TYPE CODE

Throughout this manual, the following abbreviations are used to identify individual type.

<table>
<thead>
<tr>
<th>CODE</th>
<th>AREA TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>E</td>
<td>U.K.</td>
</tr>
<tr>
<td>F</td>
<td>France</td>
</tr>
<tr>
<td>ED</td>
<td>EUROPEAN DIRECT SALES</td>
</tr>
</tbody>
</table>
A Few Words About Safety

Service Information
The service and repair information contained in this manual is intended for use by qualified, professional technicians. Attempting service or repairs without the proper training, tools, and equipment could cause injury to you or others. It could also damage the vehicle or create an unsafe condition.

This manual describes the proper methods and procedures for performing service, maintenance, and repairs. Some procedures require the use of specially designed tools and dedicated equipment. Any person who intends to use a replacement part, service procedure or a tool that is not recommended by Honda, must determine the risks to their personal safety and the safe operation of the vehicle.

If you need to replace a part, use genuine Honda parts with the correct part number or an equivalent part. We strongly recommend that you do not use replacement parts of inferior quality.

For Your Customer's Safety
Proper service and maintenance are essential to the customer's safety and the reliability of the vehicle. Any error or oversight while servicing a vehicle can result in faulty operation, damage to the vehicle, or injury to others.

For Your Safety
Because this manual is intended for the professional service technician, we do not provide warnings about many basic shop safety practices (e.g., Hot parts—wear gloves). If you have not received shop safety training or do not feel confident about your knowledge of safe servicing practice, we recommended that you do not attempt to perform the procedures described in this manual.

Some of the most important general service safety precautions are given below. However, we cannot warn you of every conceivable hazard that can arise in performing service and repair procedures. Only you can decide whether or not you should perform a given task.

Important Safety Precautions
Make sure you have a clear understanding of all basic shop safety practices and that you are wearing appropriate clothing and using safety equipment. When performing any service task, be especially careful of the following:

- Read all of the instructions before you begin, and make sure you have the tools, the replacement or repair parts, and the skills required to perform the tasks safely and completely.
- Protect your eyes by using proper safety glasses, goggles or face shields any time you hammer, drill, grind, pry or work around pressurized air or liquids, and springs or other stored-energy components. If there is any doubt, put on eye protection.
- Use other protective wear when necessary, for example gloves or safety shoes. Handling hot or sharp parts can cause severe burns or cuts. Before you grab something that looks like it can hurt you, stop and put on gloves.
- Protect yourself and others whenever you have the vehicle up in the air. Any time you lift the vehicle, either with a hoist or a jack, make sure that it is always securely supported. Use jack stands.

Make sure the engine is off before you begin any servicing procedures, unless the instruction tells you to do otherwise. This will help eliminate several potential hazards:

- Carbon monoxide poisoning from engine exhaust. Be sure there is adequate ventilation whenever you run the engine.
- Burns from hot parts or coolant. Let the engine and exhaust system cool before working in those areas.
- Injury from moving parts. If the instruction tells you to run the engine, be sure your hands, fingers and clothing are out of the way.

Gasoline vapors and hydrogen gases from batteries are explosive. To reduce the possibility of a fire or explosion, be careful when working around gasoline or batteries.

- Use only a nonflammable solvent, not gasoline, to clean parts.
- Never drain or store gasoline in an open container.
- Keep all cigarettes, sparks and flames away from the battery and all fuel-related parts.
HOW TO USE THIS MANUAL

This service manual describes the service procedures for the CBF125M.

Follow the Maintenance Schedule (Section 3) recommendations to ensure that the vehicle is in peak operating condition and the emission levels are within the standard set.

Performing the first scheduled maintenance is very important. It compensates for the initial wear that occurs during the break-in period.

Sections 1 and 3 apply to the whole motorcycle. Section 2 illustrates procedures for removal/installation of components that may be required to perform service described in the following sections.

Section 4 through 18 describe parts of the motorcycle, grouped according to location.

Find the section you want on this page, then turn to the table of contents on the first page of the section.

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

If you don't know the source of the trouble, go to section 20 Troubleshooting.

Your safety, and the safety of others, is very important. To help you make informed decisions we have provided safety messages and other information throughout this manual. Of course, it is not practical or possible to warn you about all the hazards associated with servicing this vehicle. You must use your own good judgement.

You will find important safety information in a variety of forms including:

- Safety Labels – on the vehicle
- Safety Messages – preceded by a safety alert symbol ▲ and one of three signal words, DANGER, WARNING, or CAUTION.

These signal words mean:

▲ DANGER You WILL be KILLED or SERIOUSLY HURT if you don't follow instructions.

▲ WARNING You CAN be KILLED or SERIOUSLY HURT if you don't follow instructions.

▲ CAUTION You CAN be HURT if you don't follow instructions.

Instructions – how to service this vehicle correctly and safely.

As you read this manual, you will find information that is preceded by a | NOTICE symbol. The purpose of this message is to help prevent damage to your vehicle, other property, or this environment.

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Honda Motor Co., Ltd.
SERVICE PUBLICATION OFFICE
<table>
<thead>
<tr>
<th>SYMBOL</th>
<th>INSTRUCTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image-replace" alt="Replace" /></td>
<td>Replace the part(s) with new one(s) before assembly.</td>
</tr>
<tr>
<td><img src="image-use" alt="Use" /></td>
<td>Use the recommended engine oil, unless otherwise specified.</td>
</tr>
<tr>
<td><img src="image-use" alt="Use" /></td>
<td>Use molybdenum oil solution (mixture of the engine oil and molybdenum grease in a ratio of 1:1).</td>
</tr>
<tr>
<td><img src="image-use" alt="Use" /></td>
<td>Use multi-purpose grease (lithium based multi-purpose grease NLGI #2 or equivalent).</td>
</tr>
</tbody>
</table>
| ![Use](image-use) | Use molybdenum disulfide grease (containing more than 3% molybdenum disulfide, NLGI #2 or equivalent).  
Example: Molykote® BR-2 plus manufactured by Dow Corning U.S.A.  
Multi-purpose M-2 manufactured by Mitsubishi Oil, Japan |
| ![Use](image-use) | Use molybdenum disulfide paste (containing more than 40% molybdenum disulfide, NLGI #2 or equivalent).  
Example: Molykote® G-n Paste manufactured by Dow Corning U.S.A.  
Honda Moly 60 (U.S.A. only)  
Rocol ASP manufactured by Rocol Limited, U.K.  
Rocol Paste manufactured by Sumico Lubricant, Japan |
| ![Use](image-use) | Use silicone grease. |
| ![Apply](image-apply) | Apply a locking agent. Use a medium strength locking agent unless otherwise specified. |
| ![Apply](image-apply) | Apply sealant. |
| ![Use](image-use) | Use DOT 3 or DOT 4 brake fluid. Use the recommended brake fluid unless otherwise specified. |
| ![Use](image-use) | Use fork or suspension fluid. |
1. GENERAL INFORMATION

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GENERAL INFORMATION

SERVICE RULES

1. Use genuine Honda or Honda-recommended parts and lubricants or their equivalents. Parts that do not meet Honda’s design specifications may cause damage to the motorcycle.
2. Use the special tools designed for this product to avoid damage and incorrect assembly.
3. Use only metric tools when servicing the motorcycle. Metric bolts, nuts and screws are not interchangeable with English fasteners.
4. Install new gaskets, O-rings, cotter pins, and lock plates when reassembling.
5. When tightening bolts or nuts, begin with the larger diameter or inner bolt first. Then tighten to the specified torque diagonally in incremental steps unless a particular sequence is specified.
6. Clean parts in cleaning solvent upon disassembly. Lubricate any sliding surfaces before reassembly.
7. After reassembly, check all parts for proper installation and operation.
8. Route all electrical wires as shown in the CABLE & HARNESS ROUTING (page 1-16).
9. Do not bend or twist control cables. Damaged control cables will not operate smoothly and may stick or bend.

ABBREVIATION

Throughout this manual, the following abbreviations are used to identify the respective parts or systems.

<table>
<thead>
<tr>
<th>Abbrev. term</th>
<th>Full term</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAP sensor</td>
<td>Manifold Absolute Pressure sensor</td>
</tr>
<tr>
<td>MIL</td>
<td>Malfunction Indicator Lamp</td>
</tr>
<tr>
<td>PGM-FI</td>
<td>Programmed Fuel Injection</td>
</tr>
<tr>
<td>SCS connector</td>
<td>Service Check Short connector</td>
</tr>
<tr>
<td>IAT sensor</td>
<td>Intake Air Temperature sensor</td>
</tr>
<tr>
<td>TP sensor</td>
<td>Throttle Position sensor</td>
</tr>
<tr>
<td>ECM</td>
<td>Engine Control Module</td>
</tr>
<tr>
<td>DTC</td>
<td>Diagnostic Trouble Code</td>
</tr>
<tr>
<td>DLC</td>
<td>Data Link Connector</td>
</tr>
<tr>
<td>CKP sensor</td>
<td>Crankshaft Position sensor</td>
</tr>
<tr>
<td>EEPROM</td>
<td>Electrically Erasable Programmable Read Only Memory</td>
</tr>
<tr>
<td>HDS</td>
<td>Honda Diagnostic System</td>
</tr>
<tr>
<td>IACV</td>
<td>Idle Air Control Valve</td>
</tr>
<tr>
<td>EOT sensor</td>
<td>Engine Oil Temperature sensor</td>
</tr>
<tr>
<td>TDC</td>
<td>Top Dead Center</td>
</tr>
</tbody>
</table>
MODEL IDENTIFICATION

SERIAL NUMBERS

The Vehicle Identification Number (V.I.N.) is stamped on the right side of the steering head.

The registered number plate is located in left side of the frame.
GENERAL INFORMATION

The engine serial number is stamped on the lower left side of the crankcase.

The throttle body identification number is stamped on the lower side of the throttle body.

LABEL

The color label is attached on the right front frame. When ordering color-coded parts, always specify the designated color code.
### GENERAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>ITEM</th>
<th>SPECIFICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DIMENSIONS</strong></td>
<td></td>
</tr>
<tr>
<td>Overall length</td>
<td>1,955 mm (77.0 in)</td>
</tr>
<tr>
<td>Overall width</td>
<td>760 mm (29.9 in)</td>
</tr>
<tr>
<td>Overall height</td>
<td>1,110 mm (43.7 in)</td>
</tr>
<tr>
<td>Wheelbase</td>
<td>1,270 mm (50.0 in)</td>
</tr>
<tr>
<td>Seat height</td>
<td>792 mm (31.2 in)</td>
</tr>
<tr>
<td>Footpeg height</td>
<td>312 mm (12.3 in)</td>
</tr>
<tr>
<td>Ground clearance</td>
<td>173 mm (6.8 in)</td>
</tr>
<tr>
<td>Curb weight</td>
<td>128 kg (282 lbs)</td>
</tr>
<tr>
<td>Maximum weight capacity</td>
<td>183 kg (397 lbs)</td>
</tr>
<tr>
<td><strong>FRAME</strong></td>
<td></td>
</tr>
<tr>
<td>Frame type</td>
<td>Diamond type</td>
</tr>
<tr>
<td>Front suspension</td>
<td>Telescopic fork</td>
</tr>
<tr>
<td>Front axle travel</td>
<td>103.4 mm (4.1 in)</td>
</tr>
<tr>
<td>Rear suspension</td>
<td>Swingarm</td>
</tr>
<tr>
<td>Rear axle travel</td>
<td>87.3 mm (3.4 in)</td>
</tr>
<tr>
<td>Rear damper</td>
<td>Both side operation tube type</td>
</tr>
<tr>
<td>Front tire size</td>
<td>80/100-17 M/C 46P</td>
</tr>
<tr>
<td>Rear tire size</td>
<td>100/90-17 M/C 55P</td>
</tr>
<tr>
<td>Tire brand</td>
<td></td>
</tr>
<tr>
<td><strong>FRONT</strong></td>
<td>ATT525 (TVS)</td>
</tr>
<tr>
<td><strong>REAR</strong></td>
<td>ATT750 (TVS)</td>
</tr>
<tr>
<td>Front brake</td>
<td>Hydraulic single disc</td>
</tr>
<tr>
<td>Rear brake</td>
<td>Mechanical drum (leading-trailing)</td>
</tr>
<tr>
<td>Caster angle</td>
<td>25°55'</td>
</tr>
<tr>
<td>Trail length</td>
<td>89 mm (3.5 in)</td>
</tr>
<tr>
<td>Fuel tank capacity</td>
<td>13.0 liter (3.43 US gal, 2.86 Imp gal)</td>
</tr>
<tr>
<td><strong>ENGINE</strong></td>
<td></td>
</tr>
<tr>
<td>Cylinder arrangement</td>
<td>Single cylinder inclined 16° forward-leaning from vertical</td>
</tr>
<tr>
<td>Bore and stroke</td>
<td>52.4 x 57.8 mm (2.06 x 2.28 in)</td>
</tr>
<tr>
<td>Displacement</td>
<td>125 cm³ (7.6 cu-in)</td>
</tr>
<tr>
<td>Compression ratio</td>
<td>9.2:1</td>
</tr>
<tr>
<td>Valve train</td>
<td>Chain driven OHC with rocker arm</td>
</tr>
<tr>
<td>Intake valve</td>
<td>opens 10° BTDC at 1.0 mm (0.04 in) lift</td>
</tr>
<tr>
<td>Exhaust valve</td>
<td>opens 35° BBDC at 1.0 mm (0.04 in) lift</td>
</tr>
<tr>
<td>Lubrication system</td>
<td>Forced pressure and wet sump</td>
</tr>
<tr>
<td>Oil pump type</td>
<td>Trochoid</td>
</tr>
<tr>
<td>Cooling system</td>
<td>Air cooled</td>
</tr>
<tr>
<td>Air filtration</td>
<td>Viscous paper filter</td>
</tr>
<tr>
<td>Engine dry weight</td>
<td>26.9 kg (59.3 lbs)</td>
</tr>
<tr>
<td><strong>FUEL DELIVERY SYSTEM</strong></td>
<td></td>
</tr>
<tr>
<td>Type</td>
<td>PGM-FI</td>
</tr>
<tr>
<td>Throttle bore</td>
<td>26 mm (1.0 in)</td>
</tr>
<tr>
<td><strong>DRIVE TRAIN</strong></td>
<td></td>
</tr>
<tr>
<td>Clutch system</td>
<td>Multi-plate, wet</td>
</tr>
<tr>
<td>Clutch operation system</td>
<td>Cable operating</td>
</tr>
<tr>
<td>Transmission</td>
<td>Constant mesh, 5-speeds</td>
</tr>
<tr>
<td>Primary reduction</td>
<td>3.360 (67/20)</td>
</tr>
<tr>
<td>Final reduction</td>
<td></td>
</tr>
<tr>
<td>1st</td>
<td>2.625 (42/16)</td>
</tr>
<tr>
<td>2nd</td>
<td>2.687 (43/16)</td>
</tr>
<tr>
<td>3rd</td>
<td>3.076 (40/13)</td>
</tr>
<tr>
<td>4th</td>
<td>1.944 (35/18)</td>
</tr>
<tr>
<td>5th</td>
<td>1.473 (28/19)</td>
</tr>
<tr>
<td>6th</td>
<td>1.190 (25/21)</td>
</tr>
<tr>
<td>Gear ratio</td>
<td>1.038 (27/26)</td>
</tr>
<tr>
<td>Gearshift pattern</td>
<td>Left foot operated return system</td>
</tr>
<tr>
<td>1 - N = 2 - 3 - 4 - 5</td>
<td></td>
</tr>
<tr>
<td><strong>ELECTRICAL</strong></td>
<td></td>
</tr>
<tr>
<td>Ignition system</td>
<td>Computer-controlled digital transistorized with electric advance</td>
</tr>
<tr>
<td>Starting system</td>
<td>Electric starter motor</td>
</tr>
<tr>
<td>Charging system</td>
<td>Single phase output alternator</td>
</tr>
<tr>
<td>Regulator/rectifier</td>
<td>SCR shorted, single phase half-wave rectification</td>
</tr>
</tbody>
</table>
### LUBRICATION SYSTEM SPECIFICATIONS

<table>
<thead>
<tr>
<th>ITEM</th>
<th>STANDARD</th>
<th>SERVICE LIMIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engine oil capacity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>After draining</td>
<td>0.9 liter (1.0 US qt, 0.8 Imp qt)</td>
<td></td>
</tr>
<tr>
<td>After disassembly</td>
<td>1.1 liter (1.2 US qt, 1.0 Imp qt)</td>
<td></td>
</tr>
<tr>
<td>Recommended engine oil oil</td>
<td>Honda &quot;4-stroke motorcycle oil&quot; or an equivalent</td>
<td></td>
</tr>
<tr>
<td>Oil recommendation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>API classification</td>
<td>SG or higher</td>
<td></td>
</tr>
<tr>
<td>(except oils labeled as energy conserving on the circular API service label)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Viscosity</td>
<td>SAE 10W-30</td>
<td></td>
</tr>
<tr>
<td>JASO T 903 Standard</td>
<td>MA</td>
<td></td>
</tr>
<tr>
<td>Oil pump rotor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tip clearance</td>
<td>0.15 (0.006)</td>
<td>0.20 (0.008)</td>
</tr>
<tr>
<td>Body clearance</td>
<td>0.15 - 0.21 (0.006 - 0.008)</td>
<td>0.25 (0.010)</td>
</tr>
<tr>
<td>Side clearance</td>
<td>0.05 - 0.10 (0.002 - 0.004)</td>
<td>0.15 (0.006)</td>
</tr>
</tbody>
</table>

### FUEL SYSTEM (PGM-FI) SPECIFICATIONS

<table>
<thead>
<tr>
<th>ITEM</th>
<th>SPECIFICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Throttle body identification number</td>
<td>GQM6A</td>
</tr>
<tr>
<td>Idle speed</td>
<td>1,500 ± 100 min⁻¹ (rpm)</td>
</tr>
<tr>
<td>Throttle grip freeplay</td>
<td>2 - 6 mm (1/16 - 1/4 in)</td>
</tr>
<tr>
<td>Fuel pressure at idle</td>
<td>294 ± 6 kPa (3 ± 0.1 kgf/cm², 43 ± 0.9 psi)</td>
</tr>
<tr>
<td>Fuel pump flow (at 12 V)</td>
<td>27.7 cm³ (0.94 US oz, 0.98 Imp oz) minimum/10 seconds</td>
</tr>
</tbody>
</table>

### CYLINDER HEAD/VALVES SPECIFICATIONS

<table>
<thead>
<tr>
<th>ITEM</th>
<th>STANDARD</th>
<th>SERVICE LIMIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cylinder compression at 800 min⁻¹ (rpm)</td>
<td>1,275 kPa (13.0 kgf/cm², 185 psi)</td>
<td></td>
</tr>
<tr>
<td>Valve clearance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IN</td>
<td>0.08 ± 0.02 (0.003 ± 0.001)</td>
<td></td>
</tr>
<tr>
<td>EX</td>
<td>0.12 ± 0.02 (0.005 ± 0.001)</td>
<td></td>
</tr>
<tr>
<td>Valve, valve guide</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Valve stem O.D.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IN</td>
<td>4.975 - 4.990 (0.1959 - 0.1965)</td>
<td>4.92 (0.194)</td>
</tr>
<tr>
<td>EX</td>
<td>4.955 - 4.970 (0.1951 - 0.1957)</td>
<td>4.90 (0.193)</td>
</tr>
<tr>
<td>Valve guide I.D.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IN/EX</td>
<td>5.000 - 5.012 (0.1969 - 0.1973)</td>
<td>5.04 (0.198)</td>
</tr>
<tr>
<td>Stem-to-guide clearance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IN</td>
<td>0.010 - 0.037 (0.0004 - 0.0015)</td>
<td>0.07 (0.003)</td>
</tr>
<tr>
<td>EX</td>
<td>0.030 - 0.057 (0.0012 - 0.0022)</td>
<td>0.09 (0.004)</td>
</tr>
<tr>
<td>Valve seat width</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IN/EX</td>
<td>0.90 - 1.10 (0.035 - 0.043)</td>
<td>1.5 (0.06)</td>
</tr>
<tr>
<td>Valve spring free length</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IN/EX</td>
<td>37.78 (1.487)</td>
<td></td>
</tr>
<tr>
<td>Rocker arm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arm I.D.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IN/EX</td>
<td>10.000 - 10.015 (0.3937 - 0.3943)</td>
<td>10.10 (0.398)</td>
</tr>
<tr>
<td>Shaft O.D.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IN/EX</td>
<td>9.972 - 9.987 (0.3926 - 0.3932)</td>
<td>9.91 (0.390)</td>
</tr>
<tr>
<td>Arm-to-shaft clearance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IN/EX</td>
<td>0.013 - 0.043 (0.0005 - 0.0017)</td>
<td>0.10 (0.004)</td>
</tr>
<tr>
<td>Camshaft</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cam lobe height</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IN</td>
<td>33.268 - 33.508 (1.3098 - 1.3192)</td>
<td></td>
</tr>
<tr>
<td>EX</td>
<td>33.018 - 33.268 (1.2999 - 1.3094)</td>
<td></td>
</tr>
<tr>
<td>Cylinder head warpage</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.05 (0.002)</td>
<td></td>
</tr>
</tbody>
</table>
### CYLINDER/PISTON SPECIFICATIONS

<table>
<thead>
<tr>
<th>ITEM</th>
<th>STANDARD</th>
<th>SERVICE LIMIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cylinder I.D.</td>
<td>52.400 - 52.410 (2.0630 - 2.0634)</td>
<td>52.50 (2.067)</td>
</tr>
<tr>
<td>Out-of-round</td>
<td>-</td>
<td>0.10 (0.004)</td>
</tr>
<tr>
<td>Taper</td>
<td>-</td>
<td>0.10 (0.004)</td>
</tr>
<tr>
<td>Warpage</td>
<td>-</td>
<td>0.10 (0.004)</td>
</tr>
<tr>
<td>Piston O.D. at 5 (0.2) from bottom</td>
<td>52.370 - 52.390 (2.0618 - 2.0626)</td>
<td>52.30 (2.059)</td>
</tr>
<tr>
<td>Piston pin hole I.D.</td>
<td>13.002 - 13.008 (0.5119 - 0.5121)</td>
<td>13.03 (0.513)</td>
</tr>
<tr>
<td>Piston pin O.D.</td>
<td>12.994 - 13.000 (0.5116 - 0.5118)</td>
<td>12.98 (0.511)</td>
</tr>
<tr>
<td>Piston-to-piston pin clearance</td>
<td>0.002 - 0.014 (0.0001 - 0.0006)</td>
<td>0.04 (0.002)</td>
</tr>
<tr>
<td>Piston ring end gap Top</td>
<td>0.10 - 0.25 (0.004 - 0.010)</td>
<td>0.40 (0.016)</td>
</tr>
<tr>
<td>第二</td>
<td>0.30 - 0.45 (0.012 - 0.016)</td>
<td>0.60 (0.024)</td>
</tr>
<tr>
<td>Oil (side rail)</td>
<td>0.20 - 0.70 (0.008 - 0.026)</td>
<td>0.85 (0.033)</td>
</tr>
<tr>
<td>Piston ring-to-ring groove clearance Top</td>
<td>0.030 - 0.065 (0.0012 - 0.0026)</td>
<td>0.10 (0.004)</td>
</tr>
<tr>
<td>第二</td>
<td>0.015 - 0.050 (0.0006 - 0.0020)</td>
<td>0.09 (0.004)</td>
</tr>
<tr>
<td>Cylinder-to-piston clearance</td>
<td>0.010 - 0.040 (0.0004 - 0.0016)</td>
<td>0.10 (0.004)</td>
</tr>
<tr>
<td>Connecting rod small end I.D.</td>
<td>13.016 - 13.034 (0.5124 - 0.5131)</td>
<td>13.05 (0.514)</td>
</tr>
<tr>
<td>Connecting rod-to-piston pin clearance</td>
<td>0.016 - 0.040 (0.0006 - 0.0016)</td>
<td>0.07 (0.003)</td>
</tr>
</tbody>
</table>

### CLUTCH/GEARSHIFT LINKAGE SPECIFICATIONS

<table>
<thead>
<tr>
<th>ITEM</th>
<th>STANDARD</th>
<th>SERVICE LIMIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clutch lever freeplay</td>
<td>10 - 20 (3/8 - 13/16)</td>
<td></td>
</tr>
<tr>
<td>Clutch Spring free length</td>
<td>39.0 (1.54)</td>
<td></td>
</tr>
<tr>
<td>Disc thickness</td>
<td>2.92 - 3.08 (0.115 - 0.121)</td>
<td>2.80 (0.110)</td>
</tr>
<tr>
<td>Plate warpage</td>
<td>-</td>
<td>0.20 (0.008)</td>
</tr>
<tr>
<td>Primary driven gear I.D.</td>
<td>23.000 - 23.021 (0.9055 - 0.9063)</td>
<td>23.06 (0.909)</td>
</tr>
<tr>
<td>Clutch outer guide O.D.</td>
<td>22.859 - 22.980 (0.8939 - 0.9047)</td>
<td>22.93 (0.903)</td>
</tr>
<tr>
<td>Clutch outer guide I.D.</td>
<td>16.991 - 17.009 (0.6689 - 0.6696)</td>
<td>17.04 (0.671)</td>
</tr>
<tr>
<td>Mainshaft O.D. at clutch outer guide</td>
<td>16.996 - 16.984 (0.6690 - 0.6687)</td>
<td>16.95 (0.667)</td>
</tr>
<tr>
<td>Primary driven gear-to-guide clearance</td>
<td>0.020 - 0.062 (0.0008 - 0.0024)</td>
<td></td>
</tr>
<tr>
<td>Clutch outer guide-to-mainshaft clearance</td>
<td>0.007 - 0.043 (0.0003 - 0.0017)</td>
<td></td>
</tr>
</tbody>
</table>

### ALTERNATOR/STARTER CLUTCH SPECIFICATION

<table>
<thead>
<tr>
<th>ITEM</th>
<th>STANDARD</th>
<th>SERVICE LIMIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Starter driven gear boss O.D.</td>
<td>45.660 - 45.673 (1.7976 - 1.7981)</td>
<td></td>
</tr>
</tbody>
</table>
### CRANKCASE/CRANKSHAFT/TRANSMISSION SPECIFICATIONS

<table>
<thead>
<tr>
<th>ITEM</th>
<th>STANDARD</th>
<th>SERVICE LIMIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crankshaft</td>
<td>Runout</td>
<td>0.03 (0.001)</td>
</tr>
<tr>
<td>Connecting rod big end radial clear-</td>
<td>0 - 0.008 (0 - 0.0003)</td>
<td>0.05 (0.002)</td>
</tr>
<tr>
<td>Connecting rod big end side clearance</td>
<td>0.10 - 0.35 (0.004 - 0.014)</td>
<td>0.80 (0.031)</td>
</tr>
<tr>
<td>Transmission</td>
<td>Gear I.D.</td>
<td>M4 20.000 - 20.018 (0.7874 - 0.7881)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>M5 17.000 - 17.018 (0.6693 - 0.6700)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C1 20.500 - 20.521 (0.8071 - 0.8079)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C2 23.020 - 23.041 (0.9063 - 0.9071)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C3 23.025 - 23.046 (0.9069 - 0.9073)</td>
</tr>
<tr>
<td></td>
<td>Bushing O.D.</td>
<td>C1 20.458 - 20.480 (0.8055 - 0.8063)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C2, C3 22.984 - 23.005 (0.9049 - 0.9057)</td>
</tr>
<tr>
<td></td>
<td>Gear-to-bushing clearance</td>
<td>C1, C3 0.020 - 0.062 (0.0008 - 0.0024)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C2 0.015 - 0.057 (0.0006 - 0.0022)</td>
</tr>
<tr>
<td></td>
<td>Bushing I.D.</td>
<td>C1 17.000 - 17.018 (0.6693 - 0.6700)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C2, C3 20.020 - 20.041 (0.7882 - 0.7890)</td>
</tr>
<tr>
<td></td>
<td>Mainshaft O.D.</td>
<td>at M4 19.566 - 19.580 (0.7861 - 0.7866)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>at M5 16.568 - 16.580 (0.6680 - 0.6685)</td>
</tr>
<tr>
<td></td>
<td>Gear-to-shaft clearance</td>
<td>at M4, M5 0.020 - 0.050 (0.0008 - 0.0020)</td>
</tr>
<tr>
<td></td>
<td>Countershaft O.D.</td>
<td>at C1 bushing 16.966 - 16.984 (0.6680 - 0.6687)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>at C2 bushing 19.978 - 19.998 (0.7882 - 0.7890)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>at C3 bushing 19.979 - 20.000 (0.7882 - 0.7890)</td>
</tr>
<tr>
<td></td>
<td>Bushing-to-shaft clearance</td>
<td>C1 0.016 - 0.052 (0.0006 - 0.0020)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C2 0.031 - 0.063 (0.0012 - 0.0025)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C3 0.020 - 0.062 (0.0008 - 0.0024)</td>
</tr>
<tr>
<td>Shift fork, shift fork shaft/shift drum</td>
<td>Shift fork shaft O.D.</td>
<td>9.986 - 9.995 (0.3931 - 0.3935)</td>
</tr>
<tr>
<td></td>
<td>Shift fork I.D.</td>
<td>10.000 - 10.018 (0.3937 - 0.3944)</td>
</tr>
<tr>
<td></td>
<td>Shift fork claw thickness</td>
<td>4.93 - 5.00 (0.194 - 0.197)</td>
</tr>
<tr>
<td></td>
<td>Shift drum O.D.</td>
<td>Left 23.969 - 23.980 (0.9433 - 0.9441)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Right 20.956 - 20.980 (0.8252 - 0.8260)</td>
</tr>
<tr>
<td></td>
<td>Shift drum journal I.D.</td>
<td>Left 24.000 - 24.033 (0.9449 - 0.9462)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Right 21.000 - 21.021 (0.8268 - 0.8276)</td>
</tr>
<tr>
<td></td>
<td>Shift drum-to-shift drum journal clearance</td>
<td>Left 0.020 - 0.074 (0.0008 - 0.0029)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Right 0.020 - 0.062 (0.0008 - 0.0024)</td>
</tr>
</tbody>
</table>

### FRONT WHEEL/SUSPENSION/STEERING SPECIFICATIONS

<table>
<thead>
<tr>
<th>ITEM</th>
<th>STANDARD</th>
<th>SERVICE LIMIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum tire thread depth</td>
<td>-</td>
<td>1.5 (0.06)</td>
</tr>
<tr>
<td>Cold tire pressure</td>
<td>Driver only 175 kPa (1.75 kgf/cm², 25 psi)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Driver and passenger 175 kPa (1.75 kgf/cm², 25 psi)</td>
<td></td>
</tr>
<tr>
<td>Axle runout</td>
<td>Radial - 0.2 (0.01)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Axial - 1.0 (0.04)</td>
<td></td>
</tr>
<tr>
<td>Wheel rim runout</td>
<td>Radial - 1.0 (0.04)</td>
<td></td>
</tr>
<tr>
<td>Fork</td>
<td>Spring free length 372.7 (14.67)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tube runout - 0.20 (0.008)</td>
<td></td>
</tr>
<tr>
<td>Recommended fluid</td>
<td>Honda Ultra Cushion Oil 10W or equivalent</td>
<td></td>
</tr>
<tr>
<td>Fluid level</td>
<td>167 (6.6)</td>
<td></td>
</tr>
<tr>
<td>Fluid capacity</td>
<td>146 ± 2.5 cm³ (4.9 ± 0.08 US oz, 5.1 ± 0.09 Imp oz)</td>
<td></td>
</tr>
<tr>
<td>Steering head bearing pre-load</td>
<td>5.6 - 8.9 N (0.6 - 0.9 kgf)</td>
<td></td>
</tr>
</tbody>
</table>
### GENERAL INFORMATION

**REAR WHEEL/SUSPENSION SPECIFICATIONS**

<table>
<thead>
<tr>
<th>ITEM</th>
<th>STANDARD</th>
<th>SERVICE LIMIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum tire thread depth</td>
<td>-</td>
<td>2.0 (0.08)</td>
</tr>
<tr>
<td>Cold tire pressure</td>
<td>Driver only</td>
<td>200 kPa (2.00 kgf/cm², 29 psi)</td>
</tr>
<tr>
<td></td>
<td>Driver and passenger</td>
<td>225 kPa (2.25 kgf/cm², 33 psi)</td>
</tr>
<tr>
<td>Axle runout</td>
<td>Radial</td>
<td>0.2 (0.01)</td>
</tr>
<tr>
<td></td>
<td>Axial</td>
<td>1.0 (0.04)</td>
</tr>
<tr>
<td>Drive chain</td>
<td>Size/link RK</td>
<td>RK428KRO-118LE</td>
</tr>
<tr>
<td></td>
<td>Slack</td>
<td>15 - 25 (9/16 - 1)</td>
</tr>
</tbody>
</table>

### BRAKE SYSTEM SPECIFICATIONS

<table>
<thead>
<tr>
<th>ITEM</th>
<th>STANDARD</th>
<th>SERVICE LIMIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Front brake</td>
<td>Specified brake fluid</td>
<td>DOT 3 or DOT 4</td>
</tr>
<tr>
<td>Brake disc thickness</td>
<td>3.8 - 4.2 (0.15 - 0.17)</td>
<td>3.5 (0.14)</td>
</tr>
<tr>
<td>Brake disc runout</td>
<td>-</td>
<td>0.10 (0.004)</td>
</tr>
<tr>
<td>Master cylinder I.D.</td>
<td>12.700 - 12.743 (0.5000 - 0.5017)</td>
<td>12.756 (0.5022)</td>
</tr>
<tr>
<td>Master piston O.D.</td>
<td>12.657 - 12.684 (0.4983 - 0.4994)</td>
<td>12.645 (0.4978)</td>
</tr>
<tr>
<td>Caliper cylinder I.D.</td>
<td>25.400 - 25.450 (1.0000 - 1.0070)</td>
<td>25.460 (1.0024)</td>
</tr>
<tr>
<td>Caliper piston O.D.</td>
<td>25.318 - 25.368 (0.9988 - 0.9987)</td>
<td>25.310 (0.9965)</td>
</tr>
<tr>
<td>Rear brake</td>
<td>Brake pedal freeplay</td>
<td>20 - 30 (13/16 - 1-3/16)</td>
</tr>
<tr>
<td></td>
<td>Brake drum I.D.</td>
<td>130.0 - 130.2 (5.12 - 5.13)</td>
</tr>
<tr>
<td></td>
<td>Lining thickness</td>
<td>To the indicator</td>
</tr>
</tbody>
</table>

### BATTERY/CHARGING SYSTEM SPECIFICATIONS

<table>
<thead>
<tr>
<th>ITEM</th>
<th>SPECIFICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Battery</td>
<td>Capacity</td>
</tr>
<tr>
<td></td>
<td>12 V - 6 Ah</td>
</tr>
<tr>
<td></td>
<td>Current leakage</td>
</tr>
<tr>
<td></td>
<td>Voltage (20°C/68°F)</td>
</tr>
<tr>
<td></td>
<td>Fully charged</td>
</tr>
<tr>
<td></td>
<td>Needs charging</td>
</tr>
<tr>
<td></td>
<td>Charging current</td>
</tr>
<tr>
<td></td>
<td>Normal</td>
</tr>
<tr>
<td></td>
<td>Quick</td>
</tr>
<tr>
<td>Alternator</td>
<td>Capacity</td>
</tr>
<tr>
<td></td>
<td>Charging coil resistance (20°C/68°F)</td>
</tr>
</tbody>
</table>

### IGNITION SYSTEM SPECIFICATIONS

<table>
<thead>
<tr>
<th>ITEM</th>
<th>SPECIFICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spark plug</td>
<td>Standard</td>
</tr>
<tr>
<td></td>
<td>CPR7EA-9 (NGK) or UR8DC (BOSCH)</td>
</tr>
<tr>
<td>Spark plug for extended high speed riding</td>
<td>CPR8EA-9 (NGK) or UR5DC (BOSCH)</td>
</tr>
<tr>
<td>Spark plug gap</td>
<td>0.8 - 0.9 mm (0.03 - 0.04 in)</td>
</tr>
<tr>
<td>Ignition coil primary peak voltage</td>
<td>100 V minimum</td>
</tr>
<tr>
<td>CKP sensor peak voltage</td>
<td>0.7 V minimum</td>
</tr>
<tr>
<td>Ignition timing ('F' mark)</td>
<td>10° BTDC at 1,500 min⁻¹ (rpm)</td>
</tr>
</tbody>
</table>
## GENERAL INFORMATION

### ELECTRIC STARTER SPECIFICATION

<table>
<thead>
<tr>
<th>ITEM</th>
<th>STANDARD</th>
<th>SERVICE LIMIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Starter motor brush length</td>
<td>10.000 - 10.050 (0.3937 - 0.3957)</td>
<td></td>
</tr>
</tbody>
</table>

### LIGHTS/METER/SWITCHES SPECIFICATIONS

<table>
<thead>
<tr>
<th>ITEM</th>
<th>SPECIFICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bulbs</strong></td>
<td></td>
</tr>
<tr>
<td>Headlight (Hi/Low beam)</td>
<td>12 V - 35/35 W</td>
</tr>
<tr>
<td>Brake/tail light</td>
<td>12 V - 21/6 W</td>
</tr>
<tr>
<td>Turn signal light</td>
<td>12 V - 21 W x 4</td>
</tr>
<tr>
<td>Position light</td>
<td>12 V - 5 W</td>
</tr>
<tr>
<td>Instrument light</td>
<td>12 V - 1.7 W x 2</td>
</tr>
<tr>
<td>Turn signal indicator</td>
<td>12 V - 1.7 W</td>
</tr>
<tr>
<td>High-beam indicator</td>
<td>12 V - 1.7 W</td>
</tr>
<tr>
<td>Neutral indicator</td>
<td>12 V - 1.7 W</td>
</tr>
<tr>
<td>MIL</td>
<td>12 V - 1.7 W</td>
</tr>
<tr>
<td><strong>Fuse</strong></td>
<td></td>
</tr>
<tr>
<td>Main</td>
<td>15 A</td>
</tr>
<tr>
<td>Sub</td>
<td>10 A x 2</td>
</tr>
<tr>
<td><strong>Fuel level sensor resistance (20°C/68°F)</strong></td>
<td></td>
</tr>
<tr>
<td>Full</td>
<td>6 - 10 Ω</td>
</tr>
<tr>
<td>Empty</td>
<td>90 - 95 Ω</td>
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</tbody>
</table>
### GENERAL INFORMATION

#### TORQUE VALUES

##### STANDARD TORQUE VALUES

<table>
<thead>
<tr>
<th>FASTENER TYPE</th>
<th>TORQUE</th>
<th>FASTENER TYPE</th>
<th>TORQUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 mm bolt and nut</td>
<td>5.2 (0.5, 3.8)</td>
<td>5 mm screw</td>
<td>4.2 (0.4, 3.1)</td>
</tr>
<tr>
<td>6 mm bolt and nut (Includes SH flange bolt)</td>
<td>10 (1.0, 7)</td>
<td>6 mm screw</td>
<td>9.0 (0.9, 6.6)</td>
</tr>
<tr>
<td>8 mm bolt and nut</td>
<td>22 (2.2, 16)</td>
<td>6 mm flange bolt and nut (Includes 8 mm head, large flange)</td>
<td>12 (1.2, 9)</td>
</tr>
<tr>
<td>10 mm bolt and nut</td>
<td>34 (3.5, 25)</td>
<td>8 mm flange bolt and nut</td>
<td>27 (2.8, 20)</td>
</tr>
<tr>
<td>12 mm bolt and nut</td>
<td>55 (5.6, 41)</td>
<td>10 mm flange bolt and nut</td>
<td>39 (4.0, 29)</td>
</tr>
</tbody>
</table>

**ENGINE & FRAME TORQUE VALUES**

- Torque specifications listed below are for specified fasteners.
- Others should be tightened to standard torque values (page 1-11).

##### FRAME/BODY PANELS/EXHAUST SYSTEM

<table>
<thead>
<tr>
<th>ITEM</th>
<th>Q'TY</th>
<th>THREAD DIA. (mm)</th>
<th>TORQUE N-m (kgf-m, lbf-ft)</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exhaust pipe stud bolt</td>
<td>2</td>
<td>8</td>
<td>11 (1.1, 8)</td>
<td>See page 2-18</td>
</tr>
<tr>
<td>Front cowl screw</td>
<td>4</td>
<td>6</td>
<td>5 (0.5, 3.7)</td>
<td></td>
</tr>
<tr>
<td>Side cover screw</td>
<td>2</td>
<td>6</td>
<td>5 (0.5, 3.7)</td>
<td></td>
</tr>
<tr>
<td>Muffler protector screw</td>
<td>3</td>
<td>6</td>
<td>9 (0.9, 6.6)</td>
<td></td>
</tr>
<tr>
<td>Rearview mirror adaptor</td>
<td>2</td>
<td>10</td>
<td>34 (3.5, 25)</td>
<td>Left hand thread</td>
</tr>
<tr>
<td>Sidestand pivot bolt</td>
<td>1</td>
<td>10</td>
<td>10 (1.0, 7)</td>
<td></td>
</tr>
<tr>
<td>Sidestand pivot nut</td>
<td>1</td>
<td>10</td>
<td>29 (3.0, 21)</td>
<td></td>
</tr>
</tbody>
</table>

##### MAINTENANCE

<table>
<thead>
<tr>
<th>ITEM</th>
<th>Q'TY</th>
<th>THREAD DIA. (mm)</th>
<th>TORQUE N-m (kgf-m, lbf-ft)</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spark plug</td>
<td>1</td>
<td>10</td>
<td>16 (1.6, 12)</td>
<td>Apply engine oil to the threads and seating surface.</td>
</tr>
<tr>
<td>Valve adjusting screw lock nut</td>
<td>2</td>
<td>6</td>
<td>14 (1.4, 10)</td>
<td>Apply grease to the threads.</td>
</tr>
<tr>
<td>Crankshaft hole cap</td>
<td>1</td>
<td>32</td>
<td>15 (1.5, 11)</td>
<td></td>
</tr>
<tr>
<td>Timing hole cap</td>
<td>1</td>
<td>14</td>
<td>10 (1.0, 7)</td>
<td></td>
</tr>
<tr>
<td>Oil drain bolt</td>
<td>1</td>
<td>12</td>
<td>30 (3.1, 22)</td>
<td></td>
</tr>
<tr>
<td>Oil filter rotor cover screw</td>
<td>3</td>
<td>5</td>
<td>4 (0.4, 3.0)</td>
<td></td>
</tr>
<tr>
<td>Air cleaner cover screw</td>
<td>4</td>
<td>5</td>
<td>1.2 (0.1, 0.9)</td>
<td></td>
</tr>
<tr>
<td>Throttle cable adjuster lock nut (throttle grip side)</td>
<td>1</td>
<td>10</td>
<td>3 (0.3, 2.2)</td>
<td></td>
</tr>
<tr>
<td>Throttle cable adjuster lock nut (throttle body side)</td>
<td>1</td>
<td>6</td>
<td>8 (0.8, 5.9)</td>
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</tr>
</tbody>
</table>

##### LUBRICATION SYSTEM

<table>
<thead>
<tr>
<th>ITEM</th>
<th>Q'TY</th>
<th>THREAD DIA. (mm)</th>
<th>TORQUE N-m (kgf-m, lbf-ft)</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil pump cover screw</td>
<td>1</td>
<td>4</td>
<td>3 (0.3, 2.2)</td>
<td></td>
</tr>
<tr>
<td>Oil pump mounting bolt</td>
<td>2</td>
<td>6</td>
<td>12 (1.2, 9)</td>
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</tr>
</tbody>
</table>

##### FUEL SYSTEM (PGM-FI)

<table>
<thead>
<tr>
<th>ITEM</th>
<th>Q'TY</th>
<th>THREAD DIA. (mm)</th>
<th>TORQUE N-m (kgf-m, lbf-ft)</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>IACV setting plate torx screw</td>
<td>2</td>
<td>4</td>
<td>2.1 (0.2, 1.5)</td>
<td>See page 5-58</td>
</tr>
<tr>
<td>Insulator band screw</td>
<td>1</td>
<td>5</td>
<td>1.0 (0.1, 0.7)</td>
<td></td>
</tr>
<tr>
<td>O2 sensor</td>
<td>1</td>
<td>12</td>
<td>25 (2.5, 18)</td>
<td></td>
</tr>
<tr>
<td>EOT sensor</td>
<td>1</td>
<td>10</td>
<td>14 (1.4, 10)</td>
<td></td>
</tr>
<tr>
<td>Throttle cable guide screw</td>
<td>1</td>
<td>5</td>
<td>3.4 (0.3, 2.5)</td>
<td></td>
</tr>
<tr>
<td>Sensor unit torx screw</td>
<td>3</td>
<td>5</td>
<td>3.4 (0.3, 2.5)</td>
<td></td>
</tr>
<tr>
<td>Air cleaner housing cover screw</td>
<td>8</td>
<td>5</td>
<td>1.1 (0.11, 0.8)</td>
<td></td>
</tr>
<tr>
<td>Injector joint mounting bolt</td>
<td>2</td>
<td>5</td>
<td>5.1 (0.5, 3.8)</td>
<td></td>
</tr>
</tbody>
</table>
## GENERAL INFORMATION

### ENGINE REMOVAL/INSTALLATION

<table>
<thead>
<tr>
<th>ITEM</th>
<th>Q'TY</th>
<th>THREAD DIA. (mm)</th>
<th>TORQUE N·m (kgf-m, lbf-ft)</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Front engine hanger nut</td>
<td>2</td>
<td>10</td>
<td>34 (3.5, 25)</td>
<td></td>
</tr>
<tr>
<td>Rear engine hanger nut</td>
<td>2</td>
<td>10</td>
<td>54 (5.5, 40)</td>
<td></td>
</tr>
<tr>
<td>Drive sprocket fixing plate bolt</td>
<td>2</td>
<td>6</td>
<td>12 (1.2, 9)</td>
<td></td>
</tr>
</tbody>
</table>

### CYLINDER HEAD/VALVES

<table>
<thead>
<tr>
<th>ITEM</th>
<th>Q'TY</th>
<th>THREAD DIA. (mm)</th>
<th>TORQUE N·m (kgf-m, lbf-ft)</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cylinder head cover bolt</td>
<td>2</td>
<td>6</td>
<td>10 (1.0, 7)</td>
<td></td>
</tr>
<tr>
<td>Rocker arm shaft bolt</td>
<td>2</td>
<td>5</td>
<td>5 (0.5, 3.7)</td>
<td></td>
</tr>
<tr>
<td>Insulator socket bolt</td>
<td>2</td>
<td>6</td>
<td>12 (1.2, 9)</td>
<td></td>
</tr>
<tr>
<td>Cam sprocket bolt</td>
<td>2</td>
<td>5</td>
<td>9 (0.9, 6.6)</td>
<td>Apply engine oil to the threads and seating surface.</td>
</tr>
<tr>
<td>Camshaft holder bolt</td>
<td>4</td>
<td>8</td>
<td>32 (3.3, 24)</td>
<td></td>
</tr>
<tr>
<td>Cam chain tensioner lifter plug</td>
<td>1</td>
<td>6</td>
<td>4 (0.4, 3.0)</td>
<td></td>
</tr>
</tbody>
</table>

### CYLINDER/PISTON

<table>
<thead>
<tr>
<th>ITEM</th>
<th>Q'TY</th>
<th>THREAD DIA. (mm)</th>
<th>TORQUE N·m (kgf-m, lbf-ft)</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cylinder stud bolt</td>
<td>4</td>
<td>6</td>
<td>11 (1.1, 8)</td>
<td>See page 8-6</td>
</tr>
</tbody>
</table>

### CLUTCH/GEARSHIFT LINKAGE

<table>
<thead>
<tr>
<th>ITEM</th>
<th>Q'TY</th>
<th>THREAD DIA. (mm)</th>
<th>TORQUE N·m (kgf-m, lbf-ft)</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clutch center lock nut</td>
<td>1</td>
<td>14</td>
<td>74 (7.5, 55)</td>
<td>Apply engine oil to the threads and seating surface.</td>
</tr>
<tr>
<td>Clutch lifter plate bolt</td>
<td>4</td>
<td>6</td>
<td>12 (1.2, 9)</td>
<td></td>
</tr>
<tr>
<td>Oil filter rotor lock nut</td>
<td>1</td>
<td>14</td>
<td>64 (6.5, 47)</td>
<td>Apply engine oil to the threads and seating surface.</td>
</tr>
<tr>
<td>Gearshift cam bolt</td>
<td>1</td>
<td>6</td>
<td>12 (1.2, 9)</td>
<td>Apply locking agent to the threads.</td>
</tr>
<tr>
<td>Shift drum stopper arm bolt</td>
<td>1</td>
<td>6</td>
<td>12 (1.2, 9)</td>
<td>Apply locking agent to the threads.</td>
</tr>
</tbody>
</table>

### ALTERNATOR/STARTER CLUTCH

<table>
<thead>
<tr>
<th>ITEM</th>
<th>Q'TY</th>
<th>THREAD DIA. (mm)</th>
<th>TORQUE N·m (kgf-m, lbf-ft)</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flywheel lock nut</td>
<td>1</td>
<td>14</td>
<td>74 (7.5, 55)</td>
<td>Apply engine oil to the threads and seating surface.</td>
</tr>
<tr>
<td>Starter clutch torx screw</td>
<td>6</td>
<td>6</td>
<td>16 (1.6, 12)</td>
<td>Apply locking agent to the threads.</td>
</tr>
<tr>
<td>CKP sensor socket bolt</td>
<td>2</td>
<td>6</td>
<td>12 (1.2, 9)</td>
<td>Apply locking agent to the threads.</td>
</tr>
<tr>
<td>Wire guide bolt</td>
<td>1</td>
<td>6</td>
<td>12 (1.2, 9)</td>
<td>Apply locking agent to the threads.</td>
</tr>
</tbody>
</table>

### CRANKSHAFT/TRANSMISSION

<table>
<thead>
<tr>
<th>ITEM</th>
<th>Q'TY</th>
<th>THREAD DIA. (mm)</th>
<th>TORQUE N·m (kgf-m, lbf-ft)</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mainshaft bearing setting plate bolt</td>
<td>2</td>
<td>6</td>
<td>12 (1.2, 9)</td>
<td>Apply locking agent to the threads.</td>
</tr>
<tr>
<td>Push plug bolt</td>
<td>1</td>
<td>6</td>
<td>10 (1.0, 7)</td>
<td>Apply locking agent to the threads.</td>
</tr>
</tbody>
</table>
## GENERAL INFORMATION

