By KWANG YANG Motor Co., Ltd.
1st Edition, Nov. 2012

T300-LHG7-A1

# PREFACE

This Service Manual describes the technical features and servicing procedures for the KYMCO **G-DINK 300i**.

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 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 5 to 12 give instructions for disassembly, assembly and adjustment of engine parts. Section 13 is the AFI system. Section 14 to 15 is the removal/ installation of chassis. Section 16 to 19 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 motorcycle in case specifications are changed.**

**KWANG YANG MOTOR CO., LTD.**
**QUALITY TECHNOLOGY DEPT.**
**EDUCATION SECTION**

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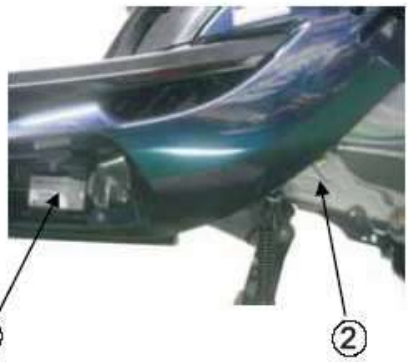
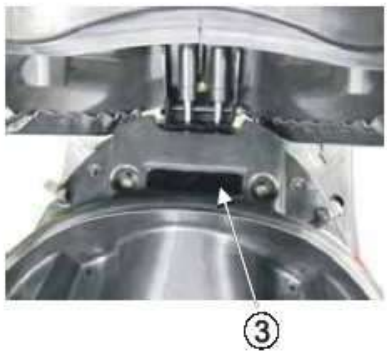
## GENERAL INFORMATION

**Identification Numbers Record**

## Identification Numbers Record




**1. VEHICLE IDENTIFICATION NUMBER (VIN)**

**2. ENGINE SERIAL NUMBER (ESN)**

**3. FRAME SERIAL NUMBER (VIN)**

Record the Vehicle Identification Number ①, Engine Serial Number ② and Frame Serial Number ③ in the boxes above for future reference (to assist you in ordering parts from your authorized KYMCO dealer or for reference in case the vehicle is stolen).

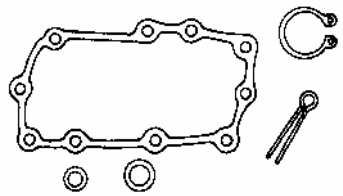
## SPECIFICATIONS

| | | |
|---|---|---|
| Oil filter type | | Full-flow filtration |
| Oil capacity | | 1.1 liter |
| Exchanging capacity | | 0.9 liter |
| **Fi injection system** | | |
| Air cleaner type & No | | Paper element, wet |
| Fuel capacity | | 9 liters |
| Brand | | Keihin |
| Throttle Body | | Butterfly type |
| Venturi diameter (mm) | | 32 |
| Fuel pump pressure | | 3 bar |
| **Electrical system** | | |
| Ignition type | | ECU |
| Ignition timing | | 9°BTDC / idle<br>36° / 6500min |
| Spark plug | | DPR6EA |
| Spark plug gap | | 0.9mm |
| Battery Capacity | | 12V10AH |
| **Transmission system** | | |
| Clutch type | | Dry multi-disc |
| Transmission type | | CVT |
| Operation type | | Auto centrifugal |
| Reduction gear type | | Two-stage reduction |
| Reduction ratio | 1st | 0.72 ~ 2.24 |
| | 2nd | 7.222 |
| **Moving device** | | |
| Tire type | | Tubeless |
| Tire spec. | Front wheel | 120/70-13 |
| | Rear wheel | 140/70-12 |
| Tire pressure (kg/cm²) | Front wheel | 1.75 |
| | Rear wheel | 2.0 |
| Wheel material | | Aluminium |
| Turning angle | Left | 40° |
| | Right | 40° |
| Brake type | Front | Disk brake |
| | Rear | Disk brake |
| **Damping Device** | | |
| Suspension type | Front | Telescope |
| | Rear | Swing arm |
| Shock absorber stroke | Front | 95 mm |
| | Rear | 90 mm |

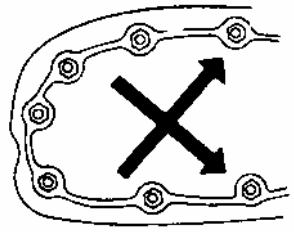
| | | |
|---|---|---|
| Name | | G-DINK 300i |
| Model No. | | SH60AA |
| Overall length | | 2090 mm |
| Overall width | | 770 mm |
| Overall height | | 1360 mm |
| Wheel base | | 1450 mm |
| Engine type | | 4 stroke O.H.C. |
| Displacement | | 270.6 cc |
| Fuel Used | | 92# nonleaded gasoline above |
| Curb weight (kg) | Front wheel | 61 |
| | Rear wheel | 99 |
| | Total | 160 |
| Max. weight capacity (kg) | Front wheel | 105 |
| | Rear wheel | 228 |
| | Total | 333 |
| Ground clearance (mm) | | 140 |
| Braking distance (m) | | 7.9m / 40 km/hr |
| Min. turning radius (mm) | | 2350 |
| **Engine part** | | |
| Starting system | | Starting motor |
| Type | | Gasoline 4-cycle |
| Cylinder arrangement | | Single cylinder |
| Combustion chamber type | | Semi-sphere |
| Valve arrangement | | O.H.C.-4V |
| Bore x stroke (mm) | | φ 72.7 * 65.2 |
| Compression ratio | | 10.6:1 |
| Compression pressure (kg/cm²) | | 15 |
| Max. output (ps/rpm) | | 22.8 /8000 |
| Max. torque (kg-m/rpm) | | 22.5 / 6500 |
| Intake Timing | Open | 9° BTDC |
| | Close | 36° BTDC |
| Exhaust Timing | Open | 42° BTDC |
| | Close | 7° BTDC |
| Valve clearance | Intake | 0.10 |
| | Exhaust | 0.10 |
| Idle speed (rpm) | | 1600±100 rpm |
| Cooling Type | | Liquid cooling |
| Lubrication type | | Forced pressure & wet sump |
| Oil pump type | | Inner/outer rotor |

**SERVICE PRECAUTIONS**

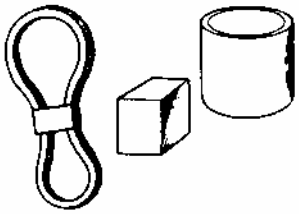
■ Make sure to install new gaskets, O-rings, circlips, cotter pins, etc. when reassembling.



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

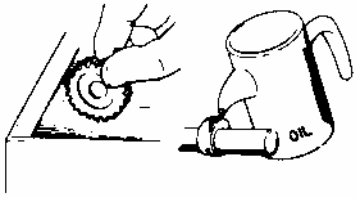


■ Use genuine parts and lubricants.

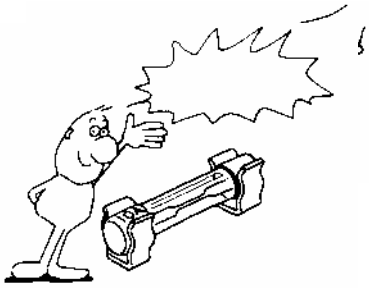


■ When servicing the motorcycle, be sure to use special tools for removal and installation.

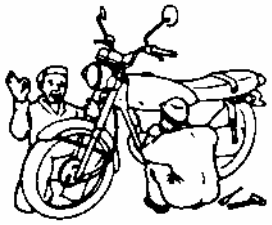
■ After disassembly, clean removed parts. Lubricate sliding surfaces with engine oil before reassembly.




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

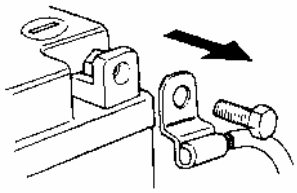


■ When two persons work together, pay attention to the mutual working safety.



■ Disconnect the battery negative (-) terminal before operation.

■ When using a spanner or other tools, make sure not to damage the motorcycle surface.

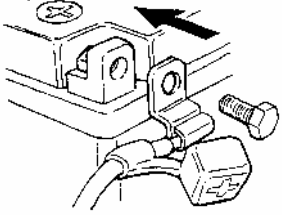


■After operation, check all connecting points, fasteners, and lines for proper connection and installation.

■ When connecting the battery, the positive (+) terminal must be connected first.

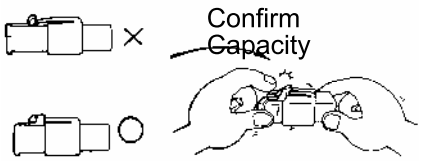
■ After connection, apply grease to the battery terminals.

■ Terminal caps shall be installed securely.

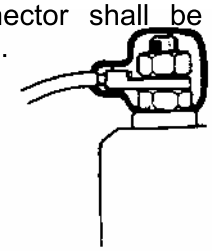


■ If the fuse is burned out, find the cause and repair it. Replace it with a new one according to the specified capacity.

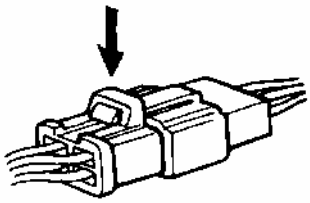
■ After operation, terminal caps shall be installed securely.




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

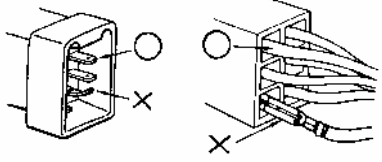


■ Hold the connector body when connecting or disconnecting it.
■ Do not pull the connector wire.

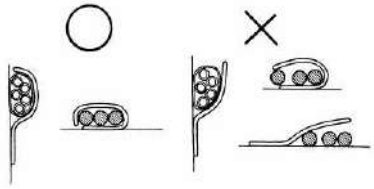


■Check if any connector terminal is bending, protruding or loose.

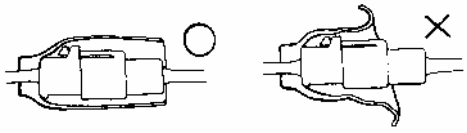
■ The connector shall be inserted completely.
■ If the double connector has a lock, lock it at the correct position.
■ Check if there is any loose wire.



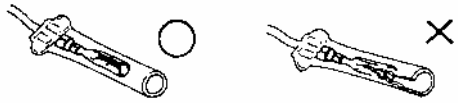
■ Before connecting a terminal, check for damaged terminal cover or loose negative terminal.



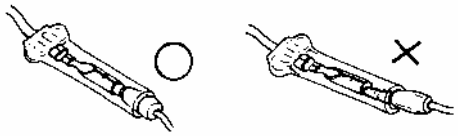
■ Check the double connector cover for proper coverage and installation.



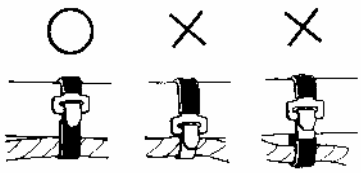
■ Insert the terminal completely.
■ Check the terminal cover for proper coverage.
■ Do not make the terminal cover opening face up.



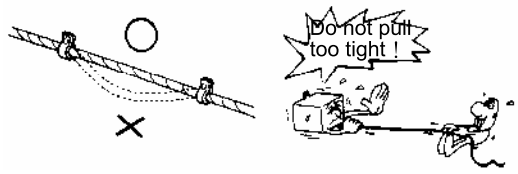
■ Secure wire harnesses to the frame with their respective wire bands at the designated locations.
Tighten the bands so that only the insulated surfaces contact the wire harnesses.



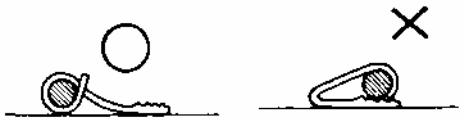
■ After clamping, check each wire to make sure it is secure.



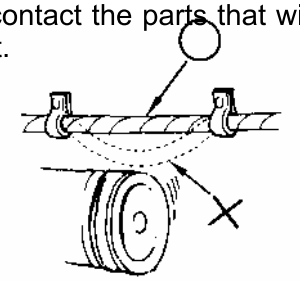
■ Do not squeeze wires against the weld or its clamp.




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

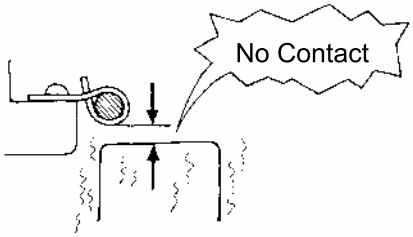


■ When fixing the wire harnesses, do not make it contact the parts that will generate high heat.

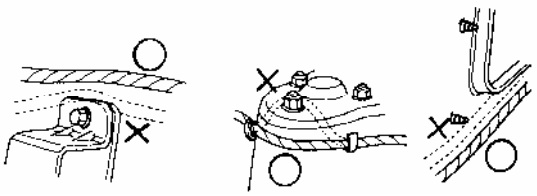


■ Route wire harnesses to avoid sharp edges or corners. Avoid the projected ends of bolts and screws.

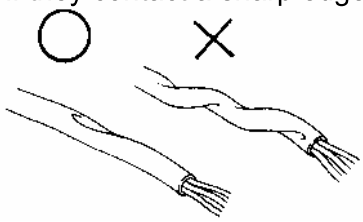
■ Route wire harnesses passing through the side of bolts and screws. Avoid the projected ends of bolts and screws.



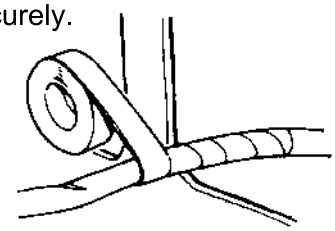

■ Route harnesses so they are neither pulled tight nor have excessive slack.



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

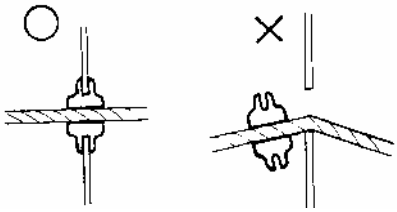


■ When rubber protector cover is used to protect the wire harnesses, it shall be installed securely.

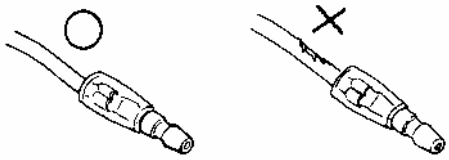


■ Do not break the sheath of wire.

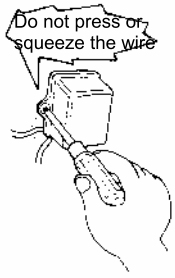
■ If a wire or harness is with a broken sheath, repair by wrapping it with protective tape or replace it.



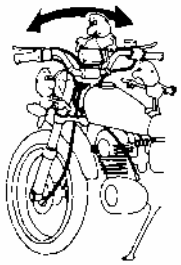
■ When installing other parts, do not press or squeeze the wires.



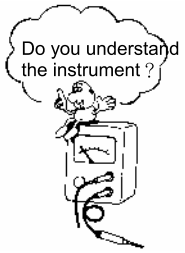
■ After routing, check that the wire harnesses are not twisted or kinked.



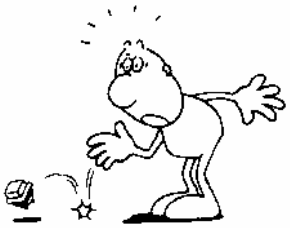
- Wire harnesses routed along with handlebar should not be pulled tight, have excessive slack or interfere with adjacent or surrounding parts in all steering positions.



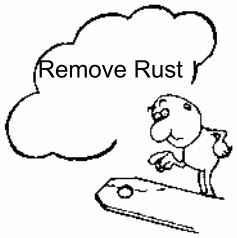
- When a testing device is used, make sure to understand the operating methods thoroughly and operate according to the operating instructions.




- 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.


Engine Oil

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


Grease

: Apply grease for lubrication.


Gear Oil

: Transmission Gear Oil (90#)


: Use special tool.

* : Caution

: Warning

## TORQUE VALUES

### STANDARD TORQUE VALUES

| Item | Torque (kgf-m) | Item | Torque (kgf-m) |
|---|---|---|---|
| 5mm bolt, nut | 0.45~0.6 | 5mm screw | 0.45~0.6 |
| 6mm bolt, nut | 0.8~1.2 | 6mm screw, SH bolt | 0.7~1.1 |
| 8mm bolt, nut | 1.8~2.5 | 6mm flange bolt, nut | 1.0~1.4 |
| 10mm bolt, nut | 3.0~4.0 | 8mm flange bolt, nut | 2.4~3.0 |
| 12mm bolt, nut | 5.0~6.0 | 10mm flange bolt, nut | 3.0~4.5 |

### ENGINE

| Item | Q'ty | Thread dia.(mm) | Torque N•m (kgf•m, lbf•ft) | Remarks |
|---|---|---|---|---|
| **MAINTENANCE:** | | | | |
| Valve adjusting lock nut | 2 | 5 | 9 (0.9, 6.5) | Apply oil |
| Spark plug | 1 | 10 | 12 (1.2, 9) | |
| Transmission oil drain bolt | 1 | 12 | 20 (2, 15) | |
| Transmission oil check/fill bolt | 1 | 8 | 20 (2, 15) | |
| Crank case oil drain bolt | 1 | 12 | 25 (2.5, 18) | |
| Oil filter screen cap | 1 | 30 | 15 (1.5, 10.8) | Apply oil |
| **LUBRICATION SYSTEM:** | | | | |
| Oil pump screw | 1 | 3 | 2 (0.2, 1.4) | |
| **COOLING SYSTEM:** | | | | |
| Water pump impeller | 1 | 7 | 12 (1.2, 8.6) | Left screw |
| **CYLINDER HEAD:** | | | | |
| Cylinder head cap nut | 4 | 8 | 25 (2.5, 18) | Apply oil |
| Tensioner lifter bolt | 1 | 6 | 4 (0.4, 3) | |
| Cylinder head cover bolt | 4 | 6 | 12 (1.2, 8.6) | |
| Cam chain tensioner bolt | 2 | 6 | 12 (1.2, 8.6) | |

## TORQUE VALUES

| Item | Q'ty | Thread dia. (mm) | Torque N•m (kgf•m, lbf•ft) | Remarks |
|---|---|---|---|---|
| **DRIVE/DRIVEN PULLEY:** | | | | |
| Drive face nut | 1 | 14 | 93 (9.3, 67) | Apply oil |
| Clutch outer nut | 1 | 12 | 54 (5.4, 39) | |
| Clutch drive plate nut | 1 | 28 | 54 (5.4, 39) | |
| Left crankcase cover bolt | 6 | 6 | 12 (1.2, 8.6) | |
| **ALTERNATOR** | | | | |
| A.C.G. stator | 5 | 5 | 9 (0.9, 6.5) | |
| Flywheel nut | 1 | 14 | 55 (5.5, 40) | |
| **FINAL REDUCTION:** | | | | |
| Transmission case cover bolt | 9 | 8 | 20 (2, 14.4) | |
| **CRANKCASE:** | | | | |
| Cam chain guide bolt | 1 | 6 | 10 (1, 7) | |
| **SWITCH:** | | | | |
| Oil pressure switch | 1 | PT 1/8 | 22 (2.2, 16) | Apply seal |

## TORQUE VALUES
## FRAME

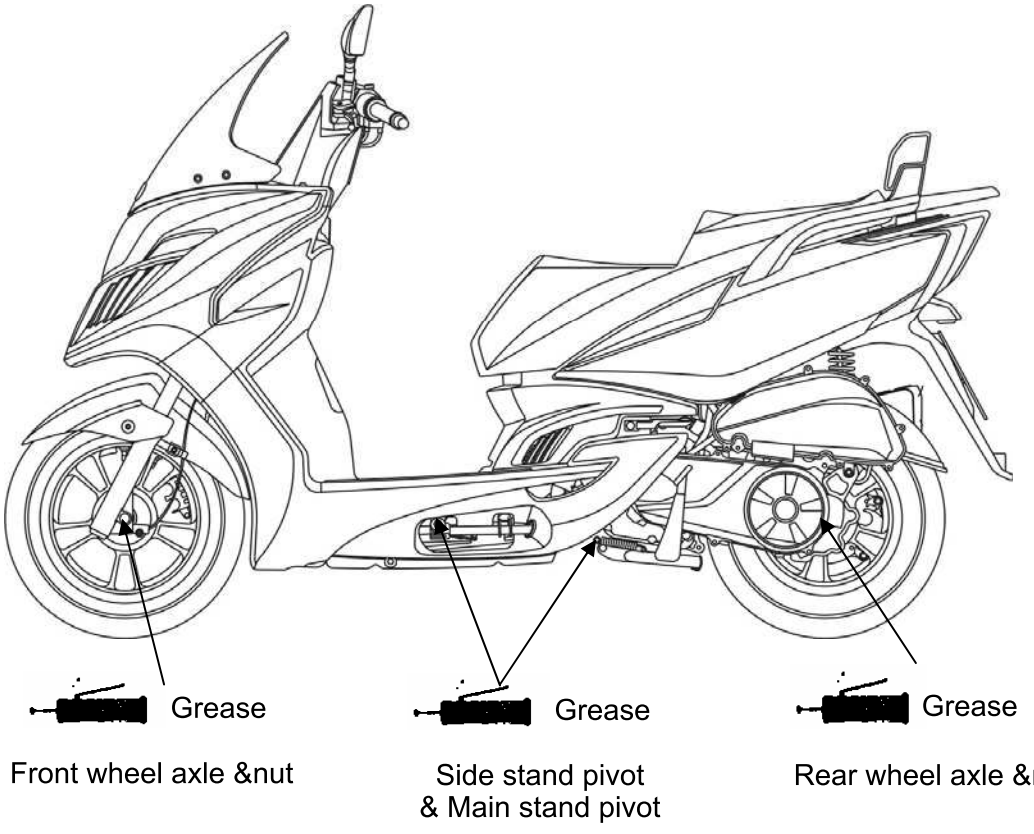
| No. | ITEM | THREAD SIZE AND TYPE | TORQUE | | PR Kgf-m | REMARK | THREAD DWG NO. | Impt |
|---|---|---|---|---|---|---|---|---|
| | | | Kgf-m | N-m | | | | |
| 1 | STEERING | | | | | | | |
| | HANDLE POST | M10x1.25 | 6.0~7.0 | 60~70 | 6.5 | U NUT | 90106-GEN5-9000 | A |
| | BRIDGE BOLT | M8x1.25 | 2.4~3.0 | 24~30 | 2.7 | — | 95801-08040-08 | A |
| | STEM LOCK | BCI | 6.0~6.5 | 60~65 | 6.3 | — | 50306-1F96-0010 | A |
| | RACE NUT(HEAD) | BCI | 1.8~2.2 | 18~22 | 2.0 | — | 53220-LBA2-E000 | B |
| | | | | | | | | |
| 2 | WHEEL | | | | | | | |
| | FR.AXLE | M14x1.5 | 1.5~2.5 | 15~25 | 2.0 | — | 44301-LLJ3-E000 | A |
| | RR.AXLE NUT | M16x1.5 | 11~13 | 110~130 | 12 | U NUT | 90305-KFW6-9120-MI | A |
| | | | | | | | | |
| 3 | SUSPENSION | | | | | | | |
| | FR FORK BOLT | M8x1.25 | 2.0~2.6 | 20~26 | 2.3 | — | 96600-08025-06 | A |
| | RR. CUSH. UP | M10x1.25 | 3.5~4.5 | 35~45 | 4.0 | U NUT | 90304-GHE8-0040 | A |
| | RR. CUSH. LWR. | M10x1.25 | 3.5~4.5 | 35~45 | 4.0 | — | 95801-10035-06 | A |
| | | | | | | | | |
| 4 | BRAKE | | | | | | | |
| | FR CALIPER R | M10x1.25 | 3.0~4.0 | 30~40 | 3.5 | — | 90122-LEA7-E000 | A |
| | RR CALIPER | M10x1.25 | 3.0~4.0 | 30~40 | 3.5 | — | 90122-LEA7-E000 | A |
| | BRK OIL BOLT | M10x1.25 | 3.0~4.0 | 30~40 | 3.5 | — | 90145-MS9-6120-MI | A |
| | M/C HOLDER | M6x1.0 | 1.0~1.4 | 10~14 | 1.2 | — | 96001-06028-06 | C |
| | M/C CAP SCREW | M4x0.7 | 0.12~0.2 | 1.2~2.0 | 0.16 | — | 96000-04012-1A | B |
| | C/P BLEEDER | M8x1.25 | 0.4~0.7 | 4.0~7.0 | 0.55 | — | 43352-5H68-0040 | B |
| | DISK BOLT | M8x1.25 | 3.2~3.8 | 32~38 | 3.5 | — | 90105-KCR3-0010 | A |
| | C/P PIN BOLT | M12x1.25 | 3.4~4.6 | 34~46 | 4.0 | | 45131-LDH1-E000 | B |
| | | | | | | | | |
| 5 | ENG HANGER | | | | | | | |
| | FRAME SIDE | M14x1.5 | 6.0~7.0 | 60~70 | 6.5 | U NUT | 90305-LBD4-9000 | A |
| | ENG SIDE | M10x1.25 | 4.5~5.5 | 45~55 | 5.0 | U NUT | 90304-GLW0-9020-MI | A |
| | | | | | | | | |
| 6 | MUFFLER | | | | | | | |
| | EXH. PIPE | M8x1.25 | 1.8~2.2 | 18~22 | 2.0 | — | 90033-GFY6-9000 | B |
| | MUFF. BRKT/RR FORK | M8x1.25 | 3.0~3.6 | 30~36 | 3.3 | — | 95801-08042-06 | A |
| | MUFF. BRKT/RR FORK | M10x1.25 | 3.2~3.8 | 32~38 | 3.5 | — | 95801-10070-06 | A |
| | | | | | | | | |
| 7 | RR FORK/ENG CASE | M8x1.25 | 2.4~3.0 | 24~30 | 2.7 | — | 90131-KFAF-9000 | A |
| | | | | | | | | |
| 8 | | | | | | | | |
| | IGN COIL | M6x1.0 | 0.25~0.35 | 2.5~3.5 | 0.3 | — | 94050-06080 | B |
| | O2 SENSOR | M12x1.25 | 2.0~3.0 | 20~30 | 2.5 | — | — | B |
| | START RELAY | M6x1.0 | 0.25~0.35 | 2.5~3.5 | 0.3 | | 94050-06080 | C |
| | RR CARRIER | M8x1.25 | 2.0~2.8 | 20~28 | 2.4 | — | 90106-KKC4-9000 | C |

## SPECIAL TOOLS

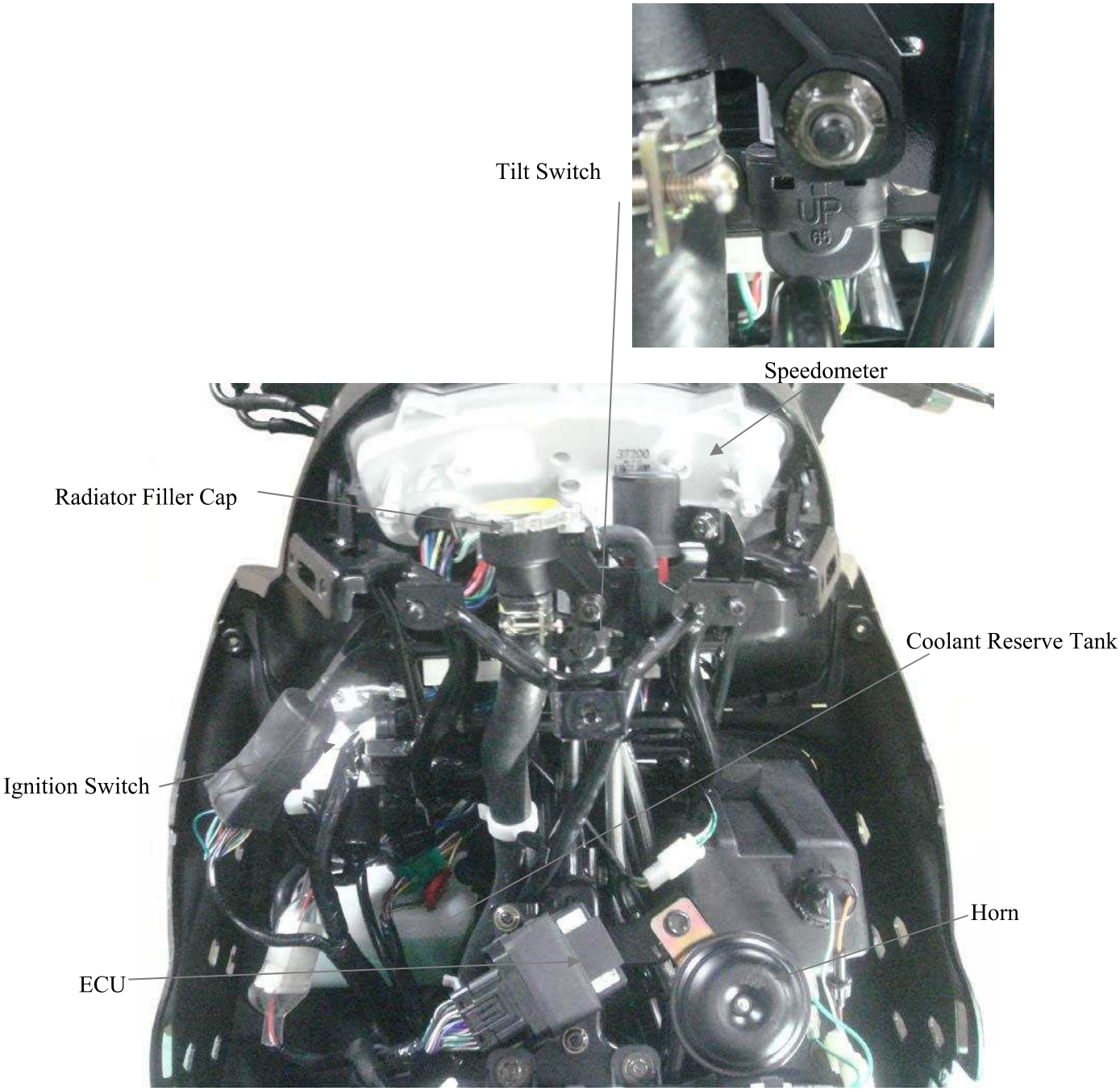
| Tool Name | Tool No. | Remarks | Ref. Page |
|---|---|---|---|
| Flywheel puller | E003 | A.C. generator flywheel removal | 4.10 |
| One way clutch puller | E006 | One way clutch removal | 9 |
| Tappet adjuster | E012 | Tapper adjustment | 3.7 |
| Oil seal & bearing installer | E014 | Oil seal & bearing install | 9.10.11 |
| Flywheel holder | E021 | A.C. generator flywheel holding | 4.10 |
| Clutch spring compressor | E027 | Clutch disassembly | 9 |
| Thread protector | E029 | Protect the crankshaft's thread | 10 |
| Bearing puller 10,12,15,18mm | E037 | Bearing removal | 10 |
| Valve cotter installer | E051 | Valve cotter installation | 7 |
| Lock nut socket wrench | F002 | Steering stem removal or install | 12 |

**LUBRICATION POINTS**
**FRAME**

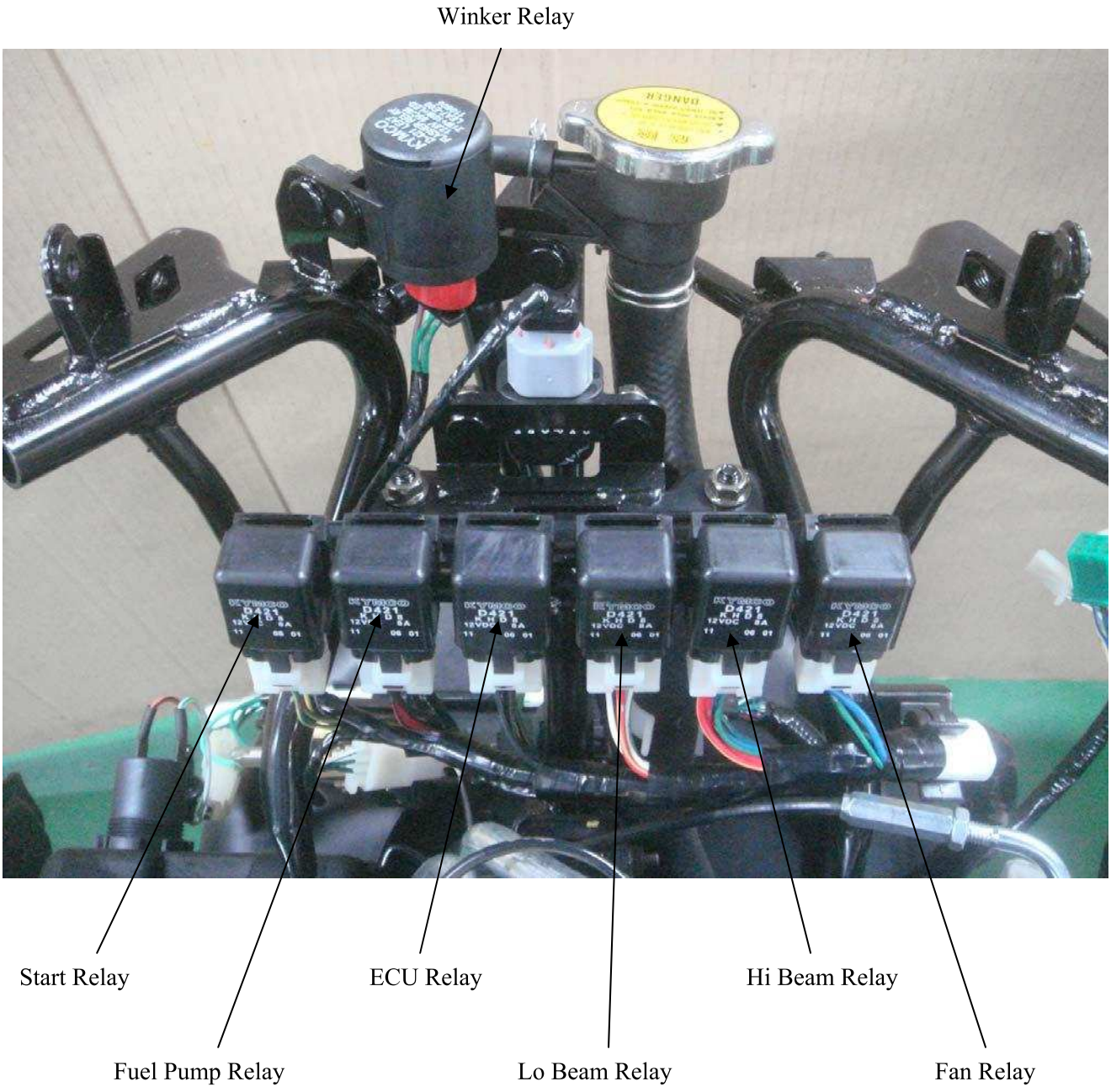
The following is the lubrication points for the frame.
Use grease for parts not listed.
Apply engine oil or grease to cables and movable parts not specified. It will avoid abnormal noise and damage the durability of the motorcycle.

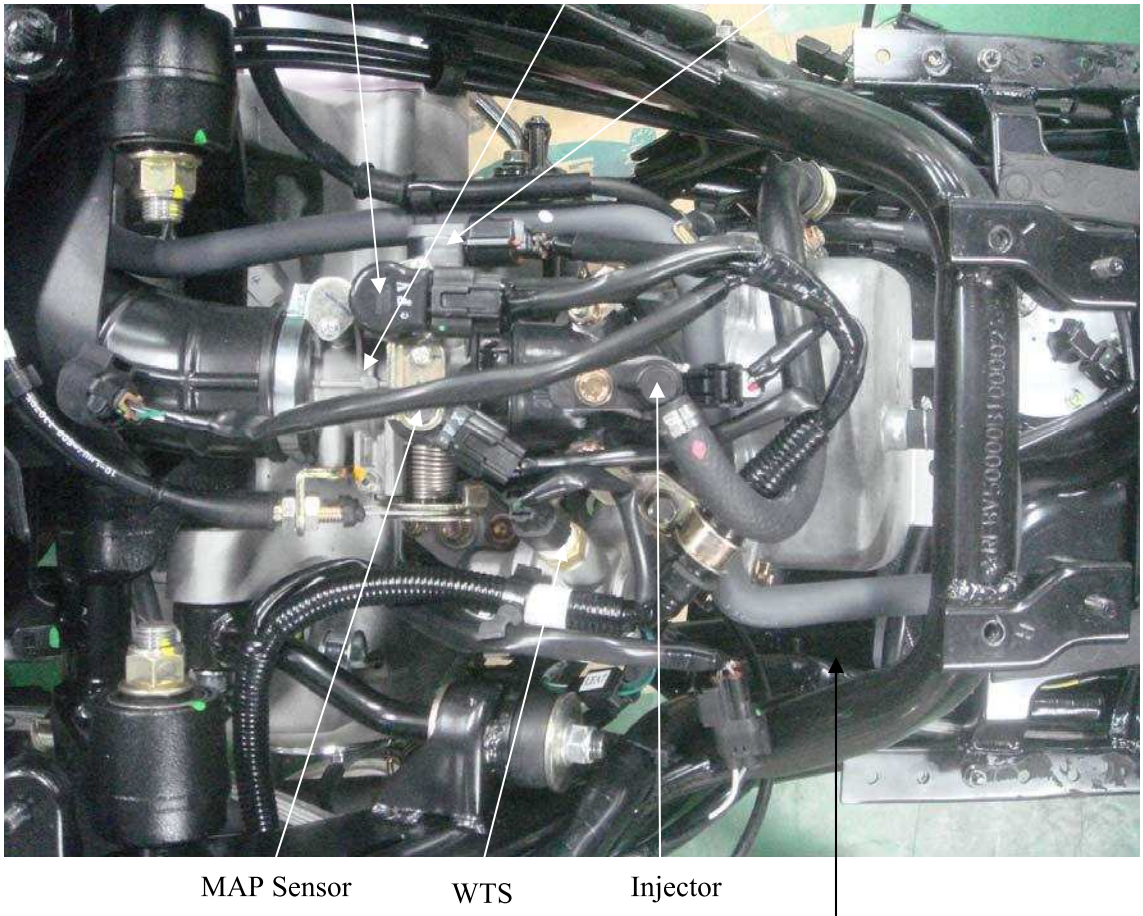


## CABLE & HARNESS ROUTING



## CABLE & HARNESS ROUTING



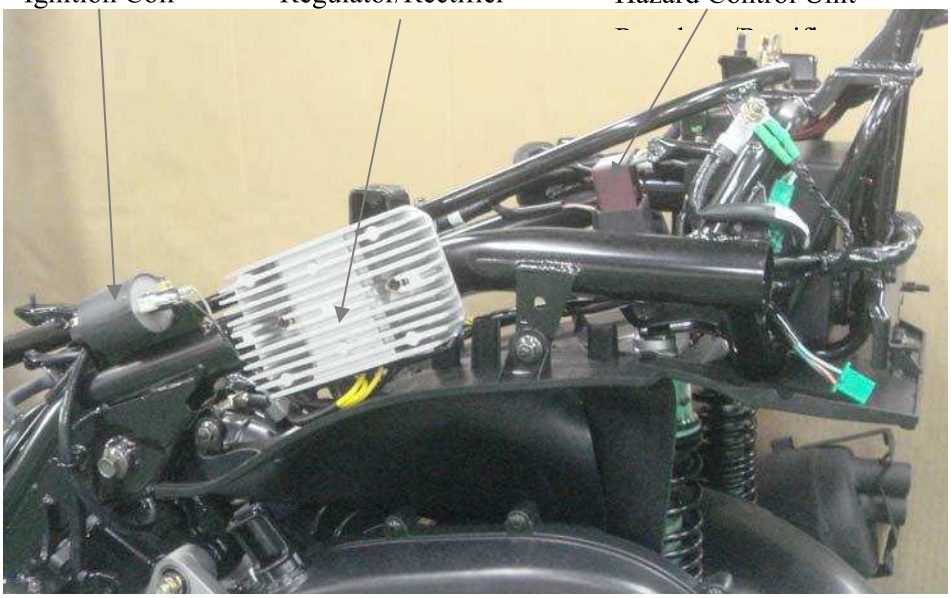

ISC
Throttle Body
TPS
MAP Sensor
WTS
Injector


O2 Sensor

Ignition Coil

Regulator/Rectifier

Hazard Control Unit



Starter Relay

Crank Position Sensor

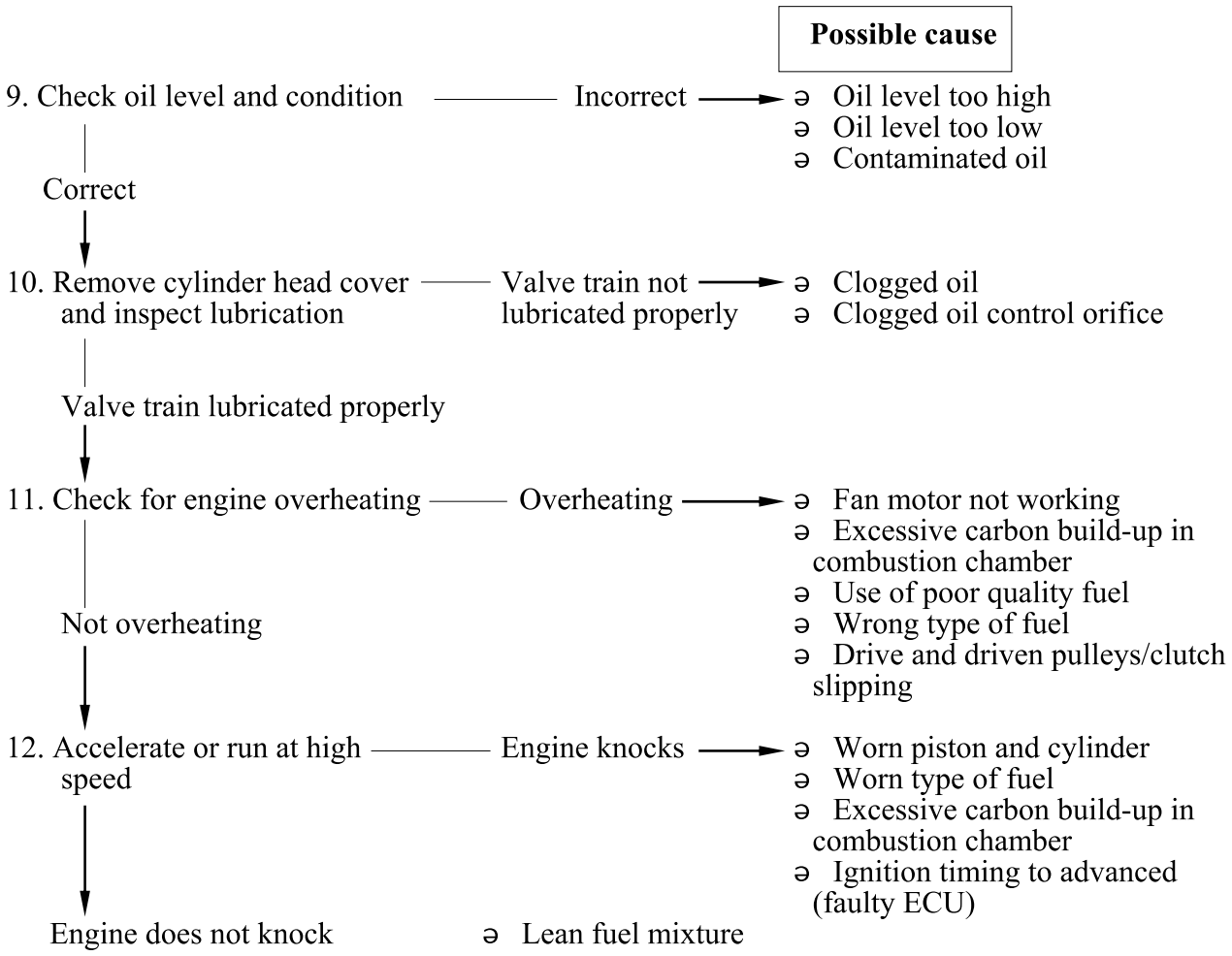
## TROUBLESHOOTING

### ENGINE WILL NOT START OR IS HARD TO START

| | | Possible cause |
|---|---|---|
| 1. Check for operation of the fuel pump | Abnormal → | ə Faulty fuel pump |
| Normal ↓ | | |
| 2. Inspect the fuel flow | Abnormal → | ə Faulty pressure regulator |
| Normal ↓ | | |
| 3. Inspect the fuel injector | Abnormal → | ə Faulty injector |
| Normal ↓ | | |
| 4. Perform spark test | Weak or no spark → | ə Faulty spark plug<br>ə Fouled spark plug<br>ə Faulty ECU<br>ə Broken or shorted spark plug wire<br>ə Faulty ignition switch<br>ə Faulty ignition pulse generator<br>ə Loose or disconnected spark plug wire |
| Good spark ↓ | | |
| 5. Test cylinder compression | Low compression → | ə Valve stuck open<br>ə Worn cylinder and piston ring<br>ə Damaged cylinder head gasket<br>ə Seized valve<br>ə Improper valve timing |
| Compression normal ↓ | | |
| 6. Starting following normal procedure | Engine start but stops → | ə Intake pipe leaking<br>ə Improper ignition timing (Faulty ignition coil or ignition pulse generator)<br>ə Fuel contaminated |
| Engine does not start ↓ | | |
| 7. Remove and inspect spark plug | Wet plug → | ə Throttle valve open<br>ə Clogged air cleaner |

**ENGINE LACKS POWER**

| | | Possible cause |
|---|---|---|
| 1. Raise wheel off the ground and spin by hand | Wheels do not spin freely | ə Brake dragging<br>ə Worn or damaged wheel bearing |
| Wheel spins freely | | |
| 2. Check tire pressure | Pressure low | ə Faulty tire valve<br>ə Punctured tire |
| Pressure normal | | |
| 3. Accelerate lightly | Engine speed does not increase | ə Air cleaner dirty<br>ə Restricted fuel flow<br>ə Clogged muffler<br>ə Pinched fuel tank breather |
| Engine speed increase | | |
| 4. Check ignition timing | Incorrect | ə Faulty ECU<br>ə Faulty ignition pulse generator |
| Correct | | |
| 5. Test cylinder compression | Incorrect | ə Valve stuck open<br>ə Worn cylinder and piston rings<br>ə Leaking head gasket<br>ə Improper valve timing |
| Normal | | |
| 6. Inspect fuel flow | Abnormal | ə Faulty pressure regulator |
| Normal | | |
| 7. Inspect the fuel injector | Abnormal | ə Faulty injector |
| Normal | | |
| 8. Remove spark plug | Fouled or discolored | ə Faulty spark plug |
| Not fouled or discolored | | |


Possible cause
9. Check oil level and condition
Incorrect
ə Oil level too high
ə Oil level too low
ə Contaminated oil
Correct
10. Remove cylinder head cover and inspect lubrication
Valve train not lubricated properly
ə Clogged oil
ə Clogged oil control orifice
Valve train lubricated properly
11. Check for engine overheating
Overheating
ə Fan motor not working
ə Excessive carbon build-up in combustion chamber
ə Use of poor quality fuel
ə Wrong type of fuel
ə Drive and driven pulleys/clutch slipping
Not overheating
12. Accelerate or run at high speed
Engine knocks
ə Worn piston and cylinder
ə Worn type of fuel
ə Excessive carbon build-up in combustion chamber
ə Ignition timing to advanced (faulty ECU)
Engine does not knock
ə Lean fuel mixture

**POOR PERFORMANCE AT LOW AND IDLE SPEED**

| | | Possible cause |
|---|---|---|
| 1. Check ignition timing | Incorrect | ə Improper ignition timing |
| Correct ↓ | | |
| 2. Inspect the fuel flow | Abnormal | ə Faulty pressure regulator |
| Normal ↓ | | |
| 3. Inspect the fuel injector | Abnormal | ə Faulty injector |
| Normal ↓ | | |
| 4. Check for leaks in the intake pipe | Leaking | ə Loose insulator clamp<br>ə Damage insulator |
| No leak ↓ | | |
| 5. Perform spark test | Weak or intermittent spark | ə Faulty the spark plug<br>ə Faulty carbon or wet fouled spark plug<br>ə Faulty ECU<br>ə Faulty ignition coil<br>ə Faulty ignition pulse generator<br>ə Faulty ignition switch<br>ə Loose or disconnected spark plug wires |
| Good spark | | |

**POOR PERFORMANCE AT HIGH SPEED**

| | | Possible cause |
|---|---|---|
| 1. Check ignition timing | Incorrect → | ə Faulty ECU |
| Correct ↓ | | |
| 2. Inspect the fuel flow | Abnormal → | ə Faulty pressure regulator |
| Normal ↓ | | |
| 3. Inspect the fuel injector | Abnormal → | ə Faulty injector |
| Normal ↓ | | |
| 4. Check valve timing | Incorrect → | ə Camshaft not installed properly |
| Correct ↓ | | |
| 5. Check valve spring | Weak → | ə Faulty valve spring |
| Not weak | | |

**POOR HANDLING**

| | Possible cause |
|---|---|
| 1. If steering is heavy → | ə Steering stem adjusting nut too tight<br>ə Damaged steering head bearings |
| 2. If either wheel is wobbling → | ə Excessive wheel bearing play<br>ə Bent rim<br>ə Improper installed wheel hub<br>ə Swing arm pivot bearing excessively worn<br>ə Bent frame |
| 3. If the motorcycle pulled to one side → | ə Faulty the shock absorber<br>ə Front and rear wheel not aligned<br>ə Bent fork<br>ə Bent swing arm<br>ə Bent axle |

2

# EXHAUST MUFFLER/FRAME COVERS

## SERVICE INFORMATION

### GENERAL INSTRUCTIONS

- When removing frame covers, use 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 pipe nuts | 1.8~2.2 kgf-m |
| Exhaust muffler brake /RR Frok | 3.2~3.8 kgf-m |
| RR fork/Engine case | 2.4~3.0 kgf-m |

## TROUBLESHOOTING

**Noisy exhaust muffler**

- Damaged exhaust muffler
- Exhaust muffler joint air leaks

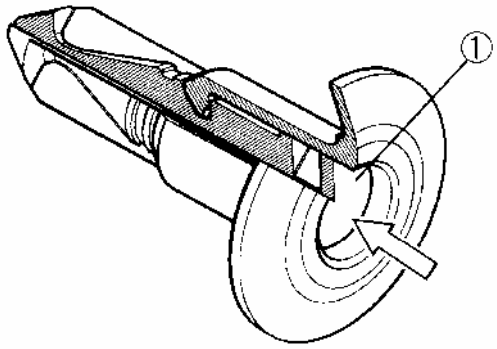
**Lack of power**

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

## FASTENER REMOVAL AND REINSTALLATION

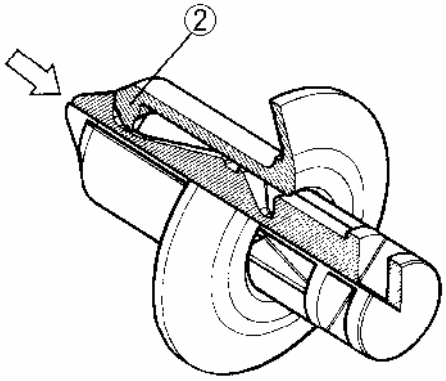
### REMOVAL

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



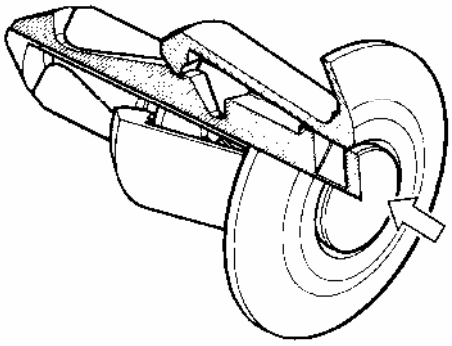

### INSTALLATION

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 REMOVAL/ INSTALLATION

### LUGGAGE BOX

Unlock the seat with the ignition key.
Open the seat.

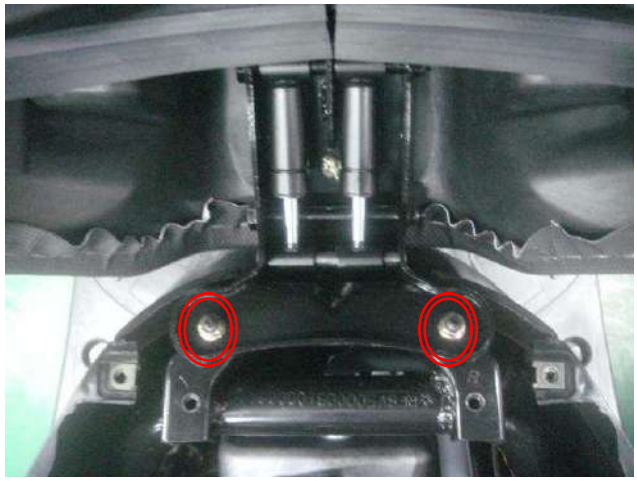
Remove 2 bolts, 2 screws and 4 nuts on the luggage box.

### SEAT

Unlock the seat with the ignition key.
Open the seat.

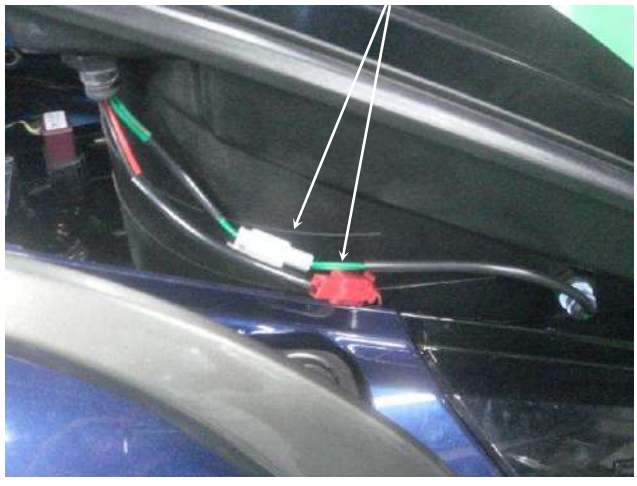
Remove the two nuts and the seat.

Nuts



Luggage Box Light Connector

Disconnect the luggage box light connector, then remove the luggage box.



Installation is in the reverse order of removal.

## CENTER COVER

Remove the luggage box and seat.

