NOTICE

This manual was written by the Yamaha Motor Company primarily for use by Yamaha dealers and their qualified mechanics. It is not possible to put an entire mechanic’s education into one manual, so it is assumed that persons using this book to perform maintenance and repairs on Yamaha motorcycle has a basic understanding of the mechanical concepts and procedures inherent in motorcycle repair technology. Without such knowledge, attempted repairs or service to this model may render it unfit to use and/or unsafe.

Yamaha Motor Company, Ltd. is continually striving to improve all models manufactured by Yamaha. Modifications and significant changes in specifications or procedures will be forwarded to all Authorized Yamaha dealers and will, where applicable, appear in future editions of this manual.

NOTE:  
PARTICULARLY IMPORTANT INFORMATION  
This materials distinguished by the following notation.

⚠️  
The Safety Alert Symbol means ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!

⚠️ WARNING  
Failure to follow WARNING instructions could result in severe injury or death to the motorcycle operator, a bystander or a person checking or repairing the motorcycle.

⚠️ CAUTION:  
A CAUTION indicates special precautions that must be taken to avoid damage to the motorcycle.

NOTE:  
A NOTE provides key information to make procedures easier or clearer.
HOW TO USE THIS MANUAL

This manual is intended as a handy, easy-to-read reference book for the mechanic. Comprehensive explanations of all installation, removal, disassembly, assembly, repair and check procedures are laid out with the individual steps in sequential order.

1. The manual is divided into chapters. An abbreviation and symbol in the upper right corner of each page indicate the current chapter. Refer to “SYMBOLS”.

2. Each chapter is divided into sections. The current section title is shown at the top of each page, except in Chapter 3 (“PERIODIC CHECKS AND ADJUSTMENTS”), where the sub-section title(-s) appears.

3. Sub-section titles appear in smaller print than the section title.

4. To help identify parts and clarify procedure steps, there are exploded diagrams at the start of each removal and disassembly section.

5. Numbers are given in the order of the jobs in the exploded diagram. A circled number indicates a disassembly step.

6. Symbols indicate parts to be lubricated or replaced. Refer to “SYMBOLS”.

7. A job instruction chart accompanies the exploded diagram, providing the order of jobs, names of parts, notes in jobs, etc.

8. Jobs requiring more information (such as special tools and technical data) are described sequentially.
The following symbols are not relevant to every vehicle.
Symbols 1 to 8 indicate the subject of each chapter.
1 General information  
2 Specifications  
3 Periodic checks and adjustments  
4 Engine  
5 Carburetor(-s)  
6 Chassis  
7 Electrical system  
8 Troubleshooting

Symbols 9 to 16 indicate the following.
9 Serviceable with engine mounted  
10 Filling fluid  
11 Lubricant  
12 Special tool  
13 Tightening torque  
14 Wear limit, clearance  
15 Engine speed  
16 Electrical data

Symbols 17 to 22 in the exploded diagrams indicate the types of lubricants and lubrication points.
17 Engine oil  
18 Gear oil  
19 Molybdenum disulfide oil  
20 Wheel bearing grease  
21 Lithium soap base grease  
22 Molybdenum disulfide grease  
Symbols 23 to 24 in the exploded diagrams indicate the following:
23 Apply locking agent (LOCTITE®)  
24 Replace the part
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</thead>
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<td>ELECTRICAL</td>
<td>ELEC 7</td>
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<tr>
<td>TROUBLESHOOTING</td>
<td>TRBL SHTG 8</td>
</tr>
</tbody>
</table>
CHAPTER 1.
GENERAL INFORMATION

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CIRCLIPS ............................................. 1-3

CHECKING OF THE CONNECTIONS ..................... 1-4

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VEHICLE IDENTIFICATION NUMBER (For E)
The vehicle identification number ① is stamped into the right side of the steering head.

MODEL CODE
The model code label ① is affixed to the frame. This information will be needed to order spare parts.
PREPARATION FOR REMOVAL AND DISASSEMBLY

1. Before removal and disassembly, remove all dirt, mud, dust, and foreign material.

2. Use only the proper tools and cleaning equipment. Refer to “SPECIAL TOOLS”.

3. When disassembling, always keep mated parts together. This includes gears, cylinders, pistons and other parts that have been “mated” through normal wear. Mated parts must always be reused or replaced as an assembly.

4. During disassembly, clean all of the parts and place them in trays in the order of disassembly. This will speed up assembly and allow for the correct installation of all parts.

5. Keep all parts away from any source of fire.

REPLACEMENT PARTS

Use only genuine Yamaha parts for all replacements. Use oil and grease recommended by Yamaha for all lubrication jobs. Other brands may be similar in function and appearance, but inferior in quality.

GASKETS, OIL SEALS AND O-RINGS

1. When overhauling the engine, replace all gaskets, seals and O-rings. All gasket surfaces, oil seal lips and O-rings must be cleaned.

2. During reassembly, properly oil all mating parts and bearings and lubricate the oil seal lips with grease.
**LOCK WASHERS/PLATES AND COTTER PINS**

After removal, replace all lock washers/plates and cotter pins. After the bolt or nut has been tightened to specification, bend the lock washer tabs and the cotter pin ends along a flat of the bolt or nut.

**BEARINGS AND OIL SEALS**

1. Install bearings and oil seals so that the manufacturer's marks or numbers are visible. When installing oil seals, lubricate the oil seal lips with a light coat of lithium soap base grease. Oil bearings liberally when installing, if appropriate.

   **CAUTION:**

   Do not spin the bearing with compressed air because this will damage the bearing surfaces.

**CIRCLIPS**

Before reassembly, check all circlips carefully and replace damaged or distorted circlips. Always replace piston pin clips after one use. When installing a circlip, make sure that the sharp-edged corner is positioned opposite the thrust that the circlip receives.
CHECKING THE CONNECTIONS

Check the leads, couplers, and connectors for stains, rust, moisture, etc.

1. Disconnect:
   - lead
   - coupler
   - connector

2. Check:
   - lead
   - coupler
   - connector
   - Moisture → Dry with an air blower.
   - Rust/stains → Connect and disconnect several times.

3. Check:
   - all connections
   - Loose connection → Connect properly.
   
   NOTE: If the pin ① on the terminal is flattened, bend it up.

4. Connect:
   - lead
   - coupler
   - connector
   
   NOTE: Make sure that all connections are tight.

5. Check:
   - continuity
   (with a pocket tester)

   Pocket tester 90890-03112
   
   NOTE:
   - If there is no continuity, clean the terminals.
   - When checking the wire harness, perform steps (1) to (3).
   - As a quick remedy, use a contact revitalizer available at most part stores.
The following special tools are necessary for complete and accurate tune-up and assembly. Use only the appropriate special tools as this will help prevent damage caused by the use of inappropriate tools or improvised techniques. When placing an order, refer to the list provided below to avoid any mistakes.

<table>
<thead>
<tr>
<th>Tool No.</th>
<th>Tool name/Function</th>
<th>Illustration</th>
</tr>
</thead>
<tbody>
<tr>
<td>90890-01268</td>
<td>Exhaust &amp; steering nut wrench</td>
<td></td>
</tr>
<tr>
<td>90890-01403</td>
<td>Ring nut wrench</td>
<td></td>
</tr>
<tr>
<td></td>
<td>This tools are used to loosen and tighten the steering ring nut.</td>
<td></td>
</tr>
<tr>
<td>90890-01304</td>
<td>Piston pin puller</td>
<td></td>
</tr>
<tr>
<td></td>
<td>This tool is used to remove the piston pins.</td>
<td></td>
</tr>
<tr>
<td>90890-01312</td>
<td>Fuel level gauge</td>
<td></td>
</tr>
<tr>
<td></td>
<td>This tool is used to measure the fuel level in the float chamber.</td>
<td></td>
</tr>
<tr>
<td>90890-01367</td>
<td>Fork seal driver weight</td>
<td></td>
</tr>
<tr>
<td>90890-01374</td>
<td>Fork seal driver attachment (ø43)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>These tools are used when installing the fork seal.</td>
<td></td>
</tr>
<tr>
<td>90890-01326</td>
<td>T-handle</td>
<td></td>
</tr>
<tr>
<td>90890-01327</td>
<td>Damper rod holder</td>
<td></td>
</tr>
<tr>
<td></td>
<td>These tools are used to hold the damper rod assembly when loosening or tightening</td>
<td></td>
</tr>
<tr>
<td></td>
<td>the damper rod assembly bolt.</td>
<td></td>
</tr>
<tr>
<td>90890-03081</td>
<td>Compression gauge</td>
<td></td>
</tr>
<tr>
<td>90890-04082</td>
<td>Adapter</td>
<td></td>
</tr>
<tr>
<td></td>
<td>These tools are used to measure engine compression.</td>
<td></td>
</tr>
<tr>
<td>90890-03094</td>
<td>Vacuum gauge</td>
<td></td>
</tr>
<tr>
<td></td>
<td>This guide is used to synchronize the carburetors.</td>
<td></td>
</tr>
<tr>
<td>90890-03112</td>
<td>Pocket tester</td>
<td></td>
</tr>
<tr>
<td></td>
<td>This tool is used to check the electrical system.</td>
<td></td>
</tr>
<tr>
<td>Tool No.</td>
<td>Tool name/Function</td>
<td>Illustration</td>
</tr>
<tr>
<td>------------------</td>
<td>---------------------------------------------------------</td>
<td>------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>90890-03113</td>
<td>Engine tachometer</td>
<td><img src="image1.png" alt="Illustration" /></td>
</tr>
<tr>
<td></td>
<td>This tool is used to check engine speed.</td>
<td></td>
</tr>
<tr>
<td>90890-03141</td>
<td>Timing light</td>
<td><img src="image2.png" alt="Illustration" /></td>
</tr>
<tr>
<td></td>
<td>This tool is used to check the ignition timing.</td>
<td></td>
</tr>
<tr>
<td>90890-03158</td>
<td>Carburetor angle driver</td>
<td><img src="image3.png" alt="Illustration" /></td>
</tr>
<tr>
<td></td>
<td>This tool is used to turn the pilot screw when adjusting the engine idling speed.</td>
<td></td>
</tr>
<tr>
<td>90890-04016</td>
<td>Valve guide reamer, remover and installer (5.5 mm)</td>
<td><img src="image4.png" alt="Illustration" /></td>
</tr>
<tr>
<td></td>
<td>These tools are used to rebore, remove and install the valve guide.</td>
<td></td>
</tr>
<tr>
<td>90890-04019</td>
<td>Valve spring compressor</td>
<td><img src="image5.png" alt="Illustration" /></td>
</tr>
<tr>
<td></td>
<td>This tool is used to remove or install the valve assemblies.</td>
<td></td>
</tr>
<tr>
<td>90890-03153</td>
<td>Oil pressure gauge</td>
<td><img src="image6.png" alt="Illustration" /></td>
</tr>
<tr>
<td>90890-03124</td>
<td>Oil pressure adaptor B</td>
<td></td>
</tr>
<tr>
<td></td>
<td>These tools are used to measure the engine oil pressure.</td>
<td></td>
</tr>
<tr>
<td>90890-04086</td>
<td>Clutch holding tool</td>
<td><img src="image7.png" alt="Illustration" /></td>
</tr>
<tr>
<td></td>
<td>This tool is used to hold the clutch boss when removing or installing the clutch boss nut.</td>
<td></td>
</tr>
<tr>
<td>90890-04101</td>
<td>Valve lapper</td>
<td><img src="image8.png" alt="Illustration" /></td>
</tr>
<tr>
<td></td>
<td>This tool is used for removing and installing the valve lifter and for lapping the valve.</td>
<td></td>
</tr>
<tr>
<td>90890-04110</td>
<td>Tappet adjusting tool</td>
<td><img src="image9.png" alt="Illustration" /></td>
</tr>
<tr>
<td></td>
<td>This tool is necessary to replace valve adjusting pads.</td>
<td></td>
</tr>
<tr>
<td>Tool No.</td>
<td>Tool name/Function</td>
<td>Illustration</td>
</tr>
<tr>
<td>---------------</td>
<td>------------------------------------------</td>
<td>--------------</td>
</tr>
<tr>
<td>90890-06754</td>
<td>Ignition checker</td>
<td><img src="image1.png" alt="Illustration" /></td>
</tr>
<tr>
<td></td>
<td>This tool is used to check the ignition system components.</td>
<td></td>
</tr>
<tr>
<td>90890-85505</td>
<td>Yamaha bond No. 1215</td>
<td><img src="image2.png" alt="Illustration" /></td>
</tr>
<tr>
<td></td>
<td>This bond is used to seal two mating surfaces (e.g., crankcase mating surfaces).</td>
<td></td>
</tr>
</tbody>
</table>
CHAPTER 2.
SPECIFICATIONS

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## GENERAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>Model</th>
<th>XJR1300(L)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Model code:</strong></td>
<td>5EA2/5EA3/5EA4</td>
</tr>
<tr>
<td><strong>Dimensions:</strong></td>
<td></td>
</tr>
<tr>
<td>Overall length</td>
<td>2175 mm (GB) (D) (NL) (B) (F) (E) (P) (I) (GR) (SF) (AUS) 2250 mm (N) (SF) (G) (A)</td>
</tr>
<tr>
<td>Overall width</td>
<td>775 mm</td>
</tr>
<tr>
<td>Overall height</td>
<td>1115 mm</td>
</tr>
<tr>
<td>Seat height</td>
<td>775 mm</td>
</tr>
<tr>
<td>Wheelbase</td>
<td>1500 mm</td>
</tr>
<tr>
<td>Minimum ground clearance</td>
<td>120 mm</td>
</tr>
<tr>
<td>Minimum turning radius</td>
<td>2800 mm</td>
</tr>
<tr>
<td><strong>Basic weight:</strong></td>
<td></td>
</tr>
<tr>
<td>With oil and full fuel tank</td>
<td>253 kg</td>
</tr>
<tr>
<td><strong>Engine:</strong></td>
<td>Air-cooled 4-stroke, DOHC Forward-inclined parallel 4-cylinder</td>
</tr>
<tr>
<td>Engine type</td>
<td>Forward-inclined parallel 4-cylinder</td>
</tr>
<tr>
<td>Cylinder arrangement</td>
<td>1250 cm³</td>
</tr>
<tr>
<td>Displacement</td>
<td>79.0 × 63.8 mm</td>
</tr>
<tr>
<td>Bore × stroke</td>
<td>9.7: 1</td>
</tr>
<tr>
<td>Compression ratio</td>
<td>1050 kPa (10.5 kg/cm², 10.5 bar) at 400 r/min</td>
</tr>
<tr>
<td>Compression pressure (STD)</td>
<td>Electric starter</td>
</tr>
<tr>
<td>Starting system</td>
<td>Wet sump</td>
</tr>
<tr>
<td><strong>Lubrication system:</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Oil type or grade:</strong></td>
<td>SE or higher grade</td>
</tr>
</tbody>
</table>

### Engine Oil

<table>
<thead>
<tr>
<th>Temp. (°C)</th>
<th>10W/30</th>
<th>10W/40</th>
<th>20W/40</th>
</tr>
</thead>
<tbody>
<tr>
<td>-20, -10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Engine oil

- Periodic oil change: 3.0 L
- With oil filter replacement: 3.35 L
- Total amount: 4.2 L
- Oil cooler capacity (including all routes): 0.2 L

**Air filter:**

- Dry type element

**Fuel:**

- Type: Regular unleaded gasoline
- Fuel tank capacity: 21 L
- Fuel reserve amount: 4.5 L
<table>
<thead>
<tr>
<th><strong>Model</strong></th>
<th><strong>XJR1300(L)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Carburetor:</strong></td>
<td></td>
</tr>
<tr>
<td>Type/quantity</td>
<td>BS36/4</td>
</tr>
<tr>
<td>Manufacturer</td>
<td>MIKUNI</td>
</tr>
<tr>
<td><strong>Spark plug:</strong></td>
<td></td>
</tr>
<tr>
<td>Type × quantity</td>
<td>DPR8EA-9/X24EPR-U9 × 4</td>
</tr>
<tr>
<td>Manufacturer</td>
<td>NGK/DENSO</td>
</tr>
<tr>
<td>Spark plug gap</td>
<td>0.8 ~ 0.9 mm</td>
</tr>
<tr>
<td><strong>Clutch type:</strong></td>
<td>Wet, multiple-disc</td>
</tr>
<tr>
<td><strong>Transmission:</strong></td>
<td></td>
</tr>
<tr>
<td>Primary reduction system</td>
<td>Spur gear</td>
</tr>
<tr>
<td>Primary reduction ratio</td>
<td>98/56 (1.750)</td>
</tr>
<tr>
<td>Secondary reduction system</td>
<td>Chain drive</td>
</tr>
<tr>
<td>Secondary reduction ratio</td>
<td>38/17 (2.235)</td>
</tr>
<tr>
<td>Transmission type</td>
<td>Constant mesh 5-speed</td>
</tr>
<tr>
<td>Operation</td>
<td>Left foot operation</td>
</tr>
<tr>
<td>Gear ratio 1st</td>
<td>40/14 (2.857)</td>
</tr>
<tr>
<td>2nd</td>
<td>36/18 (2.000)</td>
</tr>
<tr>
<td>3rd</td>
<td>33/21 (1.571)</td>
</tr>
<tr>
<td>4th</td>
<td>31/24 (1.292)</td>
</tr>
<tr>
<td>5th</td>
<td>29/26 (1.115)</td>
</tr>
<tr>
<td><strong>Chassis:</strong></td>
<td>Double cradle</td>
</tr>
<tr>
<td>Frame type</td>
<td></td>
</tr>
<tr>
<td>Caster angle</td>
<td>25.5°</td>
</tr>
<tr>
<td>Trail</td>
<td>100 mm</td>
</tr>
<tr>
<td><strong>Tire:</strong></td>
<td></td>
</tr>
<tr>
<td>Type</td>
<td>Tubeless</td>
</tr>
<tr>
<td>Size</td>
<td></td>
</tr>
<tr>
<td>Front</td>
<td>120/70ZR17 (58W)</td>
</tr>
<tr>
<td>Rear</td>
<td>180/55ZR17 (73W)</td>
</tr>
<tr>
<td>Manufacturer</td>
<td></td>
</tr>
<tr>
<td>Front</td>
<td>MICHELIN/DUNLOP/BRIDGESTONE</td>
</tr>
<tr>
<td>Rear</td>
<td>MICHELIN/DUNLOP/BRIDGESTONE</td>
</tr>
<tr>
<td>Type</td>
<td></td>
</tr>
<tr>
<td>Front</td>
<td>MACADAM 90X/D207F/BT57F</td>
</tr>
<tr>
<td>Rear</td>
<td>MACADAM 90X/D207/BT57R</td>
</tr>
<tr>
<td><strong>Tire pressure (cold tire):</strong></td>
<td></td>
</tr>
<tr>
<td>Maximum load-except motorcycle</td>
<td>207 kg</td>
</tr>
<tr>
<td>Loading condition A *</td>
<td>0 ~ 90 kg</td>
</tr>
<tr>
<td>Front</td>
<td>250 kPa (2.5 kg/cm², 2.5 bar)</td>
</tr>
<tr>
<td>Rear</td>
<td>250 kPa (2.5 kg/cm², 2.5 bar)</td>
</tr>
<tr>
<td>Loading condition B *</td>
<td>90 ~ 207 kg</td>
</tr>
<tr>
<td>Front</td>
<td>250 kPa (2.5 kg/cm², 2.5 bar)</td>
</tr>
<tr>
<td>Rear</td>
<td>290 kPa (2.9 kg/cm², 2.9 bar)</td>
</tr>
<tr>
<td>High-speed riding</td>
<td></td>
</tr>
<tr>
<td>Front</td>
<td>250 kPa (2.5 kg/cm², 2.5 bar)</td>
</tr>
<tr>
<td>Rear</td>
<td>290 kPa (2.9 kg/cm², 2.9 bar)</td>
</tr>
</tbody>
</table>

*Load is the total weight of cargo, rider, passenger, and accessories.
<table>
<thead>
<tr>
<th>Model</th>
<th>XJR1300(L)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Brake:</strong></td>
<td></td>
</tr>
<tr>
<td>Front brake type</td>
<td>Dual disc brake</td>
</tr>
<tr>
<td>Operation</td>
<td>Right hand operation</td>
</tr>
<tr>
<td>Rear brake type</td>
<td>Single disc brake</td>
</tr>
<tr>
<td>Operation</td>
<td>Right foot operation</td>
</tr>
<tr>
<td><strong>Suspension:</strong></td>
<td></td>
</tr>
<tr>
<td>Front suspension</td>
<td>Telescopic fork</td>
</tr>
<tr>
<td>Rear suspension</td>
<td>Swingarm</td>
</tr>
<tr>
<td><strong>Shock absorber:</strong></td>
<td></td>
</tr>
<tr>
<td>Front shock absorber</td>
<td>Coil spring/Oil Damper</td>
</tr>
<tr>
<td>Rear shock absorber</td>
<td>Coil spring/Gas-oil damper</td>
</tr>
<tr>
<td><strong>Wheel travel:</strong></td>
<td></td>
</tr>
<tr>
<td>Front wheel travel</td>
<td>130 mm</td>
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<tr>
<td>Rear wheel travel</td>
<td>110 mm</td>
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<tr>
<td><strong>Electrical:</strong></td>
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<tr>
<td>Ignition system</td>
<td>T.C.I. (Digital)</td>
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<tr>
<td>Generator system</td>
<td>A.C. generator</td>
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<tr>
<td>Battery type</td>
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<tr>
<td>Battery capacity</td>
<td>12 V 12AH</td>
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<tr>
<td><strong>Headlight type:</strong></td>
<td>Halogen bulb</td>
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<tr>
<td><strong>Bulb wattage × quantity:</strong></td>
<td></td>
</tr>
<tr>
<td>Headlight</td>
<td>12 V 60 W/55 W × 1</td>
</tr>
<tr>
<td>Auxiliary light</td>
<td>12 V 4 W × 1</td>
</tr>
<tr>
<td>Tail/brake light</td>
<td>12 V 5 W/21 W × 2</td>
</tr>
<tr>
<td>Flasher light</td>
<td>12 V 21 W × 4</td>
</tr>
<tr>
<td>Meter light</td>
<td>12 V 1.7 W × 4</td>
</tr>
<tr>
<td>Neutral indicator light</td>
<td>12 V 1.7 W × 1</td>
</tr>
<tr>
<td>High beam indicator light</td>
<td>12 V 3.4 W × 1</td>
</tr>
<tr>
<td>Oil level indicator light</td>
<td>12 V 1.7 W × 1</td>
</tr>
<tr>
<td>Turn indicator light</td>
<td>12 V 1.7 W × 2</td>
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## MAINTENANCE SPECIFICATIONS

### ENGINE

<table>
<thead>
<tr>
<th>Model</th>
<th>Standard</th>
<th>Limit</th>
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<tbody>
<tr>
<td><strong>Cylinder head:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Warp limit</td>
<td></td>
<td>0.1 mm</td>
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<tr>
<td><strong>Cylinder:</strong></td>
<td></td>
<td></td>
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<tr>
<td>Bore size</td>
<td>79.00 ~ 79.01 mm</td>
<td></td>
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<tr>
<td>Taper limit</td>
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<td>0.05 mm</td>
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<tr>
<td>Out of round limit</td>
<td></td>
<td>0.05 mm</td>
</tr>
<tr>
<td>Wear limit</td>
<td></td>
<td>79.1 mm</td>
</tr>
<tr>
<td><strong>Camshaft:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drive method</td>
<td>Chain drive (Center)</td>
<td>⋆</td>
</tr>
<tr>
<td>Cam cap inside diameter</td>
<td>25.000 ~ 25.021 mm</td>
<td>⋆</td>
</tr>
<tr>
<td>Camshaft outside diameter</td>
<td>24.967 ~ 24.980 mm</td>
<td>⋆</td>
</tr>
<tr>
<td>Shaft-to-cap clearance</td>
<td>0.020 ~ 0.054 mm</td>
<td>⋆</td>
</tr>
<tr>
<td>Cam dimensions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intake “A”</td>
<td>35.95 ~ 36.05 mm</td>
<td>35.85 mm</td>
</tr>
<tr>
<td>“B”</td>
<td>28.248 ~ 28.348 mm</td>
<td>28.15 mm</td>
</tr>
<tr>
<td>“C”</td>
<td>7.95 ~ 8.05 mm</td>
<td>⋆</td>
</tr>
<tr>
<td>Exhaust “A”</td>
<td>35.95 ~ 36.05 mm</td>
<td>35.85 mm</td>
</tr>
<tr>
<td>“B”</td>
<td>28.248 ~ 28.348 mm</td>
<td>28.15 mm</td>
</tr>
<tr>
<td>“C”</td>
<td>7.95 ~ 8.05 mm</td>
<td>⋆</td>
</tr>
<tr>
<td>Camshaft runout limit</td>
<td>⋆</td>
<td>0.03 mm</td>
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## MAINTENANCE SPECIFICATIONS

<table>
<thead>
<tr>
<th>Model</th>
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<tbody>
<tr>
<td>Cam chain:</td>
<td>79RH2015/156</td>
<td>(\ldots)</td>
</tr>
<tr>
<td>Cam chain type/No. of links</td>
<td>(\ldots)</td>
<td>(\ldots)</td>
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<tr>
<td>Cam chain adjustment method</td>
<td>Automatic</td>
<td>(\ldots)</td>
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<tr>
<td>Valve, valve seat, valve guide:</td>
<td></td>
<td>(\ldots)</td>
</tr>
<tr>
<td>Valve clearance (cold)</td>
<td>IN: 0.11 (\sim) 0.15 mm</td>
<td>(\ldots)</td>
</tr>
<tr>
<td></td>
<td>EX: 0.16 (\sim) 0.20 mm</td>
<td>(\ldots)</td>
</tr>
<tr>
<td>Valve dimensions:</td>
<td></td>
<td>(\ldots)</td>
</tr>
<tr>
<td>&quot;A&quot; head diameter IN</td>
<td>28.9 (\sim) 29.1 mm</td>
<td>(\ldots)</td>
</tr>
<tr>
<td></td>
<td>EX: 24.9 (\sim) 25.1 mm</td>
<td>(\ldots)</td>
</tr>
<tr>
<td>&quot;B&quot; face width IN</td>
<td>1.98 (\sim) 2.55 mm</td>
<td>(\ldots)</td>
</tr>
<tr>
<td></td>
<td>EX: 1.98 (\sim) 2.55 mm</td>
<td>(\ldots)</td>
</tr>
<tr>
<td>&quot;C&quot; seat width IN</td>
<td>0.9 (\sim) 1.1 mm</td>
<td>(\ldots)</td>
</tr>
<tr>
<td></td>
<td>EX: 0.9 (\sim) 1.1 mm</td>
<td>(\ldots)</td>
</tr>
<tr>
<td>&quot;D&quot; margin thickness IN</td>
<td>0.8 (\sim) 1.2 mm</td>
<td>(\ldots)</td>
</tr>
<tr>
<td></td>
<td>EX: 0.8 (\sim) 1.2 mm</td>
<td>(\ldots)</td>
</tr>
<tr>
<td>Stem outside diameter IN</td>
<td>5.475 (\sim) 5.490 mm</td>
<td>5.445 mm</td>
</tr>
<tr>
<td></td>
<td>EX: 5.460 (\sim) 5.475 mm</td>
<td>5.43 mm</td>
</tr>
<tr>
<td>Guide inside diameter IN</td>
<td>5.500 (\sim) 5.512 mm</td>
<td>5.552 mm</td>
</tr>
<tr>
<td></td>
<td>EX: 5.500 (\sim) 5.512 mm</td>
<td>5.552 mm</td>
</tr>
<tr>
<td>Stem-to-guide clearance IN</td>
<td>0.010 (\sim) 0.037 mm</td>
<td>0.08 mm</td>
</tr>
<tr>
<td></td>
<td>EX: 0.025 (\sim) 0.052 mm</td>
<td>0.1 mm</td>
</tr>
<tr>
<td>Stem runout limit</td>
<td>(\ldots)</td>
<td>0.01 mm</td>
</tr>
<tr>
<td>Valve seat width IN</td>
<td>0.9 (\sim) 1.1 mm</td>
<td>1.6 mm</td>
</tr>
<tr>
<td></td>
<td>EX: 0.9 (\sim) 1.1 mm</td>
<td>1.6 mm</td>
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### MAINTENANCE SPECIFICATIONS

<table>
<thead>
<tr>
<th>Model</th>
<th>Standard</th>
<th>Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Valve spring:</strong></td>
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<td></td>
</tr>
<tr>
<td>Inner spring</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Free length</td>
<td>IN 39.65 mm</td>
<td>37.5 mm</td>
</tr>
<tr>
<td></td>
<td>EX 39.65 mm</td>
<td>37.5 mm</td>
</tr>
<tr>
<td>Set length (valve closed)</td>
<td>IN 32.8 mm</td>
<td>***</td>
</tr>
<tr>
<td></td>
<td>EX 32.8 mm</td>
<td>***</td>
</tr>
<tr>
<td>Compressed pressure (installed)</td>
<td>IN 61.7 ~ 72.5 N (6.29 ~ 7.39 kg)</td>
<td>***</td>
</tr>
<tr>
<td></td>
<td>EX 61.7 ~ 72.5 N (6.29 ~ 7.39 kg)</td>
<td>***</td>
</tr>
<tr>
<td>Tilt limit</td>
<td>IN ***</td>
<td>2.5°/1.7 mm</td>
</tr>
<tr>
<td></td>
<td>EX ***</td>
<td>2.5°/1.7 mm</td>
</tr>
<tr>
<td>Direction of winding (top view)</td>
<td>IN Clockwise</td>
<td>***</td>
</tr>
<tr>
<td></td>
<td>EX Clockwise</td>
<td>***</td>
</tr>
<tr>
<td><strong>Outer spring</strong></td>
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<td></td>
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<tr>
<td>Free length</td>
<td>IN 41.1 mm</td>
<td>39 mm</td>
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<tr>
<td></td>
<td>EX 41.1 mm</td>
<td>39 mm</td>
</tr>
<tr>
<td>Set length (valve closed)</td>
<td>IN 34.8 mm</td>
<td>***</td>
</tr>
<tr>
<td></td>
<td>EX 34.8 mm</td>
<td>***</td>
</tr>
<tr>
<td>Compressed pressure (installed)</td>
<td>IN 130.4 ~ 154.0 N (13.3 ~ 15.7 kg)</td>
<td>***</td>
</tr>
<tr>
<td></td>
<td>EX 130.4 ~ 154.0 N (13.3 ~ 15.7 kg)</td>
<td>***</td>
</tr>
<tr>
<td>Tilt limit</td>
<td>IN ***</td>
<td>2.5°/1.7 mm</td>
</tr>
<tr>
<td></td>
<td>EX ***</td>
<td>2.5°/1.7 mm</td>
</tr>
<tr>
<td>Direction of winding (top view)</td>
<td>IN Counterclockwise</td>
<td>***</td>
</tr>
<tr>
<td></td>
<td>EX Counterclockwise</td>
<td>***</td>
</tr>
<tr>
<td><strong>Piston:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Piston to cylinder clearance</td>
<td>0.015 ~ 0.040 mm</td>
<td>0.15 mm</td>
</tr>
<tr>
<td>Piston size “D”</td>
<td>78.970 ~ 78.985 mm</td>
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<tr>
<td><strong>Measuring point “H”</strong></td>
<td></td>
<td></td>
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<tr>
<td>Measuring point “H”</td>
<td>2 mm</td>
<td>***</td>
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<tr>
<td>Piston off-set</td>
<td>1 mm</td>
<td>***</td>
</tr>
<tr>
<td>Piston off-set direction</td>
<td>IN side</td>
<td>***</td>
</tr>
<tr>
<td>Piston pin bore inside diameter</td>
<td>18.004 ~ 18.015 mm</td>
<td>***</td>
</tr>
<tr>
<td>Piston pin outside diameter</td>
<td>17.991 ~ 18.000 mm</td>
<td>***</td>
</tr>
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</table>
## MAINTENANCE SPECIFICATIONS

