5 L (1.45 US gal)
Performance	
Minimum Turning Radius	2.66 m (8.73 ft.)
Engine	
Type	4-stroke, SOHC, 1-cylinder
Cooling System	Air-cooled
Bore and Stroke	39 × 41.4 mm (1.53 × 1.63 in.)
Displacement	49.5 cm^3 (3.02 cu in.)
Compression Ratio	10.8 : 1
Carburetion System	Carburetor, Keihin PTE
Starting System	Electric Starter & Kick Starter
Ignition System	CDI
Ignition Timing	13° BTDC @ 2 000 r/min (rpm)
Spark Plug	NGK CR7HSA
Valve Timing:	
Inlet:	
Open	4° BTDC
Close	12° ABDC
Duration	170°
Exhaust:	
Open	20° BBDC
Close	8° BTDC
Duration	170°
Lubrication System	Forced lubrication (wet sump)
Engine Oil:	
Type	API SE, SF or SG
Viscosity	SAE10W-40
Capacity	0.8 L (0.85 US qt)

Items	KSF50B7F ~
Drive Train	
Primary Reduction System:	
Type	Belt converter
Reduction Ratio	0.91 ~ 3.03
Clutch Type (primary)	Centrifugal
Transmission:	
Type	1-speed
Oil Viscosity	SAE 90
Oil Capacity	0.12 L (0.13 US gt)
Final Drive System:	
Type	Chain
Reduction Ratio	2.0 (32/16)
Overall Drive Ratio (at Top)	24.8 ~ 82.5
Frame	
Type	Double cradle
Caster (Rake Angel)	3.8°
Camber	-1°
King Pin Angle	11.8°
Trail	13.5 mm (0.53 in.)
Tread:	
Front	690 mm (27.17 in.)
Rear	700 mm (27.56 in.)
Front Tire:	
Type	Tubeless
Size	16 × 8-7
Rear Tire:	
Type	Tubeless
Size	16 × 8-7
Rim Size:	
Front	7 × 5
Rear	7 × 5
Suspension:	
Front:	
Type	Single A-arm
Wheel travel	71 mm (2.80 in.)
Rear:	
Type	Swingarm
Wheel travel	74 mm (2.91 in.)
Brake type:	
Front	Mechanical drum
Rear	Hydraulic disc
Parking Brake	Mechanical drum

Items	KSF50B7F ~
Electrical Equipment:	
Battery	12 V 4 Ah
Brake Light Bulb	12 V 21 W
Alternator:	
Type	Single-phase AC
Rated Output	5 A, 14 V @5 000 r/min (rpm)

Specifications are subject to change without notice, and may not apply to every country.

SERVICE PRECAUTIONS

CAUTION
★ If parts replacement is necessary, replace the parts with KAWASAKI Genuine Parts or their equivalent. ★ When removing parts that are to be reused, keep them arranged in an orderly manner so that they may be reinstalled in the proper order and orientation. ★ Be sure to use special tools when instructed. ★ Make sure that all parts used in reassembly are clean. Lubricate them when specified. ★ Use the specified lubricants, bonds, or sealant. ★ When removing the battery, disconnect the negative cable first and then the positive cable. When reconnecting the battery, connect the positive cable first and then the negative cable, and replace the terminal cover on the positive terminal. ★ When performing service to electrical parts, if the service procedures not require use of battery power, disconnect the negative cable of the battery. ★ When tightening the cylinder head and case bolts and nuts tighten the larger sizes first. Always tighten the bolts and nuts from the inside working out, in a crisscross manner. ★ Whenever you remove oil seals, gaskets, packing, O-rings, locking washers, self-locking nuts, cotter pins, circlips, and certain other parts as specified, be sure to replace them with new ones. Also, before installing these new parts, be sure to remove any left over material from the mating surfaces. ★ Never reuse a circlip. When installing a new circlip, take care not to expand the end gap larger than required to slip the circlip over the shaft. After installing a circlip, always ensure that it is completely seated in its groove and securely fitted. ★ Use a torque wrench to tighten fasteners to the specified torque. Wipe off grease and oil if a thread is smeared with them. ★ After reassembling, check parts for tightness and proper operation. ★ To protect the environment, do not unlawfully dispose of used motor oil and all other fluids: batteries and tires. ★ To protect the Earth's natural resources, properly dispose of used vehicle and parts.

MODEL IDENTIFICATION

KSF50B7F Left Side View

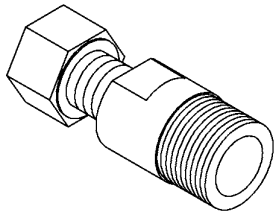
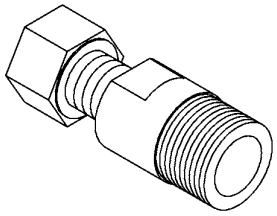
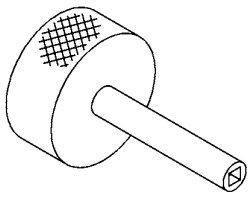
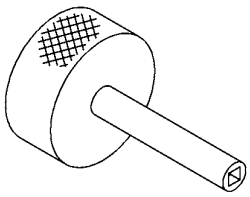
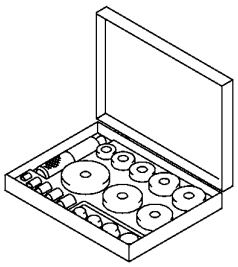
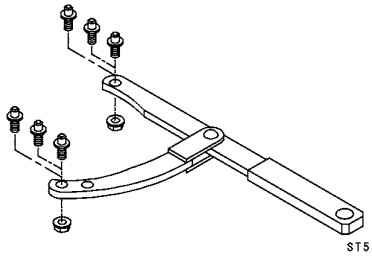
KSF50B7F Right Side View

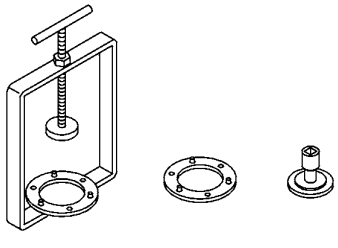
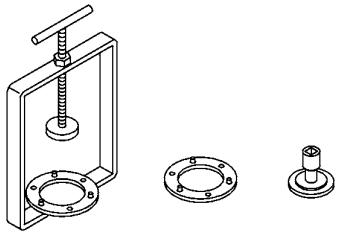
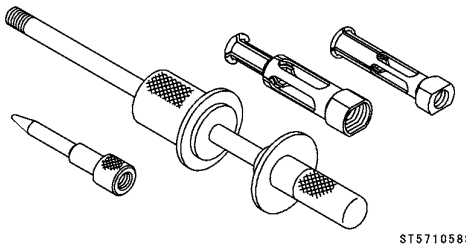
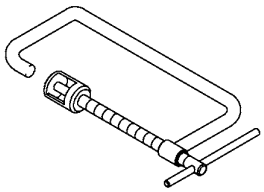
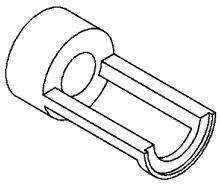
SYMBOL

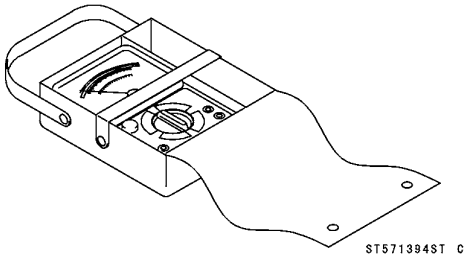
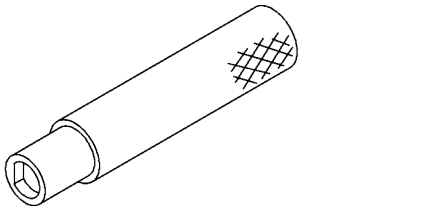
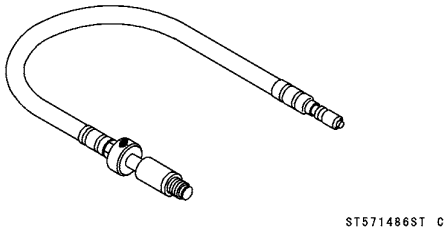
Throughout this manual are symbols indicating instructions and other information necessary for servicing. The meaning of each symbol is included in the table below. Where applicable, comparable Kawasaki products and their part numbers have been included.

SYMBOL	KYMCO DEFINITION	KAWASAKI DEFINITION
	Apply engine oil to the specified points. (Use designated engine oil for lubrication.)	Apply engine oil.
	Apply grease for lubrication.	←
	Transmission Gear Oil (SAE90)	←
*	This symbol indicates points of particular interest for more efficient and convenient operation.	←

SPECIAL TOOLS

Base Manual Tools	Kawasaki Recommend Tools
 ST57K001ST C A120E00001 Flywheel Puller	 ST57K001ST C 57001-Y001 Flywheel Puller
 ST57K003ST C A120E00012 Tappet Adjuster	 ST57K003ST C 57001-Y003 Tappet Adjuster
 A120E00014 Oil Seal and Bearing Driver	 ST571129ST C 57001-1129 Bearing Driver Set
 A120E00017 Universal Holder	 ST571605ST C 57001-1605 Flywheel & Pulley Holder

Base Manual Tools	Kawasaki Recommend Tools
 A120E00034 Clutch Spring Compressor	 57001-Y006 Clutch Spring Compressor
 A120E00037 Bearing Puller	 57001-1058 Oil Seal & Bearing Remover Assy For an oil seal or a bearing of smaller size (inner diameter is 13 mm or less) use a suitable commercially available tool.
 A120E00040 Valve Spring Compressor	 57001-241 Valve Spring Compressor
	 57001-1272 Adapter, ϕ21

Base Manual Tools	Kawasaki Recommend Tools
 YF-3501 Tester	 57001-1394 Hand Tester
—	 57001-1665 Pilot Screw Adjuster
—	 57001-1486 Compression Gauge Adapter, M10 × 1.0

Base Manual

Kawasaki KFX50

Note: Kawasaki modified KYMCO 4121-PWA5-S00.

Use the Kawasaki Service Manual Supplement along with the KYMCO Base Manual when servicing the Kawasaki KFX50 model.

PREFACE

This Service Manual describes the technical features and servicing procedures for the ATV *50*.

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

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 17 give instructions for disassembly, assembly and inspection of engine, chassis frame and 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.

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

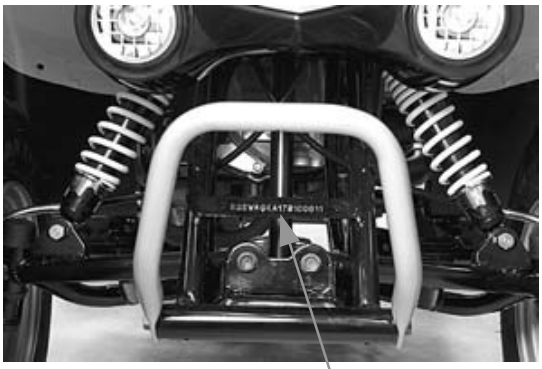
TABLE OF CONTENTS

1

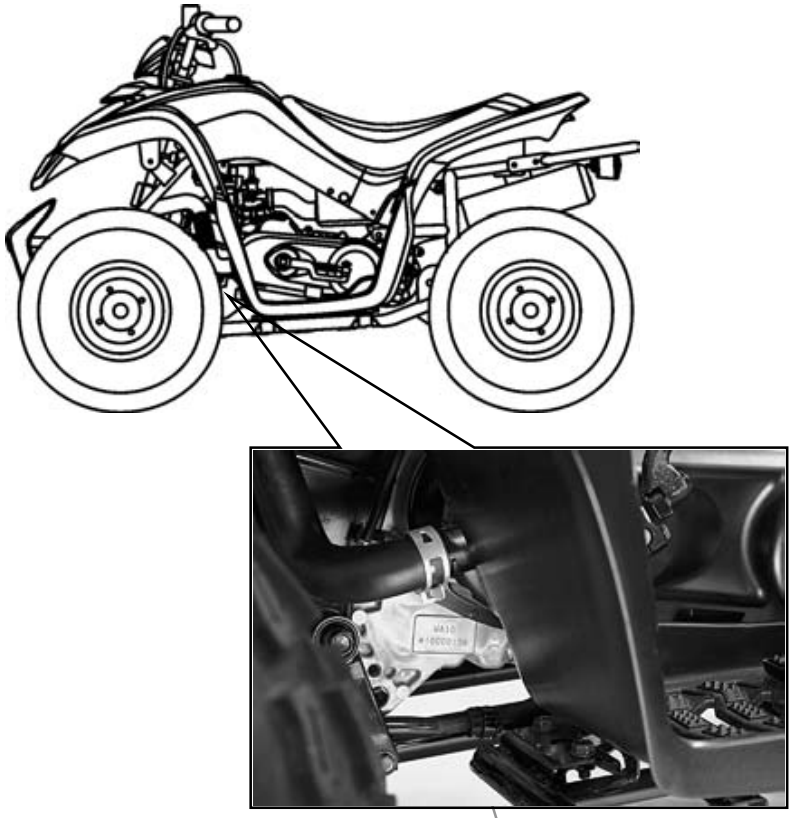
GENERAL INFORMATION

1. GENERAL INFORMATION

SERIAL NUMBER



Location of Frame Serial Number



Location of Engine Serial Number

1. GENERAL INFORMATION

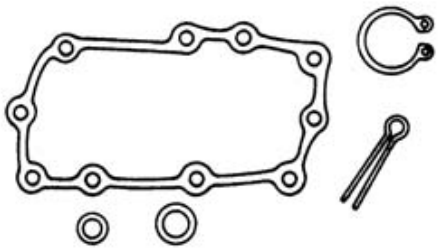
SPECIFICATIONS

Name			KFX50
Overall length			1400 mm (55.12 in)
Overall width (mm)			880 mm (34.65 in)
Overall height (mm)			910 mm (35.83 in)
Wheel base (mm)			965 (37.99 in)
Engine type			SOHC
Displacement			49.5 cm^3 (3.02 cu-in)
Fuel Used			#92 nonleaded gasoline
Dry weight		Front wheel	53 kg (117 lbs)
		Rear wheel	52 kg (115 lbs)
		Total	105 kg (232 lbs)
Curb weight (kg)		Front wheel	56 kg (123 lbs)
		Rear wheel	53 kg (117 lbs)
		Total	109 kg (240 lbs)
Tires		Front wheel	16 × 8-7
		Rear wheel	16 × 8-7
Ground clearance (rear axle)			85 mm (3.35 in)
Engine	Starting system		Electric & Kick starter
	Type		Gasoline, 4-stroke
	Cylinder arrangement		Single cylinder
	Combustion chamber type		Semi-sphere
	Valve arrangement		SOHC, chain drive
	Bore × stroke		39×41.4 mm (1.53×1.63 in)
	Compression ratio		10.8:1
	Compression pressure (Electric starter)		1170 ~ 1580 kPa (12 ~ 16 kgf/cm², 170 ~ 230 psi)
	Port timing	Intake Open	4° (BTDC)
		Intake Close	12° (ABDC)
		Exhaust Open	20° (BBDC)
		Exhaust Close	-8° (BTDC)
	Valve clearance (cold)	Intake	0.04 mm (0.0016 in)
		Exhaust	
	Idle speed (rpm)		2000 rpm
	Lubrication System	Lubrication type	Wet sump
		Oil pump type	Inner/outer rotor type
		Oil filter type	Full-flow filtration
		Oil capacity	0.8 L (0.7 lmp qt, 0.85 US qt)
		Oil exchanging capacity	0.7 L (0.62 lmp qt, 0.74 US qt)
	Cooling Type		Air cooling

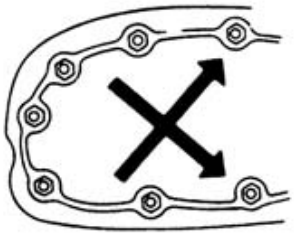
Fuel System	Air cleaner type		Sponge
	Fuel capacity		5.5 L (1.21 lmp gal, 1.45 US gal)
	Carburetor	Type	Keihin PTE
		Main jet No.	#85
		Venturi dia.(mm)	ϕ16
		Throttle type	PISTON
Electrical Equipment	Ignition System	Type	CDI
		Ignition timing	13°BTDC/2000 rpm
		Contact breaker	Non-contact point type
		Spark plug	NGK CR7HSA
		Spark plug gap	0.6 ~ 0.7 mm (0.024 ~ 0.028 in)
	Battery	Capacity	12 V 4Ah
Power Drive System	Clutch	Type	CVT
	Transmission Gear	Type	Helical gear
		Operation	Automatic centrifugal type
	Reduction Gear	Type	V-Belt
		Primary reduction	0.91~3.03
		Final reduction	2.0 (32/16)
Moving Device	FR/RR tire rolling circumference (mm)		1266 mm (49.04 in)
	Tire pressure	Front	25 kPa (0.25 kgf/cm^2, 3.6 psi)
		Rear	
	Turning angle	Left	35°
		Right	35°
Brake system type		Front	Drum brake
		Rear	Disk brake
Damping Device	Suspension type	Front	Swing axle
		Rear	Swing arm
Frame type			Steel tube frame

SERVICE PRECAUTIONS

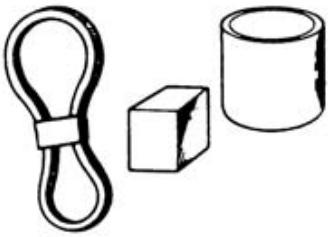
■ Make sure to install new gaskets, O-rings, circlips, cotter pins, etc. when reassembling.



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



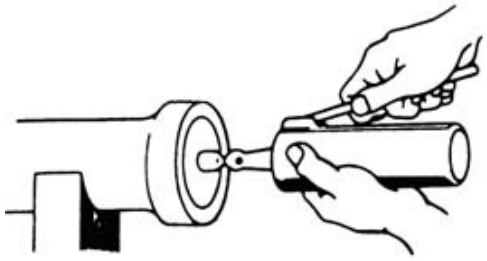
■ Use genuine parts and lubricants.



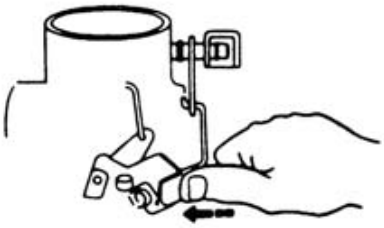
■ When servicing the vehicle, be sure to use special tools for removal and installation.

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

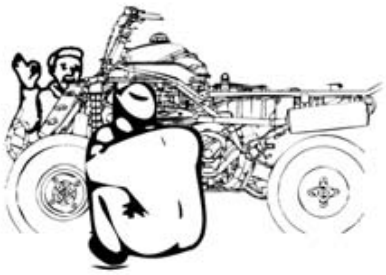
■ Apply or add designated greases and lubricants to the specified lubrication points.



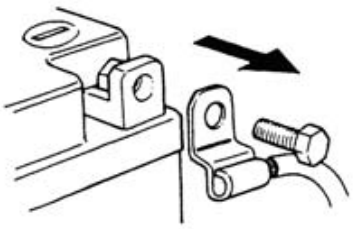
■ After reassembly, check all parts for proper tightening and operation.



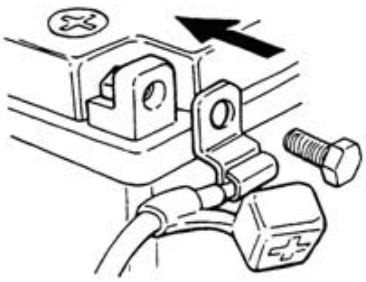
■ When two persons work together, pay attention to the mutual working safety.



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



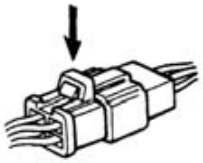
■ After operation, check all connecting points, fasteners, and lines for proper connection and installation.
■ When connecting the battery, the positive (+) terminal must be connected first.
■ After connection, apply grease to the battery terminals.
■ Terminal caps shall be installed securely.



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

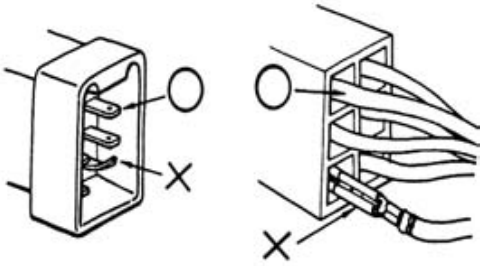
■ After operation, terminal caps shall be installed securely.

■ When taking out the coupler, the lock on the coupler shall be released before operation.

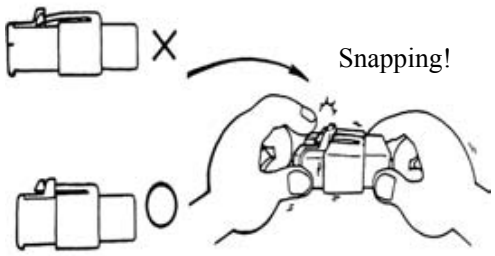


■ Hold the coupler body when connecting or disconnecting it.
■ Do not pull the coupler wire.

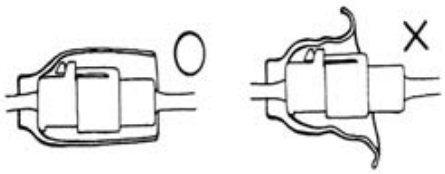
■ Check if any coupler terminal is bending, protruding or loose.



- The coupler shall be inserted completely.
- If the double coupler has a lock, lock it at the correct position.
- Check if there is any loose wire.

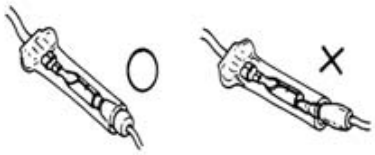


- Before connecting a terminal, check for damaged terminal cover or loose negative terminal.

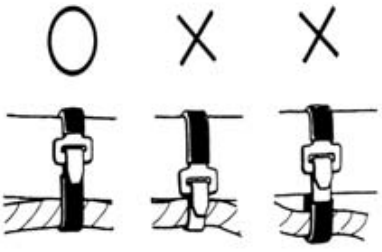


- Check the double coupler cover for proper coverage and installation.

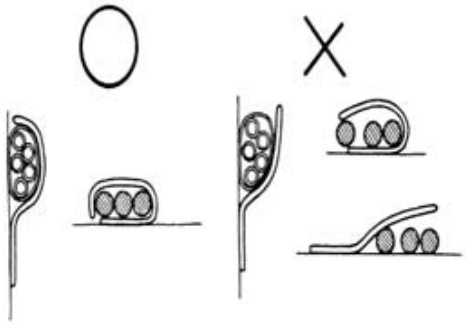
- Insert the terminal completely.
- Check the terminal cover for proper coverage.
- Do not make the terminal cover opening face up.



- Secure wire harnesses to the frame with their respective wire bands at the designated locations.
  Tighten the bands so that only the insulated surfaces contact the wire harnesses.

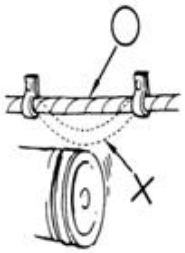


■ After clamping, check each wire to make sure it is secure.

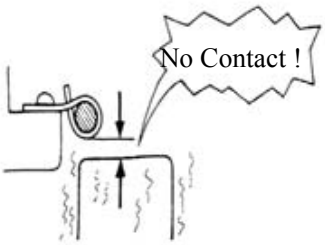


■ Do not squeeze wires against the weld or its clamp.

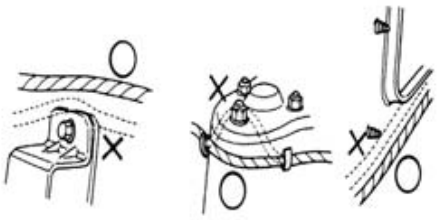
■ After clamping, check each harness to make sure that it is not interfering with any moving or sliding parts.



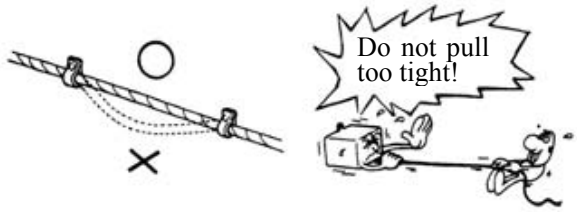
■ When fixing the wire harnesses, do not make it contact the parts which will generate high heat.



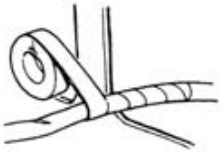
■ Route wire harnesses to avoid sharp edges or corners. Avoid the projected ends of bolts and screws.
■ Route wire harnesses passing through the side of bolts and screws. Avoid the projected ends of bolts and screws.



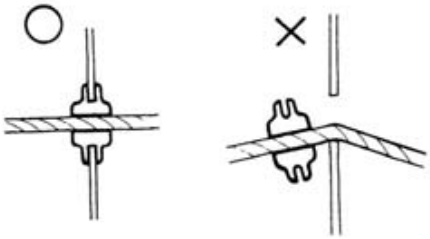
■ Route harnesses so they are neither pulled tight nor have excessive slack.



■ Protect wires and harnesses with electrical tape or tube if they contact a sharp edge or corner.

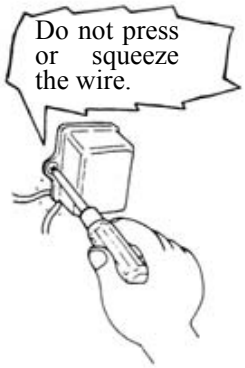


■ When rubber protecting cover is used to protect the wire harnesses, it shall be installed securely.

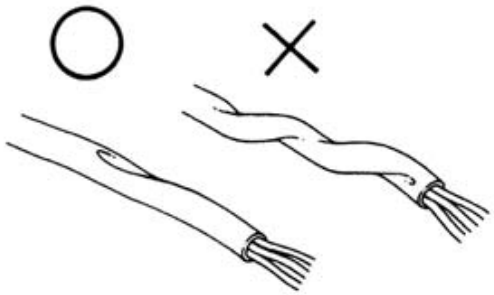


■ Do not break the sheath of wire.
■ If a wire or harness is with a broken sheath, repair by wrapping it with protective tape or replace it.

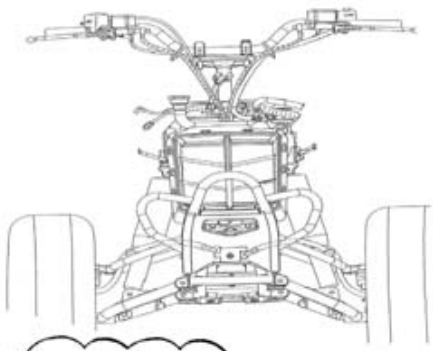
■ When installing other parts, do not press or squeeze the wires.



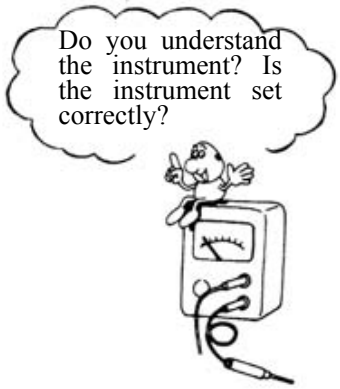
■ After routing, check that the wire harnesses are not twisted or kinked.



■ 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.

■ 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 (SAE90)

✻ : This symbol indicates points of particular interest for more efficient and convenient operation.

⚠ WARNING

This warning symbol identifies special instructions or procedures which, if not correctly followed, could result in personal injury, or loss of life.

CAUTION

This caution symbol identifies special instructions or procedures which, if not strictly observed, could result in damage to or destruction of equipment.

TORQUE VALUES

STANDARD TORQUE VALUES

Item	Torque N·m (kgf·m, lbf·ft)	Item	Torque N·m (kgf·m, lbf·ft)
5 mm bolt and nut	5(0.5, 4)	4 mm screw	3 (0.3, 2)
6 mm bolt and nut	10 (1, 7)	5 mm screw	4 (0.4, 3)
8 mm bolt and nut	22 (2.2, 16)	6 mm screw, SH bolt	9 (0.9, 6.5)
10 mm bolt and nut	35 (3.5, 25)	6 mm flange bolt and nut	12 (1.2, 9)
12 mm bolt and nut	55 (5.5, 40)	8 mm flange bolt and nut	27 (2.7, 20)
14 mm bolt and nut	70 (7, 50)	10 mm flange bolt and nut	40 (4, 29)

Torque specifications listed below are for important fasteners.

ENGINE

Item	Q'ty	Thread dia. (mm)	Torque N·m (kgf·m, lbf·ft)	Remarks
Stud bolt	4	8	9 (0.9, 6.5)	
Oil filter cap	1	30	15 (1.5, 11)	
Left crankcase cover bolt	8	6	12 (1.2, 9)	
Camshaft hold nut	4	8	14 (1.4, 10)	Apply oil
Tappet adjusting nut	2	5	9 (0.9, 6.5)	Apply oil
Lifter tensioner bolt	2	6	12 (1.2, 9)	
Tensioner cap	1	6	4.5 (0.45, 3)	
Cam chain guide bolt	1	6	10 (1, 7)	
Transmission case cover bolt	7	8	27 (2.7, 19)	
Mission oil filler bolt	1	8	18 (1.8, 13)	
Drive face nut	1	12	60 (6, 43)	Apply oil
Clutch outer nut	1	10	40 (4, 29)	
Clutch drive plate nut	1	28	55 (5.5, 40)	
ACG flywheel nut	1	10	40 (4, 29)	
Spark plug	1	10	12 (1.2, 9)	
Engine drain plug	1	10	25 (2.5, 18)	
Head CYL stud bolt (IN pipe)	2	6	9 (0.9, 6.5)	
Head CYL stud bolt (EX pipe)	2	8	9 (0.9, 6.5)	
A.C.G Stator bolt	3	5	10 (1, 7)	
Cooling fan	4	6	8 (0.8, 6)	

FRAME

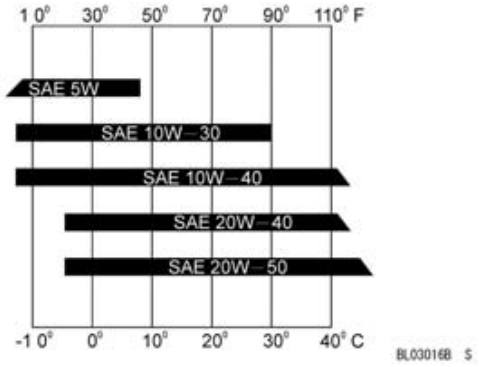
Item	Q'ty	Thread dia. (mm)	Torque N·m (kgf·m, lbf·ft)	Remarks
Steering column nut	1	14	70 (7, 50)	
Front arm nut	4	10	45 (4.5, 32)	
Knuckle arm nut	2	10	50 (5, 36)	
Front wheel nut	8	10	45 (4.5, 32)	
Rear wheel nut	8	10	45 (4.5, 32)	
Front axle nut	2	12	60 (6, 43)	
Rear axle nut	2	14	80 (8, 58)	
Front shock absorber upper mount bolt	2	10	40 (4, 29)	
Front shock absorber lower mount bolt	2	10	40 (4, 29)	
Rear shock absorber upper mount bolt	1	10	40 (4, 29)	
Rear shock absorber lower mount bolt	1	10	40 (4, 29)	
Axle holding bolt	1	14	70 (7, 50)	
Swing arm bolt	4	12	70 (7, 50)	
Front engine mounting bolt	2	10	45 (4.5, 32)	
Rear engine mounting bolt	2	8	32 (3.2, 23)	
Caliper holder bolt	2	8	32 (3.2, 23)	
Brake hose banjo bolt	2	10	35 (3.5, 25)	
Master cylinder bolt	2	6	12 (1.2, 9)	
Exhaust muffler lock bolt (frame)	2	8	35 (3.5, 25)	
Exhaust muffler lock nut (engine)	2	8	35 (3.5, 25)	
Tie-rod end nut	4	8	35 (3.5, 25)	

SPECIAL TOOLS

Tool Name	Tool No.	Remarks Ref. Page
Flywheel puller	A120E00001	
Tappet adjuster	A120E00012	
Oil seal & bearing driver	A120E00014	
Universal holder	A120E00017	
Clutch spring compressor	A120E00034	
Bearing puller	A120E00037	
Valve spring compressor	A120E00040	

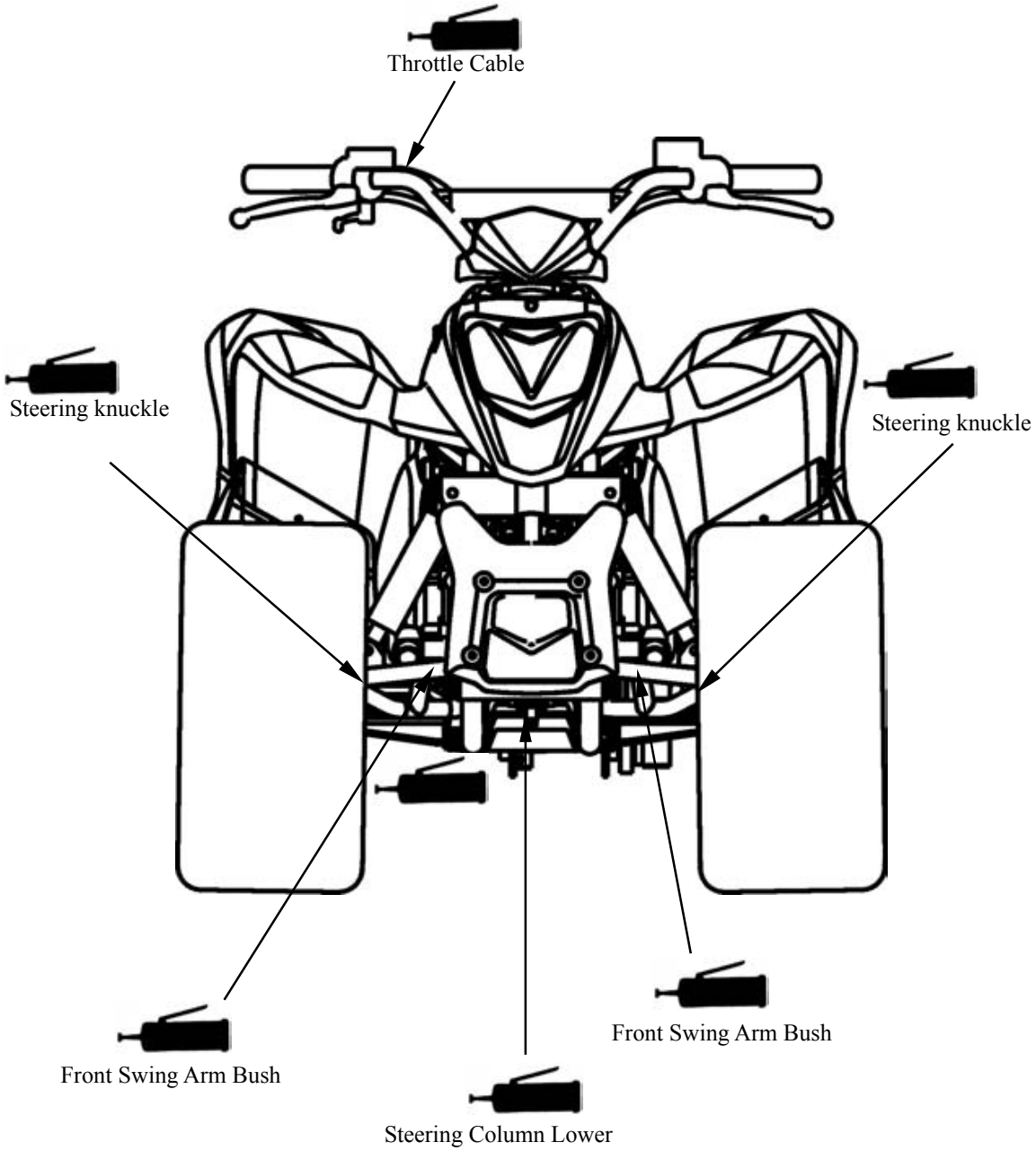
LUBRICATION POINTS

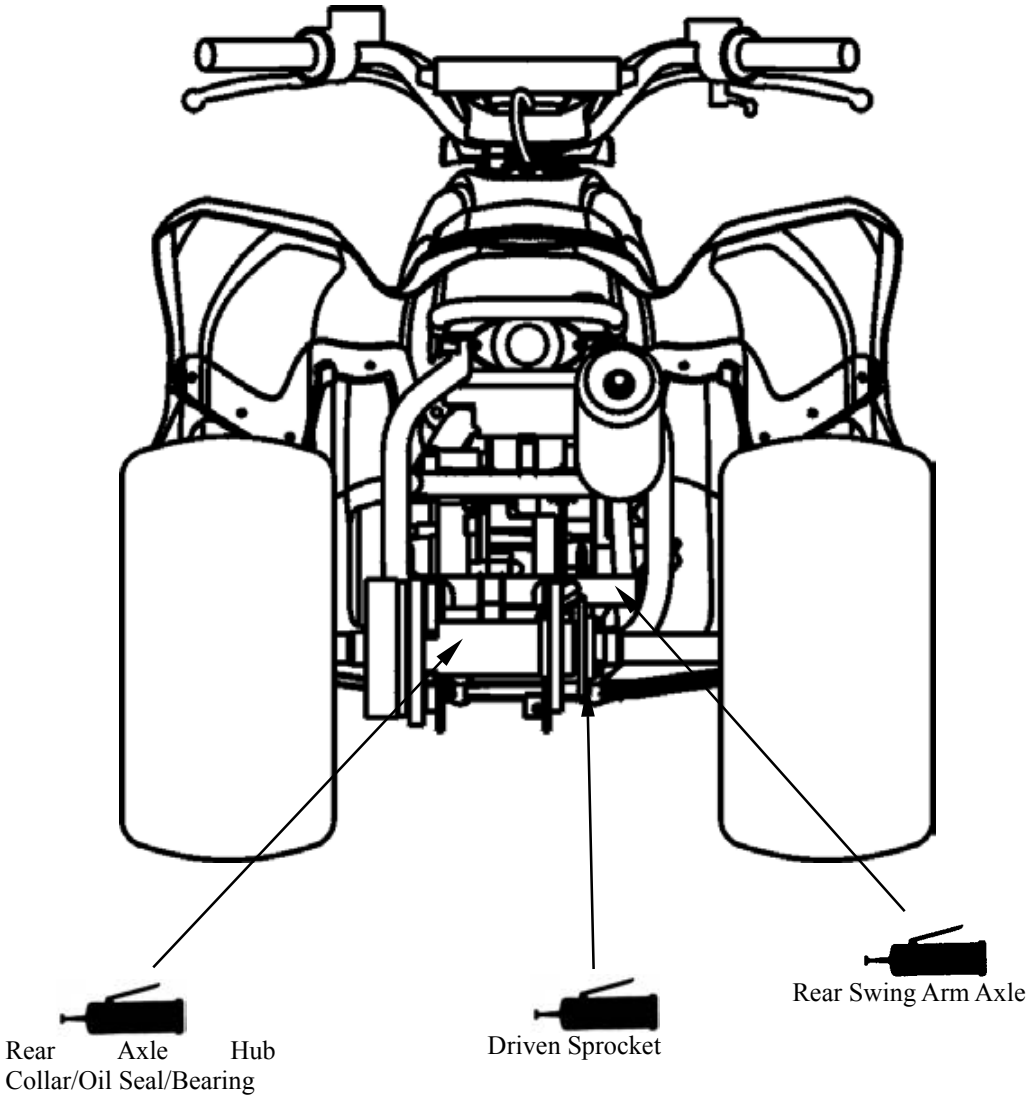
ENGINE

Lubrication Points	Lubricant
Valve guide/valve stem movable part Cam lobes Valve rocker arm friction surface Cam chain Cylinder lock bolt and nut Piston surroundings and piston ring grooves Piston pin surroundings Cylinder inside wall Connecting rod/piston pin hole Connecting rod big end Crankshaft right side oil seal Oil pump drive gear A.C. generator Bearing movable part O-ring face Oil seal lip	•Genuine KYMCO Engine Oil (SAE15W-40) or •API SE, SF or SG Engine Oil 
Transmission gear and movable parts	Gear oil: SAE90

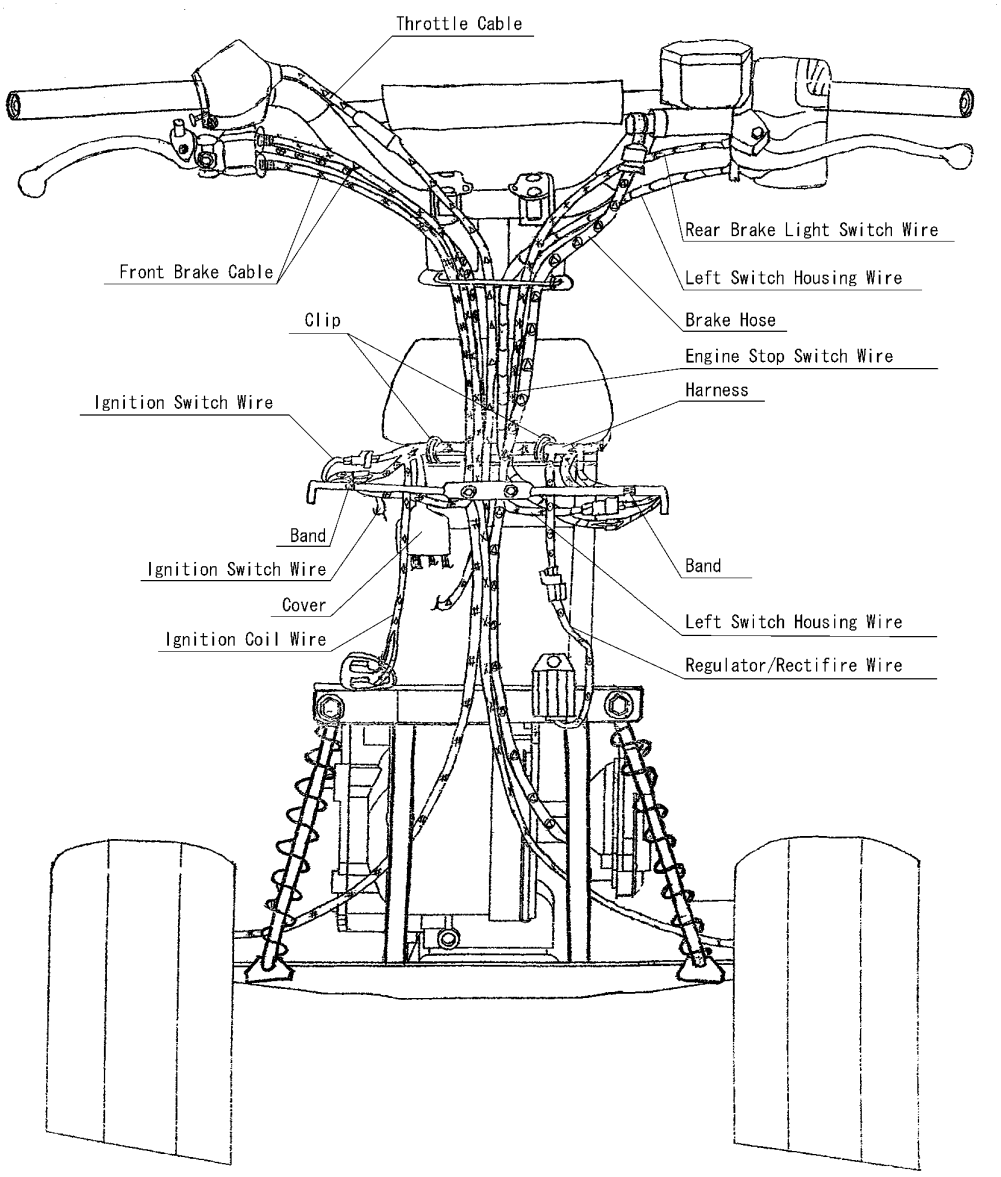
FRAME

The following is the lubrication points for the frame.
Use general purpose grease for parts not listed.
Apply clean engine oil or grease to cables and movable parts not specified. This will avoid abnormal noise and rise the durability of the ATV.

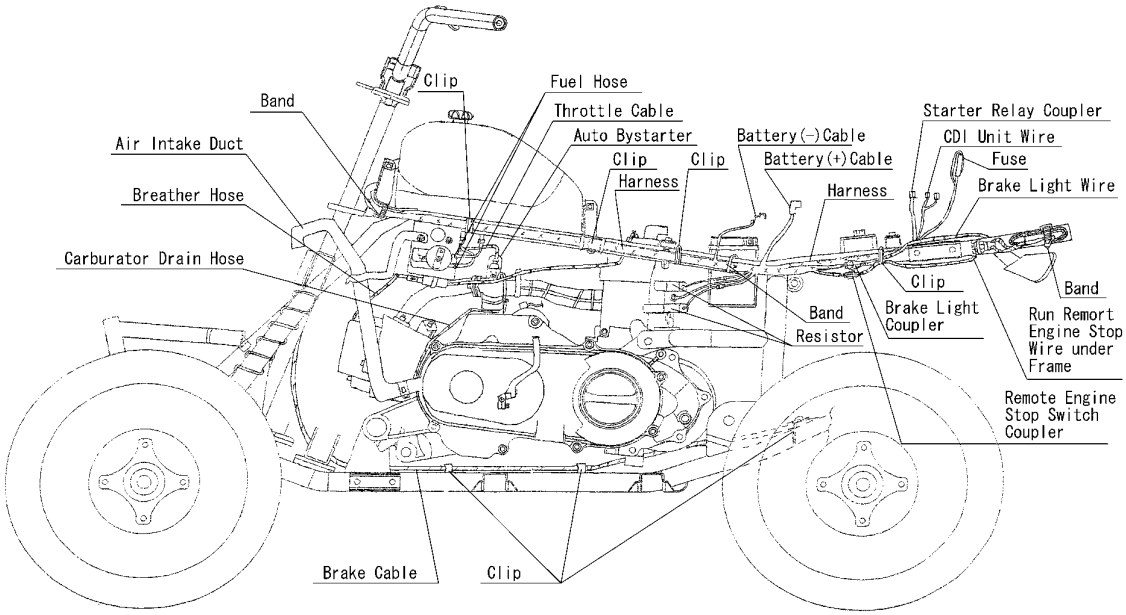




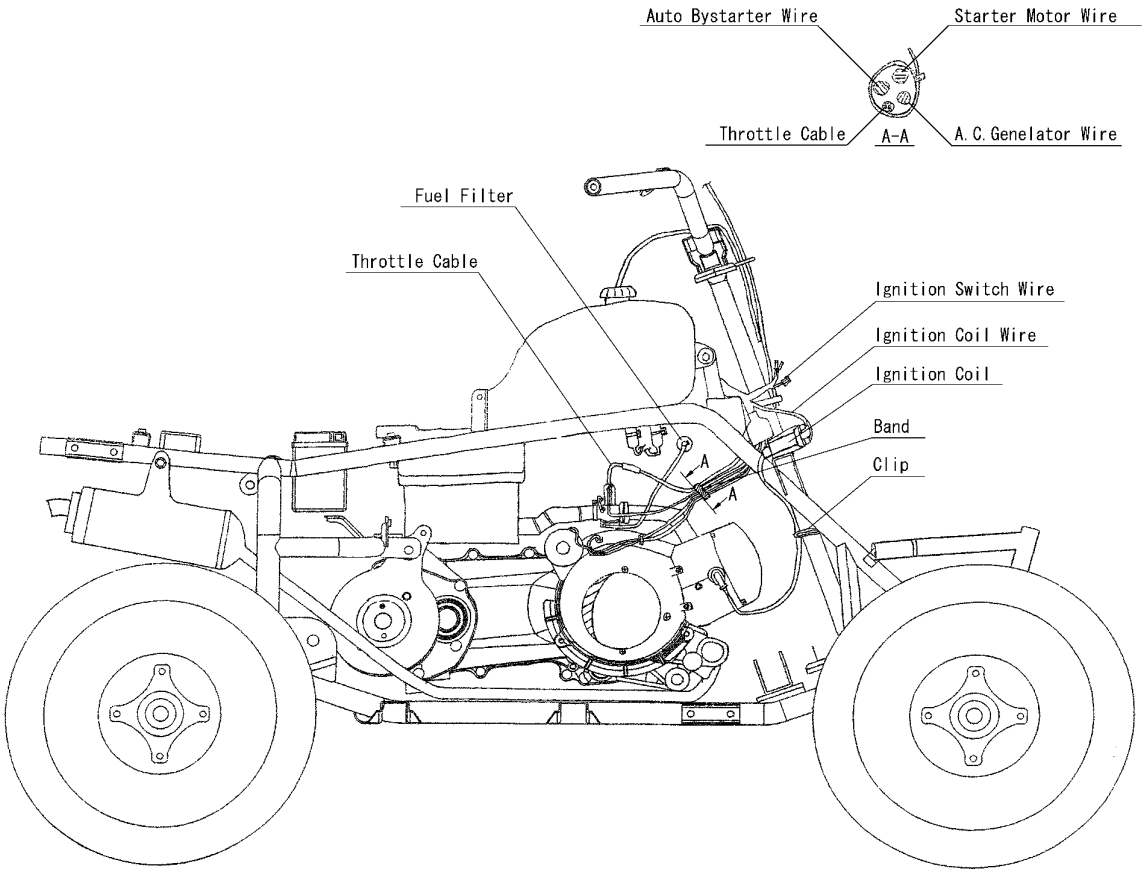
CABLE & HARNESS ROUTING



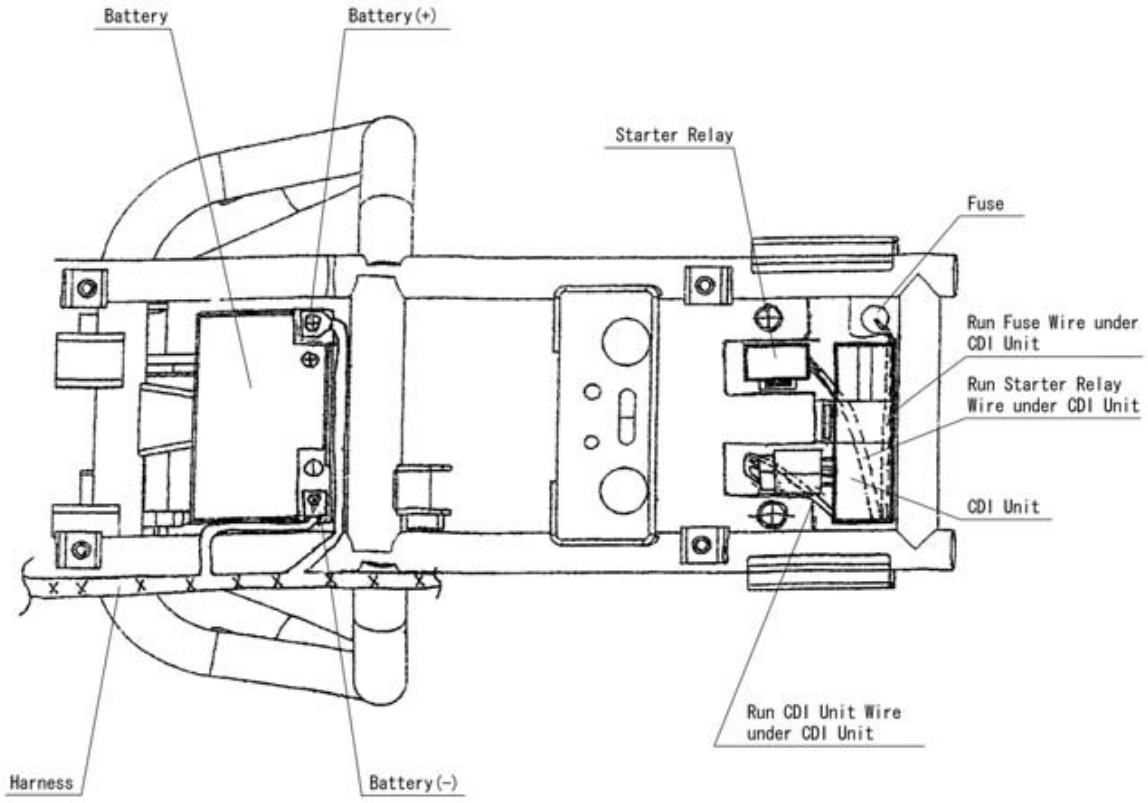
KM901003 S



KM501001 S

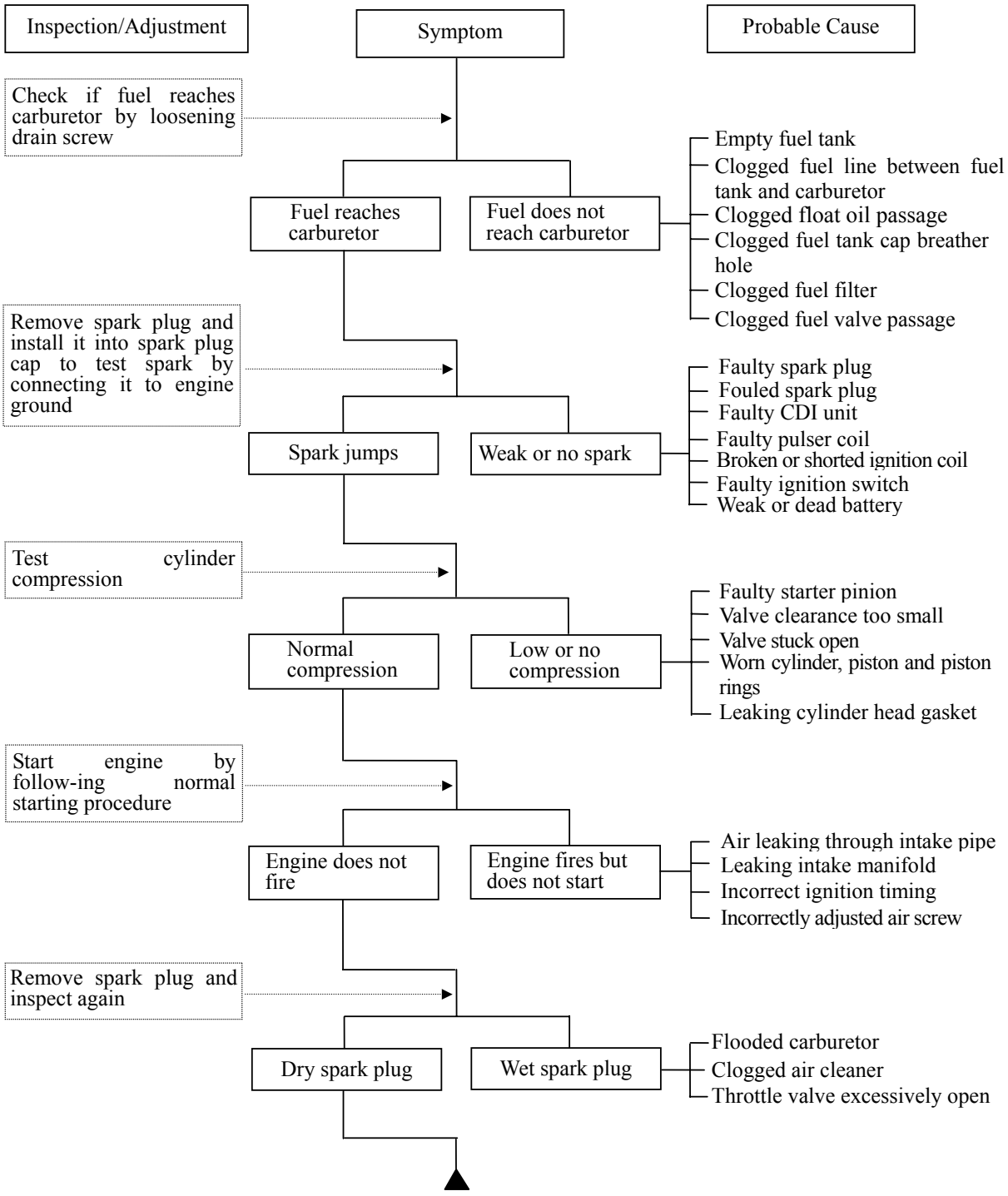


KM901005 S

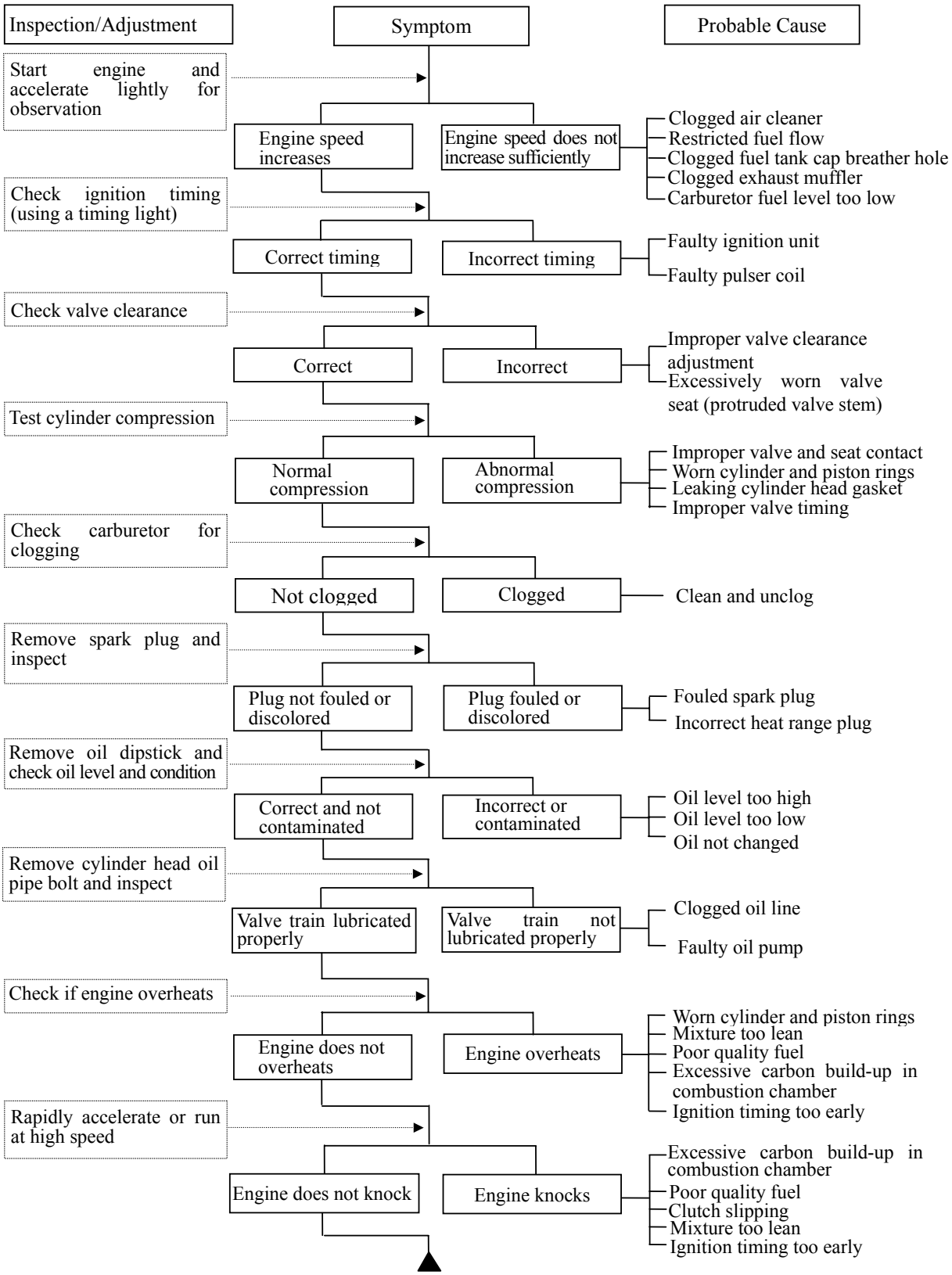


TROUBLESHOOTING

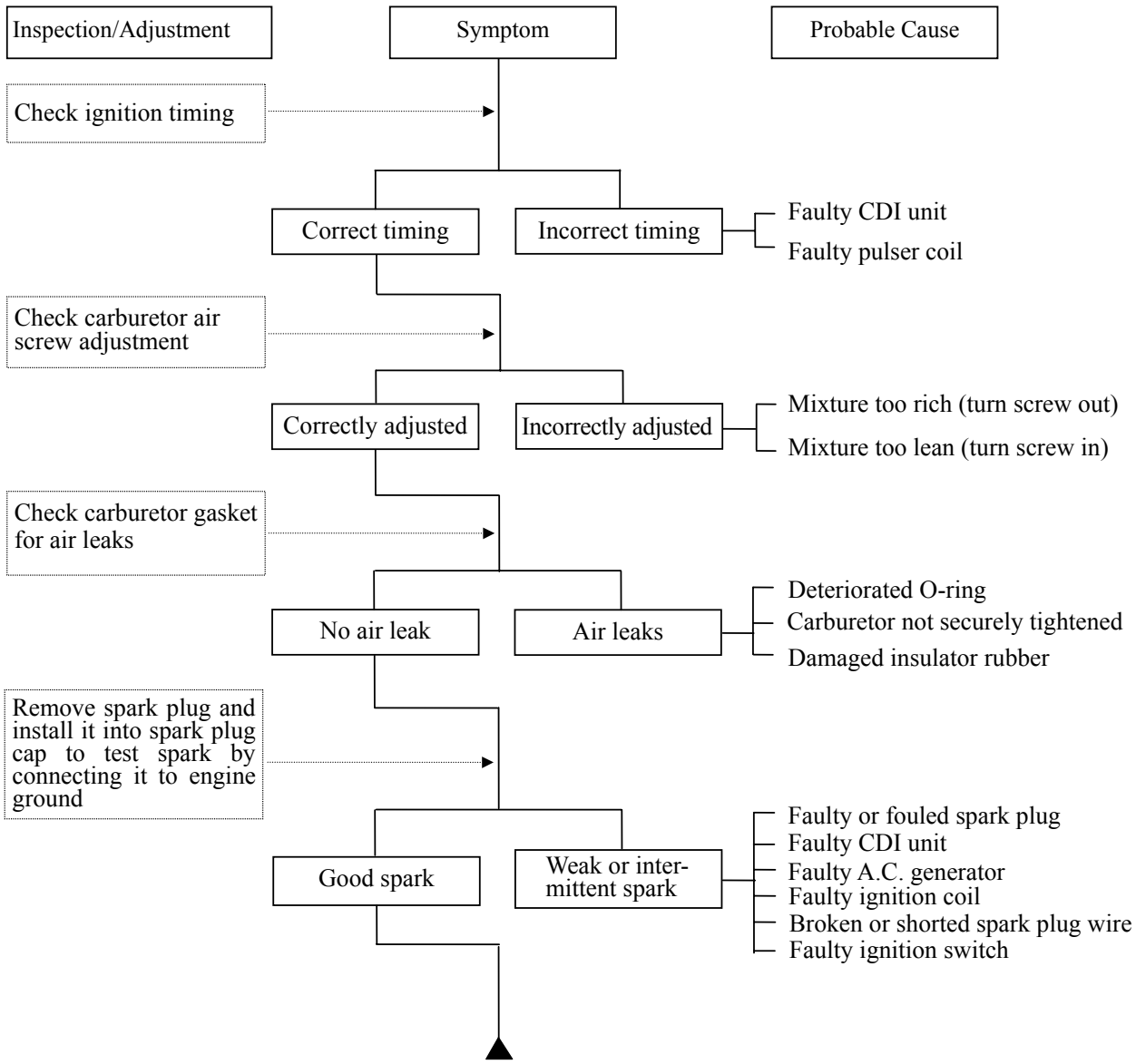
ENGINE WILL NOT START OR IS HARD TO START