### FRONT WHEEL/SUSPENSION/STEERING

<table>
<thead>
<tr>
<th>ITEM</th>
<th>Q'TY</th>
<th>THREAD DIA. (mm)</th>
<th>TORQUE N·m (kgf·m, lbf·ft)</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clutch lever pivot bolt</td>
<td>1</td>
<td>6</td>
<td>1 (0.1, 0.7)</td>
<td></td>
</tr>
<tr>
<td>Clutch lever pivot nut</td>
<td>1</td>
<td>6</td>
<td>5.9 (0.6, 4.4)</td>
<td></td>
</tr>
<tr>
<td>Front axle nut</td>
<td>1</td>
<td>12</td>
<td>54 (5.5, 40)</td>
<td></td>
</tr>
<tr>
<td>Front brake disc mounting bolt</td>
<td>6</td>
<td>8</td>
<td>42 (4.3, 31)</td>
<td>ALOC bolt; replace with a new one.</td>
</tr>
<tr>
<td>Handlebar end screw</td>
<td>2</td>
<td>6</td>
<td>9 (0.9, 6.6)</td>
<td>ALOC bolt; replace with a new one.</td>
</tr>
<tr>
<td>Handlebar lower holder nut</td>
<td>2</td>
<td>10</td>
<td>39 (4.0, 29)</td>
<td></td>
</tr>
<tr>
<td>Handlebar upper holder bolt</td>
<td>4</td>
<td>6</td>
<td>12 (1.2, 9)</td>
<td></td>
</tr>
<tr>
<td>Fork socket bolt</td>
<td>2</td>
<td>8</td>
<td>20 (2.0, 15)</td>
<td>Apply locking agent to the threads.</td>
</tr>
<tr>
<td>Fork cap</td>
<td>2</td>
<td>26</td>
<td>22 (2.2, 16)</td>
<td></td>
</tr>
<tr>
<td>Bottom bridge pinch bolt</td>
<td>2</td>
<td>8</td>
<td>32 (3.3, 24)</td>
<td></td>
</tr>
<tr>
<td>Top fork bolt</td>
<td>2</td>
<td>10</td>
<td>44 (4.5, 33)</td>
<td></td>
</tr>
<tr>
<td>Steering bearing adjusting nut</td>
<td>1</td>
<td>26</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Steering stem nut</td>
<td>1</td>
<td>24</td>
<td>74 (7.5, 55)</td>
<td>See page 12-29</td>
</tr>
</tbody>
</table>

### REAR WHEEL/SUSPENSION

<table>
<thead>
<tr>
<th>ITEM</th>
<th>Q'TY</th>
<th>THREAD DIA. (mm)</th>
<th>TORQUE N·m (kgf·m, lbf·ft)</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Driven sprocket nut</td>
<td>4</td>
<td>8</td>
<td>32 (3.3, 24)</td>
<td></td>
</tr>
<tr>
<td>Rear axle nut</td>
<td>1</td>
<td>12</td>
<td>54 (5.5, 40)</td>
<td></td>
</tr>
<tr>
<td>Shock absorber mounting nut</td>
<td>2</td>
<td>10</td>
<td>34 (3.5, 25)</td>
<td></td>
</tr>
<tr>
<td>Shock absorber mounting bolt</td>
<td>2</td>
<td>10</td>
<td>34 (3.5, 25)</td>
<td></td>
</tr>
<tr>
<td>Brake panel stopper arm joint nut</td>
<td>2</td>
<td>8</td>
<td>22 (2.2, 16)</td>
<td></td>
</tr>
<tr>
<td>Swingarm pivot nut</td>
<td>1</td>
<td>12</td>
<td>54 (5.5, 40)</td>
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</table>

### BRAKE SYSTEM

<table>
<thead>
<tr>
<th>ITEM</th>
<th>Q'TY</th>
<th>THREAD DIA. (mm)</th>
<th>TORQUE N·m (kgf·m, lbf·ft)</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caliper bleeder valve</td>
<td>1</td>
<td>8</td>
<td>5.4 (0.6, 4)</td>
<td>ALOC bolt; replace with a new one.</td>
</tr>
<tr>
<td>Master cylinder holder bolt</td>
<td>2</td>
<td>6</td>
<td>9 (0.9, 6.6)</td>
<td></td>
</tr>
<tr>
<td>Master cylinder reservoir cap screw</td>
<td>2</td>
<td>4</td>
<td>1.2 (0.1, 0.9)</td>
<td></td>
</tr>
<tr>
<td>Brake caliper mounting bolt</td>
<td>2</td>
<td>8</td>
<td>30 (3.1, 22)</td>
<td></td>
</tr>
<tr>
<td>Front brake light switch screw</td>
<td>1</td>
<td>4</td>
<td>1.2 (0.1, 0.9)</td>
<td></td>
</tr>
<tr>
<td>Brake lever pivot bolt</td>
<td>1</td>
<td>6</td>
<td>1.0 (0.1, 0.7)</td>
<td></td>
</tr>
<tr>
<td>Brake lever pivot nut</td>
<td>1</td>
<td>6</td>
<td>6.0 (0.6, 4.4)</td>
<td></td>
</tr>
<tr>
<td>Brake hose oil bolt</td>
<td>2</td>
<td>10</td>
<td>34 (3.5, 25)</td>
<td></td>
</tr>
<tr>
<td>Brake caliper slide pin</td>
<td>1</td>
<td>8</td>
<td>22 (2.2, 16)</td>
<td>Apply locking agent to the threads.</td>
</tr>
<tr>
<td>Brake arm nut</td>
<td>1</td>
<td>6</td>
<td>10 (1.0, 7)</td>
<td></td>
</tr>
<tr>
<td>Brake pad pin</td>
<td>1</td>
<td>10</td>
<td>17 (1.7, 13)</td>
<td></td>
</tr>
</tbody>
</table>

### ELECTRIC STARTER

<table>
<thead>
<tr>
<th>ITEM</th>
<th>Q'TY</th>
<th>THREAD DIA. (mm)</th>
<th>TORQUE N·m (kgf·m, lbf·ft)</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Starter motor bolt</td>
<td>2</td>
<td>5</td>
<td>4.9 (0.5, 3.6)</td>
<td></td>
</tr>
</tbody>
</table>

### LIGHTS/METER/SWITCHES

<table>
<thead>
<tr>
<th>ITEM</th>
<th>Q'TY</th>
<th>THREAD DIA. (mm)</th>
<th>TORQUE N·m (kgf·m, lbf·ft)</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuel level sensor mounting nut</td>
<td>4</td>
<td>6</td>
<td>9 (0.9, 6.6)</td>
<td></td>
</tr>
</tbody>
</table>
### GENERAL INFORMATION

### LUBRICATION & SEAL POINTS

#### ENGINE

<table>
<thead>
<tr>
<th>MATERIAL</th>
<th>LOCATION</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liquid sealant</td>
<td>Left crankcase mating surface</td>
<td>See page 11-20</td>
</tr>
<tr>
<td></td>
<td>Alternator wire grommet seating surface</td>
<td></td>
</tr>
<tr>
<td>Engine oil</td>
<td>Oil pump inner, outer rotors and rotor shaft</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Oil through sliding surface</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Oil pump driven gear teeth</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Rocker arm shaft whole surface</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Rocker arm inner and roller surfaces</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Camshaft whole surface</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cam chain entire surface</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cylinder inner surface</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Piston pin hole and ring groove</td>
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</tr>
<tr>
<td></td>
<td>Piston sliding surface</td>
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</tr>
<tr>
<td></td>
<td>Piston ring whole surface</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Clutch disc whole surface</td>
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</tr>
<tr>
<td></td>
<td>Primary drive gear teeth</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Primary driven gear teeth</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Clutch lifter rod whole surface</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Gearshift spindle journal rotating area</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Transmission gear teeth</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Starter clutch rolling surface</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Starter reduction gear shaft whole surface</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Shift fork shaft whole surface</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Shift drum journal rotating surface</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Each bearing rotating surface</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Each O-ring</td>
<td></td>
</tr>
<tr>
<td>Multi-purpose grease</td>
<td>Each dust seal lips</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Each oil seal lips</td>
<td></td>
</tr>
<tr>
<td>Molybdenum oil solution (mixture of the engine oil and molybdenum grease in a ratio of 1:1)</td>
<td>Valve stem sliding surface and stem end</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Piston pin outer surface</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Clutch outer guide whole surface</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Clutch outer rotating surface</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Starter driven gear inner surface</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Crankshaft connecting rod small end inner surface</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Push plug whole surface</td>
<td></td>
</tr>
<tr>
<td></td>
<td>C1, C2, C3 gear inner surface</td>
<td></td>
</tr>
<tr>
<td></td>
<td>C1, C2, C3 gear bushing whole surface</td>
<td></td>
</tr>
<tr>
<td></td>
<td>M4, M5 gear inner surface</td>
<td></td>
</tr>
<tr>
<td></td>
<td>M3, C4, C5 gear shift fork grooves</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Crankshaft connecting rod big end needle bearing</td>
<td></td>
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<tr>
<td></td>
<td>Each gear inner surface</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 - 2 cm³</td>
</tr>
<tr>
<td>Locking agent</td>
<td>Shift drum stopper arm bolt threads</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Gearshift cam bolt threads</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Starter clutch torx screw threads</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CKP sensor mounting bolt threads</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mainshaft bearing setting plate bolt threads</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Wire guide bolt threads</td>
<td></td>
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<tr>
<td></td>
<td>Push plug bolt threads</td>
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<td></td>
<td>Coating width: 6.5 ± 1.0 mm (0.26 ± 0.04 in) from tip</td>
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<td>Coating width: 6.5 ± 1.0 mm (0.26 ± 0.04 in) from tip</td>
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<td>Coating width: 6.5 ± 1.0 mm (0.26 ± 0.04 in) from tip</td>
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<tr>
<td></td>
<td>Coating width: 6.5 ± 1.0 mm (0.26 ± 0.04 in) from tip</td>
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</table>

1-14
<table>
<thead>
<tr>
<th>MATERIAL</th>
<th>LOCATION</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multi-purpose grease with extreme pressure (SHELL ALVANIA EP2 or EXCELITE EP2 or equivalent)</td>
<td>Steering cone races and steering ball races&lt;br&gt;Steering dust seal lips</td>
<td>Apply 3 g (0.1 oz) or more&lt;br&gt;Apply 3 g (0.1 oz) or more</td>
</tr>
<tr>
<td>Multi-purpose grease</td>
<td>Front wheel dust seal lips&lt;br&gt;Driven flange dust seal lips&lt;br&gt;Rear wheel hub O-ring&lt;br&gt;Brake cam sliding surface and shoe contacting area&lt;br&gt;Brake panel anchor pin sliding surface&lt;br&gt;Center stand shaft sliding surface&lt;br&gt;Gearshift pedal pivot sliding surface&lt;br&gt;Joint rod sliding surface&lt;br&gt;Speedometer cable casing inside&lt;br&gt;Speedometer gear box seal lips&lt;br&gt;Speedometer pinion gear teeth&lt;br&gt;Speedometer gear box inner area and retainer tabs&lt;br&gt;Brake pedal pivot shaft sliding surface&lt;br&gt;Throttle grip/pipe flange&lt;br&gt;Clutch lever pivot bolt sliding surface&lt;br&gt;Side stand sliding surface&lt;br&gt;Seat lock stay sliding surface&lt;br&gt;Fork oil seal lips&lt;br&gt;Each dust seal lips&lt;br&gt;Each bearing rotating area&lt;br&gt;Each O-ring</td>
<td>Apply 0.20 – 0.30 g (0.007 – 0.010 oz) or more&lt;br&gt;Apply 0.20 – 0.30 g (0.007 – 0.010 oz) or more&lt;br&gt;Apply 1 g (0.04 oz)&lt;br&gt;Apply 3 g (0.1 oz)&lt;br&gt;Apply 1.8 g (0.06 oz)</td>
</tr>
<tr>
<td>Engine oil</td>
<td>Brake cam felt seal</td>
<td></td>
</tr>
<tr>
<td>Drive chain lubricant</td>
<td>Drive chain</td>
<td></td>
</tr>
<tr>
<td>Silicone grease</td>
<td>Throttle cable boot inside and casing inside&lt;br&gt;Clutch cable boot inside and casing inside&lt;br&gt;Brake lever pivot bolt sliding surface&lt;br&gt;Brake lever contacting area of the master piston&lt;br&gt;Brake caliper pin boot inner surface&lt;br&gt;Brake caliper dust seal whole surface&lt;br&gt;Brake pad pin O-ring</td>
<td></td>
</tr>
<tr>
<td>DOT 3 or DOT 4 brake fluid</td>
<td>Brake master piston, spring and piston cups&lt;br&gt;Brake caliper piston seal whole surface&lt;br&gt;Brake caliper piston outer surface</td>
<td></td>
</tr>
<tr>
<td>Locking agent</td>
<td>Driven flange stud bolt&lt;br&gt;Brake caliper slide pin&lt;br&gt;Ignition switch mounting screw threads&lt;br&gt;Side stand switch bolt/washer threads</td>
<td></td>
</tr>
<tr>
<td>Fork fluid</td>
<td>Fork cap O-ring</td>
<td></td>
</tr>
<tr>
<td>Honda Bond A or equivalent</td>
<td>Left handlebar and inside of handlebar grip&lt;br&gt;Throttle pipe and inside of throttle grip&lt;br&gt;Air cleaner connecting tube contacting surface</td>
<td></td>
</tr>
</tbody>
</table>
GENERAL INFORMATION

RIGHT TURN SIGNAL LIGHT WIRE
LEFT TURN SIGNAL LIGHT WIRE
TURN SIGNAL RELAY WIRE
MAIN WIRE HARNESS

INSIDE BOOT:
- FRONT TURN SIGNAL LIGHT WIRE CONNECTORS
- HEADLIGHT/POSITION LIGHT/TURN SIGNAL RELAY 6P (BLACK) CONNECTOR
- COMBINATION METER 4P (NATURAL) CONNECTOR
- COMBINATION METER 6P (NATURAL) CONNECTOR
- DLC
BRAKE LIGHT SWITCH WIRE
LEFT HANDLEBAR SWITCH WIRE
COMBINATION METER WIRE
SPEEDOMETER CABLE
THROTTLE CABLE
CLUTCH CABLE
RIGHT HANDLEBAR SWITCH WIRE
LEFT HANDLEBAR SWITCH WIRE
INSIDE BOOT:
- COMBINATION METER 4P (NATURAL) CONNECTOR
- COMBINATION METER 6P (NATURAL) CONNECTOR
- FRONT TURN SIGNAL WIRE CONNECTORS
- HEADLIGHT/POSITION LIGHT/TURN SIGNAL RELAY 6P (BLACK) CONNECTOR
- DLC
FRONT BRAKE HOSE
IGNITION SWITCH WIRE
10 - 15 mm (0.4 - 0.6 in)
GENERAL INFORMATION

INSIDE BOOT:
- IGNITION SWITCH 3P (NATURAL) CONNECTOR
- HANDLEBAR SWITCH 6P (NATURAL) CONNECTOR
- HANDLEBAR SWITCH 4P (BLACK) CONNECTOR
- HANDLEBAR SWITCH 4P (NATURAL) CONNECTOR

BANK ANGLE SENSOR
3P (GRAY) CONNECTOR

O₂ SENSOR 2P (NATURAL) CONNECTOR

EOT SENSOR WIRE

FUEL FEED HOSE

FUEL PUMP 2P (BLACK) CONNECTOR

MAIN WIRE HARNESS

NEUTRAL SWITCH

SIDESTAND SWITCH

NEUTRAL SWITCH WIRE

SIDESTAND SWITCH WIRE

SIDESTAND SWITCH
GENERAL INFORMATION

BATTERY POSITIVE (+) CABLE
REAR LEFT TURN SIGNAL WIRE
STARTER RELAY SWITCH WIRE
REGULATOR/RECTIFIER 4P (BLACK) CONNECTOR
MAIN HARNESS
BATTERY NEGATIVE (-) CABLE (GROUND CABLE)
STARTER MOTOR CABLE

INSIDE BOOT:
- BRAKE/TAIL LIGHT 3P (NATURAL) CONNECTOR
- REAR TURN SIGNAL LIGHT WIRE CONNECTORS
GENERAL INFORMATION

EMISSION CONTROL SYSTEMS

SOURCE OF EMISSIONS

The combustion process produces carbon monoxide (CO), oxides of nitrogen (NOx) and hydrocarbons (HC). Control of carbon monoxide, oxides of nitrogen and hydrocarbons is very important because, under certain conditions, they react to form photochemical smog when subjected to sunlight. Carbon monoxide does not react in the same way, but it is toxic.

Honda Motor Co., Ltd. utilizes various systems (page 1-28), to reduce carbon monoxide, oxides of nitrogen and hydrocarbons.

CRANKCASE EMISSION AND EXHAUST EMISSION CONTROL SYSTEMS

The engine is equipped with a closed crankcase system to prevent discharging crankcase emissions into the atmosphere. Blow-by gas is returned to the combustion chamber through the air cleaner and throttle body.

The exhaust emission control system is composed of a three-way catalytic converter and PGM-Fi system.

THREE-WAY CATALYTIC CONVERTER

This motorcycle is equipped with a three-way catalytic converter.

The three-way catalytic converter is in the exhaust system. Through chemical reactions, it converts HC, CO and NOx in the engine’s exhaust to carbon dioxide (CO2), nitrogen (N2) and water vapor.

No adjustment to these systems should be made although periodic inspection of the components is recommended.
GENERAL INFORMATION

NOISE EMISSION CONTROL SYSTEM

TAMPERING WITH THE NOISE EMISSION CONTROL SYSTEM IS PROHIBITED: Local law may prohibit the following acts or the causing thereof: (1) The removal or rendering inoperative by any person, other than for the purpose of maintenance, repair or replacement, of any device or element of design incorporated into any vehicle for the purpose of noise control prior to its sale or delivery to the ultimate customer or while it is in use; or (2) the use of the vehicle after such device or element of design has been remove or rendered inoperative by any person.

AMONG THOSE ACTS PRESUMED TO CONSTITUTE TAMPERING ARE THE ACTS LISTED BELOW:

1. Removal of or puncturing of the muffler, baffles, header pipes or any other component which conducts exhaust gases.
2. Removal of or puncturing of any parts of the intake system.
3. Lack of proper maintenance.
4. Replacing any moving parts of the vehicle, or parts of the exhaust or intake system, with parts other than those specified by the manufacturer.
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SERVICE INFORMATION .......................... 2-3
TROUBLESHOOTING .............................. 2-3
SNAP FIT CLIP ................................. 2-4
WINDSCREEN .................................... 2-4
FRONT COWL ................................... 2-5
FRONT FENDER ................................. 2-9
SIDE COVER ................................... 2-10
PILLION SEAT .................................. 2-11
SEAT ............................................. 2-11
REAR GRIP ..................................... 2-12
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HUGGER FENDER ................................. 2-16
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REARVIEW MIRROR ............................... 2-19
SIDESTAND ..................................... 2-19
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FRAME/BODY PANELS/EXHAUST SYSTEM

BODY PANEL LOCATIONS

- REARVIEW MIRROR
- WINDSCREEN
- FRONT COWL
- FRONT FENDER
- SEAT
- REAR GRIP
- PILLION SEAT
- REAR COWL
- REAR FENDER COVER
- REAR FENDER
- SIDE COVER
- HUGGER FENDER
- FRONT COWL PANELS
SERVICE INFORMATION

GENERAL
- This section covers removal and installation of the body panels, exhaust system, sidestand and center stand.
- Serious burns may result if the exhaust system is not allowed to cool before components are removed or serviced.
- Always replace the exhaust pipe gasket with a new one after loosening or removing the exhaust pipe joint nuts.
- When installing the exhaust system, loosely install all of the exhaust pipe/muffler fasteners, always tighten the exhaust pipe joint nuts first, then tighten the mounting bolt and nut; if you tighten the mounting bolt and nut first, the exhaust pipe may not seat properly.
- Always inspect the exhaust system for leaks after installation.

TORQUE VALUES

<table>
<thead>
<tr>
<th>Component</th>
<th>Torque Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exhaust pipe stud bolt</td>
<td>11 N-m (1.1 kgf-m, 8 lbf-ft)</td>
</tr>
<tr>
<td>Front cowl screw</td>
<td>5 N-m (0.5 kgf-m, 3.7 lbf-ft)</td>
</tr>
<tr>
<td>Side cover screw</td>
<td>5 N-m (0.5 kgf-m, 3.7 lbf-ft)</td>
</tr>
<tr>
<td>Muffler protector screw</td>
<td>9 N-m (0.9 kgf-m, 6.6 lbf-ft)</td>
</tr>
<tr>
<td>Rearview mirror adapter</td>
<td>34 N-m (3.5 kgf-m, 25 lbf-ft)</td>
</tr>
<tr>
<td>Sidestand pivot bolt</td>
<td>10 N-m (1.0 kgf-m, 7 lbf-ft)</td>
</tr>
<tr>
<td>Sidestand pivot nut</td>
<td>29 N-m (3.0 kgf-m, 21 lbf-ft)</td>
</tr>
</tbody>
</table>

See page 2-18
Left-hand threads

TROUBLESHOOTING

Excessive exhaust noise
- Broken exhaust system
- Exhaust gas leak

Poor performance
- Deformed exhaust system
- Exhaust gas leak
- Clogged muffler
SNAP FIT CLIP

REMOVAL/INSTALLATION

Make sure that the insertion of the clip is not tilted when removing or installing the snap fit clip. If tilted upon removal or installation, damage to the insertion and/or the hole may occur.

Separate the parts by pulling the snap fit clip straight out of the hole, being careful not to tilt the insertion of the clip.

Check the snap fit clip for damage and replace if necessary.

Install the parts by inserting the snap fit clip straight into the hole, being careful not to tilt the insertion of the clip.

WINDSCREEN

REMOVAL/INSTALLATION

Remove the following:
- Screws
- Washers
- Windscreen
- Special nuts

Installation is in the reverse order of removal.
- Tighten the windscreen screws properly as shown.
FRONT COWL

REMOVAL/INSTALLATION

Be careful not to damage the snap fit clips and holes.

Remove the windscreen (page 2-4).

Remove the screws and front cowl panels.

Unhook the harness from the clamps.

Slide the rubber boot and disconnect the turn signal light and headlight/position light/turn signal relay 6P (Black) connectors.

Release the speedometer cable from the hook of the front cowl.
Remove the bolt and collar from the front side of the front cowl.

Remove the front cowl screws.

Remove the slots of the front cowl rear end from the tabs of the fuel tank.

Be careful not to damage the tabs.

Remove the front cowl by releasing its tabs from the grommets.

Installation is in the reverse order of removal.

- Tighten the front cowl screws to the specified torque.

TORQUE: 5 N·m (0.5 kgf m, 3.7 lbf ft)

DISASSEMBLY/ASSEMBLY

Unhook the turn signal light relay from the rubber.

Remove the rubber from the front cowl.
Unhook the wires from the wire band.
Remove the nuts and tune signal lights (page 18-5).
Disconnect the headlight 3P (Natural) connector and pull the position light socket out from the headlight.
Remove the bolt, clips and headlight.
Remove the screws A and clamps.
Remove the screws B, C and turn signal light stay.
Remove the screws D, screws E, front cowl, left and right front cowls.
Remove the screws F and front cowl inner panel stays.

Assembly is in the reverse order of disassembly.

- Install the left and right front cowls to the front cowl while aligning them tabs with the slots of the front cowl as show.
FRONT FENDER

REMOVAL/INSTALLATION
Remove the bolts, brake hose clamp, collars and front fender stay.
Remove the front fender by pulling it upward.
Remove the rubbers if necessary.

Installation is in the reverse order of removal.
SIDE COVER

REMOVAL/INSTALLATION

Remove the front cowl and side cover screws.

Release the side cover tabs from the fuel tank grommets.
Remove the side cover by releasing its slot from the tab.

Installation is in the reverse order of removal.
• Tighten the front cowl and side cover screws to the specified torque.

TORQUE: 5 N·m (0.5 kgf·m, 3.7 lbf·ft)
PILLION SEAT

REMOVAL/INSTALLATION
Unhook the pillion seat lock using the ignition key.
Remove the pillion seat by pulling it rearward.
Apply 1.8 g (0.06 oz) of grease to the seat lock stay sliding surface.
Install the pillion seat by inserting its tabs to the hooks of the frame, then push down the rear of the pillion seat until it locks.

SEAT

REMOVAL/INSTALLATION
Remove the pillion seat (page 2-11).
Remove the bolts, collars and seat rearward.
Install the seat by aligning the following:
- Seat prong with the frame
- Seat tabs with the fuel tank
- Bolt holes of the seat and seat rail
Install and tighten the bolts securely.
REAR GRIP

REMOVAL/INSTALLATION
Remove the pillion seat (page 2-11).
Remove the bolts and rear grip.
Installation is in the reverse order of removal.
REAR COWL

REMOVAL/INSTALLATION

Remove the rear grip (page 2-12).
Remove the bolts and collars.
Disconnect the brake/tail light 3P (Natural) connector.
Carefully release the bosses of the rear cowl from the grommets of the frame, then remove the rear cowl.

Installation is in the reverse order of removal.
Be careful not to damage the snap fit clips and holes.

Remove the screws and separate the upper rear cowl from the lower rear cowl.
Remove the screws and tail light lid.
Remove the rubbers from the upper rear cowl.
Remove the screws and brake/tail light stay.
Remove the screws, washers and brake/tail light.

Assembly is in the reverse order of disassembly.

REAR FENDER

REMOVAL/INSTALLATION

Remove the following:
- Battery (page 15-7)
- Rear cowl (page 2-13)
- Seat (page 2-11)
Dis Connnect the rear turn signal light wire connectors.
Remove the bolts and rear turn signal light stay.
Remove the screws, bolt and rear fender cover.

Remove the bolts A, bolts B, bolts C and rear fender.
Remove the seat lock and collars.
Remove the lock plate and key cylinder.
Installation is in the reverse order of removal.
HUGGER FENDER

REMOVAL/INSTALLATION
Remove the bolts and hugger fender.

Install the hugger fender by aligning its tabs with the hooks of the swingarm.
Install the bolts securely.

EXHAUST PIPE/MUFFLER

REMOVAL
Remove the nuts.

Remove the following:
- Nut
- Washer
- Bolt
- Collar
- Exhaust pipe/muffler
Remove the rubber if necessary.
Remove the gasket from the cylinder head.
Check the installed length of the stud bolts (page 2-18).

**INSTALLATION**
Install a new gasket into the exhaust port.
Install the exhaust pipe/muffler, then loosely install the exhaust pipe joint nuts, collar, bolt, washer and nut.

Always replace the exhaust pipe gasket with a new one when removing the exhaust pipe/muffler.
Tighten the exhaust pipe joint nuts securely, then tighten the nut while holding the bolt.

- Always inspect the exhaust system for leaks after installation.

**MUFLER PROTECTOR REMOVAL/INSTALLATION**

Remove the screw and rubber.

Remove the screws, collars, rubbers and muffler protector forward.

Install the following:

- Muffler protector by aligning its hole with the tab of the exhaust pipe/muffler
- Rubbers, collars and screws

Tighten the muffler protector screws to the specified torque.

**TORQUE: 9 N·m (0.9 kgf·m, 6.6 lbf·ft)**

**EXHAUST PIPE STUD BOLT**

Check that the length from the bolt head to the cylinder head surface is within specifications.

**STANDARD: 20.5 - 22.5 mm (0.81 - 0.89 in)**

If the exhaust pipe stud bolts are loose, tighten them to the specified torque.

**TORQUE: 11 N·m (1.1 kgf·m, 8 lbf·ft)**

After tightening the stud bolts, check that the length from the bolt head to the cylinder head surface is within specification.
REARVIEW MIRROR

REMOVAL/INSTALLATION

Remove the rearview mirrors.

- The rearview mirror has right-hand threads.
- The adapter has left-hand threads.

Install and tighten the rearview mirror adapter to the specified torque.

**TORQUE:** 34 N·m (3.5 kgf·m, 25 Ibf-ft)

Install the rearview mirror and tighten the lock nut while holding the adapter.

SIDESTAND

REMOVAL/INSTALLATION

Remove the bolt/washer and sidestand switch.

Remove the springs, nut, bolt and sidestand.

Install the sidestand and bolt, then tighten the bolt to the specified torque.

**TORQUE:** 10 N·m (1.0 kgf·m, 7 Ibf-ft)

Install and tighten the nut to the specified torque while holding the bolt.

**TORQUE:** 29 N·m (3.0 kgf·m, 21 Ibf-ft)

Hook the springs to the sidestand.
Install the sidestand switch by aligning its hole with the pin of the sidestand stay.

Apply locking agent to the threads of the sidestand switch bolt/washer.

Install the sidestand switch bolt/washer and tighten the bolt securely.

**CENTER STAND**

**REMOVAL/INSTALLATION**

Remove the exhaust pipe/muffler (page 2-16).

Support the motorcycle on its sidestand.

Unhook the center stand springs.

Remove the cotter pin and washer.

Remove the shaft and center stand.

Installation is in the reverse order of removal.

• Apply grease to the center stand shaft sliding surface.
3. MAINTENANCE

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NUTS, BOLTS, FASTENERS ....................................... 3-25

WHEELS/TIRES ....................................................... 3-25

STEERING HEAD BEARINGS ....................................... 3-26
**GENERAL**

- Place the motorcycle on a level surface before starting any work.
- Gasoline is extremely flammable and is explosive under certain conditions.
- Work in a well ventilated area. Smoking or allowing flames or sparks in the work area or where the gasoline is stored can cause a fire or explosion.
- The exhaust contains poisonous carbon monoxide gas that may cause loss of consciousness and may lead to death.
  Run the engine in an open area or with an exhaust evacuation system in an enclosed area.

**SPECIFICATIONS**

<table>
<thead>
<tr>
<th>ITEM</th>
<th>SPECIFICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Throttle grip freeplay</td>
<td>2 - 6 mm (1/16 - 1/4 in)</td>
</tr>
<tr>
<td>Spark plug</td>
<td>Standard: CPR7EA-9 (NGK) or URE6DC (BOSCH)</td>
</tr>
<tr>
<td></td>
<td>For extended high speed riding: CPR8EA-9 (NGK) or UR5DC (BOSCH)</td>
</tr>
<tr>
<td>Spark plug gap</td>
<td>IN: 0.8 - 0.9 mm (0.03 - 0.04 in)</td>
</tr>
<tr>
<td></td>
<td>EX: 0.12 ± 0.02 mm (0.005 ± 0.001 in)</td>
</tr>
<tr>
<td>Valve clearance</td>
<td>IN: 0.08 ± 0.02 mm (0.003 ± 0.001 in)</td>
</tr>
<tr>
<td></td>
<td>EX: 0.12 ± 0.02 mm (0.005 ± 0.001 in)</td>
</tr>
<tr>
<td>Engine oil capacity</td>
<td>After draining: 0.9 liter (1.0 US qt, 0.8 Imp qt)</td>
</tr>
<tr>
<td></td>
<td>After disassembly: 1.1 liter (1.2 US qt, 1.0 Imp qt)</td>
</tr>
<tr>
<td>Recommended engine oil</td>
<td>Honda &quot;4-stroke motorcycle oil&quot; or an equivalent</td>
</tr>
<tr>
<td>Engine idle speed</td>
<td>1,500 ± 100 min⁻¹ (rpm)</td>
</tr>
<tr>
<td>Drive chain size/link</td>
<td>RK: RK428KRO-T18 LE</td>
</tr>
<tr>
<td>Drive chain slack</td>
<td>15 - 25 mm (9/16 - 1 in)</td>
</tr>
<tr>
<td>Recommended brake fluid</td>
<td>DOT 3 or DOT 4</td>
</tr>
<tr>
<td>Brake pedal freeplay</td>
<td>20 - 30 mm (13/16 - 1-3/16 in)</td>
</tr>
<tr>
<td>Clutch lever freeplay</td>
<td>10 - 20 mm (3/8 - 13/16 in)</td>
</tr>
<tr>
<td>Cold tire pressure</td>
<td>Front: 175 kPa (1.75 kgf/cm², 25 psi)</td>
</tr>
<tr>
<td></td>
<td>Driver only: 175 kPa (1.75 kgf/cm², 25 psi)</td>
</tr>
<tr>
<td></td>
<td>Driver and passenger: 200 kPa (2.00 kgf/cm², 29 psi)</td>
</tr>
<tr>
<td></td>
<td>Rear: 225 kPa (2.25 kgf/cm², 33 psi)</td>
</tr>
<tr>
<td>Tire size</td>
<td>Front: 80/100 - 17 M/C 46P</td>
</tr>
<tr>
<td></td>
<td>Rear: 100/90 - 17 M/C 55P</td>
</tr>
<tr>
<td>Minimum tire tread depth</td>
<td>Front: 1.5 mm (0.06 in)</td>
</tr>
<tr>
<td></td>
<td>Rear: 2.0 mm (0.08 in)</td>
</tr>
</tbody>
</table>

**TORQUE VALUES**

<table>
<thead>
<tr>
<th>ITEM</th>
<th>TORQUE VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spark plug</td>
<td>16 N·m (1.6 kgf-m, 12 lbf-ft)</td>
</tr>
<tr>
<td>Valve adjusting screw lock nut</td>
<td>14 N·m (1.4 kgf-m, 10 lbf-ft)</td>
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<tr>
<td>Crankshaft hole cap</td>
<td>15 N·m (1.5 kgf-m, 11 lbf-ft)</td>
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<td>Timing hole cap</td>
<td>10 N·m (1.0 kgf-m, 7 lbf-ft)</td>
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<td>Oil drain bolt</td>
<td>30 N·m (3.1 kgf-m, 22 lbf-ft)</td>
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<td>Oil filter rotor cover screw</td>
<td>4 N·m (0.4 kgf-m, 3.0 lbf-ft)</td>
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<td>Rear axle nut</td>
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<tr>
<td>Air cleaner cover screw</td>
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<tr>
<td>Drive sprocket fixing plate bolt</td>
<td>12 N·m (1.2 kgf-m, 9 lbf-ft)</td>
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<tr>
<td>Driven sprocket nut</td>
<td>32 N·m (3.3 kgf-m, 24 lbf-ft)</td>
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<td>Sidestand pivot bolt</td>
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<td>Master cylinder reservoir cap screw</td>
<td>1.2 N·m (0.1 kgf-m, 0.9 lbf-ft)</td>
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</table>

Apply engine oil to the threads and seating surface.
Apply grease to the threads.
MAINTENANCE

TOOLS

Drive chain tool set
07HMH-MR10103

Valve adjusting wrench
07708-0030400
MAINTENANCE

MAINTENANCE SCHEDULE

Perform the Pre-ride inspection in the Owner’s Manual at each scheduled maintenance period.


The following items require some mechanical knowledge. Certain items (particularly those marked * and **) may require more technical information and tools. Consult an authorized Honda dealer.

### FREQUENCY

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* Should be serviced by an authorized Honda dealer, unless the owner has proper tools and service data and is mechanically qualified.

** In the interest of safety, we recommend these items be serviced only by an authorized Honda dealer.

Honda recommends that an authorized Honda dealer should road test the motorcycle after each periodic maintenance is carried out.

NOTES:

1. At higher odometer reading, repeat at the frequency interval established here.
2. Service more frequently when riding in unusually wet or dusty areas.
3. Service more frequently when riding in rain or at full throttle.
4. Replace every 2 years. Replacement requires mechanical skill.
**FUEL LINE**

Remove the side covers (page 2-10).
Check the fuel line for deterioration, damaged or leakage.
Replace the fuel line if necessary.
Also, check the fuel feed hose fittings for leakage.
Install the right and left side covers (page 2-10).

**THROTTLE OPERATION**

Check for smooth operation of the throttle and that it returns automatically to the fully closed position from any open position and from any steering positions.

If the throttle grip does not return properly, lubricate the throttle cable, then overhaul and lubricate the throttle grip housing.
For cable lubrication: Disconnect the throttle cable at its upper end. Thoroughly lubricate the cable and its pivot point with a commercially available cable lubricant or a lightweight oil.

If the throttle grip still does not return properly, replace the throttle cable.
With the engine idling, turn the handlebar all the way to the left and right to ensure that the idle speed does not change. If idle speed increases, check the throttle grip freeplay and throttle cable connection.
Measure the throttle grip freeplay at the throttle grip flange.
FREEPLAY: 2 – 6 mm (1/16 – 1/4 in)
Throttle grip freeplay can be adjusted at upper end of the throttle cable.

Minor adjustment is made with the upper adjuster.

Slide the rubber boot off the adjuster.
Adjust the freeplay by loosening the adjuster lock nut and turning the adjuster.
After adjustment, tighten the adjuster lock nut to the specified torque while holding the adjuster.

**TORQUE: 3 N·m (0.3 kgf·m, 2.2 lbf·ft)**

Recheck the throttle operation.
If the adjuster cannot be reached the correct freeplay, turn the adjuster all the way in and turn it out one turn, then adjust the major adjustment.

Major adjustment is made with the lower adjuster on the throttle body.

Remove the right side cover (page 2-10).
Loosen the lock nut, turn the adjuster as required and tighten the lock nut to the specified torque.

**TORQUE: 8 N·m (0.8 kgf·m, 5.9 lbf·ft)**

After adjustment, recheck the throttle operation.
Install the right side cover (page 2-10)

---

**AIR CLEANER**

**REMOVAL/INSTALLATION**

Remove the seat (page 2-11).

Remove the following:
- Rubber cover
- Screws
- Air cleaner cover
- Packings
- Air cleaner element

- The viscous paper element type air cleaner cannot be cleaned because the element contains a dust adhesive.
- If the motorcycle is used in unusually wet or dusty areas, more frequent inspections are required.

Installation is in the reverse order of removal.
- Check that the packings are in good condition, replace them if necessary.
- Align the rubber cover slits to the tabs of the rear fender.
- Tighten the air cleaner cover screws to the specified torque.

**TORQUE: 1.2 N·m (0.1 kgf·m, 0.9 lbf·ft)**
CRANKCASE BREATHER CLEANING

- Service more frequently when ridden in rain, at full throttle, or after the motorcycle is washed or overturned. Service if the deposit level can be seen in the drain plug.

Remove the right side cover (page 2-10).

Check the crankcase breather hose and replace it if the crankcase breather hose is deteriorated, damaged or leaked.

Also check the crankcase breather hose fittings for leakage.

Install the right side cover (page 2-10).

Check the drain plug.

If deposit has corrected, remove the clip and drain plug.

Drain deposits into a suitable container.

Install the drain plug and clip securely.

SPARK PLUG REMOVAL

Disconnect the spark plug cap.

Clean around the spark plug base with compressed air before removing the plug.

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

Inspect or replace the spark plug as described in the maintenance schedule (page 3-4).
INSPECTION

Always use the specified spark plug on this motorcycle.

Clean the spark plug electrodes with a wire brush or special plug cleaner.

Check the following:
- Insulator for damage or cracks
- Electrodes for wear
- Burning condition, discoloration

Replace the spark plug if necessary.

RECOMMENDED SPARK PLUG:

Standard:
CPR7EA-9 (NGK), UR6DC (BOSCH)
For extended high speed riding:
CPR8EA-9 (NGK), UR5DC (BOSCH)

Check the spark plug gap between the center and side electrodes with a feeler gauge.

SPARK PLUG GAP: 0.8 - 0.9 mm (0.03 - 0.04 in)

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

INSTALLATION

Do not overtighten the spark plug.

Install and hand tighten the spark plug to the cylinder head.

Tighten the spark plug to the specified torque using an equipped spark plug wrench or equivalent.

TORQUE: 16 N·m (1.6 kgf·m, 12 lbf·ft)

Install the spark plug cap securely.
VALVE CLEARANCE INSPECTION

NOTE:
- Inspect and adjust the valve clearance while the engine is cold (below 35°C/95°F).
- After the valve clearance inspection, check the engine idle speed (page 3-14).

Remove the cylinder head cover (page 7-6).

Remove the timing hole cap, crankshaft hole cap and O-rings.

Rotate the crankshaft counterclockwise, and align the "T" mark on the flywheel with the index notch on the left crankcase cover.

Make sure the piston is at TDC on the compression stroke.
This position can be obtained by confirming that there is slack in the rocker arms. If there is no slack, rotate the crankshaft counterclockwise one full turn and align the "T" mark with the index notch again.

The index lines on the cam sprocket must be flush with the cylinder head surface and timing mark "o" is facing front at TDC on the compression stroke.
If the timing mark is facing rear, rotate the crankshaft one full turn (360°), and match up the "T" mark again.
MAINTENANCE

When checking the clearance, slide the feeler gauge from the outside to the center.

Check each valve clearance by inserting a feeler gauge between the valve adjusting screw and valve stem.

VALVE CLEARANCE:
IN: 0.08 ± 0.02 mm (0.003 ± 0.001 in)
EX: 0.12 ± 0.02 mm (0.005 ± 0.001 in)

ADJUSTMENT

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

TOOL:
Valve adjusting wrench 07708-0030400

Apply engine oil to the valve adjusting screw lock nut threads and seating surface.

Hold the adjusting screw and tighten the valve adjusting screw lock nut to the specified torque.

TORQUE: 14 N-m (1.4 kgf-m, 10 lbf-ft)

Recheck the valve clearance.

Apply engine oil to new O-rings, and install them to each hole cap.

Apply grease to the crankshaft hole cap threads.

Install and tighten the crankshaft hole cap to the specified torque.

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

Install and tighten the timing hole cap to the specified torque.

TORQUE: 10 N-m (1.0 kgf-m, 7 lbf-ft)

Install the cylinder head cover (page 7-25).

ENGINE OIL

OIL LEVEL INSPECTION

Start the engine and let it idle for 3 - 5 minutes.
Stop the engine and wait 2 - 3 minutes.
Hold the motorcycle in an upright position.

Remove the oil filler cap/dipstick, and wipe oil from the dipstick with a clean shop towel.
Insert the oil filler cap/dipstick without screwing it in, then remove it.
Check the oil level. If the oil level is below or near the lower level line on the oil filler cap/dipstick, add the recommended oil to the upper level.

Other viscosities of oil may be used depending upon the average temperature in your riding area. Use the chart as a guide.

**RECOMMENDED ENGINE OIL:**
- Honda "4-stroke motorcycle oil" or an equivalent
- Oil recommendation: API classification, SG or higher (except oils labeled as energy conserving on the circular API service label)
- Viscosity: SAE 10W-30
- JASO T 903 standard: MA

Check the O-ring for wear or damage, and replace it if necessary.
Apply engine oil to the O-ring, and install it to the groove of oil filler cap/dipstick.
Install the oil filler cap/dipstick.

**OIL CHANGE**
Warm up the engine.
Stop the engine and remove the oil filler cap/dipstick.
MAINTENANCE

Place a clean container under the engine.
Remove the oil drain bolt and sealing washer.
Drain the engine oil completely.
Install the oil drain bolt with a new sealing washer,
and tighten it to the specified torque.
TORQUE: 30 N·m (3.1 kgf·m, 22 lbf ft)

Pour the recommended engine oil into the crankcase to the upper level line on the oil filler cap/dipstick.

OIL CAPACITY:
- 0.9 liters (1.0 US qt, 0.8 Imp qt) at draining
- 1.1 liters (1.2 US qt, 1.0 Imp qt) at disassembly

Check the engine oil level (page 3-10).
Make sure there are no oil leaks.

ENGINE OIL STRAINER SCREEN

REMOVAL/INSTALLATION

Remove the right crankcase cover (page 9-6).

Be careful not to damage the oil strainer screen.
Pull the oil strainer screen out of the crankcase.
Wash the oil strainer screen thoroughly in nonflammable or high flash point solvent until all accumulated dirt has been removed.
Blow and dry the oil strainer screen with compressed air to clean completely.
Before installing the oil strainer screen, it should be examined closely for damage, and make sure the sealing rubber is good condition.

Install the oil strainer screen with the thin edge facing in and flange side facing up as shown.
Install the right crankcase cover (page 9-8).
ENGINE OIL CENTRIFUGAL FILTER
CLEANING

Remove the right crankcase cover (page 9-6).

Do not allow dust and dirt to enter the oil passage in the crankshaft. Never use compressed air for cleaning.

Remove the screws, oil filter rotor cover and gasket.

Clean the oil filter rotor cover and inside of the oil filter rotor using a clean lint-free cloth.

While pressing the oil through from the reverse side, remove the clip.

Remove the oil through and spring from the oil filter rotor cover.

Blow and clean the oil through using compressed air.

Apply engine oil to the oil through sliding surface. Install the spring and oil through to the oil filter rotor cover.

While pressing the oil through from the reverse side, install the clip.

Check the oil through operates freely without binding.
MAINTENANCE

Install a new gasket to the oil filter rotor cover, then install them to the oil filter rotor. Install and tighten the screws to the specified torque.

**TORQUE**: 4 N·m (0.4 kgf·m, 3.0 lbf·ft)

Install the right crankcase cover (page 9-8).

---

ENGINE IDLE SPEED

**NOTE**

- Inspect the idle speed after all other engine maintenance items have been performed and are within specifications.
- Before checking the idle speed, inspect the following items:
  - No DTC and MIL blinking
  - Spark plug condition (page 3-8)
  - Air cleaner element condition (page 3-6)
- The engine must be warm for accurate idle speed inspection.
- This system eliminates the need for manual idle speed adjustment compared to previous designs.
- Use a tachometer with graduations or 50 min⁻¹ (rpm) or smaller that will accurately indicate a 50 min⁻¹ (rpm) change.

Turn the ignition switch ON and start the engine, and let it idle.

Check the idle speed.

**ENGINE IDLE SPEED**: 1,500 ± 100 min⁻¹ (rpm)

If the idle speed is out of the specification, check the following:

- Intake air leak or engine top-end problem (page 7-5)
- Throttle operation and freeplay (page 3-5)
- IACV operation (page 5-63)

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DRIVE CHAIN

**DRIVE CHAIN SLACK INSPECTION**

*Never inspect and adjust the drive chain while the engine is running.*

Turn the ignition switch OFF.

Place the motorcycle on its center stand and shift the transmission into neutral.

Check the slack in the drive chain lower run midway between the sprockets.

**DRIVE CHAIN SLACK**: 15 – 25 mm (9/16 – 1 in)

**NOTICE**

Excessive chain slack, 50 mm (1-15/16 in) or more, may damage the frame.
**ADJUSTMENT**

Loosen the rear axle nut.
Loosen the lock nuts and turn the adjusting nuts until the correct drive chain slack is obtained.

Make sure the arrow mark on both drive chain adjusters are aligned with the rear end of the axle slots in the swingarm.
Tighten the rear axle nut to the specified torque.

**TORQUE: 54 N·m (5.5 kgf·m, 40 lbf·ft)**

Hold the adjusting nuts and tighten the lock nuts.
Recheck the drive chain slack and free wheel rotation.

Check the drive chain wear indicator label attached on the left swingarm.
If the arrow mark of the drive chain adjuster reaches red zone of the indicator label, replace the drive chain with a new one (page 3-17).

**CLEANING AND LUBRICATION**

Clean the chain with non-flammable or high flash point solvent and wipe it dry.
Be sure the chain has dried completely before lubricating.
Inspect the drive chain for possible damage or wear.
Replace any chain that has damaged rollers, loose fitting links, or otherwise appears unserviceable.
Installing a new chain on badly worn sprockets will cause the new chain to wear quickly.
Inspect and replace sprockets as necessary.

Lubricate the drive chain with drive chain lubricant or equivalent designed specifically for use with O-ring chains. Wipe off the excess oil or drive chain lubricant.
**SPROCKET INSPECTION**

Remove the bolts, drive sprocket cover and guide plate.

Inspect the drive and driven sprocket teeth for wear or damage, replace them if necessary.

Never use a new drive chain on worn sprockets. Both chain and sprockets must be in good condition, or the new replacement chain will wear rapidly.

Check the attaching bolts and nuts on the drive and driven sprockets.

If any are loose, torque them.

**TORQUE:**
- Drive sprocket fixing plate bolt:
  - 12 N·m (1.2 kgf-m, 9 lbf·ft)
- Driven sprocket nut:
  - 32 N·m (3.3 kgf-m, 24 lbf·ft)
Install the guide plate by aligning its holes with the tabs of the drive sprocket cover.
Install the drive sprocket cover assembly.

Install and tighten the drive sprocket cover bolts.

REPLACEMENT
This motorcycle uses a drive chain with a staked master link.
Fully slacken the drive chain (page 3-15).
Assemble the special tool as shown.

TOOL:
Drive chain tool set 07HMH-MR10103
Locate the crimped pin ends of the master link from the outside of the drive chain, and remove the master link with the drive chain tool set.

**TOOL:**
Drive chain tool set 07HMH-MR10103

Remove the drive chain.

Remove the excess drive chain links from a new drive chain with the drive chain tool set.

**STANDARD LINKS:** 118 LINKS

**REPLACEMENT CHAIN:**
RK: RK428KRO-118LE

- Never reuse the old drive chain, master link, master link plate and O-rings.

Assemble the new master link, O-rings and plate.

Assemble and set the drive chain tool set.

**TOOL:**
Drive chain tool set 07HMH-MR10103
MAINTENANCE

Make sure that the master link pins are installed properly.
Measure the master link pin length projected from the plate.

STANDARD LENGTH:
Approx. 1.1 mm (0.04 in)

Stake the master link pins.

Make sure that the pins are staked properly by measuring the diameter of the staked area using a slide caliper.

DIAMETER OF THE STAKED AREA:
4.75 – 4.95 mm (0.187 – 0.195 in)

A drive chain with a clip-type master link must not be used. After staking, check the staked area of the master link for cracks. If there is any cracking, replace the master link, O-rings and plate.
MAINTENANCE

BRAKE FLUID

NOTICE
Spilled fluid can damage painted, plastic or rubber parts. Place a shop towel over these parts whenever the system is serviced.

• Do not mix different types of fluid, as they are not compatible with each other.
• Do not allow foreign material to enter the system when filling the reservoir.

BRAKE FLUID LEVEL INSPECTION
Support the motorcycle on its center stand.
Turn the handlebar so that the reservoir is level and check the brake reservoir level through the sight glass.
When the fluid level is low, check the brake pads for wear (page 3-20).
A low fluid level may be due to wear of the brake pads. If the brake pads are worn, the caliper pistons are pushed out, and this accounts for a low reservoir level. If the brake pads are not worn and the fluid level is low, check entire system for leaks (page 3-21).
If the brake system not leaks and fluid level is low, fill the brake fluid as follows.

BRAKE FLUID FILLING
Remove the screws, reservoir cap, set plate and diaphragm.
Add the reservoir with DOT 3 or DOT 4 brake fluid from a sealed container to the casting ledge.
Install the diaphragm, set plate and reservoir cap, then tighten the screws to the specified torque.
TORQUE: 1.2 N·m (0.1 kgf-m, 0.9 lbf-ft)

BRAKE SHOES/PADS WEAR

FRONT BRAKE PADS
Check the brake pads for wear.
Replace the brake pads if either pad is worn to the bottom of each wear limit groove.
For brake pad replacement (page 14-8).
REAR BRAKE SHOES

Check the wear indicator position when the brake pedal is applied.