<table>
<thead>
<tr>
<th>Model</th>
<th>Standard</th>
<th>Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Piston rings:</strong></td>
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<td></td>
</tr>
<tr>
<td><strong>Top ring:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type</td>
<td>Barrel</td>
<td>***</td>
</tr>
<tr>
<td>Dimensions (B × T)</td>
<td>1.00 × 3.05 mm</td>
<td>***</td>
</tr>
<tr>
<td>End gap (installed)</td>
<td>0.20 ~ 0.35 mm</td>
<td>0.6 mm</td>
</tr>
<tr>
<td>Side clearance (installed)</td>
<td>0.045 ~ 0.080 mm</td>
<td>0.1 mm</td>
</tr>
<tr>
<td><strong>2nd ring:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type</td>
<td>Taper</td>
<td>***</td>
</tr>
<tr>
<td>Dimensions (B × T)</td>
<td>1.2 × 3.0 mm</td>
<td>***</td>
</tr>
<tr>
<td>End gap (installed)</td>
<td>0.35 ~ 0.50 mm</td>
<td>0.75 mm</td>
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<tr>
<td>Side clearance (installed)</td>
<td>0.03 ~ 0.07 mm</td>
<td>0.1 mm</td>
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<tr>
<td><strong>Oil ring:</strong></td>
<td></td>
<td></td>
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<tr>
<td>Dimensions (B × T)</td>
<td>2.5 × 2.9 mm</td>
<td>***</td>
</tr>
<tr>
<td>End gap (installed)</td>
<td>0.2 ~ 0.5 mm</td>
<td>***</td>
</tr>
<tr>
<td>Side clearance</td>
<td>0.050 ~ 0.155 mm</td>
<td>***</td>
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</table>

| **Connecting rod:** | | |
| Oil clearance | 0.017 ~ 0.040 mm | 0.08 mm |

| **Crankshaft:** | | |
| Crank width “A” | 62.25 ~ 63.85 mm | *** |
| Assembly width “B” | 382.0 ~ 383.2 mm | *** |
| Runout limit “C” | 0.02 mm | *** |
| Big end side clearance “D” | 0.160 ~ 0.262 mm | 0.5 mm |
| Journal oil clearance | 0.030 ~ 0.064 mm | 0.09 mm |
## MAINTENANCE SPECIFICATIONS

<table>
<thead>
<tr>
<th>Model</th>
<th>Standard</th>
<th>Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Clutch:</strong></td>
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<td></td>
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<tr>
<td>Friction plate thickness</td>
<td>2.9 ~ 3.1 mm</td>
<td>2.8 mm</td>
</tr>
<tr>
<td>Quantity</td>
<td>8 pcs</td>
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<tr>
<td>Clutch plate thickness</td>
<td>1.9 ~ 2.1 mm</td>
<td>0.1 mm</td>
</tr>
<tr>
<td>Quantity</td>
<td>7 pcs</td>
<td></td>
</tr>
<tr>
<td>Clutch spring height</td>
<td>6 mm</td>
<td></td>
</tr>
<tr>
<td>Quantity</td>
<td>1 pc</td>
<td></td>
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<tr>
<td>Clutch housing thrust clearance</td>
<td>0 ~ 0.2 mm</td>
<td>0.1 mm</td>
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<tr>
<td>Clutch housing radial clearance</td>
<td>0.004 ~ 0.048 mm</td>
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<tr>
<td>Clutch release method</td>
<td>Hydraulic inner push</td>
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<tr>
<td>Push rod bending limit</td>
<td>0.004</td>
<td>0.048 mm</td>
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<tr>
<td><strong>Transmission:</strong></td>
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<td>0.3 mm</td>
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<tr>
<td>Main axle deflection limit</td>
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<tr>
<td>Drive axle deflection limit</td>
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<tr>
<td><strong>Shifter:</strong></td>
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<td></td>
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<tr>
<td>Shifter type</td>
<td>Guide bar</td>
<td></td>
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<tr>
<td>Guide bar bending limit</td>
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<td>0.1 mm</td>
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<td><strong>Carburetor:</strong></td>
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<td>I.D. mark</td>
<td>5EA1 10</td>
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<td>Main jet</td>
<td>(M.J) #95</td>
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<tr>
<td>Main air jet</td>
<td>(M.A.J) #45</td>
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<tr>
<td>Jet needle</td>
<td>(J.N) 5D96-2</td>
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<tr>
<td>Needle jet</td>
<td>(N.J) Y-2</td>
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<tr>
<td>Pilot jet</td>
<td>(P.A.J.1) #127.5</td>
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</tr>
<tr>
<td>Pilot outlet</td>
<td>(P.O) 0.85</td>
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<td>Pilot jet</td>
<td>(P.J) #40</td>
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<tr>
<td>Bypass 1</td>
<td>(B.P.1) 0.9</td>
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</tr>
<tr>
<td>Bypass 2</td>
<td>(B.P.2) 1.0</td>
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</tr>
<tr>
<td>Bypass 3</td>
<td>(B.P.3) 0.8</td>
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</tr>
<tr>
<td>Pilot screw</td>
<td>(P.S) 1-1/2</td>
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</tr>
<tr>
<td>Valve seat size</td>
<td>(V.S) 2.3</td>
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</tr>
<tr>
<td>Starter jet</td>
<td>(G.S.1) #32.5</td>
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</tr>
<tr>
<td>Starter jet</td>
<td>(G.S.2) 0.6</td>
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</tr>
<tr>
<td>Throttle valve size</td>
<td>(Th.V) #125</td>
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</tr>
<tr>
<td>Float height</td>
<td>(F.H) 21.3 ~ 23.3 mm</td>
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</tr>
<tr>
<td>Fuel level (using special tool)</td>
<td>3.5 ~ 4.5 mm</td>
<td></td>
</tr>
<tr>
<td>Engine idle speed</td>
<td>1000 ~ 1100 r/min</td>
<td></td>
</tr>
<tr>
<td>Intake vacuum</td>
<td>31.3 kPa (235 mmHg)</td>
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</table>
## Maintenance Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>Standard</th>
<th>Limit</th>
</tr>
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<tbody>
<tr>
<td>Lubrication system:</td>
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<td></td>
</tr>
<tr>
<td>Oil filter type</td>
<td>Paper type</td>
<td>***</td>
</tr>
<tr>
<td>Oil pump type</td>
<td>Trochoid type</td>
<td>***</td>
</tr>
<tr>
<td>Tip clearance</td>
<td>0.12 ~ 0.17 mm</td>
<td>0.2 mm</td>
</tr>
<tr>
<td>Housing and rotor clearance</td>
<td>0.03 ~ 0.08 mm</td>
<td>0.15 mm</td>
</tr>
<tr>
<td>Side clearance</td>
<td>0.03 ~ 0.08 mm</td>
<td>0.15 mm</td>
</tr>
<tr>
<td>Bypass valve setting pressure</td>
<td>180 ~ 220 kPa</td>
<td>***</td>
</tr>
<tr>
<td></td>
<td>(1.8 ~ 2.2 kg/cm(^2), 1.8 ~ 2.2 bar)</td>
<td></td>
</tr>
<tr>
<td>Relief valve operating pressure</td>
<td>480 ~ 580 kPa</td>
<td>***</td>
</tr>
<tr>
<td></td>
<td>(4.8 ~ 5.8 kg/cm(^2), 4.8 ~ 5.8 bar)</td>
<td></td>
</tr>
<tr>
<td>Oil pressure (hot)</td>
<td>80 kPa (0.8 kg/cm(^2), 0.8 bar)</td>
<td>***</td>
</tr>
<tr>
<td>Pressure check location</td>
<td>MAIN GALLERY</td>
<td>***</td>
</tr>
</tbody>
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### MAINTENANCE SPECIFICATIONS

#### Tightening torques

<table>
<thead>
<tr>
<th>Part to be tightened</th>
<th>Part name</th>
<th>Thread size</th>
<th>Q’ty</th>
<th>Tightening torque Nm</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Camshaft cap</td>
<td>Bolt</td>
<td>M6 \times 1.0</td>
<td>18</td>
<td>12</td>
<td>1.2</td>
</tr>
<tr>
<td>Oil gallery bolt</td>
<td>Screw</td>
<td>M6 \times 1.0</td>
<td>1</td>
<td>7</td>
<td>0.7</td>
</tr>
<tr>
<td>Spark plug</td>
<td></td>
<td>M12 \times 1.25</td>
<td>4</td>
<td>18</td>
<td>1.8</td>
</tr>
<tr>
<td>Cylinder head</td>
<td>Cap nut</td>
<td>M10 \times 1.25</td>
<td>12</td>
<td>35</td>
<td>3.5</td>
</tr>
<tr>
<td>Cylinder head cover</td>
<td>Bolt</td>
<td>M6 \times 1.0</td>
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<td>Union bolt</td>
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<td>Oil delivery pipe (oil pan)</td>
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<td>M6 \times 1.0</td>
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<td>Oil delivery pipe (oil cooler)</td>
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<td>Intake manifold</td>
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<td>Air filter case cap</td>
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<td>Exhaust pipe</td>
<td>Nut</td>
<td>M8 \times 1.25</td>
<td>8</td>
<td>25</td>
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<td>Muffler and stay</td>
<td>Bolt</td>
<td>M8 \times 1.25</td>
<td>17</td>
<td>20</td>
<td>2.0</td>
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<td>Exhaust chamber</td>
<td>Bolt</td>
<td>M10 \times 1.25</td>
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<td>25</td>
<td>2.5</td>
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<tr>
<td>Exhaust pipe and exhaust chamber</td>
<td>Screw</td>
<td>M8 \times 1.25</td>
<td>4</td>
<td>20</td>
<td>2.0</td>
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<tr>
<td>Exhaust chamber and muffler</td>
<td>Bolt</td>
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<td>Exhaust pipe blind plug (CO test)</td>
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<td>Bearing holder (main axle)</td>
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<td>Bolt</td>
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<td>Crankcase cover (right)</td>
<td>Screw</td>
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<td>Clutch cover</td>
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<td>Drive sprocket cover</td>
<td>Bolt</td>
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<td>Clutch release cylinder</td>
<td>Bolt</td>
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<tr>
<td>Crankcase</td>
<td>Bolt</td>
<td>M6 \times 1.0</td>
<td>16</td>
<td>12</td>
<td>1.2</td>
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## MAINTENANCE SPECIFICATIONS

<table>
<thead>
<tr>
<th>Part to be tightened</th>
<th>Part name</th>
<th>Thread size</th>
<th>Q'ty</th>
<th>Tightening torque</th>
<th>Remarks</th>
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<td></td>
<td></td>
<td></td>
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<td>Nm</td>
<td>m·kg</td>
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<tr>
<td>Crankcase</td>
<td>Bolt</td>
<td>M8 × 1.25</td>
<td>17</td>
<td>24</td>
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<tr>
<td>Crankcase</td>
<td>Bolt</td>
<td>M10 × 1.25</td>
<td>5</td>
<td>35</td>
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<tr>
<td>Main gallery</td>
<td>Plug</td>
<td>M20 × 1.5</td>
<td>3</td>
<td>12</td>
<td>1.2</td>
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<tr>
<td>Oil buffer plate</td>
<td>Bolt</td>
<td>M5 × 0.8</td>
<td>3</td>
<td>4</td>
<td>0.4</td>
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<td>Stopper plate</td>
<td>Bolt</td>
<td>M6 × 1.0</td>
<td>1</td>
<td>10</td>
<td>1.0</td>
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<tr>
<td>Bearing housing</td>
<td>Screw</td>
<td>M6 × 1.0</td>
<td>3</td>
<td>10</td>
<td>1.0</td>
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<tr>
<td>HY-VO chain guide</td>
<td>Bolt</td>
<td>M6 × 1.0</td>
<td>2</td>
<td>10</td>
<td>1.0</td>
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<tr>
<td>Clutch boss</td>
<td>Nut</td>
<td>M20 × 1.5</td>
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<td>70</td>
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<td>Bolt</td>
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<td>Push lever comp.</td>
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<td>Drive sprocket</td>
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<td>M22 × 1.5</td>
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<td>Shift shaft stopper</td>
<td>Screw</td>
<td>M8 × 1.25</td>
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<td>22</td>
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<td>Screw</td>
<td>M6 × 1.0</td>
<td>2</td>
<td>7</td>
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<tr>
<td>(Starter clutch idle gear shaft)</td>
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<td>Stopper lever</td>
<td>Bolt</td>
<td>M6 × 1.0</td>
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<td>10</td>
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<td>Side plate</td>
<td>Screw</td>
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<td>Shift arm</td>
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<td>10</td>
<td>1.0</td>
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<tr>
<td>Shift lod</td>
<td>Nut</td>
<td>M6 × 1.0</td>
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<td>8</td>
<td>0.8</td>
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<td>A.C. generator</td>
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<td>M8 × 1.25</td>
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<td>25</td>
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<td>10</td>
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<td>Rotor</td>
<td>Bolt</td>
<td>M10 × 1.25</td>
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<td>45</td>
<td>4.5</td>
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</table>
Tightening sequence
Cylinder head

Crankcase
Lubrication chart:

- Pressure feed
- Splashed

Model | XJR1300(L)
### CHASSIS

<table>
<thead>
<tr>
<th>Model</th>
<th>Standard</th>
<th>Limit</th>
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<tbody>
<tr>
<td><strong>Steering system:</strong></td>
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<tr>
<td>Steering bearing type</td>
<td>Angular bearing</td>
<td>***</td>
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<tr>
<td><strong>Front suspension:</strong></td>
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<tr>
<td>Front fork travel</td>
<td>130 mm</td>
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<tr>
<td>Fork spring free length</td>
<td>407.3 mm</td>
<td>395 mm</td>
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<tr>
<td>Fitting length</td>
<td>363.3 mm</td>
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<tr>
<td>Collar length</td>
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<tr>
<td>Spring rate (K1)</td>
<td>4.9 N/mm (0.5 kg/mm)</td>
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</tr>
<tr>
<td>(K2)</td>
<td>8.8 N/mm (0.9 kg/mm)</td>
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<tr>
<td>Stroke (K1)</td>
<td>0 ~ 83 mm</td>
<td>***</td>
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<tr>
<td>(K2)</td>
<td>83 ~ 130 mm</td>
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<tr>
<td>Optional spring</td>
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<td>Oil capacity</td>
<td>538 cm³</td>
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<td>Oil level</td>
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<td>Oil grade</td>
<td>Fork oil 10W or equivalent</td>
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<td><strong>Rear suspension:</strong></td>
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<tr>
<td>Shock absorber travel</td>
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<td>Spring free length</td>
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<td>206 mm</td>
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<tr>
<td>(K2)</td>
<td>31.4 N/mm (3.2 kg/mm)</td>
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<tr>
<td>Stroke (K1)</td>
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<tr>
<td>(K2)</td>
<td>50 ~ 88 mm</td>
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<td><strong>Front wheel:</strong></td>
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<tr>
<td>Type</td>
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<tr>
<td>lateral</td>
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<td><strong>Rear wheel:</strong></td>
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<tr>
<td>Type</td>
<td>Cast wheel</td>
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<tr>
<td>Rim size</td>
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<tr>
<td>Rim material</td>
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<td>Rim runout limit radial</td>
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<tr>
<td>lateral</td>
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<td><strong>Drive chain:</strong></td>
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<td>Type/manufacturer</td>
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<td>Chain free play</td>
<td>20 ~ 30 mm</td>
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## MAINTENANCE SPECIFICATIONS

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<tr>
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<th>Limit</th>
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<td><strong>Front disc brake:</strong></td>
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<tr>
<td>Master cylinder inside diameter</td>
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<td>$\cdots$</td>
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<tr>
<td>Caliper cylinder inside diameter</td>
<td>30.2 mm and 27 mm</td>
<td>$\cdots$</td>
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<td>$\cdots$</td>
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<tr>
<td>Master cylinder inside diameter</td>
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<td>Caliper cylinder inside diameter</td>
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<td><strong>Brake lever &amp; brake pedal:</strong></td>
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<td>Brake pedal position</td>
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<td><strong>Throttle grip free play</strong></td>
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<td>Part to be tightened</td>
<td>Part name</td>
<td>Thread size</td>
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<td>Handle crown and inner tube</td>
<td>Bolt</td>
<td>M8 × 1.25</td>
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<tr>
<td>Handle crown and steering stem</td>
<td>Nut</td>
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<td>Handle crown and handlebar holder</td>
<td>Nut</td>
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<td>(lower)</td>
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<td>Upper handlebar holder</td>
<td>Bolt</td>
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<td>Lower bracket and inner tube</td>
<td>Bolt</td>
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<td>Steering stem and ring nut</td>
<td>Nut</td>
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<td>Bolt</td>
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<td>Front brake hose union bolt</td>
<td>Bolt</td>
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<td>Meter</td>
<td>Nut</td>
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<td>Headlight stay (lower)</td>
<td>Bolt</td>
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<td>Grip end</td>
<td>–</td>
<td>M16 × 1.5</td>
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<td>Front turn signal lights</td>
<td>Nut</td>
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<td>Front fender and front fork</td>
<td>Bolt</td>
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<td>Headlight stay and upper cover</td>
<td>Cap nut</td>
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<tr>
<td>Engine stay (front) and frame</td>
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<td>Engine mount (front)</td>
<td>Nut</td>
<td>M10 × 1.25</td>
</tr>
<tr>
<td>(rear-upper)</td>
<td>Nut</td>
<td>M10 × 1.25</td>
</tr>
<tr>
<td>Engine stay (rear-upper) and frame</td>
<td>Bolt</td>
<td>M10 × 1.25</td>
</tr>
<tr>
<td>Engine stay (rear-upper) and frame</td>
<td>Bolt</td>
<td>M12 × 1.25</td>
</tr>
<tr>
<td>Engine stay (rear-lower)</td>
<td>Nut</td>
<td>M10 × 1.25</td>
</tr>
<tr>
<td>Frame and down tube</td>
<td>Nut and Bolt</td>
<td>M8 × 1.25</td>
</tr>
<tr>
<td>Pivot shaft</td>
<td>Nut</td>
<td>M18 × 1.5</td>
</tr>
<tr>
<td>Rear shock absorber and frame</td>
<td>Bolt</td>
<td>M8 × 1.25</td>
</tr>
<tr>
<td>Rear shock absorber and swing arm</td>
<td>Bolt</td>
<td>M10 × 1.25</td>
</tr>
<tr>
<td>Drive chain guide and swing arm</td>
<td>Bolt</td>
<td>M6 × 1.0</td>
</tr>
<tr>
<td>Chain case and swing arm</td>
<td>Screw</td>
<td>M6 × 1.0</td>
</tr>
<tr>
<td>Fuel tank</td>
<td>Bolt</td>
<td>M8 × 1.25</td>
</tr>
<tr>
<td>Fuel tank cap</td>
<td>Screw</td>
<td>M5 × 0.8</td>
</tr>
<tr>
<td>Fuel cock</td>
<td>Screw</td>
<td>M6 × 1.0</td>
</tr>
<tr>
<td>Seat lock</td>
<td>Nut</td>
<td>M6 × 1.0</td>
</tr>
<tr>
<td>Fuel sender</td>
<td>Bolt</td>
<td>M5 × 0.8</td>
</tr>
<tr>
<td>Side cover and frame</td>
<td>Screw</td>
<td>M6 × 1.0</td>
</tr>
<tr>
<td>Tail light</td>
<td>Nut</td>
<td>M6 × 1.0</td>
</tr>
<tr>
<td>Rear fender and frame</td>
<td>Bolt</td>
<td>M6 × 1.0</td>
</tr>
<tr>
<td>Rear fender cover and cover</td>
<td>Screw</td>
<td>M5 × 0.8</td>
</tr>
<tr>
<td>Rear fender cover and frame</td>
<td>Screw</td>
<td>M6 × 1.0</td>
</tr>
<tr>
<td>Grab bar</td>
<td>Bolt</td>
<td>M8 × 1.25</td>
</tr>
<tr>
<td>Ignitor</td>
<td>Screw</td>
<td>M6 × 1.0</td>
</tr>
<tr>
<td>Rear turn signal light and rear fender</td>
<td>Nut</td>
<td>M12 × 1.25</td>
</tr>
<tr>
<td>Part to be tightened</td>
<td>Part name</td>
<td>Thread size</td>
</tr>
<tr>
<td>------------------------------</td>
<td>-------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>Hook</td>
<td>Screw</td>
<td>M6 x 1.0</td>
</tr>
<tr>
<td>Helmet holder</td>
<td>Bolt</td>
<td>M6 x 1.0</td>
</tr>
<tr>
<td>Tail light bracket</td>
<td>Bolt</td>
<td>M8 x 1.25</td>
</tr>
<tr>
<td>Side stand</td>
<td>Bolt</td>
<td>M10 x 1.25</td>
</tr>
<tr>
<td>Side stand switch</td>
<td>Screw</td>
<td>M5 x 0.8</td>
</tr>
<tr>
<td>Footrest bracket</td>
<td>Bolt</td>
<td>M8 x 1.25</td>
</tr>
<tr>
<td>Rear footrest bracket</td>
<td>Bolt</td>
<td>M8 x 1.25</td>
</tr>
<tr>
<td>Footrest and footrest bracket</td>
<td>Bolt</td>
<td>M10 x 1.25</td>
</tr>
<tr>
<td>Rear brake reservoir tank</td>
<td>Screw</td>
<td>M6 x 1.0</td>
</tr>
<tr>
<td>Rear master cylinder and bracket</td>
<td>Bolt</td>
<td>M8 x 1.25</td>
</tr>
<tr>
<td>Center stand</td>
<td>Nut and Bolt M10</td>
<td>1.25 2</td>
</tr>
<tr>
<td>Front wheel axle</td>
<td>–</td>
<td>M16 x 1.5</td>
</tr>
<tr>
<td>Front wheel axle pinch bolt</td>
<td>Bolt</td>
<td>M8 x 1.0</td>
</tr>
<tr>
<td>Front brake caliper and front fork</td>
<td>Bolt</td>
<td>M10 x 1.25</td>
</tr>
<tr>
<td>Front brake disk and hub</td>
<td>Bolt</td>
<td>M8 x 1.25</td>
</tr>
<tr>
<td>Front brake caliper and bleed screw</td>
<td>–</td>
<td>M8 x 1.25</td>
</tr>
<tr>
<td>Front brake hose</td>
<td>Union bolt M10</td>
<td>1.25 2</td>
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<tr>
<td>Tensionbar and swingarm</td>
<td>Nut and bolt M8</td>
<td>1.25 2</td>
</tr>
<tr>
<td>Driven sprocket and hub</td>
<td>Nut</td>
<td>M8 x 1.25</td>
</tr>
<tr>
<td>Chain puller</td>
<td>Nut</td>
<td>M8 x 1.25</td>
</tr>
<tr>
<td>Rear brake caliper and caliper bracket</td>
<td>Bolt</td>
<td>M10 x 1.25</td>
</tr>
<tr>
<td>Rear wheel axle</td>
<td>Nut</td>
<td>M18 x 1.5</td>
</tr>
<tr>
<td>Rear brake hose</td>
<td>Union bolt M10</td>
<td>1.25 2</td>
</tr>
<tr>
<td>Rear brake caliper and bleed screw</td>
<td>–</td>
<td>M8 x 1.25</td>
</tr>
<tr>
<td>Rear brake disc and hub</td>
<td>Bolt</td>
<td>M8 x 1.25</td>
</tr>
</tbody>
</table>

NOTE:
1. First, tighten the ring nut approximately 52 Nm (5.2 m•kg) by using the torque wrench, then loosen the ring nut one turn.
2. Retighten the ring nut to specification.
## ELECTRICAL

<table>
<thead>
<tr>
<th>Model</th>
<th>Standard</th>
<th>Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Voltage:</strong></td>
<td>12 V</td>
<td></td>
</tr>
<tr>
<td><strong>Ignition system:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ignition timing (B.T.D.C.)</td>
<td>5° /1050 r/min</td>
<td></td>
</tr>
<tr>
<td>Advanced timing (B.T.D.C.)</td>
<td>50° /5000 r/min</td>
<td></td>
</tr>
<tr>
<td><strong>Advancer type</strong></td>
<td>TPS &amp; Electrical type</td>
<td></td>
</tr>
<tr>
<td><strong>T.C.I.:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pickup coil resistance/color</td>
<td>248 ~ 372 Ω/W/R-W/G</td>
<td></td>
</tr>
<tr>
<td>T.C.I. unit model/manufacturer</td>
<td>5EA20/YAMAHA</td>
<td></td>
</tr>
<tr>
<td><strong>Ignition coil:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model/manufacturer</td>
<td>83R/YAMAHA</td>
<td></td>
</tr>
<tr>
<td>Minimum spark gap</td>
<td>6 mm</td>
<td></td>
</tr>
<tr>
<td>Primary winding resistance</td>
<td>1.9 ~ 2.9 Ω</td>
<td></td>
</tr>
<tr>
<td>Secondary winding resistance</td>
<td>9.5 ~ 14.3 kΩ</td>
<td></td>
</tr>
<tr>
<td><strong>Spark plug cap:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type</td>
<td>Resin type</td>
<td></td>
</tr>
<tr>
<td>Resistance</td>
<td>10 kΩ</td>
<td></td>
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<tr>
<td><strong>Charging system:</strong></td>
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<td></td>
</tr>
<tr>
<td>Type</td>
<td>A.C. generator</td>
<td></td>
</tr>
<tr>
<td>Model/manufacturer</td>
<td>B3G-B/DENSO</td>
<td></td>
</tr>
<tr>
<td>Normal output</td>
<td>13.5 V 28 A/3000 r/min</td>
<td></td>
</tr>
<tr>
<td>Rotor coil resistance</td>
<td>2.8 ~ 3.0 Ω</td>
<td></td>
</tr>
<tr>
<td>Stator coil resistance</td>
<td>0.19 ~ 0.21 Ω</td>
<td></td>
</tr>
<tr>
<td>Brush overall length</td>
<td>13.7 mm</td>
<td>4.7 mm</td>
</tr>
<tr>
<td>Spring force</td>
<td>5.10 ~ 5.69 N (0.52 ~ 0.58 kg)</td>
<td></td>
</tr>
<tr>
<td><strong>Voltage regulator:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type</td>
<td>Semi-conductor, field control type</td>
<td></td>
</tr>
<tr>
<td>Model/manufacturer</td>
<td>B3G-B/DENSO</td>
<td></td>
</tr>
<tr>
<td>No load regulated voltage</td>
<td>14.2 ~ 14.8 V</td>
<td></td>
</tr>
<tr>
<td><strong>Electric starter system:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type</td>
<td>Constant mesh type</td>
<td></td>
</tr>
<tr>
<td><strong>Starter motor:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model/manufacturer</td>
<td>SM-13/MITSUBA</td>
<td></td>
</tr>
<tr>
<td>Output</td>
<td>0.65 kW</td>
<td></td>
</tr>
<tr>
<td>Brush overall length</td>
<td>10 mm</td>
<td>5 mm</td>
</tr>
<tr>
<td>Spring force</td>
<td>7.65 ~ 10.01 N (0.780 ~ 1.021 kg)</td>
<td></td>
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<tr>
<td>Commutator diameter</td>
<td>28 mm</td>
<td>27 mm</td>
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# Maintenance Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>Standard</th>
<th>Limit</th>
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</thead>
<tbody>
<tr>
<td>Mica undercut</td>
<td>0.7 mm</td>
<td>***</td>
</tr>
<tr>
<td><strong>Starter relay:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model/manufacturer</td>
<td>MS5E-491/JIDECO</td>
<td>***</td>
</tr>
<tr>
<td>Amperage rating</td>
<td>100 A</td>
<td>***</td>
</tr>
<tr>
<td>Coil winding resistance</td>
<td>4.2 ~ 4.6 Ω</td>
<td>***</td>
</tr>
<tr>
<td><strong>Horn:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type</td>
<td>Plane type</td>
<td>***</td>
</tr>
<tr>
<td>Quantity</td>
<td>2 pcs</td>
<td>***</td>
</tr>
<tr>
<td>Model/manufacturer</td>
<td>YF12/NIKKO</td>
<td>***</td>
</tr>
<tr>
<td>Maximum amperage</td>
<td>3 A</td>
<td>***</td>
</tr>
<tr>
<td><strong>Flasher relay:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type</td>
<td>Full transistor type</td>
<td>***</td>
</tr>
<tr>
<td>Model/manufacturer</td>
<td>FE246BH/DENSO</td>
<td>***</td>
</tr>
<tr>
<td>Self cancelling device</td>
<td>No</td>
<td>***</td>
</tr>
<tr>
<td>Flasher frequency</td>
<td>75 ~ 95 cyl/min</td>
<td>***</td>
</tr>
<tr>
<td><strong>Oil level switch:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model/manufacturer</td>
<td>5G2/DENSO</td>
<td>***</td>
</tr>
<tr>
<td><strong>Fuel gauge:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model/manufacturer</td>
<td>4 KG/NIPPON SEIKI</td>
<td>***</td>
</tr>
<tr>
<td>Sender unit resistance</td>
<td>full</td>
<td>4 ~ 10 Ω</td>
</tr>
<tr>
<td></td>
<td>empty</td>
<td>90 ~ 100 Ω</td>
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<tr>
<td><strong>Starting circuit cut-off relay:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model/manufacturer</td>
<td>G8R-30Y-J/OMRON</td>
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</tr>
<tr>
<td>Coil winding resistance</td>
<td>162 ~ 198 Ω</td>
<td>***</td>
</tr>
<tr>
<td>Diode</td>
<td>Yes</td>
<td>***</td>
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<tr>
<td><strong>Oil level switch relay:</strong></td>
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<td></td>
</tr>
<tr>
<td>Model/manufacturer</td>
<td>G8D-117Y-2/OMRON</td>
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<td><strong>Circuit breaker:</strong></td>
<td></td>
<td></td>
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<tr>
<td>Type</td>
<td>Fuse</td>
<td>***</td>
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<tr>
<td>Amperage for individual circuit × Q'ty</td>
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<tr>
<td>MAIN</td>
<td>30 A × 1</td>
<td>***</td>
</tr>
<tr>
<td>HEAD LIGHT</td>
<td>15 A × 1</td>
<td>***</td>
</tr>
<tr>
<td>SIGNAL</td>
<td>15 A × 1</td>
<td>***</td>
</tr>
<tr>
<td>IGNITION</td>
<td>7.5 A × 1</td>
<td>***</td>
</tr>
<tr>
<td>Reserve</td>
<td>30 A × 1</td>
<td>***</td>
</tr>
<tr>
<td></td>
<td>15 A × 1</td>
<td>***</td>
</tr>
<tr>
<td></td>
<td>7.5 A × 1</td>
<td>***</td>
</tr>
</tbody>
</table>
### GENERAL TORQUE SPECIFICATIONS

**CONVERSION TABLE**

All specification data in this manual are listed in SI and METRIC UNITS. Use this table to convert METRIC unit data to IMPERIAL unit data.