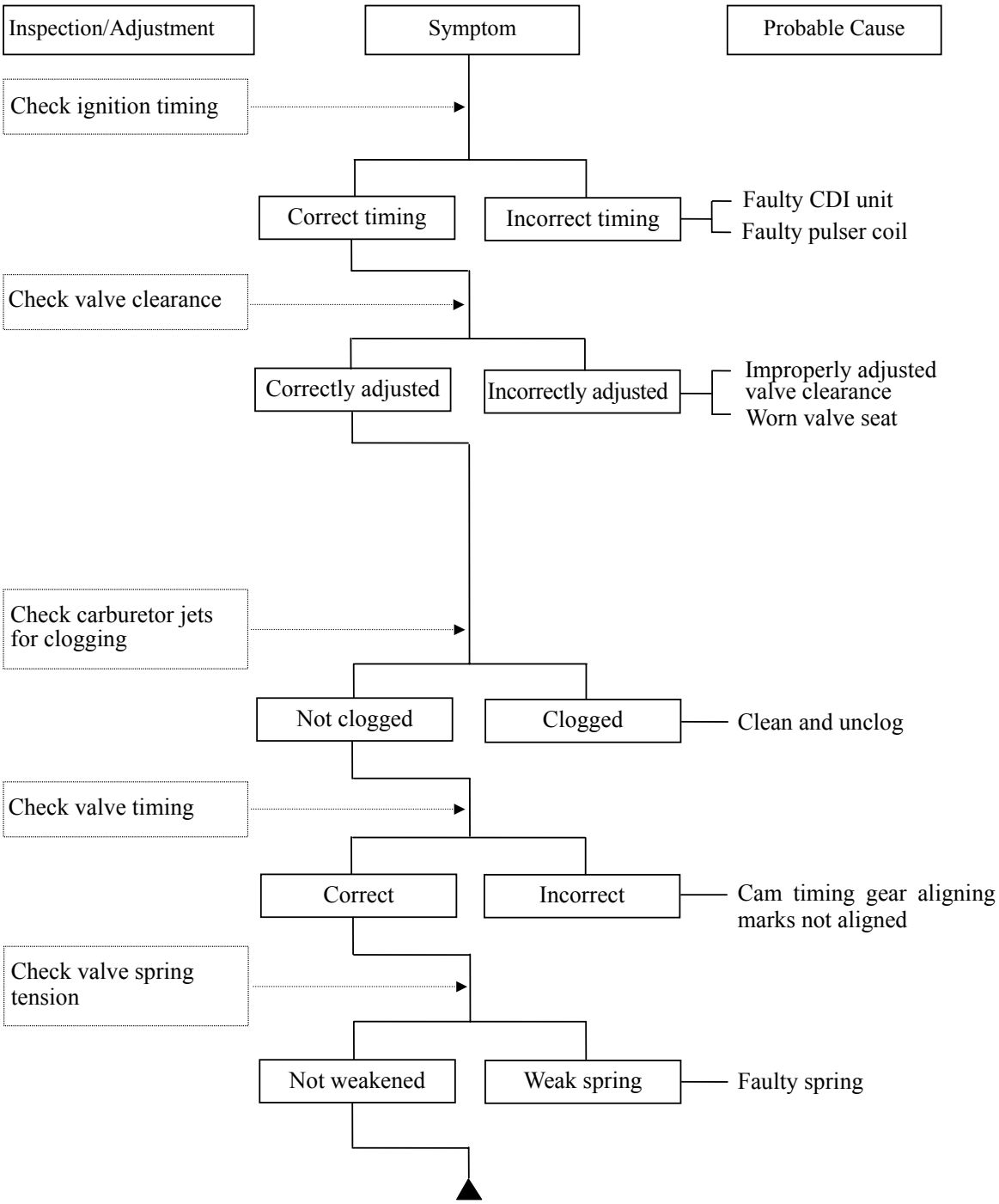
ENGINE LACKS POWER



POOR PERFORMANCE (ESPECIALLY AT IDLE AND LOW SPEEDS)

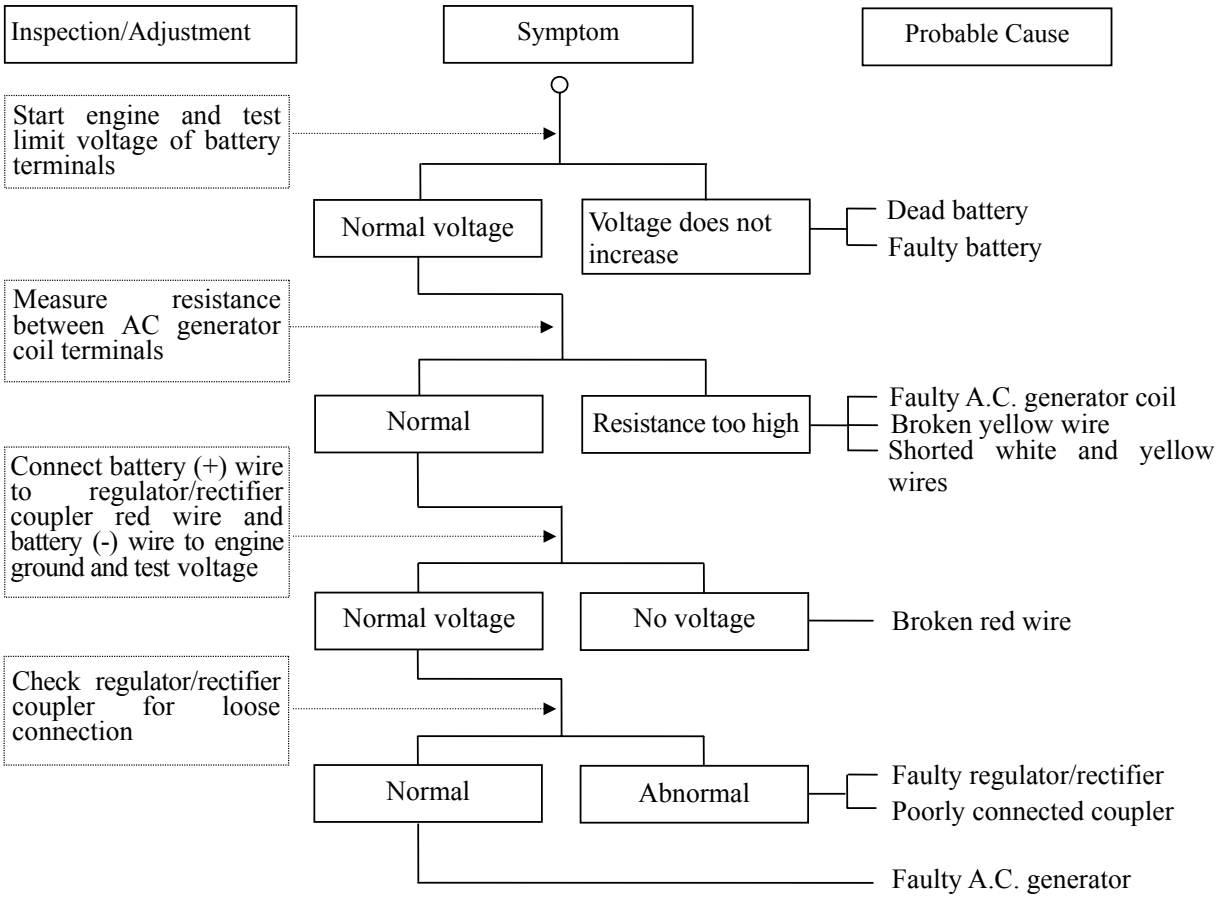


POOR PERFORMANCE (AT HIGH SPEED)

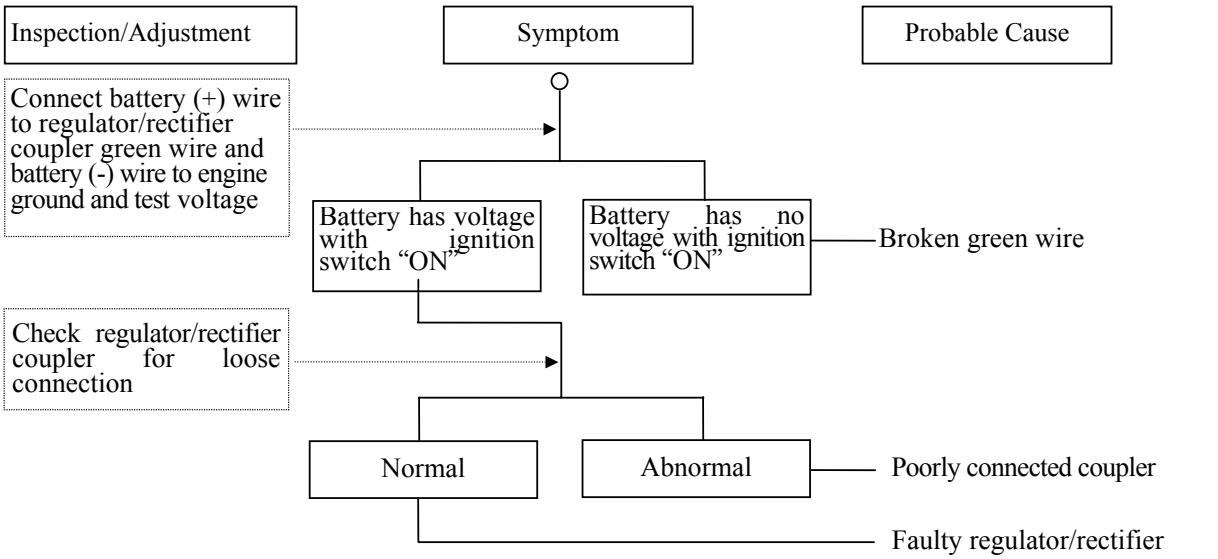


POOR CHARGING (BATTERY OVER DISCHARGING OR OVERCHARGING)

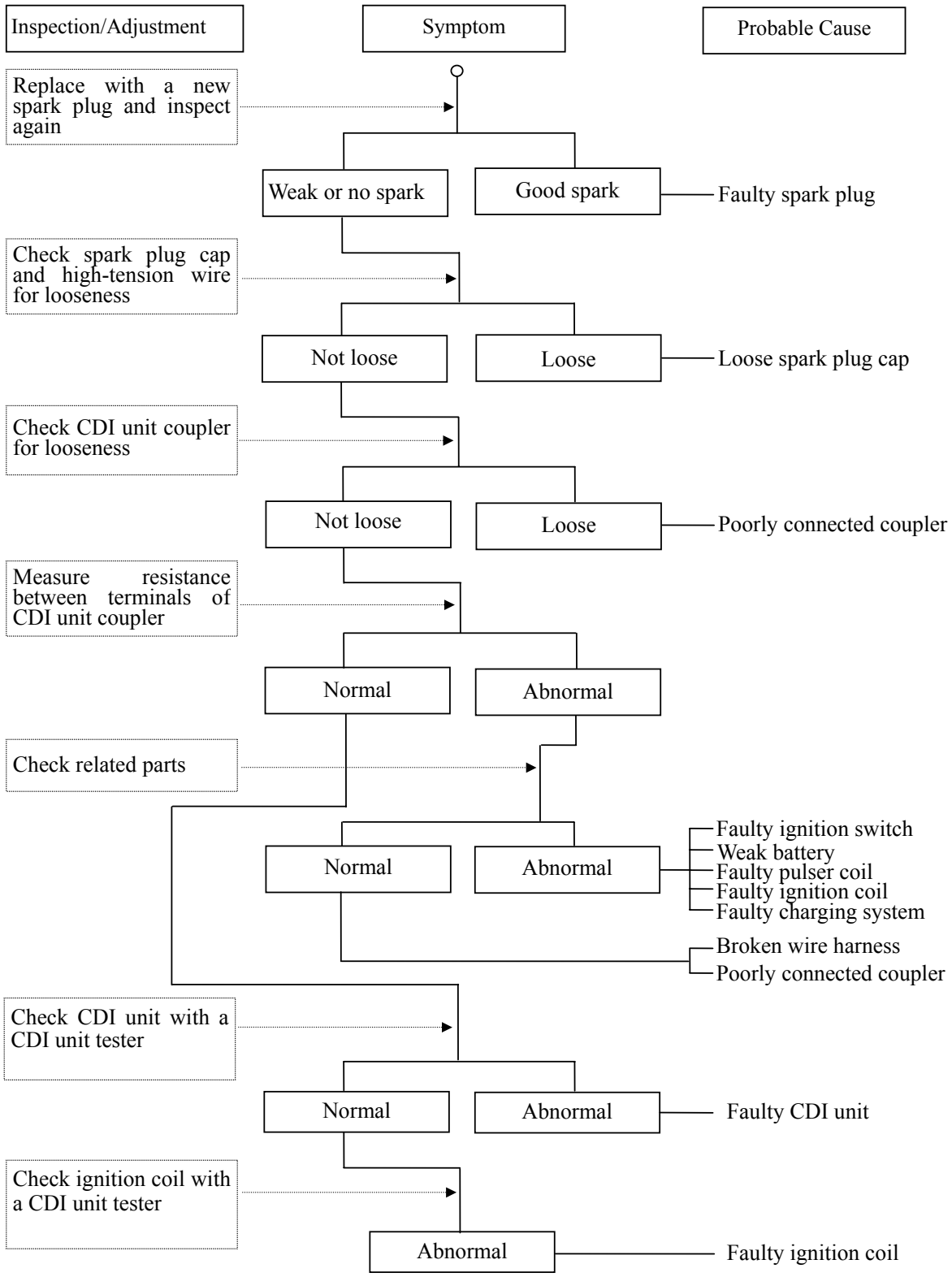
Undercharging



Overcharging

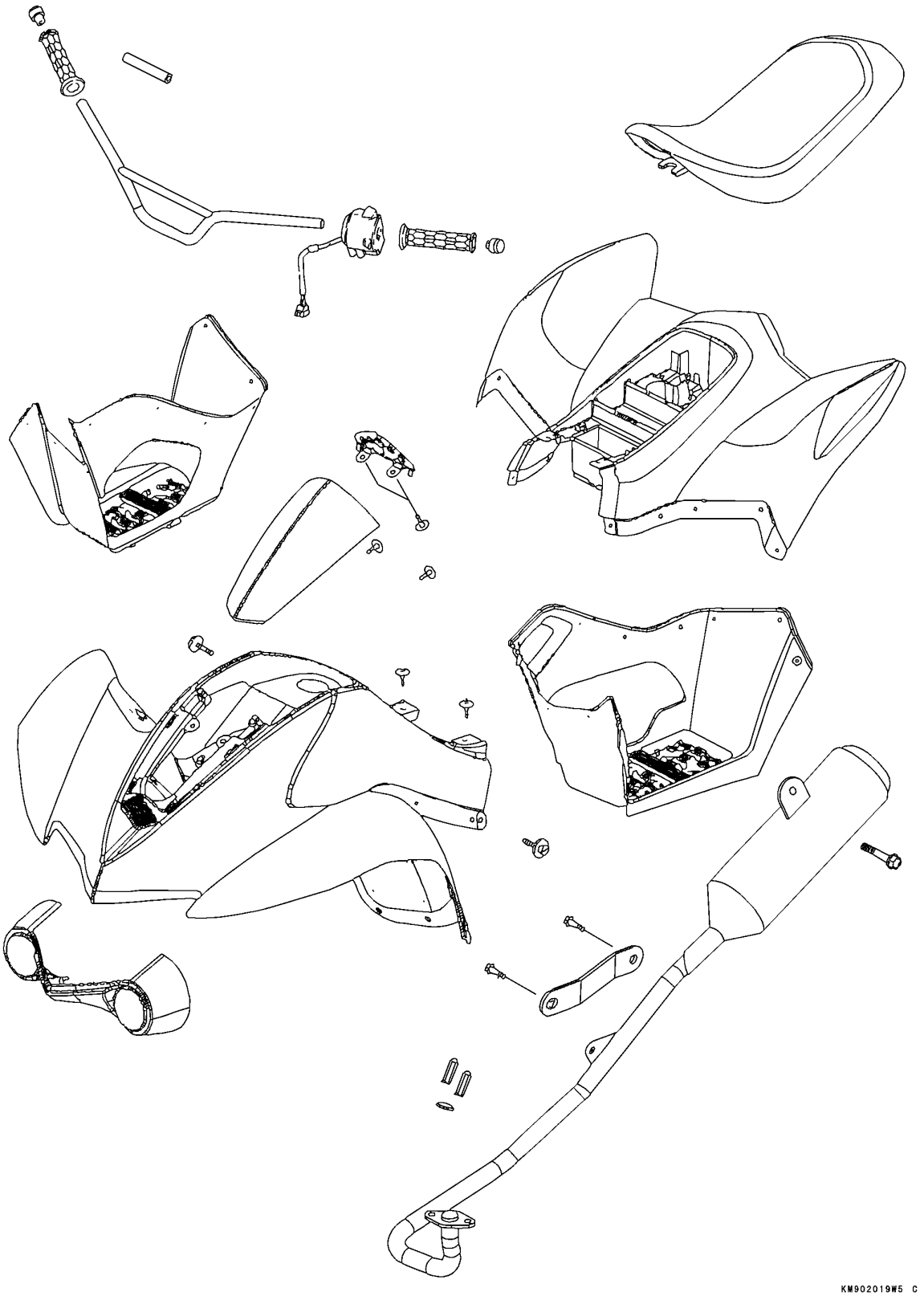


NO SPARK AT SPARK PLUG



FRAME COVERS/EXHAUST MUFFLER/BULB

2. FRAME COVERS/EXHAUST MUFFLER/BULB



2. FRAME COVERS/EXHAUST MUFFLER/BULB

SERVICE INFORMATION

GENERAL INSTRUCTIONS

- When removing frame covers, use special care not to pull them by force because the cover joint claws may be damaged.
- Make sure to route cables and harnesses according to the Cable & Harness Routing.

TORQUE VALUES

Exhaust muffler lock bolts	35 N·m (3.5 kgf·m, 25 lbf·ft)
Exhaust muffler lock nuts	10 N·m (1 kgf·m, 7 lbf·ft)

TROUBLESHOOTING

Noisy exhaust muffler

- Damaged exhaust muffler
- Exhaust muffler joint air leaks

Lack of power

- Caved exhaust muffler
- Exhaust muffler air leaks
- Clogged exhaust muffler

2. FRAME COVERS/EXHAUST MUFFLER/BULB

FRAME COVERS

SEAT REMOVAL

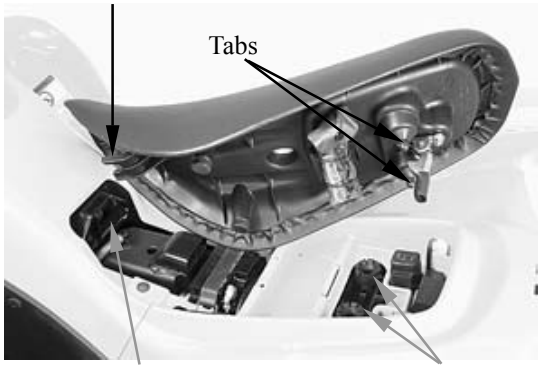
To remove the seat, pull upward the seat lock lever and pull up the seat at the rear.

Seat Lock Lever

SEAT INSTALLATION

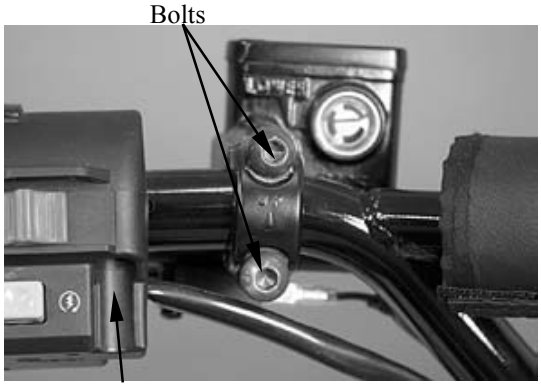
To install the seat, insert the hook in the hole and align the tabs on the seat with the grommets on the frame and press the seat down until it locks.

* Make sure that the seat is securely fitted.

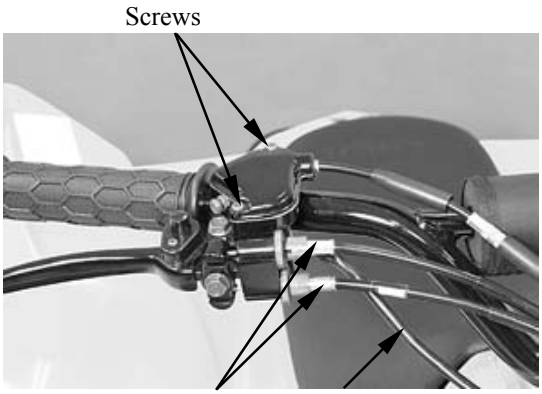


HANDLEBAR REMOVAL

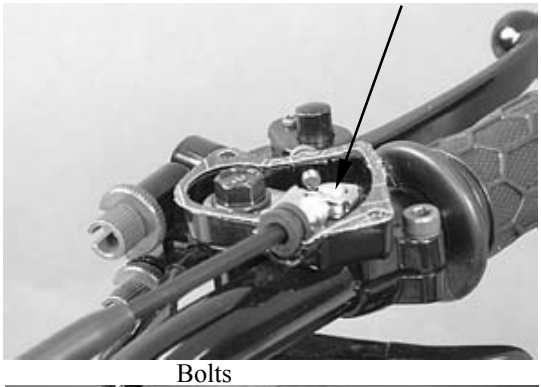
Remove the rear brake master cylinder attaching bolts (disk brake) and rear brake master cylinder. Remove the handlebar switch housing.



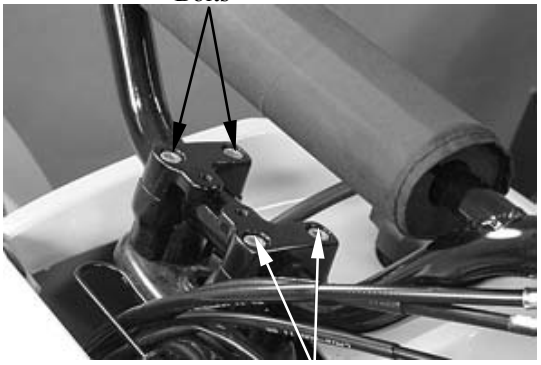
Disconnect the front brake cables.
Disconnect the front brake stop switch wires.
Remove the two screws and speed limiter cover.



Disconnect the throttle cable.



Remove the four bolts and upper handlebar holders.
Remove the handlebar.



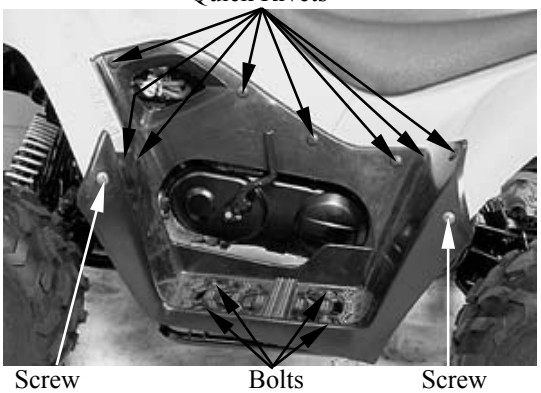
HANDLEBAR INSTALLATION

Reverse the "HANDLEBAR REMOVAL" procedures. (See page 2-3)
Apply adhesive agent to the handlebar grip when installing it.
Adhesive agent: KONISHI Co. Ltd G103 or equivalent rubber adhesive agent

* Refer to the "BRAKE LEVER FREE PLAY" section in the chapter 3 to adjust brake lever free play.

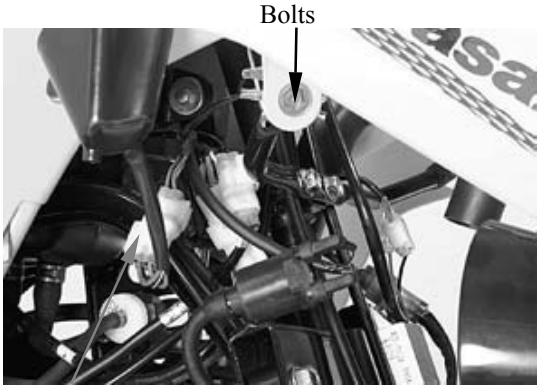
FOOTBOARD REMOVAL

Remove the eight quick rivets, two screws, two nuts and four bolts attaching the right/left footboard.



FRONT FENDER REMOVAL

Remove the seat. (See page 2-3)
Remove the handlebar. (See page 2-3)
Remove the footboard.
Remove the tow bolts attaching the front fender at the right/left side.
Disconnect the ignition switch coupler.



Remove the two bolts attaching the front fender.
Remove the two quick rivets attaching the front fender at the right/left side.
Remove the fuel filler cap.
Remove the front fender.

* During removal, do not pull the joint claws forcedly to avoid damage.
After remove, be sure to tighten the fuel filler cap.

FRONT FENDER INSTALLATION

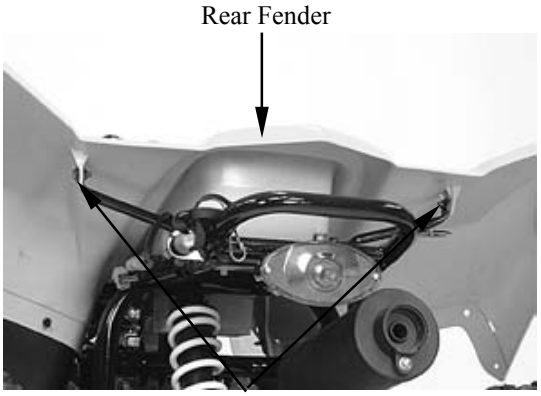
Reverse the "FRONT FENDER REMOVAL" procedures.

REAR FENDER REMOVAL

Remove the front fender. (See page 2-5)
Remove the battery. (See page 14-4)

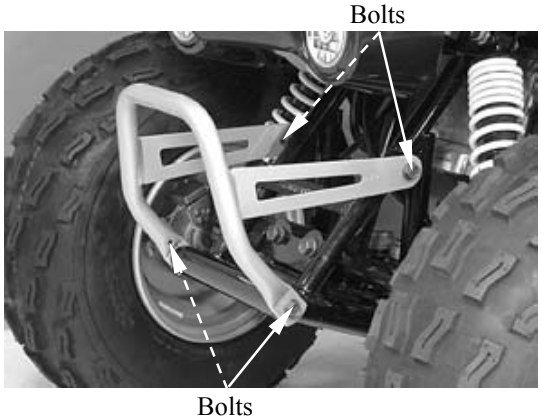
Remove the starter relay and CDI unit.
Remove the three bolts attaching the rear fender.

Remove the two bolts attaching the rear fender and then remove the rear fender.



FRONT GUARD REMOVAL

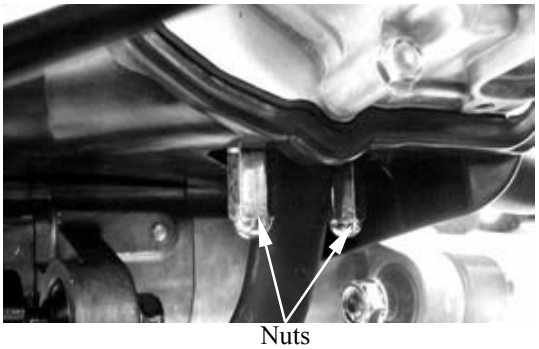
Remove the four bolts attaching front guard at the right/left side.



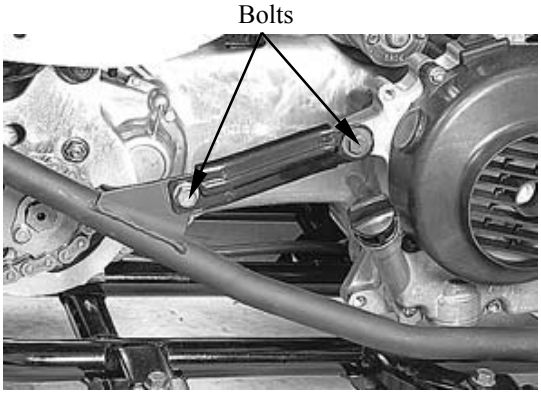
EXHAUST MUFFLER

Removal

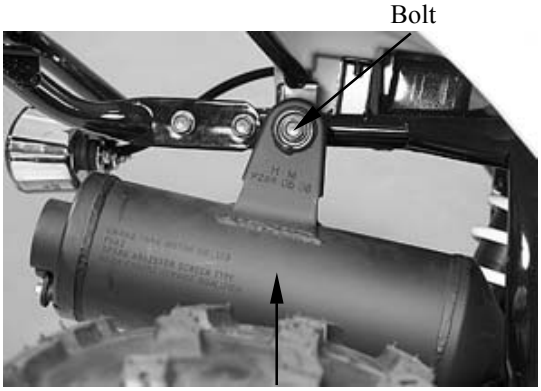
Remove the two nuts attaching the exhaust pipe and cylinder head.



Remove the two bolts attaching the exhaust pipe.



Remove the bolt attaching the exhaust muffler, then remove the exhaust muffler.



INSPECTION

Inspect the gasket at the front end of the exhaust pipe.
If the exhaust gas leaks, replace the gasket with a new one.

INSTALLATION

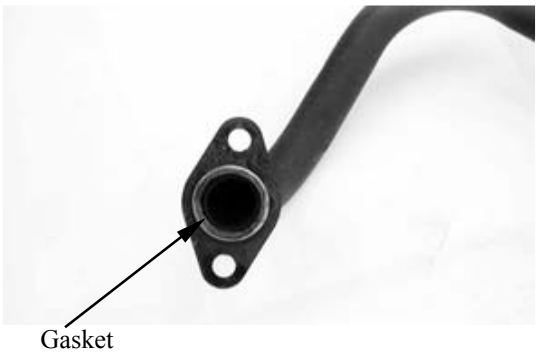
Install the exhaust muffler by reversing the removal sequence.

Torque:

Exhaust muffler lock bolts:
35 N·m (3.5 kgf·m, 25 lbf·ft)

Exhaust muffler lock nuts:
20 N·m (2 kgf·m, 15 lbf·ft)

* Be sure to install a new exhaust gasket.

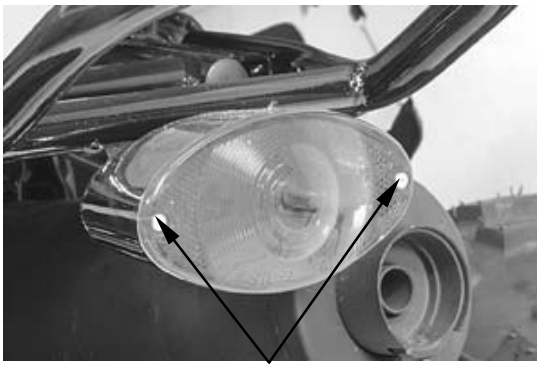


Gasket

BRAKE LIGHT BULB

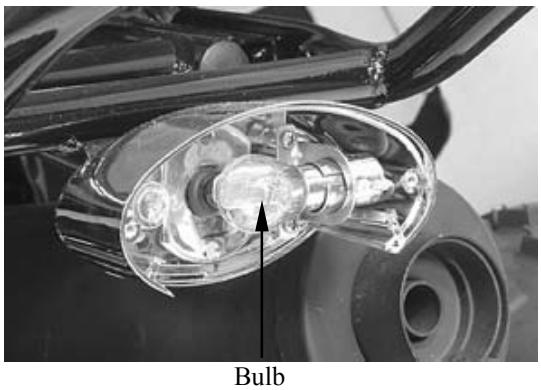
REMOVAL

Remove the two screws and brake light lenses.



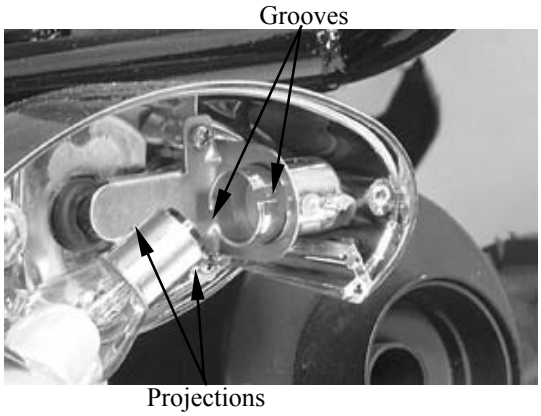
Screws

Push and turn the bulb counterclockwise and remove it.

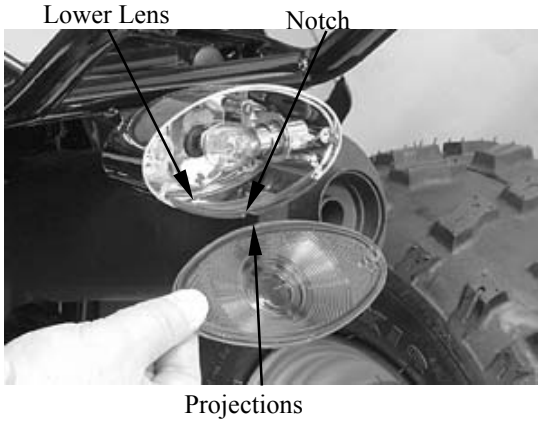


Bulb

INSTALLATION
Align the projections with the grooves of the socket.
Push and turn the bulb clockwise and install it.



Install the lower lens as shown.
Fit the projection in the notch of the lower lens.



3

INSPECTION/ADJUSTMENT

3. INSPECTION/ADJUSTMENT

SERVICE INFORMATION

GENERAL

⚠WARNING

- **Before running the engine, make sure that the working area is well-ventilated. Never run the engine in a closed area. The exhaust contains poisonous carbon monoxide gas which may cause death to people.**
- **Gasoline is extremely flammable and is explosive under some conditions. The working area must be well-ventilated and do not smoke or allow flames or sparks near the working area or fuel storage area.**

SPECIFICATIONS

ENGINE

Throttle grip free play : 1~4 mm (0.04 ~ 0.16 in)
Spark plug gap : 0.6~0.7 mm (0.024 ~ 0.028 in)
Spark plug: Standard : NGK CR7HSA
Valve clearance : IN: 0.04 mm (0.0016 in)
EX: 0.04 mm (0.0016 in)
Idle speed : 2000 rpm
Engine oil capacity:
At disassembly : 0.8 L (0.7 lmp qt, 0.85 US qt)
At change : 0.7 L (0.62 lmp qt, 0.74 US qt)
Gear oil capacity:
At disassembly : 0.12 L (0.11 lmp qt, 0.13 US qt)
At change : 0.11 L (0.1 lmp qt, 0.12 US qt)
Cylinder compression (electric start) : 1170 ~ 1580 kPa (12 ~ 16 kgf/cm², 170 ~ 230 psi)
Ignition timing : BTDC 13°/2000 rpm

CHASSIS

Front brake free play: 10~20 mm (0.4~0.8 in)
Drive chain slack: 10~20 mm (0.4~0.8 in)

TIRE PRESSURE

	1 Rider
Front	25 kPa (0.25 kgf/cm², 3.6 psi)
Rear	25 kPa (0.25 kgf/cm², 3.6 psi)

TIRE SIZE:
Front : 16 × 8-7
Rear : 16 × 8-7

TORQUE VALUES

Front wheel nut 45 N·m (4.5 kgf·m, 32 lbf·ft)
Rear wheel nut 45 N·m (4.5 kgf·m, 32 lbf·ft)

3. INSPECTION/ADJUSTMENT

MAINTENANCE SCHEDULE

This chapter includes all information necessary to perform recommended inspections and adjustments. These preventive maintenance procedures, if followed, will ensure more reliable vehicle operation and a longer service life. The need for costly overhaul work will be greatly reduced. This information applies to vehicles already in service ad well as new vehicles that are being prepared for sale. All service technicians should be familiar with this entire chapter.

FREQUENCY / OPERATION	First Service	Regular Service			
	After 10 hrs. or 100 km (60 mi) of use	Every 10 days or 200 km (120 mi) of use	Every 30 days or 600 km (360 mi) of use	Every 100 hours or 90 days of vehicle use, not to exceed 1 700 km (1 100 mi), whichever comes first	Every year of use
ENGINE					
Transmission drive belt wear-inspect*	●			●	
Air cleaner-service*	●	●			
Throttle lever play-inspect	●	●			
Valve clearance-inspect*	●			●	
Idle speed-inspect			●		
Fuel system cleanliness-inspect*	●			●	
Engine oil-change*	●			●	
Transmission oil-change*	●				●
Oil strainer-clean/replace if necessary*	●			●	
Spark plug-clean and gap	●			●	
Spark arrester-clean				●	
Fuel hoses and connections-inspect				●	
Fuel hose-replace	4 years				
Cylinder head cover breather system-inspect*				●	
Exhaust system-inspect*				●	
CHASSIS					
Joint boots-inspect*	●	●			
Brake lever adjustment-inspect*	●	●			
Brake hose-replace	4 years				
Brake pad/shoe-inspect*	●		●		
Brake fluid level-inspect	●		●		
Brake fluid-change					●
Brake hose/cable-inspect*				●	
Master cylinder piston assembly and dust seal-replace	2 years				
Caliper piston seal and dust seal-replace	2 years				
Drive chain-inspect*	●			●	
Wheel bearings-inspect*	●			●	
Tire wear-inspect*			●		
Steering-inspect	●			●	
General lubrication*			●		
Bolts and nuts-tighten	●	●			

*=Service more frequently when operated in mud, dust, or other harsh riding conditions, or when carrying heavy loads or pulling a trailer.

FUEL SYSTEM

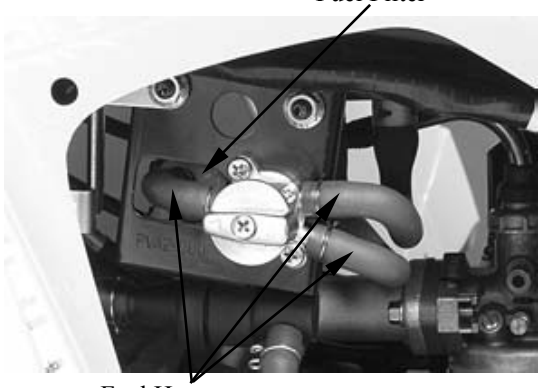
FUEL LINE

Check the fuel tubes and replace any parts, which show signs of deterioration, damage or leakage.

⚠WARNING

Gasoline is extremely flammable and can be explosive under certain condition.

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



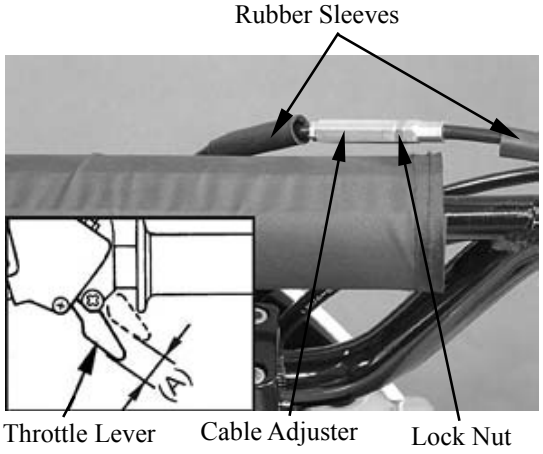
THROTTLE LEVER PLAY

Check the throttle to swing for smooth movement.
Measure the throttle to swing free play.

Free Play: 1 ~ 4 mm (0.04 ~ 0.16 in)

To adjust throttle free play:

1. Slide the rubber sleeves back to expose the throttle cable adjuster.
2. Loosen the lock nut, then turn the adjuster to obtain the correct free play (A). (1 ~ 4 mm or 0.04 ~ 0.16 in)
3. Tighten the lock nut and reinstall the sleeves.

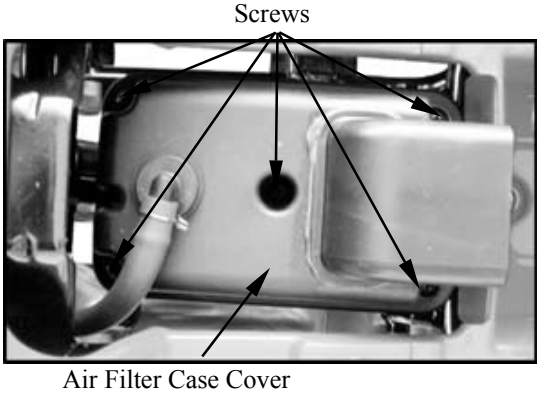


AIR CLEANER

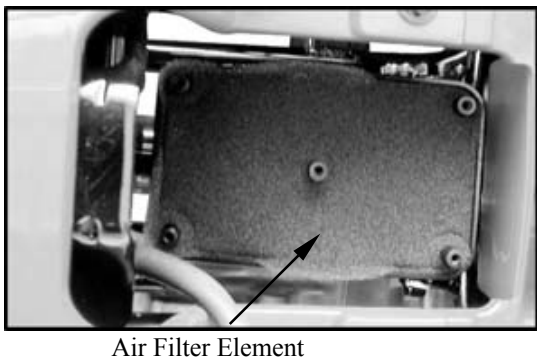
AIR FILTER ELEMENT REPLACEMENT/ CLEANING

To replace the air filter element:

1. Remove the seat. (See page 2-3)
2. Remove the five screws and then remove air filter case cover.



3. Remove the air filter element, and separate it from the box.



To clean the air filter element:

1. Wash the element gently but thoroughly in solvent.

⚠WARNING

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

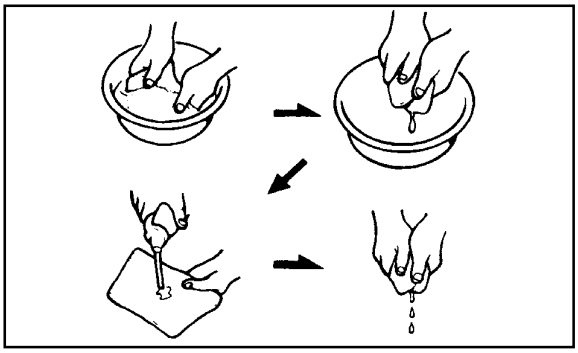
2. Squeeze the excess solvent out of the filter and let it dry.

CAUTION

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

3. Inspect the element. If damaged, replace it.
4. Apply quality foam air filter oil to the element. If foam air filter oil is not available, motor oil may be used.

* The element should be wet but not dripping.



5. Reinstall the element to the air filter case.
6. Reinstall the element assembly and parts removed for access.

Apply the engine oil.

Squeeze out the excess oil.

CATCH TANK CLEANING

Clean the catch tank at the bottom of the filter case.

CHANGE INTERVAL

More frequent replacement is required when riding in unusually dusty or rainy areas.

CARBURETOR IDLE SPEED

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

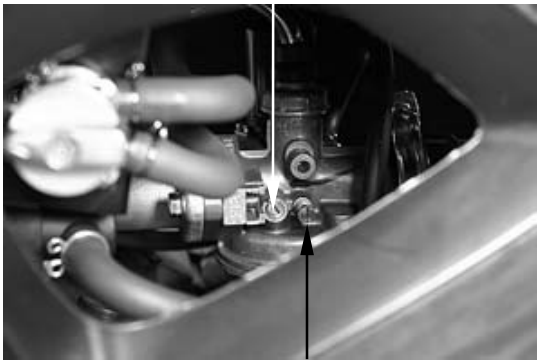
Warm up the engine before this operation.
Start the engine and connect a tachometer.
Turn the throttle stop screw to obtain the specified idle speed.

Idle Speed: 2000 rpm

When the engine misses or run erratic, adjust the air screw.

Special Tool:
Pilot screw adjuster: 57001-1665 (Kawasaki)

Air Screw



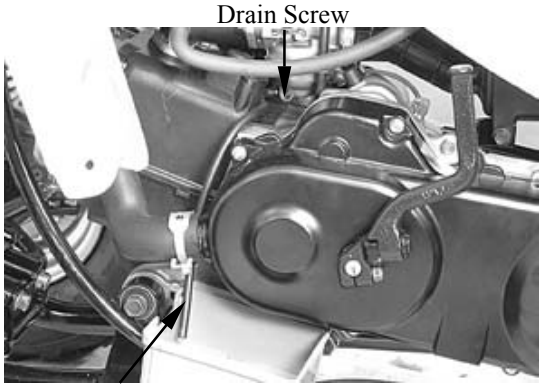
Throttle Stop Screw

Fuel System Cleanliness Inspection

⚠WARNING

Gasoline is extremely flammable and can be explosive under certain conditions. Turn the ignition switch OFF. Do not smoke. Make sure the area is well-ventilated and free from any source of flame or sparks; this includes any appliance with a pilot light.

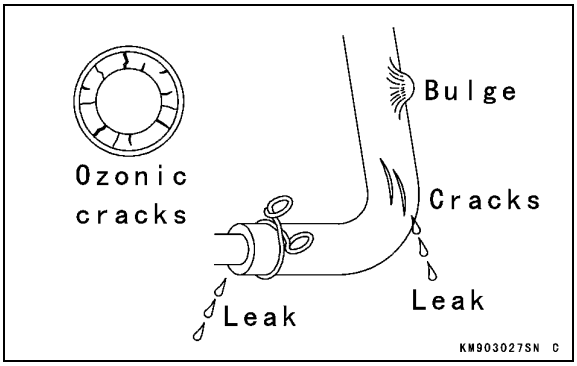
Remove the footboard. (see page 2-5)
Run the lower end of the carburetor drain hose to a suitable container.
Turn out the carburetor drain screw a few turns and drain the fuel system.



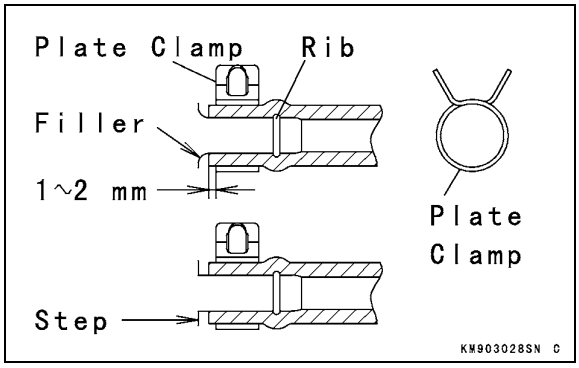
Check to see if water or dirt comes out.
Tighten the drain screw.
If any water or dirt appears during the above inspection, clean the fuel system (carburetor, fuel tap, fuel tank, and fuel hose).

FUEL HOSES AND CONNECTIONS INSPECTION

Check the fuel hoses.
Replace the fuel hose if any fraying, leaks, cracks, bulges, or ozonic cracks are noticed.
Check that the hoses are securely connected and clamps are installed correctly.
When installing the fuel hoses, avoid sharp bending, kinking, flattening or twisting, and route the fuel hoses with a minimum of bending so that the fuel flow will not be obstructed.
Replace the hose if it has been sharply bent or kinked.



Fit the fuel hose onto the fitting fully and install the plate clamp beyond the raised rib.
The hose end must reach the fillet or be as near as possible to the step.

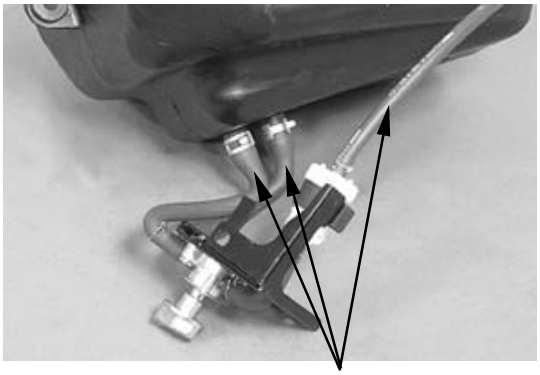


FUEL HOSE REPLACEMENT

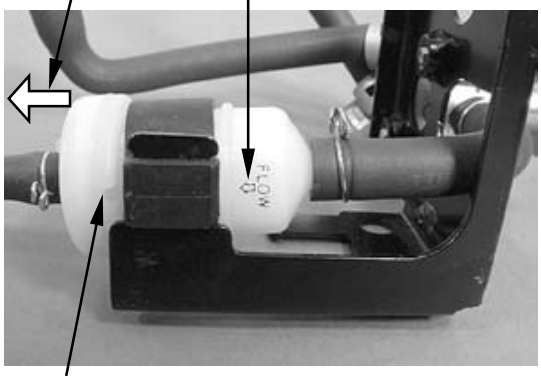
⚠ WARNING

Gasoline is extremely flammable and can be explosive under certain conditions. Turn the ignition switch OFF. Do not smoke. Make sure the area is well-ventilated and free from any source of flame or sparks; this includes any appliance with a pilot light.

Turn the fuel tap to the OFF position.
Remove the fuel tap and fuel tank.
Replace the fuel hoses with new ones.
When installing the fuel hose, avoid sharp bending, kinking, flattening or twisting, and route the fuel hose with a minimum of bending so that the fuel flow will not be obstructed.
Fit the fuel hose onto the fitting fully and install the clamps beyond the raised rib.
Install the removed parts.



When installing the fuel filter, the arrow faces the carburetor.



SPARK PLUG

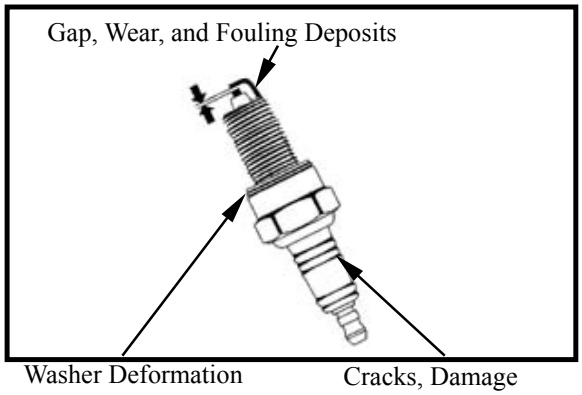
Remove the spark plug coil cap and spark plug.
Check the spark plug for wear and fouling deposits.
Clean any fouling deposits with a spark plug cleaner or a wire brush.

Specified Spark Plug: NGK CR7HSA

Measure the spark plug gap.

Spark Plug Gap: 0.6~0.7 mm (0.024~0.028 in)

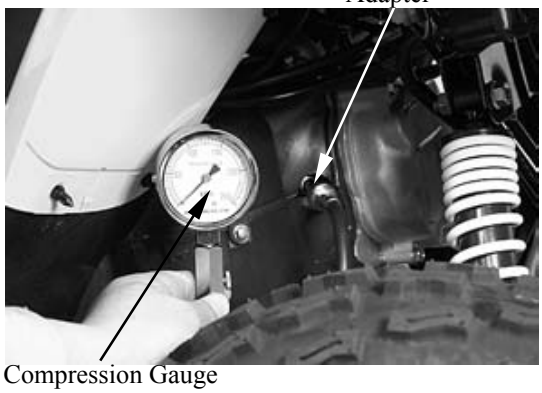
* When installing, first screw in the spark plug by hand and then tighten it with a spark plug wrench.



CYLINDER HEAD

CYLINDER COMPRESSION

Warm up the engine before compression test.
Remove the spark plug.
Install a compression gauge and adapter.
Special Tool:
Compression Gauge Adapter, M10 × 1.0 :
57001-1486 (Kawasaki)



Open the throttle valve fully and push the starter button to test the compression.

Compression (electric start):

1170 ~ 1580 kPa (12 ~ 16 kgf/cm², 170 ~ 230 psi)

If the compression is low, check for the following:

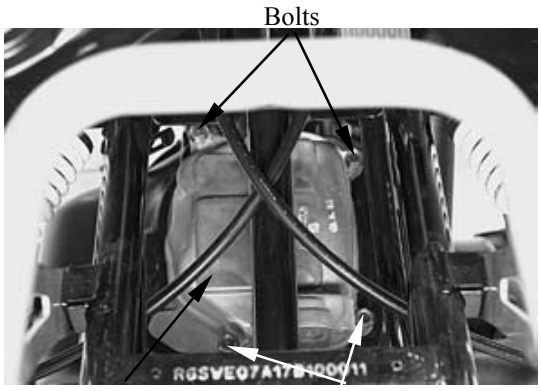
- Leaky valves
- Valve clearance too small
- Leaking cylinder head gasket
- Worn piston rings
- Worn piston/cylinder

If the compression is high, it indicates that carbon deposits have accumulated on the combustion chamber and the piston head.

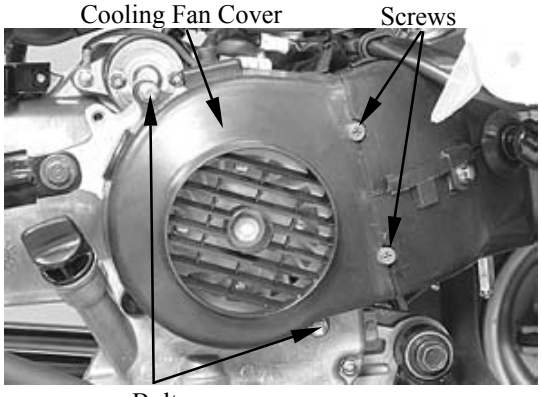
VALVE CLEARANCE

* Inspect and adjust valve clearance while the engine is cold (below 35°C).

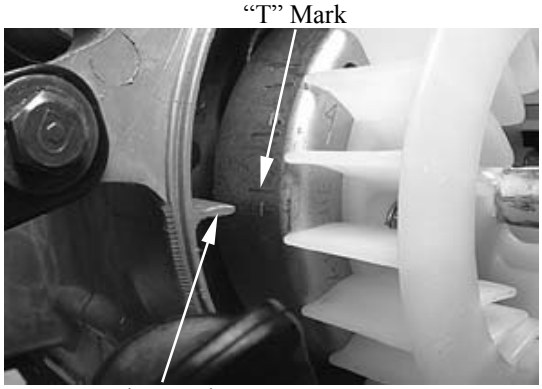
Disconnect the breather hose at the cylinder head cover.
Remove the four bolts and cylinder head cover.



Remove the two screws and two bolts, then remove the fan cover.



Turn the cooling fan clockwise so that the "T" mark line on the flywheel aligns with the index mark on the crankcase to bring the round hole on the camshaft gear facing up to the top dead center on the compression stroke.



Inspect and adjust the valve clearance.

Valve Clearance: IN: 0.04mm (0.0016 in)
EX: 0.04mm (0.0016 in)

Loosen the lock nut and adjust by turning the adjusting nut.

Special Tool:

Tappet adjuster A120E00012

* • Check the valve clearance again after the lock nut is tightened.

CYLINDER HEAD COVER BREATHER SYSTEM INSPECTION

Check breather hose for cracks or damage.
Replace if necessary.

Breather Hose

EXHAUST SYSTEM
SPARK ARRESTER CLEANING

Be sure the exhaust pipe and muffler are cool before cleaning the spark arrester.

⚠ WARNING

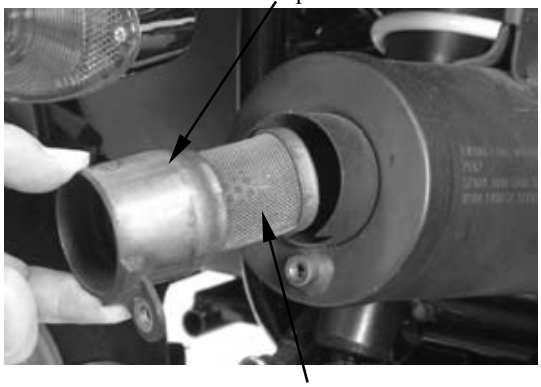
Always let the exhaust system cool prior to touching exhaust components.
Do not start the engine when cleaning the exhaust system.

Remove the bolt.

Bolt

Remove the tailpipe by pulling it out of the muffler.
Tap the tailpipe lightly, then use a wire brush to remove any carbon deposits from the spark arrester portion of the tailpipe.
Insert the tailpipe into the muffler.
Install the bolt and tighten it.

Tail Pipe



Spark Arrester

EXHAUST SYSTEM INSPECTION

Check the leakage at front end of the exhaust pipe. If the exhaust gas leaks, retighten the exhaust muffler lock nut or replace the gasket with a new one.

Torque:

Exhaust muffler lock bolt:
35 N·m (3.5 kgf·m, 25 lbf·ft)

Exhaust muffler lock nut:
20 N·m (2 kgf·m, 15 lbf·ft)

ENGINE OIL

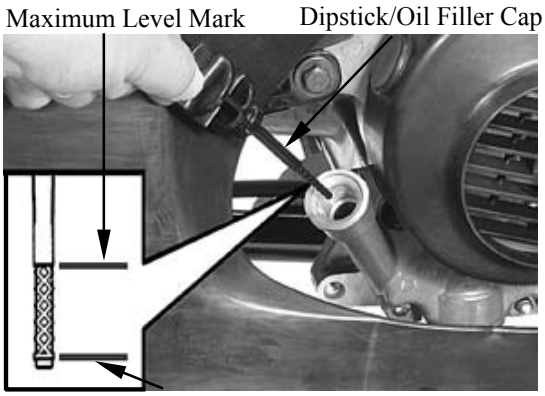
OIL LEVEL

Place the machine on a level place.

Warm up the engine for several minutes and stop it.

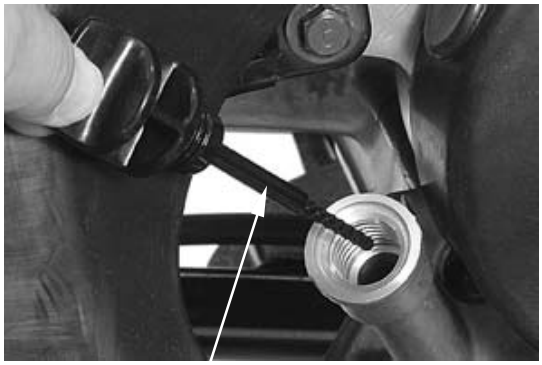
Remove the dipstick and wipe it off with a clean rag. Insert the dipstick in the filler hole without screwing it in.

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



Remove the dipstick and inspect the oil level.

