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T100LAA001



PREFACE

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

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

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

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

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

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

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

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

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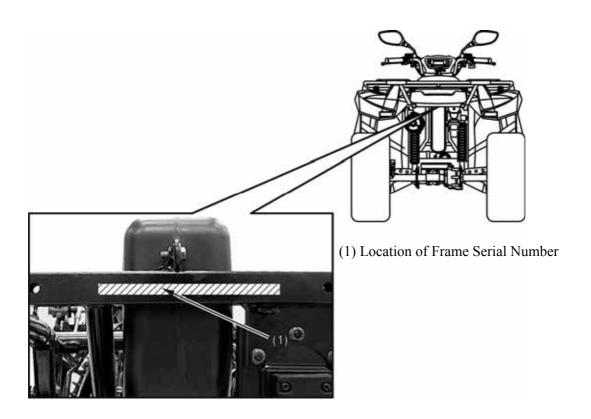
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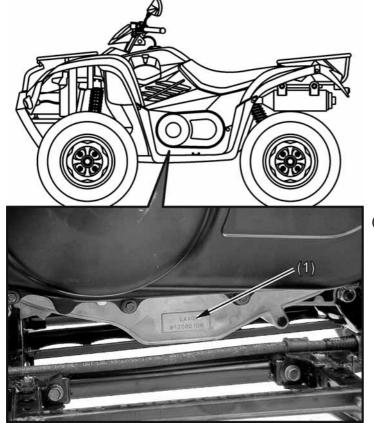


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SERIAL NUMBER





(1) Location of Engine Serial Number



SPECIFICATIONS

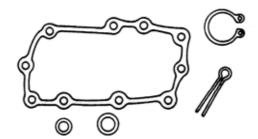
| | | | I | | |
|--------|---------------------------|-----------|----------|------------------------|--|
| _ | odel No. | | LAA0 | | |
| Na | me & Type | | MXU 500 | | |
| Ov | erall length | l | | 2203 mm (88.12 in) | |
| Ov | erall width | | | 1223 mm (48.92 in) | |
| Ov | erall height | - | | 1240 mm (49.6 in) | |
| Wł | neel base | | | 1293 mm (51.72 in) | |
| En | gine type | | | O.H.C. | |
| Dis | splacement | | | 498.5 cm ³ | |
| | | | | (30.48 cu-in) | |
| Fue | el used | 5 | | 92# nonleaded gasoline | |
| | | Front | wheel | 154 kg (338.8 lbs) | |
| Dr | y weight | Rear v | wheel | 134 kg (294.8 lbs) | |
| | | Total | | 288 kg (633.6 lbs) | |
| | | Front | wheel | 164 kg (360.8 lbs) | |
| Cu | rb weight | Rear v | wheel | 144 kg (316.8 lbs) | |
| | C | Total | | 308 kg (648 lbs) | |
| т. | | Front | wheel | 25X8-12 | |
| Tir | es | Rear v | wheel | 25X10-12 | |
| Gre | ound cleara | L | | 235 mm (9.4 in) | |
| | n. turning r | | | 3350 mm (134 in) | |
| | | | | Electric/Recoil | |
| | Starting sy | stem | | starter | |
| | Type | | | Gasoline, 4-stroke | |
| | Cylinder a | rrange | ment | Single cylinder | |
| | Combustion | n cham | ber type | Semi-sphere | |
| | Valve arra | rangement | | O.H.C., chain drive | |
| | Bore x stro | ske | | 92X75 mm | |
| | Dore x suc |)KC | | (3.68X3 in) | |
| | Compressi | on ratio | | 10.5:1 | |
| | Compressi | on pre | ssure | 15 kgf/cm ² | |
| Щ | Intoleo vole | | 0 | (1500kPa, 213 psi) | |
| Engine | Intake valv (at 1mm li | | Opens | 5° BTDC | |
| ine | ` | | Closes | 45° ABDC | |
| | Exhaust va | | Opens | 45° BBDC | |
| | (at 1mm li | | Closes | 5° ATDC | |
| | Valve clearance | | Intake | 0.1 mm (0.004 in) | |
| | (cold) | () | Exhaust | 0.1 mm (0.004 in) | |
| | Idle speed | | 1500 rpm | | |
| | Cooling type | | | Liquid cooled | |

| | ı | | | | | |
|----------------------|----------------------------|------------------|--------------|-----------------|---------------------------------|------------------------------------|
| | Lubrication type | | | | | Forced pressure & Wet sump |
| Lubrication System | Oil pump type | | | | | Trochoid |
| | Oil filter type | | | | | Full-flow filtration |
| ati | | | | | | 3.6 L (3.17 lmp qt, |
| on : | Oil capacity | | | | | 3.82 Us qt) |
| Sys | Oil a | exchang | ing c | ana | city | 3 L (2.64 lmp qt, |
| tem | | | | • | • | 3.18 Us qt) |
| | | r draini | _ | | | 3.2 L (2.82 lmp qt, |
| | | r cartrid | _ | | | 3.39 Us qt) |
| | Air | cleaner | type a | <u> </u> | 10 | Wet type element |
| Fuel System | Fuel | capacit | ty | | | 17 L (3.57 lmp gal, 4.42 US gal |
| l Sy | | Туре | | | | CVK |
| 'ste | Са | Main | ON | RO | AD | #128 |
| m | Carburetor | jet | - | | DAD | #130 |
| | reto | Slow je | | | <u> </u> | #40 |
| | ĭ | Choke | | | | #90 |
| ΕI | 31 | | <u> </u> | | | Full transistor digital |
| ecti | gnit | Type | | | ignition | |
| ica | Ignition System | Ignition timing | | | | 5°/1500 rpm |
| lΕ | Sys | Spark plug | | | | CR7E (NGK) |
| ļiuļ | sten | Charle plug can | | | | 0.6~0.7mm |
| Electrical Equipment | n | ☐ Spark plug gap | | | $(0.024 \sim 0.028 \text{ in})$ | |
| nt | Battery Capacity | | | | | 12V18AH |
| | Clutch type | | | | | Wet, centrifugal |
| | Ciut | cii typc | | | | automatic |
| D | Clut | ch oper | ation system | | tem | Automatic (V-belt) |
| riv | Prin | nary red | uctio | n sy | stem | V-belt |
| Drive Train | Seco | ondary r em | educt | tion | l | Shaft drive |
| р | Higl | n reduct | ion ra | atio | | 3.76 |
| | Low | reducti | ion ra | tio | | 6.464 |
| | Reve | erse rati | 0 | | | 5.31 |
| 1 | FR/I | RR tire | rollin | g | | 1995/1995 mm |
| Mov | circu | ımferen | ce | | 1 | (79.8/79.8 in) |
| Moving Device | Tire | pressur | re. | | Front | 0.28 kg/cm² |
| Ω | | proson | | | Rear | (28 Kpa, 3.2 psi) |
| evic | Turr | ning ang | rle | | Left | 36° |
| ë | 1 um | iiiig aiig | 51C | | Right | 36° |
| D _w | lra a | vatam tr | 112.0 | Fro | ont | Disk brake |
| DΓ | Brake system type Rear | | | | Disk brake | |
| C | Suspension type Front Rear | | | | Double wishbone | |
| Sus | | | | Link suspension | | |
| Fra | me t | ype | | | | Double cradle |
| Frame type | | | | | | |

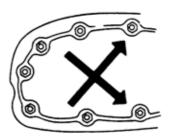


SERVICE PRECAUTIONS

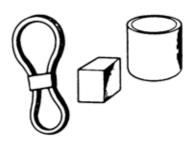
■ Make sure to install new gaskets, O-rings, circlips, cotter pins, etc. when reassembling.



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



■ Use genuine parts and lubricants.



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

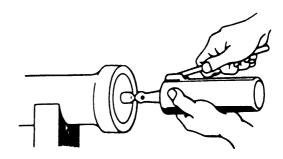


■ After disassembly, clean removed parts. Lubricate sliding surfaces with engine oil before reassembly.

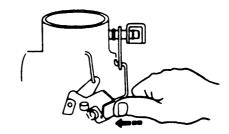




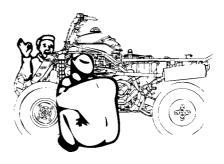
Apply or add designated greases and lubricants to the specified lubrication points.



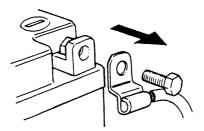
■ After reassembly, check all parts for proper tightening and operation.



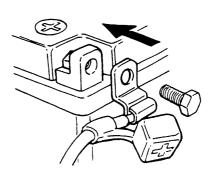
■ When two persons work together, pay attention to the mutual working safety.



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

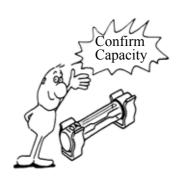


- After operation, check all connecting points, fasteners, and lines for proper connection and installation.
- When connecting the battery, the positive (+) terminal must be connected first.
- After connection, apply grease to the battery terminals.
- Terminal caps shall be installed securely.





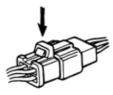
■ If the fuse is burned out, find the cause and repair it. Replace it with a new one according to the specified capacity.



■ After operation, terminal caps shall be installed securely.



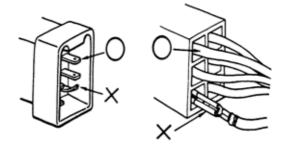
■ When taking out the connector, the lock on the connector shall be released before operation.



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

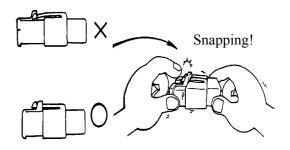


■ Check if any connector terminal is bending, protruding or loose.

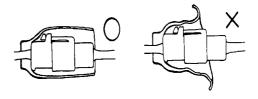




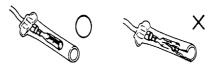
- The connector shall be inserted completely.
- If the double connector has a lock, lock it at the correct position.
- Check if there is any loose wire.



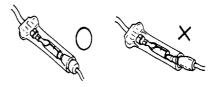
■ Before connecting a terminal, check for damaged terminal cover or loose negative terminal.



■ Check the double connector cover for proper coverage and installation.

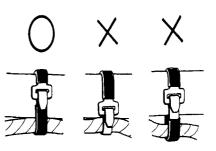


- Insert the terminal completely.
- Check the terminal cover for proper coverage.
- Do not make the terminal cover opening face up.



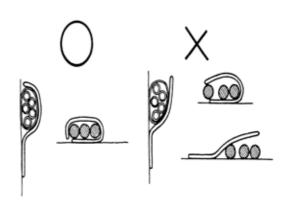
■ Secure wire harnesses to the frame with their respective wire bands at the designated locations.

Tighten the bands so that only the insulated surfaces contact the wire harnesses.

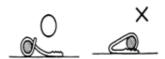




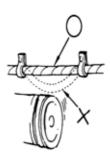
■ After clamping, check each wire to make sure it is secure.



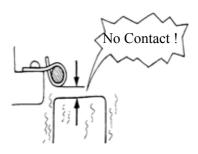
■ Do not squeeze wires against the weld or its clamp.



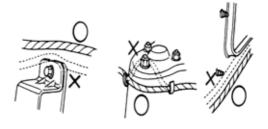
■ After clamping, check each harness to make sure that it is not interfering with any moving or sliding parts.



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

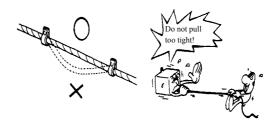


- Route wire harnesses to avoid sharp edges or corners. Avoid the projected ends of bolts and screws.
- Route wire harnesses passing through the side of bolts and screws. Avoid the projected ends of bolts and screws.





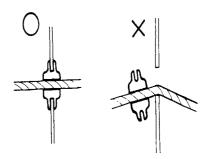
■ Route harnesses so they are neither pulled tight nor have excessive slack.



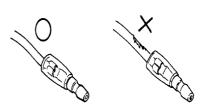
■ Protect wires and harnesses with electrical tape or tube if they contact a sharp edge or corner.



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



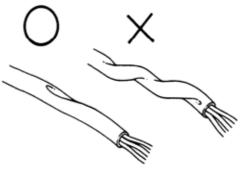
- Do not break the sheath of wire.
- If a wire or harness is with a broken sheath, repair by wrapping it with protective tape or replace it.



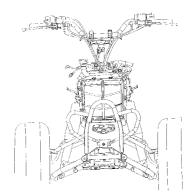
■ When installing other parts, do not press or squeeze the wires.



■ 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 (90#)



: Caution



: Warning



TORQUE VALUES

STANDARD TORQUE VALUES

| Item | Torque kgf-m (N-m, lbf-ft) | Item | Torque kgf-m (N-m, lbf-ft) |
|---|-------------------------------|---|---|
| 5mm bolt and nut 6mm bolt and nut 8mm bolt and nut 10mm bolt and nut 12mm bolt and nut 14mm bolt and nut | 1 (10, 7.2) 2.2 (22, 16) | 4mm screw 5mm screw 6mm screw, SH bolt 6mm flange bolt and nut 8mm flange bolt and nut 10mm flange bolt and nut | 0.3 (3, 2.2) 0.4 (4, 2.9) 0.9 (9, 6.5) 1.2 (12, 9) 2.7 (27, 20) 4 (40, 29) |

Torque specifications listed below are for important fasteners.

ENGINE

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



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



FRAME

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



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



SPECIAL TOOLS

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



| Tool Name | Tool No. | Illustration (Note: the special tools may differ slightly from those shown in the figure of this manual.) |
|---|------------|---|
| Driven pulley holder | | |
| (Refer to the "DRIVEN PULLEY DISASSEMBLY/INSPECTION/ ASSEMBLY" section in the chapter 10.) | A120E00059 | |
| Flywheel puller | | |
| (Refer to the "STARTER CLUTCH REMOVAL/ INSPECTION/ INSTALLATION" section in the chapter 19.) | A120E00060 | Samulania |
| Oil filter cartridge wrench | | |
| (Refer to the "(Refer to the "ENGINE OIL" section in the chapter 3.) | A120E00061 | Co. specific |
| Output shaft bearing nut | | -2017 |
| wrench (Refer to the "(Refer to the "BEARING REPLACEMENT IN THE RIGHT CRANKCASE" section in the chapter 11.) | A120E00066 | |
| Lock nut wrench | | |
| (Refer to the "CLUTCH REMOVAL/INSTALLATION" section in the chapter 10) | A120E00067 | |



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



| Tool Name | Tool No. | Illustration (Note: the special tools may differ slightly from those shown in the figure of this manual.) |
|--|------------|---|
| Pinion bearing lock nut wrench (Refer to the "REAR DRIVE DISASSEMBLY/INSPECTION/ASSEMBLY" section in the chapter 13.) | A120F00020 | 6020 |
| Pinion puller (Refer to the "REAR DRIVE DISASSEMBLY/INSPECTION/ASSEMBLY" section in the chapter 13.) | A120F00021 | |
| C-ring remover (Refer to the "FRONT DRIVE DISASSEMBLY/INSPECTION/ASSEMBLY" section in the chapter 13) | A120F00022 | |



LUBRICATION POINTS

ENGINE

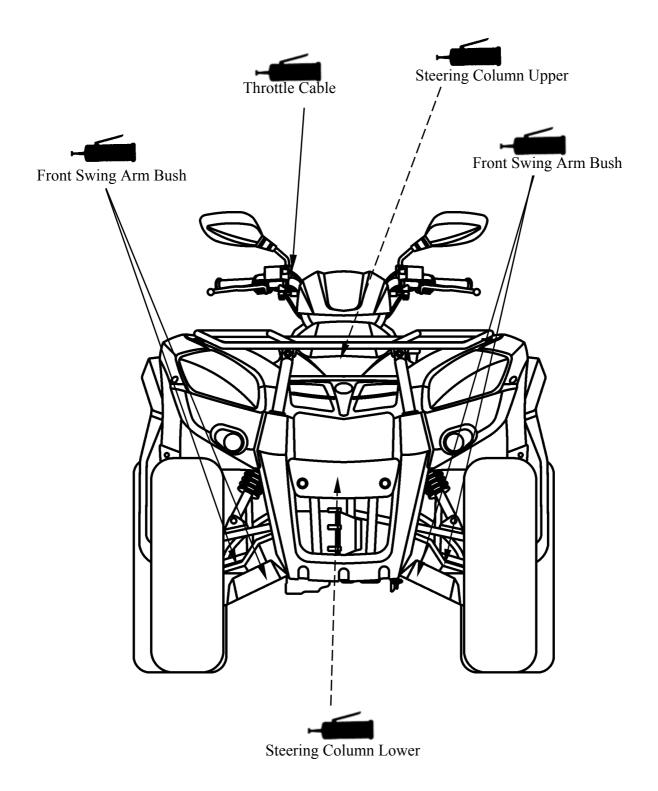
| Lubrication Points | Lubricant |
|---|--------------------------------------|
| Valve guide/valve stem movable part | •Genuine KYMCO Engine Oil (SAE5W-50) |
| Camshaft protruding surface | •API SJ Engine Oil |
| Valve rocker arm friction surface | |
| Camshaft drive chain | 10 30 50 70°F |
| Cylinder lock bolt | SAE 10W30 |
| Piston surroundings and piston ring grooves | SAE 20W40 |
| Piston pin surroundings | |
| Cylinder inside wall | SAE 5W30 |
| Connecting rod/piston pin hole | -10 0 10 20°C |
| Connecting rod big end | |
| Clutch | |
| Crankshaft | |
| Balance shaft | |
| Crankshaft one-way clutch movable part | |
| Recoil starter pulley | |
| Oil pump drive chain | |
| Starter reduction gear | |
| Starter one-way clutch | |
| O-ring face | |
| Oil seal lip | |
| Output shaft | |
| Bevel gear | |
| Drive shaft | |
| Countershaft | |
| Main shaft | |
| Transmission gear shaft bearing part | |
| Front drive gear and bearing part | Gear oil: SAE 90# |
| Rear drive gear and bearing part | Gear oil: SAE 80# |



FRAME

The following is the lubrication points for the frame. Use general purpose grease for parts not listed.

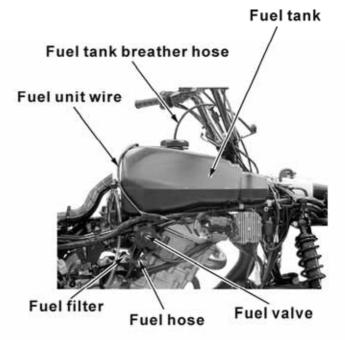
Apply clean engine oil or grease to cables and movable parts not specified. This will avoid abnormal noise and rise the durability of the ATV.



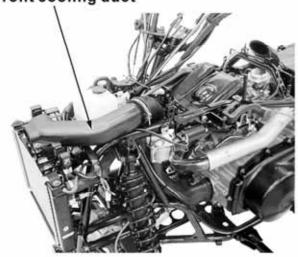


CABLE & HARNESS ROUTING

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

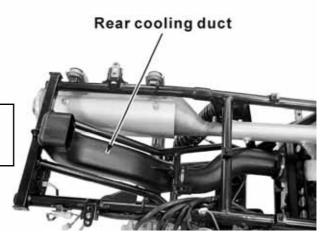


Front cooling duct

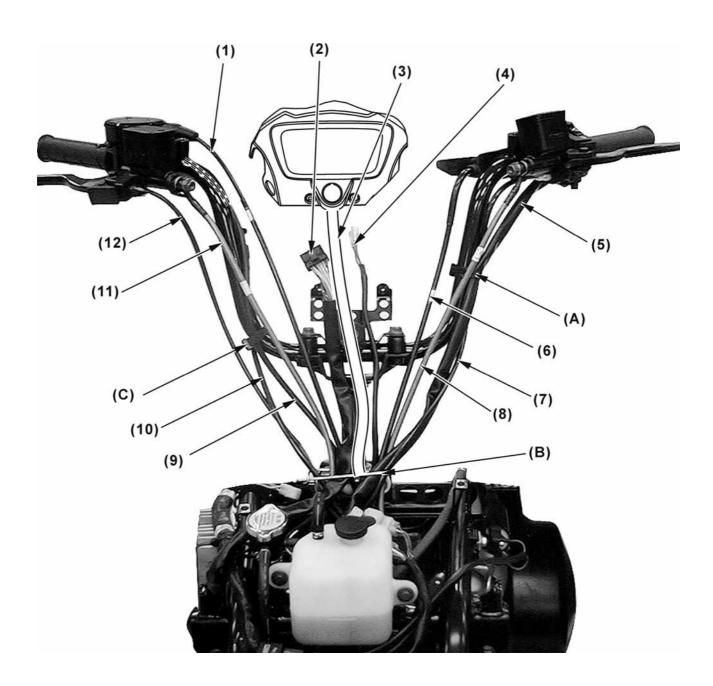


Remove the front cooling duct (refer to the "ENGINE REMOVAL" section in the chapter 7).

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

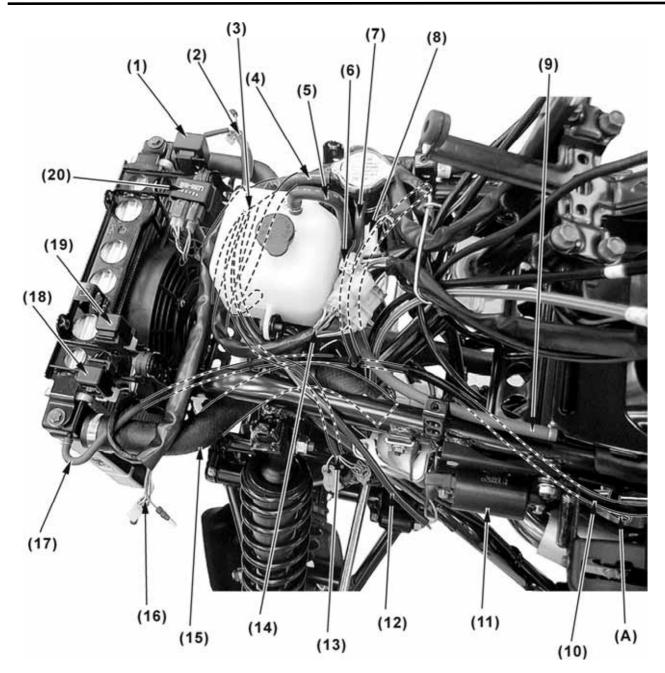






- (1) Throttle cable
- (2) Instrument connector
- (3) Ignition switch wire
- (4) Accessory socket connectors
- (5) Left handlebar switch
- (6) Rear parking brake cable (ON ROAD)
- (7) Brake light switch wire
- (8) Rear brake hose (Brake lever)
- (9) 2WD/4WD switch wire
- (10) Choke cable
- (11) Front brake hose
- (12) Brake light switch wire
- (A) Pass the brake light switch wire and left handlebar switch wire through the band.
- (B) Passe the throttle cable, chock cable, brake light switch wires, 2WD/4WD switch wire, front brake hose, rear brake hose, instrument connector wire, accessory socket connector wire, rear parking brake cable (ON ROAD), left handlebar switch wire and ignition switch wire through the guide.
- (C) Pass the 2WD/4WD switch wire through the band.



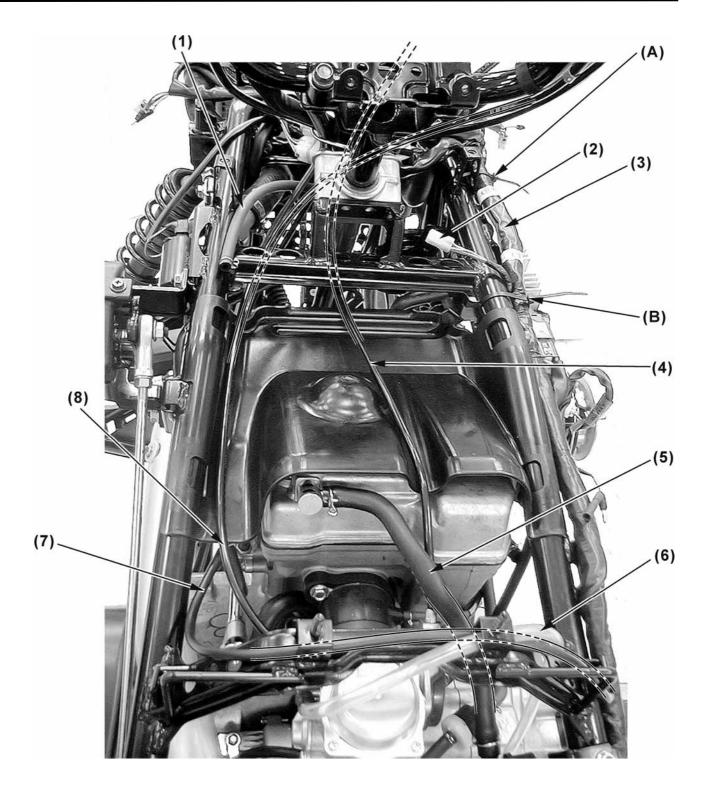


- (1) Fan EMI filter
- (2) Headlight connector Right front signal light connectors (ON ROAD)
- (3) Harness wire
- (4) Siphon hose
- (5) Over flow hose (Reserve tank)
- (6) Ignition switch connector
- (7) Air bleed hose
- (8) 2WD/4WD switch connector
- (9) Fuel tank flow hose (connect the fuel tank cover, Note)
- (10) Air bleed hose
- (11) Ignition coil

- (12) Ignition coil wire
- (13) 2WD /4WD start switch /2WD/4WD motor connectors
- (14) Left handlebar switch connectors
- (15) Upper radiator hose
- (16) Headlight connector Left front signal light connectors (ON ROAD)
- (17) Air bleed hose
- (18) LO beam relay
- (19) HI beam relay
- (20) 2WD/4WD change ECU
- (A) Pass the air bleed hose through the guide.

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



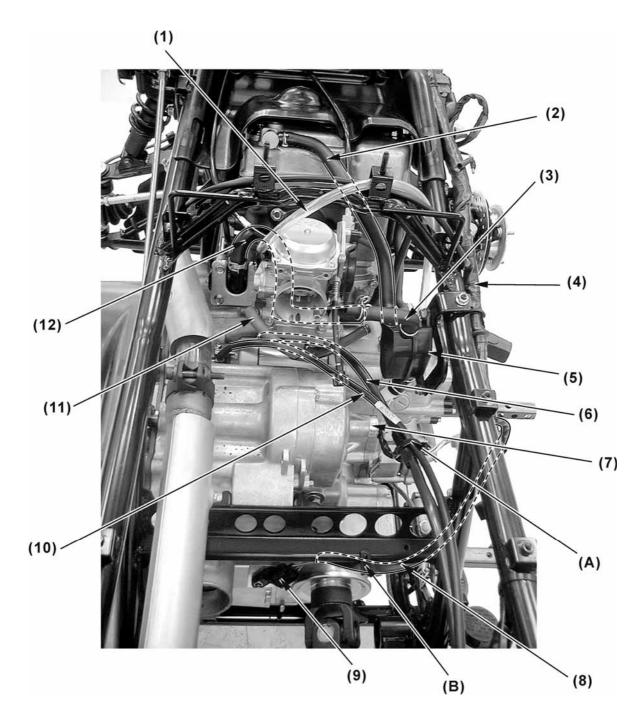


- (1) Fuel tank flow hose (connect the fuel tank cover, Note)
- (2) Hazard connector (ON ROAD)
- (3) Harness wire
- (4) Throttle cable
- (A) Pass the harness wire through the band.(B) Pass the harness wire through the band.

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

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



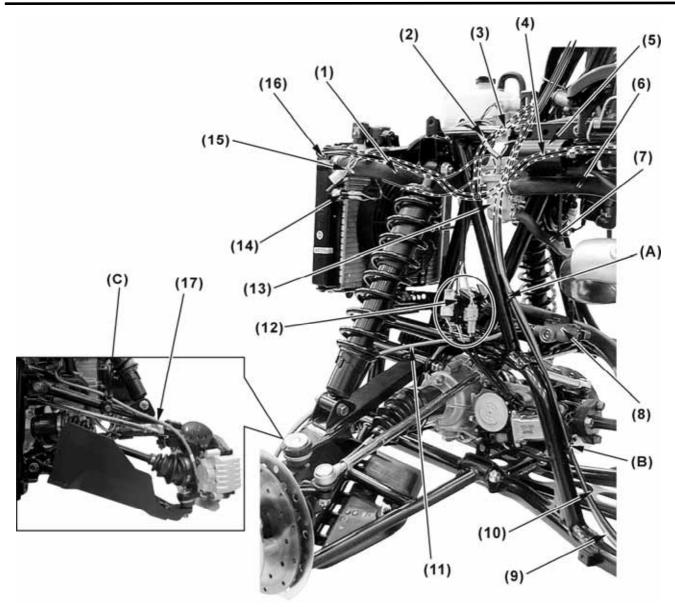


- (1) Over flow (carburetor)
- (2) Crankcase breather hose
- (3) Crankcase breather hose
- (4) Harness wire
- (5) Crankcase breather hose joint
- (6) Starter motor cable

- (7) Gear position light switch(8) Speed sensor wire(9) Speed sensor

- (10) Engine ground cable
- (11) Fuel hose
- (12) AICV air supply hose
- (A) Pass the starter motor cable, engine ground cable and gear position light wire through the band.
- (B) Pass the speed sensor wire through the band.

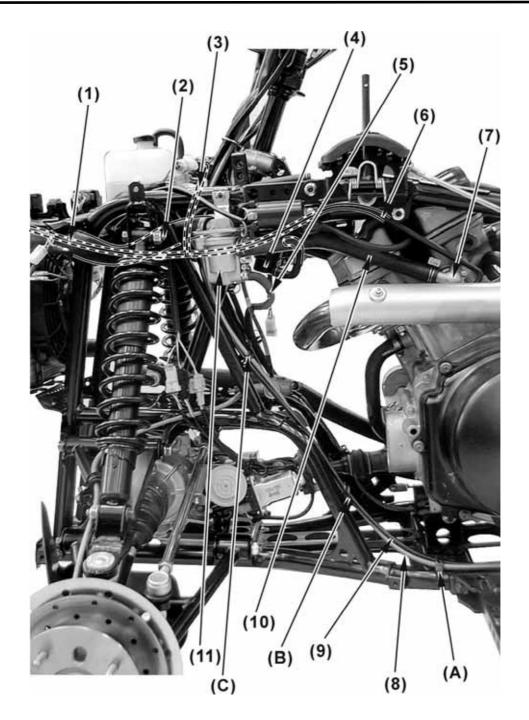




- (1) Upper radiator hose
- (2) Ignition coil wire
- (3) Air bleed hose
- (4) Air bleed hose
- (5) Ignition coil
- (6) Water hose
- (7) Water bypass hose
- (8) Delay valve (ON ROAD)
- (8) Brake fluid joint (OFF ROAD)
- (9) Rear brake hose (Brake lever)

- (10) Rear parking brake cable (ON ROAD)
- (11) Front brake hose
- (12) 2WD /4WD start switch//2WD/4WD motor connectors
- (13) Thermostat
- (14) Fan motor switch
- (15) Headlight connector Left front turn signal light connectors (ON ROAD)
- (16) Air bleed hose
- (17) Front brake hose
- (A) Pass the rear parking cable (ON ROAD) and rear brake hose through the guide.
- (B) Pass the rear parking cable (ON ROAD) and rear brake hose through the guide.
- (C) Pass the front brake hose through the guide.



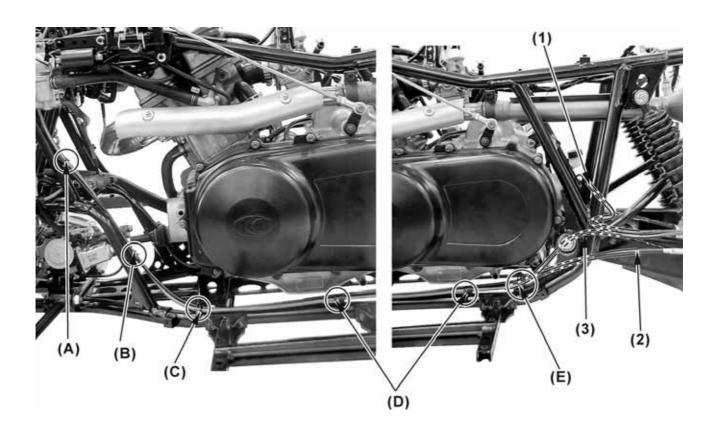


- (1) Air bleed hose
- (2) Upper radiator hose
- (3) Air bleed hose
- (4) AICV control solenoid valve
- (5) Water bypass hose
- (6) Air bleed hose

- (7) Water joint
- (8) Rear brake hose (Brake lever)
- (9) Rear parking brake cable (ON ROAD)
- (10) Water hose
- (11) Thermostat

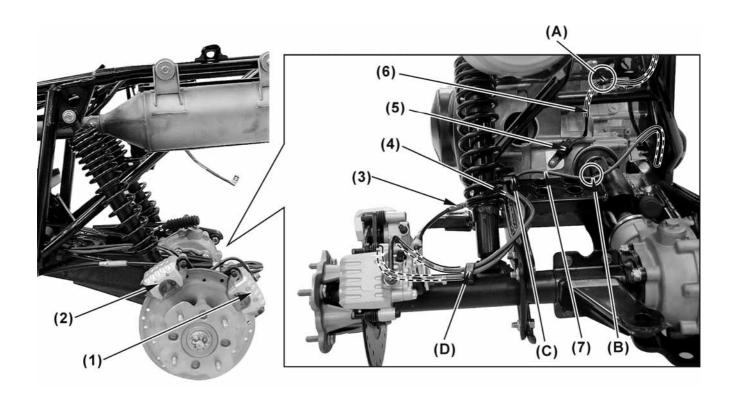
Pass the rear parking brake and rear brake hose through the guide (A), (B) and (C).





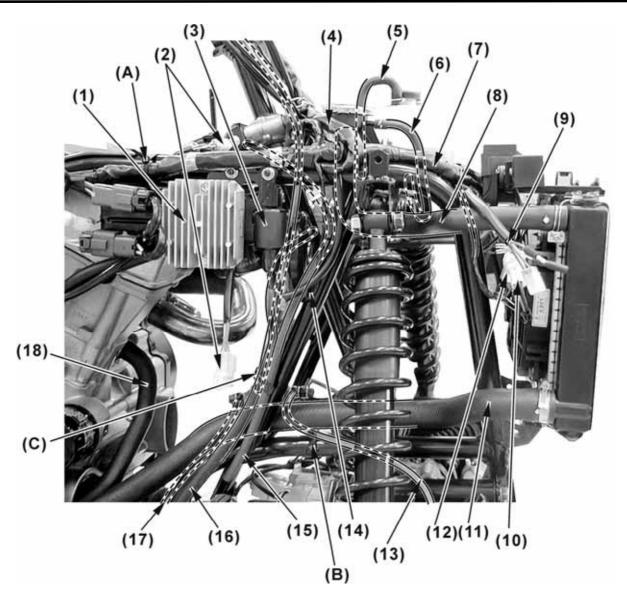
- (1) Rear brake hose (Brake pedal)
- (3) Rear brake hose (Brake lever)
- (2) Rear parking brake cable (ON ROAD)
 - Pass the rear parking brake cable (ON ROAD) and rear brake hose (Brake lever) through the guide (A), (B), (C), band (D) and guide (E).





- (1) Rear caliper (Brake pedal)
- (2) Rear caliper (Brake lever)
- (3) Rear parking brake cable (ON ROAD)
- (4) Rear brake hose (Brake lever)
- (5) Speed sensor
- (6) Speed sensor wire
- (7) Rear brake hose (Brake pedal)
- (A) Pass the speed sensor wire through the guide.
- (B) Pass the rear brake hose (Brake pedal) through the guide.
- (C) Pass the rear brake hose (Brake pedal) and rear brake hose (Brake lever) through the guide.
- (D) Pass the rear brake hose (Brake pedal) and rear brake hose (Brake lever) through the guide.





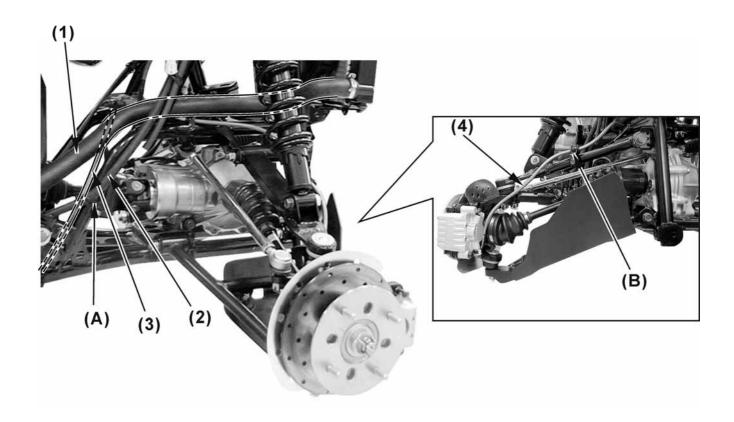
- (1) Regulator/Rectifier
- (2) Hazard connector (ON ROAD)
- (3) Flasher relay (ON ROAD)
- (4) Instrument wire
- (5) Over flow hose (reserve tank)
- (6) Siphon hose
- (7) Harness wire
- (8) Coolant filler hose
- (9) Headlight connector

Right front turn signal light connectors (ON ROAD)

- (10) Fan motor connector
- (11) Low radiator hose
- (12) EMI filter
- (13) Front brake hose
- (14) Horn (ON ROAD)
- (15) Fuel flow hose
- (16) Water bypass hose
- (17) Combined brake hose (ON ROAD)
- (18) water hose

- (A) Pass the harness wire through the band.
- (B) Pass the front brake hose through the guide.
- (C) Pass the fuel flow hose and water bypass hose through the guide.

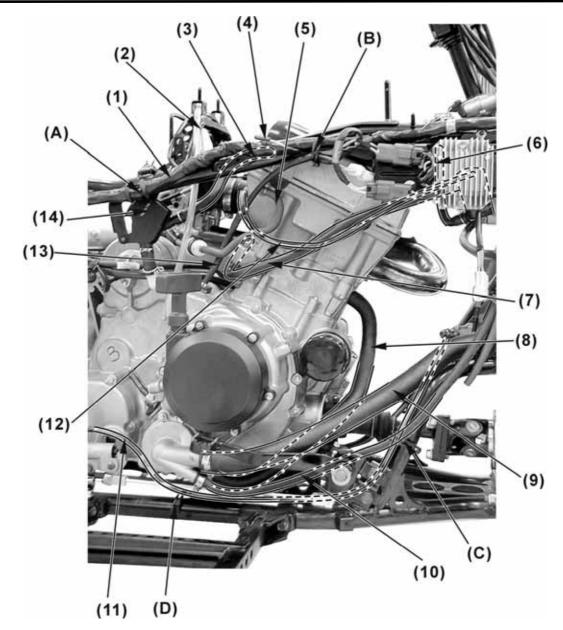




- (1) Low radiator hose
- (2) Water bypass hose

- (3) Combined brake hose (ON ROAD)
- (4) Front brake hose
- (A) Pass the front brake hose (combined) and water bypass hose through the guide.
- (B) Pass the front brake hose through the guide.



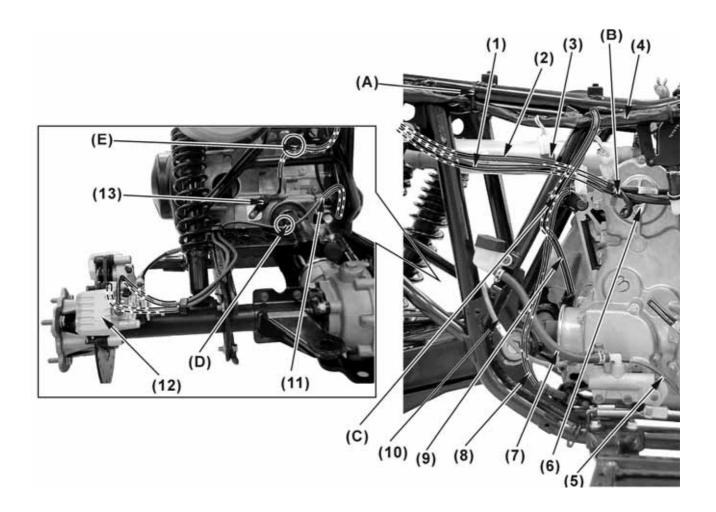


- (1) Harness wire
- (2) Over flow (carburetor)
- (3) Crankcase breather hose
- (4) Fuel unit connectors
- (5) Fuel hose
- (6) AICV air supply hose
- (7) AICV air supply hose (Note)

- (8) Water hose
- (9) Low radiator hose
- (10) Water bypass hose
- (11) Combined brake hose (ON ROAD)
- (12) AICV vacuum hose (Note)
- (13) A.C.G. wire
- (14) Crankcase breather housing
- (A) Pass the harness wire through the guide.
- (B) Pass the A.C.G. wire through the guide.
- (C) Pass the combined brake hose (ON ROAD) and water bypass hose through the guide.
- (D) Pass the combined brake hose (ON ROAD) through the guide.

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



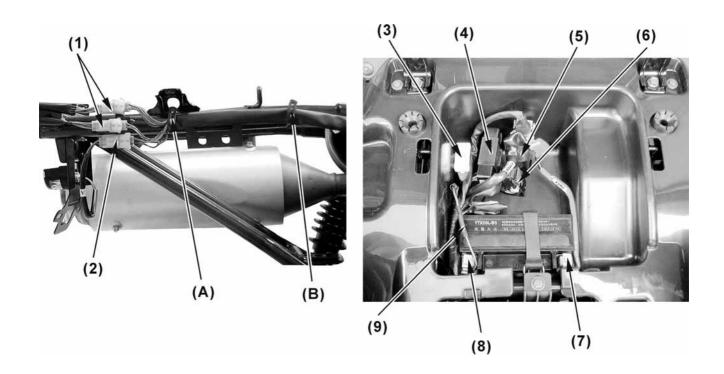


- (1) Starter motor cable
- (2) Engine ground cable
- (3) Clutch diode
- (4) Harness wire
- (5) Combined brake hose (ON ROAD)
- (6) Gear position light switch
- (7) Brake fluid filler hose

- (8) Brake light switch
- (9) Speed sensor wire
- (10) Rear brake hose (Brake pedal)
- (11) Rear brake hose (Brake pedal)
- (12) Rear caliper (Brake pedal)
- (13) Speed sensor
- (A) Pass the harness wire through the band.
- (B) Pass the gear position light switch wire, starter motor cable and engine ground cable through the band.
- (C) Pass the speed sensor wire and brake light switch wire through the guide.
- (D) Pass the rear brake hose (Brake pedal) through the guide.
- (E) Pass the speed sensor wire through the guide.

1. GENERAL INFORMATION



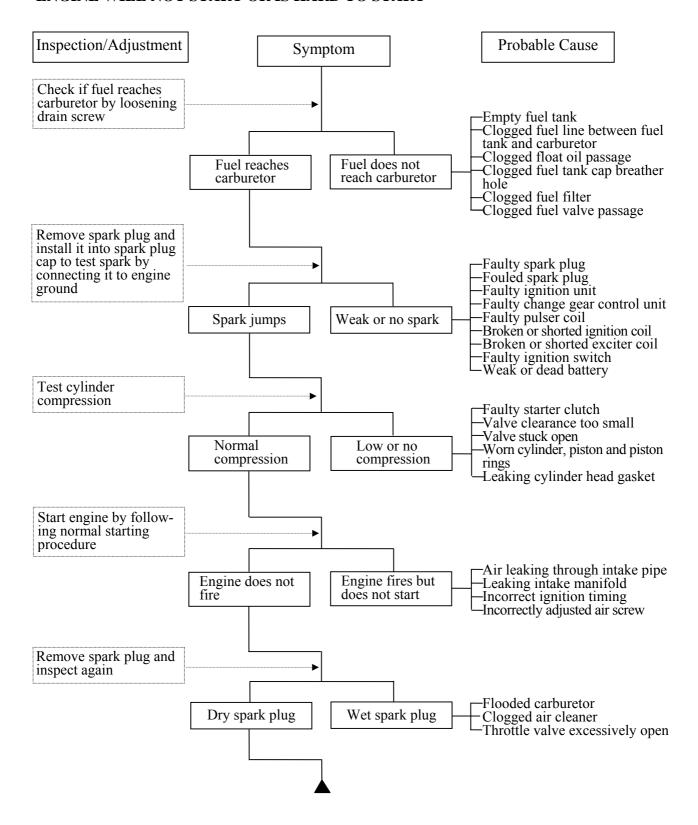


- (1) Taillight/Brake light/Rear turn signal light connectors (OFF ROAD)
- (1) Taillight/Brake light/Rear turn signal light connectors (ON ROAD)
- (2) License light connector (ON ROAD)
- (3) Fuse box
- (4) Ignition unit
- (5) Starter MAG
- (6) Starter relay
- (7) Positive terminal lead
- (8) Negative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



TROUBLESHOOTING

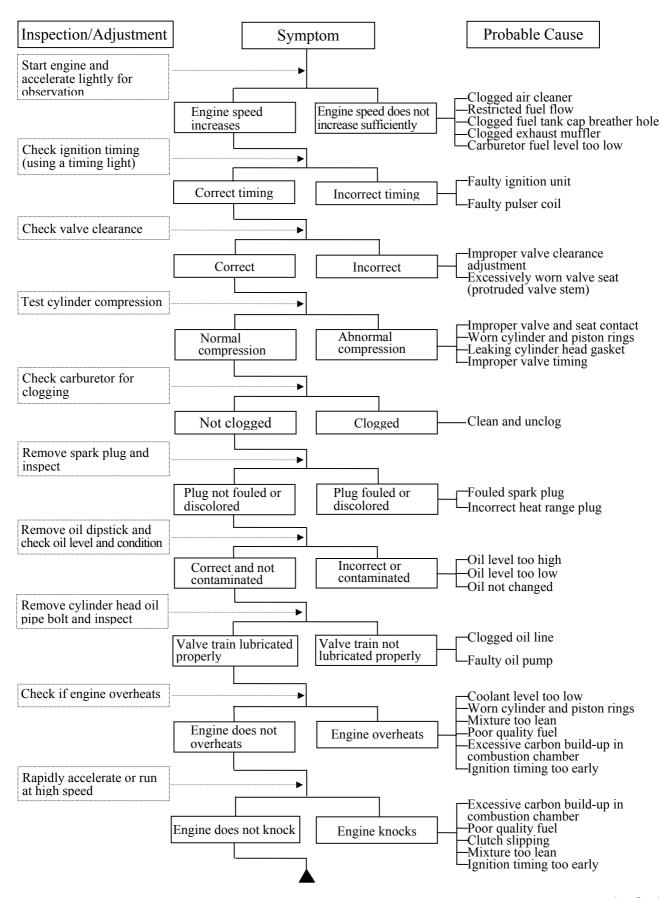
ENGINE WILL NOT START OR IS HARD TO START



1. GENERAL INFORMATION

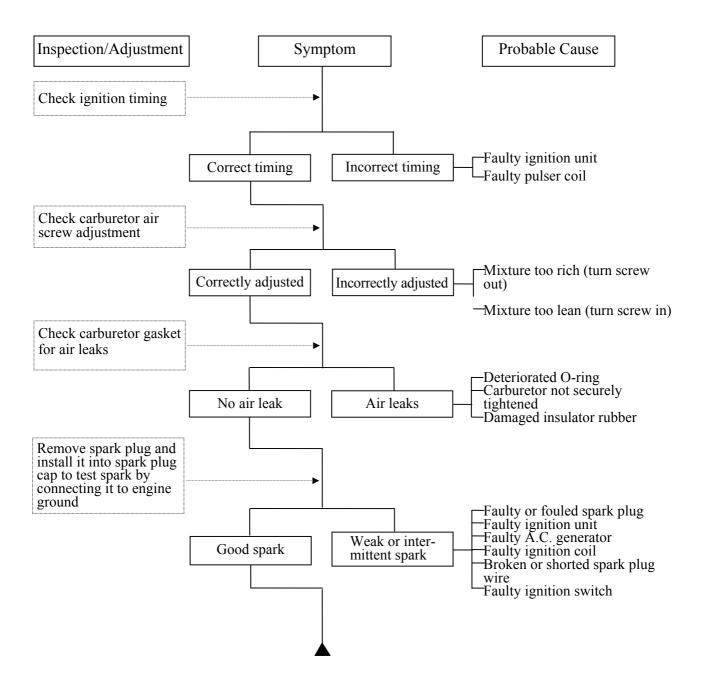


ENGINE LACKS POWER



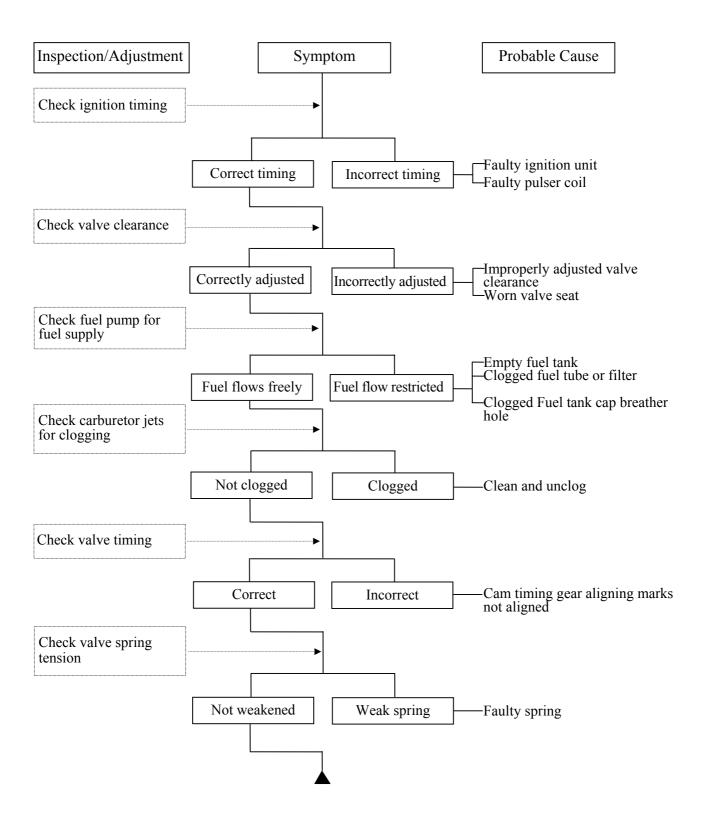


POOR PERFORMANCE (ESPECIALLY AT IDLE AND LOW SPEEDS)





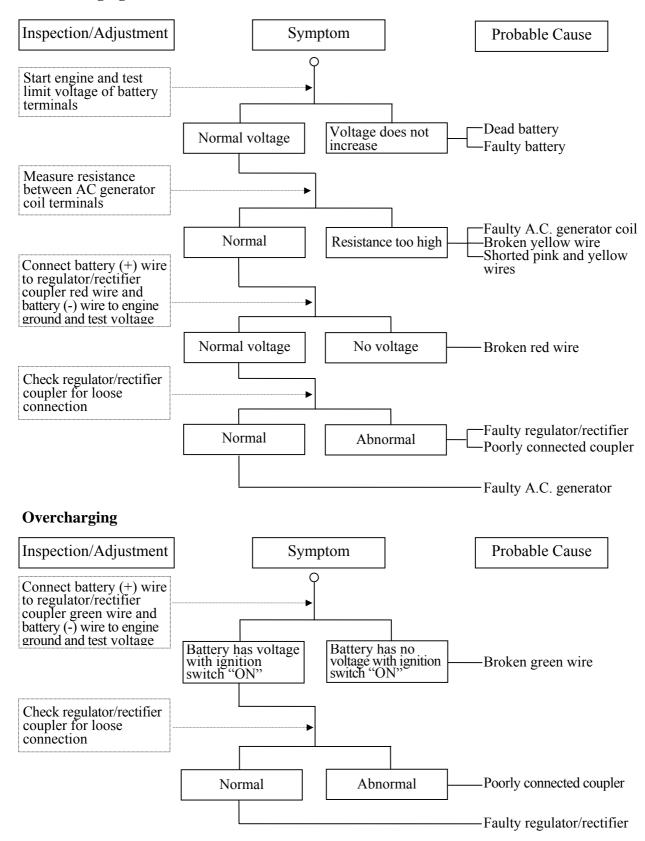
POOR PERFORMANCE (AT HIGH SPEED)





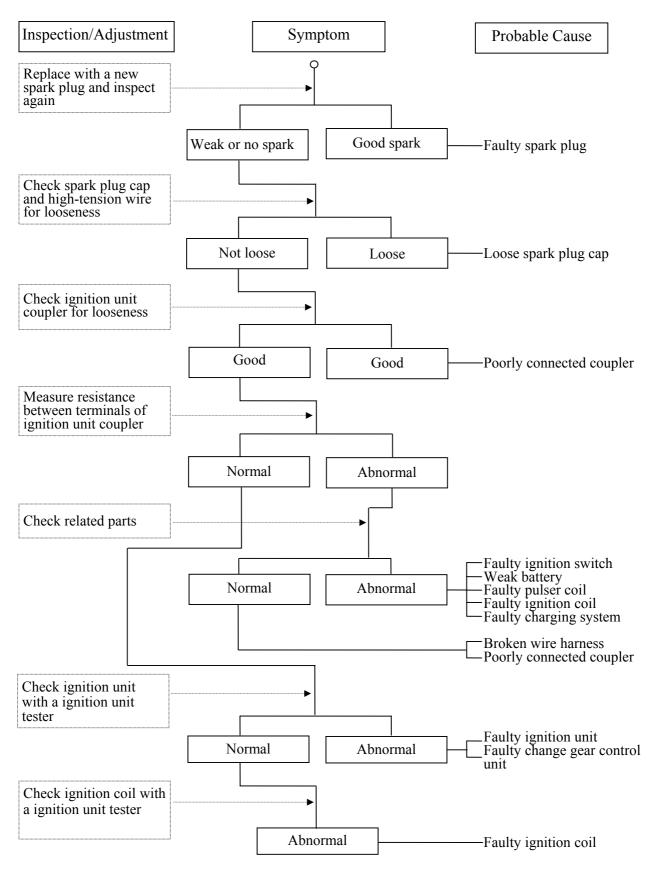
POOR CHARGING (BATTERY OVER DISCHARGING OR OVERCHARGING)

Undercharging





NO SPARK AT SPARK PLUG



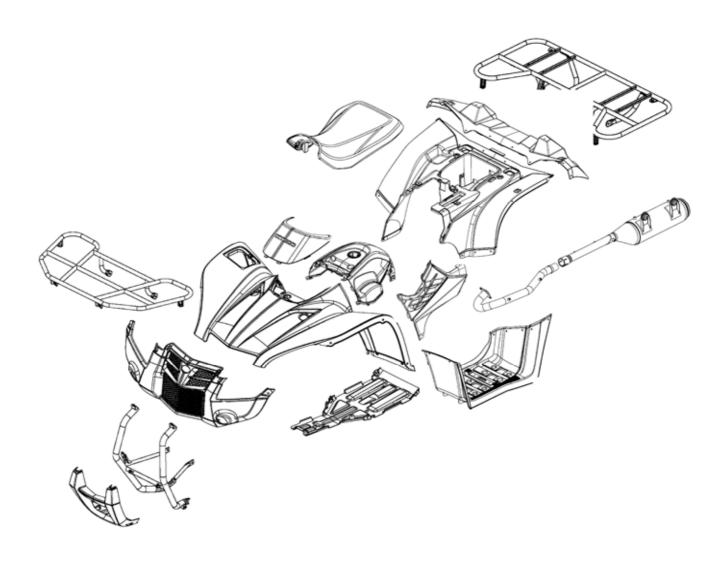


2

FRAME COVERS/EXHAUST MUFFLER

| SERVICE INFORMATION | 2- | 2 |
|-------------------------------------|-----|----|
| TROUBLESHOOTING | 2- | 2 |
| FASTENER REMOVAL AND REINSTALLATION | 2- | 3 |
| FRAME COVERS | 2- | 4 |
| EXHAUST MUFFLER | 2-1 | 13 |







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 mounting bolt 3.5 kgf-m (35 Nm, 25 lbf-ft) Exhaust pipe mounting nut 3.5 kgf-m (35 Nm, 25 lbf-ft) Exhaust muffler band bolts 2.1 kgf-m (21 N-m, 15 lbf-ft)

TROUBLESHOOTING

Noisy exhaust muffler

- Damaged exhaust muffler
- Exhaust muffler joint air leaks

Lack of power

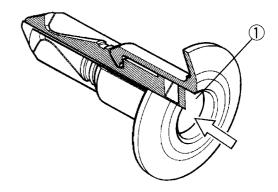
- Caved exhaust muffler
- Exhaust muffler air leaks
- Clogged exhaust muffler



FASTENER REMOVAL AND REINSTALLATION

REMOVAL

Depress the head of fastener center piece ①. Pull out the fastener.



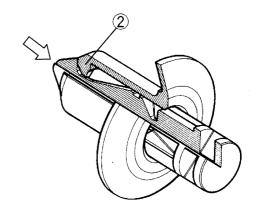
INSTALLATION

Let the center piece stick out toward the head so that the pawls ② close.

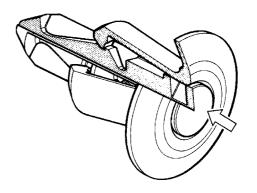
Insert the fastener into the installation hole.



To prevent the pawl ② from damage, insert the fastener all the way into the installation hole



Push in the head of center piece until it becomes flush with the fastener outside face.



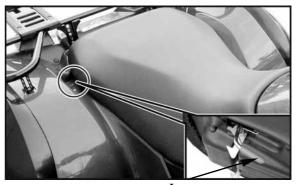


FRAME COVERS

SEAT

REMOVAL

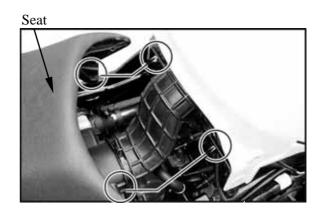
To remove the seat, pull the seat lock lever upward and pull up the seat at the rear.



Lever

INSTALLATION

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



FRONT CARGO RACK

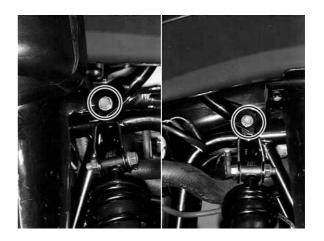
REMOVAL/INSTALLATION

Remove the two bolts under front fender.





Remove the two mounting bolts from the front cargo rack right/left side under front fender.



Remove the two mounting bolts from front cargo rack, remove the front cargo rack.

Installation is in the reverse order of removal.



FRONT CARRIER COVER

REMOVAL/INSTALLATION

Remove the four bolts from the front carrier cover, then remove the front carrier cover.

Installation is in the reverse order of removal.





FRONT CARRIER

REMOVAL/INSTALLATION

Remove front cargo rack (see page 2-5).

Remove the three mounting bolts from front carrier left side.



Remove the three mounting bolts from front carrier left side.

Installation is in the reverse order of removal.



REAR CARGO RACK

REMOVAL/INSTALLATION

Remove the two mounting bolts from the rear cargo rack right/left side under rear fender.





Remove two screws from the rear cargo rack.

Remove the four bolts under rear fender. Remove the two mounting bolts from rear cargo rack, then remove rear cargo rack.

Installation is in the reverse order of removal.



RIGHT/LEFT FOOTBOARD

REMOVAL/INSTALLATION

Remove the nine fasteners, two screws/nuts and four bolts, then remove the right footboard.



Remove the eight fasteners, two screws/nuts and four bolts, then remove the left footboard.



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

Installation is in the reverse order of removal.





RIGHT/LEFT SIDE COVER

REMOVAL/INSTALLATION

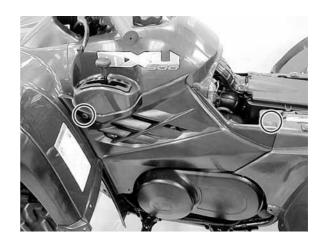
Remove the seat (page 2-4) and right or left footboard. (see page 2-7).

Remove a screw and a fastener, then remove the right or left side cover.

*

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

Installation is in the reverse order of removal.



FRONT CENTER COVER

REMOVAL/INSTALLATION

Remove the two fasteners and then remove front cover.