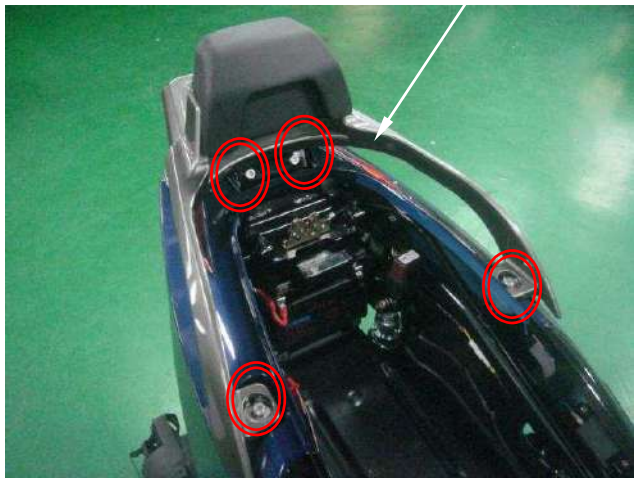
Remove the center cover.

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

Installation is in the reverse order of removal.

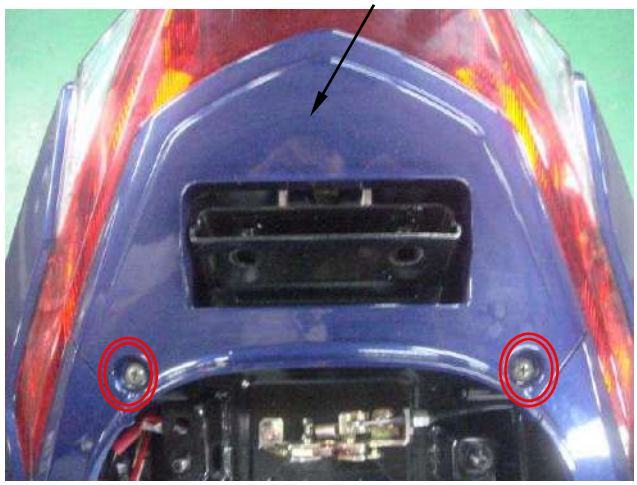

## REAR CARRIER

Remove 4 bolts and rear carrier



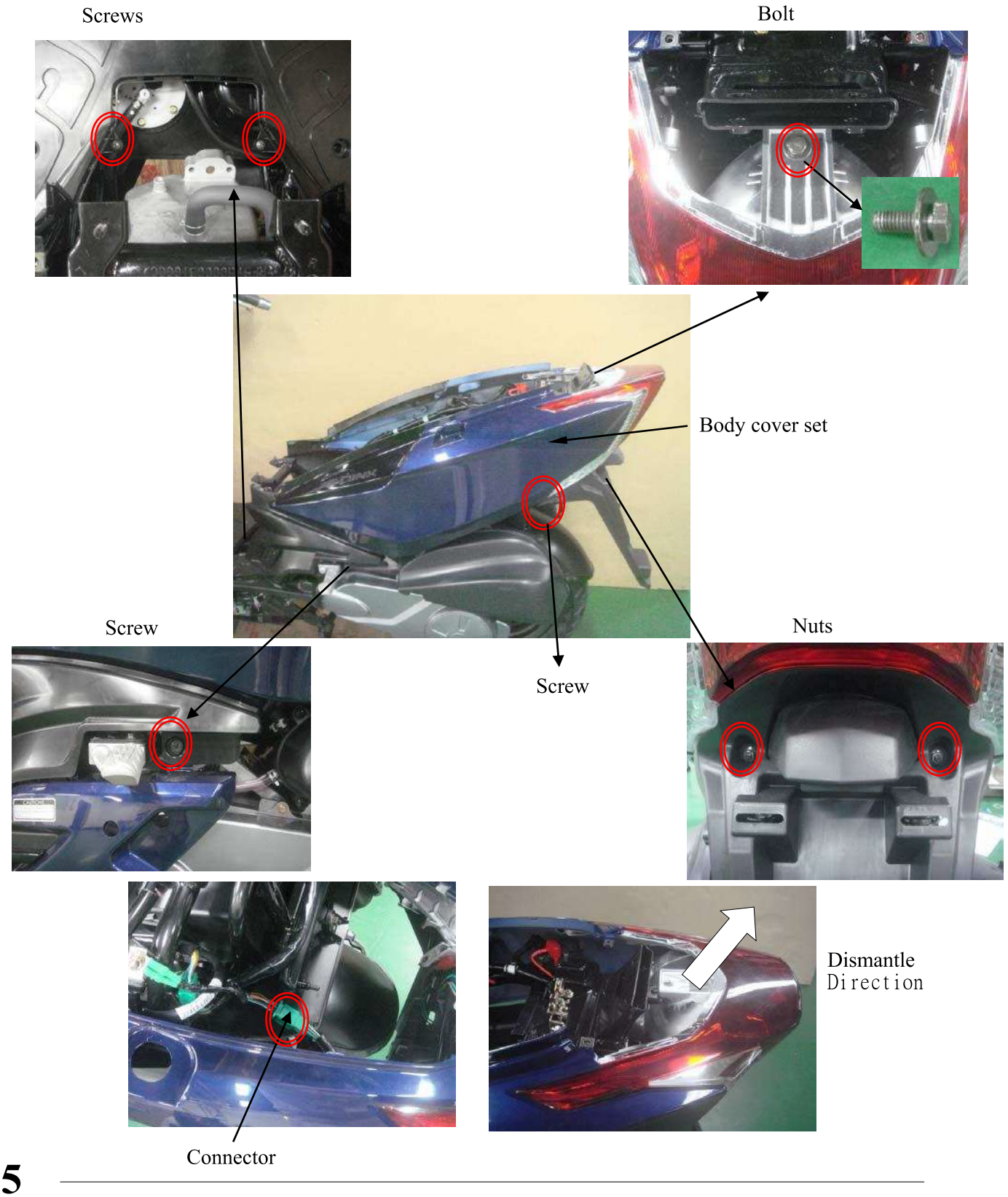

## REAR CENTER COVER

Remove two screws to remove the rear center cover.



## BODY COVER SET

Remove the screws, bolts, nuts and connecter to remove the body cover set.



### FRONT SIDE MOLD

Remove the fasteners to remove the right and left of front side molds.

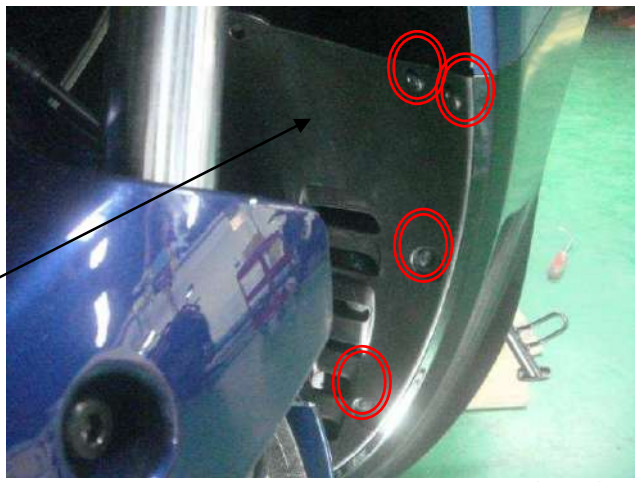
Fastener

Front side mold


Remove the mat leg shield.

Mat leg shield

Fasteners



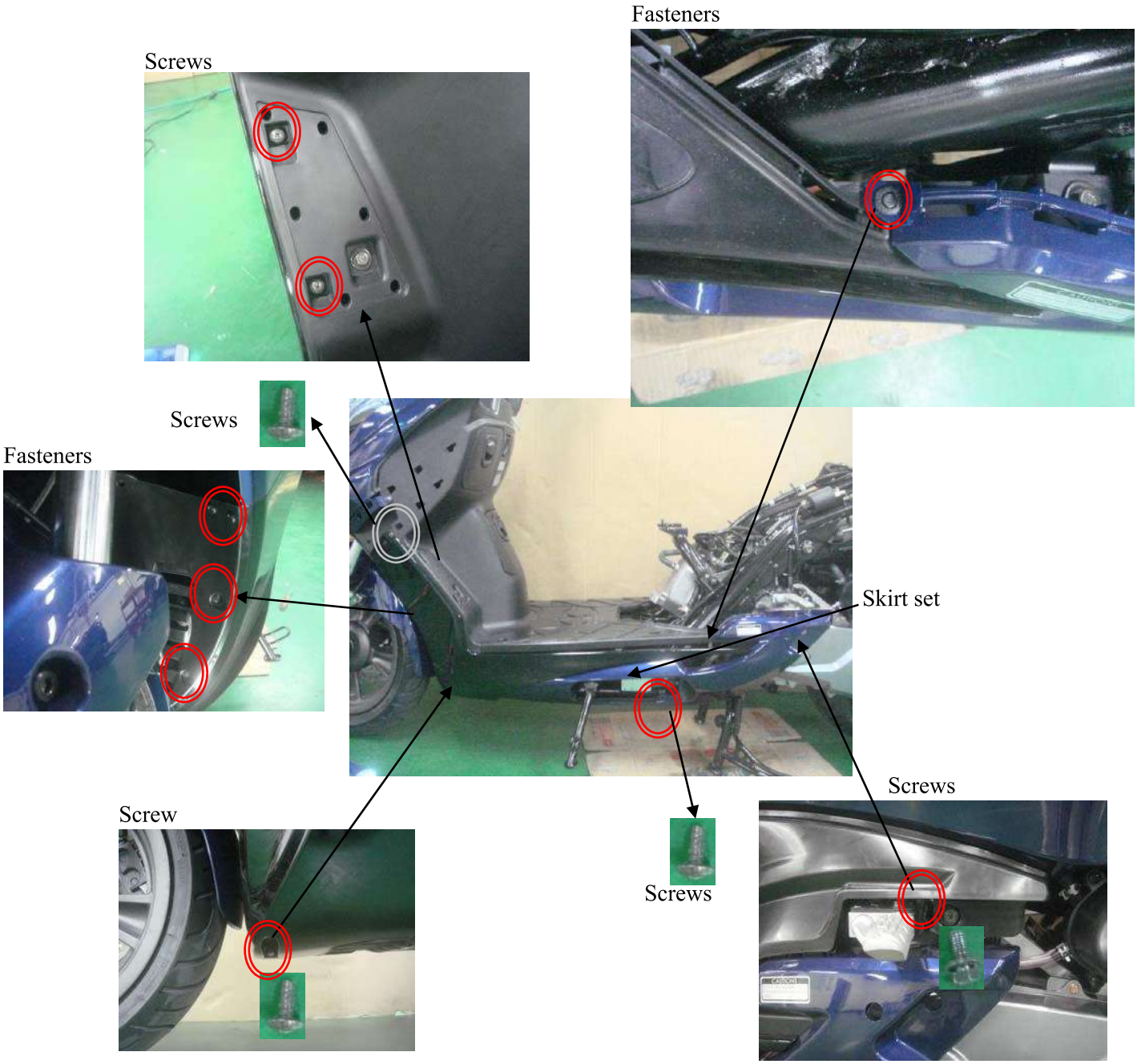
### UNDER COWL

Remove the fasteners and under cowl.

Under cowl

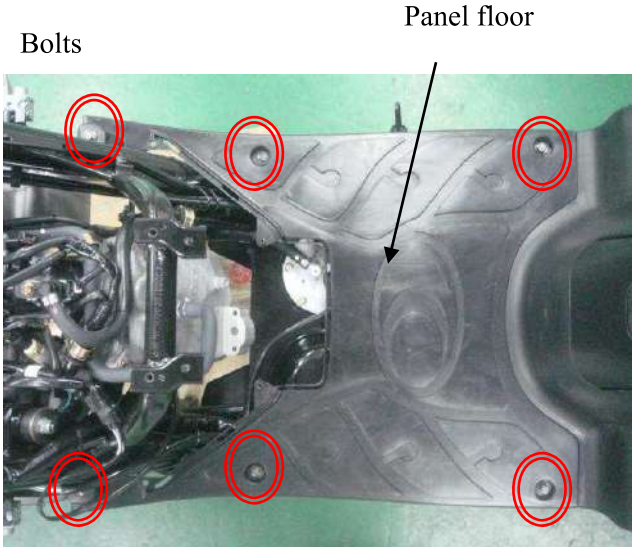
## SKIRT SET

Remove the screws and fasteners to remove the right and left skirt sets.



**PANEL FLOOR**

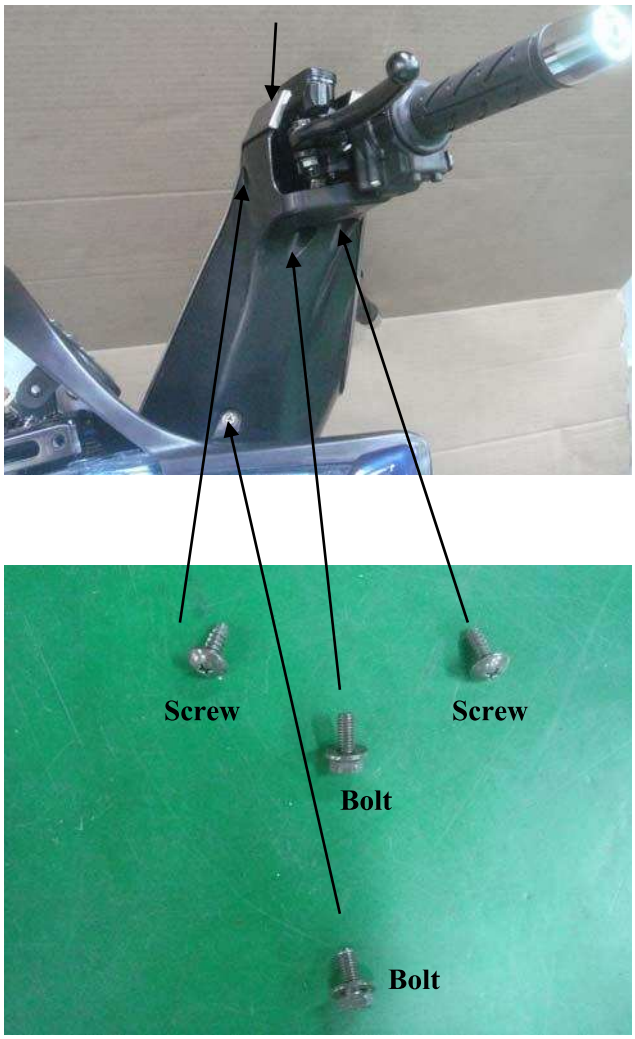
Remove the bolts and panel floor.



## HANDLE UP COVER

Remove screws and bolts to remove the handle up cover.

Handle up cover




## HANDLE LOW COVER

Remove throttle cables to remove the handle low cover.

Handle low cover

**WINDSHIELD**

Remove five bolts and windshield.

Handle up cover

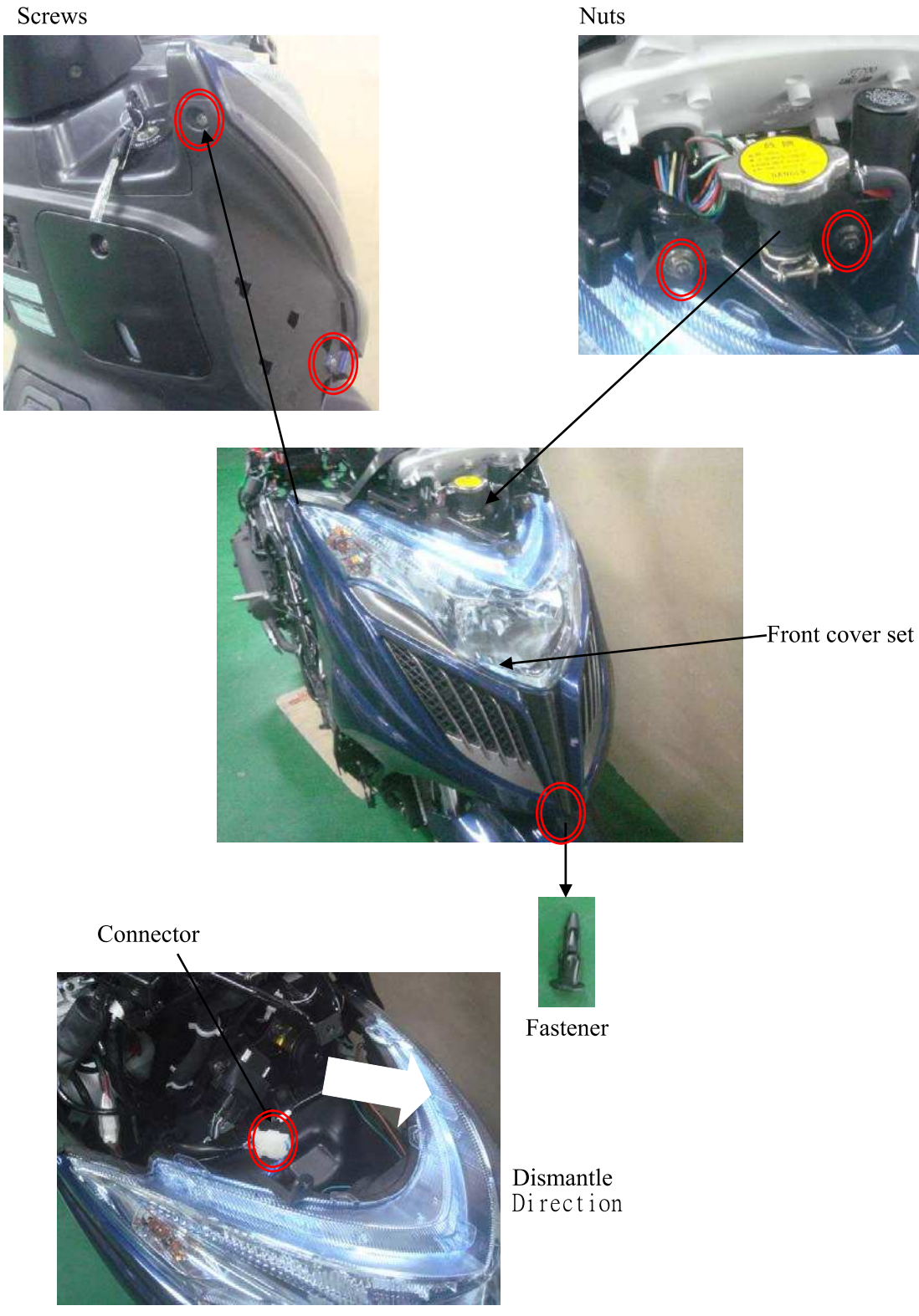
**FRONT METER COVER SET**

Remove the front meter cover.

Front meter cover set.

## FRONT COVER SET

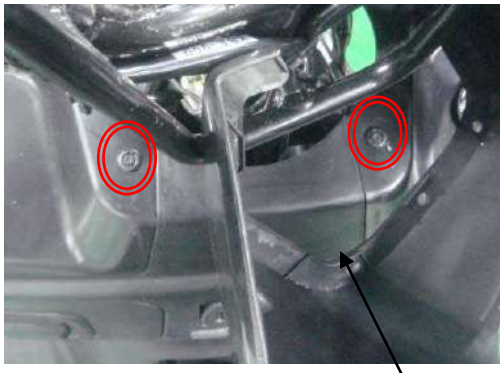
Remove the screws, nuts, fasteners and connector to remove the front cover set.



## REAR METER COVER SET

Remove the fasteners, main switch lid, bolts and connectors to remove the rear meter cover set.

Fasteners

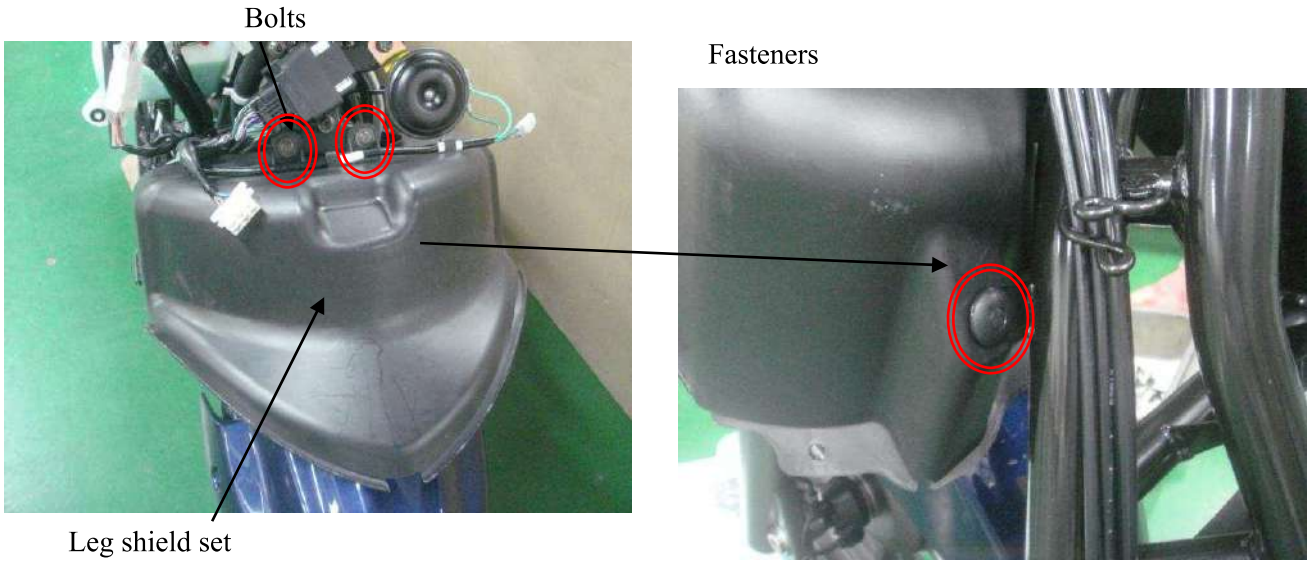



## LEG SHIELD SET

Remove the screws, bolt, center clip, connector and fuel filler cap to remove the leg shield.

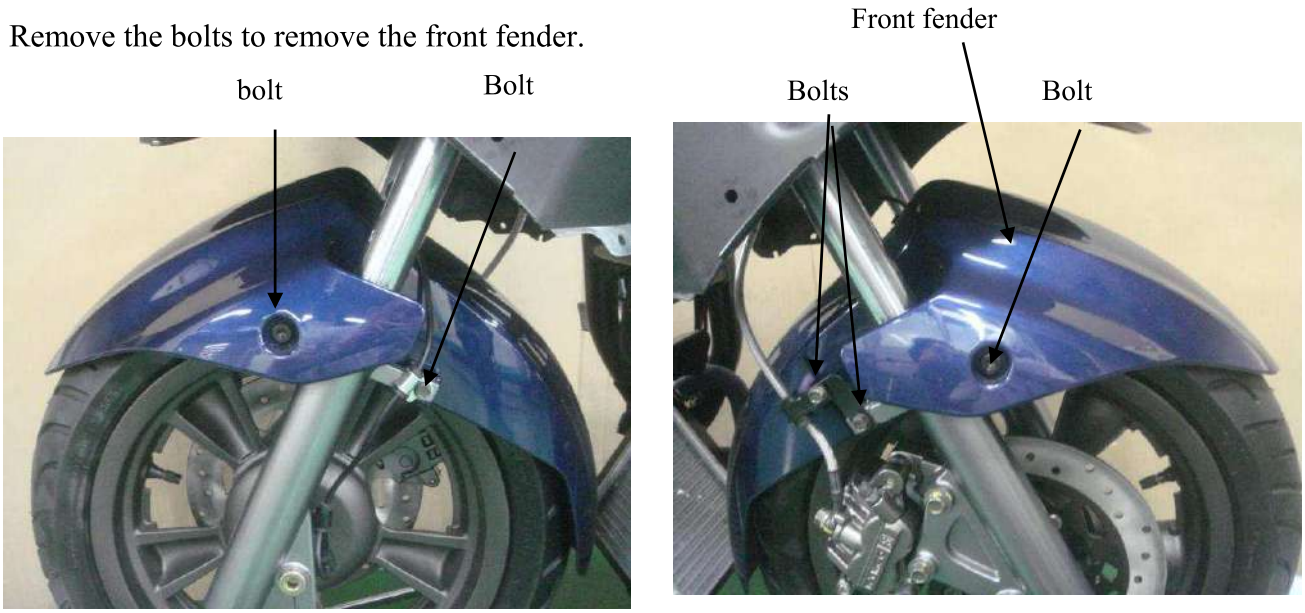
## FRONT INNER FENDER

Remove the bolts, fasteners to remove the front inner fender.




## FRONT FENDER

Remove the bolts to remove the front fender.

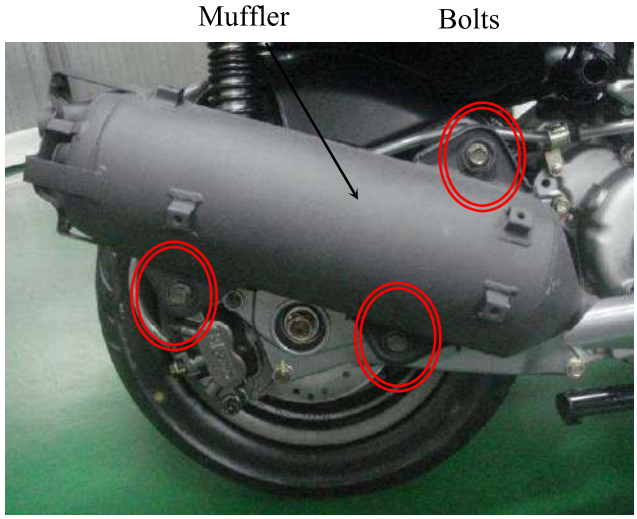


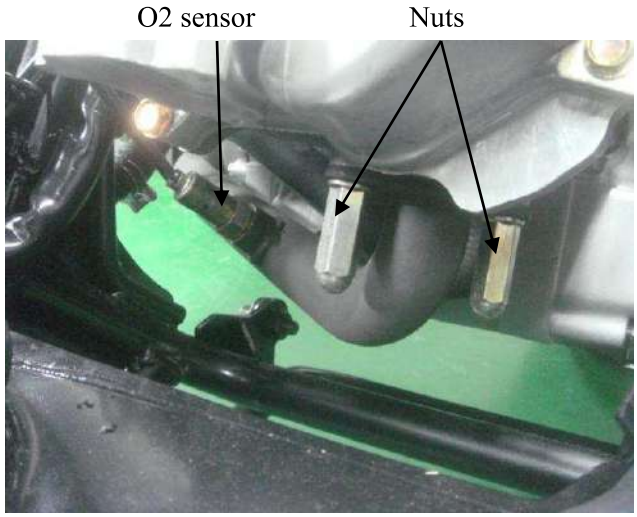
## EXHAUST MUFFLER

### REMOVAL

Disconnect the connector with O2 heater/O2 sensor.

Remove the bolts and nuts to remove the muffler.




**Installation is in the reverse order of removal.**

# 3. INSPECTION/ADJUSTMENT

3

## INSPECTION / ADJUSTMENT

## SERVICE INFORMATION

### GENERAL

**⚠ WARNING**

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

### SPECIFICATIONS

**ENGINE**

Throttle grip free play : 2～6 mm
Spark plug : DPR6EA
Spark plug gap : 0.6 mm ~ 0.7 mm
Valve clearance : IN: 0.10 mm EX: 0.10 mm
Idle speed : 1600±100 rpm

**Engine oil capacity:**

Cylinder compression: 16±2 kg/cm²
At disassembly : 1.1 Liter
At change : 0.9 Liter
Ignition timing : ECU
Coolant type : Water Cooling

**Gear oil capacity :**

At disassembly : 0.23 Liter
At change : 0.18 Liter

**TIRE**

| | 1 Rider | 2 Riders |
|---|---|---|
| Front | 1.75 kg/cm² | 1.75 kg/cm² |
| Rear | 2.0 kg/cm² | 2.25 kg/cm² |

**TIRE SPECIFICATION**

Front : 120/70-13
Rear : 140/70-12

**TORQUE VALUES**

Front axle nut : 2 kg-m
Rear axle nut : 12 kg-m

**SPECIAL TOOL**

Tappet Adjuster E012

## MAINTENANCE SCHEDULE

### MAINTENANCE SCHEDULE

Perform the pre-ride inspection **(see page 19)** at each scheduled maintenance period.
This interval should be judged by odometer reading or months, whichever comes first.
I: INSPECT AND CLEAN, ADJUST, LUBRICATE OR REPLACE IF NECESSARY
C: CLEAN R: REPLACE A: ADJUST L: LUBRICATE
The following maintenance schedule specifies all maintenance required to keep your scooter in peak operating condition. Maintenance work should be performed in accordance with standards and specifications of KYMCO by properly trained and equipped technicians. Your KYMCO dealer meets all of these requirements.

∗ Should be serviced by your KYMCO dealer, unless the owner has the proper tools and service data and is mechanically qualified.

∗∗ In the interest of safety, we recommend these items be serviced only by your KYMCO dealer.

KYMCO recommends that your KYMCO dealer should road test your scooter after each periodic maintenance is carried out.

**NOTE:**

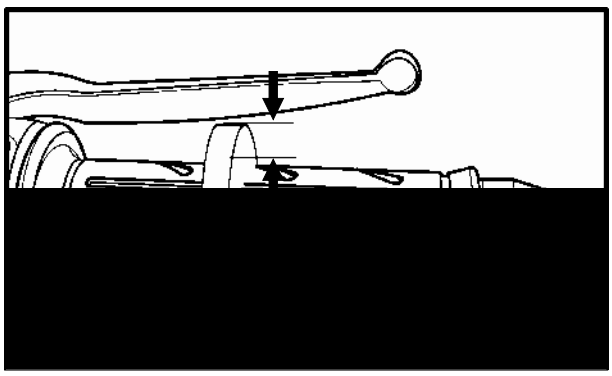
1 At higher odometer readings, repeat at the frequency interval established here.
2 Service more frequently if the scooter is ridden in unusually wet or dusty areas.
3 Service more frequently when riding in rain or at full throttle.
4 Clean every 2000 km (1200 mi) after replacement and replace every 5000 km (3000 mi).
5 Replace every 1 year, or every 4000km (2400mi), whichever comes first. Replacement requires mechanical skill.
6 Replace every 10000 km (6000 mi), or once a year it at every 5000 km (3000 mi). Replacement requires mechanical skill.
7 Replace every 2 years. Replacement requires mechanical skill.

| FREQUENCY / ITEM | | WHICHEVER COMES FIRST: NOTE | MONTH | ODOMETER READING [NOTE (1)] X 1000 km | 0.3 | 1 | 3 | 5 | 7 | 9 | 11 | REFER TO PAGE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | X 1000 mi | 0.2 | 0.6 | 1.8 | 3 | 4.2 | 5.4 | 6.6 | |
| | | | | | | 3 | 6 | 12 | 18 | 24 | 30 | |
| ∗ | AIR CLEANER | NOTE 2 | | | | I | R | I | R | I | R | 31 |
| | SPARK PLUGS | NOTE 4 | | | | | | R | | | | 32 |
| ∗ | THROTTLE OPERATION | | | | | | | I | | I | | 31 |
| ∗ | VALVE CLEARANCE | | | | A | | A | | A | | A | - |
| ∗ | FUEL LINE | | | | | | | I | | I | | - |
| | CRANKCASE BREATHER | NOTE 3 | | | | C | C | C | C | C | C | - |
| | ENGINE OIL | | | | R | R | R | R | R | R | R | 27 |
| ∗ | ENGINE OIL STRAINER SCREEN | | | | C | | C | | C | | C | - |
| ∗ | ENGINE IDLE SPEED | | | | | | I | | I | | I | - |
| | RADIATOR COOLANT | NOTE 6 | | | | | | R | | | | - |
| ∗ | COOLING SYSTEM | | | | | | | I | | I | | - |
| ∗ | SECONDARY AIR SUPPLY SYSTEM | | | | | | | I | | I | | - |
| ∗ | TRANSMISSION OIL | NOTE 5 | | | R | | R | | R | | R | 30 |
| ∗ | DRIVE BELT | | | | | | | | I | | | - |
| ∗∗ | CLUTCH SHOE WEAR | | | | | | | | I | | | - |
| | BRAKE FLUID | NOTE 7 | | | | | I | I | I | R | I | 35 |
| | BRAKE PAD WEAR | | | | | I | I | I | I | I | I | 36 |
| | BRAKE SYSTEM | | | | | I | I | I | I | I | I | - |
| ∗ | BRAKE LIGHT SWITCH | | | | | | | I | | I | | - |
| | SIDE STAND | | | | | | | I | | I | | - |
| ∗ | SUSPENSION | | | | | | | I | | I | | - |
| ∗ | HEADLIGHT AIM | | | | | | | I | | I | | - |
| ∗ | NUTS, BOLTS, FASTENERS | | | | I | | | I | | I | | - |
| ∗∗ | WHEELS/TIRES | | | | | I | I | I | I | I | I | 38 |
| ∗∗ | STEERING BEARINGS | | | | I | | | I | | I | | - |

## THROTTLE OPERATION

Check the throttle grip for smooth movement.
Measure the throttle grip free play.

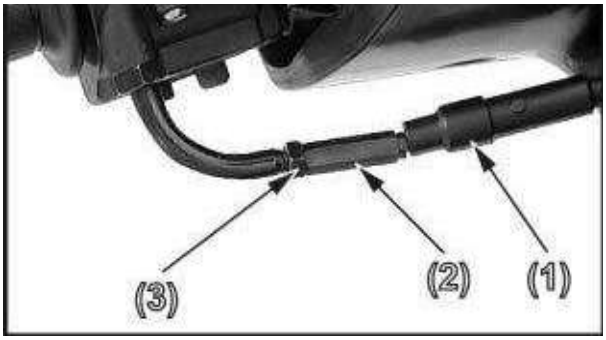
**Free Play**: 2～6 mm



Major adjustment of the throttle grip free play is made with the adjusting nut at the throttle body side. Adjust by loosening the lock nut and turning the adjusting nut.

Adjusting Nut Lock Nut

Minor adjustment is made with the adjusting nut at the throttle grip side.
Slide the rubber cover(1) out and adjust by loosening the lock nut(3) and turning the adjusting nut(2).



## ENGINE OIL

### OIL LEVEL INSPECTION

Stop the engine and support the scooter upright on the level ground.
Wait for 2～3 minutes and check the oil level with the dipstick. Do not screw in the dipstick when checking the oil level.

Dipstick

### OIL CHANGE

Remove the oil drain bolt to drain the engine oil.
Install the aluminum washer and tighten the oil drain bolt.

**Torque:** 2.5 kg-m

✻ • Replace the aluminum washer with a new one if it is deformed or damaged.

Pour the recommended oil through the oil filler hole.

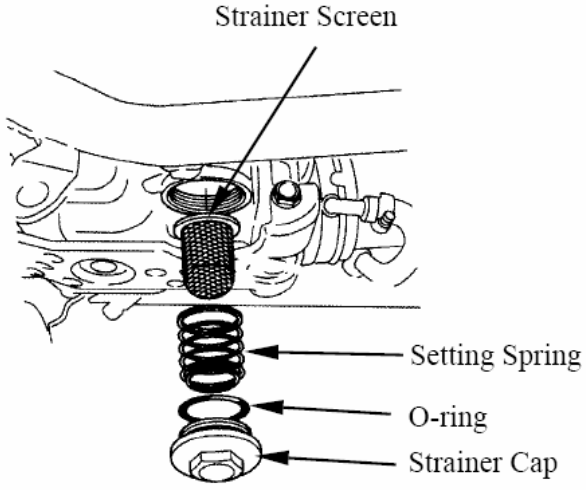

Oil Drain Bolt

### OIL CAPACITY

Engine oil capacity: 1.1 L
Engine oil exchanging capacity: 0.9 L
Engine Oil Viscosity : SAE 10W40

### OIL FILTER SCREEN INSPECTION

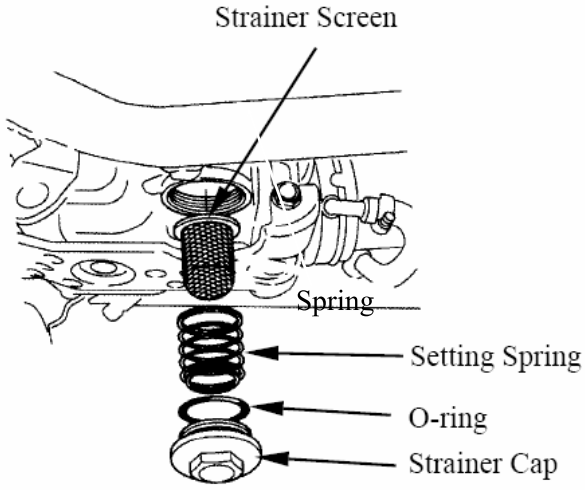
Drain the engine oil.
Remove the oil filter screen attaching the left-under crankcase.
Clean the oil filter screen.
Install the oil filter screen and filter screen cap.
Fill the engine with recommended engine oil.




### OIL FILTER REPLACEMENT

Remove the oil filler cap attaching the right-under crankcase cover.

The spring will come out when the filter cap is removed.
Let the engine oil drain out.
Check that the O-ring is in good condition.



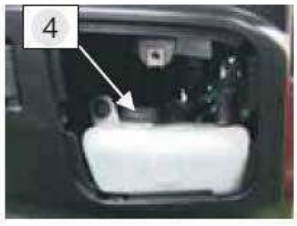

Install a new oil filter.

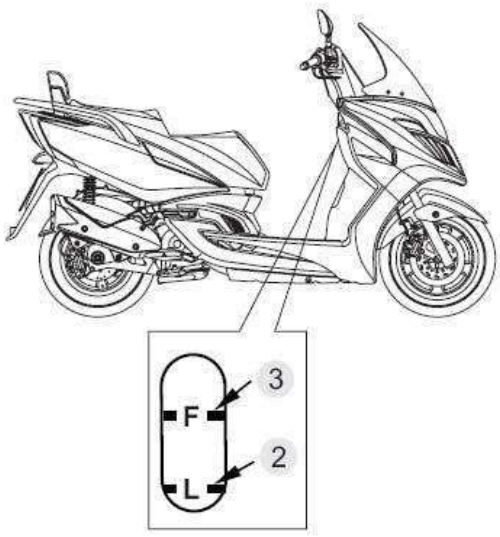
* Make sure the rubber seal on the oil filter facing the left crankcase.

## Coolant level inspection

The reserve tank is behind the leg shield.
Check the coolant level through the inspection window (1) while the engine is at the normal operating temperature, with the scooter In an upright position.

If the coolant level is below the LOWER level mark (2) ,remove the cover reserve tank, remove the lid screw, and then the reserve tank cap (4) to add coolant mixture until it reaches the upper level mark .


**⚠ WARNING**

Add coolant to the reserve tank only. Do not attempt to add coolant by removing the radiator cap. Coolant in the radiator is under pressure and is very hot and can cause serious burns.

## AIR CLEANER

### AIR FILTER REPLACEMENT

Remove screws attaching to remove air cleaner cover.
Remove screws attaching to remove filter.
Check the filter and replace it if it is excessively dirty or damaged.

Air Cleaner Filter

### CHANGE INTERVAL

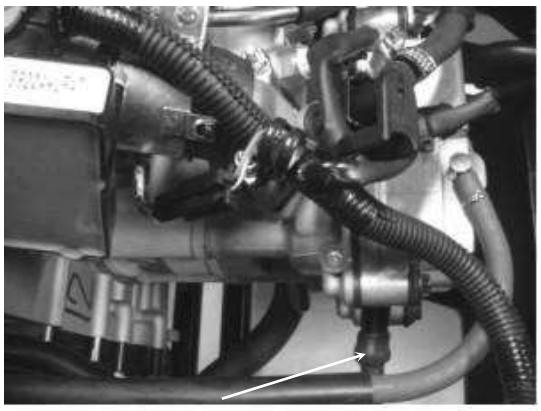
More frequent replacement is required when riding in unusually dusty or rainy areas.

* • The air cleaner element has a viscous type paper element. Do not clean it with compressed air.
  • Be sure to install the air cleaner element and cover securely.

## SPARK PLUG

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

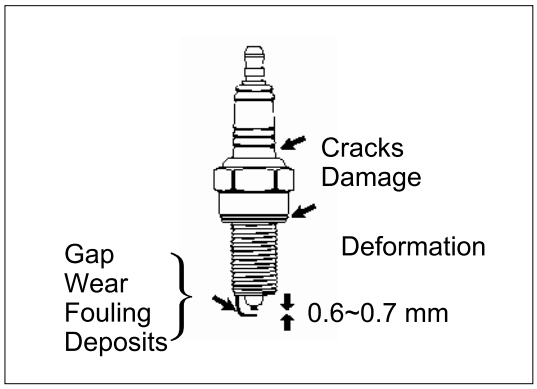
**Specified Spark Plug**: NGK-CR7E
Measure the spark plug gap.
**Spark Plug Gap**: 0.6 – 0.7 mm



Spark Plug

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

**Torque**:17.2 N-m



# 3. INSPECTION/ADJUSTMENT

## VALVE CLEARANCE

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

Remove the seat assy and luggage box.
Remove the four bolts and then cylinder head cover.

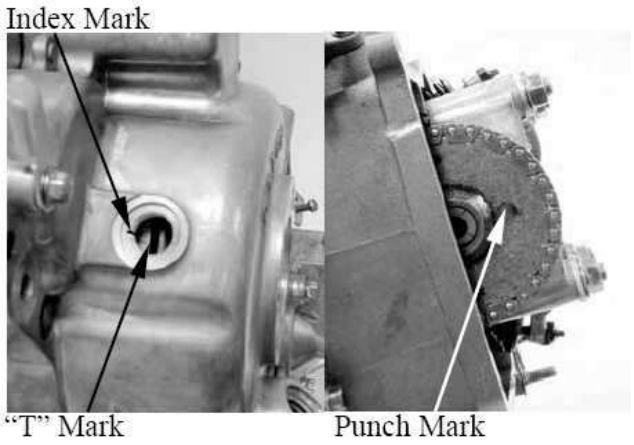
Turn the A.C. generator flywheel to the top dead center (TDC) on the compression stroke so that the “T” mark on the flywheel aligns with the index mark on the left crankcase cover.
Inspect and adjust valve clearance.

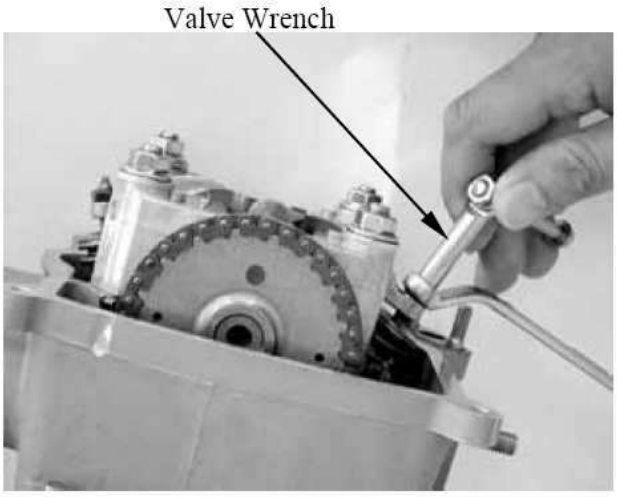
**Valve Clearance**: IN: 0.10 mm
EX: 0.10 mm

Loosen the lock nut and adjust by turning the adjusting nut

Special

Valve Adjuster E012
Feeler Gauge




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

## CYLINDER COMPRESSION

Warm up the engine before compression test.
Remove the center cover and luggage box.
Remove the spark plug.
Insert a compression gauge.
Open the throttle fully and push the starter button to test the compression.

**Max. Compression: 16±2 kg/cm$^2$ - 570 rpm**

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.

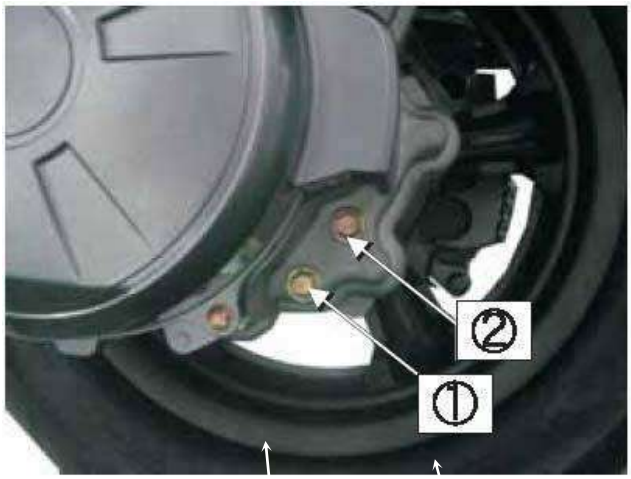
## FINAL REDUCTION GEAR OIL

✻ • Place the scooter on its main stand on level ground.

Remove the transmission fluid drain bolt.
Remove the transmission fluid filler bolt, then slowly rotate the rear wheel to drain the fluid.
Fill the transmission with the recommend fluid to the capacity listed below.

**Transmission fluid type: SAE 90**
**Transmission fluid capacity: 0.23 L**
**Transmission fluid exchanging capacity: 0.18 L**

Install the transmission filler bolt and tighten it to the specified torque.

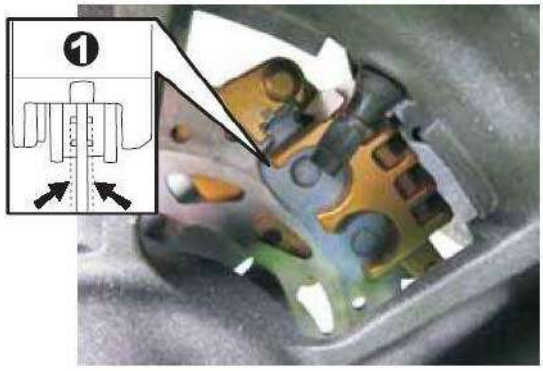



## DRIVE BELT

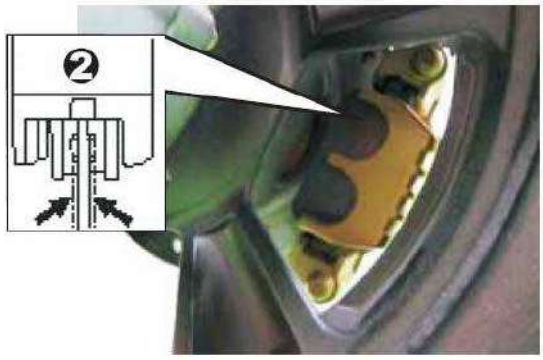
Remove the left crankcase cover.
Inspect the drive belt for cracks or excessive wear.
Replace the drive belt with a new one if necessary and in accordance with the Maintenance Schedule.

## BRAKE DISK/BRAKE PAD

Check the brake disk surface for scratches, unevenness or abnormal wear.
Check if the brake disk runout is within the specified service limit.
Check if the brake pad wear exceeds the wear indicator line.




* Keep grease or oil off the brake disk to avoid brake failure.




## BRAKE FLUID

Turn the steering handlebar upright and check if both brake fluid levels is at the upper limit. If the brake fluid is insufficient, fill to the upper limit.

**Specified Brake Fluid: DOT-4**


* The brake fluid level will decrease if the brake pads are worn.

## CLUTCH SHOE WEAR

Start engine and check the clutch operation by increasing the engine speed gradually.
If the motorcycle tends to creep or the engine stop, check the clutch shoes for wear and replace if necessary.

## SUSPENSION

### FRONT

Check the action of the front shock absorbers by compressing them several times.

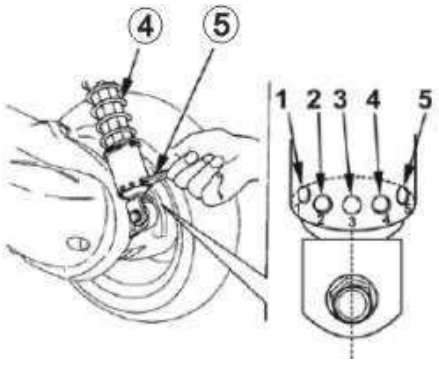
Check the entire shock absorber assembly for oil leaks, looseness or damage.

### REAR

Each shock absorber(4) on your scooter has 5 spring preload adjustment positions for different load or riding conditions.

Use a pin spanner(5) to adjust the rear shock spring preload. Position 1 is for light loads and smooth road conditions. Position 3 to 5 increase spring preload for a stiffer rear suspension and can be used when the scooter is heavily loaded.

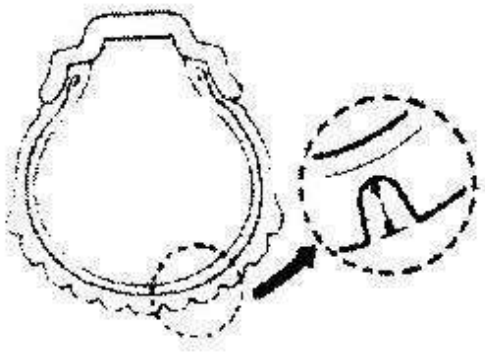
Be certain to adjust both shock absorbers to the same spring preload positions.



# 3. INSPECTION/ADJUSTMENT

## NUTS/BOLTS/FASTENERS

Check all important chassis nuts and bolts for looseness.
Tighten them to their specified torque values if any looseness is found.



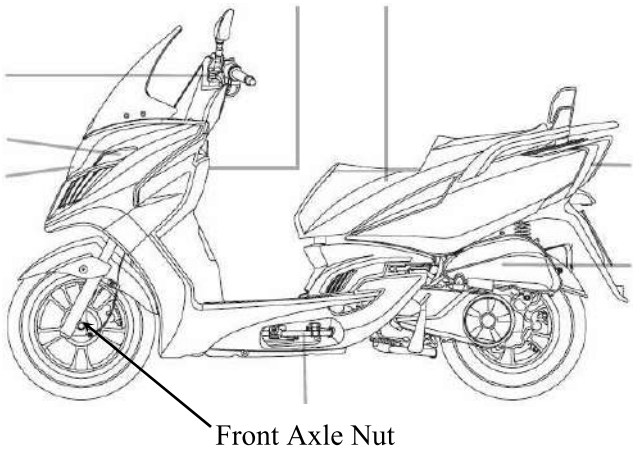
## WHEELS/TIRES

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 | 1 Rider (with passenger) |
|---|---|---|
| Front | 1.75 kg/cm$^2$ | 1.75 kg/cm$^2$ |
| Rear | 2.0 kg/cm$^2$ | 2.25 kg/cm$^2$ |



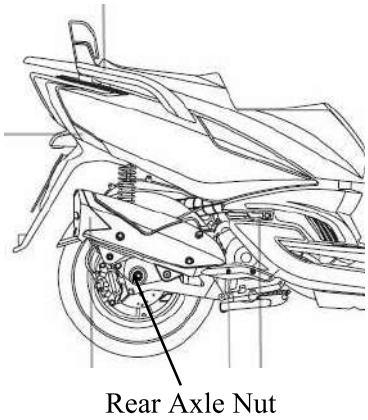

**Tire Size:**

Front 120/70-14
Rear 10/70-13

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 torques.

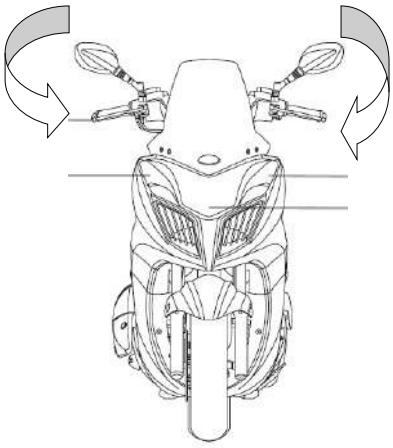
**Torque:**

Front axle nut 2 kg-m
Rear axle nut 12 kg-m




## STEERING HANDLEBAR

Raise the front wheel off the ground and check that the steering handlebar rotates freely.
If the handlebar moves unevenly, binds, or has vertical movement, adjust the steering head bearing.



# 3. INSPECTION/ADJUSTMENT

## SIDE STAND

Your scooter's side stand is not only necessary when you park, but it contains an important safety feature. This feature cuts-off the ignition if you try to ride the scooter when the side stand is down. Perform the following side stand inspection.



### INTERLOCK FUNCTION CHECK

Check the side stand ignition cut-off system,

1. Place the scooter on its center stand.
2. Put the side stand up and start the engine.
3. Lower the side stand. The engine should stop as you put the side stand down.

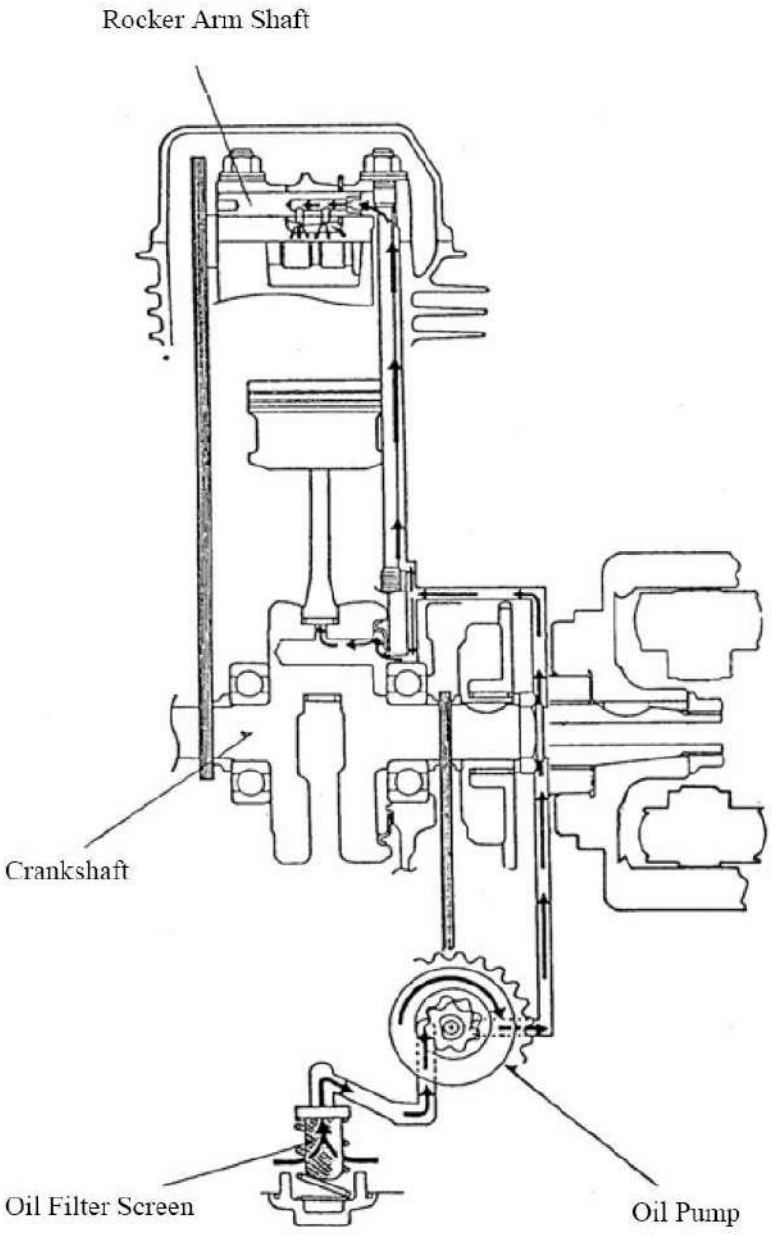
* If the side stand system does not operate as described, see your KYMCO dealer for service.