If the arrow mark on the indicator plate aligns with the "Δ" mark on the brake panel, inspect the brake drum (page 14-22).

Replace the brake shoes (page 14-22) if the drum I.D. is within the service limit.

BRAKE SYSTEM

FRONT BRAKE

Firmly apply the brake lever, and check that no air has entered the system.
If the lever feels soft or spongy when operated, bleed the air from the system.
For air bleeding procedures (page 14-7).
Inspect the brake hose and fittings for deterioration, cracks, damage or signs of leakage.
Tighten any loose fittings.
Replace the hose and fittings as required.

REAR BRAKE

Check the brake pedal and brake rod for loose connections, excessive play, or other damage.
Replace or repair them if necessary.
Measure the rear brake pedal freeplay.
FREEPLAY: 20 - 30 mm (13/16 - 1-3/16 in)

Adjust the brake pedal freeplay by turning the adjusting nut.

Make sure the cutout of the adjusting nut is seated on the joint pin.
MAINTENANCE

Check the clearance of the joint pin and adjusting nut, by pushing the brake arm.
Make sure the cut-out of the adjusting nut is seated on the joint pin.
Make sure that the rear wheel rotates smoothly.
After adjusting the brake pedal freeplay, check the rear brake light switch operation (page 3-22).

BRAKE LIGHT SWITCH

NOTE:
- The brake light switch on the front brake master cylinder cannot be adjusted. If the front brake light switch actuation and brake engagement are not synchronized, either replace the switch unit or the malfunctioning parts of the system.
- Make the rear brake light switch adjustments after the brake pedal freeplay adjustment.

Check that the brake light comes on just prior to the brake actually being engaged.
If the light fails to come on, adjust the switch so that the light comes on at the proper time.

Hold the switch body and turn the adjusting nut as required.
Recheck the brake light switch operation.

HEADLIGHT AIM

Support the motorcycle on its center stand.
Adjust the headlight beam vertically by loosening the headlight adjusting bolt.
After adjusting the headlight aim, tighten the headlight adjusting bolt securely.
CLUTCH SYSTEM

Check the cable and clutch lever for loose connections, excessive play, or other damage. Replace or repair them if necessary.

Inspect the clutch cable for kinks or damage, and lubricate the cable.

Measure the clutch lever freeplay at the tip of the clutch lever.

FREEPLAY: 10 – 20 mm (3/8 – 13/16 in)

Adjustment is performed at the clutch lifter arm.

Loosen the adjuster lock nut and turn the adjuster. After adjustment is complete, tighten the adjuster lock nut while holding the adjuster.

Check the clutch operation. If the freeplay cannot be obtained, or the clutch slips during the test ride, remove and inspect the clutch (page 9-9).

SIDESTAND

INSPECTION

Support the motorcycle on its center stand.

Check the sidestand springs for damage or loss of tension.

Check the sidestand operation for freedom of movement and lubricate the sidestand pivot if necessary. Make sure the sidestand is not bent.

Check the sidestand ignition cut-off system:

- Sit astride the motorcycle and raise the sidestand.
- Start the engine with the transmission into neutral, then shift the transmission into gear, with the clutch lever squeezed.
- Move the sidestand full down.
- The engine should stop as the sidestand is lowered.

If there is a problem with the system, check the sidestand switch (page 18-13).

Remove the sidestand switch bolt/washer and sidestand switch.
MAINTENANCE

Check that the sidestand pivot bolt and pivot nut are tightened, and tighten them to the specified torque if loosened.

TORQUE:
- Sidestand pivot bolt: 10 N·m (1.0 kgf·m, 7 lbf·ft)
- Sidestand pivot nut: 29 N·m (3.0 kgf·m, 21 lbf·ft)

Install the sidestand switch by aligning its hole with the pin of the sidestand stay.

Apply locking agent to the threads of the sidestand switch bolt/washer.

Install the sidestand switch bolt/washer and tighten it securely.

SUSPENSION

FRONT SUSPENSION INSPECTION

Check the action of the forks by operating the front brake, and compressing the front suspension several times.

Check the entire assembly for signs of leaks, damage or loose fasteners.

Loose, worn or damaged suspension parts impair motorcycle stability and control.

Replace the damaged components which cannot be repaired.

Tighten all nuts and bolts.

For fork service (page 12-18).

REAR SUSPENSION INSPECTION

Check the action of the rear shock absorbers by compressing the rear end several times.

Check the entire shock absorber assembly for signs of leaks, damage or loose fasteners.

Loose, worn or damaged suspension parts impair motorcycle stability and control.

Replace the damaged components which cannot be repaired.

Tighten all nuts and bolts.

For shock absorber service (page 13-13).

Support the motorcycle on its center stand.

Check for worn swingarm bushings by grabbing the swingarm and attempting to move the swingarm side to side.

Replace the bushing if any looseness is noted.

For swingarm service (page 13-15).
NUTS, BOLTS, FASTENERS

Check that all chassis nuts, bolts and screws are tightened to their correct torque values (page 1-11). Check that all cotter pins, clips, hose clamps and cable stays are in place and properly secured.

WHEELS/TIRES

FRONT WHEEL
Support the motorcycle on its center stand and raise the front wheel off the ground.
Hold the front fork and move the front wheel sideways forcefully to see if the front wheel bearings are worn.
Replace the bearings if any looseness is noted.
Replace the front wheel bearings if any looseness is noted (page 12-15).

REAR WHEEL
Support the motorcycle on its center stand and raise the rear wheel off the ground.
Hold the swingarm and move the rear wheel sideways forcefully to see if the final bearing or swingarm bearing are worn.
Replace each bearing if any looseness is noted:
- Rear wheel bearings (page 13-8)
- Driven flange bearing (page 13-9)

TIRES
Check the tire pressure with a tire pressure gauge when the tires are cold.

<table>
<thead>
<tr>
<th>RECOMMENDED TIRE PRESSURE kPa (kgf/cm², psi)</th>
<th>FRONT</th>
<th>REAR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Driver only</td>
<td>175 (1.75, 25)</td>
<td>200 (2.00, 29)</td>
</tr>
<tr>
<td>Driver and passenger</td>
<td>175 (1.75, 25)</td>
<td>225 (2.25, 33)</td>
</tr>
</tbody>
</table>
MAINTENANCE

Check the tires for cuts, embedded nails, or other damage.

Check the trueness of each wheel:
- Front wheel (page 12-14)
- Rear wheel (page 13-7)

RECOMMENDED TIRE SIZE:

<table>
<thead>
<tr>
<th>Tire size</th>
<th>FRONT</th>
<th>80/100 - 17 M/C 46P</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>REAR</td>
<td>100/90 - 17 M/C 55P</td>
</tr>
</tbody>
</table>

Measure the tread depth at the center of the tires. Replace the tires when the tread depth reaches the following limits.

MINIMUM TREAD DEPTH:
- FRONT: 1.5 mm (0.06 in)
- REAR: 2.0 mm (0.08 in)

STEERING HEAD BEARINGS

Support the motorcycle on its center stand and raise the front wheel off the ground.

Check that the handlebar moves freely from side to side. Make sure that the control cables do not interfere with the handlebar rotation.

Hold the motorcycle and check the steering head bearings for wear by moving the fork forward to backward.

If the handlebar or fork moves unevenly, binds, or has vertical movement, inspect the steering head bearings (page 12-26).
4. LUBRICATION SYSTEM

LUBRICATION SYSTEM DIAGRAM ........ 4-2
SERVICE INFORMATION .................. 4-3
TROUBLESHOOTING ..................... 4-3
OIL PUMP .................................. 4-4
SERVICE INFORMATION

GENERAL

⚠️ CAUTION

Used engine oil may cause skin cancer if repeatedly left in contact with the skin for prolonged periods. Although this is unlikely unless you handle used oil on a daily basis, it is still advisable to thoroughly wash your hands with soap and water as soon as possible after handling used oil.

- The oil pump can be serviced with the engine installed in the frame.
- The service procedures in this section must be performed with the engine oil drained.
- When removing and installing the oil pump, use care not to allow dust or dirt to enter the engine.
- If any portion of the oil pump is worn beyond the specified service limits, replace the oil pump as an assembly.
- After the oil pump has been installed, check that there are no oil leaks.
- Refer to the following:
  - Engine oil level check (page 3-10)
  - Engine oil change (page 3-11)
  - Engine oil strainer screen cleaning (page 3-12)
  - Engine oil centrifugal filter cleaning (page 3-13)

SPECIFICATIONS

<table>
<thead>
<tr>
<th>ITEM</th>
<th>STANDARD</th>
<th>SERVICE LIMIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engine oil capacity</td>
<td>After draining</td>
<td>0.9 liter (1.0 US qt, 0.8 Imp qt)</td>
</tr>
<tr>
<td></td>
<td>After disassembly</td>
<td>1.1 liter (1.2 US qt, 1.0 Imp qt)</td>
</tr>
<tr>
<td>Recommended engine oil</td>
<td>Honda &quot;4-stroke motorcycle oil&quot; or an equivalent</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Oil recommendation:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>API classification: SG or higher</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(except oils labeled as energy conserving on the circular API service label)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Viscosity: SAE 10W-30</td>
<td></td>
</tr>
<tr>
<td></td>
<td>JASO T 903 Standard: MA</td>
<td></td>
</tr>
<tr>
<td>Oil pump rotor</td>
<td>Tip clearance</td>
<td>0.15 (0.006)</td>
</tr>
<tr>
<td></td>
<td>Body clearance</td>
<td>0.15 - 0.21 (0.006 - 0.008)</td>
</tr>
<tr>
<td></td>
<td>Side clearance</td>
<td>0.05 - 0.10 (0.002 - 0.004)</td>
</tr>
</tbody>
</table>

TORQUE VALUES

- Oil pump cover screw: 3.2 N·m (0.3 kgf-m, 2.4 lbf-ft)
- Oil pump mounting bolt: 12 N·m (1.2 kgf-m, 9 lbf-ft)

TROUBLESHOOTING

Engine oil level too low, high oil consumption
- Oil consumption
- External oil leaks
- Faulty valve stem seal
- Worn valve guide
- Worn piston rings or incorrect piston ring installation
- Worn cylinder
- Worn or damaged oil pump

Engine oil contamination
- Oil not changed often enough
- Clogged oil strainer
- Faulty cylinder head gasket
- Faulty valve stem seal
- Worn valve guide
- Worn piston rings or incorrect piston ring installation
- Worn cylinder
OIL PUMP

REMOVAL
Remove the right crankcase cover (page 9-6).
Remove the oil pump driven gear.

Remove the bolts and oil pump assembly.

DISASSEMBLY
Remove the oil pump cover screw, dowel pins and oil pump cover.

Remove the rotor shaft, inner rotor and outer rotor from the oil pump body.
Clean all disassembled parts thoroughly.
INSPECTION

- Measure each clearance at several points and use the largest reading to compare to the service limit.
- If any portion of the oil pump is worn beyond the service limits, replace the oil pump and oil pump cover as an assembly.

Temporarily install the outer rotor, inner rotor and rotor shaft into the oil pump body.

Measure the rotor tip clearance between the inner and outer rotors.

**SERVICE LIMIT:** 0.20 mm (0.008 in)

Measure the oil pump body clearance between the outer rotor and oil pump body.

**SERVICE LIMIT:** 0.25 mm (0.010 in)

Remove the rotor shaft.

Measure the side clearance using a straight edge and feeler gauge.

**SERVICE LIMIT:** 0.15 mm (0.006 in)
Apply engine oil to the inner, outer rotors and rotor shaft, then install them into the oil pump body.

Install the oil pump cover, dowel pins and oil pump cover screw.

Tighten the oil pump cover screw to the specified torque.

**TORQUE:** 3.2 N·m (0.3 kgf·m, 2.4 lbf·ft)
INSTALLATION

- When installing the oil pump assembly, do not allow dust or dirt to enter the engine.

Install the oil pump assembly onto the right crankcase by aligning the dowel pins with the bolt holes.

Install and tighten the bolts to the specified torque.

**TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)**

Check that the oil pump shaft turns smoothly on the oil pump body.

Apply engine oil to the oil pump driven gear teeth, and install it.

Install the right crankcase cover (page 9-8).
### 5. FUEL SYSTEM (PGM-FI)

<table>
<thead>
<tr>
<th>Component Location</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMPONENT LOCATION</td>
<td>5-2</td>
</tr>
<tr>
<td>SERVICE INFORMATION</td>
<td>5-3</td>
</tr>
<tr>
<td>PGM-FI SYMPTOM TROUBLESHOOTING</td>
<td>5-5</td>
</tr>
<tr>
<td>PGM-FI SYSTEM LOCATION</td>
<td>5-6</td>
</tr>
<tr>
<td>PGM-FI SYSTEM DIAGRAM</td>
<td>5-7</td>
</tr>
<tr>
<td>PGM-FI CONNECTOR LOCATIONS</td>
<td>5-8</td>
</tr>
<tr>
<td>PGM-FI TROUBLESHOOTING INFORMATION</td>
<td>5-10</td>
</tr>
<tr>
<td>DTC INDEX</td>
<td>5-14</td>
</tr>
<tr>
<td>SENSOR UNIT POWER LINE INSPECTION</td>
<td>5-15</td>
</tr>
<tr>
<td>DTC TROUBLESHOOTING</td>
<td>5-17</td>
</tr>
<tr>
<td>MIL TROUBLESHOOTING</td>
<td>5-33</td>
</tr>
<tr>
<td>MIL CIRCUIT INSPECTION</td>
<td>5-44</td>
</tr>
<tr>
<td>FUEL LINE INSPECTION</td>
<td>5-46</td>
</tr>
<tr>
<td>SUB FUEL TANK/FUEL PUMP</td>
<td>5-51</td>
</tr>
<tr>
<td>FUEL TANK</td>
<td>5-53</td>
</tr>
<tr>
<td>AIR CLEANER HOUSING</td>
<td>5-55</td>
</tr>
<tr>
<td>THROTTLE BODY</td>
<td>5-56</td>
</tr>
<tr>
<td>INJECTOR</td>
<td>5-61</td>
</tr>
<tr>
<td>IACV</td>
<td>5-63</td>
</tr>
<tr>
<td>EOT SENSOR</td>
<td>5-64</td>
</tr>
<tr>
<td>BANK ANGLE SENSOR</td>
<td>5-65</td>
</tr>
<tr>
<td>ECM</td>
<td>5-67</td>
</tr>
<tr>
<td>O2 SENSOR</td>
<td>5-69</td>
</tr>
</tbody>
</table>
1.1 N·m (0.11 kgf·m, 0.8 lbf·ft)
SERVICE INFORMATION

GENERAL

- Work in a well ventilated area. Smoking or allowing flames or sparks in the work area or where gasoline is stored can cause a fire or explosion.
- Before disconnecting the fuel feed hose, relieve fuel pressure from the system (page 5-46).
- Bending or twisting the control cables will impair smooth operation and could cause the cables to stick or bind, resulting in loss of vehicle control.
- Do not snap the throttle valve from fully opened to fully closed after the throttle cable has been removed. It may cause incorrect idle operation.
- Seal the cylinder head intake port with tape or a clean cloth to keep dirt and debris from entering the engine after the throttle body has been removed.
- Do not damage the throttle body. It may cause incorrect throttle valve operation.
- Prevent dirt and debris from entering the throttle bore and air passages after the throttle body has been removed. Clean them using a compressed air if necessary.
- Do not loosen or tighten the white painted nut and screw of the throttle body. Loosening or tightening them can cause throttle valve and idle control failure.
- For fuel level sensor inspection (page 18-18).
- The following color codes are used throughout this section.

<table>
<thead>
<tr>
<th>Color</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bu</td>
<td>Blue</td>
</tr>
<tr>
<td>Bl</td>
<td>Black</td>
</tr>
<tr>
<td>G</td>
<td>Green</td>
</tr>
<tr>
<td>Lg</td>
<td>Light green</td>
</tr>
<tr>
<td>O</td>
<td>Orange</td>
</tr>
<tr>
<td>R</td>
<td>Red</td>
</tr>
<tr>
<td>Br</td>
<td>Brown</td>
</tr>
<tr>
<td>P</td>
<td>Pink</td>
</tr>
<tr>
<td>Y</td>
<td>Yellow</td>
</tr>
<tr>
<td>W</td>
<td>White</td>
</tr>
<tr>
<td>Gm</td>
<td>Gray</td>
</tr>
</tbody>
</table>

SPECIFICATIONS

<table>
<thead>
<tr>
<th>ITEM</th>
<th>SPECIFICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Throttle body identification number</td>
<td>GQM6A</td>
</tr>
<tr>
<td>Idle speed</td>
<td>1,500 ± 100 min⁻¹ (rpm)</td>
</tr>
<tr>
<td>Throttle grip freeplay</td>
<td>2 – 6 mm (1/16 – 1/4 in)</td>
</tr>
<tr>
<td>Fuel pressure at idle</td>
<td>294 ± 6 kPa (3 ± 0.1 kgf/cm², 43 ± 0.9 psi)</td>
</tr>
<tr>
<td>Fuel pump flow (at 12 V)</td>
<td>27.7 cm³ (0.94 US oz, 0.98 Imp oz) minimum/10 seconds</td>
</tr>
</tbody>
</table>

TORQUE VALUES

<table>
<thead>
<tr>
<th>ITEM</th>
<th>SPECIFICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>EOT sensor</td>
<td>14 N·m (1.4 kgf·m, 10 lbf·ft)</td>
</tr>
<tr>
<td>Injector joint mounting bolt</td>
<td>5.1 N·m (0.5 kgf·m, 3.8 lbf·ft)</td>
</tr>
<tr>
<td>O₂ sensor</td>
<td>25 N·m (2.5 kgf·m, 18 lbf·ft)</td>
</tr>
<tr>
<td>Sensor unit torx screw</td>
<td>3.4 N·m (0.3 kgf·m, 2.5 lbf·ft)</td>
</tr>
<tr>
<td>IACV setting plate torx screw</td>
<td>2.1 N·m (0.2 kgf·m, 1.5 lbf·ft)</td>
</tr>
<tr>
<td>Throttle cable stay screw</td>
<td>3.4 N·m (0.3 kgf·m, 2.5 lbf·ft)</td>
</tr>
<tr>
<td>Insulator band screw</td>
<td>1.0 N·m (0.1 kgf·m, 0.7 lbf·ft)</td>
</tr>
<tr>
<td>Air cleaner housing cover screw</td>
<td>1.1 N·m (0.11 kgf·m, 0.8 lbf·ft)</td>
</tr>
</tbody>
</table>

See page 5-58
FUEL SYSTEM (PGM-FI)

TOOLS

Fuel pressure gauge
07406-0040004

Pressure gauge manifold
07ZAJ-S5A0111

Hose attachment, 9 mm/9 mm
07ZAJ-S5A0120

Hose attachment, 6 mm/9 mm
07ZAJ-S5A0130

Attachment joint, 6 mm/9 mm
07ZAJ-S5A0150

ECM test harness 33P
070MZ-MCA0100

SCS connector
070PZ-ZY30100

Test probe
07ZAJ-RDJA110
## FUEL SYSTEM (PGM-FI)

### PGM-FI SYMPTOM TROUBLESHOOTING

When the motorcycle has one of these symptoms, check the DTC or MIL blinking, refer to the DTC index (page 5-14) and begin the appropriate troubleshooting procedure. If there are no DTC/MIL blinking stored in the ECM memory, do the diagnostic procedure for the symptom, in sequence listed below, until you find a cause.

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Diagnosis procedure</th>
<th>Also check for</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engine cranks but won't start</td>
<td>1. Inspect the fuel supply system (page 5-46).</td>
<td>• No fuel to injector</td>
</tr>
<tr>
<td>(No DTC and MIL blinking)</td>
<td>2. Inspect the IACV (page 5-63).</td>
<td>- Clogged fuel filter</td>
</tr>
<tr>
<td></td>
<td>3. Inspect the ignition system (page 18-9).</td>
<td>- Pinched or clogged fuel feed hose</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Faulty fuel pump</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Faulty fuel pump circuits</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Intake air leak</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Contaminated/deteriorated fuel</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Faulty fuel injector</td>
</tr>
<tr>
<td>Engine cranks but won't start</td>
<td>1. ECM power/ground circuits malfunction (page 5-67).</td>
<td>• Open circuit in the power input and/or ground wire of the ECM</td>
</tr>
<tr>
<td>(No fuel pump operation</td>
<td>2. Inspect the fuel supply system (page 5-46).</td>
<td>• Blown main fuse (15 A)</td>
</tr>
<tr>
<td>sound when the turning the ignition ON)</td>
<td></td>
<td>• Blown sub fuse B (10 A)</td>
</tr>
<tr>
<td>Engine stalls, hard to start, rough idling</td>
<td>1. Check the idle speed.</td>
<td>• Restricted fuel feed hose</td>
</tr>
<tr>
<td></td>
<td>2. Check the IACV.</td>
<td>• Contaminated/deteriorated fuel</td>
</tr>
<tr>
<td></td>
<td>3. Inspect the fuel supply system (page 5-46).</td>
<td>• Intake air leak</td>
</tr>
<tr>
<td></td>
<td>4. Inspect the battery charging system (page 15-8).</td>
<td>• Restricted fuel tank breather hose</td>
</tr>
<tr>
<td></td>
<td>5. Inspect the ignition system (page 18-9).</td>
<td>• Faulty ignition system</td>
</tr>
<tr>
<td>Afterburn when engine braking is used</td>
<td>1. Inspect the ignition system (page 18-9).</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Inspect the IACV (page 5-63).</td>
<td></td>
</tr>
<tr>
<td>Backfiring or misfiring during acceleration</td>
<td>Inspect the ignition system (page 18-9).</td>
<td></td>
</tr>
<tr>
<td>Poor performance (driveability) and poor</td>
<td>1. Inspect the fuel supply system.</td>
<td>• Pinched or clogged fuel feed hose</td>
</tr>
<tr>
<td>fuel economy</td>
<td>2. Inspect the air cleaner element (page 3-6).</td>
<td>• Faulty pressure regulator (fuel pump)</td>
</tr>
<tr>
<td></td>
<td>3. Inspect the ignition system (page 18-9).</td>
<td>• Clogged air cleaner element</td>
</tr>
<tr>
<td>Idle speed is below specifications or fast</td>
<td>1. Inspect the idle speed (page 3-14).</td>
<td>• Intake air leak</td>
</tr>
<tr>
<td>idle too low (No DTC and MIL blinking)</td>
<td>2. Inspect the IACV (page 5-63).</td>
<td>• Engine top-end problem</td>
</tr>
<tr>
<td></td>
<td>3. Inspect the fuel supply system (page 5-46).</td>
<td>• Air cleaner element condition</td>
</tr>
<tr>
<td></td>
<td>4. Inspect the ignition system (page 18-9).</td>
<td></td>
</tr>
<tr>
<td>Idle speed is above specifications or fast</td>
<td>1. Inspect the idle speed (page 3-14).</td>
<td></td>
</tr>
<tr>
<td>idle too high (No DTC and MIL blinking)</td>
<td>2. Inspect the throttle operation and freeplay.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Inspect the IACV (page 5-63).</td>
<td></td>
</tr>
<tr>
<td>MIL never comes ON at all</td>
<td>1. Check the MIL bulb (page 18-7).</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Inspect the MIL circuit (page 5-44).</td>
<td></td>
</tr>
<tr>
<td>MIL stays ON at all (No DTC set)</td>
<td>Inspect the MIL/DLC circuits (page 5-49).</td>
<td></td>
</tr>
</tbody>
</table>
PGM-FI SYSTEM DIAGRAM

- **DTC/MIL number**
- **Engine does not start when detecting DTC/MIL**
- **Short terminals for reading DTC/MIL**

**ECM 33P (BLACK) CONNECTOR**

- **Bl**: Black
- **Br**: Brown
- **Bu**: Blue
- **G**: Green
- **Gr**: Gray
- **Lg**: Light green
- **P**: Pink

**Legend**

- **( )**: DTC/MIL number
- **□**: ECM side/male terminals

5-7
NOTE 1: Remove the left side cover (page 2-10).
FUEL SYSTEM (PGM-FI)

PGM-FI TROUBLESHOOTING INFORMATION

GENERAL TROUBLESHOOTING

Intermittent Failure

The term "intermittent failure" means a system may have had a failure, but it checks OK now. If the MIL does not come on, check for poor contact or loose pins at all connectors related to the circuit that of the troubleshooting. If the MIL was on, but then went out, the original problem may be intermittent.

Opens and Shorts

"Opens" and "Shorts" are common electrical terms. An open is a break in a wire or at a connection. A short is an accidental connection of a wire to ground or to another wire. In simple electronics, this usually means something will not work at all. With ECMs this can something mean something work, but not the way it's supposed to.

If the MIL has come on

Refer to DTC READOUT (page 5-11).

If the MIL did not stay on

If the MIL did not stay on, but there is a driveability problem, do the SYMPTOM TROUBLESHOOTING (page 5-5).

SYSTEM DESCRIPTION

SELF-DIAGNOSIS SYSTEM

The PGM-FI system is equipped with the self-diagnostic system. When any abnormality occurs in the system, the ECM turns on the MIL and stores a DTC in its erasable memory.

FAIL-SAFE FUNCTION

The PGM-FI system is provided with a fail-safe function to secure a minimum running capability even when there is trouble in the system. When any abnormality is detected by the self-diagnosis function, running capability is maintained by pre-programmed values in the simulated program map. When any abnormality is detected in the injector, the fail-safe function stops the engine to protect it from damage.

DTC

- The DTC is composed of a main code and a sub code and it is displayed as a hyphenated number when retrieved from the ECM with the HDS pocket tester.
- The digits in front of the hyphen are the main code, they indicate the component of function failure.
- The digits behind the hyphen are the sub code, they detail the specific symptom of the component or function failure.
- For example, in the case of the TP sensor:
  - DTC 08-1 = (TP sensor voltage) - (lower than the specified value)
  - DTC 08-2 = (TP sensor voltage) - (higher than the specified value)

- The MAP, EOT, TP and IAT sensor diagnosis will be made according to the voltage output of the affected sensor.
- The ECM determines the Function Failure, compares the sensor voltage output to the standard value, and then outputs the corresponding DTC to the HDS pocket tester.
- For example:
  - If the output voltage line (A) on the MAP sensor is opened, the ECM detects the output voltage is about 5 V, then the DTC 1-2 (MAP sensor circuit high voltage) will be displayed.
  - If the input voltage line (B) on the TP sensor is opened, the ECM detects the output voltage is 0 V, then the DTC 8-1 (TP sensor circuit low voltage) will be displayed.

![Electrical Diagrams](image-url)
FUEL SYSTEM (PGM-FI)

MIL Blink Pattern
- If the HDS pocket tester is not available, DTC can be read from the ECM memory by the MIL blink pattern.
- The number of MIL blinks is equivalent to the main code of the DTC (the sub code cannot be displayed by the MIL).
- The MIL will blink the current DTC, in case the ECM detects the problem at present, when the ignition switch ON or idling with the sidestand down. The MIL will stay ON when the engine speed is over 5,000 min⁻¹ (rpm) or with the sidestand up.
- The MIL has two types of blinks, a long blink and short blink. The long blinking lasts for 1.3 seconds, the short blinking lasts for 0.5 seconds. One long blink is the equivalent of ten short blinks. For example, when two long blinks are followed by nine short blinks, the MIL is 29 (two long blinks = 20 blinks, plus nine short blinks).
- When the ECM stores more than one DTC, the MIL will indicate them by blinking in the order from the lowest number to highest number.

MIL Check
When the ignition switch is turned ON, the MIL will stay on for a few seconds, then go off. If the MIL does not come on, troubleshoot the MIL circuit (page 5-44).

CURRENT DTC/STORED DTC
The DTC is indicated in two ways according to the failure status.
- In the case that the ECM detects an active problem, the MIL will come on and will start to blink the DTC when the sidestand is lowered.
- In the case that the ECM does not detect an active problem but has recorded a previous problem in its memory, the MIL will not come on. If it is necessary to retrieve any past problems stored in the memory, readout the stored DTC by following the DTC readout procedure (page 5-11).

HDS POCKET TESTER INFORMATION
- The HDS pocket tester can readout the DTC, stored data, current data and other ECM condition.

How to connect the HDS pocket tester
Turn the ignition switch OFF.
- Remove the dummy connector from the DLC.
- Connect the HDS pocket tester to the DLC.
- Turn the ignition switch ON and check the DTC and stored data.

NOTE:
Stored data indicates the engine conditions when the first malfunction was detected.

ECM reset
- The HDS pocket tester can reset the ECM data including the DTC, stored data and some learning memory.
- After the ECM reset, perform the TP sensor reset procedure from ECM initialization (page 5-60).

DTC READOUT
Start the engine and check the MIL.
- When the ignition switch is turned ON, the MIL will stay on for a few seconds, then go off.
- If the MIL stays on or blinks, connect the HDS pocket tester to the DLC (page 5-11).
- To read the DTC with the MIL blinking, refer to the following procedure.
FUEL SYSTEM (PGM-FI)

Reading DTC with the MIL

Turn the ignition switch OFF.
Remove the dummy connector from the DLC.
Short the DLC terminals using the special tool.

TOOL:
SCS connector 070PZ-ZY30100

CONNECTION: Blue – Green/black

Turn the ignition switch ON, and note the MIL blinks and refer to the troubleshooting index (page 5-14).

NOTE:
If the ECM has any DTC in its memory, the MIL will start blinking.

ERASING DTC

NOTE:
Start the erasing procedure with the engine stopped.

Connect the HDS pocket tester to the DLC (page 5-11).

Erase the DTC with the HDS pocket tester.

To erase the DTC without HDS pocket tester, refer to the following procedure.

How to erase the DTC without HDS Pocket Tester

1. Turn the ignition switch OFF.
2. Remove the dummy connector from the DLC.
Short the DLC terminals using the special tool.

TOOL:
SCS connector 070PZ-ZY30100

CONNECTION: Blue – Green/black

3. Turn the ignition switch ON.
4. Remove the special tool from the DLC.
5. The MIL will light for approximately 5 seconds. While the MIL lights, short the DLC terminals again with the special tool. The self-diagnostic memory is erased if the MIL goes off and starts blinking.

NOTE:
• The DLC must be jumped while the MIL is illuminated. If not, the MIL will not start blinking.
• Note that the self-diagnostic memory cannot be erased if the ignition switch is turned OFF before the MIL starts blinking.

CIRCUIT INSPECTION

INSPECTION AT ECM CONNECTOR

• Always clean around and keep any foreign material away from the ECM 33P (Black) connector before disconnecting it.
• A faulty PGM-FI system is often related to poorly connected or corroded terminals. Check all related connections before proceeding.
• In testing at ECM 33P (Black) connector (wire side) terminal, always use the test probe. Insert the test probe into the connector terminal, then attach the digital multimeter probe to the test probe.

TOOL:
Test probe 07ZAJ-RDJA110
TEST HARNESS CONNECTION

Remove the left side cover (page 2-10).
Turn the ignition switch OFF.
Disconnect the ECM 33P (Black) connector.

Connect the test harness between the main wire harness and ECM.

TOOL:
ECM test harness 33P 070MZ-MCA0100

TEST HARNESS TERMINAL LAYOUT

The ECM 33P (Black) connector terminals are numbered as shown in this illustration.

The test harness terminals are same layout as for the ECM 33P (Black) connector terminals as shown.
<table>
<thead>
<tr>
<th>DTC (MIL blinks)</th>
<th>Function Failure</th>
<th>Symptom/Fail-safe function</th>
<th>Refer to (DTC)</th>
<th>Refer to (MIL)</th>
</tr>
</thead>
</table>
| 1-1 (1)          | MAP sensor circuit low voltage (less than 0.215 V)  
• MAP sensor or its circuit malfunction | Engine operates normally  
• Pre-program value: 760 mmHg/1,013 hPa | 5-17 | 5-33 |
| 1-2 (1)          | MAP sensor circuit high voltage (more than 3.348 V)  
• Loose or poor contact of the MAP sensor connector  
• MAP sensor or its circuit malfunction | Engine operates normally  
• Pre-program value: 760 mmHg/1,013 hPa | 5-18 | |
| 7-1 (7)          | EOT sensor circuit low voltage (less than 0.078 V)  
• EOT sensor or its circuit malfunction | Hard start at a low temperature  
• Pre-program value: 75°C/167°F  
• Cooling fan turns on | 5-19 | 5-34 |
| 7-2 (7)          | EOT sensor circuit high voltage (more than 4.922 V)  
• Loose or poor contact of the EOT sensor connector  
• EOT sensor or its circuit malfunction | Hard start at a low temperature  
• Pre-program value: 75°C/167°F  
• Cooling fan turns on | 5-20 | |
| 8-1 (8)          | TP sensor circuit low voltage (less than 0.215 V)  
• Loose or poor contact of the TP sensor connector  
• TP sensor or its circuit malfunction | Poor engine acceleration  
• Pre-program value: 0° | 5-21 | 5-36 |
| 8-2 (8)          | TP sensor circuit high voltage (more than 4.922 V)  
• TP sensor or its circuit malfunction | Poor engine acceleration  
• Pre-program value: 0° | 5-22 | |
| 9-1 (9)          | IAT sensor circuit low voltage (less than 0.078 V)  
• IAT sensor or its circuit malfunction | Engine operates normally  
• Pre-program value: 35°C/95°F | 5-23 | 5-37 |
| 9-2 (9)          | IAT sensor circuit high voltage (more than 4.922 V)  
• Loose or poor contact of the IAT sensor connector  
• IAT sensor or its circuit malfunction | Engine operates normally  
• Pre-program value: 35°C/95°F | 5-24 | |
| 12-1 (12)        | Injector circuit malfunction  
• Loose or poor contact of the injector connector  
• Injector or its circuit malfunction | Engine does not start  
• Injector, fuel pump and ignition coil shut down | 5-25 | 5-38 |
| 21-1 (21)        | O2 sensor malfunction  
• Loose or poor contact of the O2 sensor connector  
• O2 sensor or its circuit malfunction | Engine operates normally | 5-27 | 5-40 |
| 29-1 (29)        | IACV circuit malfunction  
• Loose or poor contact of the IACV connector  
• IACV or its circuit malfunction | Engine stalls, hard to start, rough idling | 5-28 | 5-41 |
| 33-2 (–)         | ECM EEPROM malfunction | Engine operates normally | 5-29 | |
| 54-1 (54)        | Bank angle sensor circuit low voltage (less than 0.351 V)  
• Bank angle sensor or its circuit malfunction | Engine operates normally  
• Engine stop function does not operate | 5-30 | 5-42 |
| 54-2 (54)        | Bank angle sensor circuit high voltage (more than 4.531 V)  
• Loose or poor contact of the bank angle sensor connector  
• Bank angle sensor or its circuit malfunction | Engine operates normally  
• Engine stop function does not operate | 5-31 | |
BEFORE DTC TROUBLESHOOTING
When the DTC displays 1-2, 8-1 and 9-2, check the following before DTC troubleshooting.
• Before starting the inspection, check for loose or poor contact on the sensor unit 5P (Black) and ECM 33P (Black) connectors.

1. Sensor Unit Power Input Voltage Inspection
Turn the ignition switch OFF.
Disconnect the sensor unit 5P (Black) connector.
Turn the ignition switch ON.
Measure the voltage at the wire side.
CONNECTION: Yellow/red (+) – Green/orange (-)
STANDARD: 4.75 – 5.25 V
If the voltage within 4.75 – 5.25 V?
YES – Turn the ignition switch OFF. Connect the sensor unit 5P (Black) connector and start the DTC troubleshooting (page 5-17).
NO – GO TO STEP 2.

2. Sensor Unit Input Voltage Line Short Circuit Inspection
Turn the ignition switch OFF.
Check the continuity between the sensor unit 5P connector of the wire side and ground.
CONNECTION: Yellow/red – Ground
Is there continuity?
YES – Short circuit in Yellow/red wire
NO – GO TO STEP 3.

3. Sensor Unit Power Line Open Circuit Inspection
Disconnect the ECM 33P (Black) connector.
Check the continuity between the sensor unit 5P and ECM 33P connectors.
TOOL: Test probe 07ZAJ-RDJA110
CONNECTION:
6 (Yellow/red) – Yellow/red
4 (Green/orange) – Green/orange
Is there continuity?
YES – Replace the ECM with a known good one, and recheck.
NO – • Open circuit in Yellow/red wire
     • Open circuit in Green/orange wire
BEFORE MIL TROUBLESHOOTING

- When the MIL blinks 1, 8 and 9 times, check the following before MIL troubleshooting.
- Before starting the inspection, check for loose or poor contact on the sensor unit 5P (Black) and ECM (Black) 33P connectors.

1. Sensor Unit Power Input Voltage Inspection 1
   Turn the ignition switch OFF.
   Connect the test harness to the ECM 33P (Black) connector (page 5-13).
   Turn the ignition switch ON.
   Measure the voltage at the test harness terminals.
   CONNECTION: 6 (+) – 4 (–)
   STANDARD: 4.75 – 5.25 V
   Is the voltage within 4.75 – 5.25 V?
   YES – GO TO STEP 2.
   NO – Replace the ECM with a known good one, and recheck.

2. Sensor Unit Power Input Voltage Inspection 2
   Turn the ignition switch OFF.
   Disconnect the sensor unit 5P (Black) connector.
   Turn the ignition switch ON.
   Measure the voltage at the wire side.
   CONNECTION: Yellow/red (+) – Green/orange (–)
   STANDARD: 4.75 – 5.25 V
   If the voltage within 4.75 – 5.25 V?
   YES – Turn the ignition switch OFF. Connect the sensor unit 5P (Black) connector and start the MIL troubleshooting (page 5-33).
   NO – GO TO STEP 3.

3. Sensor Unit Input Voltage Line Short Circuit Inspection
   Check the continuity between the sensor unit 5P connector of the wire side and ground.
   CONNECTION: Yellow/red – Ground
   Is there continuity?
   YES – Short circuit in Yellow/red wire
   NO – GO TO STEP 4.
4. Sensor Unit Input Voltage Line Open Circuit Inspection

Check the continuity between the test harness and sensor unit 5P connector of the wire side.

**CONNECTION:** 6 – Yellow/red
4 – Green/orange

*Is there continuity?*

**YES** – Intermittent failure

**NO** –
- Open circuit in Yellow/red wire
- Open circuit in Green/orange wire

---

### DTC TROUBLESHOOTING

#### DTC 1-1 (MAP SENSOR LOW VOLTAGE)

1. **MAP Sensor System Inspection**

   Turn the ignition switch ON.
   Check the MAP sensor with the HDS pocket tester.

   *Is about 0 V indicated?*

   **YES** – GO TO STEP 2.

   **NO** – Intermittent failure

2. **Sensor Unit Power Line Inspection**

   Check the sensor unit power line inspection (page 5-15).

   *Is the sensor unit power line normal?*

   **YES** – GO TO STEP 3.

   **NO** – Replace or repair the abnormal circuit.

3. **MAP Sensor Output Line Short Circuit Inspection**

   Disconnect the sensor unit 5P (Black) connector.
   Check the continuity between the sensor unit 5P connector of the wire side and ground.

   **CONNECTION:** Light green/yellow – Ground

   *Is there continuity?*

   **YES** – Short circuit in Light green/yellow wire

   **NO** – GO TO STEP 4.
4. MAP Sensor Inspection

Replace the sensor unit with a known good one (page 5-56).
Erase the DTC's (page 5-12).

Turn the ignition switch OFF.
Connect the sensor unit 5P connector.

Turn the ignition switch ON.
Check the MAP sensor with the HDS pocket tester.

*Is DTC 1-1 indicated?*

**YES** - Replace the ECM with a known good one, and recheck.
**NO** - Faulty original sensor unit (MAP sensor)

---

**DTC 1-2 (MAP SENSOR HIGH VOLTAGE)**

1. MAP Sensor System Inspection 1

Turn the ignition switch ON.
Check the MAP sensor with the HDS pocket tester.

*Is about 5 V indicated?*

**YES** - GO TO STEP 2.
**NO** -
- Intermittent failure
- Loose or poor contact on the sensor unit 5P (Black) and/or ECM 33P (Black) connectors

2. Sensor Unit Power Line Inspection

Check the sensor unit power line inspection (page 5-15).

*Is the sensor unit power line normal?*

**YES** - GO TO STEP 3.
**NO** - Replace or repair the abnormal circuit.

3. MAP Sensor System Inspection 2

Turn the ignition switch OFF.
Disconnect the sensor unit 5P (Black) connector.
Connect the sensor unit 5P connector terminals at the wire side with a jumper wire.

**CONNECTION:**
- Light green/yellow – Green/orange

Turn the ignition switch ON.
Check the MAP sensor with the HDS pocket tester.

*Is about 0 V indicated?*

**YES** - Faulty sensor unit (MAP sensor)
**NO** - GO TO STEP 4.
4. MAP Sensor Output Line Open Circuit Inspection

Turn the ignition switch OFF.
Remove the jumper wire.
Disconnect the ECM 33P (Black) connector.

Check the continuity at the Light green/yellow wire between the sensor unit 5P and ECM 33P connectors.

**TOOL:**
Test probe 07ZAJ-RDJA110

**CONNECTION:**
27 (Light green/yellow) – Light green/yellow

*Is there continuity?*

- **YES** – Replace the ECM with a known good one, and recheck.
- **NO** – Open circuit in Light green/yellow wire

---

**DTC 7-1 (EOT SENSOR LOW VOLTAGE)**

1. EOT Sensor System Inspection

Turn the ignition switch ON.
Check the EOT sensor with the HDS pocket tester.

*Is about 0 V indicated?*

- **YES** – GO TO STEP 2.
- **NO** – Intermittent failure

2. EOT Sensor Inspection

Turn the ignition switch OFF.
Disconnect the EOT sensor 2P (Black) connector.

Turn the ignition switch ON.
Check the EOT sensor with the HDS pocket tester.

*Is about 0 V indicated?*

- **YES** – GO TO STEP 4.
- **NO** – GO TO STEP 3.

3. EOT Sensor Resistance Inspection

Turn the ignition switch OFF.
Measure the resistance between the EOT sensor terminals.

**CONNECTION:** Yellow/blue – Green/orange

**STANDARD:** 2.4 – 2.9 kΩ (20°C/68°F)

*Is the resistance within 2.4 – 2.9 kΩ (20°C/68°F)?*

- **YES** – Replace the ECM with a known good one, and recheck.
- **NO** – Faulty EOT sensor
4. EOT Sensor Line Short Circuit Inspection

Turn the ignition switch OFF.
Check the continuity between the EOT sensor 2P connector of the wire side and ground.
CONNECTION: Yellow/blue – Ground

Is there continuity?
YES – Short circuit in Yellow/blue wire
NO – Replace the ECM with a known good one, and recheck.

DTC 7-2 (EOT SENSOR HIGH VOLTAGE)

● Before starting the inspection, check for loose or poor contact on the EOT sensor 2P (Black) and ECM 33P (Black) connectors, and recheck the DTC.

1. EOT Sensor System Inspection

Turn the ignition switch ON.
Check the EOT sensor with the HDS pocket tester.

Is about 5 V indicated?
YES – GO TO STEP 2.
NO –
  ● Intermittent failure
  ● Loose or poor contact on the EOT sensor 2P (Black) and/or ECM 33P (Black) connectors

2. EOT Sensor Inspection

Turn the ignition switch OFF.
Disconnect the EOT sensor 2P (Black) connector.
Connect the EOT sensor 2P connector terminals at the wire side with a jumper wire.
CONNECTION: Yellow/blue – Green/orange

Turn the ignition switch ON.
Check the EOT sensor with the HDS pocket tester.

Is about 0 V indicated?
YES – Replace the EOT sensor with a known good one, and recheck.
NO – GO TO STEP 3.
3. EOT Sensor Open Circuit Inspection

Turn the ignition switch OFF.
Remove the jumper wire.
Disconnect the ECM 33P (Black) connector.
Check the continuity between the ECM 33P and
EOT sensor 2P connectors.

TOOL:
Test probe 07ZAJ-RDJA110

CONNECTION:
24 (Yellow/blue) – Yellow/blue
4 (Green/orange) – Green/orange

Is there continuity?
YES – Replace the ECM with a known good
one, and recheck.
NO – • Open circuit in Yellow/blue wire
• Open circuit in Green/orange wire

DTC 8-1 (TP SENSOR LOW VOLTAGE)

1. TP Sensor System Inspection

Turn the ignition switch ON.
Check the TP sensor with the HDS pocket tester
when the throttle fully closed.

Is about 0 V indicated?
YES – GO TO STEP 2.
NO – • Intermittent failure
  • Loose or poor contact on the sensor
unit 5P (Black) and/or ECM 33P
(Black) connectors

2. Sensor Unit Power Line Inspection

Check the sensor unit power line inspection
(page 5-15).

Is the sensor unit power line normal?
YES – GO TO STEP 3.
NO – Replace or repair the abnormal circuit.

3. TP Sensor Output Line Short Circuit Inspection

Turn the ignition switch OFF.
Disconnect the sensor unit 5P (Black) and ECM
33P (Black) connectors.
Check the continuity between the sensor unit 5P
connector of the wire side and ground.

CONNECTION: Yellow – Ground

Is there continuity?
YES – Short circuit in Yellow wire
NO – GO TO STEP 4.
4. TP Sensor Output Line Open Circuit Inspection

Check the continuity between the sensor unit 5P and ECM 33P connectors.

**TOOL:**
Test probe 07ZAJ-RDJA110

**CONNECTION:** 5 (Yellow) - Yellow

*Is there continuity?*

**YES** - GO TO STEP 5.
**NO** - Open circuit in Yellow wire

5. TP Sensor Inspection

Replace the sensor unit with a known good one (page 5-56).
Erase the DTC’s (page 5-12).

Connect the sensor unit 5P (Black) and ECM 33P (Black) connectors.
Turn the ignition switch ON.
Check the TP sensor with the HDS pocket tester.

*Is DTC 8-1 indicated?*

**YES** - Replace the ECM with a known good one, and recheck.
**NO** - Faulty original sensor unit (TP sensor)

---

**DTC 8-2 (TP SENSOR HIGH VOLTAGE)**

1. TP Sensor System Inspection

Turn the ignition switch ON.
Check the TP sensor with the HDS pocket tester.

*Is about 5 V indicated?*

**YES** - GO TO STEP 3.
**NO** - GO TO STEP 2.

2. TP Sensor Inspection

Check that the TP sensor voltage increases continuously when moving the throttle from fully closed to fully opened using the data list menu of the HDS pocket tester.

*Is the voltage increase continuously?*

**YES** - Intermittent failure
**NO** - Replace the sensor unit (TP sensor) with a new one, and recheck.
3. TP Sensor Resistance Inspection

Turn the ignition switch OFF.
Disconnect the sensor unit 5P (Black) connector.
Check the resistance in the throttle position while operating the throttle grip.
CONNECT: Yellow – Green/orange
STANDARD: 4 – 6 kΩ

Is the resistance within 4 – 6 kΩ (Is the resistance changed by operating the throttle grip)?

YES  - GO TO STEP 4.
NO   - Faulty sensor unit (TP sensor)

4. TP Sensor Power Line Inspection

Turn the ignition switch ON.
Measure the voltage at the wire side.
CONNECT: Yellow/red (+) – Green/orange (–)
STANDARD: 4.75 – 5.25 V

Is the voltage within 4.75 – 5.25 V?

YES  - Replace the ECM with a known good one, and recheck.
NO    - • Open circuit in Yellow/red wire
        • Open circuit in Green/orange wire

DTC 9-1 (IAT SENSOR LOW VOLTAGE)

1. IAT Sensor System Inspection

Turn the ignition switch ON.
Check the IAT sensor with the HDS pocket tester.
Is about 0 V indicated?

YES  - GO TO STEP 2.
NO   - Intermittent failure

2. IAT Sensor Inspection

Turn the ignition switch OFF.
Disconnect the sensor unit 5P (Black) connector.
Turn the ignition switch ON.
Check the IAT sensor with the HDS pocket tester.
Is about 0 V indicated?

YES  - GO TO STEP 3.
NO   - Faulty sensor unit (IAT sensor)
3. IAT Sensor Line Short Circuit Inspection

Turn the ignition switch OFF.

Check the continuity between the sensor unit 5P connector of the wire side and ground.

**CONNECTION:** Gray/blue - Ground

**Is there continuity?**

- **YES** - Short circuit in Gray/blue wire
- **NO** - Replace the ECM with a known good one, and recheck.

---

**DTC 9-2 (IAT SENSOR HIGH VOLTAGE)**

1. IAT Sensor System Inspection

Turn the ignition switch ON.

Check the IAT sensor with the FIDS pocket tester.

**Is about 5 V indicated?**

- **YES** - GO TO STEP 2.
- **NO** -
  - Intermittent failure
  - Loose or poor contact on the sensor unit 5P (Black) and/or ECM 33P (Black) connectors

2. Sensor Unit Power Line Inspection

Check the sensor unit power line inspection (page 5-15).

**Is the sensor unit power line normal?**

- **YES** - GO TO STEP 3.
- **NO** - Replace or repair the abnormal circuit.

3. IAT Sensor Inspection

Turn the ignition switch OFF.

Disconnect the sensor unit 5P (Black) connector.

Connect the sensor unit 5P connector terminals at the wire side with a jumper wire.

**CONNECTION:** Gray/blue - Green/orange

Turn the ignition switch ON.

Check the IAT sensor with the FIDS pocket tester.

**Is about 0 V indicated?**

- **YES** - Faulty sensor unit (IAT sensor)
- **NO** - GO TO STEP 4.
4. IAT Sensor Line Open Circuit Inspection

Turn the ignition switch OFF.
Disconnect the ECM 33P (Black) connector.
Check the continuity at the between the sensor unit 5P and ECM 33P connectors.

**TOOL:**
Test probe 07ZAJ-RDJA110

**CONNECTION:** 14 (Gray/blue) – Gray/blue

Is there continuity?

**YES** – Replace the ECM with a known good one, and recheck.

**NO** – Open circuit in Gray/blue wire

---

**DTC 12-1 (INJECTOR)**

- Before starting the inspection, check for loose or poor contact on the injector 2P (Black) and ECM 33P (Black) connectors, and recheck the DTC.

1. **Injector System Inspection**

Erase the DTC’s (page 5-12).

Turn the ignition switch ON.
Start the engine and check the injector with the HDS pocket tester.

Is the DTC 12-1 indicated?

**YES** – GO TO STEP 2.

**NO** –
- Intermittent failure
- Loose or poor contact on the injector 2P (Black) and/or ECM 33P (Black) connectors

2. **Injector Input Voltage Inspection**

Turn the ignition switch OFF.
Disconnect the injector 2P (Black) connector.

Turn the ignition switch ON.
Measure the voltage between the injector 2P connector of the wire side and ground.