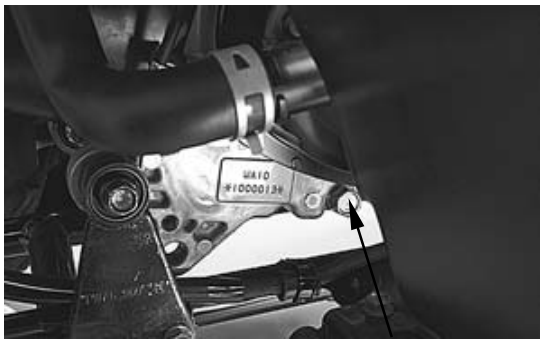
The oil level should be between the maximum and minimum marks. If the level is low, add oil to raise it to the proper level.



ENGINE OIL REPLACEMENT

Place the machine on a level place.
Warm up the engine for several minutes and stop it.
Place a container under the engine.
Remove the oil filler cap and drain plug to drain the oil.
Reinstall the drain plug and tighten the drain plug to specification.
Torque: 25 N·m (2.5 kgf·m, 18 lbf·ft)
Fill the engine with oil and install the oil filler cap.
Warm up the engine for several minutes at idle speed. Check for oil leakage while warming up.

* Be sure no foreign material enters the crankcase.


Drain Plug

Oil Capacity:
At disassembly:
0.8 L (0.7 lmp qt, 0.85 US qt)
At change:
0.7 L (0.62 lmp qt, 0.74 US qt)

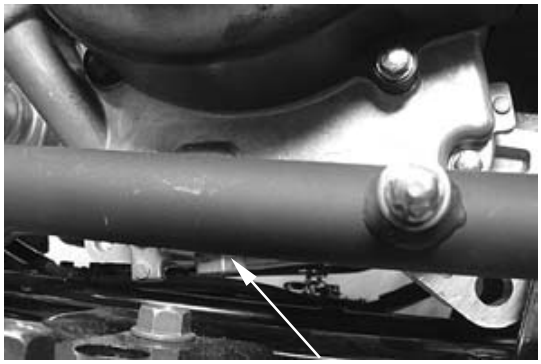
ENGINE OIL REPLACEMENT AND OIL FILTER CLEANING

A. Place the machine on a level place.
B. Warm up the engine for several minutes and stop it.
C. Place a container under the engine.
D. Remove the oil filler cap and oil filter cap to drain the oil.

* . Be sure no foreign material enters the crankcase.
  . When removing the oil filter cap, the compression spring, oil strainer and O-ring will fall out. Take care not to lose these parts.

E. Clean the oil strainer with solvent.
F. Inspect the O-ring and replace it if damaged.
G. Reinstall the O-ring, oil strainer, compression spring and oil filter cap. Tighten the oil filter cap to specification.
Torque: 15 N·m (1.5 kgf·m, 11 lbf·ft)

* Before reinstalling the oil filter cap, be sure to install the O-ring, compression spring and oil strainer.



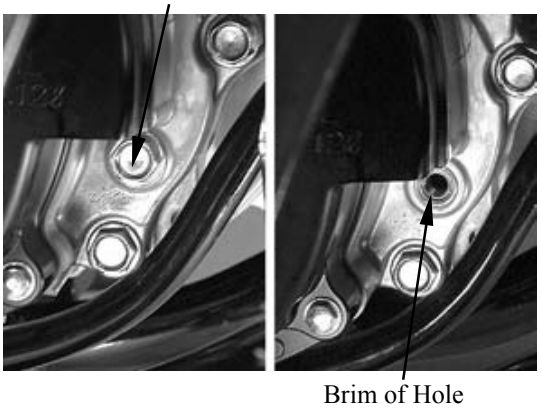
Oil Capacity:

At disassembly:
0.8 L (0.7 lmp qt, 0.85 US qt)
At change:
0.7 L (0.62 lmp qt, 0.74 US qt)

TRANSMISSION OIL

TRANSMISSION OIL MEASUREMENT

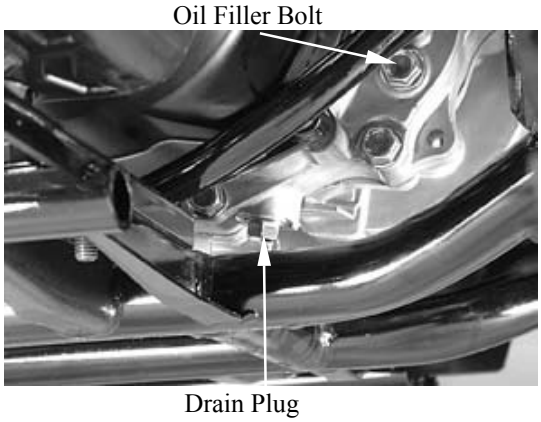
Place the machine on a level place.
Remove the oil filler bolt and check the oil level. It should be up to the brim of the hole. If the level is low, add oil to raise it to the proper level.
Reinstall the oil filler bolt and tighten to specification.
Torque: 18 N·m (1.8 kgf·m, 13 lbf·ft)



TRANSMISSION OIL REPLACEMENT

Place the machine on a level place.
Place a container under the engine.
Remove the oil filler bolt and drain plug to drain the oil.
Reinstall the drain plug and tighten to specification.
Torque: 18 N·m (1.8 kgf·m, 13 lbf·ft)

Fill the engine with oil and install the oil filler bolt.
Torque: 18 N·m (1.8 kgf·m, 13 lbf·ft)



Oil Capacity:

At disassembly:

0.12 L (0.11 lmp qt, 0.13 US qt)

At change:

0.11 L (0.1 lmp qt, 0.12 US qt)

* Be sure no foreign material enters the crankcase.

Start the engine and warm up for a few minutes. While warming up, check for oil leakage. If oil leakage is found, stop the engine immediately and check for the cause.

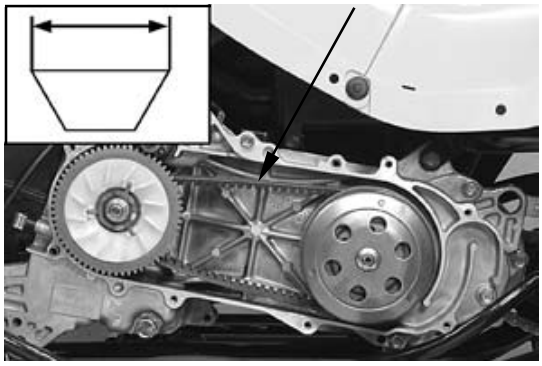
DRIVE BELT

Remove the left crankcase cover.
Inspect the drive belt for cracks, scaling, chipping or excessive wear.
Measure the V-belt width

Service limit: 17 mm (0.68 in)

Replace the drive belt if out of specification.

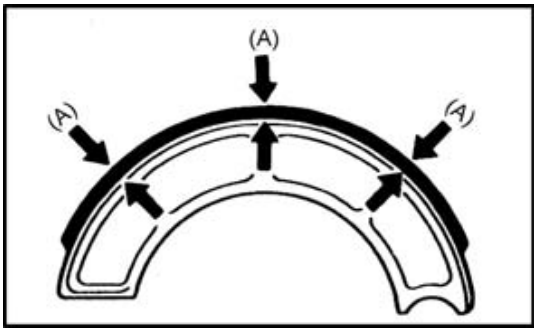
Drive Belt



BRAKES

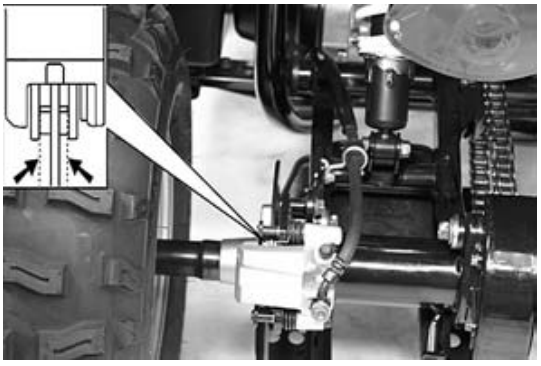
BRAKE SHOES

The checking of brake shoes wear will disassemble the brake. If the lining thickness below to the wear limit (A) 2.0 mm (0.08 in), to replace the shoes as a set.



BRAKE PADS

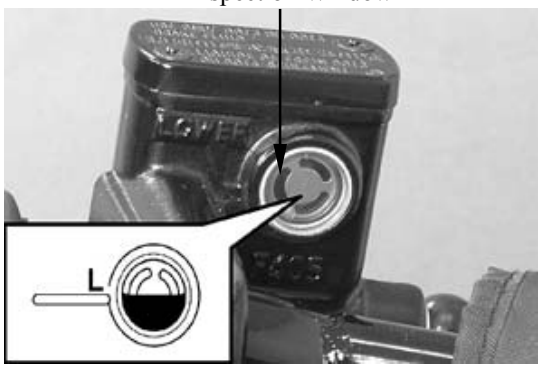
A wear indicator is provided on each brake. The indicators allow checking of brake pads wear. Check the position of the indicator. If the indicator reaches the wear limit line, replace the pads.



BRAKE FLUID

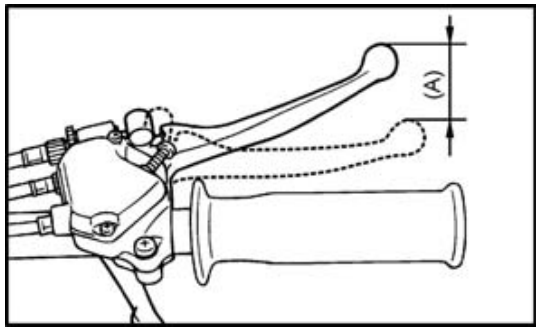
Check if the fluid level is below the lower level mark through the inspection window.
If the fluid level is lower than the lower level mark, check for fluid leakage of the brake line, and add the fluid. (see page 13-15)

Inspection Window



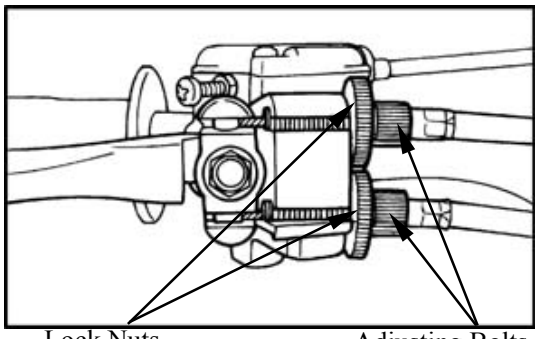
FRONT BRAKE LEVER FREE PLAY INSPECTION

The brake lever free play (A) should be adjusted to 10 ~ 20 mm (0.4 ~ 0.8 in) at the tip of the brake lever.

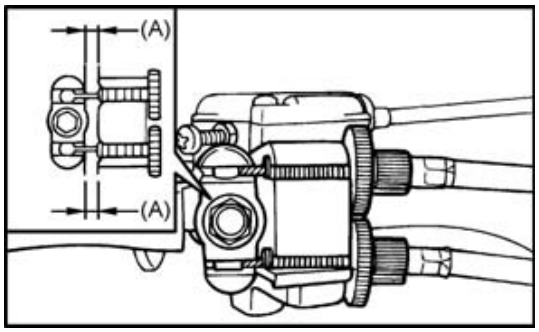


FRONT BRAKE LEVER FREE PLAY ADJUSTMENT

Loosen the upper lock nut and fully turn in the adjusting bolt.
Loosen the lower lock nut.
Turn the lower adjusting bolt until specified free play is obtained.
Tighten the lower lock nut.



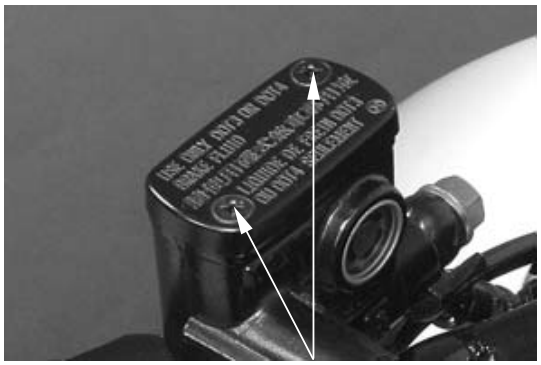
While applying the front brake, turn out the upper adjusting bolt until the upper and lower cable lengths (A) are equal. The cable joint will become vertical.
Tighten the upper lock nut.



BRAKE FLUID CHANGE

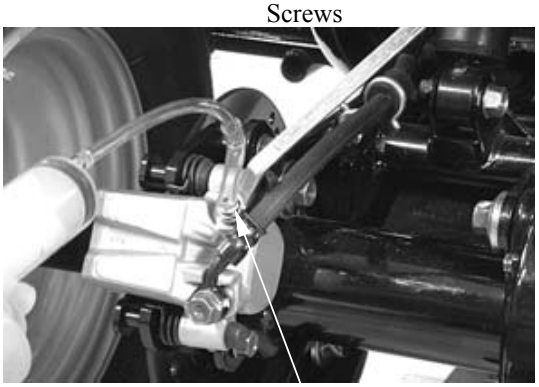
Place the machine on a level place and set the handlebar upright.
Remove the two screws attaching the brake fluid reservoir cap.

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



Screws

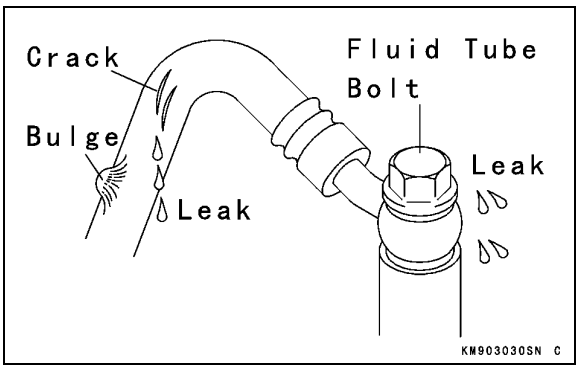
Connect a transparent hose to the brake caliper bleed valve and then loosen the bleed valve nut.
Use a syringe to draw the brake fluid out through the hose.



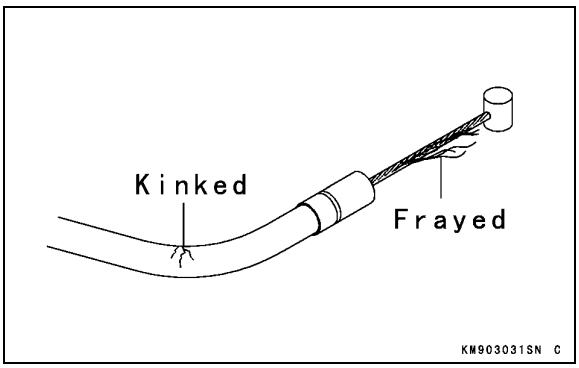
Bleed Valve

BRAKE HOSE/CABLE INSPECTION

Inspect the brake hose and fittings for deterioration, cracks and signs of leakage.
The high pressure inside the brake line can cause fluid to leak or the hose to burst if the line is not properly maintained.
Bend and twist the rubber hose while examining it.
Replace the hose if any cracks or bulges are noticed.
Tighten any loose fittings.



With the cable disconnected at the both ends, the cable should move freely within the cable housing.
If cable movement is not free after lubricating, if the cable is frayed, or if the cable housing is kinked, replace the cable.



BRAKE HOSE REPLACEMENT

Pump the brake fluid out of the line as explained in the Brake Fluid Change. (See page 3-17)
Remove the fluid tube bolts at both ends of the brake hose, and pull the hose off the vehicle.
Immediately wipe up any brake fluid that spills.

CAUTION
Brake fluid quickly ruins painted surfaces; any spilled fluid should be completely washed away immediately.

Use a new flat washer for each side of the hose fittings.
Install the new brake hose in its place (See page 1-16), and tighten the fluid tube bolts.
Torque:
Brake Hose Banjo Bolts: 35 N·m (3.5 kgf·m, 25 ft·lb)

BRAKE MASTER CYLINDER PISTON ASSEMBLY AND DUST SEAL REPLACEMENT

Remove the brake master cylinder (See page 13-17).
Refer to the disassembly and assembly of the master cylinder. (See page 13-17)

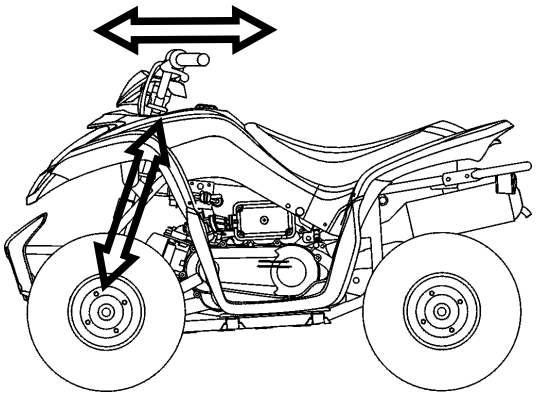
CALIPER PISTON SEAL AND DUST SEAL REPLACEMENT

Refer to the disassembly and Assembly of the caliper. (See page 13-19)

STEERING SYSTEM

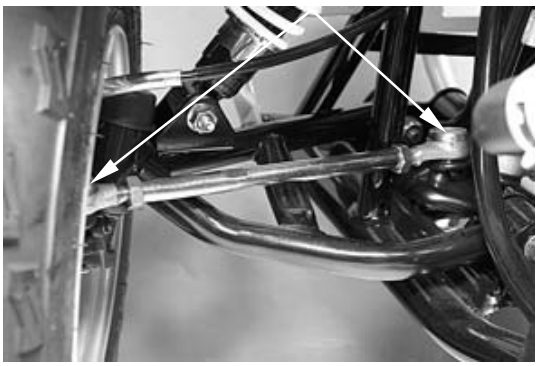
INSPECTION

Place the machine on a level place.
Check the steering column bushings and bearings:
Move the handlebar up and down, and/or back and forth.
Replace the steering column bushings and or bearings if excessive play



Check the tie-rod ends.
Turn the handlebar to the left and/or right until it stops completely, then slightly move the handlebar from left to right.
Replace the tie-rod ends if tie-rod end has any vertical play.

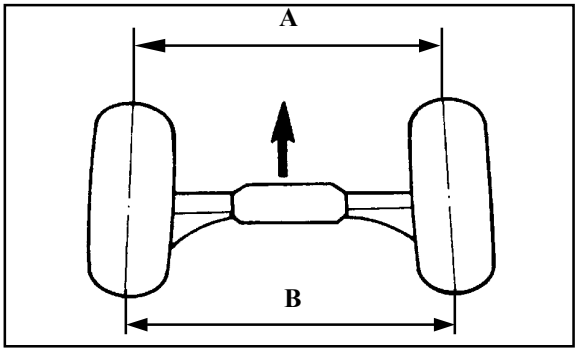
Tie-rod Ends

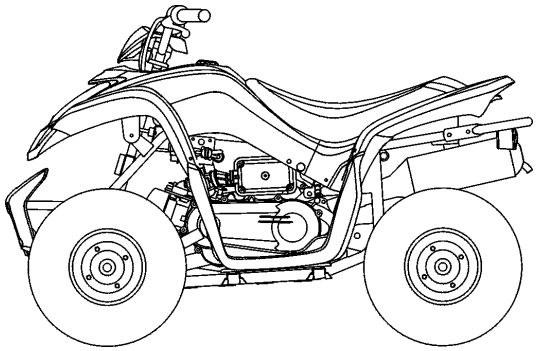


Raise the front end of the machine so that there is no weight on the front wheels.
Check ball joints and/or wheel bearings.
Move the wheels lately back and forth.
Replace the front arms and/or wheel bearings if excessive free play.

TOE-IN ADJUSTMENT

Place the machine on a level place.
Measure the toe-in.
Adjust if out of specification.
Toe-in measurement steps:
Mark both front tire tread centers.
Raise the front end of the machine so that there is no weight on the front tires.
Fix the handlebar straight ahead.
Measure the width A between the marks.
Rotate the front tires 180 degrees until the marks come exactly opposite.
Measure the width B between the marks.
Calculate the toe-in using the formula given below.
Toe-in = B-A
Toe-in: 0 ~ 15 mm (0 ~ 0.6 in)
If the toe-in is incorrect, adjust the toe-in.

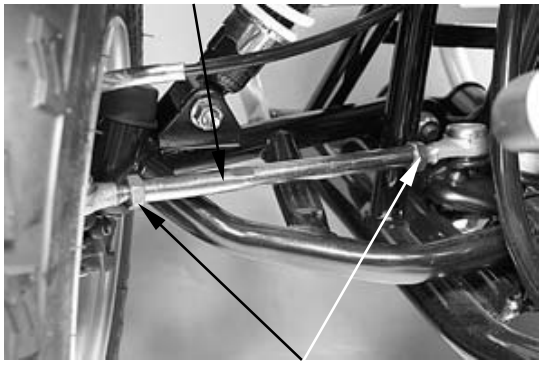




Tie-rod

Adjust the toe-in step:
Mark both tie-rods ends.
This reference point will be needed during adjustment.
Loosen the tie-rod end lock nuts of both tie-rods.
The same number of turns should be given to both tie-rods right and left until the specified toe-in is obtained, so that the lengths of the rods will be kept the same.
Tighten the tie-rod end lock nuts.

Torque: 35 N·m (3.5 kgf·m, 25 lbf·ft)



Tie-rod End Lock Nuts

Tie-rod

Tie-rod End Lock Nuts

* • Be sure that both tie-rod are turned the same amount. If not, the machine will drift right or left even though the handlebar is positioned straight which may lead to mishandling and accident.
  • After setting the toe-in to specification, run the machine slowly for some distance with hands placed lightly on the handlebar and check that the handlebar responds correctly. If not, turn either the right or left tie-rod within the toe-in specification.

WHEELS/TIRES

Check the tires for cuts, imbedded nails or other damages.
Check the tire pressure.

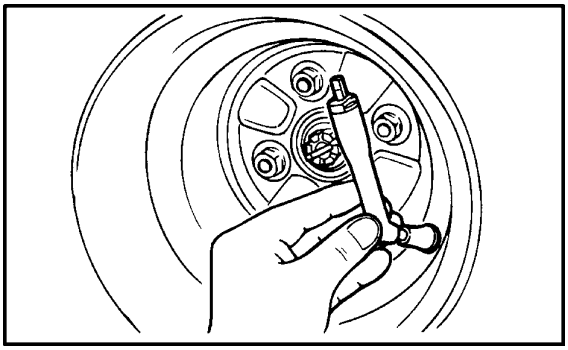
* Tire pressure should be checked when tires are cold.

TIRE PRESSURE

	1 Rider
Front	25 kPa (0.25 kgf/cm², 3.6 psi)
Rear	25 kPa (0.25 kgf/cm², 3.6 psi)

TIRE SIZE

Front : 16 × 8-7
Rear : 16 × 8-7



Front Axle Nut

Rear Axle Nut

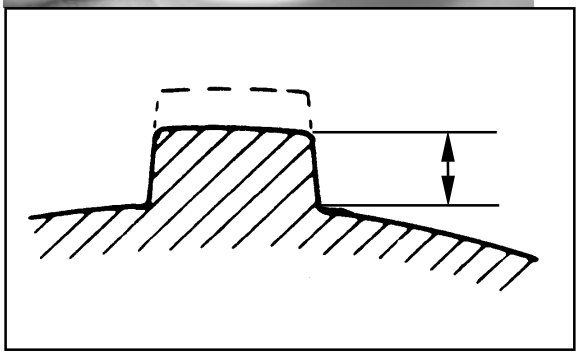
Check the front axle nut for looseness.
Check the rear axle nut for looseness.
If the axle nuts are loose, tighten them to the specified torque.
Torque:

Front: 60 N·m (6 kgf·m, 43 lbf·ft)
Rear: 80 N·m (8 kgf·m, 58 lbf·ft)

WHEEL INSPECTION

Inspect the tire surfaces.
Replace if wear or damage.
Tire wear limit: 3.0 mm (0.12 in)

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



Inspect the wheel.
Replace if damage or bends
Always balance the wheel when a tire or wheel has been changed or replaced.

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

DRIVE CHAIN

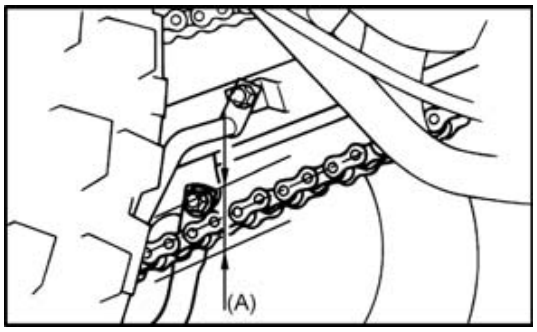
SLACK INSPECTION

Before checking and/or adjusting, rotate the rear wheels several revolutions and check slack at several points to find the tightest point. Check and/or adjust the chain slack with the rear wheels in this "tightest" position.

* Too little of chain slack will overload the engine and other vital parts; keep the slack within the specified limits.

Place the machine on a level place.

* Wheels should be on the ground without the rider on it.



Check drive chain slack (A).
Adjust if out of specification.

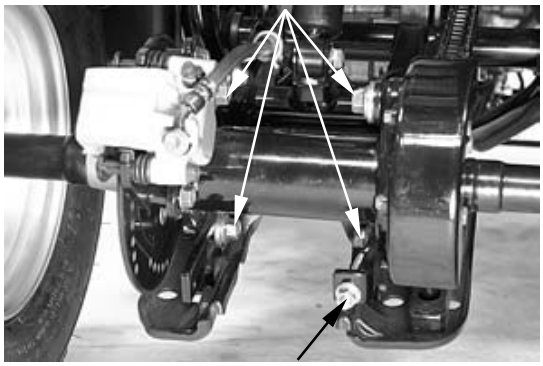
Drive chain slack: 10 ~ 20 mm (0.4 ~ 0.8 in)

Adjust drive chain slack:
Elevate the rear wheels by placing a suitable stand under the rear of frame.

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

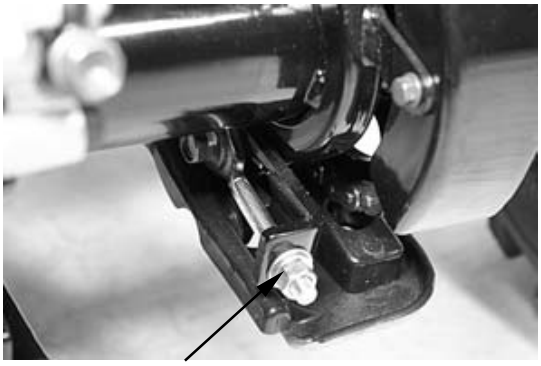
Loosen the upper and lower axle holding bolts.

Bolts



Adjusting Nut

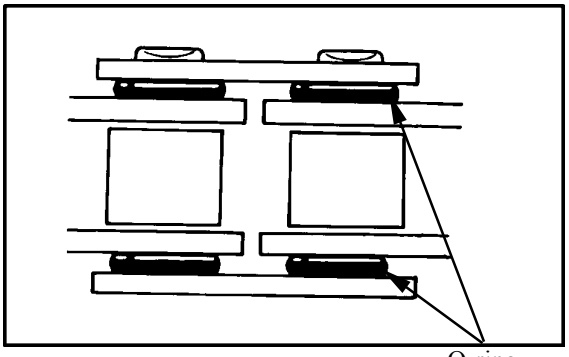
Turn the adjusting nut, to decrease or increase chain slack.
Retighten the upper and lower axle holding bolts.
Torque: 70 N·m (7 kgf·m, 50 lbf·ft)



Adjusting Nut

DRIVE CHAIN CLEANING AND LUBRICATION

The drive chain is equipped with rubber O-rings between the chain plates. Steam cleaning, high-pressure washes, and certain solvents can damage these O-rings. Use only kerosene to clean the drive chain. Wipe it dry, and thoroughly lubricate it with SAE 30~50 motor oil. Do not use any other lubricants on the drive chain. They may contain solvents that could damage the O-rings.



O-ring

CABLE INSPECTION AND GENERAL LUBRICATION

* 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.

Inspect the cable sheath.
Replace if damage.
Check the cable operation.
Lubricate or replace if unsmooth operation.

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

LEVER LUBRICATION

Lubricate the pivoting parts of each lever.

SUSPENSION LUBRICATION

Inject grease into the nipples using a grease gun until slight over flow is observed from the thrust covers.

* Wipe off the excess grease.

JOINT BOOT INSPECTION

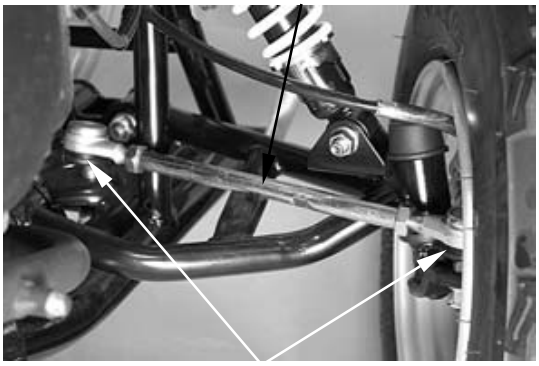
TIE-ROD END BOOT INSPECTION

Visually inspect the tie-rod end boots of the tie-rods.
If the boot is torn, worn, deteriorated, or leaks grease, replace the tie-rod end. (See page 12-17)

Front Swing Arm Nipple

Rear Swing Arm Nipple

Tie-rod



Boots

BOLTS AND NUTS TIGHTENING

TIGHTNESS INSPECTION

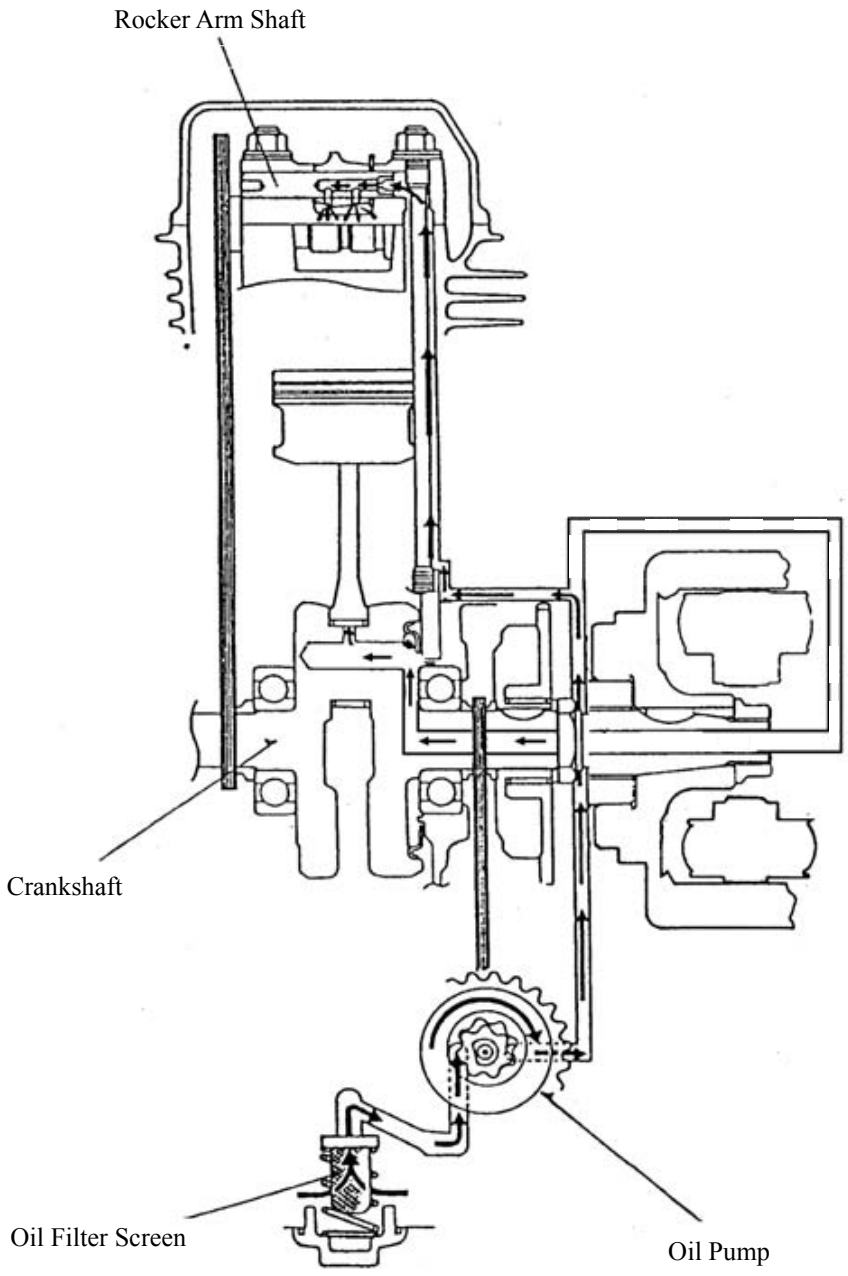
Check the tightness of the bolts and nuts listed here in accordance with the Periodic Maintenance Chart. Also, check to see that each cotter pin is in place and in good condition.
If there are loose fasteners, retorque them to the specified torque following the specified tightening sequence.
Refer to the appropriate chapter for torque specifications.
If torque specifications are not listed in the appropriate chapter, see the standard torque values table (See page 1-11). For each fastener, first loosen it by 1/2 turn, then tighten it.
If cotter pins are damaged, replace them with new ones.

Bolts, Nuts, and Fasteners to be checked
Wheels:
Front axle nuts and cotter pins
Rear axle nuts and cotter pins
Front wheel nuts
Rear wheel nuts
Brakes:
Front Brake Master Cylinder Clamp Bolts
Front Brake Caliper Mounting Bolts
Steering/Suspension:
Handlebar holder bolts
Steering column nut
Stem bearing housing bolts
Tie-rod end nuts and cotter pins
Tie-rod end locknuts
Shock absorber mount bolts
Suspension arm pivot bolts
Steering knuckle pivot nuts and cotter pins
Engine:
Engine mounting bolts
Exhaust muffler lock nuts
Exhaust muffler lock bolts

LUBRICATION SYSTEM

4. LUBRICATION SYSTEM

LUBRICATION SYSTEM



4. LUBRICATION SYSTEM

SERVICE INFORMATION

GENERAL INSTRUCTIONS

- The maintenance of lubrication system can be performed with the engine installed in the frame.
- Use care when removing and installing the oil pump not to allow dust and foreign matters to enter the engine and oil line.
- Do not attempt to disassemble the oil pump. The oil pump must be replaced as a set when it reaches its service limit.
- After the oil pump is installed, check each part for oil leaks.

SPECIFICATIONS

mm (in)

Item		Standard	Service Limit
Oil pump	Inner rotor-to-outer rotor clearance	0.15 (0.006)	0.2 (0.008)
	Outer rotor-to-pump body clearance	0.15~0.2 (0.006～0.008)	0.25 (0.01)
	Rotor end-to-pump body clearance	0.04~0.09 (0.0016～0.0036)	0.12 (0.0048)

TROUBLESHOOTING

Oil level too low

- Natural oil consumption
- Oil leaks
- Worn or poorly installed piston rings
- Worn valve guide or seal

Poor lubrication pressure

- Oil level too low
- Clogged oil filter or oil passages
- Not use the specified oil

ENGINE OIL/OIL FILTER

OIL LEVEL AND OIL CHANGE

Refer to the "ENGINE OIL" section in the chapter 3 to check the oil level and replacement and oil filter cleaning.

OIL PUMP

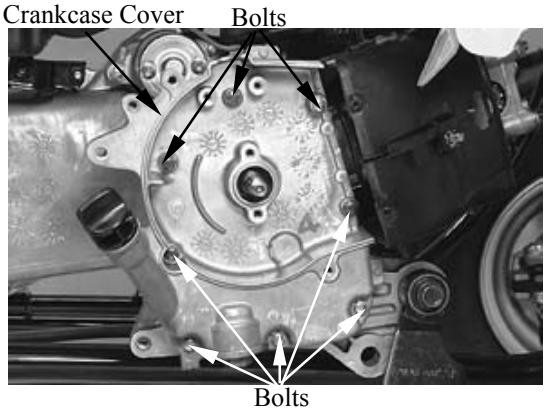
REMOVAL

Place a container under the engine.

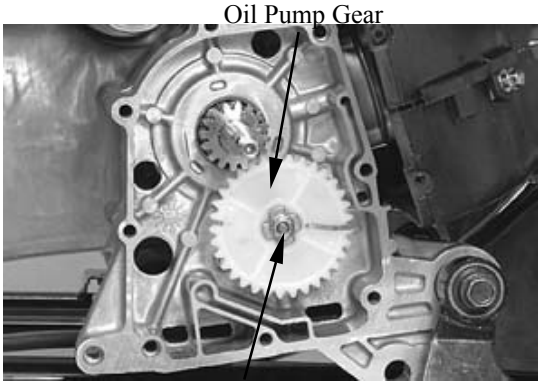
Remove the drain plug to drain the oil. (See page 3-12)

Remove the A.C. generator. (See page 14-9)

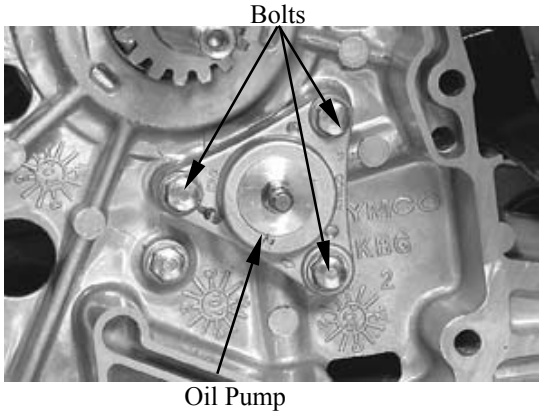
Remove the eight right crankcase cover bolts and the right crankcase cover.



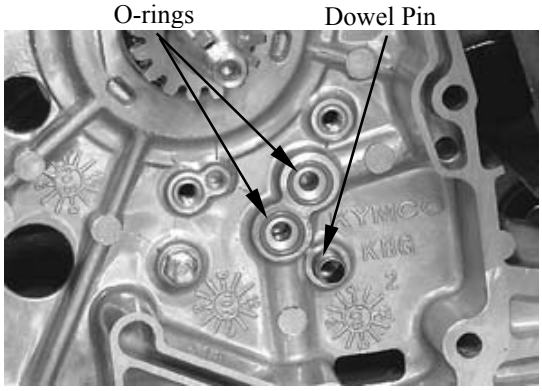
Remove the oil pump gear nut and oil pump gear.



Remove three oil pump mounting bolts and the oil pump.

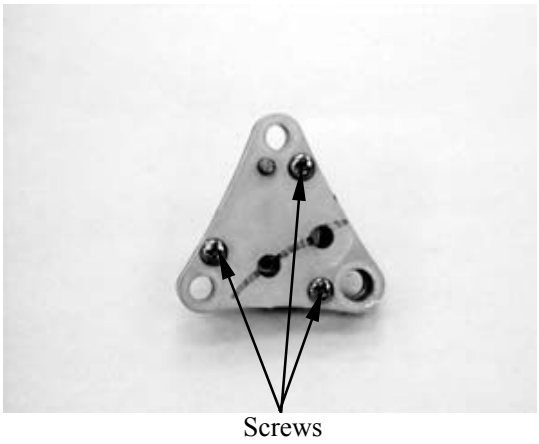


Remove O-rings and dowel pin.



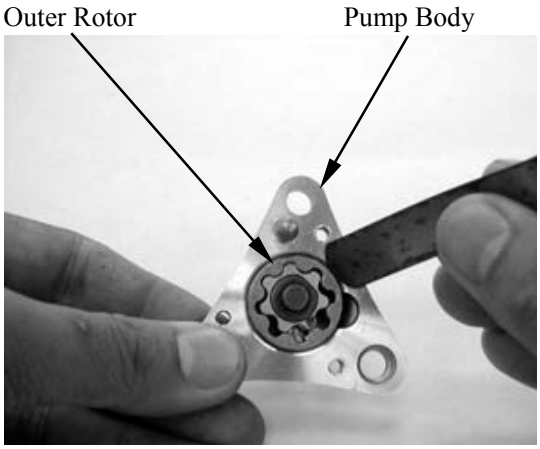
DISASSEMBLY

Remove the screws and disassemble the oil pump.

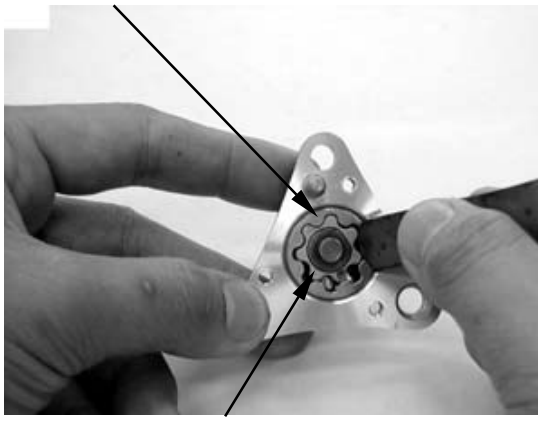


INSPECTION

Measure the pump body-to-outer rotor clearance.
Service Limit: 0.25 mm (0.01 in)



Measure the inner rotor-to-outer rotor clearance.
Service Limit: 0.2 mm (0.008 in)



Measure the rotor end-to-pump body clearance.
Service Limit: 0.12 mm (0.0048 in)

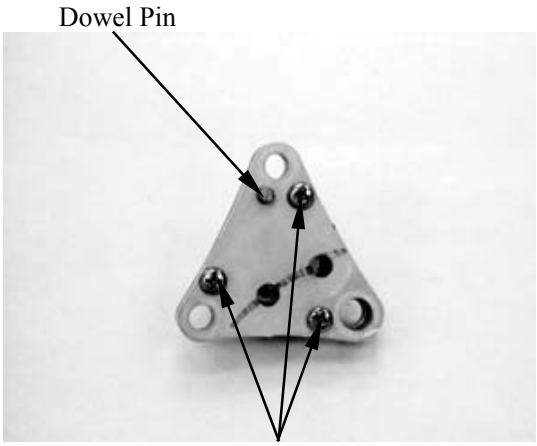
ASSEMBLY

Install the outer rotor, inner rotor and pump shaft into the pump body.

* Insert the pump shaft by aligning the flat on the shaft with the flat in the inner rotor.

Install the dowel pin.
Install the pump cover by aligning the hole in the cover with the dowel pin.

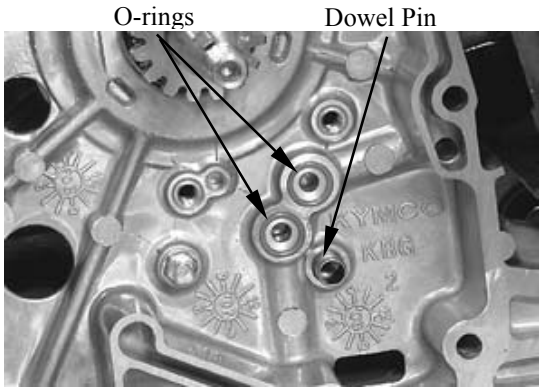
Tighten the screw to secure the pump cover.
Make sure that the pump shaft rotates freely without binding.



INSTALLATION

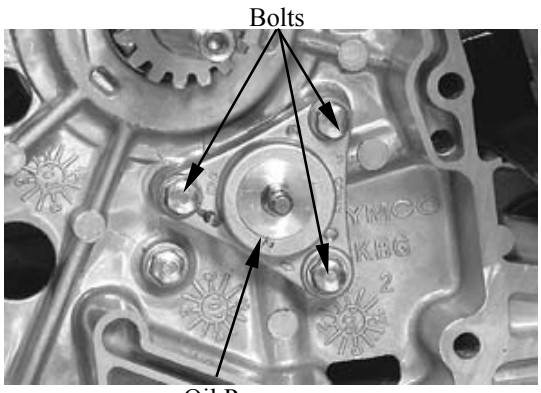
Install the O-rings and dowel pin.

* Inspect the O-rings and replace if damaged.

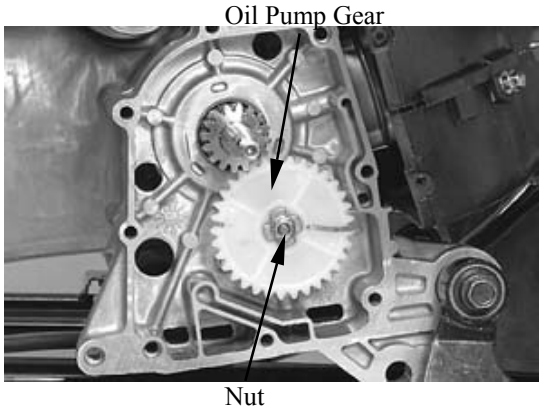


Install the oil pump and tighten the bolts.

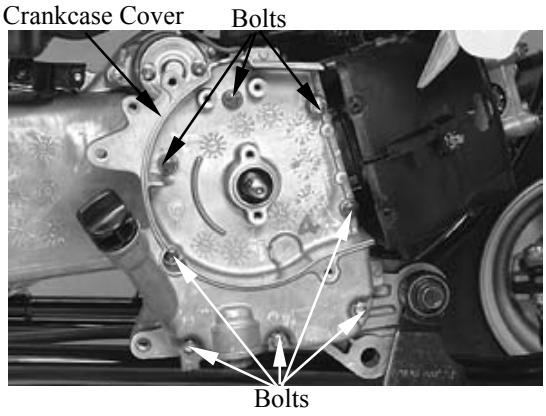
Make sure that the pump shaft rotates freely without binding.



Install the oil pump gear and tighten the nut.



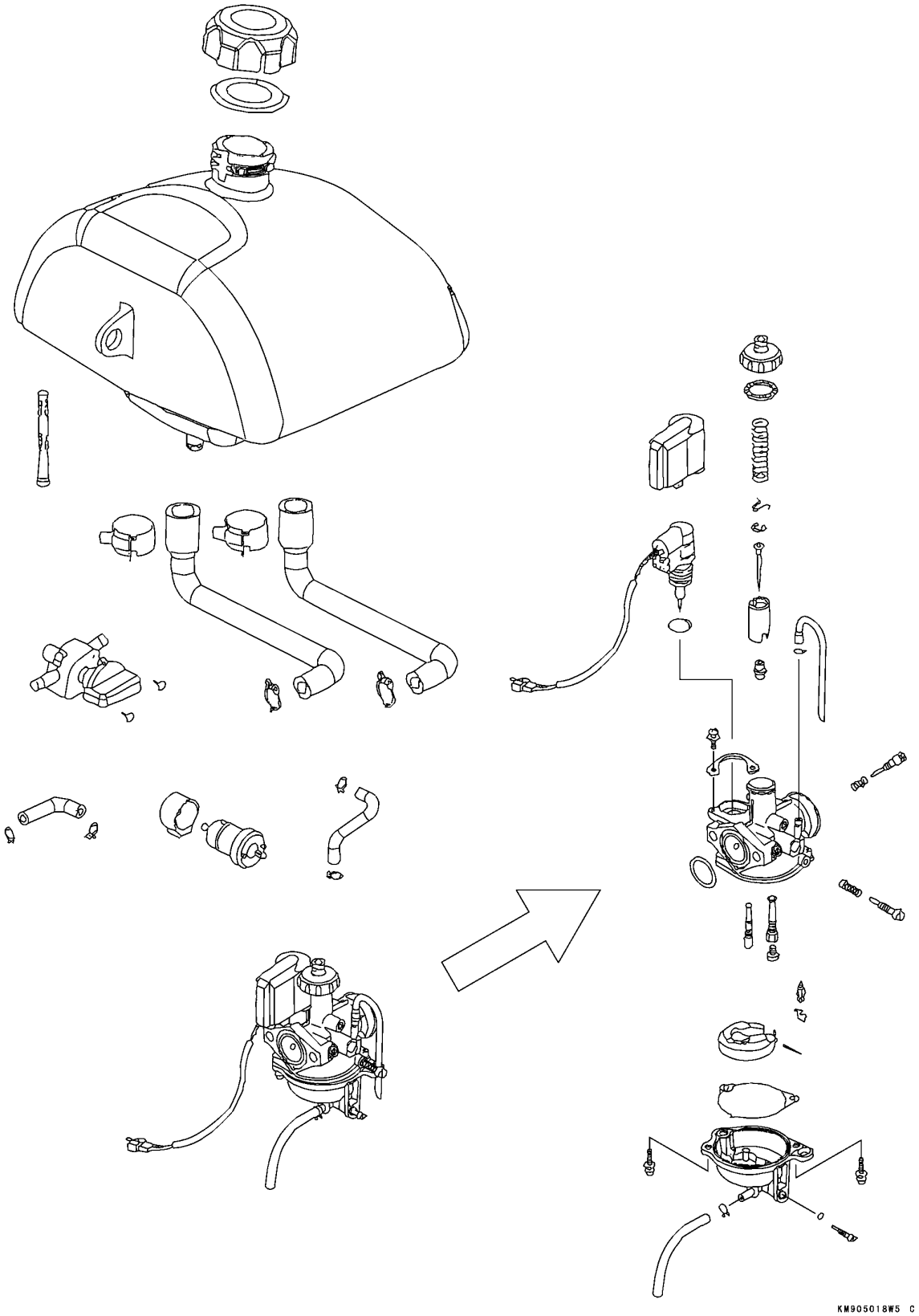
Install the right crankcase cover and tighten the bolts.



5

FUEL SYSTEM

5. FUEL SYSTEM



5. FUEL SYSTEM

SERVICE INFORMATION

GENERAL INSTRUCTIONS

⚠WARNING

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.

Item	Standard
Type	PTE
Venturi dia.	ϕ16
Slow jet No.	#40
Main jet No.	#85
Adjust method	Piston
Idle speed	2 000 rpm
Throttle grip free play	1 ~ 4 mm (0.04 ~ 0.16 in)
Float level	10.2 mm (0.408 in)
Air screw opening	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
- Faulty auto bystarter
- 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
- Bent, kinked or restricted fuel line

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

FUEL TANK

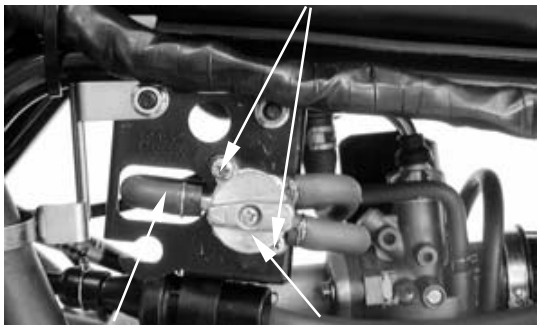
REMOVAL

⚠ WARNING

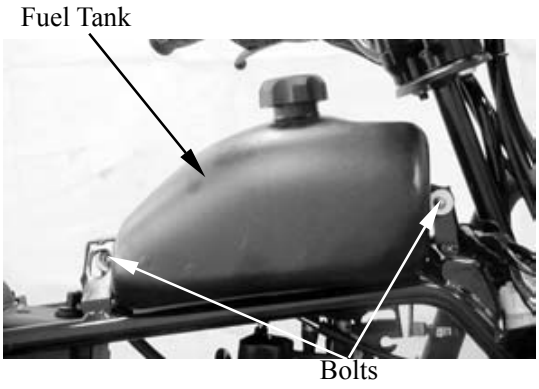
- **Gasoline is extremely flammable and can be explosive under certain conditions.**
- **Keep sparks and flames away from the work area.**
- **Wipe off any spilled gasoline.**

Remove front fender. (See page 2-5)

Switch the fuel tap "OFF".
Disconnect the fuel outlet hose from fuel tap.
Remove two screws attaching the fuel tap and holder.

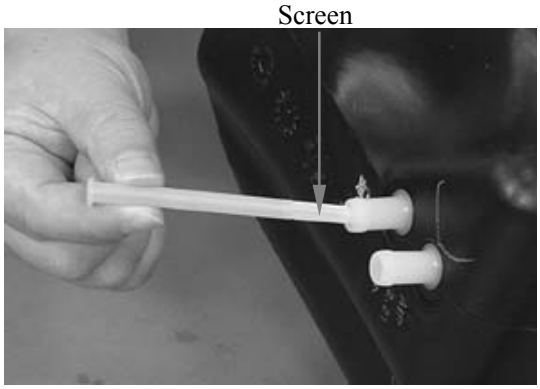


Remove the two bolts and then remove the fuel tank.



SCREEN INSPECTION

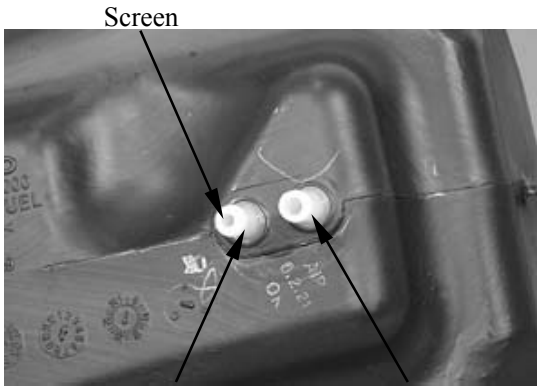
Pull out the screen from the fuel tank.
Check the screen for any breaks or deterioration.
If the screen has any break or is deteriorated, replace the screen.
Install the screen into the original position securely as shown.



INSTALLATION

Reverse the "FUEL TANK REMOVAL" procedures.

Install the "ON" fuel hose on the fitting that has screen.



FUEL TAP

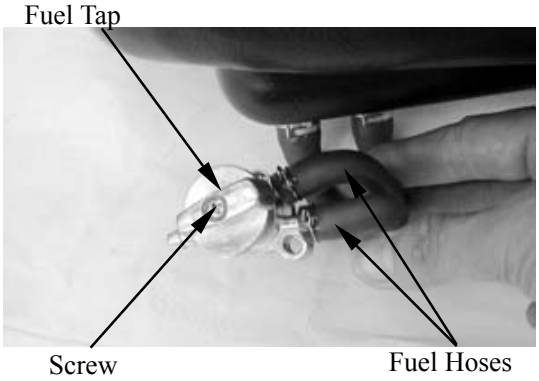
REMOVAL

⚠ WARNING

- **Gasoline is extremely flammable and can be explosive under certain conditions.**
- **Keep sparks and flames away from the work area.**
- **Drain gasoline into a clean container.**

Remove the screw and then remove fuel tap.

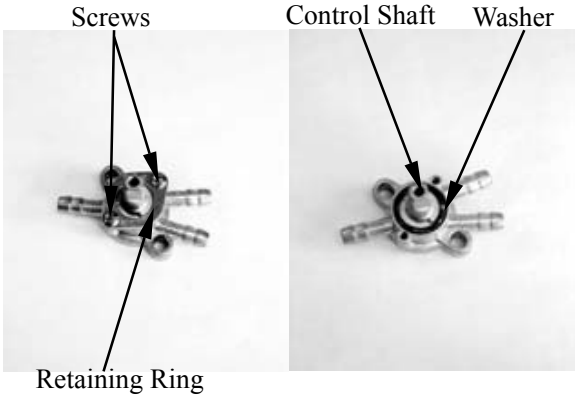
Disconnect all fuel hoses and then remove fuel tap.



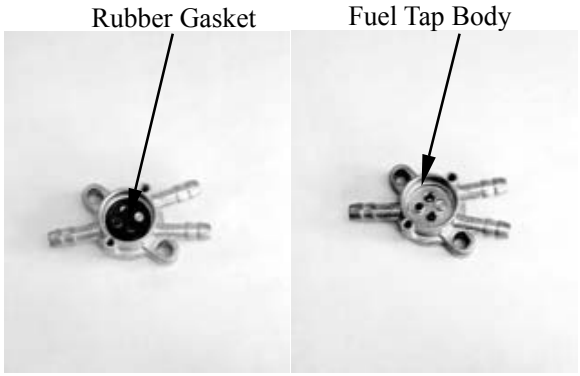
DISASSEMBLY

Remove the two screws on the retaining ring and then remove retaining ring.

Remove the washer and control shaft.



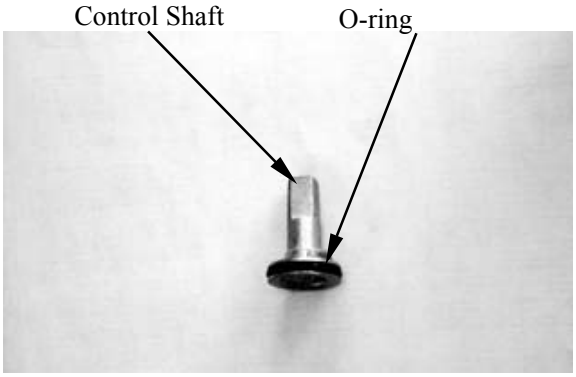
Remove the rubber gasket from the fuel tap body.



INSPECTION

Inspect the fuel tap body for dirt and clog. Clean if necessary.
Replace the rubber gasket with new ones if they are damaged or deteriorated.

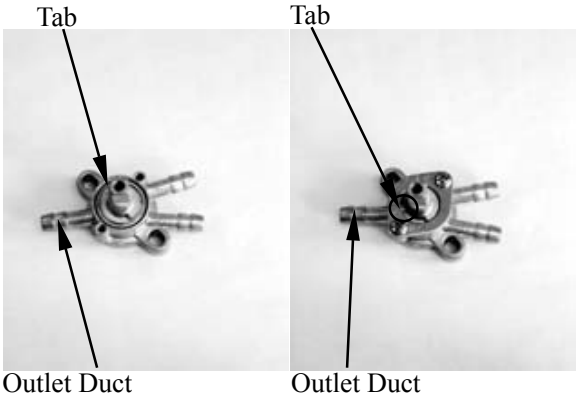
Replace the O-rings with new ones if they are damaged or deteriorated.



ASSEMBLY

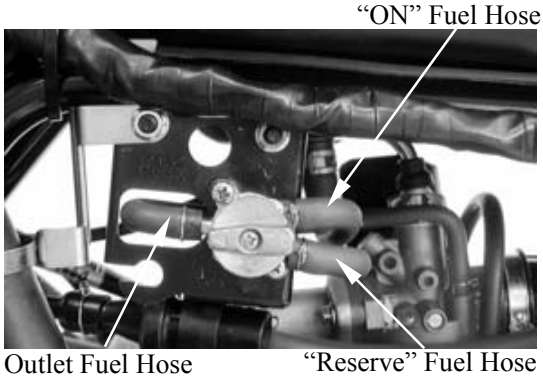
Reverse the "DISASSEMBLY" procedures.
Install rubber gasket, control shaft, washer and retaining ring.

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



INSTALLATION

Reverse the "FUEL TAP REMOVAL" procedures.
Connect all fuel hoses as shown.

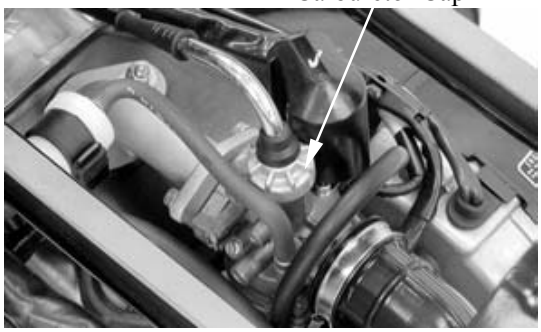


THROTTLE VALVE

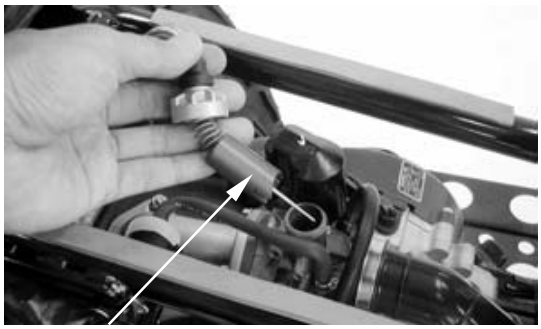
DISASSEMBLY

Remove the fuel tank. (See page 5-4)

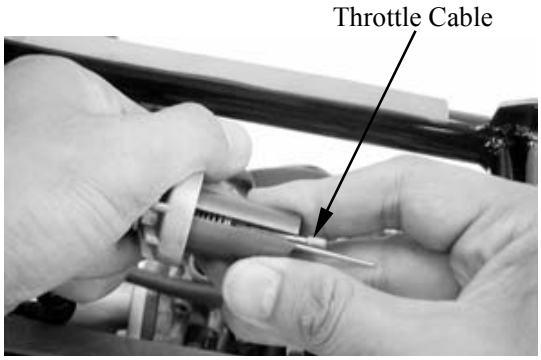
Remove the carburetor cap.