**Ex.**

<table>
<thead>
<tr>
<th>METRIC</th>
<th>MULTIPLIER</th>
<th>IMP</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>mm</strong></td>
<td>x 0.03937</td>
<td><strong>in</strong></td>
</tr>
<tr>
<td>2 mm</td>
<td>x 0.03937</td>
<td>0.08 in</td>
</tr>
</tbody>
</table>

### GENERAL TIGHTENING TORQUES

This chart specifies tightening torques for standard fasteners with a standard ISO thread pitch. Tightening torque specifications for special components or assemblies are provided for each chapter of this manual. To avoid warpage, tighten multi-fastener assemblies in a criss-cross pattern and progressive stages until the specified tightening torque is reached. Unless otherwise specified, tightening torque specifications require clean, dry threads. Components should be at room temperature.

![Conversion Table Diagram](image)

**A**: Distance across flats  
**B**: Outside thread diameter

<table>
<thead>
<tr>
<th>A (Nut)</th>
<th>B (Bolt)</th>
<th>General specifications torques</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Nm</td>
</tr>
<tr>
<td>10 mm</td>
<td>6 mm</td>
<td>6</td>
</tr>
<tr>
<td>12 mm</td>
<td>8 mm</td>
<td>15</td>
</tr>
<tr>
<td>14 mm</td>
<td>10 mm</td>
<td>30</td>
</tr>
<tr>
<td>17 mm</td>
<td>12 mm</td>
<td>55</td>
</tr>
<tr>
<td>19 mm</td>
<td>14 mm</td>
<td>85</td>
</tr>
<tr>
<td>22 mm</td>
<td>16 mm</td>
<td>130</td>
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## LUBRICATION POINT AND GRADE OF LUBRICANT

### ENGINE

<table>
<thead>
<tr>
<th>Lubrication Point</th>
<th>Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil seal lips</td>
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</tr>
<tr>
<td>O-ring</td>
<td></td>
</tr>
<tr>
<td>Bearing</td>
<td></td>
</tr>
<tr>
<td>Piston surface</td>
<td></td>
</tr>
<tr>
<td>Piston pin</td>
<td></td>
</tr>
<tr>
<td>Crankshaft pin</td>
<td></td>
</tr>
<tr>
<td>Crankshaft journal/big end</td>
<td></td>
</tr>
<tr>
<td>Connecting rod bolt/nut</td>
<td></td>
</tr>
<tr>
<td>Camshaft cam lobe/journal</td>
<td></td>
</tr>
<tr>
<td>Valve stem (IN, EX)</td>
<td></td>
</tr>
<tr>
<td>Valve stem end (IN, EX)</td>
<td></td>
</tr>
<tr>
<td>Valve lifter</td>
<td></td>
</tr>
<tr>
<td>Oil pump rotor (inner/outer), housing</td>
<td></td>
</tr>
<tr>
<td>Oil strainer assembly</td>
<td></td>
</tr>
<tr>
<td>Starter idle gear inner surface</td>
<td></td>
</tr>
<tr>
<td>Starter wheel gear inner surface</td>
<td></td>
</tr>
<tr>
<td>Starter clutch (outer/roller)</td>
<td></td>
</tr>
<tr>
<td>Crankcase cover (push rod hole)</td>
<td></td>
</tr>
<tr>
<td>Primary drive gear/damper</td>
<td></td>
</tr>
<tr>
<td>Transmission gear (wheel/pinion)</td>
<td></td>
</tr>
<tr>
<td>Shift cam</td>
<td></td>
</tr>
<tr>
<td>Shift fork/guide bar</td>
<td></td>
</tr>
<tr>
<td>Shift shaft assembly</td>
<td></td>
</tr>
<tr>
<td>Crankcase mating surfaces</td>
<td></td>
</tr>
<tr>
<td>Blind plug and oil seal (crankcase main gallery)</td>
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</tr>
</tbody>
</table>

Yamaha bond No. 1215
## CHASSIS

<table>
<thead>
<tr>
<th>Lubrication Point</th>
<th>Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steering bearing (upper/lower) and bearing cover lip</td>
<td>🛑</td>
</tr>
<tr>
<td>Front wheel oil seal (left/right)</td>
<td>🛑</td>
</tr>
<tr>
<td>Rear wheel oil seal (left/right)</td>
<td>🛑</td>
</tr>
<tr>
<td>Clutch hub fitting area</td>
<td>🛑</td>
</tr>
<tr>
<td>Rear brake pedal shaft</td>
<td>🛑</td>
</tr>
<tr>
<td>Shift pedal</td>
<td>🛑</td>
</tr>
<tr>
<td>Centerstand sliding surface</td>
<td>🛑</td>
</tr>
<tr>
<td>Sidestand sliding surface</td>
<td>🛑</td>
</tr>
<tr>
<td>Tube guide (throttle grip) inner surface</td>
<td>🛑</td>
</tr>
<tr>
<td>Brake lever bolt, sliding surface</td>
<td>🛑</td>
</tr>
<tr>
<td>Clutch lever bolt, sliding surface</td>
<td>🛑</td>
</tr>
<tr>
<td>Rear footrest pivot</td>
<td>🛑</td>
</tr>
<tr>
<td>Swingarm pivot bearing</td>
<td>🛑</td>
</tr>
<tr>
<td>Swingarm pivot shaft outer surface</td>
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</tr>
<tr>
<td>Swingarm thrust cover lip</td>
<td>🛑</td>
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</tbody>
</table>
LUBRICATION DIAGRAMS

1. Camshaft (intake)
2. Camshaft (exhaust)
3. Main gallery
4. Oil strainer
5. Oil pump
6. Main axle
7. Crankshaft
1 Oil cooler
2 Starter clutch
3 Main axle
4 Drive axle
5 Oil pump
6 Oil pan
7 Relief valve
8 Main gallery
1 Camshaft
2 Crankshaft
3 Oil pump
4 Oil filter
**CABLE ROUTING**

1. Starter motor cable
2. Battery negative (–) lead
3. Battery negative (–) lead connector
4. AC generator connector
5. Rear brake switch lead connector
6. Neutral lead
7. Pickup lead
8. Sidestand switch lead
9. Throttle position sensor
10. Ignition coil lead (#2, 3)
11. Throttle cable
12. Engine ground lead
13. Air ventilation hose
14. Rear brake switch
15. Starting circuit cutoff relay

**A** Fasten the wireharness to the seat rail with a plastic band. Make sure that the end of band downward.

**B** Align the white tape on the wireharness with a plastic band and fasten them to the seat rail. Make sure that the end of band downward.

**C** Fasten the wireharness with the steel clamp on the frame.
**CABLE ROUTING**

- **D** Route the wireharness and starter motor cable in front of the reservoir tank bracket and the battery negative (-) lead behind the reservoir tank bracket. And fasten them with a plastic band.
- **E** Fasten the wireharness, neutral lead, sidestand switch lead, pick-up coil lead, AC generator lead and rear brake switch lead to the frame with a plastic band. Make sure that the end of band forward of motorcycle.
- **F** Fasten the wireharness to the frame with a plastic band. Make sure that the end of band down ward.
- **G** Insert the plastic band through the hole of plastic panel and then fasten the throttle cables with it. Make sure that the end of band inside of motorcycle.
- **H** Fasten the wireharness to the frame with a plastic band. Make sure that the end of band forward.
- **I** Fasten the high tension cables and throttle cables with a plastic clamp.
- **J** Route the air ventilation hoses, air filter case drain hose, fuel tank drain hose and fuel tank breather hose through the engine guide.
- **K** Fasten the AC generator lead, pick-up coil lead, sidestand switch lead and starter motor cable with a plastic band.
L Route the wireharness and starter motor cable behind the side cover bracket and fasten them with a plastic band at front of the bracket.

M Align the white paint marks of the fuel tank drain hose, fuel tank breather hose and air filter case drain hose.

N Touch the brake pipe to the brake caliper stopper.
CABLE ROUTING

1. Clutch hose
2. Starter cable
3. Air filter case drain hose
4. Frame ground
5. Flasher relay connector
6. Oil light relay connector
7. Igniter unit connectors
8. Starter motor
9. AC generator
10. Sidestand switch
11. Sidestand switch lead
12. Ignition coil lead (#1, 4)

A. Insert the plastic band through the hole of plastic panel and then fasten the clutch hose with it. Make sure that the end of band inside of motorcycle.

B. To headlight lower hole.

C. Route the wireharness and starter cable through the guide.

D. Connect the ignition lead with white marking tape to the ignition coil (#1, 4).

E. Fasten the high tension cables (#1, 2) with a plastic clamp. Position the clamp at 50 – 80 mm above the high tension cable number.

F. Fasten the horn lead to the frame with a plastic band. Make sure that the end of band down ward.

G. Install the frame ground and igniter unit together with screw.
**CABLE ROUTING**

**H** Fasten the seat lock cable to the seat real with a plastic band. Make sure that the end of band down ward.

**I** Route the air filter case drain hose over the starter motor to right side of motorcycle.

**J** Position the clutch pipe parallel with the oil filter cover.

**K** Fasten the sidestand switch lead with steel clamp on the frame and then route it between the pickup cover, oil filter cover, AC generator and starter motor to the right side of motorcycle.

**L** Fasten the clutch hose with steel clamp on the frame.

**M** Clamp the gromet on the clutch hose with wire holder on the frame.

**N** Route the speedometer cable through the guide.

**O** Touch the brake pipe to the brake caliper stopper.

**P** Touch the brake pipe to the brake hose joint.
A Position the horn (high) to right side.
B Fasten the throttle cable (front side) to the frame with a plastic clamp.
C Fasten the throttle position sensor with steel clamp on the carburetor (#4).
D To fuel sender.
E Connect the fuel sender connector, neutral switch connector, pickup coil connector and sidestand switch connector above the air filter case.

F Route the battery negative (-) lead inside of the reservoir tank bracket and under the reservoir tank and then connect it.

G Fasten the battery positive (+) lead and battery positive (+) lead connector on the groove of the battery with the battery rubber band.

H Position the starter motor cable at 45 degree outside of the motorcycle.

I Position the wire harness, taillight lead and rear turn signal light leads (left and right) between the taillight bracket and rear fender rib.

J Position the seat lock cable inside under the seat lock bracket.

K Fasten the wire harness to the frame with a plastic band. Make sure that the end of band downward.

L Route the starter cable between the throttle cables.

M Fasten the wire harness, starter cable to the frame with a plastic band. Make sure that end of band downward.

**Fig. A**

**Fig. B**

**Fig. C**

**SPEC**

**CABLE ROUTING**
N Fasten the wireharness, taillight lead and rear turn signal light leads (left and right) with steel clamp on the frame make sure that the end of clamp forward.

O Route the rear turn signal light leads (left and right) through the each holes of the rear fender.

P Touch the starter cable to the stopper and position it vertical of the motorcycle.
A Route the throttle cables through the guide on the headlight stay.

B Route the meter leads, main switch lead into the upper hole of the headlight body.

C Route the handlebar switch lead (left) inside of the clutch hose. Fasten the handlebar switch lead (left), clutch hose and starter cable with a plastic band.

D Route the handlebar switch lead (left) and front turn signal light lead (left) into the left under hole of the headlight body.

E Route the front turn signal light leads (left and right) in front of the headlight body.

F Route the speedometer cable through the guide on the headlight stay.

G To front brake master cylinder.
H Touch the brake pipe to the stopper.

I Route the handlebar switch lead (right) and front turn signal light lead (right) into the right under hole of the headlight stay.

J Fasten the handlebar switch lead (right) and front brake hose with a plastic band.
CHAPTER 3.
PERIODIC INSPECTION
AND ADJUSTMENT

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

PERIODIC MAINTENANCE/LUBRICATION INTERVALS

<table>
<thead>
<tr>
<th>ITEM</th>
<th>REMARKS</th>
<th>BREAK-IN 1,000 km</th>
<th>EVERY 6,000 km or 6 months</th>
<th>EVERY 12,000 km or 12 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valves*</td>
<td>Check valve clearance. Adjust if necessary.</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Spark plugs</td>
<td>Check condition. Clean or replace if necessary.</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Air filter</td>
<td>Clean. Replace if necessary.</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Carburetor*</td>
<td>Check idle speed/synchronization/starter operation. Adjust if necessary.</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Fuel line*</td>
<td>Check fuel hose for cracks or damage. Replace if necessary.</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Fuel filter*</td>
<td>Check condition. Replace if necessary.</td>
<td>○</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Engine oil</td>
<td>Replace (Warm engine before draining).</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Engine oil filter*</td>
<td>Replace.</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Brake*</td>
<td>Check operation/fluid leakage/See NOTE. Correct if necessary.</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Clutch*</td>
<td>Check operation/fluid leakage/See NOTE. Correct if necessary.</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Swingarm pivot*</td>
<td>Check swingarm assembly for looseness. Correct if necessary.</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Rear suspension link pivots*</td>
<td>Check operation. Apply grease lightly every 24,000 km or 24 months.**</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Wheels*</td>
<td>Check balance/damage/runout. Replace if necessary.</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Wheel bearings*</td>
<td>Check bearing assembly for looseness/damage. Replace if damaged.</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Steering bearings*</td>
<td>Check bearing assembly for looseness. Correct if necessary. Moderately repack every 24,000 km or 24 months.</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Front forks*</td>
<td>Check operation/oil leakage. Repair if necessary.</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Rear shock absorber*</td>
<td>Check operation/oil leakage. Repair if necessary.</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Drive chain</td>
<td>Check chain free play/alignment. Adjust if necessary. Clean and lube.</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Fittings/Fasteners*</td>
<td>Check all chassis fittings and fasteners. Correct if necessary.</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Center and sidestand*</td>
<td>Check operation. Repair if necessary.</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Sidestand switch*</td>
<td>Check operation. Clean or replace if necessary.</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>A.C. Generator*</td>
<td>Replace generator brushes every 100,000 km.</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>
PERIODIC MAINTENANCE/LUBRICATION INTERVALS

*: It is recommended that these items be serviced by a Yamaha dealer.
**: Molybdenum disulfide grease.
***: Lithium soap base grease.

NOTE:

Brake fluid replacement:
1. When disassembling the master cylinder, caliper cylinder or clutch release cylinder, replace the brake fluid. Normally check the brake fluid level and add the fluid as required.
2. On the inner parts of the master cylinder, caliper cylinder and clutch release cylinder, replace the oil seals every two years.
3. Replace the brake and clutch hoses every four years, or if cracked or damaged.
### Removing the seat, side cover and fuel tank

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Seat</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Side cover (left)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Side cover (right)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Fuel hose</td>
<td>1/1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Fuel tank</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Fuel sender lead</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Drain hose</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Grab bar</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Rear fender cover</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

**Remove the parts in the order listed.**

**NOTE:** Disconnect the fuel pipe, set the fuel cock lever “ON” or “RES” position.

**For installation, reverse the removal procedure.**
ADJUSTING THE VALVE CLEARANCE

ENGINE
ADJUSTING THE VALVE CLEARANCE

the following procedure applies to all of the valves.

NOTE:

- Valve clearance adjustment should be made on a cold engine, at room temperature.
- When the valve clearance is to be measured or adjusted, the piston must be at top dead center (TDC) on the compression stroke.

1. Remove:
   - seat
   - side covers
   - fuel tank
   Refer to “SEAT, SIDE COVER AND FUEL TANK”.

2. Remove:
   - oil cooler ①
   - air ducts ②

3. Remove:
   - spark plugs ①
   - cylinder head cover ②
   - timing plate cover ③

4. Measure:
   - valve clearance
   - Out of specification → Adjust.

Valve clearance (cold):
- Intake valve 0.11 ~ 0.15 mm
- Exhaust valve 0.16 ~ 0.20 mm
ADJUSTING THE VALVE CLEARANCE

a. Turn the crankshaft counterclockwise.
b. When piston #1 is at TDC on the compression stroke, align the TDC mark (a) on the timing plate with the mark (b) on the pickup coil base plate.

NOTE:
TDC on the compression stroke can be found when the camshaft lobes are turned away from each other.

c. Measure the valve clearance with a thickness gauge (1).

NOTE:
- If the valve clearance is incorrect, record the measured reading.
- Measure the valve clearance in the following sequence.

Valve clearance measuring sequence
Cylinder #1 → #2 → #4 → #3

A Front
B Degrees that the crankshaft is turned counterclockwise
C Cylinder
D Combustion cycle

<table>
<thead>
<tr>
<th>Cylinder</th>
<th>Degrees</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cylinder #2</td>
<td>180°</td>
</tr>
<tr>
<td>Cylinder #4</td>
<td>360°</td>
</tr>
<tr>
<td>Cylinder #3</td>
<td>540°</td>
</tr>
</tbody>
</table>
ADJUSTING THE VALVE CLEARANCE

5. Adjust:
   • Valve clearance

   a. Align the intake and exhaust valve lifter slots with each other.
   b. Slowly turn the crankshaft until the cam lifted at maximum.
   c. Install the tappet adjusting tool ① as shown.

   ![Tappet adjusting tool: P/N 90890-04110](image)

   **NOTE:** Make sure that the tappet adjusting tool touches only the valve lifter ②, not the valve pad ③.

   d. Slowly turn the crankshaft so that the valve pad can be removed.
   e. Remove the valve pad from the valve lifter with a small screwdriver and a pair of tweezers. Make a note of the position of each valve pad and valve pad number so they can be installed in the correct place.
   f. Select the proper valve pad from the following table.

   ![Valve pad thickness range](image)

   **NOTE:**
   - The thickness of each valve pad is marked in hundredths of millimeters on the side that touches the valve lifter (not the camshaft).
   - Since valve pads of various sizes are originally installed, the valve pad number must be rounded in order to reach the closest equivalent to the original.

   g. Round off the original valve pad number according to the following table.
### Exhaust

<table>
<thead>
<tr>
<th>Measured Clearance</th>
<th>Installed Pad Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.00 ~ 0.05</td>
<td>200 205 210 215 220</td>
</tr>
<tr>
<td>0.06 ~ 0.10</td>
<td>200 205 210 215 220</td>
</tr>
<tr>
<td>0.11 ~ 0.15</td>
<td>200 205 210 215 220</td>
</tr>
<tr>
<td>0.16 ~ 0.20</td>
<td>205 210 215 220 225</td>
</tr>
<tr>
<td>0.21 ~ 0.25</td>
<td>210 215 220 225 230</td>
</tr>
<tr>
<td>0.26 ~ 0.30</td>
<td>215 220 225 230 235</td>
</tr>
<tr>
<td>0.31 ~ 0.35</td>
<td>220 225 230 235 240</td>
</tr>
<tr>
<td>0.36 ~ 0.40</td>
<td>225 230 235 240 245</td>
</tr>
<tr>
<td>0.41 ~ 0.45</td>
<td>230 235 240 245 250</td>
</tr>
<tr>
<td>0.46 ~ 0.50</td>
<td>235 240 245 250 255</td>
</tr>
<tr>
<td>0.51 ~ 0.55</td>
<td>240 245 250 255 260</td>
</tr>
<tr>
<td>0.56 ~ 0.60</td>
<td>245 250 255 260 265</td>
</tr>
<tr>
<td>0.61 ~ 0.65</td>
<td>250 255 260 265 270</td>
</tr>
<tr>
<td>0.66 ~ 0.70</td>
<td>255 260 265 270 275</td>
</tr>
<tr>
<td>0.71 ~ 0.75</td>
<td>260 265 270 275 280</td>
</tr>
<tr>
<td>0.76 ~ 0.80</td>
<td>265 270 275 280 285</td>
</tr>
<tr>
<td>0.81 ~ 0.85</td>
<td>270 275 280 285 290</td>
</tr>
<tr>
<td>0.86 ~ 0.90</td>
<td>275 280 285 290 295</td>
</tr>
<tr>
<td>0.91 ~ 0.95</td>
<td>280 285 290 295 300</td>
</tr>
<tr>
<td>0.96 ~ 0.99</td>
<td>285 290 295 300 305</td>
</tr>
<tr>
<td>1.01 ~ 1.05</td>
<td>290 295 300 305 310</td>
</tr>
<tr>
<td>1.06 ~ 1.10</td>
<td>295 300 305 310 315</td>
</tr>
<tr>
<td>1.11 ~ 1.15</td>
<td>300 305 310 315 320</td>
</tr>
<tr>
<td>1.16 ~ 1.20</td>
<td>305 310 315 320 325</td>
</tr>
<tr>
<td>1.21 ~ 1.25</td>
<td>310 315 320 325 330</td>
</tr>
<tr>
<td>1.26 ~ 1.30</td>
<td>315 320 325 330 335</td>
</tr>
<tr>
<td>1.31 ~ 1.35</td>
<td>320 325 330 335 340</td>
</tr>
</tbody>
</table>

### Intake

<table>
<thead>
<tr>
<th>Measured Clearance</th>
<th>Installed Pad Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.00 ~ 0.05</td>
<td>200 205 210 215 220</td>
</tr>
<tr>
<td>0.06 ~ 0.10</td>
<td>200 205 210 215 220</td>
</tr>
<tr>
<td>0.11 ~ 0.15</td>
<td>200 205 210 215 220</td>
</tr>
<tr>
<td>0.16 ~ 0.20</td>
<td>205 210 215 220 225</td>
</tr>
<tr>
<td>0.21 ~ 0.25</td>
<td>210 215 220 225 230</td>
</tr>
<tr>
<td>0.26 ~ 0.30</td>
<td>215 220 225 230 235</td>
</tr>
<tr>
<td>0.31 ~ 0.35</td>
<td>220 225 230 235 240</td>
</tr>
<tr>
<td>0.36 ~ 0.40</td>
<td>225 230 235 240 245</td>
</tr>
<tr>
<td>0.41 ~ 0.45</td>
<td>230 235 240 245 250</td>
</tr>
<tr>
<td>0.46 ~ 0.50</td>
<td>235 240 245 250 255</td>
</tr>
<tr>
<td>0.51 ~ 0.55</td>
<td>240 245 250 255 260</td>
</tr>
<tr>
<td>0.56 ~ 0.60</td>
<td>245 250 255 260 265</td>
</tr>
<tr>
<td>0.61 ~ 0.65</td>
<td>250 255 260 265 270</td>
</tr>
<tr>
<td>0.66 ~ 0.70</td>
<td>255 260 265 270 275</td>
</tr>
<tr>
<td>0.71 ~ 0.75</td>
<td>260 265 270 275 280</td>
</tr>
<tr>
<td>0.76 ~ 0.80</td>
<td>265 270 275 280 285</td>
</tr>
<tr>
<td>0.81 ~ 0.85</td>
<td>270 275 280 285 290</td>
</tr>
<tr>
<td>0.86 ~ 0.90</td>
<td>275 280 285 290 295</td>
</tr>
<tr>
<td>0.91 ~ 0.95</td>
<td>280 285 290 295 300</td>
</tr>
<tr>
<td>0.96 ~ 0.99</td>
<td>285 290 295 300 305</td>
</tr>
<tr>
<td>1.01 ~ 1.05</td>
<td>290 295 300 305 310</td>
</tr>
<tr>
<td>1.06 ~ 1.10</td>
<td>295 300 305 310 315</td>
</tr>
<tr>
<td>1.11 ~ 1.15</td>
<td>300 305 310 315 320</td>
</tr>
<tr>
<td>1.16 ~ 1.20</td>
<td>305 310 315 320 325</td>
</tr>
<tr>
<td>1.21 ~ 1.25</td>
<td>310 315 320 325 330</td>
</tr>
<tr>
<td>1.26 ~ 1.30</td>
<td>315 320 325 330 335</td>
</tr>
<tr>
<td>1.31 ~ 1.35</td>
<td>320 325 330 335 340</td>
</tr>
</tbody>
</table>

### Adjusting the Valve Clearance

**Valve Clearance (cold):**

- 0.11 ~ 0.15 mm

Example: Installed is 250
- Measured clearance is 0.23 mm
- Replace 250 pad with 260 pad
  - Pad number: (example)
  - Pad No. 250 = 2.50 mm
  - Pad No. 260 = 2.60 mm
- Always install pad with number down.
ADJUSTING THE VALVE CLEARANCE

EXAMPLE:
Original valve pad number = 248 (thickness = 2.48 mm (0.098 in))
Rounded value = 250

h. Locate the rounded number of the original valve pad and the measured valve clearance in the valve pad selection table. The point where the column and row intersect is the new valve pad number.

NOTE: The new valve pad number is only an approximation. The valve clearance must be measured again and the above steps should be repeated if the measurement is still incorrect.

i. Install the new valve pad with the numbered side facing down.

j. Remove the tappet adjusting tool.

INTAKE
EXHAUST

k. Measure the valve clearance again.
i. If the valve clearance is still out of specification, repeat all of the valve clearance adjustment steps until the specified clearance is obtained.

6. Install:
   • all removed parts

NOTE: For installation, reverse the removal procedure. Note the following points.

7. Install:
   • fuel tank
   • side covers
   • seat
Refer to “SEAT, SIDE COVER AND FUEL TANK”.
SYNCHRONIZING THE CARBURETORS

NOTE:
Prior to synchronizing the carburetors, the valve clearance and the engine idling speed should be properly adjusted and the ignition timing should be checked.

1. Stand the motorcycle on a level surface.

NOTE:
Place the motorcycle on a suitable stand.

2. Remove:
- side covers
- seat
- fuel tank
Refer to “SEAT, SIDE COVER AND FUEL TANK”.

3. Install:
- vacuum gauge ①
- engine tachometer ②
(to the spark plug lead of cyl. #1)

4. Start the engine and let it warm up for several minutes.

5. Check:
- engine idling speed
  Out of specification → Adjust.
  Refer to “ADJUSTING THE ENGINE IDLING SPEED”.

6. Adjust:
- carburetor synchronization

    a. Synchronize carburetor #1 to carburetor #2
       by turning the synchronizing screw ① in either direction until both gauges read the same.

NOTE:
After each step, rev the engine two or three times, each time for less than a second, and check the synchronization again.
SYNCHRONIZING THE CARBURETORS
ADJUSTING THE ENGINE IDLING SPEED

b. Synchronize carburetor #4 to carburetor #3 by turning the synchronizing screw (2) in either direction until both gauges read the same.

c. Synchronize carburetor #2 to carburetor #3 by turning the synchronizing screw (3) in either direction until both gauges read the same.

NOTE:

The difference in vacuum pressure between two carburetors should not exceed 1.33 kPa (10 mm Hg, 0.4 in Hg).

7. Check:

• engine idling speed
  Out of specification → Adjust.

8. Stop the engine and remove the measuring equipment.

9. Adjust:

• throttle cable free play
  Refer to “ADJUSTING THE THROTTLE CABLE FREE PLAY”.

10. Install:

• fuel tank
• seat
• side covers
  Refer to “SEAT, SIDE COVER AND FUEL TANK”.

ADJUSTING THE ENGINE IDLING SPEED

NOTE:

Prior to adjusting the engine idling speed, the carburetor synchronization should be adjusted properly, the air filter should be clean, and the engine should have adequate compression.

1. Start the engine and let it warm up for several minutes.

2. Install:

• engine tachometer (1)
  (to the spark plug lead of cyl. #1)
ADJUSTING THE ENGINE IDLING SPEED

3. Measure:
- engine idling speed
  Out of specification → Adjust.

4. Adjust:
- engine idling speed

- a. Turn the pilot screw ① in or out until it is lightly seated.
- b. Turn the pilot screw out the specified number of turns.

5. Adjust:
- throttle cable free play
  Refer to “ADJUSTING THE THROTTLE CABLE FREE PLAY”.

NOTE:
Prior to adjusting the throttle cable free play, the engine idling speed and carburetor synchronization should be adjusted properly.

1. Check:
- throttle cable free play ②
  Out of specification → Adjust.

Throttle cable free play (at the flange of the throttle grip)
3 ~ 5 mm
2. Remove:
   • seat
   • fuel tank
   Refer to “SEAT, SIDE COVER AND FUEL TANK”.
3. Adjust:
   • throttle cable free play

**NOTE:**
When the motorcycle is accelerating, the accelerator cable (1) is pulled.

**Carburetor side**
a. Loosen the locknut (2) (3) on the decelerator cable.
b. Turn the adjusting nut (4) in direction (a) or (b) to take up any slack on the decelerator cable.
c. Loosen the locknut (5) on the accelerator cable.
d. Turn the adjusting nut (6) in direction (a) or (b) until the specified throttle cable free play is obtained.

<table>
<thead>
<tr>
<th>Direction (a)</th>
<th>Throttle cable free play is increased.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direction (b)</td>
<td>Throttle cable free play is decreased.</td>
</tr>
</tbody>
</table>

e. Tighten the locknuts.

**NOTE:**
If the specified throttle cable free play cannot be obtained on the carburetor side of the cable, use the adjusting nut on the handlebar side.

**Handlebar side**
a. Loosen the locknut (7).
b. Turn the adjusting nut (8) in direction (a) or (b) until the specified throttle cable free play is obtained.

c. Tighten the locknut.

⚠️ **WARNING**
After adjusting the throttle cable free play, turn the handlebar to the right and to the left to ensure that this does not cause the engine idling speed to change.

**NOTE:**

4. Install:
   • fuel tank
   • seat
   Refer to “SEAT, SIDE COVER AND FUEL TANK”.

---

3-12
CHECKING THE SPARK PLUGS

The following procedure applies to all of the spark plugs.

1. Disconnect:
   • spark plug cap

2. Remove:
   • spark plug

CAUTION:

Before removing the spark plugs, blow away any dirt accumulated in the spark plug wells with compressed air to prevent it from falling into the cylinders.