# 4. LUBRICATION SYSTEM

4

## LUBRICATION SYSTEM

## LUBRICATION



## SERVICE INFORMATION

### GENERAL INSTRUCTIONS

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

### SPECIFICATIONS

**ENGINE OIL**

| | |
|---|---|
| Engine Oil Capacity | At disassembly: 1.1 liter At change: 0.9 liter |
| Recommended Oil | SAE5W50# API: SJ |

### TROUBLESHOOTING

**Oil level too low**

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

**Oil contamination**

- Oil not changed often enough
- Faulty cylinder head gasket
- Loose cylinder head bolts

**Poor lubrication pressure**

- Oil level too low
- Clogged oil filter or oil passage
- Faulty oil pump

# 4. LUBRICATION SYSTEM

## ENGINE OIL/OIL FILTER


✳
- Place the scooter upright on level ground for engine oil level check.
- Run the engine for 2～3 minutes and check the oil level after the engine is stopped for 2～3 minutes.

Remove the oil dipstick and check the oil level with the oil dipstick.
If the level is near the lower level, fill to the upper level with the recommended engine oil.

## OIL CHANGE

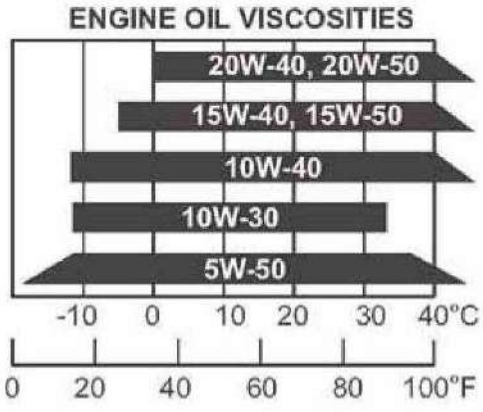
✳
- The engine oil will drain more easily while the engine is warm.

Remove the oil drain bolt located at the left side of the engine to drain the engine oil.
After the oil has been completely drained, install the aluminum washer and tighten the oil drain bolt.

Pour the recommended oil through the oil filler hole.

## OIL FILTER SCREEN

Drain the engine oil.
Remove the oil filter screen cap.
Remove the oil filter screen and spring.
Check the oil filter screen for clogging or damage and replace if necessary. Check the filter screen O-ring for damage and replace if necessary.
Install the oil filter screen, spring, O-ring and filter screen cap.




**Recommended Oil: SAE5W50# API: SJ**

**Oil Capacity:**

At disassembly: 1.1 liter

At change: 0.9 liter

Start the engine and check for oil leaks. Start the engine and let it idle for few minutes, then recheck the oil level.

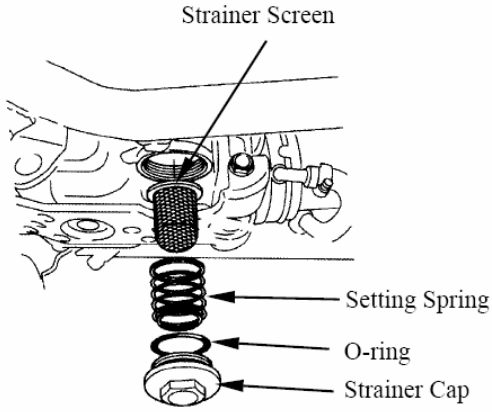
**OIL FILTER REPLACEMENT**

Remove the oil filler cap attaching the right-under crankcase cover.

The spring will come out when the filter cap is removed.

Let the engine oil drain out.

Check that the O-ring is in good condition.




Install a new oil filter.

* Make sure the rubber seal on the oil filter facing the left crankcase

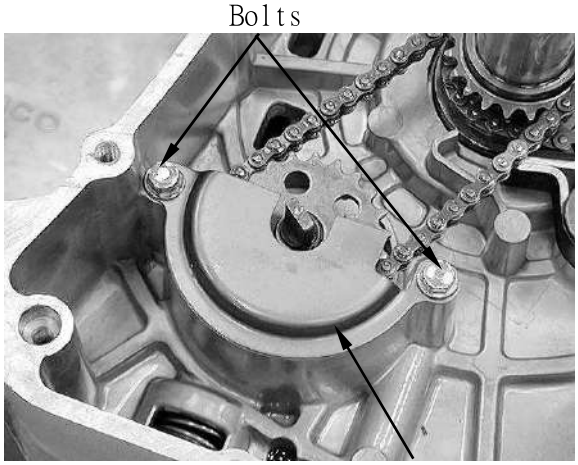
**OIL PUMP**

**REMOVAL**

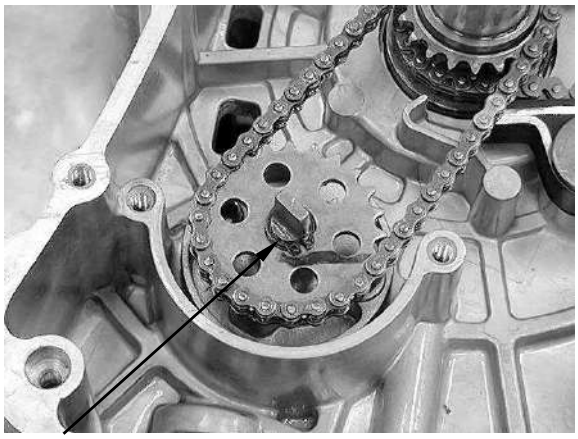
Remove the flywheel.

Remove the attaching bolt and oil separator cover.

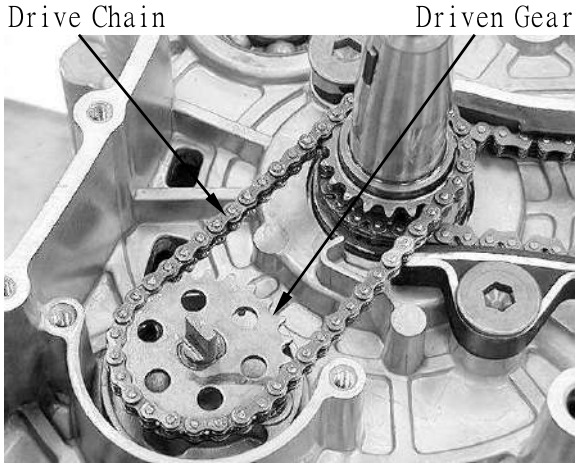
* When removing and installing the oil pump, use care not to allow dust or dirt to enter the engine.



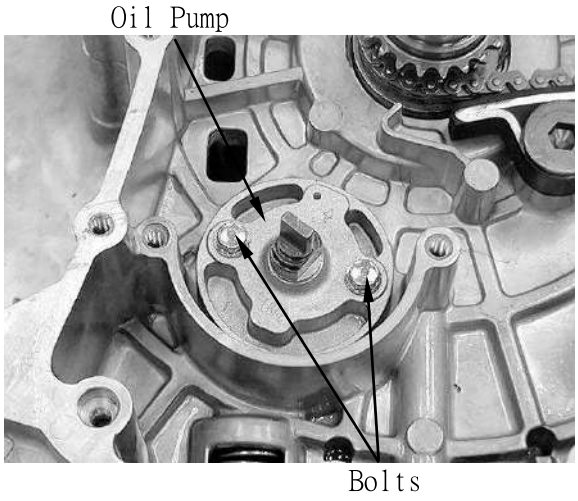

Remove snap ring.




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

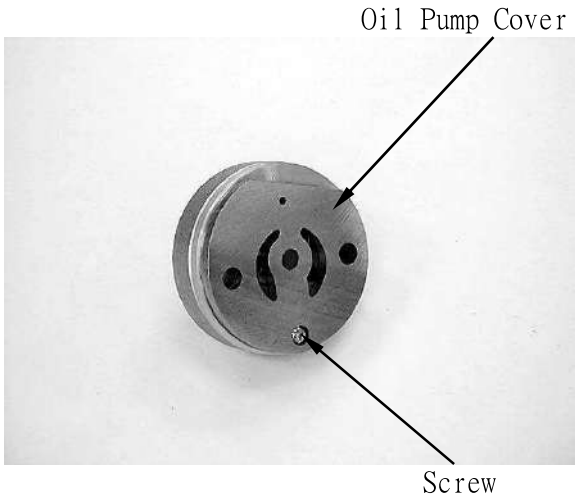


Remove the two oil pump bolts to remove the oil pump.

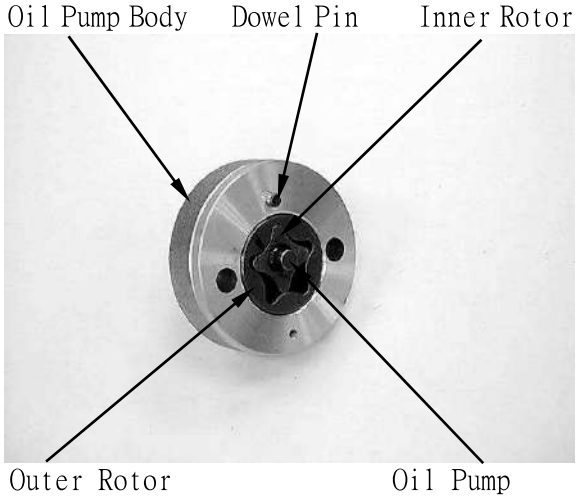



**DISASSEMBLY**

Remove the screw and oil pump cover.

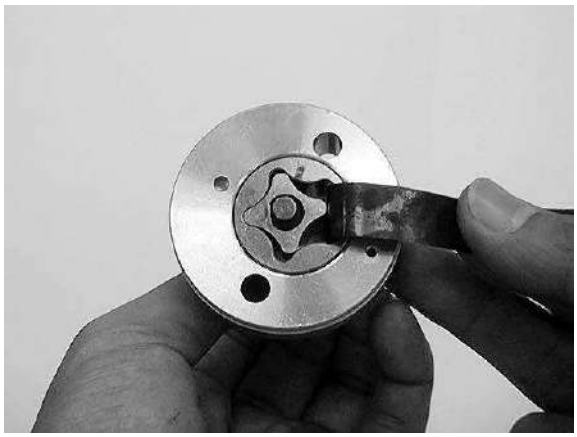



Remove the dowel pin, oil pump shaft, oil pump outer rotor and inner rotor.



**INSPECTION**

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



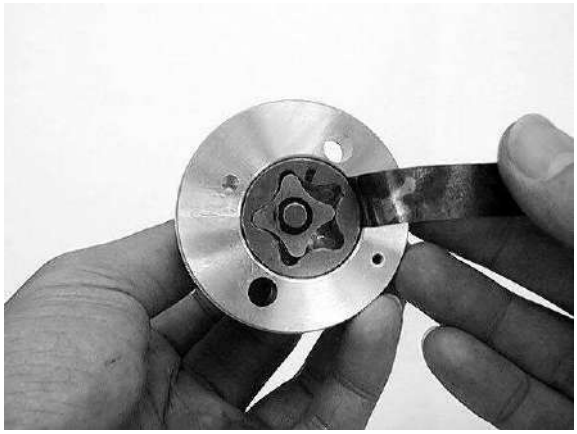
Measure the tip clearance.

**Service limit: 0.2 mm (0.008 in)**

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

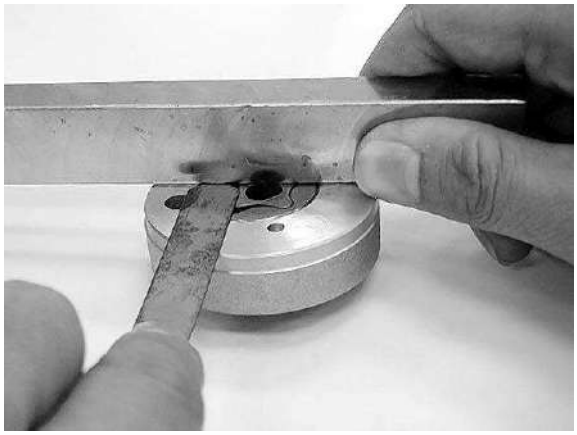
Measure the pump body clearance.

**Service limit: 0.25 mm (0.01 in)**



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

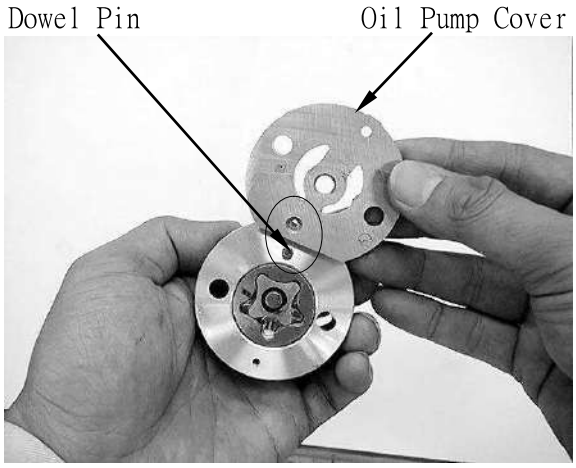
**Service limit: 0.12 mm (0.0048 in)**



# 4. LUBRICATION SYSTEM

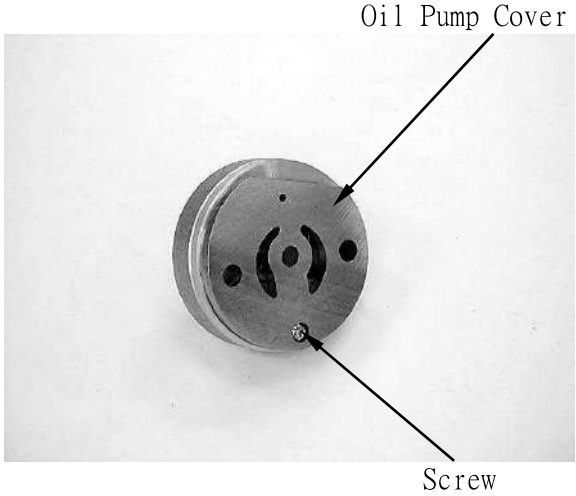
**ASSEMBLY**
Dip all parts in clean engine oil.

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



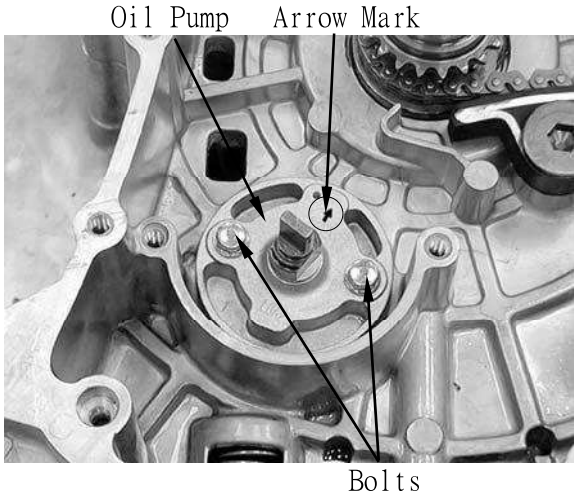

Install and tighten the screw to the specified torque.

**Torqur: 3 N•m (0.3kgf•m, 2 lbf•ft)**



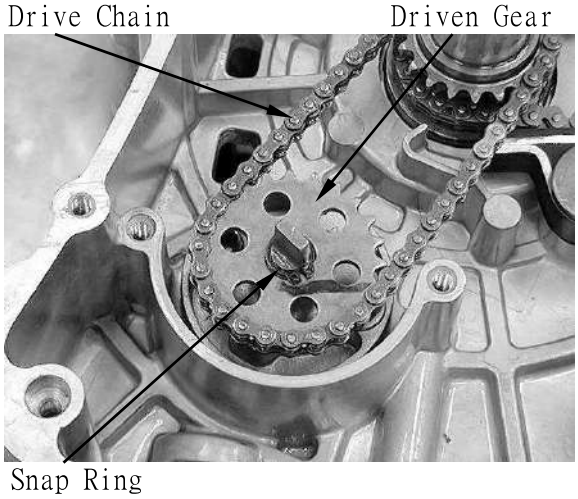

**INSTALLATION**
Install the oil pump and tighten the two bolts securely.

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

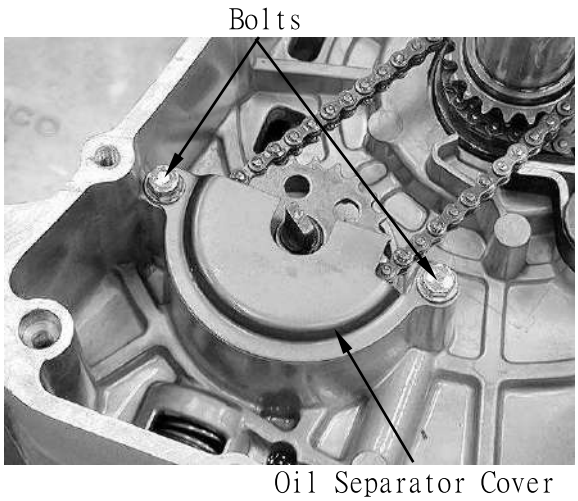


Install the oil pump driven sprocket and drive chain.

Install the snap ring.




Install the oil separator cover properly and tighten two bolts securely as shown.



5

# ENGINE REMOVAL/INSTALLATION

# 5. ENGINE REMOVAL/INSTALLATION

## SERVICE INFORMATION

### GENERAL INSTRUCTIONS

- A floor jack or other adjustable support is required to support and maneuver the engine. Be careful not to damage the scooter body, cables and wires during engine removal.
- Use shop towels to protect the scooter body during engine removal.
- Drain the coolant before removing the engine.
- After the engine is installed, fill the cooling system with coolant and be sure to bleed air from the water jacket. Start the engine to check for coolant leaks.
- Before removing the engine, the rear brake caliper must be removed first. Be careful not to bend or twist the brake fluid tube.

### SPECIFICATIONS

**Engine oil capacity:**

At disassembly: 1.1 L

At change: 0.9 L

### TORQUE VALUES

| | |
|---|---|
| Engine hanger (Engine side) | 4.5~5.5 kgf-m |
| Engine hanger (Frame side) | 6~7 kgf-m |
| Rear fork mount bolts | 2.4~3.0 kgf-m |
| Rear axle nut | 11~13 kgf-m |
| Rear cushion lower/upper mount bolts | 3.5~4.5 kgf-m |

## ENGINE REMOVAL/INSTALLATION

### REMOVAL

Remove the air cleaner

Disconnect the connector including of ISC, Throttle body, TPS, WTS, MAP sensor and injector.

Disconnect the O2 sensor connector.

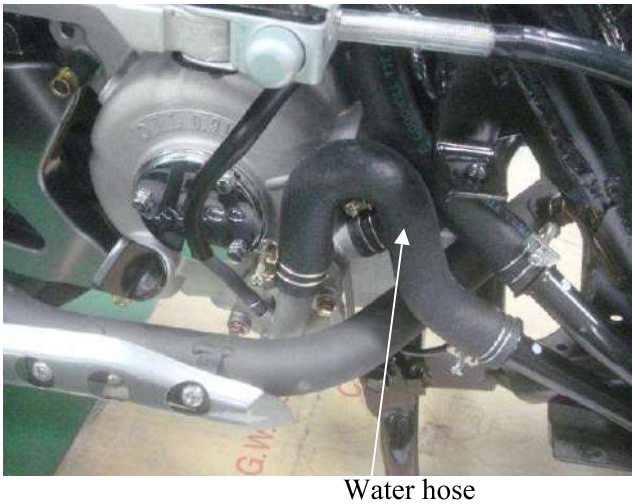
Disconnect the throttle cables.

Disconnect the Regulator/Rectifier connector.

Disconnect the starter relay wire from starter motor.

Remove a bolt from fuel hose guide.

Disconnect the fuel hose from fuel injector.



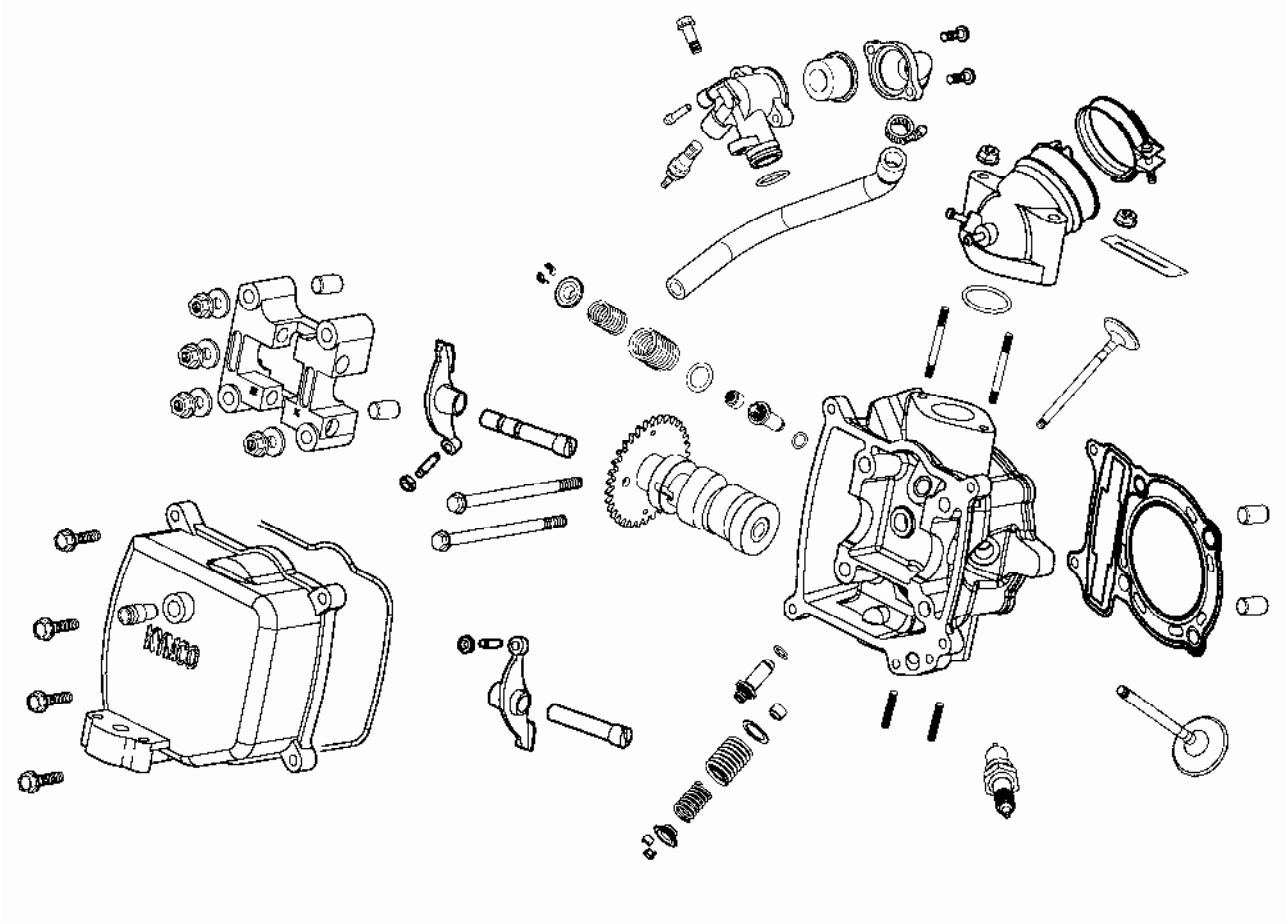
Water hose

Disconnect the input water hose.

Disconnect the air bleed hose.

# CYLINDER HEAD/VALVES

# 6. CYLINDER HEAD/VALVES



# 6. CYLINDER HEAD/VALVES

## SERVICE INFORMATION

### GENERAL INSTRUCTIONS

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

### SPECIFICATIONS

Unit: mm (in)

| Item | | Standard | Service Limit |
|---|---|---|---|
| Valve clearance (cold) | IN | 0.1 mm (0.004 in) | — |
| | EX | 0.1 mm (0.004 in) | — |
| Cylinder head compression pressure | | 15 kg/cm$^2$ (213 psi, 1500 kPa) | — |
| Cylinder head warpage | | — | 0.05 (0.002) |
| Camshaft cam height | IN | 34.2987 (1.371948) | 34.14 (1.3656) |
| | EX | 34.1721 (1.366884) | 34.02 (1.3608) |
| Valve rocker arm I.D. | IN | 10 (0.4)～10.015 (0.4006) | 10.1 (0.404) |
| | EX | 10 (0.4)～10.015 (0.4006) | 10.1 (0.404) |
| Valve rocker arm shaft O.D. | IN | 9.972 (0.399)～9.987 (0.3995) | 9.9 (0.396) |
| | EX | 9.972 (0.399)～9.987 (0.3995) | 9.9 (0.396) |
| Valve stem O.D. | IN | 4.975 (0.199)～4.99 (0.1996) | 4.925 (0.197) |
| | EX | 4.955 (0.1982)～4.97 (0.1988) | 4.915 (0.1966) |
| Valve guide I.D. | IN | 5 (0.2)～5.012 (0.2005) | 5.03 (0.2012) |
| | EX | 5 (0.2)～5.012 (0.2005) | 5.03 (0.2012) |
| Valve stem-to-guide clearance | IN | 0.01 (0.004)～0.037 (0.0015) | 0.08 (0.0032) |
| | EX | 0.03 (0.0012)～0.057 (0.0023) | 0.1 (0.004) |

### TORQUE VALUES

| | | |
|---|---|---|
| Cylinder head cap nut | 25 N•m (2.5 kgf•m, 18 lbf•ft) | Apply engine oil to threads |
| Valve clearance adjusting nut | 9 N•m (0.9 kgf•m, 6.5 lbf•ft) | Apply engine oil to threads |
| Cylinder head cover bolt | 12 N•m (1.2 kgf•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.


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/cm$^2$ (213 psi, 1500 kPa)**

Low compression can be caused by:
- Blown cylinder head gasket
- Improper valve adjustment
- Valve leakage
- Worn piston ring or cylinder

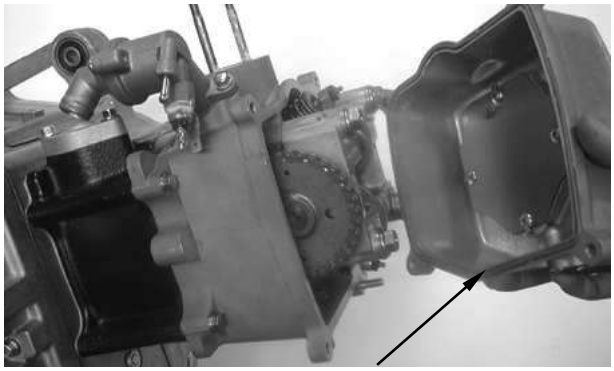
High compression can be caused by:
- Carbon deposits in combustion chamber or on piston head

## CYLINDER HEAD COVER

**DISASSEMBLY**
Remove the floorboard
Disconnect the crankcase breather hose from the cylinder head cover.

Remove the four bolts and two nuts, then remove cylinder head cover.

Remove the cylinder head cover O-ring.

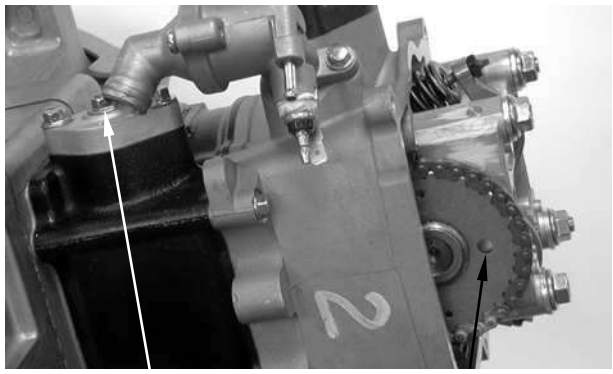

O-ring

## CAMSHAFT

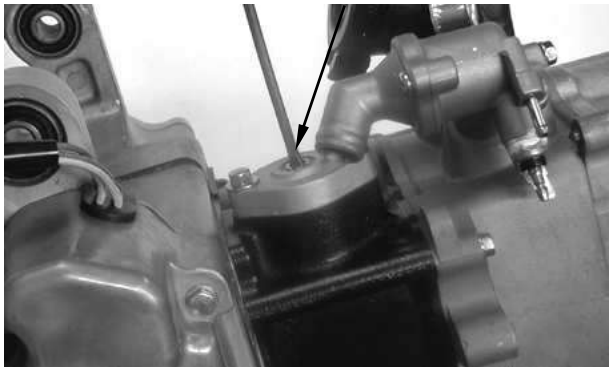
### REMOVAL

Turn the A.C. generator flywheel so that the "T" mark on the flywheel aligns with the index mark on the right crankcase cover

Hold the round hole on the camshaft gear facing up and the location is the top dead center on the compression stroke.
Remove the cam chain tensioner lifter sealing bolt.

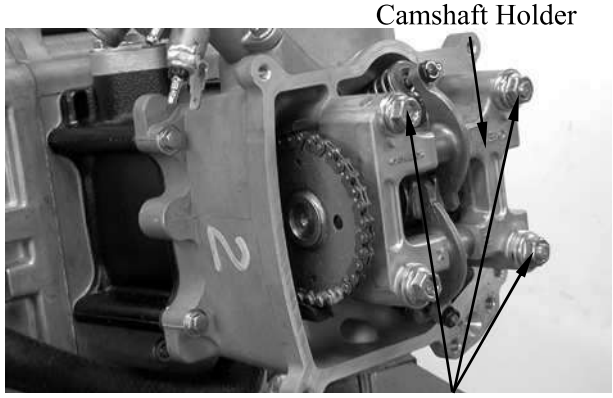



Turn the cam chain tensioner screw clockwise to pull the tensioner rod all the way in.

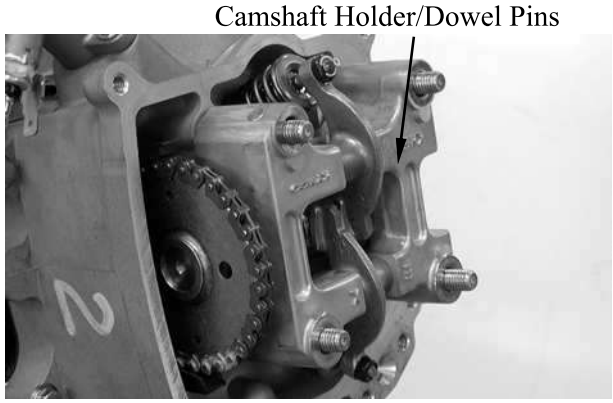



Remove the four cap nuts attaching the camshaft holder.

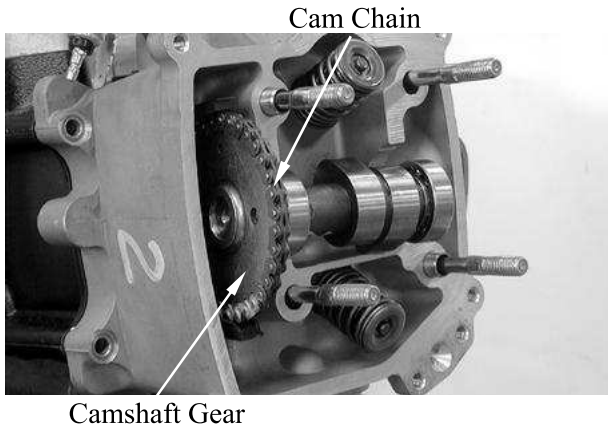
* • Diagonally loosen the cylinder head cap nuts in 2 or 3 times.



Remove the camshaft holder and dowel pins.




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

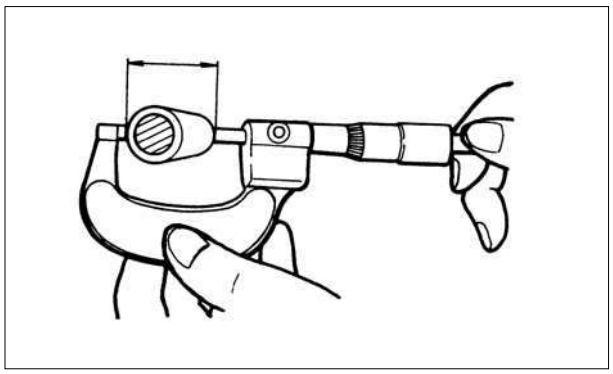


**INSPECTION**

**Camshaft**

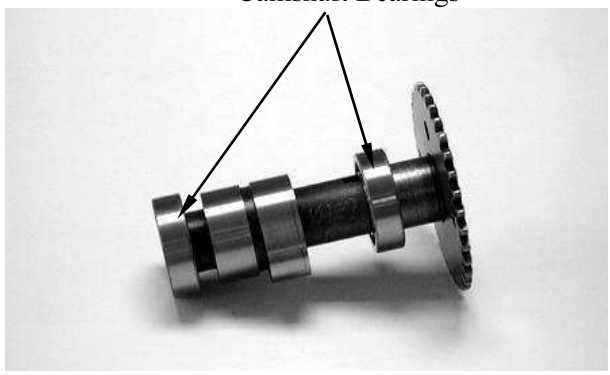
Check each cam lobe for wear or damage. Measure the cam lobe height.

**Service Limits: IN : 34.14 mm (1.3656 in)**
**EX: 34.02 mm (1.3608 in)**



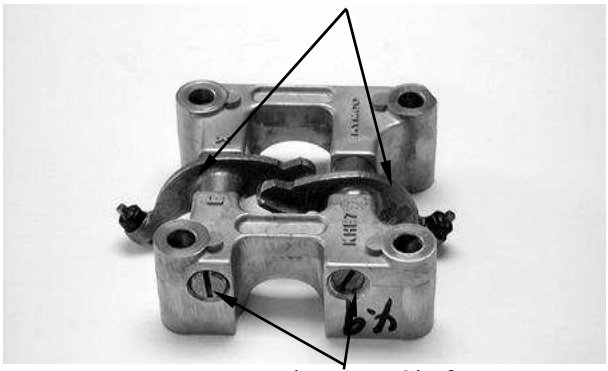
Check each camshaft bearing for play or damage. Replace the camshaft assembly with a new one if the bearings are noisy or have excessive play.

Camshaft Bearings



## ROCKER ARMS

Valve Rocker Arms



Rocker Arm Shafts

### REMOVAL

Remove the camshaft.

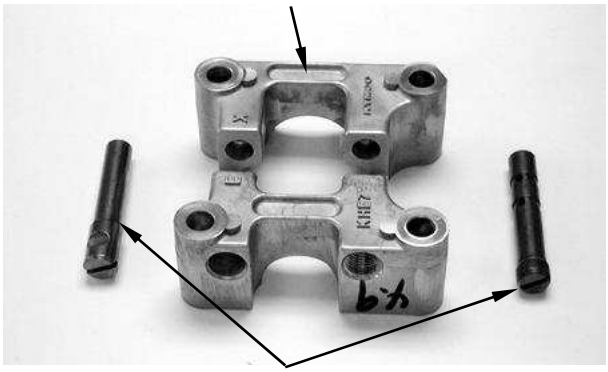
Remove the rocker arm shafts and then remove the rocker arms.

### INSPECTION

**Camshaft holder**

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

Camshaft Holder



Rocker Arm Shafts

**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.

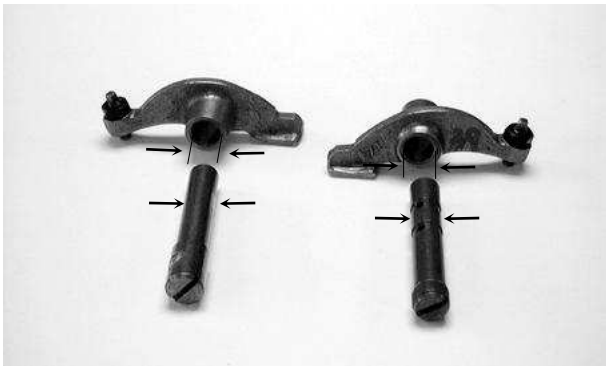
Measure each rocker arm shaft O.D.

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.

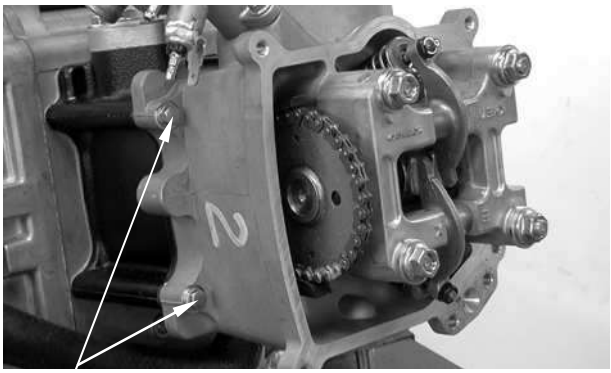
**Service limits: 0.1 mm (0.004 in)**

## CYLINDER HEAD

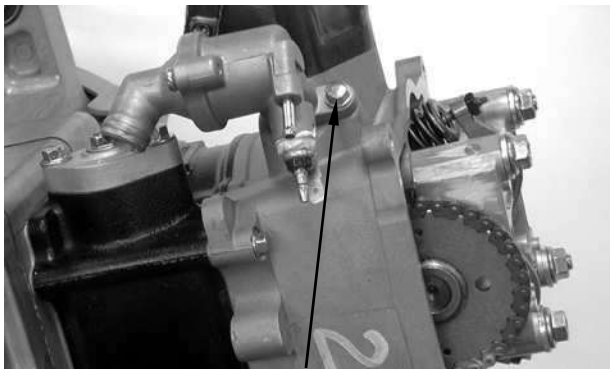
First drain the coolant from the radiator and water jacket, then remove the thermostat water hose.
Remove the camshaft.

Remove the carburetor and intake pipe.

Remove the two cylinder bolts.

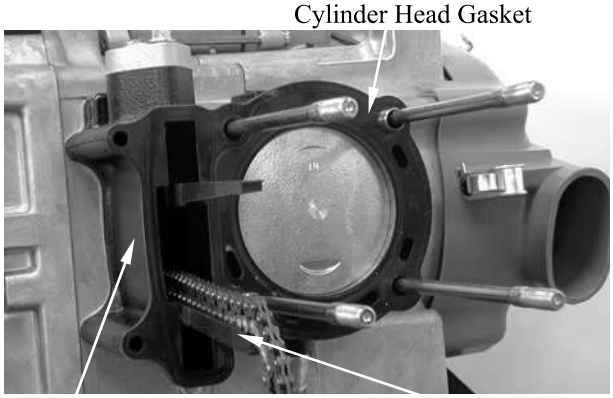

Cylinder Bolts

Remove the bolt attaching the thermostat housing and the thermostat housing.
Remove the cylinder head.


Bolt

Remove the dowel pins and cylinder head gasket.
Remove the cam chain guide.
Remove all gasket material from the cylinder head mating surface.

* Be careful not to drop any gasket material into the engine.



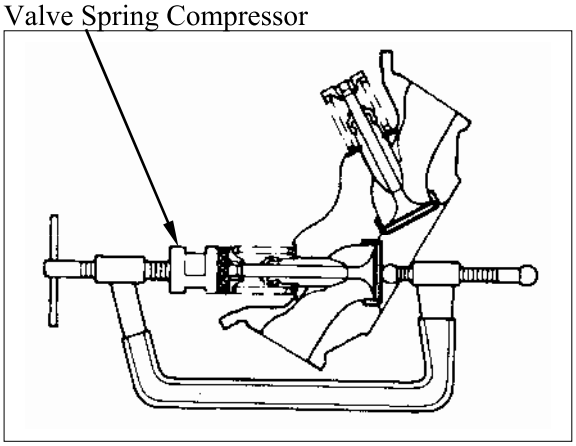
**CYLINDER HEAD DISASSEMBLY**

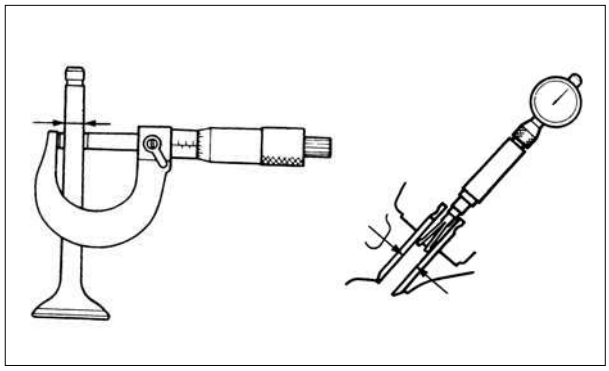
Remove the valve spring cotters, retainers, springs, spring seats, oil seals and valves using a valve spring compressor.

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

**Special tool:**
**Valve Spring Compressor A120E00040**

Valve Spring Compressor



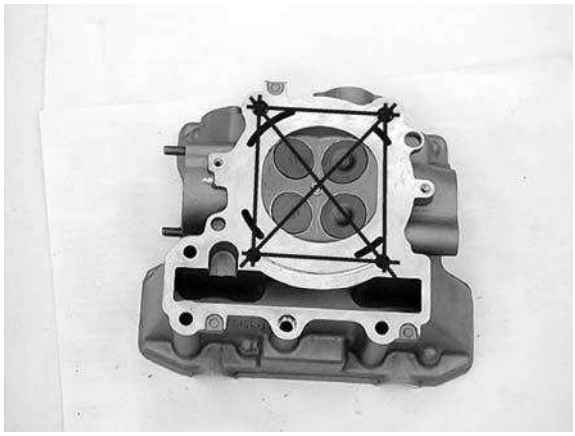


**VALVE /VALVE GUIDE INSPECTION**
Inspect each valve for bending, burning, scratches or abnormal stem wear.
If any defects are found, replace the valve with a new one.

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

**Service limits:**
**IN: 0.08 mm (0.0032 in)**
**EX: 0.1 mm (0.004 in)**

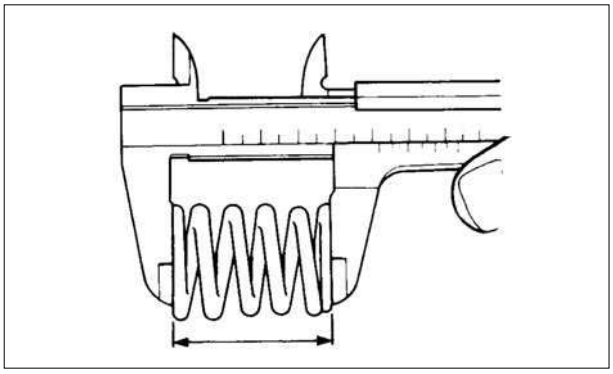
* If the stem-to-guide clearance exceeds the service limits, replace the cylinder head is necessary.



**CYLINDER HEAD INPECTION**
Check the spark plug hole and valve areas for cracks.

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

**Service Limit: 0.05 mm (0.002 in)**

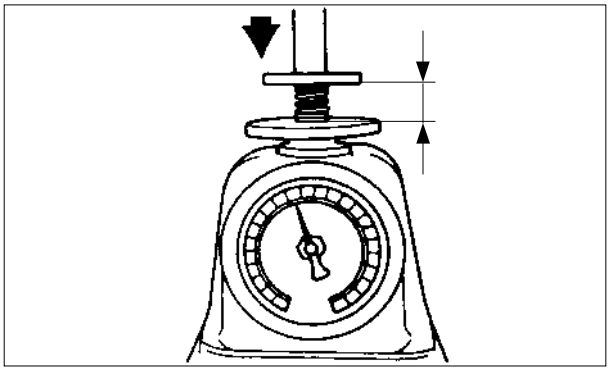


**VALVE SPRING INSPECTION**
Measure the free length of the inner and outer valve springs.

**Service Limit:**

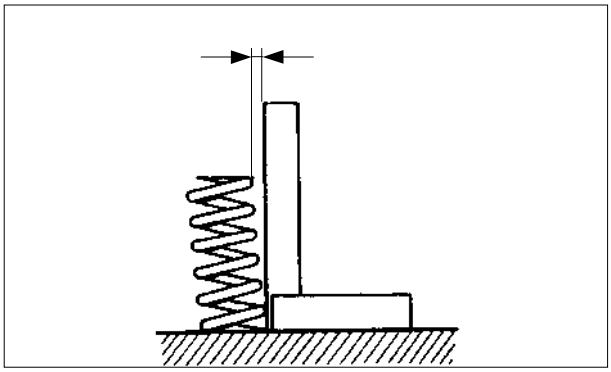
**Inner: 29.1 mm (1.164 in)**
**Outer: 39.2 mm (1.568 in)**

Measure compressed force (valve spring) and installed length.
Replace if out of specification.



**Standard**:
**Inner: 2.95 kg (at 26.6 mm, 1.064 in)**
**Outer: 10.45 kg (at 29.6 mm, 1.184 in)**

Measure the spring tilt.
Replace if out of specification.



**Standard:**
**Inner: 0.81 mm (0.0324 in)**
**Outer: 1.07 mm (0.0428 in)**

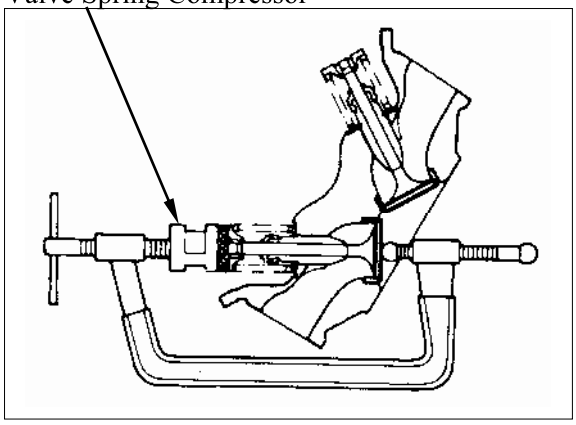
**ASSEMBLY**

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.

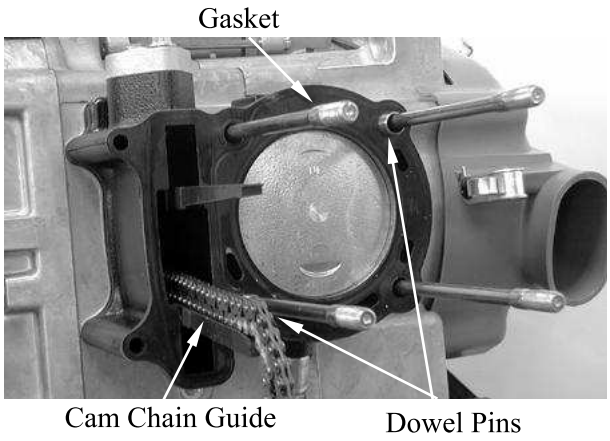
Valve Spring Compressor



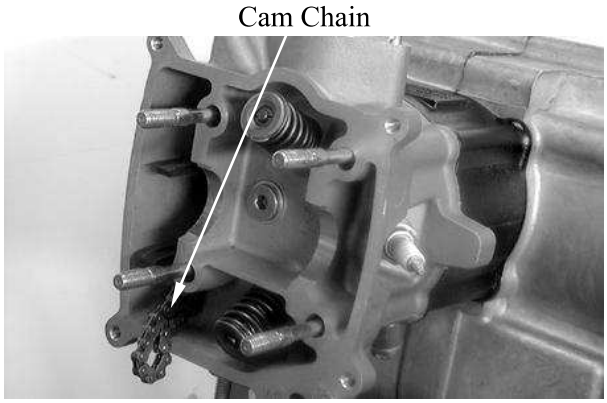
* • When assembling, a valve spring compressor must be used.
• Install the cotters with the pointed ends facing down from the upper side of the cylinder head.

**Special tool:**
**Valve Spring Compressor A120E00040**

**INSTALLATION**
Install the cam chain guide.
Install the dowel pins and a new cylinder head gasket.

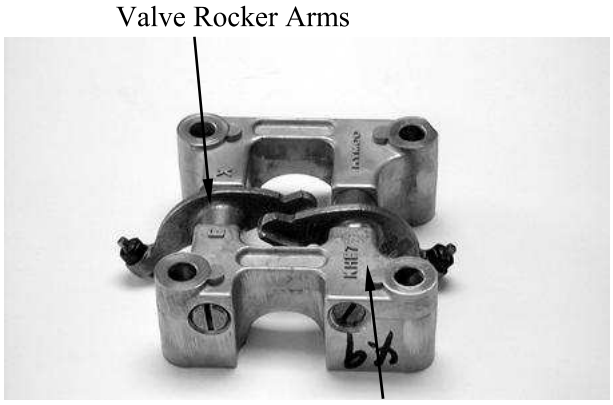



Install the cylinder head and take out the cam chain

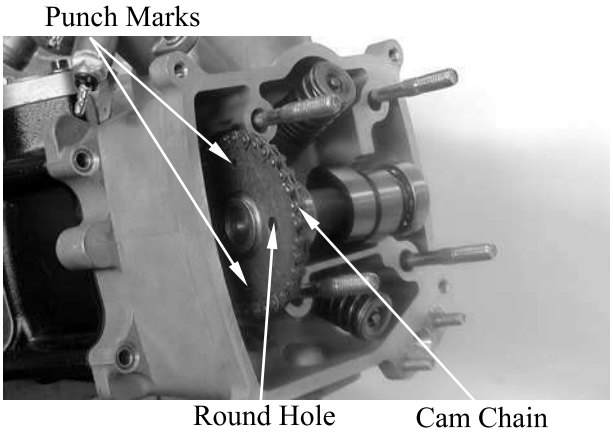



Assemble the camshaft holder.
First install the intake and exhaust valve rocker arms; then install the rocker arm shafts.

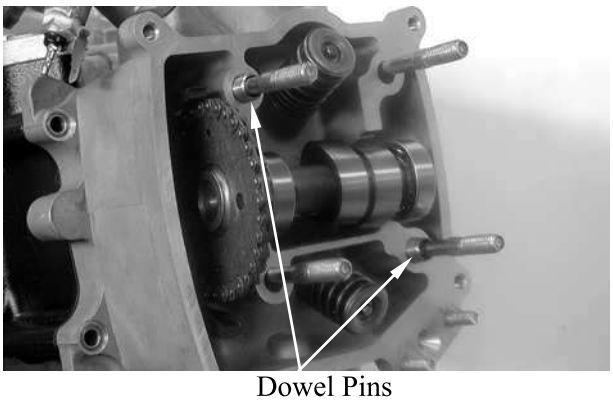
* • Install the exhaust valve rocker arm shaft on the "EX" side of the camshaft holder and the exhaust rocker arm shaft is shorter.
  • Clean the intake valve rocker arm shaft off any grease before installation.
  • Align the cutout on the exhaust valve rocker arm shaft with the bolt of the camshaft holder.



Turn the A.C. generator flywheel so that the "T" mark on the flywheel aligns with the index mark on the right crankcase cover. Keep the round hole on the camshaft gear facing up and align the punch marks on the camshaft gear with the cylinder head surface (Position the intake and exhaust cam lobes down.) and install the cam chain over the camshaft gear.



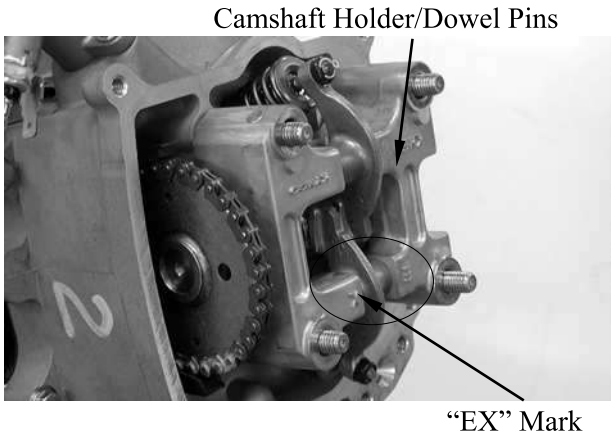

Install the dowel pins.



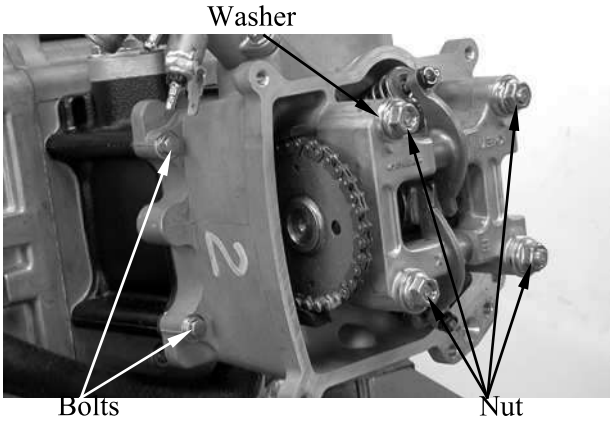

Install the camshaft holder, washers and nuts on the cylinder head.
Tighten the four cylinder head cap nuts and two cylinder bolts to the specified torque.