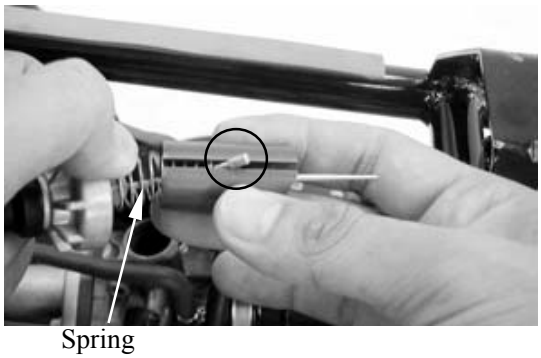
Pull out the throttle valve.



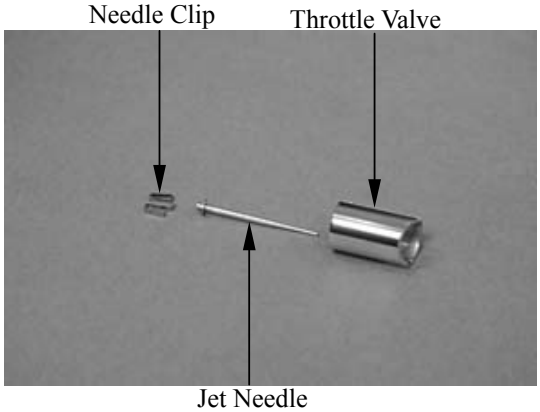
Compress the spring to disconnect the throttle cable by hand.



Remove the spring from the throttle valve.



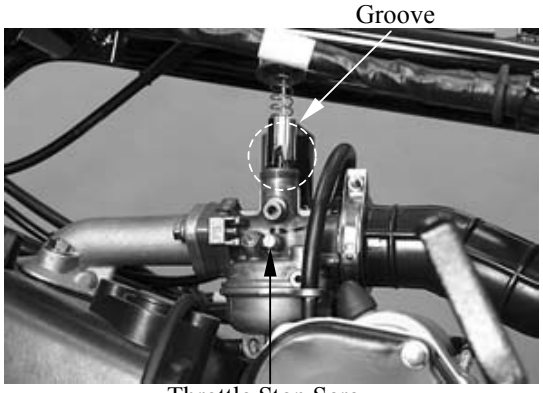
Remove the needle clip and jet needle.
Check the throttle valve and jet needle for wear or damage.



ASSEMBLY

Reverse the "DISASSEMBLY" procedures.
Install the throttle valve into the carburetor body.

* Align the groove in the throttle valve with the throttle stop screw on the carburetor body.



AIR CLEANER

CLEANING

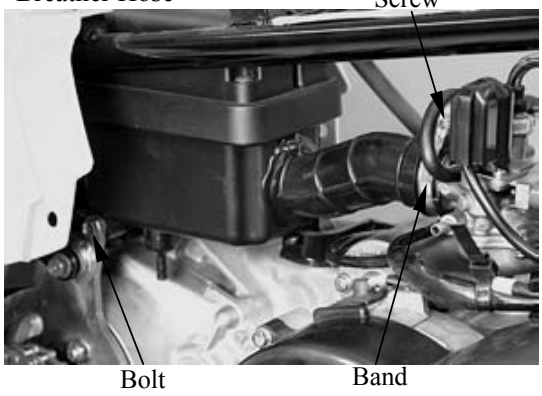
Refer to "AIR CLEANER" section in the chapter 3.

REMOVAL

Remove front fender. (See page 2-5)

Disconnect the breather hose from cylinder head and frame.
Remove the bolt at the air cleaner left side.

Loosen the screw at the band and remove bolt at the air cleaner right side, then remove air cleaner.



INSTALLATION

Reverse the "REMOVAL" procedures.

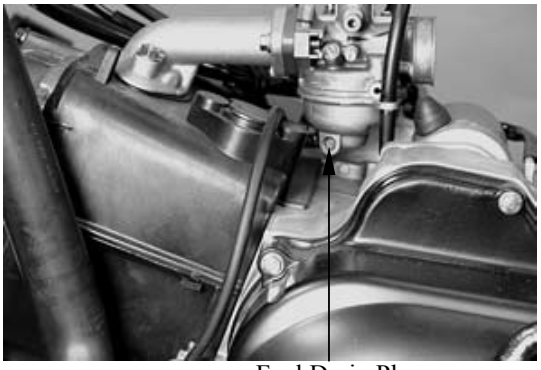
CARBURETOR

REMOVAL

Remove the fuel tank, carburetor cap and air cleaner. (Refer to chapter 5)
Loosen the drain plug to drain the gasoline from the float chamber.

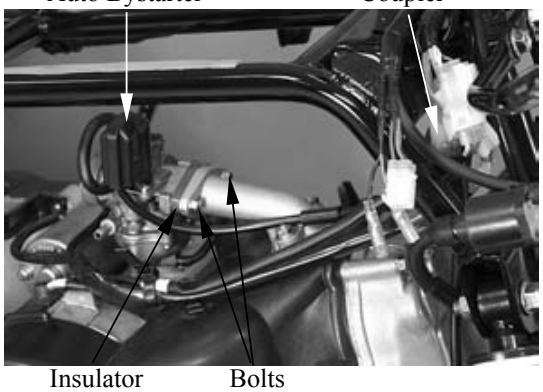
⚠ WARNING

- **Gasoline is extremely flammable and can be explosive under certain conditions.**
- **Keep sparks and flames away from the work area.**
- **Drain gasoline into a clean container.**



Fuel Drain Plug

Disconnect the auto bystarter wire coupler.
Remove the two bolts (nuts) attaching carburetor, then remove carburetor and insulator.



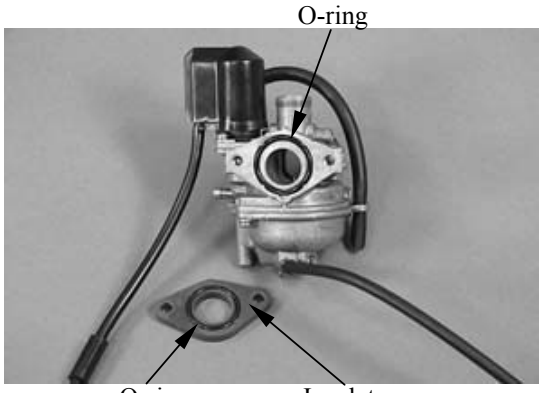
INSTALLATION

Reverse the "REMOVAL" procedures.

* When installation, do not allow foreign particles to enter the carburetor.

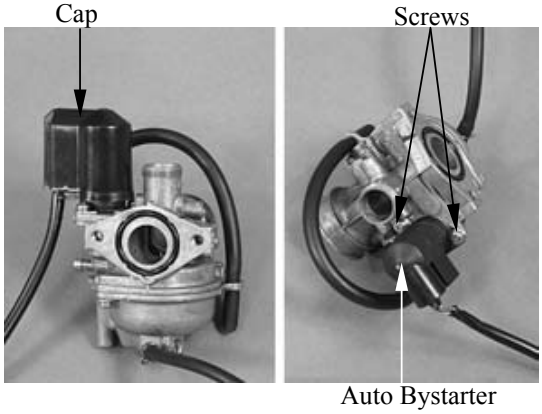
Check the carburetor insulator and O-rings for wear or damage.

* When installation, be sure the insulator O-ring faces the intake manifold.

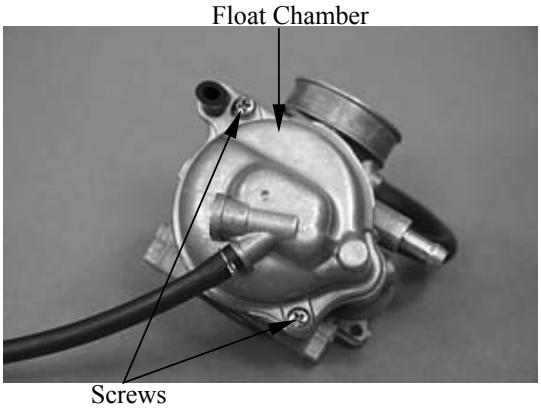


DISASSEMBLY

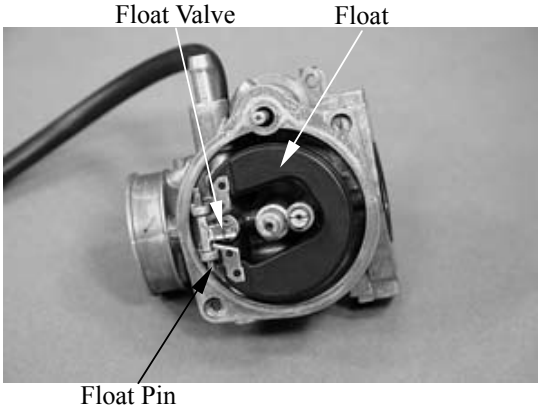
Remove auto bystarter cap.
Remove the two screws and then remove auto bystarter and plate.



Remove the three float chamber screws and remove the float chamber.



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

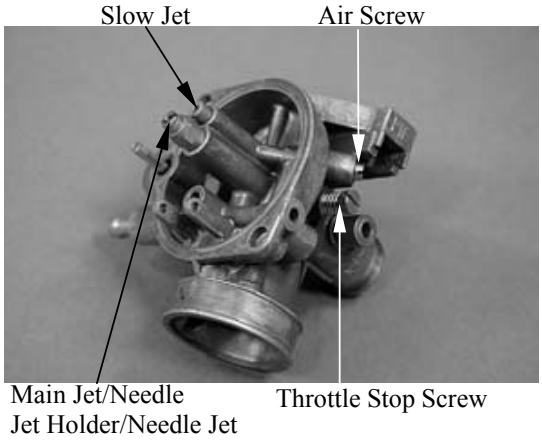


Remove the main jet, needle jet holder, and needle jet.
Remove the slow jet.
Remove the air screw and throttle stop screw.

* • When removing the air screw and throttle stop screw, turn in the screws and count the number of turns until they seat fully but not tightly, and record the number of turns.

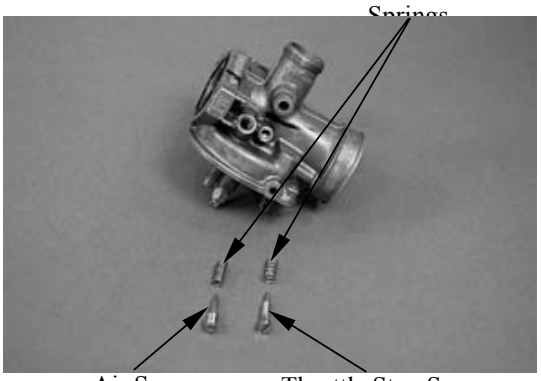
Special Tool:

Pilot screw adjuster: 57001-1665 (Kawasaki)



CAUTION

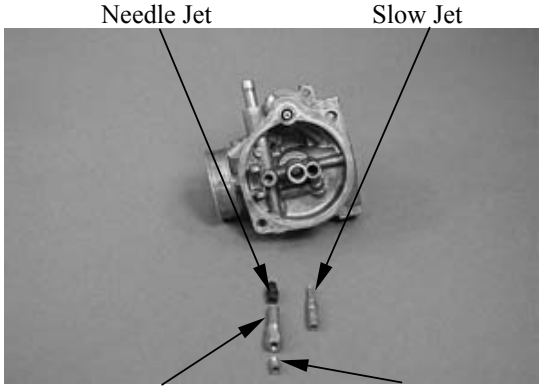
- **Be careful not to damage the jets and jet holder when removing them.**
- **Do not force the screw against its seat to avoid seat damage.**
- **Be sure to install the O-ring in the reverse order of removal.**



ASSEMBLY

Reverse the "DISASSEMBLY" procedures.
Install the needle jet into place so that the smaller end of the jet goes in first.

*
- When installing the air screw, return it to the original position as noted during removal
- Refer to the "CARBURETOR IDLE SPEED" section in the chapter 3 to perform the idle speed adjustment.
- After the carburetor is installed, be sure to perform the Exhaust Emission Test.



CARBURETOR CLEANING

Blow compressed air through all passages of the carburetor body.

FLOAT/FLOAT VALVE INSPECTION

Inspect the float valve seat for wear or damage.
Inspect the float for damage or fuel level inside the float chamber.

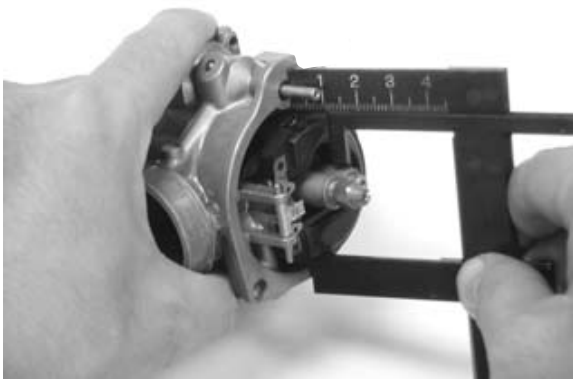
FUEL RESERVOIR O-RING CHECK

Remove the O-ring.
Inspect the O-ring for damage.
Replace with new one if necessary

FLOAT LEVEL INSPECTION

Turn the carburetor upside down so that the float will go down to make the float valve contact the float valve seat.
Then slowly tilt the carburetor and measure the float level with the float level gauge while the float pin just contacts with float valve.

Float Level: 10.2 mm (0.408 in)



AUTO BYSTARTER INSPECTION

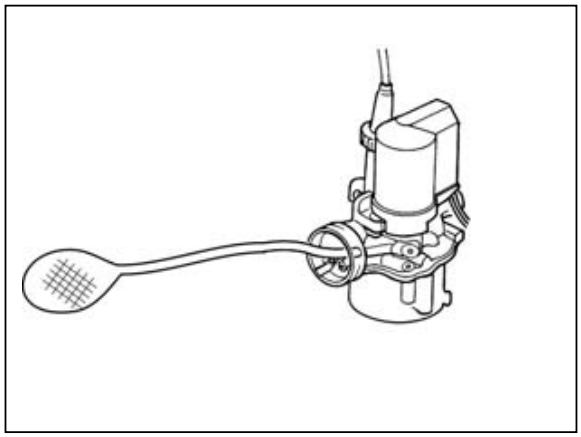
Measure the resistance between the auto bystarter wire terminals.

Resistance: 5Ω (10 minutes minimum after stopping the engine)

If the resistance exceeds 5Ω, replace the auto bystarter with a new one.

After the engine stops for 30 minutes, connect a hose to the fuel enriching circuit and blow the hose with a blowing tool.

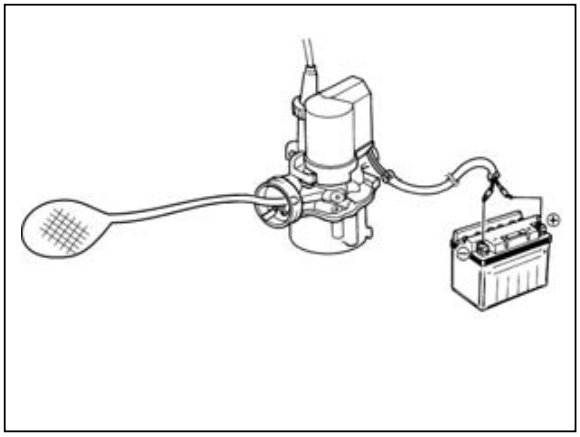
If air cannot be blown into the hose (clogged), the auto bystarter is faulty. Replace it with a new one.



Connect the auto bystarter yellow wire to the battery positive (+) terminal and green/ black wire to the battery negative (-) terminal and wait 5 minutes.

Connect a hose to the fuel enriching circuit and blow the hose with a blowing tool.

If air can be blown into the hose, the auto bystarter is faulty and replace it with a new one.



ENGINE REMOVAL

6

6. ENGINE REMOVAL

SERVICE INFORMATION

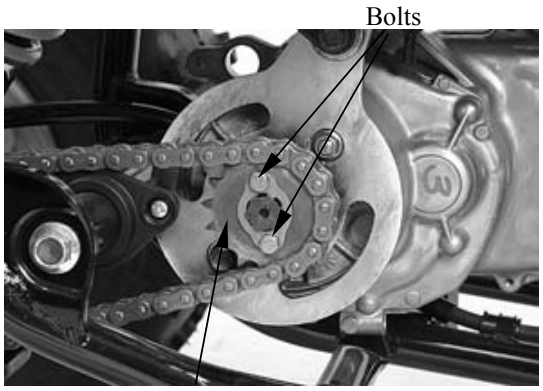
GENERAL INSTRUCTIONS

- 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.
- Parts requiring engine removal for servicing:
  — Crankcase
  — Crankshaft

ENGINE REMOVAL

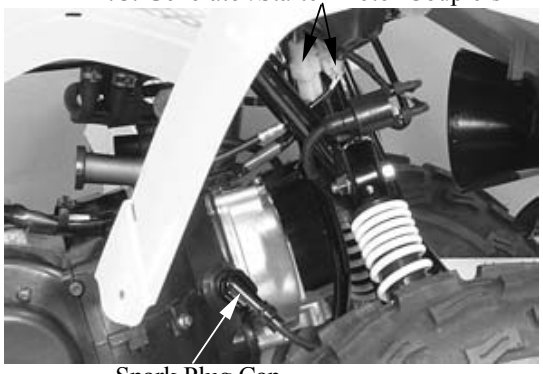
Drain engine oil and transmission oil. (Refer to chapter 3)
Remove the footboards and exhaust pipe. (Refer to chapter 2)
Remove the air cleaner and carburetor. (Refer to chapter 5)

Remove the two bolts on the drive sprocket.
Remove the drive sprocket and washer.



Remove the spark plug cap.

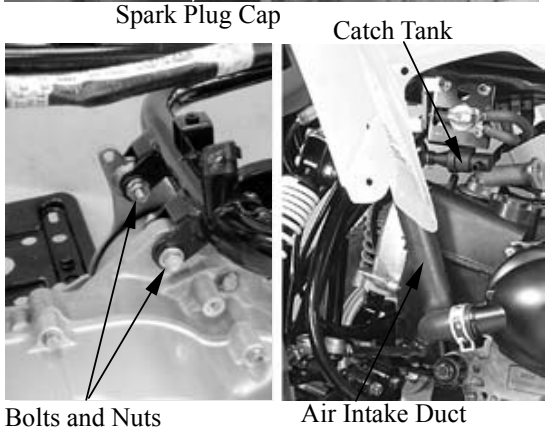
Disconnect the A.C. generator and starter motor couplers.



Remove the rear two mounting bolts and two nuts.

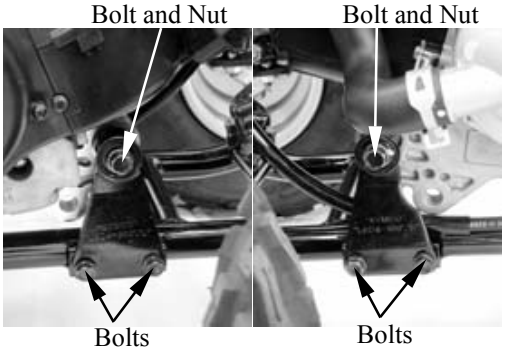
Disconnect the inlet hose from the frame.

Remove the catch tank.



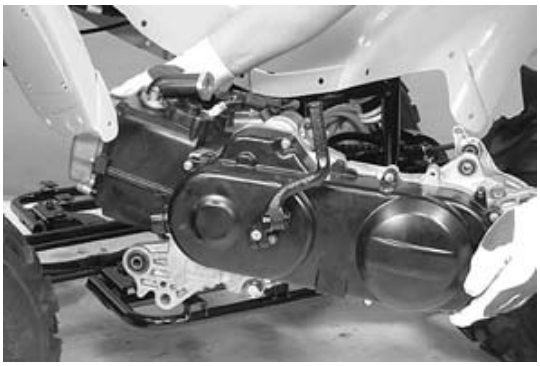
Remove the front two mounting bolts and two nuts at the engine right/left side.

Remove the four bolts and then remove the left and right engine brackets at the engine right/left side.



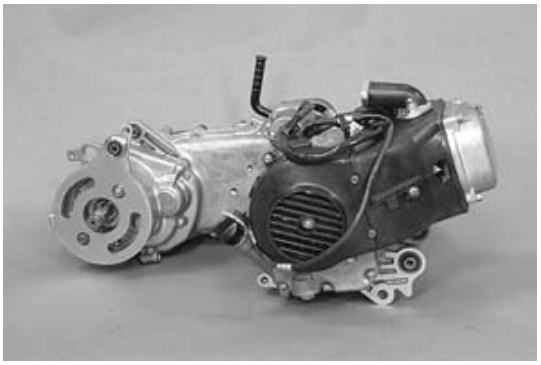
6. ENGINE REMOVAL

Remove the engine assembly to the left side of the machine.



ENGINE INSTALLATION

Reverse the “REMOVAL” procedures.



TORQUE VALUES

Engine bracket bolt

27 N·m (2.7 kgf·m, 20 lbf·ft)

Front engine mounting bolts

45 N·m (4.5 kgf·m, 32 lbf·ft)

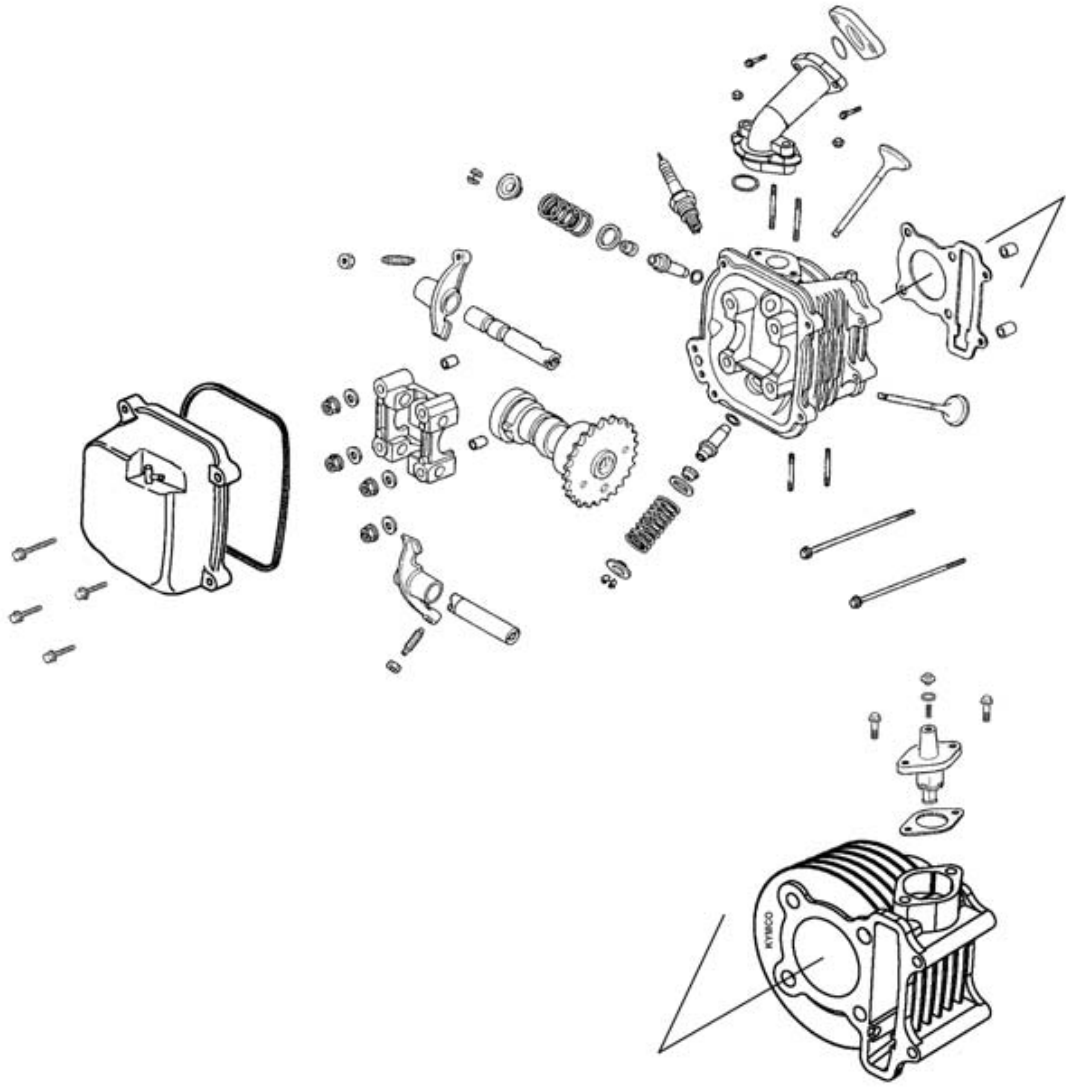
Rear engine mounting bolts

32 N·m (3.2 kgf·m, 23 lbf·ft)

CYLINDER HEAD/VALVES

7

7. CYLINDER HEAD/VALVES



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7. CYLINDER HEAD/VALVES

SERVICE INFORMATION

GENERAL INSTRUCTIONS

- The cylinder head can be serviced with the engine installed in the frame.
- When assembling, apply molybdenum disulfide grease or engine oil to the valve guide movable parts, valve arm and camshaft sliding surfaces for initial lubrication.
- The camshaft is 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

mm (in)

Item		Standard	Service Limit
Valve clearance (cold)	IN	0.04 (0.0016)	—
	EX	0.04 (0.0016)	—
Cylinder head compression pressure (electric start)		1170 ~ 1580 kPa (12~16 kgf/cm^2, 170 ~ 230 psi)	—
Cylinder head warpage		—	0.05 (0.002)
Camshaft cam height	IN	25.761 (1.03044)	25.65 (1.026)
	EX	25.563 (1.02252)	25.45 (1.018)
Valve rocker arm to shaft clearance		0.034 ~ 0.09 (0.00136 ~ 0.0036)	0.1 (0.004)
Valve stem-to-guide clearance	IN	0.01 ~ 0.037 (0.0004 ~ 0.00148)	0.06 (0.0024)
	EX	0.025 ~ 0.052 (0.001 ~ 0.00208)	0.08 (0.0032)
Valve spring free length		35.25 (1.41)	34 (1.36)
Valve spring compressed force		19.2 ~ 22 kg at 19.65 mm (0.786 in)	—

7. CYLINDER HEAD/VALVES

TORQUE VALUES

Cylinder head cover bolt	10 N·m (1 kgf·m, 7 lbf·ft)	
Camshaft hold nut	14 N·m (1.4 kgf·m, 10 lbf·ft)	Apply engine oil to threads
Tappet adjusting nut	9 N·m (0.9 kgf·m, 6.5 lbf·ft)	Apply engine oil to threads

SPECIAL TOOLS

Valve spring compressor	A120E00040
Tappet adjuster	A120E00012

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 seal

Abnormal noise

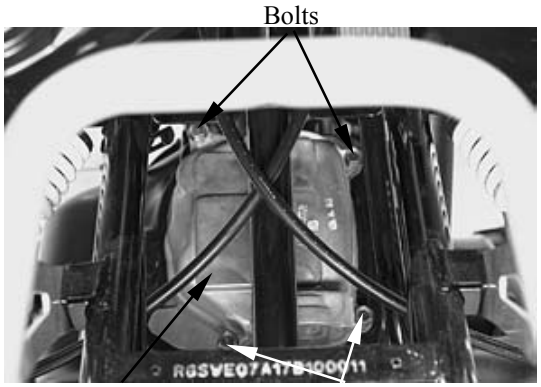
- Incorrect valve clearance adjustment
- Sticking valve or broken valve spring
- Damaged or worn camshaft
- Worn cam chain guide
- Worn camshaft and rocker arm

CYLINDER HEAD COVER

REMOVAL

Disconnect the breather hose at the cylinder head cover.

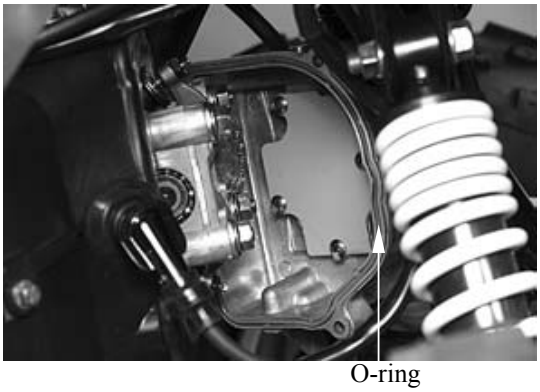
Remove the four bolts at the cylinder head cover, then remove the cylinder head cover.



INSTALLATION

Install a new cylinder head cover O-ring and install the cylinder head cover.
Install and tighten the cylinder head cover bolts.
Torque: 10 N·m (1 kgf·m, 7 lbf·ft)

* Be sure to install the O-ring into the groove properly.

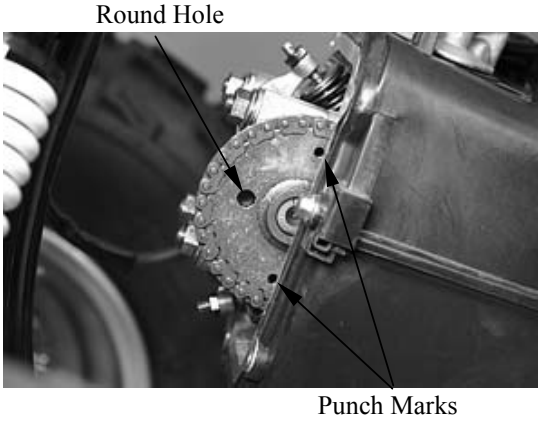


CAMSHAFT/CAMSHAFT HOLDER

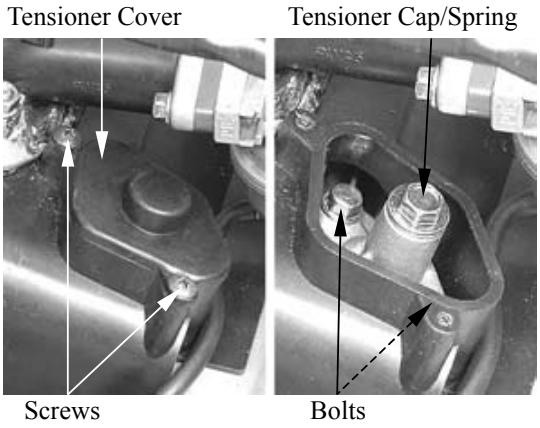
REMOVAL

Remove fuel tank. (Refer to the chapter 5)
Remove the cylinder head cover. (Refer to the "CYLINDER HEAD COVER REMOVAL")

Turn the cooling fan clockwise so that the "T" mark on the flywheel aligns with the index mark on the crankcase to bring the round hole on the camshaft gear facing up to the top dead center on the compression stroke.

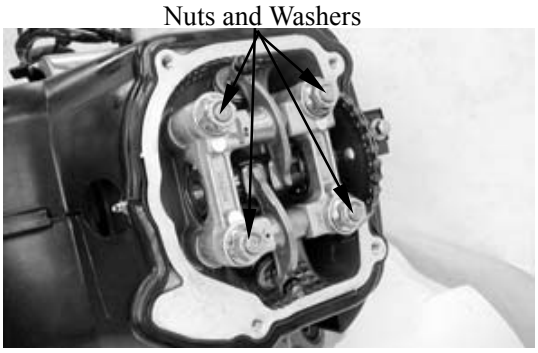


Remove the two screws and cam chain tensioner cover.
Remove the cam chain tensioner cap/spring.
Remove the lifter tensioner bolts, then remove cam chain tensioner and gasket.

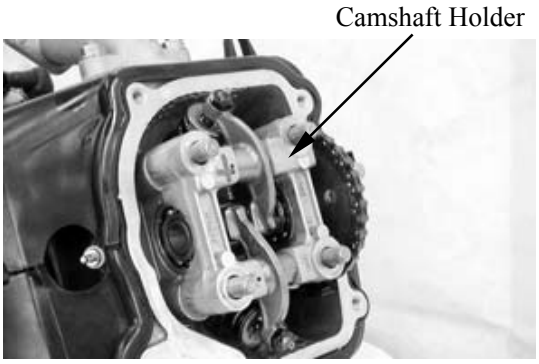


Remove the four camshaft holder nuts and washers.

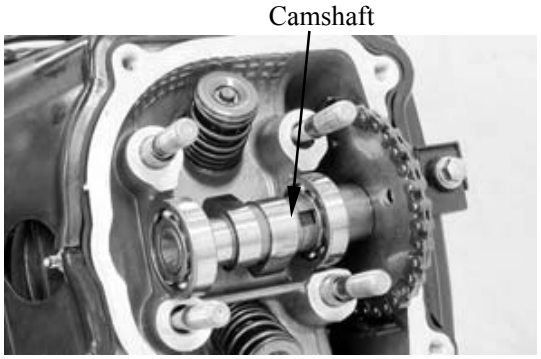
* Diagonally loosen the cylinder head nuts in 2 or 3 times.



Remove the camshaft holder and dowel pins.

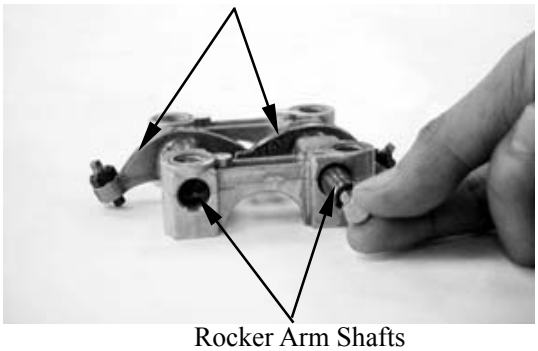


Remove the camshaft gear from the cam chain and remove the camshaft.



CAMSHAFT HOLDER DISASSEMBLY

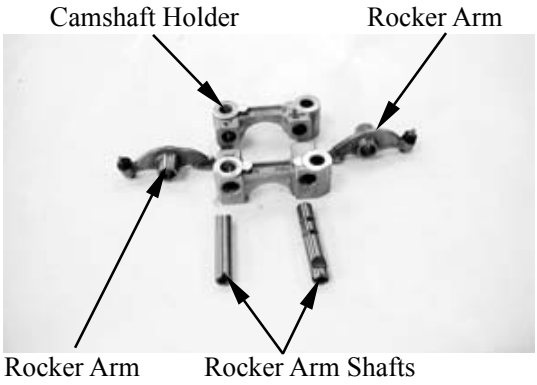
Take out the valve rocker arm shafts using a 5 mm (0.2 in) bolt.
Remove the valve rocker arms and arm shafts.



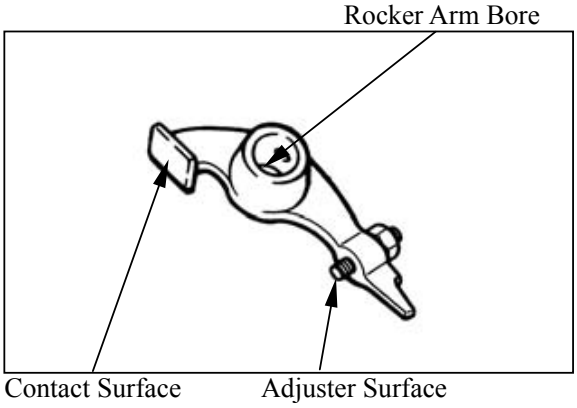
CAMSHAFT HOLDER INSPECTION

Inspect the camshaft holder for wear or damage.

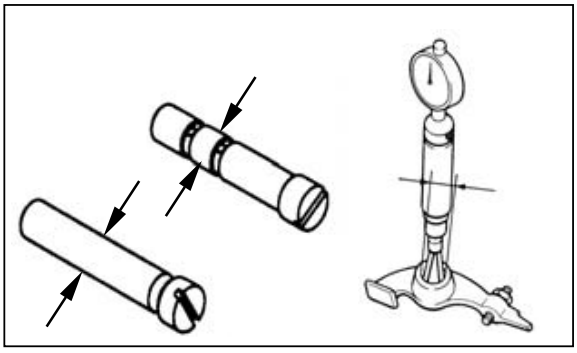
Inspect the rocker arm shaft for blue discoloration or grooves.
If any defects are found, replace the rocker arm shaft with a new one, then inspect lubrication system.



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 valve rocker arm.
Measure arm to shaft clearance.
Replace as a set if out of specification.
Service Limits: 0.1 mm (0.004 in)

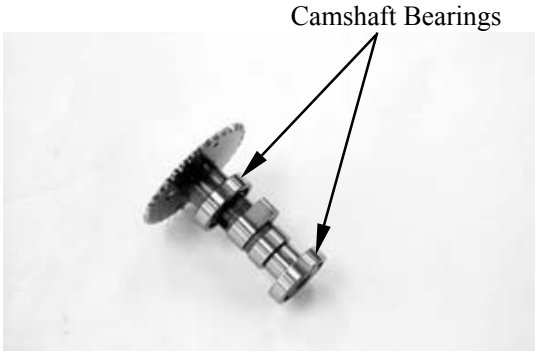


CAMSHAFT HOLDER ASSEMBLY
Reverse the "CAMSHAFT HOLDER DISASSEMBLY" procedures.

* Align the cross cutout on the exhaust valve rocker arm shaft with the bolt of the camshaft holder.

CAMSHAFT INSPECTION

Check each camshaft bearing for play or damage. Replace the camshaft assembly with a new one if the bearings are noisy or have excessive play.



Inspect camshaft lobes for pitting/scratches/blue discoloration.

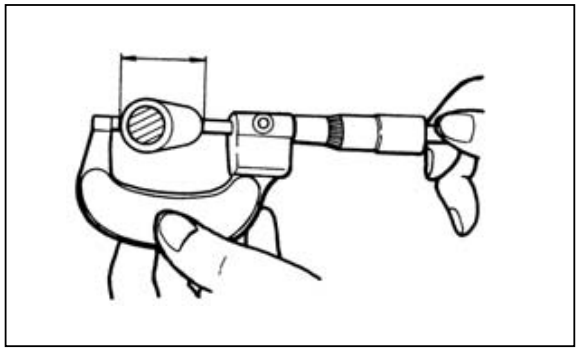
Measure the cam lobe height.

Service Limits:

IN : 25.65 mm (1.026 in)

EX: 25.45 mm (1.018 in)

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



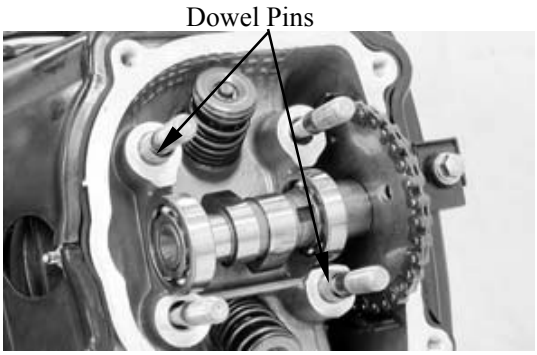
CAMSHAFT INSTALLATION

Reverse the "CAMSHAFT REMOVAL" procedures.

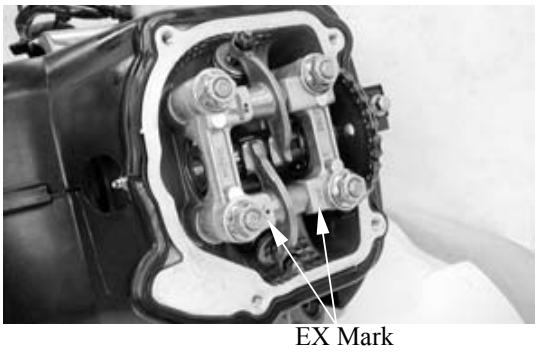
Note the following points:

1. Turn the flywheel so that the "T" mark on the flywheel aligns with the index mark on the crankcase.
   Keep the round hole on the camshaft gear facing up and align the punch marks on the camshaft gear with the cylinder head surface (Position the intake and exhaust cam lobes down.) and install the camshaft onto the cylinder head. (Refer to the "VALVE CLEARANCE" section in the chapter 3)

   Install the camshaft dowel pins and holder.



*
- Apply engine oil to the threads of the cylinder head nuts.
- Diagonally tighten the cylinder head nuts in 2~3 times.
- Position the camshaft holder "EX" mark on the exhaust valve side.

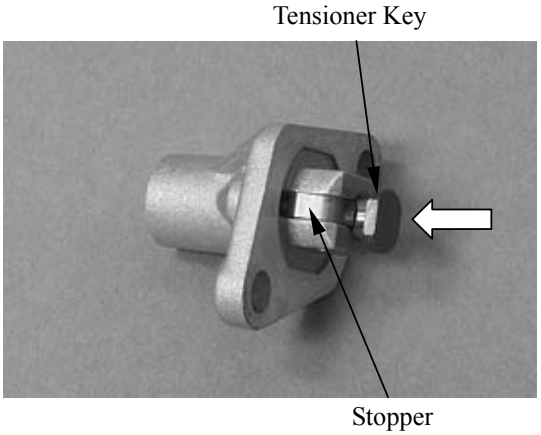


Torque:

Camshaft hold nut:
14 N·m (1.4 kgf·m, 10 lbf·ft)
Apply engine oil to threads

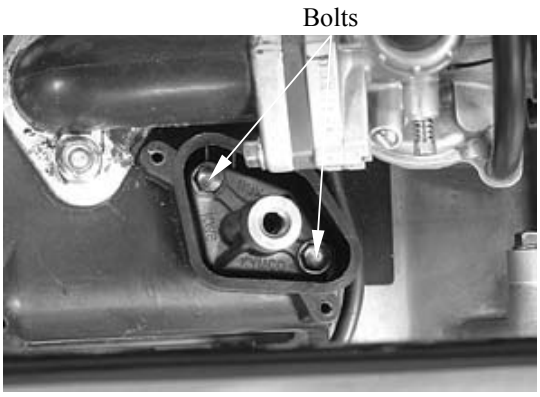
2. Push the stopper and press the tensioner key until it is stopped as shown.

* Check one-way cam operation (tensioner) for unsmooth operation.
If necessary replace the tensioner.



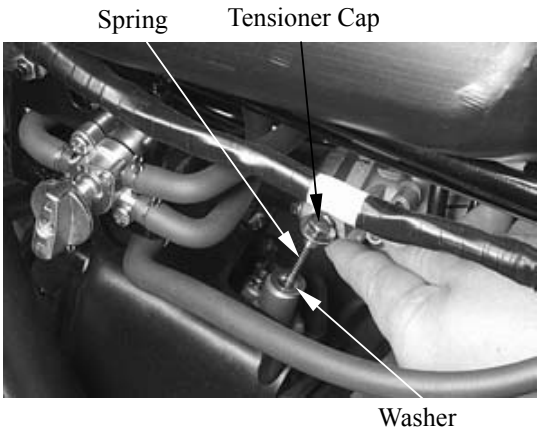
Install the tensioner and new gasket to cylinder. Install the lifter tensioner bolts and tighten them.

Torque: 12 N·m (1.2 kgf·m, 9 lbf·ft)



Install the washer, spring and tensioner cap, and then tighten the tensioner cap to specified torque.

Torque: 4.5 N·m (0.45 kgf·m, 3 lbf·ft)



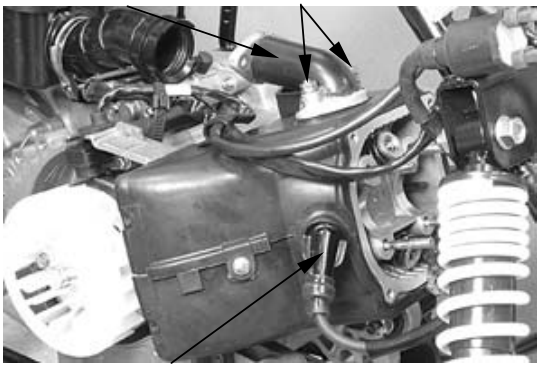
3. Adjust the valve clearance. (Refer to the "VALVE CLEARANCE" section in the chapter 3)

CYLINDER HEAD

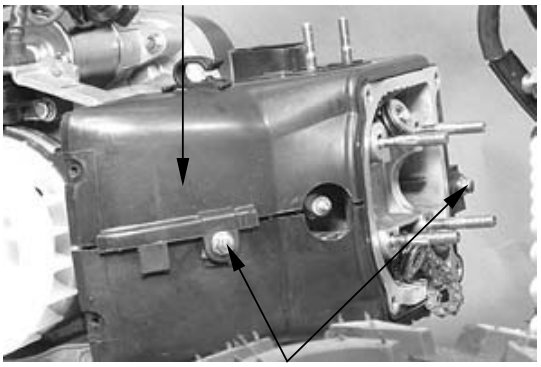
REMOVAL

Remove the camshaft. (See page 7-4)
Remove the carburetor. (Refer to the "CARBURETOR REMOVAL" section in the chapter 5)
Remove the exhaust muffler. (Refer to the "EXHAUST MUFFLER REMOVAL" section in the chapter 2)

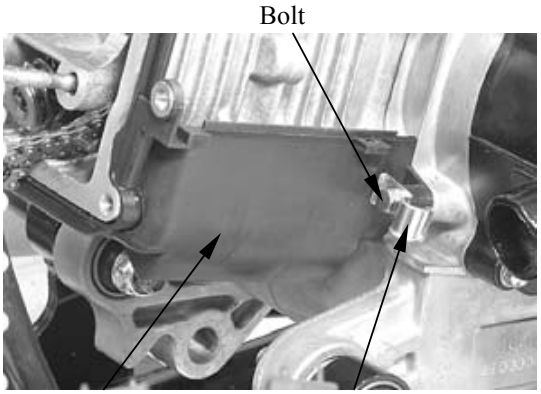
Remove the two nuts and then remove the carburetor intake manifold.
Remove the spark plug cap.

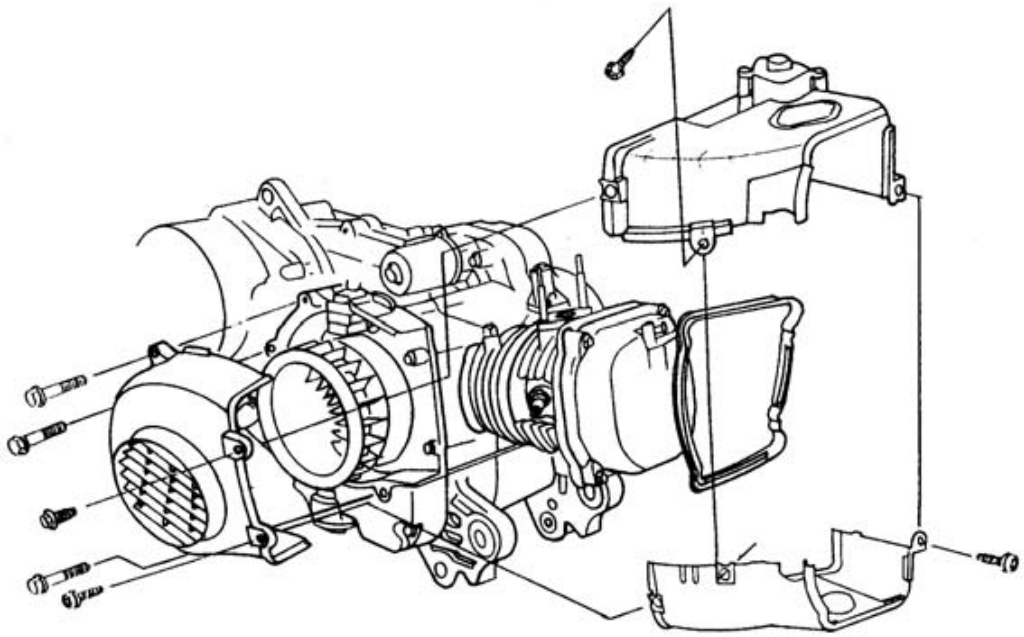


Remove the engine cover bolts.
Separate the engine cover joint claws and remove the upper engine cover.

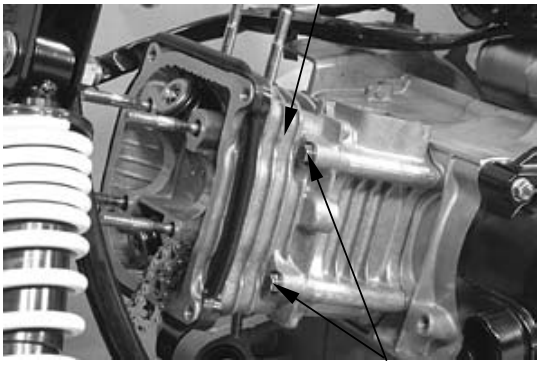


Remove the engine cover bolt and clamp.
Remove the lower engine cover.





Remove the two cylinder head bolts.
Remove the cylinder head.



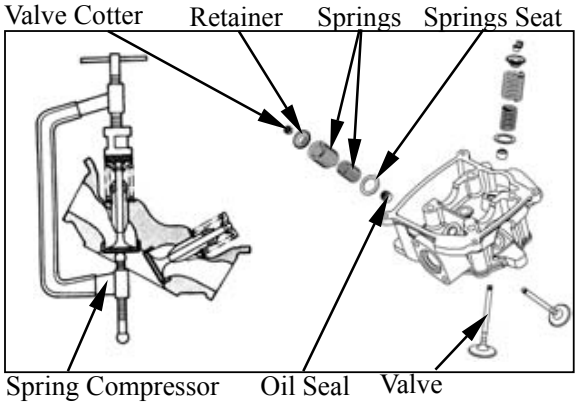
CYLINDER HEAD DISASSEMBLY

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

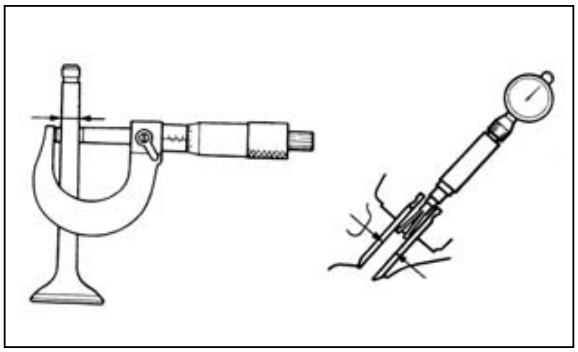


VALVE/VALVE GUIDE INSPECTION

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 : 0.06 mm (0.0024 in)
EX: 0.08 mm (0.0032 in)

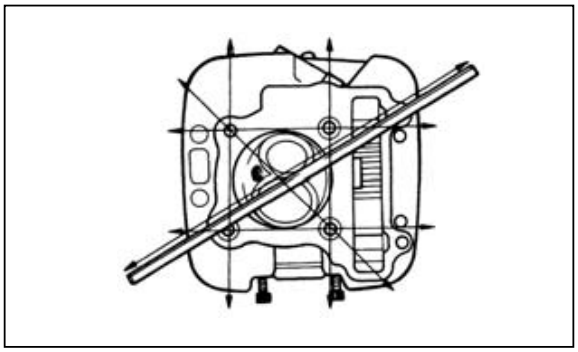


* If the stem-to-guide clearance exceeds the service limits, replace the cylinder head as necessary.

CYLINDER HEAD INPECTION

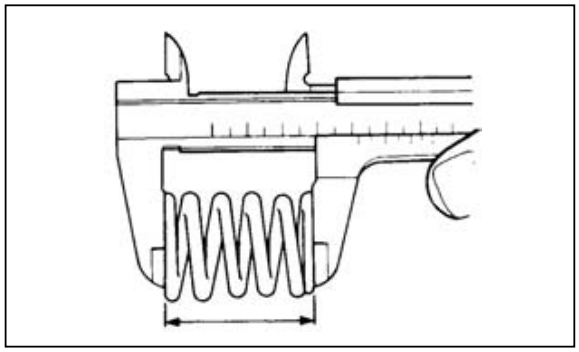
Check the spark plug hole and valve areas for cracks.
Check the cylinder head for warpage with a straight edge and feeler gauge.

Service Limit: 0.05 mm (0.002 in)

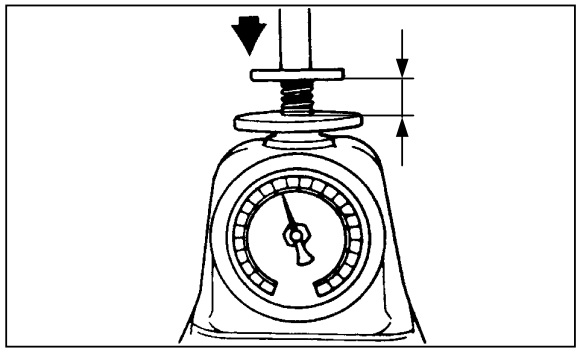


VALVE SPRING INSPECTION

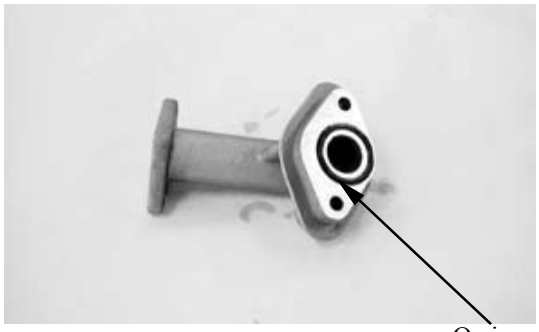
Measure the free length of the valve springs.
Service Limit: 34 mm (1.36 in)



Measure compressed force (valve spring) and installed length.
Replace if out of specification.
Standard: 19.2 ~ 22 kg at 19.65 mm (0.786 in)



Check the intake manifold and O-rings for wear or damage.



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 so that the closed coil end faces downwards 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

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.

INSTALLATION

Install the dowel pins and a new cylinder head gasket.

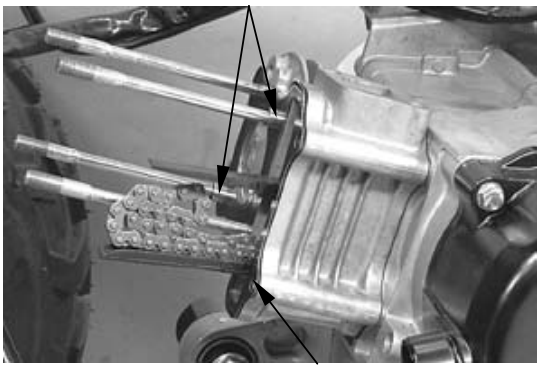
Reverse the "CYLINDER HEAD REMOVAL" procedures.

* Tighten the cylinder head bolts to specified torque, after install the camshaft holder and tighten holder nuts.

  Torque:

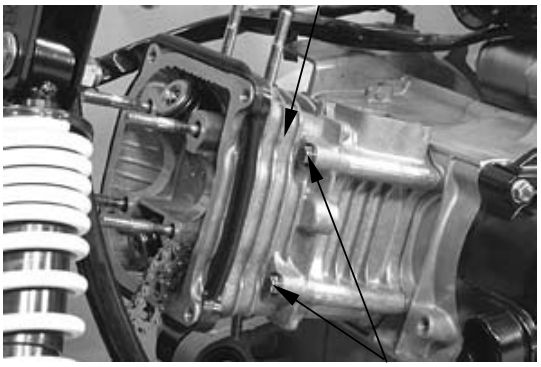
  Cylinder head bolt:
  10 N·m (1 kgf·m, 7 lbf·ft)

Dowel Pins



Gasket

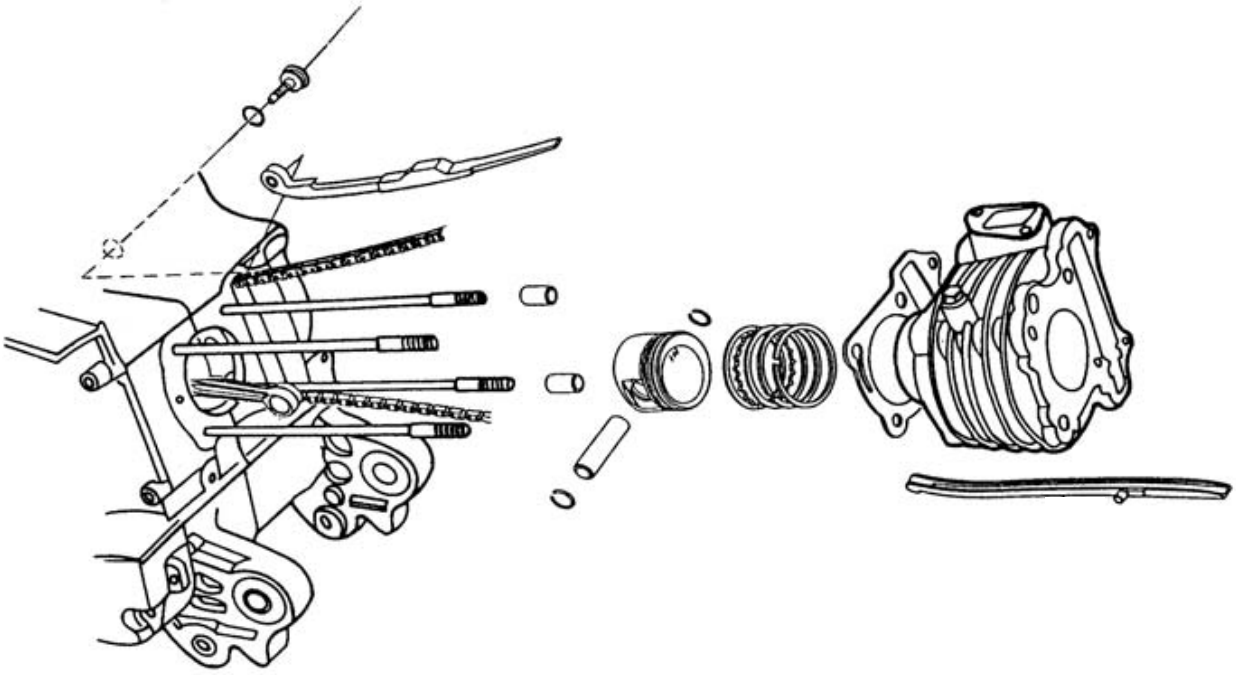
Cylinder Head



Cylinder Head Bolts

CYLINDER /PISTON

8. CYLINDER/PISTON



8. CYLINDER/PISTON

SERVICE INFORMATION

GENERAL INSTRUCTIONS

- The cylinder and piston can be serviced with the engine installed in the frame.
- Before disassembly, clean the engine to prevent dust from entering the engine.
- Remove all gasket material from the mating surfaces.
- Do not use a driver to pry between the cylinder and cylinder head, cylinder and crankcase.
- Do not damage the cylinder inside and the piston surface.
- After disassembly, clean the removed parts before inspection. When assembling, apply the specified engine oil to movable parts.

SPECIFICATIONS

mm (in)

Item			Standard	Service Limit
Cylinder	I.D.		39 ~ 39.01 (1.56 ~ 1.5604)	39.1 (1.564)
	Warpage		—	0.05 (0.002)
	Cylindricity		—	0.05 (0.002)
	True roundness		—	0.05 (0.002)
Piston, piston ring	Ring-to-groove clearance	Top	0.015 ~ 0.055 (0.0006 ~ 0.022)	0.09 (0.0036)
		Second	0.015 ~ 0.055 (0.0006 ~ 0.022)	0.09 (0.0036)
	Ring end gap	Top	0.15 ~ 0.3 (0.006 ~ 0.012)	0.5 (0.02)
		Second	0.3 ~ 0.45 (0.012 ~ 0.018)	0.65 (0.026)
		Oil ring	0.2 ~ 0.7 (0.008 ~ 0.028)	0.9 (0.036)
	Piston O.D.		38.975 ~ 38.99 (1.559 ~ 1.5596)	38.9 (1.556)
	Piston O.D. measuring position		4 (0.16) from bottom of skirt	—
	Piston-to-cylinder clearance		0.01 ~ 0.04 (0.0004 ~ 0.0016)	0.1 (0.004)
	Piston pin hole I.D.		13.002 ~ 13.008 (0.52008 ~ 0.52032)	13.04 (0.5216)
Piston pin O.D.			12.994 ~ 13 (0.51976 ~ 0.52)	12.96 (0.5184)
Piston-to-piston pin clearance			0.002 ~ 0.014 (0.00008 ~ 0.00056)	0.02 (0.0008)
Connecting rod small end I.D. bore			13.016 ~ 13.034 (0.52064 ~ 0.52136)	13.06 (0.5224)
Connecting rod-to-piston pin clearance			0.016 ~ 0.04 (0.00064 ~ 0.0016)	0.06 (0.0024)

8. CYLINDER/PISTON

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

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 piston rings

Abnormal noisy piston

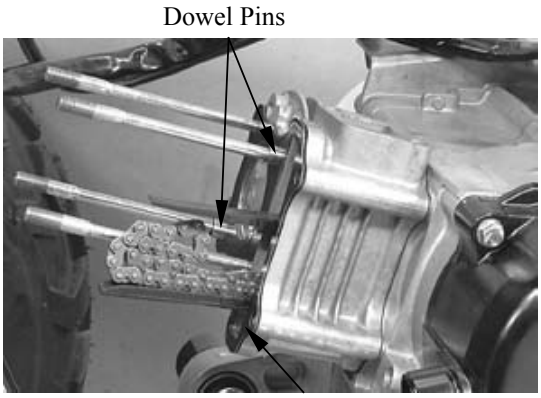
- Worn cylinder, piston and piston rings
- Worn piston pin hole and piston pin

CYLINDER/PISTON

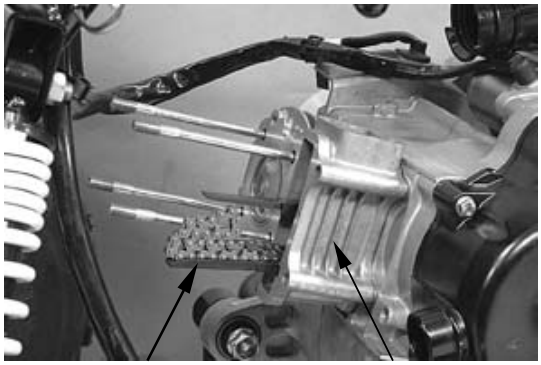
PISTON REMOVAL

Remove the cylinder head. (See page 7-10)

Remove the two dowel pins and cylinder head gasket.