3. Check:
   • spark plug type
     Incorrect → Change.

Spark plug type (manufacturer)
DPR8EA-9 (NGK)
X24EPR-U9 (DENSO)

4. Check
   • electrode ①
     Damage/wear → Replace the spark plug.
   • insulator ②
     Abnormal color → Replace the spark plug.
     Normal color is a medium-to-light tan color.

5. Clean:
   • spark plug
     (with a spark plug cleaner or wire brush)

6. Measure:
   • spark plug gap ①
     (with a wire gauge)
     Out of specification → Regap.

   Spark plug gap
   0.8 ~ 0.9 mm

7. Install:
   • spark plug

   Spark plug
   18 Nm (1.8 m•kg)

NOTE:

Before installing the spark plug clean the spark plug and gasket surface.

8. Connect:
   • spark plug cap

CHECKING THE IGNITION TIMING

NOTE:

Prior to checking the ignition timing, check the wiring connections of the entire ignition system. Make sure that all connections are tight and free of corrosion.

1. Remove:
   • timing plate cover ①
CHECKING THE IGNITION TIMING

2. Install:
   - timing light ①
   - engine tachometer ②
     (to the spark plug lead of cyl. #1)

   ![Image of timing light and engine tachometer](image_url)

   **Timing light**
   90890-03141
   **Engine tachometer**
   90890-03113

3. Check:
   - ignition timing

   ▲▼▲▼▲▼▲▼▲▼▲▼▲▼▲▼▲▼▲▼▲▼▲▼▲▼^……
   a. Start the engine, warm it up for several minutes, and then let it run at the specified engine idling speed.

   ![Image of engine idling speed](image_url)

   **Engine idling speed**
   1,000 ～ 1,100 r/min

   b. Check that the pickup coil ③ is within the firing range ④ on the timing plate.
   Incorrect firing range → Check the ignition system.

   **NOTE:**
   The ignition timing is not adjustable.

4. Remove:
   - engine tachometer
   - timing light

5. Install:
   - timing plate cover

   ![Image of timing plate cover](image_url)

   **Timing plate cover bolt:**
   7 Nm (0.7 m·kg)
   LOCTITE®

MEASURING THE COMPRESSION PRESSURE

The following procedure applies to all of the cylinders.

**NOTE:**
Insufficient compression pressure will result in a loss of performance.

1. Check:
   - valve clearance
     Out of specification → Adjust.
     Refer to “ADJUSTING THE VALVE CLEARANCE”.

2. Start the engine, warm it up for several minutes, and then turn it off.
MEASURING THE COMPRESSION PRESSURE

3. Disconnect:
   • spark plug cap

4. Remove:
   • spark plug

**CAUTION:**

Before removing the spark plugs, use compressed air to blow away any dirt accumulated in the spark plug wells to prevent it from falling into the cylinders.

5. Install:
   • compression gauge ①
   • adapter ②

6. Measure:
   • compression pressure

   Above the maximum pressure → Inspect the cylinder head, valve surfaces, and piston crown for carbon deposits.
   Below the minimum pressure → Squirt a few drops of oil into the affected cylinder and measure again.
   • Refer to the following table.

<table>
<thead>
<tr>
<th>Reading</th>
<th>Diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Higher than without oil</td>
<td>Piston wear or damage → Repair.</td>
</tr>
<tr>
<td>Same as without oil</td>
<td>Piston ring(-s), valves, cylinder head gasket or piston possibly defective → Repair. Compression pressure (at sea level)</td>
</tr>
</tbody>
</table>

**Compression pressure (at sea level):**

- **Standard:**
  1,050 kPa (10.5 kg/cm², 10.5 bar)/400 r/min.

- **Minimum:**
  900 kPa (9.0 kg/cm², 9.0 bar)/400 r/min.

- **Maximum:**
  1,200 kPa (12.0 kg/cm², 12.0 bar)/400 r/min.
MEASURING THE COMPRESSION PRESSURE/
CHECKING THE ENGINE OIL LEVEL

- a. Turn the main switch to "ON".
- b. With the throttle wide open, crank the engine until the reading on the compression gauge stabilizes.

**WARNING**
To prevent sparking, ground all spark plug leads before cranking the engine.

**NOTE:**
The difference in compression pressure between cylinders should not exceed 100 kPa (1 kg/cm², 1 bar).

- 7. Install:
  - spark plug

<table>
<thead>
<tr>
<th>Spark plug</th>
<th>18 Nm (1.8 m·kg)</th>
</tr>
</thead>
</table>

- 8. Connect:
  - spark plug cap

CHECKING THE ENGINE OIL LEVEL
1. Stand the motorcycle on a level surface.

**NOTE:**
- Place the motorcycle on a suitable stand.
- Make sure that the motorcycle is upright.

2. Let the engine idle for a few minutes, and then stop it.
3. Check:
  - engine oil level
  
  The engine oil level should be between the minimum level marks a and maximum level marks b. Below the minimum level mark → Add the recommended engine oil to the proper level.

**Recommended engine oil**
Refer to the chart for the engine oil grade which is best suited for certain atmospheric temperatures.

<table>
<thead>
<tr>
<th>API standard</th>
<th>ACEA standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>SE or higher grade</td>
<td>G4 or G5</td>
</tr>
</tbody>
</table>
CHECKING THE ENGINE OIL LEVEL / CHANGING THE ENGINE OIL

CAUTION:

• Engine oil also lubricates the clutch and the wrong oil types or additives could cause clutch slippage. Therefore, do not add any chemical additives or use engine oils with a grade of CD ✭ or higher and do not use oils labeled “ENERGY CONSERVING II” ☀ or higher.

• Do not allow foreign materials to enter the crankcase.

4. Start the engine, warm it up for several minutes, and then turn it off.
5. Check the engine oil level again.

NOTE:

Before checking the engine oil level, wait a few minutes until the oil has settled.

CHANGING THE ENGINE OIL

1. Start the engine, warm it up for several minutes, and then turn it off.
2. Place a container under the engine oil drain bolt.
3. Remove:
   • engine oil filler cap
   • engine oil drain bolt ①
4. Drain:
   • engine oil (completely from the crankcase)
5. If the oil filter element is also to be replaced, perform the following procedure.
   a. Remove the oil filter element cover ① and oil filter element ②.
   b. Check the O-ring ③ and replace it if it is cracked or damaged.
   c. Install the new oil filter element and the oil filter element cover.
   Oil filter element cover bolt 15 Nm (1.5 m·kg)

6. Check:
   • engine oil drain bolt gasket
     Damage → Replace.
7. Install:
   • engine oil drain bolt
   Engine oil drain bolt 43 Nm (4.3 m·kg)

8. Fill:
   • crankcase
     (with the specified amount of the recommended engine oil)
CHANGING THE ENGINE OIL/MEASURING THE ENGINE OIL PRESSURE

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Total amount</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4.2 L</td>
</tr>
<tr>
<td>Without oil filter element replacement</td>
<td>3 L</td>
</tr>
<tr>
<td>With oil filter element replacement</td>
<td>3.35 L</td>
</tr>
</tbody>
</table>

9. Install:
- engine oil filler cap
10. Start the engine, warm it up for several minutes, and then turn it off.
11. Check:
- engine
  (for engine oil leaks)
12. Check:
- engine oil level
  Refer to “CHECKING THE ENGINE OIL LEVEL”.

MEASURING THE ENGINE OIL PRESSURE

1. Check:
- engine oil level
  Below the minimum level mark → Add the recommended engine oil to the proper level.
2. Start the engine, warm it up for several minutes, and then turn it off.

**CAUTION:**

When the engine is cold, the engine oil will have a higher viscosity, causing the engine oil pressure to increase. Therefore, be sure to measure the engine oil pressure after warming up the engine.

3. Remove:
- main gallery bolt

**WARNING**

The engine, muffler and engine oil are extremely hot.

4. Install:
- oil pressure gauge ①
- oil pressure adapter B ②

**Oil pressure gauge**
90890-03153

**Oil pressure adapter B**
90890-03124

5. Measure:
- engine oil pressure
  (at the following conditions)
MEASURING THE ENGINE OIL PRESSURE/
ADJUSTING THE CLUTCH LEVER

Engine oil pressure
80 kPa (0.8 kg/cm², 0.8 bar)
Engine speed
Approx. 1000 r/min
Engine oil temperature
70 ~ 80°C (158 ~ 176°F)

Out of specification → Adjust.

<table>
<thead>
<tr>
<th>Engine oil pressure</th>
<th>Possible causes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below specification</td>
<td>Faulty oil pump</td>
</tr>
<tr>
<td></td>
<td>Clogged oil filter</td>
</tr>
<tr>
<td></td>
<td>Leaking oil passage</td>
</tr>
<tr>
<td></td>
<td>Broken or damaged oil seal</td>
</tr>
<tr>
<td>Above specification</td>
<td>Leaking oil passage</td>
</tr>
<tr>
<td></td>
<td>Faulty oil filter</td>
</tr>
<tr>
<td></td>
<td>Oil viscosity too high</td>
</tr>
</tbody>
</table>

6. Install:
• main gallery bolt

Main gallery bolt
12 Nm (1.2 m•kg)

ADJUSTING THE CLUTCH LEVER
1. Adjust:
• clutch lever position
  (distance ③ from the handlebar grip to the clutch lever)

a. While pushing the clutch lever forward, turn the adjusting dial ① until the clutch lever is in the desired position.

NOTE:
Be sure to align the setting on the adjusting dial with the arrow mark ② on the clutch lever holder.

<table>
<thead>
<tr>
<th>Position #1 ⑥</th>
<th>Distance ③ is the largest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Position #4 ⑦</td>
<td>Distance ③ is the smallest</td>
</tr>
</tbody>
</table>

WARNING
After adjusting the clutch lever position, make sure that the pin on the clutch lever holder is firmly inserted in the hole in the adjusting dial.
CHECKING THE CLUTCH FLUID LEVEL

1. Stand the motorcycle on a level surface.

**NOTE:**
Place the motorcycle on a suitable stand.

2. Check:
   - clutch fluid level
     Below the minimum level mark → Add the recommended clutch fluid to the proper level.

**Recommended clutch fluid**
Brake fluid DOT 4

**WARNING**
- Use only the designated clutch fluid. Other clutch fluids may cause the rubber seals to deteriorate, causing leakage and poor clutch performance.
- Refill with the same type of clutch fluid that is already in the system. Mixing clutch fluids may result in a harmful chemical reaction, leading to poor clutch performance.
- When refilling, be careful that water does not enter the reservoir. Water will significantly lower the boiling point of the clutch fluid and could cause vapor lock.

**CAUTION:**
Clutch fluid may damage painted surfaces or plastic parts. Therefore, always clean up any spilt clutch fluid immediately.

**NOTE:**
In order to ensure a correct reading of the clutch fluid level, make sure that the top of the reservoir is horizontal.

BLEEDING THE HYDRAULIC CLUTCH SYSTEM

**WARNING**
Bleed the hydraulic clutch system whenever:
- the system was disassembled,
- a clutch hose was loosened or removed,
- the clutch fluid level is very low,
- clutch operation is faulty.
NOTE:

- Be careful not to spill any clutch fluid or allow the clutch master cylinder reservoir to overflow.
- When bleeding the hydraulic clutch system, make sure that there is always enough clutch fluid before applying the clutch lever. Ignoring this precaution could allow air to enter the hydraulic clutch system, considerably lengthening the bleeding procedure.
- If bleeding is difficult, it may be necessary to let the clutch fluid settle for a few hours. Repeat the bleeding procedure when the tiny bubbles in the hose have disappeared.

1. Bleed:
   - hydraulic clutch system

   a. Add the recommended clutch fluid to the proper level.
   b. Install the clutch master cylinder reservoir diaphragm.
   c. Connect a clear plastic hose tightly to the bleed screw.
   d. Place the other end of the hose into a container.
   e. Slowly squeeze the clutch lever several times.
   f. Fully squeeze the clutch lever without releasing it.
   g. Loosen the bleed screw.
      This will release the tension and cause the clutch lever to contact the handlebar grip.
   h. Tighten the bleed screw and then release the clutch lever.
   i. Repeat steps (e) to (h) until all of the air bubbles have disappeared from the clutch fluid in the plastic hose.
   j. Tighten the bleed screw to specification.

   Bleed screw
   6 Nm (0.6 m•kg)

   k. Add the recommended clutch fluid to the proper level.
      Refer to “CHECKING THE CLUTCH FLUID LEVEL”.

   ☢️ WARNING

   After bleeding the hydraulic clutch system, check the clutch operation.
CLEANING THE AIR FILTER ELEMENT

1. Remove:
   • side cover (right)
     Refer to “SEAT, SIDE COVER AND FUEL TANK”.
   • air filter case cover ①

2. Remove:
   • air filter element ②

3. Clean:
   • air filter element ①
     Apply compressed air to the inner surface of the air filter element.

4. Check:
   • air filter element
     Damage → Replace.

5. Install:
   • air filter element
   • air filter case cover
     (along with the gasket)

CAUTION:

Never operate the engine without the air filter element installed. Unfiltered air will cause rapid wear of engine parts and may damage the engine. Operating the engine without the air filter element will also affect the carburetor tuning, leading to poor engine performance and possible overheating.

NOTE:

Make sure that the air filter element is properly installed in the air filter case.

6. Install:
   • side cover (right)
     Refer to “SEAT, SIDE COVER AND FUEL TANK”.

E000087
CHECKING THE CARBURETOR JOINTS AND INTAKE MANIFOLDS

The following procedure applies to all of the carburetor joints and intake manifolds.

1. Remove:
   - seat
   - side cover
   - fuel tank
   Refer to “SEAT, SIDE COVER AND FUEL TANK”.

2. Check:
   - carburetor joint ①
   - intake manifold ②
   Cracks/damage → Replace.
   Refer to “CARBURETOR” in chapter 6.

3. Install:
   - fuel tank
   - side cover
   - seat
   Refer to “SEAT, SIDE COVER AND FUEL TANK”.

CHECKING THE FUEL AND VACUUM HOSES

The following procedure applies to all of the fuel and vacuum hoses.

1. Remove:
   - seat
   - fuel tank
   Refer to “SEAT, SIDE COVER AND FUEL TANK”.

2. Check:
   - vacuum hose ①
   - fuel hose ②
   Cracks/damage → Replace.
   Loose connection → Connect properly.

3. Install:
   - fuel tank
   - seat
   Refer to “SEAT, SIDE COVER AND FUEL TANK”.
CHECKING THE CRANKCASE BREATHER HOSE

CAUTION:

Make sure that the crankcase breather hose is routed correctly.

CHECKING THE EXHAUST SYSTEM

The following procedure applies to all of the exhaust pipes, mufflers and gaskets.

1. Check:
   - exhaust pipe
   - muffler
   - gasket
   - Exhaust gas leaks → Replace.
2. Check:
   - tightening torque

Exhaust pipe nut
25 Nm (2.5 m•kg)

Exhaust pipe and exhaust chamber screw
20 Nm (2.0 m•kg)

Muffler bracket bolt
20 Nm (2.0 m•kg)

Exhaust chamber bolt
25 Nm (2.5 m•kg)

Exhaust chamber and muffler bolt
20 Nm (2.0 m•kg)

Muffler and stay bolt
20 Nm (2.0 m•kg)
ADJUSTING THE FRONT BRAKE

CHASSIS

ADJUSTING THE FRONT BRAKE

1. Adjust:
   - brake lever position
     (distance \( a \) from the throttle grip to the brake lever)

   a. While pushing the brake lever forward, turn the adjusting dial \( 1 \) until the brake lever is in the desired position.

NOTE:

Be sure to align the setting on the adjusting dial with the arrow mark \( 2 \) on the brake lever holder.

<table>
<thead>
<tr>
<th>Position #1</th>
<th>Distance ( 3 ) is the largest.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Position #4</td>
<td>Distance ( 3 ) is the smallest.</td>
</tr>
</tbody>
</table>

WARNING

After adjusting the brake lever position, make sure that the pin on the brake lever holder is firmly inserted in the hole in the adjusting dial.

ADJUSTING THE REAR BRAKE

1. Check:
   - brake pedal position
     (distance \( 3 \) from the top of the rider footrest to the top of the brake pedal)

     Out of specification → Adjust.

   - Brake pedal position (below the top of the rider footrest)
     45 mm

2. Adjust:
   - brake pedal position

   a. Loosen the locknut \( 1 \).
   b. Turn the adjusting bolt \( 2 \) in direction \( a \) or \( b \) until the specified brake pedal position is obtained.

   - Direction \( a \) Brake pedal is lowered.
   - Direction \( b \) Brake pedal is raised.

WARNING

After adjusting the brake pedal position, check that the end of the adjusting bolt \( 2 \) is visible through the hole \( 3 \).
ADJUSTING THE REAR BRAKE/ CHECKING THE BRAKE FLUID LEVEL

WARNING
A soft or spongy feeling in the brake pedal can indicate the presence of air in the brake system. Before the vehicle is operated, the air must be removed by bleeding the brake system. Air in the brake system will considerably reduce braking performance and could result in loss of control and possibly an accident. Therefore, inspect and, if necessary, bleed the brake system.

CAUTION:
After adjusting the brake pedal position, make sure that there is no brake drag.

3. Adjust:
   • rear brake light switch
     Refer to “ADJUSTING THE REAR BRAKE LIGHT SWITCH”.

CHECKING THE BRAKE FLUID LEVEL
1. Stand the motorcycle on a level surface.

NOTE:
• Place the motorcycle on a suitable stand.
• Make sure that the motorcycle is upright.

2. Check:
   • brake fluid level
     Below the minimum level mark (②) → Add the recommended brake fluid to the proper level.

Recommended brake fluid
DOT 4

Front brake
Rear brake

WARNING
• Use only the designated brake fluid. Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.
• Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor brake performance.

c. Tighten the locknut ① to specification.

<table>
<thead>
<tr>
<th>Locknut</th>
</tr>
</thead>
<tbody>
<tr>
<td>18 Nm (1.8 m•kg)</td>
</tr>
</tbody>
</table>

Recommended brake fluid
DOT 4
CHECKING THE BRAKE FLUID LEVEL / CHECKING THE BRAKE PADS / ADJUSTING THE REAR BRAKE LIGHT SWITCH

- When refilling, be careful that water does not enter the reservoir. Water will significantly lower the boiling point of the brake fluid and could cause vapor lock.

CAUTION:

Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilled brake fluid immediately.

NOTE:

In order to ensure a correct reading of the brake fluid level, make sure that the top of the reservoir is horizontal.

CHECKING THE BRAKE PADS

The following procedure applies to all of the brake pads.

1. Operate the brake.
2. Check:
   - front brake pad
   - rear brake pad
   Brake pad almost worn to the wear indicator line → Replace the brake pads as a set. Refer to “REPLACING THE FRONT BRAKE PADS” and “REPLACING THE REAR BRAKE PADS” in chapter 6.

ADJUSTING THE REAR BRAKE LIGHT SWITCH

NOTE:

The rear brake light switch is operated by movement of the brake pedal. The rear brake light switch is properly adjusted when the brake light comes on just before the braking effect starts.

1. Check:
   - rear brake light operation timing
     Incorrect → Adjust.
2. Adjust:
   - rear brake light operation timing

a. Hold the main body of the rear brake light switch so that it does not rotate and turn the adjusting nut in direction A or B until the rear brake light comes on at the proper time.
BLEEDING THE HYDRAULIC BRAKE SYSTEM

EAS00134

BLEEDING THE HYDRAULIC BRAKE SYSTEM

**WARNING**

Bleed the hydraulic brake system whenever:
- the system was disassembled,
- a brake hose was loosened or removed,
- the brake fluid level is very low,
- brake operation is faulty.

**NOTE:**
- Be careful not to spill any brake fluid or allow the brake master cylinder reservoir or brake fluid reservoir to overflow.
- When bleeding the hydraulic brake system, make sure that there is always enough brake fluid before applying the brake. Ignoring this precaution could allow air to enter the hydraulic brake system, considerably lengthening the bleeding procedure.
- If bleeding is difficult, it may be necessary to let the brake fluid settle for a few hours. Repeat the bleeding procedure when the tiny bubbles in the hose have disappeared.

1. Bleed:
   - hydraulic brake system

   a. Add the recommended brake fluid to the proper level.
   b. Install the diaphragm (brake master cylinder reservoir or brake fluid reservoir).
   c. Connect a clear plastic hose tightly to the bleed screw.

   ![Diagram A](image)

   **A Front**
   **B Rear**
   d. Place the other end of the hose into a container.
   e. Slowly apply the brake several times.
   f. Fully squeeze the brake lever or fully depress the brake pedal and hold it in position.
   g. Loosen the bleed screw.
      This will release the tension and cause the brake lever to contact the throttle grip or the brake pedal to fully extend.
   h. Tighten the bleed screw and then release the brake lever or brake pedal.
   i. Repeat steps (e) to (h) until all of the air bubbles have disappeared from the brake fluid in the plastic hose.
   j. Tighten the bleed screw to specification.
BLEEDING THE HYDRAULIC BRAKE SYSTEM/
ADJUSTING THE SHIFT PEDAL/
ADJUSTING THE DRIVE CHAIN SLACK

---

**WARNING**

After bleeding the hydraulic brake system, check the brake operation.

---

**NOTE:**

- **CAUTION:**

Bleed screw

6 Nm (0.6 m•kg)

k. Fill the reservoir to the proper level. Refer to “CHECKING THE BRAKE FLUID LEVEL”.

---

**ADJUSTING THE SHIFT PEDAL**

1. Check:
   - shift pedal position
   - The end ① of the shift pedal is above the shift rod. (The angle ② should be approximately 90°.)
   - Incorrect → Adjust.

2. Adjust:
   - shift pedal position

---

**ADJUSTING THE DRIVE CHAIN SLACK**

**NOTE:**

The drive chain slack must be checked at the tightest point on the chain.

---

**CAUTION:**

A drive chain that is too tight will overload the engine and other vital parts, and one that is too loose can skip and damage the swingarm or cause an accident. Therefore, keep the drive chain slack within the specified limits.
ADJUSTING THE DRIVE CHAIN SLACK

1. Stand the motorcycle on a level surface.

**WARNING**

Securely support the motorcycle so that there is no danger of it falling over.

**NOTE:**

Place the motorcycle on a suitable stand so that the rear wheel is elevated.

2. Rotate the rear wheel several times and check the drive chain to locate its tightest point.

3. Check:
   - drive chain slack
     Out of specification → Adjust.

<table>
<thead>
<tr>
<th>Drive chain slack</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 ~ 30 mm</td>
</tr>
</tbody>
</table>

4. Adjust:
   - drive chain slack

   a. Loosen the tensionbar bolt.
   b. Loosen the wheel axle nut.
   c. Loosen both locknuts.
   d. Turn both adjusting bolt in direction or until the specified drive chain slack is obtained.

<table>
<thead>
<tr>
<th>Direction</th>
<th>Drive chain is tightened.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direction</td>
<td>Drive chain is loosened.</td>
</tr>
</tbody>
</table>

**NOTE:**

To maintain the proper wheel alignment, adjust both sides evenly.

f. Tighten both locknuts to specification.

<table>
<thead>
<tr>
<th>Locknut</th>
</tr>
</thead>
<tbody>
<tr>
<td>16 Nm (1.6 m·kg)</td>
</tr>
</tbody>
</table>

g. Tighten the wheel axle nut to specification.

<table>
<thead>
<tr>
<th>Wheel axle nut</th>
</tr>
</thead>
<tbody>
<tr>
<td>150 Nm (15.0 m·kg)</td>
</tr>
</tbody>
</table>

**WARNING**

Always use a new cotter pin.
CAUTION:

Do not loosen the wheel axle nut after tightening it to the specified torque. If the groove in the wheel axle nut is not aligned with the cotter pin hole in the wheel axle, tighten the nut further until they are aligned.

i. Tighten the tensionbar bolt to specification.

<table>
<thead>
<tr>
<th>Tensionbar bolt</th>
</tr>
</thead>
<tbody>
<tr>
<td>23 Nm (2.3 m/kg)</td>
</tr>
</tbody>
</table>

LUBRICATING THE DRIVE CHAIN

The drive chain consists of many interacting parts. If the drive chain is not maintained properly, it will wear out rapidly. Therefore, the drive chain should be serviced, especially when the motorcycle is used in dusty areas. This motorcycle has a drive chain with small rubber O-rings ① between each side plate. Steam cleaning, high-pressure washing, certain solvents, and the use of a coarse brush can damage these O-rings. Therefore, use only kerosine to clean the drive chain. Wipe the drive chain dry and thoroughly lubricate it with engine oil or chain lubricant that is suitable for O-ring chains. Do not use any other lubricants on the drive chain since they may contain solvents that could damage the O-rings.

Recommended lubricant

Engine oil or chain lubricant suitable for O-ring chains
CHECKING AND ADJUSTING THE STEERING HEAD

1. Stand the motorcycle on a level surface.

**WARNING**

Securely support the motorcycle so that there is no danger of it falling over.

**NOTE:**

Place the motorcycle on a suitable stand so that the front wheel is elevated.

2. Check:
   - steering head
     Grasp the bottom of the front fork legs and gently rock the front fork.
     Looseness or binding → Adjust the steering head.

3. Remove:
   - seat
   - fuel tank
     Refer to “SEAT, SIDE COVER AND FUEL TANK”.

4. Remove:
   - headlight unit ①

5. Remove:
   - headlight body ①

6. Disconnect:
   - speed meter cable ①

7. Remove:
   - meter assembly ②
   - headlight stay ③
8. Remove:
- upper handlebar holder ①
- handlebar ②

9. Remove:
- handle crown ①

10. Adjust:
- steering head

\[\text{Note:} \]
- a. Remove the lock washer ①, the upper ring nut ②, and the rubber washer ③.
- b. Loosen the lower ring nut ④ and then tighten it to specification with a ring nut wrench ⑤.

**NOTE:**
Set the torque wrench at a right angle to the ring nut wrench.

```
Ring nut wrench
90890-01403
```

```
Lower ring nut (initial tightening torque) 52 Nm (5.2 m·kg)
```

- c. Loosen the lower ring nut ④ completely, then tighten it to specification.

**WARNING**
Do not overtighten the lower ring nut.

```
Lower ring nut (final tightening torque) 18 Nm (1.8 m·kg)
```

- d. Check the steering head for looseness or binding by turning the front fork all the way in both directions. If any binding is felt, remove the lower bracket and inspect the upper and lower bearings. Refer to “STEERING HEAD AND HANDLEBAR” in chapter 7.
CHECKING AND ADJUSTING THE STEERING HEAD/
CHECKING THE FRONT FORK

11. Install:
   * handle crown

   **Steering stem nut**
   110 Nm (11.0 m·kg)
   **Upper bracket pinch bolt**
   30 Nm (3.0 m·kg)

12. Install:
   * handlebar
13. Install:
   * upper handlebar holder

   **Handlebar holder bolt**
   23 Nm (2.3 m·kg)

CHECKING THE FRONT FORK

1. Stand the motorcycle on a level surface.

   **WARNING**

   Securely support the motorcycle so that there is no danger of it falling over.

2. Check:
   * inner tube
     Damage/scratches → Replace.
   * oil seal
     Oil leakage → Replace.
3. Hold the motorcycle upright and apply the front brake.
4. Check:
   * operation
     Push down hard on the handlebar several times and check if the front fork rebounds smoothly.
     Unsmooth operation → Repair.
     Refer to "FRONT FORK" in chapter 6.
ADJUSTING THE FRONT FORK LEGS

The following procedure applies to both of the front fork legs.

**WARNING**

- Always adjust both front fork legs evenly. Uneven adjustment can result in poor handling and loss of stability.
- Securely support the motorcycle so that there is no danger of it falling over.

Spring preload

**CAUTION:**

- Grooves are provided to indicate the adjustment position.
- Never go beyond the maximum or minimum adjustment positions.

1. Adjust:
   - Spring preload
     
     TURN THE ADJUSTING BOLT 1 IN DIRECTION A OR B.

<table>
<thead>
<tr>
<th>Direction</th>
<th>Spring preload is increased (suspension is harder).</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>Spring preload is decreased (suspension is softer).</td>
</tr>
</tbody>
</table>

Adjusting positions

- Standard: 5
- Minimum: 7 (Soft)
- Maximum: 1 (Hard)

---

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ADJUSTING THE REAR SHOCK ABSORBER ASSEMBLIES

The following procedure applies to both of the rear shock absorber assemblies.

**WARNING**

- Securely support the motorcycle so that there is no danger of it falling over.
- Always adjust both rear shock absorber assemblies evenly. Uneven adjustment can result in poor handling and loss of stability.

**CAUTION:**

Never go beyond the maximum or minimum adjustment positions.

1. Adjust:
   - spring preload

   **NOTE:**

   Adjust the spring preload with the special wrench and extension bar included in the owner’s tool kit.

   a. Turn the spring seat ① in direction ③ or ⑥.

<table>
<thead>
<tr>
<th>Direction</th>
<th>Spring preload is increased (suspension is harder).</th>
</tr>
</thead>
<tbody>
<tr>
<td>③</td>
<td></td>
</tr>
<tr>
<td>⑥</td>
<td>Spring preload is decreased (suspension is softer).</td>
</tr>
</tbody>
</table>

   **Adjusting positions**
   - Standard: 1
   - Minimum: 1
   - Maximum: 3
CHECKING THE TIRES

CHECKING THE TIRES

The following procedure applies to both of the tires.

1. Measure:
   • tire pressure
     Out of specification → Regulate.

**WARNING**

• The tire pressure should only be checked and regulated when the tire temperature equals the ambient air temperature.
• The tire pressure and the suspension must be adjusted according to the total weight (including cargo, rider, passenger and accessories) and the anticipated riding speed.
• Operation of an overloaded motorcycle could cause tire damage, an accident or an injury.

NEVER OVERLOAD THE MOTORCYCLE.

---

### Basic weight
(with oil and a full fuel tank)

- **253 kg**

### Maximum load

- **207 kg**

<table>
<thead>
<tr>
<th>Cold tire pressure</th>
<th>Front tire</th>
<th>Rear tire</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 90 kg load*</td>
<td>250 kPa (2.5 kg/cm², 2.5 bar)</td>
<td>250 kPa (2.5 kg/cm², 2.5 bar)</td>
</tr>
<tr>
<td>90 kg – Maximum load*</td>
<td>250 kPa (2.5 kg/cm², 2.5 bar)</td>
<td>290 kPa (2.9 kg/cm², 2.9 bar)</td>
</tr>
<tr>
<td>High speed riding</td>
<td>250 kPa (2.5 kg/cm², 2.5 bar)</td>
<td>290 kPa (2.9 kg/cm², 2.9 bar)</td>
</tr>
</tbody>
</table>

* Load is the total weight of cargo, rider, passenger and accessories
CHECKING THE TIRES

WARNING

It is dangerous to ride with a worn-out tire. When the tire tread reaches the wear limit, replace the tire immediately.