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

Installation is in the reverse order of removal.



METER COVER

REMOVAL/INSTALLATION

Disconnect the fuel tank breather hose from the meter cover.

Remove the two screws from the meter cover.

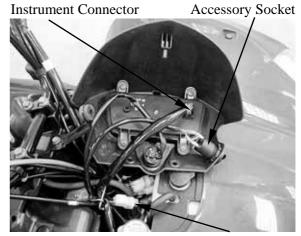


Fuel Tank Breather Hose



Disconnect the ignition switch, instrument and accessory socket connectors, then remove the meter cover.

Installation is in the reverse order of removal.



Ignition Switch Connector

FUEL TANK COVER

REMOVAL/INSTALLATION

Remove the seat (page 2-4), front center cover (page 2-8), right/left footboards (page 2-7) and right/left side covers (page 2-8).

Remove a bolt and then remove drive select grip.

Remove the two fasteners from fuel tank cover left side.



Remove the two fasteners from fuel tank cover right side.

Remove the two fasteners from fuel tank cover front side.

Remove the fuel tank cap by turning it counterclockwise and fuel tank seal, then remove the fuel tank cover.

*

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

Installation is in the reverse order of removal.



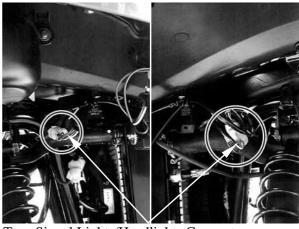


FRONT FENDER

REMOVAL/INSTALLATION

Remove the seat (page 2-4), front cargo rack (page 2-5), front carrier (page 2-6), front center cover (page 2-8), right/left footboards (page 2-7), right/left side covers (page 2-8) and fuel tank cover (page 2-9).

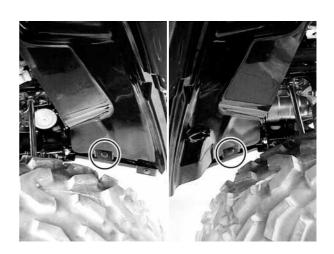
Disconnect the right/left turn signal light connectors (ON ROAD) and headlight connectors.



Turn Signal Lights/Headlights Connectors.

Remove the two fasteners from front fender right and left side front fender, then remove the front fender.

Installation is in the reverse order of removal.



REAR FENDER

REMOVAL/INSTALLATION

Remove the seat (page 2-4), rear cargo rack (page 2-6), right/left footboards (page 2-7) and right/left side covers (page 2-8).

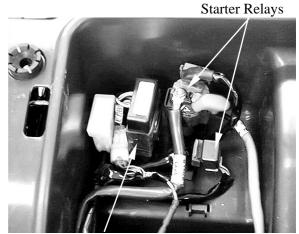
Disconnect the right and left taillight/turn signal light connectors (ON ROAD).

Disconnect the right and left taillight/brake light connectors (OFF ROAD).





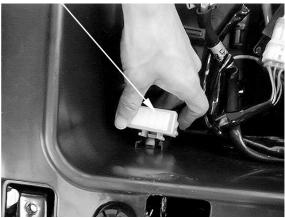
Remove the starter relays and ignition control module and



Ignition Control Module

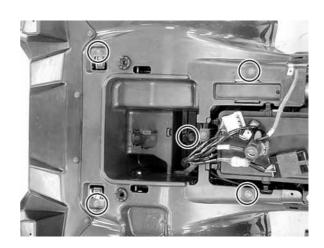
Push the lock clip under rear fender by finger and remove the fuse box.

Fuse Box



Remove the five mounting bolts from the rear fender, then remove the rear fender.

Installation is in the reverse order of removal.



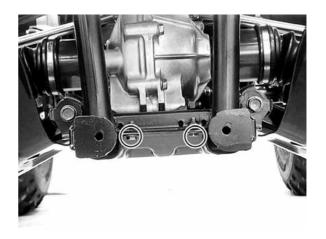


BOTTOM COVER

REMOVAL/INSTALLATION

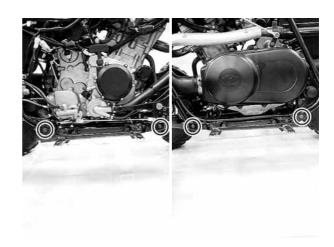
Remove the right and left footboards (page 2-7).

Remove the two mounting bolts from bottom cover front side.



Remove the four mounting bolts from bottom cover right/left side, then remove bottom cover.

Installation is in the reverse order of removal.

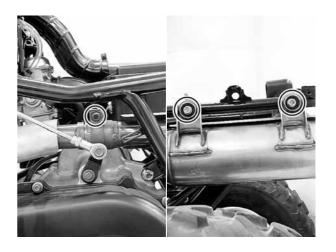




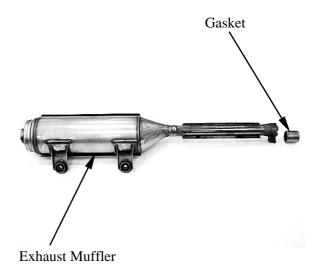
EXHAUST MUFFLER

REMOVAL

Loosen the exhaust pipe band bolt. Remove two muffler mounting bolts.



Remove the muffler and gasket from the exhaust pipe



Remove the exhaust pipe joint nuts.





Remove the exhaust pipe and gasket.

INSTALLATION

Replace the gaskets with new ones. Install the exhaust pipe and tighten the joint nuts.

Torque:

Exhaust pipe mounting nut:

3.5 kgf-m (35 N-m, 14 lbf-ft)

Install the muffler and tighten the mounting bolts

Torque:

Exhaust muffler mounting bolt:

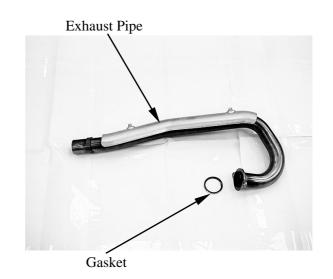
3.5 kgf-m (35 N-m, 14 lbf-ft)

Install and tighten the band bolts.

Torque: 2.1 kgf-m (21 N-m, 15 lbf-ft)



Be sure to install a new exhaust gasket.





3

INSPECTION/ADJUSTMENT

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|--|------|
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SERVICE INFORMATION

GENERAL

MARNING

- •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

Throttle grip free play $: 3 \sim 5 \text{ mm } (0.12 \sim 0.2 \text{ in})$

Spark plug gap : $0.6 \sim 0.7 \text{ mm} (0.024 \sim 0.028 \text{ in})$

Spark plug: Standard: CR7E (NGK)

Valve clearance : IN: 0.1 mm (0.004 in)

EX: 0.1 mm (0.004 in)

Idle speed : $1500\pm100 \text{ rpm}$

Engine oil capacity

At disassembly: 3.6 liter (3.17 lmp qt, 3.82 Us qt) At change: 3 liter (2.64 lmp qt, 3.18 Us qt)

After draining and oil filter cartridge change: 3.2 liter (2.82 lmp qt, 3.39 Us qt)

Front drive gear oil

Recommended oil: SAE 90

At disassembly: 300 cc (10.6 lmp oz, 10.1 Us oz) At change: 300 cc (10.6 lmp qt, 10.1 Us qt)

Rear drive gear oil

Recommended oil: SAE 80

At disassembly: 150 cc (5.33 lmp oz, 5 Us oz) At change: 130 cc (4.63 lmp qt, 4.33 Us qt)

Cylinder compression: 15 kg/cm² (1500 kPa, 213 psi)

Ignition timing: $5^{\circ}\pm1^{\circ}/1500$ rpm



Tire pressure

| | 1 Rider | | |
|-------|--------------------------------|--|--|
| Front | 0.28 kgf/cm² (28 Kpa, 3.2 psi) | | |
| Rear | 0.28 kgf/cm² (28 Kpa, 3.2 psi) | | |

Tire size:

Front: 25X8-12 Rear: 25X10-12

TORQUE VALUES

1.2kgf-m (12 N-m, 8.6 lbf-ft) Spark plug Tappet ADJ nut 0.9 kgf-m (9 N-m, 6.5 lbf-ft) Engine oil filter cap 1.5 kgf-m (15 N-m, 11 lbf-ft) Engine oil filter cartridge 1 kgf-m (10 N-m, 7.2 lbf-ft) Engine oil drain plug 2.5 kgf-m (25 N-m, 18 lbf-ft) Rear drive gear oil drain bolt 2 kgf-m (20 N-m, 15 lbf-ft) Rear drive gear oil level check bolt 2 kgf-m (20 N-m, 15 lbf-ft) Rear drive gear oil filler cap 1.5 kgf-m (15 N-m, 11 lbf-ft) Front drive gear oil drain bolt 3.2 kgf-m (32 N-m, 23 lbf-ft) Front drive gear oil filler cap 3.5 kgf-m (35 N-m, 25.5 lbf-ft) Front drive gear oil level check bolt 1 kgf-m (10 N-m, 7.2 lbf-ft) Tie-rod adjusting nut 3.5 kgf-m (35 N-m, 25.2 lbf-ft) 7 kgf-m (70 N-m, 50 lbf-ft) Front wheel hub nut Rear wheel hub nut 10 kgf-m (100 N-m, 72 lbf-ft)

SPECIAL TOOLS

Valve adjusting wrench A120E00036 Oil cartridge wrench A120E00061



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.

| | | | INITIAL | EVE | EVERY | |
|---|---|-------|---------|------|-------|--|
| ITEM | WHICHEVER COMES FIRST | mi | 100 | 600 | 1200 | |
| | 201121112 | Km | 150 | 1000 | 2000 | |
| | ROUTINE | MONTH | 1 | 6 | 12 | |
| Engine oil | Replace (Warm engine before draining). | | 0 | 0 | 0 | |
| Oil strainer | Clean. Replace if necessary. | | 0 | 0 | 0 | |
| Engine oil filter cartridge | •Replace | | 0 | 0 | 0 | |
| Front drive gear oil | Check oil level/oil leakage Replace every 12 months. | | 0 | | 0 | |
| Rear drive gear oil | Check oil level/oil leakage Replace every 12 months. | | 0 | | 0 | |
| Air filter element (for engine and *V-belt compartment) | Clean. (More often in wet or dusty areas.) Replace if necessary. | | | 0 | 0 | |
| Carburetor | Check idle speed/starter operation. Adjust if necessary. | | 0 | 0 | 0 | |
| Cylinder head cover breather system | Check breather hose for cracks or damage. Replace if necessary. | | | 0 | 0 | |
| Spark plug | Check condition. Adjust gap and clean. Replace if necessary. | | 0 | 0 | 0 | |
| Fuel line | Check fuel hose for cracks or damage. Replace if necessary. | | | 0 | 0 | |
| Valves | Check valve clearance. Adjust if necessary. | | 0 | 0 | 0 | |
| Brake | Check operation and brake fluid. Replace brake pad if necessary. | | 0 | 0 | 0 | |
| Coolant | Check coolant leakage. Replace if necessary. Replace coolant every 24 months. | | 0 | 0 | 0 | |
| V-belt | Check operation. Replace if damage or excessive wear. | | 0 | | 0 | |
| Exhaust system | Check leakage. Retighten if necessary. Replace gasket if necessary. | | | 0 | 0 | |
| Spark arrester | •Clean | | | 0 | 0 | |
| Wheels | Check balance/damage/runout. Replace if necessary. | | 0 | 0 | 0 | |
| Wheel bearings | Check bearing assembly for looseness/damage. Replace if damaged. | | 0 | 0 | 0 | |
| Steering system | Check operation. Replace if damaged. Check toe-in. Adjust if necessary. | | 0 | 0 | 0 | |
| Drive shaft boots | Check operation. Replace if damaged. | | | 0 | 0 | |
| Suspension | Check operation. Correct if necessary. | | | 0 | 0 | |
| Knuckle shafts/ Steering shaft | •Lubricate every 6 months. | | | 0 | 0 | |
| Fittings and Fasteners | Check all chassis fittings and fasteners. Correct if necessary. | | 0 | 0 | 0 | |

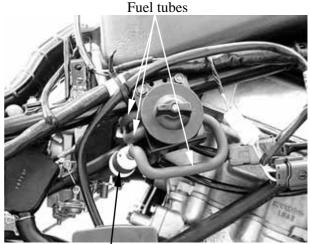


FUEL LINE

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

*

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



Fuel Filter

THROTTLE OPERATION

Check the throttle to swing for smooth movement.

Measure the throttle to swing free play.

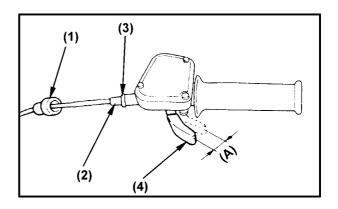
Free Play (A): $3\sim 5 \text{ mm } (0.12\sim 0.2 \text{ in})$

To adjust throttle free play:

- 1. Slide the rubber sleeve (1) back to expose the throttle cable adjuster (2).
- 2. Loosen the lock nut (3), then turn the adjuster to obtain the correct free play. (3~5 mm or 0.12~0.2 in)
- 3. Tighten the lock nut and reinstall the sleeve.

Other checks:

Check the throttle cable for kinks and signs of wear that could cause stretching or failure. Lubricate the throttle cable with a commercially available lubricant to prevent premature wear and corrosion.

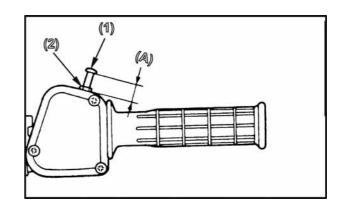




SPEED LIMITER

The speed limiter keeps the throttle from fully opening, even when the throttle lever is pushed to the maximum. Screwing in the adjuster limits the maximum engine power available and decreases the maximum speed of the ATV.

Speed limiter length (A): 13 mm (0.52 in)



WARNING

POTENTIAL HAZARD

Improper adjustment of the speed limiter and throttle.

WHAT CAN HAPPEN

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

HOW TO AVOID THE HAZARD

Do not turn the speed adjuster out more than 13 mm (0.52 in). Always make sure the throttle lever free play is adjusted to $1.0\sim4.0$ mm ($0.04\sim0.16$ in).

Adjustment

- 1. Loosen the lock nut (1).
- 2. Turn the adjuster (2) in or out until the specified speed limiter length is obtained.

Turning in:

Speed limiter length is decreased.

Turning out:

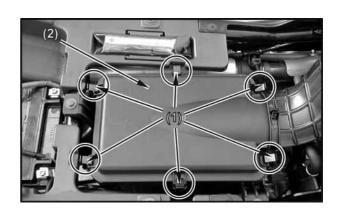
Speed limiter length is increased.

3. Tighten the lock nut.

AIR CLEANER

AIR CLEANER REPLACEMENT

- 1. Remove the seat (refer to the "**FRAME COVERS**" section in the chapter 2).
- 3. Unlatch the six retainer clips (1) and remove the air cleaner housing cover (2).

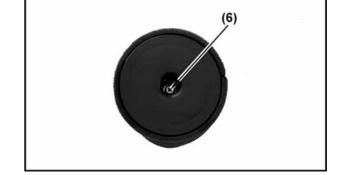




- 3. Loosen the screw (3) and remove the air cleaner assembly (4) from the air cleaner housing.
- 4. Unscrew the clamp (5)



- 5. Remove the outer air cleaner (7).
- 6. Remove the screw/washers (6) and remove the air cleaner assembly from the air cleaner holder (8).
- 7. Remove the inner air cleaner (9) and air cleaner screen (10) from the air cleaner guide (11).
- 8. Remove the air cleaner screen from the inner air cleaner.



CLEAN AIR FILTER ELEMENT

Wash the element gently, but throughly in solvent.

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

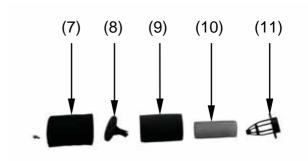
Squeeze the excess solvent out of the element and let dry.

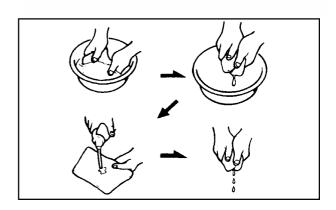
Do not twist or wring out the foam element. This could damage the foam material.

Apply the engine oil. Squeeze out the excess oil.

The element should be wet but not dripping.

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

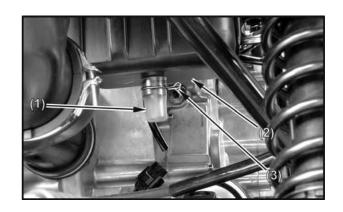






AIR CLEANER HOUSING DRAIN

- 1. Remove the drain tube (1) by removing the clip (3).
- 2. Drain the deposits.
- 3. Reinstall the drain tube, securing it with the clip.

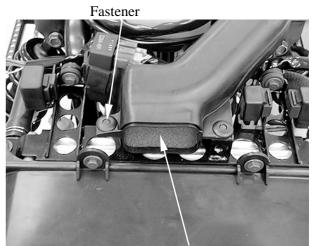


AIR FILTER FOR DRIVE BELT

To clean the air filter:

Remove front center cover (refer to the "FRAME COVERS" section in the chapter 2).

Remove a fastener from air inlet hose. Remove air filter.



Air Filter

Tap the element lightly to remove most of the dust and dirt.

Blow out the remaining dirt with compressed air.

Installation is in the reverse order of removal.

If necessary replace the air filter.





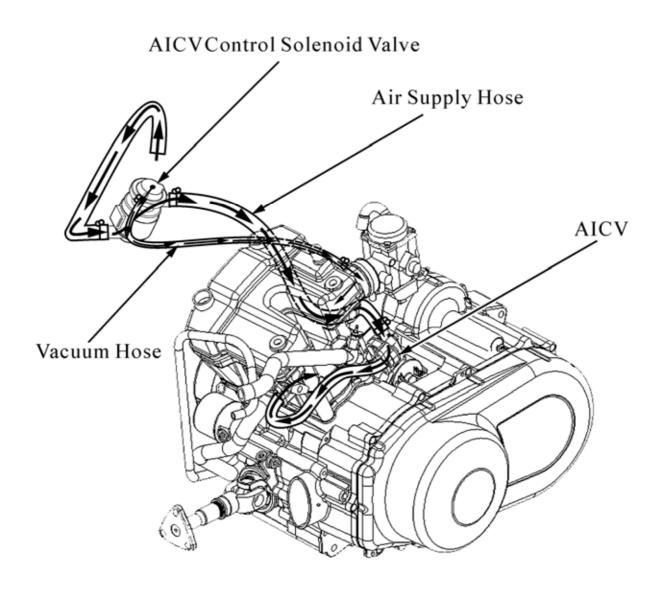
SECONDARY AIR SUPPLY SYSTEM

This model is equipped with a built-in secondary air supply system. The pulse secondary air supply system is located on the cylinder head.

The secondary air supply system introduces filtered air into exhaust gases in the exhaust port. The secondary air is drawn into the exhaust port whenever there is negative pressure pulse in the exhaust system. This charged secondary air promotes burning of the unburned exhaust gases and changes a considerable amount of hydrocarbons and carbon monoxide into relatively harmless carbon dioxide and water.

Check the AICV (air injection control valve) hoses between the AICV control solenoid valve and cylinder head for deterioration, damage or loose connections. Make sure the hoses are not cracked.

If the hoses show any signs of heat damage, inspect the AICV check valve in the AICV reed valve cover damage.





SPARK PLUG

Disconnect the spark plug cap and clean around the spark plug.

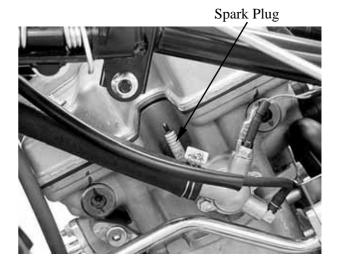
*

Clean around the spark plug base with compressed air before removing, and be sure that no debris is allowed to enter the combustion chamber.



Remove the spark plug using a equipped spark plug wrench or an equivalent tool.

Inspect or replace as described in the maintenance schedule.

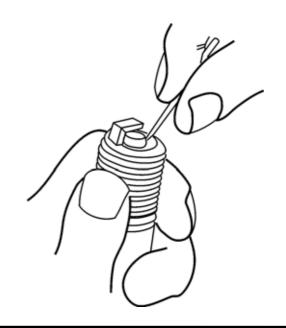


INSPECTION

Remove the carbon deposits from the spark plug with a small wire brush or a spark plug cleaning machine.

The spark plug should be replaced periodically. Whenever removing the carbon deposits, be sure to observe the operational color of the spark plug's porcelain tip. This color tells you whether or not the standard spark plug is suitable for your type of usage. A normal operating spark plug should be light brown or tan color. If the spark plug is very white or glazed appearing, then it has been operating much too hot. This spark plug should be replaced with the colder plug.

Recommended spark plug: NGK: CR7E





Measure the spark plug gap between the center and side electrodes with the feeler

gauge.
If necessary, adjust the gap by bending the side electrode carefully.

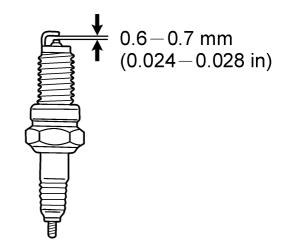
Spark plug gap: 0.6-0.7 mm (0.024-0.028 in)

Install the spark plug in the cylinder head and hand tighten, then torque to the specification.

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

Install the spark plug cap.

Install the removed parts in the reverse order of removal.





VALVE CLEARANCE

*

Inspect and adjust the valve clearance while the engine is cold (Below 35°C/95°F).

To adjust:

Remove the right floorboard (refer to the "**FRAME COVERS**" section in the chapter 2).

Remove the cylinder head cover (refer to the "CYLINDER HEAD COVER REMOVAL/INSTALLATION" section in the chapter 8).

Remove the timing hole cap and O-ring.

Remove the recoil starter and O-rings (refer to the "STARTER PULLEY REMOVAL/INSPECTION/INSTALLATION" section in the chapter 8).

Turn the crankshaft clockwise and align the "T" mark on the flywheel with the index mark on the right crankcase cover.

The punch marks on the camshaft should face upward as shown.

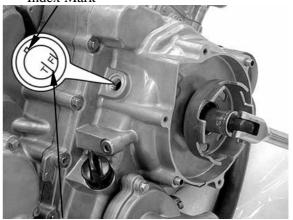
If the punch marks on the camshaft are facing downward, turn the crankshaft clockwise one full turn (360°) and the punch marks are facing upward.

Timing Hole Cap/O-ring



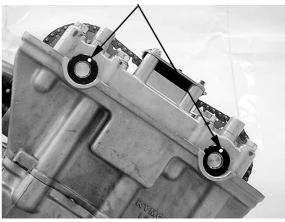
Crankshaft Hole Cap/O-ring

Index Mark



"T" Mark

Punch Marks





Adjust by loosening the valve adjusting screw lock-nut and turning the adjusting screw until there is a slight drag on the thickness gauge.

Valve clearance (when cold):

IN.: 0.1 mm (0.004 in) EX.: 0.1 mm (0.004 in)

Apply oil to the valve adjusting screw locknut threads and seating surface.

Hold the adjusting screw and tighten the lock nut.

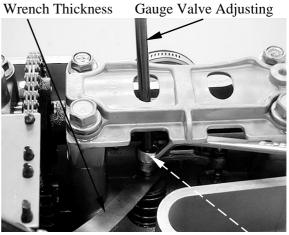
Special tool:

Valve adjusting wrench A120E00036

Torque: 0.9 kgf-m (9 N-m, 6.5 lbf-ft)

After tightening the lock nut, recheck the valve clearance.

Install the removed parts in the reverse order of removal.



Lock Nut

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: 1500±100 rpm

When the engine misses or run erratic, adjust the pilot screw (refer to the "CARBURETOR DISASSEMBLY/INSPECTION/ASSEMBLY" section in the chapter 5).



Throttle Stop Screw



CYLINDER COMPRESSION

Warm up the engine before compression test

Remove the spark plug.
Insert a compression gauge.
Open the throttle valve fully and push the starter button to test the compression.

Cylinder compression:

15 kg/cm² (1500 kPa, 213 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.

ENGINE OIL OIL LEVEL

Place the machine on a level place. Warm up the engine for several minutes and stop it.

Run the engine for $2\sim3$ minutes and check the oil level after the engine is stopped for $2\sim3$ minutes.

Check the oil level through the inspection window.

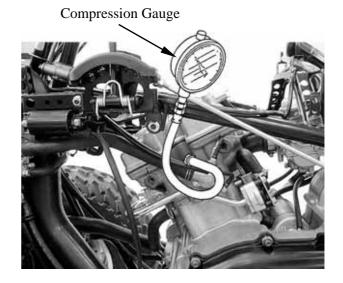
The oil level should be between the maximum (H) and minimum (L) marks. If the level is low, add oil to raise it to the proper level.

Recommended engine oil:

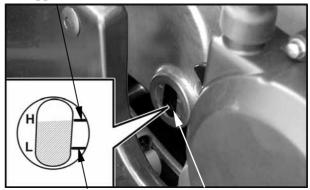
KYMCO 4-stroke oil or equivalent motor oil API service classification: SJ

Viscosity: SAE 5W50

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

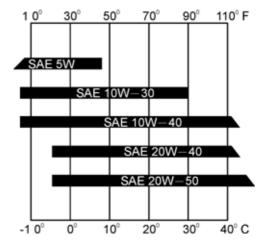


Upper Level



Lower Level

Inspection Window

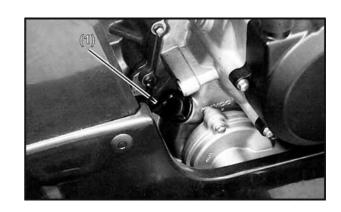




ENGINE OIL REPLACEMENT AND OIL FILTER CLEANING

- 1. Place the machine on a level place.
- 2. Warm up the engine for several minutes and stop it.
- 3. Place a container under the engine.
- 4. Remove the oil filler cap (1).

Be sure no foreign material enters the crankcase.



5. Remove the oil filter cap (2) to drain the oil.

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



6. Clean the oil strainer with solvent. Inspect the O-ring and replace if damaged. Reinstall the O-ring, oil strainer, compression spring and oil filter cap. Tighten the oil filter cap to specification.

Torque: 1.5 kgf-m (15 N-m, 11 lbf-ft)

7. Fill the engine with oil and install the oil filler cap.

Engine oil capacity

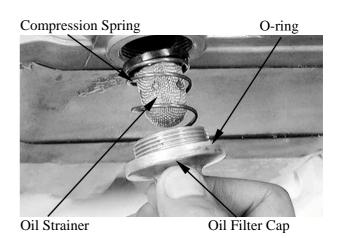
At disassembly:

3.6 liter (3.17 lmp qt, 3.82 Us qt)

At change:

3 liter (2.64 lmp qt, 3.18 Us qt) After draining and oil filter cartridge change:

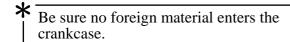
3.2 liter (2.82 lmp qt, 3.39 Us qt)





ENGINE OIL REPLACEMENT (WITH OR WITHOUT OIL FILTER CARTRIDGE REPLACEMENT)

- 1. Place the machine on a level place.
- 2. Warm up the engine for several minutes and stop it.
- 3. Place a container under the engine.
- 4. Remove the oil fill cap (1).

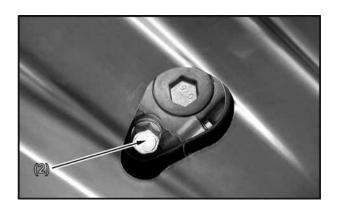




5. Remove the drain plug (2) to drain the oil.

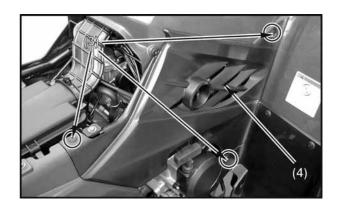


The engine oil will drain more easily while the engine is warm.



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

6. Remove the three fasteners (3) and then remove right side cover (4).

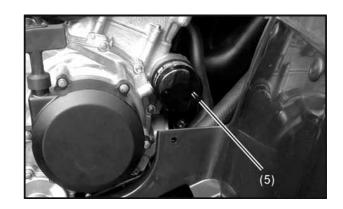




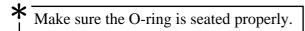
7. Remove the oil filter cartridge (5) with an oil cartridge wrench.

Special tool:

Oil cartridge wrench A120E00061



8. Apply a light coat of clean engine oil to the O-ring (6) of the new oil filter cartridge.



9. Install the new oil filter cartridge with an oil cartridge wrench, and then tighten it to the specified torque.

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

- 10. Install right side cover.
- 11. Reinstall the drain plug and tighten the drain plug to the specified torque.

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

12. Add the specified amount of recommended engine oil, and then install the engine oil filler cap and tighten it.

Engine oil capacity

At disassembly:

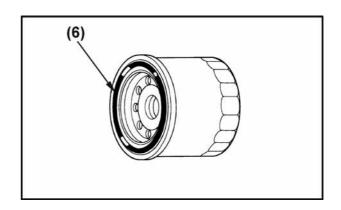
3.6 liter (3.17 lmp qt, 3.82 Us qt)

At change:

3 liter (2.64 lmp qt, 3.18 Us qt) After draining and oil filter cartridge change:

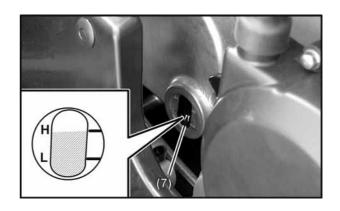
3.2 liter (2.82 lmp qt, 3.39 Us qt)

Be sure no foreign material enters the crankcase.





- 13. Start the engine and warm it up for several minutes. While warming up, check for oil leakage. If oil leakage is found, turn the engine off immediately and check for the cause.
- 14. Turn the engine off, and then check the oil level through the inspection window (7) and correct it if necessary.



REAR DRIVE GEAR OIL

Change the oil in the rear drive gear case when specified by the Maintenance Schedule. Change the oil with the rear drive gear case warm, and the ATV on level ground to assure complete and rapid draining.

Rear drive gear oil replacement

- 1. Remove the two bolts (1) on the skid plate (2) right/left side and two bolts (3) under the skid plate, remove skid plate.
- 2. To drain the oil, first place an oil drain pan under the oil drain plug (4).
- 3. Remove the oil filler cap (5), then remove the drain plug.
- 4. After the oil has completely drained, reinstall the drain plug.

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

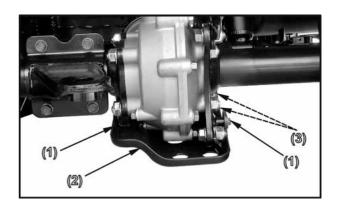
5. Fill the gear case with the recommended oil.

Recommended oil: SAE 80 **Oil quantity:**

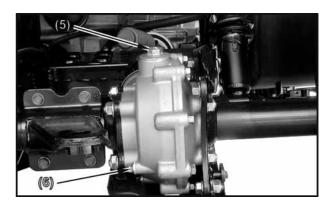
Periodic oil change:

0.13 L (4.63 lmp oz, 4.33 US oz)

Remove the oil level check bolt (6). Make sure the oil level reaches the oil level check hole.









6. Install the oil filler cap and oil level check bolt.

Torque:

Oil filler cap: 1.5 kgf-m (15 N-m, 12 lbf-ft) Oil level check bolt:

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

*

Be sure no foreign material enters the crankcase.

7. Install the skid plate.

FRONT DRIVE GEAR OIL

Change the oil in the front drive gear case when specified by the Maintenance Schedule. Change the oil with the front drive gear case warm, and the ATV on level ground to assure complete and rapid draining.

Front drive gear oil replacement

- 1. To drain the oil, first place an oil drain pan under the oil drain plug (1).
- 2. Remove the oil filler bolt (2).
- 3. Remove the drain plug.
- 4. After the oil has completely drained, reinstall and tighten the drain plug to the specified torque.

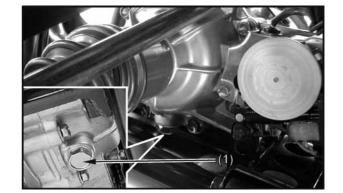
Torque: 3.2 kgf-m (32 N-m, 23 lbf-ft)

5. Fill the gear case with the recommended oil.

Recommended oil: SAE 90 **Oil quantity:**

Periodic oil change:

0.3 L (10.6 lmp oz, 10.1 US oz)







- 6. Remove the oil level check bolt (3). Make sure the oil level reaches the oil level check hole.
- 7. Install and tighten the oil filler bolt and oil level check bolt to the specified torque.

Torque:

Oil filler cap:

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

Oil level check bolt:

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

*

Be sure no foreign material enters the crankcase.



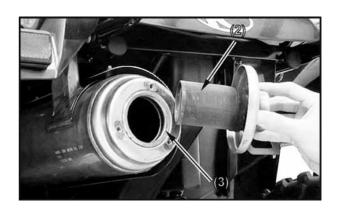
SPARK ARRESTER

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

1. Remove the three bolts (1).

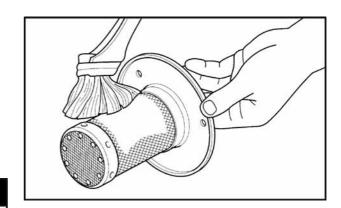


2. Remove the spark arrester (2) and the gasket (3) from the muffler.





- 3. Use a brush to remove carbon deposits from the spark arrester screen. Be careful to avoid damaging the spark arrester screen. The spark arrester must be free of breaks and holes. Replace, if necessary. Check the gasket. Replace, if necessary.
- 4. Install the spark arrester and the gasket in the muffler and tighten the three bolts securely.



WARNING

POTENTIAL HAZARD

Improper cleaning of the spark arrester. Hot exhaust system.

WHAT CAN HAPPEN

Could injure the eyes.

Could cause burns.

Could cause carbon monoxide poisoning, possibly leading to death.

Could start a fire

HOW TO AVOID THE HAZARD

When cleaning the spark arrester:

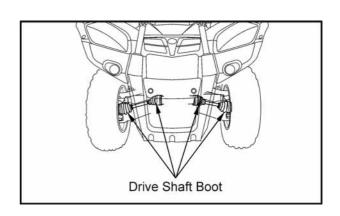
Always let the exhaust system cool prior to touching exhaust components

Do not start the engine when cleaning the exhaust system.

DRIVE SHAFT BOOTS

Check the protective boots for holes or tears.

If any damage is found, have them replaced.





DRIVE BELT

Remove the left crankcase cover (refer to the "LEFT CRANKCASE COVER REMOVAL/INSTALLATION" section in the chapter 10).

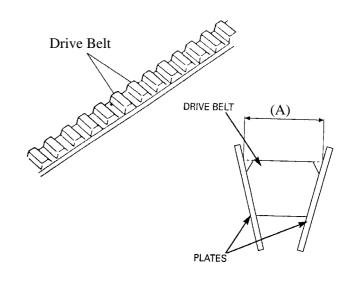
Inspect the drive belt for cracks, scaling, chipping or excessive wear.

Measure the V-belt width

Service limit (A): 30.8 mm (1.232 in)

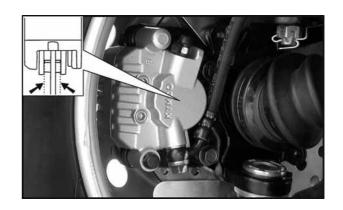
Replace the drive belt if out of specification.

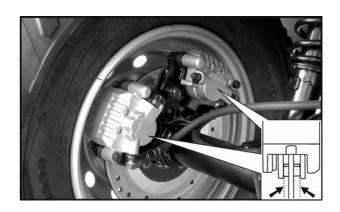
Refer to the "DRIVE PULLEY, DRIVE V-BELT AND DRIVEN PULLEY REMOVAL/INSPECTION/ INSTALLATION" section in the chapter 10 for removal/installation.



BRAKE PADS INSPECTION

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



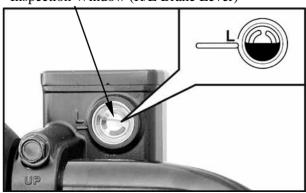




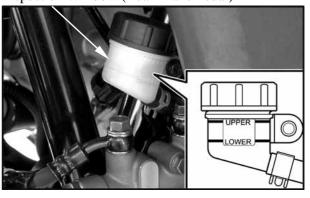
BRAKE FLUID INSPECTION

Check if the fluid level is below the lower level mark through the inspection window.

Inspection Window (R/L Brake Lever)



Inspection Window (Rear Brake Pedal)



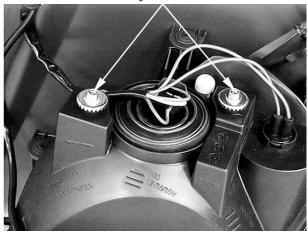
HEADLIGHT AIM

Turn the ignition switch ON and start the engine.

Turn on the headlight switch.

Adjust the headlight aim by turning the headlight aim adjusting screws.

Adjust Screws





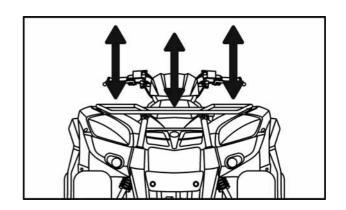
STEERING SYSTEM INSPECTION

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.

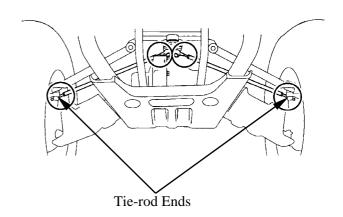
Replace the steering column bushings and or bearings if excessive play



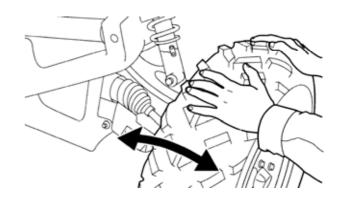
Check the tie-rod ends

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.



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 froth. 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: $0 \sim 15 \text{ mm} (0 \sim 0.6 \text{ in})$

If the toe-in is incorrect, adjust the toe-in.

Adjust the toe-in step:

Mark both tie-rods ends.

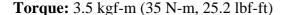
This reference point will be needed during adjustment.

Loosen the lock nuts (tie-rod end) 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.

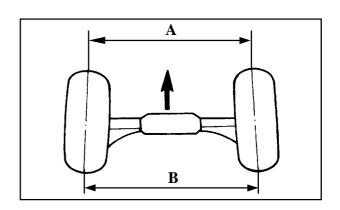
Tighten the rod end lock nuts of both tie-

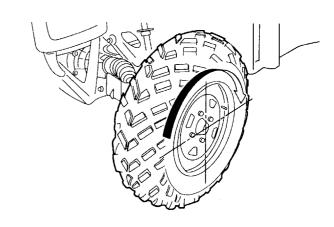
Tighten the rod end lock nuts of both tierods

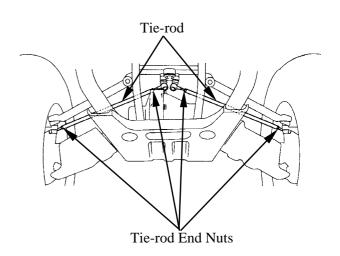




- Be sure that both tie-rod are turned the same amount. If not, the machine will drift tight or left even though the handlebar is positioned straight which may lead to mishandling and accident.
- After setting the toe-in to specification, run the machine slowly for some distance with hands placed lightly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



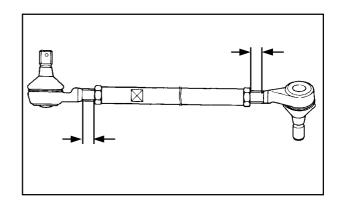






*

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



WHEELS/TIRES

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

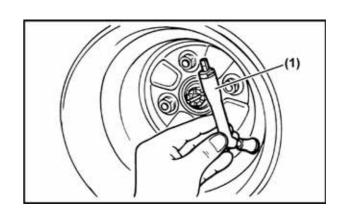
Check the tire pressure.



Tire pressure should be checked when tires are cold.

TIRE PRESSURE

| | 1 Rider | |
|-------|--------------------------------|--|
| Front | 0.28 kgf/cm² (28 Kpa, 3.2 psi) | |
| Rear | 0.28 kgf/cm² (28 Kpa, 3.2 psi) | |



TIRE SIZE

Front : 25X8-12 **Rear** : 25X10-12

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: 7 kgf-m (70 N-m, 50 lbf-ft) Rear: 10 kgf-m (100 N-m, 72 lbf-ft)



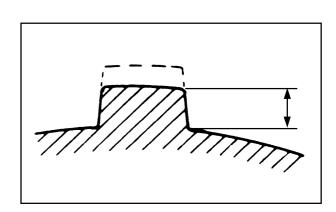
Rear Axle Nut

Inspect the tire surfaces. Replace if wear or damage.

Tire wear limit: 4 mm (0.16 in)



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



WHEEL INSPECTION

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.



FRONT SHOCK ABSORBER

*

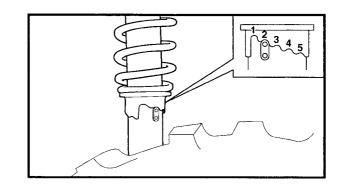
Always adjust both front shock absorber spring preload to the same setting. Uneven adjustment can cause poor handling and loss of stability.

Adjustment

Turn the adjuster to increase or decrease the spring preload.

Standard position: 2

Minimum (Soft) position: 1 Maximum (Hard) position: 5



REAR SHOCK ABSORBER

*

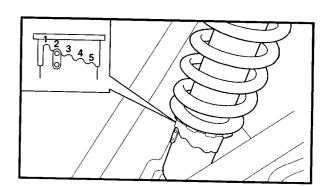
Always adjust both rear shock absorber spring preload to the same setting. Uneven adjustment can cause poor handling and loss of stability.

Adjustment

Turn the adjuster to increase or decrease the spring preload.

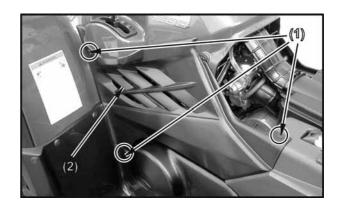
Standard position: 2

Minimum (Soft) position: 1 Maximum (Hard) position: 5



DRIVE SELECT LEVER ADJUSTMENT

- 1. Turn the ignition switch is ON and make sure the engine stop.
- 2. Remove 3 fasteners (1), then remove the left side cover (2).



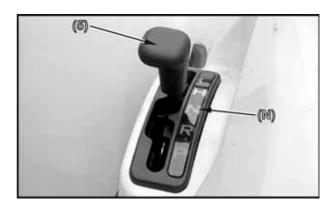


- 3. Loosen the lock nuts (3) of rod (4).
- 4. Remove the bolt and nut from the rod end (shift arm side).

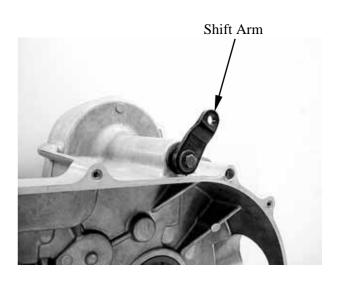


Bolt/Nut

5. Shift the drive select lever to neutral along the shift guide.

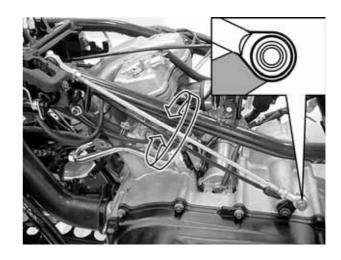


6. Shift the gear to neutral by moving the shift arm (The neutral indicator lamp comes on.)





- 7. Turn the rod clockwise or counterclockwise to align the joint ball in the rod with the hole on the shift arm, then install and tighten the bolt and nut.
- When align the joint ball in the rod with the hole on the shift arm. Always keep the joint ball original position, do not turn the joint ball.
- 8. Tighten the lock nuts of the rod.



CABLE INSPECTION AND 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.

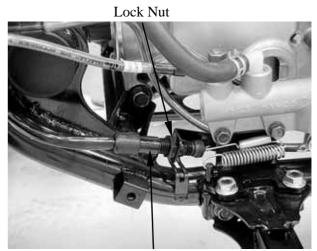
Hold cable end high and apply several drops of lubricant to cable.

LEVER LUBRICATION

Lubricate the pivoting parts of each lever.

ADJUSTING THE REAR BRAKE LIIGHT SWITCH (BRAKE PEDAL)

- 1. Loosen the lock nut.
- 2. Turn the adjusting nut clockwise or counterclockwise until the rear brake light comes on at the proper time.
- 3. Tighten the lock nut securely.



Adjuster



COOLING SYSTEM

COOLANT LEVEL INSPECTION

Place the machine on the level ground. Remove the front center cover (refer to the "FRAME COVERS" section in the chapter 2).

Check the coolant level in the coolant reservoir when the engine is cold as the coolant level will vary with engine temperature. The level should be between the "FULL" (2) and "LOW" (3) level surface.

If the level is low, remove the reserve tank cap (1) and fill the tank to the "FULL" level line with 1:1 mixture of distilled water and antifreeze (coolant mixture preparation: refer to the chapter 6 "COOLING SYSTEM")



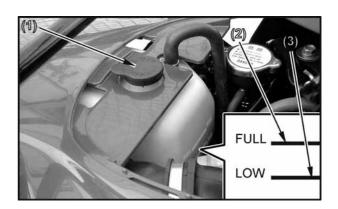
Using coolant with silicate inhibitors may cause premature wear of water pump seals or blockage of radiator passages. Using tap water may cause engine damage.

Check to see if there are any coolant leaks when the coolant level decrease very rapidly.

If reserve tank becomes completely empty, there is a possibility of air getting into the cooling system.

Be sure to remove all air from the cooling system (refer to the "COOLANT REPLACEMENT" section in the chapter 6).

Reinstall the filler cap.



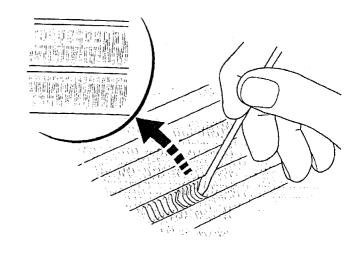


Check for any coolant leakage from the water pump, radiator hoses and hose joints. Check the radiator hoses for cracks or deterioration and replace if necessary. Check that all hose clamps are tight.

Check the radiator air passages for clogs or damage.

Straighten any bent fins, and remove insects, mud or other obstructions with compressed air or low water pressure.

Replace the radiator if the air flow is restricted over more than 20% of the radiating surface.



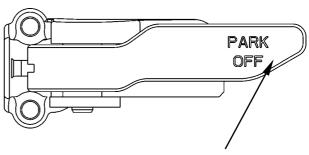


REAR PARKING BRAKE ADJUSTMENT (ON ROAD)

Parking brake adjustment may be required if the parking brake does not work properly. Every time the brake pads are replaced, adjust the parking brake.

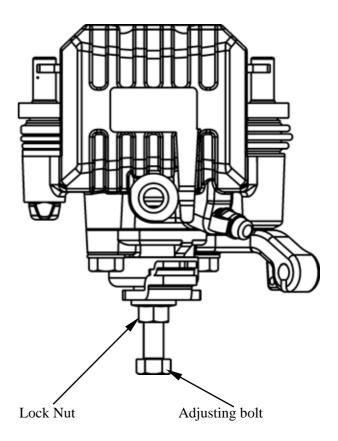
To adjust:

1. Release the parking brake lever.



Parking Brake Lever

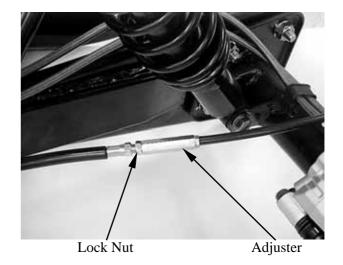
2. Loosen the lock nut and adjusting bolt on the rear caliper.





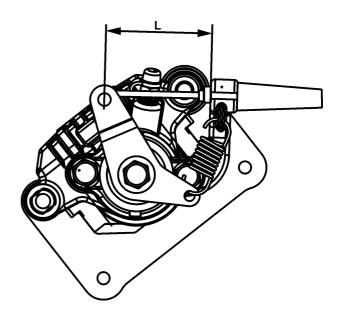
- 3. Loosen the lock nut and adjuster on the cable.
- 4. Turn the adjuster in or out until the specified brake cable end length "L" is obtained.

Tighten the lock nut.



Parking brake cable end length:

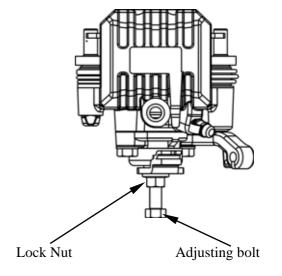
L: $53 \pm 2 \text{ mm} (2.12 \pm 0.08 \text{ in})$



- 5. Slowly turn the adjusting bolt on the caliper clockwise until resistance is felt, then turn adjusting bolt 1/8 counterclockwise.
- 6. Tighten the lock nut to the specified torque while hold the adjusting bolt.

Torque:

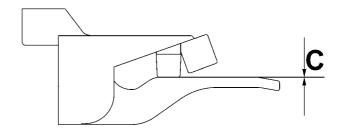
1.6 kgf-m (16 N-m, 11.52 lbf-ft)



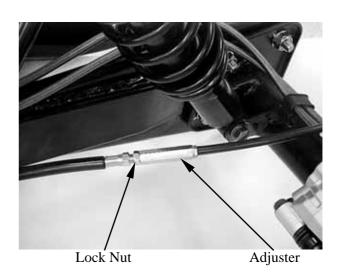


7. Check the parking brake lever free play "C".

Free play: 0 mm (0 in)



8. If the free play is incorrect, adjust the free play by adjuster on the cable.





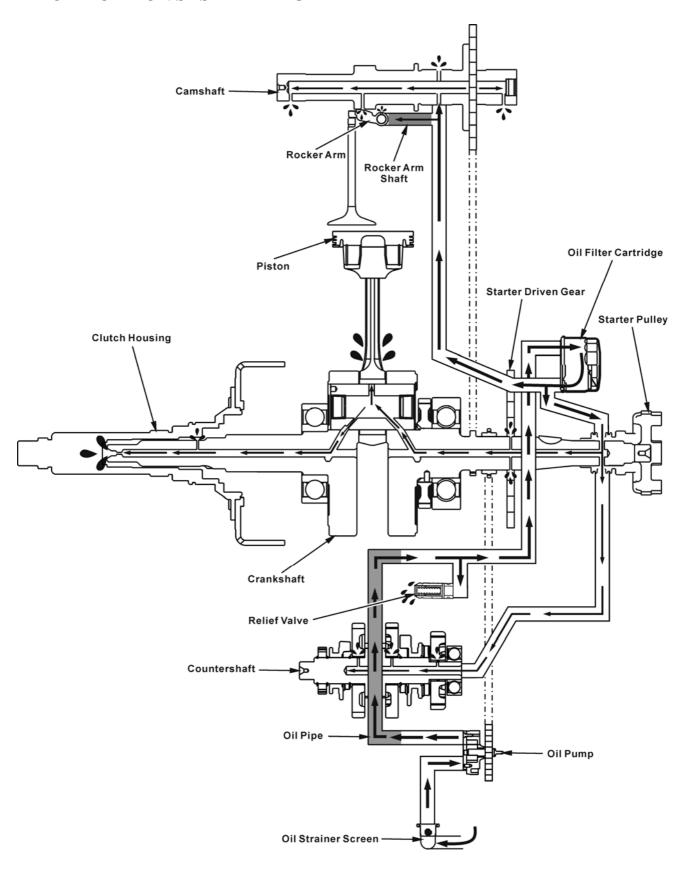
4

LUBRICATION SYSTEM

| LUBRICATION SYSTEM DIAGRAM | 4- 1 |
|--|------|
| SERVICE INFORMATION | 4- 2 |
| TROUBLESHOOTING | 4- 3 |
| LUBRICATION CHECK HOLE | 4- 4 |
| OIL PUMP REMOVAL/INSPECTION/INSTALLATION | 4- 5 |
| OIL PUMP DISASSEMBLY/INSPECTION/ASSEMBLY | 4- 9 |
| RIGHT CRANKCASE COVER DISASSEMBLY/ASSEMBLY | 4-12 |
| OIL PRESSURE RELIEF VALVE | 4-14 |
| OIL PIPE REMOVAL/INSTALLATION | 4-15 |



LUBRICATION SYSTEM DIAGRAM





SERVICE INFORMATION

GENERAL INSTRUCTIONS

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

SPECIFICATIONS Unit: mm (in)

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

TORQUE VALUES

0.3 kgf-m (3 N-m, 2 lbf-ft) Oil pump screw

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

Oil pipe bolt

Apply oil to the threads and seating surface.

Special tool:

Oil seal & bearing drive A120E00014



TROUBLESHOOTING

Oil level low

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

Oil contamination (White appearance)

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

No oil pressure

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

Low oil pressure

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

High oil pressure

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

Seized engine

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

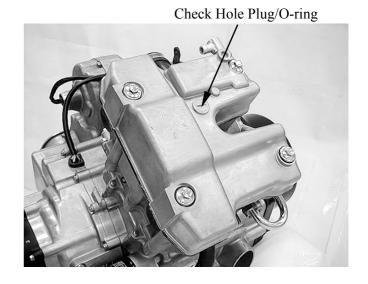
Oil contamination

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



LUBRICATION CHECK HOLE

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





OIL PUMP REMOVAL/INSPECTION/ INSTALLATION

REMOVAL

Remove the flywheel and driven gear (refer to the "STARTER CLUTCH REMOVAL/INSPECTION/INSTALLATI ON" section in the chapter 19).

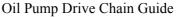
Remove the two bolts and oil pump drive chain guide.

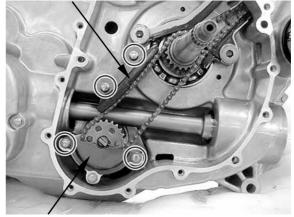
Remove the two bolts and oil separator cover.

*

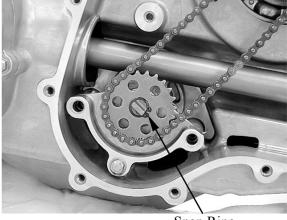
When removing and installing the oil pump, use care not to allow dust or dirt to enter the engine..

Remove snap ring.



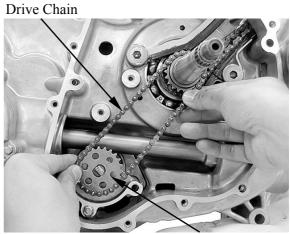


Oil Separator Cover



Snap Ring

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

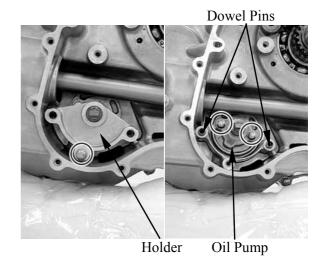


Driven Gear

Remove a bolt and then remove the oil pump holder.

Remove the two dowel pins.

Remove the two bolts and then remove the oil pump.



INSPECTION

Oil pump drive chain guide

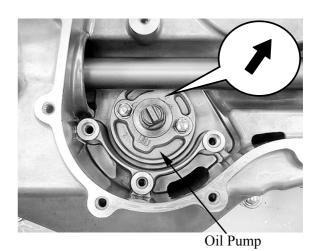
Inspect the drive chain slipper surface of the drive chain guide for wear or damage.



INSTALLATION

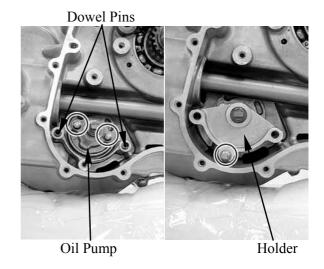
Install the oil pump.

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

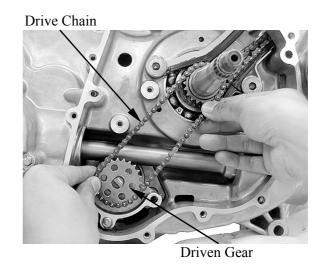


Install and tighten the two bolts securely. Install two dowel pins

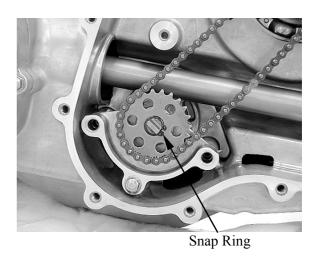
Install the holder, then install a bolt but do not tighten.



Install the driven gear and drive chain.



Install the snap ring.

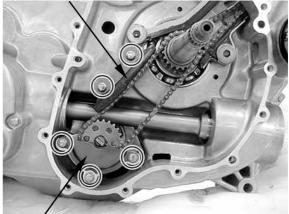




Install the chain guide, then install and tighten the two bolts securely.

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

Oil Pump Drive Chain Guide



Oil Separator Cover



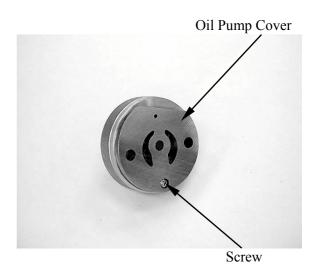
OIL PUMP DISASSEMBLY/INSPECTION/ ASSEMBLY

DISASSEMBLY

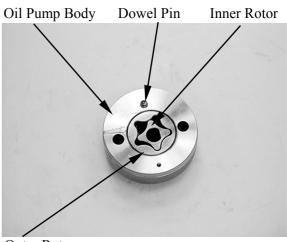
Remove the oil pump shaft.



Remove the screw and oil pump cover.



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



Outer Rotor



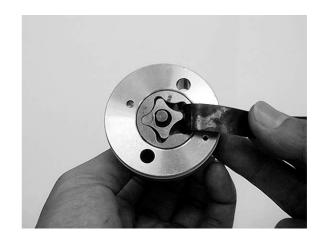
INSPECTION

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

Measure the tip clearance.

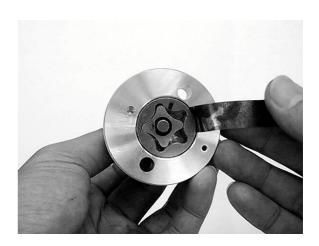
Service limit: 0.2 mm (0.008 in)

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



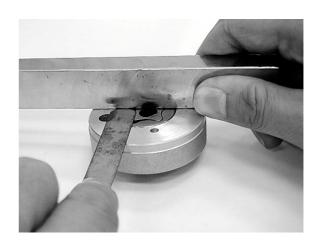
Measure the pump body clearance.

Service limit: 0.25 mm (0.01 in)



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

Service limit: 0.12 mm (0.0048 in)

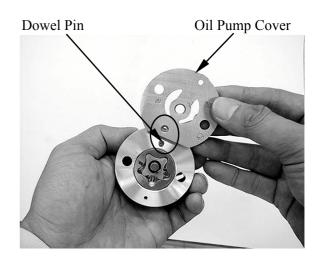




ASSEMBLY

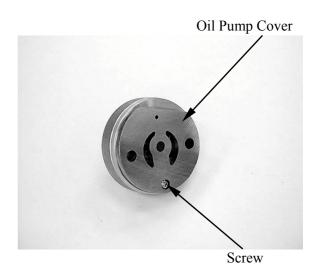
Dip all parts in clean engine oil.

Install the outer rotor into the oil pump body. Install the inner rotor into the outer rotor. Install the oil pump shaft. Install the dowel pin onto the oil pump body. Install the oil pump cover onto the oil pump body by aligning the dowel pin.



Install and tighten the screw to the specified torque.

Torqur: 3 N•m (0.3kgf•m, 2 lbf•ft)

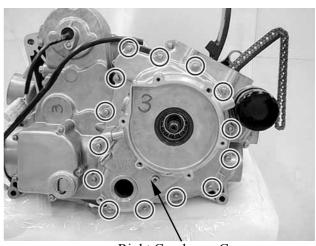




RIGHT CRANKCASE COVER DISASSEMBLY/ASSEMBLY

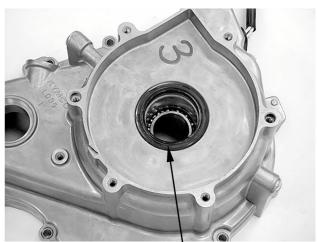
DISASSEMBLY

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



Right Crankcase Cover

Remove the oil seal.