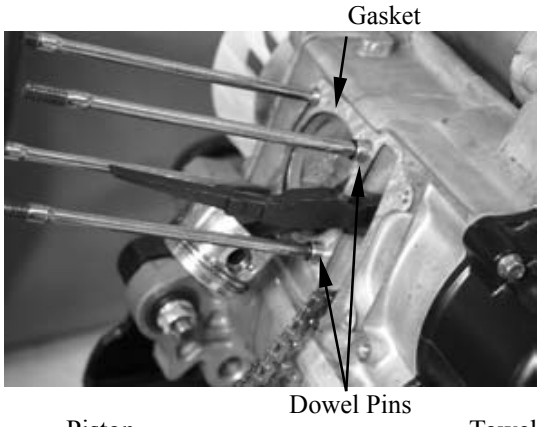


Remove cam chain guide and then remove cylinder.



Remove the cylinder gasket and dowel pins.
Clean any gasket material from the cylinder surface.

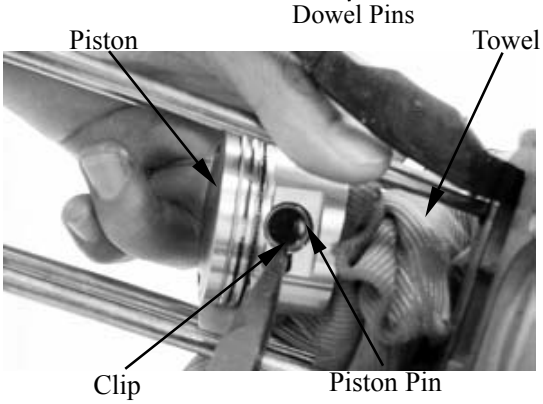
* Be careful not to drop foreign matters into the crankcase.



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.



PISTON INSPECTION

Inspect the piston, piston pin and piston rings.
Remove the piston rings.

* Take care not to damage or break the piston rings during removal.

Clean carbon deposits from the piston ring grooves.

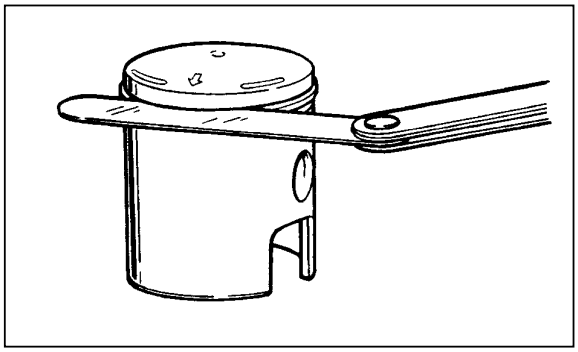
Inspect the piston wall for wear/scratches/damage.

If any defects are found, replace the piston with a new one.

Install the piston rings onto the piston and measure the piston ring-to-groove clearance.

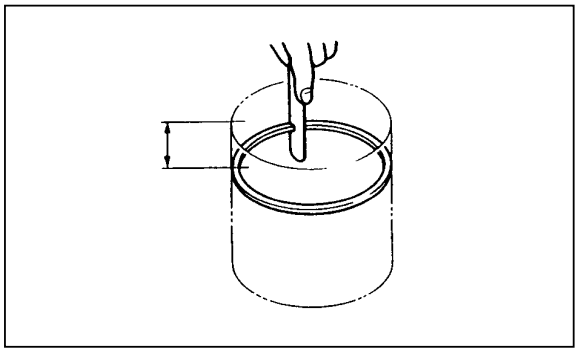
Service Limits:

Top: 0.09 mm (0.0036 in)
2nd: 0.09 mm (0.0036 in)



Remove the piston rings and insert each piston ring into the cylinder bottom.

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



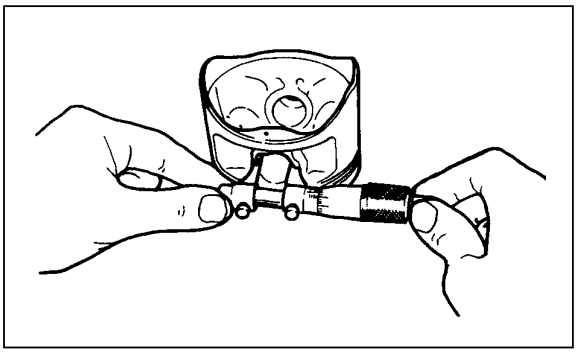
Measure the piston ring end gap.

Service Limit:

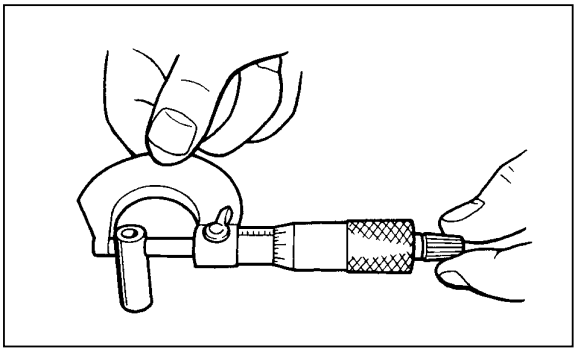
Top: 0.5 mm (0.02 in)
2nd: 0.65 mm (0.026 in)
Oil ring: 0.9 mm (0.036 in)

Measure the piston pin hole I.D.

Service Limit: 13.04 mm (0.5216 in)



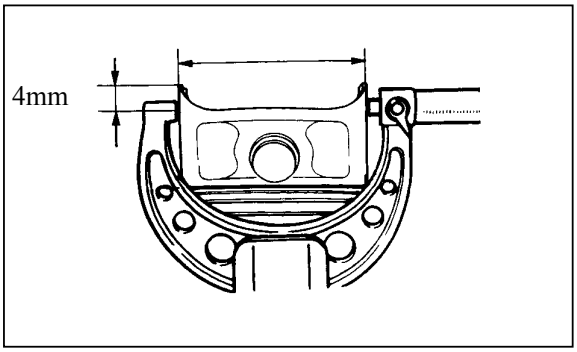
Measure the piston pin O.D.
Service Limit: 12.96 mm (0.5184 in)



Measure the piston-to-piston pin clearance.
Service Limit: 0.02 mm (0.0008 in)

Measure the piston O.D.

* Take measurement at 4 mm (0.4 in) from the bottom and 90° to the piston pin hole.

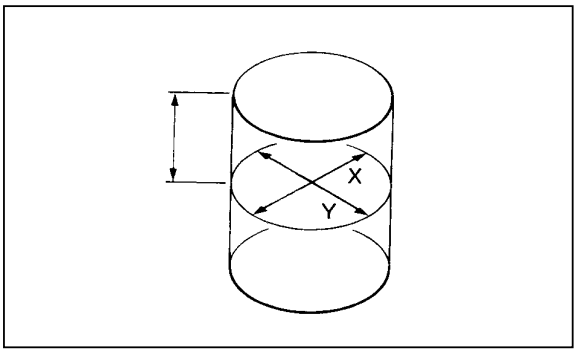


Service Limit: 38.9 mm (1.556 in)

CYLINDER INSPECTION

Inspect the cylinder bore for wear or damage.
Measure the cylinder I.D. at three levels of top, middle and bottom at 90° to the piston pin (in both X and Y directions).

Cylinder I.D.:
Service Limit: 39.1 mm (1.564 in)



Measure the cylinder-to-piston clearance.
Service Limit: 0.1 mm (0.004 in)

The true roundness is the difference between the values measured in X and Y directions. The cylindricity (difference between the values measured at the three levels) is subject to the maximum value calculated.

Service Limits:

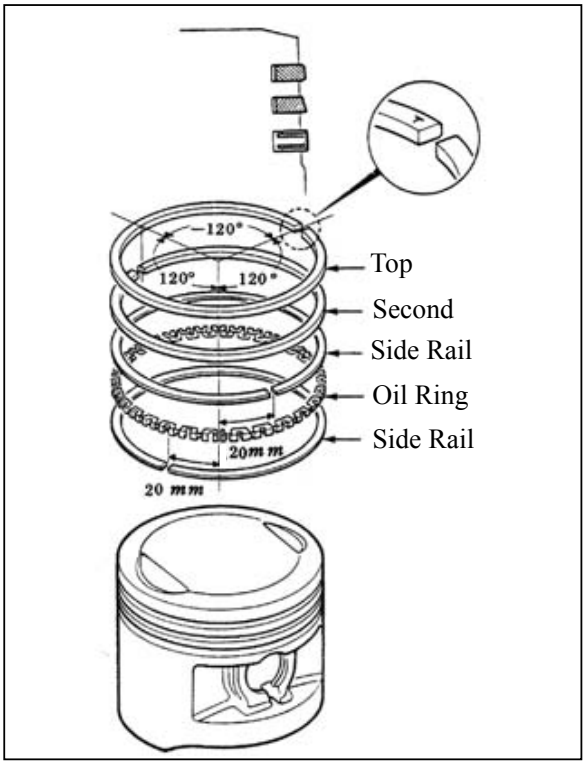
True Roundness: 0.05 mm (0.002 in)
Cylindricity: 0.05 mm (0.002 in)

PISTON RING INSTALLATION

Install the piston rings onto the piston.
Apply engine oil to each piston ring.

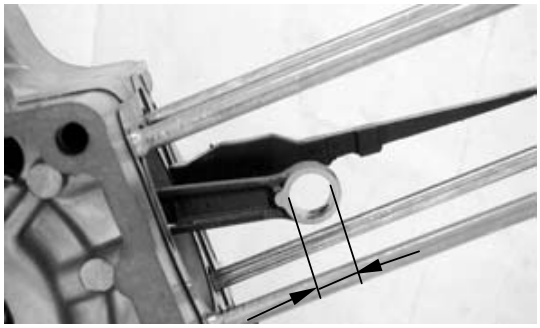
*

- Be careful not to damage or break the piston and piston rings.
- All rings should be installed with the markings facing up.
- After installing the rings, they should rotate freely without sticking.



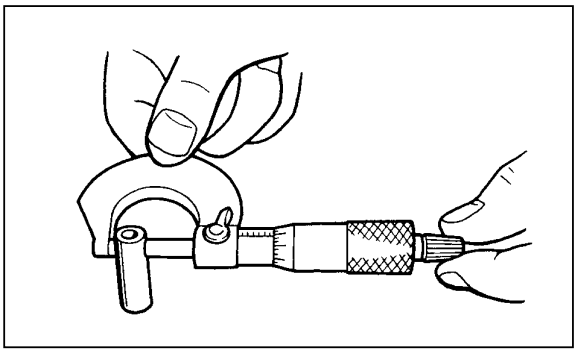
INSPECTION

Measure the connecting rod small end I.D.
Service Limit: 13.06 mm (0.5224 in)



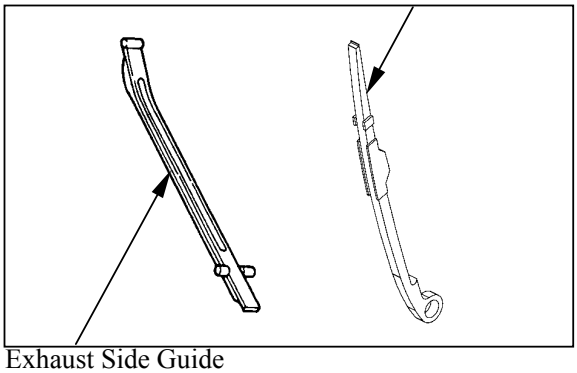
Measure the piston pin O.D.
Service Limit: 12.96 mm (0.5184 in)

Measure the connecting rod to piston pin clearance.
Service Limit: 0.06 mm (0.0024 in)



Inspect the exhaust side and intake side chain guides.

Wear or Damage → Replace.



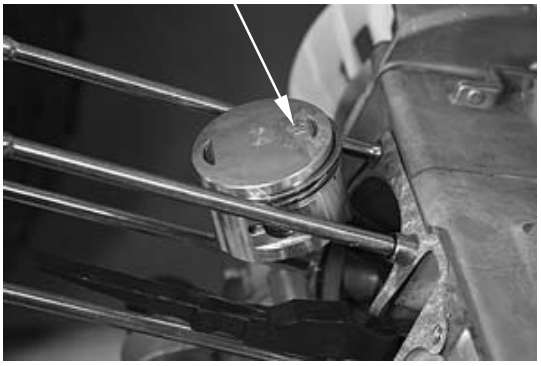
PISTON INSTALLATION

Remove any gasket material from the crankcase surface.

* Be careful not to drop foreign matters into the crankcase.

Install the piston, piston pin and a new piston pin clip.

* • Position the piston "IN" mark on the intake valve side.
  • Place a clean shop towel in the crankcase to keep the piston pin clip from falling into the crankcase.



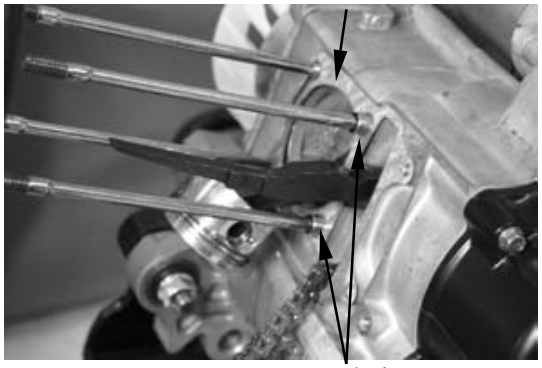
CYLINDER INSTALLATION

Install the dowel pins and a new cylinder gasket on the crankcase.

Coat the cylinder bore, piston and piston rings with clean engine oil.

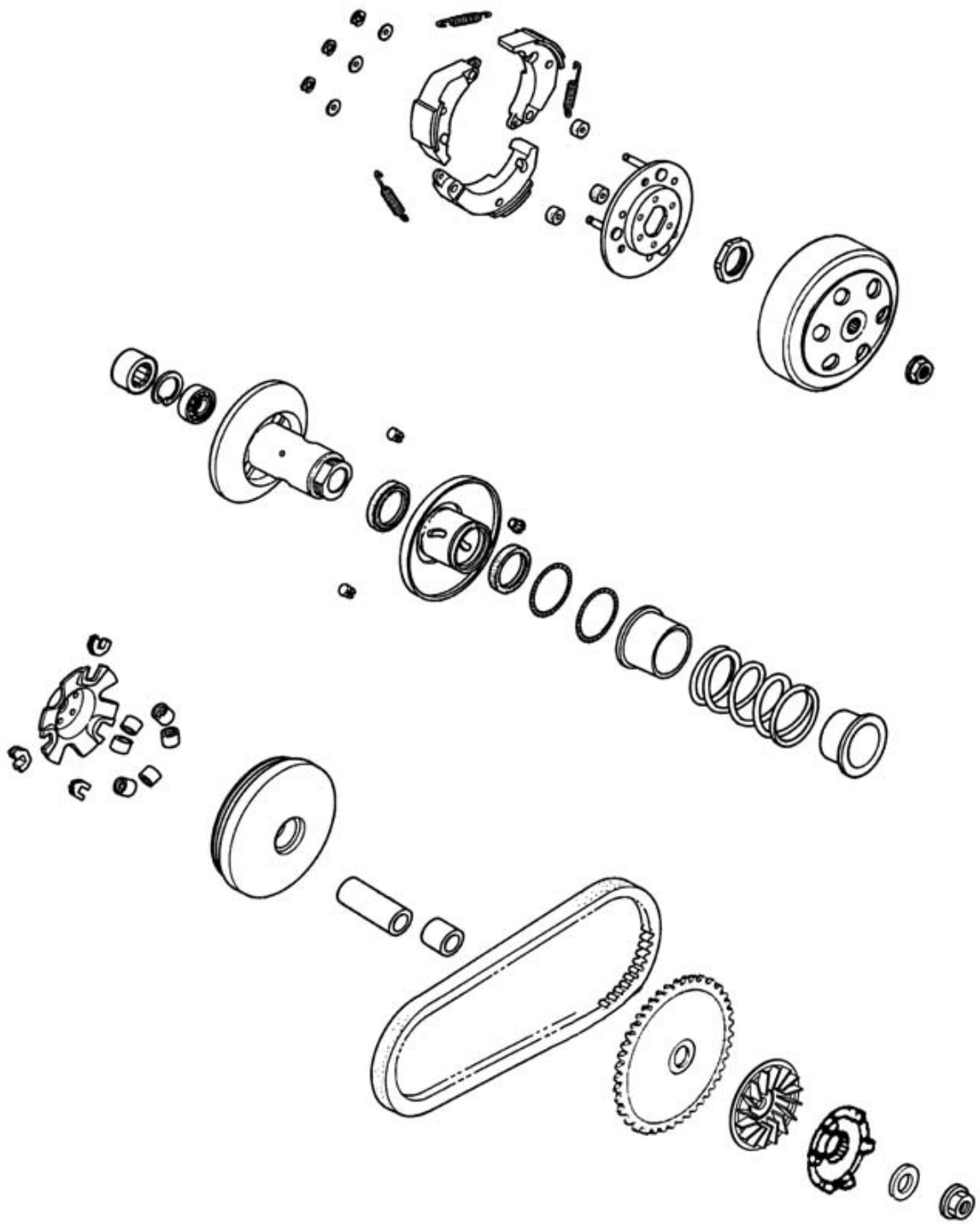
Carefully lower the cylinder over the piston by compressing the piston rings.

* • Apply proper clean engine oil around cylinder wall.
  • Be careful not to damage or break the piston rings.
  • Stagger the ring end gaps at 120° to the piston pin.



DRIVE AND DRIVEN PULLEYS

9. DRIVE AND DRIVEN PULLEYS



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9. DRIVE AND DRIVEN PULLEYS

SERVICE INFORMATION

GENERAL INSTRUCTIONS

- The drive pulley, clutch and driven pulley can be serviced with the engine installed in the frame.
- Avoid getting grease and oil on the drive belt and pulley faces. Remove any oil or grease from them to minimize the slipping of drive belt and drive pulley.

SPECIFICATIONS

mm (in)

Item	Standard	Service Limit
Movable drive face bushing I.D.	20.035 ~ 20.085 (0.8014 ~ 0.8034)	20.6 (0.824)
Drive pulley collar O.D.	19.96 ~ 19.974 (0.7984 ~ 0.79896)	19.94 (0.7976)
Drive belt width	18 (0.72)	17 (0.68)
Clutch lining thickness	3 (0.12)	1 (0.04)
Clutch outer I.D.	107 ~ 107.2 (4.28 ~ 4.288)	107.5 (4.3)
Driven face spring free length	95 (3.8)	90 (3.6)
Driven face O.D.	33.965 ~ 33.985 (1.3586 ~ 1.3594)	33.94 (1.3576)
Movable driven face I.D.	34 ~ 34.025 (1.36 ~ 1.361)	34.06 (1.3624)
Weight roller O.D.	15.92 ~ 16.08 (0.6368 ~ 0.6432)	15.4 (0.616)

TORQUE VALUES

Drive face nut	60 N·m (6 kgf·m, 43 lbf·ft)	Apply oil to threads
Clutch outer nut	40 N·m (4 kgf·m, 29 lbf·ft)	
Clutch drive plate nut	55 N·m (5.5 kgf·m, 40 lbf·ft)	

SPECIAL TOOLS

Universal holder	A120E00017	Clutch spring compressor	A120E00034
Bearing puller	A120E00037	Oil seal and bearing driver	A120E00014

TROUBLESHOOTING

Engine starts but vehicle won't move

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

Lack of power

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

Engine stalls or vehicle creeps

- Broken clutch weight spring

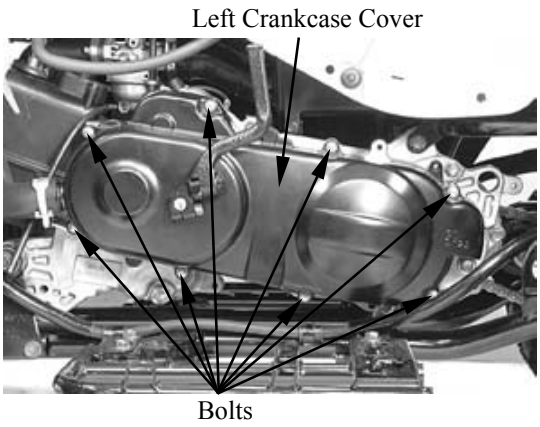
LEFT CRANKCASE COVER/KICK STARTER

REMOVAL

Remove left footboard. (See page 2-5)

Remove the eight left crankcase cover bolts and left crankcase cover.
Remove the gasket and dowel pins.

* Use specified genuine parts for replacement.

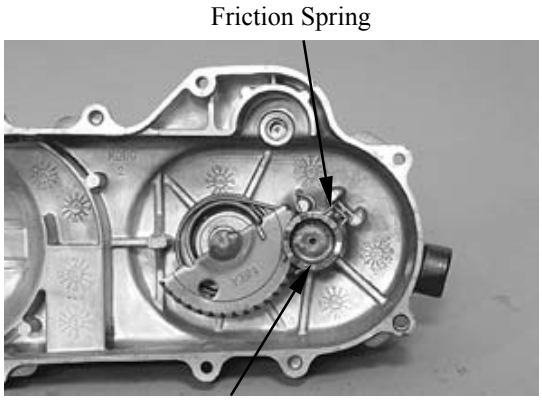


KICK STARTER

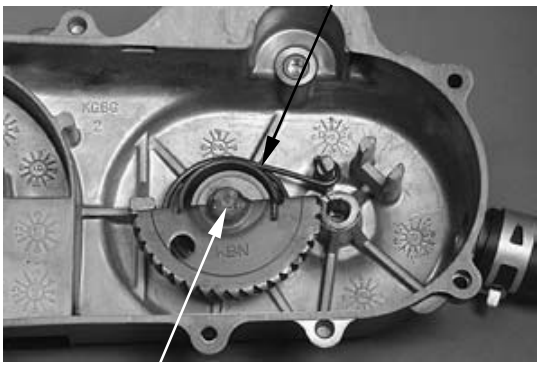
DISASSEMBLY

Remove the kick lever from the kick starter spindle.

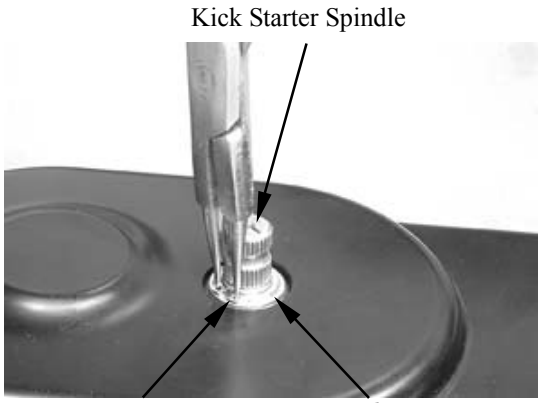
Gently turn the kick starter spindle to remove the starter driven gear together with the friction spring.



Remove the kick starter spindle and return spring from the left crankcase cover.
Remove the kick starter spindle bushings.

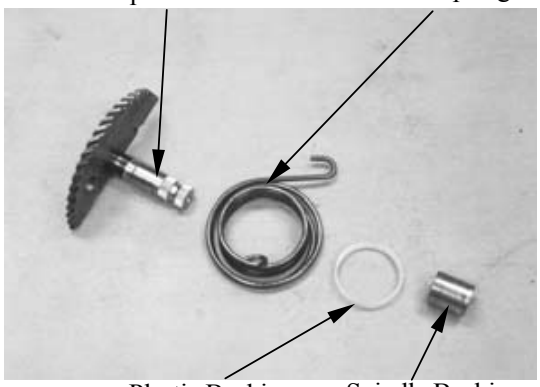


Remove the circlip and washer from the kick starter spindle.

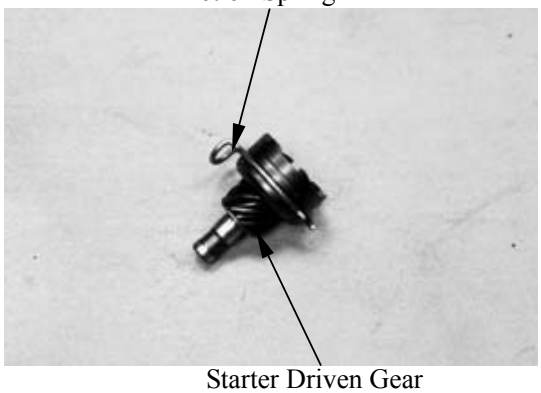


INSPECTION

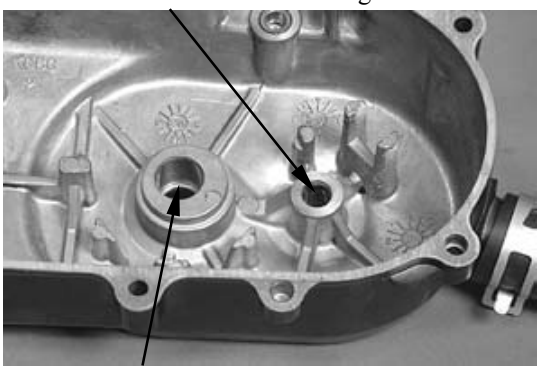
Inspect the kick starter spindle and gear for wear or damage.
Inspect the return spring for weakness or damage.
Inspect the kick starter spindle bushings for wear or damage.



Inspect the starter driven gear for wear or damage.
Inspect the friction spring for wear or damage.



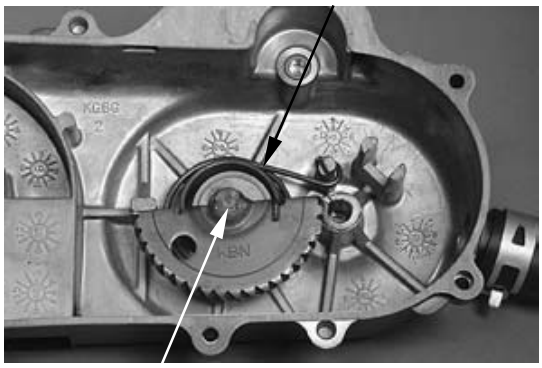
Inspect the kick starter spindle and starter driven gear shaft forcing part for wear or damage.



ASSEMBLY

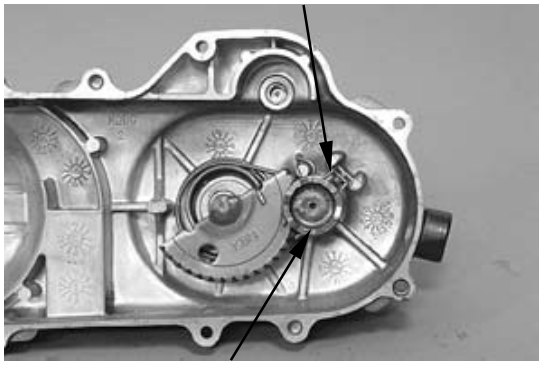
Install the kick starter spindle bushing and return spring onto the left crankcase cover.
Install the kick starter spindle.

* Apply grease onto the bushing and spindle teeth.



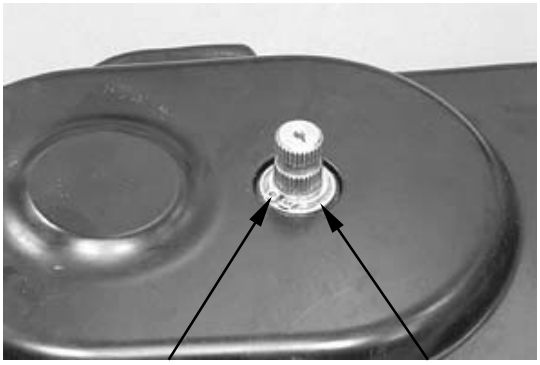
Install the starter driven gear and friction spring onto the left crankcase cover as the figure shown.

* Apply grease onto the driven gear shaft.



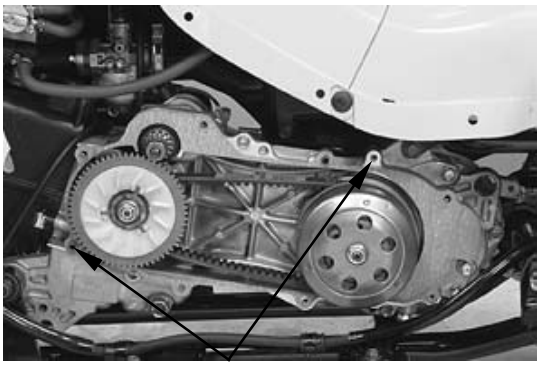
Install the kick starter spindle cover and tighten three bolts.

First install the washer and then install the circlip.
Install the kick lever.



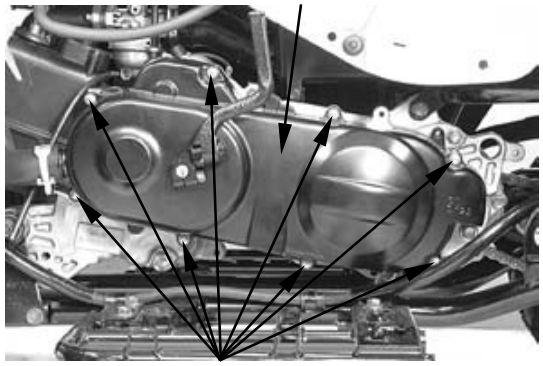
LEFT CRANKCASE COVER INSTALLATION

First install the dowel pins.
Install the new gasket.



Install the left crankcase cover and tighten the eight left crankcase cover bolts diagonally.

Torque: 12 N·m (1.2 kgf·m, 9 lbf·ft)



DRIVE PULLEY

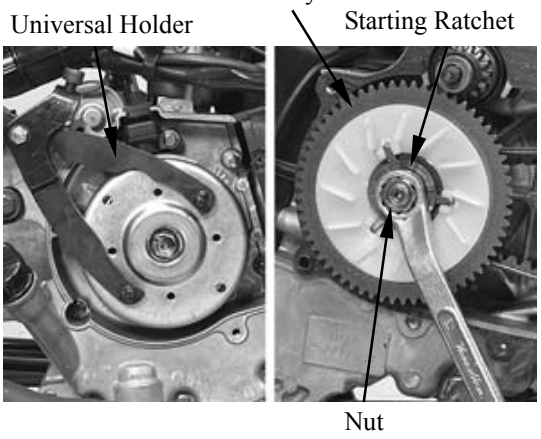
REMOVAL

Remove the left crankcase cover. (Refer to the "LEFT CRANKCASE COVER REMOVAL" section in the chapter 9)

Hold the flywheel using a universal holder (se page 14-9) and remove the drive face nut, washer and starting ratchet.
Remove the drive pulley face.

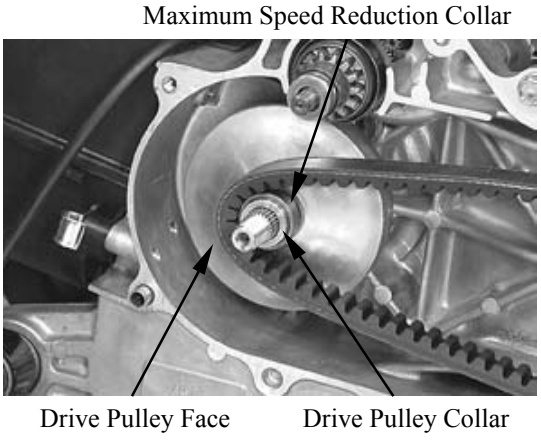
Special Tool:

Universal Holder A120E00017



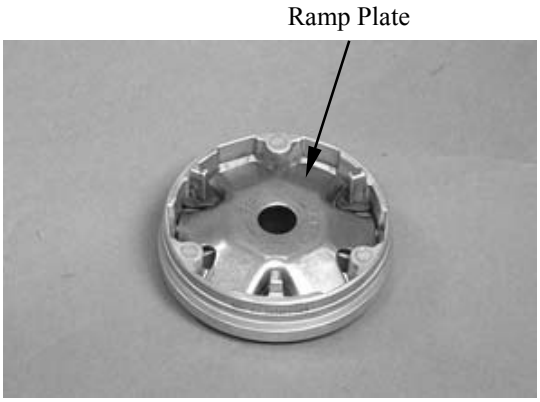
Remove the movable drive pulley face assembly and drive pulley collar.

Remove the maximum speed reduction collar (if installed).

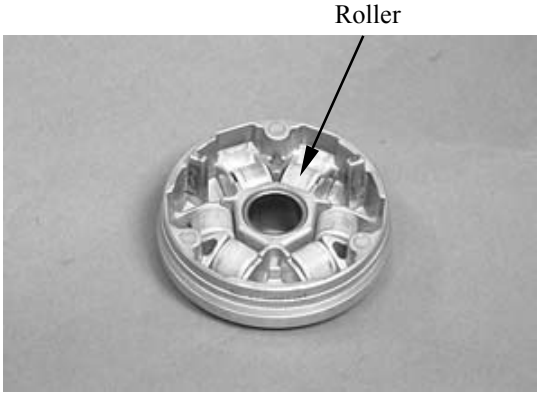


DISASSEMBLY

Remove the ramp plate.



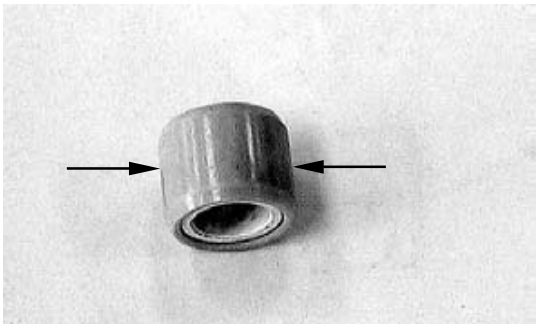
Remove the six weight rollers.



INSPECTION

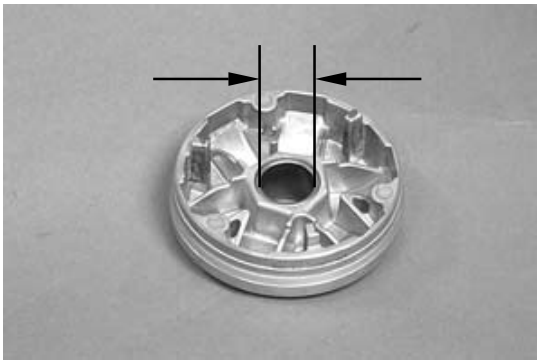
Check each weight roller for wear or damage.
Measure each weight roller O.D.

Service Limit: 15.4 mm (0.616 in)



Measure the movable drive face bushing I.D.

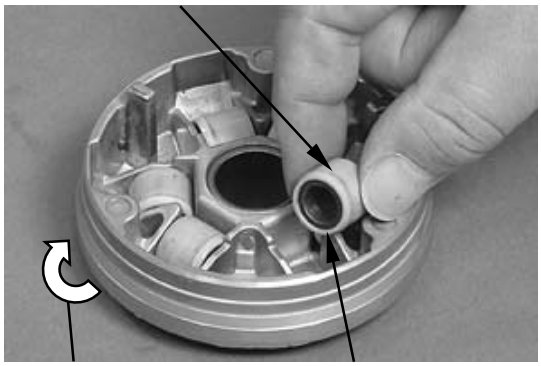
Service Limit: 20.6 mm (0.824 in)



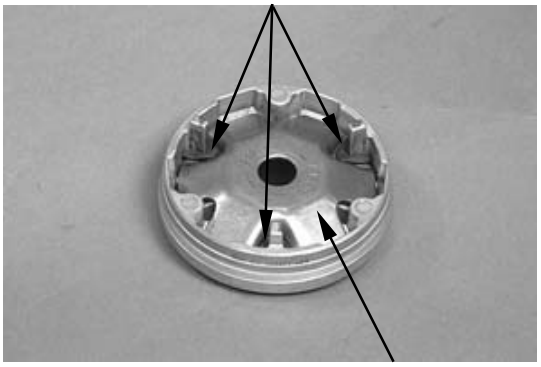
ASSEMBLY

Install the weight rollers into the movable drive face.

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

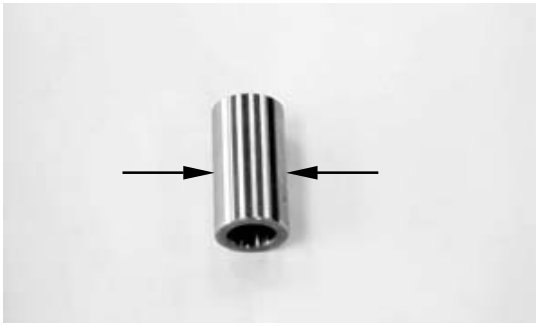


Install the slide pieces to the ramp plate.
Install the ramp plate to the movable drive face.



Check the drive pulley collar for wear or damage.
Measure the O.D. of the drive pulley collar sliding surface.

Service Limit: 19.94 mm (0.7976 in)



INSTALLATION

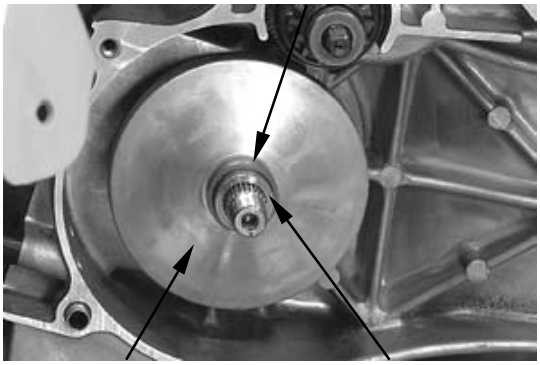
Install the drive pulley face assembly, drive pulley collar and maximum speed reduction collars.

* When assembling the drive pulley without the maximum speed reduction collar, the maximum speed capability of the ATV will be increase approximately 50 %.

⚠ WARNING

Do not remove the maximum speed reduction collar until the rider develops sufficient skills to operate the ATV safely at the maximum speed with the maximum speed reduction collar in place.

Maximum Speed Reduction Collar

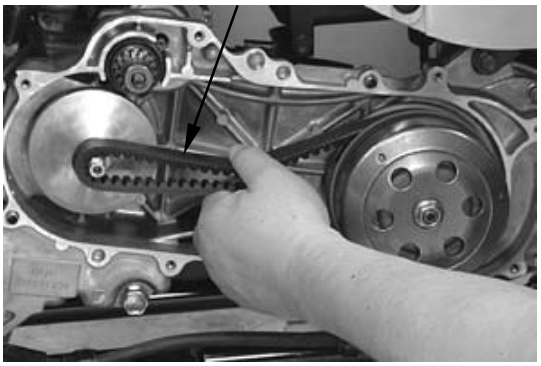


Drive Pulley Face Drive Pulley Collar

Install the drive belt, drive pulley, starting ratchet, washer and nut.

* ● When installing the drive pulley face, compress it to let the drive belt move downward to the lowest position so that the drive pulley can be tightened.
  ● Do not get oil or grease on the drive belt or pulley faces.

Drive Belt



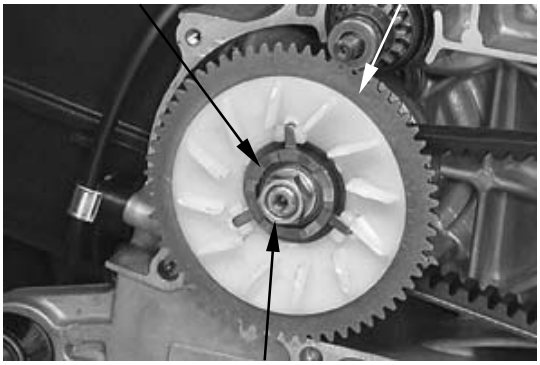
Hold the flywheel using a universal holder (see page 14-9) to tighten the drive face nut to the specified torque.

Special Tool:

Universal Holder: A120E00017

Torque (apply oil the threads): 60 N·m (6 kgf·m, 43 lbf·ft)

Starting Ratchet Drive Pulley Face



Drive Face Nut

CLUTCH/DRIVEN PULLEY

REMOVAL

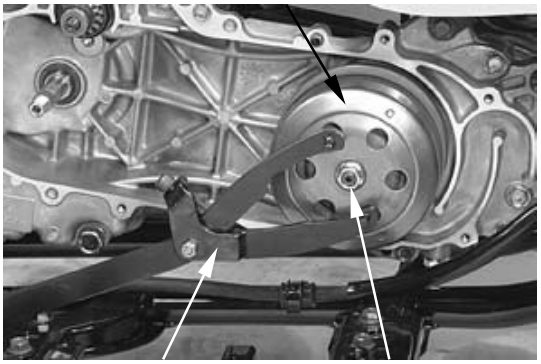
Remove the left crankcase cover. (Refer to the "LEFT CRANKCASE COVER REMOVAL" section in the chapter 9)
Remove the drive pulley. (Refer to the "DRIVE PULLEY REMOVAL" section in the chapter 9)

Remove the drive belt.
Hold the clutch outer with the universal holder, then remove the clutch outer nut and clutch outer.

Special Tool:

Universal Holder A120E00017

Clutch Outer



Universal Holder Nut

Remove the clutch/driven pulley.

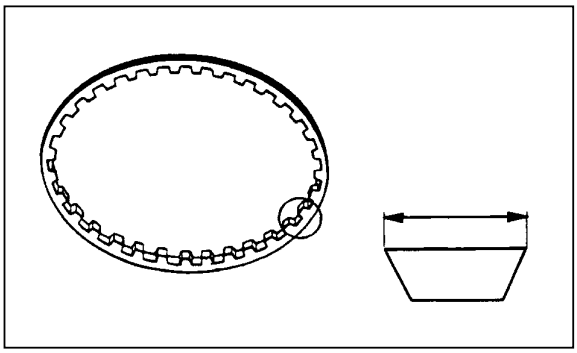
Clutch/Driven Pulley

DRIVE BELT INSPECTION

Check the drive belt for cracks, separation or abnormal or excessive wear.
Measure the drive belt width.

Service Limit: 17 mm (0.68 in)

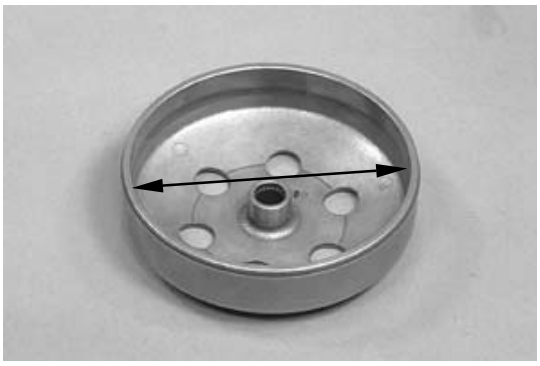
* Use specified genuine parts for replacement.



CLUTCH OUTER INSPECTION

Inspect the clutch outer for wear or damage.
Measure the clutch outer I.D.

Service Limit: 107.5 mm (4.3 in)



CLUTCH/DRIVEN PULLEY DISASSEMBLY

Hold the clutch/driven pulley assembly with the clutch spring compressor.

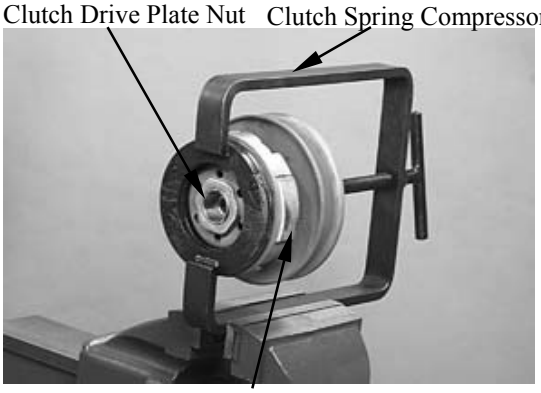
* Be sure to use a clutch spring compressor to avoid spring damage.

Special Tool:
Clutch Spring Compressor A120E00034

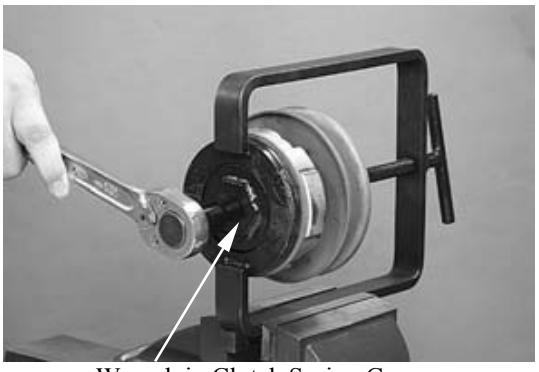
Set the clutch spring compressor in a vise and remove the clutch drive plate nut.

Loosen the clutch spring compressor and disassemble the clutch/driven pulley assembly.

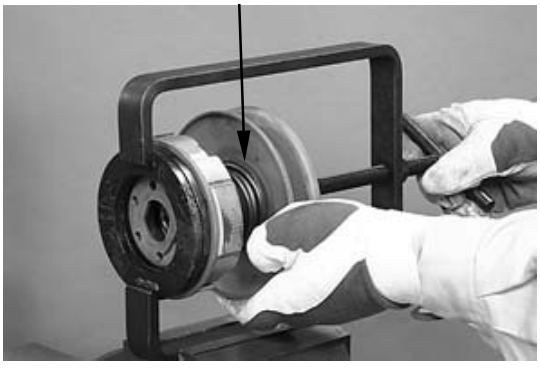
Clutch Drive Plate Nut Clutch Spring Compressor



Clutch/Driven Pulley Assemble

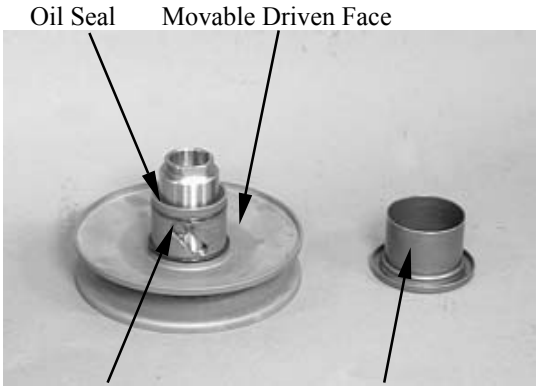


Wrench in Clutch Spring Compressor
Clutch/Driven Pulley Assemble



Remove the seal collar.

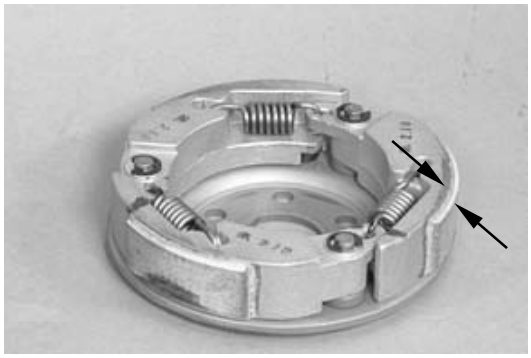
Pull out the three guide roller pins and guide rollers. Remove the movable driven face from the driven face.



INSPECTION

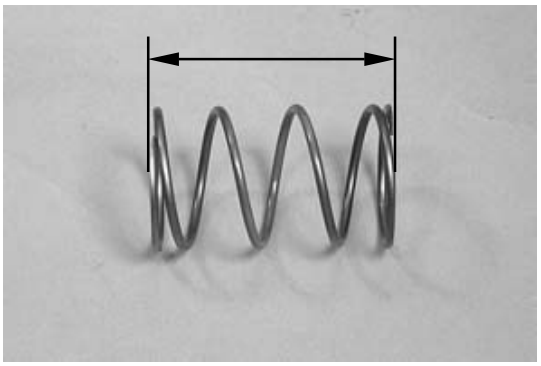
Measure the clutch lining thickness.

Service Limit: 1 mm (0.04 in)

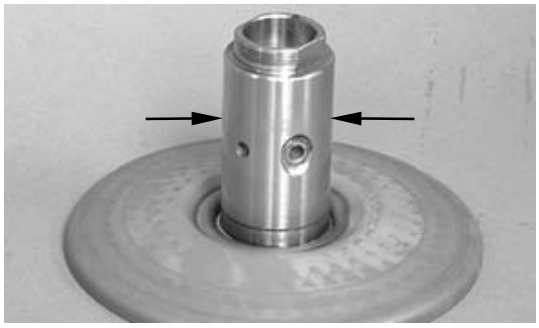


Measure the driven face spring free length.

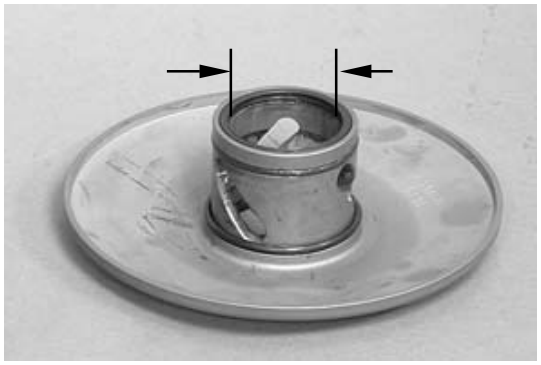
Service Limit: 90 mm (3.6 in)



Check the driven face for wear or damage.
Measure the driven face O.D.
Service Limit: 33.94mm (1.3576 in)



Check the movable driven face for wear or damage.
Measure the movable driven face I.D.
Service Limit: 34.06 mm (1.3624 in)



DRIVEN PULLEY FACE BEARING REPLACEMENT

Drive the inner needle bearing out of the driven pulley face.

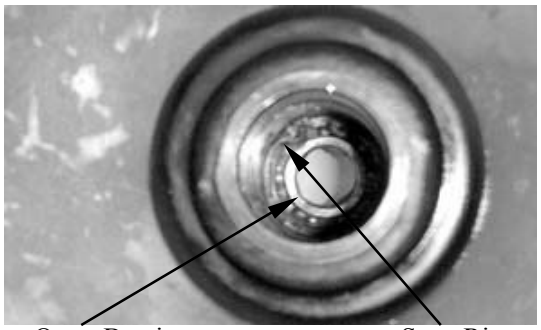
* Discard the removed bearing and replace with a new one.

Needle Bearing

Remove the snap ring and drive the outer bearing out of the driven face.

* Discard the removed bearing and replace with a new one.

Special Tool: Bearing Puller A120E00037



Outer Bearing Snap Ring

Apply grease to the outer bearing.
Drive a new outer bearing into the driven face with the sealed end facing up.

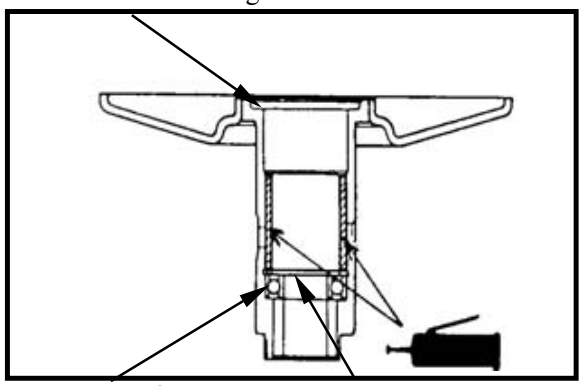
Seat the snap ring in its groove.
Apply grease to the driven face bore areas.

* Pack all bearing cavities with proper grease.
  Specified grease: Heat resistance 230ºC

Press a new needle bearing into the driven face.

Special Tool:
Oil Seal And Bearing Driver A120E00014

Inner Needle Bearing



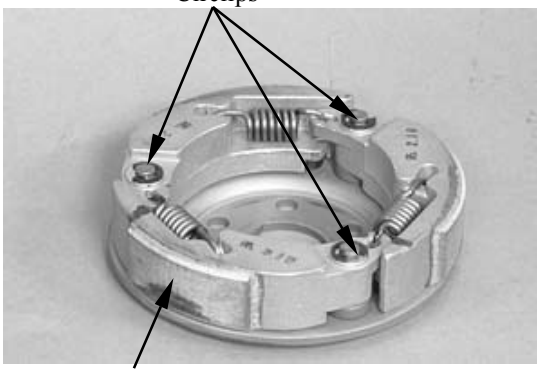
Outer Bearing Snap Ring

CLUTCH DISASSEMBLY

Remove the circlips to disassemble the clutch.

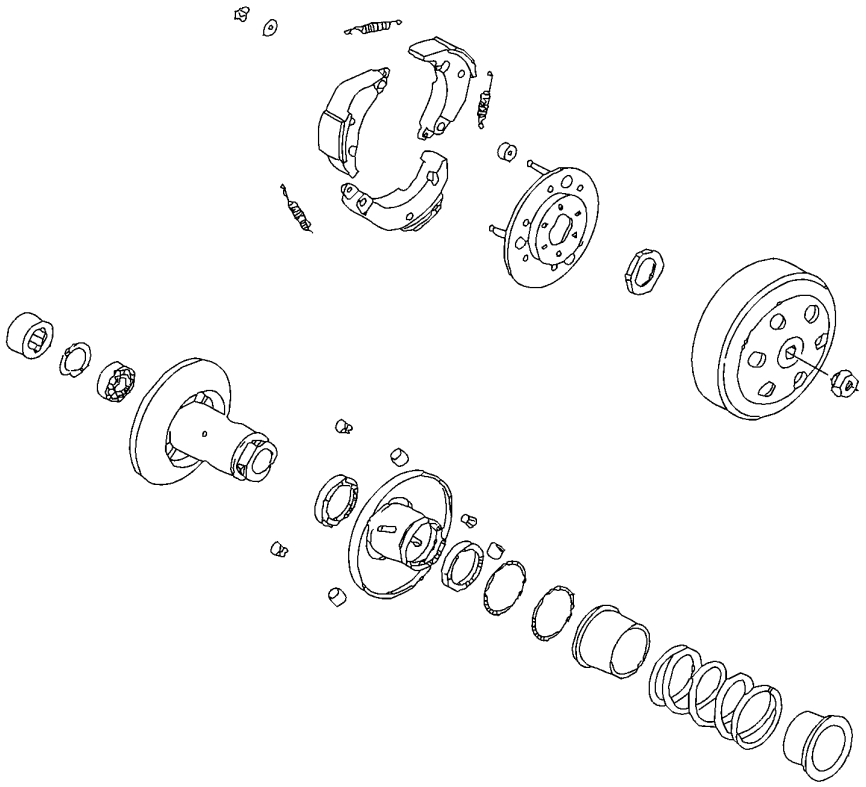
* Keep grease off the clutch linings.

Circlips



Clutch Lining

CLUTCH / DRIVEN PULLEY ASSEMBLY



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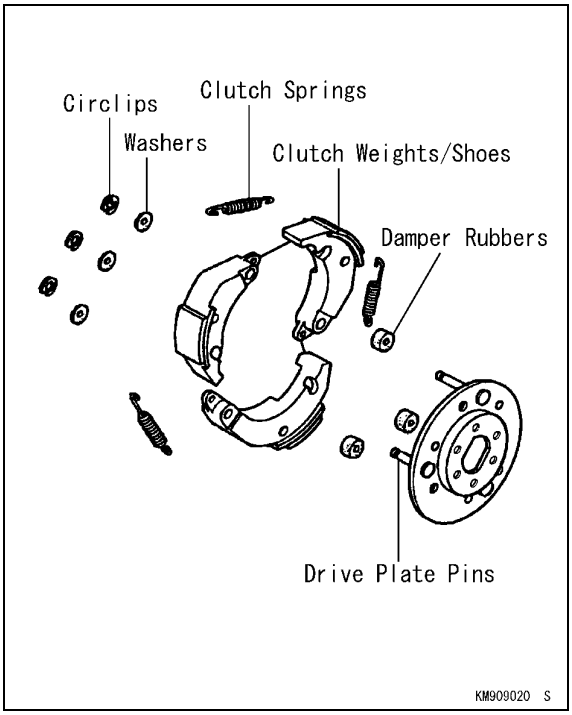
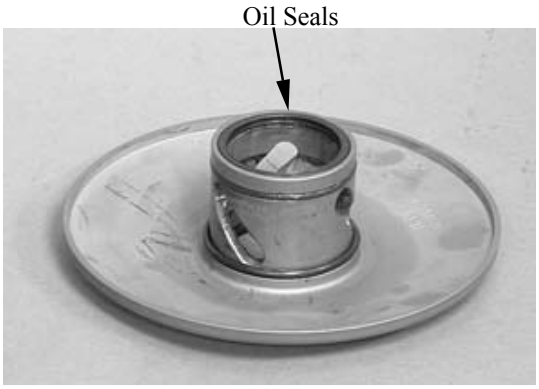
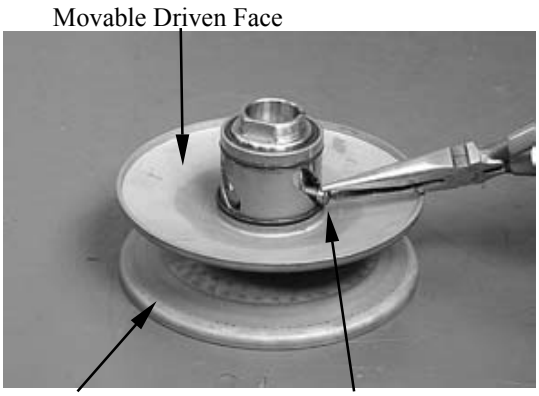
Install the damper rubbers on the drive plate pins.
Install the clutch weights/shoes and clutch springs.
Set the circlips in the groove.



Clean the driven pulley faces and remove any grease from them.
Apply grease onto the both oil seals and install them onto the movable driven face.

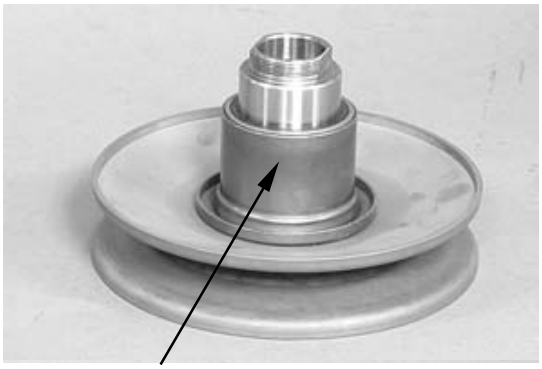


Install the movable driven face onto the driven face.
Apply grease to the guide rollers and guide roller pins and then install them into the holes of the driven face.

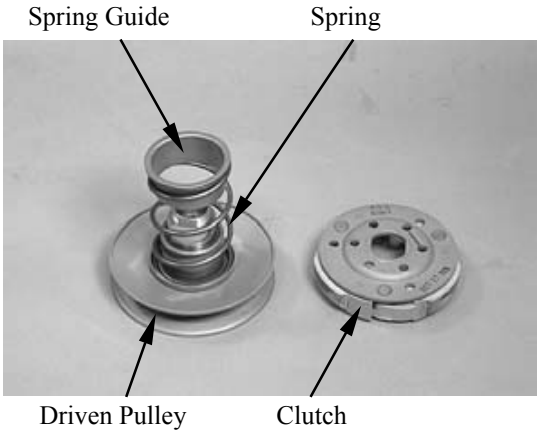


Install the seal collar.
Remove any excessive grease.

* Be sure to clean the driven face off any grease.



Set the driven pulley assembly, driven face spring and clutch assembly onto the clutch spring compressor.

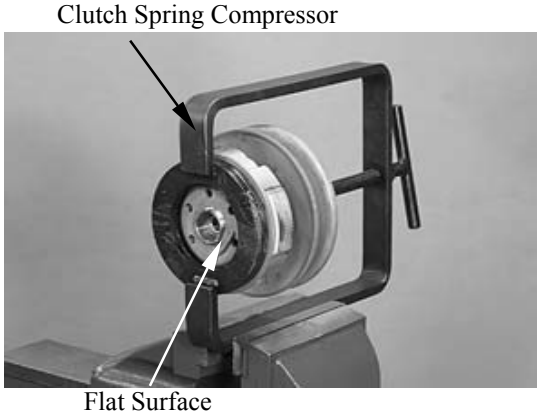


Set the clutch spring compressor in a vice.