2. Check:
   • tire surfaces
     Damage/wear → Replace the tire.

   Minimum tire tread depth
   1.6 mm
   ① Tire tread depth
   ② Side wall
   ③ Wear indicator

WARNING

• Do not use a tubeless tire on a wheel designed only for tube tires to avoid tire failure and personal injury from sudden deflation.
• When using a tube tire, be sure to install the correct tube.
• Always replace a new tube tire and a new tube as a set.
• To avoid pinching the tube, make sure that the wheel rim band and tube are centered in the wheel groove.
• Patching a punctured tube is not recommended. If it is absolutely necessary to do so, use great care and replace the tube as soon as possible with a good quality replacement.

A Tire  B Wheel

<table>
<thead>
<tr>
<th>Tube wheel</th>
<th>Tube tire only</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tubeless wheel</td>
<td>Tube or tubeless tire</td>
</tr>
</tbody>
</table>

After extensive tests, the tires listed below have been approved by Yamaha Motor Co., Ltd. for this model. The front and rear tires should always be by the same manufacturer and of the same design. No guarantee concerning handling characteristics can be given if a tire combination other than one approved by Yamaha is used on this motorcycle.
Front tire

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Size</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>MICHELIN</td>
<td>120/70ZR17</td>
<td>MACADAM 90X</td>
</tr>
<tr>
<td>DUNLOP</td>
<td>120/70ZR17</td>
<td>D207F</td>
</tr>
<tr>
<td>BRIDGESTONE</td>
<td>120/70ZR17</td>
<td>BT57F</td>
</tr>
</tbody>
</table>

Rear tire

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Size</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>MICHELIN</td>
<td>180/55ZR17</td>
<td>MACADAM 90X</td>
</tr>
<tr>
<td>DUNLOP</td>
<td>180/55ZR17</td>
<td>D207</td>
</tr>
<tr>
<td>BRIDGESTONE</td>
<td>180/55ZR17</td>
<td>BT57R</td>
</tr>
</tbody>
</table>

**WARNING**

New tires have a relatively low grip on the road surface until they have been slightly worn. Therefore, approximately 100 km should be traveled at normal speed before any high-speed riding is done.

**NOTE:**

For tires with a direction of rotation mark (1):
- Install the tire with the mark pointing in the direction of wheel rotation.
- Align the mark (2) with the valve installation point.

**CHECKING THE WHEELS**

The following procedure applies to both of the wheels.

1. Check:
   - Wheel
   - Damage/out-of-round → Replace.

**WARNING**

Never attempt to make any repairs to the wheel.

**NOTE:**

After a tire or wheel has been changed or replaced, always balance the wheel.
CHECKING AND LUBRICATING THE CABLES

The following procedure applies to all of the cable sheaths and cables.

**WARNING**

Damaged cable sheaths may cause the cable to corrode and interfere with its movement. Replace damaged cable sheaths and cables as soon as possible.

1. Check:
   - cable sheath
     Damage → Replace.
2. Check:
   - cable operation
     Unsmooth operation → Lubricate.

**NOTE:**

Hold the cable end upright and pour a few drops of lubricant into the cable sheath or use a suitable lubing device.

LUBRICATING THE LEVERS AND PEDALS

Lubricate the pivoting point and metal-to-metal moving parts of the levers and pedals.

**Recommended lubricant**

Engine oil

LUBRICATING THE SIDESTAND

Lubricate the pivoting point and metal-to-metal moving parts of the sidestand.

**Recommended lubricant**

Engine oil

LUBRICATING THE CENTERSTAND

Lubricate the pivoting point and metal-to-metal moving parts of the centerstand.

**Recommended lubricant**

Engine oil

LUBRICATING THE REAR SUSPENSION

Lubricate the pivoting point and metal-to-metal moving parts of the rear suspension.

**Recommended lubricant**

Molydenum disulfide grease
WARNING

Batteries generate explosive hydrogen gas and contain electrolyte which is made of poisonous and highly caustic sulfuric acid. Therefore, always follow these preventive measures:

- Wear protective eye gear when handling or working near batteries.
- Charge batteries in a well-ventilated area.
- Keep batteries away from fire, sparks or open flames (e.g., welding equipment, lighted cigarettes).
- DO NOT SMOKE when charging or handling batteries.
- KEEP BATTERIES AND ELECTROLYTE OUT OF REACH OF CHILDREN.
- Avoid bodily contact with electrolyte as it can cause severe burns or permanent eye injury.

First aid in case of bodily contact:

External
- SKIN – Wash with water.
- EYES – Flush with water for 15 minutes and get immediate medical attention.

Internal
- Drink large quantities of water or milk followed with milk of magnesia, beaten egg or vegetable oil. Get immediate medical attention.

CAUTION:

- This is a sealed battery. Never remove the sealing caps because the balance between cells will not be maintained and battery performance will deteriorate.
- Charging time, charging amperage and charging voltage for a MF battery are different from those of conventional batteries. The MF battery should be charged as explained in the charging method illustrations. If the battery is overcharged, the electrolyte level will drop considerably. Therefore, take special care when charging the battery.
NOTE:
Since MF batteries are sealed, it is not possible to check the charge state of the battery by measuring the specific gravity of the electrolyte. Therefore, the charge of the battery has to be checked by measuring the voltage at the battery terminals.

1. Remove:
   - seat
2. Disconnect:
   - battery leads
     (from the battery terminals)

CAUTION:
First, disconnect the negative lead ①, then the positive lead ②.

3. Remove:
   - battery
4. Check:
   - battery charge

a. Connect a pocket tester to the battery terminals.

   Tester positive lead → battery positive terminal
   Tester negative lead → battery negative terminal

NOTE:
• The charge state of a MF battery can be checked by measuring its open-circuit voltage (i.e., the voltage when the positive terminal is disconnected).
• No charging is necessary when the open-circuit voltage equals or exceeds 12.8 V.

b. Check the charge of the battery, as shown in the charts and the following example.

Example
   c. Open-circuit voltage = 12.0 V
   d. Charging time = 6.5 hours
   e. Charge of the battery = 20 ~ 30%

5. Charge:
   - battery
     (refer to the appropriate charging method illustration)
CHECKING AND CHARGING THE BATTERY

**WARNING**

Do not quick charge a battery.

**CAUTION:**

- Make sure that the battery vent is free of obstructions.
- Never remove the MF battery sealing caps.
- Do not use a high-rate battery charger. They force a high-amperage current into the battery quickly and can cause battery overheating and battery plate damage.
- If it is impossible to regulate the charging current on the battery charger, be careful not to overcharge the battery.
- When charging a battery, be sure to remove it from the motorcycle. (If charging has to be done with the battery mounted on the motorcycle, disconnect the negative lead from the battery terminal.)
- To reduce the chance of sparks, do not plug in the battery charger until the battery charger leads are connected to the battery.
- Before removing the battery charger lead clips from the battery terminals, be sure to turn off the battery charger.
- Make sure that the battery charger lead clips are in full contact with the battery terminal and that they are not shorted. A corroded battery charger lead clip may generate heat in the contact area and a weak clip spring may cause sparks.
- If the battery becomes hot to the touch at any time during the charging process, disconnect the battery charger and let the battery cool before reconnecting it. Hot batteries can explode!
- As shown in the following illustration, the open-circuit voltage of a MF battery stabilizes about 30 minutes after charging has been completed. Therefore, wait 30 minutes after charging is completed before measuring the open-circuit voltage.
Measure the open-circuit voltage prior to charging.

Connect a charger and ammeter to the battery and start charging.

Is the amperage higher than the standard charging amperage written on the battery?

Adjust the charging voltage to 20 ~ 25 V.

Monitor the amperage for 3 ~ 5 minutes. Is the standard charging amperage exceeded?

Adjust the voltage to obtain the standard charging amperage.

Set the timer to the charging time determined by the open-circuit voltage. Refer to “CHECKING AND CHARGING THE BATTERY”.

If the amperage does not exceed the standard charging amperage after 5 minutes, replace the battery.

If the required charging time exceeds 5 hours, it is advisable to check the charging amperage after 5 hours. If there is any change in the amperage, readjust the voltage to obtain the standard charging amperage.

Leave the battery unused for more than 30 minutes before measuring its open-circuit voltage.

12.8 V → Charging is complete.
12.0 ~ 12.7 V → Recharging is required.
Under 12.0 V → Replace the battery.

NOTE: Leave the battery unused for more than 30 minutes before measuring its open-circuit voltage.

NOTE: Set the charging voltage to 16 ~ 17 V. (If the charging voltage is lower charging will be insufficient, if it is higher, the battery will be over-charged.)
CHECKING AND CHARGING THE BATTERY

Charging method using a constant-voltage charger

Measure the open-circuit voltage prior to charging.

Connect a charger and ammeter to the battery and start charging.

Is the amperage higher than the standard charging amperage written on the battery?

YES

Charge the battery until the charging voltage reaches 15 V.

NO

This type of battery charger cannot charge an MF battery. A variable-voltage charger is recommended.

NOTE: Leave the battery unused for more than 30 minutes before measuring its open-circuit voltage.

NOTE: Set the charging time to a maximum of 20 hours.

Leave the battery unused for more than 30 minutes before measuring its open-circuit voltage.
12.8 V → Charging is complete.
12.0 ~ 12.7 V → Recharging is required.
Under 12.0 V → Replace the battery.

CAUTION: Constant amperage chargers are not suitable for charging MF batteries.

Charger

Voltmeter

Ammeter

3-45
6. Check:
   • battery vent
     Obstruction → Clean.
     Damage → Replace.
7. Install:
   • battery
8. Connect:
   • battery leads
     (to the battery terminals)

**CAUTION:**
First, connect the positive lead ①, then the negative lead ②.

9. Check:
   • battery terminals
     Dirt → Clean with a wire brush.
     Loose connection → Connect properly.
10. Lubricate:
    • battery terminals

| Recommended lubricant | Dielectric grease |

11. Install:
    • seat

**CHECKING THE FUSES**
The following procedure applies to all of the fuses.

**CAUTION:**
To avoid a short circuit, always turn the main switch to “OFF” when checking or replacing a fuse.

1. Remove:
   • seat
2. Check:
   • fuse

<p>| |</p>
<table>
<thead>
<tr>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Connect the pocket tester to the fuse and check the continuity.</td>
</tr>
</tbody>
</table>

**NOTE:**
Set the pocket tester selector to “Ω x 1”.

---

3-46
b. If the pocket tester indicates “∞”, replace the fuse.

3. Replace:
   • blown fuse

   a. Turn off the ignition.
   b. Install a new fuse of the correct amperage rating.
   c. Turn on the switches to verify if the electrical circuit is operational.
   d. If the fuse immediately blows again, check the electrical circuit.

---

### Fuses

<table>
<thead>
<tr>
<th>Fuses</th>
<th>Amperage rating</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main fuse</td>
<td>30 A</td>
<td>1</td>
</tr>
<tr>
<td>Headlight fuse</td>
<td>15 A</td>
<td>1</td>
</tr>
<tr>
<td>Signaling system fuse</td>
<td>15 A</td>
<td>1</td>
</tr>
<tr>
<td>Ignition fuse</td>
<td>7.5 A</td>
<td>1</td>
</tr>
<tr>
<td>Reserve</td>
<td>30 A</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>15 A</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>7.5 A</td>
<td>1</td>
</tr>
</tbody>
</table>

---

**WARNING**

Never use a fuse with an amperage rating other than that specified. Improvising or using a fuse with the wrong amperage rating may cause extensive damage to the electrical system, cause the lighting and ignition systems to malfunction and could possibly cause a fire.

---

4. Install:
   • seat
REPLACING THE HEADLIGHT BULB

1. Remove:
   • headlight unit ①

2. Disconnect:
   • headlight lead ①
   • auxiliary light lead ②

3. Remove:
   • cover ③

4. Remove:
   • headlight bulb holder ①

5. Remove:
   • headlight bulb ②

WARNING

Since the headlight bulb gets extremely hot, keep flammable products and your hands away from the bulb until it has cooled down.

6. Install:
   • headlight bulb (New)

   Secure the new headlight bulb with the headlight bulb holder.

CAUTION:

Avoid touching the glass part of the headlight bulb to keep it free from oil, otherwise the transparency of the glass, the life of the bulb and the luminous flux will be adversely affected. If the headlight bulb gets soiled, thoroughly clean it with a cloth moistened with alcohol or lacquer thinner.
### REPLACING THE HEADLIGHT BULB

1. Adjust:
   - headlight beam (vertically)

<table>
<thead>
<tr>
<th>Direction</th>
<th>Headlight beam is raised.</th>
<th>Headlight beam is lowered.</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(b)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. Adjust:
   - headlight beam (horizontally)

<table>
<thead>
<tr>
<th>Direction</th>
<th>Headlight beam moves to the right.</th>
<th>Headlight beam moves to the left.</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(b)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### ADJUSTING THE HEADLIGHT BEAM

1. Adjust:
   - headlight beam (vertically)

   a. Turn the adjusting screw in direction or .

2. Adjust:
   - headlight beam (horizontally)

   a. Turn the adjusting knob in direction or .
CHAPTER 4.
ENGINE OVERHAUL

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## ENGINE OVERHAULE

### LEADS, HOSES AND EXHAUST PIPES

**Diagram showing engine parts with torque values.**

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Exhaust band</td>
<td>6</td>
<td>Remove the parts in the order listed.</td>
</tr>
<tr>
<td>2</td>
<td>Exhaust pipe</td>
<td>4</td>
<td>Refer to “SEAT, SIDE COVER AND FUEL TANK” in Chapter 3.</td>
</tr>
<tr>
<td>3</td>
<td>Gasket</td>
<td>4</td>
<td>Refer to “CARBURETOR” in Chapter 5.</td>
</tr>
<tr>
<td>4</td>
<td>Muffler left/right</td>
<td>1/1</td>
<td>Drain</td>
</tr>
<tr>
<td>5</td>
<td>Exhaust chamber</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Exhaust chamber bracket</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Oil cooler</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Air duct left/right</td>
<td>1/1</td>
<td></td>
</tr>
</tbody>
</table>

**Removing the leads, hoses and exhaust pipes**
- Seat, side cover, fuel tank
- Carburetor
- Engine oil
- Drain
### Order Job/Part Q'ty Remarks

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>O-ring</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Ground lead</td>
<td>1</td>
<td>Disconnect ground lead.</td>
</tr>
<tr>
<td>11</td>
<td>Crankcase breather hose</td>
<td>1</td>
<td>For installation, reverse the removal pro-</td>
</tr>
</tbody>
</table>

**NOTE:**

Disconnect ground lead.

For installation, reverse the removal procedure.
LEADS AND DRIVE SPROCKET

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Removing the leads and drive</td>
<td>1</td>
<td>Remove the parts in the order listed.</td>
</tr>
<tr>
<td></td>
<td>sprocket</td>
<td></td>
<td><strong>NOTE:</strong> Disconnect starter motor lead.</td>
</tr>
<tr>
<td></td>
<td>Starter motor lead</td>
<td>1</td>
<td>Refer to “INSTALLING THE ENGINE”</td>
</tr>
<tr>
<td>2</td>
<td>Starter motor</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Pickup/neutral switch lead</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>A.C. generator lead</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>A.C. generator</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Clutch release cylinder comp.</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Shift arm</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Drive sprocket cover</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Dowel pins</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Gasket</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Nut</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

25 Nm (2.5 m·kg)

85 Nm (8.5 m·kg)

10 Nm (1.0 m·kg)
<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>Lock washer</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Drive sprocket</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Drive chain</td>
<td>1</td>
<td>For installation, reverse the removal procedure.</td>
</tr>
</tbody>
</table>
### ENGINE

**Removing the engine**

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Footrest</td>
<td>1</td>
<td>Remove the parts in the order listed.</td>
</tr>
<tr>
<td>2</td>
<td>Down tube</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Engine bracket (front)</td>
<td>2</td>
<td>Place a suitable stand under the frame and engine.</td>
</tr>
<tr>
<td>4</td>
<td>Spacer</td>
<td>1</td>
<td><strong>NOTE:</strong></td>
</tr>
<tr>
<td>5</td>
<td>Engine bracket (rear upper) left, right</td>
<td>2</td>
<td>Refer to “INSTALLING THE ENGINE”.</td>
</tr>
<tr>
<td>6</td>
<td>Engine bracket (rear lower)</td>
<td>1</td>
<td>For installation, reverse the removal procedure.</td>
</tr>
<tr>
<td>7</td>
<td>Engine</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

**Torque Specifications**

- 88 Nm (8.8 m·kg)
- 55 Nm (5.5 m·kg)
- 28 Nm (2.8 m·kg)
- 26 Nm (2.6 m·kg)
- 64 Nm (6.4 m·kg)
- 30 Nm (3.0 m·kg)
- 48 Nm (4.8 m·kg)
- 55 Nm (5.5 m·kg)
- 64 Nm (6.4 m·kg)
- 48 Nm (4.8 m·kg)
- 30 Nm (3.0 m·kg)
- 28 Nm (2.8 m·kg)
INSTALLING THE ENGINE

1. Tighten the bolts in the following order.

   Bolt ①: 88 Nm (8.8 m•kg)
   Bolt ②: 48 Nm (4.8 m•kg)
   Bolt ③: 55 Nm (5.5 m•kg)
   Bolt ④: 30 Nm (3.0 m•kg)
   Bolt ⑤: 64 Nm (6.4 m•kg)
   Nut ⑥: 64 Nm (6.4 m•kg)

2. Install:
   • shift arm ①

NOTE:

• Align the punch mark ⑥ in the shift shaft with the punched mark ④ on the shift arm.
• Align the bottom edge of the shift pedal with the mark on the frame-to-swingarm bracket.

Shift arm bolt 10 Nm (1.0 m•kg)
### Removing the cylinder head covers

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Bolts</td>
<td>2</td>
<td>Remove the parts in the order listed.</td>
</tr>
<tr>
<td>2</td>
<td>Air duct (left/right)</td>
<td>1/1</td>
<td>Refer to &quot;SEAT, SIDE COVER AND FUEL TANK&quot;.</td>
</tr>
<tr>
<td>3</td>
<td>Plug cap</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Cylinder head cover</td>
<td>1</td>
<td>For installation, reverse the removal</td>
</tr>
<tr>
<td>5</td>
<td>Gasket</td>
<td>1</td>
<td>procedure.</td>
</tr>
</tbody>
</table>

**Remarks:**
- Remove the parts in the order listed. Refer to "SEAT, SIDE COVER AND FUEL TANK".
- For installation, reverse the removal procedure.
### CAMSHAFTS

**Order**  | **Job/Part**                          | **Q'ty** | **Remarks**                                |
---        | -------------------------------------|----------|--------------------------------------------|
1         | Spark plugs                          | 4        | Remove the parts in the order listed.      |
2         | Timing plate cover/Gasket            | 1/1      | **Refer to “REMOVING/INSTALLING THE CAMSHAFTS”**. |
3         | Timing chain guide (top side)        | 1        |                                            |
4         | Timing chain tensioner assembly      | 1        |                                            |
5         | Timing chain guide (exhaust side)    | 1        |                                            |
6         | Camshaft caps                        | 8        |                                            |
7         | Dowel pins                           | 16       | For installation, reverse the removal procedure. |
8         | Camshaft (intake)                    | 1        |                                            |
9         | Camshaft (exhaust)                   | 1        |                                            |
10        | Camshaft sprockets                   | 2        |                                            |

Refer to "REMOVING/INSTALLING THE CAMSHAFTS".

**Tightening Torques**

- 12 Nm (1.2 m·kg)
- 18 Nm (1.8 m·kg)
- 20 Nm (2.0 m·kg)
- 20 Nm (2.0 m·kg)
- 10 Nm (1.0 m·kg)
- 10 Nm (1.0 m·kg)
- 12 Nm (1.2 m·kg)
REMOVING THE CAMSHAFTS

1. Align:
   - “T” mark on the timing plate
     (with the stationary pointer on the pickup coil base plate)

   a. Turn the crankshaft counterclockwise.
   b. When piston #1 is at TDC on the compression stroke, align the “T” mark \( \text{a} \) with the pickup coil mark \( \text{b} \).

   TDC on the compression stroke can be found when the camshaft lobes are turned away from each other.

2. Remove:
   - timing chain guide (top side) \( \text{1} \)
3. Loosen:
   - camshaft sprocket bolts
4. Loosen:
   - cap bolt \( \text{2} \)
5. Remove:
   - timing chain tensioner

   To prevent the timing chain from falling into the crankcase, fasten it with a wire \( \text{5} \).

6. Remove:
   - timing chain guide (exhaust side)
   - camshaft caps \( \text{3} \)

   For reference during installation, put identification marks on each camshaft cap.

CAUTION:

To prevent damage to the cylinder head, camshafts or camshaft caps, loosen the camshaft cap bolts in stages and in a crisscross pattern, working from the outside in.

7. Remove:
   - intake camshaft \( \text{6} \)
   - exhaust camshaft \( \text{7} \)
   - camshaft sprockets \( \text{4} \)
CHECKING THE CAMSHAFTS

1. Check:
   - camshaft lobes
     Blue discoloration/pitting/scratches → Replace the camshaft.

2. Measure:
   - camshaft lobe dimensions \( a \) and \( b \)
     Out of specification → Replace the camshaft.

3. Measure:
   - camshaft runout
     Out of specification → Replace.

4. Measure:
   - camshaft-journal-to-camshaft-cap clearance
     Out of specification → Measure the camshaft journal diameter.

   **Camshaft-journal-to-camshaft-cap clearance**
   0.020 ~ 0.054 mm

   a. Install the camshaft into the cylinder head (without the dowel pins and camshaft caps).
   b. Position a strip of Plastigauge\textsuperscript{®} 1 onto the camshaft journal as shown.
   c. Install the dowel pins and camshaft caps.

   **NOTE:**
   - Tighten the camshaft cap bolts in stages and in a crisscross pattern, working from the inner caps out.
   - Do not turn the camshaft when measuring the camshaft journal-to-camshaft cap clearance with the Plastigauge\textsuperscript{®}.

   **Camshaft cap bolt**
   12 Nm (1.2 m\(\text{k}\)g)

   d. Remove the camshaft caps and then measure the width of the Plastigauge\textsuperscript{®} 2.
5. Measure:
- camshaft journal diameter \(a\)
  Out of specification → Replace the camshaft.
  Within specification → Replace the cylinder head and the camshaft caps as a set.

**Camshaft journal diameter**
24.967 ~ 24.980 mm

**CHECKING THE CAMSHAFT SPROCKETS, AND TIMING CHAIN GUIDES**
The following procedure applies to all of the camshafts sprockets and timing chain guides.

1. Check:
   - camshaft sprocket
     Damage/wear → Replace the camshaft sprockets and the timing chain as a set.
2. Check:
   - timing chain guide (exhaust side)
   - timing chain guide (top side)
     Damage/wear → Replace the defective part(-s).

**CHECKING THE TIMING CHAIN TENSIONER**
1. Check:
   - timing chain tensioner
     Cracks/damage → Replace.
2. Check:
   - one-way cam operation
     Rough movement → Replace the timing chain tensioner housing.
3. Check:
   - cap bolt
   - copper washer
   - spring
   - one-way cam
   - gasket
   - timing chain tensioner rod
     Damage/wear → Replace the defective part(-s).
INSTALLING THE CAMSHAFTS

1. Install:
   • camshaft sprockets

   **NOTE:**
   - Be sure to set the sprockets in the specified position as shown in the figure.
   - Temporarily tighten the bolts in this stage.

   ![Exhaust side](image1)
   ![Intake side](image2)

2. Install:
   • camshaft (exhaust)
   • camshaft (intake)

   ![Timing chain](image3)
   ![Camshaft caps](image4)

   **CAUTION:**
   Do not turn the crankshaft during the camshafts installation. Damage or improper valve timing will result.

   ![Crankshaft](image5)

   a. Turn the crankshaft counterclockwise until the TDC mark (③) is aligned with the pickup coil mark (⑤).

   ![Exhaust camshaft](image6)
   ![Intake camshaft](image7)

   **NOTE:**
   - Install the exhaust camshaft ① first, then the intake camshaft ②.
   - Install the camshafts with the punched mark facing upward.
   - Keep the timing chain as tense as possible on the exhaust side.

   ![Camshaft caps](image8)

   b. Fit the timing chain onto both camshaft sprockets and install the camshafts.

   **NOTE:**
   - Install the camshaft caps ③ with dowel pins.

   ![Arrow mark](image9)

   **NOTE:**
   - Make sure that each camshaft cap is installed in its original place by reference to its embossed identification mark, as follows:
     Intake: I
     Exhaust: E
   - Install the camshaft cap with the arrow mark pointing towards the right side of the engine.
   - Temporarily tighten the bolts in this stage.
d. Check if the punched marks on both camshafts are inside the holes of camshaft caps. If they are not in the position, repeat the above steps.

e. Tighten the bolts (camshaft cap) in a criss-cross pattern from the inside outwards.

**CAUTION:**

The bolts (camshaft caps) must be tightened evenly or damage to the cylinder head, camshaft caps and camshaft will result.

<table>
<thead>
<tr>
<th>Bolt (camshaft cap):</th>
<th>12 Nm (1.2 m•kg)</th>
</tr>
</thead>
</table>

f. Remove the safety wire from the timing chain.

3. Install:

   - timing chain tensioner

   **Installation steps:**
   a. Remove the tensioner cap bolt 1, washer 2 and springs 3.
   b. Release the timing chain tensioner one-way cam 4 and push the tensioner rod 5 all the way into the timing chain tensioner housing.
   c. Install the timing chain tensioner with a gasket 6 onto the cylinder.

   **CAUTION:**

   Always use a new gasket.

<table>
<thead>
<tr>
<th>Timing chain tensioner bolt:</th>
<th>10 Nm (1.0 m•kg)</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Cap bolt (timing chain tensioner):</th>
<th>20 Nm (2.0 m•kg)</th>
</tr>
</thead>
</table>

4. Check:

   - Valve timing

   Out of alignment → Reinstall the camshafts by referring the above steps.
CAMSHAFTS

a. Turn the crankshaft counterclockwise several times until the TDC mark on the timing plate is aligned with the stationary pointer.
b. Check if both the camshaft timing punch marks are aligning with the camshaft cap hole.

5. Tighten:
   • Bolts (cam sprockets)

CAUTION:

Be sure to tighten the camshaft sprocket bolts to the specified torque to avoid the possibility of the bolts coming loose and damaging the engine.

Bolts (cam sprockets):
20 Nm (2.0 m•kg)
Removing the cylinder head

Camshafts
Cylinder head
Gasket
Dowel pins
O-rings
Intake manifold

Remove the parts in the order listed.

NOTE:
Remove the engine mount (front) and move the engine to front side.

Refer to “CAMSHAFTS”.

Refer to “REMOVING/INSTALLING THE CYLINDER HEAD”.

For installation, reverse the removal procedure.
REMOVING THE CYLINDER HEAD
1. Remove:
   • cylinder head nuts ① ~ ⑩

NOTE:
• Loosen the nuts in the proper sequence as shown.
• Loosen each nut 1/2 of a turn at a time. After all of the nuts are fully loosened, remove them.

CHECKING THE CYLINDER HEAD
The following procedure applies to all of the cylinder heads.
1. Eliminate:
   • combustion chamber carbon deposits (with a rounded scraper)

NOTE:
Do not use a sharp instrument to avoid damaging or scratching:
• spark plug threads
• valve seats

2. Check:
   • cylinder head
     Damage/scratches → Replace.

3. Measure:
   • cylinder head warpage
     Out of specification → Resurface the cylinder head.

   Cylinder head warpage
   Less than 0.1 mm

a. Place a straightedge ① and a thickness gauge ② across the cylinder head.
b. Measure the warpage.
c. If the limited is exceeded, resurface the cylinder head as follows.
d. Place a 400 ~ 600 grit wet sandpaper on the surface plate and resurface the cylinder head using a figure-eight sanding pattern.
NOTE:
To ensure an even surface, rotate the cylinder head several times.

INSTALLING THE CYLINDER HEAD
1. Install:
   - gasket (New) ①
   - dowel pins ②
2. Install:
   - cylinder head
   - washers
   - copper washers
   - cylinder head nuts

NOTE:
- Apply engine oil onto the threads of the cylinder head nuts.
- Tighten the cylinder head nuts in the proper tightening sequence as shown and torque them in two stages.

Cylinder head Cap nut
35 Nm (3.5 m·kg)
Cylinder head nut
10 Nm (1.0 m·kg)

3. Install:
   - exhaust camshaft
   - intake camshaft
   Refer to “INSTALLING THE CAMSHAFTS”.

EA600230
VALVES AND VALVE SPRINGS

Removing the valves and valve springs
Camshaft
Cylinder head
1 Valve pads 16
2 Valve lifters 16
3 Valve cotters 32
4 Upper springs seats 16
5 Valve springs (outer) 16
6 Valve springs (inner) 16
7 Intake valves 8
8 Exhaust valves 8
9 Lower spring seats 16
10 Oil seals 16

Remove the parts in the order listed.
Refer to “CAMSHAFTS”.
Refer to “CYLINDER HEAD”.

Refer to “REMOVING/INSTALLING THE VALVES”.

For installation, reverse the removal procedure.
REMOVING THE VALVES

The following procedure applies to all of the valves and related components.

NOTE:

Before removing the internal parts of the cylinder head (e.g., valves, valve springs, valve seats), make sure that the valves properly seal.

1. Remove:
   • valve lifter
   • valve pad

   Make a note of the position of each valve lifter and valve pad so that they can be reinstalled in their original place.

2. Check:
   • valve sealing

   Leakage at the valve seat → Check the valve face, valve seat, and valve seat width. Refer to “CHECKING THE VALVE SEATS”.

   a. Pour a clean solvent into the intake and exhaust ports.
   b. Check that the valves properly seal.

   There should be no leakage at the valve seat.

3. Remove:
   • valve cotters

   Remove the valve cotters by compressing the valve spring with the valve spring compressor.

Valve spring compressor
90890-04019
4. Remove:
   • upper spring seat ①
   • valve springs ②
   • oil seal ③
   • lower spring seat ④
   • valve ⑤

**NOTE:**
Identify the position of each part very carefully so that it can be reinstalled in its original place.

---

### CHECKING THE VALVES AND VALVE GUIDES

The following procedure applies to all of the valves and valve guides.

1. Measure:
   • valve-stem to valve guide clearance

   ![Diagram of valve-stem to valve-guide clearance measurement](image)

   **Valve-stem to valve-guide clearance**
   
<table>
<thead>
<tr>
<th>Component</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intake</td>
<td>0.010 ~ 0.037 mm</td>
</tr>
<tr>
<td></td>
<td>Limit: 0.08 mm</td>
</tr>
<tr>
<td>Exhaust</td>
<td>0.025 ~ 0.052 mm</td>
</tr>
<tr>
<td></td>
<td>Limit: 0.10 mm</td>
</tr>
</tbody>
</table>

   Out of specification → Replace the valve guide.