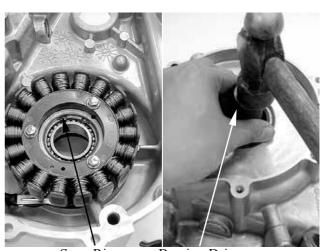
Oil Seal

Remove the snap ring.

Remove the bearing by using the special tool.

Special tool:

Oil seal & bearing drive A120E00014



Snap Ring Bearing Drive

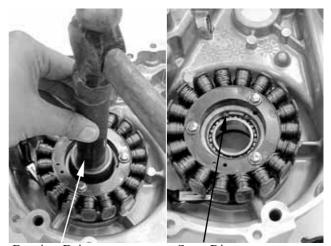


ASSEMBLY

Install a new bearing by using the special tool.

Special tool:

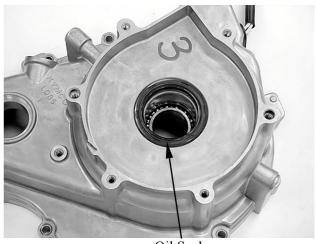
Oil seal & bearing drive A120E00014



Bearing Drive

Snap Ring

Install a new oil seal.





OIL PRESSURE RELIEF VALVE REMOVAL

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

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

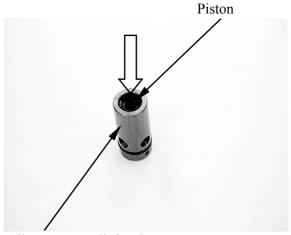


INSPECTION

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

INSTALLATION

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



Oil Pressure Relief Valve



OIL PIPE REMOVAL/INSTALLATION

REMOVAL

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



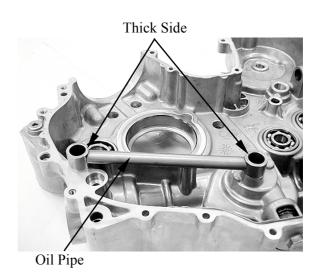
Oil Pipe/Washer (under oil pipe)

INSTALLATIION

Install the inner washers on the right crankcase.



Install the oil pipe with the thick side face upward.





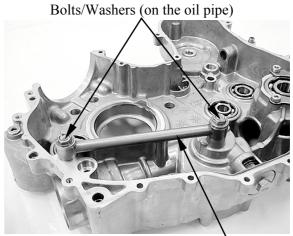
4. LUBRICATION SYSTEM

MXU 500

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

Tighten the two bolts to the specified torque.

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

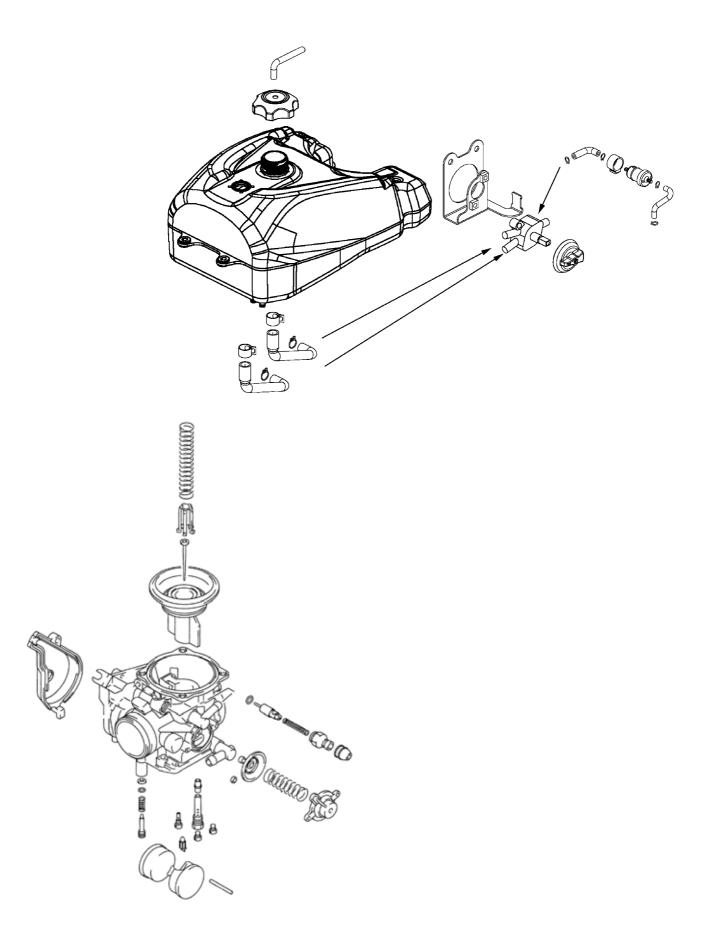


Oil Pipe/Washers (under oil pipe)



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







SERVICE INFORMATION

GENERAL INSTRUCTIONS



Gasoline is very dangerous. When working with gasoline, keep sparks and flames away from the working area.

Gasoline is extremely flammable and is explosive under certain conditions. Be sure to work in a well-ventilated area.

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

SPECIFICATIONS

| It | em | Standard | | |
|---------------------|----------|---|--|--|
| Type | | CVK | | |
| I.D. No. | | L88A ATKF | | |
| Bore size | | φ36.5 mm (φ1.46 in) | | |
| Float level | | 17 mm (0.67 in) | | |
| Main jet No. | ON ROAD | #128 | | |
| | OFF ROAD | #130 | | |
| Slow jet No. | | #40 | | |
| Choke jet No. | | #90 | | |
| Idle speed | | 1500±100 rpm | | |
| Throttle grip fi | ee play | $3\sim 5 \text{ mm } (0.12\sim 0.2 \text{ in})$ | | |
| Pilot screw opening | | 1 1/4±1/2 | | |



TROUBLESHOOTING

Engine cranks but won't start

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

Engine idles roughly, stalls or runs poorly

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

Misfiring during acceleration

- Faulty ignition system
- Faulty carburetor

Backfiring at deceleration

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

Engine lacks power

- Clogged air cleaner
- Faulty carburetor
- Faulty ignition system

Lean mixture

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

Rich mixture

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



FUEL TANK

REMOVAL

Warning

- Keep sparks and flames away from the work area.
- Wipe off any spilled gasoline.

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

Switch the fuel valve "OFF".

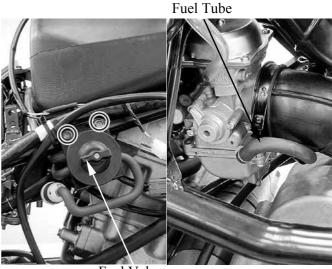
Remove the 2 mounting bolts.

Disconnect the fuel tube from carburetor.

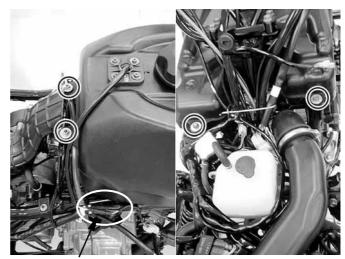
Disconnect the fuel unit connectors. Remove the two bolts and two nuts from the fuel tank, then remove the fuel tank.

INSTALLATION

Fuel tank installation is in the reverse order of removal.



Fuel Valve



Fuel Unit Connectors

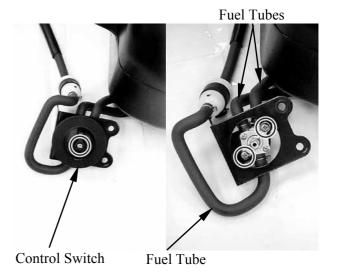
FUEL VALVE

REMOVAL

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

Remove the screw and then remove control switch.

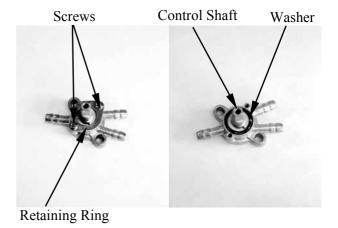
Disconnect all fuel tubes and remove the two screws, then remove fuel valve.





DISASSEMBLY

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

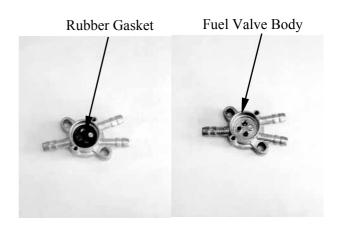


Remove the rubber gasket from the fuel valve body.

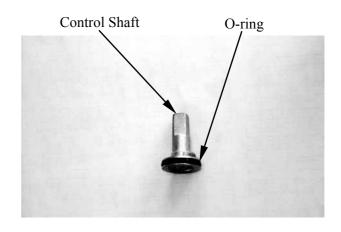
INSPECTION

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

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



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



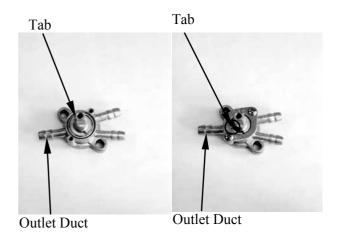


ASSEMBLY

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

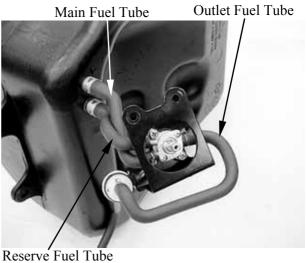


- Aligning the tab on the control shaft with the outlet duct in the fuel valve
 - Aligning the tab on the retaining ring with the outlet duct in the fuel valve body.

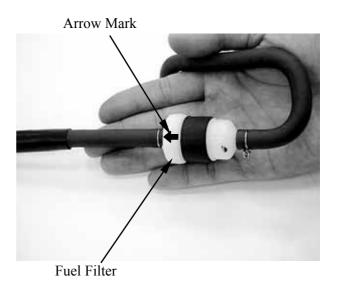


INSTALLATION

Reverse the "REMOVEAL" procedures. Connect all fuel tube.



Install the fuel filter with the arrow mark facing forward.



5-6



CARBURETOR REMOVAL/CHOKE INSPECTION/INSTALLATION

REMOVAL

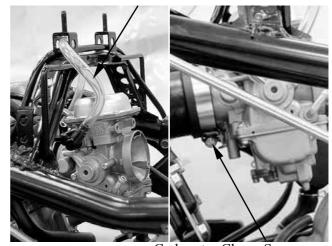
Remove the fuel tank (refer to the "FUEL TANK" section in this chapter). Remove the air cleaner housing (refer to the "AIR CLEANER HOUSING" section in this chapter).

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

Remove a screw, then remove the throttle valve cover.

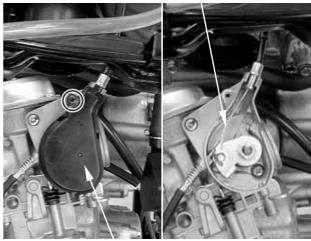
Disconnect the throttle cable from carburetor.

Over Flow Hose



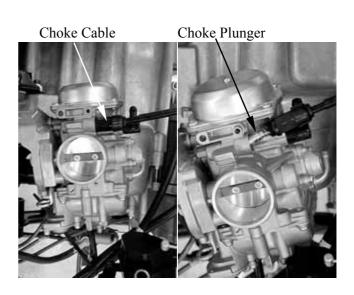
Carburetor Clamp Screw

Throttle Cable



Throttle Valve Cover

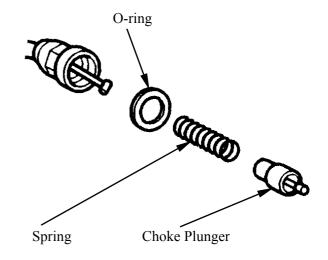
Remove the choke cable/choke plunger from carburetor, then remove the carburetor.





CHOKE INSPECTION

Inspection the choke plunger, spring and Oring for bends, wear or damage.

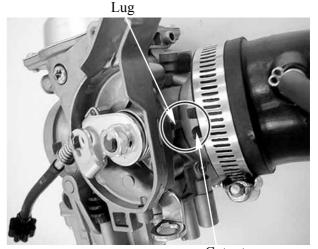


INSTALLATION

Installation is in the reverse order of removal.

*

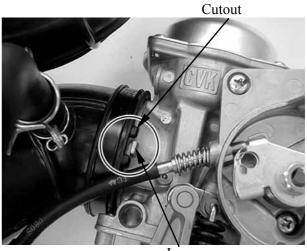
Make sure the lug on the carburetor into the cutout on the intake pipe.



Cutout

*

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





CARBURETOR DISASSEMBLY/INSPECTION/ **ASSEMBLY**

DISASSEMBLY

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

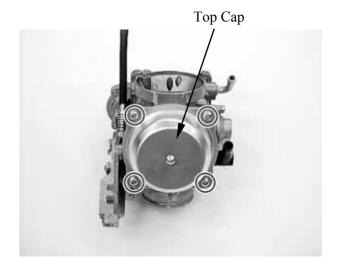
Loosen the drain screw to drain the gasoline from the float chamber.

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

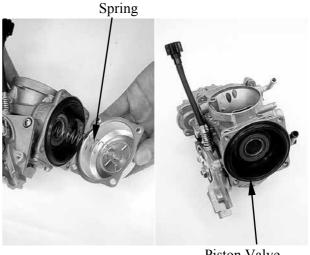
Remove the four screws and top cap



Fuel Drain Plug

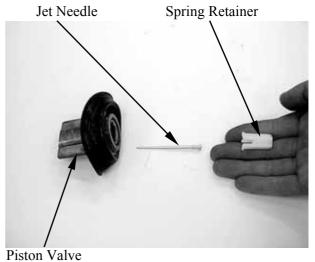


Remove the spring and piston valve.



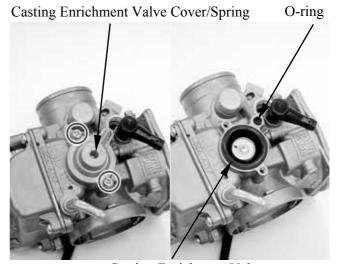
Piston Valve

Remove the spring retainer, jet needle.



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

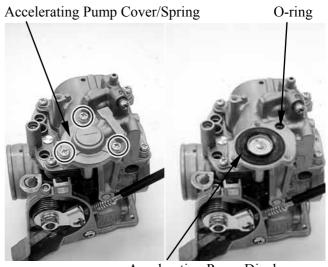
Remove the casting enrichment valve and Oring.



Casting Enrichment Valve

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

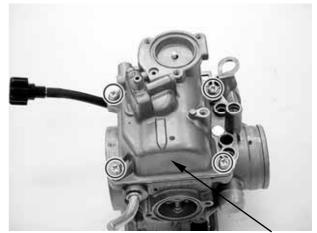
Remove the accelerating pump and O-ring.



Accelerating Pump Diaphragm

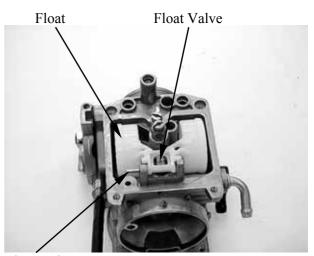


Remove the four screws and float chamber.



Float Chamber

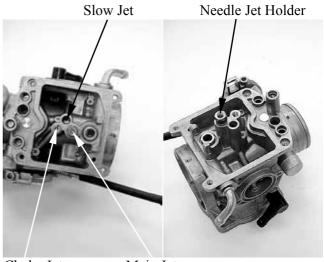
Pull float pin outs, then remove the float and float valve.



Float Valve

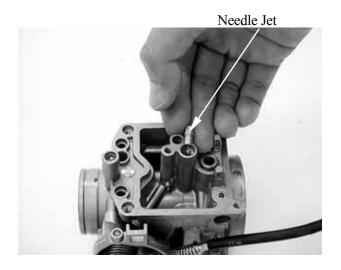
Remove the slow jet. Remove choke jet. Remove main jet.

Remove the needle jet holder.



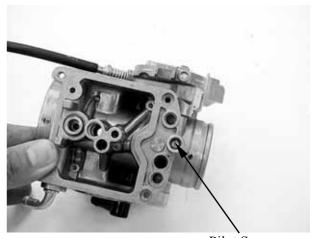
Choke Jet Main Jet

Remove the needle jet.



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

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



Pilot Screw



INSPECTION

CARBURETOR BODY/JETS CLEANING

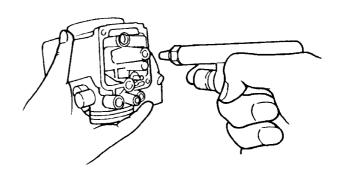
Check carburetor body and each jet for wear or damage.

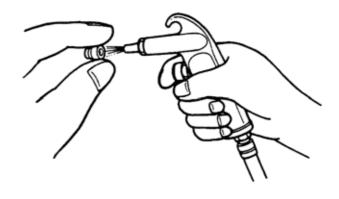
Clean all jets with a spray-type carburetor cleaner and dry them using compressed air. Clean all circuits of the carburetor thoroughly-not just the perceived problem area

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

- *
- Some carburetor cleaning chemicals, especially dip type soaking solutions, are very corrosive and must be handled carefully. Always follow the chemical manufacturer's instructions on proper use, handling and storage.
- Do not use a wire to clean the jets or passageways. A wire can damage the jets and passageways. If the components cannot be cleaned with a spray cleaner it may be necessary to use a dip-type cleaning solution and allow them to soak. Always follow the chemical manufacturer's instructions for proper use and cleaning of the carburetor components.

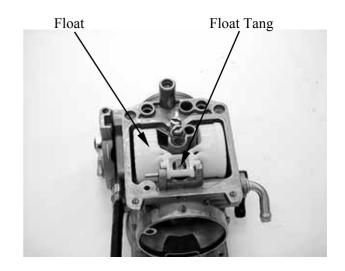
After cleaning, reassemble the carburetor with new seals.







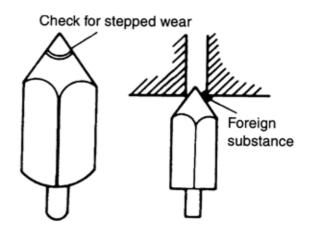
Check the float and float tang for deformation or damage.



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

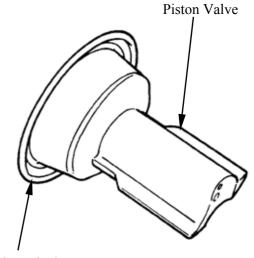
Check the tip of the float valve, where it contacts the valve seat, for stepped wear or contamination.

Check the operation of the float valve.



Check the piston valve for scratches, wear and damage.

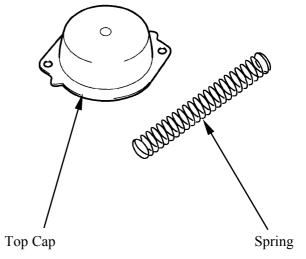
Check the rubber diaphragm for tears.



Rubber Diaphragm

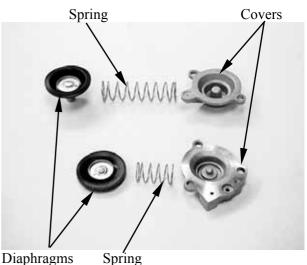


Check top cap and spring for cracks and damage.

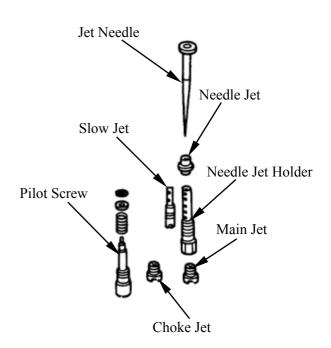


Check the diaphragms (coasting enrichment valve and accelerating pump) for tears.

Check the spring (coasting enrichment valve and accelerating pump) and cover (coasting enricher and accelerating pump) for damage.



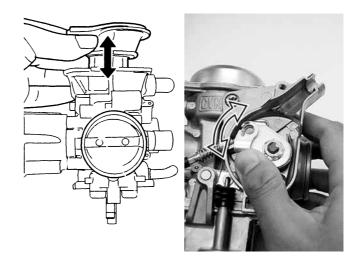
Check jet needle, needle jet, slow jet, needle jet holder, main jet, choke jet and pilot screw for bends, wear and damage.





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

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



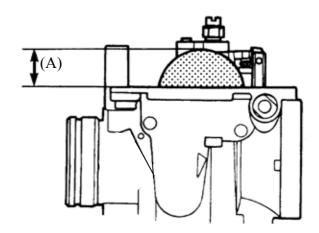
Check the float level after checking the float valve, valve seat and float.

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

Measure the float level with the float level gauge.

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

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



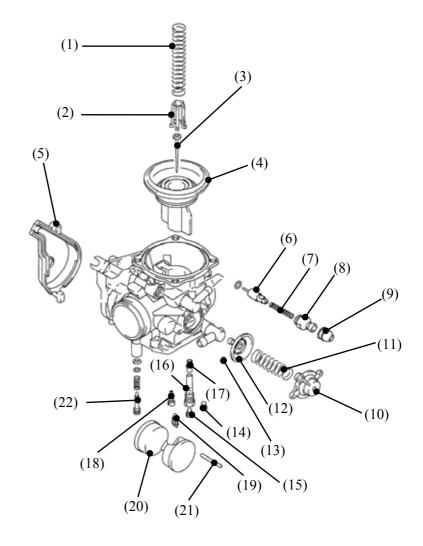


ASSEMBLY

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

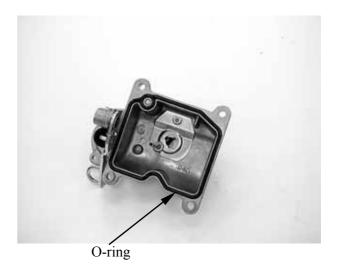


- Assemble the parts taking consideration of their function.
- Before assembling, wash all of the parts in a clean petroleum based solvent.
- Replace O-rings and seals with new ones.
- After cleaning, reinstall the pilot screw to the original setting by turn the screw in until it lightly seats, and then backing it out the same number of turns counted during disassembly.
- (1) Spring
- (2) Retainer
- (3) Jet needle
- (4) Piston valve
- (5) Cover
- (6) Choke plug
- (7) Spring
- (8) Guide holder
- (9) Cap
- (10) Cover
- (11) Spering
- (12) Casting enrichment valve
- (13) O-ring
- (14) Choke jet
- (15) Main jet
- (16) Needle jet holder
- (17) Needle jet
- (18) Slow jet
- (19) Float valve
- (20) Float
- (21) Float pin
- (22) Pilot screw





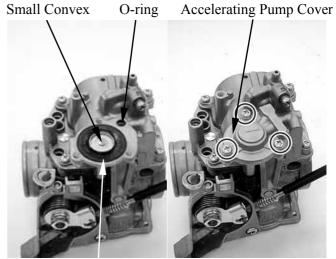
Fit a new O-ring in to the float chamber groove securely.



Assemble the accelerating pump diaphragm and new O-ring.

*

Install the accelerating pump diaphragm with the small convex facing



Accelerating Pump Diaphragm



AIR CLEANER HOUSING

REMOVAL/INSTALLATION

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

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



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

Installation is in the reverse order of removal.



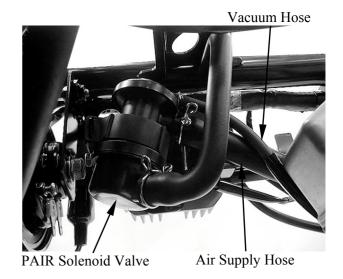
Breather Hose



PAIR SOLENOID VALVE

REMOVAL/INSTALLATION

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



Installation is in the reverse order of removal.





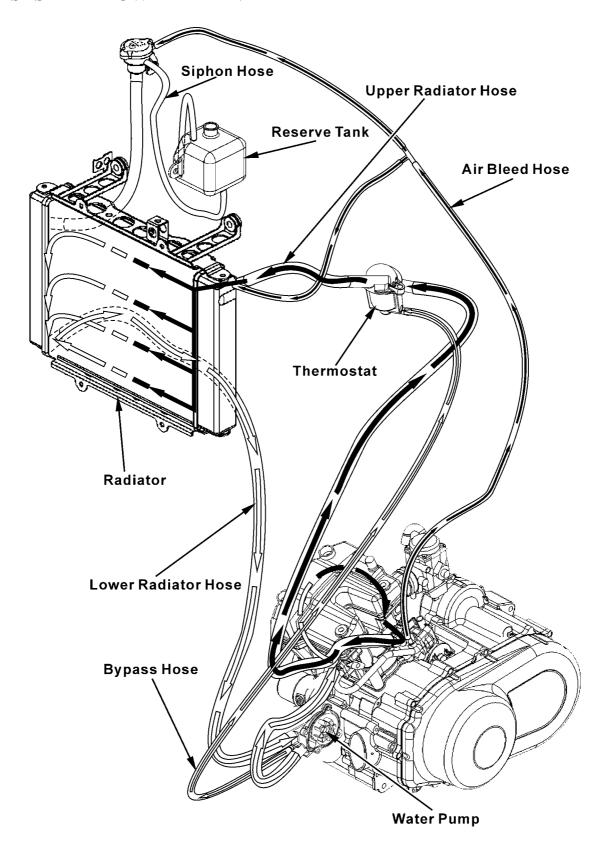
COOLING SYSTEM

| • | 4 | |
|-----|---|---|
| | _ | |
| | 8 | 1 |
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| SYSTEM FLOW PATTERN | 6- 1 |
|--------------------------|------|
| SERVICE INFORMATION | 6-2 |
| TROUBLESHOOTING | 6-4 |
| COOLING SYSTEM TESTING | 6- 5 |
| COOLANT REPLACEMENT | 6-5 |
| THERMOSTAT | 6-8 |
| WATER PUMP | 6-11 |
| RADIATOR | 6-14 |
| FAN MOTOR SWITCH | 6-15 |
| FAN MOTOR | 6-16 |
| WATER TEMPERATURE SENSOR | 6-17 |
| RAIDATOR RESERVE TANK | 6-18 |



SYSTEM FLOW PATTERN





SERVICE INFORMATION

GENERAL INSTRUCTIONS

WARING:

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

CAUTION:

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

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

NOTE:

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

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

SPECIFICATIONS

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



COOLANT GRAVITY CHART

| Temp. | 0 | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 |
|---------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| concentration | V | S | 10 | 10 | 20 | 20 | 30 | 33 | 10 | 15 | 20 |
| 5% | 1.009 | 1.009 | 1.008 | 1.008 | 1.007 | 1.006 | 1.005 | 1.003 | 1.001 | 0.009 | 0.997 |
| 10% | 1.018 | 1.107 | 1.017 | 1.016 | 1.015 | 1.014 | 0.013 | 1.011 | 1.009 | 1.007 | 1.005 |
| 15% | 1.028 | 1.027 | 1.026 | 1.025 | 1.024 | 1.022 | 1.020 | 1.018 | 1.016 | 1.014 | 1.012 |
| 20% | 1.036 | 1.035 | 1.034 | 1.033 | 1.031 | 1.029 | 1.027 | 1.025 | 1.023 | 1.021 | 1.019 |
| 25% | 1.045 | 1.044 | 1.043 | 1.042 | 1.040 | 1.038 | 1.036 | 1.034 | 1.031 | 1.028 | 1.025 |
| 30% | 1.053 | 1.051 | 1.051 | 1.049 | 1.047 | 1.045 | 1.043 | 1.041 | 1.038 | 1.035 | 1.032 |
| 35% | 1.063 | 1.062 | 1.060 | 1.058 | 1.056 | 1.054 | 1.052 | 1.049 | 1.046 | 1.043 | 1.040 |
| 40% | 1.072 | 1.070 | 1.068 | 1.066 | 1.064 | 1.062 | 1.059 | 1.056 | 1.053 | 1.050 | 1.047 |
| 45% | 1.080 | 1.078 | 1.076 | 1.074 | 1.072 | 1.069 | 1.056 | 1.063 | 1.062 | 1.057 | 1.054 |
| 50% | 1.086 | 1.084 | 1.082 | 1.080 | 1.077 | 1.074 | 1.071 | 1.068 | 1.065 | 1.062 | 1.059 |
| 55% | 1.095 | 1.093 | 1.091 | 1.088 | 1.085 | 1.082 | 1.079 | 1.076 | 1.073 | 1.070 | 1.067 |
| 60% | 1.100 | 1.098 | 1.095 | 1.092 | 1.089 | 1.086 | 1.083 | 1.080 | 1.077 | 1.074 | 1.071 |

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

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

Cautions for Using Coolant:

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

6. COOLING SYSTEM



TORQUE VALUES

Water pump cover bolt

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

Fan motor bolt

0.53 kgf-m (5 N-m, 3.8 lbf-ft)

Fan motor switch

1.8 kgf-m (17 N-m, 13 lbf-ft)

TROUBLESHOOTING

Engine temperature too high

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

Engine temperature too low

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

Coolant leak

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



COOLING SYSTEM TESTING

RADIATOR CAP INSPECTION

Remove the radiator cap (refer to the "COOLANT REPLACEMENT" section in this chapter).

Pressure test the radiator cap.

Replace the radiator cap if it does not hold pressure, or if relief pressure is too high or too low.

It must hold the specified pressure for at least six seconds.

*

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



90 kPa (0.9 kg/cm², 12.8 psi)

Pressurize the radiator, engine and hoses, and check for leaks.

*

Excessive pressure can damage the cooling system components.

Do not exceed 105 kPa (1.05 kg/cm², 14.9 psi).

Repair or replace components if the system will not hold the specified pressure for at least six seconds.

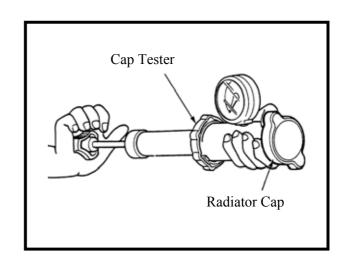
COOLANT REPLACEMENT

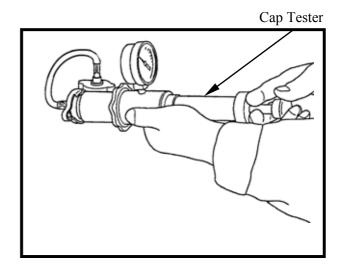
PREPARATION

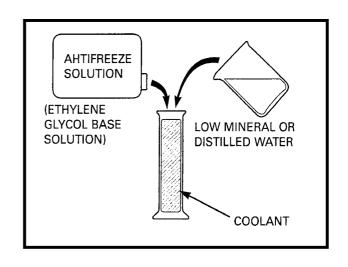
- The effectiveness of coolant decreases with the accumulation of rest or if there is a change in the mixing proportion during usage. Therefore, for best performance change the coolant regularly as specified in he maintenance schedule.
- Mix only distilled, low mineral water with the antifreeze.

Recommended mixture:

1:1 (Distilled water and antifreeze)









REPLACEMENT/AIR BLEEDING

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

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

Remove the radiator cap.

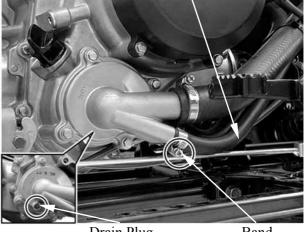


Radiator Cap

Loosen the hose band

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

Bypass Hose



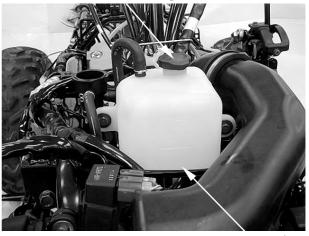
Drain Plug

Band

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

Reconnect the bypass hose securely.

Reserve Tank Cap

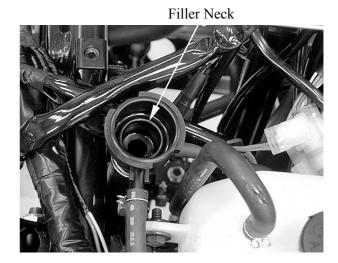


Reserve Tank

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



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



Bleed air from the system as follow:

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

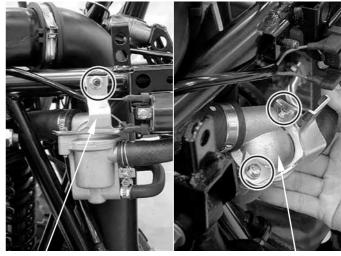


THERMOSTAT

REMOVAL

Remove the nut and thermostat housing stay from the frame.

Remove the bolts, housing stay and thermostat housing cover.



Housing stay

Thermostat Housing Cover

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

Thermostat



O-ring







INSPECTION

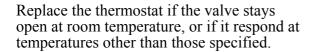
Visually inspect the thermostat for damage.

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

Suspend the thermostat in heated water to check its operation.



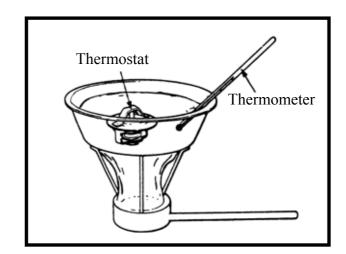
- Keep flammable materials away from the electric heating element.
- Do not let the thermostat or thermometer touch the pan, or you will get false readings.



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

Valve lift:

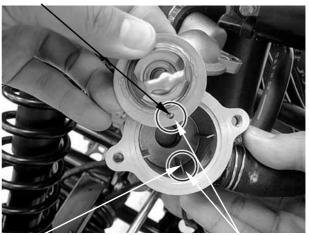
8 mm (0.3 in) minimum at 95°C (203°F)



INSTALLATION

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

Air Bleed Hole



Tab Align

6. COOLING SYSTEM



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

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

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

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





WATER PUMP

MECHANICAL SEAL INSPECTION

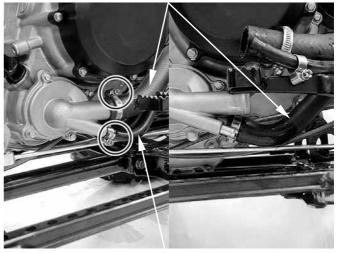
Inspect the coolant leakage.

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

REMOVAL

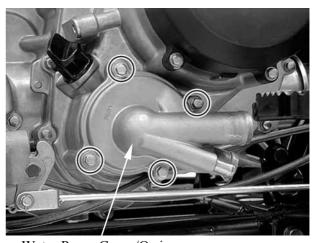
Drain the coolant (refer to the "COOLANT REPLACEMENT" section in this chapter).

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



Bypass Hose

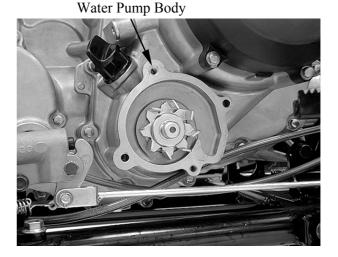
Remove the four bolts and water pump cover and O-ring.



Water Pump Cover/O-ring



Remove the water pump body from the crankcase.

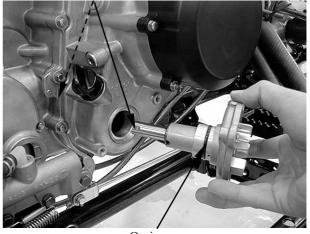


INSTALLATION

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

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





O-ring

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

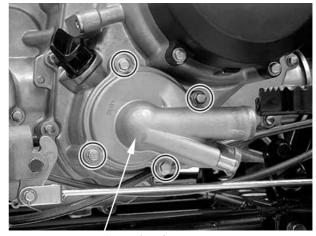
Install a new O-ring into the groove in the water pump cover.





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

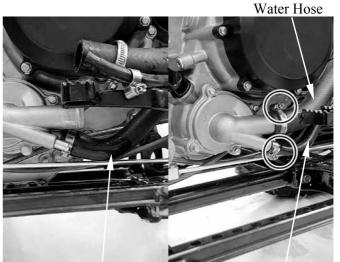
Torque: 1.3 kgf-m (13 N-m, 9 lbf-ft)



Water Pump Cover/O-ring

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

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



Water Hose

Bypass Hose



RADIATOR

REMOVAL

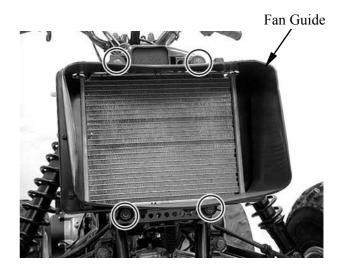
Drain the coolant (refer to the "COOLANT **REPLACEMENT**" section in this chapter).

Remove the front fender (refer to the "FRAME COVERS" section in the chapter 2).

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

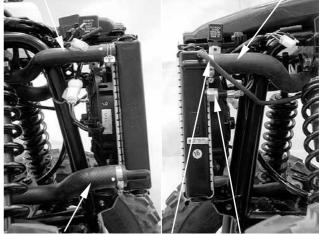
Loosen the hose bands and disconnect the radiator lower water hose, water filler hose, bleed hose and upper water hose from the radiator.

Disconnect the fan switch connectors.



Water Filler Hose

Upper Water Hose



Lower Water Hose

Bleed Hose Fan Motor SW

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

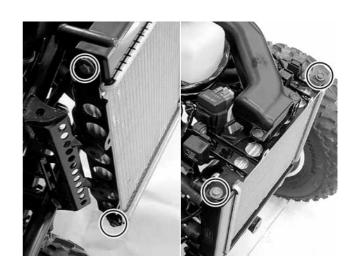


Be careful not to damage the radiator core.

INSTALLATION

Installation is in the reverse order of removal.

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



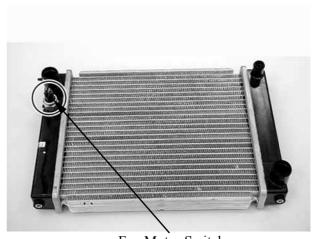


FAN MOTOR SWITCH

REMOVAL

Disconnect the fan motor switch connectors (refer to the "RADIATOR" section in this chapter).

Remove the fan motor switch.



Fan Motor Switch

INSPECTION

Place the fan motor switch in oil contained in a pan as shown and raise the oil temperature gradually to check for the temperature at which the switch starts to operate.

If the switch operating temperature is not within the specified range, replace the switch with a new one.

| OFF→ON | Over 88–92°C |
|--------|---------------|
| ON→OFF | Lower 88–92°C |

- Handle the cooling fan motor switch carefully as it is vulnerable to impact.
- Do not allow the cooling fan motor switch and the thermometer 2to come in contact with the bottom of the pan.

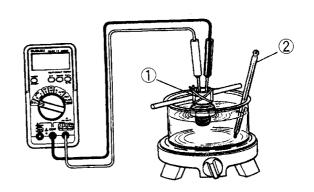
INSTALLATION

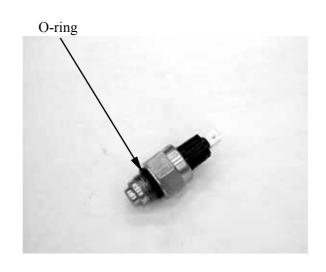
Fit the O-ring.

Tighten the cooling fan motor switch to specified torque.

Torque: 1.8 kgf-m (17 N-m, 13 lbf-ft)

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





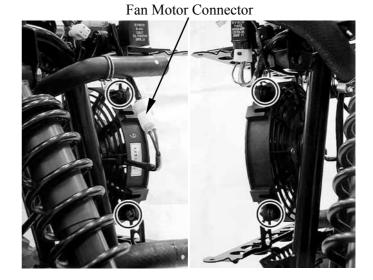


FAN MOTOR

REMOVAL

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

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



INSPECTION

Check the fan motor to operate using an available battery.



INSTALLATION

Installation is in the reveres order of removal.

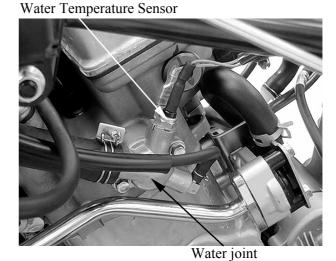


WATER TEMPERATURE SENSOR

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

Disconnect the water temperature sensor connector.

Remove the water temperature sensor from the water joint.



INSPECTION

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

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

| Temperature | Standard resistance |
|-------------|------------------------|
| 50°C | $123.9 - 478.9 \Omega$ |
| 100°C | $26 - 29.3 \Omega$ |

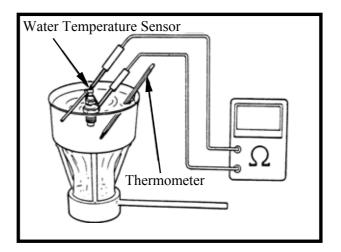
- *
- Handle the water temperature sensor carefully as it is vulnerable to impact.
- Do not allow the water temperature sensor and the thermometer to come in contact with the bottom of the pan.

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

INSTALLATION

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

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



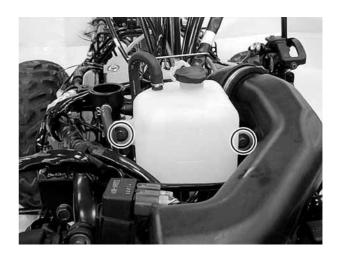


RADIATOR RESERVE TANK

REMOVAL

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

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



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

Disconnect the siphon hose.

INSTALLATION

Installation is in the reverse order of removal.

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



Siphon Hose



| ENGINE REMOV | \mathbf{AL} |
|--------------------------|---------------|
| SERVICE INFORMATION | 7. 1 |
| NHK VIC H INHOK MA I ION | /- |

ENGINE INSTALLATION ----- 7- 8



SERVICE INFORMATION

GENERAL INSTRUCTIONS

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

TORQUE VALUES

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



ENGINE REMOVAL

Drain engine oil (refer to the "**ENGINE OIL**" section in the chapter 3).

Remove frame covers and exhaust pipe (refer to the "**FRAME COVERS**" section in the chapter 2).

Drain the engine coolant (refer to the "COOLANT REPLACEMENT" section in this chapter).

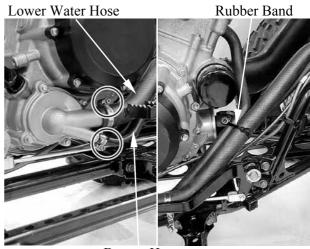
Remove the air cleaner housing and carburetor (refer to the "CARBURETOR REMOVAL/CHOKE INSPECTION/INSTALLATION" and "AIR CLEANER HOUSING" section s in the chapter 5).

Disconnect the lower water hose and bypass hose from water pump cover.

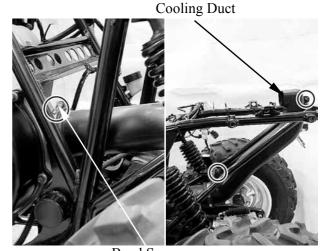
Cut the rubber band off on the water hose.

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

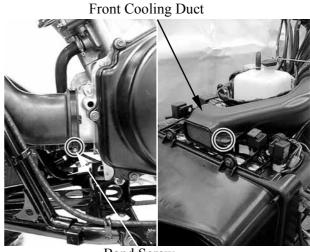
Loosen the band screw and remove the fastener from the front cooling duct, then remove the front cooling duct.



Bypass Hose



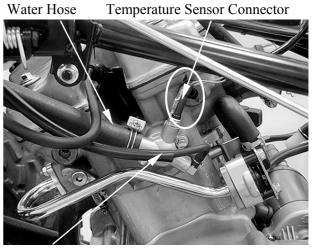
Band Screw



Band Screw

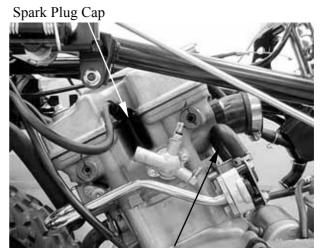


Disconnect the water hose, bleed hose and water temperature sensor connectors from water joint.



Bleed Hose

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



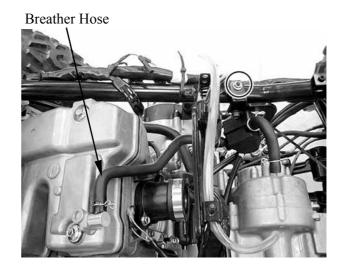
AICV Air Supply Hose

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





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



Disconnect the vacuum hose from intake pipe.

Slide the rubber sleeve back to expose the starter motor wire nut.

Remove the starter motor cable nut for disconnect the starter motor cable.

Remove the bolt and then disconnect the engine ground cable from starter motor.

Vacuum Hose Starter Cable



Rubber Sleeve

Engine Ground Cable

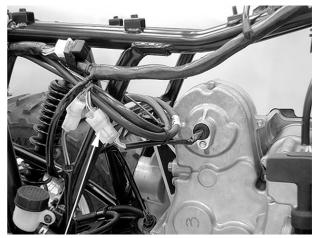
Remove the A.C.Generator and ignition pulse generator connectors.



A.C. Generator Connector



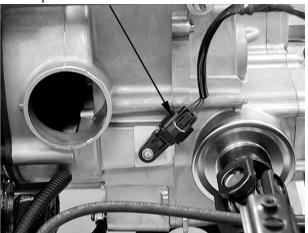
Disconnect the gear indicator light switch connector.



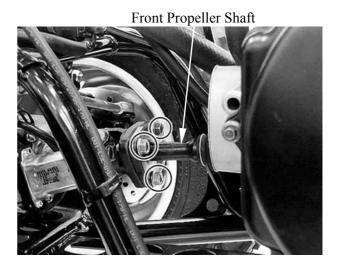
Gear Indicator Light Switch Connector

Disconnect the speed sensor connector.

Speed Sensor Connector



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

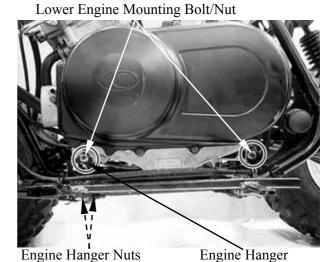




Remove the front lower engine mounting bolt/nut.

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

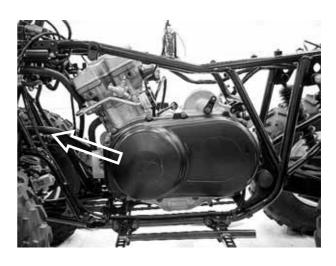
Remove the rear lower engine mounting bolt/nut.



Remove the upper engine mounting bolt/nut.



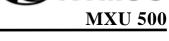
Rise the engine front side and move the engine forward, then remove the engine from the frame by disengaging the rear drive gear case.





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

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



Rear Propeller Shaft

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

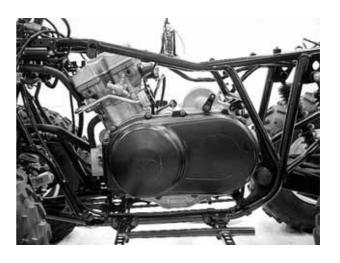






ENGINE INSTALLATION

Install the engine assembly into the frame.



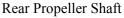
Apply lightweight lithium-soap base grease to the rear propeller shaft splines.



Install the rear propeller shaft into the engine assembly.

*

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





Apply grease



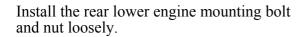
Install the compression spring into the pinion gear.

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

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

Install the joint boot securely.

Install the upper engine mounting bolt and nut loosely.



Install the engine hangers and four engine hanger nuts loosely.

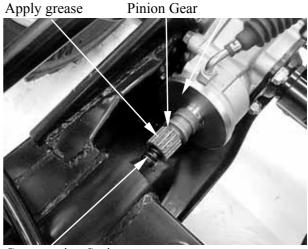
Install the front lower engine mounting bolt and nut loosely.

Tighten the four engine hanger nuts to the specified torque.

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

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

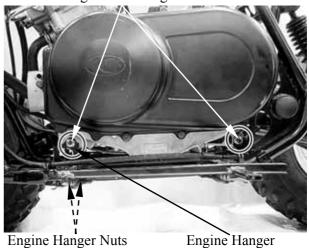
Torque: 6 kgf-m (60 N-m, 43.5 lbf-ft)



Compression Spring

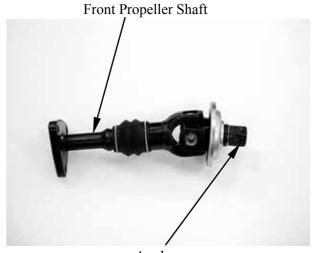


Lower Engine Mounting Bolt/Nut





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



Apply grease

Install the front propeller shaft into the engine assembly.

Install and tighten the three new bolts to specified torque.

*

Always install the bolts with the new ones.

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



Install the front cooling duct.

*

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





Install the rear cooling duct.

*

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

Install the removed parts in the reverse order of removal.

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

Adjusting the following items:

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





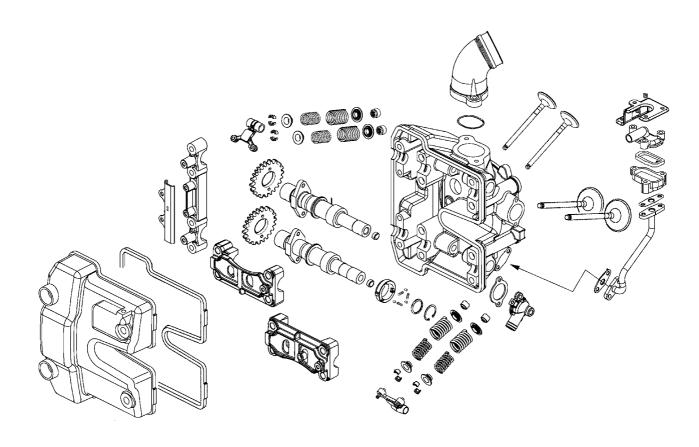
CYLINDER HEAD/VALVES

| SCHEMATIC DRAWING | 8- | 1 |
|--|-----|----|
| SERVICE INFORMATION | 8- | 2 |
| TROUBLESHOOTING | 8- | 3 |
| CYLINDER COMPRESSION TEST | 8- | 4 |
| CYLINDER HEAD COVER REMOVAL/INSTALLATION | 8- | 5 |
| CYLINDER HEAD COVER DISASSEMBLY/ASSEMBLY | 8- | 6 |
| CAMSHAFT REMOVAL/INSPECTION/INSTALLATION | 8- | 7 |
| ROCKER ARMS REMOVAL/INSPECTION/INSTALLATION | 8-1 | 15 |
| CYLINDER HEAD REMOVAL/INSTALLATION | 8-1 | 17 |
| $CYLINDER\ HEAD\ DISASSEMBLY/INSPECTION/ASSEMBLY\ -$ | 8-2 | 24 |
| CAM CHAIN REMOVAL/INSPECTION/INSTALLATION | 8-2 | 28 |

8



SCHEMATIC DRAWING





SERVICE INFORMATION

GENERAL INSTRUCTIONS

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

SPECIFICATIONS Unit: mm (in)

| Item | | Standard | Service Limit | | | |
|---------------------------|-------------|---|----------------|--|--|--|
| Valve clearance (cold) | IN | 0.1 mm (0.004 in) | _ | | | |
| varve clearance (colu) | EX | 0.1 mm (0.004 in) | _ | | | |
| Cylinder head compressi | on pressure | 15 kg/cm ² (1500 kPa, 213 psi) | _ | | | |
| Cylinder head warpage | | | 0.05 (0.002) | | | |
| Camshaft runout | | | 0.05 (0.002) | | | |
| Camshaft cam height | IN | 37.2614 (1.4905) | 37.11 (1.4844) | | | |
| Camsnatt Cam neight | EX | 37.0084 (1.4803) | 36.86 (1.4744) | | | |
| Valve rocker arm I.D. | IN | $10(0.4)\sim10.015(0.4006)$ | 10.1 (0.404) | | | |
| varve rocker arm r.D. | EX | $10(0.4)\sim10.015(0.4006)$ | 10.1 (0.404) | | | |
| Valve rocker arm shaft | IN | $9.975(0.399) \sim 9.99(0.3996)$ | 9.9 (0.396) | | | |
| O.D. | EX | $9.975(0.399) \sim 9.99(0.3996)$ | 9.9 (0.396) | | | |
| Rocker arm to shaft clear | rance | $0.009 (0.0004) \sim 0.042 (0.0017)$ | 0.1 (0.004) | | | |
| Valve stem O.D. | | $4.975(0.199)\sim4.99(0.1996)$ | 4.925 (0.197) | | | |
| varve stem O.D. | EX | $4.955(0.1982) \sim 4.97(0.1988)$ | 4.915 (0.1966) | | | |
| Valve guide I.D. | IN | $5(0.2)\sim5.015(0.2006)$ | 5.03 (0.2012) | | | |
| varve guide 1.D. | EX | $5(0.2)\sim5.015(0.2006)$ | 5.03 (0.2012) | | | |
| Valve stem-to-guide | IN | $0.01 (0.004) \sim 0.037 (0.0015)$ | 0.08 (0.0032) | | | |
| clearance | EX | $0.03 (0.0012) \sim 0.057 (0.0023)$ | 0.1 (0.004) | | | |





TORQUE VALUES

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

SPECIAL TOOLS

Valve spring compressor A120E00040

TROUBLESHOOTING

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

Poor performance at idle speed

• Compression too low

Compression too low

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

Compression too high

• Excessive carbon build-up in combustion chamber

White smoke from exhaust muffler

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

Abnormal noise

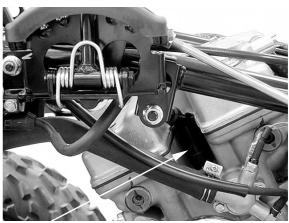
- Incorrect valve clearance adjustment
- Sticking valve or broken valve spring
- Damaged or worn camshaft
- Worn cam chain tensioner
- Worn camshaft and rocker arm



CYLINDER COMPRESSION TEST

Warm up the engine to normal operating temperature.

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



Park Plug Cap

Install a compression gauge into the spark plug hole.

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

The maximum reading is usually reached 4 – 7 seconds.

*

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

Compression pressure:

15 kg/cm² (1500 kPa, 213 psi)

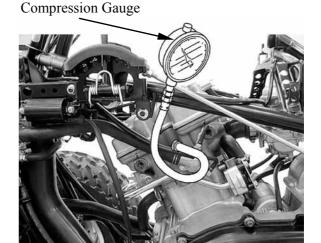
13 kg/cm (1300 kr a, 213 ps

Low compression can be caused by:

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

High compression can be caused by:

 Carbon deposits in combustion chamber or on piston head



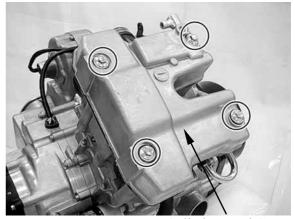


CYLINDER HEAD COVER REMOVAL/INSTALLATION

REMOVAL

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

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



Cylinder Head Cover

Remove the cylinder head cover packing.

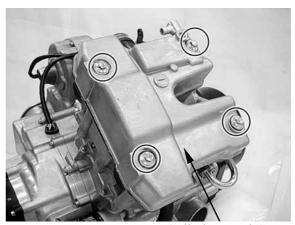
INSTALLATION

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



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

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



Cylinder Head Cover



CYLINDER HEAD COVER DISASSEMBLY/ASSEMBLY

DISASSEMBLY

Remove the three bolts and breather separator.



Remove the gasket.

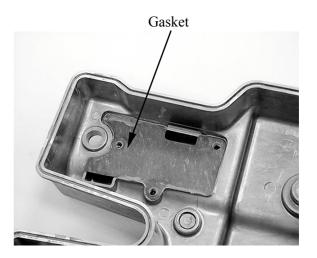
ASSEMBLY

Assembly is in the reverse order of disassembly.

Torque:

Breather separator bolt:

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





CAMSHAFT REMOVAL/INSPECTION/ INSTALLATION

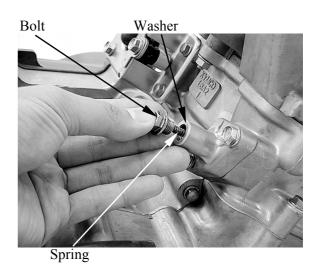
REMOVAL

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

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

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

Remove the two bolts, cam chain tensioner and gasket.



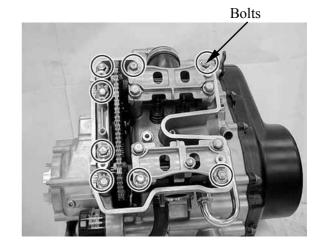


Remove the two bolts and cam chain guide.





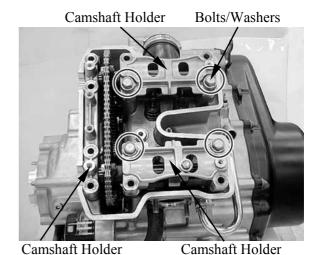
Loosen and remove the eight camshaft holder bolts in a crisscross pattern in several steps.



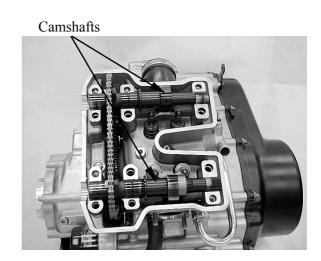
Loosen and remove the four camshaft holder bolts/washers in a crisscross pattern in several steps, then remove the camshaft holders.

*

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



Remove the camshafts.





INSPECTION

Cam chain guide

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

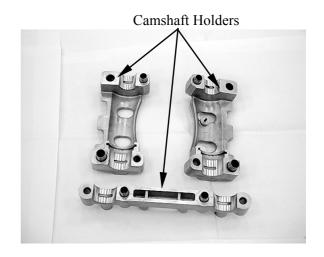


Camshaft holder



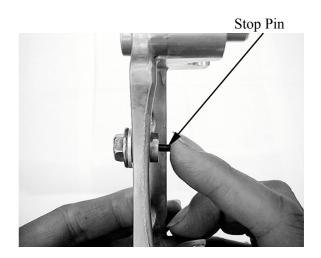
Always replace the camshaft holder and cylinder head in pairs

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



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

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

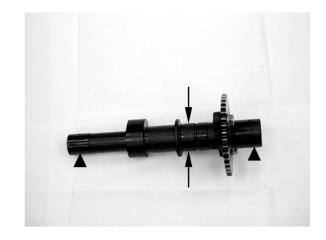




Camshaft

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

Service limit: 0.05 mm (0.002 in)



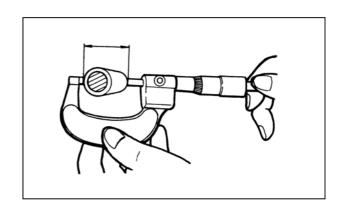
Inspect camshaft lobes for pitting/scratches/blue discoloration.

Measure the cam lobe height.

Service Limits: IN: 37.11 mm (1.4844 in)

EX: 36.86 mm (1.4744 in)

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



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

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





Cam chain tensioner

Check the one-way cam operation (tensioner) Unsmooth operation \rightarrow Replace.



INSTALLATION

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

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



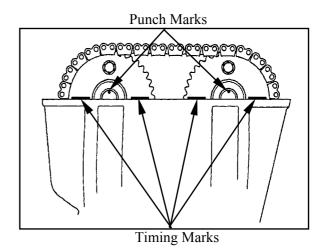
Apply molybdenum disulfide oil to the camshaft journals of the cylinder head.





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

- * Install each camshafts to the correct locations.
 - "IN": no decompressor cam
 - "EX": has a decompressor cam
 - Make sure the timing marks on the cam sprockets are flush with the cylinder head upper surface and punch marks face upward as shown.

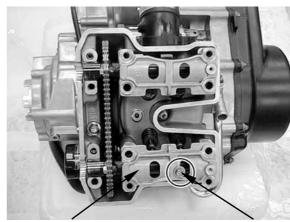


Install intake and exhaust camshaft holders to the correct locations.

Install each camshaft holders to the correct locations.

"IN": no stop pin.

"EX": has a stop pin.



Exhaust Camshaft Holder

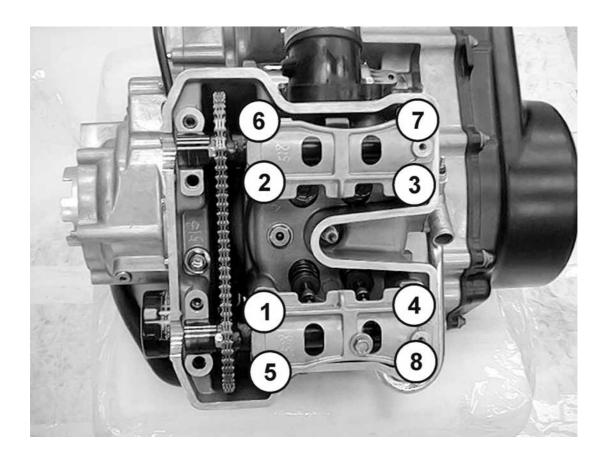
Stop Pin



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

Install the four bolts (No. 5-8). Install the four bolts/washers (No. 1-4). Tighten the holder bolts (No. 1-8) in a crisscross pattern in five steps to the specified torque as follow diagram.