**Torque:**
**Cylinder head cap nut:**
**25 N•m (2.5 kgf•m, 18 lbf•ft)**
**Apply engine oil to threads**

**Cylinder bolt: 10 N•m (1 kgf•m, 7 lbf•ft)**

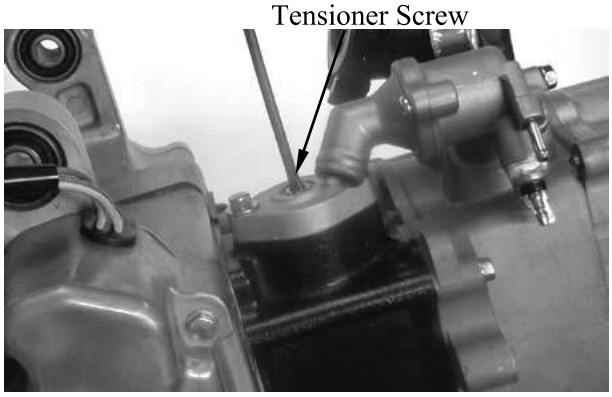



* • Install the camshaft holder with the "EX" mark face exhaust valve side.
• Apply engine oil to the threads of the cylinder head cap nuts.
• Diagonally tighten the cylinder head cap nuts in 2～3 times.
• First tighten the cylinder head cap nuts and then tighten the cylinder bolts to avoid cracks.



Turn the cam chain tension screw counterclockwise to release it.

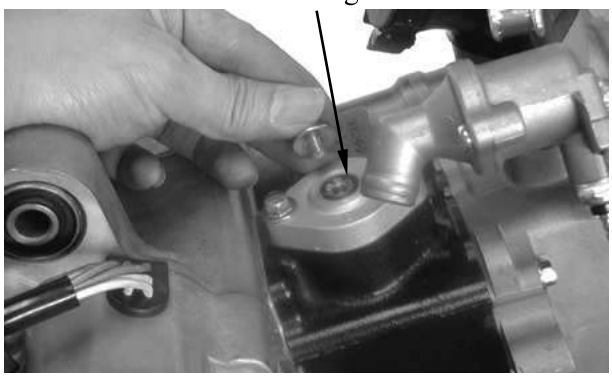
Tensioner Screw



Apply engine oil to a new O-ring and install it.
Tighten the cam chain tension cap screw.

* Be sure to install the gasket into the groove properly.

O-ring

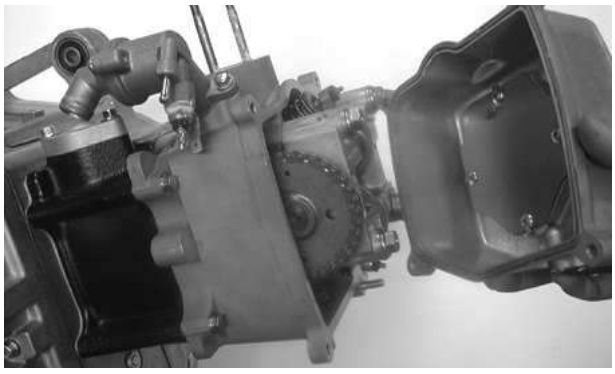


Adjust the valve clearance.

Install a new cylinder head cover O-ring and install the cylinder head cover.

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

Cylinder Head Cover



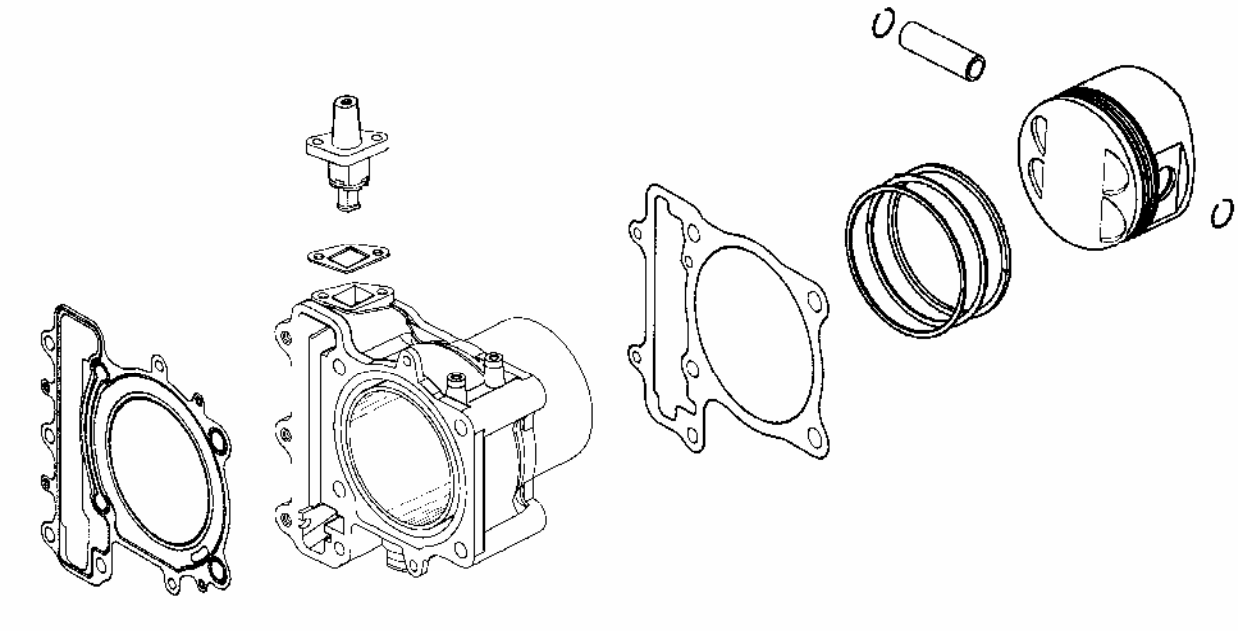
Install and tighten the cylinder head cover bolts.

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

# CYLINDER/PISTON

# 7. CYLINDER/PISTON

## SCHEMATIC DRAWING



# 7. CYLINDER/PISTON

## SERVICE INFORMATION

### GENERAL INSTRUCTIONS

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

### SPECIFICATIONS

Unit: mm (in)

| Item | | | Standard | Service Limit |
|---|---|---|---|---|
| Cylinder | I.D. | | 72.75 (2.91)～72.7015 (2.90806) | 72.8 (2.912) |
| | Warpage | | 0.01 (0.0004) | 0.05 (0.002) |
| | Cylindricity | | 0.01 (0.0004) | 0.1 (0.004) |
| | True roundness | | 0.01 (0.0004) | 0.1 (0.004) |
| Piston, piston ring | Ring-to-groove clearance | top | 0.03 (0.0012)～0.065 (0.0026) | 0.08 (0.003) |
| | | Second | 0.015 (0.0006)～0.05 (0.002) | 0.65 (0.0026) |
| | Ring end gap | top | 0.15 (0.006)～0.3 (0.012) | 0.5 (0.02) |
| | | Second | 0.03 (0.012)～0.45 (0.018) | 0.65 (0.026) |
| | | Oil side rail | 0.2 (0.008)～0.7 (0.028) | 1 (0.04) |
| | Piston O.D. | | 72.67 (2.9068)～72.69 (2.9076) | 72.6 (2.904) |
| | Piston O.D. measuring position | | 9 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. | | 17.002 (0.68008)～17.008 (0.68032) | 17.04 (0.6816) |
| Piston pin O.D | | | 16.994 (0.67976)～17 (0.68) | 16.96 (0.6784) |
| Piston-to-piston pin clearance | | | 0.002 (0.0001)～0.014 (0.0006) | 0.02 (0.001) |
| Connecting rod small end I.D. bore | | | 17.016 (0.68064)～17.034 (0.68136) | 17.06 (0.6824) |

## 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**

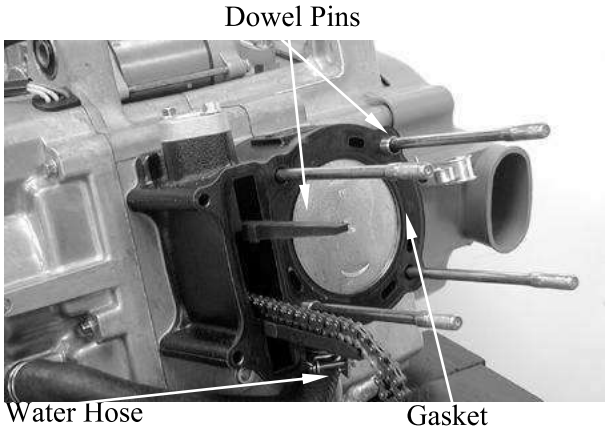
- Worn cylinder, piston and piston rings
- Worn piston pin hole and piston pin
- Incorrectly installed piston

## CYLINDER/PISTON

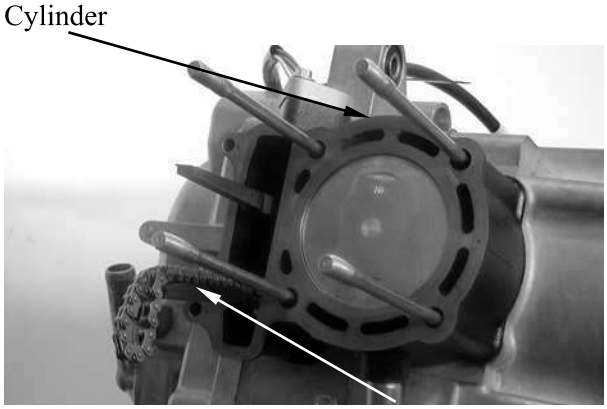
### REMOVAL

Remove the cylinder head.

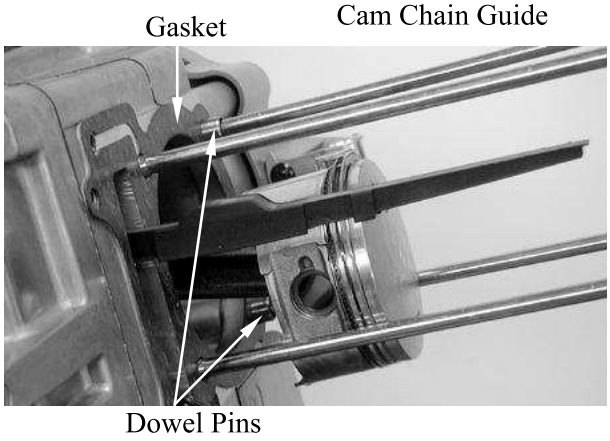
Remove the water hose from the cylinder.
Remove the cylinder head gasket and dowel pine.




Remove the cam chain guide.
Remove the cylinder.



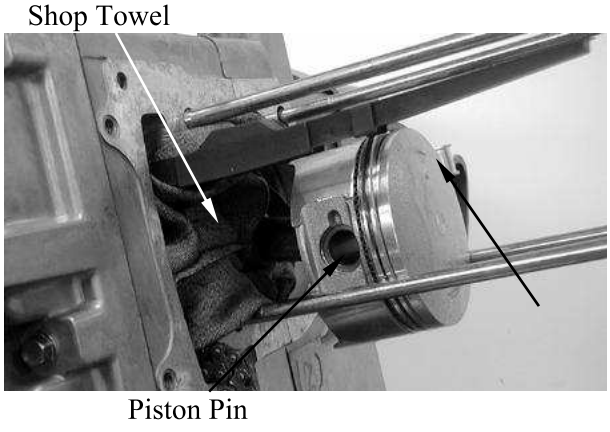

Remove the cylinder gasket and dowel pins.
Clean any gasket material from the cylinder surface.




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.

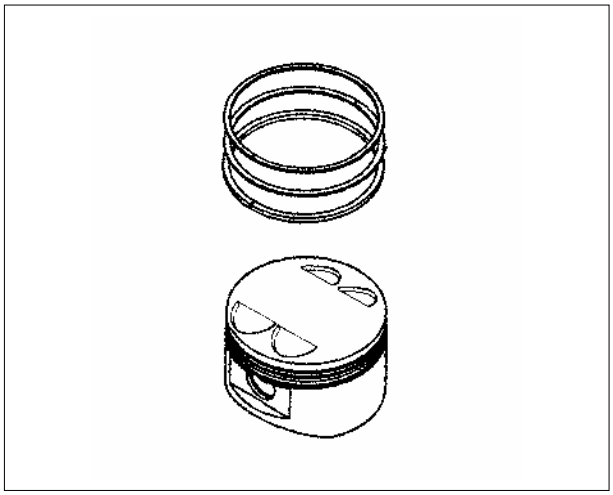


**PISTON RING REMOVAL**

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

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

Clean carbon deposits from the piston ring grooves.



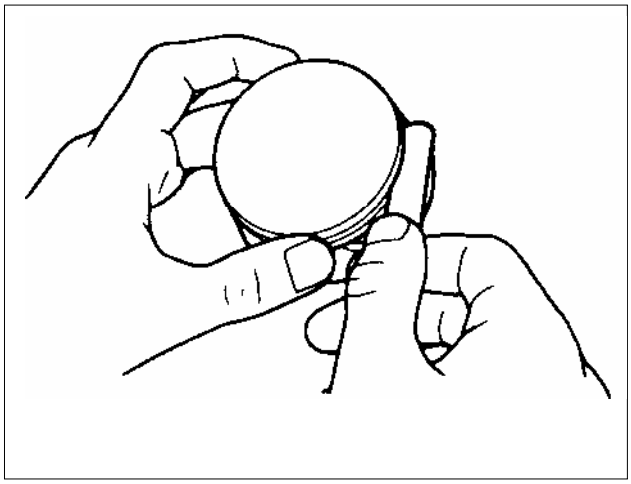
**INSPECTION**

**Piston ring**

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

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

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

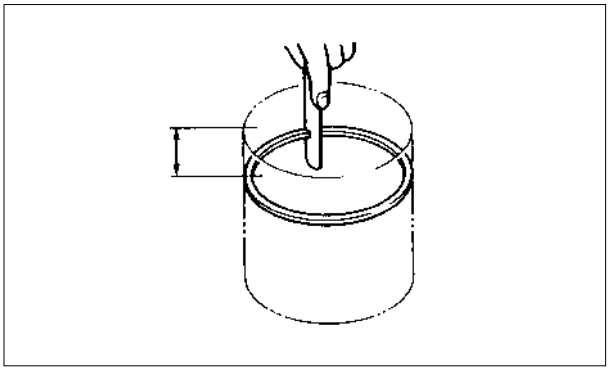


Insert each piston ring into the bottom of the cylinder squarely.

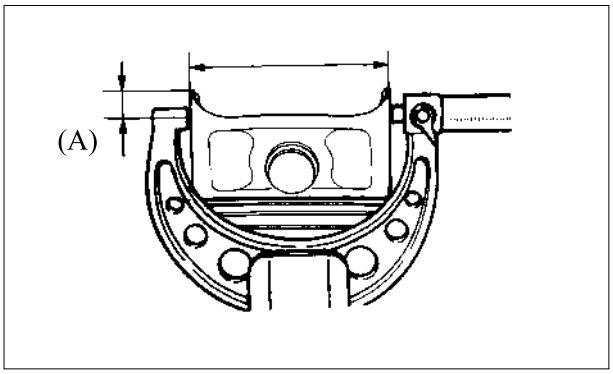
* Use the piston head to push each piston ring into the cylinder.

Measure the piston ring end gap.

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



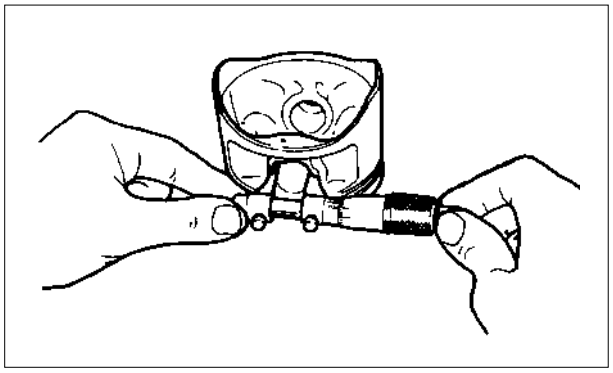
**Piston/Piston pin**
Measure the piston O.D. at the point (A) from the bottom and 90° to the piston pin hole.




**Service Limit:**
**72.6 mm (2.904 in) at (A): 9 mm**

Calculate the cylinder-to-piston clearance

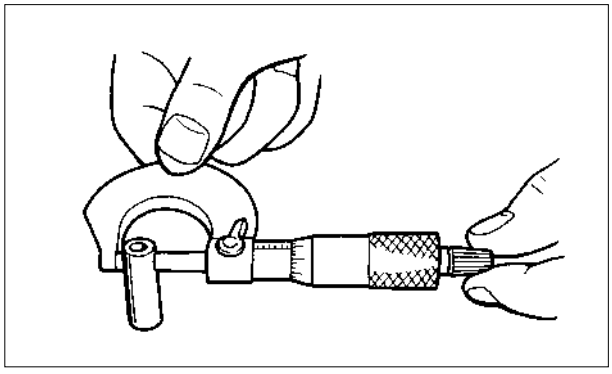
Measure the piston pin hole. Take the maximum reading to determine the I.D..



**Service Limit:**

**17.04 mm (0.6816 in)**

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



**Service Limit:**
**16.96 mm (0.6784 in)**

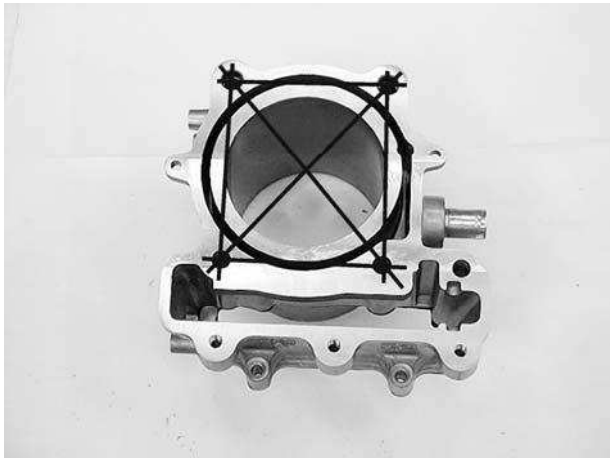
Measure the piston-to-piston pin clearance.

**Service Limit: 0.002 mm (0.0001 in)**

# 7. CYLINDER/PISTON

**Cylinder**

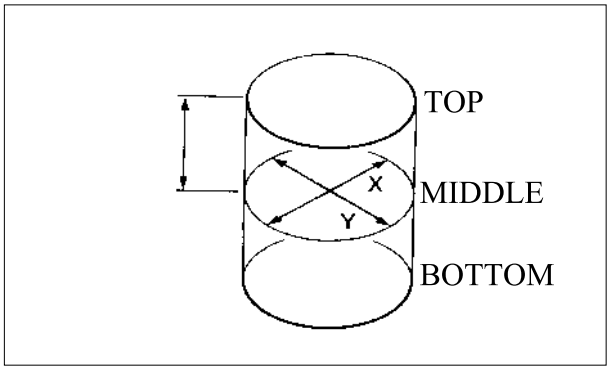
Check the cylinder for warpage with a straight edge and feeler gauge in the directions shown.



**Service Limit: 0.05 mm (0.002 in)**

Check the cylinder wall for wear or damage.

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




**Service Limit:**

**72.8 mm (2.912 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:**

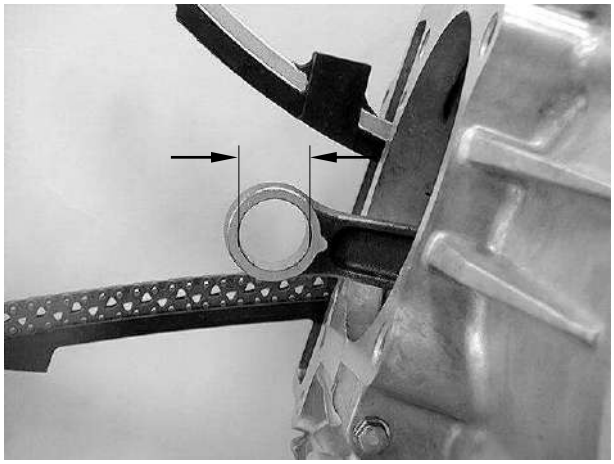
**Taper: 0.1 mm (0.004 in)**

**Out-of-round: 0. 1 mm (0.004 in)**

Measure the connecting rod small end I.D..

**Service Limit:**

**17.06 mm (0.6824 in)**



Calculate the connecting rod-to-piston pin clearance.

**Service Limit: 0.06 mm (0.002 in)**

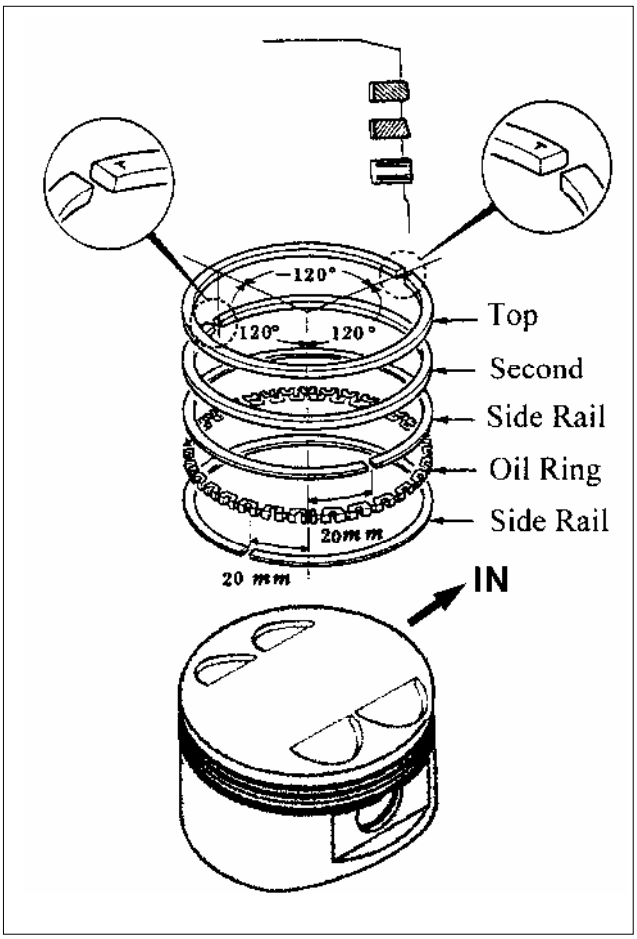
**PISTON RING INSTALLATION**

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

* Be careful not to damage the piston and rings.

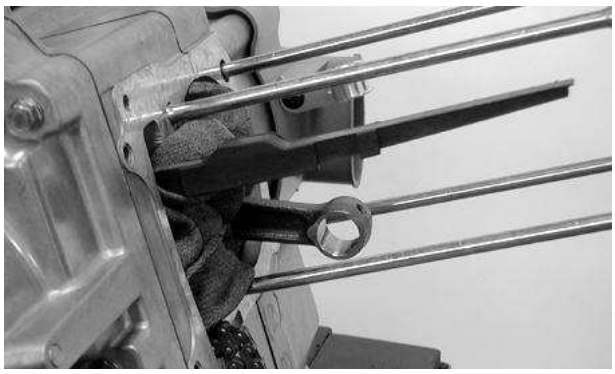
- Do not confuse the top and second rings.
- To install the oil ring, install the oil ring, then install the side rails.

Stagger the piston ring end gaps 120° degrees apart from each other.
Stagger the side rail end gaps as shown.



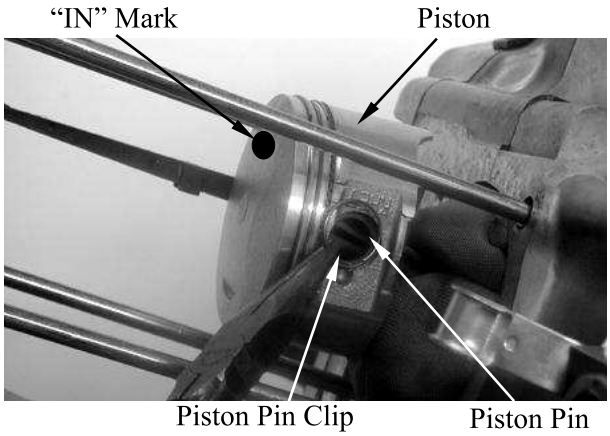
**CYLINDER/PISTON INSTALLATION**

Remove any gasket material from the crankcase surface.



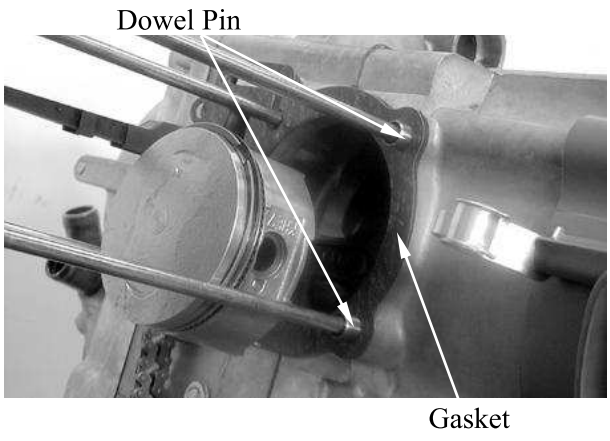
* • Be careful not to drop foreign matters into the crankcase.

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

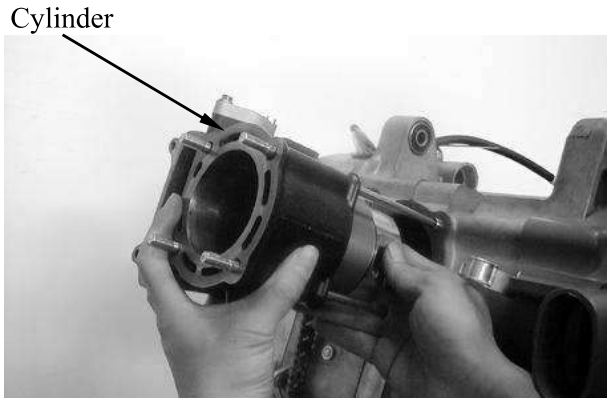



* • Position the piston "IN" mark on the intake valve side.
  • Place a clean shop towel in the crankcase to keep the piston pin clip from falling into the crankcase.

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



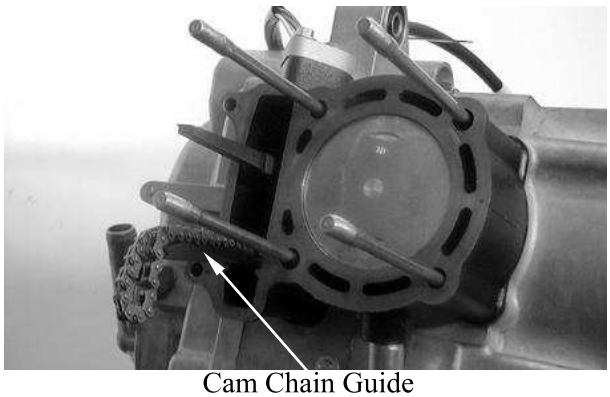

Coat the cylinder bore, piston and piston rings with clean engine oil.
Carefully lower the cylinder over the piston by compressing the piston rings.



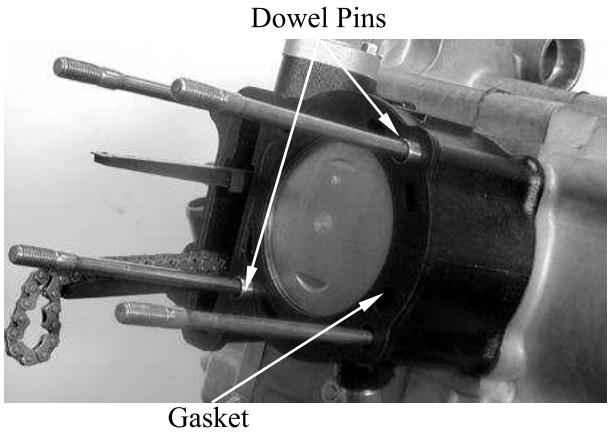

* • Be careful not to damage or break the piston rings.
  • The piston ring end gaps should not be parallel with or at 90° to the piston pin.

Install the cam chain guide.

* • Insert the tab on the cam chain guide into the cylinder groove.


Cam Chain Guide

Install the cylinder gasket and dowel pins.
Connect the water hose to the cylinder.



# DRIVE AND DRIVEN PULLEY

## 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 |
|---|---|---|
| Movable driven face bushing I.D. | 40 (1.6)～40.025 (1.601) | 40.06 (1.6024) |
| Driven face collar O.D. | 39.965 (1.5986)～39.985 (1.5994) | 39.94 (1.5976) |
| Drive belt width | 23.6 (0.944)～24.4 (0.976) | |
| Clutch lining thickness | 4 (0.16) | 1 (0.04) |
| Clutch outer I.D. | 153 (6.12)～153.2 (6.128) | 153.5 (6.14) |
| Drive pulley collar O.D. | 26.96 (1.0784)～26.974 (1.07896) | 26.9 (1.076) |
| Weight roller O.D. | 22.92 (0.9168)～23.08 (0.9232) | 22 (0.88) |

### TORQUE VALUES

| | | |
|---|---|---|
| Drive face nut | 93 N•m (9.3 kgf•m, 67 lbf•ft) | Apply oil to the threads |
| Clutch outer nut | 54 N•m (5.4 kgf•m, 39 lbf•ft) | |
| Clutch drive plate nut | 54 N•m (5.4 kgf•m, 39 lbf•ft) | |

### SPECIAL TOOLS

| | |
|---|---|
| Universal holder | A120E00017 |
| Clutch spring compressor | A120E00034 |
| Oil seal & bearing install | A120E00014 |

## TROUBLESHOOTING

**Engine starts but motorcycle won‘t move**
- Worn drive belt
- Broken ramp plate
- Worn or damaged clutch lining
- Broken driven face spring

**Engine stalls or motorcycle creeps**
- Broken clutch weight spring

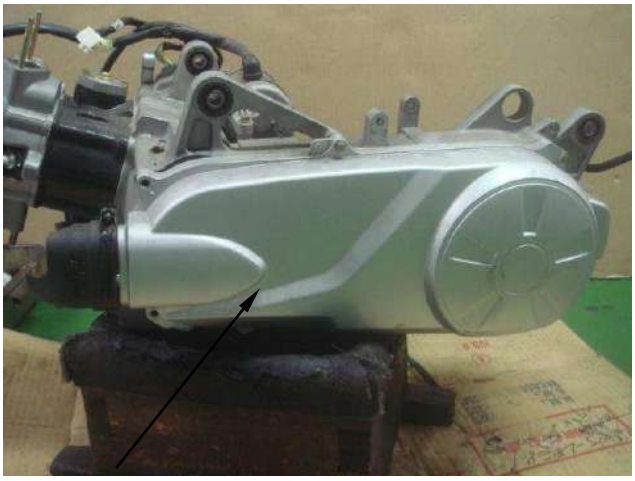
**Lack of power**
- Worn drive belt
- Weak driven face spring
- Worn weight roller
- Faulty driven face

## LEFT CRANKCASE COVER

### REMOVAL

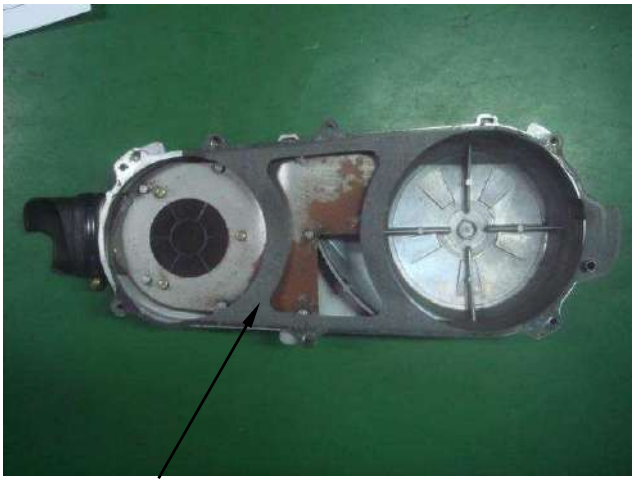
Remove the left crankcase cover bolts and left crankcase covers.

Bolts



Left Crankcase Cover

Remove the seal gasket and dowel pins.



Gasket

## DRIVE PULLEY

### REMOVAL

Remove the left crankcase cover

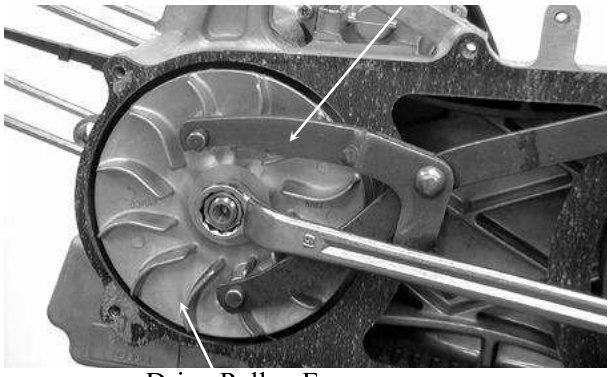
.

Hold the drive pulley face with the special tool and loosen the drive pulley face nut.

**Special tool:**

**Universal holder A120E00017**

Remove the nut, washer and drive pulley face.

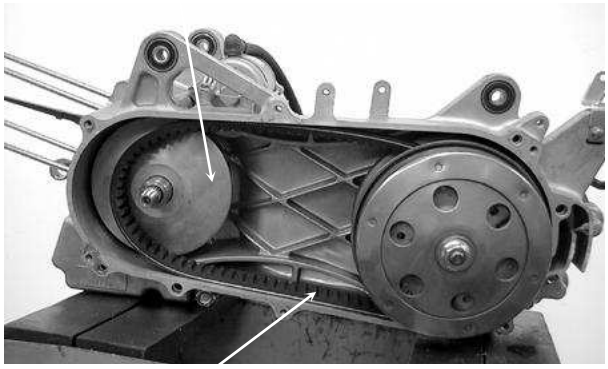



Hold the clutch outer with the special tool as shown.

**Special tool:**

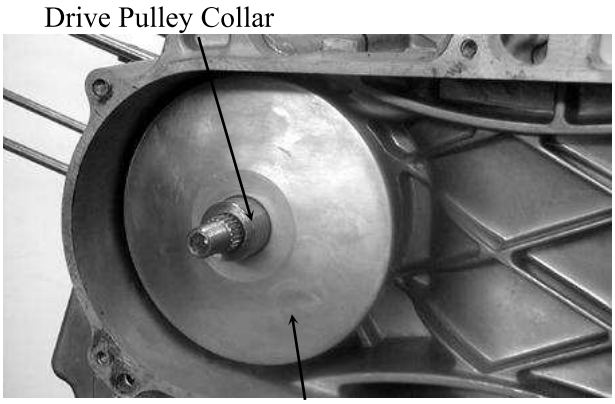
**Universal holder A120E00017**

Remove the nut, and clutch outer.

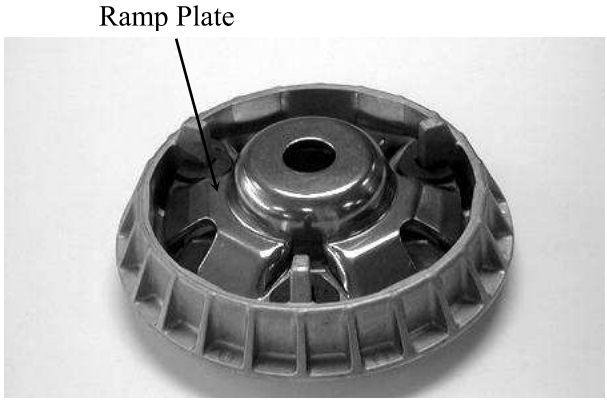



Remove the clutch/driven pulley assembly and drive belt.

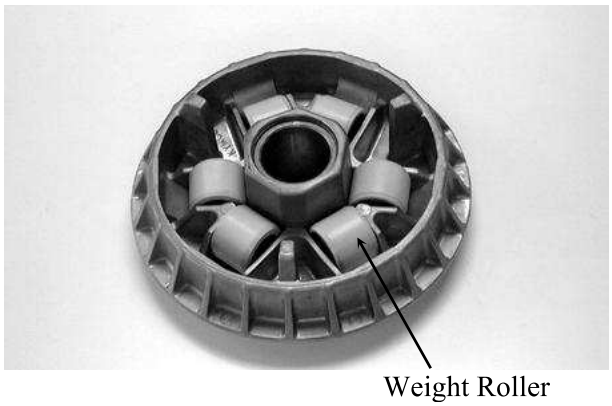
Remove the movable drive face assembly while holding the back of the face (ramp plate).



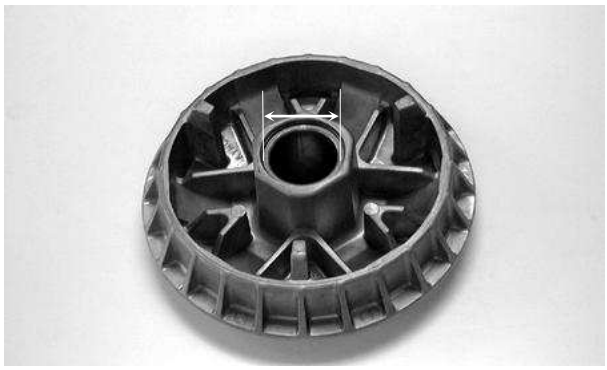
**DISASSEMBLY**
**Drive pulley**
Remove the ramp plate and slide pieces.




Remove the weight rollers.



**INSPECTION**
**Movable Drive Face**
Check the drive face boss for wear or damage.
Measure the boss O.D..



**Service limit:**

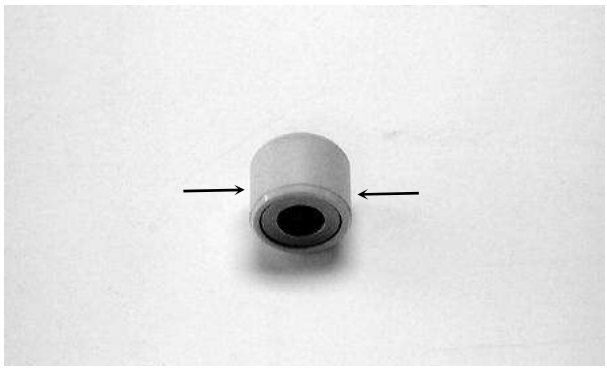
**26.9 mm (1.076 in)**

Measure the face bushing I.D..

**Service limit:**

**27.13 mm (1.058 in)**

**Weight Roller**
Check each roller for wear or damage.
Measure the weight roller O.D..

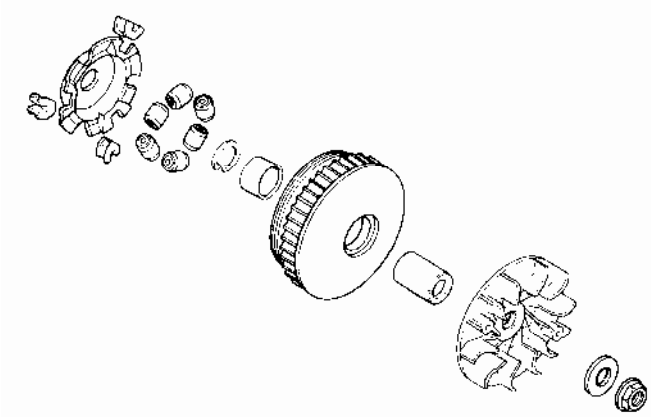


**Service limit:**
**22 mm (0.888 in)**

**ASSEMBLY**

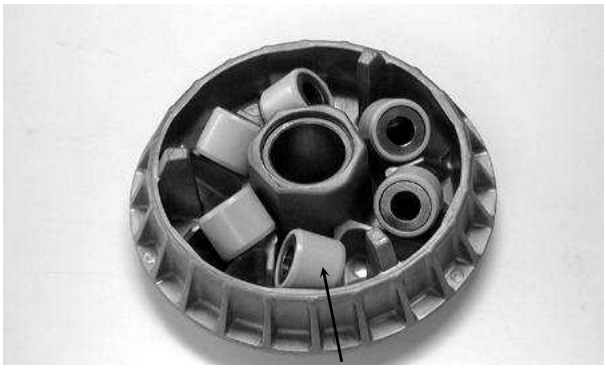
Clean any oil and grease from the pulley faces and weight rollers.

Install the drive face boss into the movable drive face.



Install the weight rollers to the movable drive face.

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



Weight Roller

Install the slide pieces to ramp plate.

Install the ramp plate to the movable drive face.

Hold the clutch outer with the special tool as shown.

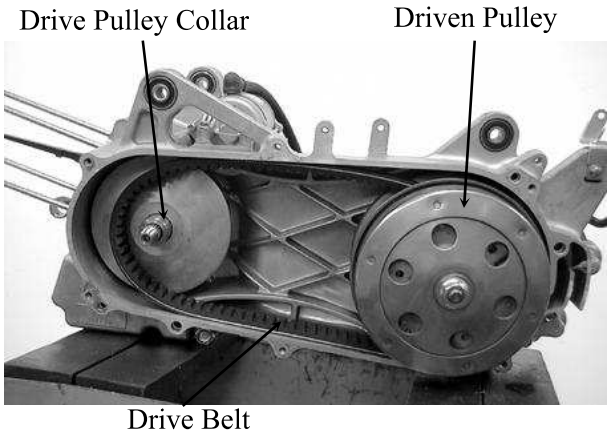
**Special tool:**
**Universal holder A120E00017**

Install the nut.

Tighten the nut to the specified torque.

**Torque:**

**54 N•m (5.4 kgf•m, 36 lbf•ft)**



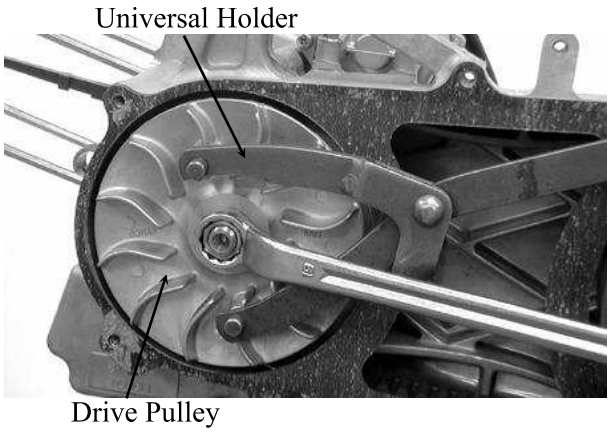

Install the drive pulley face and washer.
Apply oil to the drive pulley face nut threads and seating surface and install the nut.

Hold the drive face with the special tool and tighten the bolt to the specified torque.

**Special tool:**
**Universal holder A120E00017**

**Torque:**

**93 N•m (9.3 kgf•m, 67 lbf•ft)**



## CLUTCH/DRIVEN PULLEY

**REMOVAL**

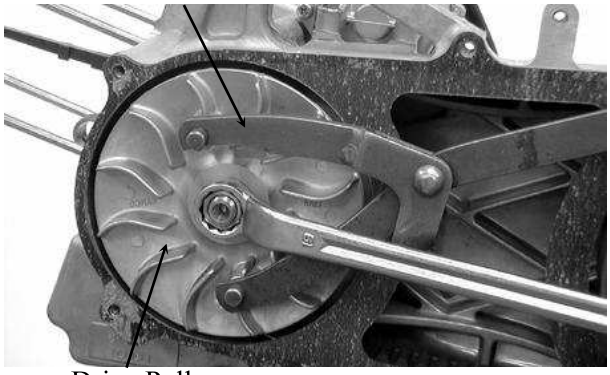
Remove the left crankcase cover.

Hold the drive pulley face with the special tool and loosen the drive pulley face nut.

**Special tool:**

**Universal holder A120E00017**

Remove the nut, washer and drive pulley face.

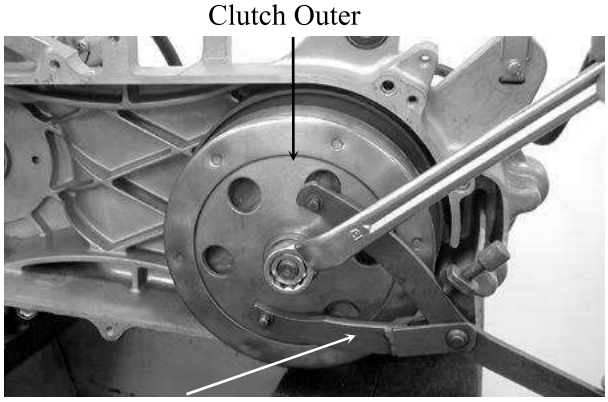



Hold the clutch outer with the special tool as shown.

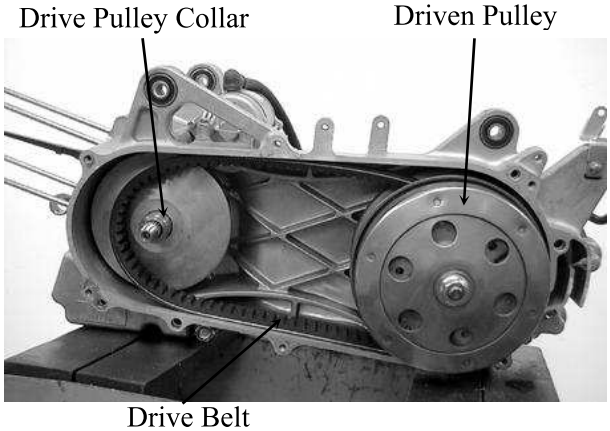
**Special tool:**

**Universal holder A120E00017**

Remove the nut, and clutch outer.




Remove the clutch/driven pulley assembly and drive belt.



**DISASSEMBLY**
**Clutch/Driven Pulley**

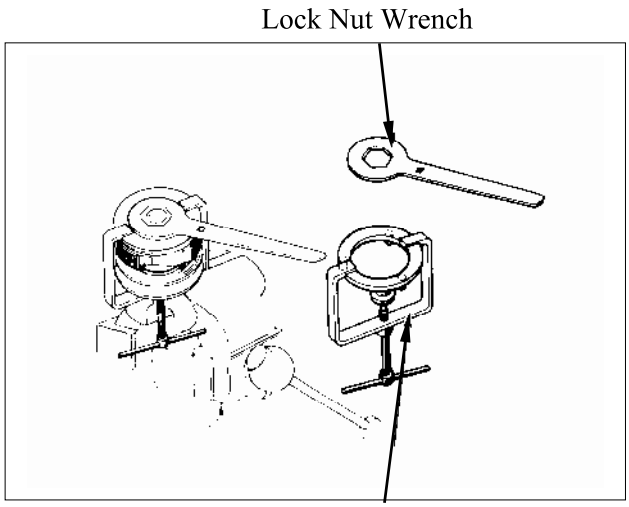
Hold the clutch/driven pulley assembly with the clutch spring compressor.

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

**Special tool:**

**Clutch Spring Compressor A120E00034**

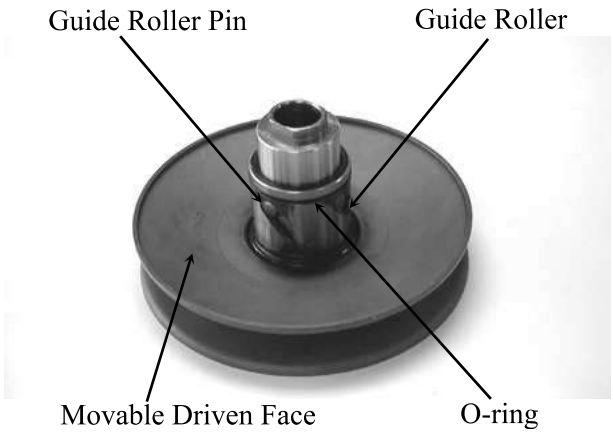
Set the tool in a vise and remove the clutch drive plate nut.



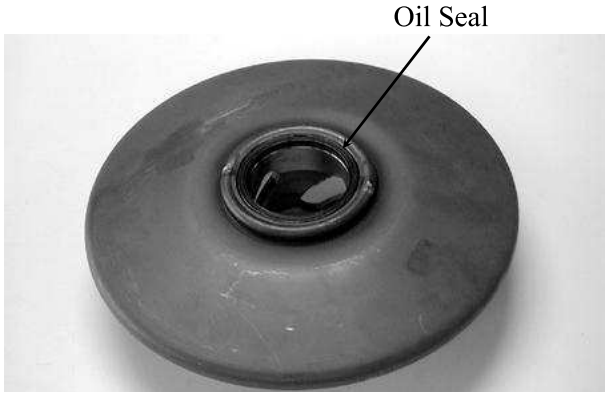
Clutch spring compressor

Remove the spring compressor and disassemble the following:
- Clutch assembly
- Driven face spring
- Driven pulley

Remove the guide roller pins, guide rollers and the movable driven face.




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




**Driven Face Bearing Replacement**

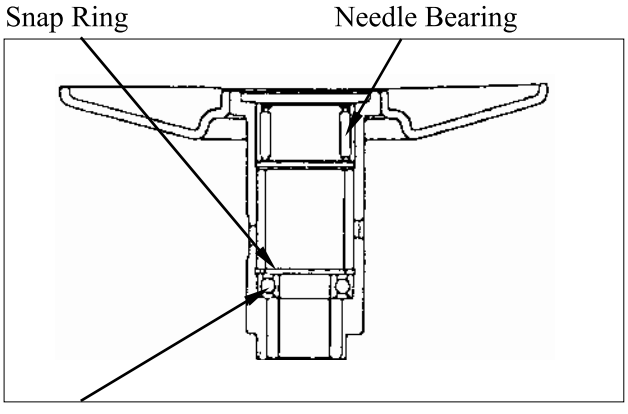
Remove the driven face needle bearing.

Remove the snap ring, then remove the ball bearing.

Apply grease to new ball bearing.

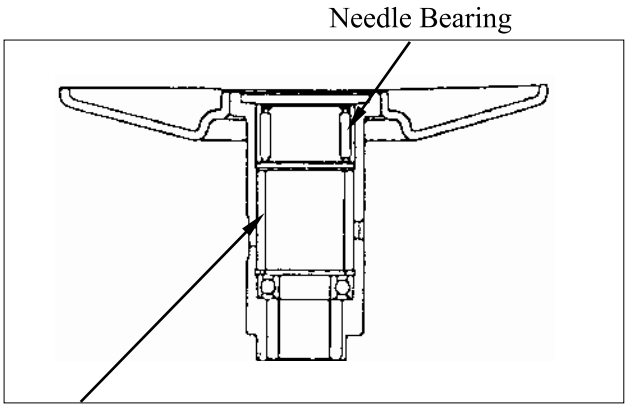
Install the ball bearing into the driven face.

Install the snap ring to groove in the driven face securely.



Filling 25 g of grease to the driven face inner surface.

Apply grease to new needle bearing.
Press the needle bearing into the driven.




**INSPECTION**
**Clutch Outer**
Check the clutch outer for wear or damage.
Measure the clutch outer I.D..

**Service limit:**

**153.5 mm (6.14 in)**

**Clutch Shoe Lining**
Check the clutch shoe for wear or damage.
Measure the thickness of each shoe.

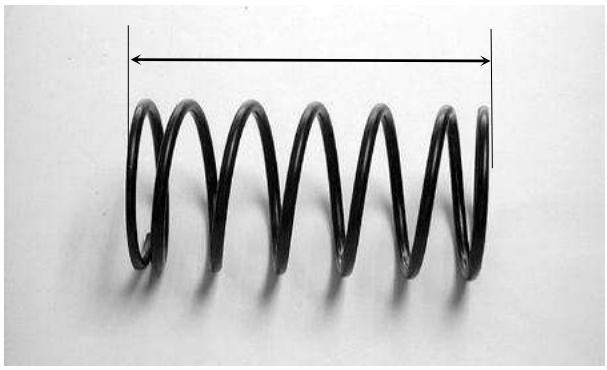
**Service limit: 1 mm (0.04 in)**

**Driven Face Spring**

Measure the driven face spring free length.

**Service limit:**

**130.5 mm (5.22 in)**



**Driven Face**

Check the driven face for scratches, scoring or damage.

Measure the driven face boss O.D..

**Service limit:**

**XCITING 250/250 AFI:**

**39.94 mm (1.5976 in)**

**Movable Driven Face**

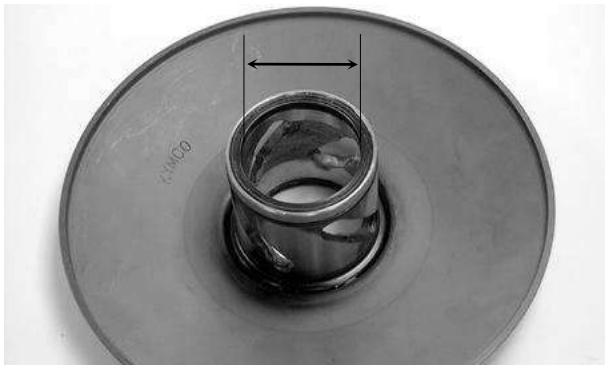
Check the movable driven face for scratches, scoring or damage.

Check the guide grooves for stepped wear or damage.

Measure the movable driven face I.D..