2. Replace:
   • valve guide

**NOTE:**
To ease valve guide removal and installation, and to maintain the correct fit, heat the cylinder head to 100°C (212°F) in an oven.
a. Remove the valve guide with a valve guide remover ①.

b. Install the new valve guide with a valve guide installer ② and valve guide remover ①.

c. After installing the valve guide, bore the valve guide with a valve guide reamer ③ to obtain the proper valve-stem to valve-guide clearance.

**NOTE:**

After replacing the valve guide, reface the valve seat.

Valve guide remover, reamer & installer (5.5 mm): 90890-04016

3. Eliminate:
   - carbon deposits (from the valve face and valve seat)

4. Check:
   - valve face
     Pitting/wear → Grind the valve face.
   - valve stem end
     Mushroom shape or diameter larger than the body of the valve stem → Replace the valve.

5. Measure:
   - valve margin thickness ⑧
     Out of specification → Replace the valve.

   Valve margin thickness
   0.8 mm ~ 1.2 mm

6. Measure:
   - valve stem runout
     Out of specification → Replace the valve.

   **NOTE:**

   - When installing a new valve, always replace the valve guide.
   - If the valve is removed or replaced, always replace the oil seal.

   Valve stem runout
   0.01 mm
CHECKING THE VALVE SEATS
The following procedure applies to all of the valves and valve seats.

1. Eliminate:
   - carbon deposits
     (from the valve face and valve seat)

2. Check:
   - valve seat
     Pitting/wear → Replace the cylinder head.

3. Measure:
   - valve seat width \( a \)
     Out of specification → Replace the cylinder head.

   **Valve seat width**
   - Intake: 0.9 ~ 1.1 mm
   - Exhaust: 0.9 ~ 1.1 mm

4. Lap:
   - valve face
   - valve seat

**NOTE:**
After replacing the cylinder head or replacing the valve and valve guide, the valve seat and valve face should be lapped.

**CAUTION:**
Do not let the lapping compound enter the gap between the valve stem and the valve guide.

- Apply Mechanic's blueing dye (Dykem) \( b \) onto the valve face.
- Install the valve into the cylinder head.
- Press the valve through the valve guide and onto the valve seat to make a clear pattern.
- Measure the valve seat width. Where the valve seat and valve face contacted one another, the blueing will have been removed.

- Apply a coarse lapping compound \( a \) to the valve face.
- Apply molybdenum disulfide oil onto the valve stem.
- Install the valve into the cylinder head.
d. Turn the valve until the valve face and valve seat are evenly polished, then clean off all of the lapping compound.

**NOTE:**

For the best lapping results, lightly tap the valve seat while rotating the valve back and forth between your hand.

e. Apply a fine lapping compound to the valve face and repeat the above steps.

f. After every lapping procedure, be sure to clean off all of the lapping compound from the valve face and valve seat.

g. Apply Mechanic’s blueing dye (Dykem) onto the valve face.

h. Install the valve into the cylinder head.

i. Press the valve through the valve guide and onto the valve seat to make a clear impression.

j. Measure the valve seat width again. If the valve seat width is out of specification, reface and lap the valve seat.

CHECKING THE VALVE SPRINGS

The following procedure applies to all of the valve springs.

1. Measure:
   - valve spring free length

   Out of specification → Replace the valve spring.
**VALVES AND VALVE SPRINGS**

Valve spring free length (intake and exhaust)
- Inner spring <Limit>
  - 39.65 mm <37.5 mm>
- Outer spring <Limit>
  - 41.1 mm <39 mm>

2. Measure:
   - compressed spring force ③
     Out of specification → Replace the valve spring.
   - Installed length

Compressed spring force
- Intake and exhaust inner spring
  - 61.7 ~ 72.5 N (6.29 ~ 7.39 kg) at 32.8 mm
- Intake and exhaust outer spring
  - 130.4 ~ 154.0 N (13.3 ~ 15.7 kg) at 34.8 mm

3. Measure:
   - valve spring tilt ③
     Out of specification → Replace the valve spring.

Spring tilt limit
- Intake and exhaust inner spring
  - 2.5° /1.7 mm
- Intake and exhaust outer spring
  - 2.5° /1.7 mm

**CHECKING THE VALVE LIFTERS**
The following procedure applies to all of the valve lifters.
1. Check:
   - valve lifter
     Damage/scratches → Replace the valve lifters and cylinder head.

**INSTALLING THE VALVES**
The following procedure applies to all of the valves and related components.
1. Deburr:
   - valve stem end
     (with an oil stone)
NOTE: Recommended lubricant
Molybdenum disulfide oil

2. Install:
- valve ①
- lower spring seat ②
- oil seal ③
- valve springs ④
- upper spring seat ⑤ (into the cylinder head)

NOTE: Install the valve spring with the larger pitch ③ facing up.

b Smaller pitch

3. Install:
- valve cotters ①

NOTE: Install the valve cotters by compressing the valve spring with the valve spring compressor ②.

Valve spring compressor 90890-04019

4. To secure the valve cotters ① onto the valve stem, lightly tap the valve tip with a soft-face hammer.

CAUTION: Hitting the valve tip with excessive force could damage the valve.

5. Install:
- valve pad ①
- valve lifter ②

NOTE:
- Apply molybdenum disulfide oil onto the valve lifter and valve pad.
- The valve lifter must move smoothly when rotated with a finger.
- Each valve lifter and valve pad must be reinstalled in its original position.
## Removing the cylinders and pistons

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Cylinder head</td>
<td>1</td>
<td>Remove the parts in the order listed. Refer to “CYLINDER HEAD”.</td>
</tr>
<tr>
<td>2</td>
<td>Cylinder block</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Dowel pins</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Gasket</td>
<td>4</td>
<td>Refer to “REMOVING/INSTALLING THE CYLINDERS AND PISTONS”.</td>
</tr>
<tr>
<td>4</td>
<td>Piston pin clips</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Piston pins</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Pistons</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Oil ring sets</td>
<td>4</td>
<td>For installation, removal procedure.</td>
</tr>
</tbody>
</table>

*20 Nm (2.0 m·kg)*
REMOVING THE CYLINDERS AND PISTONS
The following procedure applies to all of the cylinders and pistons.

1. Remove:
   - piston pin clip ①
   - piston pin ②
   - piston ③

CAUTION:
Do not use a hammer to drive the piston pin out.

NOTE:
- Before removing the piston pin clip, cover the crankcase opening with a clean rag to prevent the piston pin clip from falling into the crankcase.
- For reference during installation, put an identification mark on each piston crown.
- Before removing the piston pin, deburr the piston pin clip’s groove and the piston’s pin bore area. If both areas are deburred and the piston pin is still difficult to remove, remove it with the piston pin puller (4).

![Piston pin puller](90890-01304)

2. Remove:
   - top ring
   - 2nd ring
   - oil ring

NOTE:
When removing a piston ring, open the end gap with your fingers and lift the other side of the ring over the piston crown.

CHECKING THE CYLINDERS AND PISTONS
The following procedure applies to all of the cylinders and pistons.

1. Check:
   - piston wall
   - cylinder wall
   - Vertical scratches → Replace the cylinder, and replace the piston and piston rings as a set.

2. Measure:
   - piston to cylinder clearance
CYLINDERS AND PISTONS

a. Measure cylinder bore “C” with the cylinder bore gauge.
   ① 20 mm from the top of the cylinder

NOTE:

Measure cylinder bore “C” by taking side-to-side and front-to-back measurements of the cylinder. Then, find the average of the measurements.

Cylinder bore gauge

<table>
<thead>
<tr>
<th>Standard</th>
<th>79.00 ~ 79.01 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wear limit</td>
<td>79.1 mm</td>
</tr>
<tr>
<td>Cylinder bore “C”</td>
<td>“C” = X + Y/2</td>
</tr>
</tbody>
</table>

d. If out of specification, replace the cylinder, and replace the piston and piston rings as a set.

c. Measure piston skirt diameter “P” with the micrometer.

② 2.0 mm from the bottom edge of the piston.

<table>
<thead>
<tr>
<th>Standard</th>
<th>Piston size “P”</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>78.970 ~ 78.985 mm</td>
</tr>
</tbody>
</table>

d. If out of specification, replace the piston and piston rings as a set.

e. Calculate the piston to cylinder clearance with the following formula.

Piston to cylinder clearance = Cylinder bore “C” – Piston skirt diameter “P”

Piston-to-cylinder clearance

0.015 ~ 0.040 mm

<Limit> : 0.15 mm

f. If out of specification, replace the cylinder, and replace the piston and piston rings as a set.
CHECKING THE PISTON RINGS

1. Measure:
   - piston ring side clearance
     Out of specification → Replace the piston and piston rings as a set.

**NOTE:**
Before measuring the piston ring side clearance, eliminate any carbon deposits from the piston ring grooves and piston rings.

<table>
<thead>
<tr>
<th>Piston ring side clearance</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Top ring</strong></td>
</tr>
<tr>
<td>0.045 ~ 0.080 mm</td>
</tr>
<tr>
<td>&lt;Limit&gt;: 0.1 mm</td>
</tr>
<tr>
<td><strong>2nd ring</strong></td>
</tr>
<tr>
<td>0.03 ~ 0.07 mm</td>
</tr>
<tr>
<td>&lt;Limit&gt;: 0.1 mm</td>
</tr>
</tbody>
</table>

2. Install:
   - piston ring
     (into the cylinder)

**NOTE:**
Level the piston ring in the cylinder with the piston crown as shown.

@ 30 mm

3. Measure:
   - piston ring end gap
     Out of specification → Replace the piston ring.

**NOTE:**
The oil ring expander spacer’s end gap cannot be measured. If the oil ring rail’s gap is excessive, replace all three piston rings.

<table>
<thead>
<tr>
<th>Piston ring end gap</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Top ring</strong></td>
</tr>
<tr>
<td>0.20 ~ 0.35 mm</td>
</tr>
<tr>
<td>&lt;Limit&gt;: 0.6 mm</td>
</tr>
<tr>
<td><strong>2nd ring</strong></td>
</tr>
<tr>
<td>0.35 ~ 0.50 mm</td>
</tr>
<tr>
<td>&lt;Limit&gt;: 0.75 mm</td>
</tr>
<tr>
<td><strong>Oil ring</strong></td>
</tr>
<tr>
<td>0.2 ~ 0.5 mm</td>
</tr>
</tbody>
</table>
INSTALLING THE PISTONS AND CYLINDERS
The following procedure applies to all of the pistons and cylinders.

1. Install:
   - top ring ①
   - 2nd ring ②
   - lower oil ring rail ③
   - upper oil ring rail ④
   - oil ring expander ⑤

   Be sure to install the piston rings so that the manufacturer’s marks or numbers ③ are located on the upper side of the rings.
   - The piston rings that have an “R” mark must be installed into the 2nd ring groove.

2. Install:
   - piston ①
   - piston pin ②
   - piston pin clip (New) ③

   Apply engine oil onto the piston pin.
   - Make sure that the arrow mark ③ on the piston points towards the exhaust side of the engine.
   - Before installing the piston pin clip, cover the crankcase opening with a clean rag to prevent the piston pin clip from falling into the crankcase.
   - Reinstall each piston into its original cylinder (numbering order starting from the left: #1 to #4).
3. Install:
   - gasket (New)
   - dowel pins

4. Lubricate:
   - piston
   - piston rings
   - cylinder
   (with the recommended lubricant)

5. Offset:
   - piston ring end gaps
     - Top ring
     - Lower oil ring rail
     - Upper oil ring rail
     - 2nd ring
     - forward

6. Install:
   - cylinder block

NOTE:
- Install pistons #2 and #3 before installing pistons #1 and #4.
- Pass the timing chain and timing chain guide (intake side) through the timing chain cavity.
### Removing the clutch cover.

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Removing the clutch cover. Engine oil</td>
<td>1</td>
<td>Remove the parts in the order listed. Drain</td>
</tr>
<tr>
<td>2</td>
<td>Clutch cover</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Gasket</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Dowel pins</td>
<td>2</td>
<td>For installation, reverse the removal procedure.</td>
</tr>
</tbody>
</table>

**10 Nm (1.0 m·kg)**
<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Removing the clutch</td>
<td>1</td>
<td>Remove the parts in the order</td>
</tr>
<tr>
<td>2</td>
<td>Pressure plate</td>
<td>1</td>
<td>listed.</td>
</tr>
<tr>
<td>3</td>
<td>Clutch spring</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Spring housing</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Pressure plate</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Clutch push rod (short)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Ball</td>
<td>1</td>
<td>Refer to “INSTALLING THE</td>
</tr>
<tr>
<td>8</td>
<td>Clutch push rod (long)</td>
<td>1</td>
<td>CLUTCH”.</td>
</tr>
<tr>
<td>9</td>
<td>O-ring</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Friction plates</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Clutch plates</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Friction plates</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Clutch boss nut</td>
<td>1</td>
<td>Refer to “REMOVING/INSTALLING</td>
</tr>
<tr>
<td>14</td>
<td>Lock washer</td>
<td>1</td>
<td>THE CLUTCH”.</td>
</tr>
</tbody>
</table>

Note: Torque values are as follows:
- 70 Nm (7.0 m·kg)
- 8 Nm (0.8 m·kg)
<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>Clutch boss</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Stopper ring</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Clutch plate</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Clutch spring plate</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Clutch spring plate seat</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Friction plates (narrow)</td>
<td>1</td>
<td>Refer to “REMOVING/INSTALLING THE CLUTCH”.</td>
</tr>
<tr>
<td>20</td>
<td>Thrust washer</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>Spacer</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>Bearing</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>Clutch housing</td>
<td>1</td>
<td>For installation, reverse the removal procedure.</td>
</tr>
</tbody>
</table>
**CLUTCH**

**ENG**

**REMOVING THE CLUTCH**
1. Straighten the lock washer tab.
2. Loosen:
   - clutch boss nut (1)

**NOTE:**
While holding the clutch boss (2) with the universal clutch holder, loosen the clutch boss nut.

![Universal clutch holder](image)

**Universal clutch holder (3)**
90890-04086

3. Remove:
   - clutch boss nut (1)
   - lock washer (2)
   - clutch boss (3)
   - thrust washer (4)
   - spacer (5)
   - bearing (6)
   - clutch housing (7)

**NOTE:**
Insert two 6 mm bolts (8) into the spacer and then remove the spacer by pulling on the bolts.

**CHECKING THE FRICTION PLATES**
The following procedure applies to all of the friction plates.
1. Check:
   - friction plate
     Damage/wear → Replace the friction plates as a set.
2. Measure:
   - friction plate thickness
     Out of specification → Replace the friction plates as a set.

**NOTE:**
Measure the friction plate at four places.

<table>
<thead>
<tr>
<th>Friction plate thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.9 ~ 3.1 mm</td>
</tr>
<tr>
<td>&lt;Limit&gt;: 2.8 mm</td>
</tr>
</tbody>
</table>
CHECKING THE CLUTCH PLATES
The following procedure applies to all of the clutch plates.
1. Check:
   • clutch plate
     Damage → Replace the clutch plates as a set.
2. Measure:
   • clutch plate warpage
     (with a surface plate and thickness gauge 
     )
     Out of specification → Replace the clutch plates as a set.

   Clutch plate warpage limit
   Less than 0.1 mm

CHECKING THE CLUTCH SPRING
1. Check:
   • Clutch spring
     Damage → Replace as a set.

2. Measure:
   • Clutch spring free height
     Out of specification → Replace spring as a set.

   Free height limit (clutch spring):
   6.0 mm

CHECKING THE CLUTCH SPRING PLATE
1. Check:
   • clutch spring plate
     Damage → Replace.
2. Check:
   • clutch spring plate seat
     Damage → Replace.
CHECKING THE CLUTCH HOUSING
1. Check:
   • Clutch housing dogs
     Damage/pitting/wear → Deburr the clutch housing dogs or replace the clutch housing.

   **NOTE:**
   Pitting on the clutch housing dogs will cause erratic clutch operation.

2. Check:
   • bearing
     Damage/wear → Replace the clutch housing.

CHECKING THE CLUTCH BOSS
1. Check:
   • clutch boss splines
     Damage/pitting/wear → Replace the clutch boss.

   **NOTE:**
   Pitting on the clutch boss splines will cause erratic clutch operation.

CHECKING THE PRESSURE PLATE
1. Check:
   • pressure plate
     Cracks/damage → Replace.
CHECKING THE CLUTCH PUSH RODS

1. Check:
   - O-ring ①
   - short clutch push rod ②
   - long clutch push rod ③
   - ball ④
   - bearing ⑤
   Cracks/damage/wear → Replace the defective part(-s).

2. Measure:
   - long clutch push rod bending limit
   Out of specification → Replace the long clutch push rod.

| Long clutch push rod bending limit 0.3 mm |

INSTALLING THE CLUTCH

1. Install:
   - clutch housing ①

   **NOTE:**

   Engage the notch of clutch housing and the projection on the oil pump drive gear.

2. Install:
   - bearing ①
   - spacer ②
   - thrust washer ③

   **NOTE:**

   Install the spacer with the two screw holes facing towards the clutch boss.
3. Tighten:
* clutch boss nut

**NOTE:**
While holding the clutch boss with the universal clutch holder, tighten the clutch boss nut.

**Universal clutch holder**
90890-04086

**Clutch boss nut**
70 Nm (7.0 m•kg)

4. Bend the lock washer tab along a flat side of the nut.
5. Lubricate:
* long clutch push rod
* ball
* short clutch push rod
  (with the recommended lubricant)

**Recommended lubricant**
Lithium soap base grease

6. Install:
* clutch spring plate seat
* clutch spring plate

**NOTE:**
Install the spring plate with the letters “OUT SIDE” facing outward.
7. Install:
   • Friction plates (narrow type) ①
   • Clutch plates ②
   • Stopper ring ③
   • Friction plates (wide type) ④

   a. Install the friction plate of narrow contact face ① and one of the clutch plate to the clutch boss.
   b. Install the stopper ring ③.

   NOTE:
   Install the stopper ring onto the groove around the clutch boss with both ends of the ring fitted in the hole ③ on the boss.

   c. Install the other 6 clutch plates and the 6 friction plates of wide contact face alternately.
   d. Install the another friction plate of narrow face.

8. Install:
   • Pressure plate ①
   • Spring housing ②
   • Clutch spring ③
   • Plate ④
   • Bolts (clutch spring)

   NOTE:
   Tighten the bolts (clutch spring) in stages, using a crisscross pattern.

   Bolt (clutch spring):
   8 Nm (0.8 m•kg)
### Removing the clutch master cylinder

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Clutch lever</td>
<td>1</td>
<td>Remove the parts in the order listed.</td>
</tr>
<tr>
<td>2</td>
<td>Clutch switch lead</td>
<td>1</td>
<td><strong>NOTE:</strong> Before removing the clutch master cylinder, drain the clutch fluid from the entire clutch system.</td>
</tr>
</tbody>
</table>
| 3     | Clutch switch                   | 1    | Refer to “INSTALLING THE CLUTCH MASTER CYLINDER”.
| 4     | Union bolt                      | 1    | For installation, reverse the removal procedure. |
| 5     | Copper washers/Clutch hose      | 2/1  |         |
| 6     | Clutch lever holder             | 1    |         |
| 7     | Clutch master cylinder          | 1    |         |

**NOTE:**

- Refer to “INSTALLING THE CLUTCH MASTER CYLINDER”.  
- For installation, reverse the removal procedure.
<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Disassembling the clutch master cylinder</strong></td>
<td></td>
<td>Disassembly the parts in the order listed.</td>
</tr>
<tr>
<td>①</td>
<td>Master cylinder boot</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>②</td>
<td>Circlip</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>③</td>
<td>Master cylinder kit</td>
<td>1</td>
<td>For assembly, reverse the disassembly procedure.</td>
</tr>
<tr>
<td>④</td>
<td>Spring</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>
**CAUTION:**

Clutch components rarely require disassembly. Therefore, always follow these preventive measures:
- Never disassemble clutch components unless absolutely necessary.
- If any connection on the hydraulic clutch system is disconnected, the entire clutch system must be disassembled, drained, cleaned, properly filled, and bled after reassembly.
- Never use solvents on internal clutch components.
- Use only clean or new clutch fluid for cleaning clutch components.
- Clutch fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt fluid immediately.
- Avoid clutch fluid coming into contact with the eyes as it can cause serious injury. First aid for clutch fluid entering the eyes:
  - Flush with water for 15 minutes and get immediate medical attention.

---

**CHECKING THE CLUTCH MASTER CYLINDER**

<table>
<thead>
<tr>
<th>Recommended clutch component replacement schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td>Piston seals</td>
</tr>
<tr>
<td>Clutch hose</td>
</tr>
<tr>
<td>Clutch fluid</td>
</tr>
</tbody>
</table>

1. Check:
- clutch master cylinder body ①
  - Cracks/damage → Replace the clutch master cylinder.
- clutch fluid delivery passage ② (clutch master cylinder body)
  - Obstruction → Blow out with compressed air.

**WARNING**

Whenever a clutch master cylinder is disassembled, replace the piston seals.
2. Check:
   - clutch master cylinder ①
   - clutch master cylinder kit ②
     Rust/scratches/wear → Replace the clutch master cylinder and clutch master cylinder kit as a set.
   - clutch hose ③
     Cracks/damage/wear → Replace.

**ASSEMBLING THE CLUTCH MASTER CYLINDER**

**WARNING**

- Before installation, all internal clutch components must be cleaned and lubricated with clean or new clutch fluid.
- Never use solvents on internal clutch components as they will cause the piston seals to swell and distort.
- Whenever a clutch master cylinder is disassembled, replace the piston seals.

**Recommended clutch fluid**

 Brake fluid DOT 4

**INSTALLING THE CLUTCH MASTER CYLINDER**

1. Install:
   - clutch master cylinder ①

**WARNING**

- Install the clutch lever holder with the “UP” mark facing up.
- Align the end of the clutch lever holder with the punch mark ② in the handlebar.
- First, tighten the upper bolt, then the lower bolt.

2. Install:
   - copper washers (New)
   - clutch hose ①
   - union bolt ②

**WARNING**

Proper clutch hose routing is essential to insure safe motorcycle operation. Refer to “CABLE ROUTING”.

**NOTE:**

While holding the clutch hose, tighten the union bolt.
3. Install:
  • clutch lever ①

NOTE: Lubricate the clutch lever pivot bolt with lithium soap base grease.

4. Fill:
  • clutch master cylinder reservoir
  (with the specified amount of the recommended clutch fluid)

Recommended clutch fluid
Brake fluid DOT 4

WARNING

• Use only the designated clutch fluid. Other clutch fluids may cause the rubber seals to deteriorate, causing leakage and poor clutch performance.
• Refill with the same type of clutch fluid that is already in the system. Mixing clutch fluids may result in a harmful chemical reaction, leading to poor clutch performance.
• When refilling, be careful that water does not enter the reservoir. Water will significantly lower the boiling point of the clutch fluid and could cause vapor lock.

CAUTION:

Clutch fluid may damage painted surfaces or plastic parts. Therefore, always clean up any spilt clutch fluid immediately.

NOTE: In order to ensure a correct reading of the clutch fluid level, make sure that the top of the reservoir is horizontal.

5. Bleed:
  • clutch system
  Refer to “BLEEDING THE HYDRAULIC CLUTCH SYSTEM” in chapter 3.
6. Check:
- clutch fluid level
  Below the minimum level mark (a) → Add the recommended clutch fluid to the proper level.
  Refer to “CHECKING THE CLUTCH FLUID LEVEL” in chapter 3.

7. Check:
- clutch lever operation
  Soft or spongy feeling → Bleed the clutch system.
  Refer to “BLEEDING THE HYDRAULIC CLUTCH SYSTEM” in chapter 3.
**Removing the clutch release cylinder**

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Bolt</td>
<td>3</td>
<td>Remove the parts in the order listed.</td>
</tr>
<tr>
<td>2</td>
<td>Union bolt</td>
<td>1</td>
<td>Refer to “INSTALLING THE CLUTCH RELEASE CYLINDER”.</td>
</tr>
<tr>
<td>3</td>
<td>Copper washer</td>
<td>3</td>
<td><strong>NOTE:</strong> Before removing the clutch release cylinder, drain the clutch fluid from the entire clutch system.</td>
</tr>
<tr>
<td>4</td>
<td>Spacer</td>
<td>1</td>
<td>Refer to “INSTALLING THE CLUTCH RELEASE CYLINDER”.</td>
</tr>
<tr>
<td>5</td>
<td>Clutch hose</td>
<td>1</td>
<td>For installation, reverse the removal procedure.</td>
</tr>
<tr>
<td>6</td>
<td>Clutch release cylinder</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

- **30 Nm (3.0 m·kg)**
- **10 Nm (1.0 m·kg)**
<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><strong>Disassembling the clutch release cylinder</strong></td>
<td></td>
<td>Disassembly the parts in the order listed.</td>
</tr>
<tr>
<td>2</td>
<td>Clutch release cylinder</td>
<td>1</td>
<td>Refer to “DISASSEMBLING THE CLUTCH RELEASE CYLINDER”.</td>
</tr>
<tr>
<td>3</td>
<td>Piston seal</td>
<td>1</td>
<td>For assembly, reverse the disassembly procedure.</td>
</tr>
<tr>
<td>4</td>
<td>Clutch release cylinder piston</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Piston seal</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Spring</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>
DISASSEMBLING THE CLUTCH RELEASE CYLINDER

1. Remove:
   - piston seal ①
   - clutch release cylinder piston ②
   - spring ③
   - piston seal ④

a. Blow compressed air into the clutch hose joint opening ③ to force out the piston from the clutch release cylinder.

**WARNING**

- Cover the clutch release cylinder with a rag. Be careful not to get injured when the piston is expelled from the clutch release cylinder.
- Never try to pry out the clutch release cylinder piston.

b. Remove the clutch release cylinder piston seals.

CHECKING THE CLUTCH RELEASE CYLINDER

<table>
<thead>
<tr>
<th>Recommended clutch component replacement schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td>Piston seals</td>
</tr>
<tr>
<td>Clutch hose</td>
</tr>
<tr>
<td>Clutch fluid</td>
</tr>
</tbody>
</table>

1. Check:
   - clutch release cylinder body
     Cracks/damage → Replace the clutch release cylinder.

2. Check:
   - clutch release cylinder ①
   - clutch release cylinder piston ②
   Rust/scratches/wear → Replace the clutch release cylinder and clutch release cylinder piston as a set.
INSTALLING THE CLUTCH RELEASE CYLINDER

1. Check:
   - copper washers (New)
   - clutch hose ①
   - union bolt ②

**WARNING**
Proper clutch hose routing is essential to insure safe motorcycle operation. Refer to “CABLE ROUTING”.

<table>
<thead>
<tr>
<th>Union bolt</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 Nm (3.0 m•kg)</td>
</tr>
</tbody>
</table>

2. Fill:
   - clutch master cylinder reservoir
     (with the specified amount of the recommended clutch fluid)

**WARNING**
- Use only the designated clutch fluid. Other clutch fluids may cause the rubber seals to deteriorate, causing leakage and poor clutch performance.
- Refill with the same type of clutch fluid that is already in the system. Mixing clutch fluids may result in a harmful chemical reaction, leading to poor clutch performance.
- When refilling, be careful that water does not enter the reservoir. Water will significantly lower the boiling point of the clutch fluid and could cause vapor lock.

**CAUTION:**
Clutch fluid may damage painted surfaces or plastic parts. Therefore, always clean up any spilt clutch fluid immediately.
NOTE:

In order to ensure a correct reading of the clutch fluid level, make sure that the top of the reservoir is horizontal.

3. Bleed:
   • clutch system
   Refer to “BLEEDING THE HYDRAULIC CLUTCH SYSTEM” in chapter 3.

4. Check:
   • clutch fluid level
   Below the minimum level mark\(\circ\) → Add the recommended clutch fluid to the proper level.
   Refer to “CHECKING THE CLUTCH FLUID LEVEL” in chapter 3.

5. Check:
   • clutch lever operation
   Soft or spongy feeling → Bleed the clutch system.
   Refer to “BLEEDING THE HYDRAULIC CLUTCH SYSTEM” in chapter 3.
### Removing the oil pump.

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Oil pump drive gear</td>
<td>1</td>
<td>Remove the parts in the order listed. Refer to “INSTALLING THE CLUTCH”.</td>
</tr>
<tr>
<td>2</td>
<td>Collar</td>
<td>1</td>
<td>Refer to “INSTALLING THE OIL PUMP”.</td>
</tr>
<tr>
<td>3</td>
<td>Washer</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Oil buffer plate</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Circlip</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Oil pump driven gear</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Washer</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Oil pump</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Dowel pin</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Collar</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>O-ring</td>
<td>1</td>
<td>For installation, reverse the removal procedure.</td>
</tr>
</tbody>
</table>

*New* 5

4 Nm (0.4 m•kg)

10 Nm (1.0 m•kg)
Disassembling the oil pump

Order | Job/Part | Q'ty | Remarks
--- | --- | --- | ---
1 | Oil pump housing | 1 | Disassembly the parts in the order listed.
2 | Inner rotor | 1 |
3 | Outer rotor | 1 |
4 | Pin | 1 |
5 | Dowel pin | 1 |
6 | Oil pump housing | 1 |
7 | Inner rotor | 1 |
8 | Outer rotor | 1 |
9 | Pin | 1 |
10 | Oil pump shaft | 1 |
11 | Oil pump cover | 1 |

Refer to “ASSEMBLING THE OIL PUMP”.

For assembly, reverse the disassembly procedure.
CHECKING THE OIL PUMP

1. Check:
   - oil pump drive gear ①
   - oil pump driven gear ②
   - oil pump housing ③
   - oil pump housing cover ④
   Cracks/damage/wear → Replace the defective part(-s).

2. Measure:
   - inner-rotor to outer-rotor tip clearance [A]
   - outer-rotor to oil-pump-housing clearance [B]
   - oil-pump-housing to inner-rotor and outer-rotor clearance [C]
   Outer of specification → Replace the oil pump.

   ① Inner rotor
   ② Outer rotor
   ③ Oil pump housing

   | Inner-rotor to outer-rotor tip clearance |
   | 0.12 ~ 0.17 mm <Limit 0.2 mm> |
   |
   | Outer-rotor to oil-pump-housing clearance |
   | 0.03 ~ 0.08 mm <Limit 0.15 mm> |
   |
   | Oil-pump-housing to inner-rotor and outer-rotor clearance |
   | 0.03 ~ 0.08 mm <Limit 0.15 mm> |

3. Check:
   - oil pump operation
   Unsmooth → Repeat steps (1) and (2) or replace the defective part(-s).
ASSEMBLING THE OIL PUMP

1. Lubricate:
   - inner rotor
   - outer rotor
   - oil pump shaft
   (with the recommended lubricant)

   **Recommended lubricant**
   Engine oil

2. Install:
   - oil pump shaft (1)
     (to the oil pump cover (2))
   - pin (3)
   - inner rotor (4)
   - outer rotor (5)
   - pin (6)
   - oil pump housing (7)
   - screw

   **Oil pump housing screw**
   10 Nm (1.0 m•kg)

   **NOTE:**
   When installing the inner rotor, align the pin (3) in the oil pump shaft with the groove on the inner rotor (4).