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



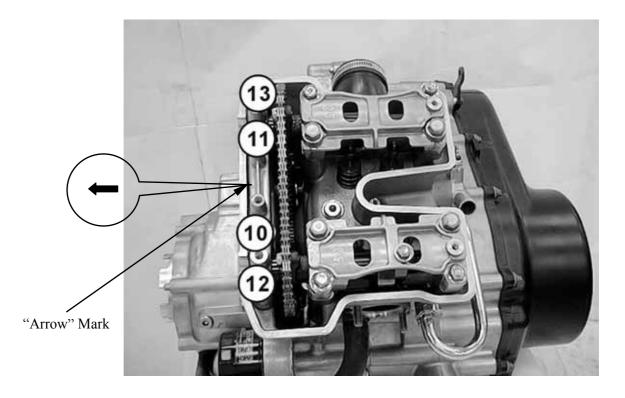


Apply engine oil to cylinder head bolt (No. 10-13) threads.

Install the common camshaft holder by arrow mark facing outside.

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

| | Tighten the bolts to the specified torque in sequence kgf-m (N-m, lbf-ft) | | | | | | | |
|--------|---|----------|----------|----------|--|--|--|--|
| | (10) | (11) | (12) | (13) | | | | |
| Step 1 | 1.2 (12, 9) | ← | ← | ← | | | | |
| Step 2 | 2.3 (23, 17) | ← | ← | ← | | | | |





ROCKER ARMS REMOVAL/INSPECTION/ INSTALLATION

REMOVAL

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

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

Rocker Arms

Rocker Arm Shafts/Washers

INSPECTION

Rocker arm shaft

Inspect the rocker arm shaft for blue discoloration or grooves.

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

Measure each rocker arm shaft O.D. Measure the I.D. of each rocker arm. Measure arm to shaft clearance. Replace as a set if out of specification.

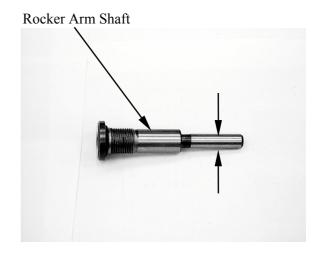
Service limits: 0.1 mm (0.004 in)

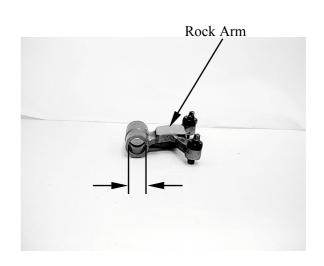
Inspect the rocker arm bore, cam lobe contact surface and adjuster surface for wear/pitting/scratches/blue discoloration.

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

Measure each rocker arm shaft O.D. Measure the I.D. of each rocker arm. Measure arm to shaft clearance. Replace as a set if out of specification.

Service limits: 0.1 mm (0.004 in)







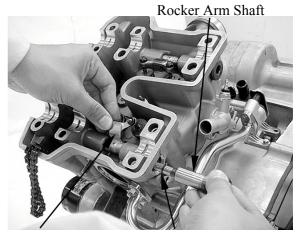
INSTALLATION

Apply engine oil to the rocker arms and rocker arm shafts

Install the rocker arms, rocker arm shafts and washers

Tighten the rocker arm shaft to the specified torque.

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



Rock Arm W



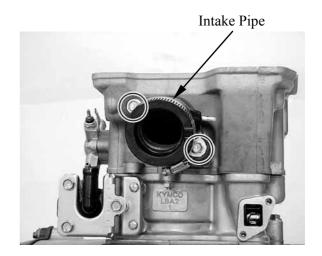
CYLINDER HEAD REMOVAL/INSTALLATION

*

Always replace the camshaft holder and cylinder head in pairs

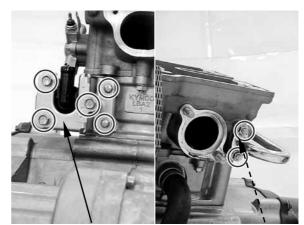
Remove the camshafts (refer to the "CAMSHAFT REMOVAL/INSPECTION/INSTALLATION" section in this chapter)

Remove the two bolts and intake pipe.



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

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



Pair Reed Valve Cover/Holder

Gasket

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



Water Joint/Gasket/Water Stop Collar

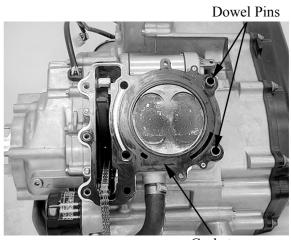
Remove the two nuts under the cylinder head.



Remove the bolt and then remove the cylinder head.



Remove the dowel pins and gasket.



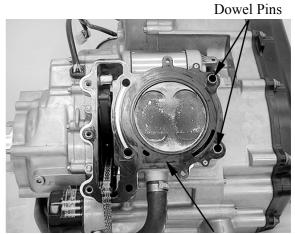
Gasket



W/X 0 00

INSTALLATION

Install the dowel pins and new gasket as shown.

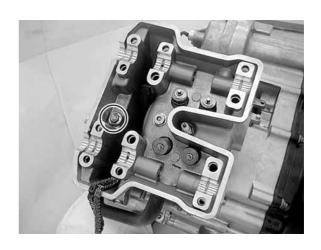


Gasket

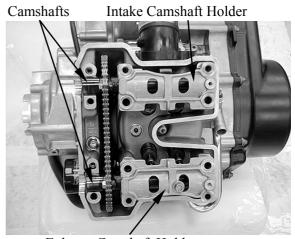
Install the cylinder head.

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

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



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



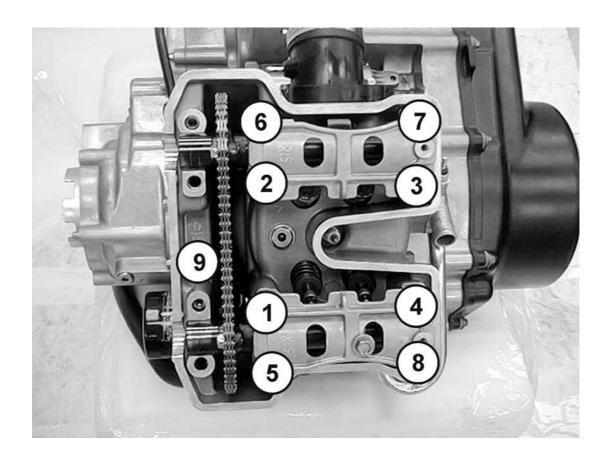
Exhaust Camshaft Holder



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

Install the four bolts (No. 5-8). Install the four bolts/washers (No. 1-4). Tighten the holder bolts (No. 1-9) in a crisscross pattern in five steps to the specified torque as follow diagram.

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



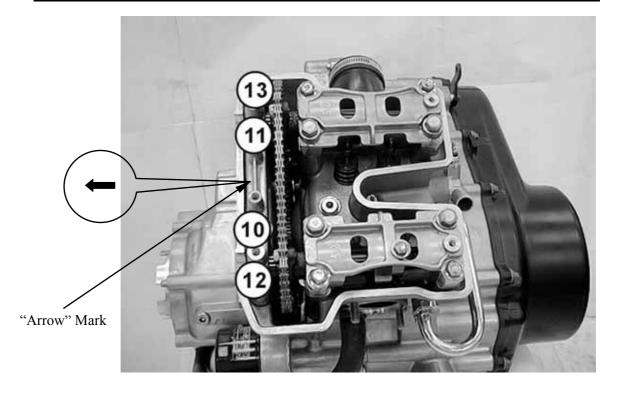


Apply engine oil to cylinder head bolt (No. 10-13) threads.

Install the common camshaft holder by arrow mark facing outside.

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

| | Tighten the bolts to the specified torque in sequence kgf-m (N-m, lbf-ft) | | | | | | | |
|--------|---|----------|----------|----------|--|--|--|--|
| | (10) | (11) | (12) | (13) | | | | |
| Step 1 | 1.2 (12, 9) | ← | ← | ← | | | | |
| Step 2 | 2.3 (23, 17) | ← | ← | ← | | | | |





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

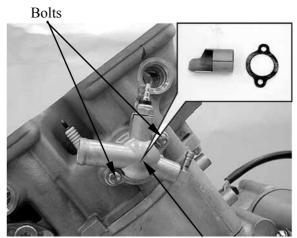
Torque: 1 kgf-m (10 N-m, 7 lbf-ft)



Install the water stop collar, gasket and water joint.

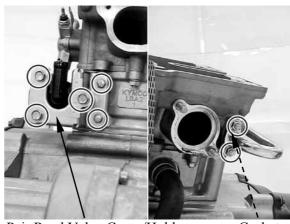
Install and tighten the two bolts to the specified torque.

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



Water Joint/Gasket/Water Stop Collar

Install gasket and pair reed valve. Install and tighten the five bolts and two nut securely.



Pair Reed Valve Cover/Holder

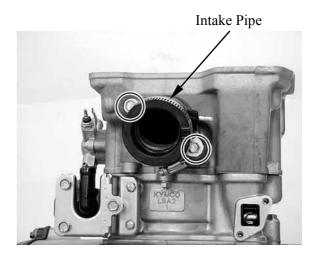
Gasket



Install the new O-ring onto the intake pipe.



Install the intake pipe and tighten the two bolts securely.





CYLINDER HEAD DISASSEMBLY/INSPECTION/ ASSEMBLY

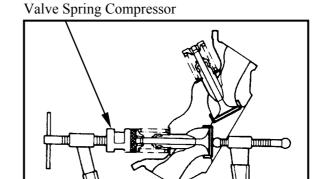
Remove the cylinder head (refer to the "CYLINDER HEAD"

REMOVAL/INSTALLATION" section in this chapter).

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

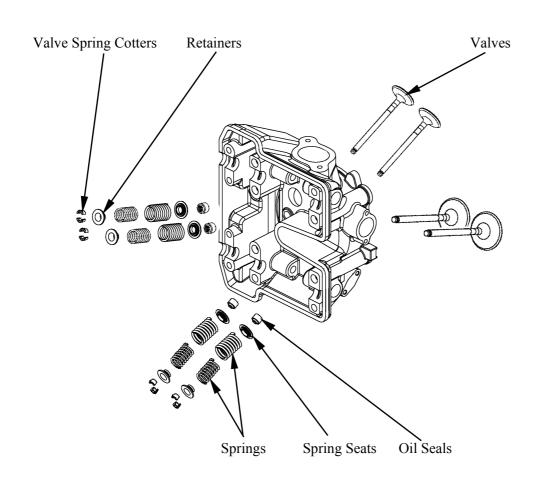


- Be sure to compress the valve springs with a valve spring compressor.
- Mark all disassembled parts to ensure correct reassembly.



Special tool:

Valve Spring Compressor A120E00040





INSPECTION

Valve /Valve guide

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

Check valve movement in the guide.

Measure each valve stem O.D.

Measure each valve guide I.D.

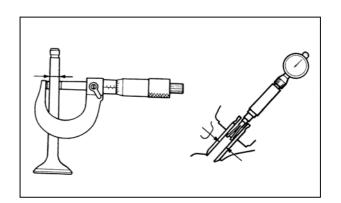
Subtract each valve stem O.D. from the corresponding guide I.D. to obtain the stemto-guide clearance.

Service limits:

IN: 0.08 mm (0.0032 in) EX: 0.1 mm (0.004 in)



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



Cylinder head

Check the spark plug hole and valve areas for cracks.

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

Service Limit: 0.05 mm (0.002 in)

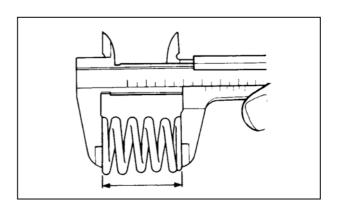


Valve spring

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

Service Limit:

Inner: 33.4 mm (1.336 in) Outer: 38 mm (1.52 in)





KYMCO

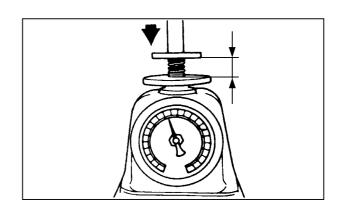
MXU 500

Measure compressed force (valve spring) and installed length.

Replace if out of specification.

Standard:

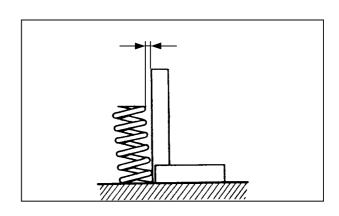
Inner: 3.5 kg (at 28.7 mm, 1.148 in) Outer: 13 kg (at 31.43 mm, 1.2572 in)



Measure the spring tilt. Replace if out of specification.

Standard:

Inner: 1.2 mm (0.048) Outer: 1.2 mm (0.048)



ASSEMBLY

Install the valve spring seats and oil seal.

Be sure to install new oil seal.

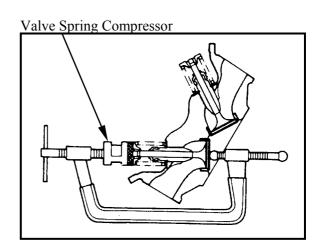
Lubricate each valve with engine oil and insert the valves into the valve guides. Install the valve springs and retainers. Compress the valve springs using the valve spring compressor, then install the valve cotters.



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

Special tool:

Valve Spring Compressor A120E00040

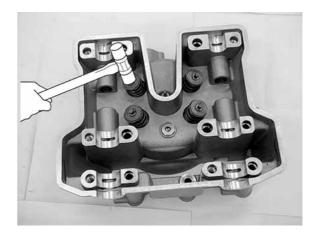




Tap the valve stems gently with a plastic hammer for $2\sim3$ times to firmly seat the cotters.



Be careful not to damage the valves.





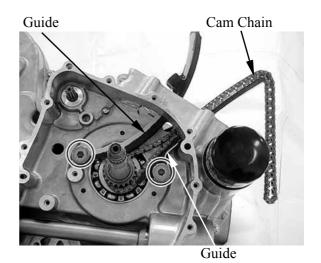
CAM CHAIN REMOVAL/INSPECTION/ INSTALLATION

REMOVAL

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

Remove the cam chain from the right crankcase.

Remove the two bolts and cam chain guides.



INSPECTION

Cam chain guide

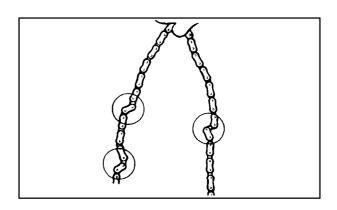
Inspect the cam chain slipper surface of the cam chain guide for wear or damage.



Slipper Surface

Cam chain

Inspect the cam chain for cracks or stiff.



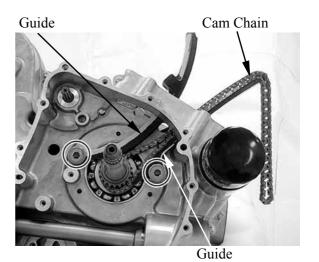


INSTALLATION

Installation is in the reverse order of removal.

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

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

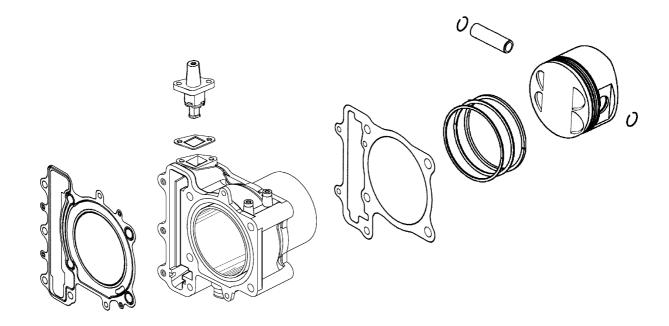




| CYLINDER/PISTON | |
|---------------------------------------|-----|
| CYLINDER/PISTON SCHEMATIC DRAWING | 9-1 |
| | |
| SCHEMATIC DRAWING | 9-2 |
| SCHEMATIC DRAWING SERVICE INFORMATION | 9-2 |



SCHEMATIC DRAWING





SERVICE INFORMATION

GENERAL INSTRUCTIONS

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

SPECIFICATIONS

Unit: mm (in)

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

TORQUE VALUES

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

TROUBLESHOOTING

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

Compression too low or uneven compression

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

Compression too high

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

Excessive smoke from exhaust muffler

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

Abnormal noisy piston

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



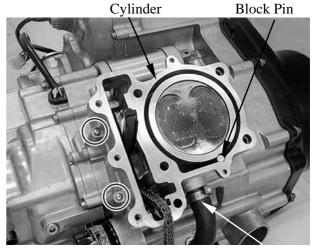
CYLINDER AND PISTON REMOVAL/INSPECTION/ **INSTALLATION**

REMOVAL

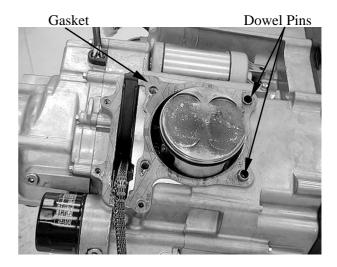
Remove the cylinder head (refer to "CYLINDER HEAD REMOVAL/INSTALLATION" section in the chapter 8).

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

Remove the dowel pins and gasket.



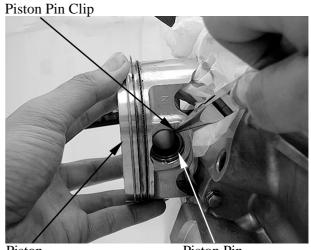
Water Hose



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.

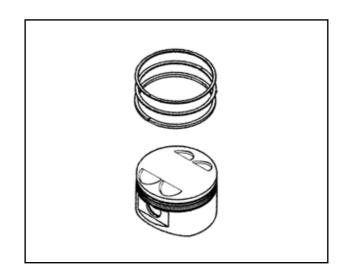


Piston Piston Pin Spread each piston ring and remove it by lifting up at a point opposite the gap

*

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

Clean carbon deposits from the piston ring grooves.



INSPECTION

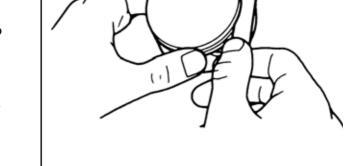
Piston ring

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

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



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



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

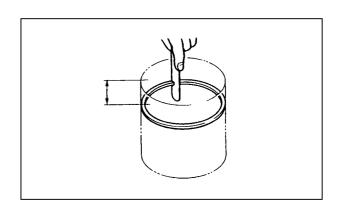


Use the piston head to push each piston ring into the cylinder.

Measure the piston ring end gap.

Service Limit:

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



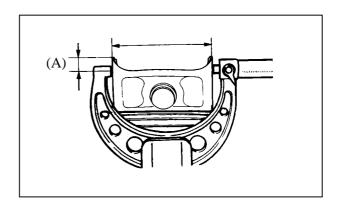


Piston/Piston pin Measure the piston O.D. at the point (A) from the bottom and 90° to the piston pin hole.

Service Limit:

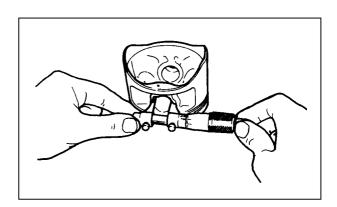
91.9 mm (3.676 in) at (A): 10 mm

Calculate the cylinder-to-piston clearance.



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

Service Limit: 22.04 mm (0.8816 in)

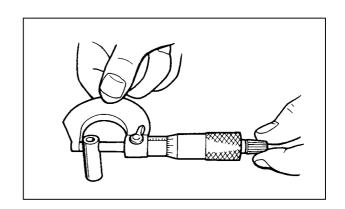


Measure the piston pin O.D. at piston and connecting rod sliding areas.

Service Limit: 21.96 mm (0.8784 in)

Measure the piston-to-piston pin clearance.

Service Limit: 0.02 mm (0.001 in)

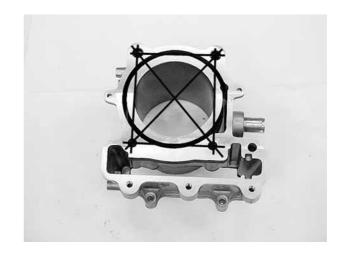




Cylinder

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

Service Limit: 0.05 mm (0.002 in)



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

Service Limit: 92.1 mm (3.684 in)

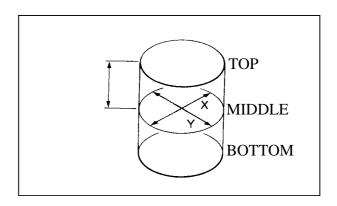
Calculate the piston-to-cylinder clearance. Take a maximum reading to determine the clearance.

Service Limit: 0.1 mm (0.004 in)

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

Service Limit:

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



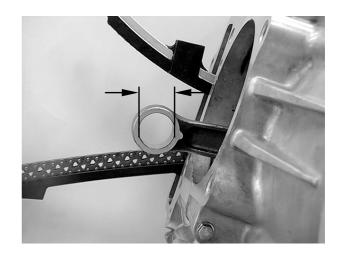


Measure the connecting rod small end I.D..

Service Limit: 22.06 mm (0.8824 in)

Calculate the connecting rod-to-piston pin clearance.

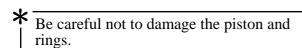
Service Limit: 0.06 mm (0.002 in)



INSTALLATION

Piston ring

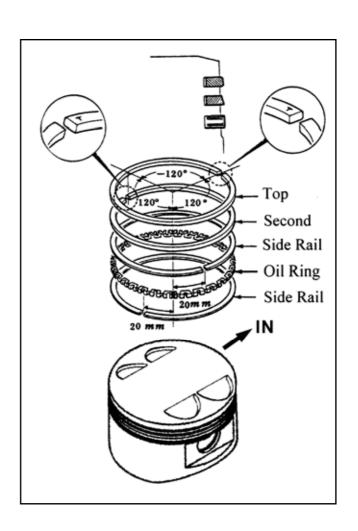
Carefully install the piston rings into the piston ring grooves with the markings facing up.



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

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

Stagger the side rail end gaps as shown.



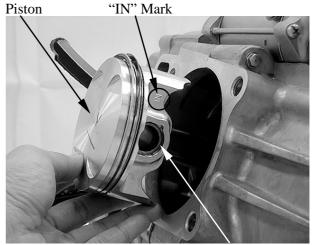


Cylinder/Piston

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

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

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

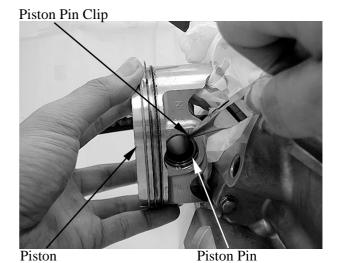


Piston Pin

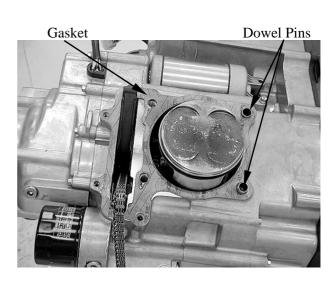
Place a clean shop towel over the crankcase prevent the clip from falling into the crankcase.

Install the new pin clip.

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



Install the dowel pins and gasket.



9. CYLINDER/PISTON



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

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

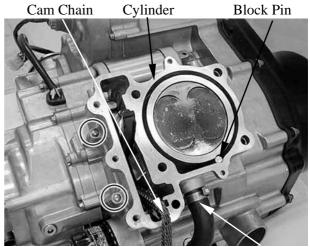
*

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

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

Torque: 10 N•m (1 kgf•m, 7 lbf•ft)

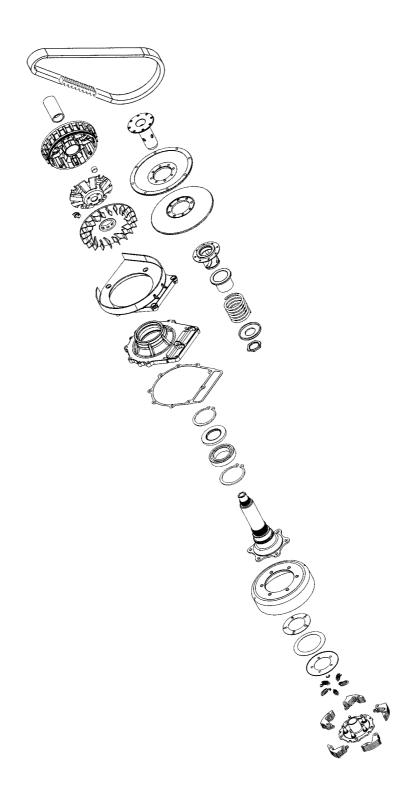
Install the block pin.
Connect the water hose.



Water Hose

| SCHEMATIC DRAWING | |
|--|---|
| | 10- 1 |
| SCHEMATIC DRAWING | 10- 1 10- 2 |
| SCHEMATIC DRAWINGSERVICE INFORMATION | 10- 1 10- 2 10- 2 |
| SCHEMATIC DRAWINGSERVICE INFORMATION FROUBLESHOOTING LEFT CRANKCASE COVER REMOVAL/INSTALLATION DRIVE PULLEY, DRIVE V-BELT AND DRIVEN PULLEY | 10- 1 10- 2 10- 2 10- 3 |
| SCHEMATIC DRAWINGSERVICE INFORMATION TROUBLESHOOTINGLEFT CRANKCASE COVER REMOVAL/INSTALLATION | 10- 1 10- 2 10- 2 10- 3 |
| SCHEMATIC DRAWINGSERVICE INFORMATION FROUBLESHOOTING LEFT CRANKCASE COVER REMOVAL/INSTALLATION DRIVE PULLEY, DRIVE V-BELT AND DRIVEN PULLEY | 10- 1 10- 2 10- 2 10- 3 |
| SCHEMATIC DRAWINGSERVICE INFORMATION FROUBLESHOOTING LEFT CRANKCASE COVER REMOVAL/INSTALLATION DRIVE PULLEY, DRIVE V-BELT AND DRIVEN PULLEY REMOVAL/INSPECTION/ INSTALLATION | 10- 1 10- 2 10- 2 10- 3 10- 5 10- 9 |
| SCHEMATIC DRAWINGSERVICE INFORMATION FROUBLESHOOTING LEFT CRANKCASE COVER REMOVAL/INSTALLATION DRIVE PULLEY, DRIVE V-BELT AND DRIVEN PULLEY REMOVAL/INSPECTION/ INSTALLATION | 10- 1 10- 2 10- 2 10- 3 10- 5 10- 9 10-13 |

SCHEMATIC DRAWING



SERVICE INFORMATION

GENERAL INSTRUCTIONS

- The drive pulley, clutch and driven pulley can be serviced with the engine installed.
- 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.
- Do not apply grease to the movable drive face and weight rollers.

SPECIFICATIONS Unit: mm (in)

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

TORQUE VALUES

Drive pulley nut 14 kgf-m (140 N-m, 100.8 lbf-ft) Apply oil to the threads

Clutch nut 14 kgf-m (140 N-m, 100.8 lbf-ft)

Driven pulley nut 10 kgf-m (100 N-m, 72 lbf-ft) Apply oil to the threads

Driven pulley assembly plate nut 7.5 kgf-m (75 N-m, 54 lbf-ft)

SPECIAL TOOLS

| A120E00014 |
|------------|
| A120E00037 |
| A120E00056 |
| A120E00058 |
| A120E00059 |
| A120E00067 |
| |

TROUBLESHOOTING

Engine starts but ATV won't move

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

Engine stalls or ATV creeps

• Broken clutch weight spring

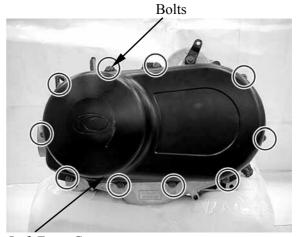
Lack of power

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

LEFT CRANKCASE COVER **REMOVAL/INSTALLATION REMOVAL**

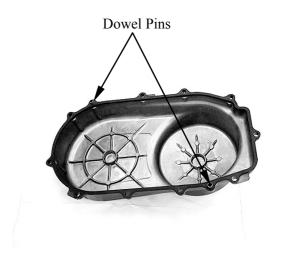
Remove the left footboard (refer to the "FRAME COVERS" section in the chapter

Remove the ten bolts, remove the left crankcase cover and rubber gasket.



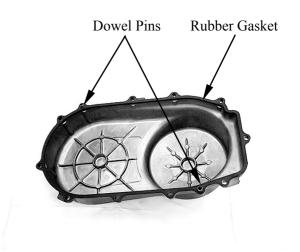
Left Front Cover

Remove the two dowel pins.



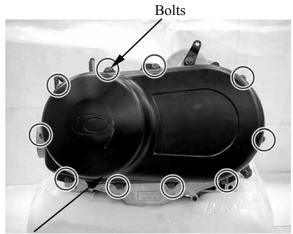
INSTALLATION

Install the rubber gasket onto the left crankcase cover. Install the two dowel pins onto the left crankcase cover.



Install the left crankcase cover and tighten the ten bolts diagonally to specified torque.

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



Left Front Cover

DRIVE PULLEY, DRIVE V-BELT AND DRIVEN PULLEY REMOVAL/INSPECTION/ INSTALLATION

REMOVAL

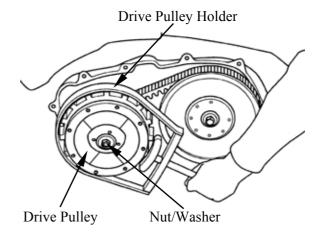
Use the special tool to hold the drive pulley, then remove the nut and washer.

Special tool:

Drive pulley holder

A120E00058

Remove the drive pulley.



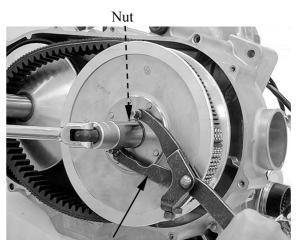
Use the special tool to hold the driven pulley, then remove the nut.

Special tool:

Y-type holder

A120E00056

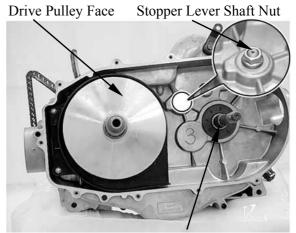
Remove the driven pulley and V-belt.



Y-type Holder

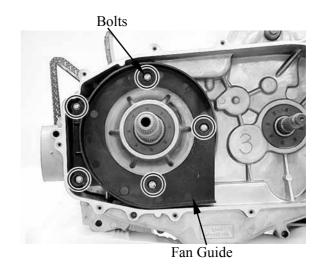
Remove the driven pulley washer. Remove the drive pulley face.

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



Washer

Remove the five bolts and then remove the fan guide.



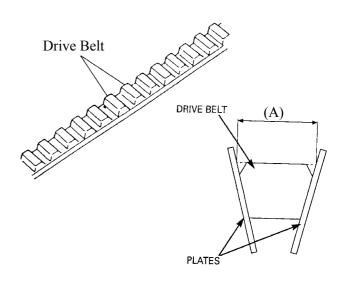
INSPECTION

Inspect the drive belt for cracks, scaling, chipping or excessive wear.

Measure the V-belt width

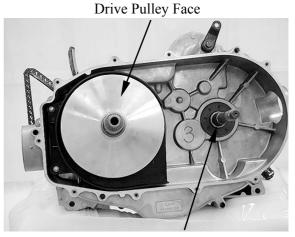
Service limit (A): 30.8 mm (1.232 in)

Replace the drive belt if out of specification.



INSTALLATION

Install the fan guide. Install the drive pulley face. Install the driven pulley washer.

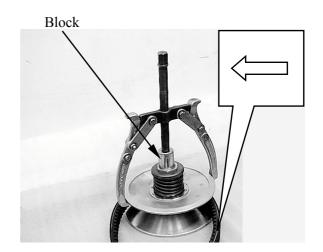


Washer

) KYMCO 10. DRIVE PULLEY/DRIVEN PULLEY/CLUTCH **MXU 500**

Place a block on the plate nut. Compress the spring by using a commercially available puller, install the drive belt.

- ★ The drive belt should be installed so that the arrows on the drive belt periphery point in the normal turning direction.
 - The drive belt contact surface of the driven face should be thoroughly cleaned.



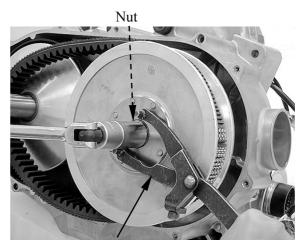
Install the driven pulley assembly and drive V-belt.

Use the special tool to hold driven pulley, then tighten the nut to the specified torque.

Torque: 10 kgf-m (100 N-m, 72 lbf-ft) Apply oil to the threads

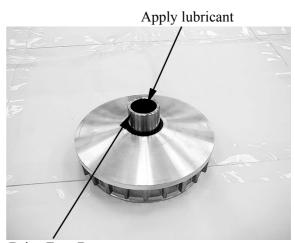
Special tools:

Y-type holder A120E00056



Y-type Holder

Apply lubricant to the drive face boss inner surface, then install the drive pulley.



Drive Face Boss

10. DRIVE PULLEY/DRIVEN PULLEY/CLUTCH MXU 500

Install the drive pulley assembly. Install the washer and nut.

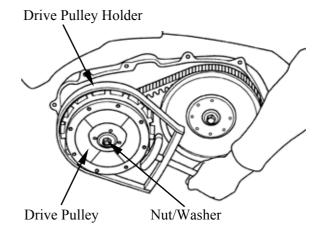
Make sure the "OUT SIDE" marks on the washer faces the left crankcase cover.

Use the special tool to hold drive pulley, then tighten the nut to the specified torque.

Torque: 14 kgf-m (140 N-m, 100.8 lbf-ft)
Apply oil to the threads

Special tool:

Drive pulley holder A120E00058



DRIVE PULLEY DISASSEMBLY/INSPECTION/ ASSEMBLY

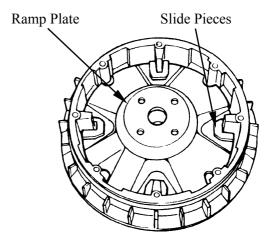
DISASSEMBLY

Remove the drive pulley (refer to "DRIVE PULLEY AND DRIVEN PULLEY REMOVAL/INSTALLATION" section)

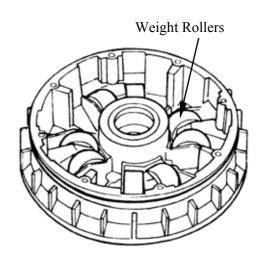
Remove the drive face boss.



Remove the ramp plate and four slide pieces.



Remove the eight weight rollers.



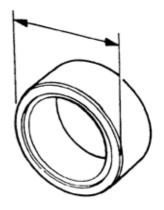
MXU 500

INSPECTION

Weight rollers

Check each roller for wear or damage. Measure outside diameter.

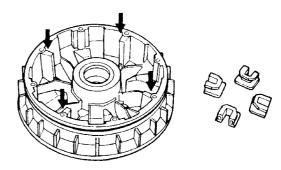
Service limit: 29.5 mm (1.18 in)



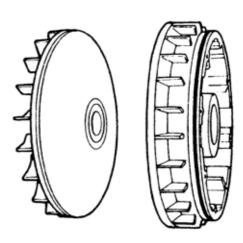
Movable drive face/Slide pieces/Drive pulley face

Check the slide pieces and movable drive face splines for wear, cracks or damage.

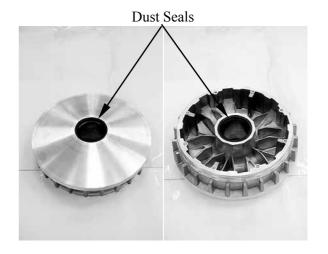
Check the ramp plate for cracks or damage.



Check the movable drive face and drive pulley face cracks or damage.



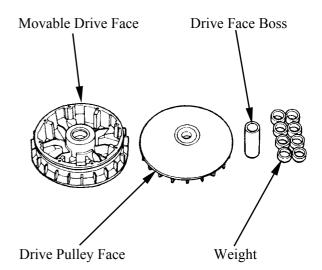
Check the dust seals on the movable drive face for wear or damage.



ASSEMBLY

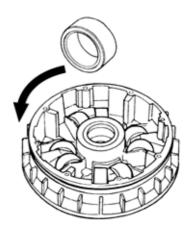
Clean the movable drive face, drive pulley face, weight rollers, slide pieces, ramp plate and drive face boss.

Remove any excess grease.

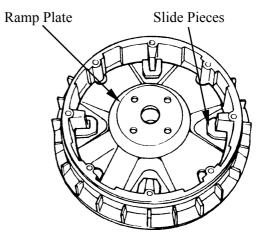


Install the weight rollers.

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



Install the slide pieces and ramp plate.



Install the drive face boss.



DRIVEN PULLEY DISASSEMBLY/INSPECTION/ **ASSEMBLY**

DISASSEMBLY

Remove the driven pulley (refer to the "DRIVE PULLEY AND DRIVEN **PULLEY** REMOVAL/INSTALLATION" section in this chapter).

Use the special tool to remove the nut.

Special tool:

Driven pulley spring compressor

A120E00059

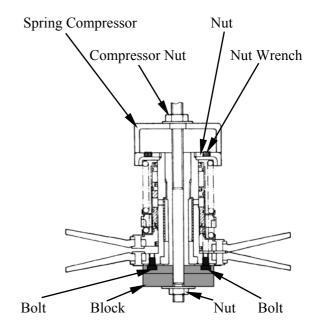
Nut

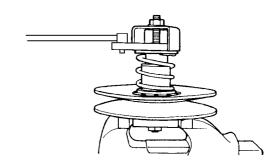
- * Install the block and bolts, then tighten the bolts.
 - Attach the block, nut wrench and spring compressor to the driven pulley assembly.
 - Place the block in a vise and secure it.
 - Tighten the spring compressor nut and compress the spring.
 - Loosen the nut with the nut wrench.
 - Remove the nut.
 - Remove the spring compressor and nut wrench.

Remove the spring seat on the spring and spring.

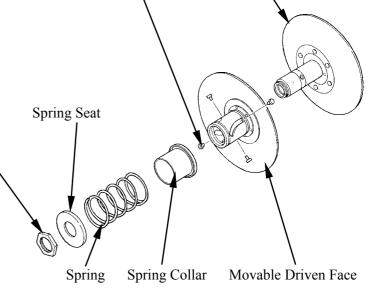
Remove the spring collar on the movable driven face.

Remove the four guide pins/rollers, then remove the movable driven face.





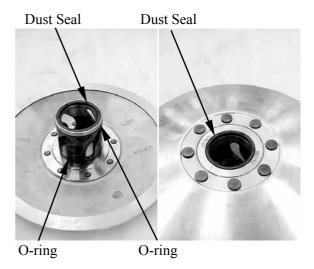
Driven Face



Guide Pins/rollers

10. DRIVE PULLEY/DRIVEN PULLEY/CLUTCH MXU 500

Remove the O-rings and dust seals from the movable driven face.



INSPECTION

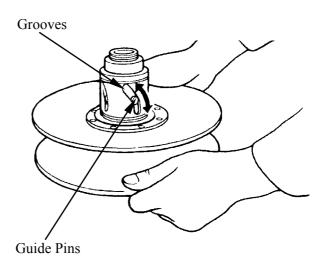
Check the driven pulley for smooth operation.

If any scratches or damage is found then replace as a set.

Check the torque cam grooves for wear or damage.

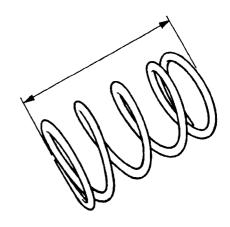
Check guide pins and rollers for wear or damage.

If any scratches or damage is found then replace as a set.



Check the spring for damage. Measure the spring free length.

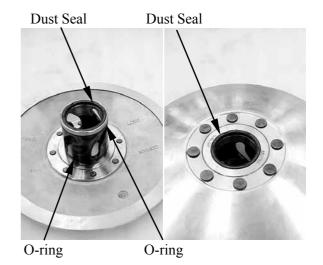
Service limit: 121.3 mm (4.852 in)



ASSEMBLY

Clean any oil from the drive belt sliding surfaces on the driven face.

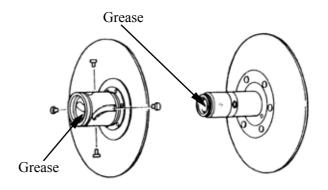
Apply grease to lips of the new dust seals and install into the movable driven face. Coat new O-rings with grease and install them into the movable driven face grooves.



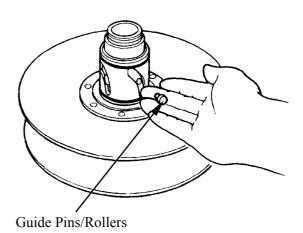
Install the movable driven face onto the driven face.

Install the guide rollers and guide roller pins.

Filling 8 g of grease to each guide groove.



Install the guide pins/rollers.



10. DRIVE PULLEY/DRIVEN PULLEY/CLUTCH

Install spring collar.

Use the special tool to install spring and spring seat, then install and tighten the nut to the specified torque.

Torque: 7.5 kgf-m (75 N-m, 54 lbf-ft)

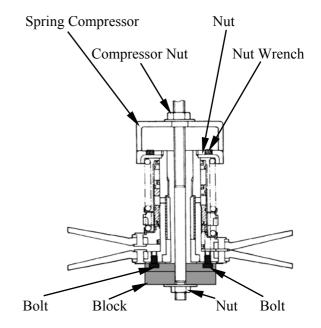
Special tool:

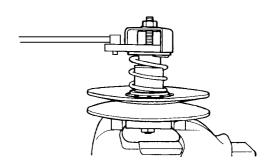
Driven pulley spring compressor

A120E00059



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





CLUTCH REMOVAL/INSTALLATION

REMOVAL

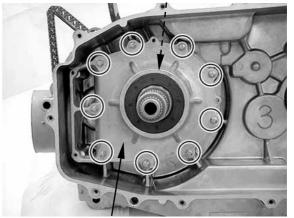
Remove the fan guide (refer to the "DRIVE PULLEY AND DRIVEN PULLEY REMOVAL/INSTALLATION" section in this chapter).

Remove the nine bolts and then remove the clutch housing assembly and one-way clutch bearing.

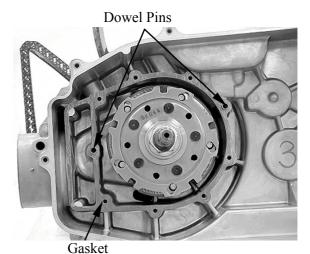
Working in crisscross pattern, loosen each bolt 1/4 of a turn. Remove them after all of them are loosened.

Remove the two dowel pins and gasket.

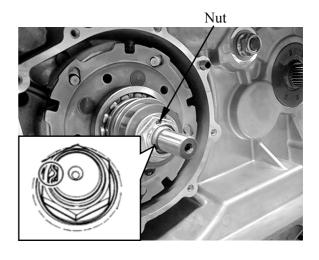
One-way Clutch Bearing



Clutch Housing Assembly



Using a chisel, unlock the nut.



10. DRIVE PULLEY/DRIVEN PULLEY/CLUTCH MXU 500

Use the special tool to hold clutch carrier assembly.

Special tool:

Y-type holder A120E00056

Not USA type:

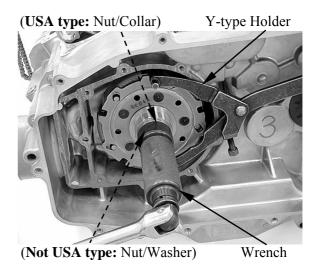
Use the special tool to remove the nut and washer.

Special tool:

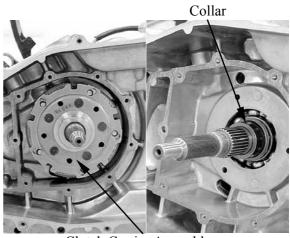
Lock nut wrench A120E00067

USA type:

Remove the nut and collar.



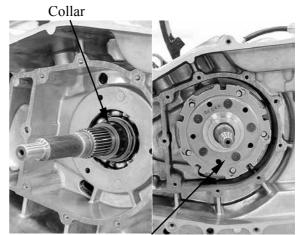
Remove the clutch carrier assembly and collar.



Clutch Carrier Assembly

INSTALLATION

Apply clean engine oil to the clutch carrier assembly and collar, then install the collar and clutch carrier assembly.



Clutch Carrier Assembly

Install the washer (Not USA type).

Install the collar (USA type).

Use the special tools to install and tighten the nut to the specified torque.

Torque: 14 kgf-m (140 N-m, 100.8 lbf-ft)

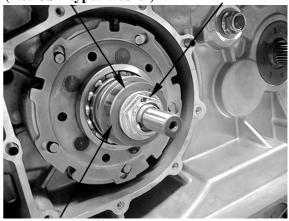
Special tool:

Y-type holder A120E00056

Lock nut wrench (Not USA type)

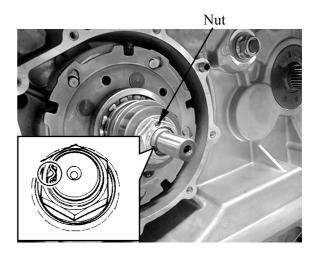
A120F00067

(Not USA type: Washer)



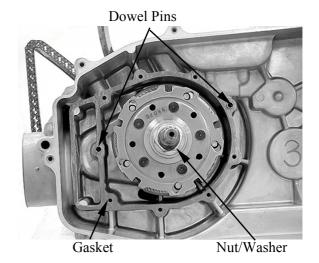
(USA type: Collar)

Stake the nut with a center punch.



10. DRIVE PULLEY/DRIVEN PULLEY/CLUTCH MXU 500

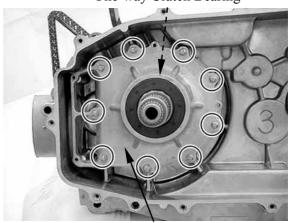
Install the dowel pins and gasket.



Apply molybdenum disulfide grease to the one-way clutch bearing, then install it. Install the clutch housing and tighten the bolts to the specified torque in a crisscross pattern in 2-3 steps.

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

One-way Clutch Bearing



Clutch Housing Assembly

CLUTCH DISASSEMBLY/INSPECTION/ **ASSEMBLY**

DISASSEMBLY

Remove the clutch housing and clutch carrier assembly (refer to the "CLUTCH REMOVAL/INSTALLATION" section in this chapter).

Remove the one-way clutch bearing from the clutch housing.

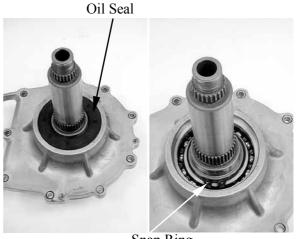


One-way Clutch Bearing

Clutch housing removal (not USA type):

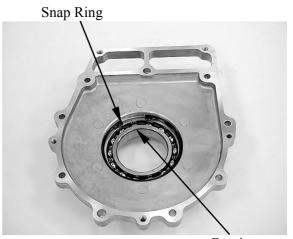
Remove the oil seal.

Remove the snap ring, then remove the clutch housing.



Snap Ring

Remove the snap ring, then remove the bearing.



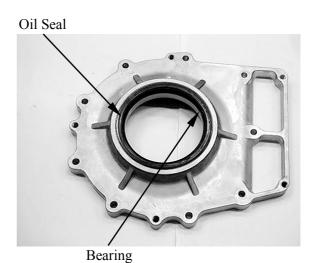
Bearing

Clutch housing removal (USA type):

Remove the clutch housing.



Remove the oil seal, then remove the bearing.



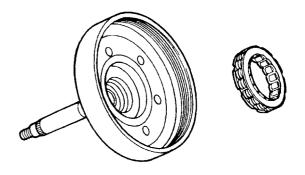
INSPECTION

Check the clutch housing for heat damage, wear or damage.

Check the one-way clutch bearing for chafing, wear or damage.



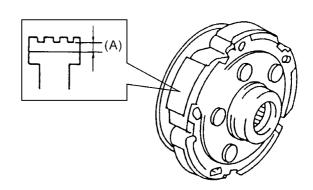
Replace the one-way clutch assembly and clutch housing as a set.



Check the clutch shoe for heat damage.

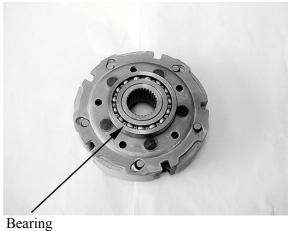
Measure the clutch shoe thickness.

Service limit (A): 1 mm (0.04 in)



Only USA type:

Turn the crankshaft bearing for smoothly and check for excessive play.



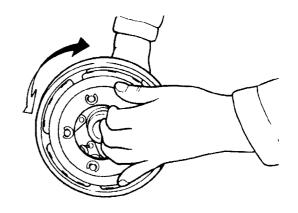


Check operation (not USA type):

Install the one-way clutch bearing and clutch carrier assembly to the clutch housing and hold the clutch carrier assembly.

When turning the clutch housing clockwise, the clutch housing should turn freely. If not, the one-way clutch assembly is faulty. Replace it.

When turning the clutch housing counterclockwise, the clutch hosing and crankshaft should be engaged. If not, the one-way clutch assembly is faulty. Replace it.



Check operation (USA type):

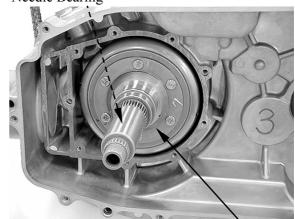
Install the one-way clutch bearing and collar to the clutch housing and hold the collar.

When turning the clutch housing clockwise, the clutch housing should turn freely. If not, the one-way clutch assembly is faulty. Replace it.

When turning the clutch housing counterclockwise, the clutch hosing and crankshaft should be engaged. If not, the one-way clutch assembly is faulty. Replace it.

Install the clutch housing to the crankshaft. When turning the clutch housing clockwise or counterclockwise, the clutch housing should turn smoothly. If not, the needle bearing or the clutch housing is damage, then replace the clutch housing.





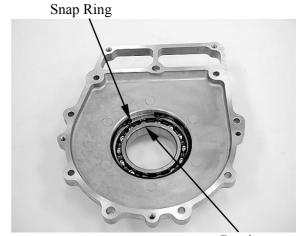
Clutch Housing

ASSEMBLY

Clutch housing installation (not USA type):

Apply clean engine oil, then install the new bearing.

Install the snap ring.

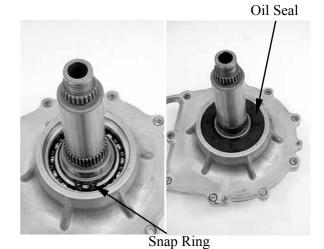


Bearing

Install the clutch housing.

Install the snap ring.

Apply lightweight lithium-soap base grease to the new oil seal lip, then install the new oil seal.



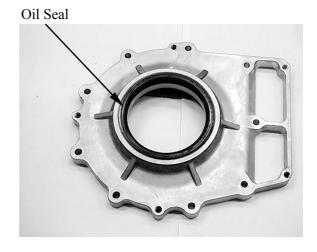
Clutch housing installation (USA type):

Apply clean engine oil, then install the new bearing.

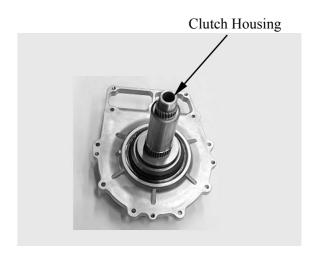


Bearing

Apply lightweight lithium-soap base grease to the new oil seal lip, then install the new oil seal.



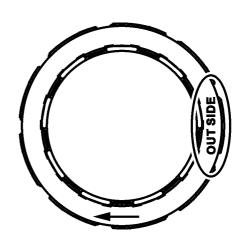
Install the clutch housing.



One-way clutch bearing installation:

Install the one-way clutch bearing into the clutch housing.

The one-way clutch bearing should be installed in the clutch carrier assembly with the arrow mark and "OUT SIDE" mark facing toward the clutch carrier assembly.



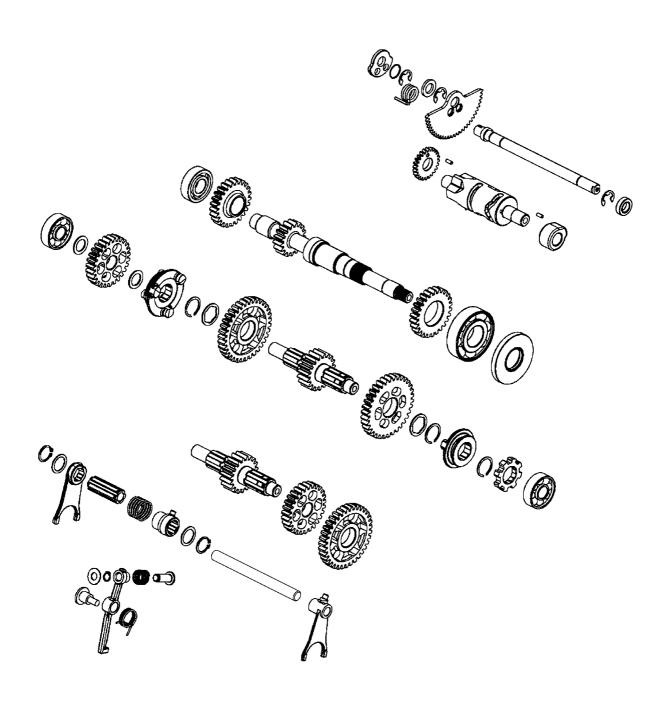


| INAL REDUCTION/TRANSMISSION SY | |
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| SERVICE INFORMATION | 11- 2 |
| SERVICE INFORMATION TROUBLESHOOTING | 11- 2 |
| SERVICE INFORMATION TROUBLESHOOTING SECONDARY DRIVE/DRIVEN BEVEL GEAR | 11- 2 11- 2 |
| SERVICE INFORMATION TROUBLESHOOTING SECONDARY DRIVE/DRIVEN BEVEL GEAR REMOVAL/INSPECTION/INSTALLATION | 11- 2 11- 2 11- 3 |
| SERVICE INFORMATION TROUBLESHOOTING SECONDARY DRIVE/DRIVEN BEVEL GEAR REMOVAL/INSPECTION/INSTALLATION SECONDARY GEAR SHIMS ADJUSTMENT | 11- 2 11- 2 11- 3 11- 8 |
| SERVICE INFORMATION TROUBLESHOOTING SECONDARY DRIVE/DRIVEN BEVEL GEAR REMOVAL/INSPECTION/INSTALLATION | 11- 2 11- 2 11- 3 11- 8 |

COUNTERSHAFT DISASSEMBLY/ASSEMBLY/INSPECTION-- 11-27

11







SERVICE INFORMATION

GENERAL INSTRUCTIONS

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

SPECIAL TOOL

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

TORQUE VALUES

Crankcase bolt
Drive bevel gear nut
Driven bevel gear nut
Stopper lever bolt
Shift cam stopper plug

1.2 kgf-m (12 N-m, 8.6 lbf-ft)
Apply engine oil
14 kgf-m (140 N-m, 100.8 lbf-ft)
Apply engine oil
14 kgf-m (140 N-m, 100.8 lbf-ft)
Apply engine oil
15 kgf-m (30 N-m, 21.6 lbf-ft)
Apply engine oil
16 kgf-m (30 N-m, 100.8 lbf-ft)
Apply engine oil
17 kgf-m (140 N-m, 100.8 lbf-ft)
Apply engine oil
18 kgf-m (140 N-m, 100.8 lbf-ft)
Apply engine oil
19 kgf-m (140 N-m, 100.8 lbf-ft)
Apply engine oil
19 kgf-m (140 N-m, 100.8 lbf-ft)
Apply engine oil
10 kgf-m (140 N-m, 100.8 lbf-ft)
Apply engine oil
11 kgf-m (140 N-m, 100.8 lbf-ft)
Apply engine oil
12 kgf-m (140 N-m, 100.8 lbf-ft)
Apply engine oil
14 kgf-m (140 N-m, 100.8 lbf-ft)
Apply engine oil
14 kgf-m (140 N-m, 100.8 lbf-ft)
Apply engine oil
14 kgf-m (140 N-m, 100.8 lbf-ft)
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14 kgf-m (140 N-m, 100.8 lbf-ft)
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14 kgf-m (140 N-m, 100.8 lbf-ft)
Apply engine oil
14 kgf-m (140 N-m, 100.8 lbf-ft)
Apply engine oil
15 kgf-m (140 N-m, 100.8 lbf-ft)
Apply engine oil
16 kgf-m (140 N-m, 100.8 lbf-ft)
Apply engine oil
17 kgf-m (140 N-m, 100.8 lbf-ft)
Apply engine oil
18 kgf-m (140 N-m, 100.8 lbf-ft)
Apply engine oil
18 kgf-m (140 N-m, 100.8 lbf-ft)
Apply engine oil

Output shaft bearing nut 11 kgf-m (110 N-m, 79.2 lbf-ft) Apply engine oil

TROUBLESHOOTING

Engine starts but motorcycle won't move

- Damaged transmission
- Seized or burnt transmission

Oil leaks

- Oil too rich
- Worn or damaged oil seal



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

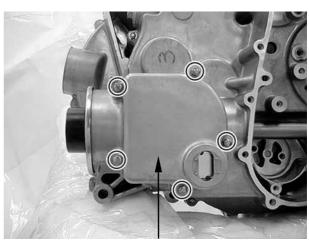
REMOVAL

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

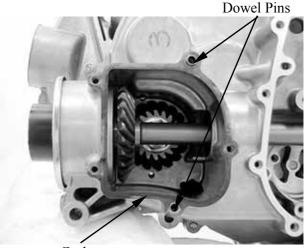
Move the engine assembly forward (refer to the "ENGINE REMOVAL" section in the chapter 6) or remove the rear propeller (refer to the "REAR PROPELLER SHAFT DISASSEMBLY/INSPECTION/ ASSEMBLY" section in the chapter 13).

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

Remove the two dowel pins and gasket.

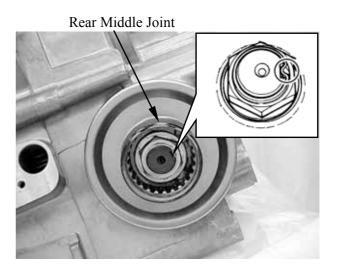


Bevel Gear Case Cover



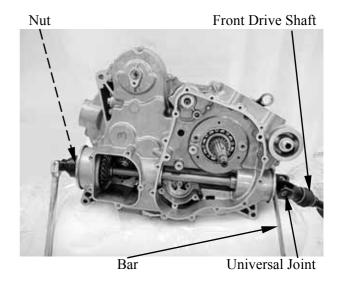
Gasket

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





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

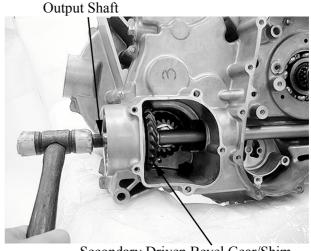


Remove the rear middle joint.



Rear Middle Joint

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



Secondary Driven Bevel Gear/Shim



Using a chisel, unlock the nut.

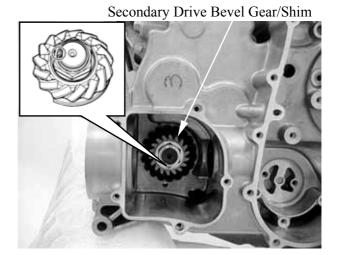
Hold the driven pulley by using the special tool (refer to the "DRIVE PULLEY, DRIVE V-BELT AND DRIVEN PULLEY REMOVAL/INSPECTION/INSTALLATIO N" section in the chapter 10), then remove the nut.

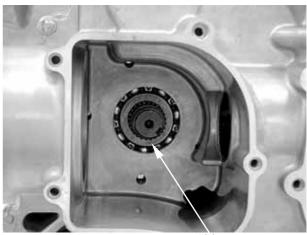
Special tool:

Y-type holder A120E00056

Remove the secondary drive bevel gear.

Remove the shim.





Shim

INSPECTION

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





Inspect the rear middle joint splines for wear or damage.