**CONNECTION:** Black/blue (+) – Ground

**STANDARD:** Battery voltage

Is there battery voltage?

**YES** – GO TO STEP 3.

**NO** – Open or short circuit in Black/blue wire
3. Injector Signal Line Short Circuit Inspection

Turn the ignition switch OFF.
Check the continuity between the injector 2P connector of wire side and ground.
CONNECTION: Pink/green – Ground

Is there continuity?
YES – Short circuit in Pink/green wire
NO – GO TO STEP 4.

4. Injector Signal Line Open Circuit Inspection

Disconnect the ECM 33P (Black) connector.
Check the continuity between the ECM 33P and injector 2P connectors of the wire side.
TOOL:
Test probe 07ZAJ-RDJA110
CONNECTION: 16 (Pink/green) – Pink/green

Is there continuity?
YES – GO TO STEP 5.
NO – Open circuit in Pink/green wire

5. Injector Resistance Inspection

Measure the resistance between the injector 2P connector terminals.
STANDARD: 9 – 12 Ω (20°C/68°F)

Is the resistance within 9 – 12 Ω (20°C/68°F)?
YES – Replace the ECM with a known good one, and recheck.
NO – Faulty injector
DTC 21-1 (O₂ SENSOR)

NOTICE
- Do not get grease, oil or other materials in the O₂ sensor air hole.
- Before starting the inspection, check for loose or poor contact on the O₂ sensor 2P (Natural) connector or O₂ sensor cap and ECM 33P (Black) connector, and recheck the DTC.

1. O₂ Sensor System Inspection
Turn the ignition switch ON.
Start the engine and warm it up until the engine oil temperature is 75°C (167°F).
Test-ride the motorcycle and check the O₂ sensor with the HDS pocket tester.
Is the DTC 21-1 indicated?
YES - GO TO STEP 2.
NO - Intermitent failure
    - Loose or poor contact on the O₂ sensor 2P (Natural) connector or O₂ sensor cap and ECM 33P (Black) connector.

2. O₂ Sensor Short Circuit Inspection
Turn the Ignition switch OFF.
Disconnect the O₂ sensor 2P (Natural) connector.
Check the continuity between the O₂ sensor 2P connector of the wire side and ground.
CONNECTION: Black/orange – Ground
Is there continuity?
YES - Short circuit in Black/orange wire
NO - GO TO STEP 3.

3. O₂ Sensor Open Circuit Inspection
Disconnect the ECM 33P (Black) connector.
Check the continuity between the ECM 33P and O₂ sensor 2P connectors of the wire side.
TOOL:
Test probe 07ZAJ-RDJA110
CONNECTION: 3 (Black/orange) – Black/orange
Is there continuity?
YES - GO TO STEP 4.
NO - Open circuit in Black/orange wire
4. **O₂ Sensor Inspection**

Replace the O₂ sensor and O₂ sensor cord with a known good one (page 5-69).

Erase the DTC’s (page 5-12).

Connect the O₂ sensor 2P (Black) and ECM 33P (Black) connectors.

Turn the ignition switch ON.

Start the engine and warm it up until the engine oil is 75°C (167°F).

Test-ride the motorcycle and recheck the O₂ sensor with the HDS pocket tester.

*Is the DTC 21-1 indicated?*

**YES**  - Replace the ECM with a known good one, and recheck.

**NO**   - Faulty original O₂ sensor and/or O₂ sensor cord

**DTC 29-1 (IACV)**

* Before starting the inspection, check for loose or poor contact on the IACV 4P (Black) and ECM 33P (Black) connectors, and recheck the DTC.

1. **Recheck DTC**

Erase the DTC’s (page 5-12).

Turn the ignition switch ON.

Check the IACV with the HDS pocket tester.

*Is the DTC 29-1 indicated?*

**YES**  - GO TO STEP 2.

**NO**   - • Intermittent failure
   • Loose or poor contact on the IACV 4P (Black) and/or ECM 33P (Black) connectors

2. **IACV Short Circuit Inspection**

Turn the ignition switch OFF.

Disconnect the IACV 4P (Black) connector.

Check the continuity between the IACV 4P connector of the wire side and ground.

**CONNECTION:** Brown/white – Ground
Brown/yellow – Ground
Brown/black – Ground
Black/yellow – Ground

*Is there continuity?*

**YES**  - • Short circuit in Brown/white or Brown/yellow wire
   • Short circuit in Brown/black or Black/yellow wire

**NO**   - GO TO STEP 3.
3. IACV Open Circuit Inspection

Disconnect the ECM 33P (Black) connector.

Check the continuity between the ECM 33P and IACV 4P connectors of the wire side.

**TOOL:**
Test probe 07ZAJ-RDJA110

**CONNECTION:**
- 20 (Brown/black) – Brown/black
- 21 (Black/yellow) – Black/yellow
- 31 (Brown/yellow) – Brown/yellow
- 32 (Brown/white) – Brown/white

*Is there continuity?*

**YES** – GO TO STEP 4.

**NO** –
- Open circuit in Brown/white or Brown/yellow wire
- Open circuit in Brown/black or Black/yellow wire

4. IACV Resistance Inspection

Measure the resistance at the IACV 4P connector of the wire side.

**CONNECTION:** Brown/white – Black/yellow
Brown/black – Brown/yellow

**STANDARD:** 117 – 143 Ω (25°C/77°F)

*Is the resistance within 117 – 143 Ω (25°C/77°F)?*

**YES** – Replace the ECM with a known good one, and recheck.

**NO** – Faulty IACV

DTC 33-2 (EEPROM)

1. Recheck DTC

Erase the DTC’s (page 5-12).

Turn the ignition switch ON and recheck the ECM EEPROM.

*Is the DTC 33-2 indicated?*

**YES** – Replace the ECM with a known good one, and recheck.

**NO** – Intermittent failure
DTC 54-1 (BANK ANGLE SENSOR LOW VOLTAGE)

1. Recheck DTC
   Erase the DTC's (page 5-12).
   Turn the ignition switch ON and check the bank angle sensor with the HDS pocket tester.
   Is the DTC 54-1 indicated?
   YES - GO TO STEP 2.
   NO - Intermittent failure

2. Bank Angle Sensor Power Input Voltage Inspection
   Turn the ignition switch OFF.
   Disconnect the bank angle sensor 3P (Gray) connector.
   Turn the ignition switch ON.
   Measure the voltage at the bank angle sensor connector of the wire side.
   CONNECTION: Yellow/red (+) - Green/orange (-)
   STANDARD: 4.75 - 5.25 V
   Is the voltage within 4.75 - 5.25 V?
   YES - GO TO STEP 4.
   NO - GO TO STEP 3.

3. Bank Angle Sensor Input Voltage Line Short Circuit Inspection
   Turn the ignition switch OFF.
   Check the continuity between the bank angle sensor 3P connector of the wire side and ground.
   CONNECTION: Yellow/red - Ground
   Is there continuity?
   YES - Short circuit in Yellow/red wire
   NO - Replace the ECM with a known good one, and recheck.

4. Bank Angle Sensor Output Line Short Circuit Inspection
   Turn the ignition switch OFF.
   Disconnect the ECM 33P (Black) connector.
   Check the continuity between the bank angle sensor 3P connector of the wire side and ground.
   CONNECTION: Red/blue - Ground
   Is there continuity?
   YES - Short circuit in Red/blue wire
   NO - GO TO STEP 5.
5. Bank Angle Sensor Inspection

Replace the bank angle sensor with a known good one (page 5-65).
Erase the DTC's (page 5-12).
Connect the bank angle sensor 3P (Gray) connector.
Turn the ignition switch ON.
Check the bank angle sensor with the HDS pocket tester.

Is DTC 54-1 indicated?

YES - Replace the ECM with a known good one, and recheck.
NO - Faulty original bank angle sensor

DTC 54-2 (BANK ANGLE SENSOR HIGH VOLTAGE)

- Before starting the inspection, check for loose or poor contact on the bank angle sensor 3P (Gray) and ECM 33P (Black) connectors, and recheck the DTC.

1. Recheck DTC

Erase the DTC's (page 5-12).
Turn the ignition switch ON.
Check the bank angle sensor with the HDS pocket tester.

Is the DTC 54-2 indicated?

YES - GO TO STEP 2.
NO - Intermittent failure
- Loose or poor contact on the bank angle sensor 3P (Gray) and/or ECM 33P (Black) connectors

2. Bank Angle Sensor Power Input Voltage Inspection

Turn the ignition switch OFF.
Disconnect the bank angle sensor 3P (Gray) connector.
Turn the ignition switch ON.
Measure the voltage at the bank angle sensor connector of the wire side.

CONNECTION: White/red (+) – Green/orange (-)
STANDARD: 4.75 – 5.25 V

Is there within 4.75 – 5.25 V?

YES - GO TO STEP 4.
NO - GO TO STEP 3.
3. Bank Angle Sensor Input Voltage Line Open Circuit Inspection

Turn the ignition switch OFF.
Disconnect the ECM 33P (Black) connector.
Check the continuity between the ECM 33P and bank angle sensor 3P connectors of the wire side.

TOOL:
Test probe 07ZAJ-RDJA110

CONNECTION:
6 (Yellow/red) – Yellow/red
4 (Green/orange) – Green/orange

Is there continuity?

YES – Replace the ECM with a known good one, and recheck.

NO –
• Open circuit in Yellow/red wire
• Open circuit in Green/orange wire

4. Bank Angle Sensor Output Line Open Circuit Inspection

Turn the ignition switch OFF.
Disconnect the ECM 33P (Black) connector.
Check the continuity between the ECM 33P and bank angle sensor 3P connectors.

TOOL:
Test probe 07ZAJ-RDJA110

CONNECTION: 26 (Red/blue) – Red/blue

Is there continuity?

YES – Inspect the bank angle sensor (page 5-65).

NO – Open circuit in Red/blue wire
MIL TROUBLESHOOTING

MIL 1 BLINK (MAP SENSOR)

1. Sensor Unit Power Line Inspection
   Check the sensor unit power line inspection (page 5-16).
   Is the sensor unit power line normal?
   YES – GO TO STEP 2.
   NO – Replace or repair of the abnormal circuit.

2. MAP Sensor Output Voltage Inspection 1
   Turn the ignition switch ON.
   Measure the voltage at the test harness terminals.
   CONNECTION: 27 (+) – 4 (-)
   STANDARD: 2.6 – 3.2 V (20°C/68°F)
   Is the voltage within 2.6 – 3.2 V (20°C/68°F)?
   YES – Intermittent failure
       • Loose or poor contact on the sensor unit 5P (Black) and/or ECM 33P (Black) connectors
   NO – GO TO STEP 3.

3. MAP Sensor Output Voltage Inspection 2
   Turn the ignition switch OFF.
   Disconnect the sensor unit 5P (Black) connector.
   Turn the ignition switch ON.
   Measure the voltage at the sensor unit 5P connector of the wire side.
   CONNECTION:
   Light green/yellow (+) – Green/orange (-)
   STANDARD: 3.80 – 5.25 V
   Is the voltage within 3.80 – 5.25 V?
   YES – Faulty sensor unit (MAP sensor)
   NO – GO TO STEP 4.

4. MAP Sensor Output Line Short Circuit Inspection
   Turn the ignition switch OFF.
   Disconnect the sensor unit 5P (Black) connector.
   Check the continuity between the sensor unit 5P connector of the wire side and ground.
   CONNECTION: Light green/yellow – Ground
   Is there continuity?
   YES – Short circuit in Light green/yellow wire
   NO – GO TO STEP 5.
5. MAP Sensor Output Line Open Circuit Inspection

Check the continuity between the test harness and sensor unit 5P connector of the wire side.

**CONNECTION:** 27 – Light green/yellow

*Is there continuity?*

**YES** – Replace the ECM with a known good one, and recheck.

**NO** – Open circuit in Light green/yellow wire

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**MIL 7 BLINKS (EOT SENSOR)**

- Before starting the inspection, check for loose or poor contact on the EOT sensor 2P (Black) and ECM 33P (Black) connectors, and recheck the MIL blinking.

1. **EOT Sensor Input Voltage Inspection**

   Turn the ignition switch OFF.
   Disconnect the EOT sensor 2P (Black) connector.
   Turn the ignition switch ON.
   Measure the voltage at the EOT sensor connector of the wire side and ground.

   **CONNECTION:** Yellow/blue (+) – Ground
   **STANDARD:** 4.75 – 5.25 V

   *Is the voltage within 4.75 – 5.25 V?*
   **YES** – GO TO STEP 3.
   **NO** – GO TO STEP 2.

2. **EOT Sensor Short Circuit Inspection**

   Turn the ignition switch OFF.
   Check the continuity between the EOT sensor connector of the wire side and ground.

   **CONNECTION:** Yellow/blue – Ground

   *Is there continuity?*
   **YES** – Short circuit in Yellow/blue wire
   **NO** – GO TO STEP 3.
3. EOT Sensor Resistance Inspection

Turn the ignition switch OFF.
Measure the resistance at the EOT sensor terminals.

**CONNECTION:** Yellow/blue – Green/orange
**STANDARD:** 2.4 – 2.9 kΩ (20°C/68°F)

Is the resistance within 2.4 – 2.9 kΩ (20°C/68°F)?

- **YES** - GO TO STEP 4.
- **NO** - Faulty EOT sensor

4. EOT Sensor Open Circuit Inspection

Connect the test harness to ECM 33P (Black) connector (page 5-13).
Check the continuity between the test harness and EOT 2P sensor connector of the wire side.

**CONNECTION:** 24 – Yellow/blue
4 – Green/orange

Is there continuity?

- **YES** - GO TO STEP 5.
- **NO** - • Open circuit in Yellow/blue wire
  • Open circuit in Green/orange wire

5. EOT Sensor Output Voltage Inspection

Connect the EOT sensor 2P (Black) connector.

Turn the ignition switch ON.
Measure the voltage at the test harness terminals.

**CONNECTION:** 24 (+) – 4 (–)
**STANDARD:** 2.7 – 3.1 V (20°C/68°F)

Is the voltage within 2.7 – 3.1 V (20°C/68°F)?

- **YES** - • Intermittent failure
  • Loose or poor contact on the EOT sensor 2P (Black) and/or ECM 33P (Black) connectors
- **NO** - Replace the ECM with a known good one, and recheck.
MIL 8 BLINKS (TP SENSOR)

1. Sensor Unit Power Line Inspection

   Check the sensor unit power line inspection (page 5-16).

   Is the sensor unit power line normal?

   YES – GO TO STEP 2.

   NO – Replace or repair the abnormal circuit.

2. TP Sensor Output Voltage Inspection

   Turn the ignition switch ON.

   Measure the TP sensor output voltage at the test harness terminals.

   CONNECTION: 5 (+) – 4 (–)

   STANDARD:
   
<table>
<thead>
<tr>
<th>Throttle Position</th>
<th>Voltage Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fully Closed</td>
<td>0.29 – 0.71 V</td>
</tr>
<tr>
<td>Fully Opened</td>
<td>4.13 – 4.76 V</td>
</tr>
</tbody>
</table>

   Is there standard voltage?

   YES –
   • Intermittent failure
   • Loose or poor contact on the sensor unit 5P (Black) and/or ECM 33P (Black) connectors

   NO – GO TO STEP 3.

3. TP Sensor Output Line Short Circuit Inspection

   Turn the ignition switch OFF.

   Disconnect the ECM 33P (Black) and sensor unit 5P (Black) connectors.

   Check the continuity between the sensor unit 5P connector of the wire side and ground.

   CONNECTION: Yellow – Ground

   Is there continuity?

   YES – Short circuit in Yellow wire

   NO – GO TO STEP 4.

4. TP Sensor Voltage Input Line Open Circuit Inspection

   Connect the test harness to the ECM 33P (Black) connector (page 5-13).

   Check the continuity between the sensor unit 5P connector of the wire side and test harness.

   CONNECTION: 5 – Yellow

   Is there continuity?

   YES –
   • Faulty sensor unit (TP sensor)
   • Replace the ECM with a known good one, and recheck.

   NO – Open circuit in Yellow wire
MIL 9 BLINKS (IAT SENSOR)

1. Sensor Unit Power Line Inspection

Check the sensor unit power line inspection (page 5-16).

Is the sensor unit power line normal?

YES – GO TO STEP 2.

NO – Replace or repair the abnormal circuit.

2. IAT Sensor Output Voltage Inspection

Turn the ignition switch ON.

Measure the voltage at the test harness terminals.

CONNECTION: 14 (+) – 4 (-)

STANDARD: 2.7 – 3.1 V (20°C/68°F)

Is the voltage within 2.7 – 3.1 V (20°C/68°F)?

YES – • Intermittent failure
       • Loose or poor contact on the sensor unit 5P (Black) connector

NO – GO TO STEP 3.

3. IAT Sensor Input Voltage Inspection

Turn the ignition switch OFF.

Disconnect the sensor unit 5P (Black) connector.

Turn the ignition switch ON.

Measure the voltage at the sensor unit 5P connector of the wire side.

CONNECTION: Gray/blue (+) – Green/orange (-)

STANDARD: 4.75 – 5.25 V

Is the voltage within 4.75 – 5.25 V?

YES – GO TO STEP 6.

NO – GO TO STEP 4.

4. IAT Sensor Voltage Input Line Short Circuit Inspection

Turn the ignition switch OFF.

Check the continuity between the sensor unit 5P connector of the wire side and ground.

CONNECTION: Gray/blue – Ground

Is there continuity?

YES – Short circuit in Gray/blue wire

NO – GO TO STEP 5.
5. IAT Sensor Voltage Input Line Open Circuit Inspection

Check the continuity between the sensor unit 5P connector of the wire side and test harness.

**CONNECTION:** 14 - Gray/blue

*Is there continuity?*

**YES** - GO TO STEP 6.

**NO** - Open circuit in Gray/blue wire

6. IAT Sensor Resistance Inspection

Turn the ignition switch OFF.

Connect the sensor unit 5P (Black) connector.

Measure the resistance at the test harness terminals.

**CONNECTION:** 14 - 4

**STANDARD:** 1 - 4 kΩ (20°C/68°F)

*Is the resistance within 1 - 4 kΩ (20°C/68°F)?*

**YES** - Replace the ECM with a known good one, and recheck.

**NO** - Faulty sensor unit (IAT sensor)

**MIL 12 BLINKS (INJECTOR)**

- Before starting the inspection, check for loose or poor contact on the injector 2P (Black) and ECM 33P (Black) connectors, and recheck the MIL blinking.

1. Injector Input Voltage Inspection

Turn the ignition switch OFF.

Disconnect the injector 2P (Black) connector.

Turn the ignition switch ON.

Measure the voltage between the injector 2P connector of the wire side and ground.

**CONNECTION:** Black/blue (+) - Ground (-)

*Is there battery voltage?*

**YES** - GO TO STEP 2.

**NO** - Open or short circuit in Black/blue wire
2. Injector Signal Line Short Circuit Inspection
   Turn the ignition switch OFF.
   Check the continuity between the injector 2P connector of the wire side and ground.
   CONNECTION: Pink/green – Ground
   Is there continuity?
   YES – Short circuit in Pink/green wire
   NO – GO TO STEP 3.

3. Injector Signal Line Open Circuit Inspection
   Connect the test harness to the ECM 33P (Black) connector (page 5-13).
   Check the continuity between the test harness and injector 2P connector of the wire side.
   CONNECTION: 16 – Pink/green
   Is there continuity?
   YES – GO TO STEP 4.
   NO – Open circuit in Pink/green wire

4. Injector Resistance Inspection
   Measure the resistance between the injector 2P connector terminals.
   STANDARD: 9 – 12 Ω (20°C/68°F)
   Is the resistance within 9 – 12 Ω (20°C/68°F)?
   YES – Replace the ECM with a known good one, and recheck.
   NO – Faulty injector
MIL 21 BLINKS (O₂ SENSOR)

**NOTICE**
- Do not get grease, oil or other materials in the O₂ sensor air hole.
- Before starting the inspection, check for loose or poor contact on the O₂ sensor 2P (Natural) connector or O₂ sensor cap and ECM 33P (Black) connector, and recheck the MIL blinking.

1. **O₂ Sensor System Inspection**
   
   Turn the ignition switch ON.
   Start the engine and warm it up until the engine oil temperature is 75°C (167°F).
   Test-ride the motorcycle and recheck the MIL blinking.
   
   **Does the MIL blink 21 times?**
   
   YES - GO TO STEP 2.
   NO - Intermittent failure
   - Loose or poor contact on the O₂ sensor 2P (Natural) connector, O₂ sensor cap and/or ECM 33P (Black) connector.

2. **O₂ Sensor Short Circuit Inspection**

   Turn the ignition switch OFF.
   Disconnect the O₂ sensor 2P (Natural) connector.
   Check the continuity between the O₂ sensor 2P connector of the wire side and ground.
   
   **CONNECTION:** Black/orange - Ground
   
   **Is there continuity?**
   
   YES - Short circuit in Black/orange wire
   NO - GO TO STEP 3.

3. **O₂ Sensor Open Circuit Inspection**

   Connect the test harness to the ECM 33P (Black) connector (page 5-13).
   Check the continuity between the test harness and O₂ sensor 2P connector of the wire side.
   
   **CONNECTION:** 3 - Black/orange
   
   **Is there continuity?**
   
   YES - GO TO STEP 4.
   NO - Open circuit in Black/orange wire
4. **O₂ Sensor Inspection**

Replace the O₂ sensor and O₂ sensor cord with a known good one (page 5-69).

Disconnect the test harness and connect the ECM 33P (Black) connector.

Turn the ignition switch ON. Start the engine and warm it up until the engine oil temperature is 75°C (167°F).

Test-ride the motorcycle and recheck the MIL blinking.

*Does the MIL blink 21 times?*

**YES** – Replace the ECM with a known good one, and recheck.

**NO** – Faulty original O₂ sensor and/or O₂ sensor cord

**MIL 29 BLINKS (IACV)**

- Before starting the inspection, check for loose or poor contact on the IACV 4P (Black) and ECM 33P (Black) connectors recheck the MIL blinking.

1. **IACV Resistance Inspection**

Turn the ignition switch OFF.

Connect the test harness to the ECM 33P (Black) connector (page 5-13).

Measure the resistance at the test harness terminals.

**CONNECTION:** 20 – 21

31 – 32

**STANDARD:** 117 – 143 Ω (25°C/77°F)

*Is the resistance within 117 – 143 Ω (25°C/77°F)?*

**YES** – **GO TO STEP 2.**

**NO** – Faulty IACV

2. **IACV Short Circuit Inspection**

Check for continuity between the IACV 4P connector of the wire side and ground.

**CONNECTION:** Brown/white – Ground

Brown/yellow – Ground

Brown/black – Ground

Black/yellow – Ground

*Is there continuity?*

**YES** – • Short circuit in Brown/white or Brown/yellow wire

• Short circuit in Brown/black or Black/yellow wire

**NO** – **GO TO STEP 3.**
3. IACV Open Circuit Inspection

Connect the test harness to ECM 33P (Black) connector.

Check the continuity between the test harness and IACV 4P connector of the wire side.

**CONNECTION:**
- 20 - Brown/black
- 21 - Black/yellow
- 31 - Brown/yellow
- 32 - Brown/white

*Is there continuity?*
- **YES** - Replace the ECM with a known good one, and recheck.
- **NO** -
  - Open circuit in Brown/white or Brown/yellow wire
  - Open circuit in Brown/black or Black/yellow wire

MIL 54 BLINKS (BANK ANGLE SENSOR)

- Before starting the inspection, check for loose or poor contact on the bank angle sensor 3P (Gray) and ECM 33P (Black) connectors, and recheck the MIL blinking.

1. Bank Angle Sensor Power Input Voltage Inspection

   Turn the ignition switch OFF.
   Disconnect the bank angle sensor 3P (Gray) connector.
   Turn the ignition switch ON.
   Measure the voltage at the bank angle sensor connector of the wire side.

   **CONNECTION:** Yellow/red (+) – Green/orange (–)
   **STANDARD:** 4.75 – 5.25 V

   *Is there within 4.75 – 5.25 V?*

   - **YES** - GO TO STEP 4.
   - **NO** - GO TO STEP 2.

2. Bank Angle Sensor Input Voltage Line Short Circuit Inspection

   Turn the ignition switch OFF.
   Check the continuity between the bank angle sensor 3P connector of the wire side and ground.

   **CONNECTION:** Yellow/red – Ground

   *Is there continuity?*

   - **YES** - GO TO STEP 3.
   - **NO** - Short circuit in Yellow/red wire
3. Bank Angle Sensor Input Voltage Line Open Circuit Inspection

Connect the test harness to the ECM 33P (Black) connector (page 5-13).

Check the continuity between the test harness and bank angle sensor 3P connector of the wire side.

**CONNECTION:** 6 - Yellow/red
4 - Green/orange

*Is there continuity?*

**YES** - Replace the ECM with a known good one, and recheck.

**NO** -
- Open circuit in Yellow/red wire
- Open circuit in Green/orange wire

4. Bank Angle Sensor Output Line Short Circuit Inspection

Turn the ignition switch OFF.

Check the continuity between the bank angle sensor 3P connector of the wire side and ground.

**CONNECTION:** Red/blue - Ground

*Is there continuity?*

**YES** - Short circuit in Red/blue wire

**NO** - GO TO STEP 5.

5. Bank Angle Sensor Output Line Open Circuit Inspection

Connect the test harness to the ECM 33P (Black) connector (page 5-13).

Check the continuity between the test harness and bank angle sensor 3P connector of the wire side.

**CONNECTION:** 26 - Red/blue

*Is there continuity?*

**YES** - Open circuit in Red/blue wire

**NO** - Inspect the bank angle sensor (page 5-65).
When The Engine Starts But The MIL Does Not Come On

Check for the combination meter function.
- Check the MIL bulb (page 18-7).
- If it is properly, check as follows:

**MIL circuit inspection with test probe**

Turn the ignition switch OFF.
Remove the left side cover (page 2-10).
Disconnect the ECM 33P (Black) connector.

Ground the ECM 33P connector terminal of the wire side with a jumper wire.

**TOOL:**
Test probe 07ZAJ-RDJA110

**CONNECTION:** 22 (White/blue) – Ground

Turn the ignition switch ON, then the MIL should come on.
- If the MIL come on, replace the ECM with a known good one.
- If the MIL does not come on, check for open circuit in the White/blue wire between the combination meter and ECM.
  - If the wire is good condition, replace the combination meter with a known good one, and recheck.

**MIL circuit inspection with test harness**

Connect the test harness to the ECM 33P (Black) connector (page 5-13).
Ground the test harness terminal with a jumper wire.

**CONNECTION:** 22 – Ground

Turn the ignition switch ON, then the MIL should come on.
- If the MIL come on, replace the ECM with a known good one.
- If the MIL does not come on, check for open circuit in the White/blue wire between the combination meter and ECM.
  - If the wire is good condition, replace the combination meter with a known good one, and recheck.
When The Engine Starts But The MIL Does Not Go Off Within A Few Seconds

Check for the combination meter function:
- Check the MIL bulb (page 18-7).
- If it is properly, check as follows:

**MIL and DLC circuit inspections with test probe**

Turn the ignition switch OFF.

Remove the left side cover (page 2-10).

Disconnect the ECM 33P (Black) connector.

Turn the ignition switch ON, then the MIL should turn off.
- If the MIL turns off, check for short circuit in the blue wire between the DLC and ECM as follows:
- If the MIL stays on, check for short circuit in the White/blue wire between the combination meter and ECM as follows:

Check the continuity between the ECM 33P connector of the wire side and ground.

**TOOL:**
Test probe 07ZAJ-RDJA110

**CONNECTION:**
15 (Blue) – Ground
22 (White/blue) – Ground

If there is continuity, check the White/blue and/or Blue wires for short circuit.
- If there is no continuity, replace the ECM with a known good one, and recheck.

**MIL and DLC circuit inspection with test harness**

Connect the test harness to the ECM 33P (Black) connector (page 5-13).

Check the continuity between the test harness and ground.

**CONNECTION**
15 – Ground
22 – Ground

If there is continuity, check the White/blue and/or Blue wires for short circuit.
- If there is no continuity, replace the ECM with a known good one, and recheck.
FUEL LINE INSPECTION

FUEL PRESSURE RELIEVING

- Before disconnecting fuel feed hose, relieve pressure from the system as follows.
1. Turn the ignition switch OFF.
2. Remove the side covers (page 2-10).
3. Disconnect the fuel pump 2P (Black) connector.
   Turn the ignition switch ON and start the engine, and let it idle until the engine stalls.
4. Turn the ignition switch OFF.
5. Disconnect the battery negative (−) cable (page 15-7).

QUICK CONNECT FITTING REMOVAL

FUEL PUMP SIDE

1. Relieve the fuel pressure (page 5-46).
2. Check the fuel quick connect fitting for dirt, and clean if necessary.
3. Pull and release the connector damper from the retainer.
   Place a shop towel over the quick connect fitting.
4. Hold the connector with one hand and squeeze the retainer tabs with the other hand to release them from the locking pawls.
   Pull the connector off and remove the retainer.

NOTE
- Absorb the remaining fuel in the fuel feed hose with a shop towel.
- Be careful not to damage the hose or other parts.
- Do not use tools.
- If the connector does not move, keep the retainer tabs pressed down, and alternately pull and push the connector until it comes off easily.
- Do not bent or twist the fuel feed hose.
5. To prevent damage and keep foreign matter out, cover the disconnected connector and joint end with the plastic bags.

**INJECTOR SIDE**

1. Relieve the fuel pressure (page 5-46).
2. Check the fuel quick connect fitting for dirt, and clean if necessary.
3. Pull and release the connector damper tabs from the retainer when disconnecting the injector joint quick connect fitting.
   Place a shop towel over the quick connect fitting.

4. Hold the connector with one hand and squeeze the retainer tabs with the other hand to release them from the locking pawls.
   Pull the connector off and remove the retainer.

**NOTE:**
- Absorb the remaining fuel in the fuel feed hose with a shop towel.
- Be careful not to damage the hose or other parts.
- Do not use tools.
- If the connector does not move, keep the retainer tabs pressed down, and alternately pull and push the connector until it comes off easily.

5. To prevent damage and keep foreign matter out, cover the disconnected connector and pipe end with the plastic bags.
QUICK CONNECT FITTING INSTALLATION

• Always replace the retainer of the quick connect fitting when the fuel feed hose is disconnected.
• If any retainer needs replacing, use the same manufacturer's retainer as the ones being removed (The various manufactures feature different retainer specifications).
• Do not bent or twist fuel feed hose.
• If the connector dampers is damaged or cut, replace it with a new one.

FUEL PUMP SIDE
1. Insert a new retainer into the connector.

NOTE:
• Align new retainer locking pawls with the connector grooves.

2. Set the connector damper on the fuel joint as shown.
   Install the connector to the fuel joint, then press the quick connect fitting onto the pipe until both retainer pawls lock with a "CLICK".

NOTE:
• Align the quick connect fitting with the joint.
   If it is hard to connect, put a small amount of engine oil on the fuel joint end.

3. Make sure the connection is secure and that the locking pawls are firmly locked into place; check visually and by pulling the connector.

4. Make sure the connector damper is in place (between the retainer tabs).

5. Increase the fuel pressure and check that there is no leakage in fuel supply system (page 5-50).
INJECTOR SIDE

1. Insert a new retainer into the connector.

NOTE:
• Align new retainer locking pawls with the connector grooves.

2. Set the connector damper on the injector joint as shown.

   Install the connector to the injector joint, then press the quick connect fitting onto the pipe until both retainer pawls lock with a "CLICK".

NOTE:
• Align the quick connect fitting with the injector joint.

   If it is hard to connect, put a small amount of engine oil on the injector joint.

3. Make sure the connection is secure and that the locking pawls are firmly locked into place; check visually and by pulling the connector.

4. Make sure the connector damper tabs are in place (between the retainer tabs).

5. Increase the fuel pressure and check that there is no leakage in fuel supply system (page 5-50).
FUEL SYSTEM (PGM-FI)

FUEL PRESSURE INCREASING
1. Connect the battery negative (−) cable.
2. Connect the fuel pump 2P (Black) connector.
3. Turn the ignition switch ON.

NOTE
• Do not start the engine.
  The fuel pump will operate for about 2 seconds, and fuel pressure will rise.
4. Turn the ignition switch OFF.
5. Repeat step 3 and 4, 2 - 3 times, and check that there is no leakage in the fuel supply system.
6. Install the side covers (page 2-10).

FUEL PRESSURE TEST
Relieve the fuel pressure and disconnect the quick connect fitting from the fuel pump side (page 5-46).
Attach the fuel pressure gauge, attachments and manifold between the fuel pump joint and fuel feed hose.

TOOLS:
- Fuel pressure gauge
- Pressure gauge manifold
- Hose attachment, 9 mm/9 mm
- Hose attachment, 6 mm/9 mm
- Attachment joint, 6 mm/9 mm

07406-0040004
07ZAJ-S5A0111
07ZAJ-S5A0120
07ZAJ-S5A0130
07ZAJ-S5A0150

Temporarily connect the battery negative (−) cable and fuel pump 2P (Black) connector.
Turn the ignition switch ON and start the engine, and let it idle.
Read the fuel pressure.

STANDARD:
294 ± 6 kPa (3 ± 0.1 kgf/cm², 43 ± 0.9 psi)
If the fuel pressure is higher than specified, replace the fuel pump.
If the fuel pressure is lower than specified, inspect the following:
  - Fuel line leaking
  - Pinched or clogged fuel feed hose or fuel tank breather hose
  - Fuel flow (page 5-51)
  - Clogged fuel filter (Faulty fuel pump)
After inspection, relieve the fuel pressure (page 5-46).
Remove the fuel pressure gauge, attachments and manifold to the fuel pump joint.
Connect the quick connect fitting (page 5-48).
FUEL FLOW INSPECTION

Relieve the fuel pressure and disconnect the quick connect fitting (page 5-46).

Connect the special tool to the fuel pump joint.

**TOOL:**

**Hose attachment, 6 mm/9 mm 07ZAJ-S5A0130**

Place the end of the hose into an approved gasoline container.

Temporarily connect the battery negative (-) cable and fuel pump 2P (Black) connector.

Turn the ignition switch ON.

Measure the amount of fuel flow.

**NOTE:**
- The fuel pump operates for 2 seconds. Repeat 5 times so that the total measuring time.
- Return fuel to the fuel tank when the first fuel is flowed.

**Amount of fuel flow:**

27.7 cm³ (0.94 US oz, 0.98 Imp oz) minimum/10 seconds at 12 V

If fuel flow is less than specified, inspect the following:
- Fuel pump (page 5-51)
- Clogged fuel filter (Faulty fuel pump unit)
- Clogged fuel cap breather hole

Connect the quick connect fitting (page 5-48).

SUB FUEL TANK/FUEL PUMP INSPECTION

Turn the ignition switch ON and confirm that the fuel pump operates a few seconds.

If the fuel pump does not operate, inspect as follows.

Turn the ignition switch OFF.

Remove the left side cover (page 2-10).

Disconnect the fuel pump 2P (Black) connector.
FUEL SYSTEM (PGM-FI)

Turn the ignition switch ON.
Measure the voltage at the fuel pump 2P (Black) connector of the wire side.

**CONNECTION:** Black/blue (+) – Brown (–)

There should be standard voltage for a few seconds.
If there is standard voltage, replace the sub fuel tank/fuel pump.
If there is no standard voltage, inspect the following:
- Main fuse (15 A)
- Sub fuse B (10 A)
- Ignition switch
- Open circuit in Red, Red/black or Black/blue wire
- ECM (page 5-67)

**REMOVAL**
- Do not disassemble the sub fuel tank/fuel pump.
Relieve the fuel pressure and disconnect the quick connect fitting (page 5-46).
Install clamps to the fuel hose and fuel vapor return hose, and shut them as shown.
Disconnect the fuel hose and fuel vapor return hose from the sub fuel tank/fuel pump.
Remove the sub fuel tank/fuel pump assembly from the stay.

Remove the rubber holder from the sub fuel tank/fuel pump.

**INSPECTION**
Check the sub fuel tank/fuel pump for damage, replace it if necessary.
**INSTALLATION**

Install the rubber holder to the sub fuel tank/fuel pump by aligning its semicircular groove with fuel joint.

Connect the fuel hose and fuel vapor return hose to the sub fuel tank/fuel pump.
Remove the clamps.
Connect the quick connect fitting (page 5-48).

---

**FUEL TANK**

**REMOVAL**

Remove the front cowl (page 2-5).
Relieve the fuel pressure and disconnect the quick connect fitting from the sub fuel tank/fuel pump (page 5-46).
Disconnect the fuel level sensor 2P (Black) connector.
Install clamps to the fuel hose and fuel vapor return hose, and shut them as shown.
Disconnect the fuel hoses from the sub fuel tank/fuel pump.

Remove the bolt and collar from the rear side of fuel tank.
Disconnect the fuel tank breather hoses from the fuel tank and remove the fuel tank.

**INSTALLATION**

- Route the hose and wire properly (page 1-16).
- Connect the fuel tank breather hoses to the fuel tank.
- Install the fuel tank, collar and bolt.
- Connect the fuel hoses to the fuel tank, then remove the clamps from them.
- Connect the fuel level sensor 2P (Black) connector.

Connect the quick connect fitting (page 5-48).

Install the removed parts in the reverse order of removal.
FUEL SYSTEM (PGM-FI)

AIR CLEANER HOUSING

REMOVAL/INSTALLATION

Remove the following:
- Air cleaner element (page 3-6).
- Side covers (page 2-10)

Disconnect the crankcase breather hose.
Loosen the connecting hose band screw.

Remove the screw and main wire harness clamp.
Unhook the sub fuse holder from the air cleaner housing.

Remove the bolts from left side air cleaner housing.

Remove the bolt, and release the connecting boot from the throttle body.
Remove the air cleaner housing to the right side of the frame.

Installation is in the reverse order of removal.
THROTTLE BODY

REMOVAL
Relieve the fuel pressure and disconnect the quick connect fitting from the injector (page 5-46).

Disconnect the following:
- Injector 2P (Black) connector
- IACV 4P (Black) connector
- Sensor unit 5P (Black) connector

Loosen the throttle cable lock nut and adjusting bolt then disconnect the throttle cable from the throttle drum and cable stay.

Loosen the band screws and remove the throttle body assembly.
Place a shop towel over the insulator.

DISASSEMBLY

**NOTICE**
- The throttle body is factory pre-set. Do not disassemble in a way other than shown in this manual.
- Do not snap the throttle valve from fully opened to fully closed after the throttle cable has been removed. It may cause incorrect idle operation.
- Do not damage the throttle body. It may cause incorrect throttle valve operation.
- Do not loosen or tighten the white painted nut and screw of the throttle body. Loosening or tightening them can cause throttle valve and idle control failure.
- Always clean around the throttle body before each sensor removal to prevent dirt and debris from entering the air passage.
Remove the following:
- Injector (page 5-61)
- IACV (page 5-63)

Remove the sensor unit torx screws and sensor unit.
Remove the O-ring from the throttle body groove.

Cleaning the air passages and sensor holes with a piece of wire will damage the throttle body.

Blow open all air passages and sensor holes in the throttle body with compressed air.

ASSEMBLY

- 3.4 N·m (0.3 kgf·m, 2.5 lbf·ft) INJECTOR JOINT
- 5.1 N·m (0.5 kgf·m, 3.8 lbf·ft) O-RING
- 3.4 N·m (0.3 kgf·m, 2.5 lbf·ft) SENSOR UNIT
- 2.1 N·m (0.2 kgf·m, 1.5 lbf·ft) IACV
- 2.1 N·m (0.2 kgf·m, 1.5 lbf·ft) THROTTLE CABLE STAY
- 3.4 N·m (0.3 kgf·m, 2.5 lbf·ft) SEAL RING
- 3.4 N·m (0.3 kgf·m, 2.5 lbf·ft) THROTTLE BODY
- 5.1 N·m (0.5 kgf·m, 3.8 lbf·ft) SETTING PLATE
FUEL SYSTEM (PGM-FI)

If the O-ring is not installed properly, the idle air will leak and engine idle speed will be unstable.

Install a new O-ring to the throttle body properly.

When installing the sensor unit to the throttle body, align the following:
- Clip of the TP sensor with the boss of the throttle valve
- IAT sensor of the throttle body with the hole

Install and tighten the sensor unit torx screws to the specified torque.
TORQUE: 3.4 N·m (0.3 kgf·m, 2.5 lbf·ft)
- Reset the TP sensor (page 5-60).
- Install the following:
  - Injector (page 5-62)
  - IACV (page 5-64)

INSTALLATION

Install the throttle body assembly to the insulator by aligning its tab with the groove of the insulator.
Tighten the connecting boot band screw securely.
Tighten the insulator band screw to the specified torque.
TORQUE: 1 N·m (0.1 kgf·m, 0.7 lbf·ft)

Check that the width between the insulator band ends clearance is 8 ± 1 mm (0.3 ± 0.04 in).
Connect the throttle cable to the throttle drum and cable stay.

Connect the following:
- Injector 2P (Black) connector
- IACV 4P (Black) connector
- Sensor unit 5P (Black) connector

**NOTE:**
If the sensor unit is removed, reset the TP sensor (page 5-60).

Connect the quick connect fitting (page 5-48).
Adjust the throttle grip freeplay (page 3-5).

Connect the hose and secure properly (page 1-16).
FUEL SYSTEM (PGM-FI)

TP SENSOR RESET PROCEDURE

- Make sure that the DTCs are not stored in ECM.
  If the DTCs are stored in ECM, the TP sensor reset mode won’t start.
- If the sensor unit is removed, reset the throttle valve fully closed position as following.

1. Erase the DTC's (page 5-12).
2. Turn the ignition switch OFF.
3. Remove the dummy connector.
4. Short the DLC using the special tool.
   TOOL:
   SCS connector 070PZ-ZY30100

5. Remove the left side cover (page 2-10) and disconnect the EOT sensor 2P (Black) connector.
   Short the EOT sensor 2P (Black) connector of the wire side using a jumper wire
   CONNECTION: Yellow/blue - Green/orange

6. Turn the ignition switch ON.
   Within 10 seconds after turning the ignition switch ON, disconnect the jumper wire from the EOT sensor 2P (Black) connector.

7. After disconnecting the jumper wire, the MIL start to blinking.
8. Check if the MIL is blinking.
   If the MIL begins short blink (0.3 seconds), the throttle valve fully closed position is reset.
   • If the MIL stays lit, the throttle valve fully closed position is not reset, perform the reset procedure from step 4 again.

9. Turn the ignition switch OFF.
10. Connect the EOT sensor 2P (Black) connector.
    Install the left side cover (page 2-10)
11. Disconnect the SCS connector from the DLC and install the dummy connector.
12. Check the engine idle speed (page 3-14).
    • If the engine revolution is out of specification, check the following:
      - Throttle operation (page 3-5)
      - IACV (page 5-63)
      - Intake air leaks
      - Sensor unit installed condition

**INJECTOR REMOVAL**

Relieve the fuel pressure and disconnect the quick connect fitting (page 5-48).

Slide the dust cover and disconnect the injector 2P (Black) connector.

Remove the bolts and injector assembly from the throttle body.
Remove the injector joint, O-ring and seal ring from the injector.
Check the removed parts for wear or damage and replace them if necessary.

INSTALLATION
Apply engine oil to new O-ring and seal ring.
Install the O-ring and seal ring to the injector, being careful not to damage them.

Install the injector into the injector joint, being careful not to damage the O-ring.

NOTE:
Align the injector with the injector joint as shown.

Be careful not to damage the seal ring.
Install the injector assembly to the throttle body.
Install and tighten the injector joint mounting bolts alternately to the specified torque.

TORQUE: 5.1 N·m (0.5 kgf·m, 3.8 lbf·ft)
Connect the injector 2P (Black) connector and install the dust cover.
INSPECTION

The IACV is installed on the throttle body and is operated by the step motor. When the ignition switch is turned ON, the IACV operates for a few seconds.

Check the step motor operating (beep) sound with the ignition switch turned ON.

Check the IACV for wear or damage. Replace if necessary.

The IACV operation can be checked visually as follows:

Remove the IACV (page 5-63).

Connect the IACV 4P (Black) connector and turn the ignition switch ON.

• The IACV slide valve will move to valve body, and then move out the valve body while guiding the groove of the slide valve.

REMOVAL

• Always clean the throttle body before the IACV removal to prevent dirt and debris from entering the IACV passage.

Remove the left side cover (page 2-10).

Disconnect the IACV 4P (Black) connector.

Remove the torx screw, set plate and IACV from the throttle body.
**INSTALLATION**

Turn the slide valve clockwise until lightly seated on valve body.

Install the IACV into the throttle body while aligning its valve slit with the slide valve housing pin in the throttle body.

Install the setting plate while aligning its cut-out with the lug on the IACV as shown. Install and tighten the IACV setting plate torx screws to the specified torque.

**TORQUE:** 2.1 N·m (0.2 kgf·m, 1.5 lbf·ft)

Connect the IACV 4P (Black) connector.

Install the left side cover (page 2-10).

---

**EOT SENSOR**

**REMOVAL/INSTALLATION**

- Replace the EOT sensor while the engine is cold.

Remove the left side cover (page 2-10).

Slide the dust cover and disconnect the EOT sensor 2P (Black) connector.
**FUEL SYSTEM (PGM-FI)**

- Always replace a sealing washer with a new one.

Remove the EOT sensor and sealing washer.

Install a new sealing washer onto the EOT sensor and install them.

Tighten the EOT sensor to the specified torque.

**TORQUE: 14 N·m (1.4 kgf-m, 10 lbf-ft)**

Connect the EOT sensor 2P (Black) connector.

Check the engine oil level (page 3-10).

---

**BANK ANGLE SENSOR**

**REMOVAL/INSTALLATION**

Disconnect the bank angle sensor 3P (Gray) connector.

Remove the mounting screw/washers, collars and bank angle sensor.

Install the bank angle sensor, collars and mounting screw/washers.

Tighten the mounting screw/washers securely.

Connect the bank angle sensor 3P (Gray) connector.
INSPECTION WITH HDS POCKET TESTER

Connect the HDS pocket tester (page 5-11).
Remove the bank angle sensor (page 5-65).
Connect the bank angle sensor 3P (Gray) connector.
Place the bank angle sensor is horizontal as shown.
Turn the ignition switch ON.
Read the voltage with the HDS pocket tester.

STANDARD: 3.6 - 4.4 V

Incline the bank angle sensor 55 ± 5° to the left or right with keeping the ignition switch ON.
Read the voltage with HDS pocket tester.

STANDARD: 0.7 - 1.3 V

• If you repeat this test, first turn the ignition switch OFF, then turn the ignition switch ON.

INSPECTION WITH ECM TEST HARNESS

Connect the test harness (page 5-13).
Remove the bank angle sensor (page 5-65).
Connect the bank angle sensor 3P (Gray) connector.
Place the bank angle sensor is horizontal as shown.
Turn the ignition switch ON.
Measure the output voltage with the test harness terminals.

CONNECTION: 26 (+) - 4 (-)
STANDARD: 3.6 - 4.4 V

Incline the bank angle sensor 55 ± 5° to the left or right with keeping the ignition switch ON.
Measure the output voltage with test harness terminals.

CONNECTION: 26 (+) - 4 (-)
STANDARD: 0.7 - 1.3 V

• If you repeat this test, first turn the ignition switch OFF, then turn the ignition switch ON.
REMOVAL/INSTALLATION
Remove the left side cover (page 2-10).
Turn the ignition switch OFF.
Disconnect the ECM 33P (Black) connector.
Remove the ECM from the rubber holder.
Install the ECM to the rubber holder.
Connect the ECM 33P (Black) connector.
Install the left side cover (page 2-10)

ECM POWER/GROUND LINE INSPECTION WITH TEST PROBE

• Before starting the inspection, check for loose or poor contact on the ECM 33P (Black) connector and recheck the MIL blinking.

ENGINE DOES NOT START (No DTC)
1. ECM Power Input Voltage Inspection
   Turn the ignition switch OFF.
   Disconnect the ECM 33P (Black) connector.
   Turn the ignition switch ON.
   Measure the voltage at the ECM 33P connector of the wire side and ground.
   TOOL: Test probe 07ZAJ-RDJA110
   CONNECTION: 1 (Black/blue) (+) – Ground
   Is there battery voltage?
   YES – GO TO STEP 2.
   NO – • Open or short circuit in Black/blue wire
        • Faulty ignition switch
        • Blown main or sub fuse B (10 A)

2. ECM Ground Line Inspection
   Turn the ignition switch OFF.
   Check the continuity between the ECM 33P connector of the wire side and ground.
   TOOL: Test probe 07ZAJ-RDJA110
   CONNECTION: 9 (Green) – Ground (PG1)
               10 (Green) – Ground (PG2)
               2 (Green/black) – Ground (LG)
   Is there continuity?
   YES – Replace the ECM with a known good one, and recheck.
   NO – • Open circuit in Green wires
        • Open circuit in Green/black wire
FUEL SYSTEM (PGM-FI)

ECM POWER/GROUND LINE INSPECTION WITH TEST HARNESS

- Before starting the inspection, check for loose or poor contact on the ECM 33P (Black) connector and recheck the MIL blinking.

ENGINE DOES NOT START (MIL no blinks)

1. ECM Power Input Voltage Inspection
   - Turn the ignition switch OFF.
   - Disconnect the ECM 33P (Black) connector.
   - Turn the ignition switch ON.
   - Measure the voltage at the test harness terminal and ground.
   
   CONNECTION: 1 (+) - Ground

   Is there battery voltage?
   
   YES - GO TO STEP 2.
   
   NO - • Open or short circuit in Black/blue wire
         • Faulty ignition switch
         • Blown main or sub fuse B (10 A)

2. ECM Ground Line Inspection
   - Turn the ignition switch OFF.
   - Check the continuity between the test harness terminals and ground.
   
   CONNECTION: 9 - Ground (PG1)
   10 - Ground (PG2)
   2 - Ground (LG)

   Is there continuity?
   
   YES - Replace the ECM with a known good one, and recheck.
   
   NO - • Open circuit in Green wires
         • Open circuit in Green/black wire
O2 SENSOR

**NOTICE**
- Do not get grease, oil or other materials in the O2 sensor air hole.
- The O2 sensor may be damaged if dropped. Replace it with a new one, if dropped.
- Handle the O2 sensor with care.
- Do not service the O2 sensor while it is hot.

**REMOVAL**
Disconnect the O2 sensor 2P (Natural) connector.

Hold the center of the O2 sensor cap by hand and disconnect the cap while turning it less than 1/2 of a turn.

Remove the O2 sensor.
FUEL SYSTEM (PGM-FI)

INSTALLATION

- Do not use an impact wrench while removing or installing the O₂ sensor, or it may be damaged.