Special Tool:

Clutch Spring Compressor A120E00034

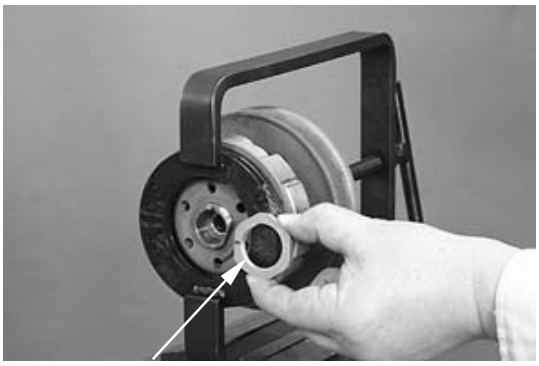
* Align the flat surface of the driven face with the flat on the clutch drive plate.



Compress the clutch spring compressor and tighten the clutch drive plate nut to the specified torque.

Torque: 55 N·m (5.5 kgf·m, 40 lbf·ft)

* Be sure to use a clutch spring compressor to avoid spring damage.



Clutch Drive Plate Nut

Wrench in Clutch Spring Compressor

INSTALLATION

Install the clutch/driven pulley and driven belt onto the drive shaft.

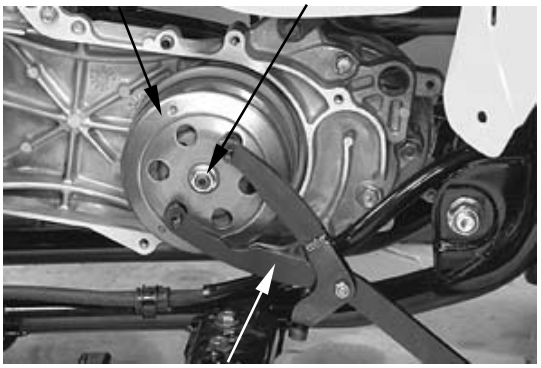
* Keep grease off the drive shaft.

Install the clutch outer.
Hold the clutch outer with the universal holder.
Install and tighten the clutch outer nut.

Torque: 40 N·m (4 kgf·m, 29 lbf·ft)

Special Tool: Universal Holder A120E00017

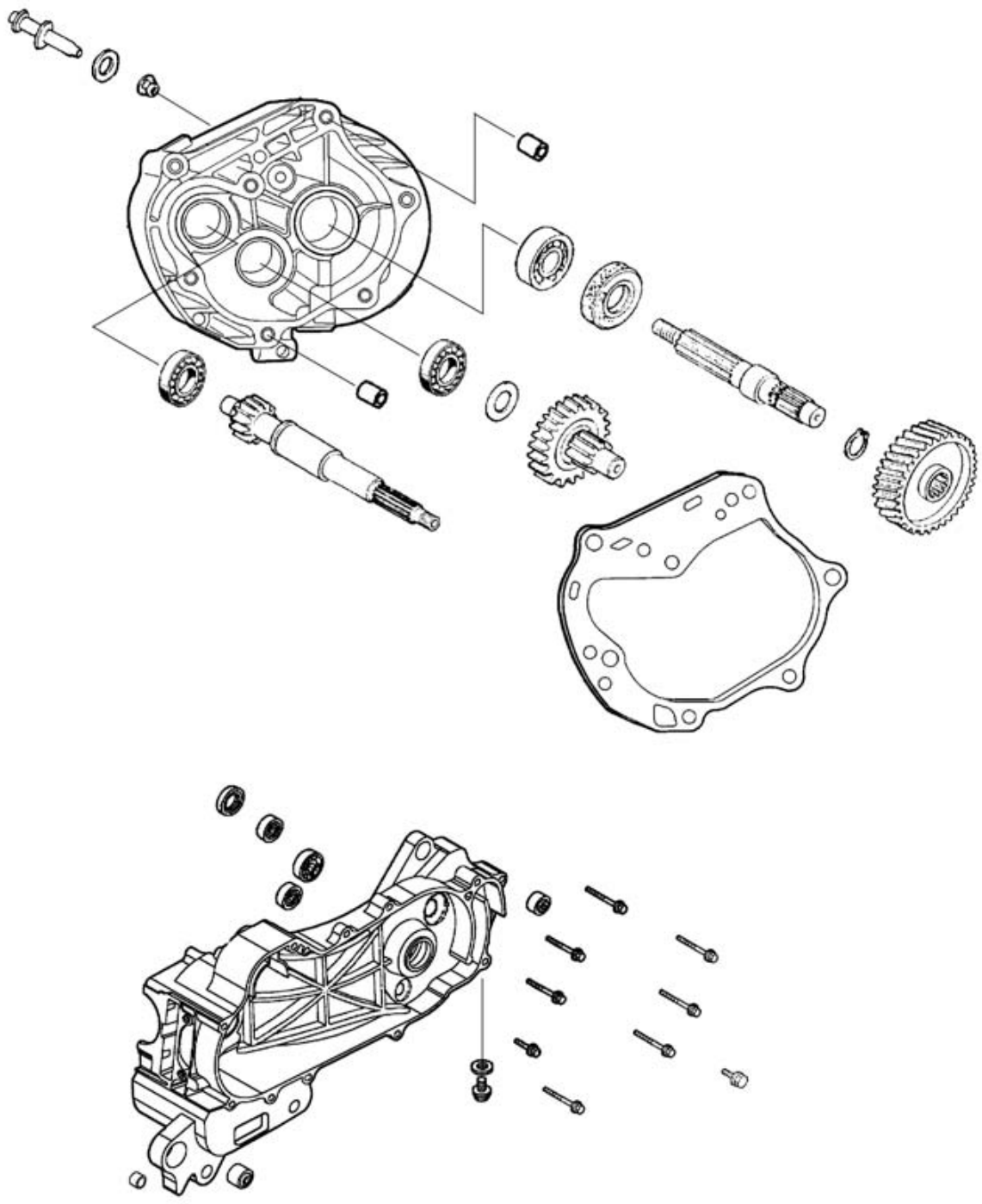
Clutch Outer Clutch Outer Nut



Universal Holder

TRANSMISSION SYSTEM

10.TRANSMISSION SYSTEM



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10.TRANSMISSION SYSTEM

SERVICE INFORMATION

GENERAL INSTRUCTIONS

- The transmission system can be serviced with the engine installed in the frame.
- When replacing the drive axle, use a special tool to hold the bearing inner race for this operation.

SPECIFICATIONS

Specified Oil: GEAR OIL SAE 90

Oil Capacity:

At disassembly: 0.12 L (0.11 lmp qt, 0.13 US qt)
At change: 0.11 L (0.1 lmp qt, 0.12 US qt)

TORQUE VALUES

Transmission case cover bolt	27 N·m (2.7 kgf·m, 19 lbf·ft)

TROUBLESHOOTING

Engine starts but ATV won‘t move

- Damaged transmission
- Seized or burnt transmission

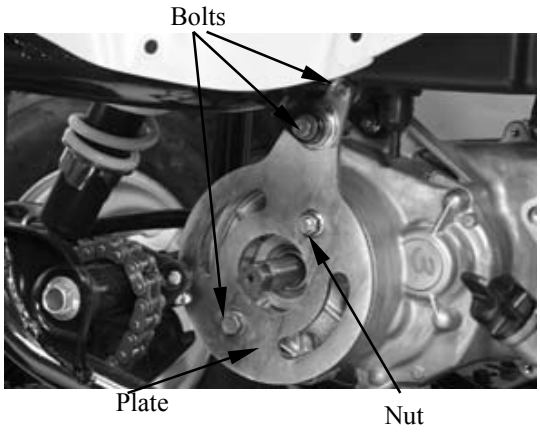
Oil leaks

- Oil too rich
- Worn or damaged oil seal

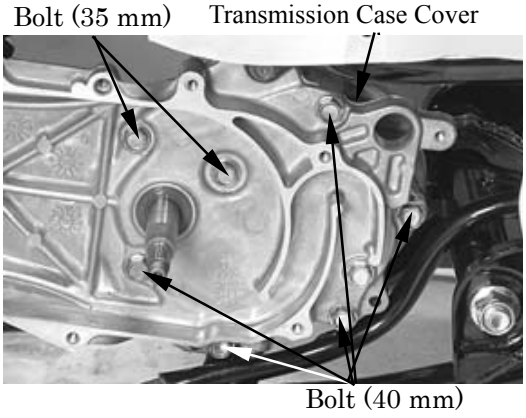
TRANSMISSION

REMOVAL

Remove the drive sprocket. (See page 6-2)
Remove the left crankcase cover. (See page 9-3)
Remove the clutch/driven pulley. (See page 9-10)
Remove the plate attaching bolts and nut.
Remove the plate.

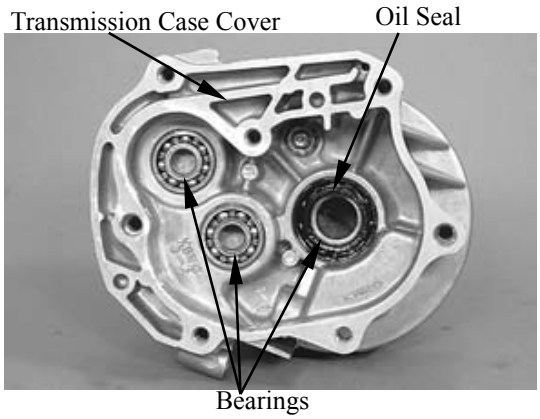


Drain the transmission gear oil into a clean container.
Remove the transmission case cover attaching bolts.
Remove the transmission case cover.
Remove the final gear and countershaft.
Remove the gasket and dowel pins.



Inspect the bearings for allow play in the transmission case cover or the bearings turn roughly.
If any defects are found, replace the bearing with a new one.

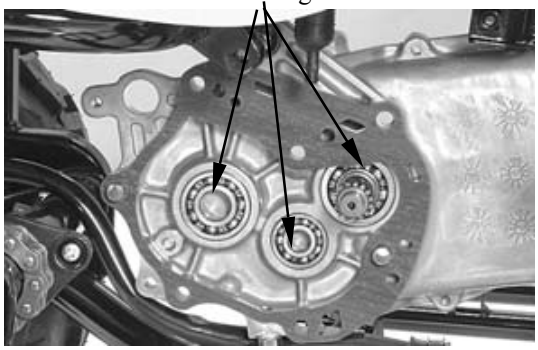
Inspect the final shaft bearing oil seal for wear or damage.



* Do not remove the transmission case cover except for necessary part replacement. When replacing the drive shaft, also replace the bearing and oil seal.

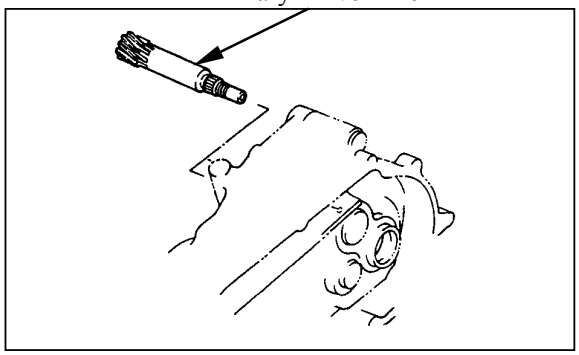
Inspect the bearings for allow play in the transmission case or the bearing turns roughly.
If any defects are found, replace the bearing with a new one.

Bearings



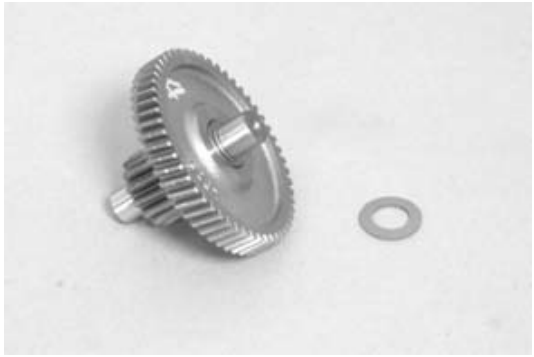
PRIMARY DRIVE AXLE REMOVAL
Remove the transmission case cover. (See page 10-3)
Remove the primary drive axle.

Primary Drive Axle



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

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

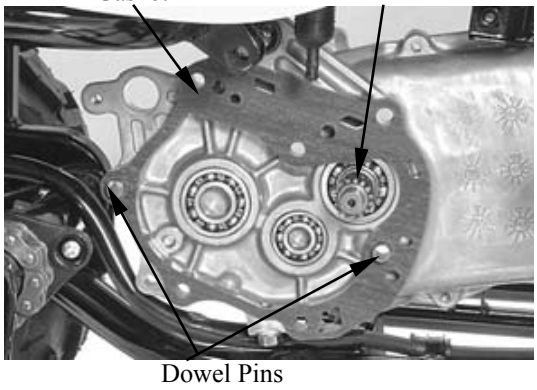


INSTALLATION

Reverse the "TRANSMISSION REVOVAL" section procedures.

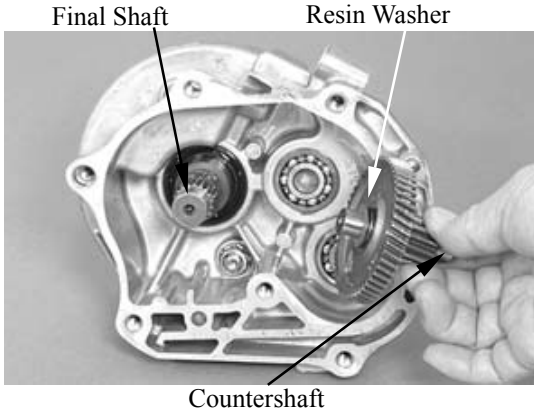
Install the primary drive axle into the left crankcase.

Install the dowel pins and a new gasket onto the left crankcase

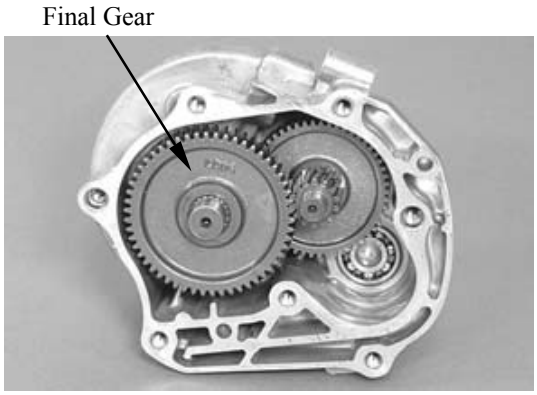


Install the final shaft into transmission case cover.

Install the countershaft and resin washer.



Install the final gear onto the final shaft.



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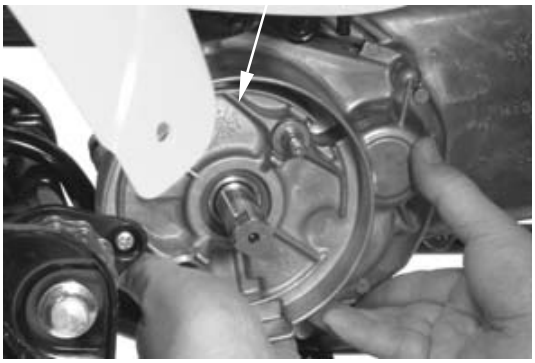
Transmission Case Cover



Install the transmission case cover assembly and tighten the transmission case cover bolt.

Torque: 27 N·m (2.7 kgf·m, 19 lbf·ft)

Fill the engine with oil and install the oil filler bolt. (Refer to the "TRANSMISSION OIL REPLACEMENT" section in the chapter 3)

Specified Gear Oil: GEAR OIL SAE 90

Oil Capacity:

At disassembly:

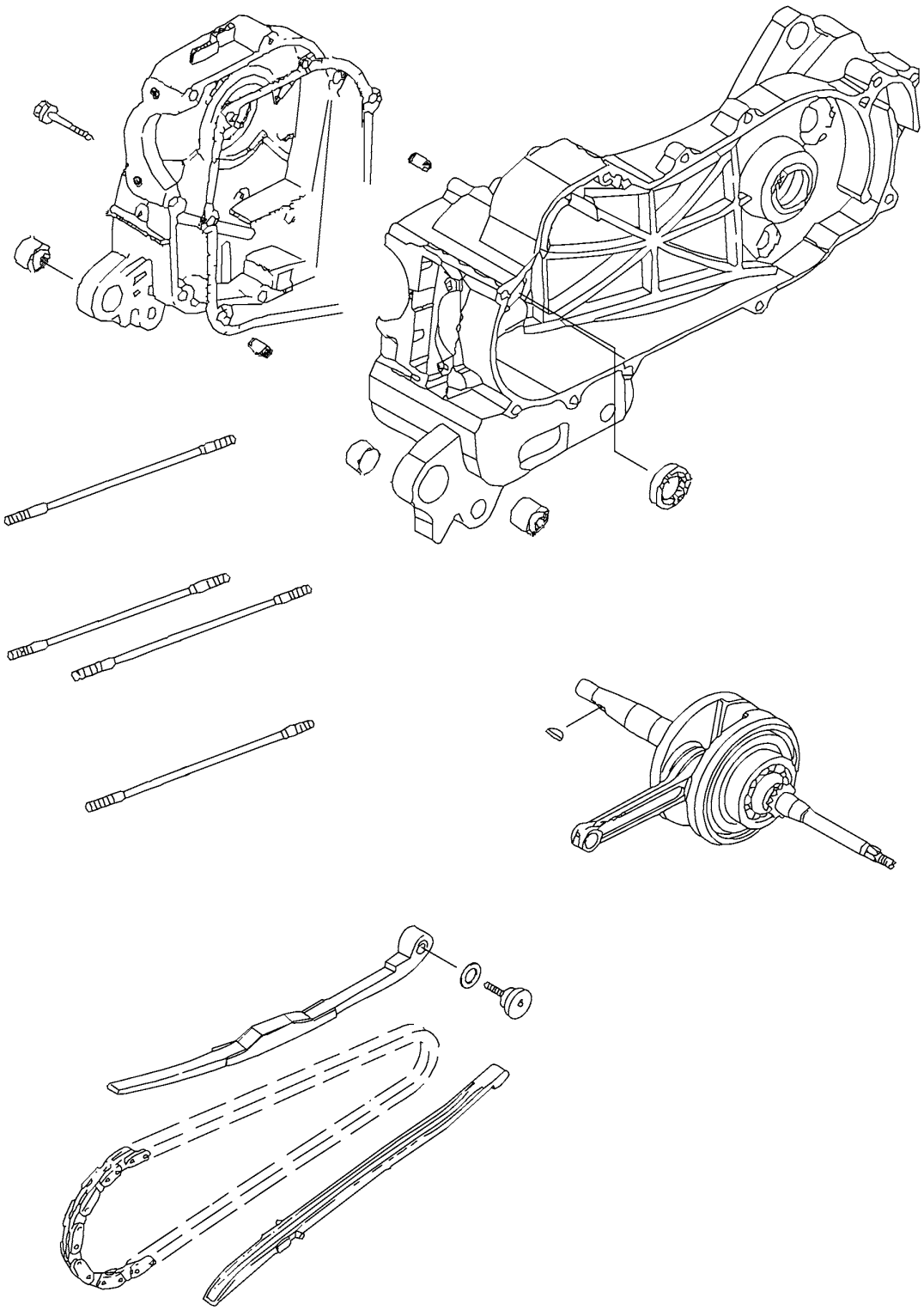
0.12 L (0.11 lmp qt, 0.13 US qt)

At change:

0.11 L (0.1 lmp qt, 0.12 US qt)

CRANKCASE/CRANKSHAFT

11.CRANKSCASE/CRANKSHAFT



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11.CRANKSCASE/CRANKSHAFT

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 (See page 7-10)

  –Cylinder/piston (See Chapter 8)

  –Drive and driven pulleys (See Chapter 9)

  –A.C. generator (See page 14-9)

  –Starter pinion (See page 16-7)

  –Oil pump (See page 4-3)

SPECIFICATIONS

mm (in)

	Item	Standard	Service Limit
Crankshaft	Connecting rod small end free play	0.05 ~ 0.4 (0.002 ~ 0.016)	0.6 (0.024)
	Connecting rod big end radial clearance	0 ~ 0.008 (0 ~ 0.00032)	0.05 (0.002)
	Run out	—	0.1 (0.004)

TORQUE VALUES

Crankcase bolt	10 N·m (1 kgf·m, 7 lbf·ft)
Cam chain guide bolt	10 N·m (1 kgf·m, 7 lbf·ft)

TROUBLESHOOTING

Abnormal engine noise

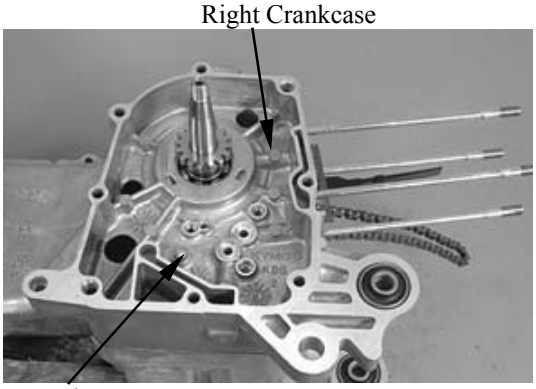
- Excessive crank journal bearing play
- Excessive crankpin bearing play
- Excessive transmission bearing play

CRANKCASE/CRANKSHAFT

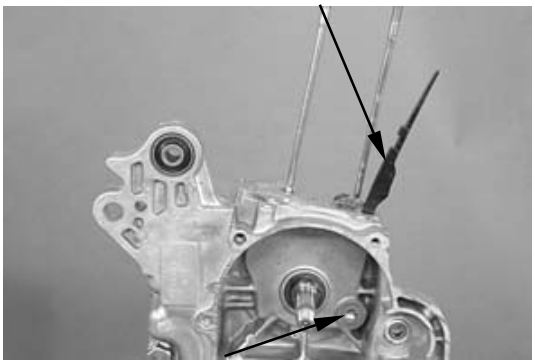
REMOVAL

Remove the crankcase attaching bolt.
Separate the left and right crankcase halves.

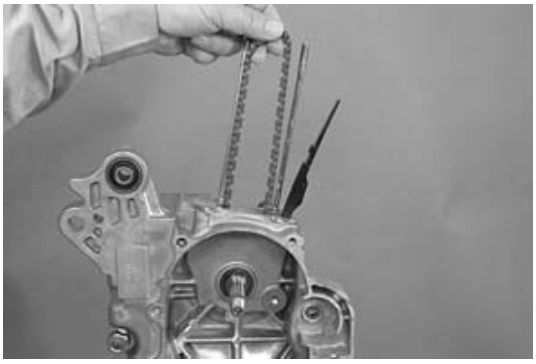
* • Do not damage the crankcase mating surface.
  • Never use a driver to pry the crankcase mating surfaces apart.



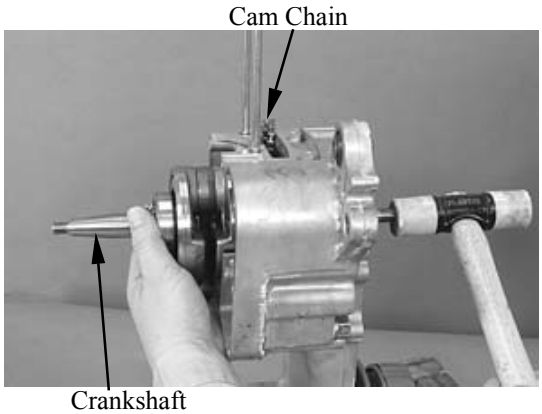
Remove the cam chain guide bolt and cam chain guide.



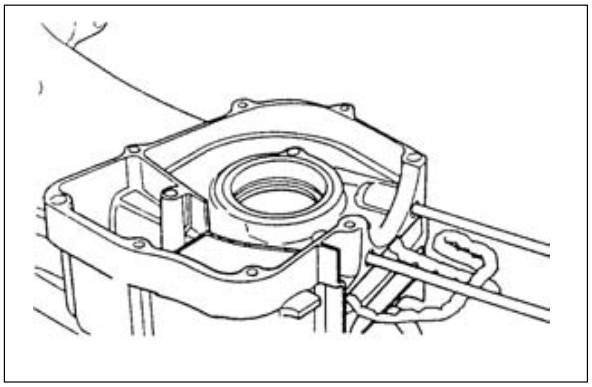
Remove the cam chain from the sprocket.
Move the crankshaft by tapping it lightly.



Hold the crankshaft and remove it from the left crankcase.
Remove the cam chain.
Remove the gasket and dowel pins.



Clean off all gasket material from the crankcase mating surfaces.

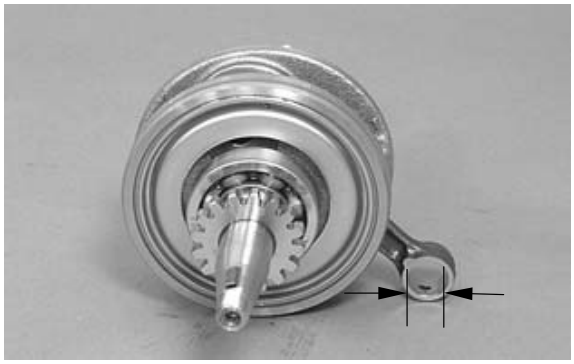


* Avoid damaging the crankcase mating surfaces.

CRANKSHAFT INSPECTION

Measure the connecting rod small end I.D.

Service Limit: 13.06 mm (0.5224 in)



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

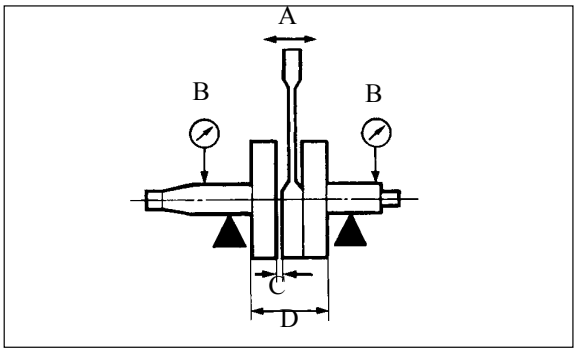
Service Limit: 0.6 mm (0.024 in)

Measure the crankshaft run out (B).

Service Limit: 0.1 mm (0.004 in)

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

Service Limit: 0.05 mm (0.002 in)



Measure the crank width (D).

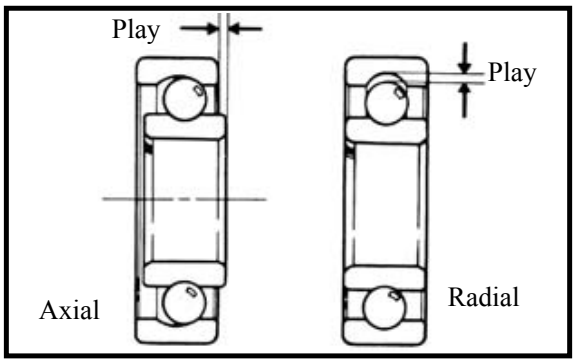
Out of specification: 42.15 ~ 42.2 mm (1.686 ~ 1.688 in)

Turn the crankshaft bearings and check for excessive play.
Measure the crankshaft bearing play.

Service Limit:

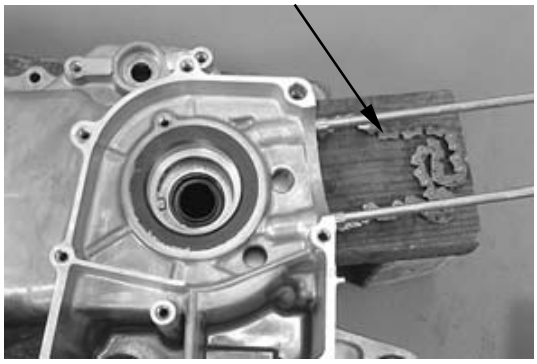
Axial : 0.2 mm (0.008 in)

Radial : 0.05 mm (0.002 in)



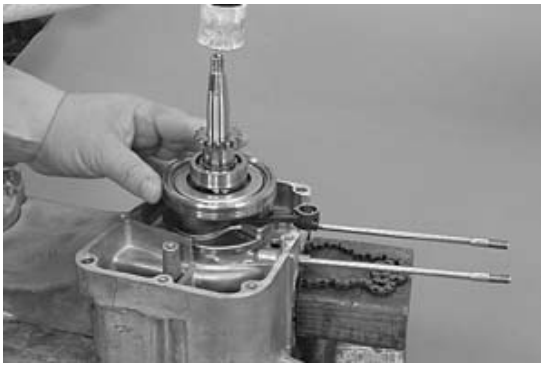
CRANKCASE/CRANKSHAFT INSTALLATION

Install the cam chain into the left crankcase.



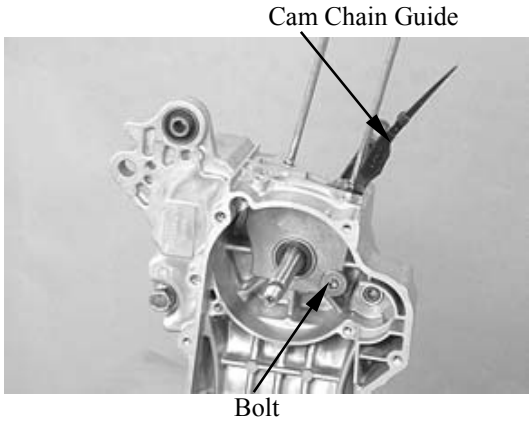
Install the crankshaft into the left crankcase.

* When installing the crankshaft, be careful not to damage the oil seal.



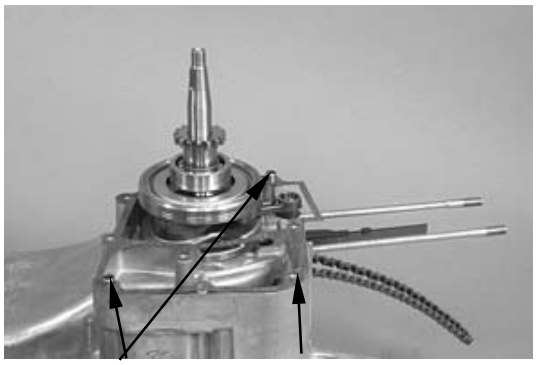
Install the cam chain guide and tighten the cam chain guide bolt.

Torque: 10 N·m (1 kgf·m, 7 lbf·ft)



Install the dowel pins and a new gasket onto the left crankcase.

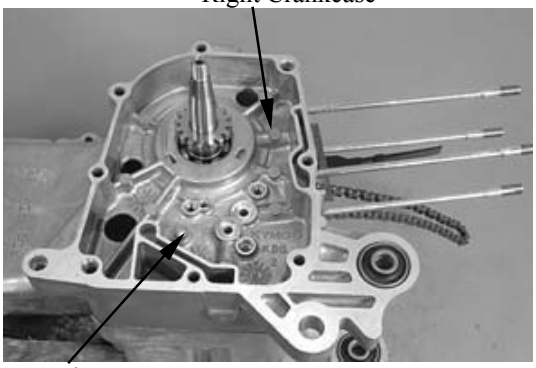
* Place the right crankcase over the crankshaft and onto the left crankcase.



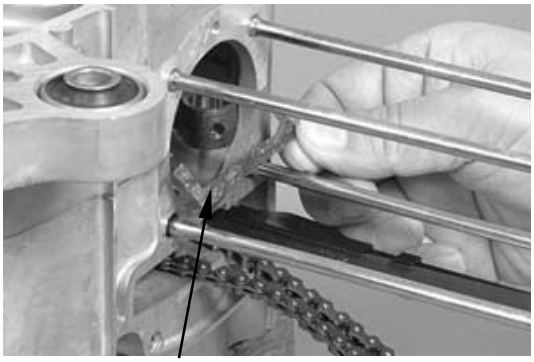
Install the right crankcase.

Tighten the crankcase attaching bolt.

Torque: 10 N·m (1 kgf·m, 7 lbf·ft)

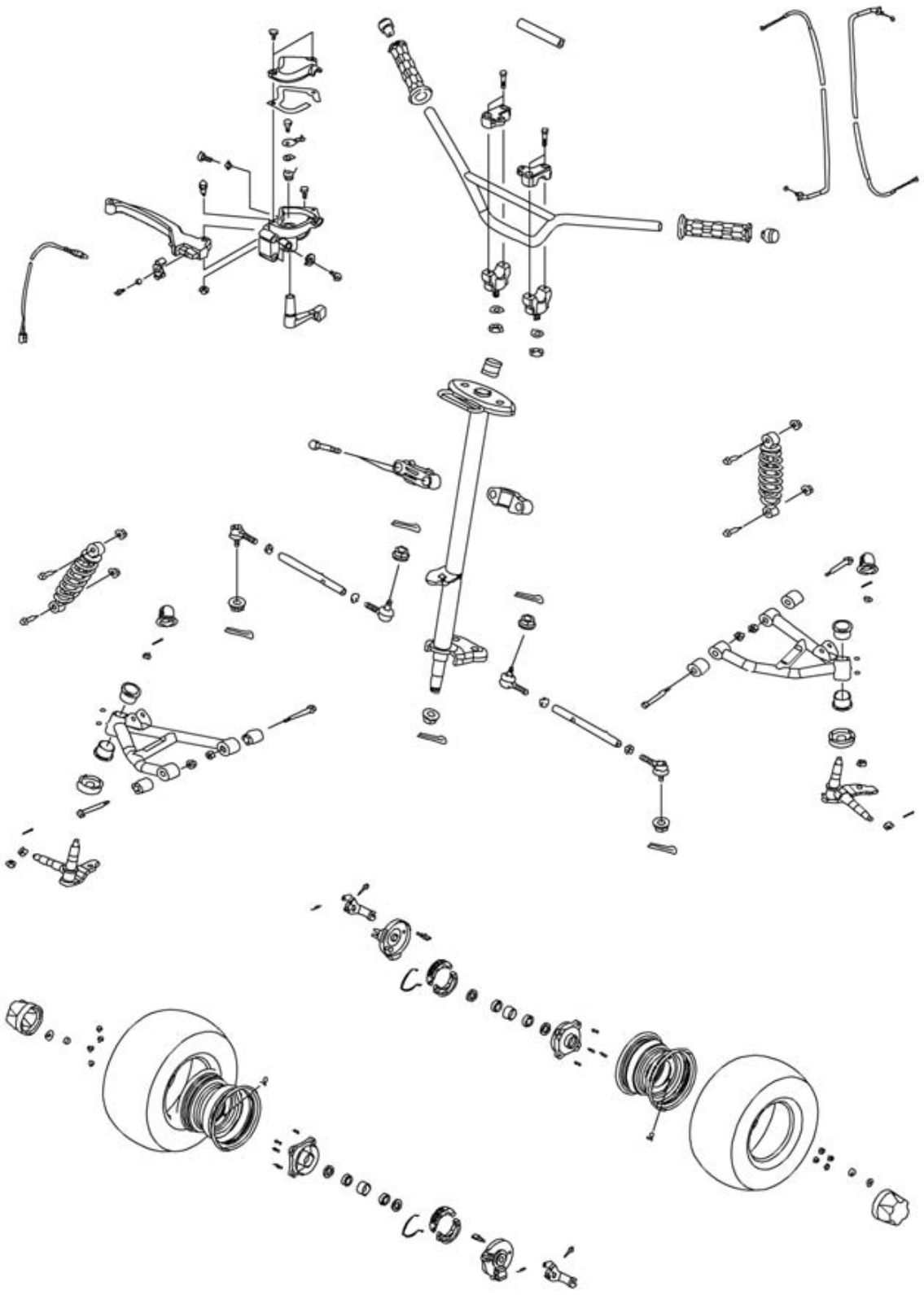


Cut the excessive part of the new gasket.



FRONT WHEEL/FRONT BRAKE/ FRONT SUSPENSION/STEERING SYSTEM

12.FRONT WHEEL/FRONT BRAKE/FRONT SUSPENSION/ STEERING SYSTEM



12. FRONT WHEEL/FRONT BRAKE/FRONT SUSPENSION/ STEERING SYSTEM

SERVICE INFORMATION

GENERAL INSTRUCTIONS

- Remove the machine frame covers before removing the front wheel. 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 drum and brake linings.
- Inspect the brake system before riding.

SPECIFICATIONS **mm (in)**

Item		Standard	Service Limit
Front wheel rim run out	Radial	—	2 (0.08)
	Axial	—	2 (0.08)
Front brake drum I.D		85 ~ 85.5 (3.4 ~ 3.42)	84 (3.36)
Front brake lining thickness		4 (0.16)	2 (0.08)
Tie-rod length		254.5 ~ 255.5 (10.18 ~ 10.22)	—
Rod end (tie-rod) angle		$15^{\circ} \pm 3^{\circ}$	—

TORQUE VALUES

Steering column nut	70 N·m (7 kgf·m, 50 lbf·ft)
Front arm nut	45 N·m (4.5 kgf·m, 32 lbf·ft)
Knuckle arm nut	50 N·m (5 kgf·m, 36 lbf·ft)
Front wheel nut	45 N·m (4.5 kgf·m, 32 lbf·ft)
Front axle nut	60 N·m (6 kgf·m, 43 lbf·ft)
Front shock absorber upper mount bolt	40 N·m (4 kgf·m, 29 lbf·ft)
Front shock absorber lower mount bolt	40 N·m (4 kgf·m, 29 lbf·ft)

12. FRONT WHEEL/FRONT BRAKE/FRONT SUSPENSION/ STEERING SYSTEM

SPECIAL TOOLS

Oil seal and bearing driver A120E00014

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

Poor brake performance

- Incorrectly adjusted brake
- Worn brake linings
- Contaminated brake lining surface
- Worn brake shoes at cam contacting area
- Worn brake drum
- Poorly connected brake arm

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

Front shock absorber noise

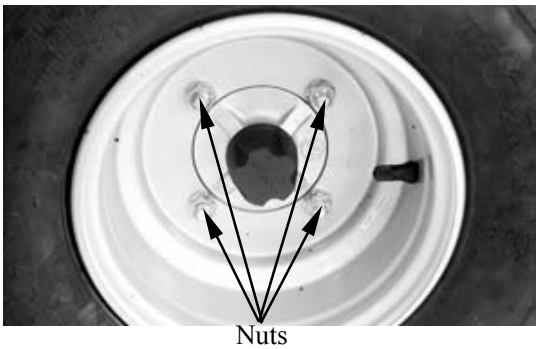
- Slider bending
- Loose arm fasteners
- Lack of lubrication

FRONT WHEEL

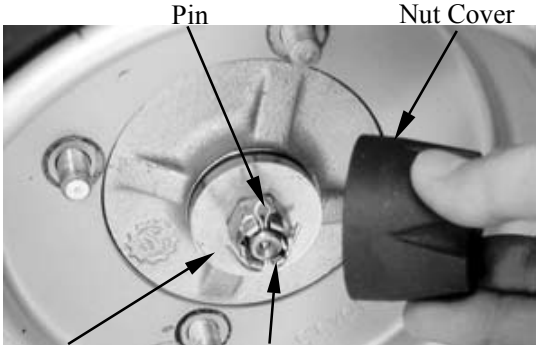
REMOVAL

Place the machine on a level place.
Remove four nuts attaching the wheel panel and front wheel.
Elevate the front wheels by placing a suitable stand under the frame.

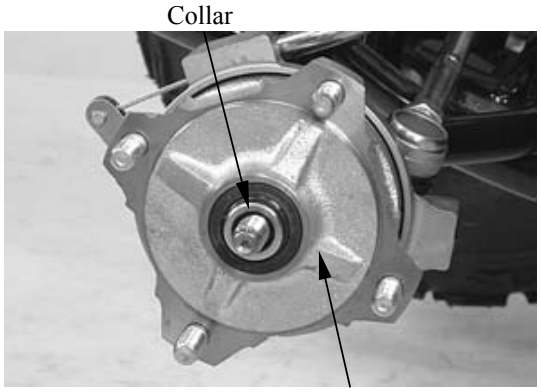
⚠WARNING
Support the machine securely so there is no danger of it falling over.



Remove the nut cover.
Remove the cotter pin.
Remove nut attaching the wheel hub and washer.



Remove the collar and wheel hub.

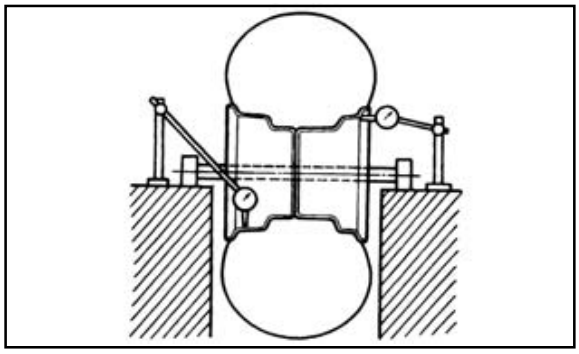


INSPECTION

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

Radial: 2 mm (0.08 in)

Axial: 2 mm (0.08 in)



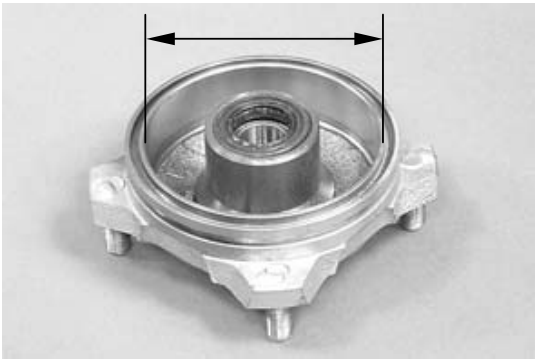
Inspect the front wheel hub.
Replace it if cracks or damage.

Inspect the front brake drum.
Measure the front brake drum I.D.

Service limits: 84 mm (3.36 in)

*

Keep oil or grease off the brake drum.

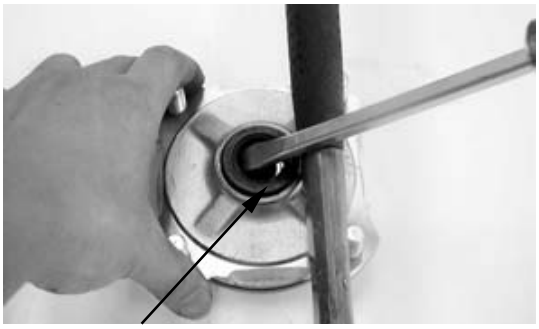


Turn the inner race of each bearing with your finger to see if they turn smoothly and quietly. Also check if the outer race fits tightly in the hub.

Replace the bearings if the races do not turn smoothly, quietly, or if they fit loosely in the hub.

FRONT WHEEL HUB DISASSEMBLY

Remove the dust seal of each side.

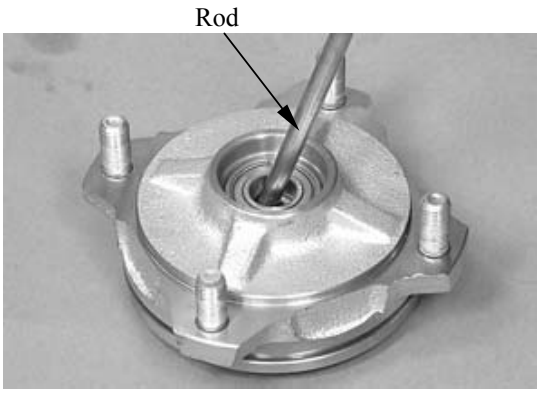


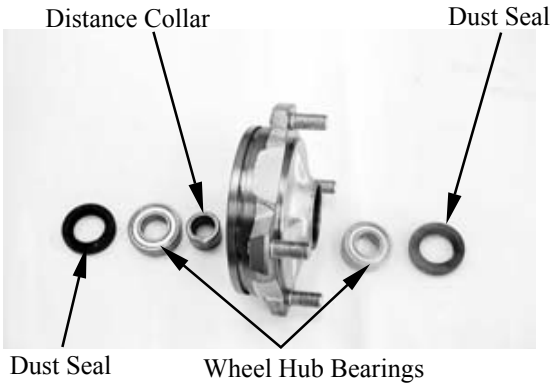
Drive the bearing a few times to make the free play.

✻

Drive the bearing on the other side of the hub when it is not make the free play.

Drive the distance collar with a suitable rod and remove the front wheel hub bearings and distance collar.



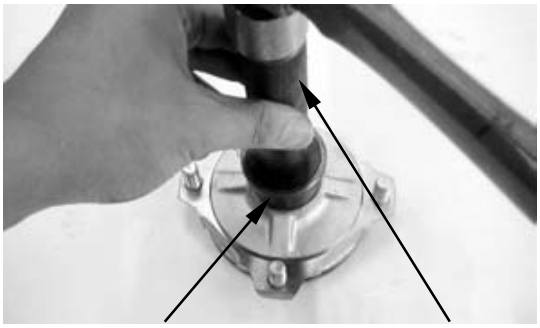


ASSEMBLY

Apply grease to a new dust seal lip and install the dust seal.

Pack all bearing cavities with grease.
Drive in the outside bearing.
Install the distance collar.
Drive in the inside bearing.

* • Do not allow the bearings to tilt while driving them in.
  • Drive in the bearing squarely with the sealed end facing out.



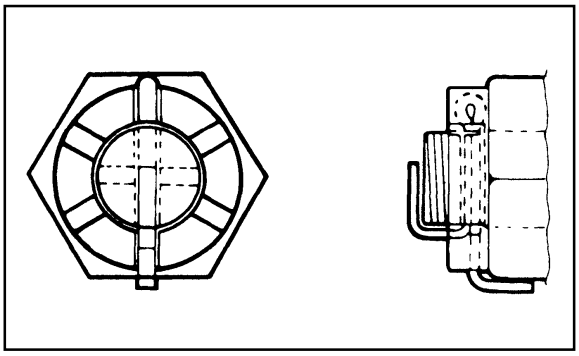
Special Tool:
Oil seal and bearing driver A120E00014

INSTALLATION

Reverse the "FRONT WHEEL REMOVAL" procedures.
Apply the grease onto the bearings and oil seal lips of the wheel hub.
Install wheel hub, side collar, washer and tighten the axle nut.

Torque: 60 N·m (6 kgf·m, 43 lbf·ft)

Install cotter pins and nut cover.



* Always use a new cotter pin.

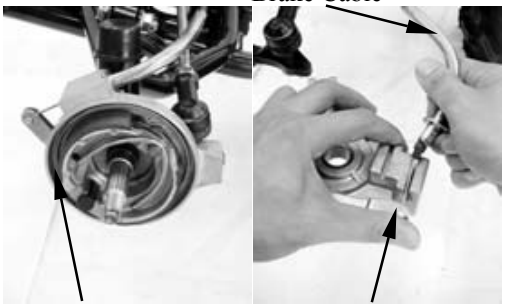
* Do not loosen the axle nut after torque tightening. If the axle nut groove is not aligned with the cotter pin hole, align groove with the hole by tightening up on the axle nut.

Install the front wheel and tighten the wheel nuts.
Torque: 45 N·m (4.5 kgf·m, 32 lbf·ft)

FRONT BRAKE

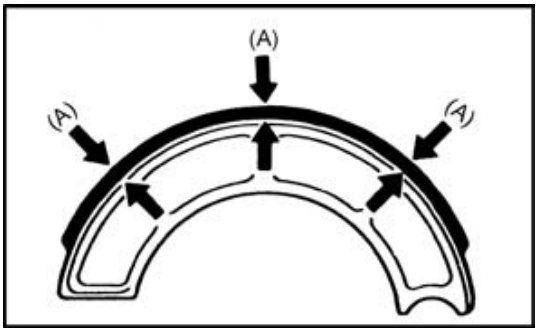
REMOVAL

Remove the wheel hub. (See page 12-4)
Pull brake shoe plate out from steering knuckle.
Disconnect the front brake cable from brake cam lever and remove the brake shoe plate.



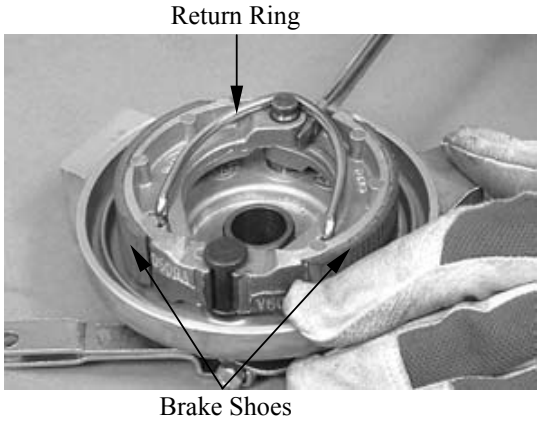
INSPECTION

Measure the front brake lining thickness (A).
Service Limit: 2.0 mm (0.08 in)
Replace it if below service limit.



DISASSEMBLY

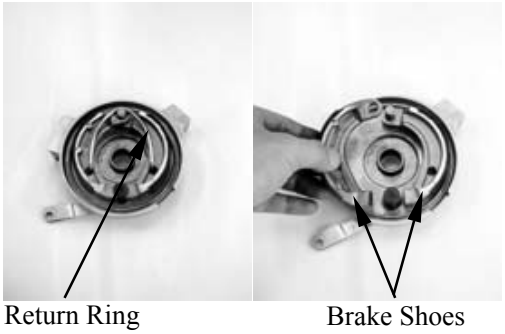
Remove return ring.
Remove the brake shoes.



ASSEMBLY

Reverse the "DISASSEMBLY" procedures.

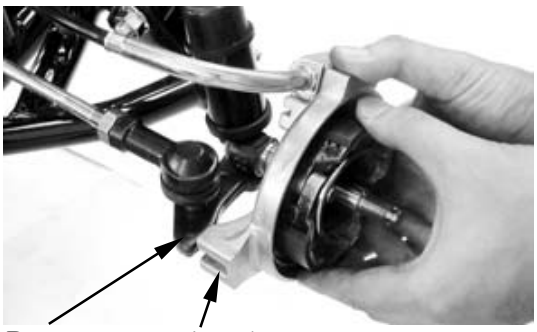
* Keep oil or grease off the brake linings.



Install the brake shoe plate.

*

Make sure that the boss on the knuckle correctly engages with the locating slot on the brake shoe plate.



Install front wheel. (See page 12-7)

Adjust the front brake cable free play.
Refer to the "BRAKE LEVER FREE PLAY" section in the chapter 3.

Brake cable free play: 10 ~ 20 mm (0.4 ~ 0.8 in)

FRONT SUSPENSION

REMOVAL

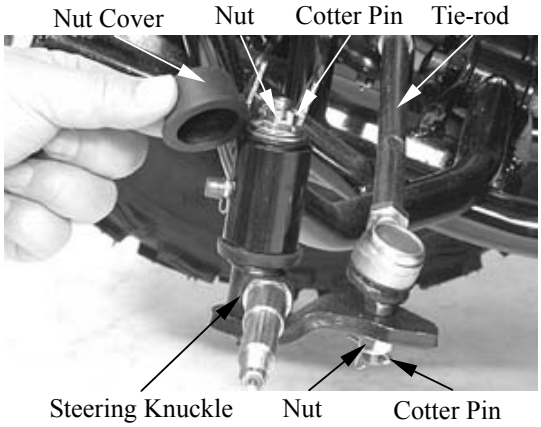
Elevate the front wheels by placing a suitable stand under the frame.

⚠WARNING

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

Remove the front wheel, wheel hub, brake shoe plate. (Refer to chapter 12.)
Remove the upper and lower bolt, then remove the shock absorber.

Remove the cotter pin and nut attaching the tie-rod and steering knuckle.
Remove nut cover at the front arm.
Remove the cotter pin and nut attaching the front arm and steering knuckle.
Remove steering knuckle.



INSPECTION

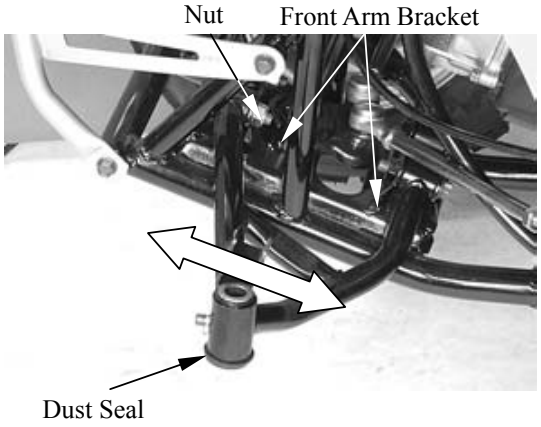
Inspect the shock absorber rod.
Replace the shock absorber assembly if bends or damage.
Inspect the shock absorber.
Replace the shock absorber assembly if oil leaks.
Inspect the spring of the shock absorber by moving the spring up and down.
Replace the shock absorber assembly if fatigue.

Inspect the steering knuckle.
Replace if cracks, pitting or damage.

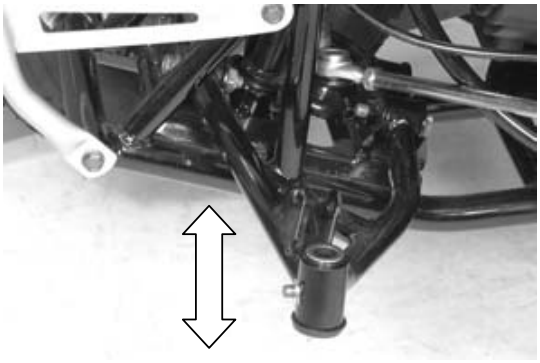
Check the front arm brackets of the frame.
If bent, cracked or damaged, repair or replace the frame.
Check the tightening torque of the front arms securing nuts.

Torque: 45 N·m (4.5 kgf·m, 32 lbf·ft)

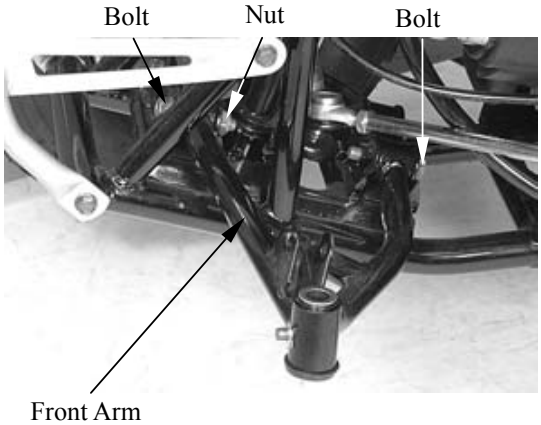
Check the dust seal.
If wear or damage, replace the dust seal.
Check the front arm side play by moving it from side to side.
If side play noticeable, replace the bushings.



Check the front arm vertical movement by moving it up and down.
If vertical movement is tight, binding or rough, then replace the bushings.



Remove the two bolts and nut attaching the front arm.
Remove the front arm.



Inspect the front arm.
Replace if cracks, bends or damage.

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

Inspect bushes.
Replace if wear or damage.

INSTALLATION

Reverse the "REMOVAL" procedures.

* Apply the grease onto the bushes.

Install the front arm onto the frame and tighten the bolts and nut.
Torque: 45 N·m (4.5 kgf·m, 32 lbf·ft)

* Apply the grease onto the bushes.

Install the steering knuckle into the front arm and tighten the knuckle arm nut.
Torque: 50 N·m (5 kgf·m, 36 lbf·ft)

Install the cotter pin and band ends of cotter pin.

* Always use a new cotter pin.

Install the tie-rod into the steering knuckle and tighten the tie-rod end nut.
Torque: 35 N·m (3.5 kgf·m, 25 lbf·ft)

Install the cotter pin and band ends of cotter pin.

* Always use a new cotter pin.

STEERING SYSTEM

HANDLEBAR REMOVAL

Remove the following parts:
Handlebar and Front Fender
Refer to the "FRAME COVERS" section in the chapter 2.

INSPECTION

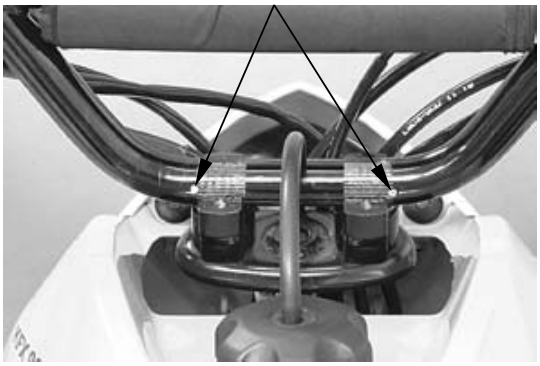
Inspect the handlebar.
Replace it if cracks, bends or damage.

INSTALLATION

Install handlebar and handlebar holder, then tighten the four bolts.
Torque: 14 N·m (1.4 kgf·m, 10 lbf·ft)

* Align the mark on the handlebar with the lower handlebar holder surface.
* Be sure the projection of the upper handlebar holder face to front.
* Fist tighten the bolts on the front side of the handlebar holder, and then tighten the bolts on the rear side.

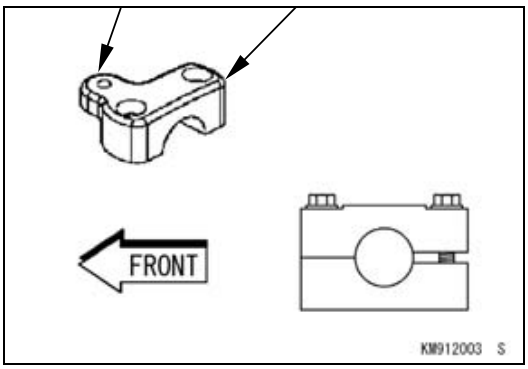
Mark



Refer to the "FRONT BRAKE LEVER FREE PLAY" section in the chapter 3 to adjust front brake.

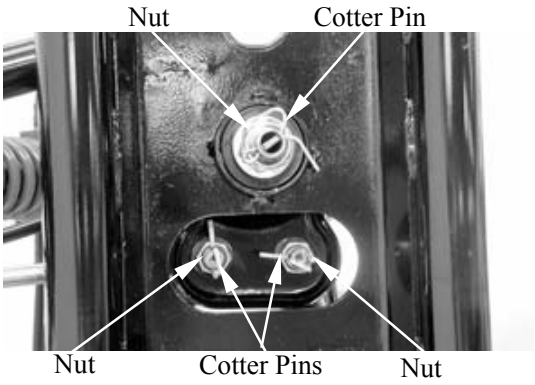
Brake cable free play: 10 ~ 20 mm (0.4 ~ 0.8 in)

Projection Upper Handlebar

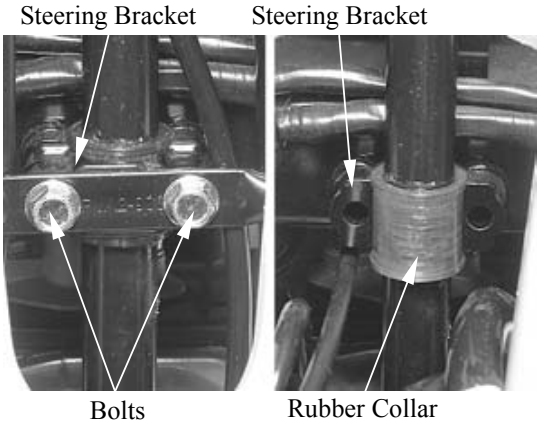


STEERING COLUMN REMOVAL

Remove handlebar. (Refer to the "FRAME COVER" section in the chapter 2)
Remove the cotter pins and nuts attaching the tie-rods, then remove tie-rods.
Remove the cotter pin and nut attaching the steering column, then remove steering column and collar.



Remove the two bolts to remove the front fender bracket, steering bracket and rubber collar.
Remove steering column and collar.

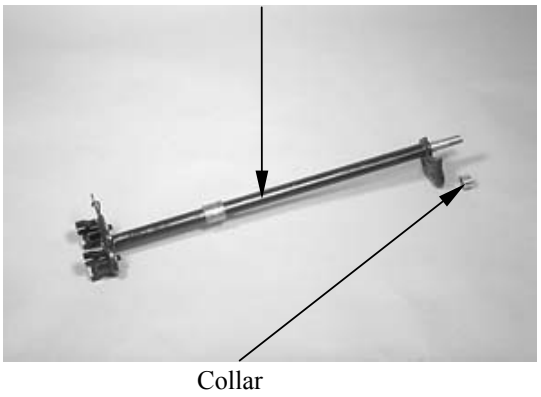


INSPECTION

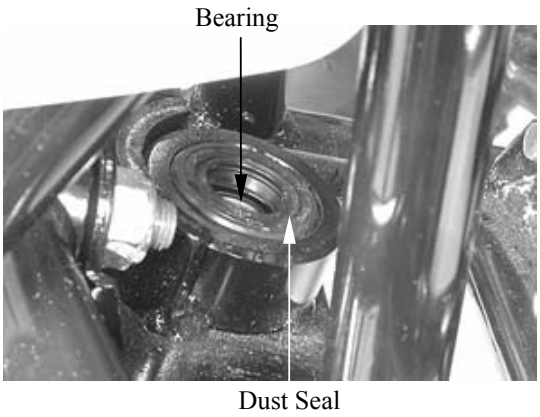
Inspect the steering column.
Replace it if bends or damage.