**Service limit:**

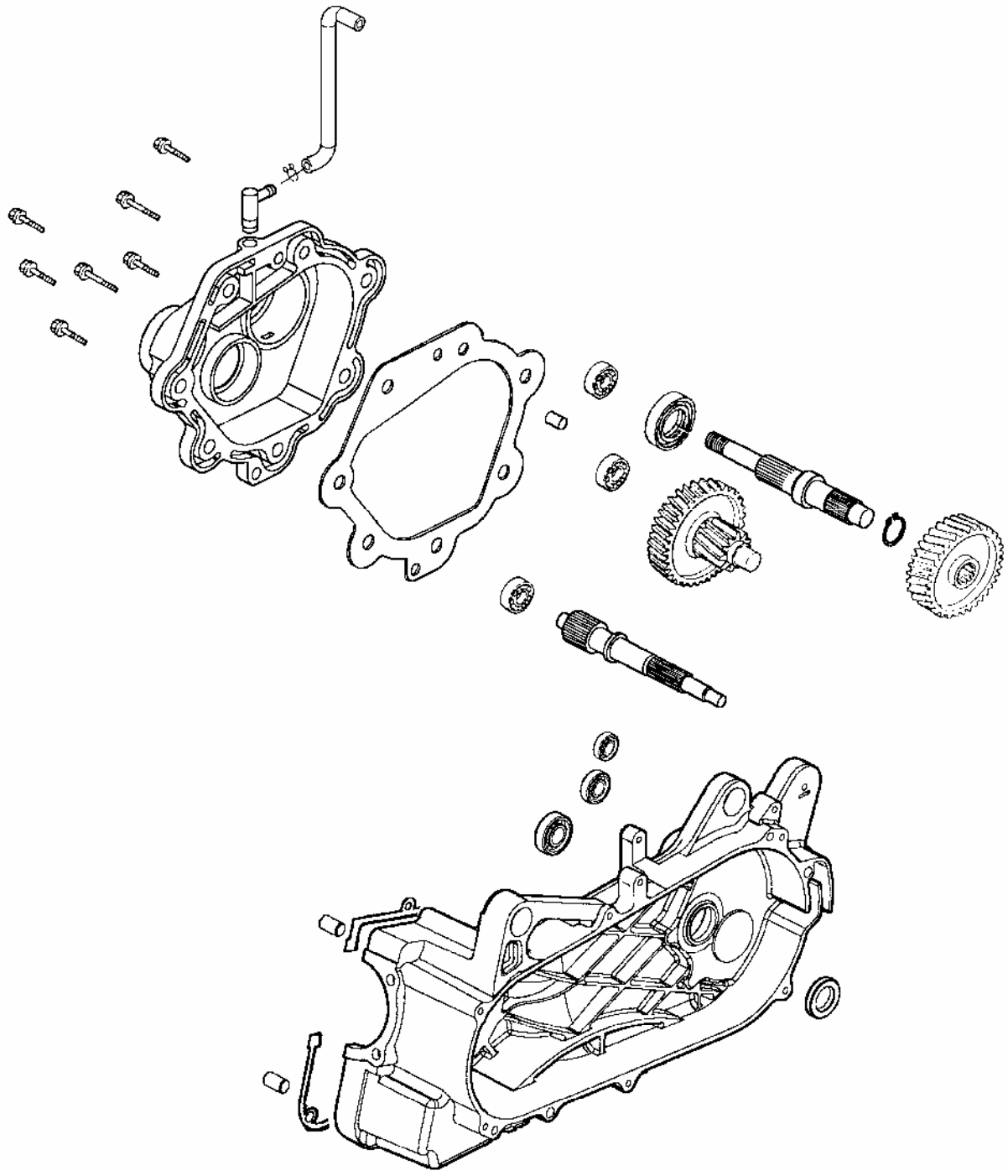
**40.06 mm (1.6024 in)**



# FINAL REDUCTION

# 9. FINAL REDUCTION

## SCHEMATIC DRAWING



## SERVICE INFORMATION

### GENERAL INSTRUCTIONS

- The servicing operations of this section can be made with the engine installed.
- When replacing the drive shaft, use a special tool to hold the bearing inner race for this operation.

### SPECIFICATIONS

Specified Oil: SAE 90#
Oil Capacity:
At disassembly : 0.2 liter
At change : 0.18 liter

### TORQUE VALUES

| | |
|---|---|
| Transmission case cover bolt | 17.7～21.6N-m |
| Oil check bolt | 7.8～11.8N-m |

### SPECIAL TOOLS

Bearing remover, 12mm
Bearing remover, 15mm
Pilot, 12mm
Pilot, 15mm

## TROUBLESHOOTING

**Engine starts but motorcycle won‘t move**

- Damaged transmission
- Seized or burnt transmission

**Abnormal noise**

- Worn, seized or chipped gears
- Worn bearing

**Oil leaks**

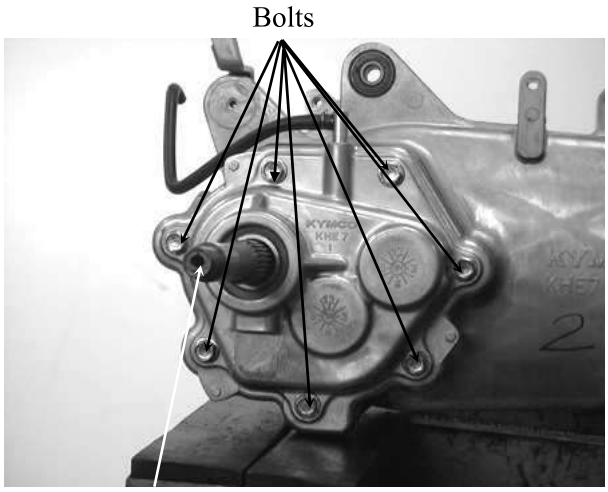
- Oil level too high
- Worn or damaged oil seal

# 9. FINAL REDUCTION

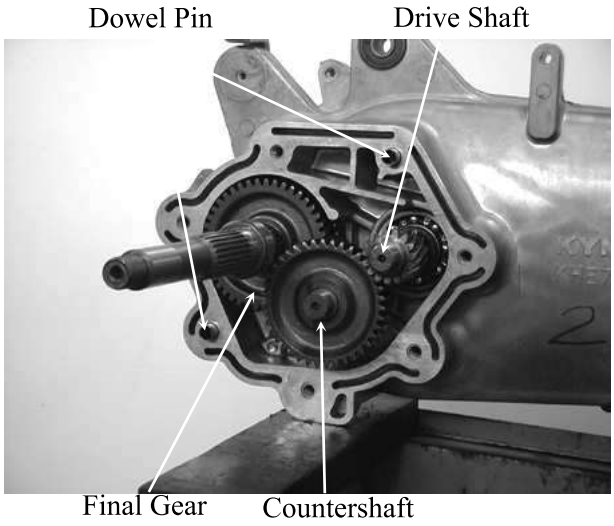
## FINAL REDUCTION DISASSEMBLY

Remove the exhaust muffler.
Remove the rear brake caliper.
Remove the right rear shock absorber.

Remove the rear fork.
Remove the rear wheel.
Remove the left crankcase cover.
Remove the clutch/driven pulleys.
Drain the transmission gear oil into a clean container.
Remove the transmission case cover attaching bolts.




Remove the transmission case cover.
Remove the gasket and dowel pins.
Remove the final gear and countershaft.



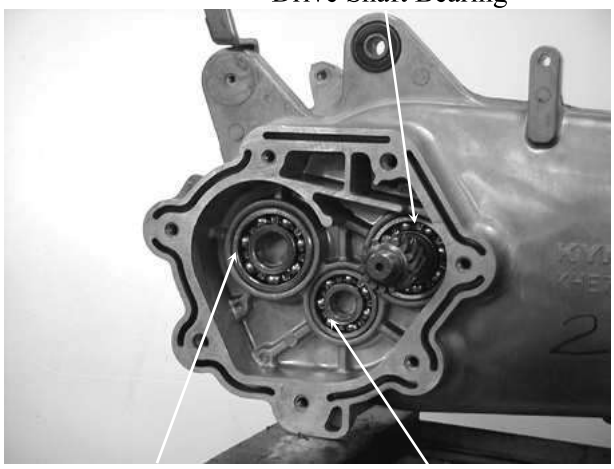

## FINAL REDUCTION INSPECTION

Inspect the countershaft and gear for wear or damage.

# 9. FINAL REDUCTION

Inspect the final gear and final shaft for wear, damage or seizure.

Check the left crankcase bearings for excessive play and inspect the oil seal for wear or damage.



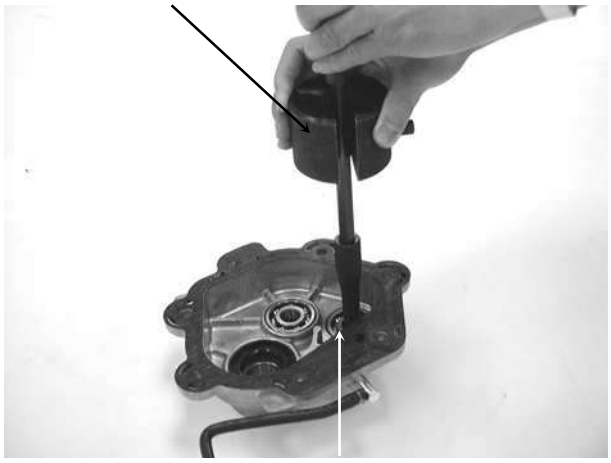

Inspect the drive shaft and gear for wear or damage.
Check the transmission case covers bearings for excessive play and inspect the final shaft bearing oil seal for wear or damage.


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

**BEARING REPLACEMENT (TRANSMISSION CASE COVER)**

Remove the transmission case cover bearings using the bearing remover.
Remove the final shaft oil seal.

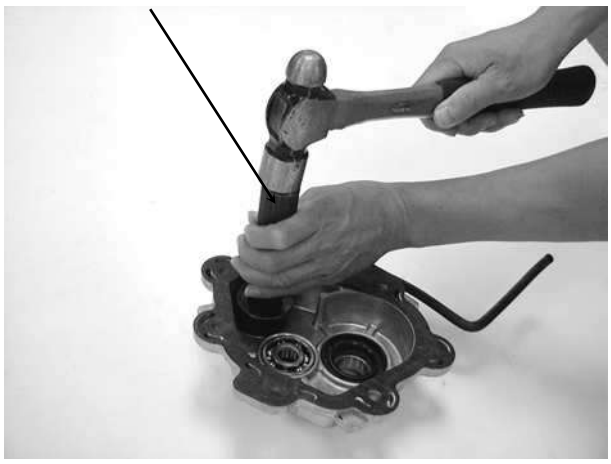
Bearing Remover, 15mm



Drive Shaft Bearing

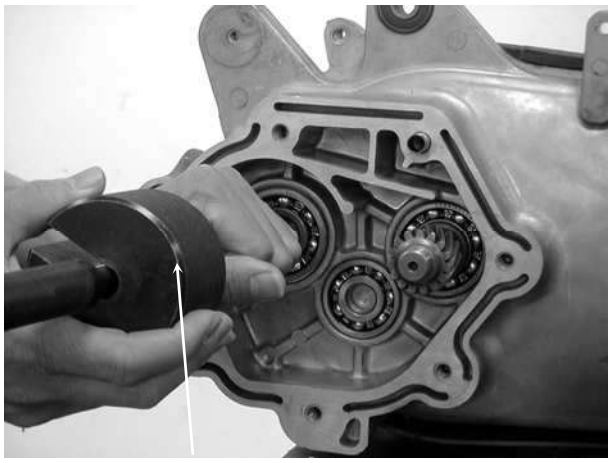
Drive new bearings into the transmission case cover.

Pilot, 15mm



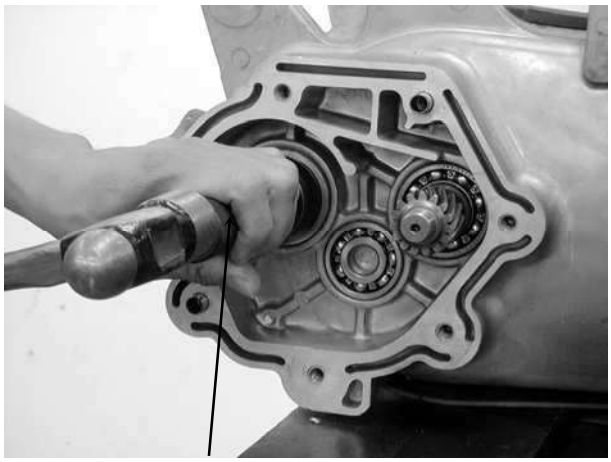
**BEARING REPLACEMENT (LEFT CRANKCASE COVER)**

Remove the drive shaft.
Remove the drive shaft oil seal.
Remove the left crankcase bearings using the bearing remover.



Bearing Remover

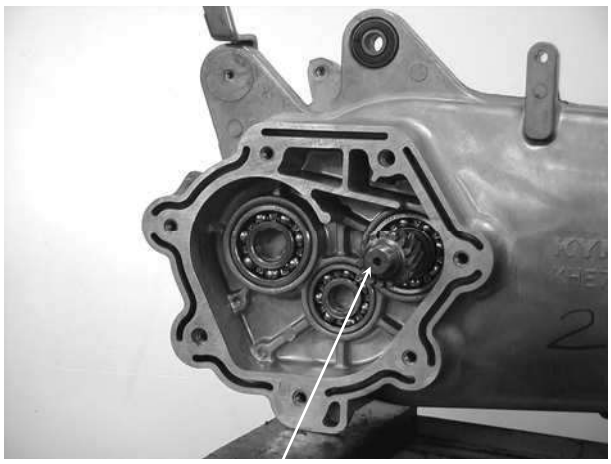
Drive new bearings into the left crankcase.
Install a new drive shaft oil seal.



Pilot

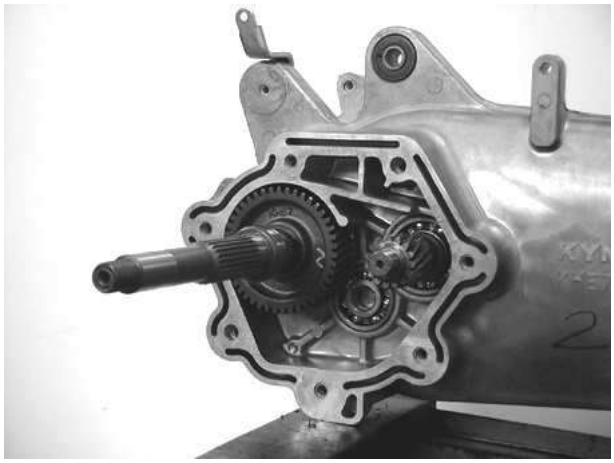
## FINAL REDUCTION ASSEMBLY

Install the drive shaft into the left crankcase.



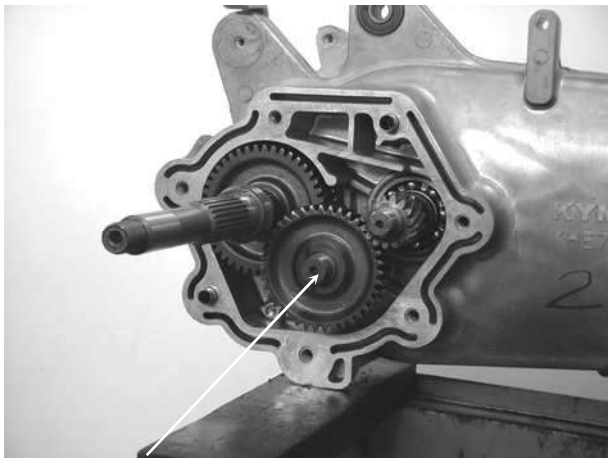
Drive Shaft

Install the final gear and final shaft into the left crankcase.



# 9. FINAL REDUCTION

Install the countershaft and gear into the left crankcase.
Install the resin washer onto the counter-shaft.
Install the dowel pins and a new gasket.



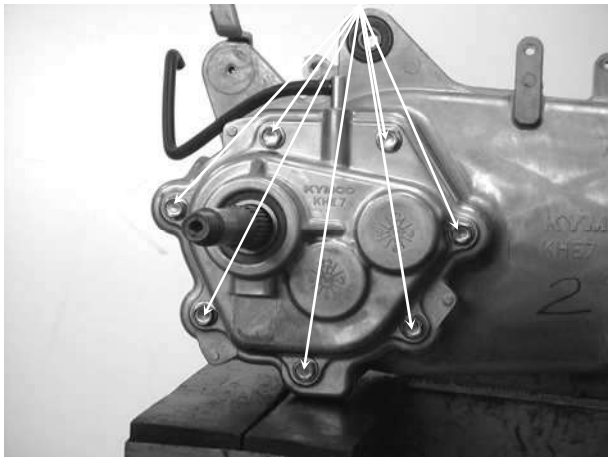
Countershaft

Install the transmission case cover.

Transmission Case Cover

Install and tighten the transmission case cover bolts.
Install the clutch/driven pulley.
Install other removed parts in the reverse order of removal.

Bolts



# 9. FINAL REDUCTION

After installation, fill the transmission case with the specified oil.

＊
- Place the motorcycle on its main stand on level ground.
- Check the oil-sealing washer for wear or damage.

**Specified Gear Oil**: SAE90#

**Oil Capacity:**

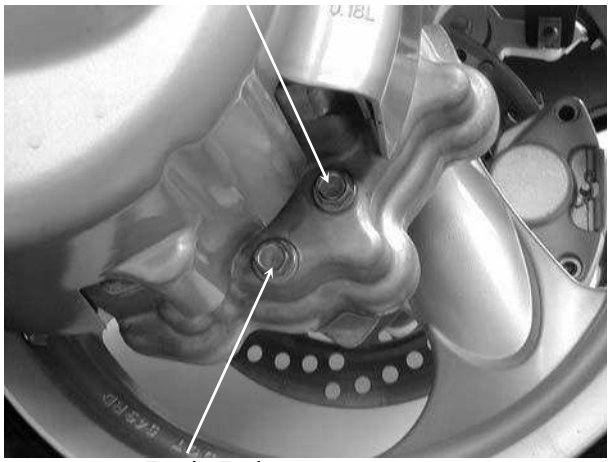
At disassembly : 0.2 liter
At change : 0.18 liter

Install and tighten the oil check bolt.

**Torque**: 7.8～11.8N-m

Start the engine and check for oil leaks. Check the oil level from the oil check bolt hole and add the specified oil to the proper level if the oil level is low.

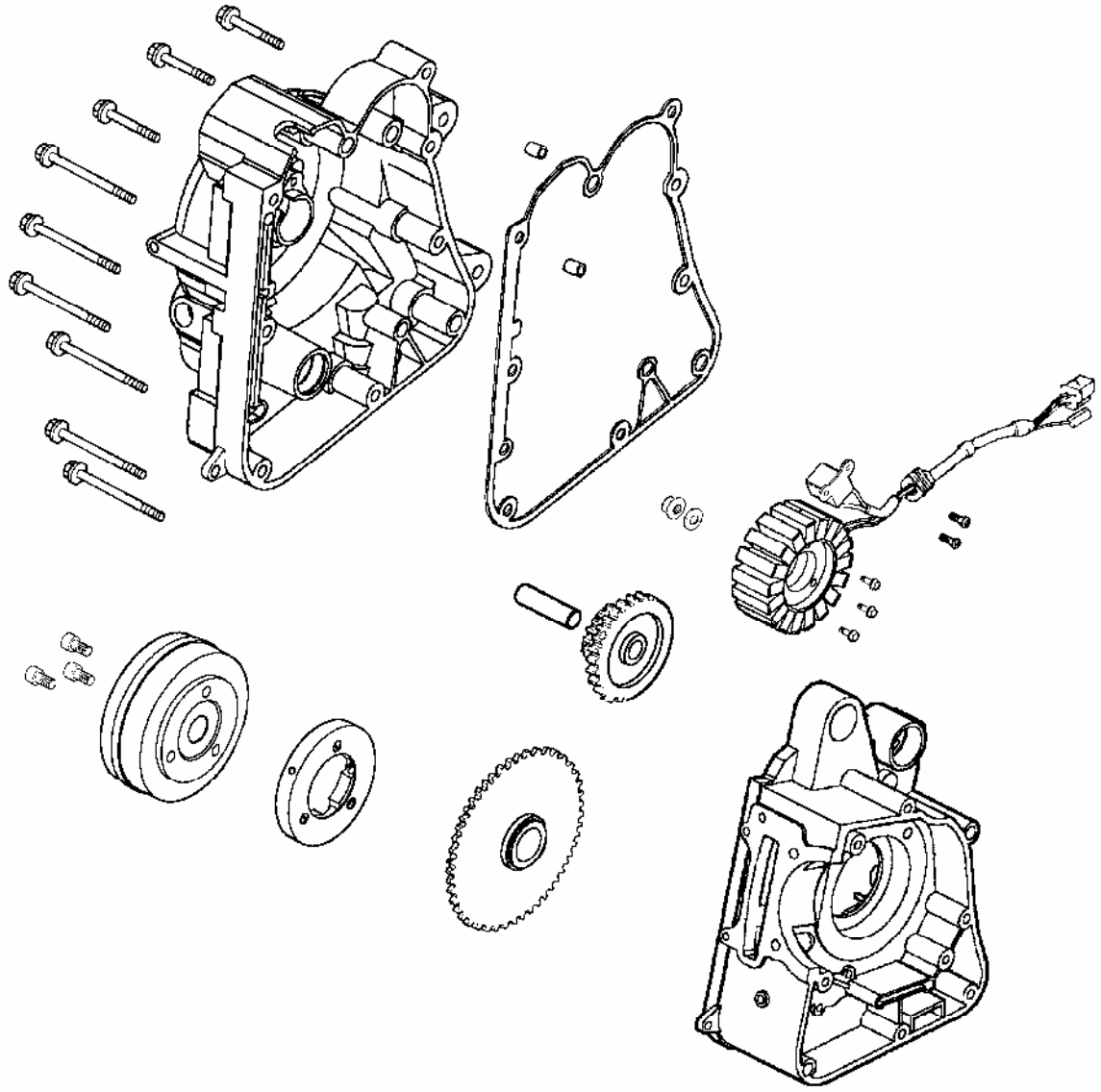
Oil Check Bolt Hole/Oil Filler



Drain Bolt

# A.C. GENERATOR/STARTER CLUTCH

**SCHEMATIC DRAWING**



## SERVICE INFORMATION

### GENERAL INSTRUCTIONS

- All servicing operations and inspections in this section can be made with the engine installed.
- Drain the coolant before removing the right crankcase cover.
- Be careful not to drain the coolant when the engine temperature is high. (Perform this operation when the engine is cold.)
- Drain the coolant into a clean container.
- Drain the engine oil into a clean container before removing the right crankcase cover.
- When the right crankcase cover is installed, fill with the recommended engine oil and coolant. Then, bleed air from the water jacket.

### SPECIAL TOOLS

Flywheel puller
Flywheel holder

### SPECIFICATIONS

| Item | Standard (mm) | Service Limit (mm) |
|---|---|---|
| Starter driven gear I.D. | 22.026～22.045 | 22.15mm |
| Starter driven gear O.D. | 42.195～42.208 | 41.5mm |

### TORQUE VALUES

Flywheel nut : 53.9～63.7N-m

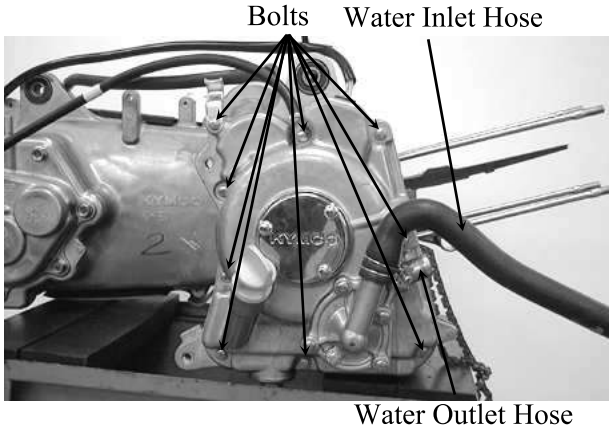
## TROUBLESHOOTING

**Starter motor rotates but engine does not start**

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

## RIGHT CRANKCASE COVER REMOVAL

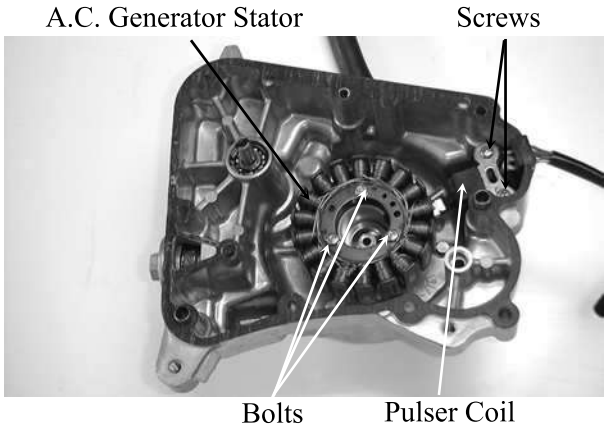
Disconnect the water hoses from the right crankcase cover.
Remove the nine bolts attaching the right crankcase cover and the cover.




## STATOR REMOVAL

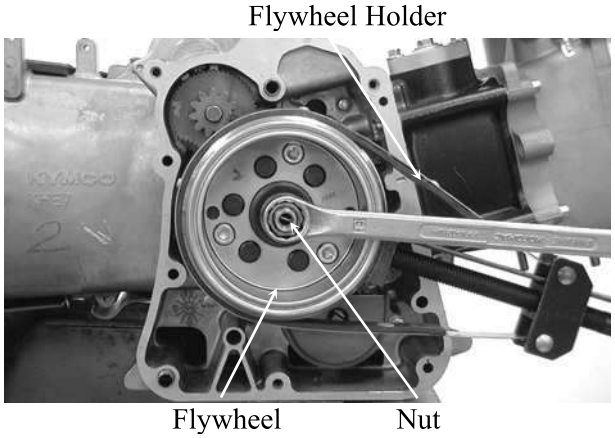
Remove the two pulser coil attaching screws and the pulser coil.
Remove the three A.C. generator stator bolts and the stator.

* When removing the pulser coil and stator, be careful not to damage them to avoid shorted or broken wire.

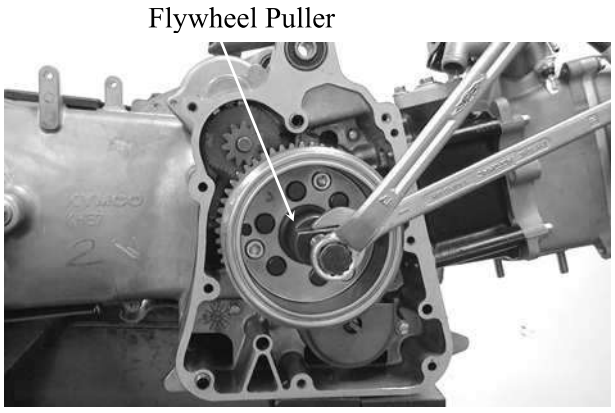



## FLYWHEEL REMOVAL

Hold the flywheel with a flywheel holder and remove the flywheel nut.



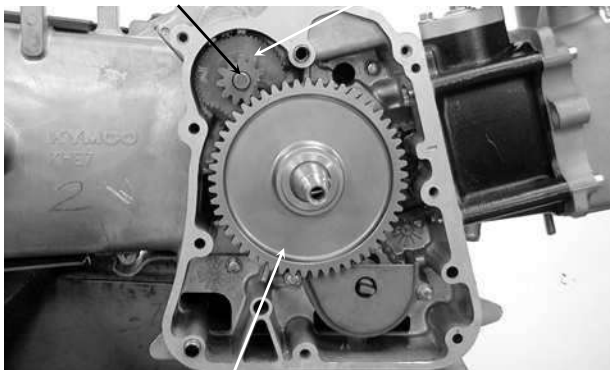

Remove the flywheel with a flywheel puller.



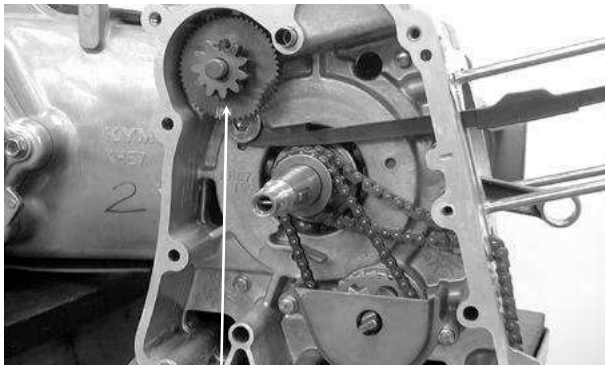
## STARTER CLUTCH

### REMOVAL

Remove the starter driven gear.




Remove the starter idle gear and shaft.

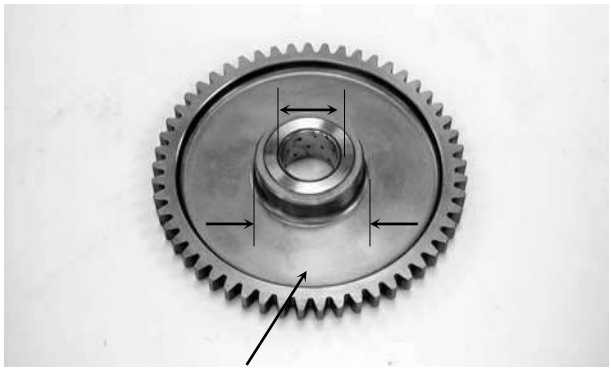



### INSPECTION

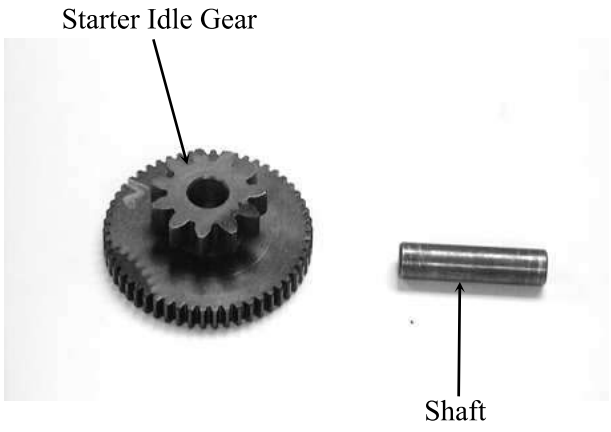
Inspect the starter driven gear for wear or damage.
Measure the starter driven gear I.D. and O.D.

**Service Limits**:

**I.D.** : 22.15mm replace if over
**O.D.** : 41.50mm replace if below



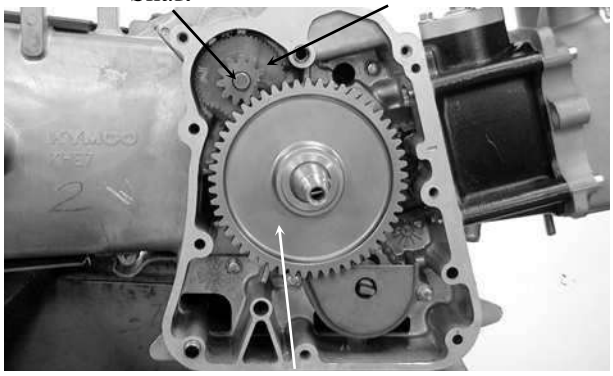

Inspect the starter idle gear and shaft for wear or damage.



Remove the starter one-way clutch rollers, plungers and springs.

**INSTALLATION**

Install the starter driven gear onto the crankshaft.
Install the starter idle gear and shaft.



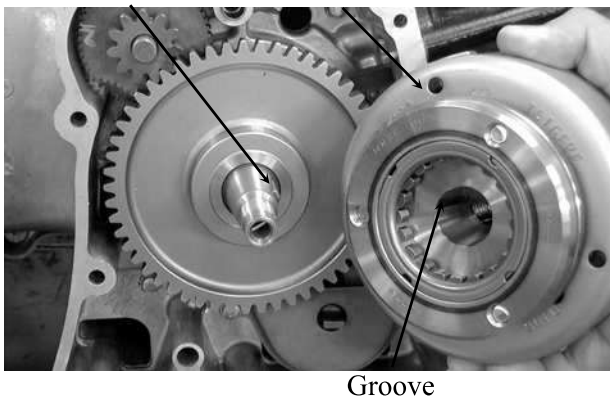

## FLYWHEEL INSTALLATION

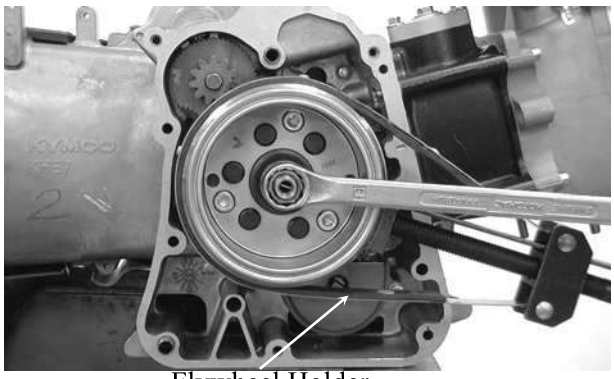
Install the flywheel onto the crankshaft by aligning the key on the crankshaft with the groove in the flywheel.

✻
- Before installation, check and make sure that the inside of the flywheel is not contaminated.

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

**Torque**: 53.9～63.7N-m

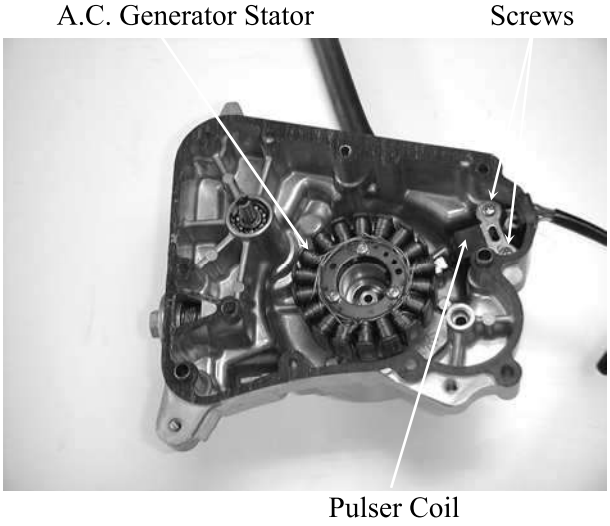


## STATOR INSTALLATION

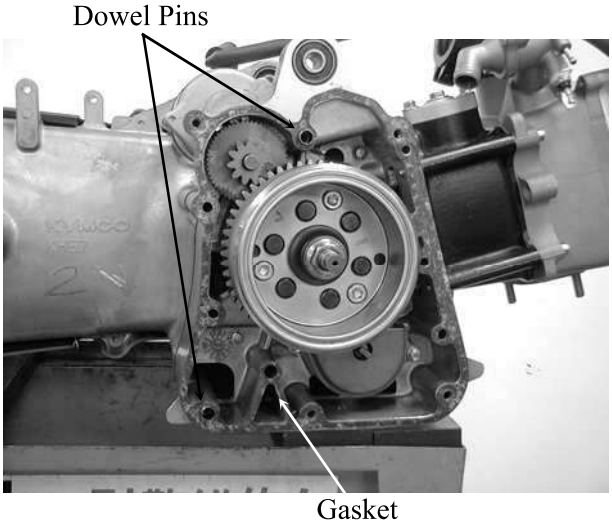
Install the A.C. generator stator on the right crankcase cover and secure it with the three bolts.
Install the pulser coil on the right crankcase cover and secure it with the two screws.
Install the wire grommet in the groove in the right crankcase cover securely.

* Be sure to route the stator wire under the pulser coil.



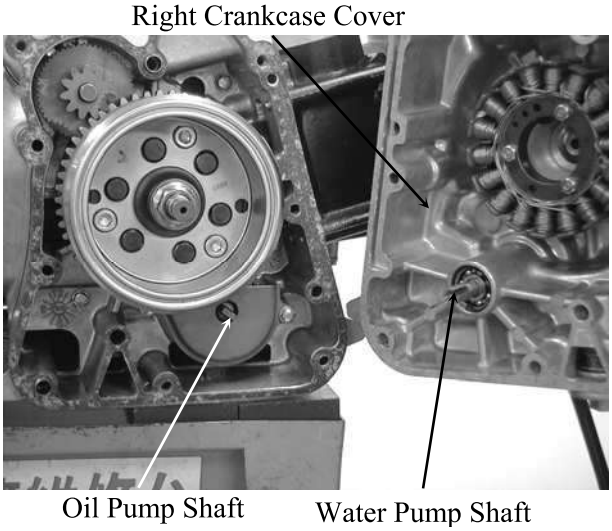

## RIGHT CRANKCASE COVER INSTALLATION

Install the two dowel pins and a new gasket.



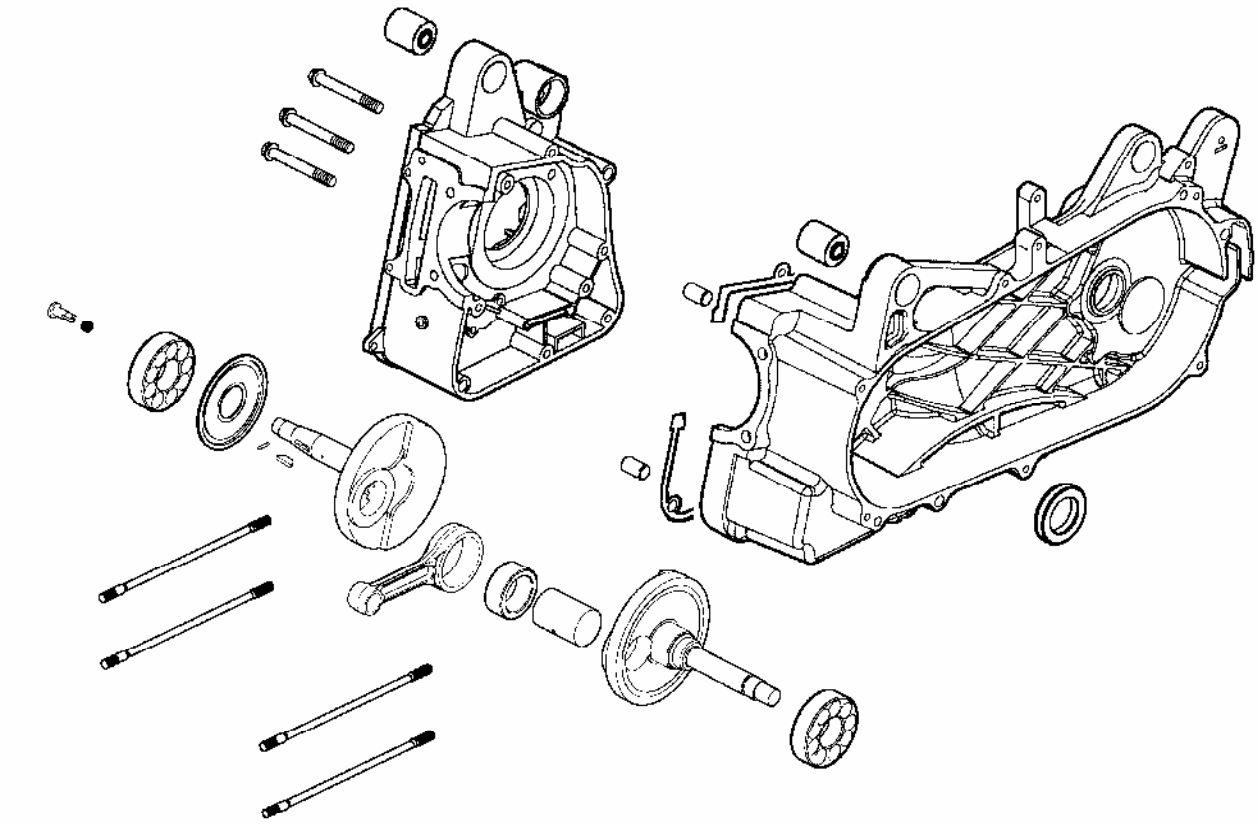

Install the right crankcase cover over the crankcase, aligning the water pump shaft groove with the oil pump shaft.
Tighten the nine right crankcase cover bolts.
Connect the water hoses to the right crankcase cover.
Add the recommended engine oil.
Fill the cooling system with the specified coolant.

* • Be sure to bleed air from the water jacket after filling the coolant.



# CRANKCASE/CRANKSHAFT

## SCHEMATIC DRAWING



## SERVICE INFORMATION

### GENERAL INSTRUCTIONS

- This section covers crankcase separation to service the crankshaft. The engine must be removed for this operation.
- When separating the crankcase, never use a driver to pry the crankcase mating surfaces apart forcedly to prevent damaging the mating surfaces.
- When installing the crankcase, do not use an iron hammer to tap it.
- The following parts must be removed before separating the crankcase.

  Cylinder head
  Cylinder/piston
  Right crankcase cover/drive and driven pulley
  A.C. generator/starter clutch
  Rear wheel/rear shock absorber
  Starter motor
  Oil pump

### SPECIFICATIONS

| | Item | Standard (mm) | Service Limit (mm) |
|---|---|---|---|
| Crankshaft | Connecting rod big end side clearance | 0.15～0.35 | 0.6 |
| | Connecting rod big end radial clearance | 0.～0.008 | 0.05 |
| | Runout | — | 0.10 |

### TORQUE VALUES

| | |
|---|---|
| Crankcase bolt | 7.8～10.8N-m |
| Cam chain tensioner slipper bolt | 7.8～11.8N-m |

### SPECIAL TOOL

Gear remover

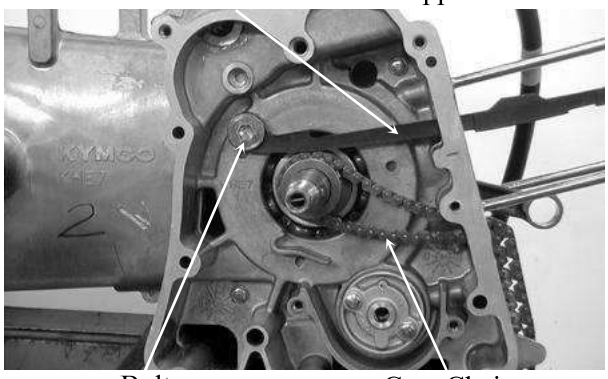
## TROUBLESHOOTING

**Excessive engine noise**

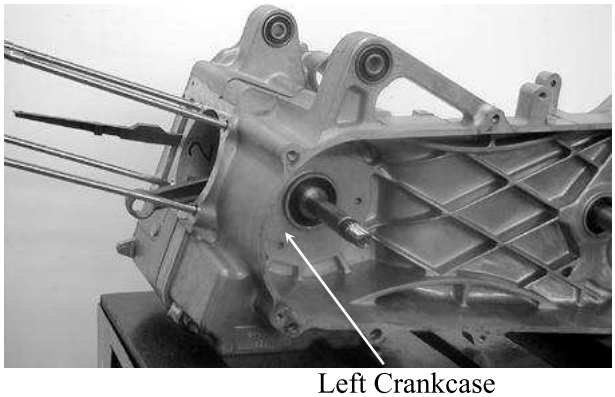
- Excessive bearing play
- Excessive crankpin bearing play
- Worn piston pin and piston pin hole

## CRANKCASE SEPARATION

Remove the cam chain tensioner slipper bolt.
Remove the cam chain tensioner slipper and cam chain.
Remove the three right crankcase attaching bolts.



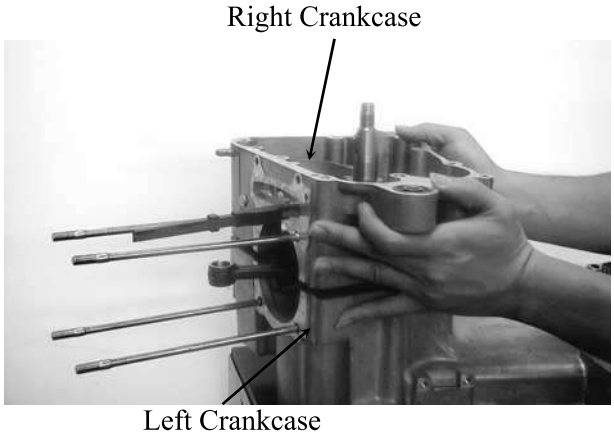

Remove the left crankcase.



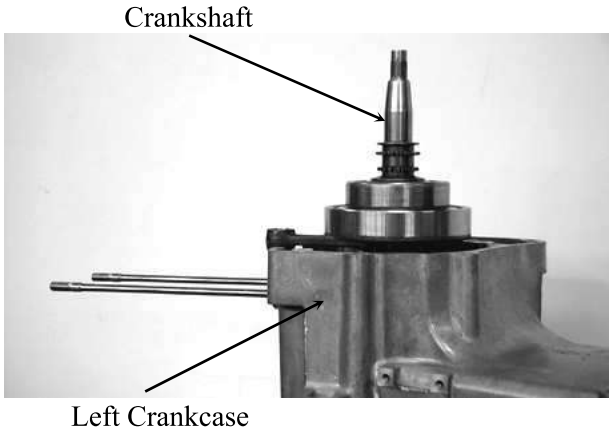

Place the crankcase with the left crankcase down and remove the right crankcase from the left crankcase.

* • Never use a driver to pry the crankcase mating surfaces apart.

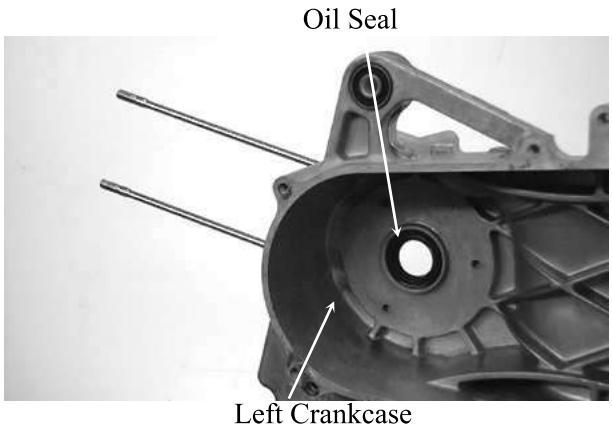
Remove the gasket and dowel pins.




Remove the crankshaft from the left crankcase.

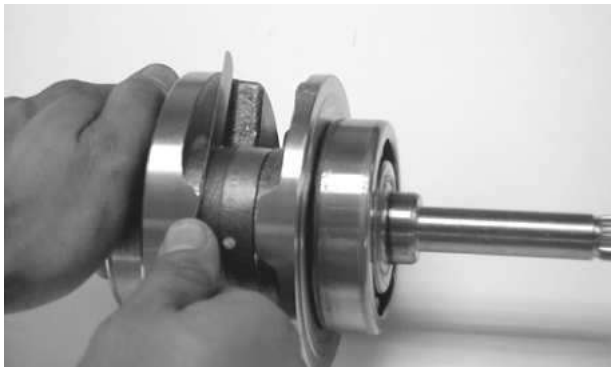


Remove the oil seal from the left crankcase.



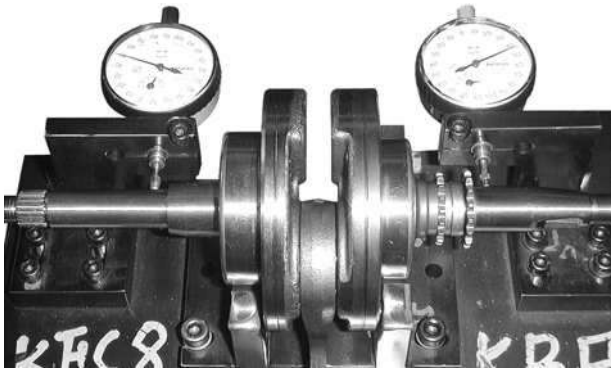

## CRANKSHAFT INSPECTION

Measure the connecting rod big end side clearance.
**Service Limit**: 0.6mm replace if over

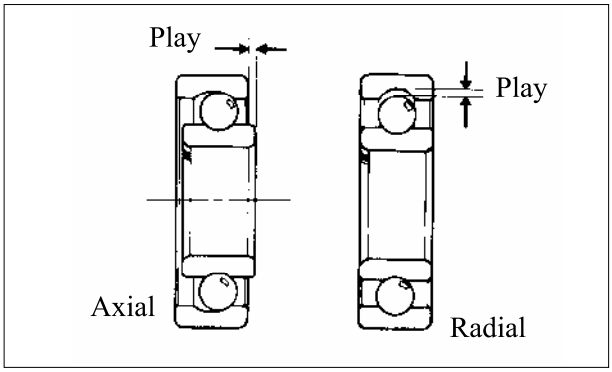


Measure the connecting rod small end I.D.
**Service Limit**: 17.06mm replace if over

Measure the crankshaft runout.
**Service Limit**: 0.10mm replace if over



Measure the crankshaft bearing play.
**Service Limits**:
Axial : 0.20mm replace if over
Radial: 0.05mm replace if over

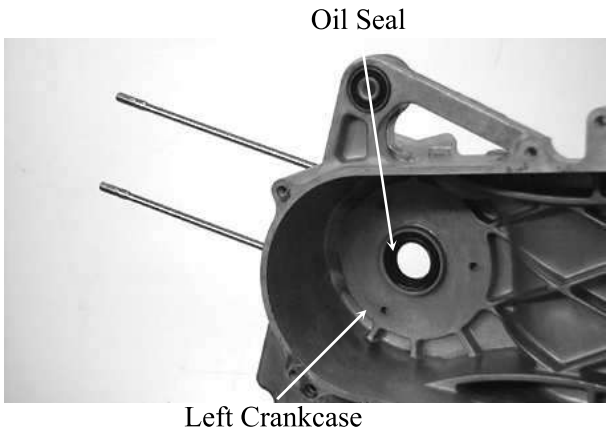



## CRANKCASE ASSEMBLY

Clean off all gasket material from the crankcase mating surfaces.

* • Avoid damaging the crankcase mating surfaces.

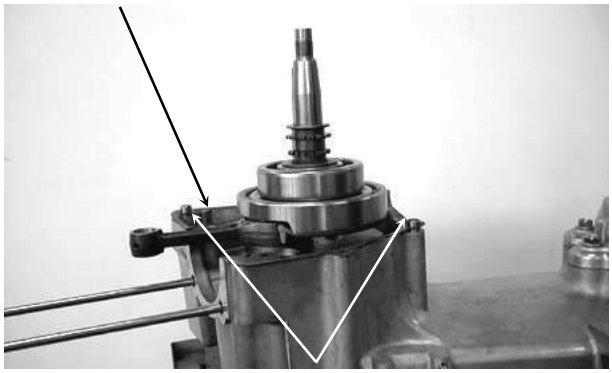
Install a new oil seal into the left crankcase.



Place the left crankcase down and install the crankshaft into the left crankcase.

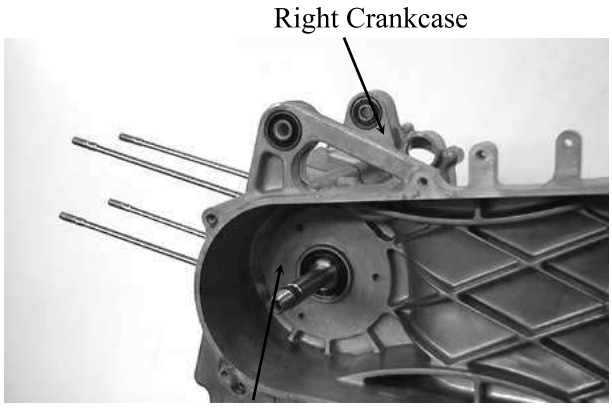
* • Avoid damaging the oil seal.
  • Apply grease to the lip of the oil seal.

Install the two dowel pins and a new gasket.



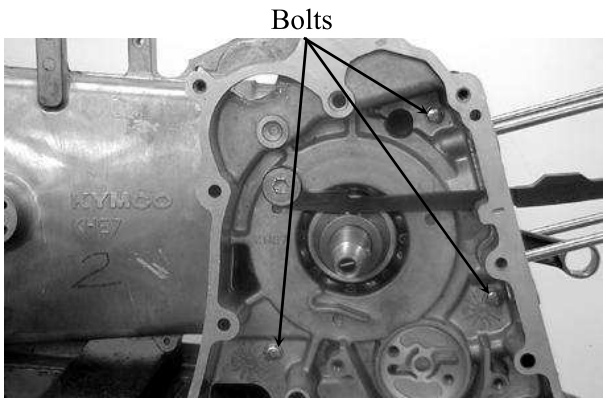

Place the right crankcase over the crankshaft and onto the left crankcase.

* • Install the right crankcase squarely and do not tap it with an iron or plastic hammer.




Install and tighten the right and left crankcase attaching bolts.

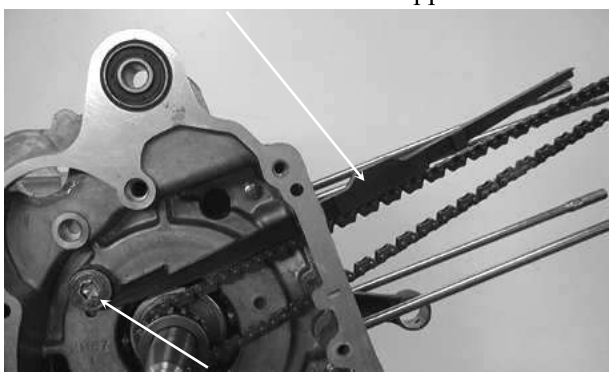
**Torque**: 7.8～10.8N-m



Install the cam chain.
Install the cam chain tensioner slipper.
Install and tighten the cam chain tensioner slipper bolt.