3. Check:
   - oil pump operation
   Refer to "CHECKING THE OIL PUMP".

INSTALLING THE OIL PUMP

1. Install:
   - oil pump (1)

   **Oil pump bolt**
   10 Nm (1.0 m•kg)

   **CAUTION:**
   After tightening the bolts, make sure that the oil pump turns smoothly.

   **NOTE:**
   Align the arrow (a) on the oil pump with the arrow (b) on the crankcase.
<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Removing the shift shaft and stopper lever</td>
<td>1</td>
<td>Remove the parts in the order listed.</td>
</tr>
<tr>
<td>2</td>
<td>Oil pump</td>
<td>1</td>
<td>Refer to “OIL PUMP”.</td>
</tr>
<tr>
<td>3</td>
<td>Drive sprocket cover</td>
<td>1</td>
<td>Refer to “ENGINE”.</td>
</tr>
<tr>
<td>4</td>
<td>Circlip</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Washer</td>
<td>1</td>
<td>Refer to “INSTALLING THE SHIFT SHAFT”.</td>
</tr>
<tr>
<td>6</td>
<td>Shift shaft</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Washer</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Shift lever spring</td>
<td>1</td>
<td>For installation, reverse the removal procedure.</td>
</tr>
<tr>
<td>8</td>
<td>Stopper lever</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Stopper lever spring</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

**Removal and Installation Notes:**

- For installation, reverse the removal procedure.
- Refer to “OIL PUMP”.
- Refer to “ENGINE”.
- Refer to “INSTALLING THE SHIFT SHAFT”.

**Torque Specifications:**

- 10 Nm (1.0 m·kg)
CHECKING THE SHIFT SHAFT

1. Check:
   - shift shaft ①
     Bends/damage/wear → Replace.
   - shift lever spring
     Damage/wear → Replace.

CHECKING THE STOPPER LEVER

1. Check:
   - stopper lever ①
     Bends/damage → Replace.
     Roller turns roughly → Replace the stopper lever.

INSTALLING THE SHIFT SHAFT

1. Install:
   - stopper lever ①
   - stopper lever spring ②
   - shift shaft lever ③

   Hook the ends of the stopper lever spring onto the stopper lever and the crankcase boss.
   Mesh the stopper lever with the shift drum segment assembly.

2. Install:
   - washer ①
   - shift shaft ②
   - circlip ③
NOTE:

- Lubricate the oil seal lips with lithium soap base grease.
- Hook the end of the shift lever spring onto the shift lever spring stopper ④.
## TIMING PLATE AND PICKUP COIL

### TIMING PLATE AND PICKUP COIL

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Removing the timing plate and pickup coil</strong></td>
<td></td>
<td>Remove the parts in the order listed.</td>
</tr>
<tr>
<td>1</td>
<td>Seat, side cover, fuel tank</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Pickup coil read</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Timing plate cover</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Gasket</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Pickup coil</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Timing plate</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Dowel pin</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Pickup base</td>
<td>1</td>
<td>For installation, reverse the removal procedure.</td>
</tr>
</tbody>
</table>

- **4 Nm (0.4 m·kg)**
- **7 Nm (0.7 m·kg)**
- **45 Nm (4.5 m·kg)**
## Removing the oil pan

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Engine</td>
<td>1/1</td>
<td>Remove the parts in the order listed. Refer to “ENGINE”.</td>
</tr>
<tr>
<td>1</td>
<td>Oil level switch/O-ring</td>
<td>1</td>
<td>Refer to “REMOVING/INSTALLING THE OIL PAN”.</td>
</tr>
<tr>
<td>2</td>
<td>Oil pan</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Dowel pin</td>
<td>2</td>
<td>Refer to “INSTALLING THE OIL STRAINER”.</td>
</tr>
<tr>
<td>4</td>
<td>Gasket</td>
<td>1/1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Relief valve/O-ring</td>
<td>1</td>
<td>For installation, reverse the removal procedure.</td>
</tr>
<tr>
<td>6</td>
<td>Oil strainer</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Oil strainer housing</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Gasket</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

For installation, reverse the removal procedure.
**REMOVING THE OIL PAN**

1. Remove:
   - oil level switch ①
   - oil pan ②
   - gasket
   - dowel pins

**NOTE:**
Loosen each bolt 1/4 of a turn at a time, in stages and in a crisscross pattern. After all of the bolts are fully loosened, remove them.

**CHECKING THE RELIEF VALVE**

1. Check:
   - relief valve body ①
   - relief valve ②
   - spring ③
   - Cover ④
   Damage/wear → Replace the defective part(s).
   - circlip ⑤

**CHECKING THE OIL DELIVERY PIPES**

The following procedure applies to all of the oil delivery pipes.

1. Check:
   - oil delivery pipe ①
   Damage → Replace.
   Obstruction → Wash and blow out with compressed air.

**CHECKING THE OIL STRAINER**

1. Check:
   - oil strainer
   Damage → Replace.
   Contaminants → Clean with engine oil.
INSTALLING THE OIL STRAINER

1. Install:
   - oil strainer housing

   ![Diagram of oil strainer housing]

   **NOTE:**
   The arrow on the oil strainer housing must point towards the front of the engine.

2. Install:
   - oil strainer cover
   - relief valve

   ![Diagram of oil strainer cover]

   **NOTE:**
   The arrow on the oil strainer cover must point towards the front of the engine.

INSTALLING THE OIL PAN

1. Install:
   - dowel pins
   - gasket (New)
   - oil pan
   - oil level switch
   - engine oil drain bolt

   ![Diagram of oil pan]

   **WARNING**
   Always use new copper washers.

   **NOTE:**
   - Tighten the oil pan bolts in stages and in a crisscross pattern.
   - Lubricate the oil level switch’s O-ring with engine oil.

   ![Diagram of engine oil drain bolt]

   **Oil pan bolt**
   10 Nm (1.0 m•kg)

   **Oil level switch bolt**
   10 Nm (1.0 m•kg)
### CRANKCASE

#### CRANKCASE

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Removing the oil pan</td>
<td>1/1</td>
<td>Remove the parts in the order listed. Refer to “ENGINE”. Refer to “CAMSHAFTS”. Refer to “CYLINDER HEAD”. Refer to “CYLINDERS AND PISTONS”. Refer to “CLUTCH”. Refer to “OIL PUMP”. Refer to “SHIFT SHAFT”. Refer to “TIMING PLATE AND PICKUP COIL”. Refer to “OIL PAN”.</td>
</tr>
<tr>
<td></td>
<td>Engine</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Camshafts</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cylinder head</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cylinder, piston</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Clutch</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Oil pump</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Shift shaft</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Timing plate, pickup coil</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Oil strainer</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Spring/rod</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Chain guide</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Cover</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

- 24 Nm (2.4 m\*kg)
- 35 Nm (3.5 m\*kg)
- 12Nm (1.2 m\*kg)
- 10 Nm (1.0 m\*kg)

*Images and diagrams of CRANKCASE are shown.*
<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Bearing cover</td>
<td>1</td>
<td>Refer to “DISASSEMBLING/ASSEMBLING THE CRANKCASE”.</td>
</tr>
<tr>
<td>5</td>
<td>Crankcase (lower)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Dowel pin</td>
<td>2</td>
<td>For installation, reverse the removal pro- cedure.</td>
</tr>
</tbody>
</table>
DISASSEMBLING THE CRANKCASE

1. Remove:
   • crankcase bolts

**NOTE:**
   • Loosen each bolt 1/4 of a turn at a time, in stages and in a crisscross pattern. After all of the bolts are fully loosened, remove them.
   • Loosen the bolts in decreasing numerical order (refer to the numbers in the illustration).
   • The numbers embossed on the crankcase indicate the crankcase tightening sequence.

2. Place the engine upside down.
3. Remove:
   • lower crankcase

**CAUTION:**
Tap on one side of the crankcase with a soft-face hammer. Tap only on reinforced portions of the crankcase, not on the crankcase mating surfaces. Work slowly and carefully and make sure that the crankcase halves separate evenly.

4. Remove:
   • dowel pins
   • O-ring

**NOTE:**
Identify the position of each crankshaft journal lower bearing so that it can be reinstalled in its original place.
CHECKING THE CRANKCASE
1. Thoroughly wash the crankcase halves in a mild solvent.
2. Thoroughly clean all the gasket surfaces and crankcase mating surfaces.
3. Check:
   • crankcase
     Cracks/damage → Replace.
   • oil delivery passages
     Obstruction → Blow out with compressed air.

ASSEMBLING THE CRANKCASE
1. Lubricate:
   • crankshaft journal bearings
     (with the recommended lubricant)

   Recommended lubricant
   Engine oil

2. Apply:
   • sealant
     (onto the crankcase mating surfaces)

   Yamaha bond No. 1215
   90890-85505

NOTE:
Do not allow any sealant to come into contact with the oil gallery or crankshaft journal bearings. Do not apply sealant to within 2 ~ 3 mm of the crankshaft journal bearings.

3. Install:
   • dowel pin

4. Install:
   • crankshaft journal lower bearings
     (into the lower crankcase)

NOTE:
• Align the projections on the crankshaft journal lower bearings with the notches in the crankcase.
• Install each crankshaft journal lower bearing in its original place.
5. Set the shift drum assembly and transmission gears in the neutral position.

6. Install:
   • lower crankcase \( \text{\( \circ \)} \)
     (onto the upper crankcase \( \text{\( \bullet \)} \))

**CAUTION:**

Before tightening the crankcase bolts, make sure that the transmission gears shift correctly when the shift drum assembly is turned by hand.

**NOTE:**

- Carefully position the shift forks so that they mesh smoothly with the transmission gears.
- Mesh shift fork center with the 2nd pinion gear \( \text{\( \circ \)} \) on the main axle.

7. Install:
   • lower crankcase bolts
   • upper crankcase bolts

**NOTE:**

Tighten the bolts in the tightening sequence cast on the crankcase.

---

**A Upper crankcase**

**B Lower crankcase**

- \( \star \) M10 bolt \( (16, 17, 31) \sim (33) \):
  - 35 Nm (3.5 m\( \cdot \)kg)
- \( \times \) M8 bolt \( (1) \sim (15, 21, 23) \):
  - 24 Nm (2.4 m\( \cdot \)kg)
- \( \triangle \) M6 bolt \( (18, 25, 29, 34) \sim (36) \):
  - 12 Nm (1.2 m\( \cdot \)kg)

8. Install:
   • clutch cover

**Clutch cover bolt**

- 10 Nm (1.0 m\( \cdot \)kg)
<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Removing the starter clutch</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
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<td>Remove the parts in the order listed. Refer to “CRANKCASE”.</td>
</tr>
<tr>
<td>2</td>
<td>Bearing housing</td>
<td>1</td>
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</tr>
<tr>
<td>3</td>
<td>O-ring</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Oil seal</td>
<td>1</td>
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<tr>
<td>5</td>
<td>Nozzle</td>
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</tr>
<tr>
<td>6</td>
<td>Generator shaft</td>
<td>1</td>
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</tr>
<tr>
<td>7</td>
<td>Bearing</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>8</td>
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<td>1</td>
<td>Refer to “INSTALLING THE STARTER CLUTCH”.</td>
</tr>
<tr>
<td>9</td>
<td>Starter clutch gear</td>
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</tr>
<tr>
<td>10</td>
<td>Collar</td>
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<tr>
<td>11</td>
<td>Circlip</td>
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<tr>
<td>12</td>
<td>Starter clutch roller</td>
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<tr>
<td>13</td>
<td>Stopper plate</td>
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*7 Nm (0.7 m·kg)*

*10 Nm (1.0 m·kg)*
### Order

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
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<td>14</td>
<td>Starter clutch idle gear</td>
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</tr>
<tr>
<td>15</td>
<td>Bearing</td>
<td>1</td>
<td>For installation, reverse the removal pro-</td>
</tr>
</tbody>
</table>

Procedure. |
CHECKING THE STARTER CLUTCH

1. Check:
   - starter clutch rollers ①
     Damage/wear → Replace.

2. Check:
   - starter clutch idle gear ②
   - starter clutch drive gear ③
   - starter clutch gear ④
     Burrs/chips/roughness/wear → Replace the defective part(s).

3. Check:
   - starter clutch gear’s contacting surfaces
     Damage/pitting/wear → Replace the starter clutch gear.

4. Check:
   - starter clutch operation

   a. Install the starter clutch gear ④ onto the starter clutch and hold the starter clutch.
   b. When turning the starter clutch drive gear clockwise ⑤, the starter clutch and the starter clutch drive gear should engage.
      If the starter clutch drive gear and starter clutch do not engage, the starter clutch is faulty and must be replaced.
   c. When turning the starter clutch drive gear counterclockwise ⑥, it should turn freely.
      If the starter clutch drive gear does not turn freely, the starter clutch is faulty and must be replaced.

5. Check:
   - starter clutch shaft
     Bends/damage/wear → Replace.
CHECKING THE GENERATOR SHAFT
1. Check:
   - generator shaft ①
   - generator shaft splines ②
     Damage/wear → Replace the generator shaft.
   - oil passages ③
     Dirt/obstruction → Wash the generator shaft and then blow out the oil passages with compressed air.
   - bearing ④
     Rough movement → Replace.

INSTALLING THE STARTER CLUTCH ROLLER
1. Install:
   - circlip ①
   - starter clutch roller ②
   - starter clutch drive gear ③

CAUTION:
Be sure to install the starter clutch roller to the starter clutch drive gear so that the circlip is outside.
### Removing the crankshaft assembly

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
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<tr>
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<td>Refer to &quot;STARTER CLUTCH&quot;.</td>
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<td>Cover</td>
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<td>Refer to &quot;INSTALLING THE CRANKSHAFT ASSEMBLY&quot;.</td>
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<td>Refer to &quot;REMOVING/INSTALLING THE CRANKSHAFT ASSEMBLY&quot;.</td>
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<tr>
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<td>HY-VO chain</td>
<td>1</td>
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<tr>
<td>6</td>
<td>Crankshaft journal bearings</td>
<td>10</td>
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</tr>
<tr>
<td>7</td>
<td>HY-VO chain guide</td>
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CONNECTING ROD

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<td>Refer to “INSTALLING THE CONNEECTING RODS.”</td>
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<td>Connecting rod</td>
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<td>Connecting rod cap</td>
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<tr>
<td>5</td>
<td>Connecting rod bearing</td>
<td>8</td>
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</tr>
</tbody>
</table>

Remove the parts in the order listed.
Refer to “INSTALLING THE CONNEECTING RODS.”
Refer to “REMOVING/INSTALLING THE CONNECTING RODS.”
For installation, reverse the removal procedur.
CRANKSHAFT

REMOVING THE CRANKSHAFT ASSEMBLY

1. Remove:
   - crankshaft assembly ①
   - crankshaft journal upper bearings
     (from the upper crankcase)

NOTE:
Identify the position of each crankshaft journal upper bearing so that it can be reinstalled in its original place.

REMOVING THE CONNECTING RODS

1. Remove:
   - connecting rods ①
   - big end bearings

NOTE:
Identify the position of each big end bearing so that it can be reinstalled in its original place.

CHECKING THE CRANKSHAFT AND CONNECTING RODS

1. Measure:
   - crankshaft runout
     Out of specification → Replace the crankshaft.

   | Crankshaft runout |
   | Less than 0.02 mm |

2. Check:
   - crankshaft journal surfaces
   - crankshaft pin surfaces
   - bearing surfaces
     Scratches/wear → Replace the crankshaft.

3. Measure:
   - crankshaft-journal-to-crankshaft-journal-bearing clearance
     Out of specification → Replace the crankshaft journal bearings.

   | Crankshaft-journal to crankshaft-journal-bearing clearance |
   | 0.030 ~ 0.064 mm |

CAUTION:

Do not interchange the crankshaft journal bearings. To obtain the correct crankshaft-journal-to-crankshaft-journal-bearing clearance and prevent engine damage, the crankshaft journal bearings must be installed in their original positions.
a. Clean the crankshaft journal bearings, crankshaft journals, and bearing portions of the crankcase.

b. Place the upper crankcase upside down on a bench.

c. Install the crankshaft journal upper bearings and the crankshaft into the upper crankcase.

**NOTE:**
Align the projections of the crankshaft journal upper bearings with the notches in the crankcase.

d. Put a piece of Plastigauge on each crankshaft journal.

**NOTE:**
Do not put the Plastigauge over the oil hole in the crankshaft journal.

e. Install the crankshaft journal lower bearings into the lower crankcase and assemble the crankcase halves.

**NOTE:**
• Align the projections of the crankshaft journal lower bearings with the notches in the crankcase.
• Do not move the crankshaft until the clearance measurement has been completed.

f. Tighten the bolts to specification in the tightening sequence cast on the crankcase.

<table>
<thead>
<tr>
<th>Crankcase bolt</th>
</tr>
</thead>
<tbody>
<tr>
<td>▲ M10 (No. 16, 17, 18 ~ 33):</td>
</tr>
<tr>
<td>35 Nm (3.5 m·kg)</td>
</tr>
<tr>
<td>▲ M8 (No. 15, 16, 19, 20):</td>
</tr>
<tr>
<td>24 Nm (2.4 m·kg)</td>
</tr>
<tr>
<td>▲ M6 (No. 26, 27, 28, 29, 34, 35):</td>
</tr>
<tr>
<td>12 Nm (1.2 m·kg)</td>
</tr>
</tbody>
</table>

**NOTE:**
Lubricate the crankcase bolt threads (M8) with engine oil.
g. Remove the lower crankcase and the crankshaft journal lower bearings.

h. Measure the compressed Plastigauge width on each crankshaft journal. If the clearance is out of specification, select replacement crankshaft journal bearings.

4. Select:
   - Crankshaft journal bearings (J₁ ~ J₅)

For example, if the crankcase “J₁” and crankshaft web “J₁” numbers are “6” and “2” respectively, then the bearing size for “J₁” is:

**Bearing size for J₁:**

\[
J₁ \text{ (crankcase)} - J₁ \text{ (crankshaft web)} = 6 - 2 = 4 \text{ (green)}
\]

**CRANKSHAFT JOURNAL BEARING (COLOR CODE)**

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<thead>
<tr>
<th></th>
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<th>Black</th>
<th>Brown</th>
<th>Green</th>
<th>Yellow</th>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
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<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td>Green</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td>Yellow</td>
<td></td>
</tr>
</tbody>
</table>

5. Measure:
   - crankshaft-pin-to-big-end-bearing clearance
     Out of specification → Replace the big end bearings.

**Crankshaft-pin-to-big-end-bearing clearance**

0.017 ~ 0.040 mm

<Limit: 0.08 mm>

The following procedure applies to all of the connecting rods.
CAUTION:

Do not interchange the big end bearings and connecting rods. To obtain the correct crankshaft-pin-to-big-end-bearing clearance and prevent engine damage, the big end bearings must be installed in their original positions.

a. Clean the big end bearings, crankshaft pins, and bearing portions of the connecting rods.
b. Install the big end upper bearing into the connecting rod and the big end lower bearing into the connecting rod cap.

NOTE:
Align the projections (a) on the big end bearings with the notches (b) in the connecting rod and connecting rod cap.

c. Put a piece of Plastigauge® (c) on the crankshaft pin.
d. Assemble the connecting rod halves.

NOTE:
- Do not move the connecting rod or crankshaft until the clearance measurement has been completed.
- Apply molybdenum disulfide grease onto the bolts, threads, and nuts seats.
- Make sure that the “Y” mark (d) on the connecting rod faces towards the left side of the crankshaft.
- Make sure that the characters (e) on both the connecting rod and connecting rod cap are aligned.

e. Tighten the connecting rod nuts.

CAUTION:
- When tightening the connecting rod nuts, be sure to use an F-type torque wrench.
- Without pausing, tighten the connecting rod nuts to the specified torque. Apply continuous torque between 2.0 and 3.6 m•kg. Once you reach 2.0 m•kg, DO NOT STOP TIGHTENING until the specified torque is reached. If the tightening is interrupted between 2.0 and 3.6 m•kg, loosen the connecting rod nut to less than 2.0 m•kg and start again.
CRANKSHAFT

Refer to "INSTALLING THE CONNECTING RODS".

<table>
<thead>
<tr>
<th>Connecting rod nut</th>
</tr>
</thead>
<tbody>
<tr>
<td>36 Nm (3.6 m•kg)</td>
</tr>
</tbody>
</table>

**f.** Remove the connecting rod and big end bearings. Refer to "REMOVING THE CONNECTING RODS".

**g.** Measure the compressed Plastigauge® width ① on the crankshaft pin. If the clearance is out of specification, select replacement big end bearings.

6. Select:
   big end bearings (P₁ ~ P₄)

**NOTE:**
- The numbers stamped into the crankshaft web and the numbers on the connecting rods are used to determine the replacement big end bearing sizes.
- "P1" ~ "P4" refer to the bearings shown in the crankshaft illustration.

For example, if the connecting rod "P₁" and the crankshaft web "P₁" numbers are "4" and "1" respectively, then the bearing size for "P₁" is:

**Bearing size for “P₁”:**

"P₁" (connecting rod) – “P₁” (crankshaft) = 4 – 1 = 3 (brown)

<table>
<thead>
<tr>
<th>BIG END BEARING COLOR CODE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>4</td>
</tr>
</tbody>
</table>
CRANKSHAFT

CHECKING THE TIMING CHAIN
1. Check:
   • timing chain ①
     Damage/stiffness → Replace the timing chain and camshaft sprockets as a set.
2. Check
   • timing chain guide (intake side)
     Damage/wear → Replace.

CHECKING THE HY-VO CHAIN
1. Check:
   • HY-VO chain ①
     Damage/stiffness → Replace the HY-VO chain and sprockets as a set.
2. Check:
   • HY-VO chain guide
     Damage/wear → Replace.

CHECKING THE BEARINGS AND OIL SEALS
1. Check:
   • bearings
     Clean and lubricate the bearings, then rotate the inner race with your finger
     Rough movement → Replace.
2. Check:
   • oil seals
     Damage/wear → Replace.

CHECKING THE CIRCLIPS AND WASHERS
1. Check:
   • circlips
     Bends/damage/looseness → Replace.
   • washers
     Bends/damage → Replace.

INSTALLING THE CONNECTING RODS
1. Lubricate:
   • bolt threads
   • nut seats
     (with the recommended lubricant)

   Recommended lubricant
   Molybdenum disulfide grease

2. Lubricate:
   • crankshaft pins
   • big end bearings
   • connecting rod inner surface
     (with the recommended lubricant)
3. Install:
- big end bearings
- connecting rods
- connecting rod caps
(onto the crankshaft pins)

NOTE:
- Align the projections on the big end bearings with the notches in the connecting rods and connecting rod caps.
- Be sure to reinstall each big end bearing in its original place.
- Make sure that the “Y” marks on the connecting rods face towards the left side of the crankshaft.
- Make sure that the characters on both the connecting rod and connecting rod cap are aligned.

4. Align:
- bolt heads (with the connecting rod caps)

5. Tighten:
- connecting rod nuts

CAUTION:
- When tightening the connecting rod nuts, be sure to use an F-type torque wrench.
- Without pausing, tighten the connecting rod nuts to the specified torque. Apply continuous torque between 2.0 and 3.6 m·kg. Once you reach 2.0 m·kg DO NOT STOP TIGHTENING until the specified torque is reached. If the tightening is interrupted between 2.0 and 3.6 m·kg, loosen the connecting rod nut to less than 2.0 m·kg and start again.
INSTALLING THE CRANKSHAFT

1. Install:
   • crankshaft journal upper bearings
     (into the upper crankcase)

   **NOTE:**
   • Align the projections a on the crankshaft journal upper bearings with the notches b in the crankcase.
   • Be sure to install each crankshaft journal upper bearing in its original place.

2. Install:
   • HY-VO chain 1
   • timing chain 2
     (onto the crankshaft sprocket)
   • crankshaft assembly 3

   **NOTE:**
   • Pass the timing chain through the timing chain cavity.
   • To prevent the timing chain from falling into the crankcase, fasten it with a wire.
Removing the transmission, shift drum assembly, and shift forks.

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
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<td>Refer to “INSTALLING THE TRANSMISSION”.</td>
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<tr>
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<td>Bearing</td>
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<tr>
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<td>Drive axle assembly</td>
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For installation, reverse the removal procedure.
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<tr>
<td>17</td>
<td>3rd pinion gear</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Circlip</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Washer</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>4th pinion gear</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>Main axle (1st pinion gear)</td>
<td>1</td>
<td>For assembly, reverse the disassembly procedure.</td>
</tr>
</tbody>
</table>
### SHIFT CAM AND SHIFT FORK

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Removing the shift cam and shift fork.</td>
<td></td>
<td>Remove the parts in the order listed. Refer to &quot;CRANKCASE&quot;</td>
</tr>
<tr>
<td>2</td>
<td>Crankcase</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Shift fork (L)</td>
<td>1</td>
<td>Refer to &quot;INSTALLING THE TRANSMISSION&quot;</td>
</tr>
<tr>
<td>4</td>
<td>Shift fork (C)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Shift fork (R)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Stopper plate</td>
<td>1</td>
<td>For installation, reverse the removal procedure.</td>
</tr>
<tr>
<td>7</td>
<td>Shift drum</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

Remove the parts in the order listed. Refer to "CRANKCASE" for installation, reverse the removal procedure.
CHECKING THE SHIFT FORKS

The following procedure applies to all of the shift forks and related components.

1. Check:
   - shift fork cam follower
   - shift fork pawl
   Bends/damage/scoring/wear → Replace the shift fork.

2. Check:
   - shift fork guide bar
   Roll the shift fork guide bar on a flat surface.
   Bends → Replace.

**WARNING**

Do not attempt to straighten a bent shift fork guide bar.

3. Check:
   - shift fork movement
     (on the shift fork guide bar)
     Rough movement → Replace the shift forks and shift fork guide bar as a set.

CHECKING THE SHIFT DRUM ASSEMBLY

1. Check:
   - shift drum grooves
     Damage/scratches/wear → Replace the shift drum.
   - shift drum segment
     Damage/wear → Replace.
   - shift drum bearing
     Damage/pitting → Replace.

CHECKING THE TRANSMISSION

1. Measure:
   - main axle runout
     (with a centering device and dial gauge)
     Out of specification → Replace the main axle.

**Main axle runout limit**

0.06 mm
2. Measure:
   • drive axle runout
     (with a centering device and dial gauge ①)
     Out of specification → Replace the drive axle.

   | Drive axle runout limit |
   | 0.06 mm |

3. Check:
   • transmission gears
     Blue discoloration/pitting/wear → Replace the defective gear(-s).
   • transmission gear dogs
     Cracks/damage/rounded edges → Replace the defective gear(-s).

4. Check:
   • transmission gear engagement
     (each pinion gear to its respective wheel gear)
     Incorrect → Reassemble the transmission axle assemblies.

   **NOTE:**
   When reassembling the main axle, press the 2nd pinion gear ① onto it ② as shown.

5. Check:
   • transmission gear movement
     Rough movement → Replace the defective part(-s).

6. Check:
   • circlips
     Damage/bends/looseness → Replace.

**INSTALLING THE SHIFT FORKS AND SHIFT DRUM ASSEMBLY**

1. Install:
   • shift drum assembly ①
   • shift fork guide bars ②
   • shift fork “R” ③
   • shift fork “C” ④
   • shift fork “L” ⑤

   **NOTE:**
   The embossed marks on the shift forks should face towards the right side of the engine and be in the following sequence: “R”, “C”, “L”.
INSTALLING THE TRANSMISSION

1. Install:
   - main axle assembly ①
   - drive axle assembly ②

   **NOTE:**
   - Make sure that the drive axle bearing circlips ③ are inserted into the grooves ④ in the upper crankcase.
   - The drive axle bearing pin ⑤ must face towards the rear of the crankcase and the main axle bearing pin ⑥ must face towards the front of the crankcase.

2. Check:
   - transmission
     Rough movement → Repair.

   **NOTE:**
   Oil each gear, shaft, and bearing thoroughly.
CHAPTER 5.
CARBURETORS

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CHECKING THE CARBURETORS ........................................ 5-4
ASSEMBLING THE CARBURETORS ................................. 5-5
INSTALLING THE CARBURETORS ................................. 5-7
MEASURING AND ADJUSTING THE FUEL LEVEL ............ 5-7
CHECKING AND ADJUSTING THE THROTTLE POSITION SENSOR .................................................. 5-8
CHECKING THE FUEL COCK ............................................. 5-10
CHECKING THE FUEL COCK OPERATION ...................... 5-10
### Removing the carburetors

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Battery negative lead</td>
<td>1</td>
<td>Loosen</td>
</tr>
<tr>
<td>2</td>
<td>Battery positive lead</td>
<td>1</td>
<td>Loosen</td>
</tr>
<tr>
<td>3</td>
<td>Battery</td>
<td>1</td>
<td>Loosen</td>
</tr>
<tr>
<td>4</td>
<td>Carburetor joint screws</td>
<td>4</td>
<td>Move to rear ward</td>
</tr>
<tr>
<td>5</td>
<td>Air filter joint screws</td>
<td>4</td>
<td>Disconnect</td>
</tr>
<tr>
<td>6</td>
<td>Bolts</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Air filter case</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Throttle position sensor lead</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Starter cable</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Throttle cables</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Carburetors</td>
<td>1</td>
<td>For installation, reverse the removal procedure.</td>
</tr>
</tbody>
</table>

Remove the parts in the order listed. Refer to “SEAT, SIDE COVER AND FUEL TANK” in Chapter 3.

For installation, reverse the removal procedure.
### Disassembling the carburetor

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Disassembling the carburetor</td>
<td>1/4</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Starter shaft/Starter levers</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Upper bracket</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Lower bracket</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Throttle stop screw set</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Carburetors</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Throttle cable bracket</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Starter plunger set</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Vacuum chamber cover</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Piston valve spring</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Piston valve</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Jet needle</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Pilot air jet</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Pilot screw</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

Disassembly the parts in the order listed.

**NOTE:**

The following procedure applies to all of the carburetors.

Refer to “ASSEMBLING THE CARBURETORS”.