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

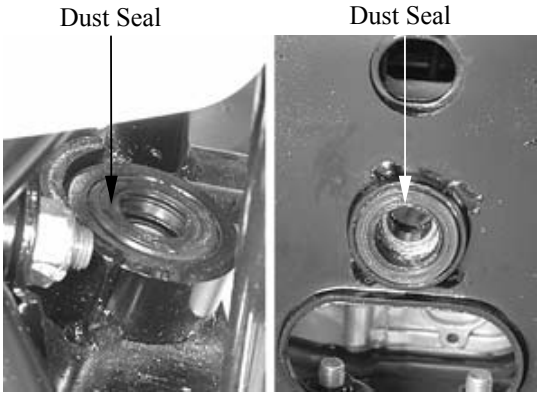
Inspect the collar.
Replace it if wear or damage.



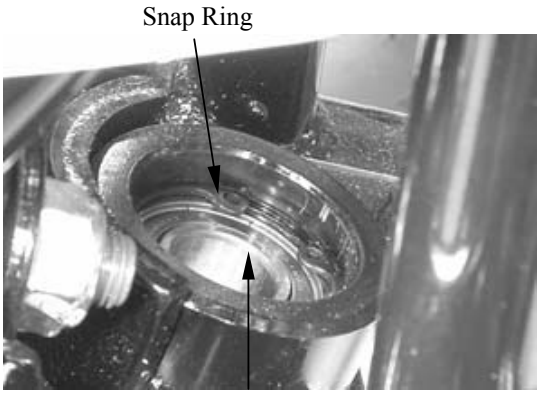
Inspect the dust seals, and bearing.
Replace them if wear or damage.



Remove the dust seals of each frame side.



Remove the snap ring.
Remove the bearing.



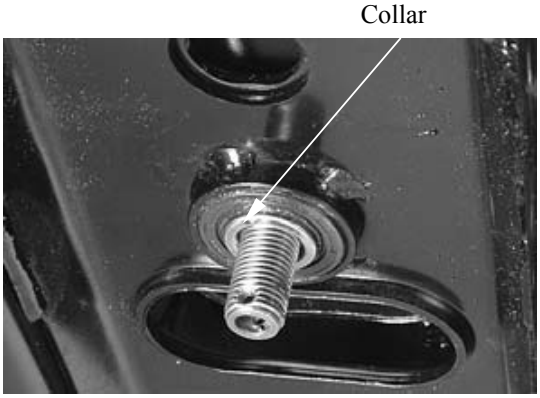
INSTALLATION

Apply grease to a new dust seal lip and install the dust seal (under frame).
Pack bearing cavities with grease.
Drive in the bearing and install snap ring.
Apply grease to a new dust seal lip and install the dust seal.

* • Do not allow the bearings to tilt while driving them in.
  • Drive in the bearing squarely with the sealed end facing out.

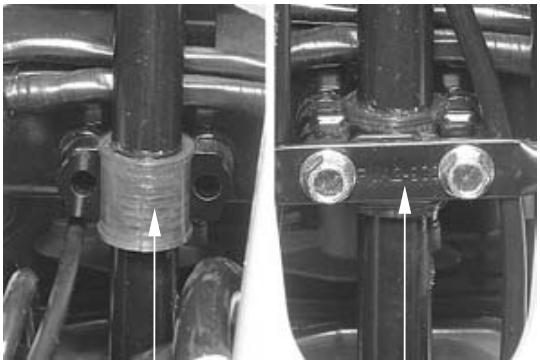
Special Tool:
Oil seal and bearing driver A120E00014

Apply the grease onto the bearings and oil seal lips of the frame.
Install steering column and collar, then tighten the nut.
Torque: 70 N·m (7 kgf·m, 50 lbf·ft)
Install cotter pins and band ends of cotter pin.



* Always use a new cotter pin.

Apply the grease onto the rubber collar and then install the rubber collar.
Install the steering bracket and front fender bracket, and tighten the two bolts.
Torque: 22 N·m (2.2 kgf·m, 16 lbf·ft)



Install the tie-rods and tighten the nuts.
Torque: 35 N·m (3.5 kgf·m, 25 lbf·ft)

Install the cotter pin and bend the ends of cotter pin.

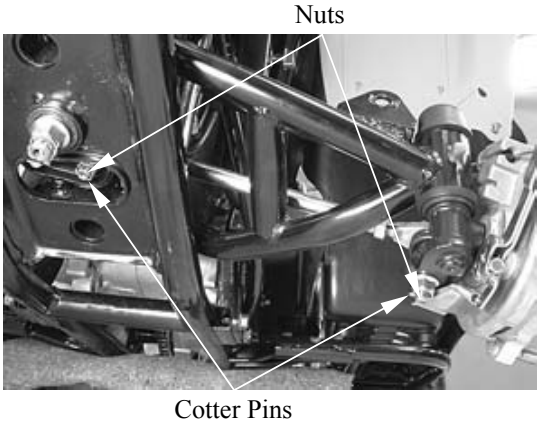
* Always use a new cotter pin.

Apply the grease onto the end of the throttle cable and end of the brake cable.

TIE-ROD

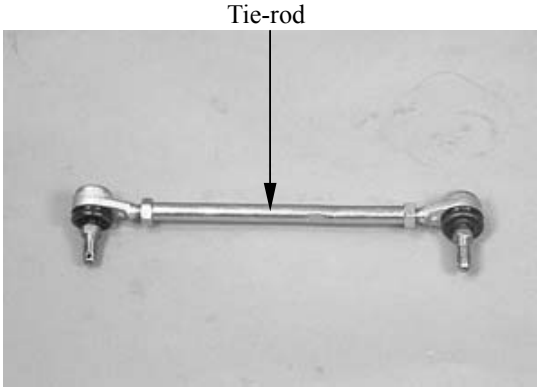
REMOVAL

Remove the cotter pin and nut at the steering knuckle.
Remove the cotter pin and nut at the steering column.
Remove the tie-road.

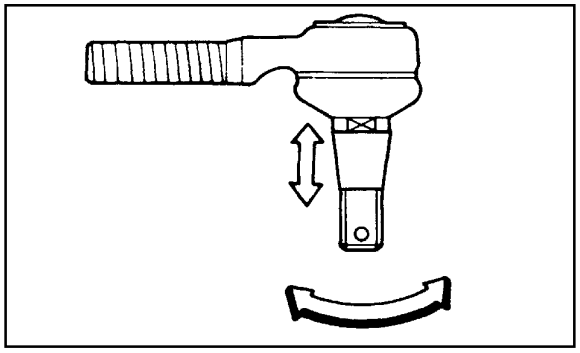


INSPECTION

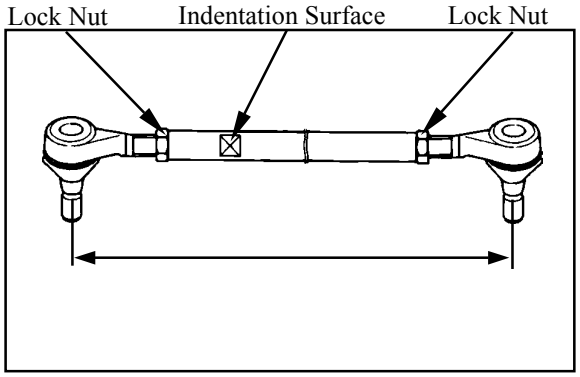
Inspect the tie-rod.
Replace it if bend or damage.



Check the tie-rod end movement.
Replace it if the tie-rod end exists free play or turns roughly.
Check the tapered surface of the tie-rod end.
Replace it if pitting, wear or damage.

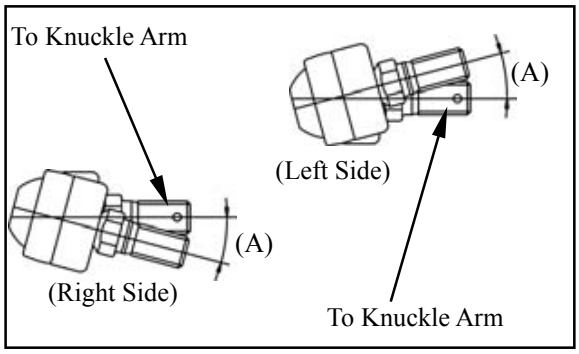


Adjust the tie-rod length.
Adjustment steps:
(The following procedures are done on both tie-rods, right and left.)
Loosen the lock nuts.
Adjust the tie-rod length by tuning both tie-rod ends.
Tie rod length: 254.5 ~ 255.5 mm (10.18 ~ 10.22 in)



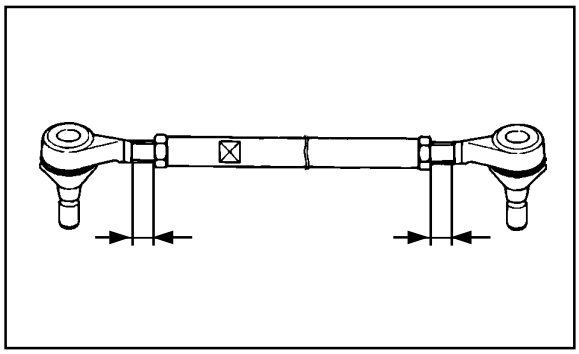
Set the rod end (steering column side) in an angle where the indentation surface of the tie-rod is parallel to the rod end shaft, and then tighten the lock nut.
Torque: 35 N·m (3.5 kgf·m, 25 lbf·ft)

Set the other rod end (knuckle arm side) in an angle as shown (right-hand tie-rod and left-had tie-rod), and then tighten the lock nut.
Rod end (tie-rod) angle (A): 15°±3°
Torque: 35 N·m (3.5 kgf·m, 25 lbf·ft)



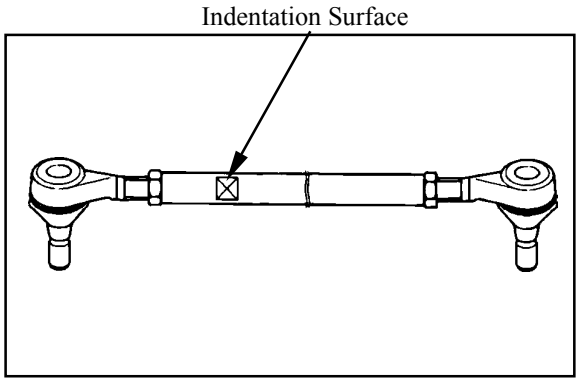
* After making adjustment on both tie rods be sure to mark them R and L for identification.

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



INSTALLATION

Install the tie-rod and tighten the tie-rod end nuts.
Torque: 35 N·m (3.5 kgf·m, 25 lbf·ft)



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

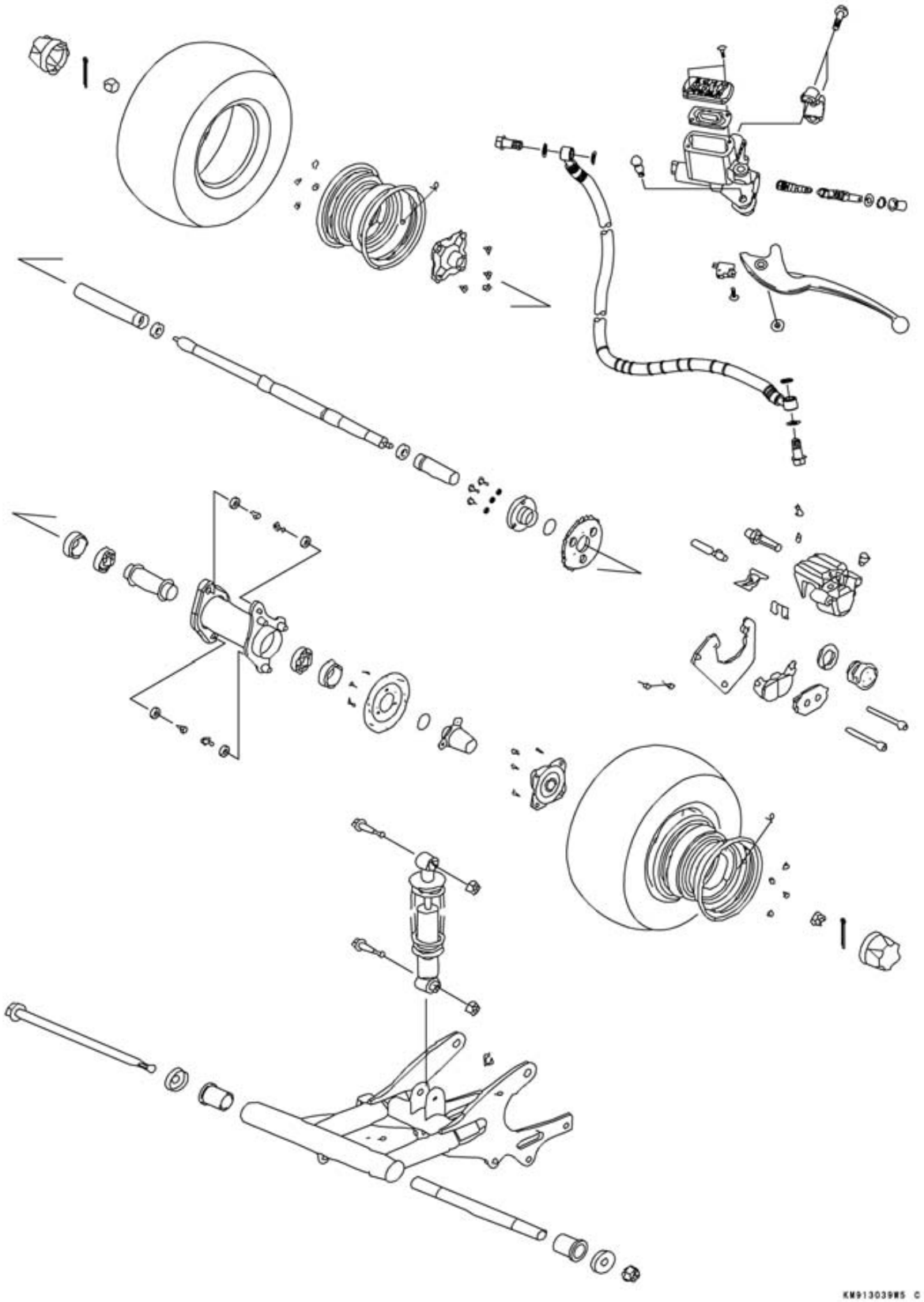
Install the cotter pins and band ends of cotter pin.

* Always use a new cotter pin.

Refer to the “TOE-IN ADJUSTMENT” section in the chapter 3 to adjust toe-in.

REAR WHEEL/SWING ARM/ HYDRAULIC BRAKE

13. REAR WHEEL/SWING ARM/HYDRAULIC BRAKE



13. REAR WHEEL/SWING ARM/HYDRAULIC BRAKE

SERVICE INFORMATION

GENERAL INSTRUCTIONS

- During servicing, keep oil or grease off the brake disk and brake pads.
- Drain the brake fluid from the hydraulic brake system before disassembly.
- Contaminated brake disk or brake pads reduce stopping power. Clean the contaminated brake disk with high-performance brake degreaser and replace the brake pads.
- Do not use brake fluid for cleaning.
- Bleed air from the brake system if the brake system is removed or the brake is soft.
- Do not allow any foreign matters entering the brake reservoir when filling the brake reservoir with brake fluid.
- Brake fluid will damage painted, coated surfaces and plastic parts. When working with brake fluid, use shop towels to cover and protect painted, rubber and plastic parts. Wipe off any splash of brake fluid with a clean towel. Do not wipe the vehicle with a towel contaminated by brake fluid.
- Make sure to use recommended brake fluid. Use of other unspecified brake fluids may cause brake failure.
- Inspect the brake operation before riding.

SPECIFICATIONS

mm (in)

Item			Standard	Service Limit
Rear wheel	Rim run out	Radial	—	2 (0.08)
		Axial	—	2 (0.08)
Brake disk thickness			3.8 ~ 4.2 (0.152 ~ 0.168)	3 (0.12)
Brake disk runout			—	0.3 (0.012)

TORQUE VALUES

Rear wheel nuts	45 N·m (4.5 kgf·m, 32 lbf·ft)
Rear shock absorber upper mount bolt	40 N·m (4 kgf·m, 29 lbf·ft)
Rear shock absorber lower mount bolt	40 N·m (4 kgf·m, 29 lbf·ft)
Swing arm nut	70 N·m (7 kgf·m, 50 lbf·ft)
Rear axle nuts	80 N·m (8 kgf·m, 58 lbf·ft)
Caliper holder bolts	32 N·m (3.2 kgf·m, 23 lbf·ft)
Brake hose banjo bolts	35 N·m (3.5 kgf·m, 25 lbf·ft)
Caliper bleed valve	6 N·m (0.6 kgf·m, 4 lbf·ft)
Master cylinder bolts	12 N·m (1.2 kgf·m, 9 lbf·ft)
Rear sprocket holder bolts	26 N·m (2.7 kgf·m, 20 lbf·ft)

13. REAR WHEEL/SWING ARM/HYDRAULIC BRAKE

TROUBLESHOOTING

Rear wheel wobbling
- Bent rim
- Faulty tire
- Axle not tightened properly

Soft rear shock absorber
- Weak shock absorber spring
- Faulty damper

Loose brake lever
- Air in hydraulic brake system
- Brake fluid level too low
- Hydraulic brake system leakage

Hard braking
- Seized hydraulic brake system
- Seized piston

Brake noise
- Contaminated brake pad surface
- Excessive brake disk run out
- Incorrectly installed caliper
- Brake disk or wheel not aligned

Poor brake performance
- Air in brake system
- Deteriorated brake fluid
- Contaminated brake pads and brake disk
- Worn brake pads
- Worn brake master cylinder piston oil seal
- Clogged brake fluid line
- Deformed brake disk
- Unevenly worn brake caliper

Tight brake lever
- Seized piston
- Clogged hydraulic brake system
- Smooth or worn brake pad

Poor brake performance

Contaminated brake pad surface

REAR WHEEL

REAR WHEEL REMOVAL

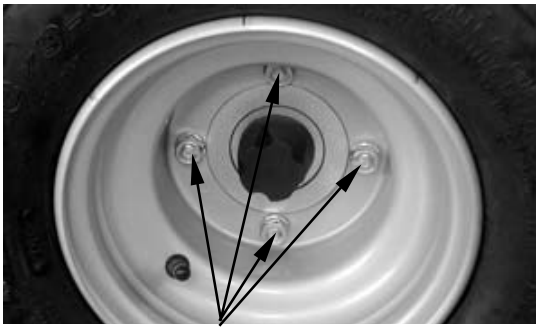
Place the machine on a level place.
Remove four nuts attaching the wheel.

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

⚠WARNING

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

Remove wheel.



Nuts

INSPECTION

Measure the wheel runout.

Service Limit:

Radial: 2 mm (0.08 in)

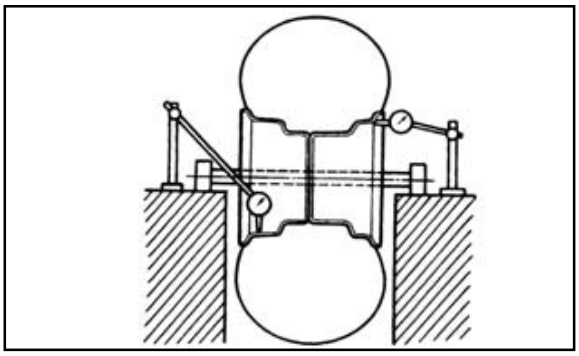
Axial: 2 mm (0.08 in)

Replace wheel if out of specification.

REAR WHEEL INSTALLATION

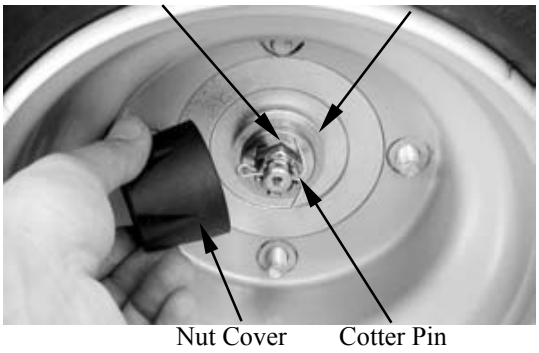
Install the rear wheel and tighten the wheel nuts.

Torque: 45 N·m (4.5 kgf·m, 32 lbf·ft)



REAR WHEEL HUB REMOVAL

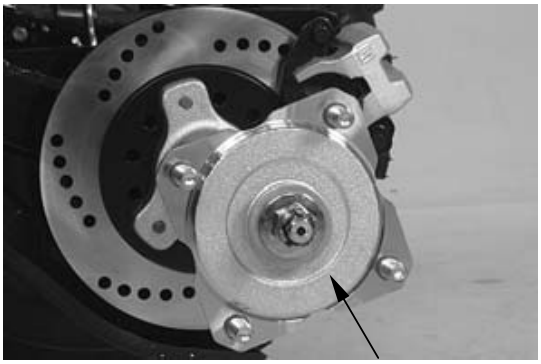
Remove rear wheel nuts. (See page 13-4)
Remove the wheel hub nut cover and cotter pin.
Loosen nut attaching the wheel hub.



Remove rear wheel. (See page 13-4)
Remove wheel hub nut, washer and wheel hub.
Elevate the rear wheels by placing a suitable stand under the rear of frame.

⚠WARNING

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



REAR WHEEL HUB INSPECTION

Replace it if the wheel hub is cracks or damage.
Replace it if splines of the wheel hub are wear or damage.

REAR WHEEL HUB INSTALLATION

* Apply grease onto the splines of the wheel hub.

Install wheel hub, washer and axle nut.

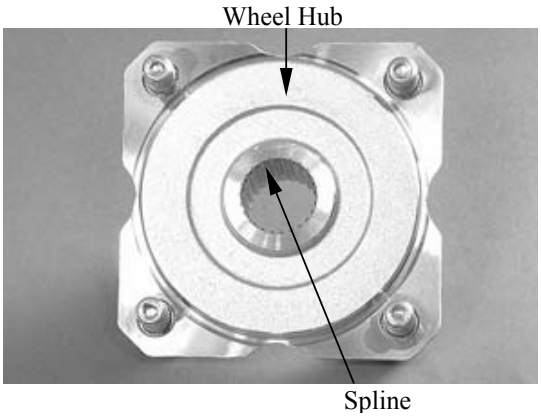
First, tighten the left axle nut and then tighten the right axle nut.

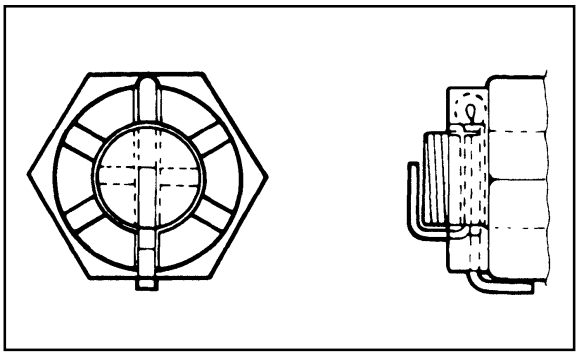
Torque: 80 N·m (8 kgf·m, 58 lbf·ft)

Install the cotter pin and band ends of cotter pin.

* Do not loosen the axle nut after torque tightening. If the axle nut groove is not aligned with the cotter pin hole, align groove with the hole by tightening up on the axle nut.

* Always use a new cotter pin.

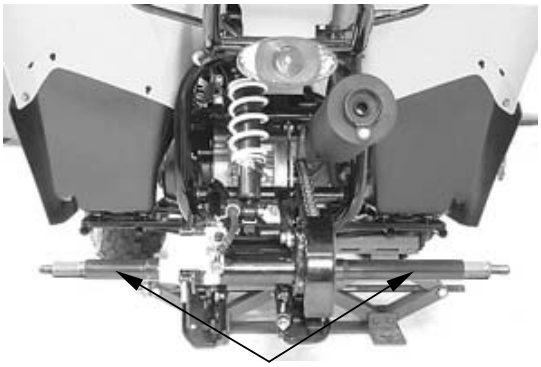




REAR AXLE REMOVAL

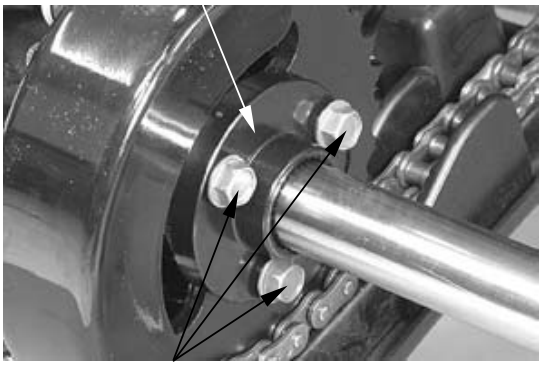
Remove the rear wheel hub of the both rear wheels. (See page 13-5)

Remove the collars on the rear axle right and left side.

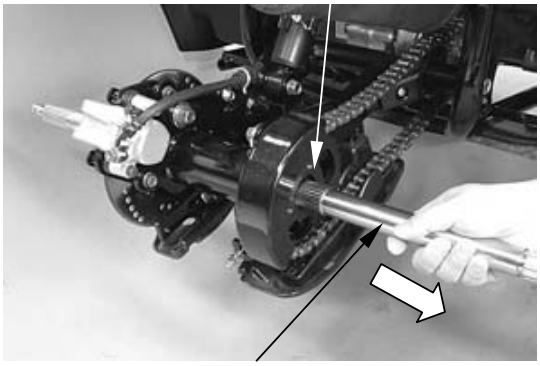


Relax the drive chain. (Refer to the "DRIVE CHAIN SLACK INSPECTION" section in the chapter 3.)

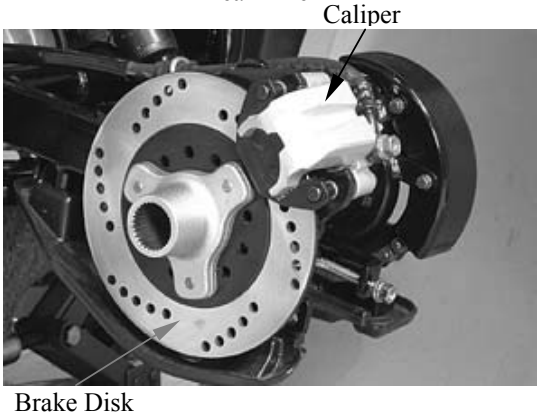
Remove the sprocket holder bolts and sprocket holder.



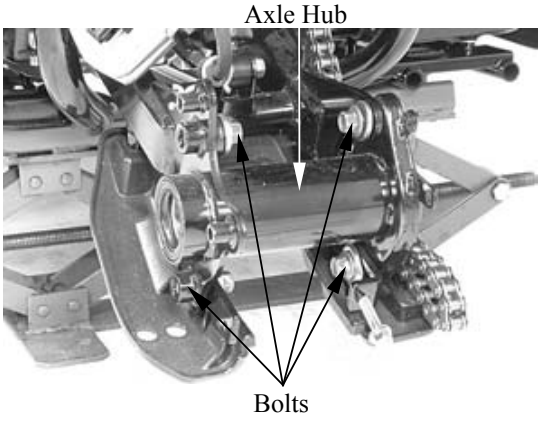
Remove the rear axle from right side.
Remove the driven sprocket.



Remove the two bolts and caliper, and then remove brake disk.

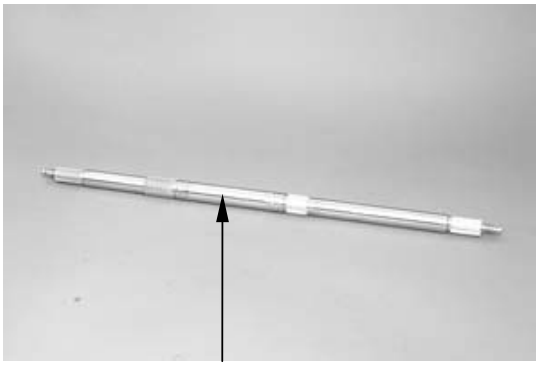


Remove the four bolts and rear axle hub.



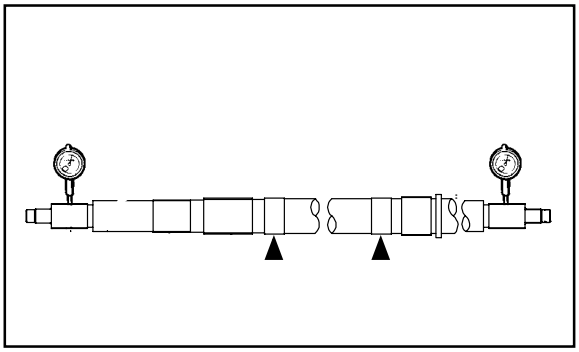
INSPECTION

Replace the rear axle if it is scratched (excessively) or damage.
Replace it if splines and threads of the rear axle are wear or damage.

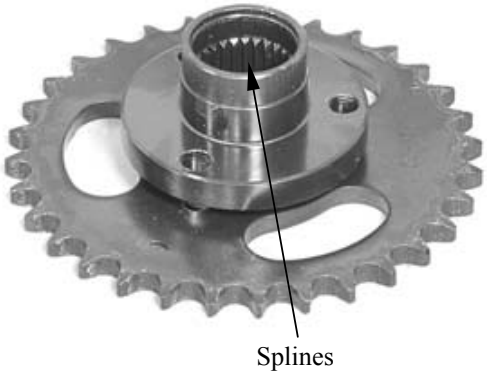


Measure the rear axle run out.
Service limit: less than 1.5 mm (0.06 in)
Replace it if it is out of specification.

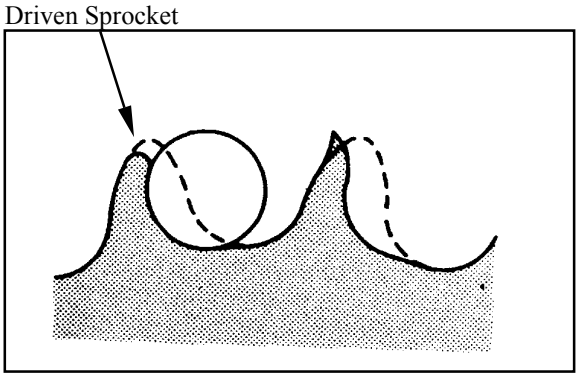
✻ Do not attempt to straighten a bent axle.



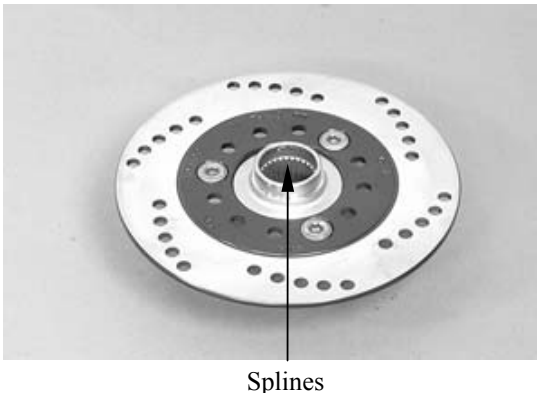
Replace it if the driven sprocket is cracks or damage.
Replace it if splines of the driven sprocket are wear or damage.



Inspect the driven sprocket.
Replace sprocket if more than 1/4 teeth wear or bent teeth.



Replace it if the brake disk is cracks or damage.
Replace it if splines of the brake disk are wear or damage.

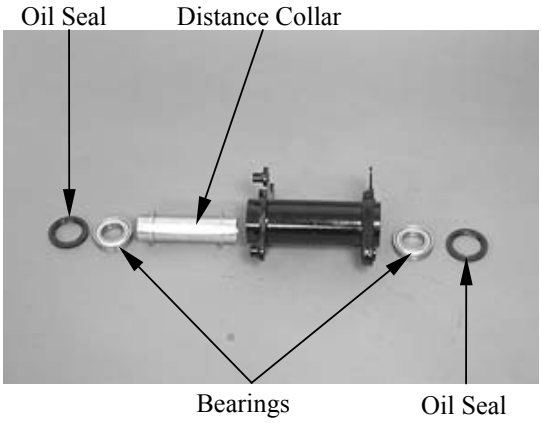


Inspect rear axle hub.
Replace it if bearing allow play in the axle hub or the bearing turns roughly.
Replace it if oil seal is wear or damage.
Replace it if rear axle hub is cracks, bend or damage.
Bearing and oil seal replacement steps:

Clean the outside of the rear axle hub.
Remove the oil seal by a flat-head screw driver.

*

Place a wood block against the outer edge to protect this edge.



Remove the bearing by a general bearing puller.
Install the new bearings and oil seal by reversing the previous steps.

*

Do not strike the center race or balls of the bearing.
Contact should be made only with the outer race.

REAR AXLE INSTALLATION

Reverse the "REAR AXLE REMOVAL" procedures.
Install the rear axle hub.

*

Apply grease onto the oil seal lips, bearings and bushes.

*

At this time, the rear axle hub should not be tightened completely.
Final tightening is done after the chain slack adjustment.

Install the driven sprocket so that the stepped side faces outward.
Install the rear axle.
Install the sprocket holder and bolts.
Torque: 26 N·m (2.7 kgf·m, 20 lbf·ft)
Install brake disk and collars.

Install wheel hub (see page 13-5) and rear wheel (see page 13-4).

Adjust drive chain slack. (Refer to the "DRIVE CHAIN SLACK INSPECTION" section in the chapter 3.)
Approximately: 10 ~ 20 mm (0.4 ~ 0.8 in)

Drive Sprocket

SWING ARM

REAR SHOCK ABSORBER REMOVAL

Place the machine on a level place.
Elevate the rear wheels by placing a suitable stand under the rear of frame.

⚠WARNING

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

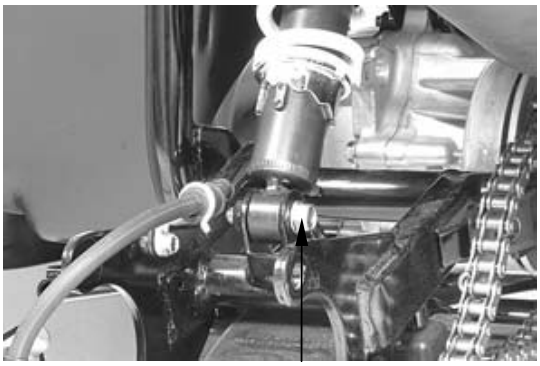
Remove the rear wheels, rear hubs, rear axle and axle hub. (Refer to the "REAR WHEEL" section in the chapter 13.)

Remove the lower bolt attaching the rear shock absorber.

*

When removing the lower bolt, hold the swing arm so that it does not drop downwards when the bolt is removed.

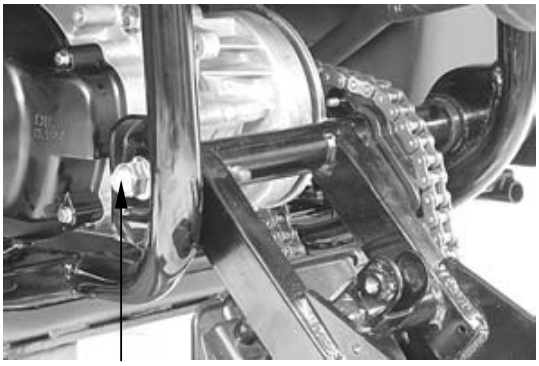
Remove the upper bolt and then remove the shock absorber.



Lower Bolt

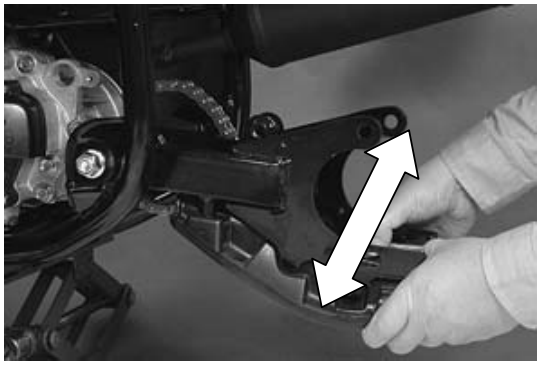
INSPECTION

Check the tightening torque of the pivot shaft (swing arm) securing nut.
Torque: 70 N·m (7 kgf·m, 50 lbf·ft)

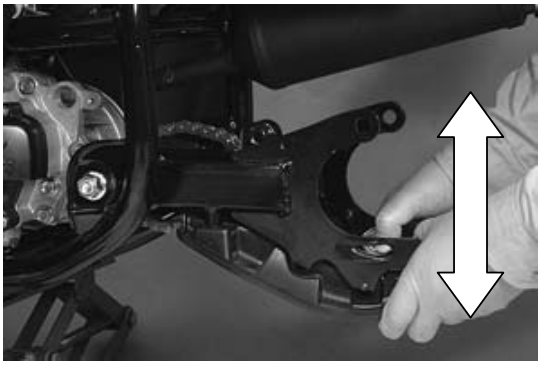


Securing Nut

Check the swing arm side play by moving it from side to side.
If side play noticeable, check the inner collar, bushing and thrust cover.

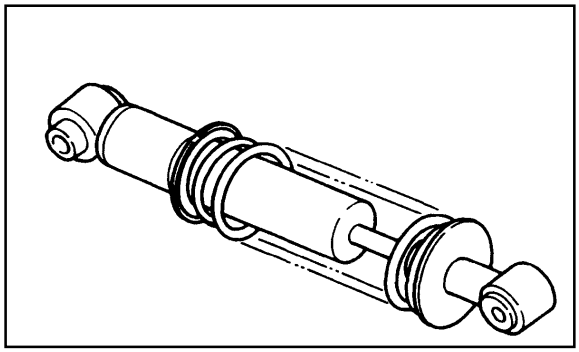


Check the swing arm vertical movement by moving it up and down.
If vertical movement is tight, binding or rough, to check the inner collar, bushing and thrust cover.



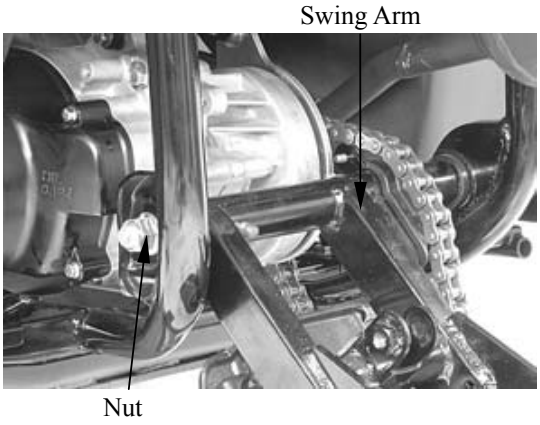
REAR SHOCK ABSORBER INSPECTION

Inspect the shock absorber rod.
Replace the shock absorber assembly if bends or damage.
Inspect the shock absorber.
Replace the shock absorber assembly if oil leak.
Inspect the spring.
Move the spring up and down.
Replace the shock absorber assembly if fatigue.

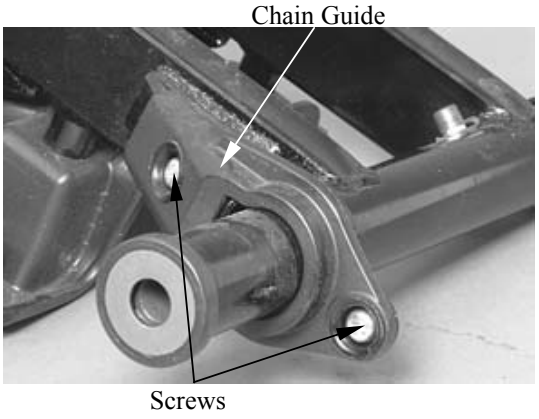


SWING ARM REMOVAL

Remove the nut and pivot shaft, then remove swing arm.

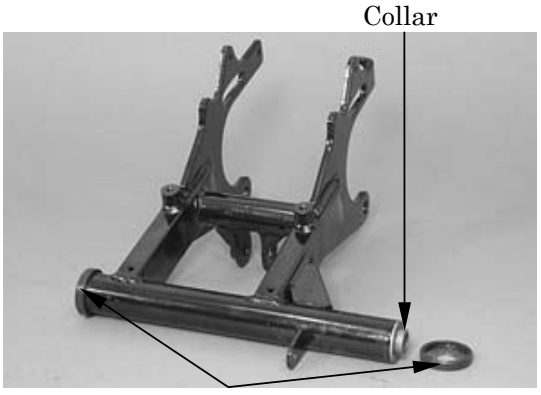


Remove the two screws and chain guide.



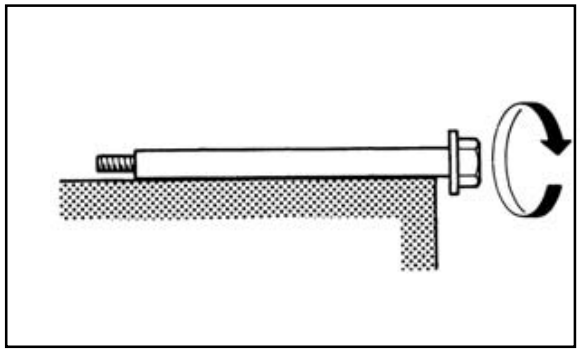
Remove the four bolts and guard.

Remove thrust covers and collar.



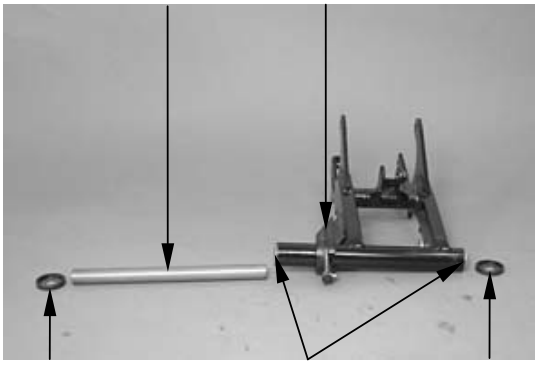
INSPECTION

Roll the axle on a flat surface to inspect the pivot shaft.
Replace it if bends.

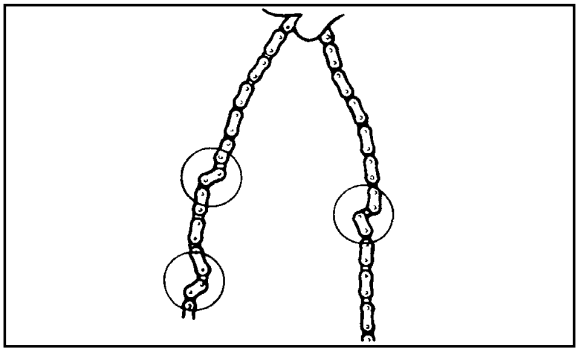


* Do not attempt to straighten a bent axle.

Inspect the swing arm.
Replace it if crack, bend or damage.
Inspect the thrust cover, chain guide, collar and bush.
Replace them if wear or damage.

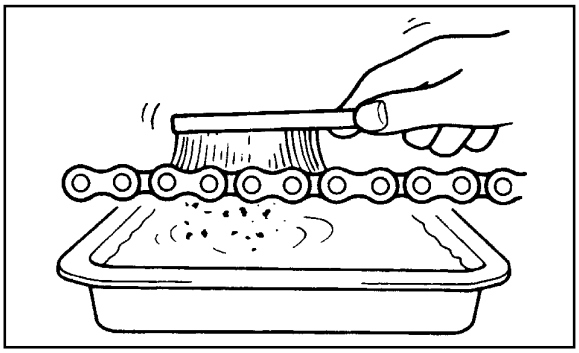


Inspect the drive chain stiffness.
Clean and lubricate or replace it if stiff.



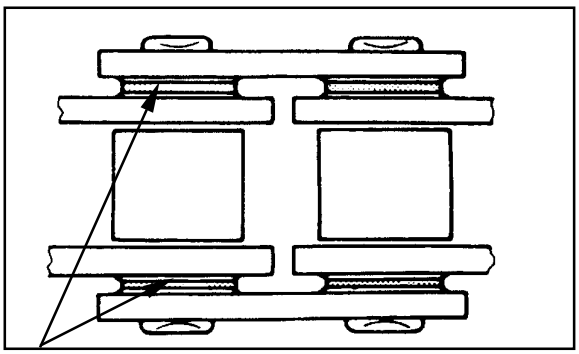
CLEAN

Place it in kerosene, and brush off as much dirt as possible. Then remove the chain from the kerosene and dry the chain.



*

This machine has a drive chain with small rubber O-rings between the chain plates. Steam cleaning, high-pressure washes, and certain solvent can damage these O-rings. Use only kerosene to clean the drive chain.



O-ring

INSTALLATION

Reverse the "SWING ARM REMOVAL" procedure.
Apply grease onto the collar, bush, pivot shaft and thrust cover.
Install the swing arm and tighten the nut.
Torque: 70 N·m (7 kgf·m, 50 lbf·ft)

Install the shock absorber and tighten the bolts.
Torque: 40 N·m (4 kgf·m, 29 lbf·ft)

HYDRAULIC BRAKE

BRAKE FLUID CHANGE

Refer to the "BRAKE FLUID CHANGE" section in the chapter 3.

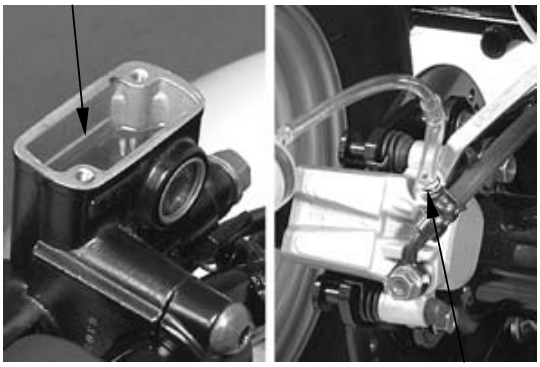
BRAKE FLUID REFILLING

Connect a transparent hose and syringe to the brake caliper bleed valve and then loosen the bleed valve nut.
Fill the brake reservoir with brake fluid and use the syringe to draw brake fluid into it until there is no air bubbles in the hose.
Then, tighten the bleed valve nut.
Torque: 6 N·m (0.6 kgf·m, 4 lbf·ft)

*

- 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.

Recommended Brake Fluid: DOT-4

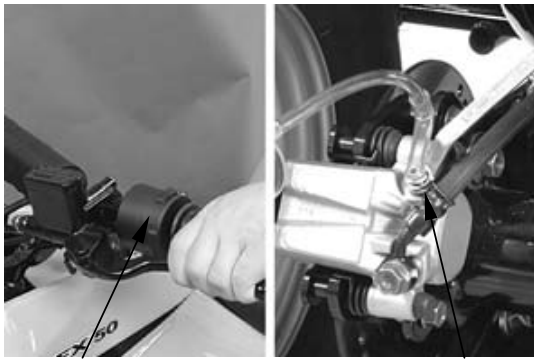


BRAKE SYSTEM BLEEDING

Connect a transparent hose to the bleed valve and fully apply the brake lever after continuously pull it several times. Then, loosen the bleed valve nut to bleed air from the brake system. Repeat these steps until the brake system is free of air.

*

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



BRAKE PAD/DISK

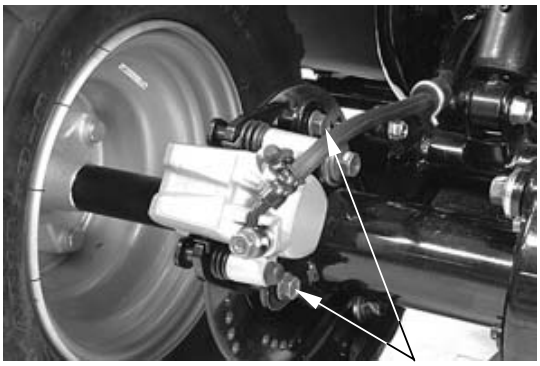
BRAKE PAD REPLACEMENT

Remove the two bolts attaching the brake caliper holder.

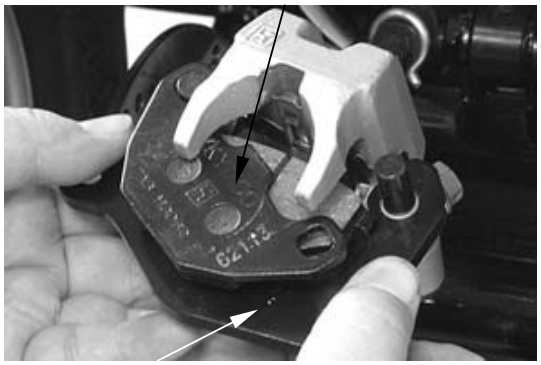
*

The brake pads can be replaced without removing the brake fluid tube.

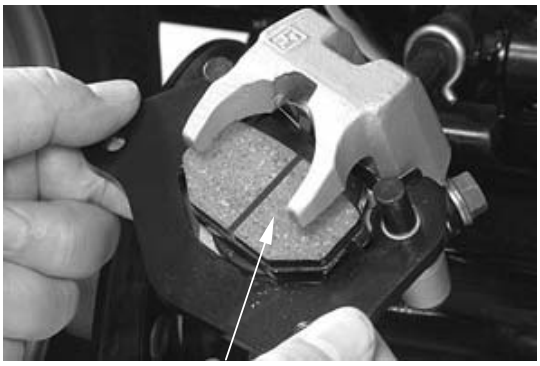
Remove the brake caliper.



Push the brake caliper holder and then remove brake pad.



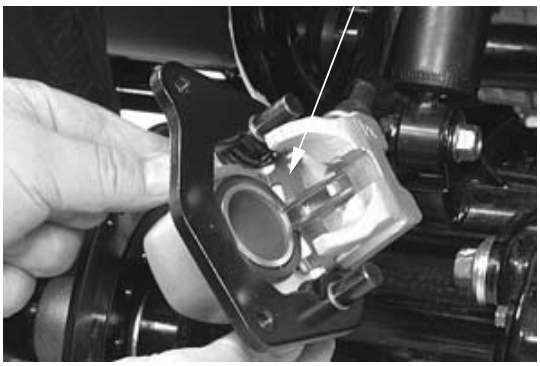
Remove the other brake pad.



ASSEMBLY

Assemble the brake pads in the reverse order of removal.

* Make sure the pad spring has fitted.

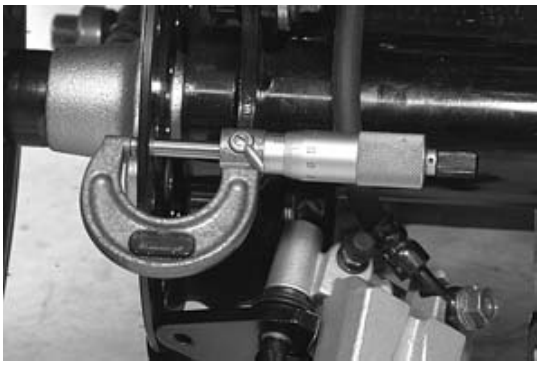


BRAKE DISK

Measure the brake disk thickness.
Service Limit: 3 mm (0.12 in)

Measure the brake disk run out.
Service Limit: 0.3 mm (0.012 in)

Replace it if it is out of specification.



BRAKE MASTER CYLINDER

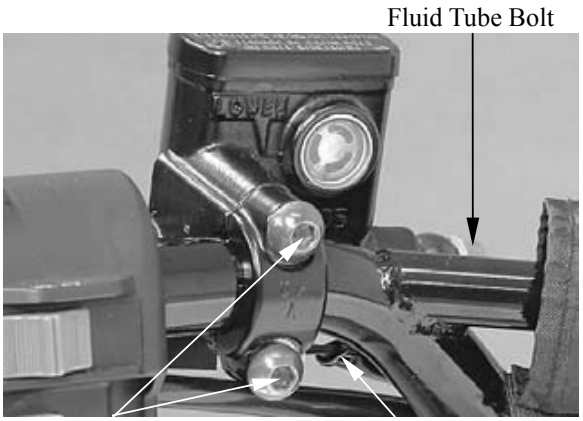
REMOVAL

Drain the brake fluid from the hydraulic brake system.

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

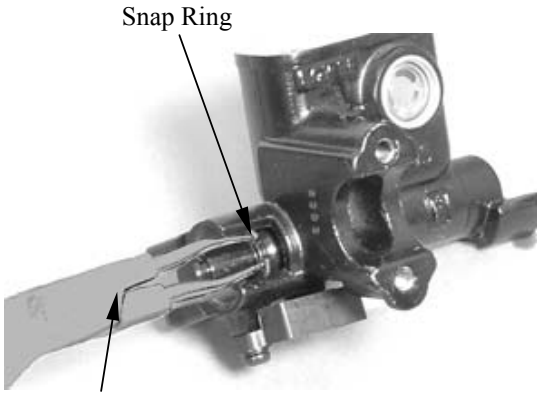
Disconnect the brake light switch wire connectors.
Remove the two master cylinder holder bolts and remove the master cylinder.

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

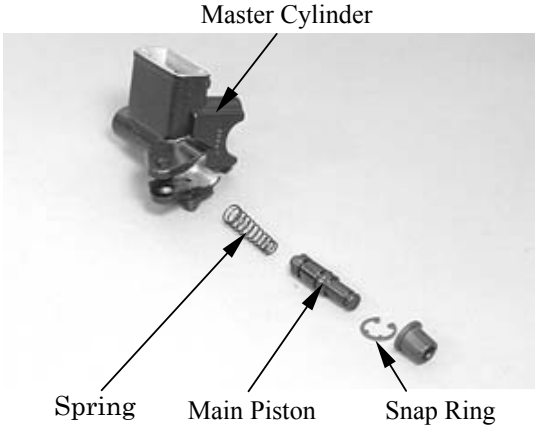


DISASSEMBLY

Remove the piston rubber cover and snap ring from the brake master cylinder.

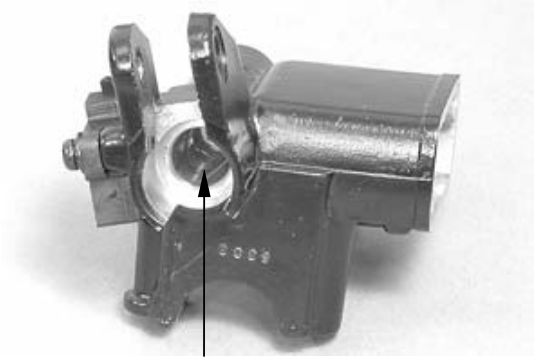


Remove the washer, main piston and spring from the brake master cylinder.
Clean the inside of the master cylinder and brake reservoir with brake fluid.



I INSPECTION

Check the cylinder inside wall, and spring for scratch, corrosion or other abnormal condition.
If any abnormal condition is found, replace the inner parts or master cylinder.



Cylinder Inside Wall

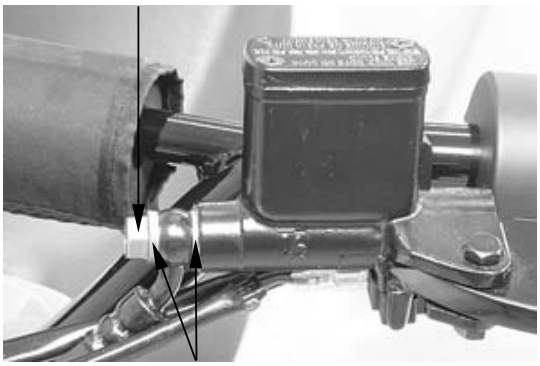
ASSEMBLY

Before assembly, apply brake fluid to all removed parts.

- During assembly, the main piston and spring must be installed as a unit without exchange.
- When assembling the piston, soak the cups in brake fluid for a while.
- Install the cups with the cup lips facing the correct direction.

Install the main piston and snap ring.
Install the rubber cover.
Install the brake lever.
Install the brake fluid tube with the bolt and two sealing washers.
Fill the brake reservoir with recommended brake fluid to the upper level.
Bleed air from the hydraulic brake system. (See page 13-15.)

Fluid Tube Bolt



Sealing Washers

Place the brake master cylinder on the handlebar and install the master cylinder holder with the "UP" mark facing up, aligning the tab on the holder with the hole in the handlebar.
First tighten the upper bolt and then tighten the lower bolt.
Torque: 12 N·m (1.2 kgf·m, 9 lbf·ft)

"UP" Mark

BRAKE CALIPER

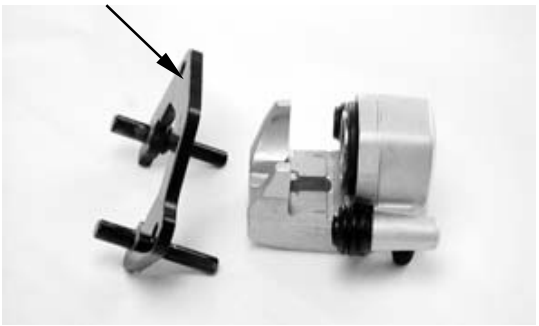
DISASSEMBLY

Remove the brake caliper, brake pads and pad spring. (See page 13-15)
Place a clean container under the brake caliper and disconnect the brake fluid tube from the brake caliper.

* Be careful not to splash brake fluid on any coated surfaces.

Remove the brake caliper holder from the brake caliper.

Brake Caliper Holder



Remove the pistons from the brake caliper.
Use compressed air to press out the pistons through the brake fluid inlet opening and place a shop towel under the caliper to avoid contamination caused by the removed pistons.

Push the piston oil seals inward to remove them.
Clean each oil seal groove with brake fluid.

* Be careful not to damage the piston surface.

Piston Oil Seals

INSPECTION
Inspect the caliper cylinder wall and piston surface for scratch, corrosion or other damages.
If any abnormal condition is noted, replace the caliper.

ASSEMBLY

Clean all removed parts.
Apply silicon grease to the pistons and oil seals.
Lubricate the brake caliper cylinder inside wall with brake fluid.
Install the oil seals and then install the brake caliper pistons with the grooved side facing out.

* Install the piston with its outer end protruding 3 ~ 5 mm (0.12 ~ 0.2 in) beyond the brake caliper.

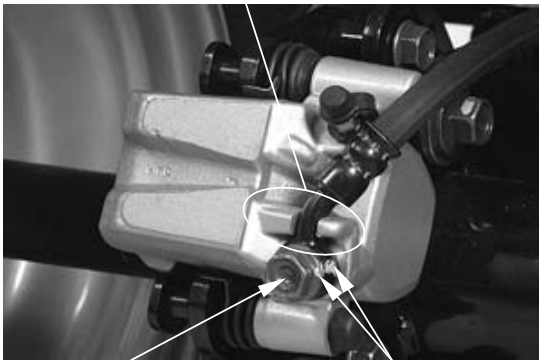
Wipe off excessive brake fluid with a clean shop towel.
Apply silicon grease to the brake caliper holder pin and caliper inside.
Install the brake caliper holder.

INSTALLATION

Connect the brake fluid tube to the brake caliper, aligning the fluid tube with groove in the caliper and tighten the brake hose banjo bolt.

Torque: 35 N·m (3.5 kgf·m, 25 lbf·ft)

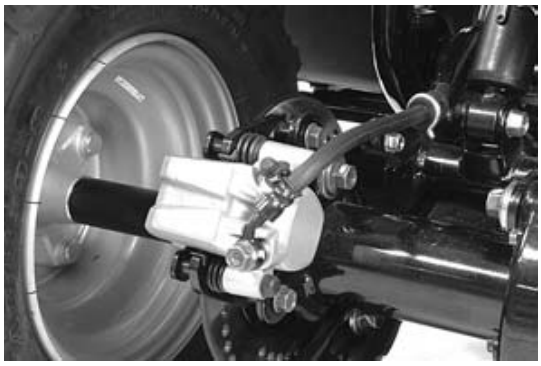
Aligning The Fluid Tube With Groove



Add the recommended brake fluid into the brake reservoir and bleed air from the brake system. (Refer to 13-15)

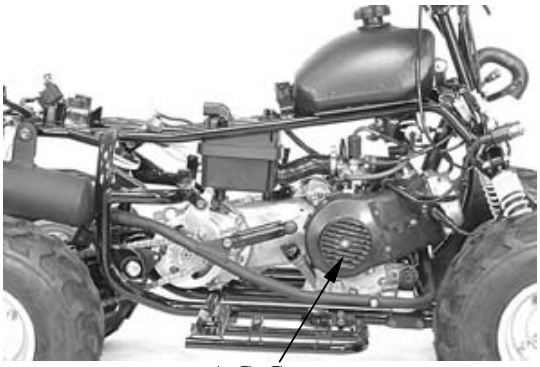
Install the brake caliper onto rear axle hub and tighten the caliper holder bolts.