Inspect the output shaft splines for wear or damage.



INSTALLATION

Install the shim and secondary drive bevel gear.

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

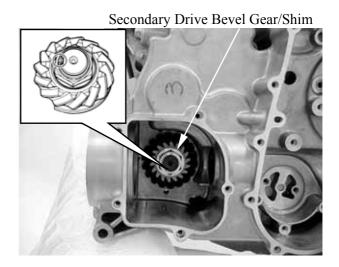
Torque:

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

Special tool:

Y-type holder A120E00056

Stake the nut with a center punch.



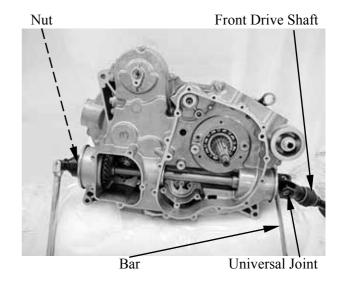


Install the output shaft, secondary driven bevel gear and shim
Install the rear middle joint.
Install the front drive shaft.
Hold universal joint nut by using a suitable bar, then install and tighten the rear middle joint nut to the specified torque.

Torque:

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

Remove the front drive shaft.

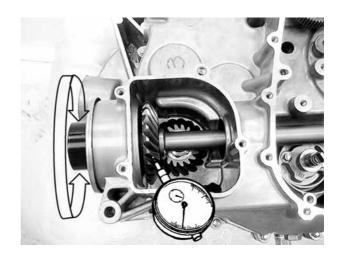




SECONDARY GEAR SHIMS ADJUSTMENT

Set a dial gauge on the driven bevel gear as shown

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



Bevel gear backlash

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

*

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

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

Drive/Driven bevel gear shims:

A: 0.6 mm (0.024 in)

B: 0.65 mm (0.026 in)

C: 0.7 mm (0.028 in)

D: 0.75 mm (0.03 in)

E: 0.8 mm (0.032 in)

F: 0.85 mm (0.034 in)

G: 0.9 mm (0.036 in)

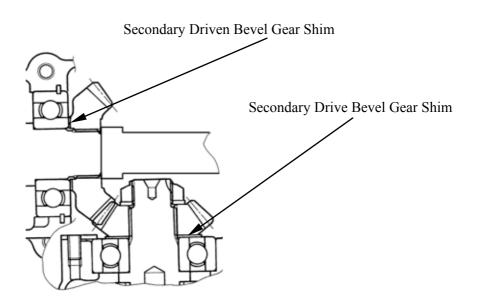
H: 0.95 mm (0.038 in)

I: 1 mm (0.04 in)

J: 1.05 mm (0.042 in)

K: 1.1 mm (0.044 in)

L: 1.15 mm (0.046 in)





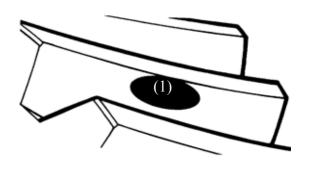
TOOTH CONTACT

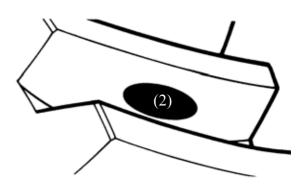
After backlash adjustment is carried out, the tooth contact must be checked. Pay attention to the following procedures:

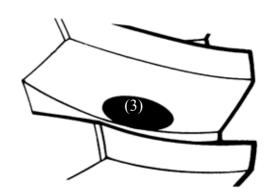
- Remove the driven bevel gear.
- Clean and degrease several teeth of the drive and driven bevel gears.
 Apply a coating of machinist's layout dye or paste to several teeth of the driven bevel gear.
- Install the driven bevel gear.
- Rotate the rear propeller shaft several turns in both directions.
- Remove the driven bevel gear and inspect the coated teeth of the drive bevel gear. The tooth contact pattern should be as shown in (1), (2) and (3).
- If tooth contact is found to be correct (example (2)), then to complete installation.
- (1): Incorrect (contact at tooth top)
- (2): Correct
- (3): Incorrect (contact at tooth root)
- If tooth contact is found to be incorrect (examples (1) and (3)), the shim thickness between the drive bevel gear and driven bevel gear must be changed and the tooth contact rechecked until correct.



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







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



RIGHT CRANKCASE REMOVAL/INSTALLATION

REMOVAL

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

Remove the stopper plug and washer.

Stopper Plug

Remove the spring and shift cam stopper.



Remove the four bolts from left crankcase.



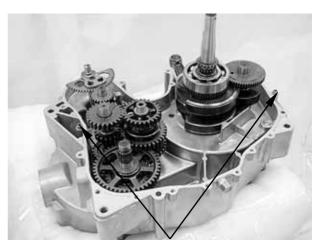
Remove the fifteen bolts from right crankcase.



Remove the two dowel pins.

INSTALLATION

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



Dowel Pins

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

Torque:

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





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

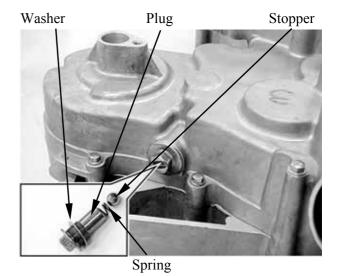
Torque:

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



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

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



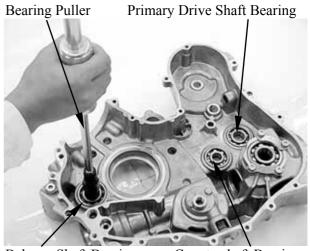
BEARING REPLACEMENT IN THE RIGHT CRANKCASE

BALANCE SHAFT/COUNTERSHAFT/ PRIMARY DRIVE SHAFT BEARING REPLACEMENT

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

Special tool:

Bearing puller A120E00037



Balance Shaft Bearing

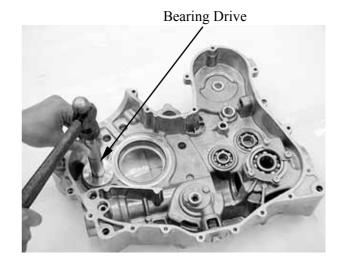
Countershaft Bearing



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

Special tool:

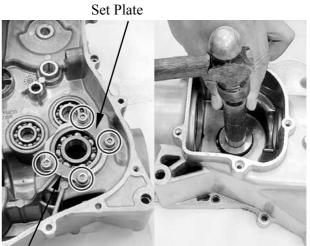
Bearing driver A120E00014



DRIVE SHAFT BEARING REPLACEMENT

Remove the four bolts and two set plates.

Remove the bearing.



Set Plate

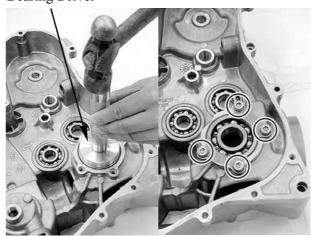
Install the new bearing by using the special tool.

Special tool:

Bearing driver A120E00014

Install the set plates and tighten the new bolts.

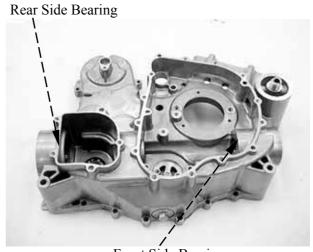
Bearing Driver





OUTPUT SHAFT FRONT/REAR BEARING REPLACEMENT

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



Front Side Bearing

REAR SIDE BEARING

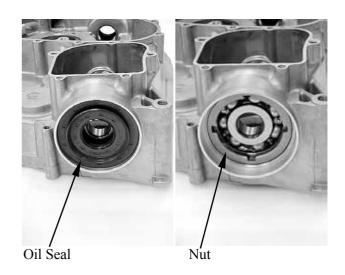
Remove the oil seal.

Remove the nut by using the special tool.

Special tool:

Nut wrench

A120E00066



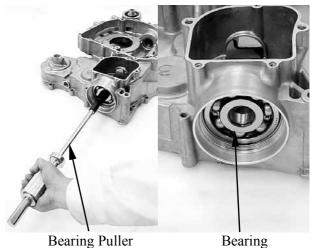
Remove the bearing by using the special tool.

Special tool:

Bearing Puller

A120E00037

Install the new bearing.





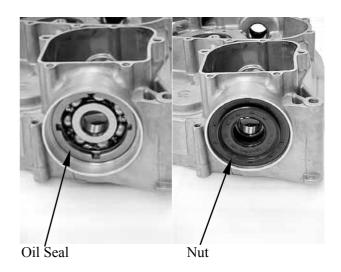
Install and tighten the nut to the specified torque by using the special tool.

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

Special tool:

Nut wrench A120E00066

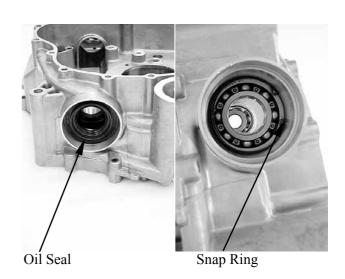
Apply clean engine oil to the new oil seal lip then install the oil seal.



FRONT SIDE BEARING

Remove the oil seal.

Remove the snap ring.



Remove the bearing by using the special tool.

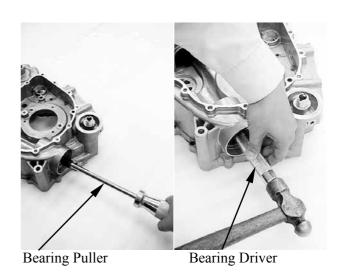
Special tool:

Bearing Puller A120E00037

Install the new bearing by using the special tool.

Special tool:

Bearing driver A120E00014

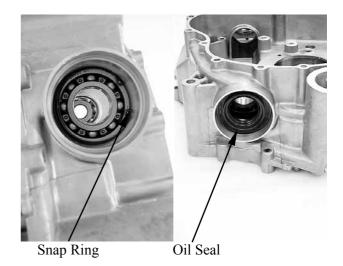


11-15-



Install the snap ring.

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



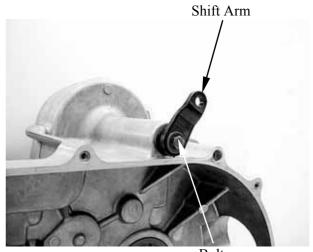


TRANSMISSION REMOVAL/INSPECTION/INSTALLATION

REMOVAL

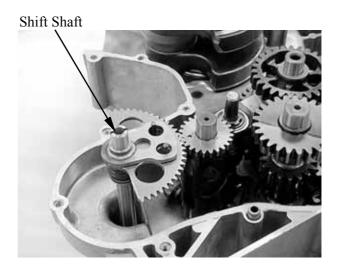
Remove the bolt and then remove the shift arm.

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



Bolt

Remove the shift shaft.

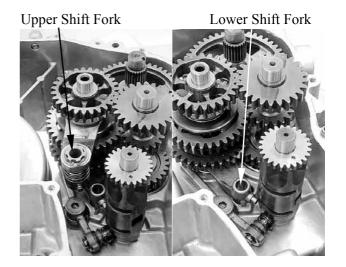


Remove the transmission guide bar.

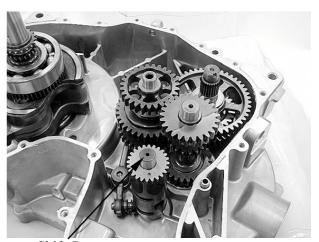




Remove the upper shift fork. Remove the lower shift fork.



Remove the shift cam.



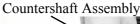
Shift Cam

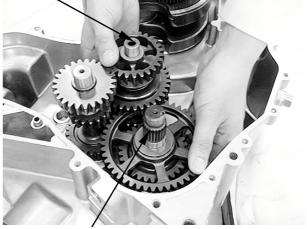
Remove the countershaft and driveshaft as an assembly.

Disassemble the countershaft and the driveshaft.



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



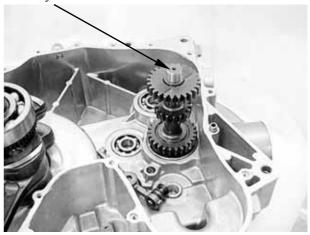


Driveshaft Assembly

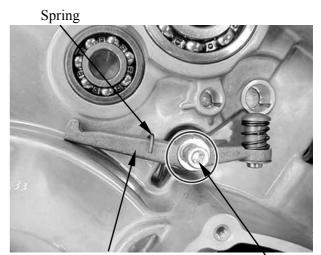


Remove the primary drive shaft.





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



Stopper Lever

Bolt/Washer

INSPECTION

Guide bar

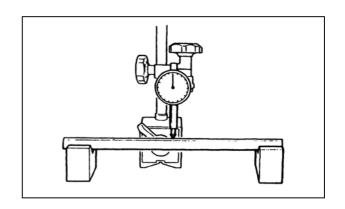
Measure the guide bar runout. Out of specification \rightarrow Replace.

Service Limit:

Less than 0.03 mm (0.0012 in)

*

Do not attempt to straighten a bent guide bar.





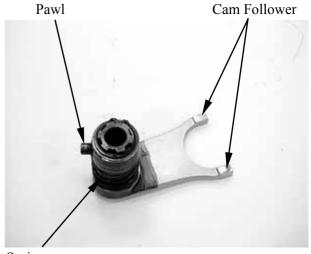
Upper shift fork

Inspect the shift fork cam follower and shift fork pawl.

Scoring/beads/wear \rightarrow Replace a set.

Inspection the spring.

Cracks or damage→ Replace a set..

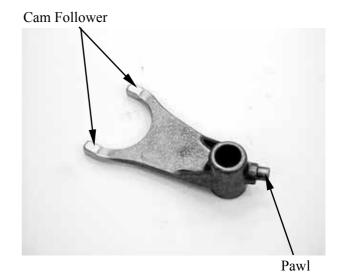


Spring

Lower shift fork

Inspect the shift fork cam follower and shift fork pawl.

Scoring/beads/wear \rightarrow Replace.



Primary drive shaft

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

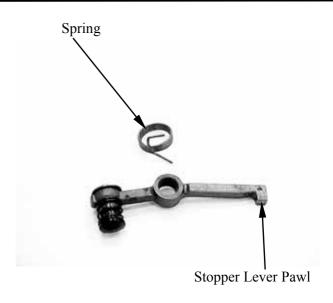




Stopper lever

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

Inspect the spring for cracks or damage.



Check the shift cam groove and shift cam gear.

Wear or damage \rightarrow Replace.



Inspect shift shaft gear.

Damage → Replace.

Inspect shift shaft.

Damage/bends/wear → Replace.

Check the return spring for fatigue or damage.



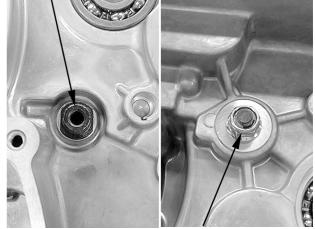


INSTALLATION

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

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

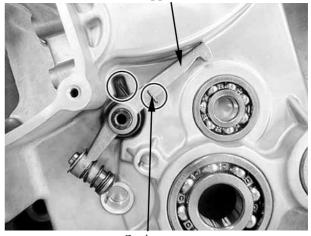




Nut

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

Stopper Lever

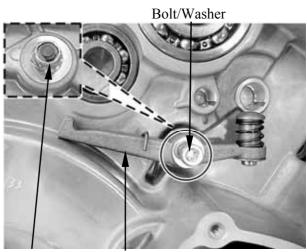


Spring

Install the washer and a new bolt.

Tighten the bolt to the specified torque while holds the shaft nut in the drive V-belt compartment.

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



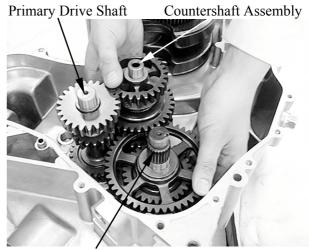
Shaft Nut Stopper Lever

11.FINAL REDUCTION/ TRANSMISSION SYSTEM

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

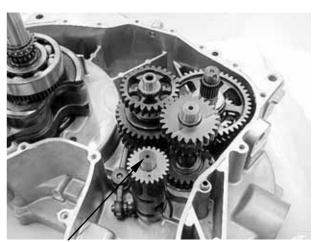
Install the primary drive shaft.

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



Drive shaft Assembly

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

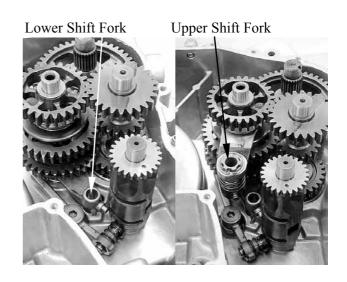


Shift Cam

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

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

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



11.FINAL REDUCTION/ TRANSMISSION SYSTEM



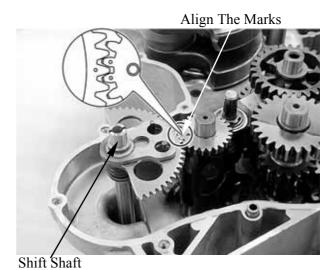
Apply clean engine oil to the guide bar, install the guide bar.



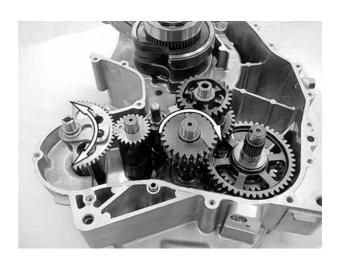
Install the shift shaft.

*

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



Check the transmission operation. Unsmooth operation \rightarrow Repair.





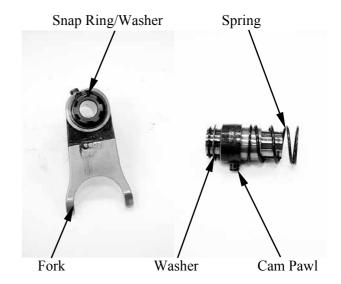
UPPER SHIFT FORK DISASSEMBLY/ASSEMBLY

DISASSEMBLY

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

Remove the snap ring, washer and fork.

Remove the spring, cam pawl and washer.

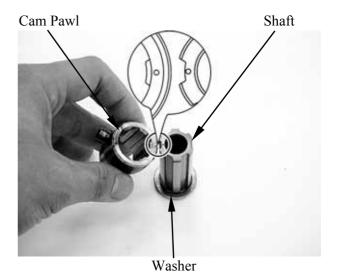


ASSEMBLY

Install the washer and cam pawl.

*

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

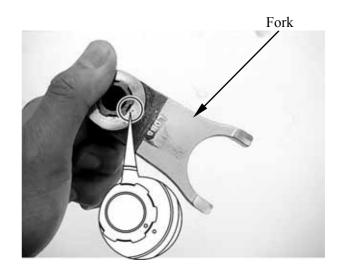


Install the spring. Install the fork.



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

Install the washer and snap ring.



11.FINAL REDUCTION/ TRANSMISSION SYSTEM



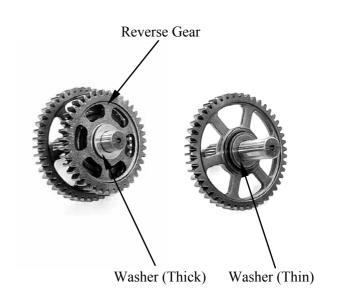
DRIVE SHAFT DISASSEMBLY/ASSEMBLY/ INSPECTION

DISASSEMBLY

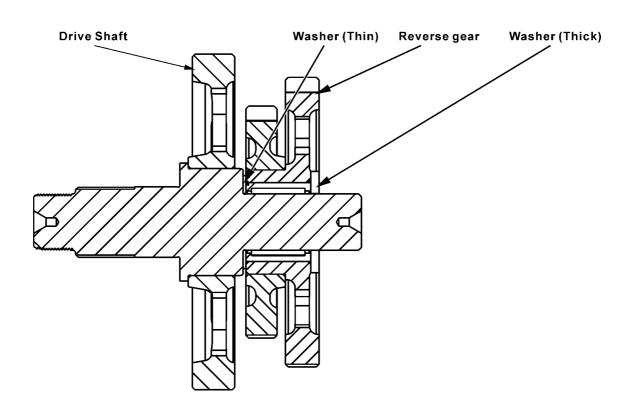
Remove the drive shaft assembly (refer to the "TRANSMISSION REMOVAL/INSPECTION/INSTALLATION" section in this chapter).

Remove the washer (thick) and reverse gear.

Remove the washer (thin).



ASSEMBLY/INSPECTION



Inspect the gear teeth. Blue discoloration/pitting/wear \rightarrow Replace.

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



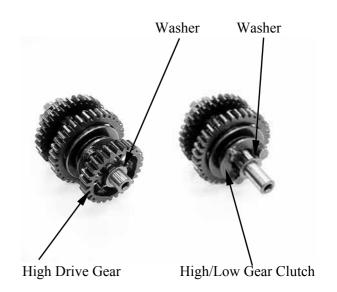
COUNTERSHAFT DISASSEMBLY/ASSEMBLY/ INSPECTION

DISASSEMBLY

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

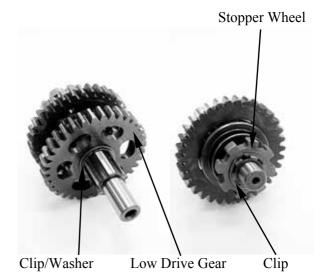
Remove the washer and high drive gear.

Remove the high/low gear clutch dog



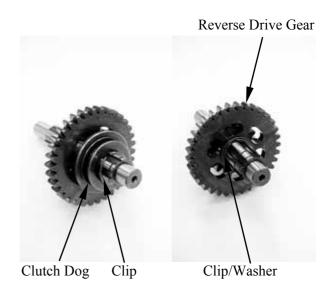
Remove the clip, then remove the washer and low drive gear.

Remove the clip, then remove the stopper wheel.



Remove the clip, then remove reverse gear clutch dog.

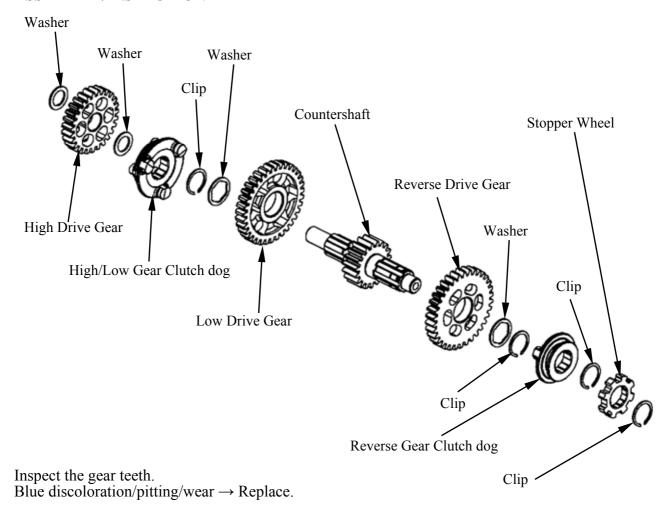
Remove the clip, then remove the washer and reverse drive gear.



11.FINAL REDUCTION/ TRANSMISSION SYSTEM



ASSEMBLY/INSPECTION



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



12.LEFT CRANKSCASE/CRANKSHAFT/ BALANCE SHAFT

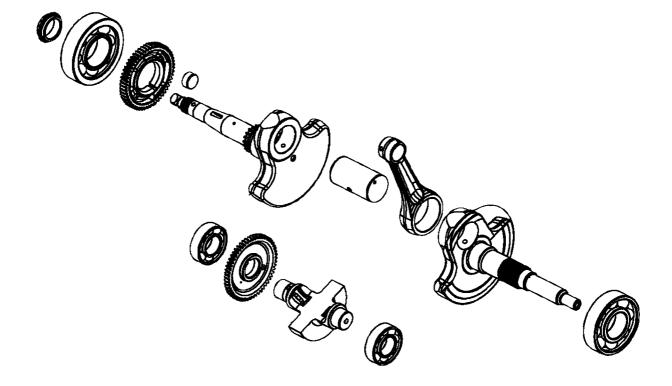
MXU 500

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

12



MXU 500





12.LEFT CRANKSCASE/CRANKSHAFT/ BALANCE SHAFT

MXU 500

SERVICE INFORMATION

GENERAL INSTRUCTIONS

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

SPECIFICATIONS Unit: mm (in)

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

TROUBLESHOOTING

Excessive engine noise Excessive bearing play



12.LEFT CRANKCASE/CRANKSHAFT/ BALANCE SHAFT

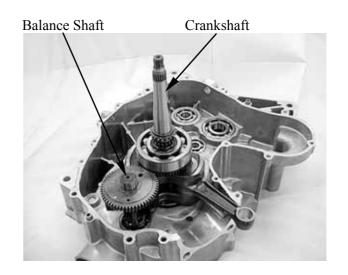
MXU 500

CRANKSHAFT AND BALANCE SHAFT REMOVAL/INSPECTION/ INSTALLATION

REMOVAL

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

Remove the crankshaft and balance shaft together.



INSPECTION

Balance shaft

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



Crankshaft inspection

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

Measure the connecting rod small end I.D.

Service Limit (replace if over):

22.06 mm (0.8824 in)





12.LEFT CRANKSCASE/CRANKSHAFT/ BALANCE SHAFT

MXU 500

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

Out of specification:

 $0.8 \sim 1 \text{ mm } (0.032 \sim 0.04 \text{ in})$ $\rightarrow \text{Replace the crankshaft.}$

Measure the crankshaft run out (B).

Service Limit (replace if over):

0.1 mm (0.004 in)

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

Service Limit (replace if over):

Not USA type: 0.6 mm (0.024 in) USA type: 0.8 mm (0.032 in)

Measure the crank width (D).

Out of specification:

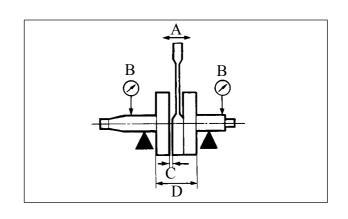
 $72 \sim 72.05$ mm (2.88 ~ 2.882 in) \rightarrow Replace the crankshaft.

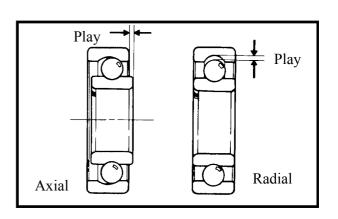
Turn the crankshaft bearings and check for excessive play.

Measure the crankshaft bearing play.

Service Limit (replace if over):

Axial : 0.2 mm (0.008 in) Radial : 0.05 mm (0.002 in)







12.LEFT CRANKCASE/CRANKSHAFT/ BALANCE SHAFT

MXU 500

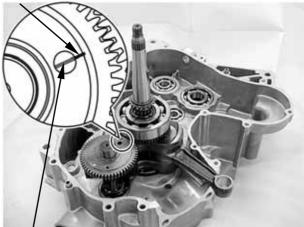
INSTALLATION

Install the balance shaft and crankshaft into the left crankcase.

*

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

Mark (on the Balance Shaft)



Mark (on the Crankshaft)



12.LEFT CRANKSCASE/CRANKSHAFT/ BALANCE SHAFT

MXU 500

BEARING/OIL SEAL REPLACEMENT IN THE LEFT CRANKCASE

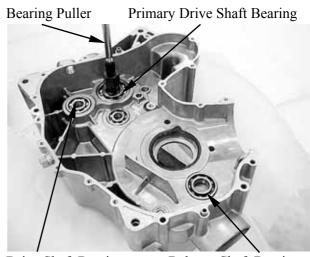
BALANCE SHAFT/COUNTERSHAFT/ PRIMARY DRIVE SHAFT/BALANCE SHAFT BEARING REPLACEMENT

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

Special tool:

Bearing puller

A120E00037



Drive Shaft Bearing

Balance Shaft Bearing

Install the new bearing by using the special tool.

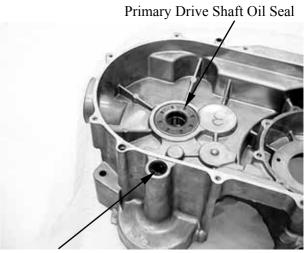
Special tool:

Bearing driver

A120E00014



Check the oil seals Wear or damage → replace



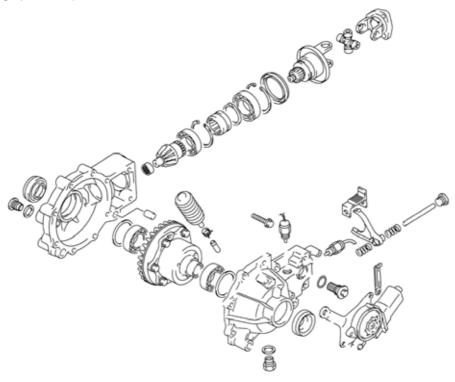
Shift Shaft Oil Seal



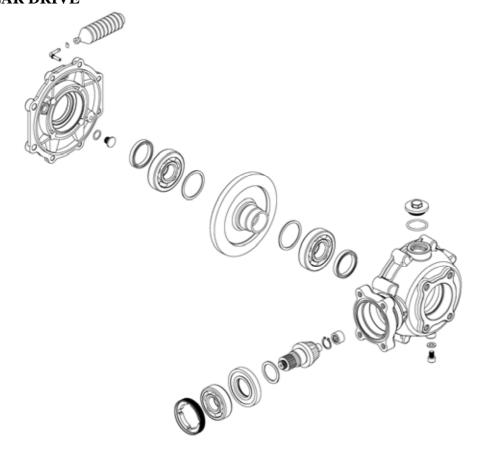
DRIVE TRAIN SERVICE INFORMATION------ 13- 2 TROUBLESHOOTING------ 13- 2 FRONT DRIVE SHAFT REMOVAL/INSPECTION/ INSTALLATION ----- 13- 3 FRONT DRIVE SHAFT DISASSEMBLY/INSPECTION/ ASSEMBLY ------ 13- 5 FRONT DRIVE REMOVAL/INSPECTION/INSTALLATION----- 13-11 FRONT DRIVE DISASSEMBLY/INSPECTION/ASSEMBLY----- 13-14 FRONT DRIVE SHIM ASJUSTMENT ----- 13-32 REAR DRIVE REMOVAL/INSPECTION/INSTALLATION ----- 13-36 REAR DRIVE DISASSEMBLY/INSPECTION/ASSEMBLY ----- 13-40 REAR DRIVE SHIM ADJUSTMENT ------ 13-51 FRONT PROPELLER SHAFT DISASSEMBLY/INSPECTION/ ASSEMBLY------ 13-56 REAR PROPELLER SHAFT DISASSEMBLY/INSPECTION/ ASSEMBLY ------ 13-61



FRONT DRIVE



REAR DRIVE





SERVICE INFORMATION

GENERAL INSTRUCTIONS

- Too little backlash is extremely destructive to the gear teeth. If a test ride following reassembly indicates this condition, stop riding immediately to minimize gear damage.
- Stop riding immediately if broken gear teeth are suspected. This condition could result in the shaft drive assembly locking up, causing loss of control of the machine and possible injury to the rider.
- An apparent oil leak on a new or nearly new machine may be the result of a rust-preventative coating or excessive seal lubrication.
- Always clean the machine and recheck the suspected location of an apparent leakage.

TORQUE VALUES

Front drive gear case mounting bolt 4 kgf-m (40 Nm, 29 lbf-ft) Front propeller shaft bolt 4.5 kgf-m (45 N-m, 32.4 lbf-ft)

Shifting fork shaft plug
1.5 kgf-m (15 N-m, 11 lbf-ft) Apply threebond: 1215
Front drive gear case bolt
2.3 kgf-m (23 N-m, 16.5 lbf-ft) Apply threebond: 1215
2WD/4WD shift motor mounting bolt (M8) 2.3 kgf-m (23 N-m, 16.5 lbf-ft) Apply threebond: 1215

2WD/4WD shift motor mounting bolt (M6) 1.2 kgf-m (12 N-m, 8.5 lbf-ft) Rear drive gear case mounting nut 5.5 kgf-m (55 Nm, 40 lbf-ft)

Rear drive gear case bolt (M10) 5 kgf-m (49 N-m, 36 lbf-ft) Apply threebond: 1215 Rear drive gear case bolt (M8) 5 kgf-m (25 N-m, 19 lbf-ft) Apply threebond: 1215

SPECIAL TOOLS

| Oil seal & bearing installer | A120E00014 |
|------------------------------|------------|
| Bearing puller | A120E00037 |
| Joint yoke remover | A120F00016 |
| Drive shaft puller | A120F00017 |
| Yoke bearing puller | A120F00018 |
| Pinion puller set | A120F00021 |
| Bearing lock nut wrench | A120F00020 |
| | |

TROUBLESHOOTING

- 1. A pronounced hesitation movement during acceleration, deceleration, or sustained speed. (This must not be confused with engine surging or transmission characteristics.)
- 2. A "rolling rumble" noticeable at low speed; a high-pitched whine from front drive component or area.
- 3. A locked-up condition of the shaft drive train mechanism, no power transmitted from the engine to the front and /or rear wheel.
- Bearing damage
- Improper backlash
- Gear tooth damage
- Broken propeller shaft
- Broken gear teeth
- Seizure due to lack of lubrication
- Small foreign objects lodged between the moving parts.



FRONT DRIVE SHAFT REOMVAL/INSPECTION/ INSTALLATION

REMOVAL

Remove the steering knuckle (refer to the "STEERING KNUCKLE REMOVAL/INSPECTION/ INSTALLATION" section in the chapter 14).

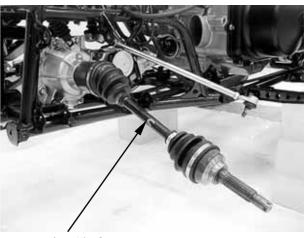
Remove the front drive shaft from front drive assembly.



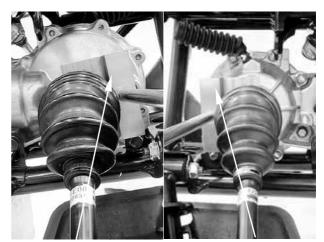
If it is difficult to remove the front drive shaft by hand, use the special tools.

Special tool:

Drive shaft remover A120F00017



Front Drive Shaft



Special Tool

Special Tool

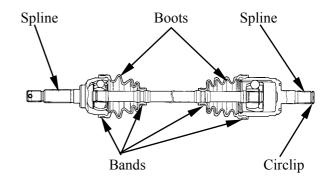
INSPECTION

Inspect the boots, circlip and boot bands for wear or damage.

If any damages are found, replace them with new ones.

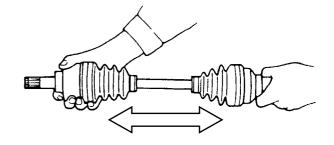
Inspect the double off-set joint spline for wear or damage.

If any damages are found, replace them with new ones.



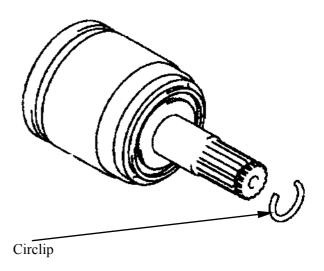


Inspect the free play by using a push-and-pull motion (thrust movement). Excessive play → Replace the joint assembly.



INSTALLATION

Install a new circlip into its groove in the splines.



Apply lightweight lithium-soap base grease to the splines of the drive shafts and install the drive shaft to the front drive gear case.



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



Case Side Joint

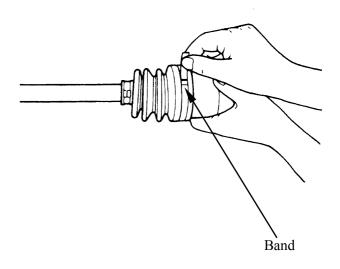


FRONT DRIVE SHAFT DISASSEMBLY/INSPECTION/ **ASSEMBLY**

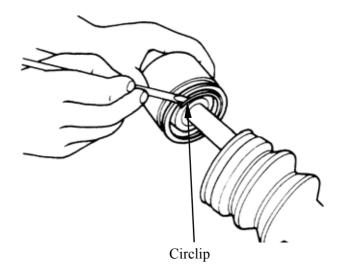
DISASSEMBLY

Remove the front drive shaft (refer to the "FRONT DRIVE SHAFT REOMVAL/INSPECTION/ **INSTALLATION**" section in this chapter)

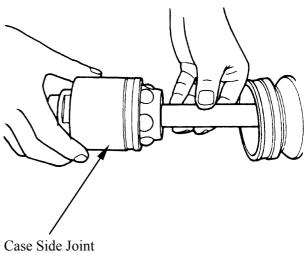
Remove the boot band of the case side joint.



Slide the boot toward the center of the front drive shaft and remove the circlip from the case side joint.

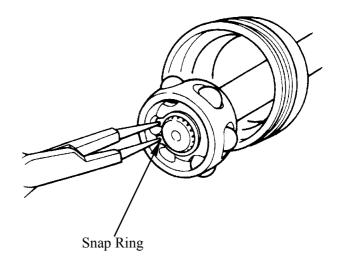


Separate the case side joint from the front drive shaft.





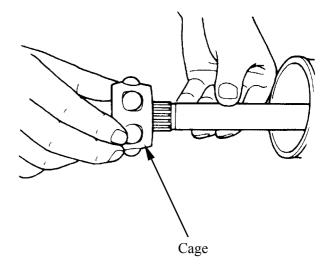
Wipe off any grease and remove the snap ring from the groove on the front drive shaft.



Remove the cage and boot from the front drive shaft.



Do not disassemble the wheel side joint. If any damages are found, replace the wheel side joint with a new one.

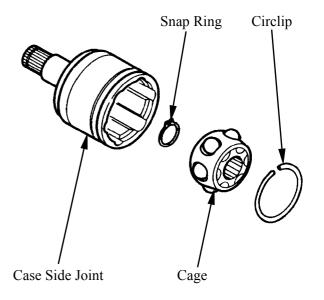


INSPECTION

Inspect the circlip and snap ring for wear or damage.

If any damages are found, replace them with new ones.

Inspect the cage and inner surface of case side joint for pitting, wear or damage. If any damages are found, replace them with new ones.





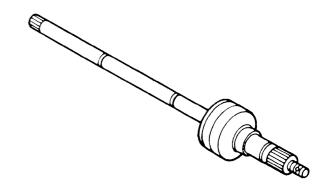
Inspect the front drive shaft spline for wear or damage.

If any damages are found, replace them with a new one.

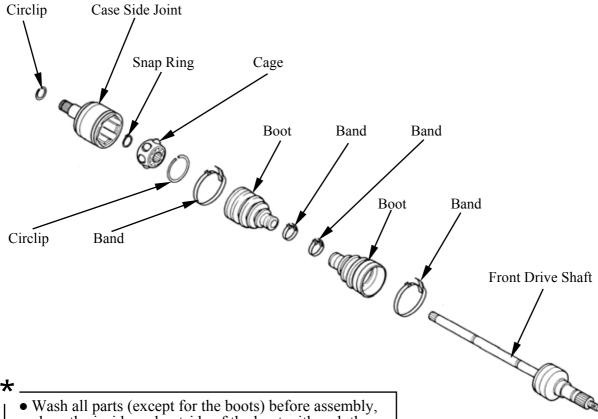
Inspect the front drive shaft for bends. If any damages are found, replace them with a new one.



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



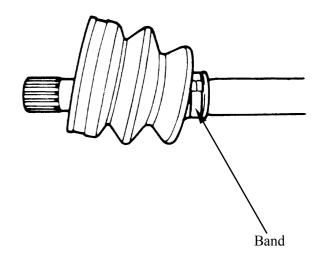
ASSEMBLY



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



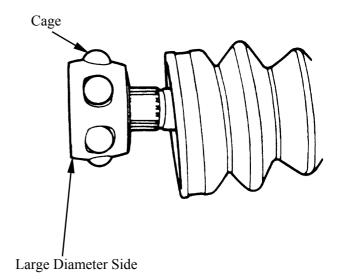
Fit a boot on the drive shaft end, fitting the small diameter side of the boot to the shaft groove, fix its end with a new band.



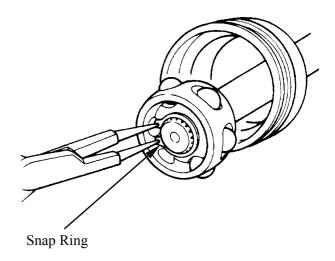
Install the cage on the shaft.

*

Install the cage with the large diameter side facing the shaft end.



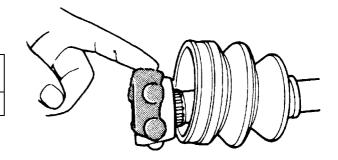
Install the snap ring to the groove on the drive shaft.





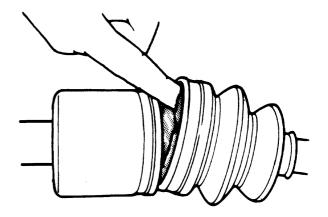
Apply molybdenum disulfide grease to the entire surface of the cage and the inside of the case side joint/wheel side joint.

| Position Grease | Case side joint | Wheel side joint |
|--------------------|-----------------|------------------|
| Quantity | 85 g (2.8 oz) | 45 g (1.5 oz) |



*

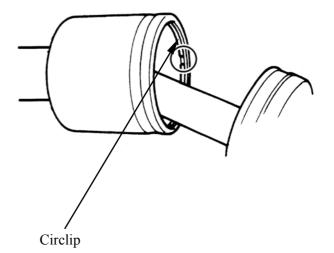
The tube of joint molybdenum disulfide grease is included in the wheel side boot set or wheel side joint assembly of spare parts.



Insert the cage into the case side joint and fit a circlip in the groove of the case side joint.



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



13. DRIVE TRAIN

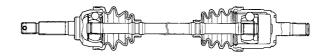


After fitting the boot on the case side joint, insert a screw driver into the boot on the case side joint and allow air to enter the boot so that the air pressure in the boot becomes the same as the atmospheric pressure.

Fix the boot on the case side joint with a new boot band, taking care not distort the boot.



The dust boots should be fastened with the boot bands at the grooves in the drive shaft.





FRONT DRIVE REMOVAL/INSPECTION/INSTALLATION

REMOVAL

Drain the front drive gear oil (refer to the "FRONT DRIVE GEAR OIL" in the chapter 3).

Remove the steering knuckle (refer to the "STEERING KNUCKLE REMOVAL/INSPECTION/ **INSTALLATION**" section in the chapter

Remove the front upper arms and front lower arms (refer to the "FRONT ARMS INSPECTION/REMOVAL/ **INSTALLATION**" section in the chapter 14).

Remove the drive shafts (refer to the "FRONT DRIVE SHAFT REOMVAL/INSPECTION/ **INSTALLATION**" section in this chapter).

Disconnect the following wire connectors
• 2WD indicator wire connector

- 2WD/4WD motor wire connector
- 4WD indicator wire connector

Then cut the wire rubber band.



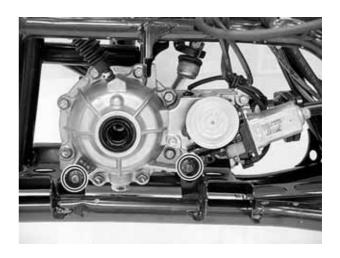


Remove the three bolts from front propeller shaft.



Front Propeller Shaft

Remove two front drive case mounting bolts/nuts from frame, then remove the case out of the frame.



INSPECTION

Check the breather rubber case for wear or damage. Also, check that the joint of the rubber case fits tightly.





INSTALLATION

Install the front drive case into the frame.

Install and tighten the two mounting bolts/nuts to the specified torque.

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



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

*

Always install the bolts with the new ones.

Torque: 4.5 kgf-m (45 N-m, 32.4 lbf-ft)



Front Propeller Shaft

Connect all wire connectors and then install a new rubber band.

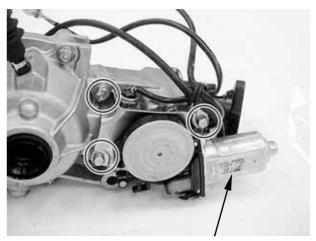




FRONT DRIVE DISASSEMBLY/INSPECTION/ASSEMBLY

Remove the front drive case assembly (refer to the "FRONT DRIVE REMOVAL/INSPECTION/INSTALLATION" section in this chapter).

Remove the three bolts and then remove the 2WD/4WD shifting motor assembly.

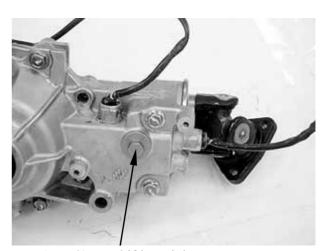


Shifting Motor Assembly

Remove the 2WD/4WD shifting pinion and O-ring by hand.

*

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



2WD/4WD shifting Pinion

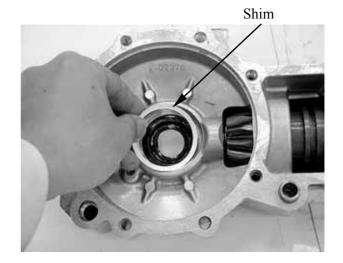
Remove the nine bolts from left gear case in a crisscross pattern.

Pry the case at the arrows as shown by using a screwdriver, then remove the right gear case.



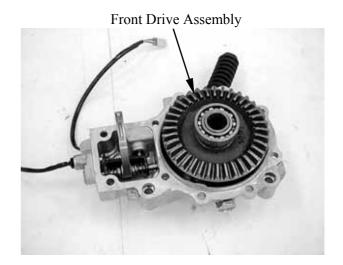


Remove the shim from right gear case.

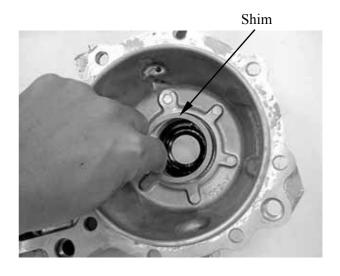


Remove the front drive assembly from the left gear case.

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



Remove the shim from the left gear case.



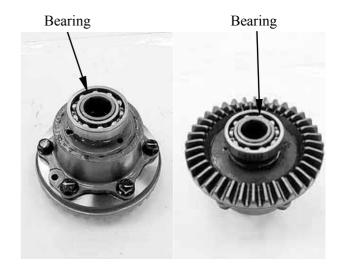


Remove the bearings from the front drive assembly by using a commercially available bearing puller.



- If there is no abnormal condition, the bearing removal is not necessary

 The removed bearing must be replaced
- with a new one.



Remove the oil seals out of the gear case.

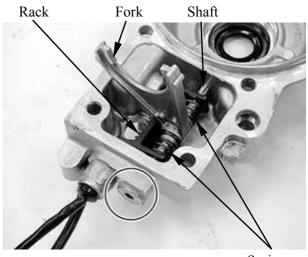


- If there is no abnormal condition, the oil seal removal is not necessary
- The removed oil seal must be replaced with a new one.



Remove the 2WD/4WD shifting fork shaft plug.

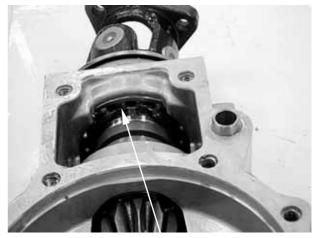
Remove the 2WD/4WD shifting fork, spring and shifting rack by removing shaft.



Springs



Remove the snap ring out of its groove and slide it towards the shifting sleeve.



Snap Ring

Remove the universal joint yoke assembly by using the special tool.

Special tool:

Joint yoke remover A120F00016



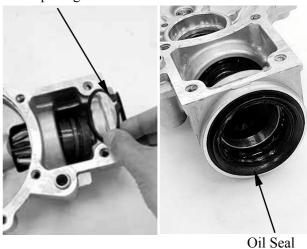
Remove the snap ring

Remove the oil seal out of the right gear case.



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







Remove the snap ring.

Remove the bearing by using the special tool.

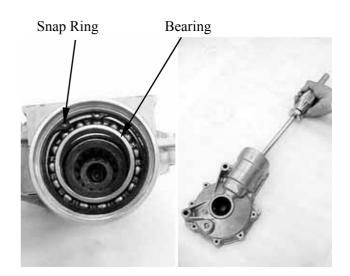
Special tool:

Yoke bearing puller

A120F00018



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

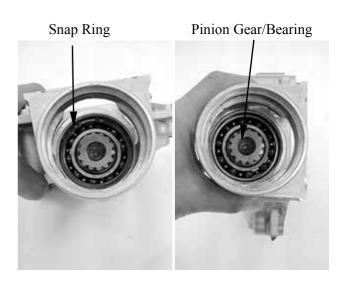


Remove the shifting sleeve.



Shifting Sleeve

Remove the snap ring. Remove the pinion gear together with the bearing.

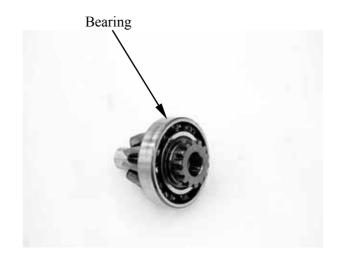




Pull the pinion bearing from the shaft with a commercially available bearing puller.

大

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



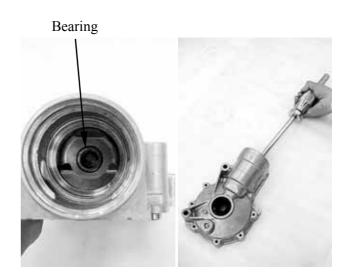
Remove the pinion gear pilot bearing by using the special tools.

Special tool:

*

Bearing puller A120E00037

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



Remove the C-rings from the universal joint by using the special tool.



Replace the removed C-ring with a new one.

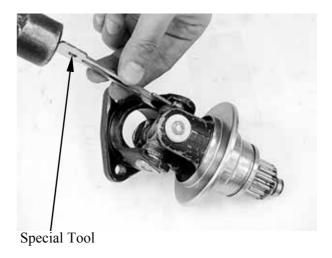
Special tool:

C-ring remover A120F00022





• Tap the C-ring out by using the special tool.



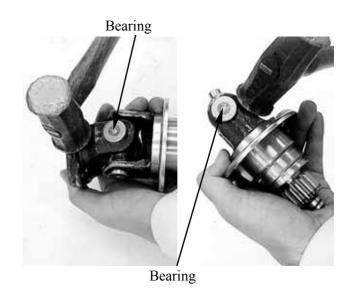
• Insert a screwdriver into the hole on the special tool, then pull it out.



Remove the bearings by tapping the universal joint with a copper hammer.



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

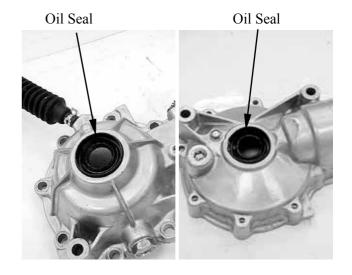




INSPECTION

Inspect the gear case and oil seals for wear or damage.

If any wear or damage is found, replace the oil seal with a new one.



Inspect the shifting fork and its rack-andpinion for wear and damage.

If any defects are found, replace the shifting fork and its rack-and-pinion with the new ones.

If the shifting fork is damaged, inspect the groove of the shifting sleeve.



Check the outer race play and smooth rotation of the bearing by hand while it is on the pinion gear shaft.

Inspect the pinion gear for wear or damage. If the pinion gear is damaged, inspect the ring gear.

If any defects are found, replace the bearing and gear with the new ones





Inspect the right gear case and oil seal for wear or damage.

If any wear or damage is found, replace the oil seal with a new one.



Check the right gear case bearing for wear or damage.

If any wear or damage is found, replace the bearing with a new one.



Check the outer race play and smooth rotation of the bearing by hand while it is on the front drive.

Inspect the ring gear for wear or damage. If the ring gear is damaged, inspect the pinion gear also.

If any defects are found, replace the bearings and ring gear with the new ones.





Inspect the splines of universal joint for wear or damage.

If any defects are found, replace the universal joint yoke with a new one.



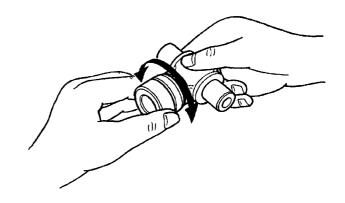
Inspect the universal joint, wear and damage.

If any defects are found, replace the bearings and universal joint as a set.



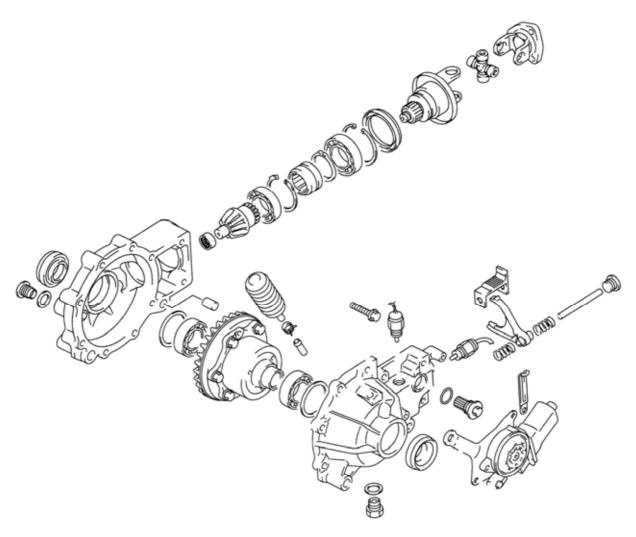
Insert the universal joint to the new bearing and check the play by turning the universal joint, as shown.

If excessive play is noted, replace the bearings and universal joint as a set.





ASSEMBLY



*

Before reassembly, thoroughly clean all parts in cleaning solvent.



Install the new bearings to the front drive.



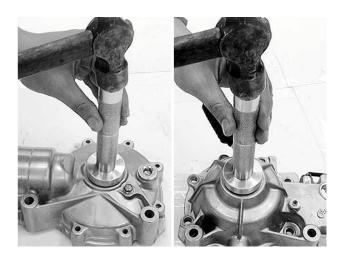


Apply lightweight lithium-soap base grease to the new oil seal lips.

Install the new oil seals into the gear cases by using the special tool.

Special tool:

Oil seal & bearing installer A120E00014

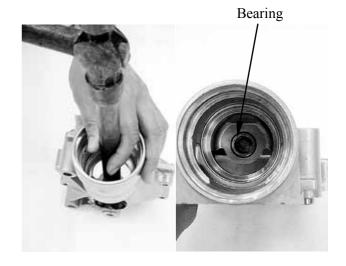


Install the new bearing onto the pinion shaft by using a proper pipe.

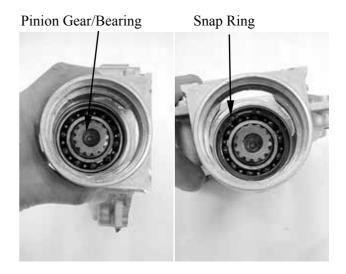




Install the new bevel pinion gear pilot bearing into the right gear case by using a proper shaft.



Install the pinion gear assembly and fix the bearing race with the snap ring.



Install the shifting sleeve to the pinion gear shaft.



Shifting Sleeve



Install the new bearing into the right gear case by using the special tool and fix it with the snap ring.

Special tool:

Oil seal & bearing installer A120E00014



Install the new oil seal into the right gear case.

Apply 4-5 g (0.13-0.17 oz) of lightweight lithium-soap base grease to the outside of seal lip groove.

Apply lightweight lithium-soap base grease to the bearing and dust seal lip



Apply grease to the new bearings. Install the universal joint and new bearings. Install the C-rings by tapping with a copper hammer.





After reassembling the universal joint, check the joint movement smoothly. If a large resistance is felt to movement, tap the bearing with a plastic mallet lightly.



Before install the universal joint yoke assembly, place the snap ring between the shifting sleeve and splines of universal joint.



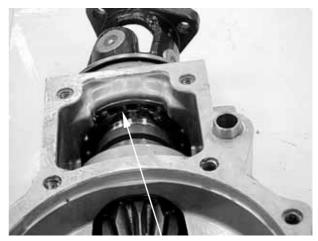
Snap Ring

Install the universal joint yoke assembly by tapping with a plastic mallet.





Fix the universal joint yoke with the snap ring.

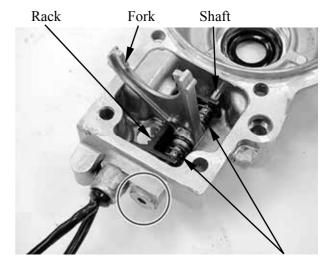


Snap Ring

Install the 2WD/4WD shifting fork, springs and shifting rack as shown.

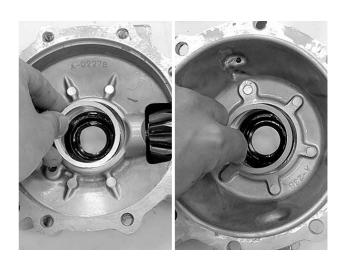
Apply sealant (three bond: 1215) to the shifting fork shaft plug and tighten it to the specified torque.

Torque: 1.5 kgf-m (15 N-m, 11 lbf-ft)



Springs

Install the removed shims to the gear case and its case.

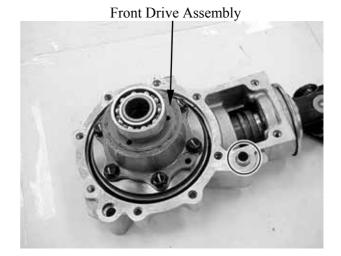




Install the front drive to the right gear case. Install the dowel pin and apply a sealant (threebond: 1215) to the mating surface of the case.



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



When installing the left gear case, align the shifting fork with its groove.



Apply three bond: 1215 to the case bolts and tighten them to the specified torque in a crisscross pattern in 2 or 3 steps.

Torque: 2.3 kgf-m (23 N-m, 16.5 lbf-ft)

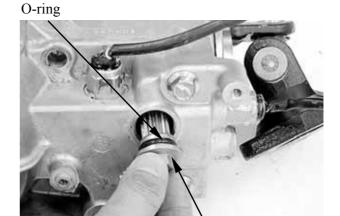


- After the backlash and tooth contact have been checked or adjusted, apply three bond: 1215 to the case bolts.
- It is important to turn the pinion while tightening the bolts. If the ring gear shim is too thick, the gears will lock after only light tightening.





Coat a new O-ring with lightweight lithium-soap base grease and install the 2WD/4WD shifting pinion.

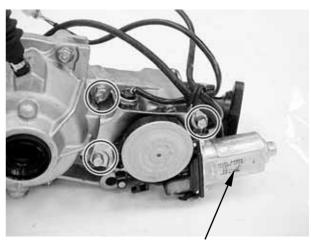


Shifting Pinion

Apply three bond: 1215 to the M8 bolt. Install the 2D/4WD shifting motor and tighten its mounting bolts to the specified torque.

Torque:

M8: 2.3 kgf-m (23 N-m, 16.5 lbf-ft) M6: 1.2 kgf-m (12 N-m, 8.5 lbf-ft)



Shifting Motor Assembly



FRONT DRIVE SHIM ADJUSTMENT

BACKLASH

Install the removed left and right side shims and front drive assembly.

Assemble the gear case (refer to the "FRONT DRIVE DISASSEMBLY/INSPECTION/ASSEMBLY" section in this chapter).



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

Remove the oil filler cap and measure the backlash of the drive ring gear using the horizontal type dial gauge and proper size of wooden piece or plastic piece, as shown. Take backlash readings at three places while turning the ring gear slightly in each direction and securely holding the pinion gear by using commercially tool.

Read the total backlash on the dial gauge.
Remove the dial gauge and turn the ring gear 120°, then measure the backlash.
Repeat this procedure once more and compare the difference of the three measurements.

If the backlash is not within specification, the shim must be changed and the backlash should be re-checked until correct.

Refer to the chart at the right for the appropriate shim thickness.

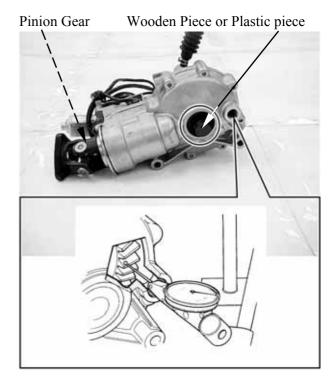
Stand backlash:

0.05 - 0.1 mm (0.002 - 0.004 in)



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

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



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



If the backlash it too small, replace the right side shim(s) with a thicker one.

If the backlash too large, replace the right side shim(s) with a thinner one.

If the right side shim was changed with a 0.1 mm thicker shim, replace the left side shim with one that is 0.1 mm thinner.