**Torque**: 7.8～11.8N-m

Cam Chain Tensioner Slipper

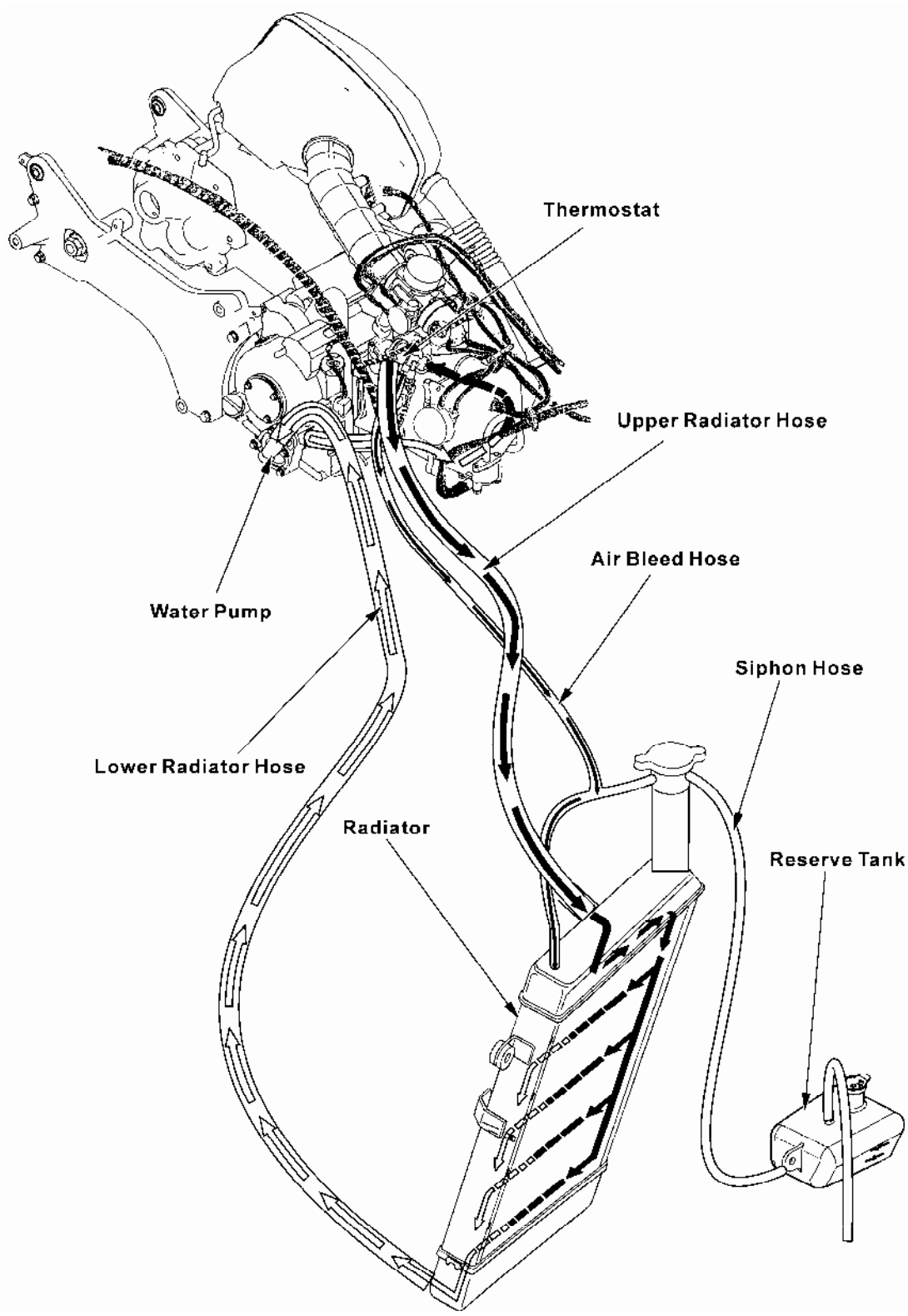


Bolt

# 12. COOLING SYSTEM

## COOLING SYSTEM

**SCHEMATIC DRAWING**



# 12. COOLING SYSTEM

## SERVICE INFORMATION

### GENERAL INSTRUCTIONS

- The water pump must be serviced after removing the engine. Other cooling system service can be done with the engine installed in the frame.
- The engine must be cool before servicing the cooling system.
  When the coolant temperature is over 100℃, never remove the radiator cap to release the pressure because the boiling coolant may cause danger.
- Avoid spilling coolant on painted surfaces because the coolant will corrode the painted surfaces. Wash off any spilled coolant with fresh water as soon as possible.
- After servicing the system, check for leaks with a cooling system tester.

### TORQUE VALUES

| | |
|---|---|
| Water pump impeller | 1.0~1.4 kgf-m (11.8 N-m) |
| Water pump cover bolt | 1.0~1.4 kgf-m (11.8 N-m) |

### TROUBLESHOOTING

**Engine temperature too high**

- Faulty temperature gauge or thermosensor
- Faulty radiator cap
- Faulty thermostat
- Insufficient coolant
- Passages blocked in hoses or water jacket
- Clogged radiator fins
- Passages blocked in radiator
- Faulty water pump

**Coolant leaks**

- Faulty pump mechanical (water) seal
- Deteriorated O-rings
- Damaged or deteriorated water hoses

**Temperature gauge shows the wrong temperature**

- Faulty temperature gauge or thermosensor
- Faulty thermostat

## SPECIFICATIONS

| ITEM | | SPECIFICATIONS |
|---|---|---|
| Coolant capacity | Radiator and engine | 1 liter (1.1 US qt, 0.88 lmp qt) |
| | Reserve tank | 0.37 liter (0.4 US qt, 0.33 lmp qt) |
| Radiator cap relief pressure | | 90 kPa (0.9 kgf/cm$^2$, 12.8 psi) |
| Thermostat | Begin to open | 80 - 82°C (176 - 180°F) |
| | Fully open | 90°C (198°F) |
| | Valve lift | 3.5 mm (0.14 in) minimum |
| Standard coolant concentration | | 1:1 mixture with soft water |

**COOLING SYSTEM TESTING**

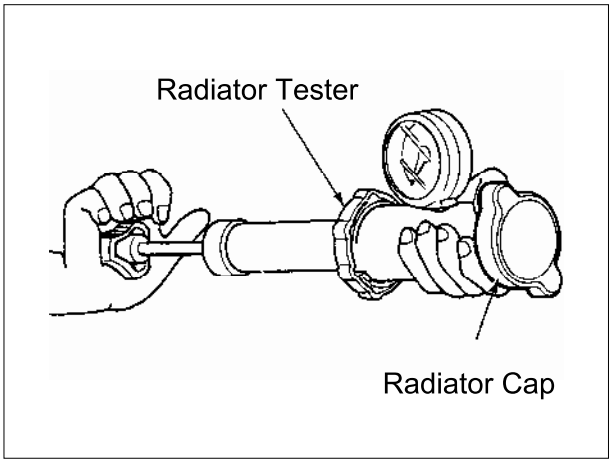
**RADIATOR CAP INSPECTION**

Install the radiator cap onto the radiator tester and apply specified pressure to it. It must hold specified pressure for at least six seconds.

* Apply water to the sealing cap surface before testing.

**Radiator Cap Relief Pressure:**

0.9±0.15 kg/cm²




Install the radiator tester onto the radiator and apply specified pressure to it. It must hold specified pressure for at least six seconds.
Check the water hoses and connectors for leaks.

* The test pressure should not exceed 1.05 kg/cm². Excessive pressure can damage the radiator and its hose connectors.

**RADIATOR**

**RADIATOR INSPECTION**

Remove the front cover.

Remove the radiator coolant panel screw

Inspect the radiator soldered joints and seams for leaks.
Blow dirt out from between core fins with compressed air. If insects are clogging the radiator, wash them off. Carefully straighten any bent fins.

**RADIATOR REMOVAL**

Drain the coolant.

Disconnect the outlet tube of the reserve tank.

Remove the overflow tube clamp and disconnect the overflow tube.

Disconnect the air vent tube from the radiator filler.

Disconnect the fan motor wire coupler.

Loosen the hose band and disconnect the upper hose and lower hose from the radiator.

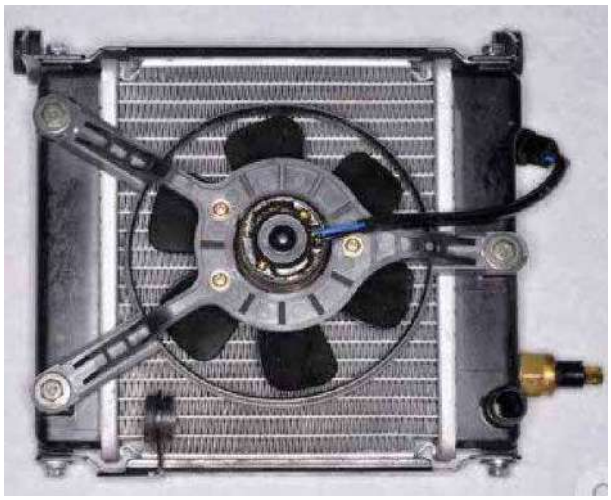
Disconnect the thermostatic switch wire coupler.

Thermostatic Switch

Remove three bolts/nuts on the radiator.
Remove the radiator.

**RADIATOR DISASSEMBLY**

Remove bolts and then remove the fan rubber from the radiator.



Check fan motor by battery.

**THERMOSTATIC SWITCH**

When the coolant temperature is lower than 85 ℃, the thermostatic switch OFF.
When coolant temperature is over 90 ℃, the thermostatic switch ON.

Thermostatic Switch

**RADIATOR INSTALLATION**

Install the fan rubber on the radiator with three bolts.
Install the radiator on the radiator bracket with three bolts/nuts.
Connect the upper and lower hoses and secure them with hose bands.
Connect the thermostatic switch wire.
Connect the fan motor wire couplers.
Connect the overflow tube and secure with the tube clamp.
Fill the radiator with coolant.
Connect the vent tube to the radiator filler.
After installation, check for coolant leaks.
Connect the outlet tube of the reservoir and secure with the tube clamp.

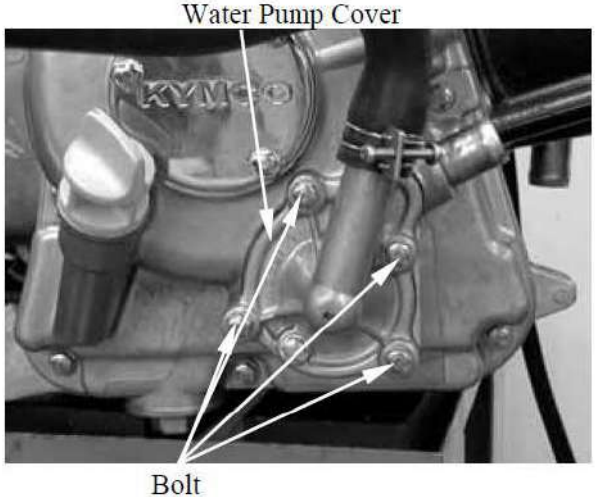
* If you want to refill the coolant, the following procedure must be checked.
  1. Please make the radiator filler and the air vent tube to be separated.
  2. Start the engine, filled in the coolant till the coolant flowed out from the air vent tube.

**WATER PUMP**

**MECHANICAL SEAL (WATER SEAL) INSPECTION**

Inspect the telltale hole for signs of mechanical seal coolant leakage.

If the mechanical seal is leaking, remove the right crankcase cover and replace the mechanical seal.

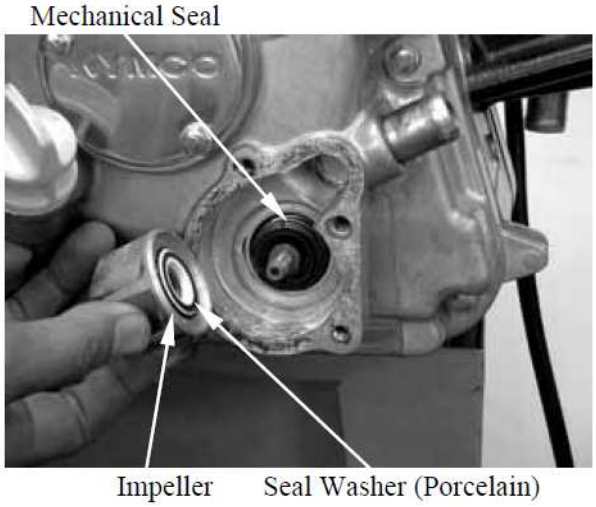



**WATER PUMP/IMPELLER REMOVAL**

Remove the coolant inlet hose and outlet hose.

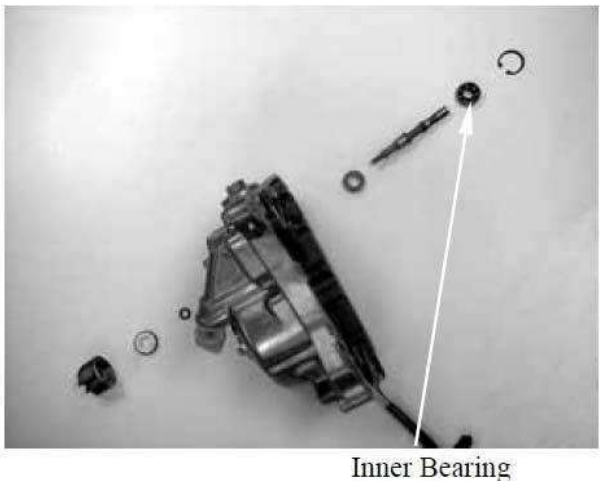
Remove four bolts and the water pump cover, gasket and 2 dowel pins.
Remove the water pump impeller.

* The impeller has left hand threads.



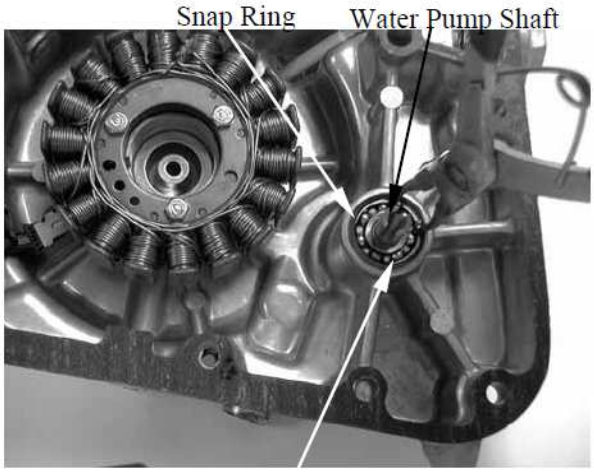

Inspect the mechanical (water) seal and seal washer if wear or damage.

* The mechanical seal and seal washer must be replace as a set.



**WATER PUMP SHAFT REMOVAL**

Disconnect the water hose from the right crankcase cover.
Remove bolts attaching the right crankcase cover.
Remove the water pump bearing snap ring from the water pump assembly.
Remove the water pump shaft and inner bearing.
Remove the water pump shaft outer bearing.



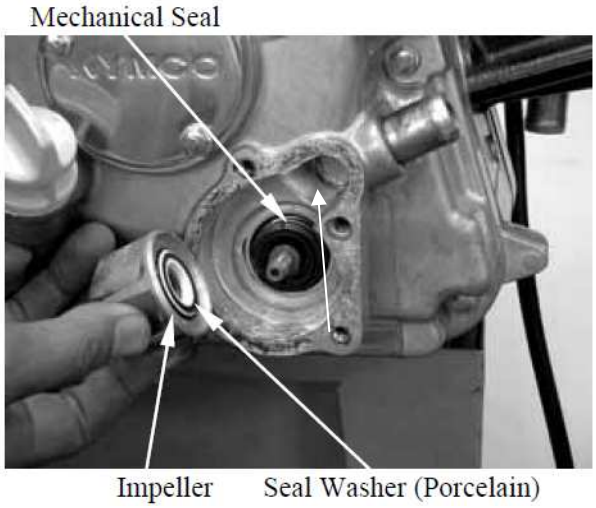

**MECHANICAL SEAL REPLACEMENT**

Drive the mechanical seal out of the water pump assembly from the inside.

* Apply sealant to the right crankcase cover of a new mechanical seal and then drive in the mechanical seal.

**WATER PUMP SHAFT INSTALLATION**

Drive a new water pump shaft outer bearing into the water pump assembly from the inside.
Install the water pump shaft and shaft inner bearing into the waster pump assembly.
Install the snap ring to secure the inner bearing properly.



Install the dowel pins and a new gasket and then install the water pump assembly to the
right crankcase cover.
Tighten 12 bolts to secure the right crankcase cover.

* When installing the water pump assembly, aligning the groove on the water pump shaft with the tab on the oil pump shaft.

**WATER PUMP/IMPELLER INSTALLATION**

When the mechanical seal is replaced, a new seal washer must be installed to the impeller.

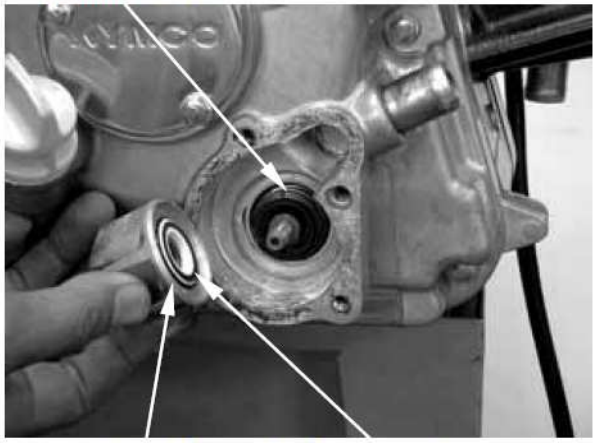
Install the impeller onto the water pump shaft.
**Torque**: 1.0~1.4 kgf-m (11.8 N-m)

* The impeller has left hand threads.

Install two dowel pins and a new gasket.
Install the water pump cover and tighten the 4 bolts.

**Torque**: 1.0~1.4 kgf-m (11.8 N-m)

Mechanical Seal



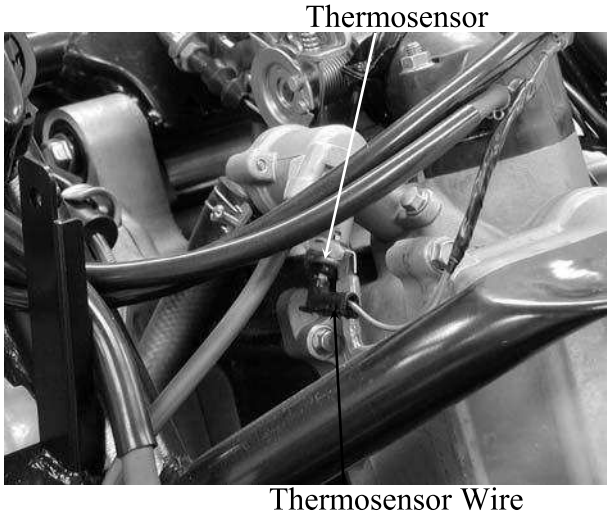
Impeller Seal Washer (Porcelain)

**THERMOSENSOR**

**THERMOSENSOR REMOVAL**

Remove the met-in box and carrier.
Remove the body cover, center cover and rear fender cover A.

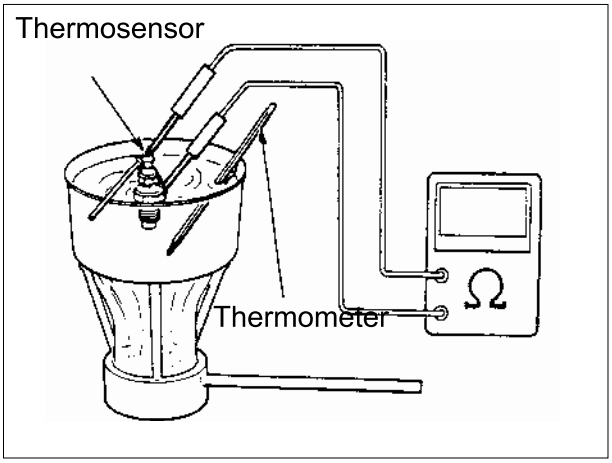
Drain the coolant.
Disconnect the thermosensor wire.
Remove the thermosensor.




**THERMOSENSOR INSPECTION**

Suspend the thermosensor in a pan of water over a burner and measure the resistance through the sensor as the water heats up.

| Temperature(℃) | 50 | 80 | 100 | 120 |
|---|---|---|---|---|
| Resistance(Ω) | 154 | 52 | 27 | 16 |



## THERMOSTAT

### THERMOSTAT REMOVAL

Remove the met-in box and carrier.
Remove the body cover, center cover and rear
fender cover A.

Drain the coolant.
Disconnect the thermosensor wire from the thermosensor.
Disconnect the water hose from the thermostat housing.
Disconnect the air vent tube from the thermostat housing.
Remove the mounting bolt and the thermostat housing from the cylinder head.


Remove two bolts and separate the thermostat housing halves.

Remove the thermostat from the thermostat housing.

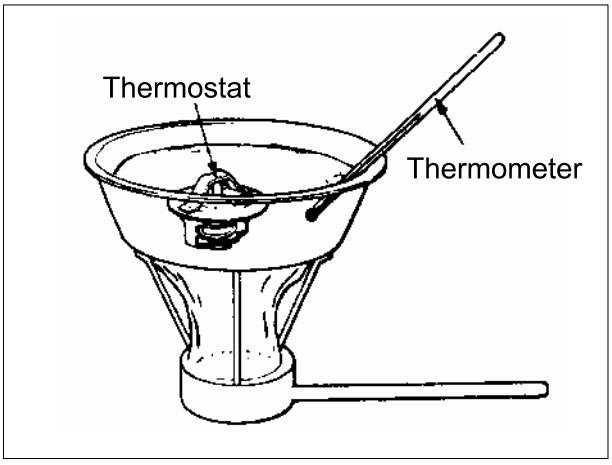
### THERMOSTAT INSPECTION

Suspend the thermostat in a pan of water over a burner and gradually raise the water temperature to check its operation.

**Technical Data**

| | |
|---|---|
| Begins to open | 71 ℃ |
| Full-open | 80 ℃ |
| Valve lift | 3.5～4.5mm |

✻
- Do not make the thermostat touch the pan as it will give a false reading.
- Replace the thermostat if the valve stays open at room temperature.
- Test the thermostat after it is opened for about 5 minutes and holds the temperature at 70℃.




### THERMOSTAT INSTALLATION

✻ Replace the O-ring with a new one and apply grease to it.

Fill the cooling system with the specified coolant.

# FUEL INJECTION SYSTEM



13

## SERVICE INFORMATION

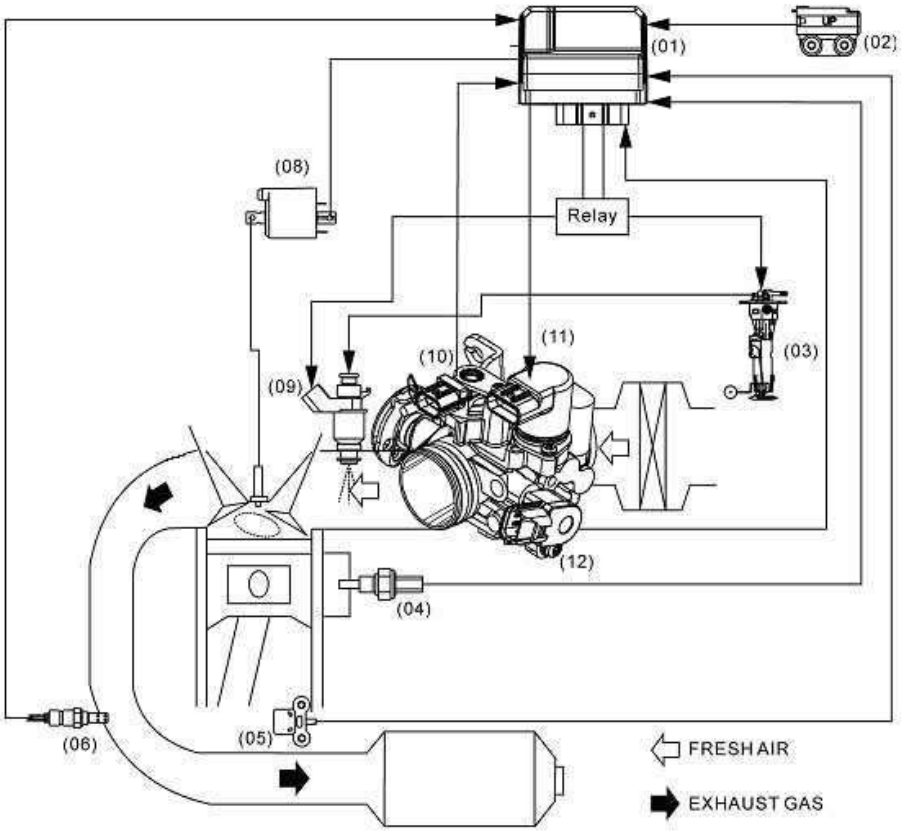
### GENERAL INSTRUCTIONS

- Scooter services can be done with the engine installed in the frame.
- Be sure to relieve the fuel pressure before fuel pump or fuel hose removal.
- Bending or twisting the control cables will affect operation and could cause the cables to stick or bind, resulting in loss of vehicle control.
- Work in a fully ventilated area. Smoking or allowing flames or sparks in the work area or where gasoline is stored can cause a fire or explosion.
- Do not apply the Carburetor Cleaners to the inside of the throttle body, which is coated with molybdenum.
- Do not snap the throttle valve from fully open to fully close after the throttle cable has been removed; it may cause incorrect idle speed.
- Do not loosen or tighten the painted bolts and screws of the throttle body. Loosening or tighten them can cause throttle and idle valve synchronization failure.
- Seal the cylinder head intake ports with tape or a clean towel to prevent dirt and debris from entering the intake ports after the throttle body has been removed.
- Do not damage the throttle body. It may cause incorrect throttle and idle valve synchronization.
- Do not take the fuel pump on the ground downward.
- Always replace the packing when the fuel pump is removed.
- The electronic fuel injection system is equipped with the self-diagnostic system. If the Check Engine Lamp “CELP” illuminate while riding, follow the self-diagnostic procedures to solve the problem.
- A faulty AFI problem is often related to poorly connected or corroded connectors. Check those connections before proceeding.
- When disassembling the fuel injection parts, note the location of the O-rings. Replace them with new ones upon reassembly.
- Do not disconnect the battery negative (-) or positive (+) cable while engine is running, it may cause ECU damage.
- **Do not disconnect or connect the ECU connector during the ignition switch “ON”; it may cause the ECU damage.**

**SPECIFICATIONS**

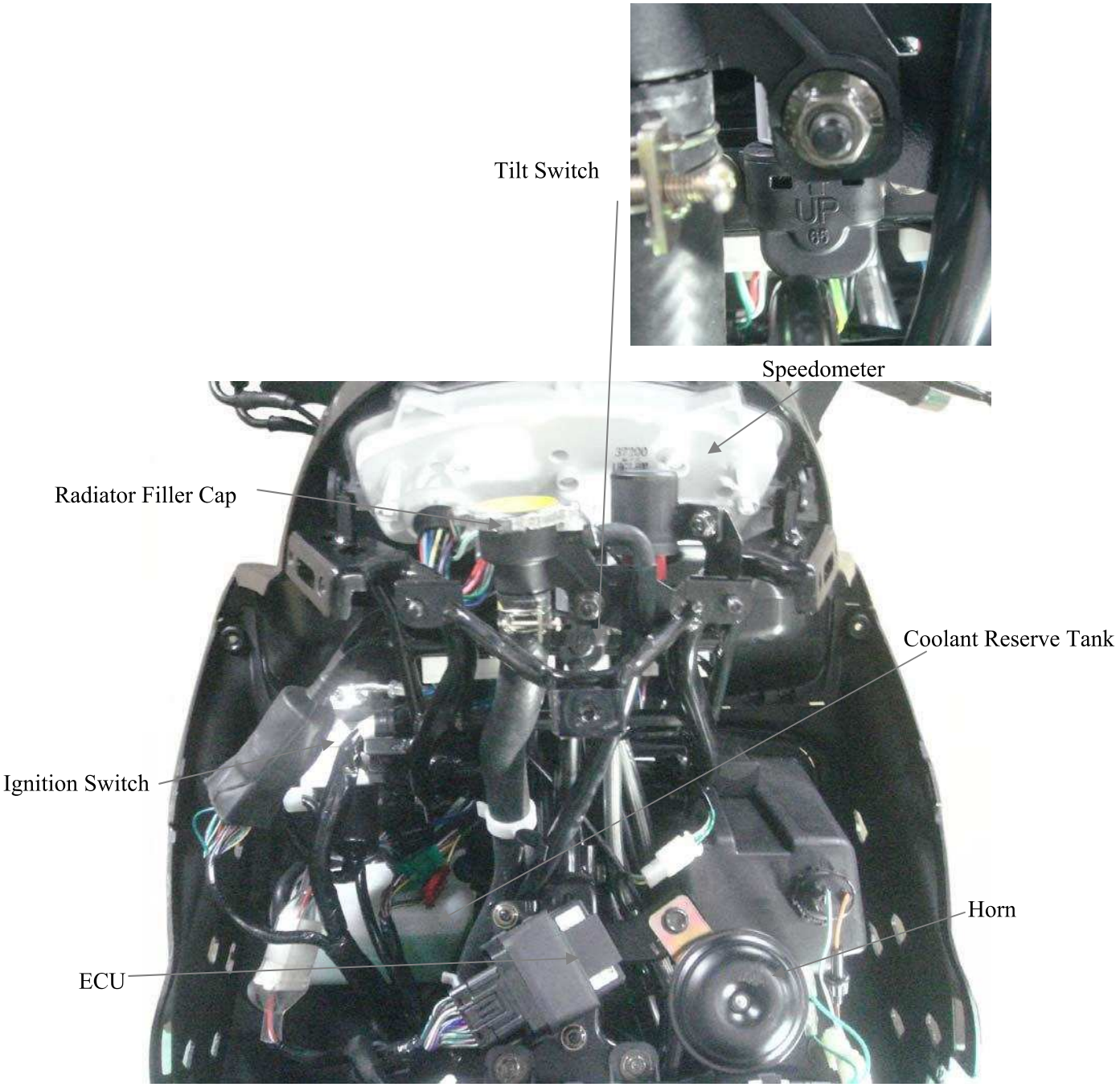
| ITEM | | SPECIFICATIONS |
|---|---|---|
| Throttle body identification number | | LHG7 |
| Idle speed | | 1600±100 rpm |
| Throttle grip free play | | 2～6 mm (1/16～1/4 in) |
| Fuel injector resistance (at 20°C/68°F) | | 11.7±0.6Ω |
| Fuel pump resistance (at 20°C/68°F) | Float at full position | 1100±33 Ω |
| | Float at empty position | 100±3 Ω |
| Fuel pump standard pressure (at 40 L/Hr) | | 294±6 kPa (3 Bar) |
| Water temperature sensor resistance | At -20°C/-4°F | 18.8 KΩ |
| | At 40°C/104°F | 1.136 KΩ |
| | At 100°C/212°F | 0.1553 KΩ |
| Intake pressure sensor (MAP) pressure (at 1～4.2 V) | | 13.332 kPa (0.13332 kgf/ $cm^2$, 1.89 psi)～ 119.99 kPa (1.1999 kgf/ $cm^2$, 17.04 psi) |
| Inductive ignition coil | | Primary: 3.57~4.83Ω<br>Secondary: 10.42~14.49KΩ |
| Throttle position sensor (TPS) resistance (at 20°C/68°F) | | 3500~6500Ω |
| Crank position sensor voltage (at 200 rpm) | | 100~130Ω |
| $O^2$ heater sensor resistance (at 20°C/68°F) | | 6.7～9.5 Ω (engine warming condition) |
| Tilt switch voltage | Standard | 0.4～1.4 V |
| | Over 65° (fall down) | 3.7～4.4 V |

## INJECTION SYSTEM DIAGRAM

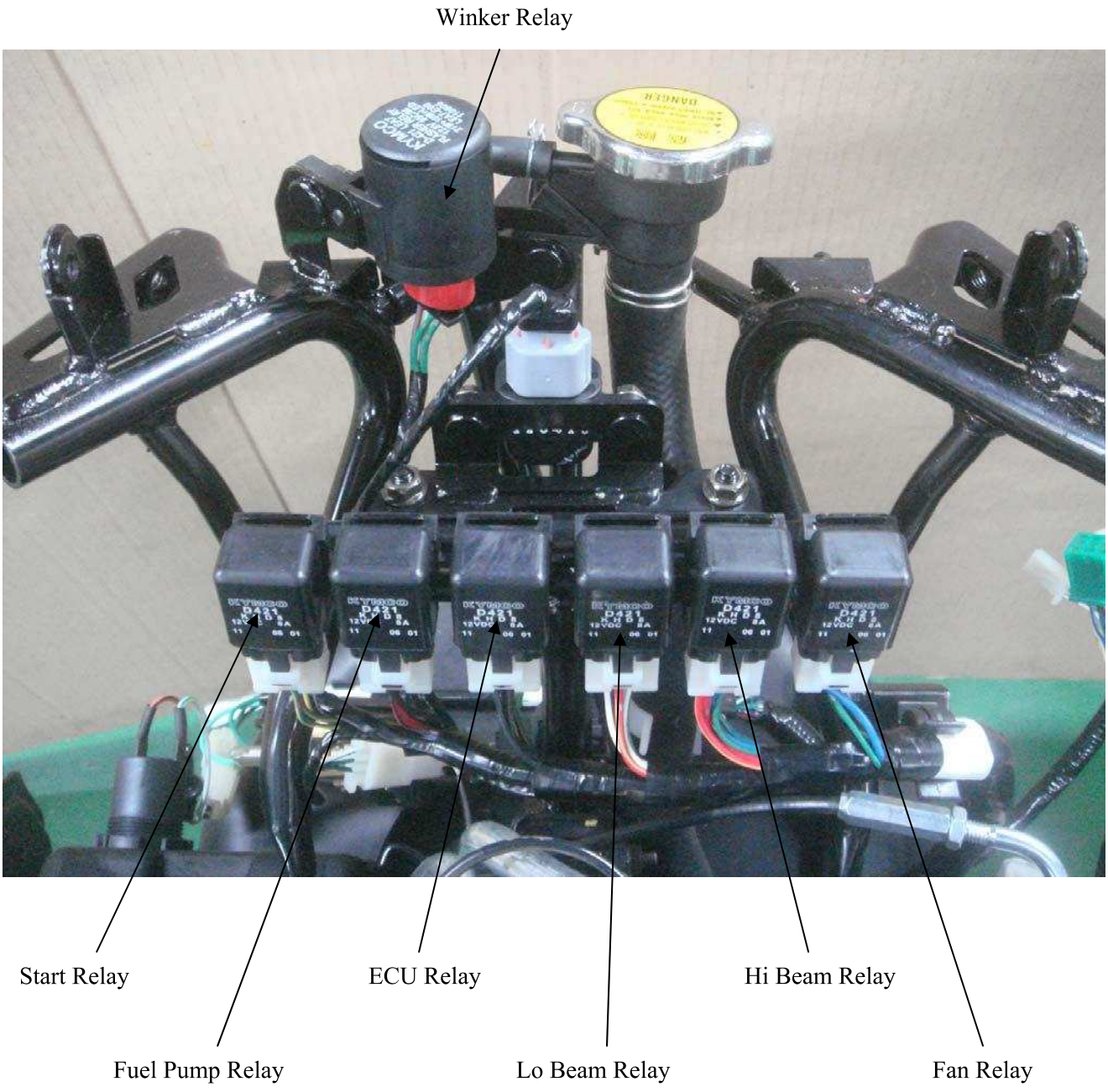


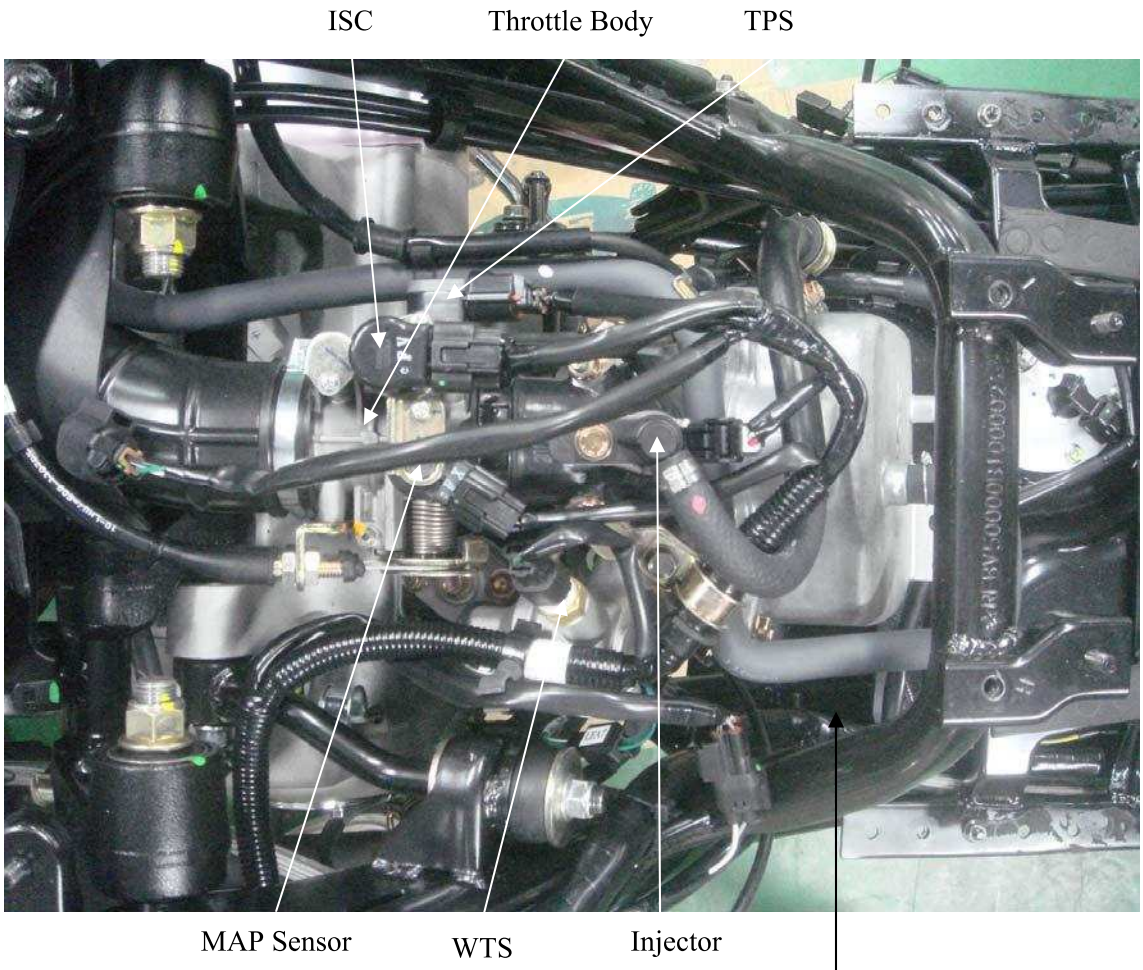

| No. | FULL NAME | ABBREVIATIONS |
|---|---|---|
| (01) | Electronic control unit | ECU |
| (02) | Tilt switch (Angle detect sensor) | ROLL |
| (03) | Fuel pump/Fuel level unit | FP |
| (04) | Water temperature sensor | WTS sensor |
| (05) | Crank position sensor (Pulser) | CPS |
| (06) | Oxygen/Oxygen heater sensor | $O^2$/$O^2$ Heat sensor |
| (08) | Inductive ignition coil | IG |
| (09) | Fuel injector (Nozzle) | INJ |
| (10) | Intake pressure sensor | MAP sensor |
| (11) | Idle air bypass valve | ISC |
| (12) | Throttle position sensor | TPS |

## PARTS LOCATION



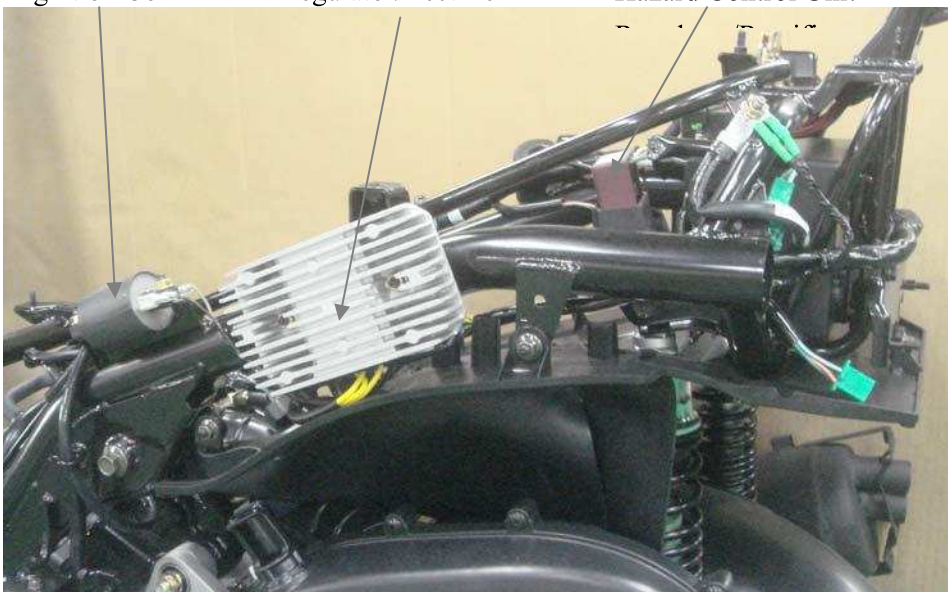
## CABLE & HARNESS ROUTING




ISC
Throttle Body
TPS
MAP Sensor
WTS
Injector


O2 Sensor

Ignition Coil
Regulator/Rectifier
Hazard Control Unit



Starter Relay

Crank Position Sensor

## TROUBLESHOOTING

**Engine fail to start**
- Intake manifold air leak
- Fuel contaminated/deteriorated
- Pinched or clogged fuel hose
- Faulty fuel pump
- Clogged fuel filter, throttle body
- Sticking fuel injector needle
- Faulty fuel pump operating system
- Carbon deposit stayed on the fuel injector
- Spark plug dirty
- Fuel pressure incorrect

**Backfiring or misfiring during acceleration**
- Ignition system malfunction

**Engine stall, hard to start, rough idling**
- Intake air leak
- Fuel contaminated/deteriorated
- Pinched or clogged fuel hose
- Idle speed fail to adjust
- Fail to perform PTS/ISC reset

**Poor performance (drive ability) and poor fuel economy**
- Pinched or clogged fuel hose
- Faulty injector

## SELF-DIAGNOSTIC PROCEDURES WITHOUT DIAGNOSTIC TOOL

### SELF-DIAGNOSTIC PROCEDURES

* It can be performed without diagnostics program.

Place the scooter on its main stand.

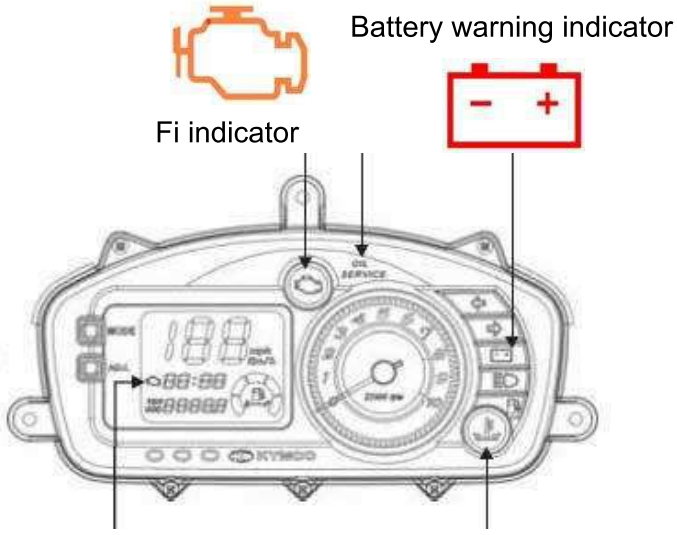
Put the side stand up and the engine stop switch is at “RUN”.

- Turn key to On position.
- The CELP will be lighting for two seconds and then off.
- If the engine has problem, the CELP will blink to show the failure codes.
- There’re 11 failure codes for the KEHIN system.

If the vehicle gets more failure codes, the CELP will be blinking from a lower number, then show the higher number after three seconds. All failure codes would be appeared repeatedly.

* No matter when the “CELP” illuminated while riding condition, should find out the cause of the problem as soon as





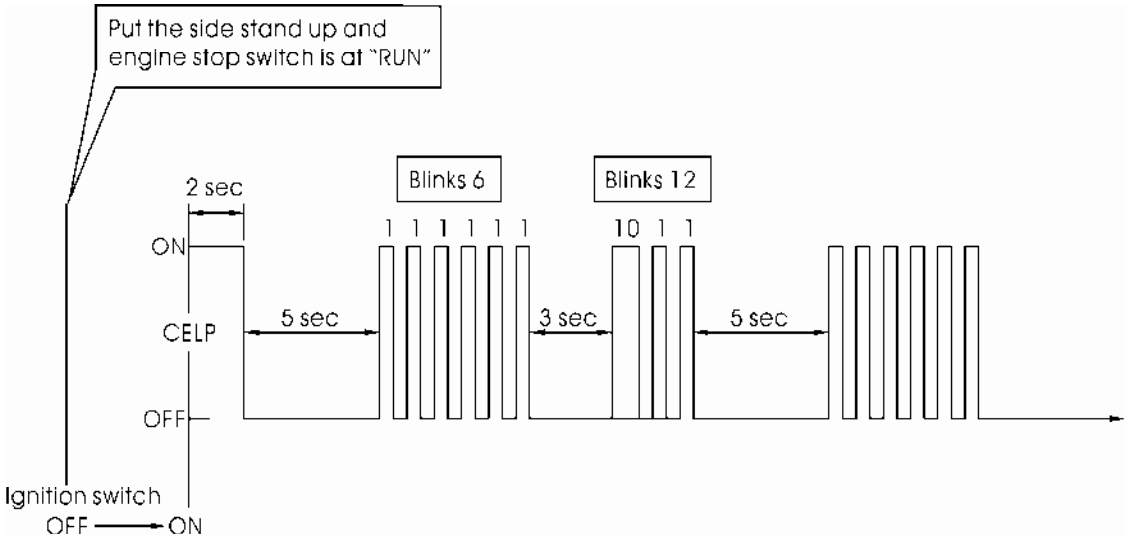
## EFI SELF-DIAGNOSIS CHECK ENGINE LAMP (CELP) FAILURE CODES

The "CELP" denotes the failure codes. When the indicator lights for one second that is equal to ten.

For example: one longer blink illumination and two shorter blinks (0.5 second x 2) of the indicator is equal to 12 blinks. Follow code 12.

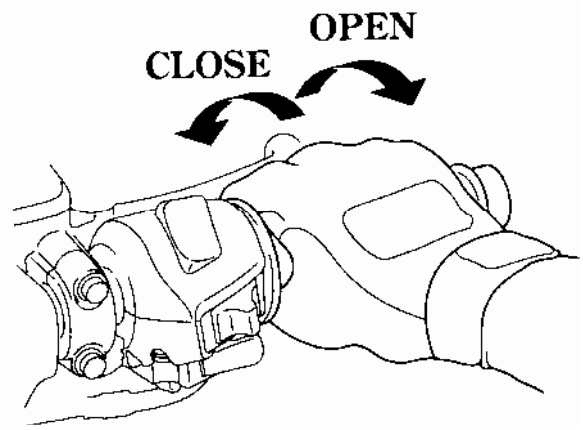
If more than a damaged part has occurred, the "CELP" begins blinking in order.

For example: If the indicator blinks six times, then shows one second illumination and two blinks, so there are two failures have occurred. Follow code 6 and 12.

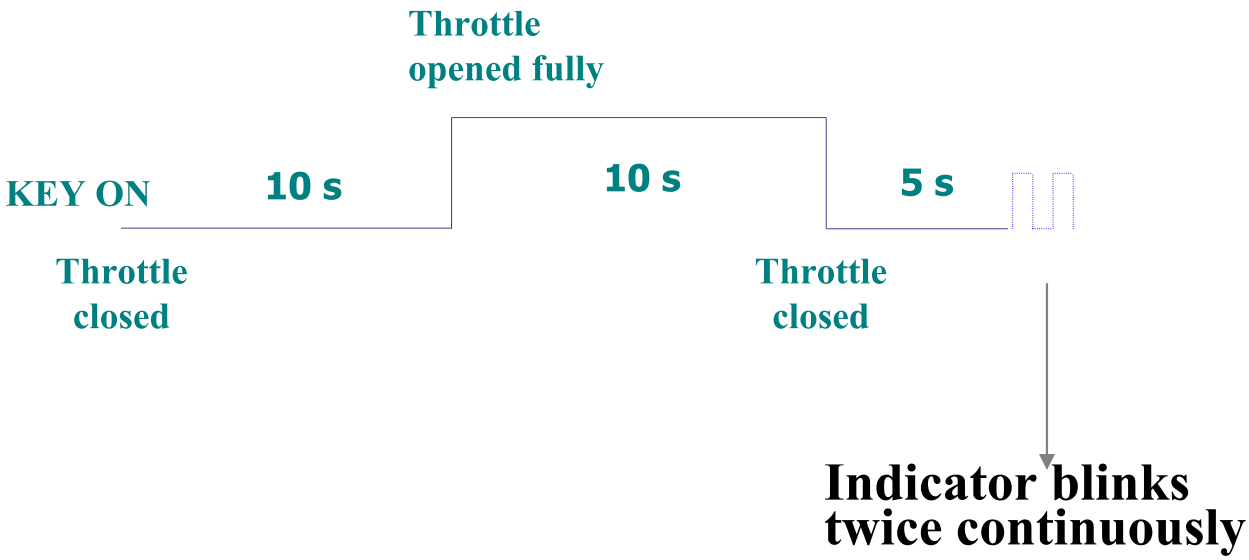


**SELF-DIAGNOSIS RESET PROCEDURE**

1. Put the side stand up and engine stop switch is at "RUN".
2. Turn the key to the ON position and wait for ten seconds.
3. Fully open the throttle and wait for ten seconds.
4. Release the throttle.
5. The indicator will blink twice (0.5 second) after five seconds quickly.
6. Self-diagnosis memory data is disappeared after the CELP lamp is off.




* The self-diagnosis can not be reset when has still problem inside the system.



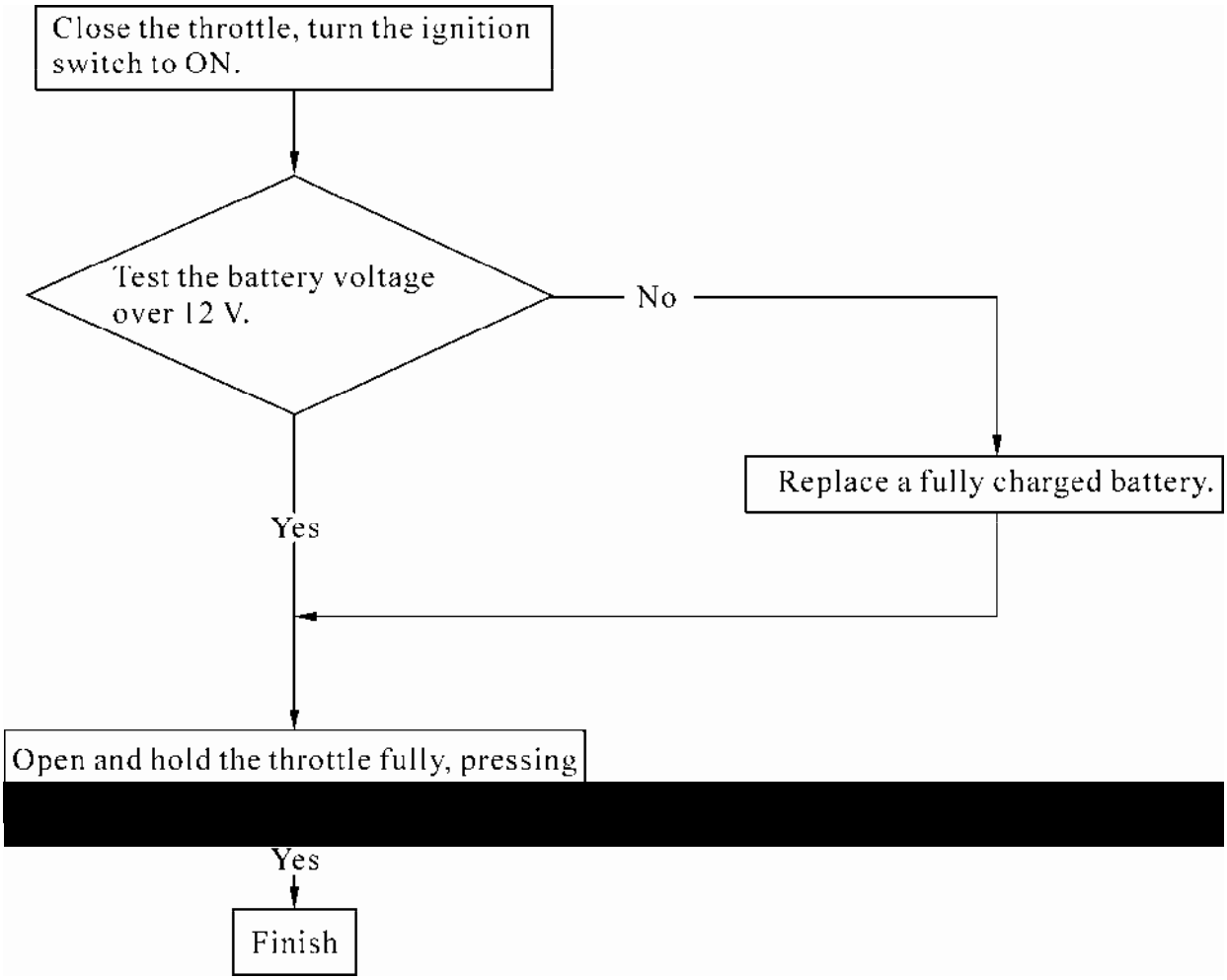
## CELP FAILURE CODES LIST

| Blinks | Failure Codes (diagnostic tool) | Contents | Causes | Symptoms |
|---|---|---|---|---|
| 06 | P0120 | Faulty TPS | ● Faulty TPS voltage range (0.3~4.5 V)<br>● Loose or poor connection on TPS Sensor<br>● Open or short circuit on the TPS wire<br>● Faulty TPS itself. | Engine operates normally |
| 09 | P0105 | Faulty MAP | ● Faulty MAP voltage range (1~4.2 V)<br>● Loose or poor connection on MAP Sensor<br>● Open or short circuit on MAP wire<br>● Faulty MAP itself | Engine operates normally |
| 12 | P0115 | Faulty WTS (water temperature) | ● Faulty ECT Ω range (-20°C: 18.8 Ω/40°C: 1.136 Ω/100°C: 0.1553 Ω)<br>● Loose or poor connection on ECT<br>● Open or short circuit on ECT wire<br>● Faulty ECT | Engine operates normally |
| 15 | P1630 | Faulty Tilt switch (Roll) | ● Faulty Tilt switch voltage range (inclined angle <65°: 0.4~1.4 V/ Inclined angle >65°: 3.7~4.4 V)<br>● Loose or poor connection on Tilt switch<br>● Open or short circuit in Tilt switch wire<br>● Faulty tilt switch | Engine operates normally |
| 17 | P0130 | Faulty $O^2$ sensor | ● Faulty $O^2$ sensor voltage range (A/F below 14.7: > 0.7V/ A/F over 14.7: < 0.18 V)<br>● Loose or poor connection on $O^2$ sensor<br>● Open or short circuit on $O^2$ sensor wire<br>● Faulty $O^2$ sensor | Engine operates normally |
| 33 | P0201 | Faulty injector (Nozzle) | ● Faulty Fuel injector Ω range (9.945~13.5Ω)<br>● Loose or poor connection on injector<br>● Open or short circuit on injector wire<br>● Faulty fuel injector | Engine fail to be operated |

| Blinks | Failure Codes (diagnostic tool) | Contents | Causes | Symptoms |
|---|---|---|---|---|
| 37 | P0351 | Faulty inductive ignition coil | ● Faulty Inductive ignition coil Ω range (4.2 Ω ± 15%)<br>● Loose or poor connection on inductive ignition coil<br>● Open or short circuit on inductive ignition coil wire<br>● Faulty inductive ignition coil | Engine fail to be operated |
| 41 | P0230 | Faulty fuel pump | ● Faulty Fuel pump Ω range (F:1100±33Ω E:100±3Ω)<br>● Loose or poor connection on fuel pump<br>● Open or short circuit on fuel pump wire<br>● Faulty fuel pump | Engine fail to be operated |
| 45 | P0135 | Faulty $O^2$ sensor heater | ● Faulty $O^2$ sensor heater Ω range (6.7Ω~9.5Ω)<br>● Loose or poor connection on $O^2$ sensor heater<br>● Open or short circuit on $O^2$ sensor heater wire<br>● Faulty $O^2$ sensor heater | Engine starts normally but not smooth |
| 49 | P1505 | Faulty ISC | ● Loose or poor contacts on ISC<br>● Open or short circuit in ISC wire<br>● Faulty ISC | Engine operates normally |
| 66 | P0335 | Faulty CPS | ● Loose or poor connection on CPS sensor<br>● Open or short circuit on CPS wire<br>● Faulty CPS sensor | Engine starts normally but not smooth |

## SPARK PLUG ANTI-FLOOD

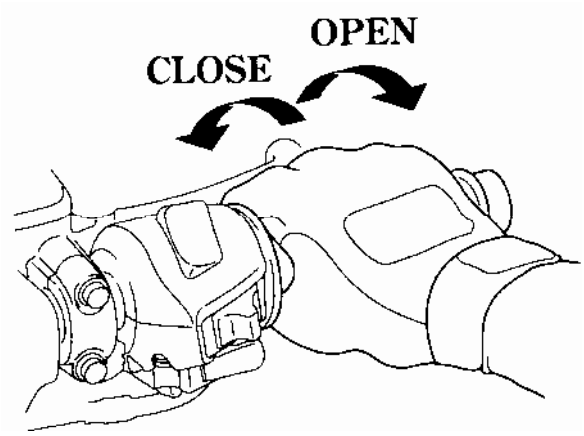
When have not failure code occurs and pressing starter switch repeatedly, can still not start the engine, maybe the spark plug is wet by fuel, perform the spark plug anti-flood to purge the fuel in the engine.