Torque: 32 N·m (3.2 kgf·m, 23 lbf·ft)



BATTERY/CHARGING SYSTEM/ A.C. GENERATOR

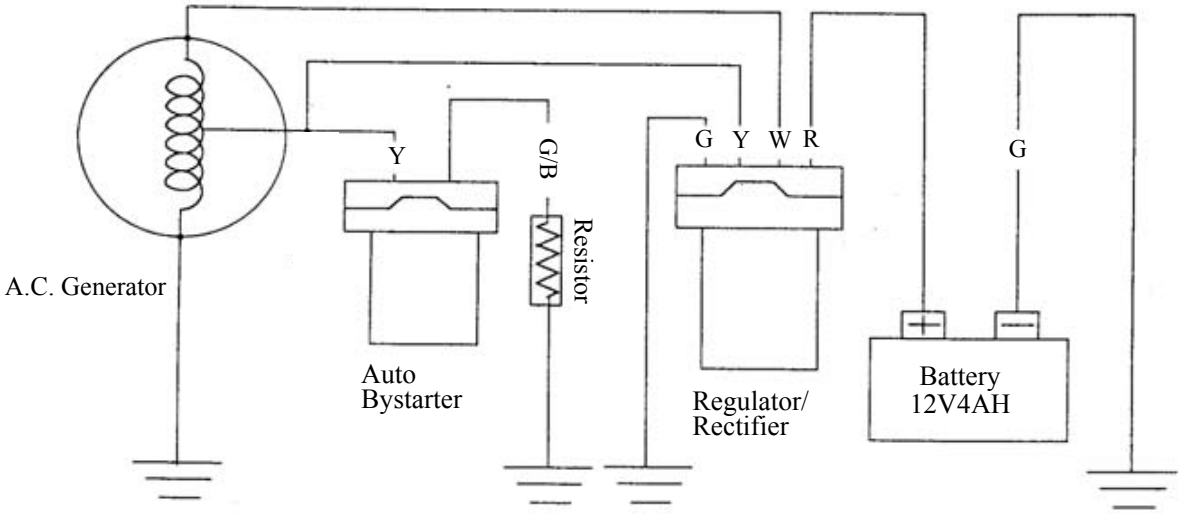
14. BATTERY/CHARGING SYSTEM/A.C. GENERATOR



A.C. Generator

Regulator/Rectifier

CHARGING CIRCUIT



14. BATTERY/CHARGING SYSTEM/A.C. GENERATOR

SERVICE INFORMATIONN

GENERAL INSTRUCTIONS

> The battery electrolyte (sulfuric acid) is poisonous and may seriously damage the skin and eyes. Avoid contact with skin, eyes, or clothing. In case of contact, flush with water and get prompt medical attention.

- The battery can be charged and discharged repeatedly. If a discharged battery is not used for a long time, its service life will be shortened. Generally, the capacity of a battery will decrease after it is used for 2 ~ 3 years. A capacity-decreased battery will resume its voltage after it is recharged but its voltage decreases suddenly and then increases when a load is added.
- When a battery is overcharged, some symptoms can be found. If there is a short circuit inside the battery, no voltage is produced on the battery terminals. If the rectifier won't operate, the voltage will become too high and shorten the battery service life.
- If a battery is not used for a long time, it will discharge by itself and should be recharged every 3 months.
- A new battery filled with electrolyte will generate voltage within a certain time and it should be recharged when the capacity is insufficient. Recharging a new battery will prolong its service life.
- Inspect the charging system according to the sequence specified in the Troubleshooting.
- Do not disconnect and soon reconnect the power of any electrical equipment because the electronic parts in the regulator/rectifier will be damaged. Turn off the ignition switch before operation.
- It is not necessary to check the MF battery electrolyte or fill with distilled water.
- Check the load of the whole charging system.
- Do not quick charge the battery. Quick charging should only be done in an emergency.
- Remove the battery from the vehicle for charging.
- When replacing the battery, do not use a traditional battery.
- When charging, check the voltage with a voltmeter.

SPECIFICATIONS

Item			Standard
Battery	Capacity		12 V 4 Ah
	Voltage (20°C)	Fully charged	13.1 V
		Undercharged	12.3 V
	Charging current		STD: 0.4 A Quick: 4.0 A
	Charging time		STD: 5 ~ 10 hr Quick: 30 min
A.C. Generator	Capacity		70 W (500 rpm)
Regulator/Rectifier	Charging		14.5 ±0.5 V

TORQUE VALUES

A.C.G. flywheel nut	40 N·m (4 kgf·m, 29 lbf·ft)
A.C.G. stator bolt	10 N·m (1 kgf·m, 7 lbf·ft)
Pulser coil bolt	5 N·m (0.5 kgf·m, 3.6 lbf·ft)
Cooling fan	8 N·m (0.8 kgf·m, 6 lbf·ft)

SPECIAL TOOLS

Flywheel puller	A120E00001
Universal holder	A120E00017

14. BATTERY/CHARGING SYSTEM/A.C. GENERATOR

TESTING INSTRUMENTS

Electric tester: YF-3501

TROUBLESHOOTING

No power

- Dead battery
- Disconnected battery cable
- Fuse burned out
- Faulty ignition switch

Low power

- Weak battery
- Loose battery connection
- Charging system failure
- Faulty regulator/rectifier

Intermittent power

- Loose battery cable connection
- Loose charging system connection
- Loose connection or short circuit in lighting system

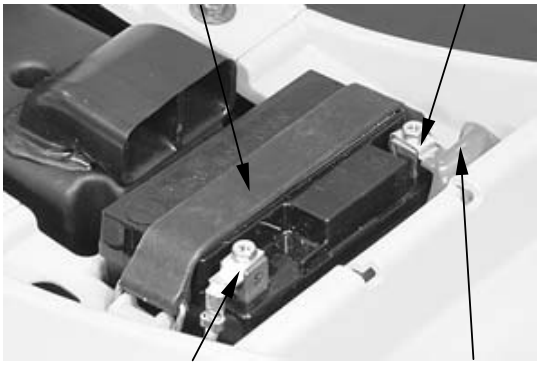
Charging system failure

- Loose, broken or shorted wire or connector
- Faulty regulator/rectifier
- Faulty A.C. generator

BATTERY

REMOVAL

Remove seat. (See page 2-3)
Make sure the ignition switch is OFF.
First disconnect the battery negative (-) cable and then the positive (+) cable.
Remove the battery by removing the band.



INSTALLATION

The installation sequence is the reverse of removal.

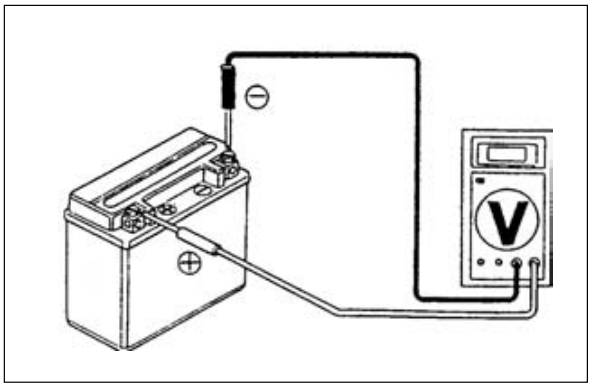
* First connect the positive (+) cable and then negative (-) cable to avoid short circuit.

BATTERY VOLTAGE (OPEN CIRCUIT VOLTAGE) INSPECTION

Remove the seat. (See page 2-3)
Disconnect the battery cables.
Measure the voltage between the battery terminals.

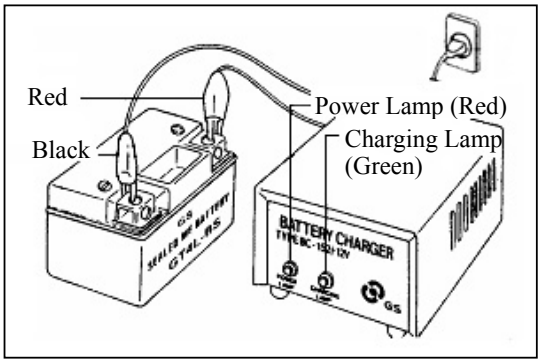
Fully charged 13.1 V
Undercharged 12.3 V max

* Battery charging inspection must be performed with a voltmeter.



CHARGING

Connect the charger positive (+) cable to the battery positive (+) terminal.
Connect the charger negative (-) cable to the battery negative (-) terminal.



⚠WARNING

- **Keep flames and sparks away from a charging battery.**
- **Turn power ON/OFF at the charger, not at the battery terminals to prevent sparks near the battery to avoid explosion.**
- **Charge the battery according to the current specified on the battery.**

*

- Quick charging should only be done in an emergency.
- Measure the voltage 30 minutes after the battery is charged.

Charging current	: Standard	: 0.4 A
	Quick	: 4.0 A
Charging time	: Standard	: 5 ~ 10 hours
	Quick	: 30 minutes

After charging: Open circuit voltage: 12.8 V min.

CHARGING SYSTEM

SHORT CIRCUIT TEST

Turn the ignition switch OFF and check for short circuit.
Disconnect the ground wire from the battery and connect an ammeter across the battery negative (-) terminal and the ground wire.

* Connect the electric tester positive (+) terminal to ground wire and the tester negative (-) terminal to the battery negative (-) terminal.

If any abnormality is found, check the ignition switch and wire harness for short circuit.

VOLTAGE TEST

This inspection must be performed with an electric tester when the battery is fully charged.
Warm up the engine for inspection.
Connect the electric tester across the battery terminals.
Attach a tachometer to the engine.
Start the engine and gradually increase the engine speed to measure the limit voltage.
Limit Voltage: 13.5 ~ 15.5 V (5 000 rpm max.)
If the limit voltage is not within the specified range, check the regulator/rectifier.

REGULATOR/RECTIFIER

MAIN HARNESS CIRCUIT INSPECTION

Remove the regulator/rectifier 4P coupler and check for continuity between the wire harness terminals according to the following:

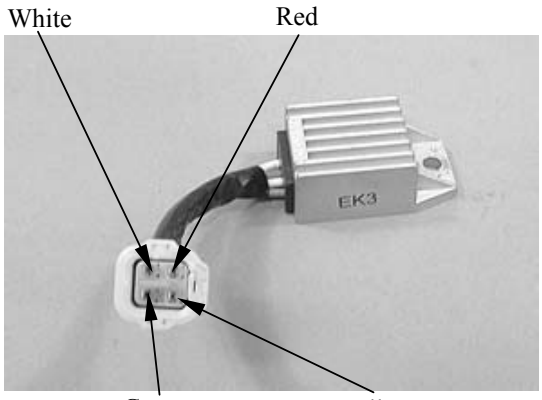
Item (Wire Color)	Judgment
Between battery (red) and engine ground	Battery voltage
Between ground (green) and engine ground	Continuity exists
Between lighting wire (yellow) and engine ground (Remove the resistor coupler and auto bystarter coupler and turn the brake light switch OFF for inspection)	A.C. generator stator resistance
Between charging coil (white) and engine ground	A.C. generator stator resistance

Regulator/Rectifier

REGULATOR/RECTIFIER INSPECTION

If the main harness terminals are normal, check the regulator/rectifier coupler for loose connection and measure the resistances between the regulator/rectifier terminals.

- Do not touch the tester probes with your finger because human body has resistance.
- Use the following specified testers for accurate testing. Use of an improper tester in an improper range may give false readings.
  Testing instrument
  Kawasaki Hand Tester: 57001-1394
- If the dry battery in the tester is weak, the readings will be incorrect. In this case, check the dry battery.



Replace the regulator/rectifier if the readings are not within the specifications in the table.

Unit: kΩ

Probe⊕ / Probe(-)	White	Yellow	Red	Green
White		∞	5 ~ 20	∞
Yellow	∞		∞	20 ~ 40
Red	∞	∞		∞
Green	∞	20 ~ 40	∞	

Note: The readings in this table are taken with a Kawasaki Hand Tester: 57001-1394.

A.C. GENERATOR CHARGING COIL

* The inspection of A.C. generator charging coil can be made with the engine installed.

INSPECTION

Disconnect the A.C. generator 2P connector.
Measure the resistance between the A.C. generator white wire and engine ground with an electric tester (YF-3501 tester).
Standard: 1 ~ 3 Ω (at 20°C)
Replace the A.C. generator charging coil if the reading is not within the specifications.

Charging Coil Wire

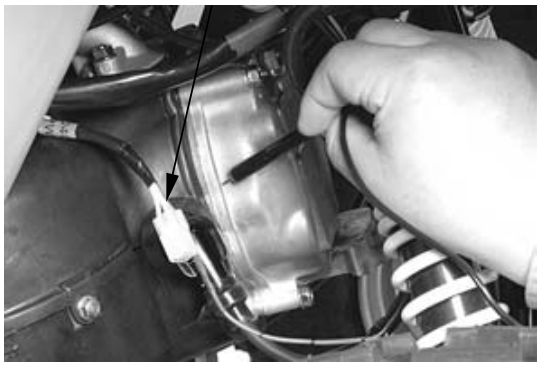
A.C. GENERATOR LIGHTING COIL

* The inspection of A.C. generator lighting coil can be made with the engine installed.

INSPECTION

Disconnect the A.C. generator 2P connector.
Measure the resistance between the A.C. generator yellow wire and engine ground with an electric tester (YF-3501 tester).
Standard: 1 ~ 4 Ω (at 20°C)
Replace the A.C. generator lighting coil if the reading is not within the specifications.

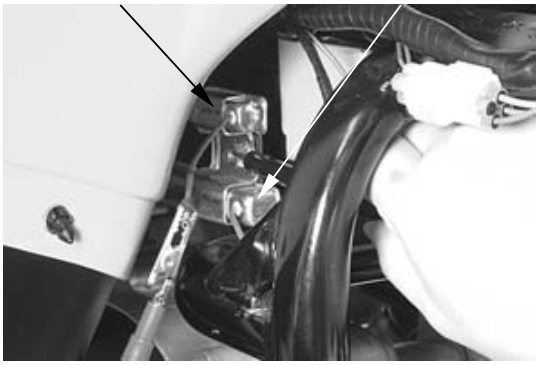
Lighting Coil Wire



RESISTOR INSPECTION

Measure the resistance between the resistor lead and engine ground.
Resistances: 5 W-9 ~ 11 Ω
30 W-5 ~ 7 Ω

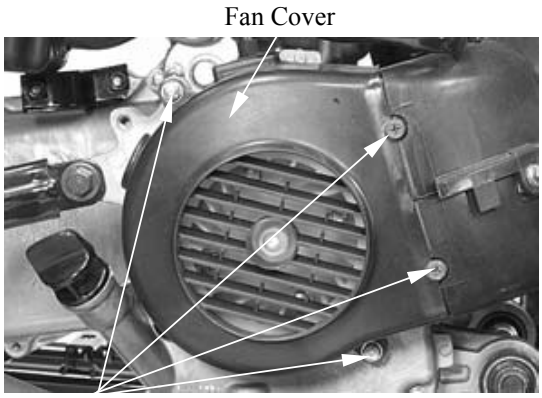
Resister (5 W) Resister (30 W)



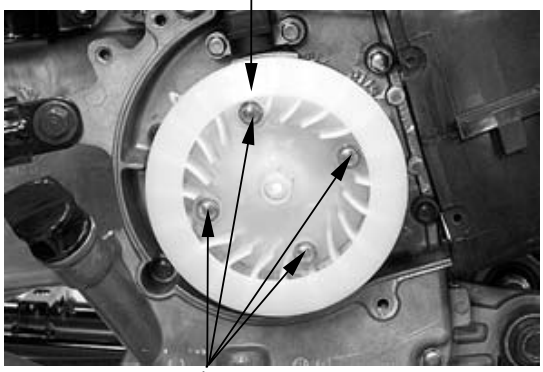
A.C. GENERATOR

REMOVAL

Remove the four bolts attaching the cooling fan cover.
Remove the fan cover.

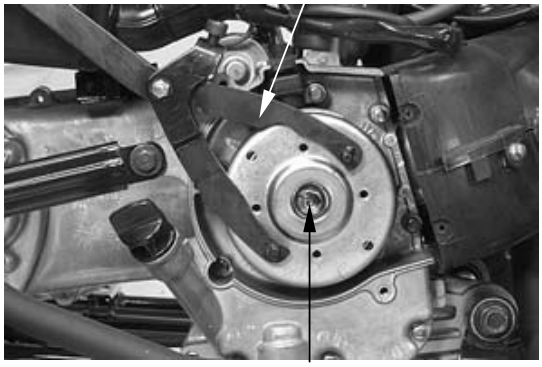


Remove the cooling fan by removing the four cooling fan attaching bolts.



Hold the flywheel with an universal holder.
Remove the flywheel nut.

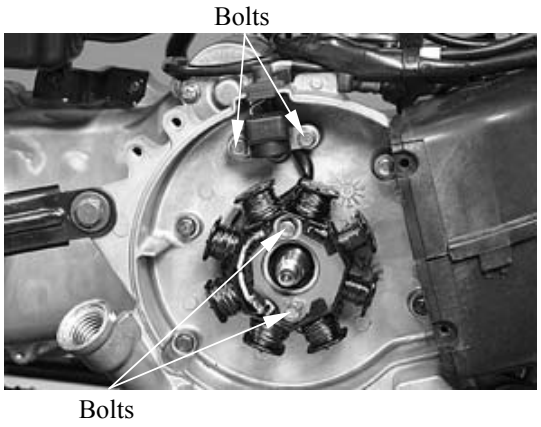
Special Tool:
Universal Holder A120E00017



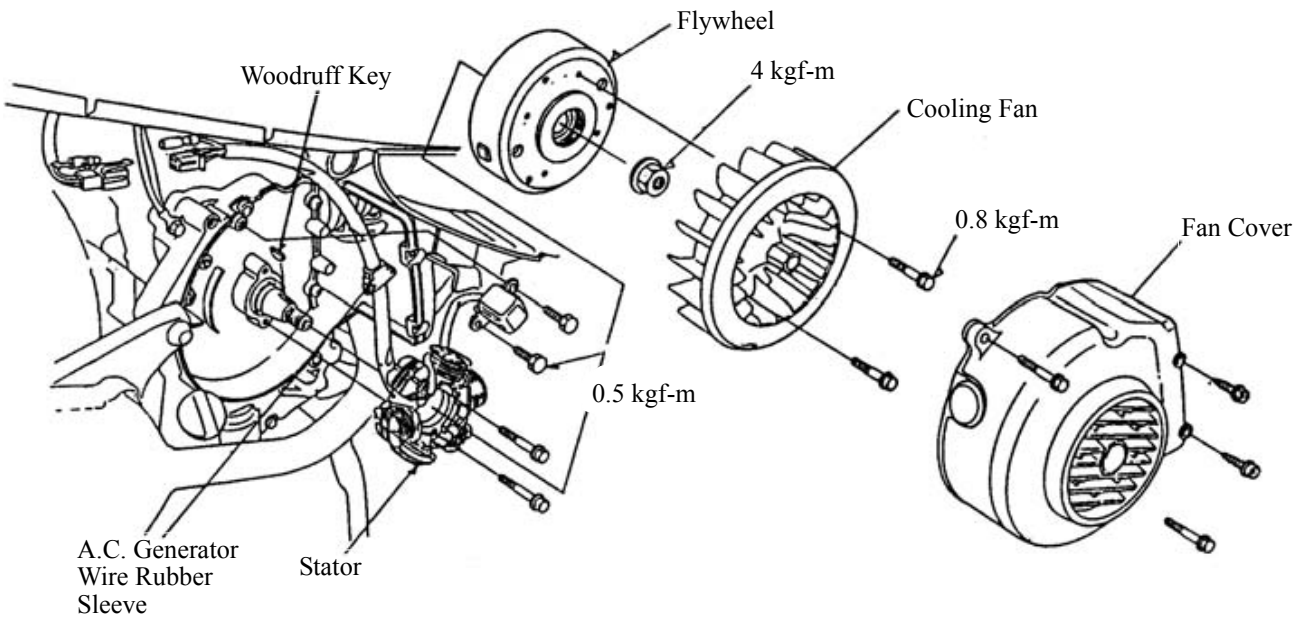
Remove the A.C. generator flywheel using the flywheel puller.

Special Tool:
Flywheel Puller A120E00001

Disconnect the A.C generator wire coupler.
Remove the pulser coil bolts.
Remove the A.C. generator wire rubber sleeve and pulser coil from the right crankcase.
Remove the two bolts and A.C. generator stator.



A.C. GNERATOR INSTALLATION



Reverse the "A.C. GENERATOR REMOVAL" procedures.

Install the A.C. generator stator and pulser coil onto the right crankcase.
Install the A.C. generator wire rubber sleeve.

Tighten the stator and pulser coil bolts.

Torques: Pulser Coil Bolts:
5 N·m (0.5 kgf·m, 3.6 lbf·ft)
Stator Bolts: 10 N·m (1 kgf·m, 7 lbf·ft)

Connect the A.C. generator wire coupler.

Clean the taper portion of the crankshaft and taper hole in the flywheel off any burrs and dirt.
Install the woodruff key in the crankshaft keyway.

Install the flywheel onto the crankshaft with the flywheel hole aligned with the crankshaft woodruff key.

* The inside of the flywheel is magnetic. Make sure that there is no bolt or nut before installation.

Woodruff Key

Hold the flywheel with the universal holder and tighten the flywheel nut.

Torque: 40 N·m (4 kgf·m, 29 lbf·ft)

Special Tool:

Universal Holder A120E00017

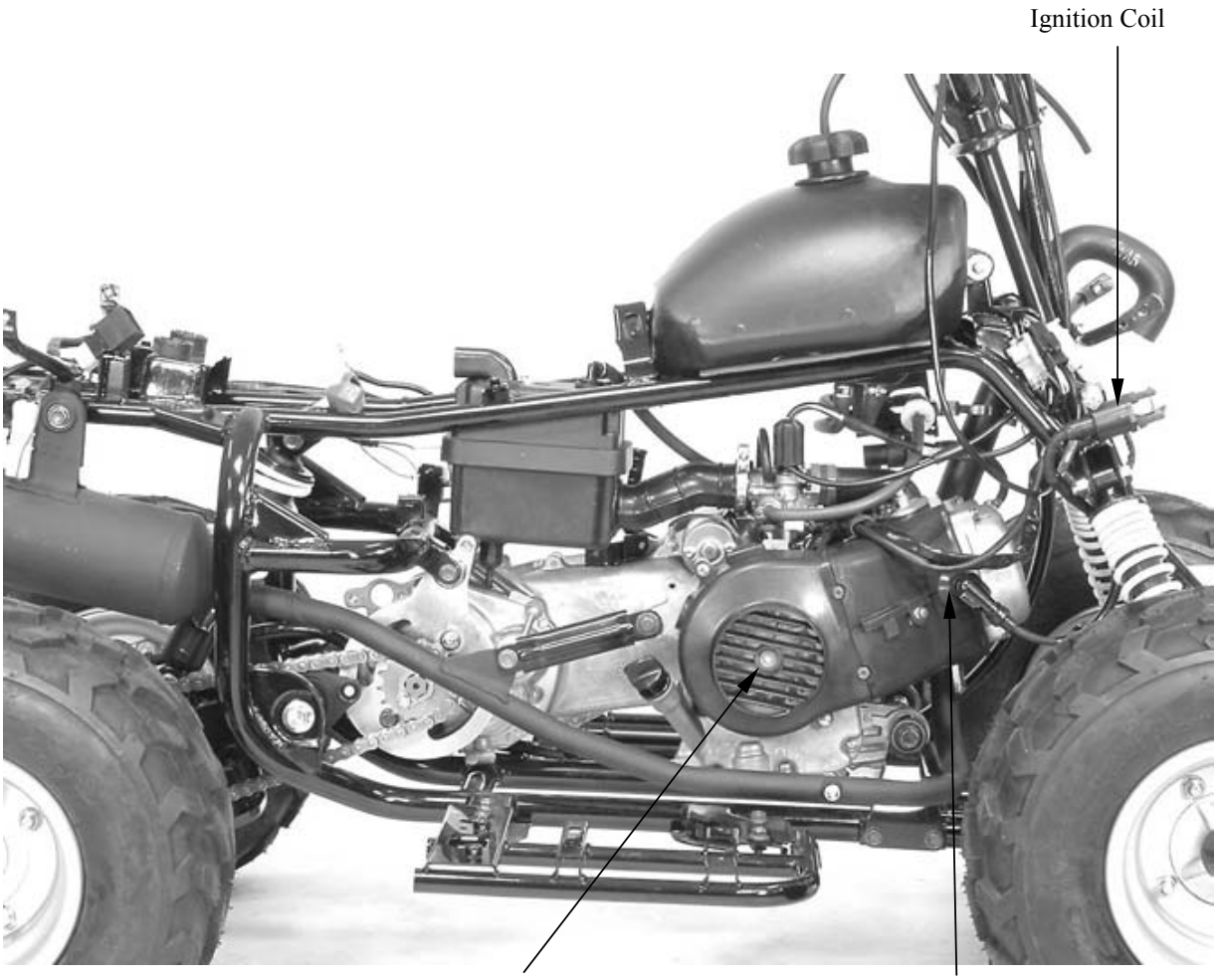
Install the cooling fan.

Torque: 8 N·m (0.8 kgf·m, 6 lbf·ft)

Install the fan cover and tighten bolts.

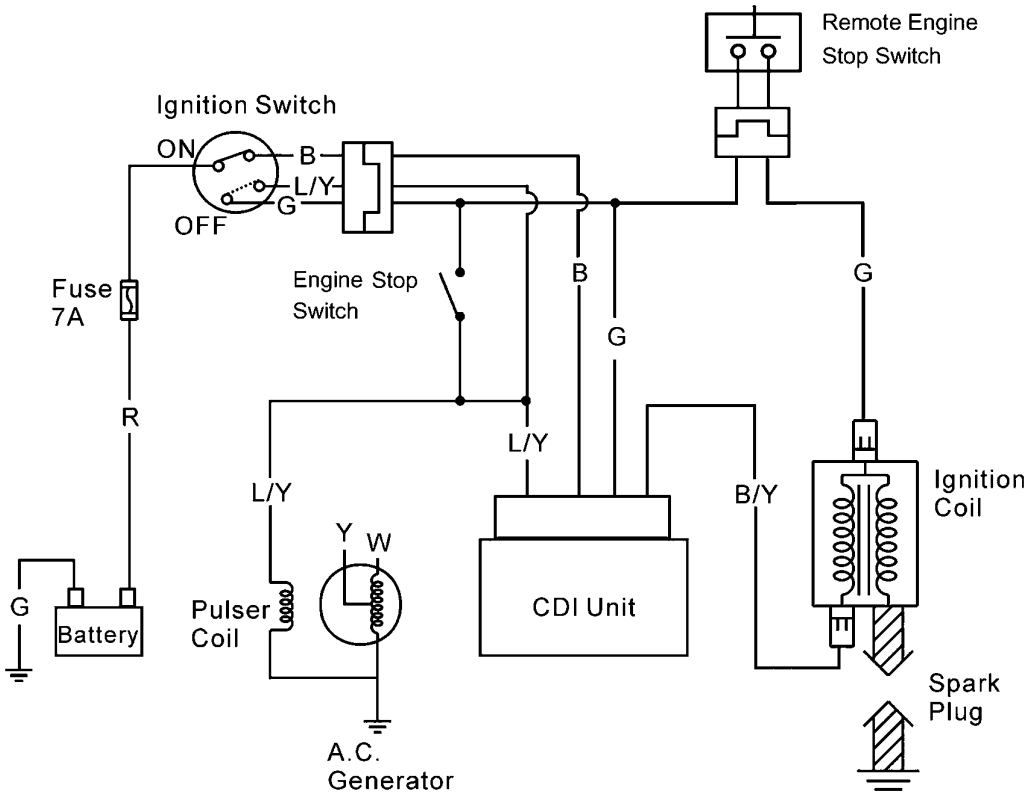
IGNITION SYSTEM

15. IGNITION SYSTEM



15. IGNITION SYSTEM

IGNITION CIRCUIT



15. IGNITION SYSTEM

SERVICE INFORMATION

GENERAL INSTRUCTIONS

- Check the ignition system according to the sequence specified in the Troubleshooting.
- The ignition system adopts ignition unit, change gear control and the ignition timing cannot be adjusted.
- If the timing is incorrect, inspect the ignition unit, A.C. generator, change gear control and replace any faulty parts. Inspect the ignition unit with an ignition unit tester.
- Loose connector and poor wire connection are the main causes of faulty ignition system. Check each connector before operation.
- Use of spark plug with improper heat range is the main cause of poor engine performance.
- The inspections in this section are focused on maximum voltage. The inspection of ignition coil resistance is also described in this section.
- Inspect the spark plug referring (see page 3-7).

SPECIFICATIONS

Item			Standard
Spark plug	Standard type		NGK-CR7HSA
Spark plug gap			0.6 ~ 0.7 mm (0.024 ~ 0.028 in)
Ignition timing	"F" mark Full advance		BTDC 13°/2 000 RPM
Ignition coil resistance (20°C)	Primary coil		1.5 ~ 3.5 Ω
	Secondary coil	without plug cap	2 ~ 5 kΩ
		with plug cap	7 ~ 9 kΩ
Pulser coil resistance (20°C)			100 ~ 140 Ω

TESTING INSTRUMENTS

Electric tester: YF-3501

TROUBLESHOOTING

High voltage too low
- Weak battery or low engine speed
- Loose ignition system connection
- Faulty ignition unit
- Faulty ignition coil
- Faulty pulser coil

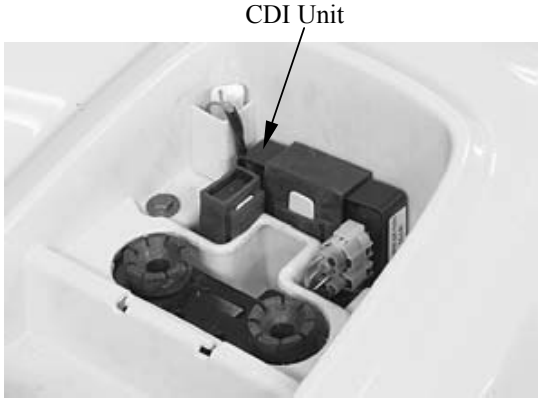
Normal high voltage but no spark at plug
- Faulty spark plug
- Electric leakage in ignition secondary circuit
- Faulty ignition coil

Good spark at plug but engine won't start
- Faulty ignition unit or incorrect ignition timing
- Faulty change gear control unit
- Improperly tightened A.C. generator flywheel

No high voltage
- Faulty ignition switch
- Faulty ignition unit
- Poorly connected or broken ignition unit ground wire
- Dead battery or faulty regulator/rectifier
- Faulty ignition coil connector
- Faulty pulser coil

CDI UNIT INSPECTION

Remove seat. (See page 2-3)
Disconnect the CDI coupler and remove the CDI unit.
Measure the resistance between the terminals using the electric tester.

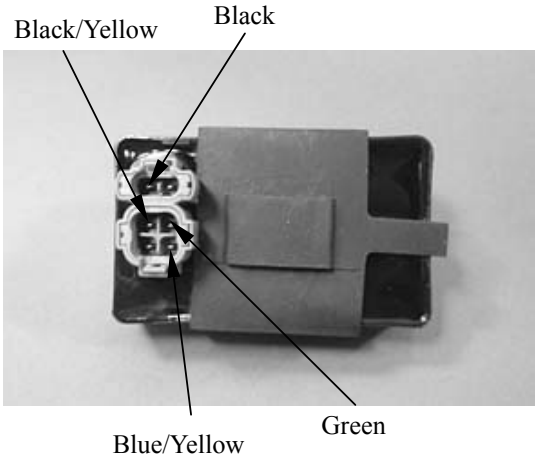


*
- Due to the semiconductor in circuit, it is necessary to use a specified tester for accurate testing. Use of an improper tester in an improper range may give false readings.
- Use Kawasaki Hand Tester: 57001-1394.
- In this table, "Needle swings then returns" indicates that there is a charging current applied to a condenser. The needle will then remain at "∞" unless the condenser is discharged.

Replace the CDI unit if the readings are not within the specifications in the table.

Unit: kΩ

Probe⊕ / (-)Probe	Black	Black/ Yellow	Blue/ Yellow	Green
Black		300 ~ 600	25 ~ 55	25 ~ 55
Black/ Yellow	∞		5 ~ 20	5 ~ 20
Blue/ Yellow	∞	200 ~ 400		0.5 ~ 5
Green	∞	200 ~ 400	0.5 ~ 5	



Note: The readings in this table are taken with a Kawasaki Hand Tester: 57001-1394.

IGNITION COIL

REMOVAL

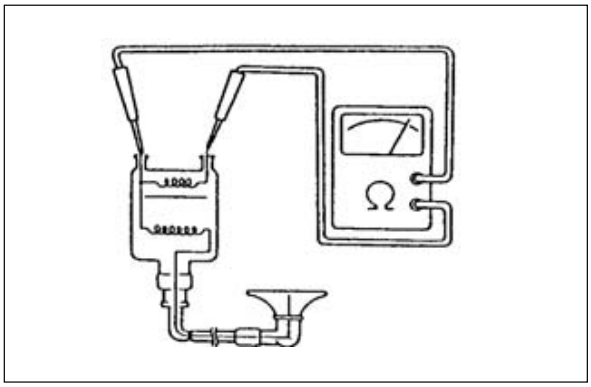
Remove the spark plug cap.
Disconnect the ignition coil wires and remove the ignition coil bolt and ignition coil.

INSPECTION

CONTINUITY TEST

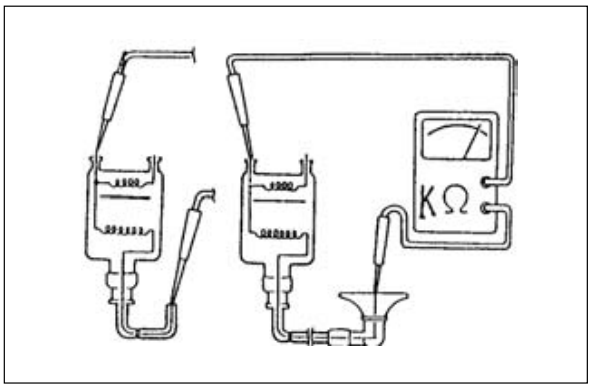
* The CDI unit is not adjustable. If the timing is incorrect, inspect the CDI unit, pulser coil and A.C. generator and replace any faulty parts.

Measure the resistance between the ignition coil primary coil terminals.



Resistance: 1.5 ~ 3.5 Ω (at 20°C)

Measure the secondary coil resistances with and without the spark plug cap.



Resistances:

(with plug cap) : 7 ~ 9 kΩ (at 20°C)
(without plug cap) : 2 ~ 5 kΩ (at 20°C)

* Correctly operate the tester following the manufacturer's instructions.

Note: The readings in this table are taken with a YF-3501 Tester.

PULSER COIL

INSPECTION

* This test is performed with the stator installed in the engine.

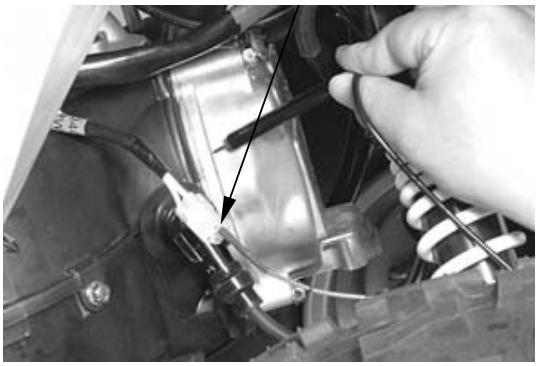
Disconnect the A.C. generator coupler.

Measure the pulser coil resistance between the blue/yellow and engine ground with an electric tester (YF-3501 tester).

Standard: 100 ~ 140 Ω (at 20°C)

Replace the A.C. generator coil assembly if the reading is not with the specifications.

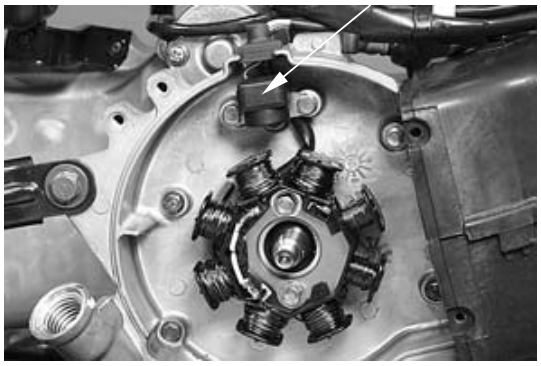
Pulser Coil Wire



REMOVAL

Refer to the "A.C. GENERATOR REMOVAL" in the chapter 14 for the pulser coil removal.

Pulser Coil

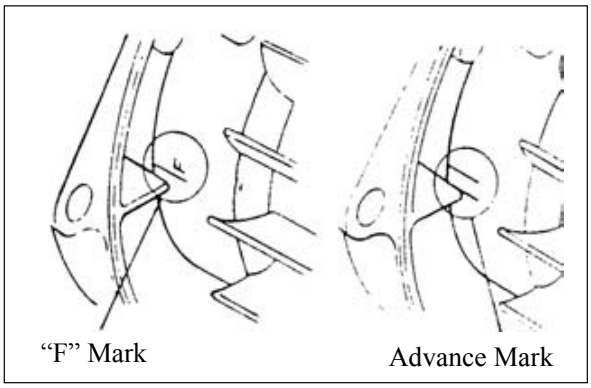


IGNITION TIMING INSPECTION

* The CDI unit is not adjustable. If the ignition timing is incorrect, inspect the CDI unit, pulser coil and A.C. generator and replace any faulty parts.

Remove the fan cover.

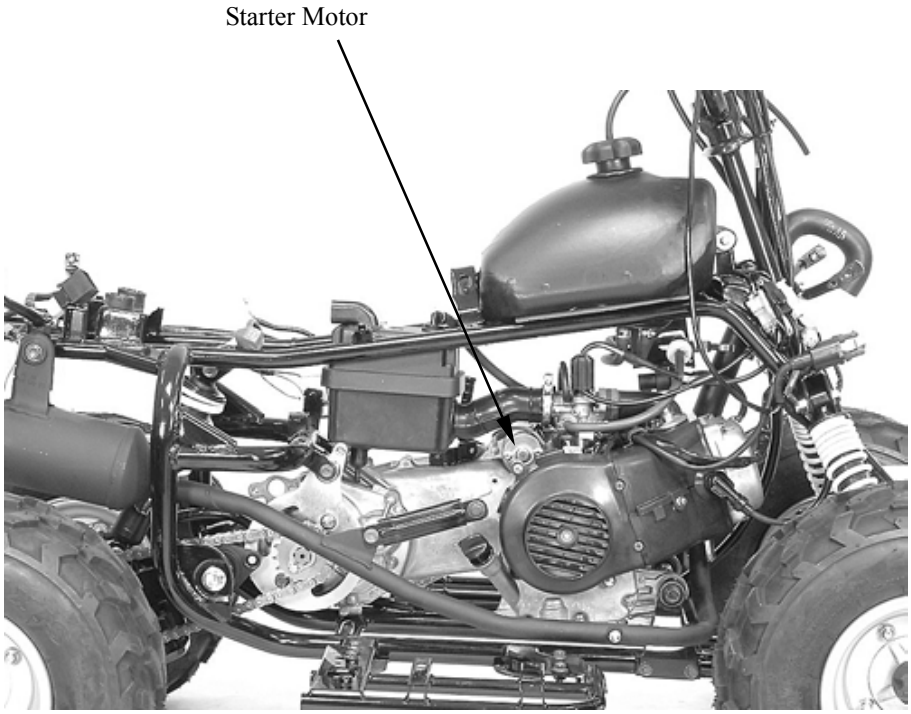
Warm up the engine and check the ignition timing with a timing light.
When the engine is running at the ignition timing is correct if the "F" mark aligns with the index mark within ±2°.



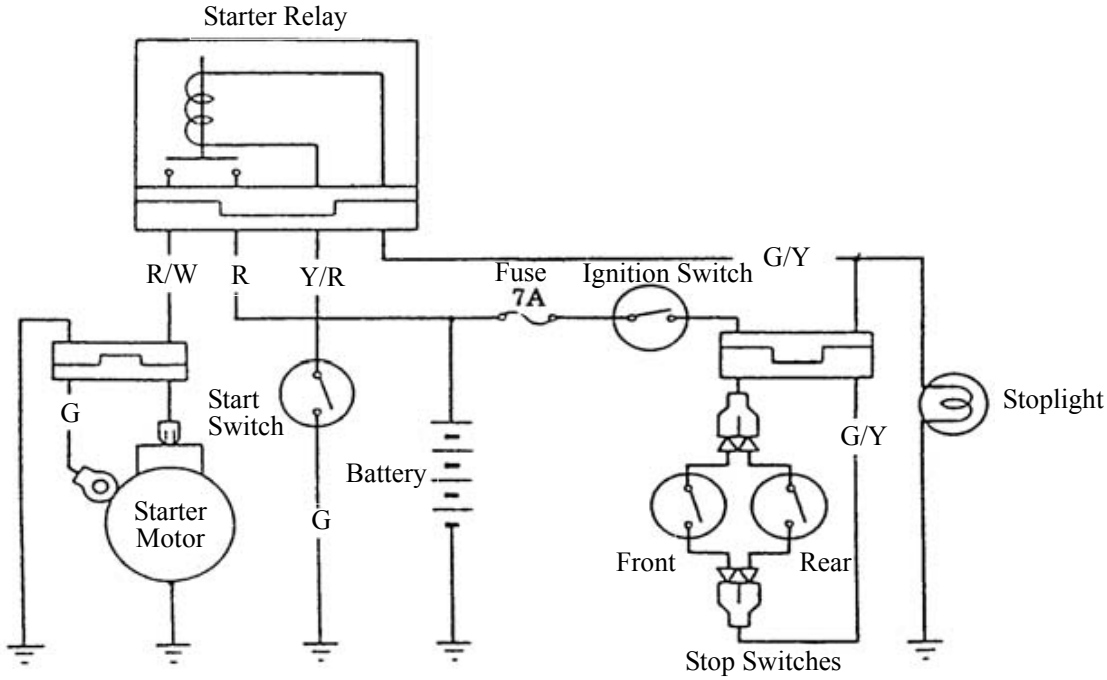
Ignition Timing: BTDC13°/2 000 rpm

STARTING SYSTEM

16. STARTING SYSTEM



STARTING CIRCUIT



16. STARTING SYSTEM

SERVICE INFORMATION

GENERAL INSTRUCTIONS

- The removal of starter motor can be accomplished with the engine installed.

TROUBLESHOOTING

Starter motor won't turn

- Fuse burned out
- Weak battery
- Faulty ignition switch
- Faulty starter pinion
- Faulty front or rear stop switch
- Faulty starter relay
- Poorly connected, broken or shorted wire
- Faulty starter motor
- Faulty change gear control unit

Lack of power

- Weak battery
- Loose wire or connection
- Foreign matter stuck in starter motor or gear

Starter motor rotates but engine does not start

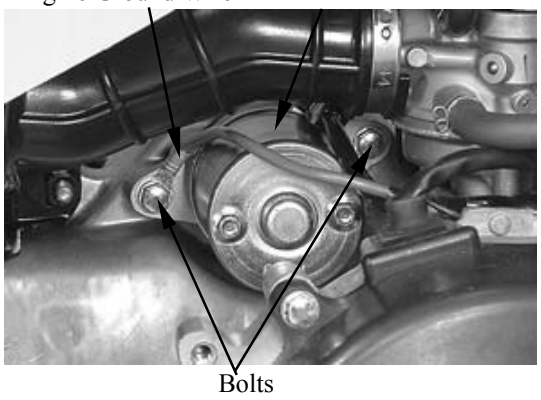
- Faulty starter pinion
- Starter motor rotates reversely
- Weak battery

STARTER MOTOR

REMOVAL

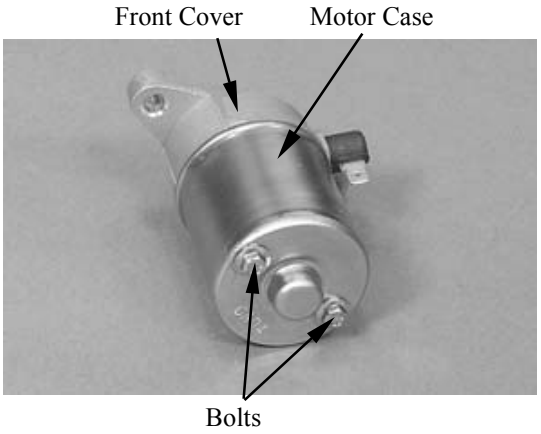
* Before removing the starter motor, turn the ignition switch OFF and remove the battery ground. Then, turn on the ignition switch and push the starter button to see if the starter motor operates properly.

Disconnect the starter motor cable coupler.
Remove the two mounting bolts at the starter motor attaching left crankcase, then remove the starter motor.



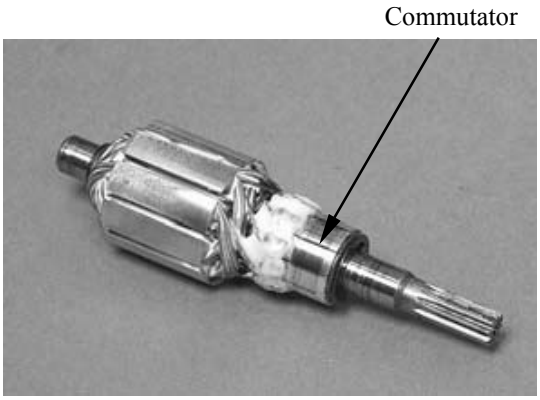
DISASSEMBLY

Remove the two starter motor case screws, front cover, motor case and other parts.



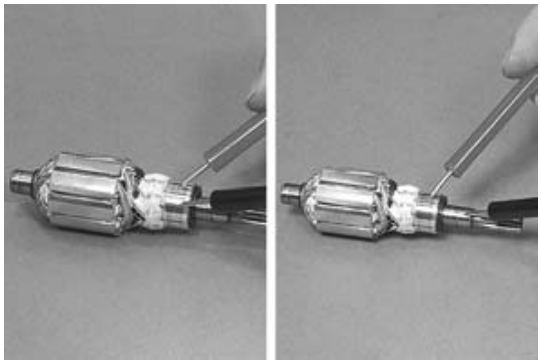
INSPECTION

Inspect the removed parts for wear, damage or discoloration and replace if necessary.
Clean the commutator if there is metal powder between the segments.



Check for continuity between pairs of the commutator segments and there should be continuity.

Also, make a continuity check between individual commutator segments and the armature shaft. There should be no continuity.



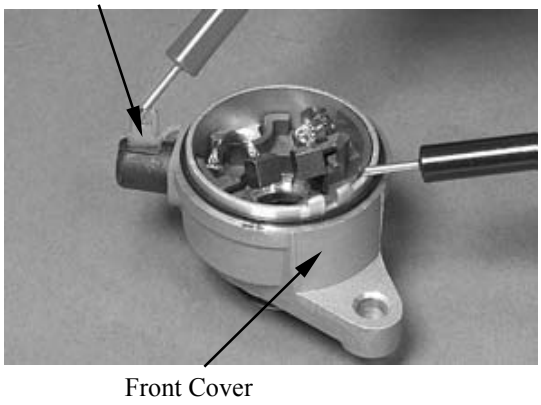
STARTER MOTOR CASE CONTINUITY INSPECTION

Check to confirm that there is no continuity between the starter motor wire terminal and the motor front cover.

Also check for the continuity between the wire terminal and each brush.

The positive brush is continuity and negative brush is no continuity.

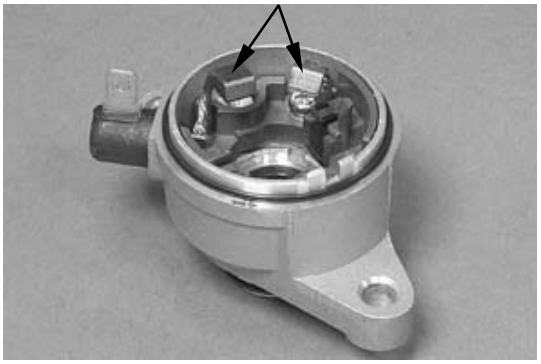
Replace if necessary.



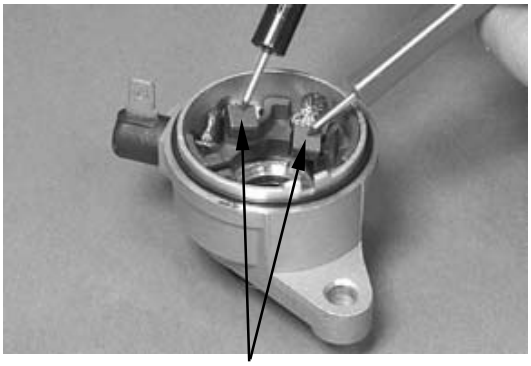
Measure the length of the brushes.

Service Limit: 2.5 mm (0.1 in)

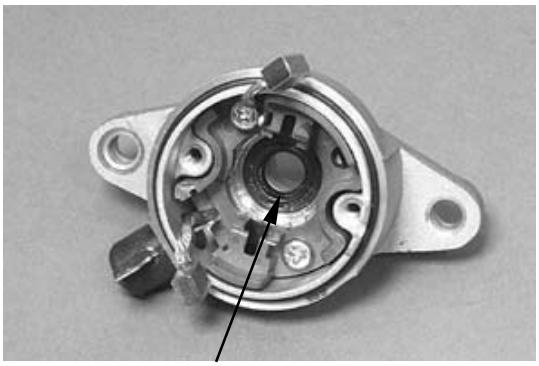
If the length is short than service limit, replace with a new one.



Check for continuity between the brushes. If there is continuity, replace with a new one.



Check the dust seal for wear or damage.



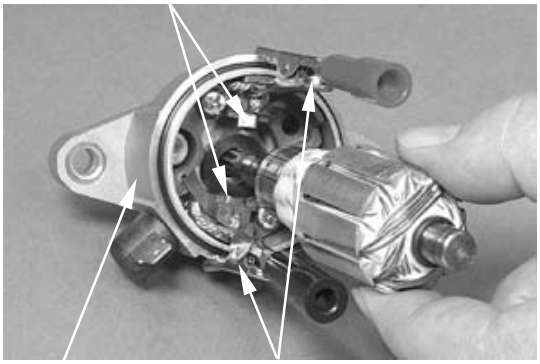
Dust Seal

ASSEMBLY

Apply grease to the dust seal in the front cover.
Install the brushes onto the brush holders.
Apply a thin coat of grease to the end of the armature shaft.
Insert the commutator into the front cover while the brushes are holding by clips as shown.

* • Be careful not to damage the brush and armature shaft mating surfaces.
  • When installing the commutator, the armature shaft should not damage the dust seal lip.

Brushes

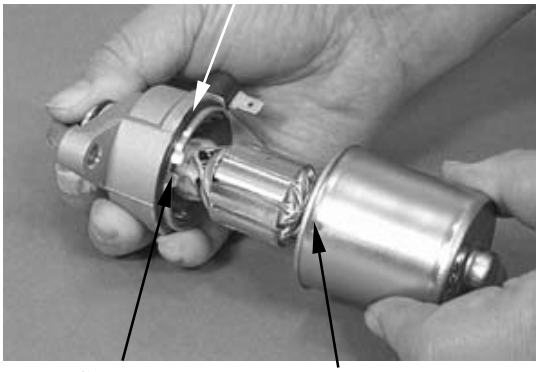


Front Cover Clips

Install a new O-ring to the front cover.
Install the starter motor case, aligning the mark on the motor case with the groove on the front cover.
Tighten the starter motor case screws.

* When assembling the front cover and motor case, slightly press down the armature shaft to assemble them.

O-ring



Groove Mark

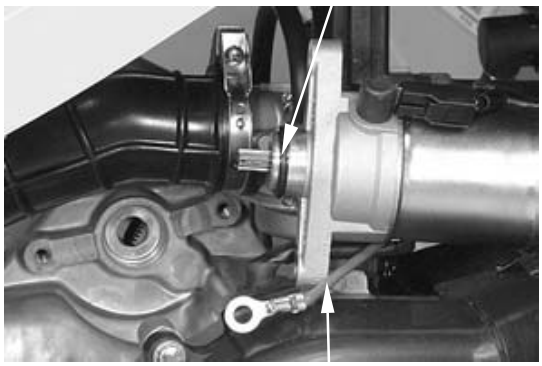
STARTER MOTOR INSTALLATION

Check the O-ring for wear or damage and replace it if necessary.

Apply grease to the O-ring and install the starter motor with the engine ground wire.
Tighten the two mounting bolts.
Torque: 10 N·m (1 kgf·m, 7 lbf·ft)

Connect the starter motor cable coupler.

* The starter motor cable coupler must be installed properly.



STARTER RELAY

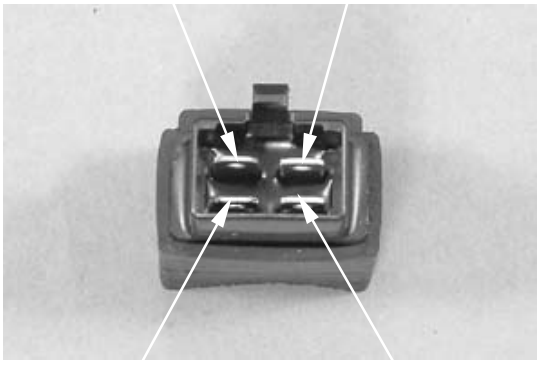
INSPECTION

Remove the seat. (See page 2-3)
Turn the ignition switch ON and the starter relay is normal if you hear a click when the starter button is depressed.
If there is no click sound:

- Inspect the starter relay voltage.
- Inspect the starter relay ground circuit.
- Check for continuity between the starter relay yellow/red and green/yellow wire terminals.

STARTER RELAY VOLTAGE INSPECTION

Connect a 12V battery across the starter relay yellow/red and green/yellow wire terminals.
Connect an electric tester between the starter relay red and red/white terminals, and check for continuity between the two terminals.
The relay is normal if there is continuity. Replace the starter relay with a new one if there is no continuity.

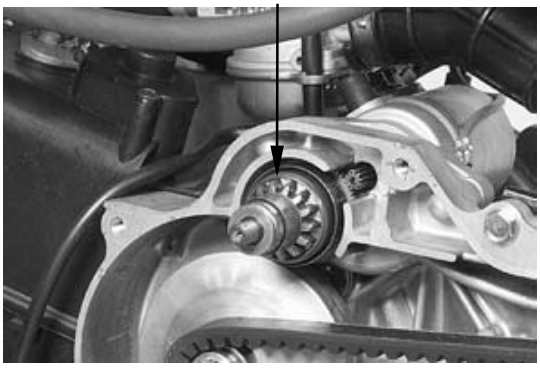


STARTER PINION

REMOVAL

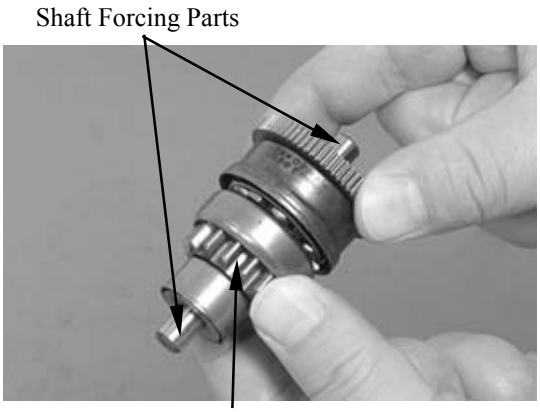
Remove the left crankcase cover.
Remove the drive pulley.
(Refer to chapter 9)

Remove the starter pinion.



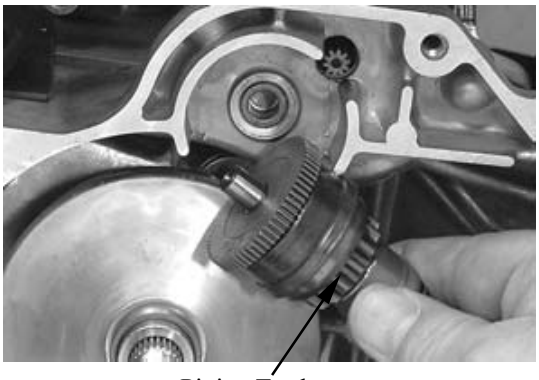
INSPECTION

Inspect the starter pinion seat for wear.
Inspect the starter pinion for smooth operation.
Inspect the starter pinion shaft forcing parts for wear and damage.



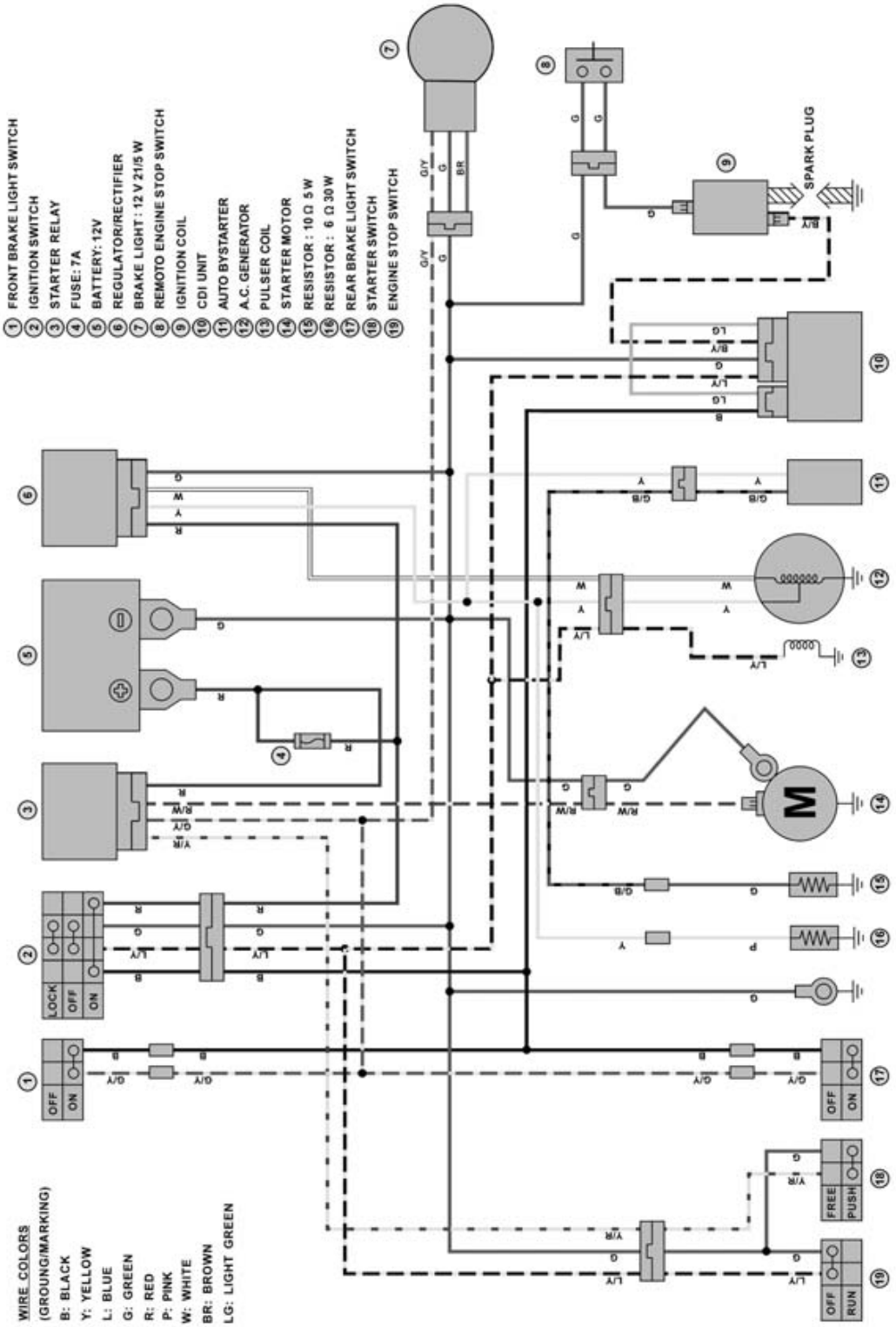
INSTALLATION

Apply a small amount of grease to the starter pinion teeth.
Install the starter pinion in the reverse order of removal.



WIRING DIAGRAMS

17. WIRING DIAGRAMS



MODEL APPLICATION

Year	Model	Beginning Frame No.
2007	KSF50B7F	RGSWA04A□7B100101 (USA Model) RGSWA04A□7B200101 (Canada Model) RGSWA04A□7B300101 (Australia Model)
2008	KSF50B8F	RGSWA04A□8B100001 (USA Model) RGSWA04A□8B200101 (Canada Model) RGSWA04A□8B300101 (Australia Model) RGSWA04A□8B600101 (Qatar Model) RGSWA04A□8B900101 (Saudi Arabia Model)

□: This digit in the frame number changes from one machine to another.

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