LEFT SIDE SHIM SELECTION

Install the removed right side shim(s) and front drive assembly.

Put a few pieces of solder (O.D.: 1.2 –2.5 mm/L: 6 mm) on the bearing outer race, as shown.



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



Assemble the gear case and tighten its bolts to the specified torque in a crisscross pattern in 2 or 3 steps.

*

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

Torque: 2.3 kgf-m (23 N-m, 16.5 lbf-ft)



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





Remove the gear case.

Measure the thickness of compressed solder with the micrometer.



Select the proper size of shim(s) from the right chart, according as the compressed solder thickness.

After selecting the proper size of shim(s), check or adjust the backlash and tooth contact.

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



TOOTH CONTACT

After backlash adjustment and left side shim selection are carried out, the tooth contact must be checked. Pay attention to the following points:

- Remove the drive ring gear.
- Clean and degrease several teeth on the ring gear and pinion gear, and then apply a coating of machinist's layout dye or paste to several teeth of the pinion gear.
- Install the removed left and right side shims and front drive assembly.
- Assembly the gear case.



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



Gear case bolts:

2.3 kgf-m (23 N-m, 16.5 lbf-ft)

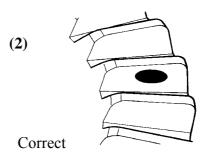
- Rotate the drive ring gear several turns in each direction. This will provide a contact pattern on the coated teeth of ring gear.
- Remove the drive ring gear and compare the coated teeth to the examples shown in (1), (2) and (3).
- If tooth contact is found to be correct (example (2)), go to the "FRONT DRIVE DISASSEMBLY/ INSPECTION/ASSEMBLY" section in this chapter) to complete installation.
- If tooth contact is found to be incorrect (example (1) and (3)), the shim must be changed and the tooth contact should be rechecked until correct.



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



Incorrect: Contact at tooth top





Incorrect: Contact at tooth root



REAR DRIVE REMOVAL/INSPECTION/ INSTALLATION

REMOVAL

REMOVAL/INSPECTION/ **INSTALLATION**" section in the chapter 15).

right rear axle housing.

Remove the left rear axle housing (refer to the "**REAR AXLE HOUSING** Remove the four mounting nuts from the

Remove the rear drive assembly and rear propeller shaft together.



Rear Drive Assembly

Remove the rear propeller shaft from the rear drive assembly.

Do not lose the compression spring.



Compression Spring



INSPECTION

Check the breather rubber case for wear or damage. Also, check that the joint of the rubber case fits tightly.



Turn the pinion gear and check that the gear turns smoothly and quietly without binding.

If the gears do not turn smoothly or quietly, the gears and/or bearing may be damaged or faulty. Replace the final gear case assembly if necessary.



INSTALLATION

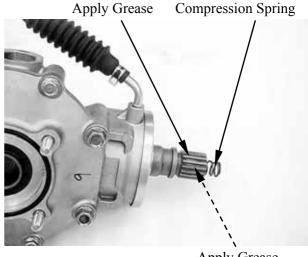
Apply lightweight lithium-soap base grease to the rear propeller shaft splines.





Install the compression spring into the pinion gear.

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



Apply Grease

Rear Propeller Shaft

Install the rear propeller shaft to the rear drive assembly.



Install the rear propeller shaft and rear drive assembly to the engine and right rear axle housing.

*

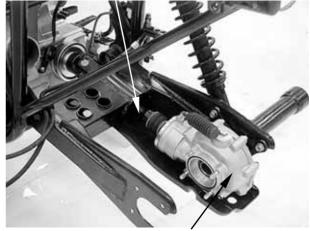
Apply lightweight lithium-soap base grease to the rear output shaft splines.



Apply Grease







Rear Drive Assembly

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

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



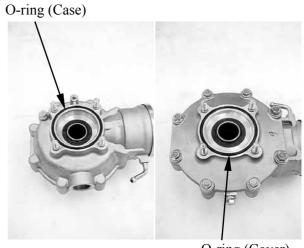


REAR DRIVE DISASSEMBLY/INSPECTION/ ASSEMBLY

DISASSEMBLY

Remove the rear drive assembly (refer to the "REAR DRIVE REMOVAL/INSPECTION/ INSTALLATION" section in this chapter).

Remove the O-rings from the gear case and cover grooves.



O-ring (Cover)

Remove the eight cover bolts in a crisscross pattern in several steps.



Pry the cover at the prying point using a screwdriver.

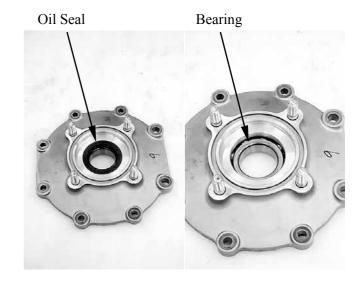




Remove the oil seal, then remove the bearing from the cover by using a proper pipe.



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



Remove the right ring gear shim.

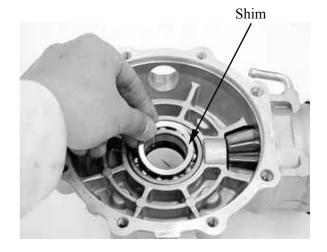


Remove the ring gear.





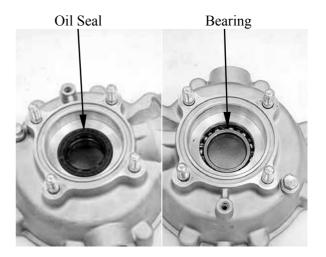
Remove the left ring gear shim.



Remove the oil seal, then remove the bearing from the case by using a proper pipe.

*_

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



Remove the water proof plate by using a commercially available puller.



Water Proof Plate



Remove the oil seal.

*

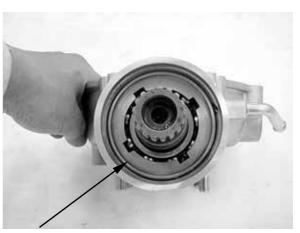
- If there is no abnormal condition, the oil seal removal is not necessary
- The removed oil seal must be replaced with a new one.



Remove the bearing lock nut by using special tool.

Special tool:

Bearing lock nut wrench A120F00020



Bearing Lock Nut

Install the special tool onto the pinion gear shaft and gear case.

Special tool:

Pinion puller set A120F00021

Pull the pinion assembly out from the case.

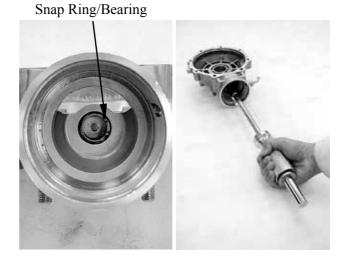




Remove the snap ring. Remove the pinion gear pilot bearing by using the special tools.

Special tool:

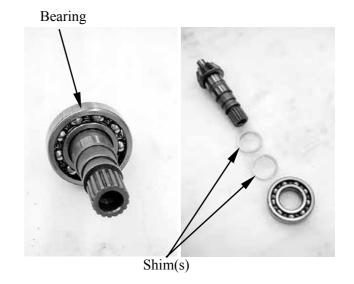
Bearing puller A120E00037



Pull the pinion bearing from the shaft with a commercially available bearing puller.

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

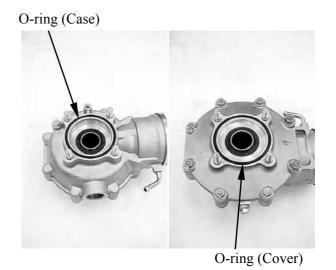
Remove the pinion shim(s).



INSPECTION

Inspect the gear case, cover and oil seals for wear or damage.

If any wear or damage is found, replace the oil seal with a new one.







Check the outer race play and smooth rotation of the bearing by hand while it is on the pinion gear shaft.

Inspect the pinion gear for wear or damage. If the pinion gear is damaged, inspect the ring gear.

If any defects are found, replace the bearing and gear with the new ones

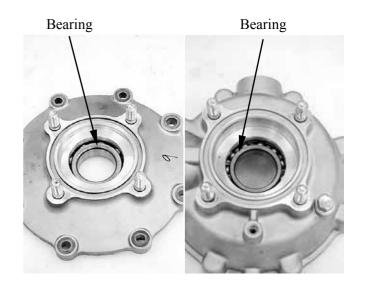
Inspect the splines of pinion gear shaft for wear or damage.

If any defects are found, replace the pinion gear shaft with a new one.



Check the cover and case bearings for wear or damage.

If any wear or damage is found, replace the bearing with a new one.



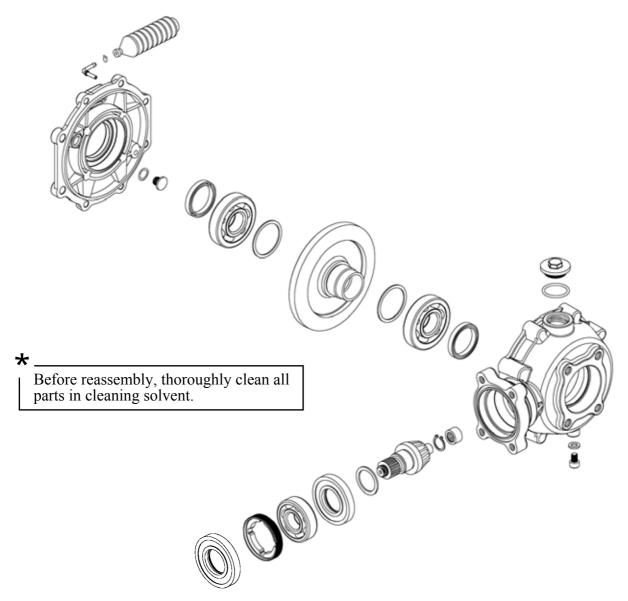


Inspect the ring gear for wear or damage. If the ring gear is damaged, inspect the pinion gear also.

If any defects are found, replace the bearings and ring gear with the new ones.

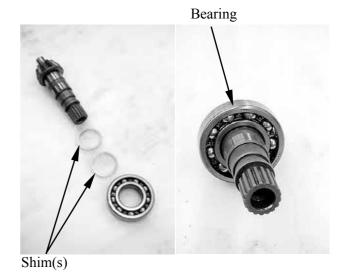


ASSEMBLY



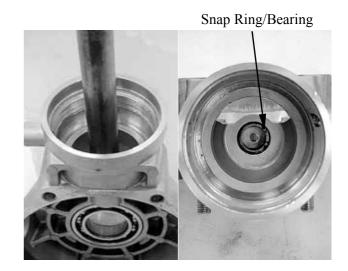


Install the shim(s) onto the pinion gear shaft, then install the new bearing onto the pinion shaft by using a proper pipe.



Install the new bevel pinion gear pilot bearing into the gear case by using a proper shaft.

Install the snap ring.

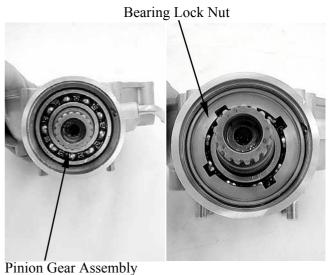


Install the pinion gear assembly by using a proper pipe.

Install the bearing lock nut by using the special tool.

Special tool:

Bearing lock nut wrench A120F00020

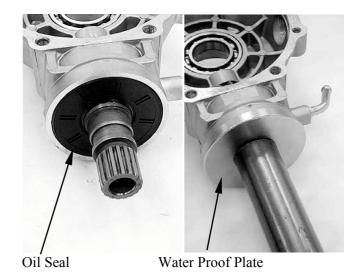




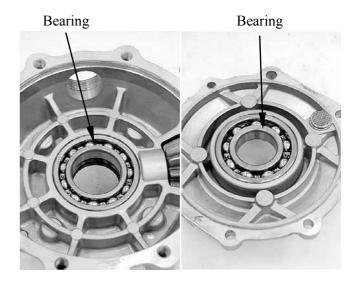
Apply lightweight lithium-soap base grease to the new oil seal lips.

Install the new oil seal into the gear case by using a proper pipe.

Install the new water proof plate by using a proper pipe.



Install the new bearings into the gear case and cover by using a proper pipe.

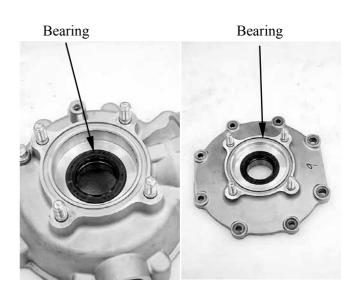


Apply lightweight lithium-soap base grease to the new oil seal lips.

Install the new oil seals into the gear case and cover by using the special tool.

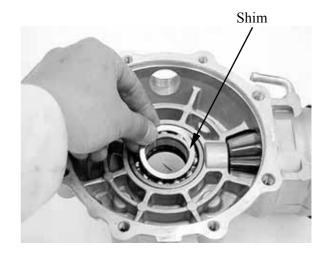
Special tool:

Oil seal & bearing installer A120E00014





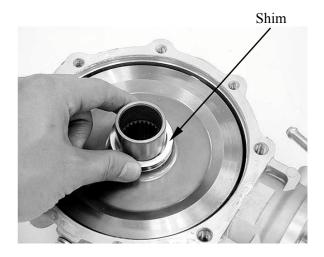
Install the removed left shim to the gear case.



Install ring gear to the gear case.



Install the removed right shim to the ring gear.





Apply a sealant (three bond: 1215) to the mating surface of the case, then install the gear cover.



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

Apply three bond: 1215 to the case bolts and tighten them to the specified torque in a crisscross pattern in 2 or 3 steps.

Torque:

10-mm bolt: 5 kgf-m (49 N-m, 36 lbf-ft) **8-mm bolt:** 2.5 kgf-m (25 N-m, 19 lbf-ft)



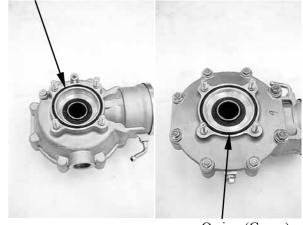
- After the backlash and tooth contact have been checked or adjusted, apply three bond: 1215 to the case bolts.
- It is important to turn the pinion while tightening the bolts. If the ring gear shim is too thick, the gears will lock after only light tightening.



Apply lightweight lithium-soap base grease to the new oil rings.

Install the new oil rings into the gear case and cover.

O-ring (Case)



O-ring (Cover)



REAR DRIVE SHIM ADJUSTMENT

BACKLASH

Install the removed left and right side shims and rear drive assembly.

Assemble the gear case (refer to the "REAR DRIVE DISASSEMBLY/INSPECTION/ASSEMBLY" section in this chapter).

*

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

Remove the oil filler cap and measure the backlash of the drive ring gear using the horizontal type dial gauge and proper size of wooden piece or plastic piece, as shown. Take backlash readings at three places while turning the ring gear slightly in each direction and securely holding the pinion gear by using commercially tool.

Read the total backlash on the dial gauge.

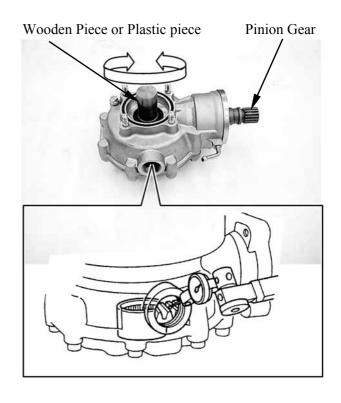


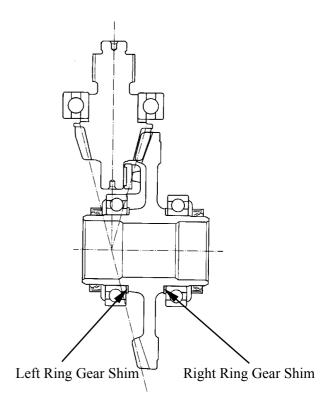
0.05 - 0.25 mm (0.002 - 0.01 in)

Service limit: 0.4 mm (0.16 in)

Remove the dial gauge and turn the ring gear 120°, then measure the backlash. Repeat this procedure once more and compare the difference of the three measurements.

Service limit: 0.2 mm (0.08 in)







If the backlash is not within specification, the shim must be changed and the backlash should be re-checked until correct.

Refer to the chart at the right for the appropriate shim thickness.



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

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

| Right/Left Shim thickness | |
|---------------------------|--------------------|
| A | 1.55 mm (0.062 in) |
| В | 1.5 mm (0.0.06 in) |
| С | 1.45 mm (0.058 in) |

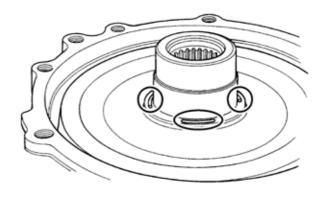
RIGHT SIDE SHIM SELECTION

Install the removed left side shim(s) and ring gear.

Put a few pieces of solder (O.D.: 2 - 2.5 mm/L: 6 mm) on the ring gear back side, as shown.



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



Install the gear case cover.



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



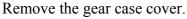
Install and tighten its bolts to the specified torque in a crisscross pattern in 2 or 3 steps.

Torque:

10-mm bolt: 5 kgf-m (49 N-m, 36 lbf-ft) **8-mm bolt:** 2.5 kgf-m (25 N-m, 19 lbf-ft)



- Do not apply a sealant to the case bolts.
- It is important to turn the pinion while tightening the bolts. If the ring gear shim is too thick, the gears will lock after only light tightening.
- Do not install the new O-ring to the gear case cover.



Measure the thickness of compressed solder with the micrometer.





Select the proper size of shim(s) from the right chart, according as the compressed solder thickness.

After selecting the proper size of shim(s), install it on the ring back side.

| Right/Left Ring Gear Shim thickness | |
|-------------------------------------|--------------------|
| A | 1.55 mm (0.062 in) |
| В | 1.5 mm (0.06 in) |
| С | 1.45 mm (0.058 in) |



TOOTH CONTACT

After backlash adjustment and right side shim selection are carried out, the tooth contact must be checked. Pay attention to the following points:

- Remove the ring gear.
- Clean and degrease several teeth on the ring gear and pinion gear, and then apply a coating of machinist's layout dye or paste to several teeth of the pinion gear.
- Install the ring gear with the shims in place.
- Install the gear case cover, and then tighten the bolts to the specified torque in a crisscross pattern in 2 or 3 steps.
 - Do not apply a sealant to the mating surface of the gear case.
 - Do not apply a sealant to the case bolts.
 - It is important to turn the pinion while tightening the bolts. If the ring gear shim is too thick, the gears will lock after only light tightening
 - At this time, it is not necessary to install the gear case cover's O-ring.

Torque:

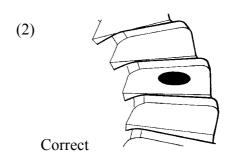
10-mm bolt: 5 kgf-m (49 N-m, 36 lbf-ft) **8-mm bolt:** 2.5 kgf-m (25 N-m, 19 lbf-ft)

- Rotate the ring gear several turns in each direction. This will provide a contact pattern on the coated teeth of ring gear.
- Remove the ring gear and compare the coated teeth to the examples shown in (1), (2) and (3).
- If tooth contact is found to be correct (example (2)), go to the "REAR DRIVE DISASSEMBLY/INSPECTION/ ASSEMBLY" section in this chapter) to complete installation.

If tooth contact is found to be incorrect (example (1) and (3)), the shim between the pinion gear bearing and pinion gear must be changed and tooth contact re-checked until correct.



Incorrect: Contact at tooth top





Tooth contact Shim adjustment

Contact at tooth top (1) Decrease shim thickness

Contact at tooth root (3) Increase shim thickness



* _

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

| Pinion Gear Shim thickness | | |
|----------------------------|--------------------|--|
| A | 2.05 mm (0.052 in) | |
| В | 2 mm (0.08 in) | |
| C | 1.95 mm (0.078 in) | |



FRONT PROPELLER SHAFT DISASSEMBLY/INSPECTION/ASSEMBLY

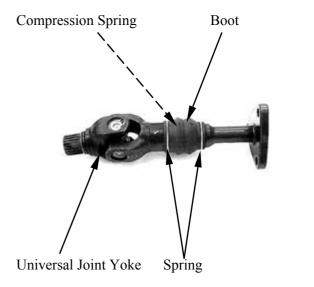
DISASSEMBLY

Remove the front propeller shaft (refer to the "FRONT DRIVE REMOVAL/INSPECTION/ INSTALLATION" section in this chapter).



Front Propeller Shaft

Slide the spring rings back, then remove the boot, universal joint yoke, shaft and compression spring.



Remove the snap rings from the universal joint.

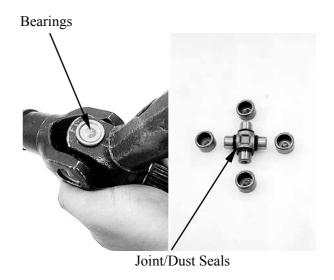




Remove the bearings by tapping the universal joint with a copper hammer.

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

Remove the universal joint/dust seals.



INSPECTION

Check the boot for holes or tears. If any damage is found, replace the boot with a new one.



Inspect the splines of universal joint for wear or damage.

If any defects are found, replace the universal joint yoke with a new one.





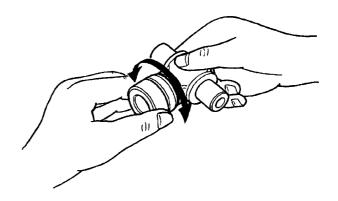
Inspect the universal joint, wear and damage.

If any defects are found, replace the bearings, dust seal and universal joint as a set.



Insert the universal joint to the new bearing and check the play by turning the universal joint, as shown.

If excessive play is noted, replace the bearings, dust seal and universal joint as a set.



Inspect the splines of shaft for wear or damage.

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





ASSEMBLY

Install the universal joint, new dust seal and new bearings.

Install the snap rings.



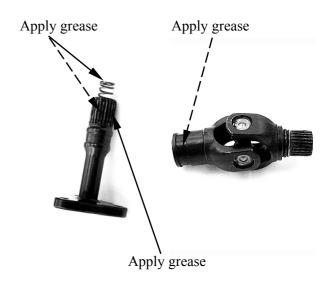
After reassembling the universal joint, check the joint movement smoothly. If a large resistance is felt to movement, tap the bearing with a plastic mallet lightly.



Apply lightweight lithium-soap base grease to the shaft splines and inner.

Apply lightweight lithium-soap base grease to the compression spring.

Apply lightweight lithium-soap base grease to the universal joint inner.



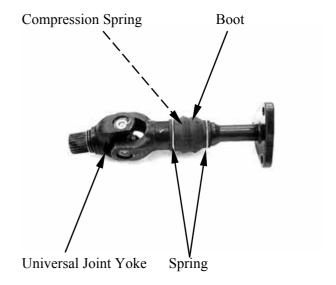
13. DRIVE TRAIN



Fix the boot and spring ring, taking care not distort the boot.

*

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





REAR PROPELLER SHAFT DISASSEMBLY/INSPECTION/ASSEMBLY

DISASSEMBLY

Remove the front propeller shaft (refer to the "REAR DRIVE REMOVAL/INSPECTION/ INSTALLATION" section in this chapter).

Slide the spring ring back, then remove the boot



Remove the snap rings from the universal joint.



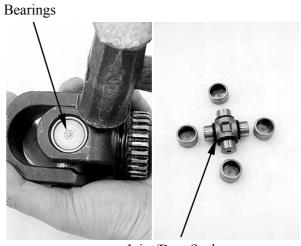


Remove the bearings by tapping the universal joint with a copper hammer.



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

Remove the universal joint/dust seals.



Joint/Dust Seals

INSPECTION

Check the boot for holes or tears. If any damage is found, replace the boot with a new one.



Inspect the splines of universal joint for wear or damage.

If any defects are found, replace the universal joint yoke with a new one.





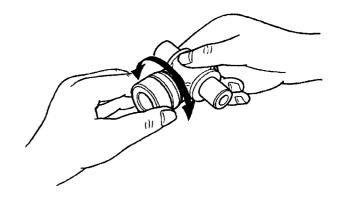
Inspect the universal joint, wear and damage.

If any defects are found, replace the bearings, dust seals and universal joint as a set.



Insert the universal joint to the new bearing and check the play by turning the universal joint, as shown.

If excessive play is noted, replace the bearings, dust seals and universal joint as a set.



ASSEMBLY

Install the universal joint, new dust seal and new bearings.

Install the snap rings.



13. DRIVE TRAIN



After reassembling the universal joint, check the joint movement smoothly. If a large resistance is felt to movement, tap the bearing with a plastic mallet lightly.



Fix the boot and spring ring, taking care not distort the boot.



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



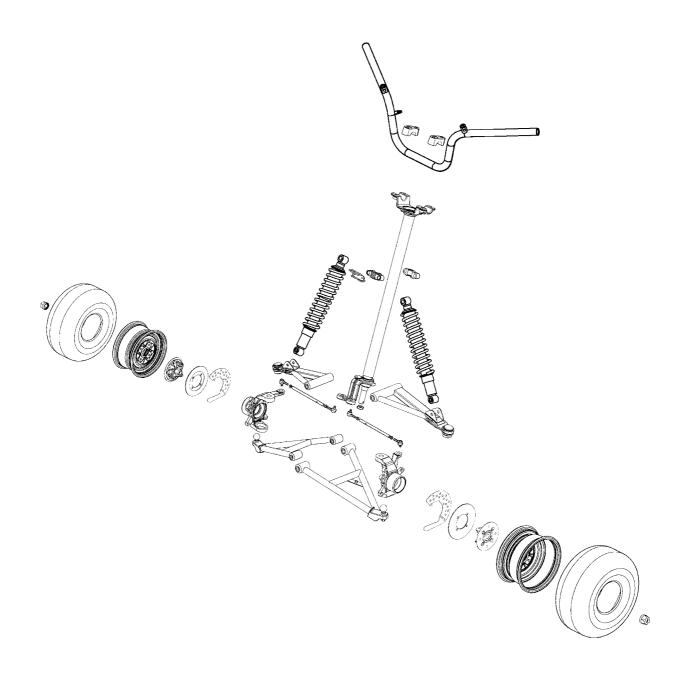


14

FRONT WHEEL/FRONT SUSPENSION STEERING SYSTEM

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| FRONT WHEEL HUB REMOVAL/INSPECTION/ |
| INSTALLATION 14- 5 |
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Unit: mm (in)

SERVICE INFORMATION

GENERAL INSTRUCTIONS

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

SPECIFICATIONS

TORQUE VALUES

Steering column nut 7 kgf-m (70 N-m, 50 lbf-ft)
Front swing arm nut 4.5 kgf-m (45 N-m, 32 lbf-ft)
Front wheel nut 6.5 kgf-m (65 N-m, 46 lbf-ft)

Front wheel hub nut 7 kgf-m (70 N-m, 50 lbf-ft) Castle nut Knuckle ball joint nut 3 kgf-m (30 N-m, 22 lbf-ft) Castle nut Tie-rod ball joint nut 2.1 kgf-m (21 N-m, 16 lbf-ft) Castle nut

Tie-rod adjusting nut

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

Front shock absorber mount bolt

Handlebar holder bolt

Steering bracket

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

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

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

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

SPECIAL TOOLS

Oil seal and bearing driver A120E00014
Ball join remover A120F00012



TROUBLESHOOTING

Hard steering (heavy)

•Insufficient tire pressure

Steers to one side or does not track straight

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

Front shock absorber noise

- Slider bending
- Loose arm fasteners
- Lack of lubrication

Front wheel wobbling

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

Soft front shock absorber

- Weak shock springs
- Insufficient damper oil



FRONT WHEEL REMOVAL/INSPECTION/INSTALLATION

REMOVAL

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

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

*

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

Remove the wheel and wheel hub nut cap together.



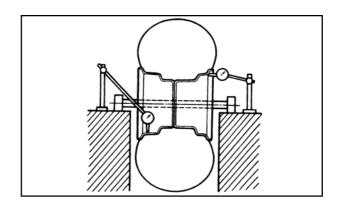
Wheel Hub Nut Cap

INSPECTION

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

Rim run out limits:

Vertical: 2 mm (0.08 in) Lateral: 2 mm (0.08 in)



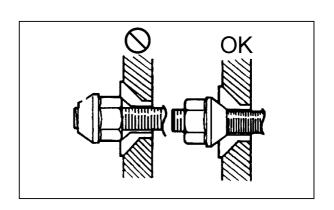
INSTALLATION

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

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



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





FRONT WHEEL HUB REMOVAL/INSPECTION/ INSTALLATION

REMOVAL

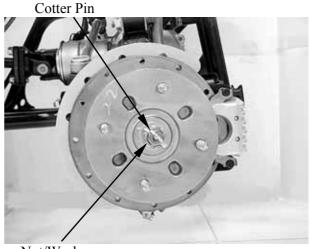
Place the machine on a level place. Remove the front wheel (refer to the "FRONT WHEEL REMOVAL/INSPECTION/ INSTALLATION" section in this chapter) Elevate the front wheels by placing a suitable stand under the frame.

*

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

Remove the cotter pin.

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



Nut/Washer

INSPECTION

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





INSTALLATION

Install the wheel hub, washer and nut.

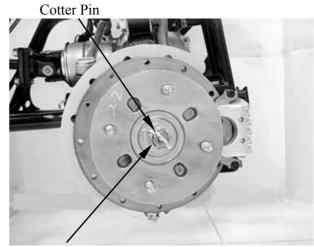
*

Apply grease onto the wheel hub splines.

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

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

Install the cotter pin and band ends of cotter pin.



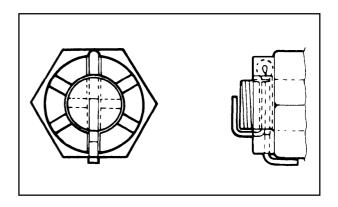
Nut/Washer

*

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



Always use a new cotter pin.

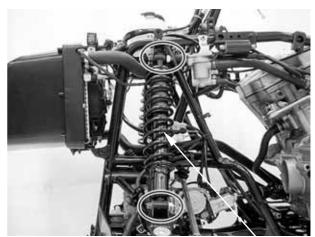




FRONT SHOCK ABSORBER REMOVAL/INSPECTION/ INSTALLATION

REMOVAL

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



Shock Absorber

INSPECTION

Inspect the shock absorber rod. Bends/damage →Replace the shock absorber assembly.

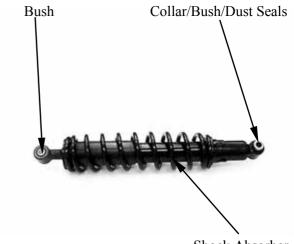
Inspect the shock absorber.

Oil leaks \rightarrow Replace the shock absorber assembly.

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

Fatigue \rightarrow Replace the shock absorber assembly.

Inspect bushes, collar and dust seals. Wear/damage →Replace.

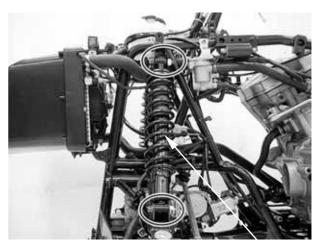


Shock Absorber

INSTALLATION

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

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



Shock Absorber



STEERING KNUCKLE REMOVAL/INSPECTION/ INSTALLATION

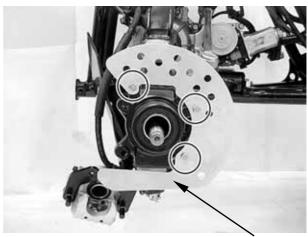
REMOVAL

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

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

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

Remove the three bolts and brake disc protection plate.



Plate

Remove the cotter pin and nut from the tierod end.

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

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



Steering Knuckle



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

Special tool:

Ball join remover

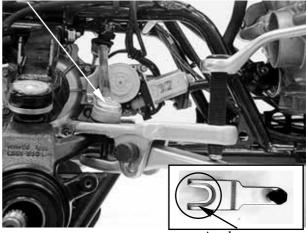
A120F00012

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

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

Tighten the pressure bolt with a wrench

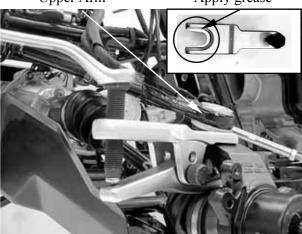
Tie-rod



Apply grease

Upper Arm

Apply grease



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

Special tool: Ball join remover F012

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

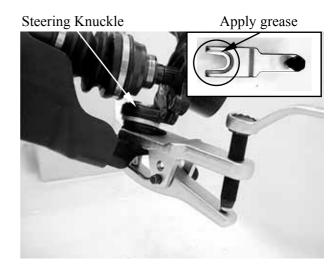
This will ease installation of the tool and prevent damage to the pressure bolt threads. Insert the jaws carefully, making sure that you do not damage the ball joint boot. Adjust the jaw spacing by turning the

pressure bolt.

Tighten the pressure bolt with a wrench

until the ball joint stud pops loose.

Remove the knuckle from the upper and lower arms





INSPECTION

Inspect the knuckle end boot for wear or damage.

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



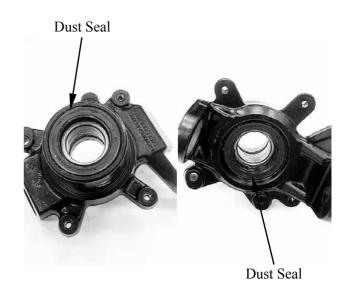
Inspect the brake disc protection plate for damage.

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



Inspect the dust seal lips for wear or damage.

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





INSTALLATION

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

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

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

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

*

Always use a new cotter pin.

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

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

Install the cotter pin and band end of cotter pin.

未

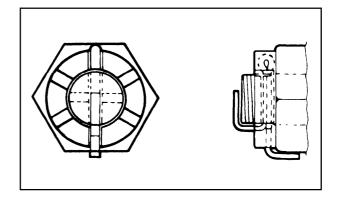
Always use a new cotter pin.



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

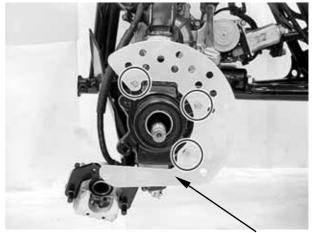


Steering Knuckle





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





STEERING KNUCKLE DISASSEMBLY/ASSEMBLY

DISASSEMBLY

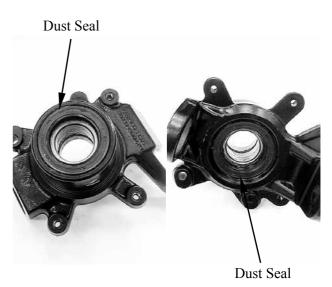
Remove the steering knuckle (refer to the "STEERING KNUCKLE REMOVAL/INSPECTION/INSTALLATION" section in this chapter)



Remove the knuckle end by using the appropriate collar.



Remove the dust seals.





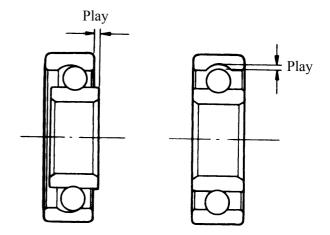
Inspect the inner race play of the bearing by hand while it is in the steering knuckle.

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

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



Make sure to check bearing in the same manner.



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



ASSEMBLY

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





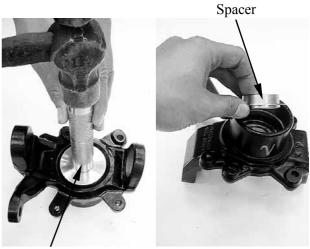
Install the new inner bearing by using the special tool.

Special tool:

Oil seal and bearing driver A120E00014

Install the spacer into the steering knuckle.

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



Bearing Driver

Install the new outer bearing by using the special tool.

Special tool:

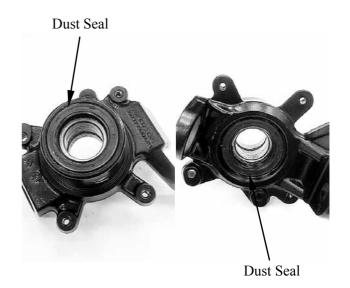
Oil seal and bearing driver A120E00014



Bearing Driver

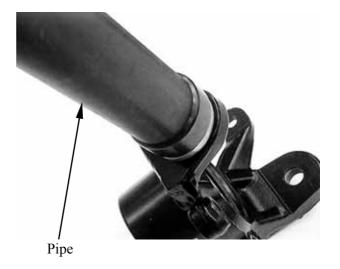
Install the new dust seals by using the special tool.

Special tool: Oil seal and bearing driver A120E00014





Install the steering knuckle end by using a appropriate pipe.



Install the snap ring.





FRONT ARMS INSPECTION/REMOVAL/ INSTALLATION

INSPECTION

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

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

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

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



Steering Knuckle

Check the front upper arm bracket of the frame.

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

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

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

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

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





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



Check the front lower arm bracket of the frame.

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

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

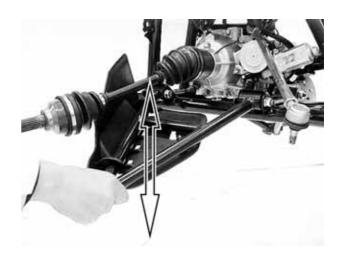
Torque: 4.5 kgf-m (45 N-m, 32 lbf-ft)

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

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

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



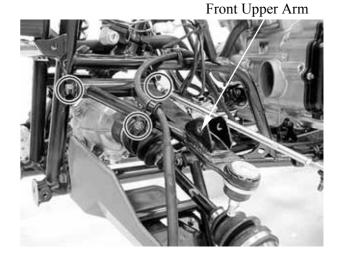




REMOVAL

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

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



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

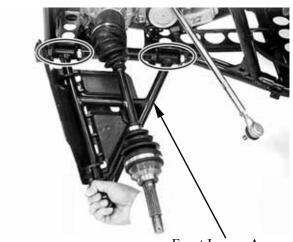
INSTALLATION



Apply the grease onto the bushes.

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

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



Front Lower Arm



FRONT ARMS DISASSEMBLY/INSPECTION/ ASSEMBLY

DISASSEMBLY

Upper arm

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



Lower arm

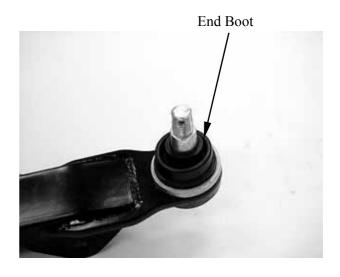
Remove the bolt and then remove the front protector.



INSPECTION

Inspect the upper arm end boot for wear or damage.

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





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

大

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

Inspect bushes.

Wear/damage → Replace.



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

*

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

Inspect bushes.

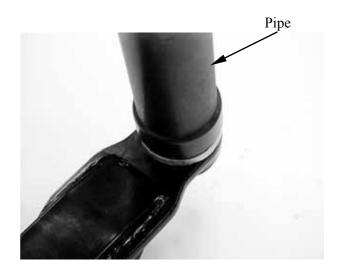
Wear/damage → Replace.

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



ASSEMBLY

Install the upper arm end by using a appropriate pipe.





Install the snap ring.



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





TIE-ROD REMOVAL/INSPECTION/ INSTALLATION

REMOVAL

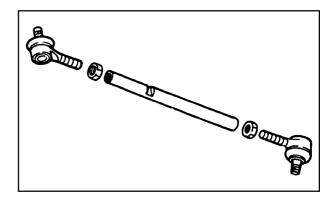
Remove the cotter pin and nut from tie-rod end steering knuckle side (refer to the "STEERING KNUCKLE REMOVAL/INSPECTION/ INSTALLATION" section in this chapter).

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



INSPECTION

Inspect the tie-rod. Bend/damage → Replace



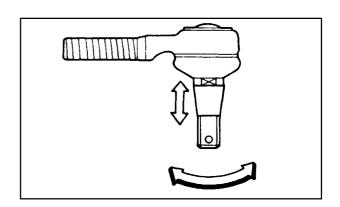
Check the tie-rod end movement.

Tie-rod end exists free play or turns roughly

→ Replace

Check the tapered surface of the tie-rod.

Pitting/wear/damage → Replace





Adjustment steps:

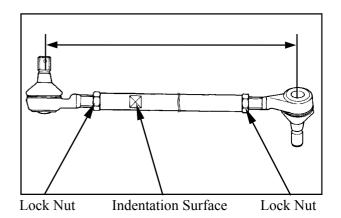
(The following procedures are done on both tie-rods, right and left.)

Loosen the lock nuts.

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

Tie rod length:

379.75±0.25 mm (15.19±0.01 in)



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

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

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

Rod-end (tie rod) angle: 180°

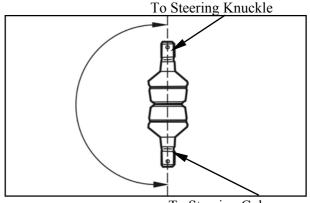
Torque: 3.5 kgf-m (35 N-m, 25.5 lbf-ft)

*_

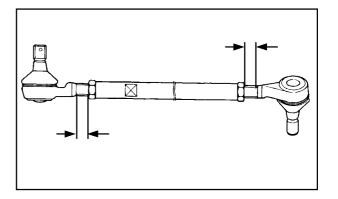
After making adjustment on both tie rods be sure to mark them R and L for identification.



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



To Steering Column





INSTALLATION

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

Torque:

Steering knuckle side:

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

Steering column side:

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

*

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



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

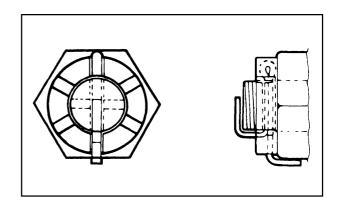


Always use a new cotter pin.





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





HANDLEBAR REMOVAL/INSPECTION/ INSTALLATION

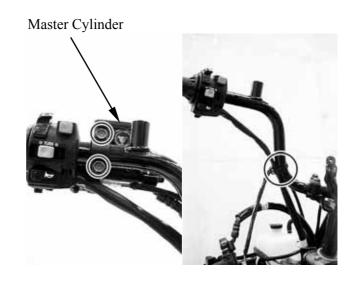
REMOVAL

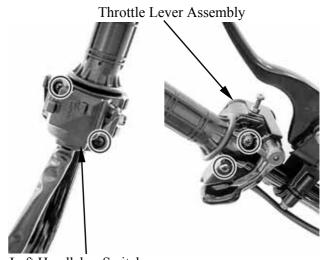
Remove the frame cover (refer to the "**FRAME COVERS**" section in the chapter 2).

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

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

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



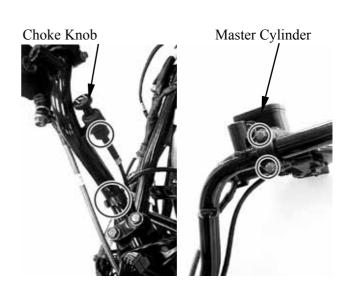


Left Handlebar Switch

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

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

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





Remove the four bolts, then remove the handlebar holders



Handlebar Holders

INSPECTION

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



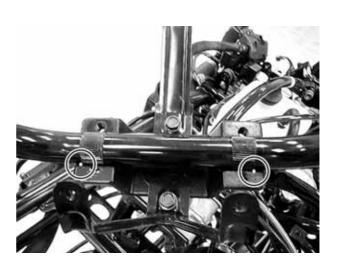
INSTALLATION

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

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



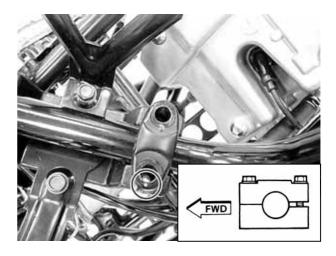
Align the mark on the handlebar with the lower handlebar holder surface.







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



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

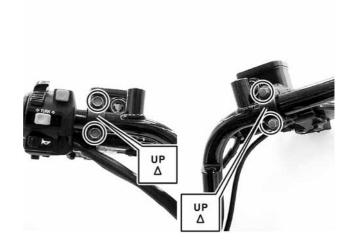


Place the right and left brake master cylinder on the handlebar and install the master cylinder holder with the "UP" mark facing up, aligning the punch mark on the handlebar with the holder joint seam. First tighten the upper bolt and then tighten the lower blot.

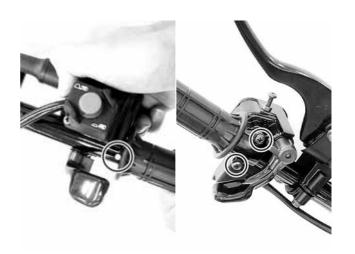
Torque: 1.2 kgf-m (12 N-m, 8.6 lbf-ft)







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



14. FRONT WHEEL/FRONT SUSPENSION/ STEERING SYSTEM



STEERING COLUMN REMOVAL/INSPECTION/ INSTALLATION

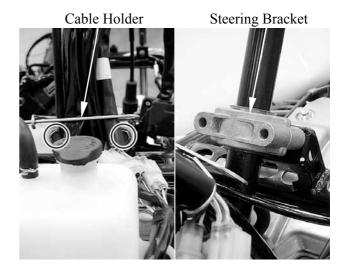
REMOVAL

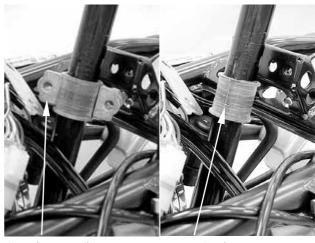
Remove frame covers (refer to the "**FRAME COVERS**" section in the chapter 2).

Remove the tie-rods (refer to the "TIE-ROD REMOVAL/INSPECTION/INSTALLATION" section in this chapter). Remove the handlebar (refer to the "HANDLEBAR REMOVAL/INSPECTION/INSTALLATION" section in this chapter).

Remove the two bolts and remove the cable holder.

Remove the steering brackets and dust seal.





Steering Bracket

Dust Seal

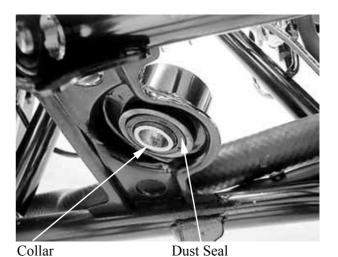
14. FRONT WHEEL/FRONT SUSPENSION STEERING SYSTEM



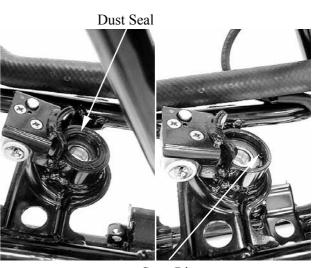
Remove the cotter pin and nut from the steering column under the frame body, then remove steering column.



Remove the collar and dust seal.



Remove the dust seal. Remove the snap ring.



Snap Ring

14. FRONT WHEEL/FRONT SUSPENSION/ STEERING SYSTEM



Replace the bearing by using the special tool.

Special tool:

Oil seal and bearing driver A120E00014



Bearing Driver

INSPECTION

Inspect the steering column. Bends/damage →Replace.

*

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

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





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

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

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

Install the cotter pin and band ends of cotter pin.



Always use a new cotter pin.



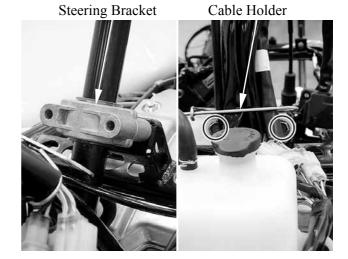


14. FRONT WHEEL/FRONT SUSPENSION STEERING SYSTEM



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

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

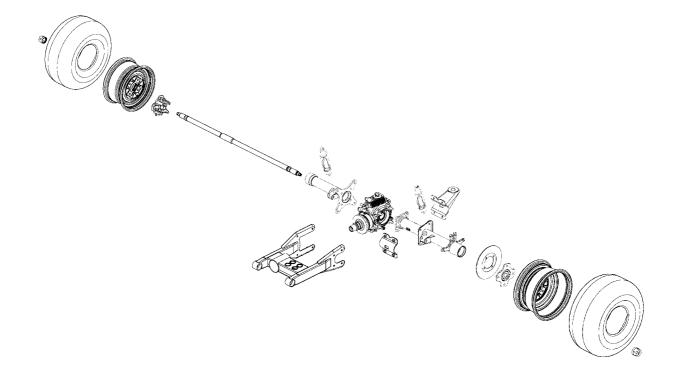




REAR WHEEL/AXLE/SHOCK ABSORBER/SWING ARM SERVICE INFORMATION------15- 2 TROUBLESHOOTING------ 15- 2 REAR WHEEL REMOVAL/INSPECTION/INSTALLATION ----- 15- 3 REAR WHEEL HUB REMOVAL/INSPECTION/ INSTALLATION ------ 15- 4 REAR SHOCK ABSORBER REMOVAL/INSPECTION/ INSTALLATION ------ 15- 6 REAR AXLE REMOVAL/INSPECTION/INSTALLATION------ 15- 7 REAR AXLE HOUSING REMOVAL/INSPECTION/INSTALLATION ----- 15- 8 REAR AXLE HOUSING DISASSEMBLT/ASSEMBLY ----- 15- 11 REAR SWING ARM REMOVAL/INSTALLATION------ 15- 15 REAR SWING ARM DISASSEMBLY/INSPECTION/

ASSEMBLY ----- 15- 17







SERVICE INFORMATION

GENERAL INSTRUCTIONS

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

SPECIFICATIONS

Unit: mm (in)

| Item | | | Standard | Service Limit |
|------------|-------------|--------|----------|---------------|
| Rear wheel | Rim run out | Radial | _ | 2 (0.08) |
| | | Axial | | 2 (0.08) |

TORQUE VALUES

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

SPECIAL TOOLS

Oil seal & bearing driver A120E00014 Lock nut wrench A120F00013

TROUBLESHOOTING

Rear wheel wobbling

- Bent rim
- Faulty tire
- Axle not tightened properly

Soft rear shock absorber

- Weak shock absorber spring
- Faulty damper



REAR WHEEL REMOVAL/INSPECTION/ INSTALLATION

REMOVAL

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

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

*

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

Remove the rear wheel and wheel hub nut cap together.

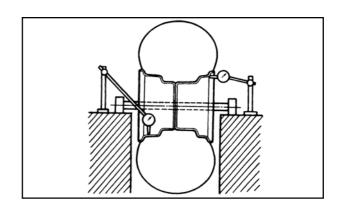


INSPECTION

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

Rim run out limits:

Vertical: 2 mm (0.08 in) Lateral: 2 mm (0.08 in)



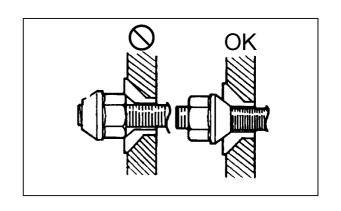
INSTALLATION

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

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



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





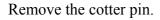
REAR WHEEL HUB REMOVAL/INSPECTION/ INSTALLATION

REMOVAL

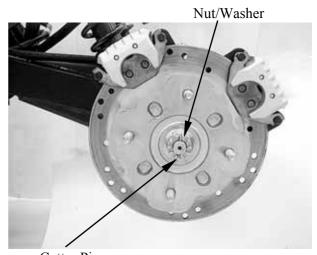
Place the machine on a level place. Remove the rear wheel (refer to the "REAR WHEEL REMOVAL/INSPECTION/INSTALLATION" section in this chapter) Elevate the rear wheels by placing a suitable stand under the frame.

*

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



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



Cotter Pin

INSPECTION

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



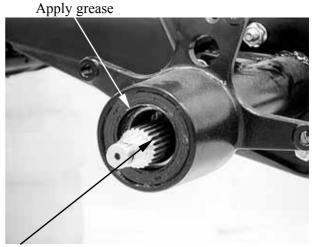


INSTALLATION

Install the wheel hub and nut.

*

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

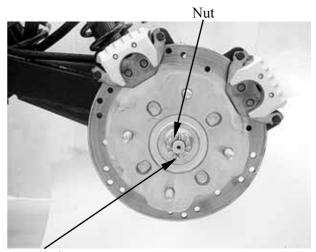


Apply grease

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

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

Install the cotter pin and band ends of cotter pin.



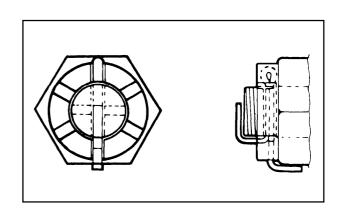
Cotter Pin



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



Always use a new cotter pin.



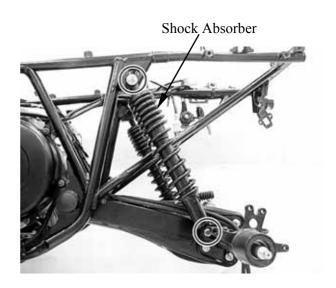


REAR SHOCK ABSORBER REMOVAL/INSPECTION/ INSTALLATION

REMOVAL

Remove the rear shock absorber upper mount nut and washer.

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



INSPECTION

Inspect the shock absorber rod.

Bends/damage \rightarrow Replace the shock absorber assembly.

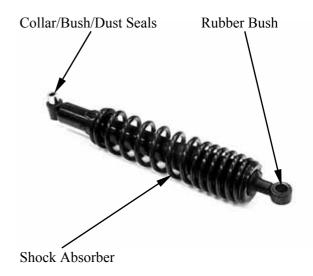
Inspect the shock absorber.

Oil leaks \rightarrow Replace the shock absorber assembly.

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

Fatigue \rightarrow Replace the shock absorber assembly.

Inspect bushes, collar and dust seals. Wear/damage →Replace.



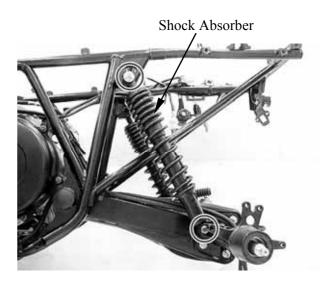
INSTALLATION

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

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

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

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





REAR AXLE REMOVAL/INSPECTION/ INSTALLATION

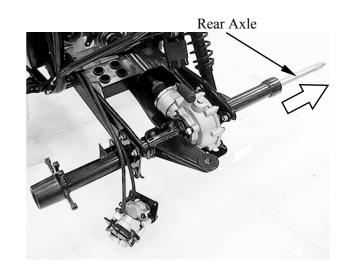
REMOVAL

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

Remove the rear axle from axle housing right side.

大

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



INSPECTION

Check the axle splines for wear or damage.

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

Axle runout is 1/2 the total indicator reading.

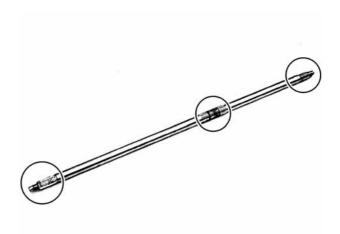
Service limit: 3 mm (0.12 in)

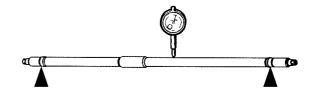
INSTALLATION

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

*

Do not attempt to straighten a bent axle.





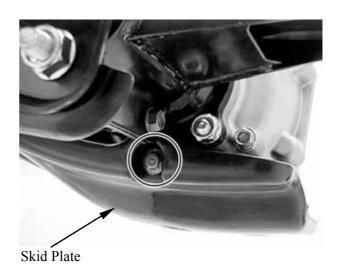


REAR AXLE HOUSING REMOVAL/INSPECTION/INSTALLATION

REMOVAL

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

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



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

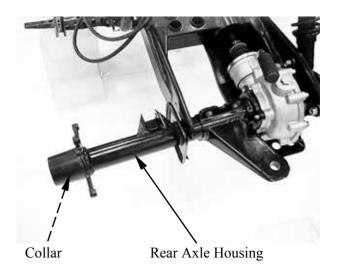
Remove the four nuts from the left housing (attaching the rear drive case).



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

*

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





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

Remove the four nuts/bolts from right housing.

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



Right Rear Axle Housing

INSPECTION

Inspect the rear axle housing for distortion or damages.

If any damages are found, replace the rear axle housing.

Inspect the dust seal lips for wear or damage.

If any damages are found, replace a new one.

Inspect the inner race play of the bearing by hand while it is in the rear axle housing.

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

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







INSTALLATION

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

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

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

Install rear shock absorber and lower mounting bolt onto the right axle housing. Install and tighten the lower mounting nut to the specified torque

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

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

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

*

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

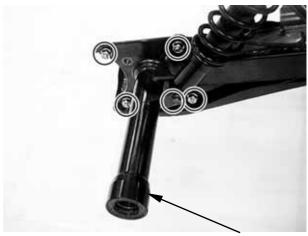
Install and tighten the four nuts/bolts (attaching the rear swing arm) to the specified torque in a crisscross pattern in 2 or 3 steps.

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

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

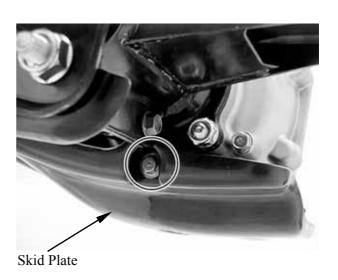
Torque: 5.5 kgf-m (55 N-m, 40 lbf-ft)

Install and tighten the bolt at the skid plate securely.



Right Rear Axle Housing







REAR AXLE HOUSING DISASSEMBLY/ASSEMBLY

DISASSEMBLY/ASSEMBLY

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

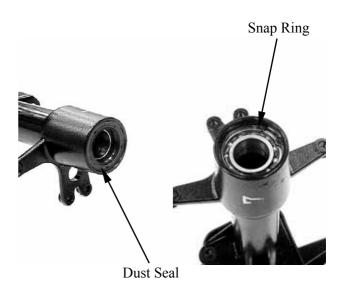
Left rear axle housing

Remove the rear axle collar from axle housing.

Remove the dust seal from the axle housing.

Remove the snap ring from the axle housing.





Remove the two bearings using the proper shaft.





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



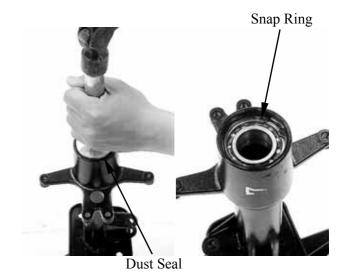
Install the new bearings by using the special tool.

Special tool:

Oil seal & bearing driver A120E00014

Install the snap ring.

Install a new dust seal.



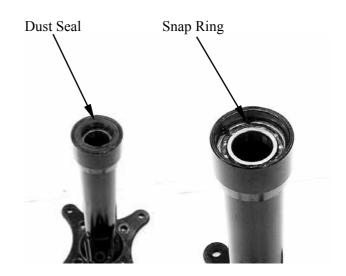
Install the rear axle collar into the axle housing.



Right rear axle housing

Remove the dust seal from the axle housing.

Remove the snap ring from the axle housing.



Remove the bearing using the proper shaft.



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





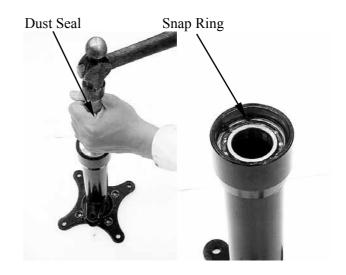
Install the new bearing by using the special tool.

Special tool:

Oil seal & bearing driver A120E00014

Install the snap ring.

Install a new dust seal.





REAR SWING ARM REMOVAL/INSTALLATION

REMOVAL

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

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



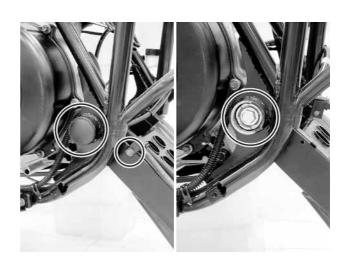
Remove the bolt and band, then remove the rear brake fluid hoses from swing arm.

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

Special tool:

Lock nut wrench A120F000013

Remove the left pivot adjusting bolt.





INSTALLATION

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

Tighten the right pivot bolt to the specified torque.

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

Tighten the left pivot adjusting bolt to the specified torque.

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

Move the swing arm up and down several times to seat the pivot bearings.

Retighten the pivot bolts to the same torque.

Install the left pivot lock nut.