## TPS/ISC RESET

- If close or open the throttle grip randomly, the ECU may record the incorrect TPS when the ECU or the throttle body has been reinstalled. It can cause hard to start engine or idling speed is not smooth when engine installation.
- ISC has a motor inside, which controls ISC valve to obtain smooth idling speed. The ECU may record the incorrect ISC position during the engine speed isn't working when the ECU or the throttle body has been reinstalled. It can cause engine stop, hard to start engine or rough idling speed.

The throttle position sensor (TPS) and idle air bypass valve (ISC) have to be reset when throttle body, MAP, TPS, ISC or ECU has been reinstalled.




### TPS/ISC RESET PROCEDURE

1. Put the side stand up and engine stop switch is at "RUN".
2. Turn the key to the OFF position.
3. Fully open the throttle.
4. Turn the key to the ON position.
5. Release the throttle after waiting for eight seconds.
6. Turn the key to the OFF position.
7. Turn the key to the ON position.
8. TPS and ISC have been reset successfully.

If fail to reset, repeat the steps from 1 to 8.

## FUEL PUMP

### INSPECTIION

Put the side stand up and the engine stop switch is at “RUN”

Disconnect the fuel pump/fuel unit connector.

Connect the multimeter (+) probe to the Red/Black terminal and the multi-meter (-) probe to the Green terminal.

Turn the ignition switch to “ON” and measure the voltage between the terminals.

It should be shown the current battery voltage for a few seconds.

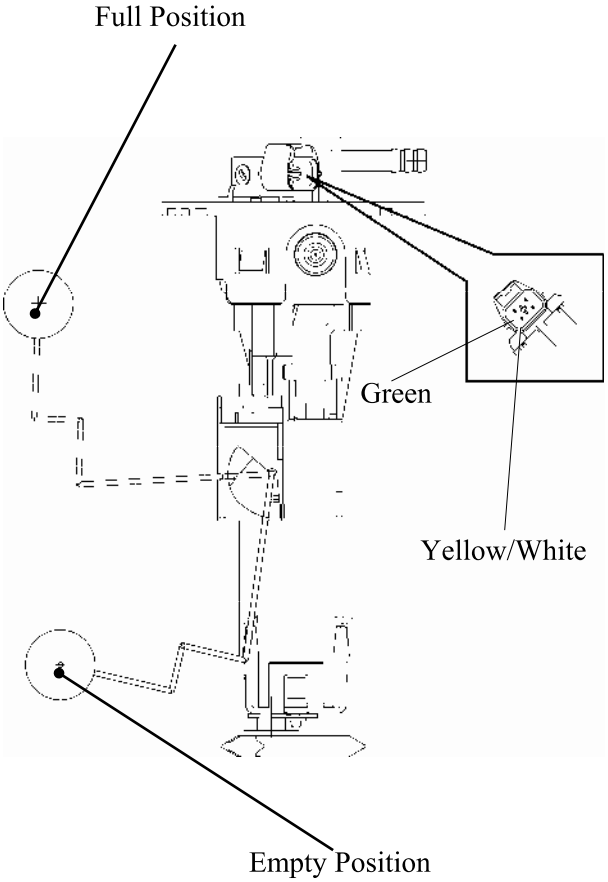
If there is still battery voltage, replace the fuel pump.

If there is not any battery voltage, inspect the following:

- Fuse B (10 A)
- Fuel cut-off relay
- ECU

Measure the resistance between the Red/Black and Green terminals of the fuel pump side connector.

**Standard** (at 20°C/68°F)**:** 1.9±0.3 Ω




### Fuel level sensor inspection

Measure the resistance between the Yellow/White and Green terminals of the fuel pump side connector.

**Standard** (at 20°C/68°F)**:**

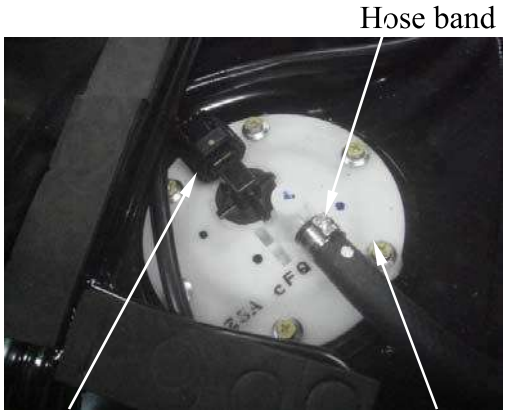
| | |
|---|---|
| Float at full position | 1100±33 Ω |
| Float at empty position | 100±3 Ω |

**REMOVAL**

Disconnect the connector and fuel band from the fuel pump.

Remove the six screws onto the fuel pump.

Remove the fuel pump and O-ring.




**INSTALLATION**

Replace a new O-ring on the fuel tank.

Don't damage the fuel pump wire and ensure the connector rearward carefully.

**Torque:** 0.35 kgf-m (3.5 N-m, 2.5 lbf-ft)

**FUEL OUTPUT PRESSURE INSPECTIION**

Turn the key to the OFF position.

Use the fuel hose clamp.

Disconnect the fuel hose from the fuel injector.

Connect the fuel pressure gauge.

Turn the key to the ON position.

Check the fuel pressure.

**Standard:3.0 Bar**

* **If the fuel output pressure is less than 3.0 bar, may fail to start the engine or in trouble in case of riding.**

## FUEL PUMP RELAY

### INSPECTION

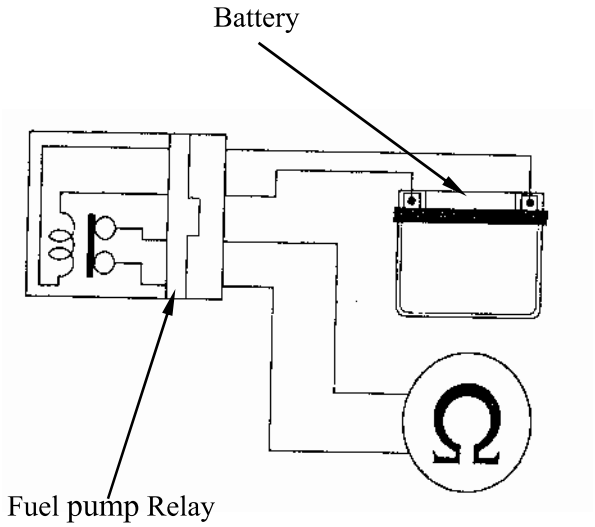
Remove the fuel pump relay.
Connect the ohmmeter to the fuel pump relay connector terminals.

**Connection: Black – Red/Black**

Connect 12 V battery with the fuel pump relay connector.

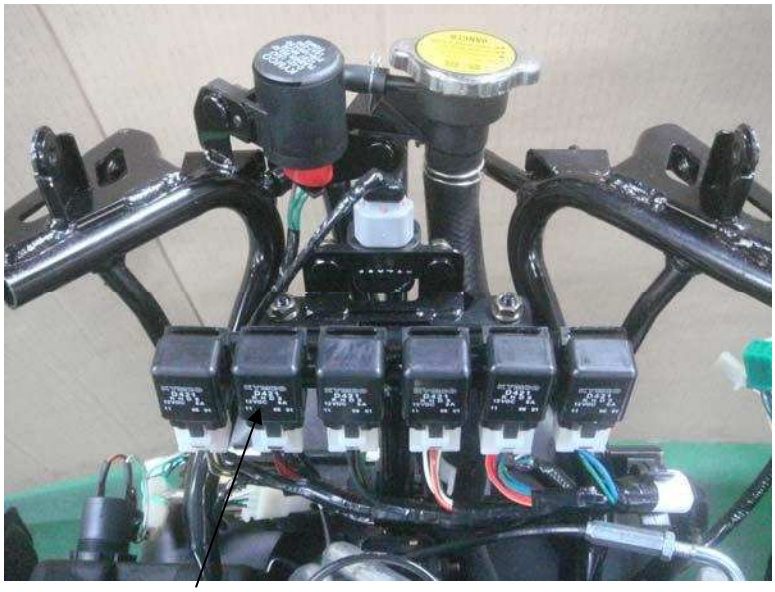
**Connection: Blue/Black – Black**

There should be continuity only when 12 V battery connected.
If there is not continuity when the 12 V battery is connected, replace a fuel pump relay.




### REMOVAL

Disconnect the fuel pump relay connector and remove it from frame.



## TILT SWITCH

### INSPECTION

Support the scooter level surface.

Put the side stand up and engine stop switch is at “RUN”.

Turn the ignition switch to “OFF”

Remove the screws, washers and tilt switch.

* Do not disconnect the tilt switch connector during inspection.

Place the tilt switch vertical as shown, and turn the ignition switch to “ON”.

Measure the voltage between the following terminals of the tilt switch connector with the connector connected.

| Terminal | Normal |
|---|---|
| Violet/Red (+) – Green/Pink (-) | 5 V (ECU voltage) |
| Black/Blue (+) – Green/Pink (-) | 0.4～1.4 V |

Incline the tilt switch 65±10 degrees to the left or right with the ignition switch turned to “ON”.

Measure the voltage between the following terminals of the tilt switch connector with the connector connected.

| Terminal | Normal |
|---|---|
| Violet/Red (+) – Green/Pink (-) | 5 V (ECU voltage) |
| Black/Blue (+) – Green/Pink (-) | 3.7～4.4 V |

If repeat this test, first turn the ignition switch to “OFF”, then turn the ignition switch to “ON”.

### REMOVAL/INSTALLATION

Disconnect the connector and remove two screws.

Remove the Tilt switch.

Installation is in the reverse order of removal.

* Install the tilt switch with its “UP” mark facing up.

Tighten the mounting screws securely.

Tilt Switch “UP” Mark


Tilt Switch Connector

## ELECTRIC CONTROL UNIT (ECU)

### REMOVAL/INSTALLATION

✻
- Do not disconnect or connect the ECU connector during the ignition switch "ON"; it may cause the ECU damaged.
- The throttle position sensor (TPS) and idle air bypass valve (ISC) have to be reset when throttle body, MAP, TPS, ISC or ECU has been reinstalled.

Disconnect the ECU connector and remove the ECU from the frame.

Installation is in the reverse order of the removal.

## INSPECTION

Disconnect and remove the ECU from the frame.

Check for continuity between pin 9 and 10 of the ECU side connector.

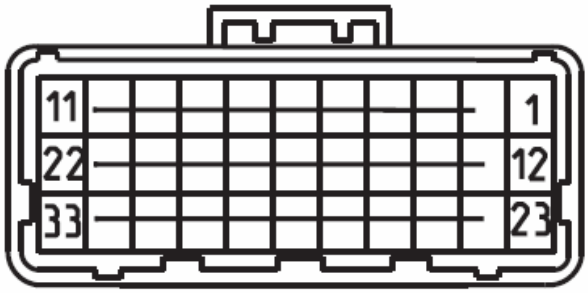
There should be continuity at all times.

Check for continuity between each pins 2, 4 and 23 of the ECU side connector.

There should be continuity at all times.

Check for continuity between pin 24 and 10 of the ECU side connector.

There should be no continuity at all times.




## ECU PIN FUNCTION

| PIN NO. | NAME | FUNCTION | PIN NO. | NAME | FUNCTION |
|---|---|---|---|---|---|
| 01 | IGP | IGNITION POWER | 19 | FLPR | FUEL PUMP RELAY |
| 02 | LG1 | LOGIC GROUND 1 | 20 | ISCBP | IDEL SPEED CONTROL B |
| 03 | HEGO | HEGO SENSOR | 21 | ISCAP | IDEL SPEED CONTROL A |
| 04 | SG | SENSOR GROUND | 22 | HEGO HT | HEGO SENSOR HTATER |
| 05 | TH | THROTTLE POSITION SENSOR | 23 | CRK-M | CRANK PULSE SENSOR GND |
| 06 | VCC | SENSOR POWER OUTPUT(+5V) | 24 | TW | WATER TEMP. SENSOR |
| 07 | BATT | BATTERY | 25 | - | - |
| 08 | FAN | FAN RELAY | 26 | ROLL | ROLL SENSOR |
| 09 | PG1 | POWER GROUND 1 | 27 | PM | MANIFOLD PRESSURE SENSOR |
| 10 | PG2 | POWER GROUND 2 | 28 | SOL | - |
| 11 | IG | IGNITION COIL | 29 | - | - |
| 12 | CRK-P | CRANK PULSE SENSOR | 30 | K-LINE | DIAGNOSTIC TOOL |
| 13 | - | - | 31 | ISCBN | IDEL SPEED CONTROL / B |
| 14 | - | - | 32 | ISCAN | IDLE SPEED CONTROL / A |
| 15 | TEST | - | 33 | NE | METER |
| 16 | INJ | INJECTION | | | |
| 17 | - | - | | | |
| 18 | MIL | MULTI INDICATOR LAMP | | | |

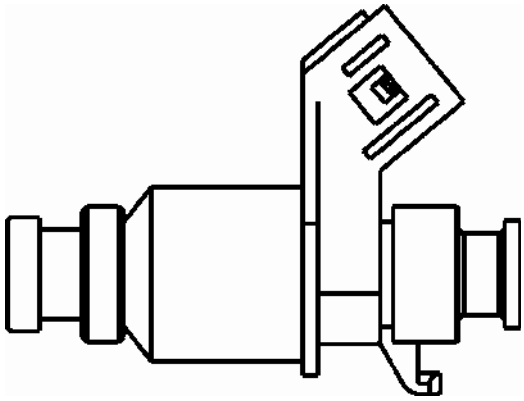
## FUEL INJECTOR

### INSPECTION

Disconnect the fuel injector connector.

Measure the resistance between 2 pins of the fuel injector connector.

**Standard:** 11.7±0.6 Ω (at 20°C/68°F)



### REMOVAL

Disconnect the connector from the fuel injector.

Remove the bolt of the fuel injector.

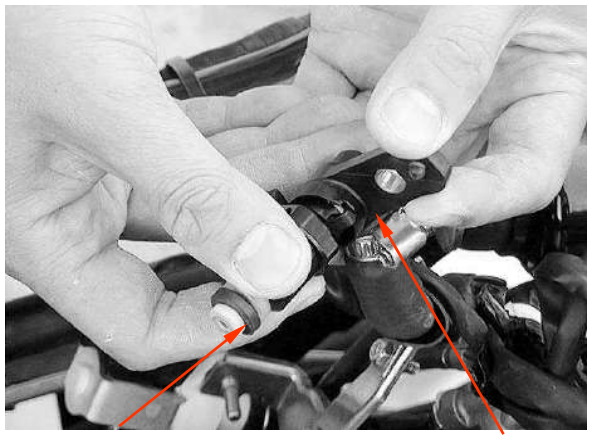
Take out of the fuel pipe and fuel injector from the Inlet pipe.

Remove the fuel injector from the fuel pipe.

Bolt

Connector

* **Ensure the fuel pipe without any pressure, then remove the fuel injector.**
**STEP 1: Disconnect the fuel pump relay or fuel pump connector.**
**STEP 2: Turn the key to the ON position. Starting the engine till the engine stop working.**

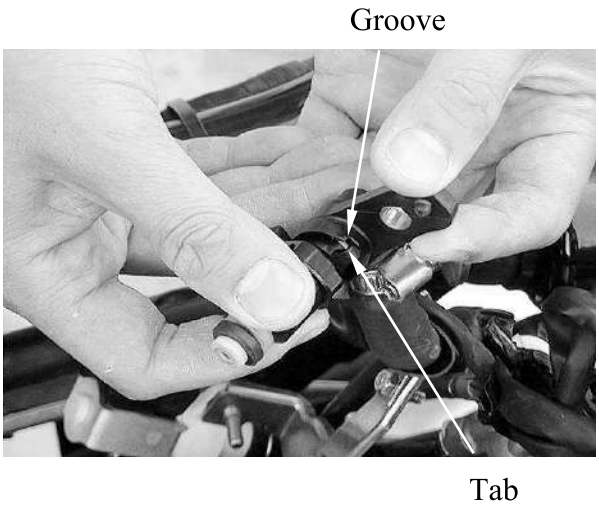


O-ring

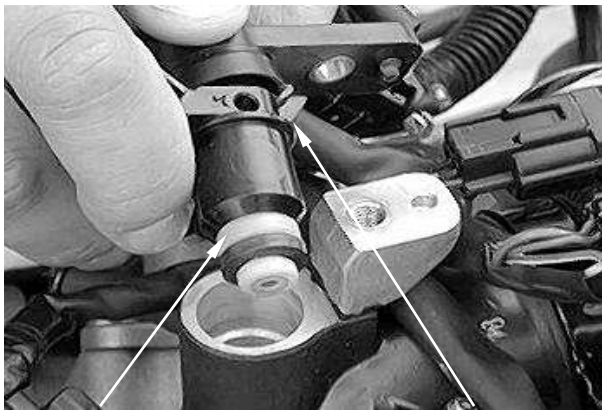
Fuel Iniector

**INSTALLATION**

Apply the engine oil to a new O-ring.
Install the fuel injector into the fuel pipe.
Ensure the tab of the fuel injector inserted into the groove of the fuel pipe.




Install the fuel pipe into the intake manifold by aligning the dowel pin.
Be careful not to damage the O-ring.
Tighten the fuel pipe mounting bolt.




**FUEL INJECTOR CLEANING**

**PROBLEM**

1. Fuel Injector cannot output the fuel.
2. The Injector injection time (ms) is shorter or longer.

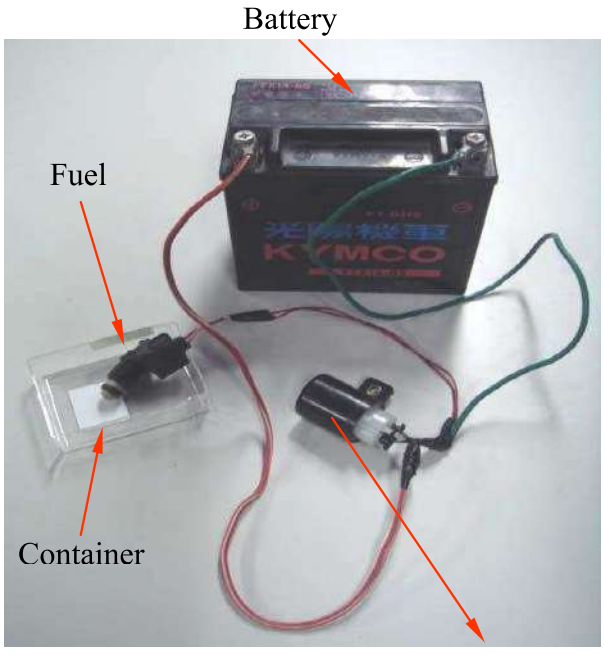
**Standard: < 1.6ms**

**ANALYSIS**

Injector block (With some carbons).

**TROUBLESHOOTING**

1. Use the specified injector cleaner.
2. Pouring the liquid of carburetor cleaner until half container.
3. Connect the battery as picture.
4. The injector cleaner with the flash relay.
5. Keeping the fuel Injector operation.
6. Waiting for 20~30 minutes.
7. Cleaning the carbons completely.



## WTS SENSOR (Water Temperature Sensor)

**REMOVAL / INSTALLATION**

Drain the coolant from the cooling system.

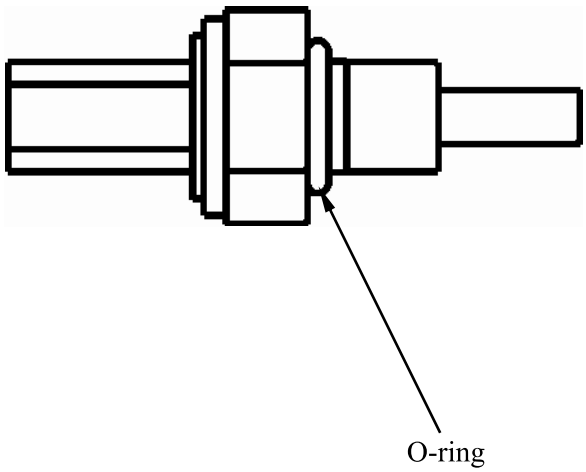
Disconnect the WTS sensor connector from the sensor.

Remove the WTS sensor and O-ring.

WTS Sensor

Install a new O-ring and WTS sensor.

* Always replace an O-ring with a new one.



O-ring

Tighten the WTS sensor to the specified torque.

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

Connect the WTS sensor connector.

Fill the cooling system with the recommended coolant.

**INSPECTION**

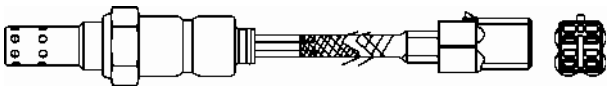
Measure the resistance at the WTS sensor terminals.

**STANDARD**

| ºC | -20 | 40 | 100 |
|---|---|---|---|
| KΩ | 18.8 | 1.136 | 0.1553 |

## $O^2$ SENSOR

The $O^2$ sensor issues signal to ECU when the temperature is over 350°C during the engine is working.
The temperature is up to 350°C earlier than the muffler for $O^2$ heater sensor. So the $O^2$ sensor begins performance.
The function of $O^2$ sensor only controls the fuel injector operation.



### INSPECTION

Disconnect the $O^2$ sensor connector.

Measure the resistance between each White wire terminals of the $O^2$ sensor side connector.

**Standard:** 7.7±1.2 Ω (at 20°C/68°F)

### REMOVAL/INSTALLATION

Disconnect the $O^2$ sensor connector and then remove it from exhaust muffler.

Installation is in the reverse order of removal.

*

| |
|---|
| Apply anti-seize compound on the surface of thread area before $O^2$ sensor |

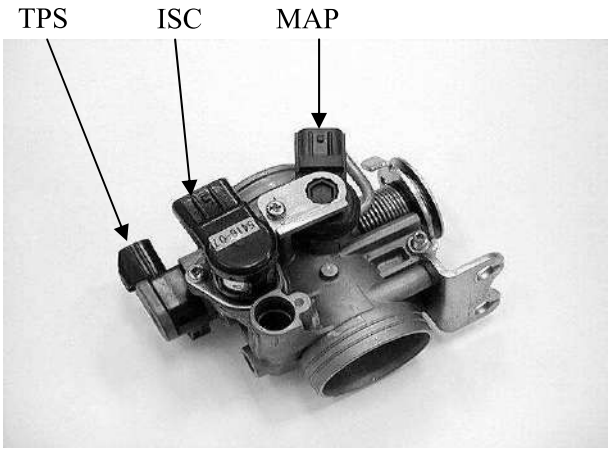
Tighten the $O^2$ sensor to specified torque.

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

O2 Sensor

## THROTTLE BODY/MAP/ISC/TPS

- Turn off the ignition switch while replacement.
- Check and confirm if the voltage is over 12V by a voltmeter after replacement.
- Check and confirm if the other connectors are installed correctly after replacement.
- Do not damage the throttle body, it may cause the throttle and idle valve isn't synchronization.
- The throttle body is preset in KYMCO factory, do not disassemble it by a wrong way.
- Do not loosen or tighten the painted bolts and screws for the throttle body. Loosen or tighten them can cause the throttle and idle valve to synchronization failure.
- **TPS and ISC have to be reset after the throttle body MAP, TPS, ISC or ECU has been reinstalled.**




### MAP INSPECTION

Support the scooter on a level surface.

Put the side stand up and engine stop switch is at "RUN".

Turn the ignition switch to "ON" position.

Measure if the ECU voltage outputs to the MAP between the following terminals of the MAP connector.

| Terminal | Normal |
|---|---|
| Violet/Red (+) – Green/Pink (-) | 5 V |

**TPS INSPECTION**

Support the scooter on a level surface.

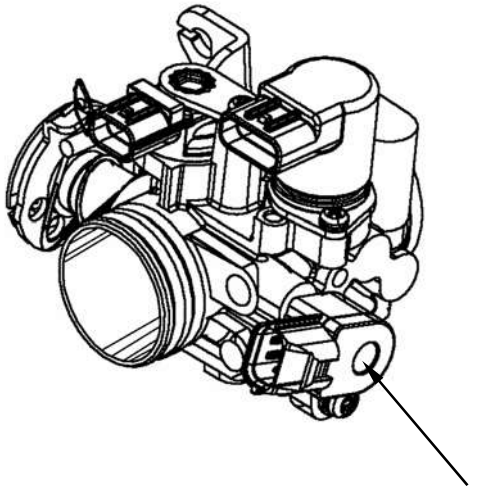
Put the side stand up and engine stop switch is at "RUN".

Turn the ignition switch to "ON".

Measure if the ECU voltage outputs to TPS between the following terminals of the TPS connector.

| Terminal | Normal |
|---|---|
| Violet/Red (+) – Green/Pink (-) | 5 V |

**Throttle position sensor (TPS) resistance (at 20°C/68°F) 3500~6500Ω**




**REMOVAL**

Loosen the throttle cables with the adjusting nuts.

Disconnect the throttle cable ends from throttle seat.


Disconnect the TPS, ISC and MAP sensor connectors.

Loosen the air cleaner connecting hose band screw.

Loosen the intake manifold band screw.

Remove the throttle body, MAP sensor, TPS sensor and ISC sensor as a set.

**DISASSEMBLY**

*

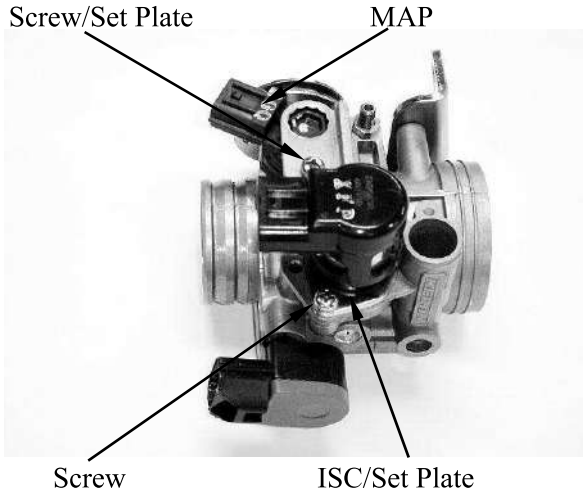
The throttle position sensor (TPS) and idle air bypass valve (ISC) have to be reset when the throttle body MAP, TPS, ISC or ECU has been reinstalled.

Remove the screw and then remove the ISC and set plate.

Remove the screw and set plate.

Remove the MAP

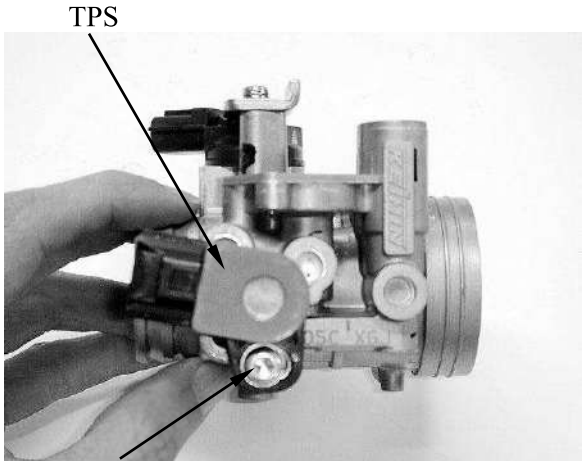
Remove the screw AND then remove the TPS.




**ASSEMBLY**

*

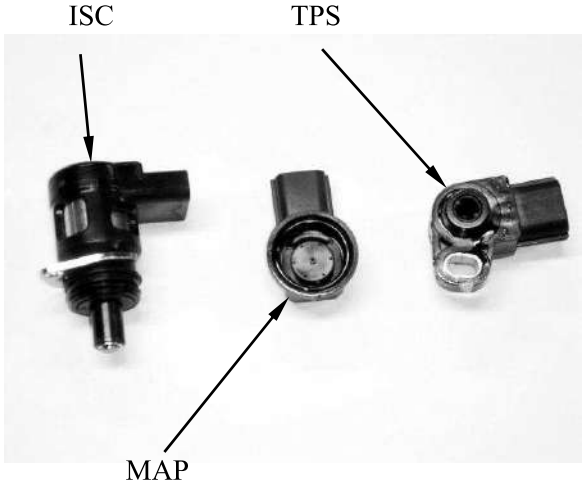
The throttle position sensor (TPS) and idle air bypass valve (ISC) have to reset when the throttle body MAP, TPS, ISC or ECU has been reinstalled.




Apply oil onto a new O-ring.

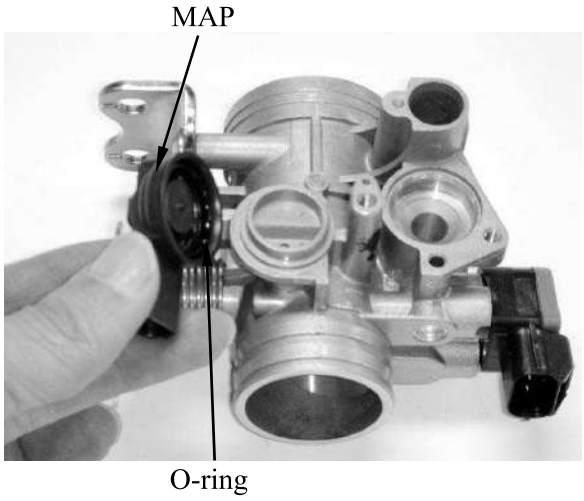
When install the TPS onto the throttle body, being careful not to damage the O-ring.

Install and tighten the screw securely.



Apply oil onto a new O-ring.

When install the MAP onto the throttle body, being careful not to damage the O-ring.

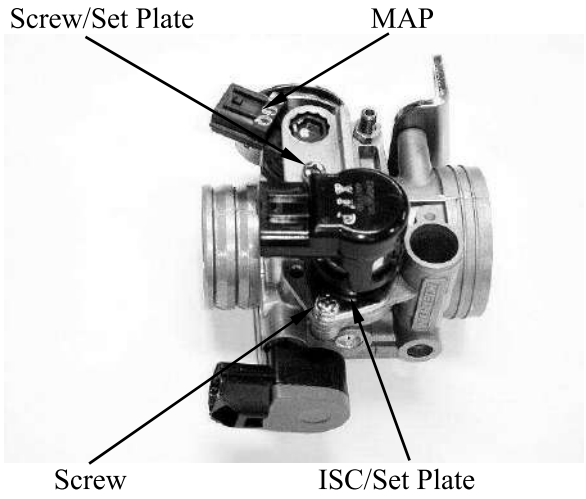



* Always replace an O-ring with a new one.

Install the set plate and tighten the screw securely.

Apply oil onto a new O-ring.

When install the ISC and set plate onto the throttle body, being careful not to damage the O-ring.




## DIAGNOSTIC TOOL CONNECTOR

### INSPECTION

Put the side stand up and engine stop switch is at "RUN".

Turn the ignition switch to "ON"

Measure the voltage between the following terminals of the diagnostic tool connector with PDA tester.

| Terminal | Normal |
|---|---|
| Black (+) – Green (-) | Battery voltage |
| White/Yellow (+) – Green (-) | Battery voltage – 1 V |

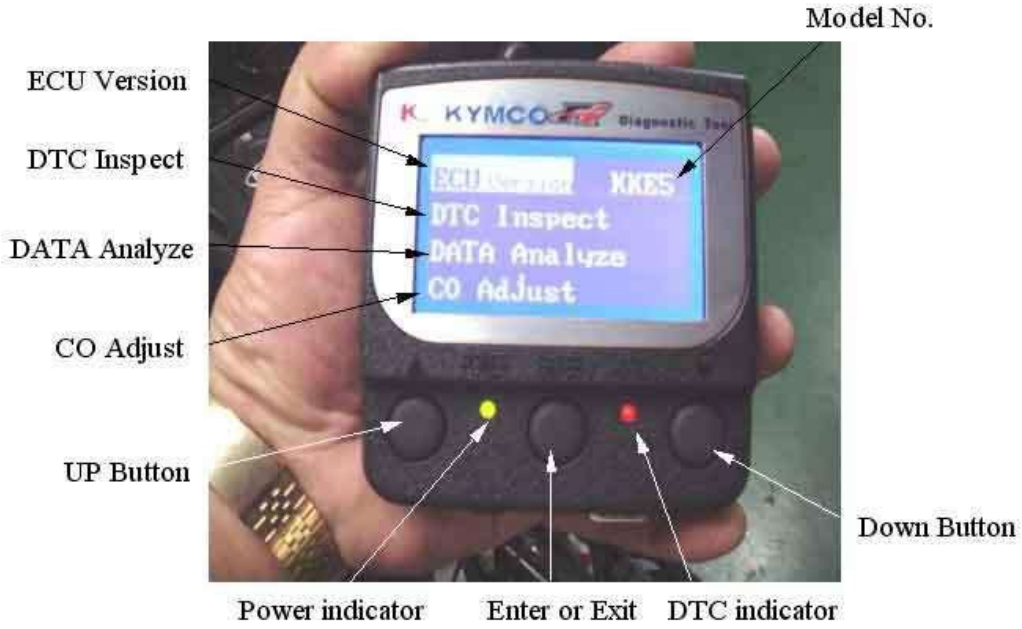
Diagnostic Connector

# FI DIAGNOSTIC TOOL OPERATION INSTRUCTIONS

# 3620A-LEB2-E00

## 一. FI DIAGNOSTIC TOOL

- This tool is developed by KYMCO and for KYMCO vehicle only.
- Please refer to the specification when serving this vehicle.
- This tool is without battery inside. The power is provided from vehicle.
- This software can be updated with computer for new model through the USB cable. The power required of tool is connected with 12V battery.
- For connection, please connect this tool with the connector of ECU. It's available when turning on the ignition switch.
- The side stand must be upward when serving the diagnostic procedure.
- The function includes ECU version, model name, data analysis and reset.
  - ECU version: includes model name, ECU number, identifications number and software version.
  - Failure codes: DTC reading, DTC clearing and troubleshooting.
  - Data analysis: For ECU's software inspection.
  - Reset: For the setting function adjustment.

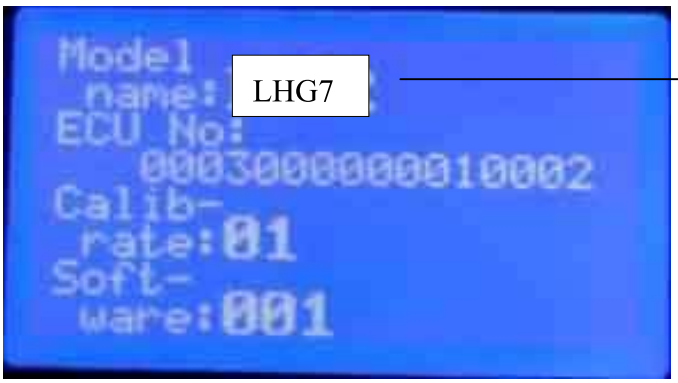


## 二. DTC INSPECTION PROCEDURE

Showing four functions on the screen when switching on power.


A). ECU version: Including of model name, ECU number, identifications number and software version.

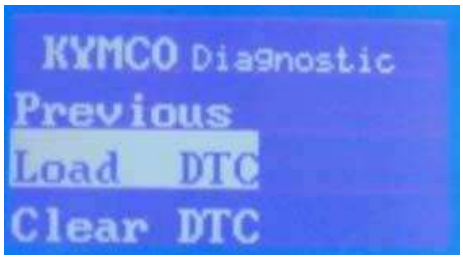
Press the " Enter " button



B). Press the " Down " button and then turn to the first page.


C). Press the " Enter " button to check the DTC failure code

D). Press the " Enter " button

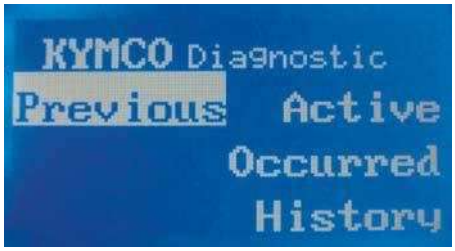



E). Press the " Enter " button

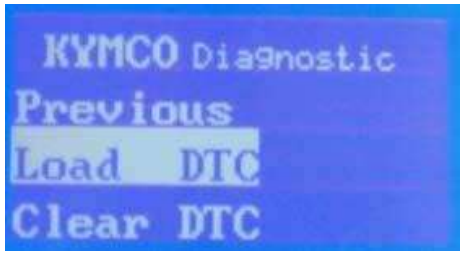

F). Display what's DTC number on this DTC-List.
Press the " Enter " button and then turn to the previous page

G). Press the " UP " button

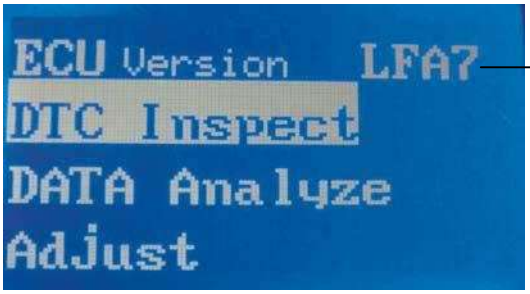

H). Press the " Enter " button and then turn to the previous page with red color.




I). Press the " UP " button



J). Press the " Enter " button and then turn to the first page.




LHG7 is for
G-Dink 300i


LHG7 is for
G-Dink 300i

## 3. DTC CLEAR PROCEDURE

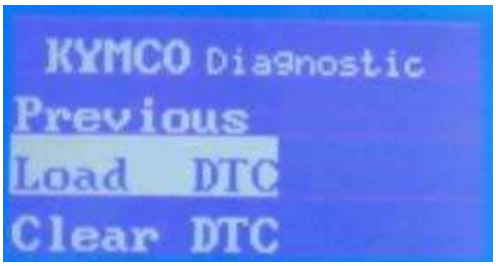
A). Check the DTC


LHG7 is for
G-Dink 300i

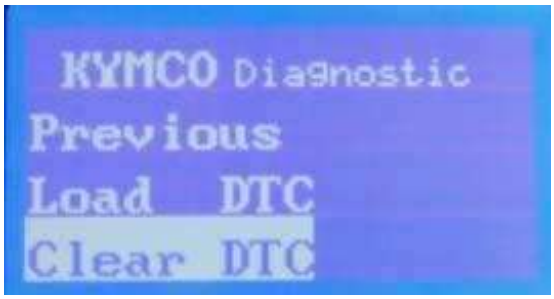
B). Press the " Enter " button


LHG7 is for
G-Dink 300i

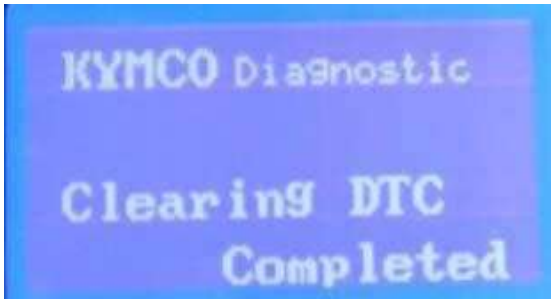
C). Choose " Load DTC "
Press the " Down " button



**D**). Press the " Enter " button and the indicator is lighting.




**E**). Clearing DTC completed if the indicator is off.




## 4. DATA ANALYSIS PROCEDURE

A). Press the " Down " twice


LHG7 is for
G-Dink 300i

B). Choose " Data Analyze"
Press the " Enter " button to enter page 01

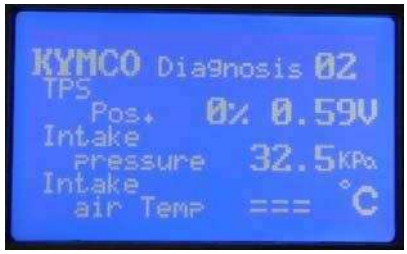

LHG7 is for
G-Dink 300i

C). Down-page 01
The measure figures including of Engine speed, Battery voltage and DTC number.
Press the " Down " button to enter page 02.

**D).** Down-page 02

The measure figures including of TPS position, Intake pressure and Intake air temperature.

Press the " Down" button to enter page 03.




**E).** Down-page 03

The measure figures including of Atmosphere pressure, Fuel Injector interval and Ignition advance timing.

Press the " Down" button to enter page 04.


**F).** Down-page 04

The measure figures including of Engine temperature, O2 sensor voltage and O2 heater activation.

Press the " Down" button to enter page 05.

**G).** Down-page 05

The measure figures including of ISC target, ISC step and ISC learn step.

Press the " Down" button to enter page 06.


**H).** Down-page 06

The measure figures including of ISC motor state.

Press the " Down" button to enter page 07.


**I).** Down-page 07

The measure figures including of Cut Out voltage.


**J).** Press the " UP " to the previous page.

## 5. Vehicle can not be started – Handling method (Steps)

**Preliminary Checking: 6 basic inspection**

1. Is the battery with voltage (12 V or higher)
2. Key-On and listen for any action with Fuel Pump / Fuel Pump Relay (It will turn off automatically in 5-10 seconds)
3. Key-On to check for any failure lamp light up on dashboard.
4. Is the Idle screw of Throttle Valve being changed or loose?
5. Has the vehicle under regular service? Is the gas station a good one?
6. Is the spark plug the correct model of specified by the vehicle builder?

**Vehicle can not be started?**

Check for any Failure code. (Failure Lamp on / How to tell the Failure code?

Turn on power to see if the engine inspection / failure lamp off?

If it flashes continuously or light up for long time, the vehicle is at failure -→ read the Failure Code?

**Methods:**

1. Reading DTC from speedometer, if PDA or diagnosis tool is not available.
2. Reading DTC from Diagnosis tool, if it is available.

## 6. Manual Trouble Shooting Procedure

**How to read DTC from speedometer?**

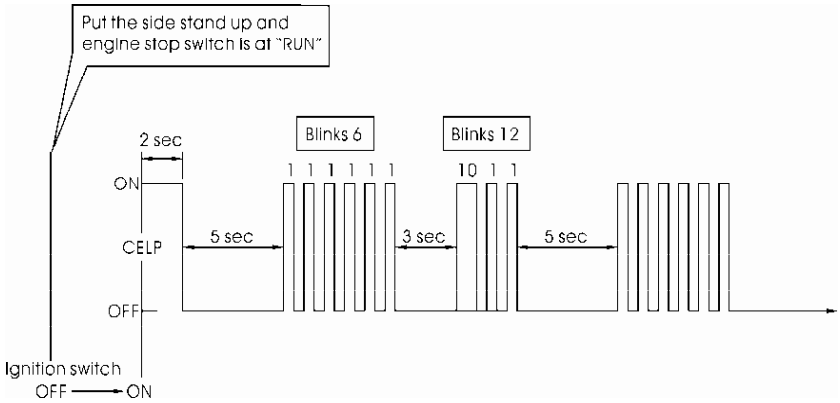
New Phase 5 Fuel Injection Engine Vehicle DTC Reading:

Automatic indication – ECU upgrade version (with Oxygen sensor): Reading DTC from speedometer directly.

Key On→ light off in 2 seconds. When the engine inspection lamp is light up again, it starts to deliver failure code. If no show, there is without any failure.

Note:

1. The "CELP" denotes the failure codes. When the indicator lights for 1 second it is equivalent 10 blinks. For example, a 1 second illumination and two blinks (0.5 second x 2) of the indicator equals 12 blinks. Refer to DTC 12.
2. If more than one failure occurs, the "CELP" shows the blinks in the occurred order. For example, if the indicator blinks 6 times, then shows one second illumination and two blinks, two failures have occurred. Refer to DTC 6 and DTC 12.




**After excluding trouble, how the DTC can be cleared? Confirm the failure is excluded.**

- Turn on power but maintain not stated and keep the engine inspection lamp light up for 4 cycles. If it is off automatically, it means the historical DTC is cleared automatically.
- Use PDA or diagnosis tool: clear Historical Failure code
- Check again to confirm DTC is excluded.
  Turn on power again. When there is no residual historical failure cod.
  Start the engine and if no failure lamp is on or flashing, it is Okay.

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# HANDLEBAR/FRONT WHEEL/FRONT BRAKE/ FRONT SHOCK ABSORBER/STEERING STEM

## SERVICE INFORMATION

### GENERAL INSTRUCTIONS

- Remove the motorcycle frame covers before removing the front wheel, steering handlebar, front shock absorber and front fork. Jack the motorcycle front wheel off the ground and be careful to prevent the motorcycle from falling down.
- During servicing, keep oil or grease off the brake pads and brake disk.

### TORQUE VALUES

| | |
|---|---|
| Handlebar post | 6.0~7.0 kgf-m |
| Steering stem lock nut | 6.0~6.5 kgf-m |
| Front axle | 1.5~2.5 kgf-m |
| Brake caliper mounting bolt | 3~4 kgf-m |
| Brake caliper bleed screw | 0.4~0.7 kgf-m |

## TROUBLESHOOTING

**Hard steering (heavy)**
- Excessively tightened steering stem top cone race
- Broken steering balls
- Insufficient tire pressure

**Steers to one side or does not track straight**
- Uneven front shock absorbers
- Bent front fork
- Bent front axle or uneven tire

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

**Front wheel wobbling**
- Bent rim
- Loose front axle
- Bent spoke plate
- Faulty tire
- Improperly tightened axle nut

**Soft front shock absorber**
- Weak shock springs
- Insufficient damper oil

**Front shock absorber noise**
- Slider bending
- Loose fork fasteners
- Lack of lubrication

## HANDLEBAR

### REMOVAL

Remove the lower handlebar cover and front cover.

Remove two bolts and disconnect the brake light switch wire, then remove the rear brake master cylinder.

Remove the two bolts and disconnect the brake light switch wire, then remove the front brake master cylinder.

Remove the inner cover.

Remove the handlebar lock nut and take out the bolt.
Remove the handlebar.

### INSTALLATION

Install the handlebar onto the steering stem and install the handlebar, lock nut and bolt.
Tighten the bolt to the specified torque.

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

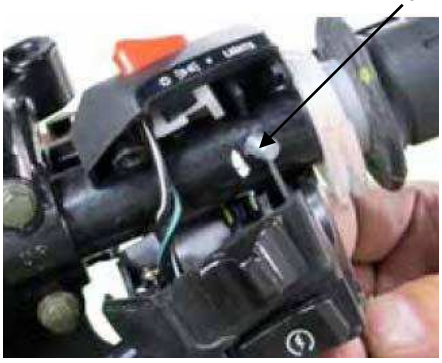
Install the front and rear master cylinders and connect the brake light switch wires.

**DISASSEMBLY**

Remove two screws attaching to the right handlebar switch.

Throttle cable

Disconnect the throttle cable from the throttle grip.
Remove the right handlebar switch.



Remove two screws and then remove the left handlebar switch.

**ASSEMBLY**

Install the left handlebar switch.

* Align the pin on the left handlebar switch with the hole on the handlebar.

Install and tighten the two screws securely.

Install the right handlebar switch.

* Align the pin on the right handlebar switch with the hole on the handlebar.

Lubricate the throttle grip front end with grease and then connect the throttle cable to the throttle grip.

Install and tighten the two screws.

## FRONT WHEEL

### REMOVAL

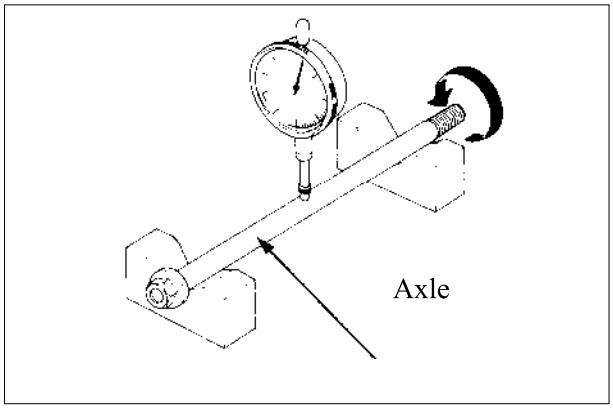
Jack the scooter front wheel off the ground.
Remove the bolt and then pull out the axle.
Remove the front wheel and collar.

### AXLE RUNOUT INSPECTION

Set the axle in V blocks and measure the runout using a dial gauge.

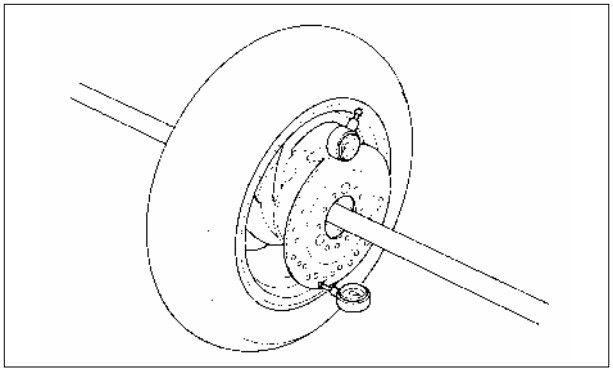
The actual runout is 1/2 of the total indicator reading.

**Service Limit**: 0.2 mm (0.008 in)




### WHEEL RIM INSPECTION

Check the wheel rim runout.



**INSTALLATION**

Apply grease to the collar, then install the collar onto the wheel.


**DISASSEMBLY**

Remove the side collar and dust seal.

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

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

Bearing

Remove the front wheel bearing.

Remove the distance collar from wheel.

## FRONT BRAKE FLUID

### FLUID REPLACEMENT/AIR BLEEDING

*
- A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.
- Do not allow foreign material to enter the system when filling the reservoir.
- Avoid spilling brake fluid on painted, plastic or rubber parts. Place a rag over these parts whenever the system is serviced.

### BRAKE FLUID DRAINING

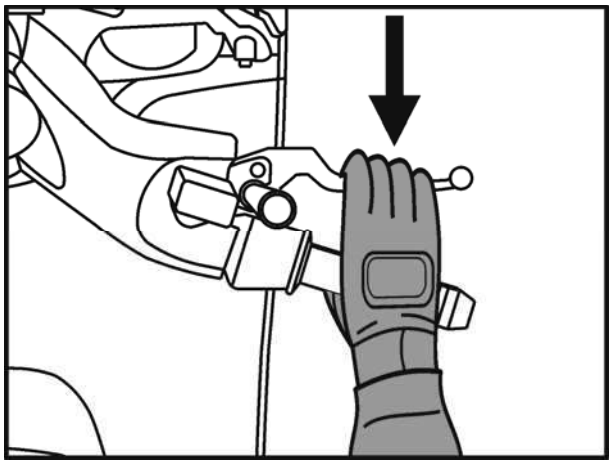
Make sure that the master cylinder parallel to the ground before removing the reservoir cover.

Remove two screws.

Remove the reservoir cover, diaphragm plate and diaphragm.

Connect a bleed hose to the bleed valve.

Loosen the bleed valve and apply the brake lever.
Stop operating the brake when no more fluid flows out of the bleed valve.



**BRAKE FLUID FILLING/AIR BLEEDING**

* Do not mix different types of fluid since they are not compatible.

Fill the master cylinder with DOT 4 to the upper level.

Connect a commercially available brake bleeder to the front caliper bleed valve.

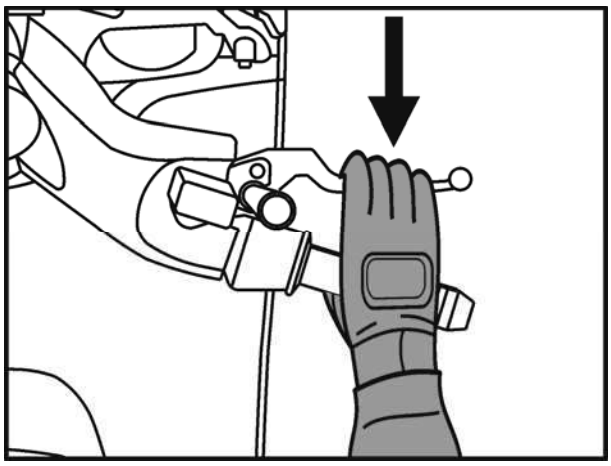
Check the fluid level often while bleeding the brake to prevent air from being pumped into the system.

Pump the brake bleeder and loosen the front caliper bleed valve. Add fluid when the fluid level in the master cylinder is low to prevent drawing air into the system.

Repeat the above procedures until no air bubbles appear in the plastic hose.

Close the front caliper bleeding valve and operate the front brake lever.
If it's still spongy, bleeding the system again.