Install and hand tighten the O₂ sensor onto the cylinder head.
Tighten the O₂ sensor to the specified torque.
TORQUE: 25 N m (2.5 kgf m, 18 lbf-ft)

Connect the O₂ sensor cap by pushing it straight.

NOTICE

- Be careful not to tilt the O₂ sensor cap when connecting the cap to the O₂ sensor.

Connect the O₂ sensor 2P (Natural) connector.
<table>
<thead>
<tr>
<th>Component</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Component Location</td>
<td>6-2</td>
</tr>
<tr>
<td>Service Information</td>
<td>6-3</td>
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<td>Engine Removal</td>
<td>6-4</td>
</tr>
<tr>
<td>Engine Installation</td>
<td>6-6</td>
</tr>
</tbody>
</table>
SERVICE INFORMATION

GENERAL
• During engine removal/installation, support the motorcycle on its center stand.
• Support the engine using a jack or other adjustable support to ease of engine hanger bolts removal.
• When removing/installing the engine, tape the frame around the engine beforehand for frame protection.
• The following components can be serviced with the engine installed in the frame.
  - Stator/CKP sensor (page 10-11)
  - Camshaft (page 7-7)
  - Clutch (page 8-9)
  - Cylinder head (page 7-11)
  - Cylinder/piston (page 8-5)
  - Gearshift linkage (page 9-17)
  - Oil pump (page 4-4)
  - Fly wheel/starter clutch (page 10-6)
• The following components require engine removal for service.
  - Crankcase (page 11-6)
  - Crankshaft (page 11-8)
  - Shift fork/shift drum/transmission (page 11-11)

SPECIFICATIONS

<table>
<thead>
<tr>
<th>ITEM</th>
<th>SPECIFICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engine oil capacity</td>
<td></td>
</tr>
<tr>
<td>After draining</td>
<td>0.9 liter (1.0 US qt, 0.8 Imp qt)</td>
</tr>
<tr>
<td>After disassembly</td>
<td>1.1 liter (1.2 US qt, 1.0 Imp qt)</td>
</tr>
<tr>
<td>Engine dry weight</td>
<td>26.9 kg (59.3 lbs)</td>
</tr>
</tbody>
</table>

TORQUE VALUES

<table>
<thead>
<tr>
<th>ITEM</th>
<th>SPECIFICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Front engine hanger nut</td>
<td>34 N·m (3.5 kgf·m, 25 lbf·ft)</td>
</tr>
<tr>
<td>Rear engine hanger nut</td>
<td>54 N·m (5.5 kgf·m, 40 lbf·ft)</td>
</tr>
<tr>
<td>Drive sprocket fixing plate bolt</td>
<td>12 N·m (1.2 kgf·m, 9 lbf·ft)</td>
</tr>
<tr>
<td>Insulator band screw</td>
<td>1.0 N·m (0.1 kgf·m, 0.7 lbf·ft)</td>
</tr>
</tbody>
</table>

See page 6-8
Support the motorcycle on its center stand. Drain the engine oil (page 3-11).

Remove the following:
- Exhaust pipe/muffler (page 2-16)
- Drive sprocket cover (page 3-16)
- Side covers (page 2-10)
- Spark plug cap (page 3-7)

Loosen the rear axle nut, drive chain adjuster lock nuts and adjusters all the way (page 3-15).

Remove the bolts, fixing plate and drive sprocket.

Disconnect the following:
- Alternator 2P (Natural) connector
- CKP sensor wire connectors
- Neutral switch wire connector
- Sidestand switch 3P (Natural) connector

Remove the bolt and gearshift pedal linkage from the gearshift spindle.

Slide the dust cover and disconnect the EOT sensor 2P (Black) connector.
Hold the center of the O₂ sensor cap by hand and disconnect the cap while turning it less than 1/2 of a turn.

Loosen the adjuster lock nut and turn the adjuster. Remove the bolts and clutch cable stay, then disconnect the clutch cable from the clutch lifter arm.

Loosen the insulator band screw and remove the throttle body assembly from the insulator.

Slide the rubber cap and remove the terminal nut and starter motor cable. Remove the starter mounting bolt and ground cable. Disconnect the crankcase breather hose from the crankcase.
ENGINE REMOVAL/INSTALLATION

Remove the bolts and sidestand stay from the crankcase.

Support the engine using a jack or other adjustable support.

Remove the following:
- Front engine hanger nuts and bolts
- Front engine hanger plate

Remove the rear engine hanger nuts and bolts.

Remove the engine from the frame.

- During engine removal, hold the engine securely and be careful not to damage the frame and engine.

ENGINE INSTALLATION

- Note the direction of the engine hanger bolts.
- Place a jack or other adjustable support under the engine.
- The jack height must be continually adjusted to relieve stress for ease bolt installation.
- Carefully align the mounting points with the jack to prevent damage the engine, frame, wires and cables.
- Route the wires, hoses and cables properly (page 1-16).
**ENGINE REMOVAL/INSTALLATION**

*During engine installation, hold the engine securely and be careful not to damage the frame and engine.*

Place the engine in the frame, then loosely install all the bolts, nuts and front engine hanger plate.

Tighten the rear engine hanger nuts to the specified torque.

**TORQUE:** 54 N-m (5.5 kgf-m, 40 lbf-ft)

---

Tighten the front engine hanger nuts to the specified torque.

**TORQUE:** 34 N·m (3.5 kgf·m, 25 lbf·ft)

---

Install the sidestand stay and bolts.

Tighten the sidestand stay bolts securely.

---

Connect the crankcase breather hose to the crankcase.

Install the ground cable and starter mounting bolt.

Tighten the starter mounting bolt securely.

Install the starter motor cable, terminal nut and rubber cap.

Tighten the terminal nut securely.
Install the throttle body assembly to the insulator. Tighten the insulator band screw to the specified torque.

**TORQUE:** 1 N·m (0.1 kgf·m, 0.7 lbf·ft)

Check that the width between the insulator band ends clearance is $8 \pm 1$ mm ($0.3 \pm 0.04$ in).

Connect the clutch cable to the clutch lifter arm and install the clutch cable stay and bolts. Tighten the clutch cable stay bolts securely.

Connect the O₂ sensor cap to the O₂ sensor by pushing it straight.

**NOTICE**

Be careful not to tilt the O₂ sensor cap when connecting the cap to the O₂ sensor.
Connect the EOT sensor 2P (Black) connector and install the dust cover.

Install the gearshift pedal linkage to the gearshift spindle.
Tighten the gearshift pedal linkage bolt securely.

Connect the following:
- Alternator 2P (Natural) connector
- CKP sensor wire connectors
- Neutral switch wire connector
- Sidestand switch 3P (Natural) connector

Install the drive chain onto the drive sprocket.
Install the drive sprocket to the countershaft.
Install the fixing plate.
Rotate the fixing plate and align the bolt holes of the fixing plate and drive sprocket.
ENGINE REMOVAL/INSTALLATION

Install and tighten the drive sprocket fixing plate bolts alternately to the specified torque.

**TORQUE: 12 N-m (1.2 kgf-m, 9 lbf-ft)**

Hook the neutral and sidestand switch wires to the tabs of the left crankcase cover.

Install the following:

- Exhaust pipe/muffler (page 2-16)
- Drive sprocket cover (page 3-16)
- Side covers (page 2-10)
- Spark plug cap (page 3-7)

Fill the crankcase with recommended engine oil to the proper level (page 3-11).

After installing the engine, perform the following inspections and adjustments:

- Drive chain slack (page 3-15)
- Clutch lever freeplay (page 3-23)
7. CYLINDER HEAD/VALVES

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SERVICE INFORMATION

GENERAL
- This section covers service of the cylinder head, valves, rocker arms, and camshaft. These services can be done with the engine installed in the frame.
- Be careful not to damage the mating surfaces when removing the cylinder head cover and cylinder head. Do not strike the cylinder head cover and cylinder head too hard during removal.
- When disassembling, mark and store the disassembled parts to ensure that they are reinstalled in their original locations.
- Clean all disassembled parts with cleaning solvent and dry them by blowing them off with compressed air before inspection.
- Camshaft and rocker arm lubricating oil is fed through oil passages in the cylinder head (stud bolt hole), camshaft holder, and cylinder head cover. Clean the oil passages before assembling them.

SPECIFICATIONS

<table>
<thead>
<tr>
<th>ITEM</th>
<th>STANDARD</th>
<th>SERVICE LIMIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cylinder compression at 800 min⁻¹ (rpm)</td>
<td>1,275 kPa (13.0 kgf/cm², 185 psi)</td>
<td>-</td>
</tr>
<tr>
<td>Valve clearance</td>
<td>IN: 0.08 ± 0.02 (0.003 ± 0.001)</td>
<td>-</td>
</tr>
<tr>
<td>Valve, valve guide</td>
<td>EX: 0.12 ± 0.02 (0.005 ± 0.001)</td>
<td>-</td>
</tr>
<tr>
<td>Valve stem O.D.</td>
<td>IN: 4.975 - 4.990 (0.1959 - 0.1965)</td>
<td>4.92 (0.194)</td>
</tr>
<tr>
<td>Valve guide LD.</td>
<td>EX: 4.955 - 4.970 (0.1951 - 0.1957)</td>
<td>4.90 (0.193)</td>
</tr>
<tr>
<td>Valve guide ID.</td>
<td>IN/EX: 5.000 - 5.012 (0.1969 - 0.1973)</td>
<td>5.04 (0.198)</td>
</tr>
<tr>
<td>Valve-to-guide clearance</td>
<td>IN: 0.010 - 0.037 (0.0004 - 0.0015)</td>
<td>0.07 (0.003)</td>
</tr>
<tr>
<td></td>
<td>EX: 0.030 - 0.057 (0.0012 - 0.0022)</td>
<td>0.09 (0.004)</td>
</tr>
<tr>
<td>Valve seat width</td>
<td>IN/EX: 0.90 - 1.10 (0.035 - 0.043)</td>
<td>1.5 (0.06)</td>
</tr>
<tr>
<td>Valve spring free length</td>
<td>IN/EX: 37.78 (1.487)</td>
<td>-</td>
</tr>
<tr>
<td>Rocker arm</td>
<td>Arm ID.</td>
<td>IN/EX: 10.000 - 10.015 (0.3937 - 0.3943)</td>
</tr>
<tr>
<td></td>
<td>Shaft O.D.</td>
<td>IN/EX: 9.9/2 - 9.9/8 (0.3926 - 0.3932)</td>
</tr>
<tr>
<td></td>
<td>Arm-to-shaft clearance</td>
<td>IN/EX: 0.013 - 0.043 (0.0005 - 0.0017)</td>
</tr>
<tr>
<td>Camshaft</td>
<td>Cam lobe height</td>
<td>IN: 33.268 - 33.508 (1.3098 - 1.3192)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EX: 33.018 - 33.258 (1.2899 - 1.3094)</td>
</tr>
<tr>
<td>Cylinder head warpage</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

TORQUE VALUES

- Cylinder head cover bolt: 10 N·m (1.0 kgf·m, 7 lbf·ft)
- Rocker arm shaft bolt: 5 N·m (0.5 kgf·m, 3.7 lbf·ft)
- Insulator socket bolt: 12 N·m (1.2 kgf·m, 9 lbf·ft)
- Cam sprocket bolt: 9 N·m (0.9 kgf·m, 6.6 lbf·ft)
- Camshaft holder bolt: 32 N·m (3.3 kgf·m, 24 lbf·ft)
- Cam chain tensioner lifter plug: 4 N·m (0.4 kgf·m, 3.0 lbf·ft)
- Crankshaft hole cap: 15 N·m (1.5 kgf·m, 11 lbf·ft)
- Timing hole cap: 10 N·m (1.0 kgf·m, 7 lbf·ft)

Apply engine oil to the threads and seating surface.
Apply grease to the threads.
<table>
<thead>
<tr>
<th>Tool Description</th>
<th>Code</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valve guide driver</td>
<td>07942-8920000</td>
<td></td>
</tr>
<tr>
<td>Valve spring compressor</td>
<td>07757-0010000</td>
<td></td>
</tr>
<tr>
<td>Seat cutter, 27.5 mm (45° IN)</td>
<td>07780-9010200</td>
<td></td>
</tr>
<tr>
<td>Seat cutter, 24 mm (45° EX)</td>
<td>07780-0010000</td>
<td></td>
</tr>
<tr>
<td>Flat cutter, 27 mm (32° IN)</td>
<td>07780-0013300</td>
<td></td>
</tr>
<tr>
<td>Flat cutter, 24 mm (32° EX)</td>
<td>07780-0012500</td>
<td></td>
</tr>
<tr>
<td>Interior cutter, 26 mm (60° IN)</td>
<td>07780-0014500</td>
<td></td>
</tr>
<tr>
<td>Interior cutter, 22 mm (60° EX)</td>
<td>07780-0014202</td>
<td></td>
</tr>
<tr>
<td>Cutter holder, 5.0 mm</td>
<td>07781-0010400</td>
<td></td>
</tr>
<tr>
<td>Valve guide reamer</td>
<td>07984-MA60001</td>
<td></td>
</tr>
<tr>
<td>Cam chain tensioner holder</td>
<td>070MG-0010000</td>
<td></td>
</tr>
<tr>
<td>Compression gauge attachment</td>
<td>07RMJ-MY50100</td>
<td></td>
</tr>
</tbody>
</table>

or equivalent commercially available
TROUBLESHOOTING

- Engine top-end problems usually affect engine performance. These problems can be diagnosed by a compression test, or by tracing top-end noise with a sounding rod or stethoscope.
- If the performance is poor at low speeds, check for white smoke in the crankcase breather hose. If the hose is smoky, check for seized piston ring (page 8-8).

Compression too low, hard starting or poor performance at low speed
- Valves:
  - Incorrect valve clearance adjustment
  - Burned or bent valve
  - Incorrect valve timing
  - Broken valve spring
  - Weak valve spring
  - Uneven valve seating
  - Valve stuck open
- Cylinder head:
  - Leaking or damaged cylinder head gasket
  - Warped or cracked cylinder head
  - Loose spark plug
- Cylinder/piston problem (page 8-5)

Compression too high
- Excessive carbon build-up on piston head or combustion chamber

Excessive smoke
- Worn valve stem or valve guide
- Damaged stem seal
- Cylinder/piston problem (page 8-5)

Excessive noise
- Incorrect valve clearance adjustment
- Sticking valve or broken valve spring
- Excessive worn valve seat
- Worn or damaged camshaft
- Worn rocker arm and/or shaft
- Worn rocker arm roller and valve stem end
- Worn cam sprocket teeth
- Loose or worn cam chain
- Worn or damaged cam chain tensioner
- Cylinder/piston problem (page 8-5)

Rough idle
- Low cylinder compression
- Faulty fuel system
CYLINDER HEAD/VALVES

CYLINDER COMPRESSION

Reference engine oil temperature: 60 - 65°C (140 - 149°F)

Warm up the engine to normal operating temperature.

Stop the engine and disconnect the spark plug cap and remove the spark plug (page 3-7).

Install a compression gauge attachment into the spark plug hole.

Connect a compression gauge to the attachment.

**TOOL:**
Compression gauge attachment 07RMJ-MY50100 or equivalent commercially available

Turn the ignition switch ON

Shift the transmission into neutral.

Crank the engine with the starter motor.

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

**COMPRESSION PRESSURE:**
1,275 kPa (13.0 kgf/cm², 185 psi) at 800 min⁻¹ (rpm)

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

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

To avoid discharging the battery, do not operate the starter motor for more than 7 seconds.

CYLINDER HEAD COVER REMOVAL

Remove the left side cover (page 2-10).

Remove the cylinder head cover bolts and rubber seals.
Remove the cylinder head cover from the cylinder head.
Remove the O-ring and oil through from the camshaft holder.
Check that the packing is in good condition, replace it if necessary.

CLEANING
Clean the oil passages of the cylinder head cover using compressed air.

CAM SPROCKET/CAMSHAFT REMOVAL
Remove the cylinder head cover (page 7-6).
Make sure the piston is at TDC on the compression stroke (page 3-9).
Remove the cam chain tensioner lifter plug and O-ring.

Install the stopper tool to the cam chain tensioner lifter.
Turn the cam chain tensioner lifter shaft clockwise with the cam chain tensioner holder to retract the cam chain tensioner lifter, then insert the cam chain tensioner holder fully to hold the cam chain tensioner lifter.

TOOL:
Cam chain tensioner holder 070MG-0010100
Be careful not to let the cam sprocket bolts fall into the crankcase.

Remove the cam sprocket bolts.

Remove the cam sprocket off the camshaft, then remove it from the cam chain.

Attach a piece of wire to the cam chain to prevent it from falling into the crankcase.

Remove the bolt and camshaft retainer plate.

Remove the camshaft from the camshaft holder while pushing the rocker arms.

INSPECTION

CAMSHAFT BEARING

Turn the outer race of each bearing with your finger. The outer race should turn smoothly and quietly. Also check that the bearing inner race fits tightly on the camshaft.

Replace the camshaft if the outer race does not turn smoothly, quietly, or if the inner race fits outer race loosely on the camshaft.

CAMSHAFT

Check the cam lobe surfaces for scratches or evidence of insufficient lubrication.

Measure the height of each cam lobe.

STANDARD:

IN: 33.268 – 33.508 mm (1.3098 – 1.3192 in)
EX: 33.018 – 33.258 mm (1.2999 – 1.3094 in)

If the cam lobe is damaged or excessively worn, inspect the rocker arms and oil passage.
CAMSHAFT HOLDER REMOVAL

Remove the cam sprocket (page 7-7).

Loosen the cylinder head bolts in a crisscross pattern in several steps.
Remove the camshaft holder bolts, washers and camshaft holder.

DISASSEMBLY

Remove the camshaft holder (page 7-9).
Remove the rocker arm shaft bolts.

Mark all the parts so they can be placed back in their original locations.

Remove the rocker arm shafts and rocker arms from the camshaft holder.

INSPECTION

CAMSHAFT HOLDER
Clean the oil passage of the camshaft holder using compressed air.
ROCKER ARM/SHAFT
Inspect the sliding surface of each rocker arm and shaft for wear or damage.
Check each rocker arm roller for scoring, scratches or evidence of insufficient lubrication.
Check the oil hole of each rocker arm for clog.
Measure each rocker arm I.D.
SERVICE LIMIT: 10.10 mm (0.398 in)
Measure each rocker arm shaft O.D.
SERVICE LIMIT: 9.91 mm (0.390 in)
Turn the rocker arm roller with your finger, the roller should turn smoothly and quietly.
Calculate the rocker arm-to-shaft clearance.
SERVICE LIMIT: 0.10 mm (0.004 in)

ASSEMBLY
CAMSHAFT HOLDER
ROCKER ARMS
ROCKER ARM SHAFTS
5 N·m (0.5 kgf·m, 3.7 lbf·ft)
ROCKER ARM
ROLLER
SHAFT

If either rocker arm require service or replacement, inspect the cam lobes and oil passages.
CYLINDER HEAD/VALVES

Install the removed parts in their original locations.

Clean the threads of each rocker arm shaft thoroughly.

Apply engine oil to each rocker arm inner and shaft rotating surfaces.

Set the rocker arm into the camshaft holder in the direction as shown, then install the rocker arm shaft with its bolt hole facing the camshaft holder bolt hole into the camshaft holder through the rocker arm.

Turn each rocker arm shaft so its bolt hole is upright position to align the rocker arm shaft bolt holes in the rocker arm shaft and camshaft holder.

Install and tighten the rocker arm shaft bolts to the specified torque while aligning the bolt holes using a flat blade screwdriver.

TORQUE 5 N·m (0.5 kgf·m, 3.7 lbf·ft)

CYLINDER HEAD REMOVAL

Remove the following:

- Cylinder head cover (page 7-6)
- Camshaft holder (page 7-9)
- Spark plug cap (page 3-7)
- Exhaust pipe/muffler (page 2-16)

Loosen the insulator band screw.

Pull the throttle body out from the insulator.

Hold the center of the O₂ sensor cap by hand and disconnect the sensor cap while turning it less than 1/2 of a turn.
Disconnect the EOT sensor 2P (Black) connector.

Do not strike the cylinder head too hard and do not damage the mating surface with a screwdriver.

Remove the cylinder head bolts.
Remove the cylinder head.
- Be careful not to let the cam chain fall into the crankcase.

Remove the gasket and dowel pins.

**CYLINDER HEAD DISASSEMBLY/ASSEMBLY**

**DISASSEMBLY**
Remove the following:
- Spark plug (page 3-7)
- EOT sensor (page 5-64)
- O₂ sensor (page 5-69)

Remove the socket bolts, insulator, O-ring and gasket.
To prevent loss of tension, do not compress the valve spring more than necessary to remove the cotters.

**TOOL:**
Valve spring compressor 07757-0010000

Remove the valve spring cotters using the special tool.

Loosen the valve spring compressor and remove the following:
- Spring retainers
- Valve springs
- Intake and exhaust valves
- Stem seals
- Spring seats

**INSPECTION**

**CYLINDER HEAD**
Remove the carbon deposits from the combustion chamber.
Clean off any gasket materials from the cylinder head surface.
Check the spark plug hole and valve area for cracks.

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

**SERVICE LIMIT:** 0.05 mm (0.002 in)
VALVE SPRING
Check the valve springs for fatigue or damage.
Measure the valve spring free length.
STANDARD: IN/EX 37.78 mm (1.487 in)

VALVE/VALVE GUIDES
Check that the valve moves smoothly in the guide.
Check each valve for bending, burning, scratches or abnormal stem wear.
Measure and record each valve stem O.D.
SERVICE LIMITS:
IN: 4.92 mm (0.194 in)
EX: 4.90 mm (0.193 in)

Use cutting oil on the reamer during this operation. Take care not to tilt or lean the reamer in the guide while reaming.

Ream the valve guide to remove any carbon build up before measuring the guide. Insert the reamer from the combustion chamber side of the head and always rotate the reamer clockwise.

Measure and record each valve guide I.D. at several points.
SERVICE LIMIT: IN/EX 5.04 mm (0.198 in)
Calculate each valve stem O.D. from the corresponding guide I.D. to obtain the stem-to-guide clearance.
SERVICE LIMITS:
IN: 0.07 mm (0.003 in)
EX: 0.09 mm (0.004 in)

If the stem-to-guide clearance exceeds the service limit, determine if a new guide with standard dimensions would bring the clearance within tolerance. If so replace the guides as necessary and ream to fit.
If the stem-to-guide clearance exceeds the service limit with new guides, also replace the valve.

Reface the valve seats whenever the valve guides are replaced (page 7-15).
VALVE GUIDE REPLACEMENT

Chill the new valve guides in the freezer section of a refrigerator for about an hour.

Heat the cylinder head to 130 - 140°C (266 - 284°F) with a hot plate or oven. Do not heat the cylinder head beyond 150°C (302°F). Use temperature indicator sticks, available from welding supply stores, to be sure the cylinder head is heated to the proper temperature.

- Using a torch to heat the cylinder head may cause warping.

Support the cylinder head, then drive the valve guides and clips out of the cylinder head from the combustion chamber side using the special tool.

**TOOL:**
Valve guide driver 07942-8920000

Remove new valve guides from the freezer and install a new valve guide clip to each valve guide.

While the cylinder head is still heated, drive each valve guide into the cylinder head from the camshaft side until it is fully seated.

**TOOL:**
Valve guide driver 07942-8920000

Let the cylinder head cool to room temperature.

Ream the new valve guides.

Insert the reamer from the combustion chamber side of the cylinder head and also always rotate the reamer clockwise.

**TOOL:**
Valve guide reamer 07984-MA60001

- Take care not to tilt or lean the reamer in the valve guide while reaming.
- Use cutting oil on the reamer during this operation.

Clean the cylinder head thoroughly to remove any metal particles after reaming and reface the valve seat (page 7-17).
VALVE SEAT INSPECTION

Clean the intake and exhaust valves thoroughly to remove the carbon deposits.

Apply a light coat of Prussian Blue to each valve seat.

Tap the valve against the valve seat several times without rotating the valve to check for proper valve seat contact.

Remove the valve and inspect the valve seat face for:

- Damaged face:
  - Replace the valve and reface the valve seat.

- Uneven seat width:
  - Bent or collapsed valve stem; Replace the valve and reface the valve seat.

- Contact area (too high or too low area):
  - Reface the valve seat.

NOTE:
The valve cannot be ground. If the valve face is burned or badly worn or if it contacts the seat unevenly, replace the valve.

Inspect the width of each valve seat.

The valve seat contact should be within the specified width and even all around the circumference.

STANDARD: 0.90 - 1.10 mm (0.035 - 0.043 in)

SERVICE LIMIT: 1.5 mm (0.06 in)

If the valve seat width is not within specification, reface the valve seat (page 7-17).
Valve seat cutters/grinders or equivalent valve seat refacing equipment are recommended to correct worn valve seats.

Follow the refacing manufacturer’s operating instructions.

Reface the valve seat with a 45° cutter whenever a valve guide is replaced.

If the contact area is too high on the valve, the seat must be lowered using a 32° flat cutter.

If the contact area is too low on the valve, the seat must be raised using a 60° inner cutter.

Use a 45° cutter to remove any roughness or irregularities from the seat.

TOOLS:
Seat cutter, 27.5 mm (IN) 07780-0010200
Seat cutter, 24 mm (EX) 07780-0010600
Cutter holder, 5.0 mm 07781-0010400

Use a 32° cutter, remove top 1/4 of the existing valve seat material.

TOOLS:
Flat cutter, 27 mm (IN) 07780-0013300
Flat cutter, 24 mm (EX) 07780-0012500
Cutter holder, 5.0 mm 07781-0010400

CONTACT TOO HIGH
OLDSEAT WIDTH
CONTACT TOO LOW
OLDSEAT WIDTH
ROUGHNESS
OLD SEAT WIDTH
Use a 60° cutter, remove the bottom 1/4 of the old seat.

**TOOLS:**
- Interior cutter, 25 mm (IN) 07780-0014500
- Interior cutter, 22 mm (EX) 07780-0014202
- Cutter holder, 5.0 mm 07781-0010400

Using a 45° finish cutter and cut the seat to the proper width.

**STANDARD SEAT WIDTH:**
- 0.90 – 1.10 mm (0.035 – 0.043 in)

Make sure that all pitting and irregularities are removed.

After cutting the seat, apply lapping compound to the valve face and lap the valve using light pressure.

**NOTE:**
- Excessive lapping pressure may deform or damage the seat.
- Change the angle of lapping tool frequently to prevent uneven seat wear.
- Lapping compound can cause damage if it enters between the valve stem and guide.

After lapping, wash any residual compound off the cylinder head and valve.
Recheck the seat contact after lapping.
Blow through all oil passage with compressed air.

Install the spring seats and new valve stem seals.

Lubricate each valve stem sliding surface and stem end with molybdenum oil solution.

Insert the intake and exhaust valves into the valve guides while turning it slowly to avoid damage to the stem seal.

Install the valve springs with the tightly wound coils should face toward the combustion chamber.

Install the spring retainers.
Grease the cotters to ease installation. To prevent loss of tension, do not compress the valve spring more than necessary.

While compressing the valve spring using the special tool, install the valve cotters.

**TOOL:**
Valve spring compressor 07757-0010000

- Support the cylinder head above the work bench surface to prevent possible valve damage.
- Tap the valve stems gently with a plastic hammer and shaft as shown to seat the cotters firmly.

Apply engine oil to a new O-ring and install it to the insulator groove.

Install a new gasket, insulator and socket bolts to the cylinder head, and tighten them to the specified torque.

**TORQUE:** 12 N·m (1.2 kgf·m, 9 lbf·ft)

Install the following:
- Spark plug (page 3-7)
- EOT sensor (page 5-64)
- O₂ sensor (page 5-69)

**CYLINDER HEAD INSTALLATION**

Do not allow dust and dirt to enter the engine. Clean off any gasket material from the cylinder head mating surfaces of the cylinder and cylinder head.

Install the dowel pins and new gasket.
Route the cam chain through the cylinder head and install the cylinder head onto the cylinder. Loosely install the cylinder head bolts.

Connect the EOT sensor 2P (Black) connector.

Connect the O₂ sensor cap by pushing it straight.

**NOTICE**
Be careful not to tilt the O₂ sensor cap when connecting the cap to the O₂ sensor.

Install the throttle body to the insulator. Tighten the insulator band screw to the specified torque.

**TORQUE:** 1 N m (0.1 kgf m, 0.7 lbf ft)
Check that the width between the insulator band ends clearance is 8 ± 1 mm (0.3 ± 0.04 in).

Install the following:
- Exhaust pipe/muffler (page 2-17)
- Spark plug (page 3-7)
- Camshaft holder (page 7-22)
- Cylinder head cover (page 7-25)

CAMSHAFT HOLDER INSTALLATION

Install the camshaft holder onto the cylinder head by aligning the holes of the cylinder head with the pins of the camshaft holder.

Apply engine oil to the camshaft holder bolt threads and seating surface.

Install the washers onto the camshaft holder bolts.

Install and tighten the camshaft holder bolts to the specified torque in a crisscross pattern in several steps.

TORQUE: 32 N·m (3.3 kgf·m, 24 lbf·ft)

Tighten the cylinder head bolts alternately.

CAM SPROCKET/CAMSHAFT INSTALLATION

Remove the timing hole cap and crankshaft hole cap (page 3-8).

Be careful not to jam the cam chain and timing sprocket on the crankshaft when rotating the crankshaft.

Rotate the crankshaft counterclockwise, and align the "T" mark on the flywheel with the index notch on the left crankcase cover.
Apply engine oil to the camshaft whole surface.

Make sure the tab of the camshaft facing up. If the camshaft is removed, install the camshaft into the camshaft holder while holding the rocker arms to make a good access for camshaft installation.

Install the camshaft retainer plate and tighten the bolt securely.

Apply engine oil to the cam chain entire surface. Install the cam sprocket to the cam chain so that the index lines of the cam sprocket are flush with the cylinder head surface and timing mark "o" is facing front. Install the cam sprocket to the camshaft.
Cover the cam chain opening with a shop towel to prevent the cam sprocket bolts from falling into the crankcase.

Align the bolt holes in the cam sprocket and camshaft.
Install and tighten the cam sprocket bolts to the specified torque by holding the crankshaft.

**TORQUE: 9 N·m (0.9 kgf·m, 6.6 lbf·ft)**

Remove the cam chain tensioner holder from the cam chain tensioner lifter.

Make sure the index lines on the cam sprocket are flush with the cylinder head surface when aligning the "T" mark on the flywheel with the index notch on the left crankcase cover.

Apply engine oil to a new O-ring, and install it into the cam chain tensioner lifter groove.
Install and tighten the cam chain tensioner lifter plug to the specified torque.

**TORQUE: 4 N·m (0.4 kgf·m, 3.0 lbf·ft)**

Apply engine oil to new O-rings, and install them into each hole cap.
Apply grease to the crankshaft hole cap threads.
Install and tighten the crankshaft hole cap to the specified torque.

**TORQUE: 15 N·m (1.5 kgf·m, 11 lbf·ft)**

Install and tighten the timing hole cap to the specified torque.

**TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)**

Install the cylinder head cover (page 7-25).
CYLINDER HEAD COVER INSTALLATION

Apply engine oil to a new O-ring and install it onto the oil through.
Install the oil through to the camshaft holder.
Install the cylinder head cover to the cylinder head.

Check the rubber seals is in good condition, replace them if necessary.
Install the rubber seals onto the cylinder head cover with their "UP" marks facing up.

Install the cylinder head cover bolts and tighten them to the specified torque.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)
8. CYLINDER/PISTON

COMPONENT LOCATION .................................. 8-2
SERVICE INFORMATION ................................... 8-3
TROUBLESHOOTING ...................................... 8-4
CYLINDER/PISTON ........................................ 8-5
SERVICE INFORMATION

GENERAL

• The cylinder and piston services can be done with the engine installed in the frame.
• Take care not to damage the cylinder wall and piston.
• Be careful not to damage the mating surfaces when removing the cylinder. Do not strike the cylinder too hard during removal.
• Camshaft and rocker arm lubricating oil is fed through an oil passage in the cylinder. Clean the oil passage before installing cylinder.
• Clean all disassembled parts with cleaning solvent and dry them by blowing them off with compressed air before inspection.

SPECIFICATIONS

<table>
<thead>
<tr>
<th>ITEM</th>
<th>STANDARD</th>
<th>SERVICE LIMIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cylinder</td>
<td>I.D.</td>
<td>52.400 - 52.410 (2.0630 - 2.0634)</td>
</tr>
<tr>
<td></td>
<td>Out-of-round</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Taper</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Warpage</td>
<td>-</td>
</tr>
<tr>
<td>Piston, piston pin, piston ring</td>
<td>Piston O.D. at 5 (0.2) from bottom</td>
<td>52.370 - 52.390 (2.0618 - 2.0626)</td>
</tr>
<tr>
<td></td>
<td>Piston pin hole I.D.</td>
<td>13.002 - 13.008 (0.5119 - 0.5121)</td>
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<tr>
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<td>Piston pin O.D.</td>
<td>12.994 - 13.000 (0.5116 - 0.5118)</td>
</tr>
<tr>
<td></td>
<td>Piston-to-piston pin clearance</td>
<td>0.002 - 0.014 (0.0008 - 0.00056)</td>
</tr>
<tr>
<td></td>
<td>Piston ring end gap</td>
<td>Top</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Second</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Oil (side rail)</td>
</tr>
<tr>
<td></td>
<td>Piston ring-to-ring groove clearance</td>
<td>Top</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Second</td>
</tr>
<tr>
<td>Cylinder-to-piston clearance</td>
<td></td>
<td>0.010 - 0.040 (0.0004 - 0.0016)</td>
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<tr>
<td>Connecting rod small end I.D.</td>
<td>13.016 - 13.034 (0.5124 - 0.5131)</td>
<td>13.05 (0.514)</td>
</tr>
<tr>
<td>Connecting rod-to-piston pin clearance</td>
<td>0.016 - 0.040 (0.0006 - 0.0016)</td>
<td>0.07 (0.003)</td>
</tr>
</tbody>
</table>

TORQUE VALUE

Cylinder stud bolt 11 N-m (1.1 kgf-m, 8 lbf-ft) See page 8-6

TOOL

Cam chain tensioner holder 070MG-0010100
TROUBLESHOOTING

Compression too low, hard starting or poor performance at low speed
• Leaking cylinder head gasket
• Worn, stuck or broken piston rings
• Worn or damaged cylinder and piston

Compression too high, overheating or knocking
• Excessive carbon built-up on piston head or combustion chamber

Excessive smoke
• Worn cylinder, piston or piston rings
• Improper installation of piston rings
• Scored or scratched piston or cylinder wall

Abnormal noise
• Worn piston pin or piston pin hole
• Worn cylinder, piston or piston rings
• Worn connecting rod small end
CYLINDER/PISTON

CYLINDER REMOVAL

Remove the cylinder head (page 7-11).
Remove the cam chain guide.

Check the cam chain guide and cam chain tensioner for excessive wear or damage, replace them if necessary.
- For cam chain tensioner removal (page 11-6)

Remove the bolts and cam chain tensioner lifter.
Remove the gasket.

Remove the cylinder being careful not to damage the piston with the stud bolts.

NOTE:
- Attach a piece of wire to the cam chain to prevent it from falling into the crankcase.
- Do not strike the cylinder too hard and do not damage the mating surface with a screwdriver.
Remove the dowel pins and gasket.

**STUD BOLT REPLACEMENT**

Thread two nuts onto the stud bolt, and tighten them together, then use wrench on them to turn the stud bolt out.

Install new stud bolts into the crankcase as shown.

**TORQUE:** 11 N·m (1.1 kgf·m, 8 lbf·ft)

After installing the stud bolts, check that the length from the bolt head to the crankcase surface is within specification.

**CAM CHAIN TENSIONER LIFTER INSPECTION**

Check the lifter operation:

- The cam chain tensioner lifter shaft should not go into the cam chain tensioner lifter body when it is pushed.
- When it is turned clockwise with a cam chain tensioner holder, the cam chain tensioner lifter shaft should be pulled into the cam chain tensioner lifter body. The cam chain tensioner lifter shaft should spring out of the cam chain tensioner lifter body as soon as the cam chain tensioner holder is released.

**TOOL:**

Cam chain tensioner holder 070MG-0010100

**CYLINDER INSPECTION**

Remove and check the insert rubbers are in good condition. Replace them if necessary.
Inspect the cylinder wall for scratches and wear.

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

**SERVICE LIMIT:** 52.50 mm (2.067 in)

Calculate the cylinder-to-piston clearance (page 8-8).

---

Calculate the cylinder for taper and out-of-round at three levels in the X and Y axes.
Take the maximum reading to determine the taper and out-of-round.

**SERVICE LIMITS:**
- Taper: 0.10 mm (0.004 in)
- Out-of-round: 0.10 mm (0.004 in)

The cylinder must be rebored and an oversize piston fitted if the service limit is exceeded.

The following oversize pistons are available:
- 0.25 mm (0.010 in)
- 0.50 mm (0.020 in)
- 0.75 mm (0.030 in)
- 1.00 mm (0.040 in)

The cylinder must be rebored so that the clearance for an oversize piston is 0.010 - 0.040 mm (0.0004 - 0.0016 in).

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

**SERVICE LIMIT:** 0.10 mm (0.004 in)

---

**PISTON REMOVAL**

Remove the cylinder (page 8-5)
Remove the piston pin clips using pliers.

---

**Place a clean shop towel at the crankcase opening to prevent the piston pin clips from falling into the crankcase.**
Push the piston pin out of the piston and connecting rod, then remove the piston.

Spread each piston ring and remove them by lifting up at a point just opposite the gap.
- Do not damage the piston rings by spreading the ends too far.
- Be careful not to damage the piston.

Clean carbon deposits from the piston ring grooves with a used piston ring that will be discarded.

Blow the oil passage with compressed air, if necessary.

PISTON/PISTON RING INSPECTION
Inspect the piston rings and replace them if they are damaged.
Temporarily install the piston rings (page 8-10) into their proper position with the mark facing up.
Inspect the piston rings for smooth movement by rotating them. 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-ring groove clearance using a feeler gauge.

SERVICE LIMITS:
Top: 0.10 mm (0.004 in)
Second: 0.09 mm (0.004 in)
Inspect the piston for cracks or other damage.
Inspect the ring grooves for excessive wear and carbon build-up.

Measure the piston O.D. at a point 5 mm (0.2 in) from the bottom and 90° to the piston pin hole.

**SERVICE LIMIT:** 52.30 mm (2.059 in)

Calculate the cylinder-to-piston clearance. Take the maximum reading to determine the clearance (Cylinder I.D.: page 8-6).

**SERVICE LIMIT:** 0.10 mm (0.004 in)

Measure the piston pin hole I.D. in the X and Y axes. Take the maximum reading to determine I.D.

**SERVICE LIMIT:** 13.03 mm (0.513 in)

Measure the piston pin O.D. at three points.

**SERVICE LIMIT:** 12.98 mm (0.511 in)

Calculate the piston-to-piston pin clearance.

**SERVICE LIMIT:** 0.04 mm (0.002 in)

Measure the connecting rod small end I.D.

**SERVICE LIMIT:** 13.05 mm (0.514 in)

Calculate the connecting rod small end-to-piston pin clearance.

**SERVICE LIMIT:** 0.07 mm (0.003 in)

Insert the piston ring into the bottom of the cylinder squarely using the piston crown.

Measure the ring end gap.

**SERVICE LIMITS:**
- Top: 0.40 mm (0.016 in)
- Second: 0.60 mm (0.024 in)
- Oil: 0.85 mm (0.033 in)
PISTON INSTALLATION

Apply engine oil to the piston ring whole surface, piston pin hole and ring groove. Carefully install the piston rings into the piston ring grooves with the marks facing up.

- Do not damage the piston ring by spreading the ends too far.
- Be careful not to damage the piston.
- Do not confuse the top and second rings.
- To install the oil ring, install the spacer first, then install the side rails.
- After installing the rings they should rotate freely, without sticking.
- Stagger the ring end gaps 120° apart from each other.

Place a clean shop towel in the crankcase opening to prevent the gasket material or piston pin clip from falling into the crankcase.

Clean off any gasket material from the cylinder mating surface of the crankcase.

Apply molybdenum oil solution to the connecting rod small end inner surface.
Do not reuse the gasket, replace with a new one.

Apply molybdenum oil solution to the piston pin outer surface.

Install the piston with its "IN" mark toward the intake side and insert the piston pin through the piston and connecting rod.

Install new piston pin clips.

- Always use new piston pin clips. Reinstalling used piston pin clips may lead to serious engine damage.
- Make sure the piston pin clips are seated securely.
- Do not align the piston pin clip end gap with the piston cut-out.

CYLINDER INSTALLATION

Install the dowel pins and a new gasket.

Make sure that the cam chain is installed on the timing sprocket.

Apply engine oil to the cylinder inner and piston sliding surfaces.

Route the cam chain through the cylinder and install the cylinder over the piston while compressing the piston rings with your fingers.

- Be careful not to damage the piston rings and cylinder wall.
- Be careful not to stuck the piston rings to the cut-out of the cylinder sleeve.
Install a new gasket on the cam chain tensioner lifter and install them to the cylinder. Install and tighten the bolt securely.

Install the cam chain guide by aligning its tabs with the cylinder grooves and its end with the left crankcase groove as shown. Install the cylinder head (page 7-20).
CLUTCH/GEARSHIFT LINKAGE

COMPONENT LOCATION

12 N·m (1.2 kgf·m, 9 lbf·ft)

12 N·m (1.2 kgf·m, 9 lbf·ft)

74 N·m (7.5 kgf·m, 55 lbf·ft)

64 N·m (6.5 kgf·m, 47 lbf·ft)
SERVICE INFORMATION

GENERAL

• This section covers service of the clutch and gearshift linkage. All services can be done with the engine installed in the frame.
• Engine oil viscosity and level have an effect on clutch disengagement. When the clutch does not disengage or the motorcycle creeps with clutch disengaged, inspect the engine oil level before servicing the clutch system.
• Clean off any gasket material from the right crankcase cover surface.
• Use care not to allow dust or dirt to enter the engine.

SPECIFICATIONS

<table>
<thead>
<tr>
<th>ITEM</th>
<th>STANDARD</th>
<th>SERVICE LIMIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clutch lever freeplay</td>
<td>10 - 20 (3/8 - 13/16)</td>
<td>-</td>
</tr>
<tr>
<td>Clutch</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spring free length</td>
<td>39.0 (1.54)</td>
<td>-</td>
</tr>
<tr>
<td>Disc thickness</td>
<td>2.92 - 3.08 (0.115 - 0.121)</td>
<td>2.80 (0.110)</td>
</tr>
<tr>
<td>Plate warpage</td>
<td>-</td>
<td>0.20 (0.008)</td>
</tr>
<tr>
<td>Primary driven gear I.D.</td>
<td>23.000 - 23.021 (0.9055 - 0.9063)</td>
<td>23.08 (0.909)</td>
</tr>
<tr>
<td>Clutch outer guide</td>
<td></td>
<td></td>
</tr>
<tr>
<td>O.D.</td>
<td>22.959 - 22.980 (0.9039 - 0.9047)</td>
<td>22.93 (0.903)</td>
</tr>
<tr>
<td>I.D.</td>
<td>16.991 - 17.009 (0.6689 - 0.6696)</td>
<td>17.04 (0.671)</td>
</tr>
<tr>
<td>Mainshaft O.D. at clutch outer guide</td>
<td>16.966 - 16.984 (0.6680 - 0.6687)</td>
<td>16.95 (0.667)</td>
</tr>
<tr>
<td>Primary driven gear-to-guide clearance</td>
<td>0.020 - 0.062 (0.0008 - 0.0024)</td>
<td>-</td>
</tr>
<tr>
<td>Clutch outer guide-to-mainshaft clearance</td>
<td>0.007 - 0.043 (0.0003 - 0.0017)</td>
<td>-</td>
</tr>
</tbody>
</table>

TORQUE VALUES

<table>
<thead>
<tr>
<th>ITEM</th>
<th>TORQUE (N-m)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clutch center lock nut</td>
<td>74</td>
<td>Apply engine oil to the threads and seating surface.</td>
</tr>
<tr>
<td>Clutch lifter plate bolt</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>Oil filter rotor lock nut</td>
<td>64</td>
<td>Apply engine oil to the threads and seating surface.</td>
</tr>
<tr>
<td>Gearshift cam bolt</td>
<td>12</td>
<td>Apply locking agent to the threads.</td>
</tr>
<tr>
<td>Shift drum stopper arm bolt</td>
<td>12</td>
<td>Apply locking agent to the threads.</td>
</tr>
</tbody>
</table>
## CLUTCH/GEARSHIFT LINKAGE

### TOOLS

<table>
<thead>
<tr>
<th>Tool Description</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lock nut wrench</td>
<td>07716-0020100</td>
</tr>
<tr>
<td>Pin driver</td>
<td>07744-0010200</td>
</tr>
<tr>
<td>Clutch center holder</td>
<td>07CMB-KT70101</td>
</tr>
<tr>
<td>Gear holder</td>
<td>07724-0010200</td>
</tr>
</tbody>
</table>
TROUBLESHOOTING

Faulty clutch operation can usually be corrected by adjusting the freeplay.

**Clutch lever is too hard to pull in**
- Damaged, kinked or dirty clutch cable
- Improperly routed clutch cable
- Damaged clutch lifter mechanism
- Faulty clutch lifter plate bearing

**Clutch will not disengage or motorcycle creeps with clutch disengaged**
- Excessive clutch lever freeplay
- Clutch plate warped
- Oil level too high, improper oil viscosity, or additive used
- Damaged clutch lifter mechanism
- Loose clutch center lock nut

**Clutch slips when accelerating**
- Clutch lifter sticking
- Worn clutch discs
- Weak clutch springs
- No clutch lever freeplay
- Engine oil mixed with molybdenum or graphite additive

**Hard to shift**
- Improper clutch operation
- Incorrect oil viscosity
- Loose gearshift spindle pin
- Loose shift drum stopper arm bolt
- Loose gearshift cam bolt
- Damaged gearshift cam
- Damaged gearshift spindle pin
- Damaged shift drum stopper arm
- Damaged gearshift spindle

**Transmission jumps out of gear**
- Worn shift drum stopper arm
- Weak or broken gearshift spindle return spring

**Gearshift pedal will not return**
- Weak or broken gearshift spindle return spring
- Bent gearshift spindle
- Loose gearshift cam bolt
- Damaged gearshift cam
CLUTCH/GEARSHIFT LINKAGE

RIGHT CRANKCASE COVER

REMOVAL

Drain the engine oil (page 3-11).

Remove the bolts and clutch cable stay, then disconnect the clutch cable from the clutch lifter arm.

Loosen the right crankcase cover bolts in a crisscross pattern in several steps.

Remove the right crankcase cover, being careful not to damage the mating surface.

Remove the dowel pins and gasket.

DISASSEMBLY

Turn the clutch lifter arm clockwise and remove the clutch lifter piece.

Unhook the return spring end from the right crankcase cover.
Measure and record the length of drive pin protrusion.

Drive the spring pin into the clutch lifter arm until the pin end is flush with the lifter arm surface using the special tool.

**TOOL:**
Pin driver 07744-0010200

Pull out the clutch lifter arm from the right crankcase cover and remove the return spring.
Check that the clutch lifter arm oil seal is in good condition, replace it if necessary.

**INSPECTION**
Check the clutch lifter arm for wear or damage.
Check the return spring for fatigue or damage.
Replace them if necessary.

**OIL SEAL REPLACEMENT**
Remove the clutch lifter arm oil seal from the right crankcase cover.
Apply grease to a new oil seal lips.
Install a new clutch lifter arm oil seal to the specified depth below the right crankcase cover as shown.
Apply grease to the oil seal lips.
Apply engine oil to the clutch lifter arm whole surface and install it into the right crankcase cover.

Install the return spring onto the lifter arm end.
From the opposite side, drive the spring pin until it projects the same amount as recorded at disassembly using the special tool.

**TOOL:**
Pin driver 07744-0010200

Hook the return spring ends to the right crankcase cover.
Install the clutch lifter piece into the clutch lifter arm groove.

**INSTALLATION**

Be careful not to damage the mating surfaces of the right crankcase and cover, being careful not to damage them.
Install the dowel pins and new gasket.
Install the right crankcase cover.
Install and tighten the right crankcase cover bolts in a crisscross pattern in several steps.

Connect the clutch cable to the clutch lifter arm, then install the clutch cable stay and bolts. Tighten the bolts securely.
Adjust the clutch lever freeplay (page 3-23).
Fill the crankcase with the recommended engine oil (page 3-11).

**CLUTCH**

**REMOVAL**

Remove the following:
- Oil filter rotor cover (page 3-13)
- Oil pump driven gear (page 4-4)

Install the gear holder between the primary drive and driven gears as shown, and loosen the oil filter rotor lock nut using the special tool.

**TOOLS:**

<table>
<thead>
<tr>
<th>Tool</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gear holder</td>
<td>07724-0010200</td>
</tr>
<tr>
<td>Lock nut wrench</td>
<td>07716-0020100</td>
</tr>
</tbody>
</table>

Remove the lock nut, washer and oil filter rotor.
Loosen the clutch lifter plate bolts in a crisscross pattern in several steps.
Remove the bolts, lifter plate and clutch springs.

Attach the clutch center holder to the pressure plate using the clutch lifter plate bolts to hold the clutch center, then loosen the clutch center lock nut.

TOOL:
Clutch center holder 07GMB-KT70101

Remove the bolts and special tool.

Remove the clutch center lock nut and washer.

Remove the following:
- Clutch center
- Clutch disc A
- Clutch plates and discs B
- Clutch disc A
- Pressure plate

* Record the clutch disc A, plates and discs B to ensure that they are reinstalled in their original locations.
CLUTCH/GEARSHIFT LINKAGE

Remove the washer and clutch outer.

Remove the clutch outer guide.

INSPECTION

CLUTCH LIFTER BEARING

Turn the inner race of the clutch lifter bearing with your finger. The bearing should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the clutch lifter plate.

Replace the bearing if the inner race does not turn smoothly, quietly, or if the outer race fits loosely in the clutch lifter plate.

CLUTCH SPRING

Check the clutch spring for fatigue or damage. Measure the clutch spring free length.

STANDARD: 39.0 mm (1.54 in)
CLUTCH/GEARSHIFT LINKAGE

CLUTCH CENTER
Check the grooves of the clutch center for damage or wear caused by the clutch plates.

CLUTCH DISC
Replace the clutch discs and plates as a set.
Check clutch discs for signs of scoring or discoloration.
Measure the thickness of each clutch disc.
SERVICE LIMIT:
Disc A, B: 2.80 mm (0.110 in)

CLUTCH PLATE
Replace the clutch discs and plates as a set.
Check the plate for discoloration.
Check the clutch plate for warpage on a surface plate using a feeler gauge.
SERVICE LIMIT: 0.20 mm (0.008 in)
Warped clutch plates prevent the clutch from disengaging properly.
CLUTCH OUTER/OUTER GUIDE

Check the slots in the clutch outer for nicks, indentations or abnormal wear made by the clutch discs.