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

Special tool:

Lock nut wrench A120F00013

Torque:

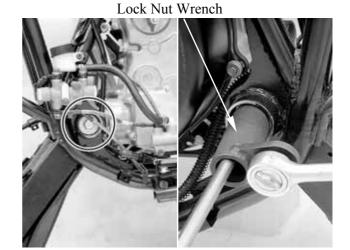
Actual: 11.8 kgf-m (118 N-m, 85 lbf-ft)

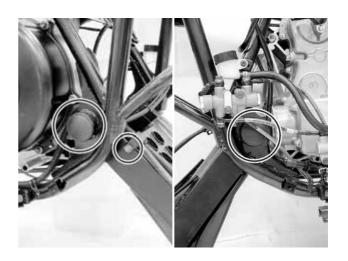
Special tool indicated:

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

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

Install the pivot bolt caps.







REAR SWING ARM DISASSEMBLY/INSPECTION/ ASSEMBLY

DISASSEMBLY/INSPECTION

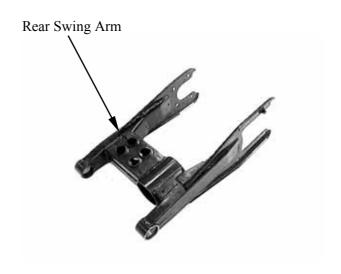
Remove the three bolts and then remove the skid plate from swing arm.

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



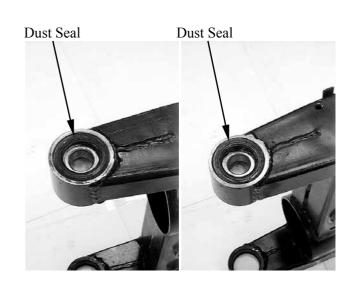
Inspect the swing arm for distortion or damage.

If any damage are found, replace the swing arm with a new one.



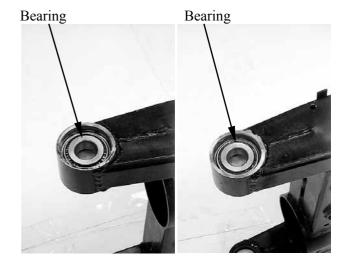
Inspect the dust seals for wear or damage. If any damages are found, replace them with new ones.

Remove the dust seals.

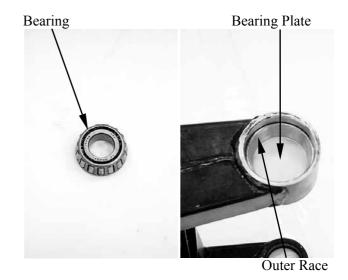




Remove the bearings.



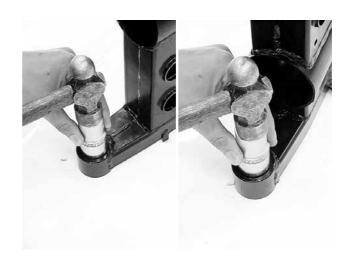
Inspect the swing arm bearings, outer races and bearing plates, if any damages are found, replace the them with new ones.



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

*

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





ASSEMBLY

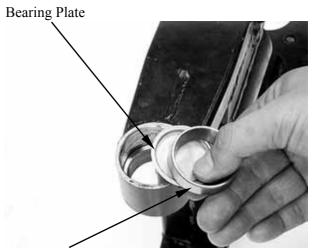
Install the new swing arm bearing outer race and its new plate to the swing arm by using the special tool.

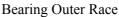
Special tool:

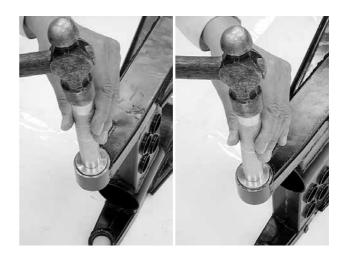
Oil seal & bearing driver A120E00014

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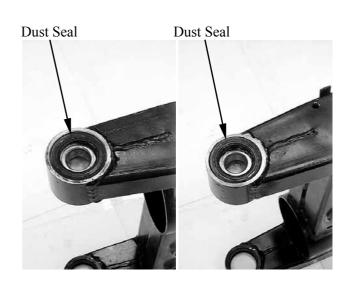
When installing the bearing plate, make sure that the bulge of bearing plate faces inside.







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



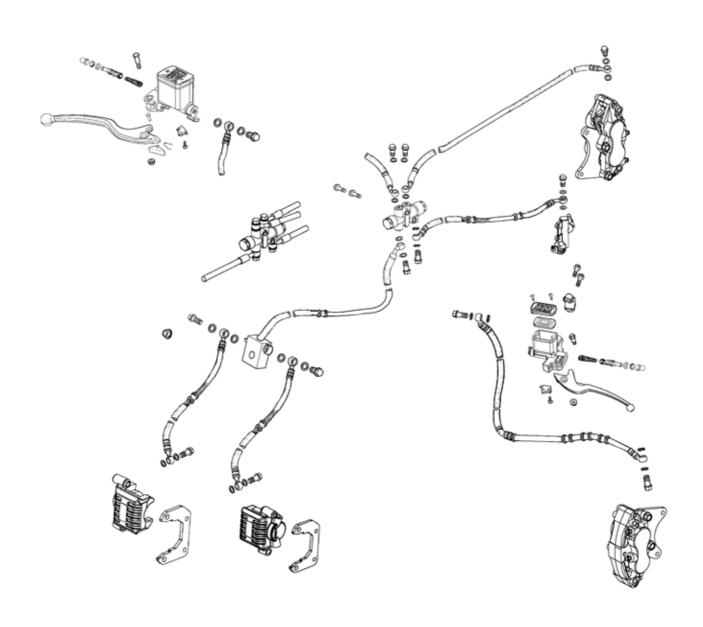


BRAKE SYSTEM

| 1 | | 7 | |
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| ASSEMBLY DELAY VALVE REMOVAL/DISASSEMBLY/INSPECTION/ ASSEMBLY/INSTALLATION FRONT BRAKE CALIPERS REMOVAL/INSPECTION/ INSTALLATION REAR BRAKE CALIPERS REMOVAL/INSPECTION/ INSTALLATION REAR BRAKE/PARKING BRAKE CALIPER REMOVAL/ | 16-31 16-34 16-35 16-36 |
| ASSEMBLY DELAY VALVE REMOVAL/DISASSEMBLY/INSPECTION/ ASSEMBLY/INSTALLATION FRONT BRAKE CALIPERS REMOVAL/INSPECTION/ INSTALLATION | 16-31 16-34 16-35 16-36 |







SERVICE INFORMATION

GENERAL INSTRUCTIONS

- During servicing, keep oil or grease off the brake pads and brake disk.
- 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 machine 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

Unit: mm (in)

| Item | Standard | Service Limit |
|----------------------|-------------------------------------|---------------|
| Brake disk thickness | $3.8 \sim 4.2 \ (0.152 \sim 0.168)$ | 3 (0.12) |
| Brake disk runout | _ | 0.3 (0.012) |

TORQUE VALUES

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

16. BRAKE SYSTEM



TROUBLESHOOTING

Loose brake lever

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

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

Brake noise

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

Hard braking

- Seized hydraulic brake system
- Seized piston



BRAKE PADS REPLACEMENT

FRONT BRAKE PADS

Remove the front wheel. (refer to the "FRONT WHEEL REMOVAL/INSPECTION/
INSTALLATION" section in the chapter 14).

Remove the two brake pad pins from the brake caliper.

Remove the two mounting bolts from brake caliper and then remove brake caliper.



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



Compress the brake caliper holder and remove brake pads.





A wear indicator is provided on each brake. The indicators allows checking of brake pads wear. Check the position of the indicator.



Install the new brake pads.

Install the brake pad mounting pins. Install the brake caliper mounting bolts to the specified torque.

Torque: 3.2 kgf-m (32 Nm, 25 lbf-ft)

Tighten the brake pad mounting pins.

Torque: 1.8 kgf-m (18 Nm, 13 lbf-ft)



REAR BRAKE PADS (OFF ROAD)

Remove the rear wheel. (refer to the "REAR WHEEL REMOVAL/INSPECTION/ INSTALLATION" section in the chapter 15).

The replacement of rear brake and front brake pads are the same.



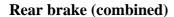


REAR BRAKE PADS (ON ROAD)

Rear brake

Remove the rear wheel. (refer to the "REAR WHEEL REMOVAL/INSPECTION/ INSTALLATION" section in the chapter 15).

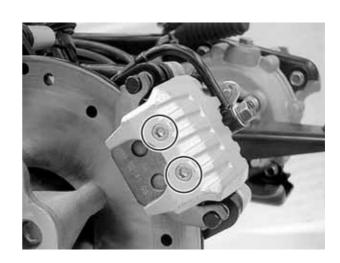
The replacement of rear brake and front brake pads are the same.



Remove the rear wheel. (refer to the "REAR WHEEL REMOVAL/INSPECTION/ INSTALLATION" section in the chapter 15).

Remove the two brake pad pins from the brake caliper.





Remove the two mounting bolts from brake caliper and then remove brake caliper.



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

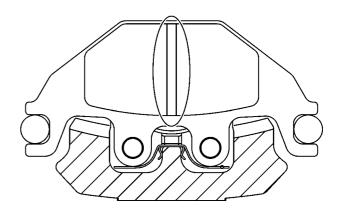




Compress the brake caliper holder and remove brake pads.

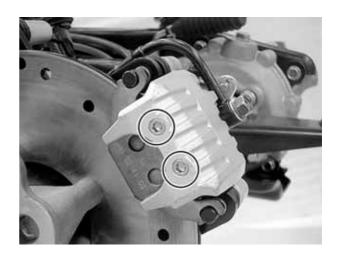


A wear indicator is provided on each brake. The indicators allows checking of brake pads wear. Check the position of the indicator.



Install the new brake pads.

Install the brake pad mounting pins.



16. BRAKE SYSTEM



Install the brake caliper mounting bolts to the specified torque.

Torque: 3.2 kgf-m (32 Nm, 25 lbf-ft)

Tighten the brake pad mounting pins.

Torque: 1.8 kgf-m (18 Nm, 13 lbf-ft)





FRONT BRAKE DISCS **REMOVAL/INSPECTION/ INSTALLATION**

REMOVAL

Remove the front wheel hub (refer to the "FRONT WHEEL HUB REMOVAL/INSPECTION/ **INSTALLATION**" section in the chapter 14).

Remove the four bolts and then remove the brake disc.

INSPECTION

Measure the brake disc thickness.

Service Limit: 3 mm (0.12 in)

Measure the brake disk run out.

Service Limit: 0.3 mm (0.012 in)

INSTALLATION

Install the brake disc onto the wheel hub. Install and tighten the new four bolts to the specified torque.

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



Brake Disc

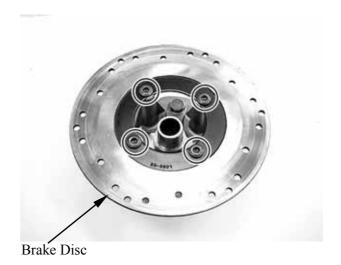


REAR BRAKE DISC REMOVAL/INSPECTION/ INSTALLATION

REMOVAL

Remove the rear wheel hub (refer to the "REAR WHEEL HUB REMOVAL/INSPECTION/INSTALLATION" section in the chapter 15).

Remove the four bolts and then remove the brake disc.



INSPECTION

Measure the brake disc thickness.

Service Limit: 3 mm (0.12 in)

Measure the brake disk run out.

Service Limit: 0.3 mm (0.012 in)

INSTALLATION

Install the brake disc onto the wheel hub. Install and tighten the new four bolts to the specified torque.

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



FRONT BRAKE FLUID CHANGE/AIR BLEED (OFF ROAD)

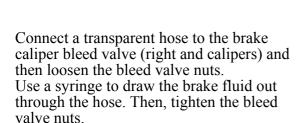
BRAKE FLUID CHANGE

Place the machine on the level ground and set the handlebar upright.

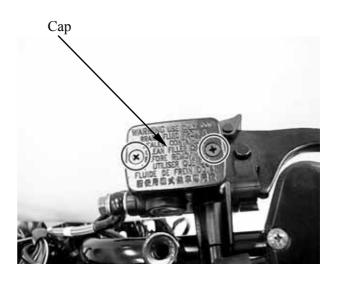
Remove the two screws from the brake fluid reservoir cap.

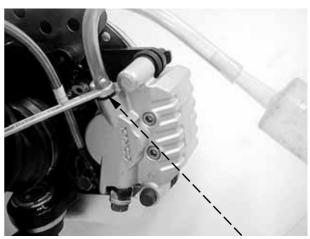


Use shop towels to cover plastic parts and coated surfaces to avoid damage caused by splash of brake fluid.



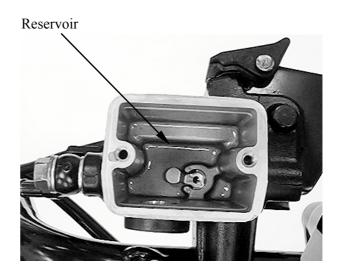
Torque: 0.6 kgf-m (6 Nm, 4.32 lbf-ft)





Bleed Valve Nut

Fill the brake reservoir with brake fluid.



16. BRAKE SYSTEM



Connect a transparent hose to the right caliper bleed valve and then loosen the bleed valve nuts.

Use the syringe to draw brake fluid into it until there is no air bubbles in the transparent hose.

Then, tighten the bleed valve nut.

Torque: 0.6 kgf-m (6 Nm, 4.32 lbf-ft)

Connect a transparent hose to the left caliper bleed valve and then loosen the bleed valve nuts.
Use the syringe to draw brake fluid into it until there is no air bubbles in the transparent hose.

Then, tighten the bleed valve nut.

Torque: 0.6 kgf-m (6 Nm, 4.32 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

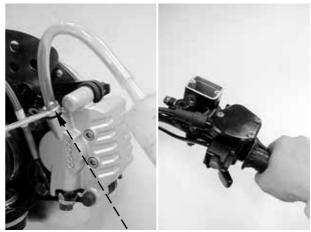


BRAKE SYSTEM BLEEDING

- 1. Connect a transparent hose to the bleed valves (right and left caliper).
- 2. Fully apply the brake lever after continuously pull it several times. Then, loosen the right caliper bleed valve nut to bleed air from the brake system.
- 3. Fully apply the brake lever after continuously pull it several times. Then, loosen the left caliper bleed valve nut to bleed air from the brake system.
- 4. 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.



Bleed Valve



REAR BRAKE FLUID CHANGE/AIR BLEED

BRAKE LEVER

Brake fluid change

Place the machine on the level ground and set the handlebar upright.

Remove the two screws from the brake fluid reservoir cap.



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

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.

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 transparent hose.

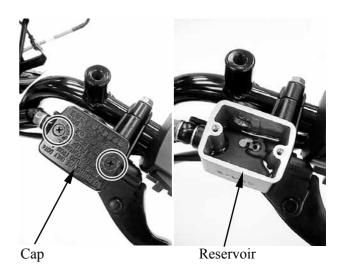
Then, tighten the bleed valve nut.

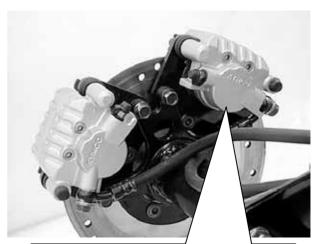
Torque: 0.6 kgf-m (6 Nm, 4.32 lbf-ft)



- 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







Bleed Valve

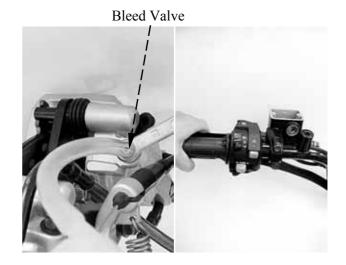


Brake system bleeding

- 1. Connect a transparent hose to the bleed valve.
- 2. Fully apply the brake lever after continuously pull it several times. Then, loosen the caliper bleed valve nut to bleed air from the brake system.
- 3. 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 PEDAL (OFF ROAD)

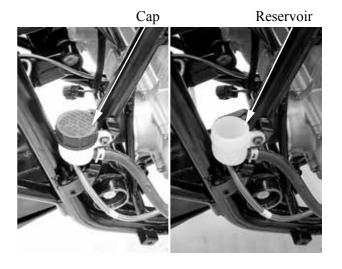
Brake fluid change

Place the machine on the level ground and set the handlebar upright.

Remove the brake fluid reservoir cap.

*

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





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.

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 transparent hose.

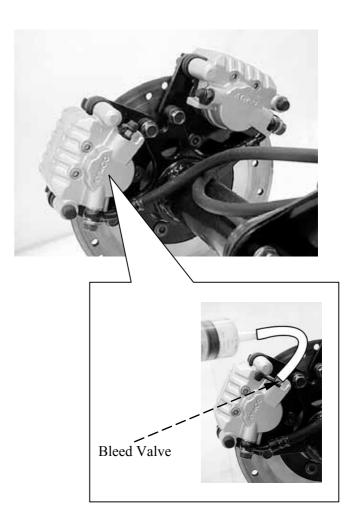
Then, tighten the bleed valve nut.

Torque: 0.6 kgf-m (6 Nm, 4.32 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

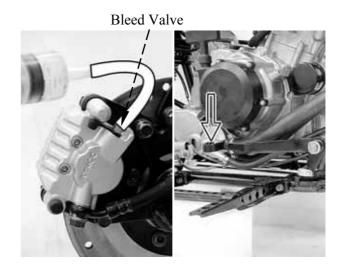


Brake system bleeding

- 1. Connect a transparent hose to the bleed valve.
- 2. Fully apply the brake pedal after continuously depress it several times. Then, loosen the caliper bleed valve nut to bleed air from the brake system.
- 3. 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.





COMBINATION BRAKE FLUID CHANGE/AIR BLEED (ON ROAD)

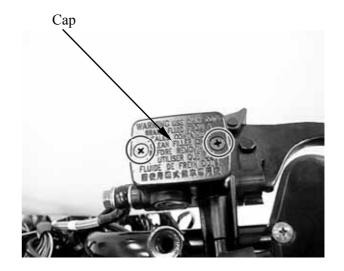
BRAKE FLUID CHANGE

Place the machine on the level ground and set the handlebar upright.

- 1. Remove the two screws from the brake fluid reservoir cap.
- 2. Remove the brake fluid reservoir cap (front brake lever).

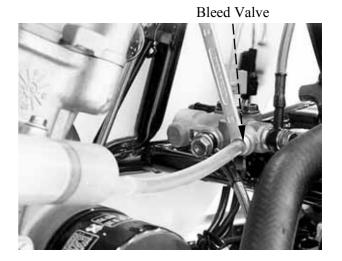


Use shop towels to cover plastic parts and coated surfaces to avoid damage caused by splash of brake fluid.



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

Torque: 0.6 kgf-m (6 Nm, 4.32 lbf-ft)

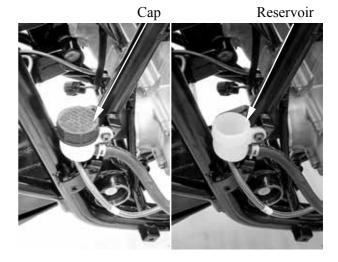




4. Remove the brake fluid reservoir cap (brake pedal).

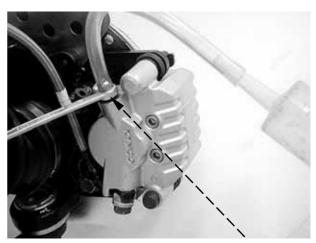
* _

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



5. Connect a transparent hose to the front brake caliper bleed valve (front right and left calipers) and then loosen the bleed valve nut. Use a syringe to draw the brake fluid out through the hose. Then tighten the bleed valve nuts.

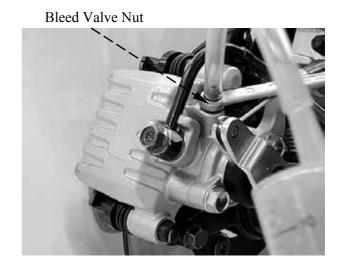
Torque: 0.6 kgf-m (6 Nm, 4.32 lbf-ft)



Bleed Valve Nut

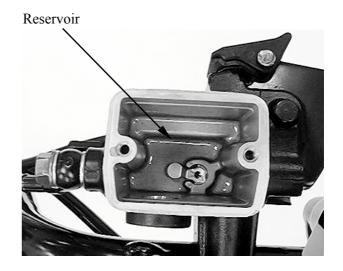
6. Connect a transparent hose to the rear brake caliper bleed valve (combined) and then loosen the bleed valve nut. Use a syringe to draw the brake fluid out through the hose. Then tighten the bleed valve nut.

Torque: 0.6 kgf-m (6 Nm, 4.32 lbf-ft)





7. Fill the brake reservoir (front brake lever) with brake fluid.



8. Loosen the delay valve bleed valve nut. Connect the transparent hose to the bleed valve.

Use the syringe to draw brake fluid into it until there is no air bubbles in the transparent hose.

Then, tighten the bleed valve nut.

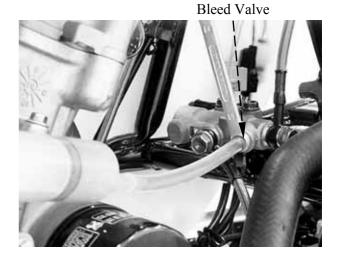
Torque: 0.6 kgf-m (6 Nm, 4.32 lbf-ft)



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

Recommended Brake Fluid: DOT-4

9. Fill the brake reservoir (brake pedal) with brake fluid.







10. Connect a transparent hose to the right caliper bleed valve and then loosen the bleed valve nuts.

Use the syringe to draw brake fluid into it until there is no air bubbles in the transparent hose.

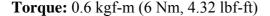
Then, tighten the bleed valve nut.

Torque: 0.6 kgf-m (6 Nm, 4.32 lbf-ft)

Connect a transparent hose to the left caliper bleed valve and then loosen the bleed valve nuts.

Use the syringe to draw brake fluid into it until there is no air bubbles in the transparent hose.

Then, tighten the bleed valve nut.





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

Recommended Brake Fluid: DOT-4

11. Loosen the rear caliper (combined) bleed valve nut. Connect the transparent hose to the bleed valve. Use the syringe to draw brake fluid into it until there is no air bubbles in the transparent hose.

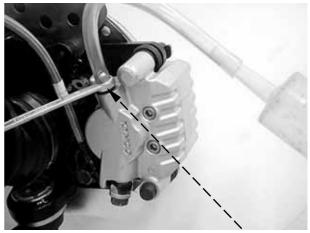
Then, tighten the bleed valve nut.

Torque: 0.6 kgf-m (6 Nm, 4.32 lbf-ft)



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

Recommended Brake Fluid: DOT-4



Bleed Valve Nut







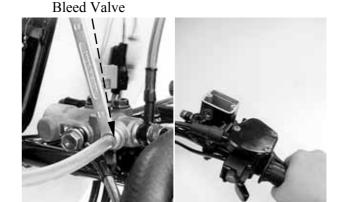
DELAY VALVE BLEEDING

- 1. Connect a transparent hose to the bleed valve (delay valve).
- 2. Fully apply the front brake lever after continuously pull it several times. Then, loosen the bleed valve nut (delay valve) to bleed air between the front brake master cylinder and the delay valve.
- 3. Repeat these steps until between the front brake master cylinder and the delay valve is free of air. Then tighten the bleed valve nut.

Torque: 0.6 kgf-m (6 Nm, 4.32 lbf-ft)

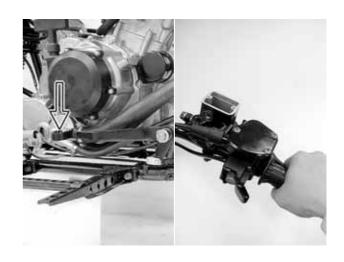


When bleeding air from the brake system, the brake fluid level should be kept over 1/2 of the brake reservoir height (front brake lever).



COMBINATION BRAKE SYSTEM AIR BLEEDING

- 1. To finish delay valve bleeding (refer to above).
- 2. Connect a transparent hose to the rear caliper (combined) and front calipers bleed valves.
- 3. Fully apply the brake pedal after continuously depress it several times and fully apply the front brake lever after continuously pull it several times. Then, loosen the rear caliper bleed valve nut to bleed air from the brake system.
- 4. Fully apply the brake pedal after continuously depress it several times and fully apply the front brake lever after continuously pull it several times. Then, loosen the front right caliper bleed valve nut to bleed air from the brake system.
- 5. Fully apply the brake pedal after continuously depress it several times and fully apply the front brake lever after continuously pull it several times. Then, loosen the front left caliper bleed valve nut to bleed air from the brake system.



16. BRAKE SYSTEM

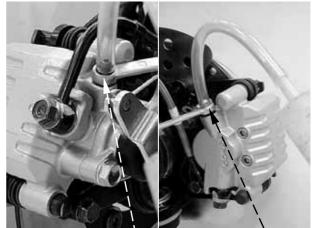


6. Repeat these steps until the brake system is free of air. Then tighten the bleed valve nuts.

Torque: 0.6 kgf-m (6 Nm, 4.32 lbf-ft)

*

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



Bleed Valve



BRAKE MASTER CYLINDERS REMOVAL/INSPECTION/ INSTALLATION

REMOVAL

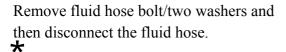
Front/rear master cylinder

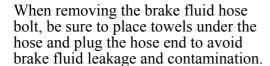
Remove the brake reservoir cap and drain the brake fluid from the hydraulic brake system (refer to the "FRONT BRAKE FLUID CHANGE/AIR BLEED (OFF ROAD" section or "REAR BRAKE FLUID CHANGE/AIR BLEED" section or "COMBINATION BRAKE FLUID CHANGE/AIR BLEED (ON ROAD)"in this chapter).



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

Remove the bolt/nut and then remove the brake lever.

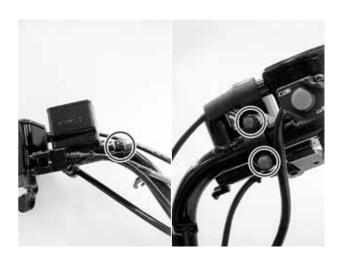




Remove the two master cylinder holder bolts and remove the master cylinder.



Brake Lever





Push the hole under the front brake master cylinder and then remove the brake light switch.

Remove the screw and then remove the brake light switch from the rear brake master cylinder.





Front Brake Master Cylinder

Brake pedal master cylinder

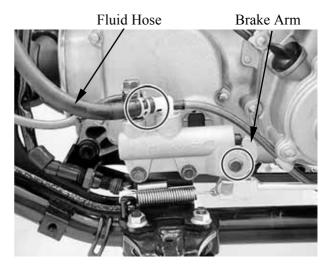
Remove the brake reservoir cap and drain the brake fluid from the hydraulic brake system (refer to the "REAR BRAKE FLUID CHANGE/AIR BLEED" section or "COMBINATION BRAKE FLUID CHANGE/AIR BLEED (ON ROAD)" section in this chapter).

*

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

Remove the joint then disconnect the fluid hose from the master cylinder.

Remove the bolt/nut then remove the brake arm from the master cylinder.



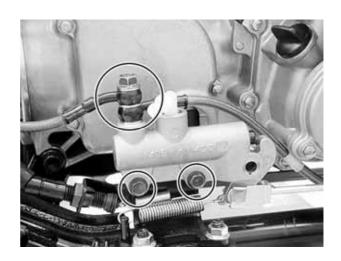


Remove fluid hose bolt/two washers and then disconnect the fluid hose.

*

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

Remove the two mounting bolts and remove the master cylinder.



INSPECTION

Check the diaphragm to cracks or damage. If any damages are found, replace the diaphragm with a new one.





INSTALLATION

Front/rear master cylinder

Install the brake light switch.

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

Torque: 1.2 kg-m (12 Nm, 8.6 lbf-ft)

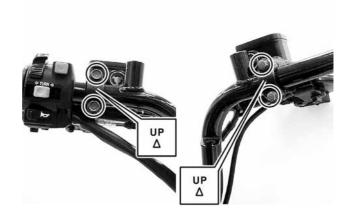




*_

ON ROAD TYPE:

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



Install the brake fluid hose with the attaching bolt and two new sealing washers, then tighten the bolt to the specified torque.

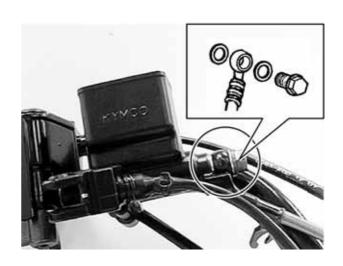
Torque: 3.5 kgf-m (35 Nm, 25 lbf-ft)

Apply lightweight lithium-soap base grease to the dust boot in the master cylinder, then install the brake lever.

Apply lightweight lithium-soap base grease to the bolt, then install and tighten the bolt and nut securely.

Fill the brake reservoir with the specified brake fluid and bleed air from the brake system (refer to the "FRONT BRAKE FLUID CHANGE/AIR BLEED" section or "REAR BRAKE FLUID CHANGE/AIR BLEED" section or "COMBINATION BRAKE FLUID CHANGE/AIR BLEED (ON ROAD" section in this chapter).

Install the brake reservoir cap.





Apply grease to the dust boot



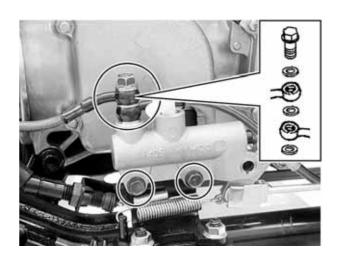
Brake pedal master cylinder

Install and tighten the two mounting bolts to the specified torque.

Torque: 1.2 kg-m (12 Nm, 8.6 lbf-ft)

Install the brake fluid hose (ON ROAD: two brake fluid hose) with the attaching bolt and two (ON ROAD: three) new sealing washers, then tighten the bolt to the specified torque.

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



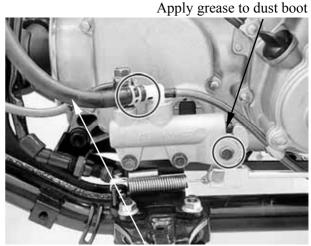
Apply lightweight lithium-soap base grease to the dust boot in the master cylinder, then install the brake arm.

Apply lightweight lithium-soap base grease to the bolt, then install and tighten the bolt and nut securely.

Connect the fluid hose to the master cylinder, then fix the joint.

Fill the brake reservoir with the specified brake fluid and bleed air from the brake system (refer to the "COMBINATION BRAKE FLUID CHANGE/AIR BLEED" section in this chapter).

Install the brake reservoir cap.



Fluid Hose



BRAKE MASTER CYLINDER DISASSEMBLY/INSPECTION/ ASSEMBLY

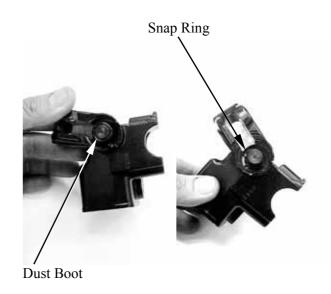
DISASSEMBLY

Front/rear brake master cylinder

Remove the brake master cylinder (refer to the "BRAKE MASTER CYLINDERS REMOVAL/INSTALLATION" section in this chapter).

Remove the piston dust boot and snap ring from the brake master cylinder.

Remove the spring and piston together.

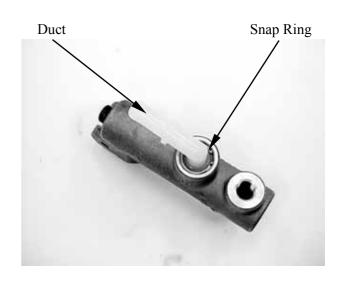




Brake pedal master cylinder

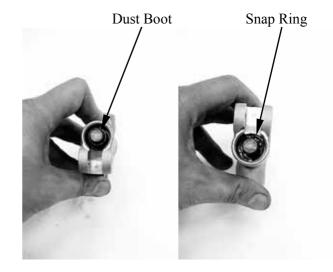
Remove the brake master cylinder (refer to the "BRAKE MASTER CYLINDERS REMOVAL/INSTALLATION" section in this chapter).

Remove the snap ring then remove the fluid duct and O-ring.





Remove the dust boot. Remove the snap ring, then remove the piston and spring together.



INSPECTION

Check the cylinder inside wall for scratch, corrosion or other abnormal condition.

If any abnormal condition is found, replace the master cylinder.





Check the spring and piston for scratch, corrosion or other abnormal condition.

If any abnormal condition is found, replace the parts.

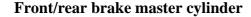




ASSEMBLY

*

- Wash the master cylinder components with new brake fluid before reassembly.
- Do not wipe the brake fluid off with a rag after washing the components.
- When washing the components, use the specified brake fluid (DOT 4). Never use different types of fluid or cleaning solvents such as gasoline, kerosine, etc.
- Apply brake fluid to the master cylinder bore and all the component to be inserted to be inserted to the bore.



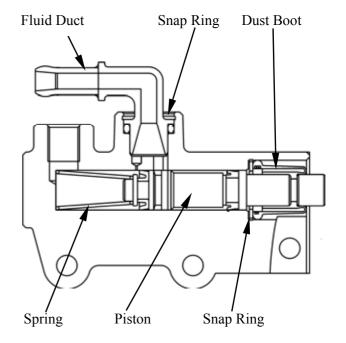
Install the spring/piston. Install the snap ring. Install a new dust boot.



Brake pedal master cylinder

Install the spring/piston. Install the snap ring.
Install a new dust boot.

Install a new O-ring. Install the fluid duct. Install the snap ring.





RELAY VALVE REMOVAL/DISASSEMBLY/INSP ECTION/ASSEMBLY/ INSTALLATION (ON ROAD)

REMOVAL

Drain brake fluid (refer to the "COMBINATION BRAKE FLUID CHANGE/AIR BLEED (ON ROAD)" section in this chapter).



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

Remove all fluid hoses bolts/washers and then disconnect the all fluid hoses.



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

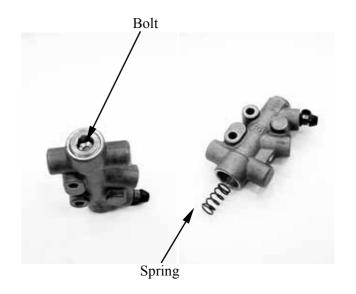
Remove the two mounting bolts and remove the relay valve.



DISASSEMBLY

Remove the bolt.

Remove the spring.





Push the piston out with a screwdriver.

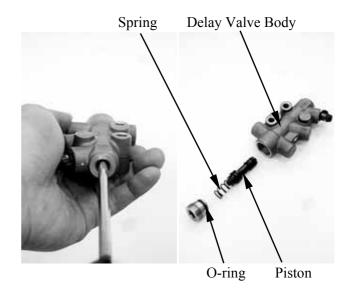
INSPECTION

Check the delay valve body inside wall for scratch, corrosion or other abnormal condition.

If any abnormal condition is found, replace the delay valve.

Check the spring and piston for scratch, corrosion or other abnormal condition.

If any abnormal condition is found, replace the parts.



ASSEMBLY



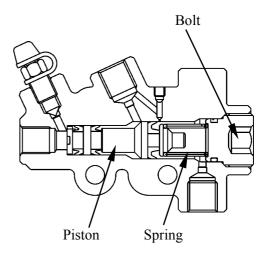
- Wash the delay valve components with new brake fluid before reassembly.
- Do not wipe the brake fluid off with a rag after washing the components.
- When washing the components, use the specified brake fluid (DOT 4).
 Never use different types of fluid or cleaning solvents such as gasoline, kerosine, etc.
- Apply brake fluid to the delay valve bore and all the component to be inserted to be inserted to the bore.

Install the piston.

Install the spring.

Replace a new O-ring then install and tighten the bolt to the specified torque.

Torque: 5 kgf-m (50 N-m, 36 lbf-ft)





INSTALLATION

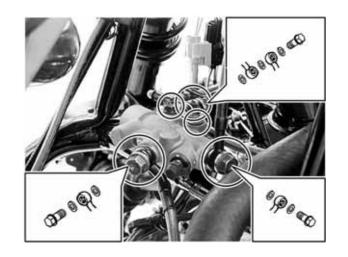
Install and tighten the mounting bolts to the specified torque.

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

Install the all brake fluid hoses with the attaching bolts and new sealing washers, then tighten the bolts to the specified torque.

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

Fill the specified brake fluid and bleed air from the brake system (refer to the "COMBINATION BRAKE FLUID CHANGE/AIR BLEED (ON ROAD)" section in this chapter).





FRONT BRAKE CALIPERS REMOVAL/INSTALLATION

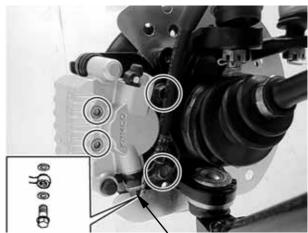
REMOVAL

Drain the brake fluid from the hydraulic brake system (refer to the "FRONT BRAKE FLUID CHANGE/AIR BLEED (OFF ROAD)" section or "COMBINATION BRAKE FLUID CHANGE/AIR BLEED (ON ROAD)" section in this chapter).

Remove the brake fluid hose bolt and two washers from the caliper.

Remove the brake pads (refer to the "BRAKE PADS REPLACEMENT" section in this chapter).

Remove the brake caliper.



Fluid Hose Bolt/Washers

INSTALLATION

Install the brake fluid hose with the attaching bolt and two new sealing washers, then tighten the bolt to the specified torque.

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

Fill the specified brake fluid and bleed air from the brake system (refer to the "FRONT BRAKE FLUID CHANGE/AIR BLEED (OFF ROAD)" section or "COMBINATION BRAKE FLUID CHANGE/AIR BLEED (ON ROAD)" section in this chapter).



REAR BRAKE CALIPERS REMOVAL/INSTALLATION

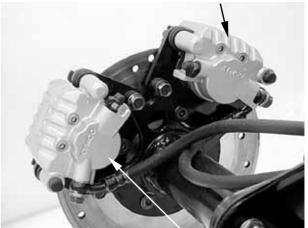
Drain the brake fluid from the hydraulic brake system (refer to the "**REAR BRAKE FLUID CHANGE/AIR BLEED**" section in this chapter).

Remove the brake fluid hose bolt and two washers from the caliper.

Remove the brake pads (refer to the "BRAKE PADS REPLACEMENT" section in this chapter).

Remove the brake caliper.

Caliper (Brake Lever)



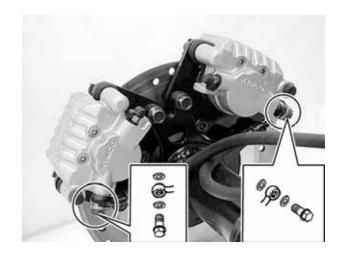
OFF ROAD Type: Caliper (Brake Pedal)

INSTALLATION

Install the brake fluid hose with the attaching bolt and two new sealing washers, then tighten the bolt to the specified torque.

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

Fill the specified brake fluid and bleed air from the brake system (refer to the "REAR BRAKE FLUID CHANGE/AIR BLEED" section in this chapter).





REAR BRAKE/PARKING BRAKE CALIPER REMOVAL/INSTALLATION (ON ROAD)

Drain the brake fluid from the hydraulic brake system (refer to the "COMBINATION BRAKE FLUID CHANGE/AIR BLEED (ON ROAD)" section in this chapter).

Disconnect the parking brake cable from the caliper.

Remove the brake fluid hose bolt and two washers from the caliper.

Remove the brake pads (refer to the "BRAKE PADS REPLACEMENT" section in this chapter).

Remove the brake caliper.

INSTALLATION

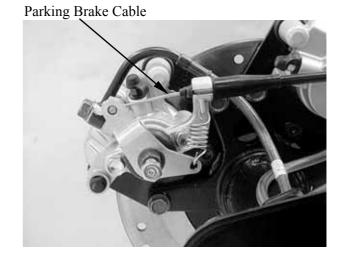
Install the brake fluid hose with the attaching bolt and two new sealing washers, then tighten the bolt to the specified torque.

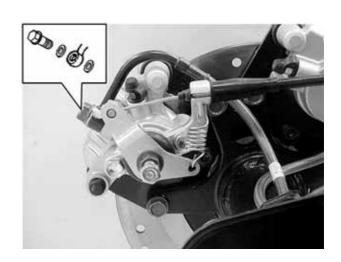
Torque: 3.5 kgf-m (35 Nm, 25 lbf-ft)

Connect the parking brake cable.

Fill the specified brake fluid and bleed air from the brake system (refer to the "COMBINATION BRAKE FLUID CHANGE/AIR BLEED (ON ROAD)" section in this chapter).

Adjust the parking brake lever (refer to the "PARKING BRAKE ADJUSTMENT" section in the chapter 3).





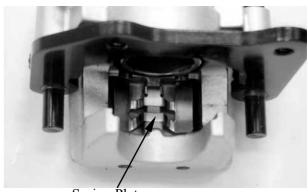


BRAKE CALIPER DISASSEMBLY/INSPECTION/ ASSEMBLY

DISASSEMBLY

Remove the front or rear brake caliper (refer to the "FRONT BRAKE CALIPERS REMOVAL/INSTALLATION" section or "REAR BRAKE CALIPERS REMOVAL/INSTALLATION" section in this chapter).

Remove the brake pad spring plate.



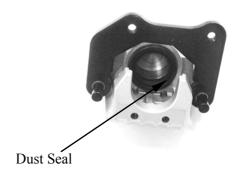
Spring Plate

Remove the piston from the brake caliper. If necessary, use compressed air to squeeze out the piston through the brake fluid inlet opening and place a shop towel under the caliper to avoid contamination caused by the removed piston.





Push the piston dust seal inward to remove.



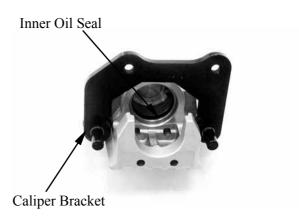
Pushing the piston oil seal outward to remove it.

Clean the seals groove with brake fluid.



Be careful not to damage the piston surface.

Remove the caliper bracket.



INSPECTION

Inspect the caliper cylinder wall and piston surface for scratch, corrosion or other damages.

If any abnormal condition is noted, replace the caliper.

Inspect the dust boots for deterioration or damage.

If any damages are found, replace them with a new ones.





ASSEMBLY

*

- Wash the brake caliper components with new brake fluid before reassembly.
- Do not wipe the brake fluid off with a rag after washing the components.
- When washing the components, use the specified brake fluid (DOT 4). Never use different types of fluid or cleaning solvents such as gasoline, kerosine, etc.
- Apply brake fluid to all of the seals, brake caliper bore and piston before reassembly.



Apply silicone grease to the caliper bracket pins.

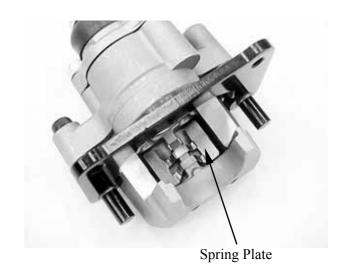


REAR BRAKE/PARKING BRAKE CALIPER DISASSEMBLY/INSPECTION/ ASSEMBLY (ON ROAD)

DISASSEMBLY/INSPECTION

Remove parking brake caliper (refer to the "REAR BRAKE/PARKING BRAKE CALIPER EMOVAL/INSTALLATION (ON ROAD)" section in this chapter).

Remove the brake pad spring plate.



Remove the piston from the brake caliper. If necessary, use compressed air to squeeze out the piston through the brake fluid inlet opening and place a shop towel under the caliper to avoid contamination caused by the removed piston.



Inspect the caliper cylinder wall and piston surface for scratch, corrosion or other damages.

If any abnormal condition is noted, replace the caliper.



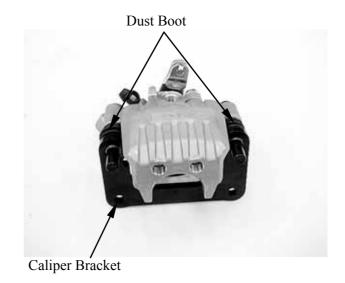


Inspect the dust boots for deterioration or damage.

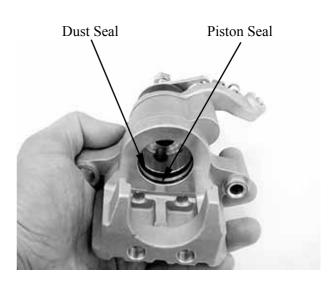
If any damages are found, replace them with a new ones.

Remove the caliper bracket.

Remove the dust boot.



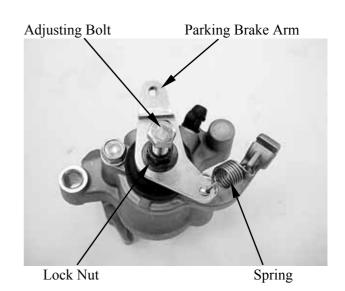
Remove the dust seal and piston seal.



Loosen the lock nut while hold the adjusting bolt.

Remove the adjusting bolt.

Remove the parking brake arm and spring.



16. BRAKE SYSTEM



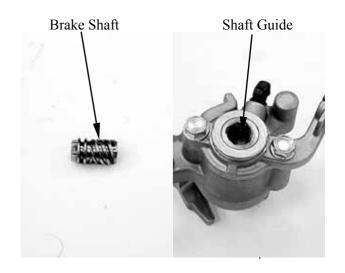
Inspect the dust boot for deterioration or damage.

If any damage is found, replace it with a new one

Remove the drive bolt and dust boot.



Inspect the drive shaft and shaft guide for wear or damage.

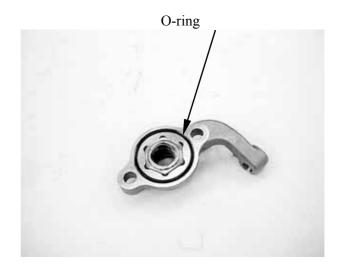


Remove the two bolts and parking brake case.

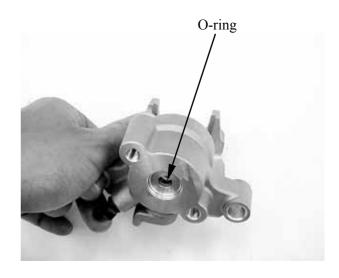




Remove the O-ring.

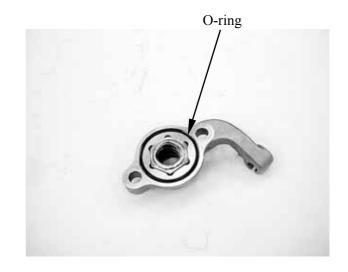


Inspect the O-ring for wear or damage. If any damages are found, replace it with a new one.



INSTALLATION

Apply silicone grease to the new O-ring, then install the new O-ring.



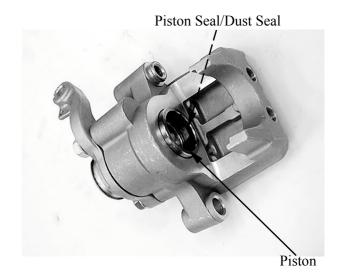


Install the parking brake case and two bolts. Tighten the bolts securely.



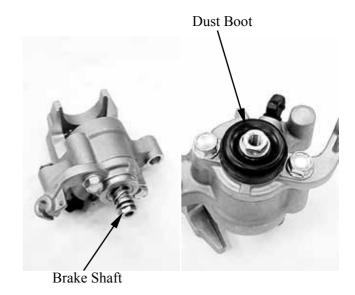
Apply silicone grease to the new piston seal and new dust seal, then install them.

Install the piston.



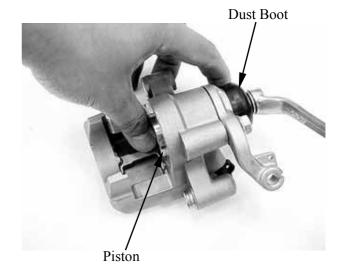
Apply silicone grease to the brake shaft, then install it.

Apply silicone grease to the dust boot, then install it.



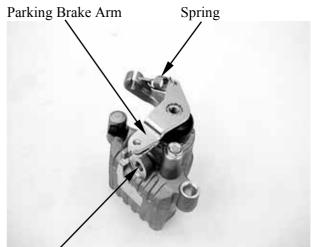


Press the piston and turn the brake shaft counterclockwise to expand boot, then the brake shaft does not touch piston.



Install the parking brake arm and spring.

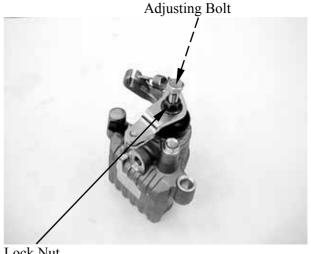
Align the parking brake arm with the brake fluid inlet hole as shown.



Brake Fluid Inlet hole

Install the adjusting bolt and lock nut.

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



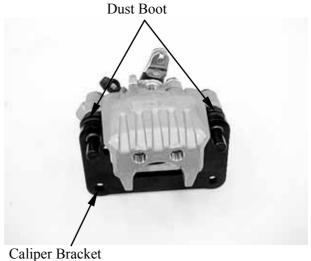
Lock Nut

16. BRAKE SYSTEM



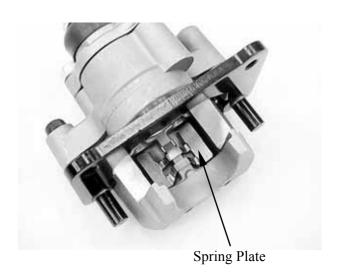
Install the dust boots.

Apply silicone grease to caliper bracket, then install it.



Camper Bracket

Install the spring plate.



Install the parking brake caliper (refer to the "REAR BRAKE/PARKING BRAKE CALIPER EMOVAL/INSTALLATION (ON ROAD)" section in this chapter).

Adjust the parking brake (refer to the "PARKING BRAKE ADJUSTMENT (ON ROAD)" section in the chapter 3).



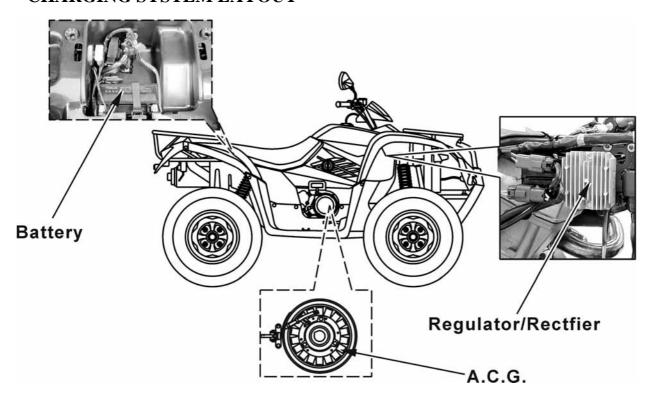
17

BATTERY/CHARGING SYSTEM

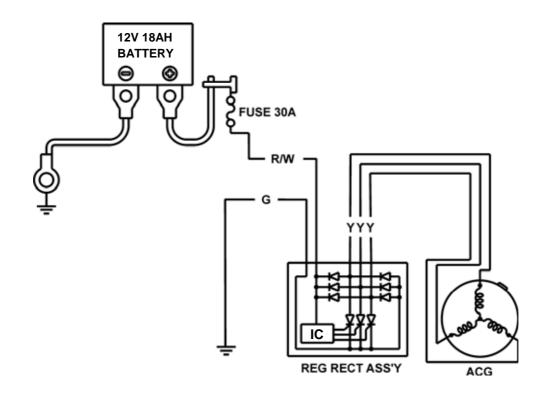
| CHARGING SYSTEM LAYOUT/CHARGING CIRCUIT | 1/- 1 |
|---|-------|
| SERVICE INFORMATION | 17-2 |
| TROUBLESHOOTING | 17-4 |
| BATTERY | 17-5 |
| CHARGING SYSTEM INSPECTION | 17-6 |
| ALTERNATOR CHARGING COIL | 17-7 |
| REGULATOR/RECTIFIER | 17-8 |
| ALTERNATOR STATOR REMOVAL/INSPECTION/ | |
| INSTALLATION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



CHARGING SYSTEM LAYOUT



CHARGING CIRCUIT



17. BATTERY/CHARGING SYSTEM



SERVICE INFORMATION

GENERAL

CAUTION

- The battery gives off explosive gases; keep sparks, flames and cigarettes away. Provide adequate ventilation when charging.
- The battery contains sulfuric acid (electrolyte). Contact with skin or eyes may cause severe burns. Wear protective clothing and a face shield.
- If electrolyte gets on your skin, flush with water.
- If electrolyte gets in your eyes, flush with water for at least 15 minutes and call a physician immediately.
- Electrolyte is poisonous.
 - If swallowed, drink large quantities of water or milk and call your local Poison Control Center or physician immediately, KEEP OUT OF REACH OF CHILDREN.
- Always turn off the ignition switch before disconnecting any electrical component.
- Some electrical components may be damaged if terminals or connectors are connected or disconnected while the ignition switch is turned to "ON" and current is present.
- For extended storage, remove the battery, give it a full charge, and store it in a cool, dry place.
- For a battery remaining in a shorted vehicle, disconnect the negative battery cable from the battery.
- The battery caps should not be removed. Attempting to remove the sealing caps from the cells may damage the battery.
- The maintenance free battery must be replaced when it reaches the end of its service life.
- The battery can be damaged if overcharged or undercharged, or if left to discharge for long period. These same conditions contribute to shortening the "life span" of the battery. Even under normal use, the performance of the battery deteriorates after 2-3 years.
- Battery voltage may recover after battery charging, but under heavy load, the battery voltage will drop quickly and eventually die out. For this reason, the charging system is often suspected as the problem. Battery overcharge often results from problems in the battery itself, which may appear to be an overcharging symptom. If one of the battery cells is shorted and battery voltage does not increase, the regulator/rectifier supplies excess voltage to the battery. Under these conditions, the electrolyte level goes down quickly.
- Before troubleshooting the charging system, check for proper use and maintenance of the battery. Check if the battery is frequently under heavy load, such as having the headlight and taillight on for long periods of time without riding the vehicle.
- The battery self-discharge when the vehicle is not in use, for this reason, charge the battery every 2 weeks to prevent sulfate from occurring.
- Filling a new battery with electrolyte will produce some voltage, but in order to achieve its maximum performance, always charge the battery. Also, the battery life is lengthened when it is initially charged.
- When checking the charging system, always follow the steps in the troubleshooting flow chart (page 17-4)

KYMCO MXU 500

17. BATTERY/CHARGING SYSTEM

BATTERY CHARGING

- This model comes with a maintenance free (MF) battery. Remember the following about MF batteries.
- Use only the electrolyte that comes with the battery.
- Use all of the electrolyte
- Seal the battery properly
- Never open the seals again
- For battery charging, do not exceed the charging current and time specified on the battery. Using excessive current or extending the charging time may damage the battery.

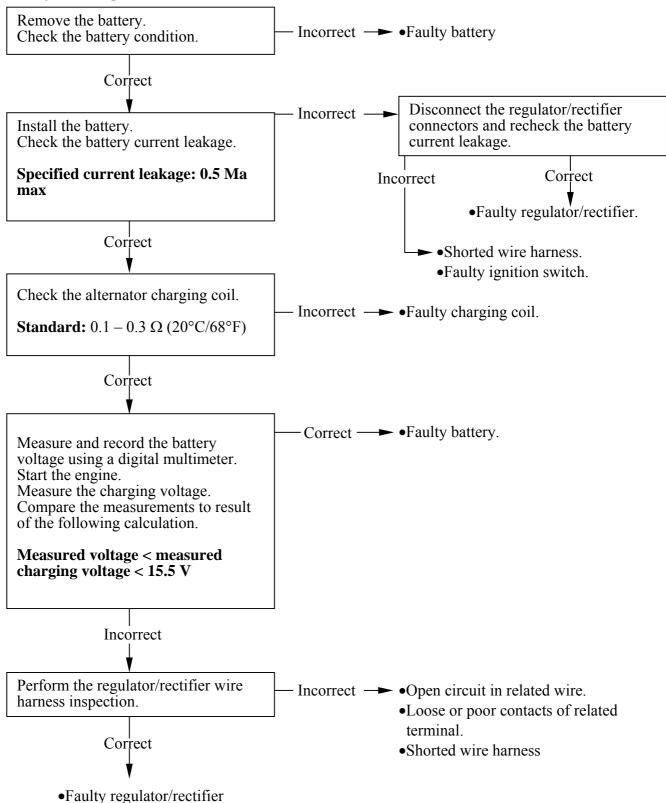
SPECIFICATIONS

| | ITEM | | SPECIFICATIONS |
|----------------|--------------------------|----------------|----------------------|
| | Capacity | | 12V – 18 Ah |
| | Current leakage | | 0.5 Ma max. |
| D-44 | Voltage (20°C/68°F) | Full charged | 13.0 – 13.2 V |
| Battery | | Needs charging | Below 12.3 V |
| | Charging current | Normal | 1.8 A/5 - 10 h |
| | | Quick | 9 A/1 h |
| Alternator | Capacity | | 310 – 400 W/5000 rpm |
| 7 111011111101 | Charging coil resistance | (20°C/68°F) | $0.1 - 0.3 \Omega$ |



TROUBLESHOOTING

Battery is damaged or weak





BATTERY

REMOVAL/INSTALLATION

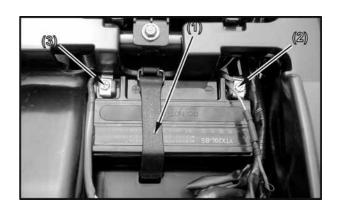
Battery removal

- 1. Make sure the ignition switch is OFF.
- 2. Remove the seat (refer to the "**FRAME COVERS**" section in the chapter 2)
- 3. Release the rings and remove the rubber band (1).
- 4. Disconnect the negative (-) terminal lead (2) from the battery first, then disconnect the positive (+) terminal lead (3).
- 5. Remove the battery.

Battery installation

- 1. Install in the reverse order of removal.
- 2. After installing the battery, check to see if the battery cables are routed correctly.

After connecting the battery cables, coat the terminals with grease.



VOLTAGE INSPECTION

Remove the battery cover (see above).

Measure the battery voltage using a commercially available digital multi-meter.

Voltage (20°C/68°C):

Fully charged: 13.0 - 13.2 V Under charged: below 12.3 V





BATTERY CHARGING

Remove the battery (see page 17-5).

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

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

*

Turn the power ON/OFF at the charger, not at the battery terminals.

Charging current time:

Standard: 1.8 A/5 - 10 hours **Ouick:** 9 A/1 hours

Quick charging should only be done in an emergency; slow charging is preferred. For battery charging, do not exceed the charging current and time specified on the battery. Using excessive current or extending the charging time may damage the battery.

CHARGING SYSTEM INSPECTION

CURRENT LEAKAGE TEST

Turn the ignition switch OFF, disconnect the negative (-) cable from the battery.

Connect the ammeter (+) probe to the negative (-) cable and the ammeter (-) probe to the battery (-) terminal.

With the ignition switch OFF, check for current leakage.

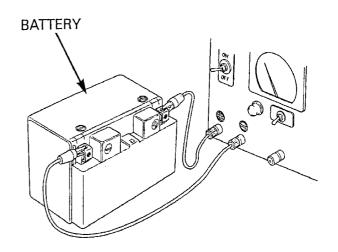
When measuring current using a tester, set it to a high range, and then bring the range down to an appropriate level. Current flow higher than the range selected may blow out the fuse in the tester.

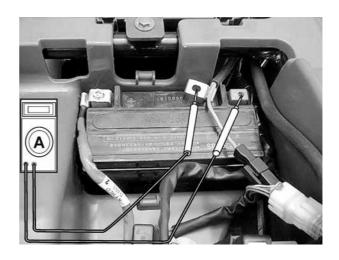
While measuring current, do not turn the ignition switch ON. A sudden surge of current may blow out the fuse in the tester.

Specified current leakage: 0.5 Ma max.

If current leakage exceeds the specified value, a shorted circuit is likely.

Locate the short by disconnecting connections one by one and measuring the current.







CHARGING VOLTAGE INSPECTION

Be sure that the battery is in good condition before performing this test.



Do not disconnect the battery or any cable in the charging system without first switching off the ignition switch. Failure to follow this precaution can damage the tester or electrical components.

Start the engine and warm it up to the operating temperature; stop the engine. Connect the multi-meter between the positive and negative terminals of the battery.