If the brake bleeder is not available, perform the following procedure.



Pump up the system pressure with the brake lever until these are not air bubbles in the fluid flowing out of the reservoir small hole and lever resistance is felt.

1. Pump the brake lever several times, then squeeze the brake lever all the way and loosen the bleed valve 1/4 turn. Wait several seconds and close the bleed valve.

* Do not release the brake lever until the bleed valve has been closed.

2. Release the brake lever slowly until the bleed valve has been closed. Add fluid when the fluid level in the master cylinder is low to prevent drawing air into the system.

3. Repeat the steps 1 - 2 until there are no air bubbles in the bleed hose.

After bleeding air completely, tighten the bleed valve to the specified torque.

**Torque:** 6 N-m (0.6 kgf-m, 4.3 lbf-ft)

Fill the reservoir to the casting ledge with DOT 4 to the upper level.

Install the diaphragm, set plate and reservoir cover and tighten the screws to the specified torque.

**Torque:** 2 N-m (0.2 kgf-m, 1.1 lbf-ft)

## FRONT BRAKE PAD

### BRAKE PAD REPLACEMENT

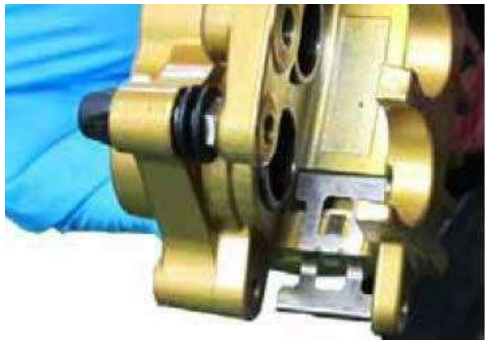
Remove the caliper mounting bolts, then remove the caliper.

Brake Pads

Remove the brake pads.

* Always replace the brake pads in pairs to ensure even disc pressure.

Install new pads so that their ends rest on the pad retainer on the brake properly.



Install the front caliper onto the fork leg and then install and tighten the new two caliper mounting bolts to the specified torque.

**Torque:** 35 N-m (3.5 kgf-m)

Tighten the pad pins to the specified torque.

**Torque:** 18 N-m (1.8 kgf-m, 13 lbf-ft)

## BRAKE DISC INSPECTION

| ITEM | | STANDARD | SERVICE LIMIT |
|---|---|---|---|
| Brake disc thickness | Front | 5±0.1mm (0.2±0.004in) | 4.0mm (0.16in) |
| | Rear | 4±0.2mm (0.16±0.004in) | 3.5mm (0.14in) |

## FRONT SHOCK ABSORBER

### REMOVAL

Remove the front cover and front fender.
Remove the front brake caliper
Remove the front wheel
Remove the speed wheel sensor bolt and then remove the brake hose guide from right front shock absorber.
Remove two mounting bolts and then remove the right/left front shock absorber.

### INSTALLATION

Installation is in the reverse order of removal.

* Tighten the shock absorber mounting bolt to the specified torque.

  **Torque: 2.7** kgf-m (27 N-m, 19.5 lbf-ft)

### INSPECTION

Inspect the following items and replace if necessary.

- Front shock absorber tube bending, damage or wear
- Weak front shock absorber spring
- Damper and damper rod bending
- Oil seal damage or wear

## STEERING STEM

### REMOVAL

Remove the steering handlebar.
Remove the front brake hose and speed wheel sensor connector from the guide.

Hold the steering stem top cone race and remove the steering stem lock nut by using the special tool.

**Special tool:**

Lock nut wrench F00002

Lock Nut Wrench

Remove the top cone race and washer.
Remove the steering stem.

Inspect the ball races, cone races and steel balls for wear or damage. Replace if necessary.

Remove the top balls.

Remove the upper ball race by using a chisel if necessary.

Ball

Top Ball Cone Race

Remove the bottom balls.

Remove the bottom ball race.

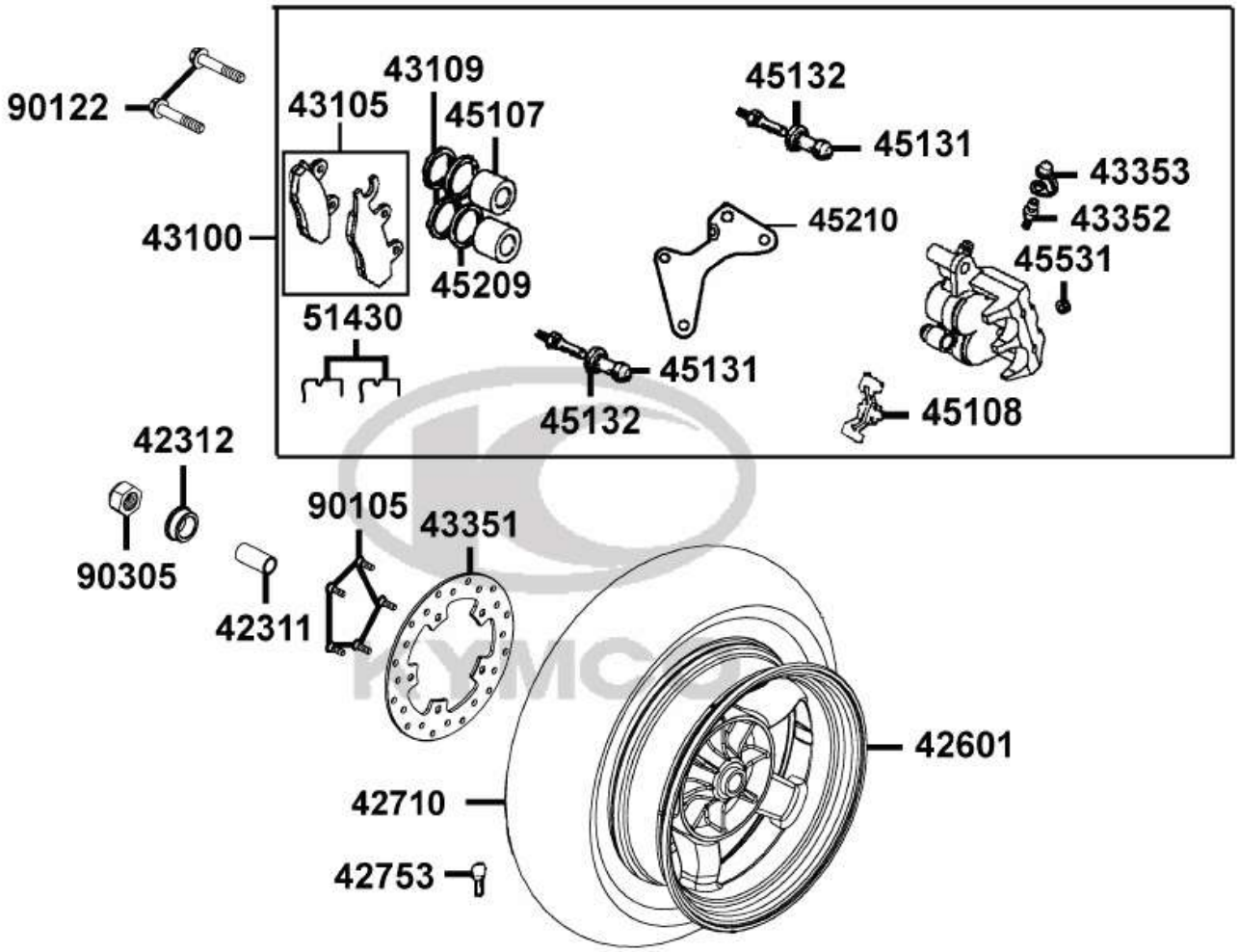
Remove the bottom cone race by using a chisel if necessary.

* Be careful not to damage the steering stem.

Install with reverse operation.

## REAR BRAKE/REAR FORK/REAR WHEEL/ REAR SHOCK ABSORBER

**SCHEMATIC DRAWING**



## SERVICE INFORMATION

### GENERAL INSTRUCTIONS

- When performing the services stated in this section, the engine and exhaust muffler must be cold to avoid scalding.
- During servicing, keep oil or grease off the brake pads and brake disk.

### SPECIFICATIONS

| Item | Standard (mm) | Service Limit (mm) |
|---|---|---|
| Rear wheel rim runout | — | |
| Rear brake disk thickness | 4.0 | |
| Rear brake disk runout | — | |

### TORQUE VALUES

| | |
|---|---|
| Exhaust muffler pipe nuts | 1.8~2.2 kgf-m |
| Exhaust muffler brake /RR Frok | 3.2~3.8 kgf-m |
| RR fork/Engine case | 2.4~3.0 kgf-m |

### TROUBLESHOOTING

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

**Soft rear shock absorber**
- Weak shock absorber spring
- Damper oil leaks

**Rear wheel noise**
- Worn rear wheel axle bearings
- Worn rear fork bearings
- Deformed rear fork

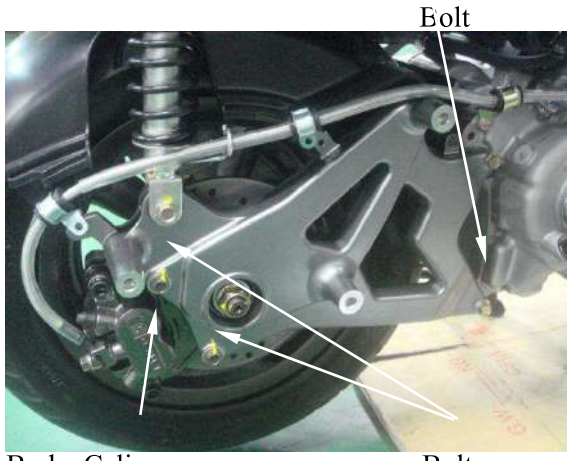
**Poor brake performance**
- Air in brake system
- Deteriorated brake fluid
- Contaminated brake pad surface
- Worn brake pads
- Clogged brake fluid line
- Deformed brake disk
- Unequal worn brake caliper

## REAR BRAKE

### REAR BRAKE CALIPER REMOVAL

First remove the exhaust muffler.
Remove the rear brake fluid tube bolt and disconnect the brake fluid tube.
Remove two bolts attaching the rear brake caliper.
Remove the rear brake caliper.

* When removing the brake fluid tube, use shop towels to cover plastic parts and coated surfaces to avoid damage.




### INSPECTION

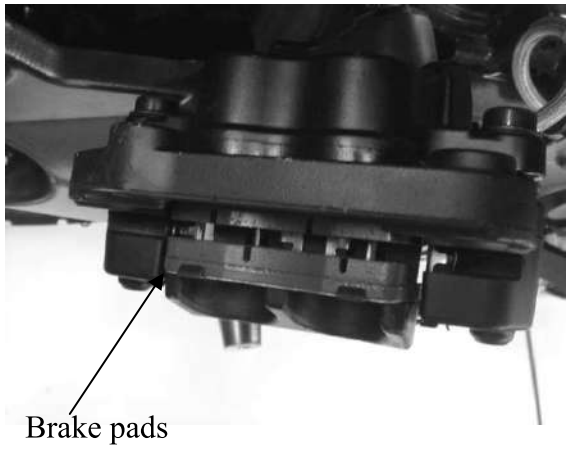
Inspect the brake pads and brake disk.

Measure the brake disk thickness.

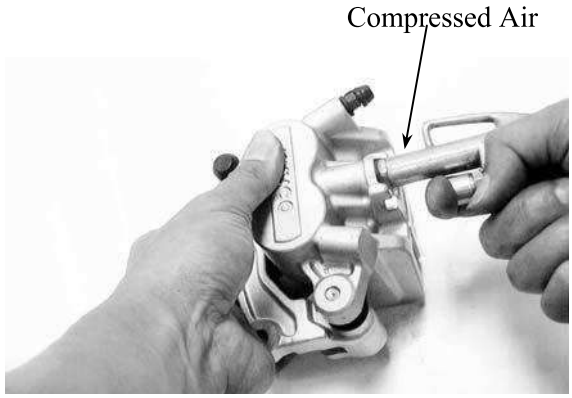
Visually check the brake pad thickness


### DISASSEMBLY

Remove two brake pads dowel pins and three bolts from the brake caliper.
Remove the brake pads.



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 towel under the caliper to avoid contamination caused by the removed piston.
Check the piston cylinder for scratches or wear and replace if necessary.

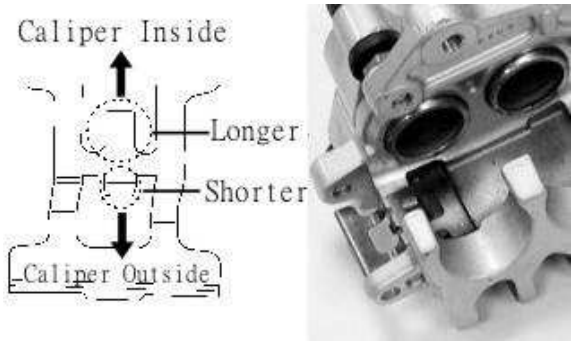



Check the caliper cylinder for scratches or wear and measure the cylinder bore.

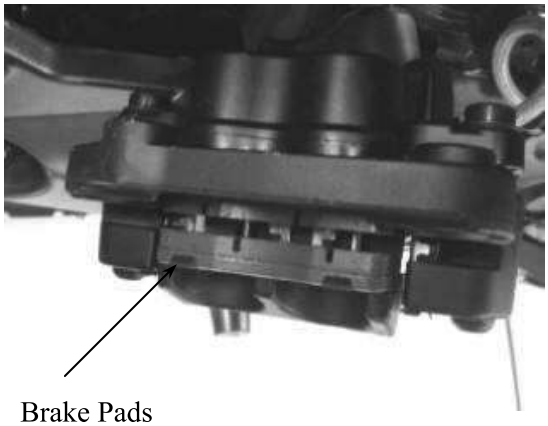
**ASSEMBLY**

Install the two spring plates onto the groove of the caliper.

* Make sure the spring plate next to the brake pad dowel pin orientation.

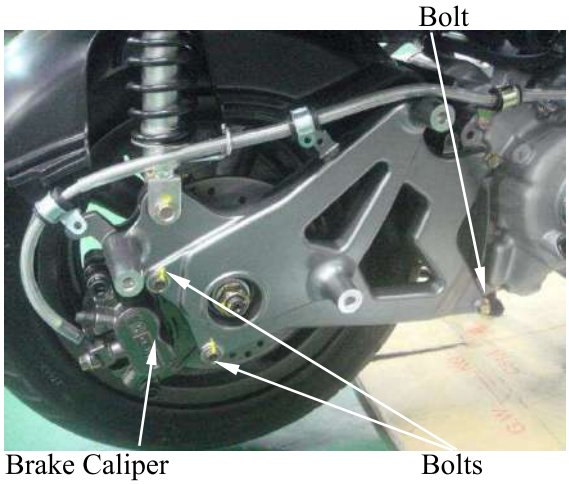



Install two brake pads.




**INSTALLATION**

Install the brake caliper to the rear fork and tighten the two bolts.




Connect the brake fluid tube to the brake caliper and install fluid tube bolt, copper washers and tighten the fluid tube bolt.

Fill the brake reservoir with the specified brake fluid and bleed air from the brake system.

* When installing the brake fluid tube, be sure to install the two copper sealing washers.

## REAR FORK

### REMOVAL

Remove the exhaust muffler.

Remove the rear brake caliper.

Bear Axle Nut

Bolt

Remove the right rear shock absorber lower mount bolt.

Remove the rear axle nut and remove the collar.

Remove the rear fork.

The installation sequence is the reverse of removal.

Bear Axle Collar

## REAR WHEEL

### REMOVAL

Remove the exhaust muffler.
Remove the rear brake caliper.
Remove the rear fork.
Remove the rear axle collar.
Remove the rear wheel.

Bear Axle Collar

### INSTALLATION

The installation sequence is the reverse of removal.

**Torque:**
Rear shock absorber lower mount bolt:
40 N-m (4 kgf-m)
Rear axle nut 120 N-m (12 kgf-m)

Bear Axle Collar Bolts

## REAR SHOCK ABSORBER

### REMOVAL

Remove the met-in box and carrier.
Remove the body cover, center cover and rear fender A together.
Remove the right/left rear shock absorber upper and lower mount bolts.
Remove the right and left rear shock absorbers.

### INSTALLATION

Install the rear suspension in the reverse order of removal.

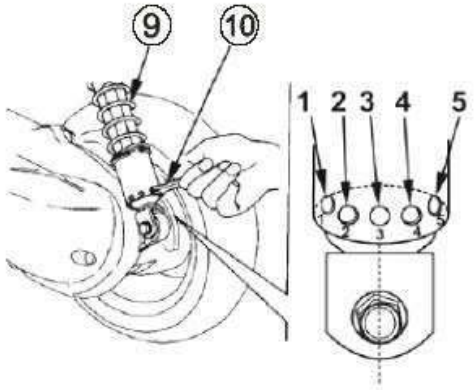
**Torque:**
Upper Mount Bolt: 40 N-m (4 kgf-m)
Lower Mount Bolt: 40 N-m (4 kgf-m)

Bolts

## Suspension

Each shock absorber ⑨ on your scooter has 5 spring preload adjustment positions for different load or riding conditions.

Use a pin spanner ⑩ to adjust the rear shock spring preload. Position 1 is for light loads and smooth road conditions. Position 3 to 5 increase spring preload for a stiffer rear suspension and can be used when the scooter is heavily loaded.
Be certain to adjust both shock absorbers to the same spring preload positions.




**Standard spring preload position: 3**

**⚠ CAUTION**

Always adjust the shock absorber pre-load position in sequence (1-2-3-4-5 or 5-4-3-2-1). Attempting to adjust directly from 1 to 5 or 5 to 1 may damage the shock absorber.

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# BATTERY/CHARGING SYSTEM

## CHARGING SYSTEM LAYOUT

## SERVICE INFORMATION

### GENERAL INSTRUCTIONS

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

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

### SPECIFICATIONS

| Item | | | Standard |
|---|---|---|---|
| Battery | Capacity | | 12V10AH |
| | Voltage (20℃) | Fully charged | 13.2V |
| | | Insufficient charged | < 12.3V |
| | Charging current | | 1.2A* 5~10H |

## TROUBLESHOOTING

**No power**
- Dead battery
- Disconnected battery cable
- Fuse burned out
- Faulty ignition switch

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

**Intermittent power**
- Loose battery cable connection
- Loose charging system connection
- Loose connection or short circuit in ignition system

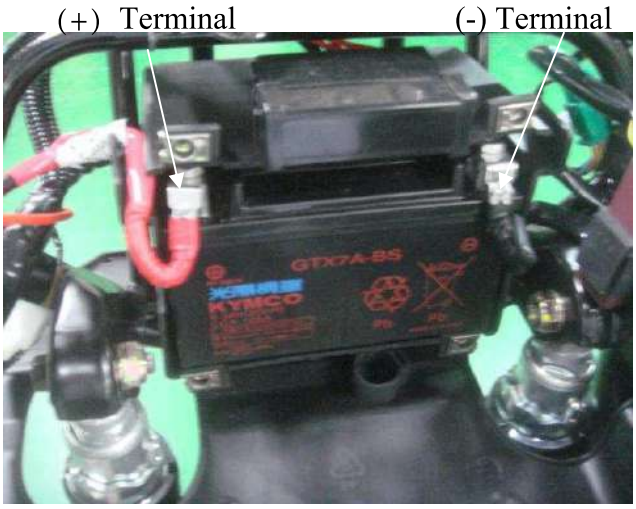
**Charging system failure**
- Loose, broken or shorted wire or connector
- Faulty regulator/rectifier
- Faulty A.C. generator

## BATTERY

### REMOVAL

The battery is in the battery box below seat.

1. Remove the seat.
2. Remove the met-in box
3. Remove four screws then the battery retainer.




4. Pull battery out to expose the terminal leads
5. Disconnect the negative (-) terminal lead from the battery first, then disconnect the positive (+) terminal lead.
6. Remove the battery from the battery box.

### BATTERY INSTALLATION

Install in the reverse order of the removal.

* When install the battery, first connect the positive (+) cable and then negative (-) cable to avoid short circuit.

### VOLTAGE INSPECTION

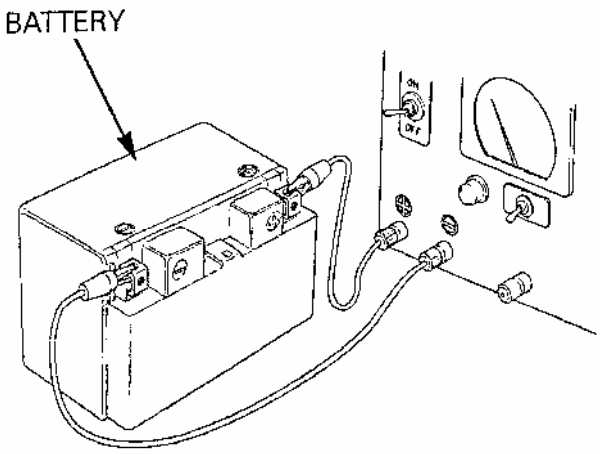
Remove the battery cover.

Measure the battery voltage by using a commercially available digital multimeter.

**Voltage (20ºC/68ºF):**

**Fully charged: 13.0 ~ 13.2 V**

**Insufficient charged: < 12.3 V**




**BATTERY CHARGING**

Remove the battery

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:**

**Standard: 1 .2A / 5~10 Hours**

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 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

Start the engine and warm it up to the operating temperature; stop the engine.

Connect the multimeter 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 multimeter when the engine runs at 5000 rpm.

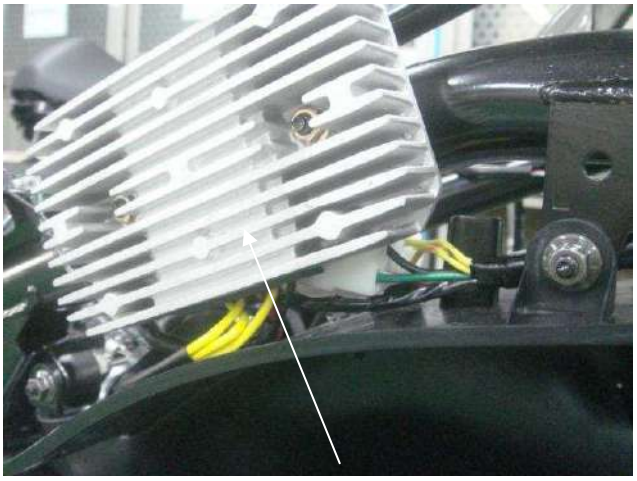
**Standard:**

Battery charging voltage 14 ~ 15V

## REGULATOR/RECTIFIER

### WIRE HARNESS INSPECTION

Remove the luggage box
Disconnect the regulator/rectifier connectors.
Check the connectors for loose contacts of corroded terminals.



Regulator/Rectifier

### BATTERY WIRE

Measure the voltage between the Red/White wire terminal and ground.
There should be battery voltage at all times.


### GROUND WIRE

Check the continuity between the Green wire terminal and ground.
There should be continuity at all times.

### CHARGING COIL WIRE

Measure the resistance between each Yellow wire terminals.

**Standard:** 0.4 ~ 0.6 Ω (20ºC/68ºF)

Disconnect the regulator/rectifier connector.

Check for continuity between each Yellow wire terminal regulator/rectifier side and ground.

There should be no continuity.


Regulator/Rectifier

### REMOVAL/INSTALLATION

Remove the side body cover.

Disconnect the regulator/rectifier connectors.

Remove the two bolts, regulator/rectifier.

Installation is in the reverse order of removal.

Connectors

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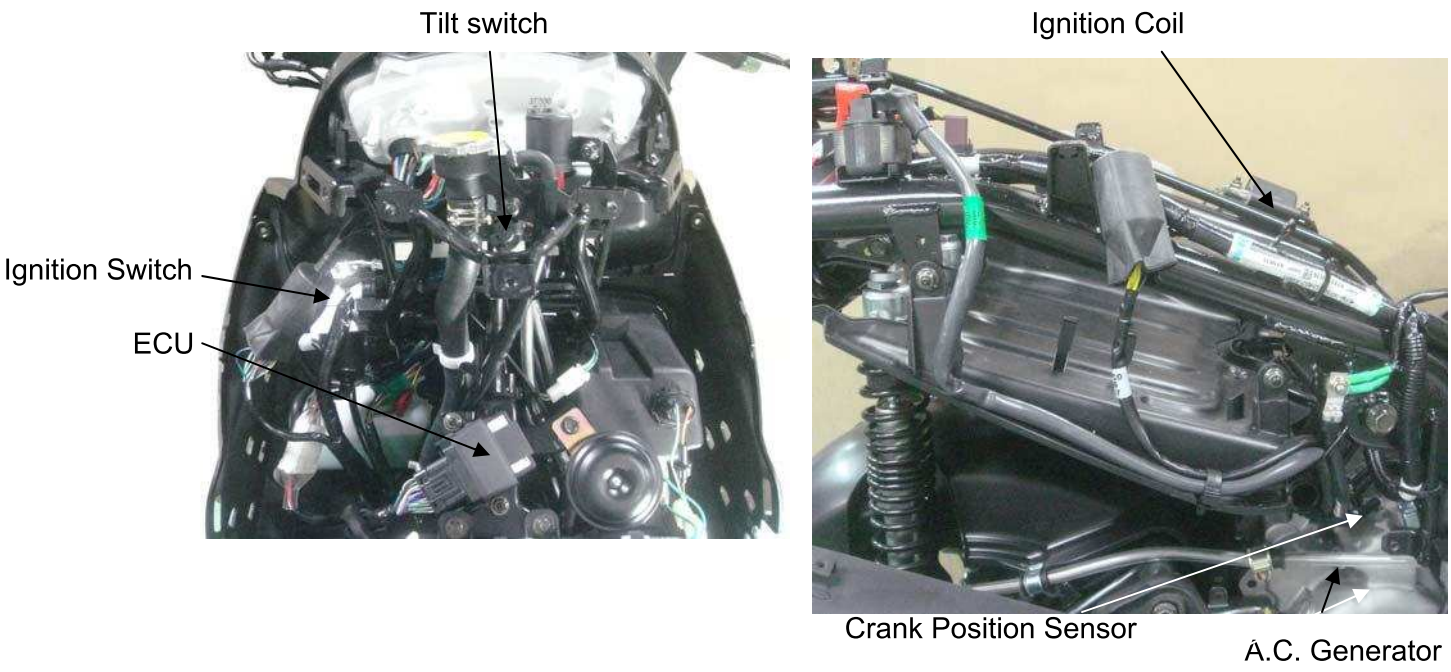
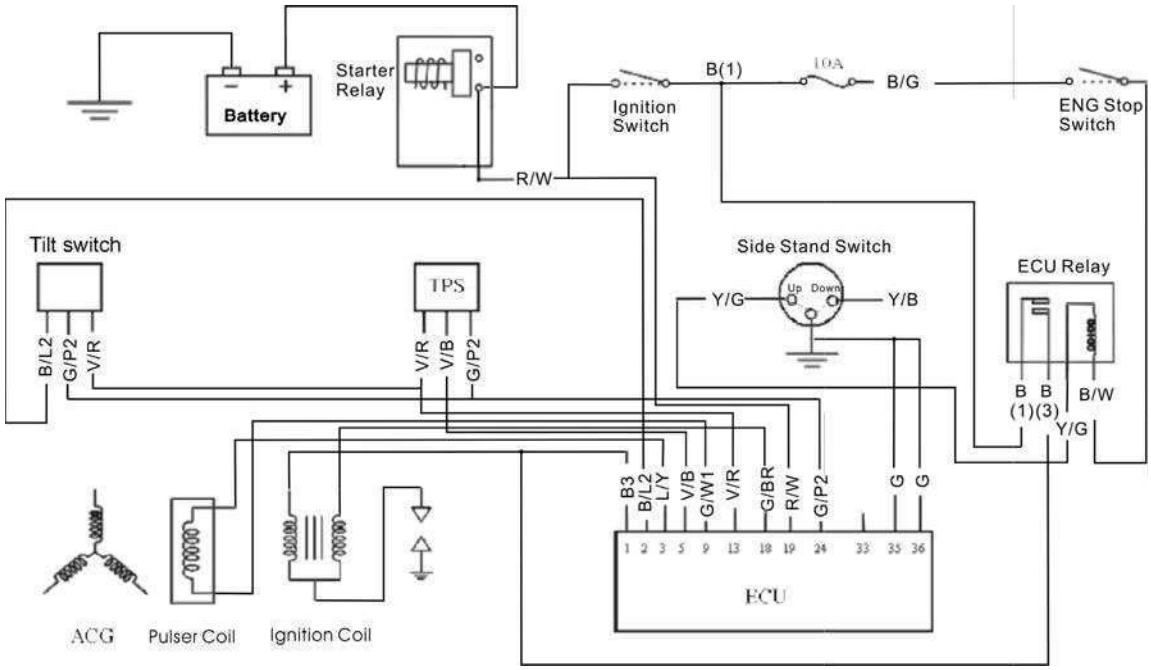
## IGNITION SYSTEM

# 17. IGNITION SYSTEM

## IGNITION SYSTEM LAYOUT




## IGNITION CIRCUIT



## 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 17-2.
- The ignition timing cannot be adjusted since the ignition control module is already adjusted in factory.
- The ignition control module or ECU maybe damaged if dropped or the connector is disconnected when the key is “ ON ” , the excessive voltage may damage the ignition control module or ECU. 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 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.

### SPECIFICATIONS

| Item | | Standard |
|---|---|---|
| Spark plug | Standard type | DPR6EA |
| Spark plug gap | | 0.6 ~ 0.7 mm |
| Inductive Ignition Coil | Primary coil | 3.57~4.83Ω |
| | Secondary coil without plug cap | 10.42~14.49 KΩ |
| Throttle Position Sensor | | 3500~6500Ω |
| Fuel Pump | | 1.9 Ω about |
| Fuel Injector | | 11.7±0.6Ω |
| Water Temperature Sensor | | 2.076KΩ±10% (25℃) |
| Oxygen Sensor ( engine warming condition ) | | 6.7Ω~9.5Ω |
| Crank Position Sensor | | 115Ω±15Ω |
| Tilt Switch | | 0.4V~1.4V(normal)<br>3.7V~4.4V (fall down) |

### TROUBLESHOOTING

#### 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 crank position sensor.
- 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.

# 17. IGNITION SYSTEM

## SPARK PLUG

For spark plug inspection and adjustment, refer to page 3-5.

## IGNITION COIL INSPECTION

Remove the seat and met-in box. (⇨2-6)
Remove the ignition coil.

Ignition Coil

## IGNITION COIL CONTINUITY TEST

Inspect the continuity of the ignition coil, primary coil and secondary coil.

* This is a general test. Accurate ignition coil test must be performed with an ignition unit tester.

Primary Coil

Secondary Coil with plug cap

Measure the ignition coil resistances at 20℃.

| | |
|---|---|
| Primary coil | 3.57~4.83Ω |
| Secondary coil with plug cap | 15 ~ 19 KΩ |
| Secondary coil without plug cap | 10 ~14 KΩ |

Secondary Coil without plug cap

## A .C. GENERATOR INSPECTION

### CRANK POSITION SENSOR INSPECTION

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

Remove the seat and met-in box.
Disconnect the Crank Position Sensor Wire Coupler.
Measure the resistance between the blue/white and green/white wire terminals.

| | |
|---|---|
| Blue/Yellow～Green/White | 115Ω±15Ω |

Crank Position Sensor Wire Coupler

## TILT SWITCH

### INSPECTION

Support the scooter level surface.
Put the side stand up and engine stop switch is at “RUN”.
Turn the ignition switch to “OFF”.
Remove the screws, washers and tilt switch.

* Do not disconnect the tilt switch connector during inspection.
The capacity of battery must be fully charged.


Place the tilt switch vertical as shown at the ignition switch “ON”. Measure the voltage as below.

| Terminal | Standard |
|---|---|
| Violet/Red (+) – Green/Pink (-) | 5 V (ECU voltage) |
| Black/Blue (+) – Green/Pink (-) | 0.4～1.4 V less |

Incline the tilt switch 65±10 degrees to the left or right at the ignition switch “ON”. Measure the voltage as below.

| Terminal | Standard |
|---|---|
| Violet/Red (+) – Green/Pink (-) | 5 V (ECU voltage) |
| Black/Blue (+) – Green/Pink (-) | 3.7～4.4 V |

If repeat this test, first turn the ignition switch to “OFF”, then turn the ignition switch to “ON”.

Tilt Switch Connector

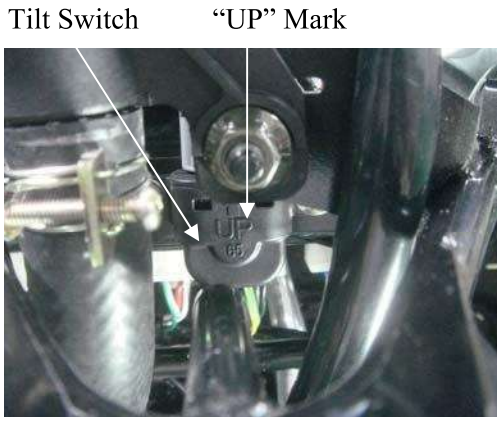
**REMOVAL/INSTALLATION**

Disconnect the connector and remove two screws, then remove tilt switch.

Installation is in the reverse order of removal.

* Install the tilt switch with its “up” mark facing up.

Tighten the mounting screws securely.

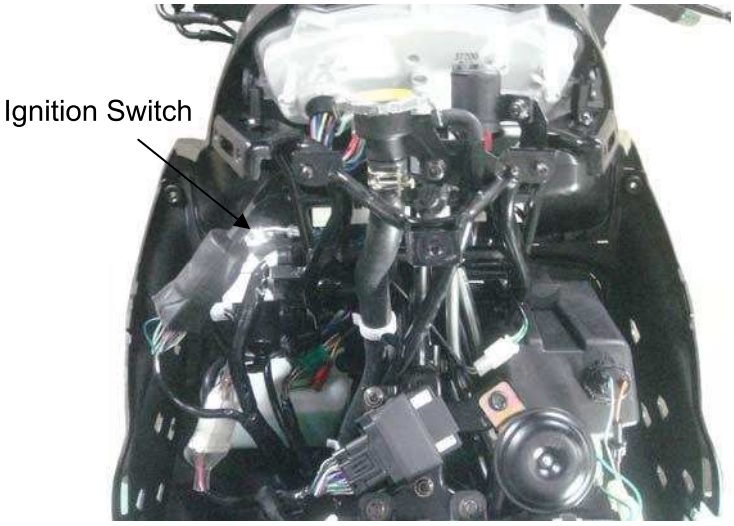


18

## STARTING SYSTEM

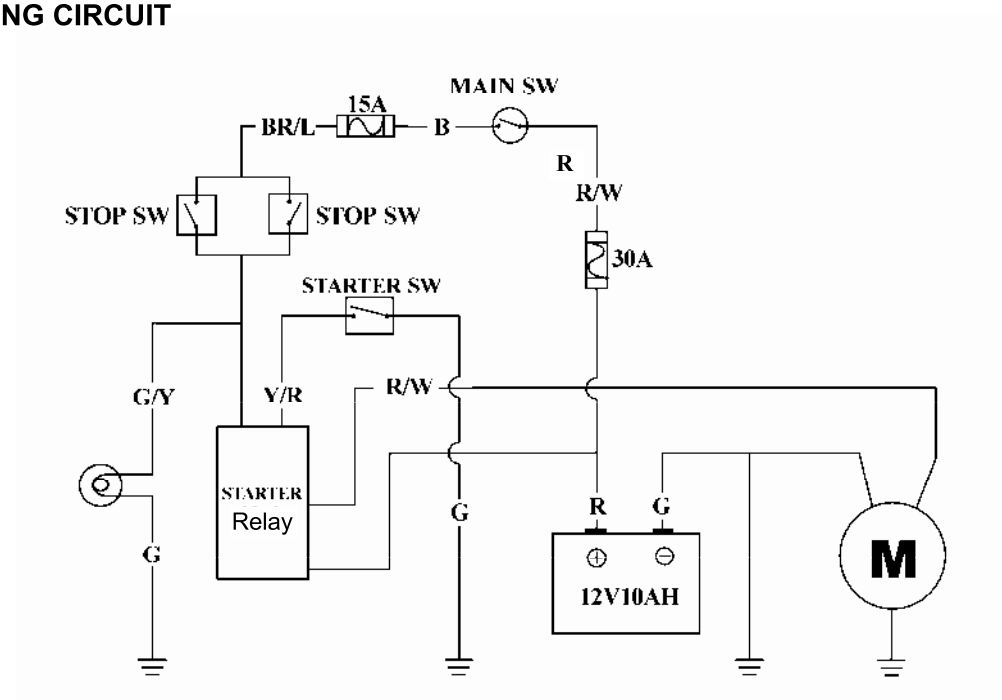
# 18. STARTING SYSTEM

## STARTING SYSTEM LAYOUT





## STARTING CIRCUIT



## SERVICE INFORMATION

### GENERAL INSTRUCTIONS

- The removal of starter motor can be accomplished with the engine installed.
- After the starter clutch is installed, be sure to add the engine oil and coolant and then bleed air from the cooling system.

### SPECIFICATIONS

| Item | Standard (mm) | Service Limit (mm) |
|---|---|---|
| Starter motor brush length | 12.5mm | 8.5mm |

### SPECIAL TOOLS

| | |
|---|---|
| Flywheel holder | E021 |
| Flywheel puller | E003 |

### TROUBLESHOOTING

**Starter motor won‘t turn**

- Fuse burned out
- Weak battery
- Faulty ignition switch
- Faulty starter clutch
- Faulty front or rear stop switch
- Faulty starter relay
- Poorly connected, broken or shorted wire
- Faulty starter motor

**Lack of power**

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

**Starter motor rotates but engine does not start**

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

**STARTER MOTOR**

**REMOVAL**

* Before removing the starter motor, turn the ignition switch OFF and remove the battery ground. Then, turn on the ignition switch and push the starter button to make sure the starter motor can't operate securely.

Remove the seat, met-in box and carrier.
Remove the body cover, center cover and rear fender A together.
Remove the nut goes to the starter relay and relax cable band to disconnect the starter motor cable.

Remove two start motor mounting bolts and the motor.


# 18. STARTING SYSTEM

Starter Motor Cable

**INSTALLATION**

Connect the starter motor cable.

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

Apply grease to the O-ring and install it to the starter motor.

Tighten the two mounting bolts.

**STARTER RELAY INSPECTION**

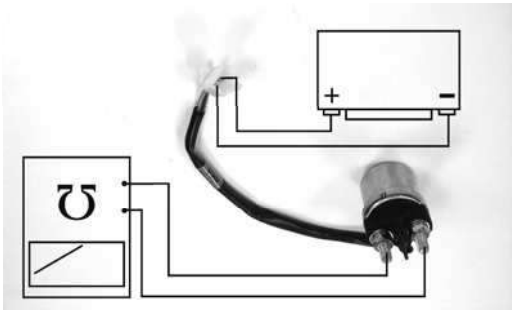
Disconnect the starter relay wire connector.

Check for continuity between the yellow/red wire and green/yellow wire.

There should be continuity when the starter button is depressed.

If there is no continuity, check the starter button for continuity and inspect the wire.

**OPERATION TEST**




Starter Relay test chart

Connect the electric meter to the starter relay terminals that connect to the battery positive cable and the starter motor cable.

Connect a fully charged battery across the starter relay yellow/red and green/yellow wire terminals.

Check for continuity between the starter relay large terminals. The relay is normal if there is continuity and hear sounds.

# LIGHTS/METERS/SWITCHES

19

## SERVICE INFORMATION

### GENERAL

* A halogen head light bulb becomes very hot while the head light is on, and remains for a while after it is turned off. Be sure to let it cool down before servicing.

- Note the following when replacing the halogen headlight bulb
  - ™ Wear clean gloves while replacing the bulb. Do not put finger prints on the headlight bulb, as they may create hot spots on the bulb and cause it to fail.
  - ™ If you touch the bulb with your bare hands, clean it with a cloth moistened with alcohol to prevent its early failure.
  - ™ Be sure to install the dust cover after replacing the bulb.

- Check the battery condition before performing any inspection that requires proper battery voltage.
- A continuity test can be made with the switches installed on the scooter.
- Route the wires and cables properly after servicing each component.

### TROUBLESHOOTING

**Lights do not come on when ignition switch is "ON"**
- Burned bulb
- Faulty switch
- Poorly connected, broken or shorted wire

**Temperature gauge does not register correctly**
- Faulty temperature gauge
- Faulty thermosensor
- Broken or shorted wire between the temperature gauge and thermosensor

**Fuel gauge does not work or wrong show figures**
- Faulty fuel gauge
- Faulty fuel unit
- Poorly connected wire between fuel gauge and fuel unit
- Fuse burned out

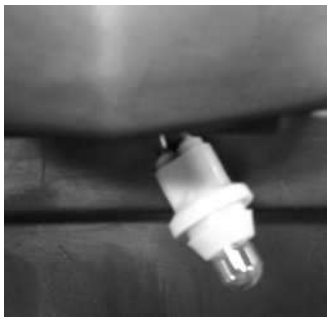
### SPECIFICATIONS

| | |
|---|---|
| Fuse | 10A,15A,30A |
| Headlight bulb | 12V 60W/55W |
| Turn signal light bulb | 12V 21W(Front) / 10W(Rear) |
| Stoplight/taillight | 12V 21/5W |

## BULB REPLACEMENT

### LICENECE LIGHT

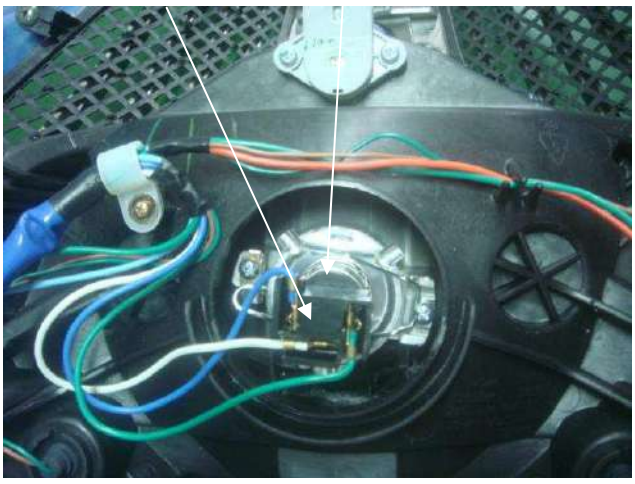
Remove the seat assembly and luggage box.
Remove the body covers.
Disconnect the license bulb socket.
Remove the bulb and replace with a new one.



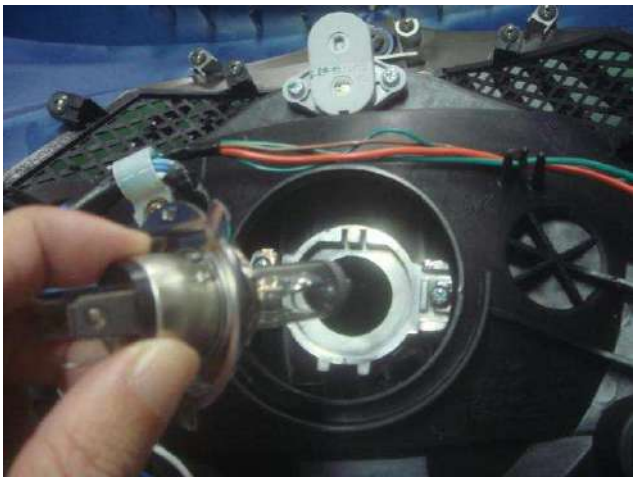
## HEADLIGHT

* A halogen headlight bulb becomes hot while the headlight is ON and remains for a while after it is turned OFF. Be sure to let it cool down before servicing.

Remove the front cover
Disconnect the headlight cover
Disconnect the headlight connector from the headlight bulb.

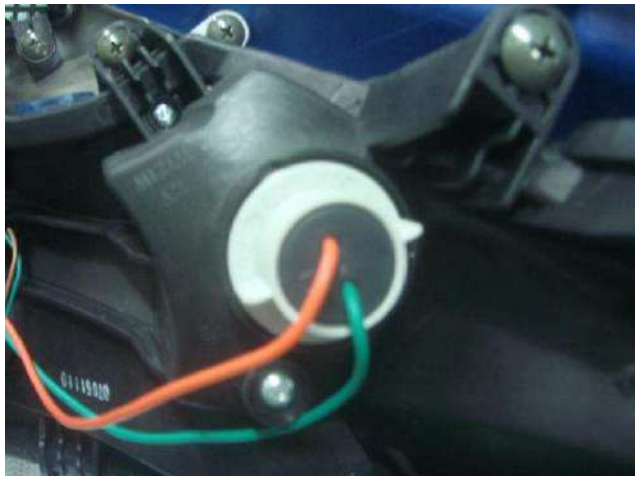



Install a new bulb into the headlight case.
Install the headlight and connect the headlight connector



**FRONT TURN SIGNAL LIGHT**

Remove the front cover.
Turn the bulb socket, then remove the front turn signal light.

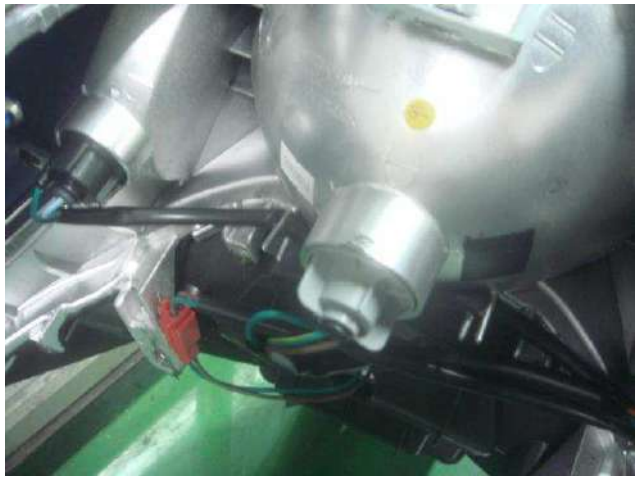


Push and turn the bulb counterclockwise to remove it, then replace with a new one.

Installation is in the reverse order of removal.

**TAILLIGHT/BRAKE LIGHT/REAR TURN SIGNAL LIGHT**

Remove the seat and met-in, then remove the taillight bulb socket.



**REAR TURN SIGNAL LIGHT**

Push and turn the bulb counterclockwise to remove it, then replace with a new one.

Installation is in the reverse order of removal.

Rear Turn Signal Light

Taillight/Brake Light

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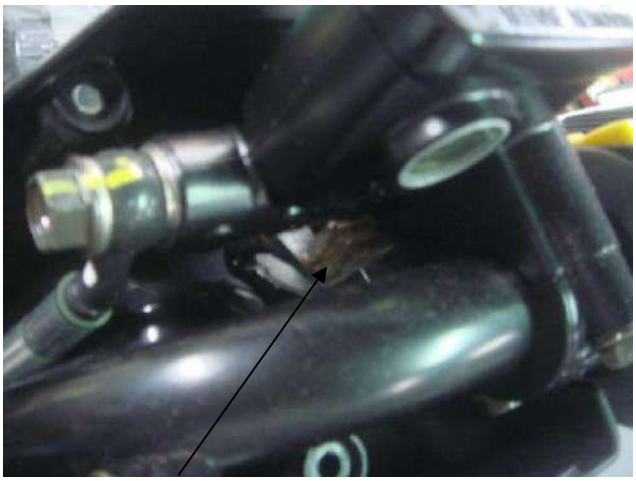
## BRAKE LIGHT SWITCH

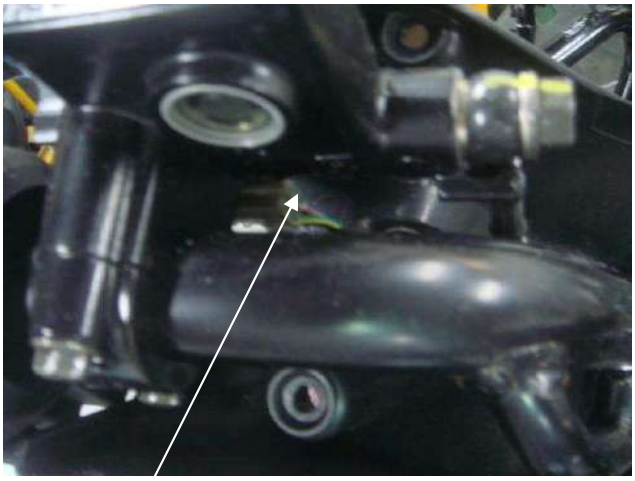
Remove the upper handlebar cover.

Disconnect front or rear brake light switch connectors and check for continuity between the switch terminals.

There should be continuity with the front or rear brake lever squeezed, and there should be no continuity with the front or rear brake lever is released.



Front Brake Light Switch



Rear Brake Light Switch

## IGNITION SWITCH

### INSPECTION

Remove the front cover.

Disconnect the ignition switch connector and check the ignition switch for continuity at the switch side connector terminals.

Continuity should exist between the color code wires as follows:

COMB SW

| | BAT2 | IG | E | BAT1 | HA |
|---|---|---|---|---|---|
| LOCK | | ○—○ | | | |
| OFF | | ○—○ | | ○—○ | |
| ON | ○ | | | ○—○ | |
| COLOR | B | B/W | G | R | B/L |

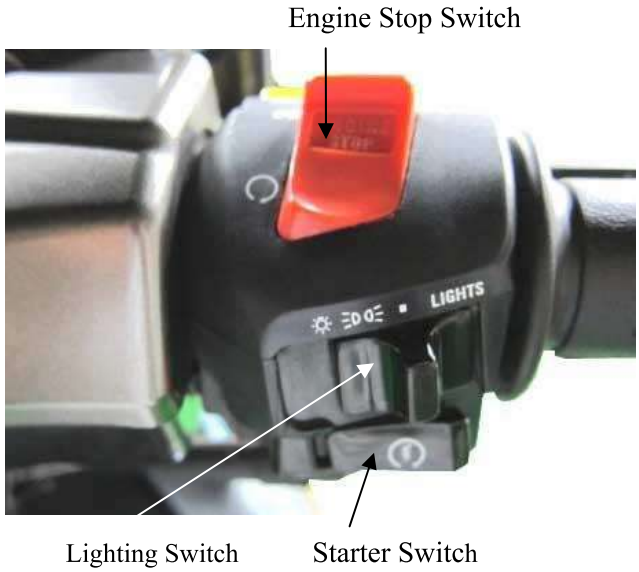
## RIGHT HANDLEBAR SWITCH

### INSPECTION

Remove the front cover

Disconnect the right handlebar switch connector and check for continuity at switch side connector terminals.

Continuity should exist between the color code wires as follows:




LIGHTING SW

| | BAT3 | PO | TL | HL |
|---|---|---|---|---|
| • | | | | |
| (N) | | | | |
| P | ○ | ○ | ○ | |
| (N) | ○ | ○ | ○ | ○ |
| H | ○ | | ○ | ○ |
| COLOR | BR/L | BR/W | BR | W/L |

STARTER SW

| | E | ST |
|---|---|---|
| FREE | | |
| PUSH | ○ | ○ |
| COLOR | G | Y/R |

ENGINE STOP SW

| | IG | BAT3 |
|---|---|---|
| OFF | | |
| RUN | ○ | ○ |
| COLOR | B/W | B/G |

### LEFT HANDLEBAR SWITCH

### INSPECTION

Disconnect the left handlebar switch connector and check for continuity at switch side connector terminals.

Continuity should exist between the color code wires as follows:

WINKER SW

| | WR | R | L |
|---|---|---|---|
| R | ○ | ○ | |
| N | | | |
| L | ○ | | ○ |
| COLOR | GR | SB | O |

HORN SW

| | BAT6 | HO |
|---|---|---|
| FREE | | |
| PUSH | ○ | ○ |
| COLOR | BR/L | LG |

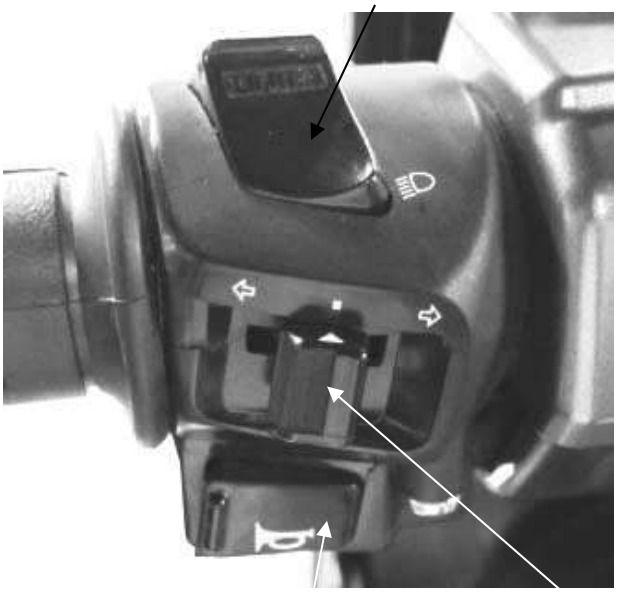
DIMMER SW

| | HL | HI | LO |
|---|---|---|---|
| LO | ○ | | ○ |
| (N) | ○ | ○ | ○ |
| HI | ○ | ○ | |
| COLOR | W/L | L | W |

PASSING SW

| | BAT4 | HI |
|---|---|---|
| FREE | | |
| PUSH | ○ | ○ |
| COLOR | BR/L | L |

Dimmer Switch



Horn Switch  Turn Signal light Switch

Passing Switch


## LUGGAGE BOX LIGHT SWITCH

### INSPECTION

Remove the luggage box

Disconnect the luggage box light switch connector and check the luggage box light switch for continuity between the switch terminals.

There should be no continuity with the luggage box light switch pushed, and there should be continuity with the luggage box light switch is released.

Luggage box light switch  Connector

## SIDE STAND SWITCH

### INSPECTION

Remove the luggage box.

Side stand switch is located on side stand.

Disconnect the side stand switch connector.

There should be continuity between the Yellow/Green and Green with the side stand is up.

There should be continuity between the Yellow/Black and Green with the side stand is down.

## HORN

### INSPECTION

Remove the front cover.

Disconnect the horn connectors from the horn.

Connect a 12 V battery to the horn terminals.

The horn is normal if it sounds when the 12 V battery is connected across the horn terminals.