Check the primary driven gear teeth for wear or damage.

Measure the primary driven gear I.D.

SERVICE LIMIT: 23.08 mm (0.909 in)

Check the clutch outer guide for damage or abnormal wear.

Measure the clutch outer guide I.D. and O.D.

SERVICE LIMITS:
  I.D.: 17.04 mm (0.671 in)
  O.D.: 22.93 mm (0.903 in)

Calculate the primary driven gear-to-guide clearance.

STANDARD: 0.020 – 0.062 mm (0.0008 – 0.0024 in)

MAINSHAFT

Measure the mainshaft O.D. at the clutch outer guide.

SERVICE LIMIT: 16.95 mm (0.667 in)

Calculate the clutch outer guide-to-mainshaft clearance.

STANDARD: 0.007 – 0.0043 mm (0.0003 – 0.0017 in)

For measurement of the clutch outer guide O.D. (page 9-13).

For mainshaft removal (page 11-11).
Apply molybdenum oil solution to the whole surface of the clutch outer guide and install it to the mainshaft with the flange side facing the crankcase.

Apply engine oil to the primary driven gear teeth.

Apply molybdenum oil solution to the rotating area of the clutch outer and install it to the clutch outer guide.
Install the washer.

Set the clutch disc A and B as noted during removal. Clutch disc A has a larger lining width than clutch disc B.

Apply engine oil to the clutch disc whole surface. Assemble the clutch discs A, B, clutch plates and pressure plate onto the clutch center by aligning "o" marks of the clutch center and pressure plate.
Install the clutch center assembly to the clutch outer.
- Install the tabs of the clutch disc A (outside) to the shallow slots of the clutch outer.

Install the washer.
Apply engine oil to the threads and seating surface of the clutch center lock nut, and install it.

Attach the clutch center holder to the pressure plate using the clutch lifter plate bolts to hold the clutch center, then tighten the clutch center lock nut to the specified torque.

**TOOL:**
Clutch center holder 07GMB-KT70101

**TORQUE:** 74 N·m (7.5 kgf-m, 55 lbf-ft)

Remove the bolts and special tool.

Install the clutch springs, clutch lifter plate and clutch lifter plate bolts.
Tighten the clutch lifter plate bolts to the specified torque in a crisscross pattern in several steps.

**TORQUE:** 12 N·m (1.2 kgf-m, 9 lbf-ft)
Clean the inside of the oil filter rotor.
Install the oil filter rotor and washer to the crankshaft.
Apply engine oil to the threads and seating surface of the oil filter rotor lock nut, and install it.

Install the gear holder between the primary drive and driven gears as shown, and tighten the oil filter rotor lock nut to the specified torque using the special tools.

**TOOLS**
- Gear holder 07724-0010200
- Lock nut wrench 07716-0020100

**TORQUE:** 64 N·m (6.5 kgf·m, 47 lbf·ft)

Install the following:
- Oil pump driven gear (page 4-7)
- Oil filter rotor cover (page 3-13)

**GEARSFHT LINKAGE**

**REMOVAL**
Remove the clutch assembly (page 9-9).
Remove the bolts and gearshift pedal.
- When removing the gearshift pedal, mark the pedal position to ensure correct reassembly in its original position.

Clean the gearshift spindle end.

Pull the gearshift spindle out of the crankcase.
Remove the thrust washer from the gearshift spindle.
CLUTCH/GEARSHIFT LINKAGE

Remove the stopper arm bolt, stopper arm, washer and return spring.

Remove the bolt and gearshift cam.

Remove the dowel pins from the shift drum.

GEARSHIFT PEDAL DISASSEMBLY/ASSEMBLY

Slide the dust covers and remove the cotter pins, washers and joint rod.

Assembly is in the reverse order of disassembly.

- Replace the cotter pin with a new one.
- Apply 1 g (0.04 oz) of grease to the gearshift pedal pivot sliding surface.
- Apply grease to the joint rod sliding surface.
INSPECTION
Check the gearshift spindle for bend, wear or damage.
Check the spindle plate for wear, damage or deformation.
Check the return spring for fatigue or damage.

INSTALLATION
Install the dowel pins to the shift drum.
Install the gearshift cam to the shift drum by aligning its holes with the dowel pins.

Apply locking agent to the gearshift cam threads (coating width 6.5 ± 1.0 mm (0.26 ± 0.04 in) from the tip) and install it to the gearshift cam.
Tighten the bolt to the specified torque.
TORQUE: 12 N m (1.2 kgf m, 9 lb ft)

Apply locking agent to the stopper arm bolt threads (coating width 6.5 ± 1.0 mm (0.26 ± 0.04 in) from the tip).
Install the return spring, washer, stopper arm with hooking the return spring at the stopper arm groove.
Install and tighten the stopper arm bolt to the specified torque while holding the stopper arm using a screwdriver.
TORQUE: 12 N m (1.2 kgf m, 9 lb ft)
Check the stopper arm for proper operation.
CLUTCH/GEARSHIFT LINKAGE

Check the gearshift spindle oil seal is in good condition, replace it if necessary (page 11-20).
Apply grease to the gearshift spindle oil seal lips.
Apply engine oil to the gearshift spindle journal rotating area.
Install the thrust washer to the gearshift spindle, and insert them into the crankcase.

Install the spindle plate by aligning the return spring ends with the stopper pin.

Install the gearshift pedal on its original position as marked during removal.
Install and tighten the pinch bolts securely.
Install the clutch assembly (page 9-14).

PRIMARY DRIVE GEAR/CRANKSHAFT COLLAR

REMOVAL
Remove the clutch assembly (page 9-9).
Remove the primary drive gear.
Remove the crankshaft collar and woodruff key, being careful not to damage the key groove and crankshaft.

**INSTALLATION**

Clean any oil from the crankshaft surface.

Install the woodruff key, being careful not to damage the key groove and crankshaft.

Install the crankshaft collar by aligning its groove with the woodruff key.

Apply engine oil to the primary drive gear teeth.

Install the primary drive gear by aligning its groove with the woodruff key.

Install the clutch assembly (page 9-14).
ALTERNATOR/STARTER CLUTCH

SERVICE INFORMATION

GENERAL
- This section covers the removal and installation of the flywheel/starter clutch, stator and CKP sensor. These services can be done with the engine installed in the frame.
- For alternator inspection (page 15-9).

SPECIFICATION

<table>
<thead>
<tr>
<th>ITEM</th>
<th>STANDARD</th>
<th>SERVICE LIMIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Starter driven gear boss O.D.</td>
<td>45.660 – 45.673 (1.7976 – 1.7981)</td>
<td>–</td>
</tr>
</tbody>
</table>

TORQUE VALUES

- Flywheel lock nut: 74 N·m (7.5 kgf·m, 55 lbf·ft) Apply engine oil to the threads and seating surface.
- Starter clutch torx screw: 16 N·m (1.6 kgf·m, 12 lbf·ft) Apply locking agent to the threads.
- CKP sensor mounting socket bolt: 12 N·m (1.2 kgf·m, 9 lbf·ft) Apply locking agent to the threads.
- Wire guide bolt: 12 N·m (1.2 kgf·m, 9 lbf·ft) Apply locking agent to the threads.

TOOLS

- Flywheel holder: 07725-0040001
- Flywheel puller: 07933-KM10001

TROUBLESHOOTING

Starter motor turns, but engine does not turn
- Faulty starter clutch
- Damaged starter reduction gear/shaft
ALTERNATOR/STARTER CLUTCH

LEFT CRANKCASE COVER

REMOVAL

Remove the following:
- Left side cover (page 2-10)
- Drive sprocket cover (page 3-16)

Disconnect the alternator 2P (Natural) connector and CKP sensor wire connectors.

Release the neutral switch and sidestand switch wires from the left crankcase tabs.

Loosen the left crankcase cover bolts in a crisscross pattern in several steps and remove the left crankcase cover bolts and left crankcase cover.

Remove the dowel pins and gasket.

The left crankcase cover (stator) is magnetically attracted to the flywheel, be careful during remove.
INSTALLATION

Install the dowel pins and new gasket.

Be careful not to pinch your fingers because the stator is magnetically attracted.

Install the left crankcase cover and left crankcase cover bolts.
Tighten the left crankcase cover bolts in a crisscross pattern in several steps securely.

Route the neutral switch and sidestand switch wires to the left crankcase guides.

Connect the alternator 2P (Natural) connector and CKP sensor connectors.
Install the following:
- Drive sprocket cover (page 3-17)
- Left side cover (page 2-10)
ALTERNATOR/STARTER CLUTCH

FLYWHEEL/STARTER CLUTCH

REMOVAL

Remove the left crankcase cover (page 10-4).
Remove the shaft, collar and starter reduction gear.
Check the shaft, collar and starter reduction gear for wear or damage.

Hold the flywheel with the special tool and remove the flywheel lock nut and washer.

TOOL:
Flywheel holder 07725-0040001

Remove the flywheel using the special tool.

TOOL:
Flywheel puller 07933-KM10001

Remove the special tool from the flywheel.

Remove the needle bearing and woodruff key.

NOTE:
- When removing the woodruff key, be careful not to damage the key groove and crankshaft.
- Do not lose the woodruff key.
DISASSEMBLY

Check the operation of the starter clutch by turning the driven gear. You should be able to turn the driven gear clockwise smoothly, but the gear should not turn counterclockwise.

Remove the starter driven gear from the starter clutch while turning it counterclockwise.

Hold the flywheel with the special tool and remove the starter clutch torx screws.

TOOL:
Flywheel holder 07725-0040001

Remove the starter clutch assembly from the flywheel.

Remove the cover from the clutch outer.
ALTERNATOR/STARTER CLUTCH

Remove the rollers, spring guides and springs from the starter clutch outer.

INSPECTION

Check the rollers, spring guides, springs and starter clutch outer for wear or damage.

Replace the rollers as a set.

Replace the rollers if necessary.

NOTE:
Starter clutch should be replaced as an assembly if the starter clutch, spring guides and springs are damaged or worn.

Check the starter driven gear teeth and roller contact surface for wear or damage.

Measure the starter driven gear boss O.D.

STANDARD: 45.660 – 45.673 mm (1.7976 – 1.7981 in)
Install the springs, spring guides and rollers into the starter clutch outer.

Apply engine oil to the starter clutch rolling surface.

Install the cover to the clutch outer.

16 N·m (1.6 kgf·m, 12 lbf·ft)
Install the starter clutch assembly to the flywheel as shown.

Apply locking agent to the starter clutch torx screw threads (coating width 6.5 ± 0.1 mm (0.26 ± 0.04 in) from tip).

Install the starter clutch assembly onto the flywheel. Install the torx screws by aligning the bolt holes with the starter clutch assembly and flywheel. Hold the flywheel with the special tool and tighten the torx screws to the specified torque.

**TOOL:**
- Flywheel holder 07725-0040001

**TORQUE:** 16 N·m (1.6 kgf·m, 12 lbf·ft)

Install the starter driven gear into the starter gear assembly while turning it counterclockwise.

Make sure that the starter driven gear turns counterclockwise smoothly and does not turn clockwise.

**INSTALLATION**

Install the woodruff key, being careful not to damage the key groove and crankshaft.

Apply engine oil to the needle bearing rolling surface and install the needle bearing on the crankshaft.

Clean any oil from the crankshaft taper.
Apply molybdenum oil solution to the starter driven gear inner surface.
Install the flywheel by aligning its groove with the woodruff key.

Apply engine oil to the flywheel lock nut threads and seating surface.
Install the washer and lock nut.
Hold the flywheel with the special tool and tighten the flywheel lock nut to the specified torque.

**TOOL:**
Flywheel holder 07725-0040001

**TORQUE:** 74 N·m (75 kgf·m, 55 lbf·ft)

Apply engine oil to the starter reduction gear shaft whole surface.
Install the starter reduction gear, collar and shaft.
Install the left crankcase cover (page 10-5).

**STATOR/CKP SENSOR**

**REMOVAL**
Remove the left crankcase cover (page 10-4).
Remove the socket bolts, wire guide, CKP sensor and alternator wire grommet.
ALTERNATOR/STARTER CLUTCH

Remove the socket bolts and stator from the left crankcase cover.

INSTALLATION

Install the stator.
Install and tighten the socket bolts securely.
Apply liquid sealant to the alternator wire grommet seating surface and install the wire grommet to the groove.

Install the wire guide and CKP sensor.

Apply locking agent to the wire guide and CKP sensor mounting socket bolt threads (coating width 6.5 ± 1.0 mm (0.26 ± 0.04 in) from the tip).

Install and tighten the wire guide and CKP sensor mounting socket bolts to the specified torque.

**TORQUE: 12 N m (1.2 kgf m, 9 lbf ft)**

Install the left crankcase cover (page 10-5).
CRANKCASE/CRANKSHAFT/TRANSMISSION

SERVICE INFORMATION

GENERAL
• The crankcase must be separated to service the crankshaft and transmission.
• The following parts must be removed before separating the crankcase:
  - Cylinder head (page 7-11)
  - Cylinder/piston (page 8-5)
  - Oil pump (page 4-4)
  - Clutch (page 9-9)
  - Gearshift linkage (page 9-17)
  - Primary drive gear/crankshaft collar (page 9-20)
  - Flywheel/starter clutch (page 10-6)
  - Neutral switch (page 18-13)
  - Sidestand (page 2-19)
  - Starter motor (page 17-6)
  - Engine (page 6-4)
• Be careful not to damage the crankcase mating surfaces when servicing.
• Clean the oil passages before assembling the crankcase halves.
• Prior to assembling the crankcase halves, apply sealant to their mating surfaces. Wipe off excess sealant thoroughly.

SPECIFICATIONS

<table>
<thead>
<tr>
<th>ITEM</th>
<th>STANDARD</th>
<th>SERVICE LIMIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crankshaft</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Runout</td>
<td>-</td>
<td>0.03 (0.001)</td>
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<tr>
<td>Connecting rod big end radial clearance</td>
<td>0 - 0.008 (0 - 0.0003)</td>
<td>0.05 (0.002)</td>
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<tr>
<td>Connecting rod big end side clearance</td>
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<td>0.80 (0.031)</td>
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<tr>
<td>Transmission</td>
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</tr>
<tr>
<td>Gear I.D.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N4</td>
<td>20.000 - 20.018 (0.7874 - 0.7881)</td>
<td>-</td>
</tr>
<tr>
<td>N5</td>
<td>17.000 - 17.018 (0.6693 - 0.6700)</td>
<td>-</td>
</tr>
<tr>
<td>C1</td>
<td>20.500 - 20.521 (0.8071 - 0.8079)</td>
<td>-</td>
</tr>
<tr>
<td>C2</td>
<td>23.020 - 23.041 (0.9063 - 0.9071)</td>
<td>-</td>
</tr>
<tr>
<td>C3</td>
<td>23.025 - 23.046 (0.9065 - 0.9073)</td>
<td>-</td>
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<tr>
<td>Bushing O.D.</td>
<td></td>
<td></td>
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<tr>
<td>C1</td>
<td>20.459 - 20.480 (0.8063 - 0.8063)</td>
<td>-</td>
</tr>
<tr>
<td>C2, C3</td>
<td>22.984 - 23.005 (0.9057 - 0.9057)</td>
<td>-</td>
</tr>
<tr>
<td>Gear-to-bushing clearance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C1, C3</td>
<td>0.020 - 0.062 (0.0008 - 0.0024)</td>
<td>-</td>
</tr>
<tr>
<td>C2</td>
<td>0.015 - 0.057 (0.0006 - 0.0022)</td>
<td>-</td>
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<tr>
<td>Bushing I.D.</td>
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<td></td>
</tr>
<tr>
<td>C1</td>
<td>17.000 - 17.018 (0.6693 - 0.6700)</td>
<td>-</td>
</tr>
<tr>
<td>C2, C3</td>
<td>20.020 - 20.041 (0.7882 - 0.7890)</td>
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<tr>
<td>Mainshaft O.D.</td>
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<tr>
<td>at M4</td>
<td>19.968 - 19.980 (0.7861 - 0.7866)</td>
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</tr>
<tr>
<td>at M5</td>
<td>19.968 - 19.980 (0.7861 - 0.7866)</td>
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<tr>
<td>Gear-to-shaft clearance</td>
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<td></td>
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<tr>
<td>at M4, M5</td>
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<td>Countershaft O.D.</td>
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<td>at C1 bushing</td>
<td>16.966 - 16.984 (0.6680 - 0.6686)</td>
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<tr>
<td>at C2 bushing</td>
<td>19.976 - 19.993 (0.7870 - 0.7876)</td>
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<tr>
<td>at C3 bushing</td>
<td>19.979 - 20.000 (0.7866 - 0.7874)</td>
<td>-</td>
</tr>
<tr>
<td>Bushing-to-shaft clearance</td>
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<td></td>
</tr>
<tr>
<td>C1</td>
<td>0.016 - 0.052 (0.0006 - 0.0020)</td>
<td>-</td>
</tr>
<tr>
<td>C2</td>
<td>0.031 - 0.063 (0.0012 - 0.0025)</td>
<td>-</td>
</tr>
<tr>
<td>C3</td>
<td>0.020 - 0.062 (0.0008 - 0.0024)</td>
<td>-</td>
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<tr>
<td>Shift fork, shift fork shaft/shift drum</td>
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<tr>
<td>Shift fork shaft O.D.</td>
<td>9.966 - 9.995 (0.3931 - 0.3935)</td>
<td>-</td>
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<tr>
<td>Shift fork I.D.</td>
<td>10.000 - 10.016 (0.3937 - 0.3944)</td>
<td>-</td>
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<tr>
<td>Shift fork claw thickness</td>
<td>4.93 - 5.00 (0.19 - 0.197)</td>
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<tr>
<td>Shift drum O.D.</td>
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<td></td>
</tr>
<tr>
<td>Left</td>
<td>23.559 - 23.980 (0.9283 - 0.9441)</td>
<td>-</td>
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<tr>
<td>Right</td>
<td>20.959 - 20.980 (0.8252 - 0.8260)</td>
<td>-</td>
</tr>
<tr>
<td>Shift drum journal I.D.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Left</td>
<td>24.000 - 24.033 (0.9449 - 0.9462)</td>
<td>-</td>
</tr>
<tr>
<td>Right</td>
<td>21.000 - 21.021 (0.8268 - 0.8276)</td>
<td>-</td>
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<tr>
<td>Shift drum-to-shift drum journal clearance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Left</td>
<td>0.020 - 0.074 (0.0008 - 0.0029)</td>
<td>-</td>
</tr>
<tr>
<td>Right</td>
<td>0.020 - 0.062 (0.0008 - 0.0024)</td>
<td>-</td>
</tr>
</tbody>
</table>
CRANKCASE/CRANKSHAFT/TRANSMISSION

TORQUE VALUES

- Mainshaft bearing setting plate bolt
  - 12 N·m (1.2 kgf·m, 9 lbf·ft)
- Push plug bolt
  - 10 N·m (1.0 kgf·m, 7 lbf·ft)
- Apply locking agent to the threads.

TOOLS

- Remover shaft set, 12 mm
  - 07936-1660101
- Remover head, 12 mm
  - 07936-1660110
- Remover shaft, 12 mm
  - 07936-1660120
- Remover weight
  - 07741-0010201
- Driver
  - 07749-0010000
- Pilot, 12 mm
  - 07746-0040200
- Pilot, 17 mm
  - 07746-0040400
- Attachment, 37 x 40 mm
  - 07746-0010200
- Pilot, 20 mm
  - 07746-0040500
- Attachment, 32 x 35 mm
  - 07746-0010100
- Attachment, 42 x 47 mm
  - 07746-0010300
- Attachment, 52 x 55 mm
  - 07746-0010400
CRANKCASE/CRANKSHAFT/TRANSMISSION

Remover shaft, 17 mm
07936-3710300

Remover handle
07936-3710100

Universal bearing puller
07631-0010000

Threaded adaptor
07WMF-KFF0300

Assembly collar
07965-VM00100

Assembly shaft
07965-VM00200

Seal driver
07947-1180001

TROUBLESHOOTING

Excessive engine noise
• Worn, seized or chipped transmission gears
• Worn or damaged transmission bearings
• Worn or damaged connecting rod big end bearing
• Worn crankshaft bearing

Hard to shift
• Improper clutch operation
• Bent shift fork shaft
• Bent shift fork claw
• Damaged shift drum guide grooves
• Damaged shift fork guide pin

Transmission jumps out of gear
• Worn gear dogs or slots
• Worn shift drum guide groove
• Worn shift fork guide pin
• Worn shift fork groove in gear
• Worn shift fork shaft
• Bent shift fork shaft
• Bent shift fork claw

Engine vibration
• Excessive crankshaft runout

11-5
CRANKCASE/CRANKSHAFT/TRANSMISSION

CRANKCASE SEPARATION

Refer to Service Information (page 11-3) for removal of necessary parts before separating the crankcase.

Remove the bolts, tensioner set plate and cam chain tensioner.
Remove the cam chain.

Remove the bolt and push plug plate.

Remove the spring and push plug.

Remove the bolts and bearing retainer plates.
Do not pry the crankcase halves with a screwdriver.

Remove the snap ring, washer, collar and washer from the countershaft.
Remove the right crankcase bolt.

Loosen the left crankcase bolts in a crisscross pattern in several steps and remove them.

Place the crankcase assembly with the right side down.

Carefully separate the left crankcase from the right crankcase by tapping them at several locations with a plastic hammer.

Remove the countershaft and gearshift spindle oil seals from the left crankcase.
CRANKCASE / CRANKSHAFT / TRANSMISSION

Remove the dowel pins.

CRANKSHAFT

REMOVAL
Separate the crankcase halves (page 11-6).
Remove the crankshaft from the right crankcase.

INSPECTION
CRANKSHAFT RUNOUT
Place the crankshaft on a stand or V-blocks.
Set the dial indicator on the shafts as shown.
Rotate the crankshaft two revolutions and measure the runout.
Actual runout is 1/2 the total indicator reading.
SERVICE LIMIT: 0.03 mm (0.001 in)

47.5 mm (18.7 in)  43.0 mm (16.9 in)
**BIG END SIDE CLEARANCE**

Measure the side clearance between the connecting rod big end and crank weight.

**SERVICE LIMIT:** 0.80 mm (0.031 in)

---

**BIG END RADIAL CLEARANCE**

Measure the radial clearance of the connecting rod big end.

**SERVICE LIMIT:** 0.05 mm (0.002 in)

---

**TIMING SPROCKET**

Check the timing sprocket teeth for wear or damage.

If you replace the timing sprocket, align the center of the timing sprocket tooth with the center of the key groove as shown.

---

**CRANKSHAFT BEARING**

Turn the race of each crankshaft bearing with your finger.

The bearing should turn smoothly and quietly. Also check that the bearing race fits tightly in the crankcase or crankshaft.

Replace any bearings if the race does not turn smoothly, quietly, or if they fit loosely in the crankcase or crankshaft (page 11-10).
CRANKSHAFT BEARING REPLACEMENT

RIGHT BEARING
Remove the transmission (page 11-11).
Remove the inner race.
Remove the right crankshaft bearing from the right crankcase using a hydraulic press.

Press a new right crankshaft bearing into the right crankcase until it is fully seated using the special tools and a hydraulic press as shown.

TOOLS:
Driver 07749-0010000
Attachment, 52 x 55 mm 07746-0010400
Seal driver (Φ 60 side facing up) 07947-1180001

Apply engine oil to the bearing rotating surface.

Install the crankshaft bearing inner race to the right crankshaft bearing from the inside.

LEFT BEARING
Remove the left crankshaft bearing from the crankshaft using the special tool as shown.

TOOL:
Universal bearing puller 07631-0010000
Install the special tool onto the left crankshaft end.

**TOOL:**
Threaded adaptor 07WMF-KFF0300

Install new left crankshaft bearing with the retainer groove facing out and special tools onto the crankshaft.

**TOOLS:**
Assembly collar 07965-VM00100
Assembly shaft 07965-VM00200

Draw the crankshaft into the bearing inner race.
Apply engine oil to the bearing rotating surface.

**INSTALLATION**
Install the crankshaft into the right crankcase with the flywheel side facing up.
Assemble the crankcase (page 11-20).

**TRANSMISSION**

**REMOVAL/DISASSEMBLY**
Separate the crankcase halves (page 11-6).
Pull out the shift fork shafts.

Remove the shift forks and shift drum.
CRANKCASE/CRANKSHAFT/TRANSMISSION

Remove the mainshaft and countershaft as an assembly.

Disassemble the mainshaft and countershaft.
Clean all disassembled parts in solvent thoroughly.

NOTE:
- Do not expand the snap ring more than necessary for removal.
- Keep track of the disassembled parts (gears, bushings, washers and snap rings) by sliding them onto a tool or piece of wire.

INSPECTION

GEAR/BUSHING
Check the gear shifter groove, dogs, dog holes and teeth for abnormal wear or damage.

Measure the I.D. of each gear.

STANDARD:
M4: 20.000 - 20.018 mm (0.7874 - 0.7881 in)
M5: 17.000 - 17.018 mm (0.6693 - 0.6700 in)
C1: 20.500 - 20.521 mm (0.8071 - 0.8079 in)
C2: 23.020 - 23.041 mm (0.9063 - 0.9071 in)
C3: 23.025 - 23.046 mm (0.9065 - 0.9073 in)
Check the bushings for abnormal wear or damage.
Measure the O.D. of each bushing.

**STANDARD:**
- C1: 20.459 – 20.480 mm (0.8055 – 0.8063 in)
- C2, C3: 22.984 – 23.005 mm (0.9049 – 0.9057 in)

Calculate the gear-to-bushing clearance.

**STANDARD:**
- C1, C3: 0.020 – 0.062 mm (0.0008 – 0.0024 in)
- C2: 0.015 – 0.057 mm (0.0006 – 0.0022 in)

Measure the I.D. of each bushing.

**STANDARD:**
- C1: 17.000 – 17.018 mm (0.6693 – 0.6700 in)
- C2, C3: 20.020 – 20.041 mm (0.7882 – 0.7890 in)

**MAINSHAFT/COUNTERSHAFT**

Check the spline grooves and sliding surfaces for abnormal wear or damage.

Measure the mainshaft and countershaft O.D. at the gear or bushing sliding areas.

**STANDARD:**
- at M4 gear: 19.968 – 19.980 mm (0.7861 – 0.7866 in)
- at M5 gear: 16.968 – 16.980 mm (0.6680 – 0.6685 in)
- at C1 bushing: 16.966 – 16.984 mm (0.6680 – 0.6687 in)
- at C2 bushing: 19.978 – 19.989 mm (0.7865 – 0.7870 in)
- at C3 bushing: 19.979 – 20.000 mm (0.7866 – 0.7874 in)

Calculate the gear-to-shaft clearance.

**STANDARD:**
- M4, M5: 0.020 – 0.050 mm (0.0008 – 0.0020 in)

Calculate the bushing-to-shaft clearance.

**STANDARD:**
- C1: 0.016 – 0.052 mm (0.0006 – 0.0020 in)
- C2: 0.031 – 0.063 mm (0.0012 – 0.0025 in)
- C3: 0.020 – 0.062 mm (0.0008 – 0.0024 in)

**SHIFT DRUM**

Inspect the shift drum end for scoring, scratches, or evidence of sufficient lubrication.

Check the shift drum grooves for abnormal wear or damage.

Measure the O.D. at each shift drum end.

**STANDARD:**
- Left side: 23.959 – 23.980 mm (0.9433 – 0.9441 in)
- Right side: 20.959 – 20.980 mm (0.8252 – 0.8260 in)
Measure the I.D. of each shift drum journal.

**STANDARD:**
- Left side: 24.000 - 24.033 mm (0.9449 - 0.9462 in)
- Right side: 21.000 - 21.021 mm (0.8268 - 0.8276 in)

Calculate the shift drum-to-shift drum journal clearance.

**STANDARD:**
- Left side: 0.020 - 0.074 mm (0.0008 - 0.0029 in)
- Right side: 0.020 - 0.062 mm (0.0008 - 0.0024 in)

Check the gearshift spindle journals of the left and right crankcases for excessive wear or damage.

**SHIFT FORK/SHAFT**

Check the shift forks for deformation or abnormal wear.
Check the shift fork guide pin for abnormal wear or damage.
Measure the shift fork claw thickness of each shift fork.

**STANDARD:**
- 4.93 - 5.00 mm (0.194 - 0.197 in)

Measure each shift fork I.D.

**STANDARD:**
- 10.000 - 10.018 mm (0.3937 - 0.3944 in)

Check the shift fork shafts for damage and straightness.
Measure each shift fork shaft O.D.

**STANDARD:**
- 9.986 - 9.995 mm (0.3931 - 0.3935 in)

**TRANSMISSION BEARING**

Turn the inner race of each bearing with your finger. The inner race should turn smoothly and quietly. Also check that each bearing outer race fits tightly in the crankcases.
Replace any bearings if the inner race does not turn smoothly, quietly, or if the outer race fits loosely in the crankcase (page 11-15).
TRANSMISSION BEARING REPLACEMENT

RIGHT CRANKCASE
Remove the crankshaft (page 11-8).
Remove the bolts and mainshaft bearing setting plates from the right crankcase.

Drive out the mainshaft bearing from the right crankcase.
Remove the countershaft bearing from the right crankcase using the special tools.

TOOLS:
Remover shaft, 17 mm 07936-3710300
Remover handle 07936-3710100
Remover weight 07741-0010201

Drive a new right mainshaft bearing into right crankcase with its marked side facing up until it is fully seated using the special tools.

TOOLS
Driver 07749-0010000
Attachment, 37 x 40 mm 07746-0010200
Pilot, 17 mm 07746-0040400

Drive a new right countershaft bearing into right crankcase with its sealed side facing down until it is fully seated using the special tools.

TOOLS
Driver 07749-0010000
Attachment, 42 x 47 mm 07746-0010300
Pilot, 17 mm 07746-0040400

Apply locking agent to the mainshaft bearing setting plate bolt threads (coating width 6.5 ± 1.0 mm (0.26 ± 0.04 in) from the tip).
Install the mainshaft bearing setting plates and setting plate bolts.
Tighten the setting plate bolts to the specified torque.
TORQUE: 12 N m (1.2 kgf m, 9 lbf ft)
LEFT CRANKCASE

Drive out the countershaft bearing from the left crankcase.

Remove the mainshaft bearing from the left crankcase using the special tools.

TOOLS:
- Remover shaft set, 12 mm 07936-1660101
- Remover head, 12 mm 07936-1660110
- Remover shaft, 12 mm 07936-1660120
- Remover weight 07741-0010201

Apply engine oil to each bearing rotating area.

Drive a new left mainshaft bearing into the left crankcase with its sealed side facing down until it is fully seated using the special tools.

TOOLS:
- Driver 07749-0010000
- Attachment, 32 x 35 mm 07746-0010100
- Pilot, 12 mm 07746-0040200

Drive a new left countershaft bearing into the left crankcase with its marked side facing up until it is fully seated using the special tools.

TOOLS:
- Driver 07749-0010000
- Attachment, 42 x 47 mm 07746-0010300
- Pilot, 20 mm 07746-0040500

ASSEMBLY/INSTALLATION

Clean all parts in solvent, and dry them thoroughly.

Apply molybdenum oil solution to each gear inner surface, C1, C2, C3 gear bushing whole surface and M3, C4, C5 gear shift fork grooves to ensure initial lubrication.

Assemble all parts into their original positions.

NOTE:
- Check the gears for freedom of movement or rotation on the shaft.
- Install the washers and snap rings with the chamfered edge facing the thrust load side.
- Do not reuse worn snap ring which could easily spin in the groove.
- Check that the snap rings are seated in the shaft grooves and align their end gaps with the grooves of the spline.
- Each gear inner surface
- M3 gear shift fork groove

THRUSt WASHER
M2 GEAR (18T)

M3 GEAR (19T)

M5 GEAR (26T)

SPLINE WASHER

SNAP RING
Check the transmission gears for freedom of movement and rotation on the shaft.

Apply engine oil to the transmission gear teeth.

Engage the mainshaft and countershaft gears.

Install the mainshaft and countershaft as an assembly into the right crankcase.

Be sure to install the three ends washers (mainshaft; left only/countershaft; both ends).

Each shift fork has an identification mark:

- "C" for mainshaft
- "R/L" for countershaft

Install the shift forks into the shifter gear grooves with their identification marks facing up (left crankcase side).

Apply engine oil to the shift drum journal rotating area and install the shift drum by aligning the shift fork guide pins with the shift drum guide grooves.
CRANKCASE/CRANKSHAFT/TRANSMISSION

Apply engine oil to the shift fork shaft whole surface and insert the shafts through the shift forks into the right crankcase.

Rotate the mainshaft by hand to see the gears rotate freely.

Assemble the crankcase (page 11-20).

CRANKCASE ASSEMBLY

Clean the oil passages of each crankcase using the compressed air.

Apply grease to each new oil seal lips.

Install the countershaft and gearshift spindle oil seals to the specified depth below the crankcase surface as shown.

0.5 - 1.0 mm (0.02 - 0.04 in)

0.5 - 1.0 mm (0.02 - 0.04 in)

GEARSHIFT SPINDLE OIL SEAL

COUNTERSHAFT OIL SEAL

Clean the left and right crankcase mating surfaces thoroughly, being careful not to damage them and check for damage.

Apply a light but thorough coating of the liquid sealant to the left crankcase mating surface except the oil passage area as shown.
Install the dowel pins.

Install the left crankcase over the right crankcase, being careful not to damage the oil seal lips.
- Do not force the crankcase halves together, if there is excessive force required, something is wrong. Remove the left crankcase and check for misaligned parts.

Install and tighten the left crankcase bolts in a criss-cross pattern in several steps.

Install the washer, collar and washer onto the countershaft.

Install the snap ring into the groove of the countershaft.
- Check that the snap ring is seated in the groove.
- Do not reuse the snap ring which could easily spin in the groove.

Install and tighten the right crankcase bolt.
CRANKCASE/CRANKSHAFT/TRANSMISSION

When installing the retainer plate, lightly pull the crankshaft out and hook the plate tabs on the crankshaft bearing groove.

Install the bearing retainer plates, and tighten the plate bolts.

Apply molybdenum oil solution to the push plug whole surface. Install the push plug and spring.

- Make sure the crankshaft bearing outer touches the taper part of the push plug.

Apply locking agent to the push plug bolt threads (coating width 6.5 ± 1.0 mm (0.26 ± 0.04 in) from the tip). Install the push plug plate and push plug bolt. Tighten the push plug bolt to the specified torque. TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)

Apply engine oil to the cam chain entire surface. Install the cam chain onto the timing sprocket.

Install the cam chain tensioner and tensioner set plate while aligning its hole with the pin of the left crankcase. Install and tighten the tensioner set plate bolts securely.

- Refer to service information (page 11-3) for installation of the removed parts for crankcase/crankshaft/transmission service.
12. FRONT WHEEL/SUSPENSION/STEERING

COMPONENT LOCATION .................. 12-2
SERVICE INFORMATION .................. 12-3
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HANDLEBAR ............................ 12-6
FRONT WHEEL ............................ 12-13
FORK ..................................... 12-18
STEERING STEM .......................... 12-26
FRONT WHEEL/SUSPENSION/STEERING

SERVICE INFORMATION

GENERAL

⚠️ CAUTION

Frequent inhalation of brake pad dust, regardless of material composition could be hazardous to your health.
- Avoid breathing dust particles.
- Never use an air hose or brush to clean brake assemblies. Use an OSHA-approved vacuum cleaner.

- Riding on damaged rims impairs safe operation of the motorcycle.
- When servicing the front wheel, fork or steering stem, support the motorcycle using a center stand or hoist.
- Raise the front wheel off the ground by supporting the frame securely when servicing the front wheel, suspension and steering stem. A hoist or equivalent is required to support the motorcycle.
- When using the pin spanner, use a deflecting beam type torque wrench 25 cm (10 in) long. The pin spanner increases the torque wrench's leverage, so the torque wrench reading will be less than the torque actually applied to the steering stem adjusting nut. The specification given is the actual torque applied to the adjusting nut, not the reading on the torque wrench. Do not overtighten the adjusting nut. The specification later in the text gives both actual and indicated torque.
- 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 operate the brake lever after removing the caliper and front wheel. To do so will cause difficulty in fitting the brake disc between the pads.
- After the front wheel installation, check the brake operation by applying the brake lever.
- Use only tires marked "TUBELESS" and tubeless valves on rim marked "TUBELESS TIRE APPLICABLE".
- Keep grease off the brake pads and disc.
- For brake system information (page 14-3).

SPECIFICATIONS

<table>
<thead>
<tr>
<th>ITEM</th>
<th>STANDARD</th>
<th>SERVICE LIMIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum tire thread depth</td>
<td>-</td>
<td>1.5 (0.06)</td>
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<tr>
<td>Cold tire pressure</td>
<td>Driver only 175 kPa (1.75 kgf/cm², 25 psi)</td>
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<td>Driver and passenger 175 kPa (1.75 kgf/cm², 25 psi)</td>
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<tr>
<td>Axle runout</td>
<td>Radial - 0.2 (0.01)</td>
<td>0.2 (0.01)</td>
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<td>Wheel rim runout</td>
<td>Axial - 1.0 (0.04)</td>
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<td>Fork</td>
<td>Spring free length 372.7 (14.67)</td>
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<td>Tube runout 167 (6.6)</td>
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<td>Fluid level</td>
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<tr>
<td>Fluid capacity</td>
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<td>-</td>
</tr>
</tbody>
</table>

TORQUE VALUES

- Clutch lever bolt 1 N·m (0.1 kgf·m, 0.7 lbf·ft)
- Clutch lever nut 5.9 N·m (0.6 kgf·m, 4.4 lbf·ft)
- Front axle nut 54 N·m (5.5 kgf·m, 40 lbf·ft)
- Front brake disc mounting bolt 42 N·m (4.3 kgf·m, 31 lbf·ft)
- Handlebar end screw 9 N·m (0.9 kgf·m, 6.6 lbf·ft)
- Handlebar lower holder nut 39 N·m (4.0 kgf·m, 29 lbf·ft)
- Handlebar upper holder bolt 12 N·m (1.2 kgf·m, 9 lbf·ft)
- Fork socket bolt 20 N·m (2.0 kgf·m, 15 lbf·ft)
- Fork cap 22 N·m (2.2 kgf·m, 16 lbf·ft)
- Bottom bridge pinch bolt 32 N·m (3.3 kgf·m, 24 lbf·ft)
- Top fork bolt 44 N·m (4.5 kgf·m, 33 lbf·ft)
- Steering bearing adjusting nut -
- Steering stem nut 74 N·m (7.5 kgf·m, 55 lbf·ft)
- Master cylinder holder bolt 9 N·m (0.9 kgf·m, 6.6 lbf·ft)

ALOC bolt; replace with a new one.
ALOC bolt; replace with a new one.
Apply locking agent to the threads.
See page 12-29
<table>
<thead>
<tr>
<th>Description</th>
<th>Code</th>
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<tbody>
<tr>
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<tr>
<td>Attachment, 42 x 47 mm</td>
<td>07746-0010300</td>
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<tr>
<td>Pilot, 12 mm</td>
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<tr>
<td>Driver</td>
<td>07749-0010000</td>
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<tr>
<td>Bearing remover shaft</td>
<td>07746-0050100</td>
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<tr>
<td>Bearing remover head, 12 mm</td>
<td>07746-0050300</td>
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<tr>
<td>Oil seal remover</td>
<td>07749-0010001</td>
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<tr>
<td>Steering stem driver</td>
<td>07947-1180001</td>
</tr>
<tr>
<td>Pin spanner</td>
<td>07702-0020001</td>
</tr>
<tr>
<td>Ball race remover</td>
<td>07GMD-KS40100</td>
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</tbody>
</table>
TROUBLESHOOTING

Hard steering
• Steering stem adjusting nut too tight
• Worn or damaged steering head bearings
• Worn or damaged steering head bearing races
• Bent steering stem
• Insufficient tire pressure
• Faulty tire

Steers to one side or does not track straight
• Bent fork tubes
• Bent axle
• Wheel installed incorrectly
• Damaged or loose steering head bearings
• Bent frame
• Worn or damaged wheel bearing
• Unevenly assembled left and right fork tubes
• Unequal oil quantity in each fork tube

Front wheel wobbling
• Bent rim
• Worn or damaged wheel bearings
• Faulty tire
• Axle fastener not tightened properly
• Unbalanced front wheel and tire

Front wheel turns hard
• Faulty wheel bearings
• Faulty speedometer gear
• Bent axle
• Brake drag

Soft suspension
• Weak fork springs
• Insufficient fluid in fork
• Insufficient tire pressure
• Incorrect fork fluid weight (low viscosity)

Stiff suspension
• Incorrect fork fluid weight (high viscosity)
• Bent or damaged fork tubes
• Clogged fork fluid passage
• Tire pressure too high
• Fork slider binds
• Incorrect axle alignment

Front suspension noisy
• Insufficient fluid in fork
• Loose fork fasteners
• Lack of grease in speedometer gearbox
FRONT WHEEL/SUSPENSION/STEERING

HANDLEBAR

REMOVAL

Remove the rearview mirrors (page 2-19).
Remove the wire bands.

Remove the screws and handlebar ends.

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

- Keep the master cylinder upright to prevent air from entering the hydraulic system. Do not twist the brake hose.

Remove the screws and separate the throttle housing.
Disconnect the throttle cable from the throttle grip pipe.
Remove the throttle grip/pipe from the handlebar.
Remove the throttle grip from the throttle pipe if necessary.

Remove the screws and separate the right handlebar switch housing.

Remove the screws and separate the left handlebar switch housing.

Slide the dust cover out from the clutch lever.
Remove the nut, bolt and clutch lever.
Disconnect the clutch cable from the clutch lever.
FRONT WHEEL/SUSPENSION/STEERING

Remove the handlebar grip.
Loosen the clutch lever bracket bolt and slide the clutch lever bracket out from the handlebar.

If removing the handlebar lower holders, loosen the handlebar lower holder nuts.

Remove the handlebar upper holder bolts, handlebar upper holder and handlebar.

Remove the nuts, washers and handlebar lower holders.
HANDLEBAR INNER WEIGHT REPLACEMENT

Push the retainer tab through the handlebar hole with a screwdriver or punch.

Temporarily install the handlebar end and screw, then remove the inner weight assembly by turning the handlebar end.

Remove the screw, handlebar end and rubber cushions from the inner weight.

Check the condition of the rubber cushions, replace them if necessary.

Install the rubber cushions and a new retainer onto the inner weight.

Install the handlebar end onto the inner weight aligning its boss with the groove each other.

Install the handlebar end screw.

Insert the inner weight assembly into the handlebar. Turn the inner weight and hook the retainer tab with the hole in the handlebar.

Remove the screw and handlebar end.

INSTALLATION

GRIP REPLACEMENT

Install the clutch lever bracket to the left side handlebar.

Clean the inside of the handlebar grip, outer surface of the left handlebar.

Apply Honda Bond A or equivalent to the inside of new handlebar grip and to the clean surface of the left handlebar.

When removing the throttle grip from the throttle pipe, apply Honda Bond A or equivalent to the inside of the throttle grip and to the clean surface of the throttle pipe.

Wait 3 – 5 minutes and install the grips.

Rotate the grips for even application of the adhesive.
Install the handlebar lower holders, washer and nuts.
Temporarily tighten the nuts securely.

Place the handlebar onto the handlebar lower holders.
Place the handlebar upper holder with the punch marks facing forward and install the handlebar upper holder bolts.
Align the end of the handlebar lower holder with the punch mark on the handlebar.
Tighten the front bolts first, then tighten the rear bolts to the specified torque.
TORQUE: 12 N·m (1.2 kgf-m, 9 lbf·ft)

Tighten the handlebar lower holder nuts to the specified torque.
TORQUE: 39 N·m (4.0 kgf-m, 29 lbf·ft)

Align the end of the clutch lever bracket with the punch mark on the handlebar.
Tighten the clutch lever bracket bolt securely.
Connect the clutch cable to the clutch lever.
Install the clutch lever and bolt.
Tighten the bolt to the specified torque.
TORQUE: 1 N·m (0.1 kgf·m, 0.7 lbf·ft)
Install and tighten the nut to the specified torque while holding the bolt.
TORQUE: 5.9 N·m (0.6 kgf·m, 4.4 lbf·ft)
Set the dust cover to the clutch lever.

Install the left handlebar switch housing by aligning its locating pin with the hole on the handlebar.

Install and tighten the front screw first, then tighten the rear screw.

Install the right handlebar switch housing by aligning its locating pin with the hole on the handlebar.
Install and tighten the front screw first, then tighten the rear screw.
Install the throttle grip/pipe on the handlebar.

Apply grease to the throttle grip/pipe flange.
Connect the throttle cable end to the throttle grip pipe.
Install the throttle housing by aligning its locating pin with the hole on the handlebar.

Install the screws.
Tighten the upper screw first, then tighten the lower screw securely.

Place the master cylinder on the handlebar and set the master cylinder holder with its "UP" mark facing up, and loosely install the bolts.
Align the end of the master cylinder with the punch mark on the handlebar.
Tighten the upper bolt first, then tighten the lower bolt to the specified torque.
TORQUE: 9 N·m (0.9 kgf·m, 6.6 lbf·ft)
Connect the brake light switch connectors.
Install the handlebar end by aligning the cut-outs of the handlebar end and inner weight.

Install and tighten a new screw to the specified torque.

**TORQUE:** 9 N·m (0.9 kgf·m, 6.6 lbf·ft)

Install the wire bands.

- Route the wires and cables properly (page 1-16).

Install the rearview mirror (page 2-19).

Check the following:
  - Throttle grip freeplay (page 3-5)
  - Clutch lever freeplay (page 3-23)

---

**FRONT WHEEL**

**REMOVAL**

Loosen the axle nut.

Support the motorcycle on its center stand and raise the front wheel off the ground.

Push the caliper pistons all the way in by pushing the caliper body inward to allow installation of the front wheel.

Disconnect the speedometer cable by pushing the cable tab.

Remove the axle nut, front axle and front wheel.

Do not operate the front brake lever after removing the front wheel.

Remove the right side collar.

Remove the speedometer gear box.
INSPECTION

AXLE
Place the axle on V-blocks.
Turn the axle and measure the runout using a dial indicator.
Actual runout is 1/2 the total indicator reading.
SERVICE LIMIT: 0.2 mm (0.01 in)

WHEEL BEARING
Turn the inner race of each bearing with your finger. The bearing should turn smoothly and quietly.
Also check that the bearing outer race fits tightly in the hub.
Remove the bearings if the inner race does not turn smoothly, quietly, or if the outer race fits loosely in the hub.

WHEEL RIM
Check the wheel rim runout by placing the wheel in a truing stand.
Turn the wheel slowly and read the runout using a dial indicator.
Actual runout is 1/2 the total indicator reading.
SERVICE LIMITS:
Axial: 1.0 mm (0.04 in)
Radial: 1.0 mm (0.04 in)

TIRE
Note the rotating direction mark on the wheel and tire.
When installing the tire align the balance mark on the tire with the valve stem of the wheel rim within 50 mm (2.0 in).
DISASSEMBLY

Remove the dust seal, then remove the speedometer gear retainer from the left wheel hub.

Remove the dust seal from the right wheel hub.

Loosen the brake disc socket bolts in a crisscross pattern in several steps, and remove them and brake disc.

WHEEL BEARING REPLACEMENT

Never install the old bearing, once the bearing has been removed, the bearing must be replaced with new ones.

Pack all bearing cavities with grease.

Drive in a new right bearing squarely with its sealed side facing up until it is fully seated.

Install the distance collar, then drive in a new left bearing squarely with its sealed side facing up.

Tools:
- Bearing remover head, 12 mm 07746-0050300
- Bearing remover shaft 07746-0050100
- Driver 07749-0010000
- Attachment, 37 x 40 mm 07746-0010200
- Pilot, 12 mm 07746-0040200

Fully seated
Install the brake disc onto the brake hub with the arrow mark facing out.

Install and tighten new brake disc socket bolts to the specified torque in a crisscross pattern in several steps.

**TORQUE:** 42 N·m (4.3 kgf·m, 31 lbf·ft)

Apply grease to a new right dust seal lips.
Install the dust seal until it is flush with the right wheel hub surface.

Install the speedometer gear retainer to the left wheel hub by aligning its tabs with the slots on the hub.

*Do not get grease on the brake disc or stopping power will be reduced.*
Apply grease to a new left dust seal lips. Install the dust seal until it is fully seated with the left wheel hub.

**INSTALLATION**

Apply grease to the speedometer gear box inside area and retainer tabs.

Install the speedometer gear box onto the left wheel hub by aligning its retainer tabs with the slots on the hub.

Install the side collar onto the right wheel hub.

Be careful not to damage the pads. Install the front wheel between the fork legs by aligning the speedometer gear box groove with the boss of the left fork leg so that the brake disc is positioned between the pads.

Install the front axle from right side.
FRONT WHEEL/SUSPENSION/STEERING

Apply grease to the speedometer pinion gear teeth. Install and tighten the axle nut to the specified torque.
TORQUE: 54 N·m (5.5 kgf·m, 40 lbf·ft)

Connect the speedometer cable by aligning its tab with the groove of the speedometer gear box.
Check the brake operation.

FORK

REMOVAL

Do not twist the brake hose.

Remove the following:
- Front fender (page 2-9)
- Front wheel (page 12-13)

Remove the bolts and brake caliper with the hose connected.
- Support the brake caliper with a piece of wire so that it does not hang from the brake hose.
- Do not operate the brake lever after removing the brake caliper.

Remove the top fork bolt and washer.

Loosen the bottom bridge pinch bolts and lower the fork leg.

If the fork will be disassembled, temporarily tighten the bottom bridge pinch bolts and loosen the fork cap.

Loosen the bottom bridge pinch bolts and remove the fork legs.
DISASSEMBLY

The fork cap is under spring pressure; use care when loosening it.

The fork cap is under spring pressure; use care when loosening it.

Remove the fork cap and O-ring.

Remove the collar, spring seat and fork spring from the fork tube.

Remove the collar, spring seat and fork spring from the fork tube.

Remove the fork cap and O-ring.

Remove the collar, spring seat and fork spring from the fork tube.

Pour out the fork fluid by pumping the fork tube several times.

Pour out the fork fluid by pumping the fork tube several times.

Hold the fork slider in a vise with soft jaws or a shop towel.

Hold the fork slider in a vise with soft jaws or a shop towel.

Do not overtighten the vise on the fork slider.

Do not overtighten the vise on the fork slider.

Remove the fork socket bolt and sealing washer.

Remove the fork socket bolt and sealing washer.

- If the fork piston turns together with the socket bolt, temporarily install the fork spring, spring seat, collar and fork cap.