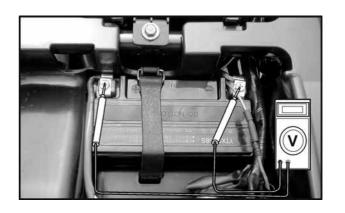
To prevent short, make absolutely certain which are the positive and negative terminals or cable.

With the headlight on and turned to the high beam position, restart the engine.

Measure the voltage on the multi-meter when the engine runs at 5000 min-1 (rpm).



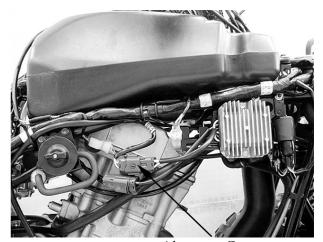
Measured battery voltage (page 17-5) < Measure charging voltage (see above) < 15 V



ALTERNATOR CHARGING COIL

INSPECTION

Disconnect the alternator connector.



Alternator Connector



Measure the resistance between each Yellow wire terminals.

Standard: 0.1 - 0.3 Ω (20°C/68°F)

Check for continuity between each Yellow wire terminal of the alternator side connector and ground.

There should be no continuity.

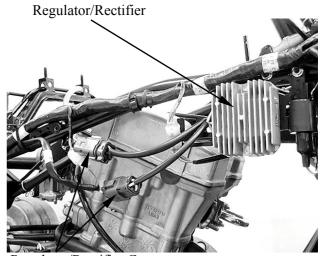
Replace the alternator stator if resistance is out of specification, or if any wire has continuity to ground.



REGULATOR/RECTIFIER

WIRE HARNESS INSPECTION

Disconnect the regulator/rectifier connectors. Check the connectors for loose contacts of corroded terminals.



Regulator/Rectifier Connectors

Battery line

Measure the voltage between the Red/White wire terminal and ground.

There should be battery voltage at all times.

Voltage feedback line

Measure the voltage between the black wire terminal and ground.

There should be battery voltage with the ignition switch "ON", and no voltage with the ignition switch "OFF".

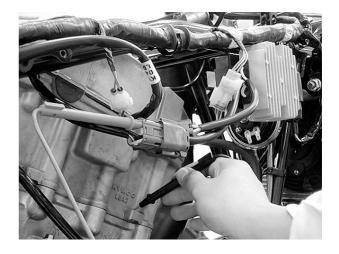




Ground line

Check the continuity between the Green wire terminal and ground.

There should be continuity at all times.



Charging coil line

Measure the resistance between each Yellow wire terminals.

Standard: 0.1 - 0.3 Ω (20°C/68°F)

Check for continuity between each Yellow wire terminal and ground.

There should be no continuity.



KYMCO MXU 500

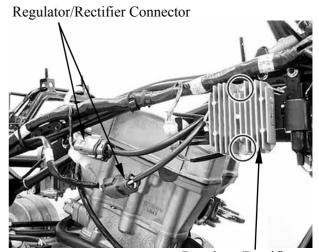
17. BATTERY/CHARGING SYSTEM

REMOVAL/INSTALLATION

Disconnect the regulator/rectifier connectors.

Remove the two bolts and then remove the regulator/rectifier.

Installation is in the reverse order of removal.



Regulator/Rectifier

ALTERNATOR STATOR REMOVAL/INSPECTION/INSTALLATION

REMOVAL

Drain the engine oil (refer to the "**ENGINE OIL**" section in the chapter 3).

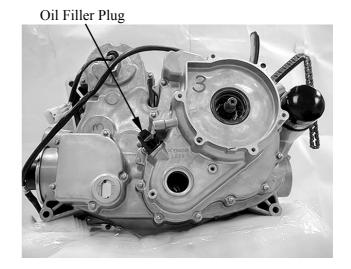
Disconnect the alternator stator connectors.



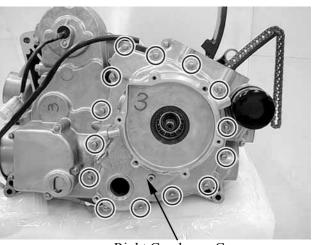
Alternator Stator Connectors

Remove the starter pulley (refer to the "STARTER PULLEY REMOVAL/INSPECTION/INSTALLATI ON" section in the chapter 19).

Remove the oil filler plug.

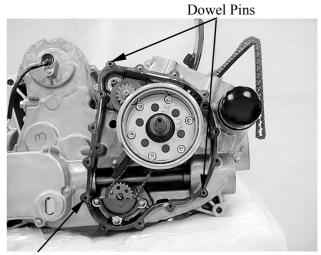


Remove the fourteen bolts and then remove the right crankcase cover.



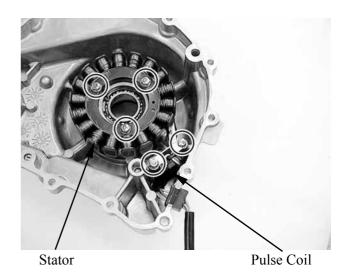
Right Crankcase Cover

Remove the two dowel pins and gasket.



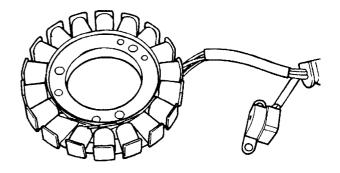
Gasket

Remove the two pulse coil mount bolts. Remove the three stator mount bolts, grommet and the stator from the right crankcase cover.



INSPECTION

Check the stator and pulse coil for damage.





INSTALLATION

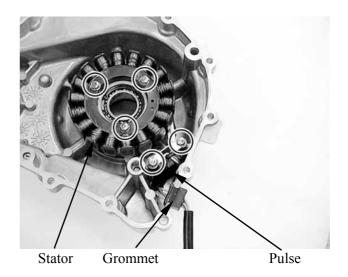
Install the stator and tighten the stator mount bolts to the specified torque.

Torque: 1.2 kgf-m (12 N-m, 9 lbf-ft)

Apply sealant to the grommet seating surface and install it to the cover groove properly.

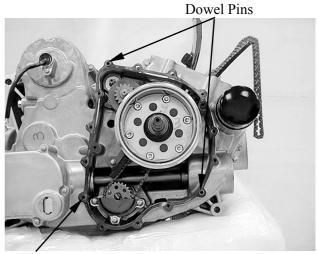
Install the pulse coil and tighten mount bolts to the specified torque.

Torque: 1.2 kgf-m (12 N-m, 9 lbf-ft)



Clean the mating surfaces of the right crankcase and cover.

Install the dowel pins and gasket.

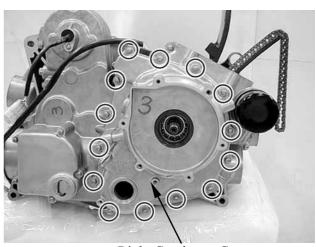


Gasket

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

FLYWHEEL:

Refer to the "STARTER CLUTCH REMOVAL/INSPECTION/INSTALL ATION" section in the chapter 19



Right Crankcase Cover



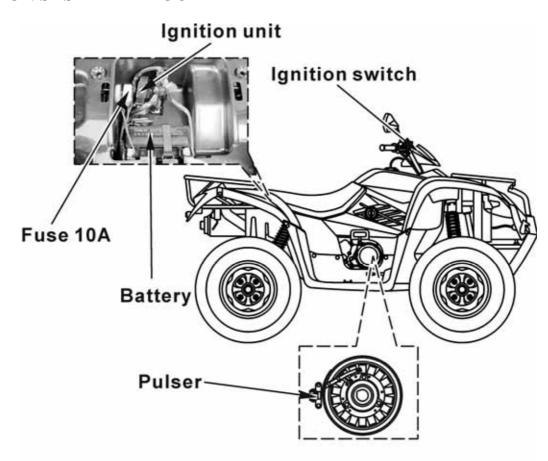
18

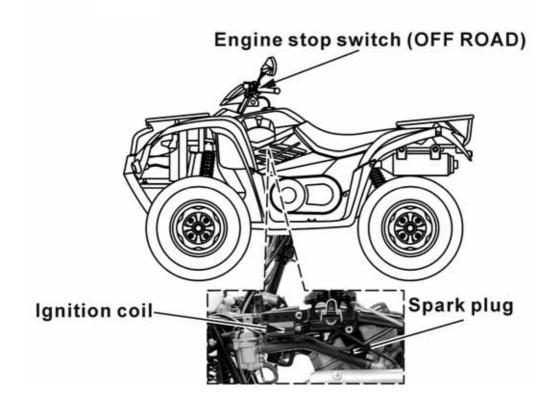
IGNITION SYSTEM

| IGNITION SYSTEM LAYOUT | 18-1 |
|--------------------------|------|
| IGNITION CIRCUIT | 18-2 |
| SERVICE INFORMATION | 18-3 |
| TROUBLESHOOTING | 18-4 |
| IGNITION COIL INSPECTION | 18-5 |
| IGNITION CONTROL MODULE | 18-6 |

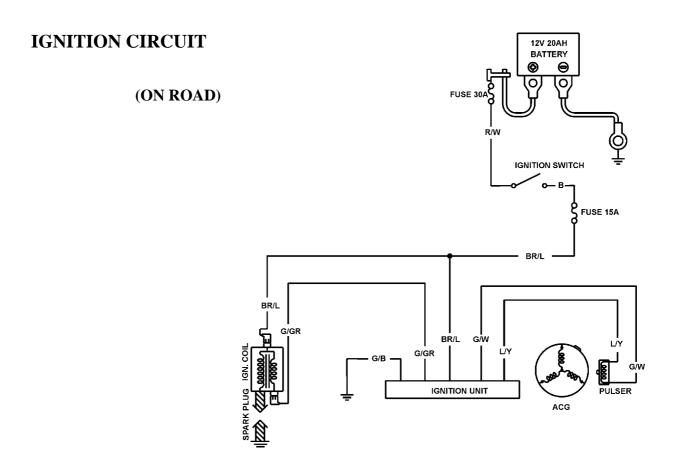


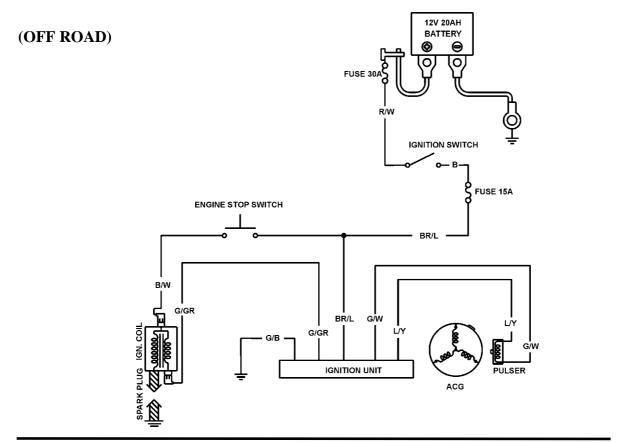
IGNITION SYSTEM LAYOUT













SERVICE INFORMATION

GENERAL INSTRUCTIONS

- Some electrical components may be damaged if terminals or connectors are connected or disconnected while the ignition switch is "ON" and current is present.
- When servicing the ignition system, always follow the steps in the troubleshooting on page 18-3.
- The ignition timing cannot be adjusted since the ignition control module is factory preset.
- The ignition control module may be damaged if dropped. Also, if the connector is disconnected when current is flowing, the excessive voltage may damage the ignition control module. Always turn off the ignition switch before servicing.
- A faulty ignition system is often related to poor connections. Check those connections before proceeding.
- Make sure the battery is adequately charged. Using the starter motor with a weak battery results in a slower engine cranking speed as well as no spark at the spark plug.
- Use a spark plug of the correct heat range. Using spark plug with an incorrect heat range can damage the engine.
- See section 17 for ignition pulse generator removal/installation.
- See section 20 for following components:
- Ignition switch
- _ Engine stop switch

SPECIFICATIONS

| Item | Standard |
|-----------------|----------------------------------|
| Spark plug | NGK-CR7E |
| Spark plug gap | 0.7 mm (0.028 in) |
| Ignition system | Full transistor digital ignition |
| Ignition timing | 5°/1500 rpm |

18. IGNITION SYSTEM



TROUBLESHOOTING

LOW PEAK VOLTAGE

- Cranking speed is too low (battery is undercharged).
- Poorly connected connectors or an open circuit in the ignition system.
- Faulty ignition-coil.
- Faulty ignition control module.

NO PEAK VOLTAGE

- Short circuit in engine stop switch or ignition switch wire.
- Faulty engine stop switch or ignition switch.
- Loose or poorly connected ignition control module connectors.
- Open circuit or poor connection in ground wire of the ignition control module.
- Faulty ignition pulse generator.
- Faulty ignition control module.

PEAK VOLTAGE IS NORMAL, BUT NO SPARK JUMPS AT THE PLUG

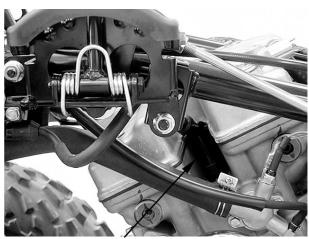
- Faulty spark plug or leaking ignition coil secondary current.
- Faulty ignition coil.



IGNITION COIL INSPECTION

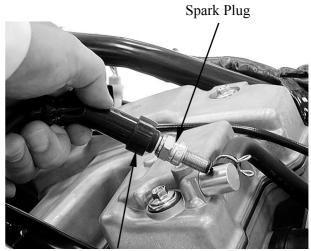
IGNITION COIL PRIMARY PEAK VOLTAGE

Check cylinder compression and check that the spark plugs is installed correctly in the cylinder. Disconnect the spark plug cap from the spark plug.



Spark Plug Cap

Connect known good spark plug to the spark plug cap and ground the spark plugs to the cylinder as done in the spark test.



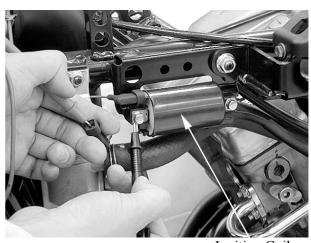
Spark Plug Cap

Turn the ignition switch to "ON" and engine stop switch ON.

Turn the engine stop switch in RUN (OFF ROAD).

Connect the multi-meter (+) probe to the Brown/Blue wire and the multi-meter (-) to the body ground.

Check for initial voltage at this time.
The battery voltage should be measured.
If the initial voltage cannot be measured, check the power supply circuit.



Ignition Coil

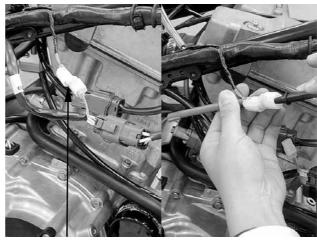


IGNITION PULSE GENERATOR INSPECTION

Disconnect the ignition pulse generator connector.

Measure the ignition pulse generator resistance between the Green/White wire and Blue/Yellow wire.

Standard: 791 Ω (20°C/68°F)



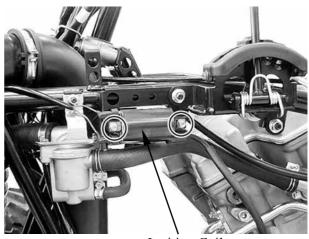
Ignition Pulse Generator Connector

IGNITION COIL REMOVAL/INSTALLATION

Disconnect the spark plug cap from the spark plug (page 18-4).

Disconnect the ignition coil primary connectors. Remove the two bolts and the ignition coil.

Installation is in the reverse order of removal.

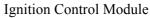


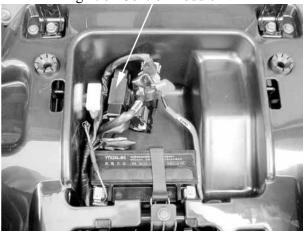
Ignition Coil

IGNITION CONTROL MODULE

REMOVAL/INSTALLATION
Remove the seat (refer to the "FRAME COVERS" section in the chapter 2).

Disconnect the ignition control module connectors and remove the ignition control module.



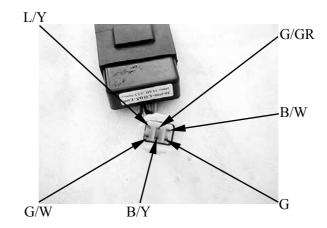


RESISTANCE INSPECTION

Measure the resistance between the terminals.



Due to the semiconductor in circuit, it is necessary to use a specified tester for accurate testing. Use of an improper tester in an improper range may give false readings.



Unit: Ω

| (-) | B/W | G/GR | L/Y | G/W | B/Y | G |
|------|-----|------|----------|---------|-----|----------|
| B/W | | | | | | |
| G/GR | | | 6.7 M | 6.7 M | | 6.7 M |
| L/Y | | | | 0.785 K | | Continue |
| G/W | | | 0.778 K | | | 0.785 k |
| B/Y | | | | | | |
| G | | | Continue | 0.785 K | | |



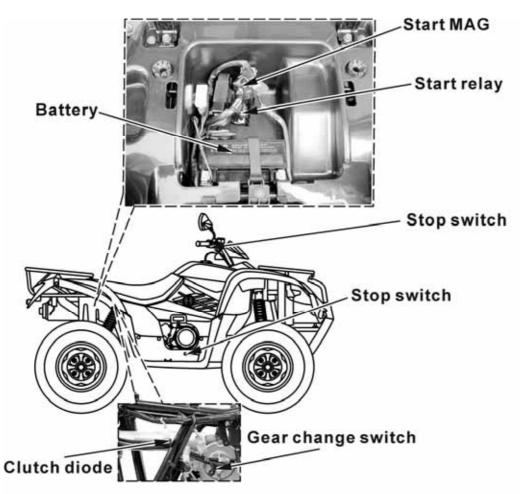
STARTER SYSTEM

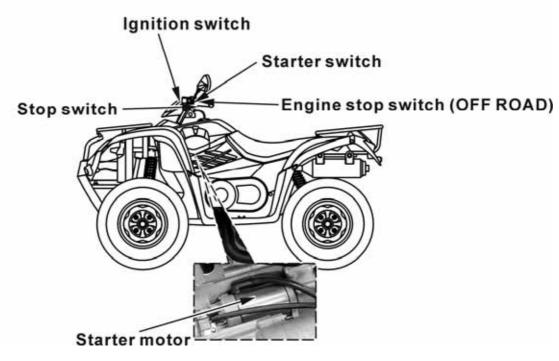
| 19 | | |
|-----|---|--|
| 119 | 1 | |
| | | |
| | | |

| STARTING SYSTEM LAYOUT | 19- 1 |
|--|-------|
| STARTING CIRCUIT | 19-2 |
| SERVICE INFORMATION | 19-3 |
| TROUBLESHOOTING | 19-3 |
| STARTER MOTOR | 19-6 |
| STARTER RELAY SWITCH/STARTER MAG | 19-7 |
| RECOIL STARTER REMOVAL/INSPECTION/ | |
| INSTALLATION | 19-9 |
| RECOIL STARTER HANDLE REPLACE | 19-11 |
| RECOIL STARTER DISASSEMBLY/INSPECTION/ | |
| ASSEMBLY | 19-12 |
| STARTER PULLEY REMOVAL/INSPECTION/ | |
| INSTALLATION | 19-18 |
| STARTER CLUTCH REMOVAL/INSPECTION/ | |
| INSTALLATION | 19-20 |

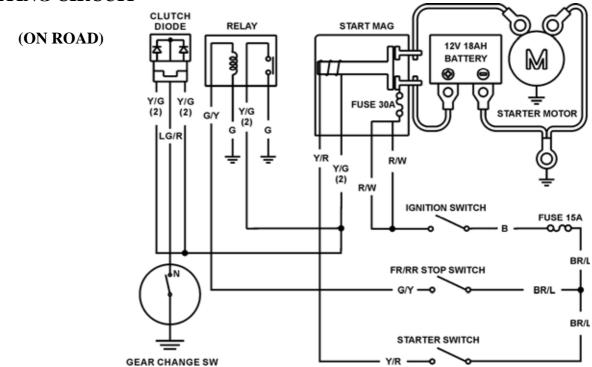


STARTING SYSTEM LAYOUT

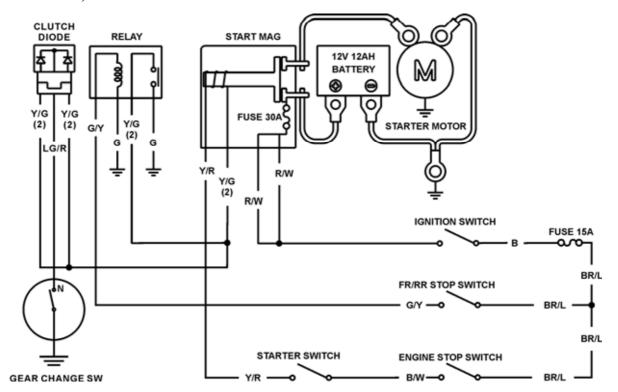




STARTING CIRCUIT



(OFF ROAD)





SERVICE INFORMATION

GENERAL

- Always turn the ignition switch to "OFF" before servicing the starter motor. The motor could suddenly start, causing serious injury.
- The starter motor can be serviced with the engine in the frame.
- When checking the starter system, always follow the steps in the troubleshooting flow chart (page 19-2).
- A weak battery may be unable to turn the starter motor quickly enough, or supply adequate ignition current.
- If the current is kept flowing through the starter motor to turn it while the engine is not cranking over, the starter motor may be damaged.
- See section 20 for following components:
 - Ignition switch
 - Starter switch
 - Brake light switch

SPECIAL TOOL

Flywheel puller A120E00060

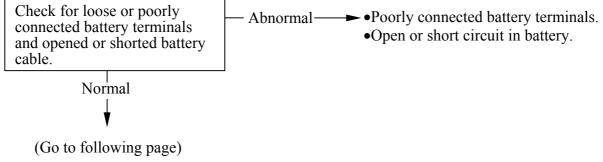
TORQUE

Starter pulley nut 5.5 kgf-m (55 N-m, 40 lbf-ft)

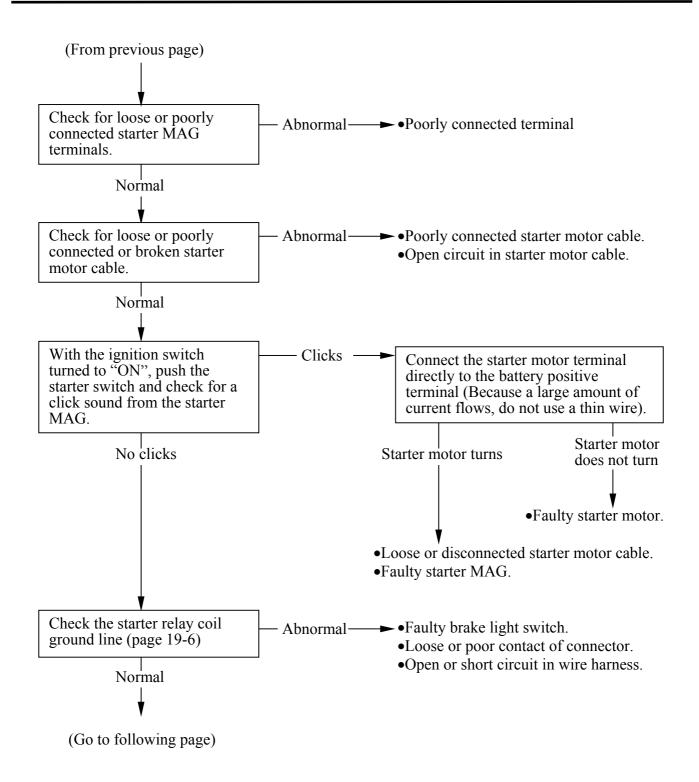
TROUBLESHOOTING

- Check for the following before troubleshooting:
 - Blown main fuse (30A) and sub fuse (15 A)
 - Loose battery and starter motor cable
 - Discharged battery
- The starter motor can turn with the following conditions:
 - Ignition switch ON
 - Engine stop switch in RUN (OFF ROAD)
 - Rear brake lever fully squeezed
 - Starter switch pushed

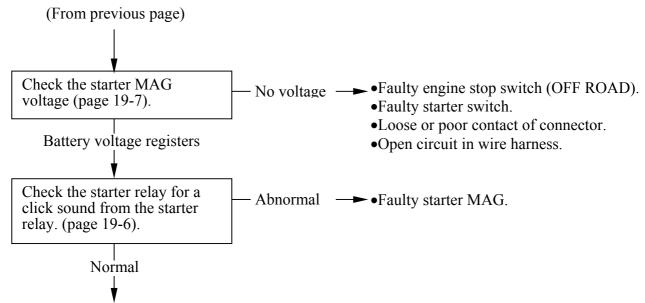
Starter motor will not turn













STARTER MOTOR

INSPECTION

Disconnect the starter motor cable from the starter MAG.

Turn the ignition switch to "ON".

Connect the starter motor cable directly to the battery positive terminal.

If the starter motor does not turn, the starter motor is faulty.



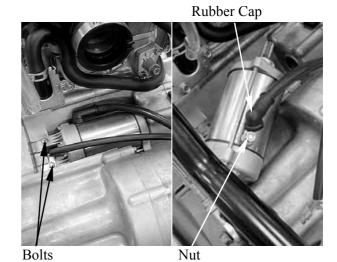
REMOVAL

Remove the carburetor (refer to the "CARBURETOR REMOVAL/CHOKE INSPECTION/INSTALLATION" section in the chapter 5).

Turn the ignition switch turned to "OFF"

Remove the two mounting bolts and starter motor.

Release the rubber cap and remove the terminal nut to disconnect the starter motor cable from the starter motor.



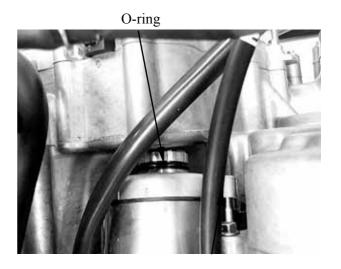
INSTALLATION

Coat a new O-ring with engine oil and install it into the starter motor groove.

Connect the starter motor cable to motor terminal with the terminal nut and tighten it.

Install the starter motor into the crankcase.

Install the two mounting bolts and tighten them securely.





STARTER RELAY SWITCH/STARTER MAG

INSPECTION

Turn the ignition switch to "ON".

Squeeze the brake lever or pedal fully. The coil is normal if the starter relay switch clicks.

Squeeze and hold the brake lever or pedal fully then push the starter switch.

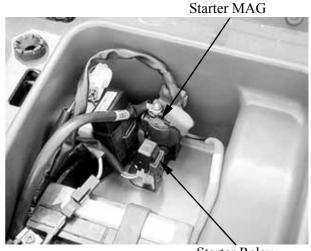
The coil is normal if the starter MAG switch clicks.

If you do not hear the switch click. Inspect the relay switch and starter MAG using the procedure below.

GROUND LINE INSPECTION

Disconnect the starter relay switch connector. Check for continuity between the Green wire terminal and ground.

There should be continuity.



Starter Relay

Starter Relay



VOLTAGE INSPECTION

Connect the starter MAG connector. Turn the ignition switch ON.

Measure the starter MAG Yellow/Red wire terminal and ground.

If the battery voltage appears only when the rear brake lever is squeezed fully (or the gear change switch in neutral) and starter switch is pushed, the circuit is normal.



Starter MAG

19. STARTER SYSTEM

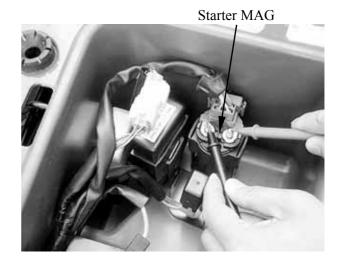


CONTINUTY INSPECTION

Disconnect the starter MAG switch connector and cables.

Connect a fully charged 12 V battery positive wire to the relay switch Yellow/Red wire terminal and negative wire to the Yellow/Green wire terminal.

There should be continuity between the cable terminals while the battery is connected, and no continuity when the battery is disconnected.



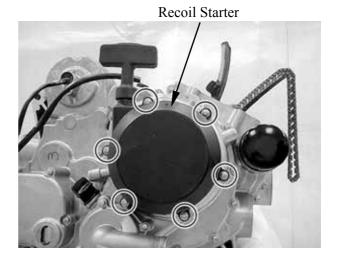


RECOIL STARTER REMOVAL/INSPECTION/INSTALLATION

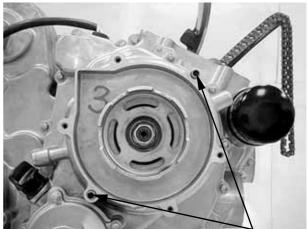
The recoil starter can not start the engine when the battery is removal.

REMOVAL

Remove the six bolts, then remove the recoil starter assembly.



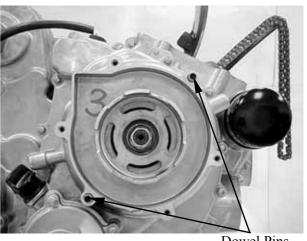
Remove the two dowel pins.



Dowel Pins

INSTALLATION

Install the dowel pins.

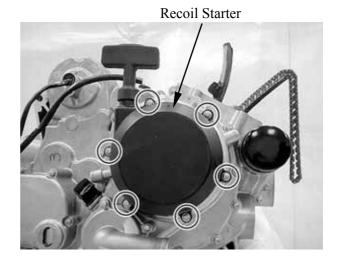


Dowel Pins

19. STARTER SYSTEM



Install the recoil starter assembly. Install and tighten the six bolts diagonally.





RECOIL STARTER HANDLE REPLACE

Remove the recoil starter assembly (refer to the "RECOIL STARTER REMOVAL/INSPECTION/INSTALLATION" section in this chapter).

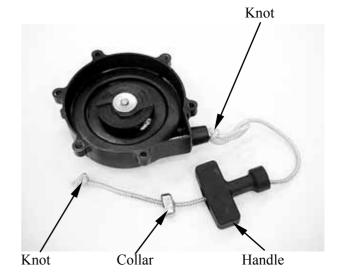
Remove the cap on the handle.



Replace the handle.

*

Before untying the knot above the starter handle, make a knot in the rope so that the rope is not pulled into the housing.





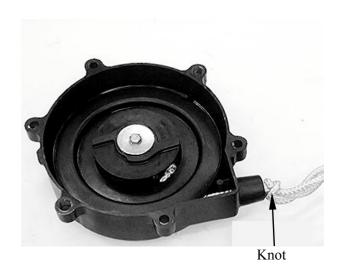
RECOIL STARTER DISASSEMBLY/INSPECTION/ ASSEMBLY

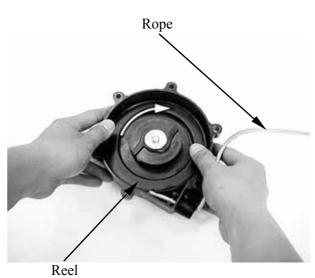
DISASSEMBLY

Remove the recoil starter assembly (refer to the "RECOIL STARTER REMOVAL/INSPECTION/INSTALLATION" section in this chapter).

Remove the handle (refer to the "**RECOIL STARTER HANDLE REPLACE**" section in this chapter).

Untying the knot, then turn the reel clockwise with the rope slowly.





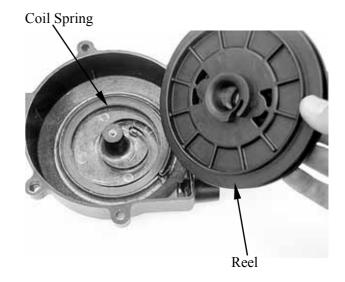
Remove the bolt and then remove the washer, friction plate and pawl spring.



Remove the reel, then remove the coil spring.

*

Wear hand and eye protection when removing the reel, since the spring may quickly unwind and cause and injury.



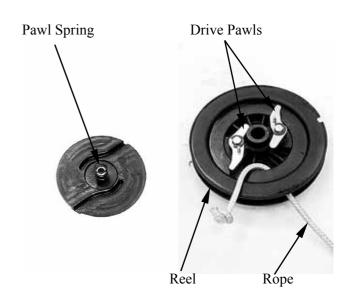
INSPECTION

Pull the rope and check that the ratchet is pushed out.

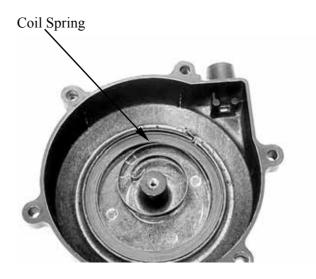


Inspect the rope, reel and drive pawl for wear or damage.

Inspect the pawl spring for fatigue.



Inspect the coil spring for fatigue.

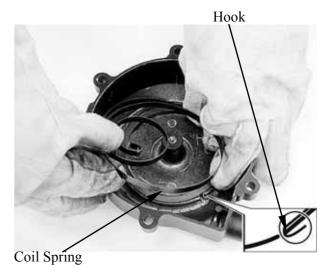


ASSEMBLY

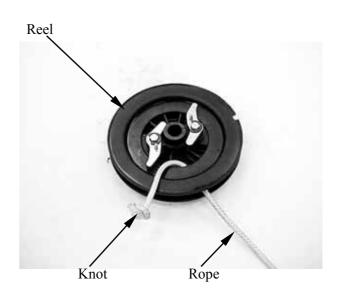
Apply molybdenum disulfide grease to the coil spring, then install the coil spring.

*

- Wear hand and eye protection when installing the spring, since the spring may quickly unwind and cause and injury.
- Mesh the spring hook with the housing slit, then wind the housing to make the diameter of the spring smaller and the spring will be into the housing.



Pass the rope through the reel and make a knot above the reel.

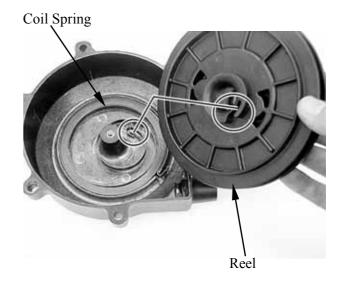




Install the reel.

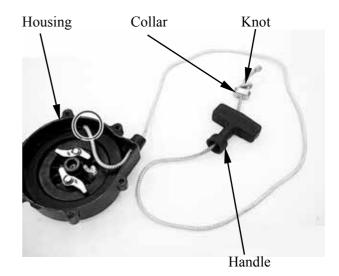
*

- Wear hand and eye protection when installing the reel, since the spring may quickly unwind and cause and injury.
- Engage the part of the reel with coil spring end.



Hook the rope onto the hook part of the reel, then pass the rope through the recoil starter housing, handle and collar.

Make a knot above the collar.



Hook the rope onto the hook part of the reel, turn the reel counterclockwise three or four times with the rope.

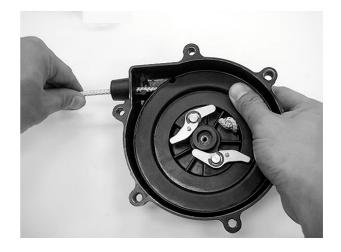


Wear hand and eye protection when assembling the recoil starter, since the spring may quickly unwind and cause and injury.

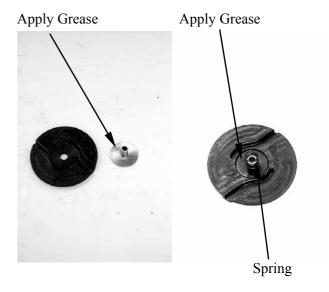




Unhook the rope, then turn the reel clockwise with the rope slowly.



Apply molybdenum disulfide grease to the washer and friction plate.



Install the pawl spring, friction plate/washer. Install and tighten the new bolt securely.





Pull the rope and check that the ratchet is pushed out.



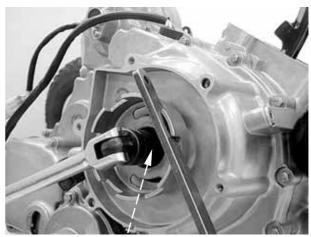


STARTER PULLEY REMOVAL/INSPECTION/ INSTALLATION

REMOVAL

Remove the recoil starter assembly (refer to the "RECOIL STARTER REMOVAL/INSPECTION/INSTALLATION" section in this chapter).

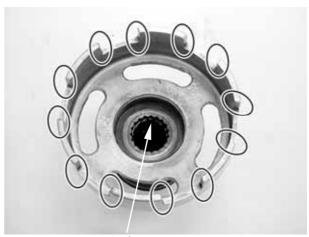
Remove the starter pulley nut by using a suitable bar.



Nut/Washer

INSPECTION

Inspect the starter pulley for cracks or pitting. Inspect the O-ring for wear or damage.



O-ring

Inspect the oil stop ring for crack or damage.

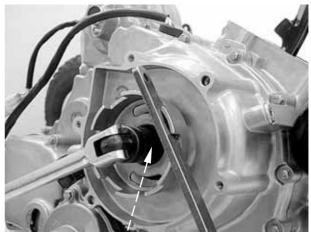




INSTALLATION

Install the starter pulley and washer. Install and tighten the nut to the specified torque by using suitable bar.

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



Nut/Washer



STARTER CLUTCH REMOVAL/INSPECTION/ INSTALLATION

REMVOAL

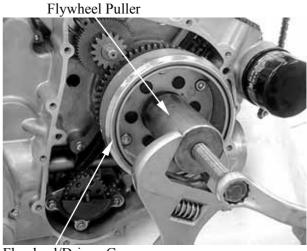
Remove the right crankcase cover (refer to the "ALTERNATOR STATOR REMOVAL/INSPECTION/INSTALLATION" section in the chapter 17).

Remove the flywheel/driven gear by using the special tool.

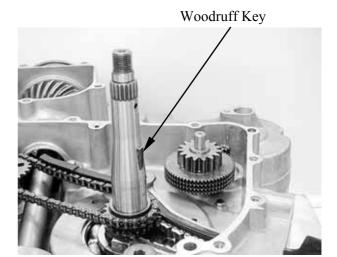
Special tool:

Flywheel puller A120E00060

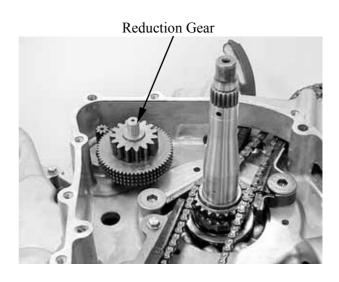
Remove the woodruff key.



Flywheel/Driven Gear



Remove the reduction gear.





INSPECTION

Check the operation of the sprag clutch by

turning the driven gear.
You should be able to turn the driven gear clockwise smoothly, but the gear should not turn counterclockwise.

Remove the starter driven gear by turning the driven gear.



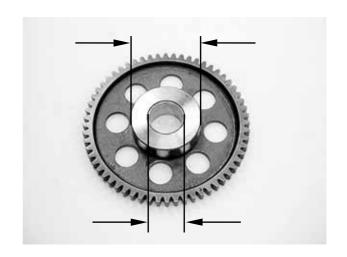
Check the starter driven gear teeth for wear or damage.

Measure the starter driven gear boss O.D..

Service limit: 57.7 mm (2.272 in)

Measure the starter driven gear bushing I.D..

Service limit: 27.1 mm (1.084 in)



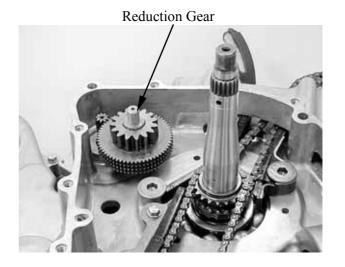
Check the starter reduction gear teeth and shaft for wear or damage.



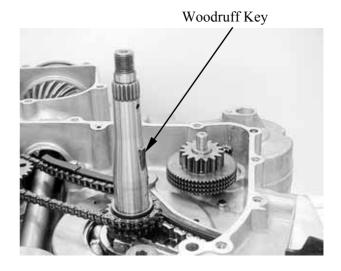
19. STARTER SYSTEM

INSTALLATION

Apply oil to the starter reduction gear. Install the starter reduction gear to the right crankcase.



Install the woodruff key in the crankshaft key groove.



Apply molybdenum oil solution to the starter driven gear bushing.

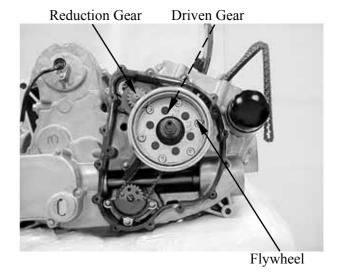
Install the starter driven gear by turning the driven gear clockwise.



19. STARTER SYSTEM

Clean any oil from the tappered portion of the flywheel I.D.

Install the flywheel/driven gear onto the crankshaft, aligning the key way with woodruff key.





LIGHTS/SWITHCES

| SERVICE INFORMATION | 20- 1 |
|--------------------------|-------|
| BULBS REMOVAL | 20-2 |
| HORN (ON ROAD) | 20-4 |
| IGNITION SWITCH | 20- 5 |
| HANDLEBAR SWITCH | 20- 5 |
| GEAR INDICATOR SWITCH | 20-8 |
| SPEED SENSOR | 20-9 |
| 2WD/4WD SELECTING SYSTEM | 20-10 |
| FUEL UNIT | 20-13 |

20. LIGHTS/SWITCHES



SERVICE INFORMATION

- A continuity test can be made with the switches installed on the vehicle.
- All plastic connectors have locking tabs that must be released before disconnecting, and
- must be aligned when reconnecting.

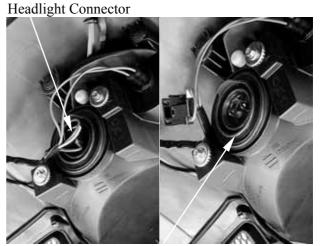
 To isolate an electrical failure, check the continuity of the electrical path through the part. A continuity check can usually be made without removing the pat from the vehicle. Simply disconnect the connectors and connect a continuity tester to the terminals or connections.



BULBS REMOVAL

HEADLIGHT

Disconnect the headlight wire connector. Remove the rubber boot from the headlight case.



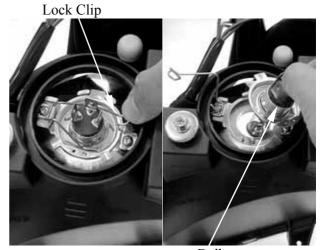
Rubber Boot

Relax the lock clip to remove the bulb and replace with a new one.

Install the bulb, aligning the bulb socket groove with the bulb tab and set the lock clip.

Connect headlight wire connector. Install the rubber boot.

Install the front fender in the reverse order of removal.

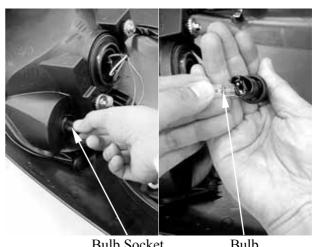


Bulb

POSITION LIGHT

Remove the bulb socket by pulling it out. Remove the bulb.

Install the bulb in the reverse order of removal



Bulb Socket

Bulb

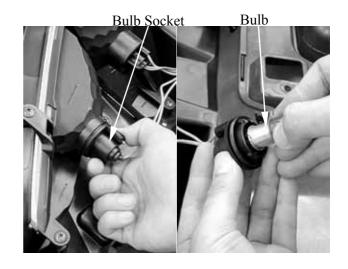


TAIL/BRAKE LIGHT

Remove the bulb socket by turning it counterclockwise.

Remove the bulb.

Install the bulb in the reverse order of removal.

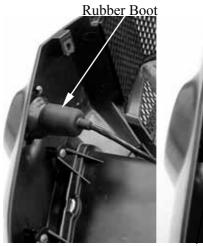


TURN SIGNAL LIGHT (ON ROAD)

FRONT

Remove the rubber boot from the turn signal light case. Remove the bulb socket by turning it

counterclockwise.

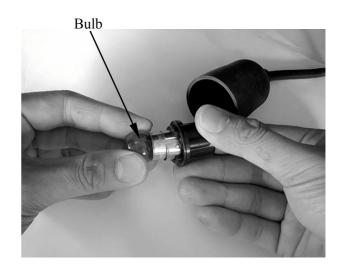




Bulb Socket

Remove the bulb.

Install the bulb in the reverse order of removal.



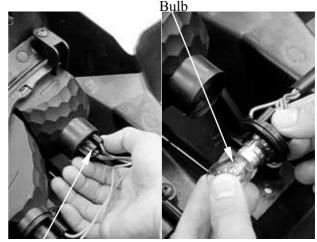


REAR

Remove the bulb socket by turning it counterclockwise.

Remove the bulb.

Install the bulb in the reverse order of removal.



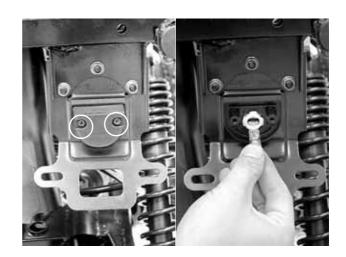
Bulb Socket

LICENCE LIGHT BULB (ON ROAD)

Remove the two screws and licence light cover.

Remove the bulb.

Install the bulb in the reverse order of removal



HORN (ON ROAD)

REMOVAL

Disconnect the horn wire leads. Remove the bolt and remove horn.

INSTALLATION

The installation sequence is the reverse of removal.



Horn Wire Leads

Horn



IGNITION SWITCH

INSPECTION

Disconnect the ignition switch connectors. (Refer to the "**FRAME COVER**" section in the chapter 2.)

Check for continuity between the switch side connector terminals in each switch position.

Continuity should exist between the color coded wires as right:

| | IG | Е | BAT1 | BAT2 | РО |
|-------|---------------|---|----------|------|----|
| OFF | <mark></mark> | 9 | | | |
| ON | | | Ŷ | P | |
| РО | | | 6 | þ | 9 |
| COLOR | B/W | G | R | В | BR |

REPLACEMENT

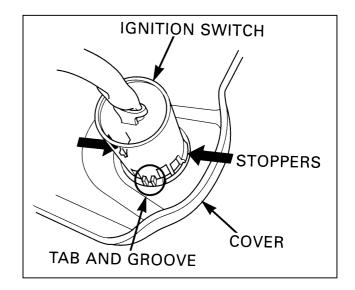
Release the switch wire from the wire clips on the steering shaft holder frame pipe.

Remove the meter cover (refer to the "FRAME COVER" section in the chapter 2).

Remove the ignition switch from the cover while pushing in the two stoppers.

Install a new ignition switch by aligning the locating tab with the groove in the cover.

Install the removed parts in the reverse order of removal.



HANDLEBAR SWITCH

INSPECTION

Remove front center cover (refer to the "FRAME COVER" section in the chapter 2).

Disconnect the connectors.

Check for continuity between the switch side connector terminals in each switch position.

Continuity should exist between the color coded wires as next page:



(ON ROAD)

HORN SW

| | но | ват |
|-------|----|-----|
| FREE | | |
| PUSH | þ | 9 |
| COLOR | LG | В |

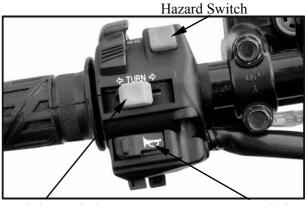
| WINKERSW | | | |
|----------|----|----|----|
| | R | WR | |
| ٦ | | þ | þ |
| R | þ | | Ą |
| COLOR | SB | 0 | GR |

| 1 | | | |
|---|--|--|--|
| | | | |
| 1 | | | |
| | | | |
| | | | |

START SW

| | ST | С |
|-------|-----|------|
| FREE | | |
| PUSH | φ | Q |
| COLOR | Y/R | Y/BR |

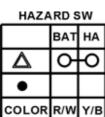
| LIGHTSW | | | | | |
|----------|----------|---|---|--|--|
| | PO LO HI | | | | |
| 10 OH | 0 | | | | |
| M | b | φ | | | |
| | b | | φ | | |
| COLOR | BR/B | w | L | | |



Winker Switch

Horn Switch

Light Switch





Start Switch

2WD/4WD SW

| | WR | 2WD | 4WD |
|-------|------|-----|-----|
| 2WD | þ | 9 | |
| 4WD | þ | | 9 |
| COLOR | BR/L | W/L | W/R |



2WD/4WD Select Button



(OFF ROAD)

ENGINE STOP SW

| | E | IG |
|----------|---------------|-----|
| С | <mark></mark> | 9 |
| X | | |
| COLOR | BR/L | B/W |

| STARTSW | | | | |
|---------------|--|---|--|--|
| ST C | | | | |
| FREE | | | | |
| PUSH | | 9 | | |
| COLOR Y/R B/W | | | | |

DIMMER SW

| | HL | LO | H |
|-------|------|----|---|
| 1001 | 0 | | |
| | þ | 9 | |
| | þ | | 9 |
| COLOR | BR/B | W | L |

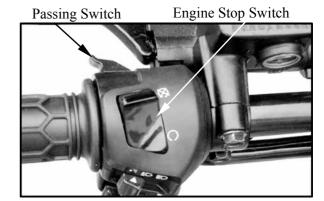
| PASS | SINGS | W |
|------|-------|---|
| | ST | С |

| | ST | С |
|-------|------|---|
| FREE | | |
| PUSH | δ | P |
| COLOR | BR/L | L |

Dimmer Switch



Start Switch



2WD/4WD SW

| | WR | 2WD | 4WD |
|-------|------|-----|-----|
| 2WD | þ | 9 | |
| 4WD | þ | | 9 |
| COLOR | BR/L | W/L | W/R |



2WD/4WD Select Button

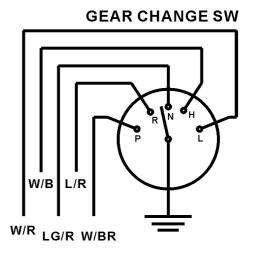


GEAR INDICATOR LIGHT SWITCHES

INSPECTION

Disconnect the gear indicator light switch wire connector.

Check for continuity between the switch side connector terminal and engine ground.



Gear Indicator Light Switch

REPLACEMENT

Disconnect the gear indicator light switch connector.

Remove the bolt, then remove the gear indicator light switch and washer.



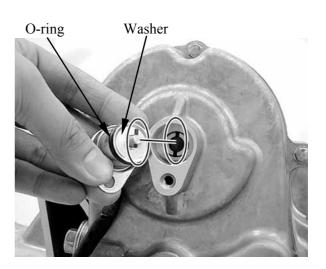
Gear Indicator Light Switch Connector

Install the washer and a new switch with a new O-ring (apply engine oil to O-ring).

*

Make sure that the lever on the gear indicator light switch correctly engages with the locating slot on the shift shaft.

Shift the drive select lever to check if the gear indicator light is correct.





SPEED SENSOR

Disconnect the connector.

Remove the bolt then remove the speed sensor.

If the speedometer, odometer or trip meter does not function properly. Inspect the connection of speed sensor connector.

If the connection is all right, replace the speedometer with a new one.

If the speedometer, odometer or trip meter still does not function properly, replace the speed sensor.



Speed Sensor



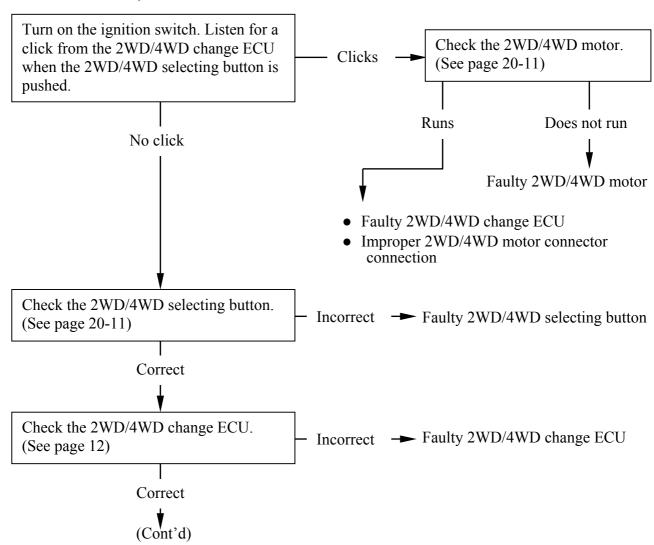
2WD/4WD SELECTING SYSTEM

The 2WD/4WD selecting system consists of the following components:

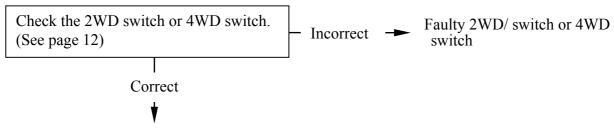
- 2WD/4WD selecting button
- 2WD switch
- 4WD switch
- 2WD/4WD change ECU
- 2WD/4WD motor
- Battery

TROUBLSHOOTING

Does not shift to 2WD/4WD (2WD/4WD motor will not run.)







Open circuit in wire harness

The 2WD/4WD motor runs, but does not shift to 2WD/4WD. Check the front drive sliding dog (refer to the "FRONT DRIVE DISASSEMBLY/INSPECTION/ASSEMBLY" section in the chapter 13).

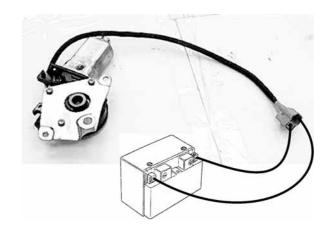
INSPECTION

2WD/4WD motor

Remove the 2WD/4WD motor (refer to the "FRONT DRIVE DISASSEMBLY/INSPECTION/ ASSEMBLY" section in the chapter 13).

Connect the 12 V battery to the 2WD/4WD motor lead wires as shown. If the motor does not run , replace the motor assembly with a new one.

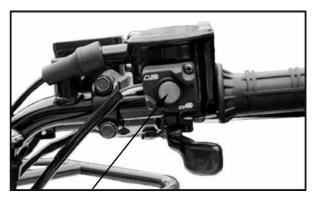
Install the 2WD/4WD motor and tighten the bolts to the specified torque (refer to the "FRONT DRIVE DISASSEMBLY/INSPECTION/ASSEMBLY" section in the chapter 13).



2WD/4WD selecting button

2WD/4WD SW

| | WR | 2WD | 4WD |
|-------|------|-----|-----|
| 2WD | φ | 9 | |
| 4WD | φ | | 9 |
| COLOR | BR/L | W/L | W/R |



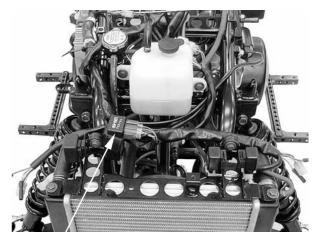
2WD/4WD Select Button



2WD/4WD change ECU

Make sure the 2WD/4WD selecting button is correct (see page 20-11). Disconnect the 2WD/4WD motor connector.

Turn on the ignition switch. Listen for a click from the 2WD/4WD change ECU when the 2WD/4WD selecting button is pushed.



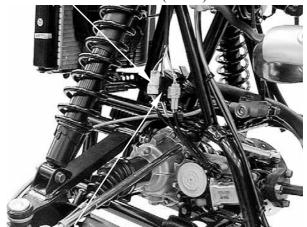
2WD/4WD Change ECU

2WD switch and 4WD switch

Remove the 2WD/4WD motor (refer to the "FRONT DRIVE DISASSEMBLY/INSPECTION/ ASSEMBLY" section in the chapter 13).

Disconnect the switch connectors.

4WD Switch Connector (White)



2WD Switch Connector (Black)

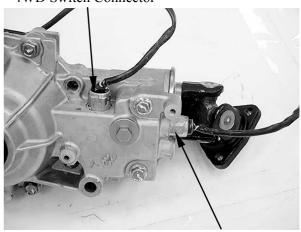
Remove the 2WD switch and 4WD switch.

Inspect the switches.

| 2WD SW | | |
|--------|-----|-----|
| | 2WD | BAT |
| OPEN | | |
| SHORT | φ | 9 |
| COLOR | W/L | B/L |

| 4WD SW | | |
|--------|-----|-----|
| | 4WD | ват |
| OPEN | | |
| SHORT | φ | 9 |
| COLOR | W/R | B/R |
| | | |

4WD Switch Connector



2WD Switch Connector



Apply three bond: 1215 to the 2WD/4WD switches and tighten them to the specified torque.

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

FUEL UNIT

REMOVAL

Remove the fuel tank cover (refer to the "**FRAME COVERS**" section in the chapter 2).

Remove the fuel unit connectors. Remove the four bolts, then remove the fuel unit from fuel tank.

INSPECTION

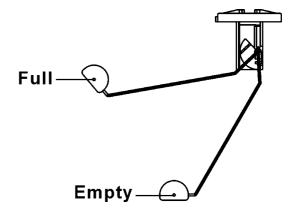
Measure the resistance between the Yellow/White and Blue/White terminals of the fuel unit connector.

Standard (at 20°C/68°F):

| Float at full position | $1100 \pm 33 \Omega$ |
|-------------------------|----------------------|
| Float at empty position | $100 \pm 3 \Omega$ |



Fuel Unit Connectors



INSTALLATION

Fuel unit installation is in the reverse order of removal.

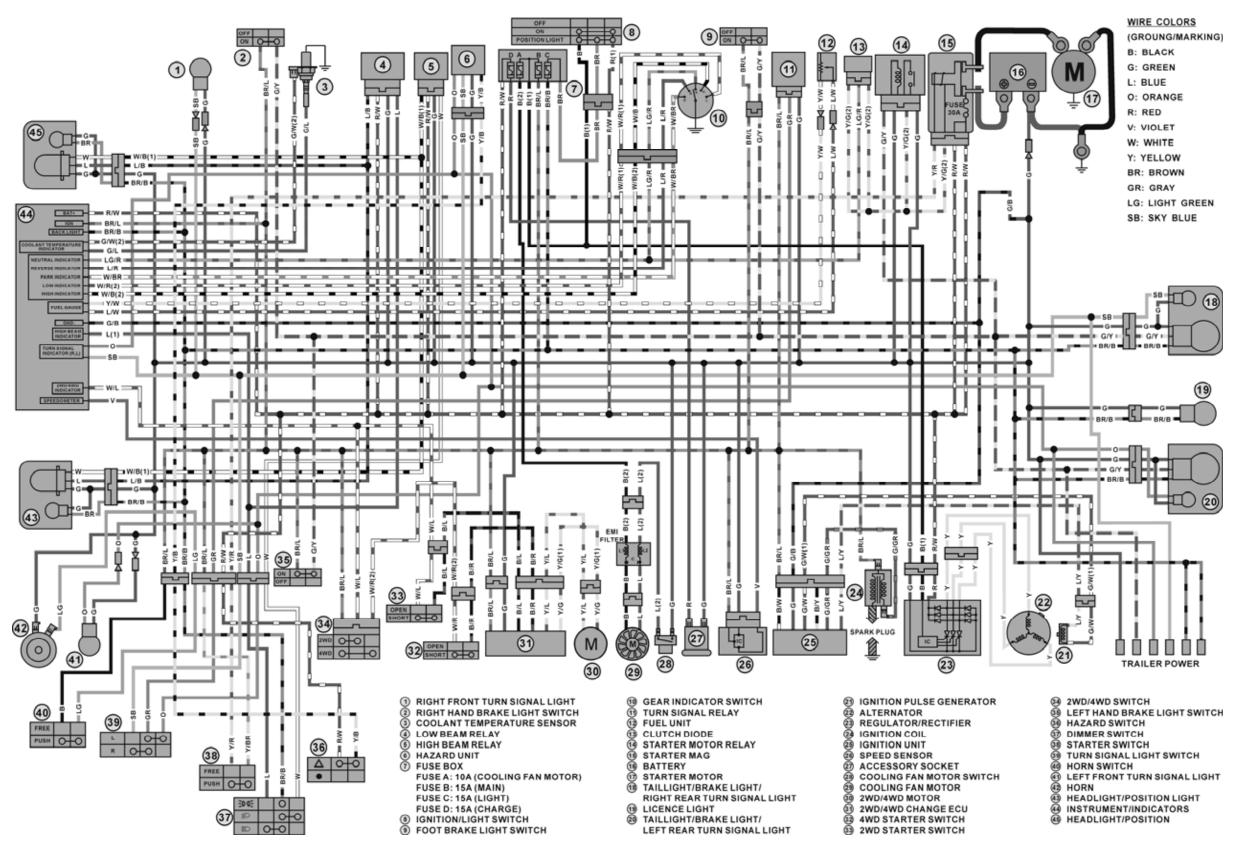
*

Align the tab on the fuel unit with the mark on the fuel tank.





MXU 500 Wiring Diagram (ON ROAD Type)



21

MXU 500 Wiring Diagram (OFF ROAD Type)