- If the fork piston turns together with the socket bolt, temporarily install the fork spring, spring seat, collar and fork cap.

Remove the fork tube/fork piston from the fork slider.

Remove the fork tube/fork piston from the fork slider.

Remove the oil lock piece from the fork slider.

Remove the oil lock piece from the fork slider.
Remove the fork piston and rebound spring from the fork tube.

- Do not remove the fork piston ring, unless it is necessary to replace with a new one.

Remove the dust seal.

Remove the oil seal stopper ring.

Be careful not to damage the fork slider.

Remove the oil seal using the special tool.

**TOOL:**
- Oil seal remover 07748-0010001
INSPECTION

FORK SPRING
Check the fork spring for fatigue or damage.
Measure the fork spring free length.
STANDARD: 372.7 mm (14.67 in)

FORK TUBE/SLIDER/PISTON/REBOUND SPRING
Check the fork tube and slider for score marks, excessive or abnormal wear.
Replace any damaged component if necessary.

Check the fork piston for score marks, excessive or abnormal wear.
Check the fork piston ring for wear or damage.
Check the rebound spring for fatigue or damage.
Replace any damaged component if necessary.

Place the fork tube on V-blocks.
Turn the fork tube and measure the runout using a dial indicator.
Actual runout is 1/2 the total indicator reading.
SERVICE LIMIT: 0.20 mm (0.008 in)
Apply silicone grease to a new oil seal lips and apply fork fluid to the oil seal outer surface.

Install the oil seal with its marked side facing up. Drive the oil seal into the fork slider until the stopper ring groove is visible, using the special tools.

Install the oil seal stopper ring into the groove of the fork slider securely.
Apply silicone grease to a new dust seal lips and install it to the fork slider.

Install the rebound spring onto the fork piston, then install them into the fork tube.

Install the oil lock piece to the fork piston end, then install the fork tube into the fork slider.

Do not over-tighten the vise on the fork slider.

Hold the fork slider in a vise with piece of woods or a shop towel.

Install a new sealing washer onto the socket bolt.

Apply locking agent to the fork socket bolt threads, and install it.
FRONT WHEEL/SUSPENSION/STEERING

If the fork piston turns together with the socket bolt, temporarily install the fork spring, spring seat, collar and fork cap.

Tighten the socket bolt to the specified torque.

**TORQUE:** 20 N·m (2.0 kgf·m, 15 lbf·ft)

Pour the specified amount of recommended fork fluid into the fork tube.

**RECOMMENDED FLUID:**
Honda Ultra Cushion Oil 10 W or equivalent

**FORK FLUID CAPACITY:**
146 ± 2.5 cm³ (4.9 ± 0.08 US oz, 5.1 ± 0.09 Imp oz)

Pump the fork tube several times to remove trapped air from the lower portion of the fork tube.

Compress the fork leg fully, and measure the fork fluid level from the top of the fork tube.

**FORK FLUID LEVEL:** 167 mm (6.6 in)

Pull the fork tube up and install the fork spring with its taper (tightly wound coil) side facing down.

Install the spring seat and collar.
Apply fork fluid to a new O-ring and install it to the fork cap groove.

Install and tighten the fork cap while pushing it to the fork tube.

- Tighten the fork cap after installing the fork tube into the bottom bridge.

**INSTALLATION**

Install the fork leg through the bottom bridge, and temporarily tighten the bottom bridge pinch bolt. Tighten the fork cap to the specified torque.

**TORQUE:** 22 N·m (2.2 kgf-m, 16 lbf-ft)

Loosen the bottom pinch bolt and install the fork leg through the top bridge.

Install the washer and top fork bolt. Tighten the top fork bolt to the specified torque.

**TORQUE:** 44 N·m (4.5 kgf-m, 33 lbf-ft)

Tighten the bottom bridge pinch bolt to the specified torque.

**TORQUE:** 32 N·m (3.3 kgf-m, 24 lbf-ft)
FRONT WHEEL/SUSPENSION/STEERING

Install the brake caliper to the fork.
Install and tighten new brake caliper bolts to the specified torque.
**TORQUE: 30 N m (3.1 kgf m, 22 lbf ft)**

Install the following:
- Front fender (page 2-9)
- Front wheel (page 12-17)

STEERING STEM

REMOVAL

Remove the following:
- Front cowl (page 2-5)
- Front fender (page 2-9)
- Front wheel (page 12-13)
- Handlebar (page 12-6)

Disconnect the following:
- Handlebar switch 4P (Black) connector
- Handlebar switch 4P (Natural) connector
- Handlebar switch 6P (Natural) connector
- Ignition switch 3P (Natural) connector

Remove the bolt and brake hose guide from the bottom bridge.

Loosen the steering stem nut.
Remove the fork legs (page 12-18).
Be careful not to lose the steel balls.

Loosen the steering bearing adjusting nut using the special tool.

**TOOL:**
Pin spanner 07702-0020001

Hold the steering stem, and remove the steering bearing adjusting nut.

Remove the top cone race and upper steel balls (18 pieces).

Remove the steering stem and lower steel balls (18 pieces).

---

**BALL RACE REPLACEMENT**

*Replace the steel balls, outer race and inner race as a set.*

Remove the ball races using the special tool.

**TOOL:**
Ball race remover 07GMD-KS40100
FRONT WHEEL/SUSPENSION/STEERING

Install a new top ball race using the special tools.

TOOLS:
Driver 07749-0010000
Attachment, 42 x 47 mm 07746-0010300

Install a new bottom ball race using the special tools.

TOOLS:
Driver 07749-0010000
Attachment, 42 x 47 mm 07746-0010300

BOTTOM CONE RACE REPLACEMENT

Avoid damaging the steering stem thread, temporarily install the steering stem nut.

Remove the bolt and brake hose guide.

Remove the bottom cone race with a chisel or equivalent tool, being careful not to damage the stem.

Remove the dust seal.

Apply specified grease (page 1-15) to a new dust seal lips and install it over the steering stem.

Install a new steering bottom cone race to the steering stem using the special tool and a hydraulic press as shown.

TOOL:
Steering stem driver 07947-1180001

Install the brake hose guide and bolt, tighten the bolt securely.
Apply specified grease (page 1-15) to the steering cone races and steering ball races.

Install the steel balls (18 pieces) onto the bottom cone race.

Insert the steering stem into the steering head pipe, being careful not to drop the steel balls.

Install the steel balls (18 pieces) onto the top ball race.

Install the top cone race.

Install the steering bearing adjusting nut, and tighten it to the specified torque using the special tool.

**TOOL**
Pin spanner 07702-0020001

**TORQUE**: 25 N·m (2.5 kgf·m, 18 lbf·ft)
Move the steering stem left and right, lock-to-lock, several times to seat the bearings.
Check that the steering stem moves smoothly, without play or binding.
Loosen the steering bearing adjusting nut to torque of 0 N·m (0 kgf·m, 0 lbf·ft).

Retighten the steering bearing adjusting nut to the specified torque using the special tool.

**TOOL:**
Pin spanner 07702-0020001

**TORQUE:**
- Actual: 1.5 N·m (0.2 kgf·m, 1.1 lbf·ft)
- Indicated: 1.1 N·m (0.1 kgf·m, 0.8 lbf·ft)

Install the top bridge to the steering head.
Install the washer and steering stem nut.
Temporarily install the fork legs (page 12-25) but do not tighten the bottom bridge pinch bolts.

Tighten the steering stem nut to the specified torque.

**TORQUE:** 74 N·m (7.5 kgf·m, 55 lbf·ft)
Move the steering stem right and left, lock-to-lock several times again.
Make sure that the steering stem moves smoothly, without play or binding.
Install the brake hose guide and push it against the guide stay of the bottom bridge. Install and tighten the bolt securely.

Connect the following:
- Handlebar switch 4P (Black) connector
- Handlebar switch 4P (Natural) connector
- Handlebar switch 6P (Natural) connector
- Ignition switch 3P (Natural) connector

Install the following:
- Fork legs (page 12-25)
- Front cowl (page 2-5)
- Front fender (page 2-9)
- Front wheel (page 12-17)
- Handlebar (page 12-9)

**STEERING BEARING PRELOAD**

Support the motorcycle on its center stand. Raise the front wheel off the ground using a hoist or equivalent. Position the steering stem to the straight ahead position.

Hook a spring scale to the fork tube between the fork top and bottom bridges. Pull the spring scale keeping the scale at a right angle to the steering stem. Read the scale at the point where the steering stem just starts to move.

**STEERING BEARING PRELOAD:**
5.6 - 8.9 N (0.6 - 0.9 kgf)

If the readings do not fall within the limits, lower the front wheel to the ground, and readjust the steering bearing adjusting nut.
<table>
<thead>
<tr>
<th>COMPONENT LOCATION</th>
<th>13-2</th>
<th>REAR WHEEL</th>
<th>13-6</th>
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</thead>
<tbody>
<tr>
<td>SERVICE INFORMATION</td>
<td>13-3</td>
<td>SHOCK ABSORBER</td>
<td>13-13</td>
</tr>
<tr>
<td>TROUBLESHOOTING</td>
<td>13-5</td>
<td>SWINGARM</td>
<td>13-15</td>
</tr>
</tbody>
</table>
**COMPONENT LOCATION**

- **54 N·m (5.5 kgf·m, 40 lbf·ft)**
- **34 N·m (3.5 kgf·m, 25 lbf·ft)**
- **22 N·m (2.2 kgf·m, 16 lbf·ft)**
SERVICE INFORMATION

GENERAL

⚠️ CAUTION ⚠️

Frequent inhalation of brake shoe dust, regardless of material composition could be hazardous to your health.
- Avoid breathing dust particles.
- Never use an air hose or brush to clean brake assemblies. Use an OSHA-approved vacuum cleaner.

- Riding on damaged rims impairs safe operation of the motorcycle.
- When servicing the rear wheel and suspension, support the motorcycle on its center stand.
- A contaminated brake drum or shoe reduces stopping power. Discard contaminated shoes, and clean a contaminated drum with a high quality brake degreasing agent.
- Keep grease off of the brake shoes and drum.
- Use only tires marked "TUBELESS" and tubeless valve stems on rims marked "FOR TUBELESS".
- Use genuine Honda replacement bolts and nuts for all suspension pivots and mounting points.
- For brake system service (page 14-3).
- For brake light switch inspection (page 3-22).

SPECIFICATIONS

<table>
<thead>
<tr>
<th>ITEM</th>
<th>STANDARD</th>
<th>SERVICE LIMIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum tire thread depth</td>
<td></td>
<td>2.0 (0.08)</td>
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<tr>
<td>Cold tire pressure</td>
<td>Driver only 200 kPa (2.00 kgf/cm², 29 psi)</td>
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<tr>
<td></td>
<td>Driver and passenger 225 kPa (2.25 kgf/cm², 33 psi)</td>
<td>-</td>
</tr>
<tr>
<td>Axle runout</td>
<td>-</td>
<td>0.2 (0.01)</td>
</tr>
<tr>
<td>Wheel rim runout</td>
<td>Radial 1.0 (0.04)</td>
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</tr>
<tr>
<td></td>
<td>Axial 1.0 (0.04)</td>
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<tr>
<td>Drive chain</td>
<td>Size/link RK RK428KPO-118LE</td>
<td>50 (1-15/16)</td>
</tr>
<tr>
<td></td>
<td>Slack 15 - 25 (9/16 - 1)</td>
<td></td>
</tr>
</tbody>
</table>

TORQUE VALUES

- Driven sprocket nut 32 N·m (3.3 kgf-m, 24 lbf-ft)
- Rear axle nut 54 N·m (5.5 kgf-m, 40 lbf-ft)
- Shock absorber mounting nut 34 N·m (3.5 kgf-m, 25 lbf-ft)
- Shock absorber mounting bolt 34 N·m (3.5 kgf-m, 25 lbf-ft)
- Brake panel stopper arm joint nut 22 N·m (2.2 kgf-m, 16 lbf-ft)
- Swingarm pivot nut 54 N·m (5.5 kgf-m, 40 lbf-ft)
### REAR WHEEL/SUSPENSION

#### TOOLS

<table>
<thead>
<tr>
<th>Description</th>
<th>Part Number</th>
<th>Image</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pilot, 12 mm</td>
<td>07746-0040200</td>
<td><img src="image1.png" alt="Pilot 12 mm" /></td>
</tr>
<tr>
<td>Pilot, 17 mm</td>
<td>07746-0040400</td>
<td><img src="image2.png" alt="Pilot 17 mm" /></td>
</tr>
<tr>
<td>Attachment, 37 x 40 mm</td>
<td>07746-0010200</td>
<td><img src="image3.png" alt="Attachment" /></td>
</tr>
<tr>
<td>Bearing remover shaft</td>
<td>07746-0050100</td>
<td><img src="image4.png" alt="Bearing remover shaft" /></td>
</tr>
<tr>
<td>Bearing remover head, 12 mm</td>
<td>07746-0050300</td>
<td><img src="image5.png" alt="Bearing remover head" /></td>
</tr>
<tr>
<td>Driver</td>
<td>07749-0010000</td>
<td><img src="image6.png" alt="Driver" /></td>
</tr>
</tbody>
</table>
TROUBLESHOOTING

Rear wheel wobbling
- Bent rim
- Worn or damaged rear wheel bearings
- Worn or damaged driven flange bearing
- Faulty tire
- Worn or damaged swingarm pivot bushings
- Bent frame or swingarm
- Axle fastener not tightened properly
- Insufficient tire pressure

Wheel turns hard
- Brake drag
- Faulty rear wheel bearings
- Faulty driven flange bearing
- Bent axle
- Drive chain too tight (page 3-14)

Soft suspension
- Incorrect shock absorber spring preload
- Weak shock absorber springs
- Oil leakage from damper unit
- Insufficient tire pressure
- Faulty tire

Stiff suspension
- Incorrect shock absorber spring preload
- Bent shock absorber damper rod
- Worn or damaged shock absorber or swingarm pivot bushings
- Bent swingarm pivot or frame
- Insufficient tire pressure
- Improperly tightened swingarm pivot

Steers to one side or does not track straight
- Axle alignment/chain adjustment not equal on both sides
- Bent axle
- Bent frame and/or swingarm
- Worn swingarm pivot component

Rear suspension noise
- Loose shock absorber fasteners
- Worn or damaged shock absorber pivot bushings
- Faulty shock absorber
REAR WHEEL/SUSPENSION

REAR WHEEL

REMOVAL

Support the motorcycle on its center stand.
Remove the rear brake adjusting nut.
Push the brake pedal down, and remove the brake rod from the joint pin.
Remove the rod spring and joint pin.

Remove the following:
- Cotter pin
- Joint nut
- Washer
- Cushion rubber
- Joint bolt

Loosen the axle nut.
Loosen both the drive chain adjuster lock nuts and slacken the drive chain fully.
Remove the drive chain from the driven sprocket.
Remove the following:
- Axle nut
- Rear axle
- Setting plates
- Rear wheel
- Right side collar

Remove the brake panel assembly from the right wheel hub.
REAR WHEEL/SUSPENSION

INSPECTION

AXLE

Place the axle on V-blocks.

Turn the axle and measure the runout using a dial indicator.

Actual runout is 1/2 the total indicator reading.

SERVICE LIMIT: 0.2 mm (0.01 in)

WHEEL AND DRIVEN FLANGE BEARINGS

Turn the inner race of each bearing with your finger. The inner race should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the wheel hub or driven flange.

Replace the bearings if the inner race does not turn smoothly and quietly, or if the outer race fits loosely in the wheel hub or driven flange.

WHEEL RIM

Check the wheel rim runout by placing the wheel in a truing stand. Turn the wheel by hand, and read the runout using a dial indicator.

Actual runout is 1/2 the total indicator reading.

SERVICE LIMITS:
- Radial: 1.0 mm (0.04 in)
- Axial: 1.0 mm (0.04 in)
REAR WHEEL/SUSPENSION

DISASSEMBLY

If removing the drive sprocket, loosen the nuts.
Remove the driven flange from the left wheel hub.

Replace the damper rubbers as a set.

Remove the nuts and driven sprocket.
Remove the dust seal.

WHEEL BEARING REMOVAL

Install the bearing remover head into the bearing.
From the opposite side, install the bearing remover shaft, and drive the bearing out of the wheel hub.
Remove the distance collar, and drive out the other bearing.

TOOLS:
Bearing remover head, 12 mm 07746-0050300
Bearing remover shaft 07746-0050100

For wheel bearing installation (page 13-10).
**DRIVEN FLANGE**

**STUD BOLT REPLACEMENT**

Check that the length from the bolt head to the driven flange surface is within specifications.

**STANDARD:** 14 ± 0.5 mm (0.6 ± 0.02 in)

When removing the driven flange stud bolts, install and tighten new stud bolts into the driven flange so that the length from the bolt head to the driven flange surface is within specifications.

**BEARING REPLACEMENT**

Remove the driven flange collar.

Drive out the driven flange bearing.

Never install the old bearing; once the bearing has been removed, the bearing must be replaced with new ones.

Drive in a new driven flange bearing squarely until it is fully seated using the special tools.

**TOOLS:**

- Driver 07749-0010000
- Attachment, 37 x 40 mm 07746-0010200
- Pilot, 17 mm 07746-0040400

Install the driven flange collar securely.
Never install the old bearing, once the bearing has been removed, the bearing must be replaced with new ones.

Pack all bearing cavities with grease.

Drive in a new left bearing squarely with its sealed side facing up until it is fully seated using the special tools.

**TOOLS:**
- Driver: 07749-0010000
- Attachment, 37 x 40 mm: 07746-0010200
- Pilot, 12 mm: 07746-0040200

Install the distance collar, then drive in a new left bearing squarely with its sealed side facing up using the special tools.

**TOOLS:**
- Driver: 07749-0010000
- Attachment, 37 x 40 mm: 07746-0010200
- Pilot, 12 mm: 07746-0040200
Apply grease to a new dust seal lips.
Install the dust seal until it is flush with the driven flange.
Install the driven sprocket to the driven flange with its stamp mark facing out.
Loosely install the nuts.

Apply grease to a new O-ring and install it to the left wheel hub groove.
Install the damper rubbers.

Install the driven flange onto the left wheel hub by aligning the damper rubber grooves with the driven flange bosses.
Tighten the nuts to the specified torque.
TORQUE: 32 N·m (3.3 kgf·m, 24 lbf·ft)

INSTALLATION
Install the left side collar to the wheel hub.
Install the brake panel assembly to the right wheel hub.

Do not get grease on the brake drum and shoe linings.

Place the rear wheel into the swingarm. Install the drive chain over the driven sprocket. Install the left setting plate on the rear axle. Install the rear axle from the left side through the swingarm, left collar, rear wheel, right collar and swingarm. Install the right adjusting plate. Install and tighten the axle nut to the specified torque.

**TORQUE: 54 N·m (5.5 kgf·m, 40 lbf ft)**

Make sure the right adjusting plate position is aligned with the left adjusting plate position. Adjust the drive chain slack (page 3-16).

Install the following:
- Joint bolt
- Brake panel stopper arm
- Cushion rubber
- Washer

Install and tighten the joint nut.

**TORQUE: 22 N·m (2.2 kgf·m, 16 lbf ft)**

Install a new cotter pin.

Install the joint pin to the brake arm. Install the roller spring to the brake rod. Push down the brake pedal and insert the brake rod into the joint pin. Install the adjusting nut. Adjust the brake pedal freeplay (page 3-21).
SHOCK ABSORBER

REMOVAL

Support the motorcycle on its center stand.

Remove the right shock absorber upper mounting nut, washer, upper mount of the shock absorber and washer.

Remove the left shock absorber upper mounting nut, washer, upper mount of the shock absorber and washer.

Remove the left shock absorber lower mounting bolt and shock absorber.

Remove the right shock absorber lower mounting bolt and shock absorber.

INSPECTION

Do not disassemble the shock absorber. Replace the shock absorbers as a set.

Visually inspect the shock absorber for wear or damage.

Check the following:
- Damper rod for bending or damage
- Deformation or oil leakage
- Bushings for wear or damage

Check the smooth damper operation.
REAR WHEEL/SUSPENSION

INSTALLATION

Install the right shock absorber and lower mounting bolt loosely.

Install the left shock absorber and lower mounting bolt loosely.
Install the washer, upper mount of the left shock absorber, washer and upper mounting nut loosely.

Install the washer, upper mount of the right shock absorber, washer and upper mounting nut loosely.

Retract the center stand and support the motorcycle as be preloaded to the shock absorber and swingarm pivot bushings.

Tighten the shock absorber mounting nuts and bolts to the specified torque.

TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)
SWINGARM

REMOVAL

Remove the following:
- Rear wheel (page 13-6)
- Hugger fender (page 2-16)
Remove the bolts and drive chain cover.

Unhook the brake pedal return spring.

Remove the right shock absorber upper mounting nut, washer, upper mount of the shock absorber and washer.

Remove the left shock absorber lower mounting bolt and release the left shock absorber from the swingarm.
REAR WHEEL/SUSPENSION

Remove the swingarm pivot nut.

Remove the swingarm pivot bolt and swingarm.

DISASSEMBLY/INSPECTION

Remove the bolt and right shock absorber.

Remove the drive chain slider by releasing the slits from the tab of the swingarm, then release the bosses from the swingarm.
Check the drive chain slider for wear or damage. The drive chain slider must be replaced if it is worn to the wear limit groove.

Remove the cotter pin, joint nut, washer, spring washer, joint bolt and brake panel stopper arm.

Remove the drive chain adjusters.

Check the swingarm pivot bushings for wear or damage. Check the swingarm for cracks or damage. Replace them if necessary.
Install the brake panel stopper arm, joint bolt, spring washer and washer.

Install and tighten the joint nut to the specified torque.

**TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)**

Install a new cotter pin.
Install the drive chain slider by aligning the bosses with the holes of the swingarm, then install the slits of the drive chain slider to the swingarm on the tab.

Install the right shock absorber and lower mounting bolt loosely.

**INSTALLATION**

Be careful not to damage the rear brake light switch spring.

Route the drive chain and install the swingarm to the frame.

Install the swingarm pivot bolt from the left side through the swingarm pivot and frame.

Loosely install the swingarm pivot nut.
Install the left shock absorber to the swingarm and bolt loosely.

Install the washer, right upper mount of the shock absorber, washer and nut loosely.

Hook the brake pedal return spring to the swingarm.

Install the drive chain cover to the swingarm by aligning its tab with the slit of the swingarm.
Install and tighten the drive chain cover bolts securely.

Install the following:
- Rear wheel (page 13-11)
- Hugger fender (page 2-16)

Retract the center stand and support the motorcycle as be preload to the shock absorber and swingarm pivot bushings.

Tighten the pivot nut to the specified torque.
TORQUE: 54 N m (5.5 kgf-m, 40 lb-ft)

Tighten the shock absorber mounting nut and bolt to the specified torque.
TORQUE: 34 N m (3.5 kgf m, 25 lb ft)
## 14. BRAKE SYSTEM

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<td>14-22</td>
</tr>
</tbody>
</table>
BRAKE SYSTEM

COMPONENT LOCATION

FRONT

9 N⋅m (0.9 kgf⋅m, 6.6 lbf⋅ft)

34 N⋅m (3.5 kgf⋅m, 25 lbf⋅ft)

30 N⋅m (3.1 kgf⋅m, 22 lbf⋅ft)

REAR
BRAKE SYSTEM

SERVICE INFORMATION

GENERAL

**CAUTION**

Frequent inhalation of brake pad (shoe) dust, regardless of material composition, could be hazardous to your health.
- Avoid breathing dust particles.
- Never use an air hose or brush to clean brake assemblies. Use an OSHA-approved vacuum cleaner.

**NOTICE**

Spilling brake fluid will severely damage instrument lenses and painted surface. It is also harmful to some rubber parts. Be careful whenever you remove the reservoir cap; make sure the reservoir is horizontal first.
- A contaminated brake disc or pad (drum or shoe) reduces stopping power. Discard contaminated pads (shoes), and clean a contaminated disc (drum) with a high quality brake degreasing agent.
- Check the hydraulic brake system by applying the brake lever after the air bleeding.
- Never allow contaminates (dirt, water, etc.) to get into an open reservoir.
- Once the hydraulic system has been opened, or if the brake feels spongy, the system must be bled.
- Always use fresh DOT 3 or DOT 4 brake fluid from a sealed container when servicing the system. Do not mix different types of fluid, they may not be compatible.
- Always check brake operation before riding the motorcycle.
- Do not reuse the sealing washers. Replace with new ones.

**SPECIFICATIONS**

<table>
<thead>
<tr>
<th>ITEM</th>
<th>STANDARD</th>
<th>SERVICE LIMIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Front brake</td>
<td>Specified brake fluid</td>
<td>DOT 3 or DOT 4</td>
</tr>
<tr>
<td>Brake disc thickness</td>
<td>3.8 - 4.2 (0.15 - 0.17)</td>
<td>3.5 (0.14)</td>
</tr>
<tr>
<td>Brake disc runout</td>
<td></td>
<td>0.10 (0.004)</td>
</tr>
<tr>
<td>Master cylinder I.D.</td>
<td>12.700 - 12.743 (0.5000 - 0.5017)</td>
<td>12.755 (0.5022)</td>
</tr>
<tr>
<td>Master piston O.D.</td>
<td>12.657 - 12.684 (0.4983 - 0.4994)</td>
<td>12.645 (0.4978)</td>
</tr>
<tr>
<td>Caliper cylinder I.D.</td>
<td>25.400 - 25.450 (1.0000 - 1.0020)</td>
<td>25.460 (1.0024)</td>
</tr>
<tr>
<td>Caliper piston O.D.</td>
<td>25.318 - 25.368 (0.9968 - 0.9987)</td>
<td>25.310 (0.9965)</td>
</tr>
<tr>
<td>Rear brake</td>
<td>Brake pedal freeplay</td>
<td>20 - 30 (13/16 - 1-3/16)</td>
</tr>
<tr>
<td>Brake drum I.D.</td>
<td>130.0 - 130.2 (5.12 - 5.13)</td>
<td>131.0 (5.16)</td>
</tr>
<tr>
<td>Lining thickness</td>
<td></td>
<td>To the indicator</td>
</tr>
</tbody>
</table>

**TORQUE VALUES**

- Caliper bleed valve: 5.4 N·m (0.6 kgf·m, 4 lbf·ft)
- Master cylinder holder bolt: 9 N·m (0.9 kgf·m, 6.6 lbf·ft)
- Master cylinder reservoir cap screw: 1.2 N·m (0.1 kgf·m, 0.9 lbf·ft)
- Brake caliper mounting bolt: 30 N·m (3.1 kgf·m, 22 lbf·ft)
- Front brake light switch screw: 1.2 N·m (0.1 kgf·m, 0.9 lbf·ft)
- Brake lever pivot bolt: 1.0 N·m (0.1 kgf·m, 0.7 lbf·ft)
- Brake lever pivot nut: 6.0 N·m (0.6 kgf·m, 4.4 lbf·ft)
- Brake hose oil bolt: 34 N·m (3.5 kgf·m, 25 lbf·ft)
- Brake caliper slide pin: 22 N·m (2.2 kgf·m, 16 lbf·ft)
- Brake arm nut: 10 N·m (1.0 kgf·m, 7 lbf·ft)

ALOC bolt; replace with a new one.
Apply locking agent to the threads.
BRAKE SYSTEM

TOOL

Snap ring pliers
07914-SA50001
TROUBLESHOOTING

FRONT BRAKE

Brake lever soft or spongy
• Air in hydraulic system
• Leaking hydraulic system
• Contaminated brake pad/disc
• Worn caliper piston seal
• Worn master cylinder piston cups
• Worn brake pad/disc
• Contaminated caliper
• Contaminated master cylinder
• Caliper not sliding properly
• Low brake fluid level
• Clogged/restricted fluid passage
• Warped/deformed brake disc
• Sticking/worn caliper piston
• Sticking/worn master cylinder piston
• Bent brake lever

Brake lever hard
• Clogged/restricted fluid passage
• Sticking/worn caliper piston
• Caliper not sliding properly
• Worn caliper piston seal
• Sticking/worn master cylinder piston
• Bent brake lever

Brake drags
• Contaminated brake pad/disc
• Axle alignment/chain adjustment not equal on both sides
• Badly worn brake pad/disc
• Warped/deformed brake disc
• Caliper not sliding properly
• Clogged/restricted fluid passage
• Sticking/worn master cylinder piston

REAR BRAKE

Poor brake performance
• Improperly brake adjustment
• Worn brake linings
• Worn brake drum
• Worn brake cam
• Improperly installed brake linings
• Contaminated brake linings
• Contaminated brake drum
• Worn brake shoes at cam contact area
• Improper engagement between brake arm and serrations

Brake lever hard or slow return
• Worn/broken return spring
• Improperly adjusted rear brake freeplay
• Sticking brake drum due to contamination
• Worn brake shoes at cam contact area
• Brake cable sticking/needs lubrication
• Improperly installed brake linings

Brake squeaks
• Worn brake linings
• Worn brake drum
• Contaminated brake linings
• Contaminated brake drum
NOTICE
Spilled fluid can damage painted, plastic, or rubber parts. Place a shop towel over these parts whenever the system is serviced.

NOTE:
Never allow contaminates (dirt, water, etc.) to get into an open reservoir.

BRAKE FLUID DRAINING
Support the motorcycle on its center stand and turn the handlebar until the reservoir is parallel to the ground.
Remove the screws, reservoir cap, diaphragm plate and diaphragm.

Connect a bleed hose to the caliper bleed valve.

Loosen the bleed valve and pump the front brake lever until no more fluid flows out of the bleed valve.
Tighten the bleed valve.
BRAKE FLUID FILLING/AIR BLEEDING

Do not mix different types of brake fluid. They are not compatible.

Fill the master cylinder reservoir with DOT 3 or DOT 4 brake fluid from a sealed container.

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

If an automatic refill system is not used, add brake fluid when the fluid level in the reservoir is low.

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

If air is entering the bleeder from around the bleed valve threads, seal the threads with teflon tape.

Operate the brake bleeder and loosen the bleed valve.
- When using a brake bleeding tool, follow the manufacturer's operating instructions.

Perform the bleeding procedure until the system is completely flushed/bled.

Close the bleed valve and operate the brake lever. If it still feels spongy, bleed the system again.

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

TORQUE: 5.4 N·m (0.6 kgf-m, 4 lbf-ft)

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

Fill the reservoir to the casting ledge with DOT 3 or DOT 4 brake fluid from the sealed container.

Pump up the system pressure with the brake lever until the lever resistance is felt.

Connect a bleed hose to the bleed valve, and bleed the system as follows:

1. Squeeze the brake lever all the way and loosen the bleed valve 1/2 turn. Wait several seconds, and then close the bleed valve.

NOTE:
- Do not release the brake lever until the bleed valve has been closed.

2. Release the brake lever slowly and wait several seconds after it reaches the end of its travel.

Repeat the steps 1 and 2 until air bubbles do not appear in the bleed hose.

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

TORQUE: 5.4 N·m (0.6 kgf-m, 4 lbf-ft)
BRAKE SYSTEM

Fill the reservoir to the casting ledge with DOT 3 or DOT 4 brake fluid from a sealed container.

Install the diaphragm, diaphragm plate and reservoir cap, then tighten the screws to the specified torque.

TORQUE: 1.2 N m (0.1 kgf m, 0.9 lbf ft)

BRAKE PAD/DISC

BRAKE PAD REPLACEMENT

Check the brake fluid level in the master cylinder reservoir as this operation causes the fluid level to rise.

Push the caliper pistons all the way in by pushing the caliper body inward to allow installation of new brake pads.

- Always replace the brake pads in pairs to assure even disc pressure.

Do not operate the front brake lever after the brake pads are removed.

Remove the pad pin and brake pads.

Check the pad pin for abnormal wear or distortion, replace them if necessary.

Clean the brake caliper inside especially around the pistons.
Install new brake pads to the brake caliper so their ends seat against the retainer and brake caliper pin bolt A.

**NOTE:**
Make sure that the retainer is installed on the caliper bracket.

Apply silicone grease to the pad pin O-ring and install it to the pad pin groove.
Install the pad pin by pushing the pads against the pad spring to align the pad pin holes in the pads and brake caliper.

Tighten the pad pin to the specified torque.

**TORQUE:** 17 N·m (1.7 kgf·m, 13 lbf·ft)

Operate the brake lever to seat the caliper pistons against the pads.

**BRAKE DISC INSPECTION**
Visually inspect the brake disc for damage or cracks. Measure the brake disc thickness at several points.

**SERVICE LIMIT:** 3.5 mm (0.14 in)
Replace the brake disc if the smallest measurement is less than service limit.
BRAKE SYSTEM

Measure the brake disc warpage using a dial indicator.

SERVICE LIMIT: 0.10 mm (0.004 in)

Check the wheel bearings for excessive play, if the warpage exceeds the service limit. Replace the brake disc if the wheel bearings are normal.

FRONT MASTER CYLINDER

REMOVAL

Drain the brake fluid from the hydraulic system (page 14-6).

Remove the right rearview mirror with the rearview mirror adapter.

Disconnect the brake light switch connectors.

When removing the oil bolt, cover the end of the brake hose to prevent contamination.

Remove the oil bolt, sealing washers and brake hose eyelet.

Remove the bolts, holder and master cylinder.

DISASSEMBLY

Remove the brake lever pivot nut, bolt and brake lever.
Remove the screw and brake light switch.

Remove the boot from the master cylinder.

Remove the snap ring using the special tool.

**TOOL:**
Snap ring pliers 07914-SA50001

Remove the master piston and spring from the master cylinder.

Clean the master cylinder, reservoir and master piston in clean brake fluid.

*Be sure that each part is free from dust or dirt before reassembly.*
BRAKE SYSTEM

INSPECTION

Check the piston cups for wear, deterioration or damage.

Check the spring for fatigue or damage.

Check the master cylinder inner surface and master piston outer surface for scratches or damage.

Measure the master cylinder I.D.

SERVICE LIMIT: 12.755 mm (0.5022 in)

Measure the master piston O.D.

SERVICE LIMIT: 12.645 mm (0.4978 in)
Keep the piston, cups, spring, snap ring and boot as a set, do not substitute individual parts.

Coat the master piston, spring, and piston cups with clean brake fluid.

Install the spring with its tapered side facing the master piston.

Install the master piston/spring into the master cylinder.

- Do not allow the piston cup lips to turn inside out.

Be certain the snap ring is firmly seated in the groove.

Install the snap ring into the groove in the master cylinder using the special tool.

**TOOL:**
Snap ring pliers 07914-SA50001
Install the boot securely.

Install the brake light switch by aligning its boss with the hole of the master cylinder.

Install and tighten the brake light switch screw to the specified torque.

TORQUE: 12 N·m (0.1 kgf·m, 0.9 lbf·ft)

Apply silicone grease to the brake lever contacting area of the master piston and brake lever pivot bolt sliding surface.

Install the brake lever to the master cylinder. Install and tighten the pivot bolt to the specified torque.

TORQUE: 1.0 N·m (0.1 kgf·m, 0.7 lbf·ft)

Install and tighten the pivot nut to the specified torque while holding the pivot bolt.

TORQUE: 6.0 N·m (0.6 kgf·m, 4.4 lbf·ft)
BRAKE SYSTEM

INSTALLATION

Install the master cylinder and holder with the "UP" mark facing up.

Loosely install the bolts while aligning the end of the master cylinder with the punch mark on the handlebar.

Tighten the upper bolt first, then tighten the lower bolt to the specified torque.

TORQUE: 9 N·m (0.9 kgf-m, 6.6 lbf-ft)

Push the brake hose joint against the stopper of the lower side.

Install the brake hose to the master cylinder with the oil bolt and new sealing washers.

Tighten the oil bolt to the specified torque.

TORQUE: 34 N·m (3.5 kgf-m, 25 lbf-ft)

Connect the brake light switch connectors.

Fill and bleed the hydraulic brake system with brake fluid (page 14-7).

Install the right rearview mirror (page 2-19).

FRONT BRAKE CALIPER

NOTICE

Spilled fluid can damage painted, plastic, or rubber parts. Place a shop towel over these parts whenever the system is serviced.

NOTE:

When removing the brake hose oil bolt, cover the end of the hose to prevent contamination. Secure the hose to prevent fluid from leaking out.

REMOVAL

Drain the brake fluid from the hydraulic brake system (page 14-6).

Remove the brake pads (page 14-8).

Remove the oil bolt, sealing washers and disconnect the brake hose from the brake caliper.
BRAKE SYSTEM

Do not reuse the brake caliper mounting bolts.

Remove the brake caliper mounting bolts and brake caliper.

DISASSEMBLY

Remove the caliper bracket from the caliper body.

Remove the caliper pin boot from the caliper bracket.

Remove the pad spring and pin boot from the caliper body.

Place a shop towel over the caliper pistons.

Position the caliper body with the piston down, and apply short bursts of air pressure to the fluid inlet to remove the caliper pistons.

Remove the dust and piston seals from the brake caliper.

Clean the seal grooves, caliper piston sliding surfaces and caliper pistons with clean brake fluid.

- Mark the pistons to ensure that they are reinstall in their original locations.
INSPECTION
Check the caliper cylinder for scoring, scratches or damage.
Measure the caliper cylinder I.D.
SERVICE LIMIT: 25.460 mm (1.0024 in)

Check the caliper piston for scoring, scratches or damage.
Measure the caliper piston O.D.
SERVICE LIMIT: 25.310 mm (0.9965 in)

ASSEMBLY

CALIPER PIN BOOT

PISTON SEAL

DUST SEAL

CALIPER PISTON

5.4 N·m (0.6 kgf·m, 4 lbf·ft)

CALIPER BODY

PAD PIN
17 N·m (1.7 kgf·m, 13 lbf·ft)

PAD SPRING

BRAKE CALIPER SLIDE PIN
22 N·m (2.2 kgf·m, 16 lbf·ft)

CALIPER BRACKET

BRAKE PADS
NOTE:
• Be sure that each part is free from the dust or dirt before disassembly.

Coat new piston seal whole surface with clean brake fluid.
Coat new dust seal whole surface with silicone grease.
Install the piston seals and dust seals into the seal grooves in the caliper cylinder.
Coat the caliper piston outer surface with clean brake fluid and install them into their original locations with the opening sides toward the pads.

Install the pad spring onto the caliper body.
Replace the bracket pin boots with new ones if they are wear, deterioration or damage.
Apply silicone grease to the inside of the brake caliper pin boots, and install them into the caliper body.
Install the caliper bracket into the caliper body.

INSTALLATION
Be careful not to damage the pads.
Install the brake caliper to the right fork leg so that the disc is positioned between the pads.
Install and tighten new brake caliper mounting bolts to the specified torque.
TORQUE: 30 N·m (3.1 kgf·m, 22 lbf·ft)

Install the brake hose to the brake caliper with the oil bolt and new sealing washers.
Rest the hose joint onto the stoppers, and tighten the oil bolt to the specified torque.
TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)
Install the brake pads (page 14-8)
Fill and bleed the hydraulic system with brake fluid (page 14-7).
BRAKE PEDAL

REMOVAL

Support the motorcycle on its center stand.
Remove the rear brake adjusting nut.
Push the brake pedal down, and remove the brake rod from the joint pin.
Remove the rod spring and joint pin.

Unhook the brake pedal return spring.

Unhook the brake light switch spring from the brake pedal.

Remove the pivot nut, bolt and right step bracket.
BRAKE SYSTEM

Remove the bolt and brake arm from the brake pedal.
Remove the brake pedal from the right step bracket.

Remove the cotter pin, joint pin and brake rod.

INSTALLATION
Install the brake rod to the brake arm, then install the joint pin by aligning the cut-outs of the joint pin and brake rod.
Install a new cotter pin to the joint pin hole securely.

Apply 3 g (0.1 oz) of grease to the brake pedal pivot sliding surface.
Install the brake pedal to the right step bracket.
Install the brake arm to the brake pedal while aligning the punch marks of the brake arm and brake pedal.
Install and tighten the bolt securely.

Install the right step bracket and bolt. Loosely install the pivot nut.

Hook the brake light switch spring to the brake pedal.

Hook the return spring.
BRAKE SYSTEM

Install the joint pin to the brake arm.
Install the rod spring to the brake rod.
Push down the brake pedal, and insert the brake rod into the joint pin.
Install the adjusting nut.
Adjust the brake pedal freeplay (page 3-21).

Retract the center stand and support the motorcycle as be preload to the shock absorber and swingarm pivot bushings.
Tighten the pivot nut to the specified torque.
TORQUE: 54 N m (5.5 kgf m, 40 lbf ft)

REAR DRUM BRAKE

INSPECTION
Remove the rear wheel and then remove the brake panel (page 13-6).
Measure the rear brake drum I.D.
SERVICE LIMIT: 131.0 mm (5.16 in)

DISASSEMBLY
Expand the brake shoes and remove them from the brake panel.
Remove the shoe springs from the brake shoes.

NOTE:
• Always replace the brake shoes as a set.
• When the brake shoes are reused, mark all parts before disassembly so they can be installed in their original locations.
Remove the brake arm nut, bolt and brake arm.

Remove the indicator plate.

Remove the felt seal and brake cam.
Apply grease to the brake cam sliding surface.
Install the brake cam to the brake panel.
Apply engine oil to a new felt seal and install it onto the brake panel.

Install the indicator plate onto the brake cam by aligning its wide tooth with the wide groove on the brake cam.
Install the brake arm by aligning the punch marks of the brake arm and brake cam.

Install the brake arm bolt and nut as shown, and tighten the nut to the specified torque.

**TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)**

Apply 0.20 - 0.30 g (0.007 - 0.010 oz) of grease to the following:

- Brake cam sliding surface and shoe contacting area
- Brake panel anchor pin sliding surface

Assemble the brake shoes and springs.

Install the shoe assembly onto the brake panel.

Wipe any excess grease off the brake cam and anchor pin.

Install the brake panel and then install the rear wheel (page 13-11).
BATTERY/CHARGING SYSTEM

SYSTEM LOCATION

ALTERNATOR
BATTERY
REGULATOR/RECTIFIER
MAIN FUSE (15 A)

SYSTEM DIAGRAM

15 A
MAIN FUSE
R/W

BATTERY
REGULATOR/RECTIFIER

4P (Bl)
G

ALTERNATOR

Bl : Black
G : Green
R : Red
W : White
## General

**WARNING**

- The battery gives off explosive gases; keep sparks, flames and cigarettes away. Provide adequate ventilation when charging.
- The battery contains sulfuric acid (electrolyte). Contact with skin or eyes may cause severe burns. Wear protective clothing and a face shield.
  - If electrolyte gets on your skin, flush with water.
  - If electrolyte gets in your eyes, flush with water for at least 15 minutes and call a physician immediately.
- Electrolyte is poisonous.
  - If swallowed, drink large quantities of water or milk and call your local Poison Control Center or a physician immediately.

**NOTICE**

- Always turn OFF the ignition switch before disconnecting any electrical component.
- Some electrical components may be damaged if terminals or connectors are connected or disconnected by the ignition switch is ON, and current is present.
- This model comes with a maintenance free (MF) battery. Remember the following about MF batteries:
  - Use only the electrolyte that comes with the battery.
  - Use all of the electrolyte.
  - Seal the battery properly.
  - Never open the seals after installation.
- For extended storage, remove the battery, give it a full charge, and store it in a cool, dry space. For maximum service life, charge the stored battery every two weeks.
- For a battery remaining in a stored motorcycle, disconnect the negative battery cable from the battery terminal.
- The maintenance free (MF) battery must be replaced when it reaches the end of its service life.
- The battery can be damaged if overcharged or undercharged, or if left to discharge for a long period. These same conditions contribute to shortening the "life span" of the battery. Even under normal use, the performance of the battery deteriorates after 2 – 3 years.
- Battery voltage may recover after battery charging, but under heavy load, battery voltage will drop quickly and eventually die out. For this reason, the charging system is often suspected as the problem. Battery overcharge often results from problems in the battery itself, which may appear to be an overcharging symptom. If one of the battery cells is shorted and battery voltage does not increase, the regulator/rectifier supplies excess voltage to the battery. Under these conditions, the electrolyte level goes down quickly.
- Before troubleshooting the charging system, check for proper use and maintenance of the battery. Check if the battery is frequently under heavy load, such as having the headlight and tail light ON for long periods of time without riding the motorcycle.
- The battery will self-discharge when the motorcycle is not in use. For this reason, charge the battery every 2 weeks to prevent sulfation from occurring.
- When checking the charging system, always follow the steps in the troubleshooting flow chart (page 15-5).
- For stator removal (page 10-11).

### Battery Charging

- Turn power ON/OFF at the charger, not at the battery terminal.
- 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.
- Quick charging should only be done in an emergency; slow charging is preferred.

### Battery Testing

Refer to the instruction in the Operation Manual for the recommended battery tester for details about battery testing. The recommended battery tester puts a "load" on the battery so that the actual battery condition can be measured.

**Recommended battery tester:** BM-210 or BATTERY MATE or equivalent
## BATTERY/CHARGING SYSTEM

### SPECIFICATIONS

<table>
<thead>
<tr>
<th>ITEM</th>
<th>SPECIFICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Battery</td>
<td></td>
</tr>
<tr>
<td>Capacity</td>
<td>12 V - 6 Ah</td>
</tr>
<tr>
<td>Current leakage</td>
<td>0.1 mA max.</td>
</tr>
<tr>
<td>Voltage (20°C/68°F)</td>
<td></td>
</tr>
<tr>
<td>Fully charged</td>
<td>12.7 - 12.9 V</td>
</tr>
<tr>
<td>Needs charging</td>
<td>Below 12.4 V</td>
</tr>
<tr>
<td>Charging current</td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td>0.6 A x 5 - 10 h</td>
</tr>
<tr>
<td>Quick</td>
<td>3.0 A x 1 h</td>
</tr>
<tr>
<td>Alternator</td>
<td></td>
</tr>
<tr>
<td>Capacity</td>
<td>0.170 kW/5,000 min(^{-1}) (rpm)</td>
</tr>
<tr>
<td>Charging coil resistance (20°C/68°F)</td>
<td>0.2 - 1.0 Ω</td>
</tr>
</tbody>
</table>
TROUBLESHOOTING

BATTERY IS DAMAGED OR WEAK

1. BATTERY TEST
   Remove the battery (page 15-7).
   Check the battery condition using the recommended battery tester.
   **RECOMMENDED BATTERY TESTER:**
   BM-210 or BATTERY MATE or equivalent
   *Is the battery in good condition?*
   **YES** - GO TO STEP 2.
   **NO** - Faulty battery

2. FUSE INSPECTION
   Check the main fuse (15 A) for blown.
   *Is the main fuse good condition?*
   **YES** - GO TO STEP 3.
   **NO** - Replace a main fuse.

3. CURRENT LEAKAGE TEST
   Install the battery (page 15-7).
   Check the battery current leakage (Leak test; page 15-8).
   *Is the current leakage below 0.1 mA?*
   **YES** - GO TO STEP 5.
   **NO** - GO TO STEP 4.

4. CURRENT LEAKAGE TEST WITHOUT REGULATOR/RECTIFIER CONNECTOR
   Disconnect the regulator/rectifier connector, and recheck the battery current leakage.
   *Is the current leakage below 0.1 mA?*
   **YES** - Faulty regulator/rectifier
   **NO** - • Shorted wire harness
           • Faulty ignition switch

5. ALTERNATOR CHARGING COIL INSPECTION
   Check the alternator charging coil (page 15-9).
   *Is the alternator charging coil resistance within 0.2 – 1.0 Ω (20°C/68°F)?*
   **YES** - GO TO STEP 6.
   **NO** - Faulty charging coil

6. CHARGING VOLTAGE INSPECTION
   Measure and record the battery voltage using a digital multimeter (page 15-7).
   Start the engine and measure the charging voltage (page 15-8).
   Compare the measurements to the results of the following calculation.
   **STANDARD:**
   Measured BV < Measured CV < 15.5 V
   • BV = Battery Voltage (page 15-7)
   • CV = Charging Voltage (page 15-8)
   *Is the measured charging voltage within the standard voltage?*
   **YES** - Faulty battery
   **NO** - GO TO STEP 7.
7. REGULATOR/RECTIFIER SYSTEM INSPECTION

Check the voltage and resistance at the regulator/rectifier connector (page 15-9).

Are the results of the checked voltage and resistance correct?

YES  – Faulty regulator/rectifier

NO   – • Open circuit in related wire
       – • Loose or poor contacts of related terminal
       – • Shorted wire harness
**BATTERY**

**REMOVAL/INSTALLATION**

- Always turn the ignition switch OFF before removing the battery.
- Remove the seat (page 2-11).
- Remove the bolts and battery holder.
- Remove the bolt and disconnect the battery negative (-) cable from the battery.
- Remove the bolt and disconnect the battery positive (+) cable from the battery.
- Remove the battery from the rear fender.
- Install the battery in the reverse order of removal.
  - Connect the positive (+) cable first and then the negative (-) cable.

**ROUTE THE BATTERY CABLE PROPERLY (PAGE 1-16).**

**VOLTAGE INSPECTION**

- Remove the seat (page 2-11).
- Measure the battery voltage using a commercially available digital multimeter.

**VOLTAGE (20°C/68°F):**

- Fully charged: 12.7 - 12.9 V
- Under charged: Below 12.4 V

If the battery voltage is below 12.4 V, charge the battery.

**BATTERY TESTING**

- Refer to the instructions that are appropriate to the battery testing equipment available to you.

**TOOL:**
- Battery tester
- BM-210 or BATTERY MATE or equivalent
BATTERY/CHARGING SYSTEM

CHARGING SYSTEM INSPECTION

CURRENT LEAKAGE INSPECTION

Remove the seat (page 2-11).

Turn the ignition switch OFF and disconnect the negative (-) cable from the battery.

Connect the ammeter (+) probe to the battery negative (-) cable and ammeter (-) probe to the battery negative (-) terminal.

With the ignition switch OFF and check for current leakage.

• When measuring current using a tester, set it to a high range, and then bring the range down to an appropriate level. Current flow higher than the range selected may blow out the fuse in the tester.

• While measuring current, do not turn the ignition switch ON. A sudden surge of current may blow out the fuse in the tester.

SPECIFIED CURRENT LEAKAGE: 0.1 mA max.

If current leakage exceeds the specified value, a shorted circuit is likely.

Locate the shorted circuit by disconnecting connections one by one and measuring the current.

CHARGING VOLTAGE INSPECTION

Remove the seat (page 2-11).

Be sure the battery is in good condition before performing this test.

Warm up the engine to normal operating temperature.

Stop the engine, and connect the multimeter between the battery positive (+) and negative (-) terminals of the battery.

• To prevent a short, make absolutely certain which are the positive (+) and negative (-) terminals or cables.

• Do not disconnect the battery or any cable in the charging system without first turning the ignition switch OFF. Failure to follow this precaution can damage the tester or electrical components.

Connect a tachometer according to the tachometer manufacturer's instructions.

Restart the engine.

With the headlight on high beam, measure the voltage on the multimeter when the engine runs at 5,000 min⁻¹ (rpm).

STANDARD:

Measured BV < Measured CV < 15.5 V

• BV = Battery Voltage (page 15-7)

• CV = Charging voltage
ALTERNATOR CHARGING COIL

INSPECTION
Remove the left side cover (page 2-10).
Disconnect the alternator 2P (Natural) connector.

Measure the resistance between each wire terminal of the alternator side connector.

**CONNECTION: White - Green**

**STANDARD:** 0.2 - 1.0 Ω (20°C/68°F)

If reading is for beyond the standard, replace the stator.
For stator removal (page 10-11).

REGULATOR/RECTIFIER

SYSTEM INSPECTION
Remove the rear cowl (page 2-13).
Disconnect the regulator/rectifier 4P (Black) connector, and check it for loose contact or corroded terminals.

If the charging voltage reading (page 15-8) is out of the specification, measure and check the following between the wire harness side connector terminal and ground:

<table>
<thead>
<tr>
<th>Item</th>
<th>Terminal</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Battery charging line</td>
<td>Red (+) and ground (-)</td>
<td>Battery voltage should appear</td>
</tr>
<tr>
<td>Charging coil line</td>
<td>White and ground</td>
<td>0.2 - 1.0 Ω (20°C/68°F)</td>
</tr>
<tr>
<td>Ground line</td>
<td>Green and ground</td>
<td>Continuity should exist</td>
</tr>
</tbody>
</table>

If all components of the charging system are normal and there are no loose connection at the regulator/rectifier connector, replace the regulator/rectifier.
BATTERY/CHARGING SYSTEM

REMOVAL/INSTALLATION

Remove the rear cowl (page 2-13).

Disconnect the regulator/rectifier 4P (Black) connector.

Remove the bolt and regulator/rectifier from the frame.

Install the regulator/rectifier in the reverse order of removal.

- Route the wire and cable properly (page 1-16).
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>SYSTEM LOCATION</td>
<td>16-2</td>
</tr>
<tr>
<td>SYSTEM DIAGRAM</td>
<td>16-2</td>
</tr>
<tr>
<td>SERVICE INFORMATION</td>
<td>16-3</td>
</tr>
<tr>
<td>TROUBLESHOOTING</td>
<td>16-4</td>
</tr>
<tr>
<td>IGNITION SYSTEM INSPECTION</td>
<td>16-5</td>
</tr>
<tr>
<td>IGNITION TIMING</td>
<td>16-8</td>
</tr>
<tr>
<td>IGNITION COIL</td>
<td>16-9</td>
</tr>
</tbody>
</table>
GENERAL

NOTICE

- The ECM may be damaged if dropped. Also if the connector is disconnected when current is flowing, the excessive voltage may damage the ECM. Always turn OFF the ignition switch before servicing.
- Use spark plug of the correct heat range. Using spark plug with an incorrect heat range can damage the engine.
- Some electrical components may be damaged if terminals or connectors are connected or disconnected while the ignition switch is turned ON and current is present.
- When servicing the ignition system, always follow the steps in the troubleshooting sequence (page 16-4).
- This motorcycle's ICM is built into the ECM.
- The ignition timing cannot be adjusted since the ECM is factory preset.
- A faulty ignition system is often related to poor connected or corroded connectors. Check those connections before proceeding. Make sure the battery is adequately charged. Using the starter motor with a weak battery results in a slower engine cranking speed as well as no spark at the spark plug.
- Although the ECM is controlling ignition timing according to engine speed fundamentally, ignition timing is assisted also with the signal from the TP sensor and ECT sensor.
- The following components information:
  - Ignition switch (page 18-9)
  - Sidestand switch (page 18-13)
  - Bank angle sensor (page 5-65)
  - Clutch switch (page 18-12)
  - Neutral switch (page 18-13)
  - Diode (page 17-16)

SPECIFICATIONS

<table>
<thead>
<tr>
<th>ITEM</th>
<th>SPECIFICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spark plug Standard</td>
<td>CPR7EA-9 (NGK) or UR6DC (BOSCH)</td>
</tr>
<tr>
<td>For extended high speed riding</td>
<td>CPR8EA-9 (NGK) or UR5DC (BOSCH)</td>
</tr>
<tr>
<td>Spark plug gap</td>
<td>0.8 - 0.9 mm (0.03 - 0.04 in)</td>
</tr>
<tr>
<td>Ignition coil primary peak voltage</td>
<td>100 V minimum</td>
</tr>
<tr>
<td>CKP sensor peak voltage</td>
<td>0.7 V minimum</td>
</tr>
<tr>
<td>Ignition timing (°F mark)</td>
<td>10° BTDC at 1,500 min¹ (rpm)</td>
</tr>
</tbody>
</table>

TORQUE VALUE

Timing hole cap 10 N-m (1.0 kgf-m, 7 lbf-ft)

TOOLS

- Imrie diagnostic tester (model 625) or Peak voltage adaptor 07HGJ-0020100
- ECM test harness 33P 070MZ-MCA0100
- Test probe 07ZAJ-RDJA110
- with commercially available digital multimeter (impedance 10 MΩ/DCV minimum)
IGNITION SYSTEM

TROUBLESHOOTING

- Inspect the following before diagnosing the system.
  - Faulty spark plug
  - Loose spark plug cap or spark plug wire connection
  - Water got into the spark plug cap (Leaking the ignition coil secondary voltage)
- If there is no spark at cylinder, temporarily exchange the ignition coil with a known-good one and perform the spark test. If there is spark, the original ignition coil is faulty.
- "Initial voltage" of the ignition primary coil is the battery voltage with the ignition switch turned ON (The engine is not cranked by the starter motor).

No spark at spark plug

<table>
<thead>
<tr>
<th>Unusual condition</th>
<th>Probable cause (Check in numerical order)</th>
</tr>
</thead>
</table>
| Ignition coil primary voltage | 1. Faulty ignition switch  
2. An open circuit in Black/blue and/or Red/black wires between the ignition coil and ignition switch  
3. Loose or poor connection of the ignition coil primary wire terminal, or an open circuit in the primary coil  
4. Faulty ECM (in case when the initial voltage is normal while disconnecting ECM connector). |
| Initial voltage is normal, but it drops down to 2 – 4 V while cranking the engine. | 1. Incorrect peak voltage adaptor connections (System is normal if measured voltage is over the specifications with reverse connections)  
2. Battery is undercharged (Voltage drops largely when the engine is started)  
3. No voltage between the Black/blue (+) wire and body ground (-) at the ECM connector or loose ECM connection  
4. An open circuit or loose connection in Green wire at the ECM  
5. An open circuit or loose connection in Black/white wire between the ignition coils and ECM  
6. Faulty sidestand switch or neutral switch  
7. Loose or poor connection or an open circuit in No. 6 related wires  
- Sidestand switch line: Green/white wire  
- Neutral switch line: Light green/red wire  
8. Faulty CKP sensor (measure peak voltage)  
9. Faulty ECM (in case when above No. 1 – 8 are normal). |
| Initial voltage is normal but there is no peak voltage while cranking the engine. | 1. Incorrect peak voltage adaptor connections (System is normal if measured voltage is over the specifications with reverse connections)  
2. Faulty peak voltage adaptor  
3. Faulty CKP sensor  
4. Faulty ECM (in case when above No. 1 – 3 are normal). |
| Initial voltage is normal but peak voltage is lower than the standard value. | 1. The multimeter impedance is too low; below 10 MΩ DCV.  
2. Cranking speed is too slow (Battery is undercharged)  
3. The sampling timing of the tester and measured pulse were not synchronized (System is normal if measured voltage is over the standard voltage at least once)  
4. Faulty ignition coil  
5. Faulty ECM (in case when above No. 1 – 4 are normal). |
| Initial and peak voltages are normal but does not spark. | 1. Faulty spark plug or leaking ignition coil secondary current ampere  
2. Faulty ignition coil |
| CKP sensor Peak voltage is lower than the standard value. | 1. The multimeter impedance is too low; below 10 MΩ DCV.  
2. Cranking speed is too low (Battery is undercharged)  
3. The sampling timing of the tester and measured pulse were not synchronized (System is normal if measured voltage is over the standard voltage at least once)  
4. Faulty CKP sensor (in case when above No. 1 – 3 are normal). |
| No peak voltage | 1. Faulty peak voltage adapter  
2. Faulty CKP sensor |
IGNITION SYSTEM INSPECTION

- If there is no spark at the plug, check all connections for loose or poor contact before measuring the peak voltage.
- Use a commercially available digital multimeter with an impedance of 10 MΩ/DCV minimum.
- The display value differs depending upon the internal impedance of the multimeter.
- If the Imrie diagnostic tester (model 625) is used, follow the manufacturer’s instructions.

Connect the peak voltage adaptor to the digital multimeter, or use the Imrie diagnostic tester.

TOOLS:
Imrie diagnostic tester (model 625) or
Peak voltage adaptor 07HGJ-0020100
with commercially available digital multimeter (impedance 10 MΩ/DCV minimum)

IGNITION COIL PRIMARY PEAK VOLTAGE

- Check all system connections before performing this inspection. If the system is disconnected, incorrect peak voltage might be measured.
- Check the cylinder compression, and check that the spark plug is installed correctly in the cylinder head.

Disconnect the spark plug cap from the spark plug.
Connect a known-good spark plug to the spark plug cap and ground it to the cylinder head as done in a spark test.

Remove the fuel tank (page 5-53).
Retract the sidestand and shift the transmission into neutral.
Turn the ignition switch ON.
Measure the voltage between the Black/blue (+) wire terminal at the ignition coil and ground (-).
If the battery voltage appears only when the ignition switch is ON, the ignition coil input voltage is normal.
With the ignition coil primary wire connected, connect the peak voltage adaptor or tester probes to the ignition coil primary terminal and ground.

**TOOLS:**
- Imrie diagnostic tester (model 625) or Peak voltage adaptor 07HGJ-0020100 with commercially available digital multimeter (impedance 10 MΩ/DCV minimum)

**CONNECTION:** Black/white (+) – Ground

Avoid touching the tester probes to prevent electric shock.

Crank the engine with the starter switch, and measure the ignition coil primary peak voltage.

**PEAK VOLTAGE:** 100 V minimum

If the peak voltage is abnormal, follow the checks described in the troubleshooting chart (page 16-4).

Install the removed parts in the reverse order of removal.

---

**IGNITION SYSTEM**

**IGNITION COIL**

**CKP SENSOR PEAK VOLTAGE**

**USING THE TEST PROBE**

- Check all system connections before performing this inspection. If the system is disconnected, incorrect peak voltage might be measured.
- Check the cylinder compression, and make sure that the spark plug is installed correctly in the cylinder head.

Remove the left side cover (page 2-10).

Support the motorcycle on its center stand.

Disconnect the ECM 33P (Black) connector.

Connect the peak voltage adaptor or tester probes to the terminals of the wire harness side ECM 33P connector.

**TOOLS:**
- Test probe 07ZAJ-RDJA110
- Imrie diagnostic tester (model 625) or Peak voltage adaptor 07HGJ-0020100 with commercially available digital multimeter (impedance 10 MΩ/DCV minimum)

**CONNECTION:** Blue/yellow – White/yellow

Avoid touching the tester probes to prevent electric shock.

Crank the engine with the kickstarter, and measure the CKP sensor peak voltage.

**PEAK VOLTAGE:** 0.7 V minimum

If the peak voltage measured at the ECM 33P connector is abnormal, measure the peak voltage at the CKP sensor connector.
IGNITION SYSTEM

Remove the left side cover (page 2-10).

Disconnect the CKP sensor connectors and connect the tester or adaptor probes to the CKP sensor side connector terminals.

**CONNECTION:** Blue/yellow – White/yellow

In the same manner as at the ECM 33P connector, measure the peak voltage and compare it to the voltage measured at the CKP sensor connectors.

- If the peak voltage measured at the ECM 33P connector is abnormal and the one measured at the CKP sensor is normal, the wire harness has an open or short circuit, or loose connection.
- If both peak voltages are abnormal, follow the checks described in the troubleshooting chart (page 16-4).
- If all items are normal, the CKP sensor is faulty.

For CKP sensor replacement (page 10-11).

Install the removed parts in the reverse order of removal.

**USING THE TEST HARNESS**

- Check all system connections before performing this inspection. If the system is disconnected, incorrect peak voltage might be measured.
- Check the cylinder compression, and make sure that the spark plug is installed correctly in the cylinder head.

Support the motorcycle on its center stand.

Connect the test harness to the ECM 33P (Black) connector (page 5-13).

Connect the peak voltage adaptor or tester probes to the terminals of the test harness.

**TOOLS:**
- ECM test harness 070MZ-MCA0100
- Imrie diagnostic tester (model 625) or
- Peak voltage adaptor 07HGJ-0020100 with commercially available digital multimeter (impedance 10 MΩ/DCV minimum)

**CONNECTION:** 12 – 23

Retract the sidestand and shift the transmission into neutral.

Turn the ignition switch ON.

Crank the engine with the kickstarter, and measure the CKP sensor peak voltage.

**PEAK VOLTAGE:** 0.7 V minimum

If the peak voltage measured at the test harness is abnormal, measure the peak voltage at the CKP sensor connector.
IGNITION SYSTEM

Remove the left side cover (page 2-10).

Disconnect the CKP sensor connectors and connect the tester or adaptor probes to the CKP sensor side connector terminals.

**CONNECTION: Blue/yellow – White/yellow**

In the same manner as at the test harness, measure the peak voltage and compare it to the voltage measured at the CKP sensor connectors.

- If the peak voltage measured at the test harness is abnormal and the one measured at the CKP sensor is normal, the wire harness has an open or short circuit, or loose connection.
- If both peak voltages are abnormal, follow the checks described in the troubleshooting chart (page 16-4).
- If all items are normal, the CKP sensor is faulty.

For CKP sensor replacement (page 10-11).

Install the removed parts in the reverse order of removal.

IGNITION TIMING

Warm up the engine.

Stop the engine, and remove the timing hole cap.

Connect a timing light to the spark plug wire.

Connect a tachometer according to the tachometer manufacturer's instructions.

Start the engine, and hold it at idle speed while pointing the timing light towards the flywheel.

**IDLE SPEED: 1,500 ± 100 mm/s (rpm)**

The ignition timing is correct if the "F" mark on the flywheel aligns with the index notch in the left crankcase cover.
Apply engine oil to a new O-ring, and install it to the timing hole cap.
Install and tighten the timing hole cap to the specified torque.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)

IGNITION COIL

REMOVAL/INSTALLATION

Remove the fuel tank (page 5-53). Disconnect the spark plug cap (page 3-7).
Disconnect the connectors from the ignition coil. Remove the bolts, spacers and ignition coil.
Installation is in the reverse order of removal.
• Route the wires properly (page 1-16).
ELECTRIC STARTER

SYSTEM LOCATION

IGNITION SWITCH
CLUTCH SWITCH
DIODE
MAIN FUSE (15 A)
SUB FUSE B (10 A)
BATTERY
STARTER RELAY SWITCH
STARTER MOTOR
NEUTRAL SWITCH
SIDE STAND SWITCH
STARTER SWITCH

SYSTEM DIAGRAM

IGNITION SWITCH
SUB FUSE B
BATTERY
STARTER MOTOR
SIDE STAND SWITCH
CLUTCH SWITCH
DIODE
NEUTRAL SWITCH
MAIN FUSE (15 A)
STARTER RELAY SWITCH
STARTER SWITCH

17-2
SERVICE INFORMATION

GENERAL

NOTICE

If the current is kept flowing through the starter motor to turn it while the engine is not cranking over, the starter motor may be damaged.

• The starter motor can be serviced with the engine installed in the frame.
• Always turn the ignition switch OFF before servicing the starter motor. The motor could suddenly start, causing serious injury.
• A weak battery may be unable to turn the starter motor quickly enough, or supply adequate ignition current.
• When servicing the starter system, always follow the steps in the troubleshooting flow chart (page 17-4).
• Refer to the following components information:
  - Ignition switch (page 18-9)
  - Starter switch (page 18-10)
  - Neutral switch (page 18-13)
  - Sidestand switch (page 18-13)
  - Clutch switch (page 18-12)

SPECIFICATION

<table>
<thead>
<tr>
<th>ITEM</th>
<th>STANDARD</th>
<th>SERVICE LIMIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Starter motor brush length</td>
<td>10.000 - 10.050 (0.3937 - 0.3957)</td>
<td>-</td>
</tr>
</tbody>
</table>

TORQUE VALUE

Starter motor case bolt 4.9 N-m (0.5 kgf-m, 3.6 lbf-ft)
ELECTRIC STARTER

TROUBLESHOOTING

Starter motor does not turn

1. Fuse Inspection
   Check for blown main fuse (15 A) or sub fuse B (10 A).
   Is the fuse blown?
   YES – Replace the fuse.
   NO – GO TO STEP 2.

2. Battery Inspection
   Make sure the battery is fully charged and in good condition (page 15-7).
   Is the battery in good condition?
   YES – GO TO STEP 3.
   NO – Charge or replace the battery.

3. Starter Relay Switch Operation
   Check the starter relay switch operation.
   You should hear the relay “CLICK” when the starter switch button is depressed.
   Is there a “CLICK”?
   YES – GO TO STEP 4.
   NO – GO TO STEP 5.

4. Starter Motor Inspection
   Apply battery voltage directly to the starter motor and check the operation.
   Is the starter motor turn?
   YES –
   • Loose or poorly contacted starter motor cable.
   • Inspect starter relay switch (page 17-14).
   NO – Faulty starter motor (page 17-6)

5. Starter Relay Coil Ground Lines Inspection
   Disconnect the starter relay switch connector, and check the relay coil ground line as below for continuity:
   1. Green/red terminal – diode – neutral switch line (with the transmission in neutral and clutch lever released).
   2. Green/red terminal – clutch switch – sidestand switch line (in any gear except neutral, and with the clutch lever pulled in and sidestand up).
   Is there continuity?
   YES – GO TO STEP 6.
   NO –
   • Loose or poor contact connector
   • Open circuit in wire harness
   • Faulty starter switch (page 18-10)
   • Faulty sidestand switch (page 18-13)
   • Faulty diode (page 17-16)
   • Faulty clutch switch (page 18-12)
   • Faulty neutral switch (page 18-13)

6. Starter Relay Input Voltage Inspection
   Connect the starter relay switch connector.
   With the ignition switch ON, measure the voltage at the starter relay switch connector (between Yellow/red (+) and ground (-)).
   Is there battery voltage?
   YES – GO TO STEP 7.
   NO –
   • Faulty ignition switch (page 18-9)
   • Faulty starter switch (page 18-10)
   • Loose or poor contact connector
   • Open circuit in wire harness
7. Starter Relay Switch Continuity Inspection

Remove and check the starter relay switch for continuity (page 17-15).

*Is there continuity?*

**YES** – Loose or poor contact starter relay switch connector

**NO** – Faulty starter relay switch

The starter motor turns when the transmission is in neutral, but does not turn with the transmission in any position except neutral, with the sidestand up and the clutch lever pulled in.

1. Clutch Switch Inspection

Check the clutch switch operation (page 18-12).

*Is the clutch switch operation normal?*

**YES** – GO TO STEP 2.

**NO** – Faulty clutch switch

2. Sidestand Switch Inspection

Check the sidestand switch operation (page 3-23).

*Is the sidestand switch operation normal?*

**YES** –
- Open circuit in wire harness
- Loose or poor contact connector

**NO** – Faulty sidestand switch

Starter motor turns slowly
- Low battery voltage
- Poorly connected battery cables
- Poorly connected starter motor cable
- Faulty starter motor

Starter motor turns, but engine does not turn
- Starter motor is running backwards
  - Case assembled improperly
  - Terminals connected improperly
- Faulty starter clutch
- Damaged or faulty starter idle gear or shaft
- Damaged or faulty starter reduction gear

Starter relay switch "CLICK", but engine does not turn over
- Crankshaft does not turn due to engine problems
ELECTRIC STARTER

STARTER MOTOR

REMOVAL

• With the ignition switch OFF, disconnect the negative (−) cable at the battery before servicing the starter motor.

Release the rubber cap.
Remove the starter motor terminal nut and starter motor cable.
Remove the bolts and ground cable.

Pull the starter motor out from the left crankcase.
Remove the O-ring.

DISASSEMBLY/INSPECTION

Remove the starter motor case bolts and O-rings.
Record the location and number of shims.
Remove the front cover, shims, insulator and seal ring.
Remove the lock washer from the front cover.

Remove the rear cover, shims and seal ring.
Remove the armature from the motor case.

Remove the brushes and springs from the brush holder.

Check the oil seal of the front cover for deterioration or damage.
Check the needle bearing for wear or damage.
Replace the starter motor as an assembly if necessary.
Do not use emery or sandpaper on the commutator.

Clean the metallic debris off between commutator bars.

Check the commutator bars of the armature for discoloration, wear or damage.

Replace the starter motor as an assembly if necessary.

Check for continuity between pair of commutator bars.
There should be continuity.

Check for continuity between each individual commutator bar and the armature shaft.
There should be no continuity.

Check for continuity between the positive brush and starter motor cable terminal.
There should be continuity.
Check for continuity between the positive brush and rear cover.
There should be no continuity.
Check for continuity between positive and negative brushes.
There should be no continuity.

Remove the screws, washers, negative brush and brush holder from the rear cover.

Remove the insulator plates from the rear cover.

Remove the following:
- Nut
- Washer
- Insulators
- O-ring
ELECTRIC STARTER

Remove the positive brush and set plate from the rear cover.

Check the brushes for wear or damage.
Measure the brush length.
**STANDARD:** 10.000 – 10.050 mm (0.3937 – 0.3957 in)

Check the bushing of the rear cover for wear or damage.
Replace the starter motor as an assembly if necessary.
Install the set plate and positive brush into the rear cover.

Install a new O-ring, insulators, washer and nut. Tighten the nut securely.
Install the insulator plates onto the rear cover.

Install the brush holder, negative brush, washers and screws into the rear cover as shown. Tighten the screws securely.

Apply engine oil to the needle bearing rotating surface. Apply grease to the oil seal lips.

Install the same number of shims in the same locations as noted during disassembly.

Install the shims onto the armature shaft.
Install the springs and brushes into the brush holder.

Install the armature into the rear cover by holding the brushes into the brush holder.

Install a new seal ring to the motor case.

Install the motor case to the rear cover while align the brush set plate tab with the motor case groove.

- Install the motor case to the rear cover while holding the armature shaft tightly to keep the magnet of the motor case from pulling the armature shaft against it.

**NOTICE**
The coil may be damaged if the magnet pulls the armature against the motor case.

Install the same number of shims in the same locations as noted during disassembly.

Install the shims and insulator.
Install a new seal ring to the motor case.
Install the lock washer to the front cover.
Install the front cover.

- When installing the front cover, take care to prevent damaging the oil seal lip with the armature shaft.

Align the index lines on the front cover and motor case.
Apply engine oil to new O-rings and install them onto the motor case bolts.
Install and tighten the starter motor case bolts to the specified torque.

**TORQUE: 4.9 N m (0.5 kgf m, 3.6 lbf ft)**
INSTALLATION

Apply engine oil to a new O-ring and install it into the starter motor groove.
Install the starter motor into the crankcase from the right side.

Route the cable properly (page 1-16).

Install the ground cable and starter motor mounting bolts.
Tighten the mounting bolts securely.
Install the starter motor cable and starter motor terminal nut.
Tighten the terminal nut securely and reposition rubber cap properly on the starter motor terminal.

STARTER RELAY SWITCH

INSPECTION

Remove the seat (page 2-11).
Shift the transmission into neutral.
Turn the ignition switch ON and push the starter switch.
The coil is normal if the starter relay switch clicks.
If you don’t hear the starter relay switch “CLICK”, inspect the starter relay switch using the procedure below.

INPUT VOLTAGE

Connect the starter relay switch 4P (Red) connector.
Turn the ignition switch ON.
Measure the voltage between the Yellow/red (+) wire terminal at the starter relay switch 4P (Red) connector and ground.
If the battery voltage appears only when the starter switch is pushed with the ignition switch ON, the starter relay input voltage is normal.
GROUND LINE
Turn the ignition switch OFF.
Disconnect the starter relay switch 4P (Red) connector.
Check for continuity between the Green/red wire of the wire harness side (ground line) and ground when the starter switch button is pushed.
If there is continuity when the transmission is in neutral or when the clutch is disengaged and the sidestand is retracted, the ground circuit of the relay coil is normal. (In neutral, there is a slight resistance due to the diode.)

OPERATION CHECK
Remove the starter relay switch (page 17-15).
Connect a fully charged 12 V battery wires to the relay switch Yellow/red wire terminal and Green/red wire terminal.
There should be continuity between the cable terminals when the battery is connected, and not continuity when the battery is disconnected.

REMOVAL/INSTALLATION
Remove the battery holder (page 15-7).
Release the rubber cover.
Disconnect the starter relay switch 4P (Red) connector.
Remove the socket bolts and disconnect the starter and ground cables.
Remove the starter relay switch from the rear fender.
Installation is in the reverse order of removal.
INSPECTION

Remove the diode.

Check for continuity between the diode terminals.
When there is continuity, a small resistance value will register.
If there is continuity in one direction, the diode is normal.
<table>
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<th>Page</th>
</tr>
</thead>
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<tr>
<td>SERVICE INFORMATION</td>
<td>18-3</td>
</tr>
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<td>18-4</td>
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<td>BRAKE/TAIL LIGHT</td>
<td>18-5</td>
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<td>18-5</td>
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<td>COMBINATION METER</td>
<td>18-7</td>
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<td>HANDLEBAR SWITCHES</td>
<td>18-10</td>
</tr>
<tr>
<td>BRAKE LIGHT SWITCH</td>
<td>18-11</td>
</tr>
<tr>
<td>CLUTCH SWITCH</td>
<td>18-12</td>
</tr>
<tr>
<td>SIDESTAND SWITCH</td>
<td>18-13</td>
</tr>
<tr>
<td>NEUTRAL SWITCH</td>
<td>18-13</td>
</tr>
<tr>
<td>FUEL GAUGE/FUEL LEVEL SENSOR</td>
<td>18-16</td>
</tr>
<tr>
<td>HORN</td>
<td>18-18</td>
</tr>
<tr>
<td>TURN SIGNAL RELAY</td>
<td>18-19</td>
</tr>
<tr>
<td>FUSE BOX</td>
<td>18-20</td>
</tr>
</tbody>
</table>
SERVICE INFORMATION

GENERAL

NOTICE

• 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 break.
  - 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.

• A halogen headlight bulb becomes very hot while the headlight is on, and remains hot for a while after it is turned off.
  Be sure to let it cool down before servicing.
• 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 motorcycle.
• The following color codes are used throughout this section.

| Bu = Blue | Y = Yellow | Lg = Light green | R = Red | Lb = Light blue |
| Bl = Black | Gr = Gray | O = Orange | W = White |

SPECIFICATIONS

<table>
<thead>
<tr>
<th>ITEM</th>
<th>SPECIFICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bulbs</td>
<td>Headlight (Hi/Low beam)</td>
</tr>
<tr>
<td></td>
<td>Brake/tail light</td>
</tr>
<tr>
<td></td>
<td>Turn signal light</td>
</tr>
<tr>
<td></td>
<td>Position light</td>
</tr>
<tr>
<td></td>
<td>Instrument light</td>
</tr>
<tr>
<td></td>
<td>Turn signal indicator</td>
</tr>
<tr>
<td></td>
<td>High-beam indicator</td>
</tr>
<tr>
<td></td>
<td>Neutral indicator</td>
</tr>
<tr>
<td></td>
<td>MIL</td>
</tr>
<tr>
<td>Fuse</td>
<td>Main</td>
</tr>
<tr>
<td></td>
<td>Sub</td>
</tr>
<tr>
<td>Fuel level sensor resistance (20°C/68°F)</td>
<td>Full</td>
</tr>
<tr>
<td></td>
<td>Empty</td>
</tr>
</tbody>
</table>

TORQUE VALUE

Fuel level sensor mounting nut | 9 N·m (0.9 kgf·m, 6.6 lbf·ft)
HEADLIGHT BULB REPLACEMENT

Remove the front cowl panels (page 2-5).
Disconnect the headlight connector.
Remove the dust cover.
Unhook the bulb retainer and remove the headlight bulb.

NOTICE
Avoid touching the halogen headlight bulb. Finger points can create hot spots that cause a bulb to break.

If you touch the bulb with your bare hands, clean it with cloth moistened with denatured alcohol to prevent early bulb failure.
Install a new headlight bulb by aligning the tabs of the bulb with the slots of the headlight unit.
Hook the bulb retainer into the headlight unit groove.
Install the dust cover with its "TOP" mark facing up.
Install the front cowl panels (page 2-5).

POSITION LIGHT BULB REPLACEMENT

Pull the position light bulb socket out from the headlight unit.
Remove the position light bulb from the bulb socket.
Install the position light bulb to the bulb socket and install them to the headlight unit.
BRAKE/TAIL LIGHT

- For brake/tail light unit removal/installation (page 2-14)

BULB REPLACEMENT

Remove the screws and tail light lid.
Remove the brake/tail light bulb socket by turning it counterclockwise.
While pushing the bulb in, turn it counterclockwise to remove it and replace the bulb with a new one.
Installation is in the reverse order of removal.

TURN SIGNAL LIGHTS

BULB REPLACEMENT

Remove the screws, turn signal light lens and packing.
While pushing the bulb in, turn it counterclockwise to remove it.
Replace the bulb with a new one.
Check the condition of the rubber seal, replace it if necessary.
Installation is in the reverse order of removal.

REMOVAL/INSTALLATION

FRONT

Remove the front cowl panels (page 2-5).
Disconnect the turn signal light connectors.
Disconnect the headlight/position light/turn signal relay 6P (Black) connector.
Unhook the wire clamps and band.
LIGHTS/METER/SWITCHES

Remove the nut and turn signal light.
Install the turn signal light by aligning the cut-outs of the turn signal light and stay.
Install the removed parts in the reverse order of removal.
• Route the wires properly (page 1-16).

REAR
Remove the rear cowl (page 2-13).
Disconnect the turn signal light connectors.

Remove the bolts and turn signal light stay.
Remove the nuts and turn signal lights.
Install the turn signal light by aligning the cut-out of turn signal light and stay.
Install the removed parts in the reverse order of removal.
• Route the wires properly (page 1-16).

DISASSEMBLY/ASSEMBLY
Remove the screws, turn signal light lens and packing.
While pushing the bulb in, turn it counterclockwise to remove it.
Remove the screw and separate the turn signal light and stay.
Assembly is in the reverse order of disassembly.
COMBINATION METER

BULB REPLACEMENT

Remove the front cowl (page 2-5).
Disconnect the combination meter 4P (Natural) and 6P (Natural) connectors.

Disconnect the speedometer cable.
Removal the nuts, washers and combination meter.
Check the condition of the rubbers, replace it if necessary.

Pull the bulb sockets out from the combination meter.
Remove the bulb from the bulb socket.
Installation is in the reverse order of removal.
• Route the wires properly (page 1-16).

DISASSEMBLY

Pull the bulb sockets out from the combination meter.
Remove the screws and fuel gauge wires.
Remove the screw, clamp and wire harness.
Remove the screw and knob from the speedometer.

Remove the screw/washers from the speedometer.
Remove the screws and disassemble the following:
- Upper case
- Meter case
- Speedometer
- Fuel gauge

Assemble the meter in the reverse order of disassembly.
IGNITION SWITCH

INSPECTION
Remove the left side cover (page 2-10).
Disconnect the ignition switch 3P (Natural) connector.
Check for continuity between the ignition switch connector terminal in each switch position.
Continuity should exist between the color coded wires as follows:

<table>
<thead>
<tr>
<th>Switch Position</th>
<th>Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOCK</td>
<td>R</td>
</tr>
<tr>
<td>OFF</td>
<td>R/BI</td>
</tr>
<tr>
<td>ON</td>
<td>R</td>
</tr>
</tbody>
</table>

IGNITION SWITCH:

3P (NATURAL) CONNECTOR:

REMOVAL/INSTALLATION
Remove the top bridge (page 12-26).
Remove the screws and cover.
Remove the clamp from the harness guide.
Remove the bolts and harness guide.

Remove the ignition switch mounting screws and ignition switch.
Clean the ignition switch mounting screw threads, then apply locking agent to them.
Install the ignition switch by aligning its tab with the hole of the top bridge.
Install and tighten the ignition switch mounting screws securely.
Install the top bridge (page 12-29).
LIGHTS/METER/SWITCHES

HANDLEBAR SWITCHES

INSPECTION
Remove the left side cover (page 2-10).
Disconnect the following:
- Handlebar switch 6P (Natural) connector
- Handlebar switch 4P (Black) connector
- Handlebar switch 4P (Natural) connector

LEFT HANDLEBAR SWITCHES
Check for continuity between the connector terminals in each switch position.
Continuity should exist between the color coded wires as shown in the charts:

Turn Signal Switch:

<table>
<thead>
<tr>
<th></th>
<th>R</th>
<th>WR</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>(N)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>COLOR</td>
<td>Lb</td>
<td>Gr</td>
<td>O</td>
</tr>
</tbody>
</table>

Dimmer Switch:

<table>
<thead>
<tr>
<th></th>
<th>HL</th>
<th>HI</th>
<th>LO</th>
</tr>
</thead>
<tbody>
<tr>
<td>(N)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>COLOR</td>
<td>Y</td>
<td>Bu</td>
<td>W</td>
</tr>
</tbody>
</table>

Horn Switch:

<table>
<thead>
<tr>
<th></th>
<th>BAT</th>
<th>HO</th>
</tr>
</thead>
<tbody>
<tr>
<td>FREE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PUSH</td>
<td></td>
<td></td>
</tr>
<tr>
<td>COLOR</td>
<td>Bl</td>
<td>Lg</td>
</tr>
</tbody>
</table>
RIGHT HANDLEBAR SWITCH
Check for continuity between the connector terminals in each switch position.
Continuity should exist between the color coded wires as shown in the charts:

Starter Switch:

<table>
<thead>
<tr>
<th>FREE</th>
<th>BAT</th>
<th>ST</th>
</tr>
</thead>
<tbody>
<tr>
<td>PUSH</td>
<td>(</td>
<td>(</td>
</tr>
<tr>
<td>COLOR</td>
<td>Bl/Bu</td>
<td>Y/R</td>
</tr>
</tbody>
</table>

BRAKE LIGHT SWITCH

FRONT
Disconnect the front brake light switch connectors and check for continuity between the switch terminals.
There should be continuity with the brake lever squeezed and no continuity with the lever released.

REAR
Remove the left side cover (page 2-10).
Disconnect the rear brake light switch 2P (Natural) connector, and check for continuity between the switch side connector terminals.
There should be continuity with the brake pedal squeezed, and no continuity with the pedal released.
REAR BRAKE LIGHT SWITCH REMOVAL/INSTALLATION

Remove the side covers (page 2-10).

Disconnect the rear brake light switch 2P (Natural) connector.

Unhook the brake light switch spring and remove the rear brake light switch.

Installation is in the reverse order of removal.

Adjust the rear brake light switch (page 3-22).

CLUTCH SWITCH

Disconnect the clutch switch wire connectors and check for continuity between the switch terminals.

There should be continuity with the clutch lever squeezed and no continuity with the lever released.
SIDESTAND SWITCH

INSPECTION
Remove the left side cover (page 2-10).
Disconnect the sidestand switch 3P (Natural) connector.
Check for continuity between the switch side connector terminals.
There should be continuity with the sidestand retracted and no continuity with the sidestand lowered.
When replacing the sidestand switch, remove the drive sprocket cover (page 3-16) and sidestand switch (page 3-23).

NEUTRAL SWITCH

INSPECTION
Remove the left side cover (page 2-10).
Disconnect the neutral switch wire connector.
Shift the transmission into the neutral.
Check for continuity between the switch side connector terminal and ground.
There should be continuity when the transmission is in neutral, and no continuity when the transmission is in gear except neutral.
LIGHTS/METER/SWITCHES

Make sure that the neutral indicator comes on with the ignition switch ON and transmission is in neutral.

If the neutral indicator does not come on, inspect the following:

- Ignition switch
- Sub fuse A (10 A)
- Neutral indicator light bulb
- Diode
- Open or short circuit in Red wire between the ignition switch and starter relay switch
- Open or short circuit in Black and/or Red/black wires between the neutral indicator light and ignition switch
- Open or short circuit in Light green/red and/or Light green/black wires between the neutral indicator light and neutral switch

REMOVAL
Remove the following:

- Left side cover (page 2-10)
- Drive sprocket cover (page 3-16)

Disconnect the neutral switch wire connector.

Remove the bolts and neutral switch.

Remove the neutral switch and O-ring.

Remove the drive piece and spring.
INSTALLATION

Check the drive piece and spring for wear or damage, replace them if necessary.

- Bent drive piece by force or crushed contact point will cause poor electricity connection.

Shift the transmission into neutral.

Install the spring and drive piece.

Apply engine oil to a new O-ring, and install it to the neutral switch.

Install the neutral switch by aligning its drive piece contact point with the drive piece.

Install and tighten the neutral switch mounting bolts.

Route the neutral switch and sidestand switch wires to the left crankcase cover grooves properly.

Installation is in the reverse order of removal.
FUEL GAUGE/FUEL LEVEL SENSOR

SYSTEM INSPECTION

- Before starting the inspection, check for loose or poor contact on the fuel level sensor 2P (Black) and combination meter 6P (Natural) connectors.

If the needle does not move

1. Fuel Level Sensor Inspection
   - Remove the left side cover (page 2-10).
   - Disconnect the fuel level sensor 2P (Black) connector.
   - Measure the resistance at the fuel level sensor terminals.
   - **STANDARD: 6 – 96 Ω (20°C/68°F)**
   - *Is the resistance within 6 – 96 Ω (20°C/68°F)?*
     - **YES** – GO TO STEP 2.
     - **NO** – Inspect the fuel level sensor (page 18-18)

2. Fuel Level Sensor Output Line Inspection
   - Remove the front cowl (page 2-5).
   - Disconnect the combination meter 6P (Natural) connector.
   - Check the continuity between the fuel level sensor 2P (Black) connector terminal and wire harness side of the combination meter 6P (Natural) connector.
   - **CONNECTION: Yellow/white – Yellow/white Green – Ground**
   - *Is there continuity?*
     - **YES** – GO TO STEP 3.
     - **NO** – Open circuit in Yellow/white or Green wire
3. Fuel Gauge Power Input Line Inspection
   Remove the combination meter (page 18-7).
   Connect the fuel level sensor 2P (Black) and combination meter 6P (Natural) connectors.
   Turn the ignition switch ON and measure the voltage between the combination meter terminals.
   **CONNECTION:** Black (+) – Green (–)
   *Is there battery voltage?*
   **YES** – GO TO STEP 4.
   **NO** – • Open short circuit in Black wire
             • Open circuit in Green wire

4. Fuel Gauge Inspection
   Ground the combination meter terminal with a jumper wire.
   **CONNECTION:** Yellow/white – Ground
   *Is the needle moves?*
   **YES** – Open or short circuit in Yellow/white
   **NO** – Faulty fuel gauge

**REMOVAL/INSTALLATION**
Remove the fuel tank (page 5-53).
Drain the remaining fuel into an approved gasoline container.
Remove the fuel level sensor mounting nuts, fuel level sensor and O-ring.
Install a new O-ring to the fuel tank.
Install the fuel level sensor into the fuel tank.
Install and tighten the fuel level sensor mounting nut to the specified torque in a crisscross pattern in 2 or 3 steps.
**TORQUE:** 9 N·m (0.9 kgf·m, 6.6 lbf·ft)
Install the removed parts in the reverse order of removal.
• Route the wire properly (page 1-18).
FUEL LEVEL SENSOR INSPECTION

Remove the fuel level sensor (page 18-17).
Check the fuel level sensor and arm for damage.
Inspect the resistance at the fuel level sensor 2P (Black) connector terminal with moving the float at the top (Full) and bottom (Empty) positions.

STANDARD RESISTANCE (20°C/68°F)

<p>| | |</p>
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<tr>
<td>Full</td>
<td>6 - 10 Ω</td>
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<tr>
<td>Empty</td>
<td>90 - 96 Ω</td>
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HORN

INSPECTION
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.

REMOVAL/INSTALLATION
Disconnect the horn connectors.
Remove the bolt and horn.
Install the horn by aligning its hole with the tab of the stay, then the bolt securely.
Connect the horn connectors.
LIGHTS/METER/SWITCHES

TURN SIGNAL RELAY

INSPECTION

1. Recommended Inspection
   Check the following:
   - Battery condition
   - Burned out bulb or non-specified wattage
   - Burned sub fuse B (10 A)
   - Ignition and turn signal switches function
   - Loose connectors

   Are the above items in good condition?
   YES  - GO TO STEP 2.
   NO   - Replace or repair the malfunction part(s)

2. Turn Signal Circuit Inspection
   Disconnect the turn signal relay 2P connector from the turn signal relay (page 18-19).
   Short the Black and Gray terminals of the turn signal relay connector with a jumper wire.
   Turn the ignition switch ON, and check the turn signal light by turning the turn signal switch to left or right

   Is the light come on?
   YES  - • Faulty turn signal relay
          • Poor connection of the connector
   NO   - Open circuit in Black or Gray wires

REMOVAL/INSTALLATION

Remove the left front cowl panel (page 2-5)
Disconnect the turn signal relay 2P connector from the relay.
Remove the turn signal relay from the front cowl.
Installation is in the reverse order of removal.
LIGHTS/METER/SWITCHES

FUSE BOX

INSPECTION

Remove the left side cover (page 2-10).

Open the fuse box covers and pull the sub fuse A and B.

Check the sub fuses are in good condition, replace them if necessary.

Close the fuse box covers.

Install the left side cover (page 2-10).
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<tr>
<td>Engine lacks power</td>
<td>20-3</td>
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<tr>
<td>Poor performance at low and idle speed</td>
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<td>Poor performance at high speed</td>
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<td>Poor handling</td>
<td>20-7</td>
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TROUBLESHOOTING

ENGINE DOES NOT START OR IS HARD TO START

1. Spark Plug Inspection
   Remove and inspect the spark plug.
   *Is spark plug in good condition?*
   YES → GO TO STEP 2.
   NO →
   - Incorrect spark plug heat range
   - Incorrect spark plug gap
   - Dirty air cleaner element

2. Spark Test
   Perform spark test.
   *Is the spark good?*
   YES → GO TO STEP 3.
   NO →
   - Faulty spark plug
   - Fouled spark plug
   - Loose or disconnected ignition system wires
   - Broken or shorted spark plug wire
   - Faulty ignition coil
   - Faulty CKP sensor
   - Faulty ignition switch
   - Faulty ECM

3. Starter Motor Inspection
   Check the starter motor operation.
   *Does the starter motor turns?*
   YES → GO TO STEP 4.
   NO → Faulty electric starter system (page 17-4)

4. PGM-FI System Inspection
   Check the PGM-FI system (page 5-10).
   *Is the PGM-FI system normal?*
   YES → GO TO STEP 5.
   NO → Faulty PGM-FI system (page 5-14)

5. Cylinder Compression Inspection
   Test cylinder compression.
   *Is the compression within specification?*
   YES →
   - Valve clearance too small
   - Valve stuck open
   - Worn cylinder and piston rings
   - Damaged cylinder head gasket
   - Seized valve
   - Improper valve timing
   NO → GO TO STEP 6.

6. Engine Start Condition
   Start by following normal procedure.
   *Does the engine start then stops?*
   YES →
   - Faulty IACV
   - Leaking intake manifold
   - Improper ignition timing (Faulty ECM or CKP sensor)
   - Contaminated fuel
TROUBLESHOOTING

ENGINE LACKS POWER

1. Drive Train Inspection
   Raise the wheels off the ground, and spin them by hand.
   
   *Does the wheel spin freely?*
   
   **YES**  -  GO TO STEP 2.
   
   **NO**  -  
   - Brake dragging
   - Worn or damaged wheel bearings
   - Bent axle

2. Tire Pressure Inspection
   Check tire pressure.
   
   *Is the tire pressures correct?*
   
   **YES**  -  GO TO STEP 3.
   
   **NO**  -  
   - Faulty tire valve
   - Punctured tire

3. Clutch Inspection
   Accelerate rapidly from low to second.
   
   *Does the engine speed change accordingly when clutch is engaged?*
   
   **YES**  -  GO TO STEP 4.
   
   **NO**  -  
   - Clutch slipping
   - Improperly adjusted clutch lever freeplay
   - Worn clutch discs/plates
   - Warped clutch discs/plates
   - Weak clutch spring
   - Additive in engine oil

4. Engine Performance Inspection
   Accelerate lightly.
   
   *Does the engine speed increase?*
   
   **YES**  -  GO TO STEP 5.
   
   **NO**  -  
   - Clogged air cleaner
   - Clogged muffler
   - Faulty IACV
   - Faulty fuel pump

5. Ignition Timing Inspection
   Check the ignition timing.
   
   *Is the ignition timing within specification?*
   
   **YES**  -  GO TO STEP 6.
   
   **NO**  -  
   - Faulty ECM
   - Faulty CKP sensor
   - Improper valve timing

6. Engine Oil Inspection
   Check the engine oil level and condition.
   
   *Is there correct level and good condition?*
   
   **YES**  -  GO TO STEP 7.
   
   **NO**  -  
   - Oil level too high
   - Oil level too low
   - Contaminated oil
7. Spark Plug Inspection
Remove and inspect the spark plug.

*Is the spark plug in good condition?*

**YES** – GO TO STEP 8.

**NO** –
- Plugs not serviced frequently enough
- Incorrect spark plug heat range
- Incorrect spark plug gap

8. Cylinder compression Inspection
Test the cylinder compression.

*Is the compression within specification?*

**YES** – GO TO STEP 9.

**NO** –
- Valve clearance too small
- Valve stuck open
- Worn cylinder and piston rings
- Damaged cylinder head gasket
- Seized valve
- Improper valve timing

9. PGM-FI System Inspection
Check the PGM-FI system (page 5-10).

*Is the PGM-FI system normal?*

**YES** – GO TO STEP 10.

**NO** – Faulty PGM-FI system (page 5-14)

10. Lubrication Inspection
Remove the cylinder head cover and inspect for signs of proper lubrication.

*Is the valve train lubricated properly?*

**YES** – GO TO STEP 11.

**NO** –
- Clogged oil passage
- Clogged oil strainer

11. Over Heating Inspection
Check for engine over heating.

*Is the engine over heating?*

**YES** –
- Excessive carbon build-up in combustion chamber
- Use of poor quality fuel
- Wrong type of fuel
- Clutch slipping

**NO** – GO TO STEP 12.

12. Engine Knocking Inspection
Accelerate or run at high speed.

*Is the engine knocking?*

**YES** –
- Worn piston and cylinder
- Wrong type of fuel
- Excessive carbon build-up in combustion chamber
- Ignition timing too advance (Faulty ECM or CKP sensor)
- Lean fuel mixture

**NO** – Engine does not knock
POOR PERFORMANCE AT LOW AND IDLE SPEED

1. Spark Plug Inspection
   Remove and inspect the spark plug.
   Is the spark plug in good condition?
   YES – GO TO STEP 2.
   NO – • Plug not serviced frequently enough
        • Incorrect spark plug heat range
        • Incorrect spark plug gap

2. Ignition Timing Inspection
   Check the ignition timing.
   Is the ignition timing within specification?
   YES – GO TO STEP 3.
   NO – • Faulty ECM
        • Faulty CKP sensor
        • Improper valve timing

3. Fuel Pump Inspection
   Inspect the fuel flow.
   Is the fuel pump unit normal?
   YES – GO TO STEP 4.
   NO – Faulty fuel pump unit.

4. PGM-FI System Inspection
   Check the PGM-FI system (page 5-10).
   Is the PGM-FI system normal?
   YES – GO TO STEP 5.
   NO – Faulty PGM-FI system (page 5-14)

5. Spark Test
   Perform spark test.
   Is the spark good?
   YES – • Faulty IACV
          • Improperly adjusted valve clearance
   NO – • Faulty spark plug
         • Fouled spark plug
         • Loose or disconnected ignition system wires
         • Broken or shorted spark plug wire
         • Faulty ignition coil
         • Faulty CKP sensor
         • Faulty ignition switch
         • Faulty ECM
1. **Ignition Timing Inspection**
   Check the ignition timing.

   *Is the ignition timing within specification?*

   **YES** – GO TO STEP 2.

   **NO** –
   - Faulty ECM
   - Faulty CKP sensor
   - Improper valve timing

2. **Fuel Line Inspection**
   Disconnect the fuel hose at the fuel pump.

   *Does the fuel flow freely?*

   **YES** – GO TO STEP 3.

   **NO** –
   - Clogged fuel line
   - Faulty fuel pump
   - Loose or disconnected fuel pump system line

3. **PGM-FI System Inspection**
   Check the PGM-FI system (page 5-10).

   *Is the PGM-FI system normal?*

   **YES** – GO TO STEP 4.

   **NO** – Faulty PGM-FI system (page 5-14)

4. **Spark Plug Inspection**
   Remove and inspect the spark plug.

   *Is the spark plug in good condition?*

   **YES** – GO TO STEP 5.

   **NO** –
   - Plug not serviced frequently enough
   - Incorrect spark plug heat range
   - Incorrect spark plug gap
   - Dirty air cleaner element

5. **Valve Timing Inspection**
   Check the valve timing.

   *Is the valve timing correct?*

   **YES** – GO TO STEP 6.

   **NO** – Cam sprocket not installed properly

6. **Valve Spring Inspection**
   Check the valve springs.

   *Are the valve spring free length within specified?*

   **YES** – Not weak

   **NO** – Faulty valve spring
POOR HANDLING

Steering is heavy
- Steering bearing adjusting nut too tight
- Damaged steering head bearings

Either wheel is wobbling
- Excessive wheel bearing play
- Bent rim
- Excessively worn swingarm pivot bushings
- Bent frame

Motorcycle pulls to one side
- Front and rear wheels not aligned
- Faulty shock absorber
- Bent fork
- Bent swingarm
- Bent axle
- Bent frame
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<td>POOR PERFORMANCE AT LOW AND</td>
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<td>IDLE SPEED</td>
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<td>REAR WHEEL/SUSPENSION</td>
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<td>TURN SIGNAL LIGHTS</td>
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<td>TURN SIGNAL RELAY</td>
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<td>VALVE CLEARANCE</td>
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<td>VALVE GUIDE REPLACEMENT</td>
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<td>VALVE SEAT INSPECTION</td>
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<td>VALVE SEAT REFACING</td>
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<td>WHEELS/TIRES</td>
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<td>WINDSCREEN</td>
<td>2-4</td>
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<td>WIRING DIAGRAM</td>
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