---

**New**

CARBURETORS CARB
<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>Float chamber</td>
<td>1/1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Float chamber gasket</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Float pin</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Float</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Needle valve ass'y</td>
<td>1</td>
<td>Refer to &quot;ASSEMBLING THE CARBURETORS&quot;.</td>
</tr>
<tr>
<td>18</td>
<td>Pilot jet</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Main jet</td>
<td>1</td>
<td>For assembly, reverse the disassembly procedure.</td>
</tr>
<tr>
<td>20</td>
<td>Needle jet</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>
CHECKING THE CARBURETORS

The following procedure applies to all of the carburetors.

1. Check:
   - carburetor body
   - float chamber
   - jet housing
     Cracks/damage → Replace.

2. Check:
   - fuel passages
     Obstruction → Clean.

3. Check:
   - float chamber body
     Dirt → Clean.

4. Check:
   - float chamber rubber gasket
     Cracks/damage/wear → Replace.

5. Check:
   - float
     Damage → Replace.

6. Check:
   - needle valve ①
   - needle valve seat ②
     Damage/obstruction/wear → Replace the needle valve, needle valve seat and O-ring as a set.

7. Check:
   - O-ring ③
     Damage/wear → Replace the needle valve, needle valve seat and O-ring as a set.

8. Check:
   - piston valve
     Damage/scratches/wear → Replace.
   - rubber diaphragm
     Cracks/tears → Replace.

9. Check:
   - vacuum chamber cover
   - piston valve spring
   - jet needle holder
     Cracks/damage → Replace.
10. Check:
- jet needle kit (1)
- needle jet (2)
- main jet (3)
- pilot jet (4)
- pilot screw (5)
  Bends/damage/wear → Replace.
  Obstruction → Clean.
  Blow out the jets with compressed air.

11. Check:
- piston valve movement
  Insert the piston valve into the carburetor body and move it up and down.
  Tightness → Replace the piston valve.

12. Check:
- fuel feed pipes
- hose joint
  Cracks/damage → Replace.
  Obstruction → Clean.
  Blow out the pipes with compressed air.

13. Check:
- fuel feed hoses
- fuel hoses
  Cracks/damage/wear → Replace.
  Obstruction → Clean.
  Blow out the hoses with compressed air.

ASSEMBLING THE CARBURETORS
The following procedure applies to both of the carburetors.

**CAUTION:**

- Before assembling the carburetors, wash all of the parts in a petroleum-based solvent.
- Always use a new gasket.

1. Install:
   - needle jet (1)
   - pilot jet
   - main jet

**NOTE:**

Align the slot (3) on the needle jet with the projection (5) on the carburetor body.
2. Measure:
   - float height \( \theta \)
     - Out of specification → Adjust.

   ![Float height](image)

   **Float height**
   \( 21.3 \sim 23.3 \text{ mm} \)

   a. Hold the carburetor upside down.
   b. Measure the distance from the mating surface of the float chamber (with the gasket removed) to the top of the float.

   **NOTE:**
   The float arm should rest on the needle valve without depressing it.

c. If the float height is not within specification, inspect the needle valve seat and needle valve.

d. If either the needle valve seat or needle valve is worn, replace them both.

e. If both the needle valve seat and needle valve are fine, adjust the float height by bending the float tang (1).

f. Check the float height again.

3. Install:
   - piston valve
   - piston valve spring
   - vacuum chamber cover

4. Install:
   - connecting bracket

**NOTE:**
After installing the connecting bracket, check that the throttle cable lever and starter plunger link operate smoothly.
INSTALLING THE CARBURETORS

1. Adjust:
   • carburetor synchronization
     Refer to “SYNCHRONIZING THE CARBURETORS” in chapter 3.

2. Adjust:
   • engine idling speed

   **Engine idling speed**
   1,000 ~ 1,100 r/min

   Refer to “ADJUSTING THE ENGINE IDLING SPEED” in chapter 3.

3. Adjust:
   • throttle cable free play

   **Throttle cable free play (at the flange of the throttle grip)**
   3 ~ 5 mm

   Refer to “ADJUSTING THE THROTTLE CABLE FREE PLAY” in chapter 3.

MEASURING AND ADJUSTING THE FUEL LEVEL

1. Measure:
   • fuel level
     Out of specification → Adjust.

   **Fuel level (below the line on the float chamber)**
   3.5 ~ 4.5 mm

   a. Stand the motorcycle on a level surface.
   b. Place the motorcycle on a suitable stand to ensure that the motorcycle is standing straight up.
   c. Install the fuel level gauge ① to the fuel drain pipe ②.

   **Fuel level gauge**
   90890-01312

   d. Loosen the fuel drain screw ③.
   e. Hold the fuel level gauge vertically next to the line on the float chamber
   f. Measure the fuel level ③.

   **NOTE:**
   Fuel level readings should be equal on both sides of the carburetor assembly.

2. Adjust:
   • fuel level
CARBURETORS

a. Remove the carburetor assembly.
b. Check the needle valve seat and needle valve.
c. If either is worn, replace them as a set.
d. If both are fine, adjust the float level by slightly bending the float tang ①.
e. Install the carburetor assembly.
f. Measure the fuel level again.
g. Repeat steps (a) to (f) until the fuel level is within specification.

CHECKING AND ADJUSTING THE THROTTLE POSITION SENSOR

**NOTE:**

- Before adjusting the throttle position sensor, the engine idling speed should be properly adjusted.
- When installing the throttle position sensor, adjust its angle according to the r/min which are displayed on the tachometer.
  Refer to the adjustment procedure below.

1. Check:
   - throttle position sensor
   a. Disconnect the throttle position sensor coupler.
   b. Remove the throttle position sensor from the carburetor.
   c. Connect the pocket tester (Ω × 1k) to the throttle position sensor.

   Tester positive lead → Blue terminal ①
   Tester negative lead → Black/Blue terminal ②

d. Check the throttle position sensor maximum resistance.
   Out of specification → Replace the throttle position sensor.

Throttle position sensor maximum resistance

4.0 ~ 6.0 kΩ at 20°C (68°F)
(Blue – Black/Blue)

e. Install the throttle position sensor onto the carburetor.

f. Connect the pocket tester (Ω × 1k) to the throttle position sensor.

Tester positive lead → Yellow ①
Tester negative lead → Black/Blue ②
g. While slowly opening the throttle, check that the throttle position sensor resistance is within the specified range.
Out of specification → Replace the throttle position sensor.

**Throttle position sensor resistance**

0 to 4 ~ 6 kΩ at 20°C (68°F)

(Yellow – Black/Blue)

2. Adjust:

- Throttle position sensor angle

a. Turn the main switch to “ON”.

b. Disconnect the throttle position sensor coupler.

c. Reconnect the throttle position sensor coupler.

**NOTE:**

After reconnecting the throttle position sensor coupler, the tachometer switches to the throttle position sensor adjustment mode.

d. Loosen the throttle position sensor screws ①.

e. Adjust the throttle position sensor angle according to the following table:

**NOTE:**

The angle of the throttle position sensor is indicated by the r/min which are displayed on the tachometer.

f. After adjusting the throttle position sensor angle, tighten the throttle position sensor screws.

**NOTE:**

To exit the throttle position sensor adjustment mode, start the engine or turn the main switch to “OFF”.

---

Tachometer reading

<table>
<thead>
<tr>
<th>Tachometer reading</th>
<th>Throttle position sensor angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,000 r/min ①</td>
<td>Too small</td>
</tr>
<tr>
<td>5,000 r/min ②</td>
<td>Correct</td>
</tr>
<tr>
<td>10,000 r/min ③</td>
<td>Too large</td>
</tr>
</tbody>
</table>
CHECKING THE FUEL COCK

1. Check:
   • fuel cock
     Cracks/damage/wear → Replace.

CHECKING THE FUEL COCK OPERATION

NOTE:

After installing the fuel cock, check its operation.

1. Check that the fuel cock lever is positioned to “ON” or “R”.
2. Place a container under the end of the fuel hose.
3. Check:
   • fuel cock operation

   a. Suck on the end of the vacuum hose.

   Fuel flows → Fuel cock is OK
   Fuel does not flows → Replace the fuel cock.
CHAPTER 6. CHASSIS

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## CHASSIS
### FRONT WHEEL AND BRAKE DISCS

### Order

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Removing the front wheel and brake discs</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Wheel axle pinch bolt</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Brake hose holder (left/right)</td>
<td>1/1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Caliper (left/right)</td>
<td>1/1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Wheel axle</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Front wheel</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Speedometer gear unit</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Collar</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Brake disc (left/right)</td>
<td>1/1</td>
<td></td>
</tr>
</tbody>
</table>

### Remarks
- Remove the parts in the order listed.
- **NOTE:**
  - Place the motorcycle on a suitable stand so that the front wheel is elevated.
  - Refer to “REMOVING/INSTALLING THE FRONT WHEEL”.
  - For installation, reverse the removal procedure.
Disassembling the front wheel.

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>①</td>
<td>Oil seal</td>
<td>1</td>
<td>Disassembly the parts in the order listed.</td>
</tr>
<tr>
<td>②</td>
<td>Bearing</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>③</td>
<td>Spacer</td>
<td>1</td>
<td>For assembly, reverse the disassembly</td>
</tr>
<tr>
<td>④</td>
<td>Bearing</td>
<td>1</td>
<td>procedure.</td>
</tr>
</tbody>
</table>
REMOVING THE FRONT WHEEL
1. Stand the motorcycle on a level surface.

**WARNING**

Securely support the motorcycle so that there is no danger of it falling over.

**NOTE:**

Place the motorcycle on a suitable stand so that the front wheel is elevated.

2. disconnect:
   - speedometer cable ①
3. Remove:
   - brake calipers ② (left and right)

**NOTE:**

Do not squeeze the brake lever when removing the brake calipers.

4. Loosen:
   - pinch bolt (front wheel axle) ①
   - front wheel axle ②
5. Elevate:
   - front wheel

**NOTE:**

Place the motorcycle on a suitable stand so that the front wheel is elevated.

CHECKING THE FRONT WHEEL
1. Check:
   - wheel axle
     Roll the wheel axle on a flat surface.
     Bends → Replace.

**WARNING**

Do not attempt to straighten a bent wheel axle.

2. Check:
   - tire
   - front wheel
     Damage/wear → Replace.
     Refer to “CHECKING THE TIRES” and “CHECKING THE WHEELS” in chapter 3.
3. Measure:
   - front wheel radial runout ①
   - front wheel lateral runout ②
     Over the specified limits → Replace.
**NOTE:**

CAUTION:  
Do not contact the wheel bearing center race 5 or balls 6. Contact should be made only with the outer race 7.

**NOTE:**

Use a socket 4 that matches the diameter of the wheel bearing outer race and oil seal.

---

**CHECKING THE BRAKE DISCS**

The following procedure applies to all of the brake discs.

1. Check:
   - brake disc
     Damage/galling → Replace.
   
2. Measure:
   - brake disc deflection
     Out of specification → Correct the brake disc deflection or replace the brake disc.
Brake disc deflection limit (maximum)
Front: 0.2 mm
Rear: 0.15 mm

- Place the motorcycle on a suitable stand so that the wheel is elevated.
- Before measuring the front brake disc deflection, turn the handlebar to the left or right to ensure that the front wheel is stationary.
- Remove the brake caliper.
- Hold the dial gauge at a right angle against the brake disc surface.
- Measure the deflection 2 ~ 3 mm below the edge of the brake disc.

3. Measure:
  - brake disc thickness
    Measure the brake disc thickness at a few different locations.
    Out of specification → Replace.

Brake disc thickness limit (minimum)
Front: 4.5 mm
Rear: 4.5 mm

4. Adjust:
  - brake disc deflection

- Remove the brake disc.
- Rotate the brake disc by one bolt hole.
- Install the brake disc.

NOTE:
Tighten the brake disc bolts in stages and in a crisscross pattern.

Brake disc bolt
20 Nm (2.0 m•kg)
LOCTITE®

- Measure the brake disc deflection.
- If out of specification, repeat the adjustment steps until the brake disc deflection is within specification.
- If the brake disc deflection cannot be brought within specification, replace the brake disc.
CHAS

INSTALLING THE FRONT WHEEL
The following procedure applies to both brake discs.
1. Lubricate:
   • wheel axle
   • oil seal lips

   Recommended lubricant
   Lithium soap base grease

2. Install:
   • brake disc ①

   NOTE:
   • Apply LOCTITE® 648 to the threads of the brake disc bolts.
   • Tighten the brake disc bolts in stages and in a crisscross pattern.

3. Install:
   • speedometer gear unit

   NOTE:
   Make sure that the speedometer gear unit and the wheel hub are installed with the two projections ③ meshed into the two slots ⑤ respectively.

4. Install:
   • front wheel

   NOTE:
   Make sure that the slot ③ in the speedometer gear unit fits over the stopper ⑤ on the outer tube.

5. Tighten:
   • wheel axle ①
   • wheel axle pinch bolt ②

   Wheel axle
   73 Nm (7.3 m·kg)
   Wheel axle pinch bolt
   19 Nm (1.9 m·kg)

   CAUTION:
   Before tightening the wheel axle nut, push down hard on the handlebar several times and check if the front fork rebounds smoothly.
6. Install:
• brake caliper

Brake caliper bolt
40 Nm (4.0 m•kg)

**WARNING**

Make sure that the brake hose is routed properly.

---

ADJUSTING THE FRONT WHEEL STATIC BALANCE

**NOTE:**

- After replacing the tire, wheel or both, the front wheel static balance should be adjusted.
- Adjust the front wheel static balance with the brake discs installed.

1. Remove:
• balancing weight(-s)

**NOTE:**
Place the front wheel on a suitable balancing stand.

2. Find:
• front wheel’s heavy spot

Spin the front wheel.

a. When the front wheel stops, put an “X₁” mark at the bottom of the wheel.
b. Turn the front wheel 90° so that the “X₁” mark is positioned as shown.
c. Release the front wheel.
d. When the wheel stops, put an “X₂” mark at the bottom of the wheel.
e. Repeat steps (b) through (d) several times until all the marks come to rest at the same spot.
g. The spot where all the marks come to rest is the front wheel’s heavy spot “X”.

---
3. Adjust:
   - front wheel static balance

   a. Install a balancing weight \( 1 \) onto the rim exactly opposite the heavy spot “\( X \).”

   **NOTE:**
   Start with the lightest weight.

   b. Turn the front wheel 90° so that the heavy spot is positioned as shown.
   c. If the heavy spot does not stay in that position, install a heavier weight.
   d. Repeat steps (b) and (c) until the front wheel is balanced.

4. Check:
   - front wheel static balance

   a. Turn the front wheel and make sure that it stays at each position shown.
   b. If the front wheel does not remain stationary at all of the positions, rebalance it.
### Removing the rear wheel

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Chain adjusters</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Rear wheel axle nut</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Plate washer</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Chain puller (left)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Wheel axle</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Chain Puller (right)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Rear wheel</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

**Remove the parts in the order listed.**

**NOTE:**

Place the motorcycle on a suitable stand so that the rear wheel is elevated.

Refer to “REMOVING/INSTALLING THE REAR WHEEL”.

For installation, reverse the removal procedure.

- **150 Nm (15.0 m•kg)**
### BRAKE DISC AND REAR WHEEL SPROCKET

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Collar</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Brake disc</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Clutch hub</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Collar</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Rear wheel sprocket</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Clutch dampers</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Oil seal</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Bearing</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

**Removing the brake disc and rear wheel sprocket**

- Remove the parts in the order listed.
- For installation, the removal procedure.
REAR WHEEL, BRAKE DISC AND REAR WHEEL SPROCKET

REMOVING THE REAR WHEEL
1. Stand the motorcycle on a level surface.

**WARNING**
Securely support the motorcycle so that there is no danger of it falling over.

**NOTE:**
Place the motorcycle on a suitable stand so that the rear wheel is elevated.

2. Loosen:
   - adjusting bolt ①
   - locknut ②
3. Remove:
   - wheel axle nut ③
   - wheel axle ④
   - rear wheel
   - right collar ⑤

**NOTE:**
Push the rear wheel forward and remove the drive chain from the rear wheel sprocket.

CHECKING THE REAR WHEEL
1. Check:
   - wheel axle
   - rear wheel
   - wheel bearings
   - oil seals
   Refer to “FRONT WHEEL”.

2. Check:
   - tire
   - rear wheel
   Damage/wear → Replace.
   Refer to “INSPECTING THE TIRES” and “INSPECTING THE WHEELS” in chapter 3.
3. Measure:
   - rear wheel radial runout
   - rear wheel lateral runout
   Refer to “FRONT WHEEL”.

EAS00561
EAS00565
REAR WHEEL, BRAKE DISC AND REAR WHEEL SPROCKET

CHECKING THE REAR WHEEL DRIVE HUB
1. Check:
   • rear wheel drive hub
     Cracks/damage → Replace.
   • rear wheel drive hub dampers
     Damage/wear → Replace.

CHECKING AND REPLACING THE REAR WHEEL SPROCKET
1. Check:
   • rear wheel sprocket
     More than 1/4 tooth wear → Replace the rear wheel sprocket.
     Bent teeth → Replace the rear wheel sprocket.

2. Replace:
   • rear wheel sprocket
     a. Remove the self-locking nuts and the rear wheel sprocket.
     b. Clean the rear wheel drive hub with a clean cloth, especially the surfaces that contact the sprocket.
     c. Install the new rear wheel sprocket.

Rear wheel sprocket self-locking nut
60 Nm (6.0 m·kg)

NOTE: 
Tighten the self-locking nuts in stages and in a crisscross pattern.
INSTALLING THE REAR WHEEL

1. Lubricate:
   - wheel axle
   - wheel bearings
   - oil seal lips

<table>
<thead>
<tr>
<th>Recommended lubricant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lithium soap base grease</td>
</tr>
</tbody>
</table>

2. Tighten:
   - wheel axle nut

<table>
<thead>
<tr>
<th>Wheel axle nut</th>
</tr>
</thead>
<tbody>
<tr>
<td>150 Nm (15.0 m•kg)</td>
</tr>
</tbody>
</table>

ADJUSTING THE REAR WHEEL STATIC BALANCE

NOTE:
- After replacing the tire, wheel or both, the rear wheel static balance should be adjusted.
- Adjust the rear wheel static balance with the brake disc and rear wheel drive hub installed.

1. Adjust:
   - rear wheel static balance
     Refer to “FRONT WHEEL”.
Order | Job/Part | Q'ty | Remarks
--- | --- | --- | ---
1 | Removing the front brake pads | 4 | Remove the parts in the order listed.
2 | Clip | 2 | Refer to “REPLACING THE FRONT BRAKE PADS”.
3 | Pad pin | 2 |
4 | Pad support | 4 |
5 | Brake pad | 2 |

For installation, reverse the removal procedure.
REAR BRAKE PADS

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Caliper</td>
<td>1</td>
<td>Remove the parts in the order listed.</td>
</tr>
<tr>
<td>2</td>
<td>Cover</td>
<td>1</td>
<td>Refer to “REPLACING THE REAR BRAKE PADS”.</td>
</tr>
<tr>
<td>3</td>
<td>Clip</td>
<td>2</td>
<td>For installation, reverse the removal procedure.</td>
</tr>
<tr>
<td>4</td>
<td>Pad pin</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Pad spring</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Brake pad</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Caliper shim</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

Remove the rear brake pads

40 Nm (4.0 m•kg)
CAUTION:

Disc brake components rarely require disassembly. Therefore, always follow these preventive measures:

- Never disassemble brake components unless absolutely necessary.
- If any connection on the hydraulic brake system is disconnected, the entire brake system must be disassembled, drained, cleaned, properly filled, and bled after reassembly.
- Never use solvents on internal brake components.
- Use only clean or new brake fluid for cleaning brake components.
- Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt fluid immediately.
- Avoid brake fluid coming into contact with the eyes as it can cause serious injury. First aid for brake fluid entering the eyes:
  - Flush with water for 15 minutes and get immediate medical attention.

REPLACING THE FRONT BRAKE PADS

The following procedure applies to both brake calipers.

NOTE: When replacing the brake pads, it is not necessary to disconnect the brake hose or disassemble the brake caliper.

1. Remove:
   - brake hose holder ①
   - speedometer cable guide ②
   - brake caliper ③
2. Remove:
   - brake pad clips ④
   - brake pad pin ⑤
   - brake pad spring ⑥
3. Remove:
- brake pads

4. Measure:
- brake pad wear limit
  Out of specification → Replace the brake pads as a set.

5. Install:
- brake pads
- brake pad spring

**NOTE:**
Always install new brake pads, and a brake pad spring as a set.

**a.** Connect a clear plastic hose tightly to the bleed screw. Put the other end of the hose into an open container.

**b.** Loosen the bleed screw and push the brake caliper pistons into the brake caliper with your finger.

**c.** Tighten the bleed screw.

**Bleed screw**

6 Nm (0.6 m•kg)

**d.** Install new brake pads and a new brake pad spring.

**NOTE:**
The arrow on the brake pad spring must point in the direction of disc rotation.
6. Install:
  • brake pad pins
  • brake pad clips
  • brake caliper

<table>
<thead>
<tr>
<th>Brake caliper bolt</th>
</tr>
</thead>
<tbody>
<tr>
<td>40 Nm (4.0 m•kg)</td>
</tr>
</tbody>
</table>

7. Check:
  • brake fluid level
    Below the minimum level mark \( \overline{\text{a}} \) → Add the recommended brake fluid to the proper level. Refer to “CHECKING THE BRAKE FLUID LEVEL” in chapter 3.

8. Check:
  • brake lever operation
    Soft or spongy feeling → Bleed the brake system. Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM” in chapter 3.

---

**REPLACING THE REAR BRAKE PADS**

**NOTE:**

When replacing the brake pads, it is not necessary to disconnect the brake hose or disassemble the brake caliper.

1. Remove:
   • brake caliper \( \overline{1} \)

2. Remove:
   • brake pad cover \( \overline{1} \)
   • brake pad clips \( \overline{2} \)
   • brake pad pins \( \overline{3} \)
   • brake pad spring \( \overline{4} \)

3. Remove:
   • brake pads \( \overline{5} \)
     (along with the brake pad shims)

4. Measure:
   • brake pad wear limit \( \overline{8} \)
     Out of specification → Replace the brake pads as a set.

<table>
<thead>
<tr>
<th>Brake pad wear limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5 mm</td>
</tr>
</tbody>
</table>
5. Install:
- brake pad shims
  (onto the brake pads)
- brake pads
- brake pad spring

**NOTE:**
Always install new brake pads, brake pad shims, and a brake pad spring as a set.

```plaintext
a. Connect a clear plastic hose 1 tightly to the bleed screw 2. Put the other end of the hose into an open container.
b. Loosen the bleed screw and push the brake caliper pistons into the brake caliper with your finger.
c. Tighten the bleed screw.
```

<table>
<thead>
<tr>
<th>Bleed screw</th>
<th>6 Nm (0.6 m•kg)</th>
</tr>
</thead>
</table>

```
d. Install new brake pad shims onto the new brake pads.
e. Install new brake pads and a new brake pad spring.

**NOTE:**
The longer tangs 3 on the brake pad spring must point in the direction of disc rotation.
```

6. Install:
- brake pad pins
- brake pad clips
- brake pad cover
- brake caliper

<table>
<thead>
<tr>
<th>Brake caliper bolt</th>
<th>40 Nm (4.0 m•kg)</th>
</tr>
</thead>
</table>

7. Check:
- brake fluid level
  Below the minimum level mark 4 → Add the recommended brake fluid to the proper level.
  Refer to “CHECKING THE BRAKE FLUID LEVEL” in chapter 3.

8. Check:
- brake lever operation
  Soft or spongy feeling → Bleed the brake system.
  Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM” in chapter 3.
FRONT BRAKE MASTER CYLINDER

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Brake lever</td>
<td>1</td>
<td>Remove the parts in the order listed.</td>
</tr>
<tr>
<td>2</td>
<td>Brake switch lead</td>
<td>2</td>
<td>Drain</td>
</tr>
<tr>
<td>3</td>
<td>Front brake switch</td>
<td>1</td>
<td>Refer to “DISASSEMBLING/ASSEMBLING AND INSTALLING THE REAR BRAKE MASTER CYLINDER”.</td>
</tr>
<tr>
<td>4</td>
<td>Union bolt</td>
<td>1</td>
<td>For installation, reverse the removal procedure.</td>
</tr>
<tr>
<td>5</td>
<td>Copper washers/Brake hose</td>
<td>2 / 1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Master cylinder bracket</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Master cylinder</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

Remove the parts in the order listed. Drain.
### Disassembling the Front Brake Master Cylinder

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Master cylinder boot</td>
<td>1</td>
<td>Disassembly the parts in the order listed.</td>
</tr>
<tr>
<td>2</td>
<td>Circlip</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Master cylinder kit</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Spring</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

For assembly, reverse the disassembly procedure.
### Removing the rear brake master cylinder

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Brake fluid</td>
<td>2</td>
<td>Remove the parts in the order listed.</td>
</tr>
<tr>
<td>2</td>
<td>Bolts</td>
<td>1</td>
<td>Drain</td>
</tr>
<tr>
<td>3</td>
<td>Brake pedal</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Brake switch</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Union bolt</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Copper washers/brake hose</td>
<td>2/1</td>
<td>Refer to “DISASSEMBLING/ASSEMBLING THE REAR BRAKE MASTER CYLINDER”.</td>
</tr>
<tr>
<td>7</td>
<td>Clip/reservoir hose</td>
<td>2/1</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Cotter pin/copper washer</td>
<td>1/1</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Pin</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Master cylinder ass’y</td>
<td>1</td>
<td>For installation, reverse removal procedure.</td>
</tr>
<tr>
<td>11</td>
<td>Reservoir tank</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>
## Disassembling the rear brake master cylinder

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>①</td>
<td>Disassembling the rear brake master cylinder</td>
<td>1</td>
<td>Disassembly the parts in the order listed.</td>
</tr>
<tr>
<td>②</td>
<td>Master cylinder boot</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>③</td>
<td>Circlip</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>④</td>
<td>Master cylinder kit</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Spring</td>
<td>1</td>
<td>For assembly, reverse the disassembly procedure.</td>
</tr>
</tbody>
</table>

Disassembly the parts in the order listed.

For assembly, reverse the disassembly procedure.
FRONT AND REAR BRAKES

EAS00588
DISASSEMBLING THE FRONT BRAKE MASTER CYLINDER

NOTE:
Before disassembling the front brake master cylinder, drain the brake fluid from the entire brake system.

1. Remove:
   • rear view mirror (right)
   • brake lever ①
2. Disconnect:
   • brake switch coupler ②
     (from the brake switch)
3. Remove:
   • union bolt ③
   • copper washers ④
   • brake hose ⑤

NOTE:
To collect any remaining brake fluid, place a container under the master cylinder and the end of the brake hose.

EAS00589
DISASSEMBLING THE REAR BRAKE MASTER CYLINDER

NOTE:
Before disassembling the rear brake master cylinder, drain the brake fluid from the entire brake system.

1. Remove:
   • union bolt ①
   • copper washers ②
   • brake hose ③

NOTE:
To collect any remaining brake fluid, place a container under the master cylinder and the end of the brake hose.
CHECKING THE FRONT AND REAR BRAKE MASTER CYLINDERS

The following procedure applies to the both of the brake master cylinders.

1. Check:
   - brake master cylinder ①
     Damage/scratches/wear → Replace.
   - brake fluid delivery passages ②
     (brake master cylinder body)
     Obstruction → Blow out with compressed air.

2. Check:
   - brake master cylinder kit ①
     Damage/scratches/wear → Replace.

3. Check:
   - front brake master cylinder reservoir ①
     Cracks/damage → Replace.
   - front brake master cylinder reservoir diaphragm ②
     Damage/wear → Replace.
   - rear brake fluid reservoir ①
     Cracks/damage → Replace.
   - rear brake fluid reservoir diaphragm ②
     Cracks/damage → Replace.

4. Check:
   - brake hoses ①
     Cracks/damage/wear → Replace.
ASSEMBLING AND INSTALLING THE FRONT BRAKE MASTER CYLINDER

**WARNING**

- Before installation, all internal brake components should be cleaned and lubricated with clean or new brake fluid.
- Never use solvents on internal brake components.

**NOTE:**

- Install the brake master cylinder holder with the “UP” mark facing up.
- Align the end of the brake master cylinder holder with the punch mark on the handlebar.
- First, tighten the upper bolt, then the lower bolt.

![Diagram](image_url)

1. Install:
   - brake master cylinder

2. Install:
   - copper washers (New)
   - brake hose
   - union bolt

**Recommended brake fluid DOT 4**

*Brake master cylinder bolt 10 Nm (1.0 m•kg)*

*Union bolt 30 Nm (3.0 m•kg)*

**WARNING**

Proper brake hose routing is essential to insure safe motorcycle operation. Refer to “CABLE ROUTING”.

**CAUTION:**

When installing the brake hose onto the brake master cylinder make sure that the brake pipe touches the projection as shown.

**NOTE:**

Turn the handlebar to the left and to the right to make sure that the brake hose does not touch other parts (e.g., wire harness, cables, leads). Correct if necessary.
3. Fill:
   • brake master cylinder reservoir
     (with the specified amount of the recommended brake fluid)

   ![Recommended brake fluid DOT 4]

**WARNING**

- Use only the designated brake fluid. Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.
- Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor brake performance.
- When refilling, be careful that water does not enter the reservoir. Water will significantly lower the boiling point of the brake fluid and could cause vapor lock.

**CAUTION:**

Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.

4. Bleed:
   • brake system
     Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM” in chapter 3.

5. Check:
   • brake fluid level
     Below the minimum level mark → Add the recommended brake fluid to the proper level.
     Refer to “CHECKING THE BRAKE FLUID LEVEL” in chapter 3.

6. Check:
   • brake lever operation
     Soft or spongy feeling → Bleed the brake system.
     Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM” in chapter 3.
ASSEMBLING THE REAR BRAKE MASTER CYLINDER

1. Install:
   - copper washers (New) 1
   - brake hose 2

<table>
<thead>
<tr>
<th>Union bolt 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 Nm (3.0 m·kg)</td>
</tr>
</tbody>
</table>

**WARNING**

Proper brake hose routing is essential to insure safe motorcycle operation. Refer to “CABLE ROUTING”.

**CAUTION:**

When installing the brake hose onto the brake master cylinder make sure that the brake pipe touches the projection 3 as shown.

2. Fill:
   - brake fluid reservoir

**Recommended brake fluid**

DOT 4

**WARNING**

- Use only the designated brake fluid. Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.
- Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor brake performance.
- When refilling, be careful that water does not enter the reservoir. Water will significantly lower the boiling point of the brake fluid and could cause vapor lock.

**CAUTION:**

Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilled brake fluid immediately.
3. Bleed:
• brake system
   Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM” in chapter 3.

4. Check:
• brake fluid level
   Below the minimum level mark \( \rightarrow \) Add the recommended brake fluid to the proper level.
   Refer to “CHECKING THE BRAKE FLUID LEVEL” in chapter 3.

5. Adjust:
• brake pedal position \( \circ \)
   Refer to “ADJUSTING THE REAR BRAKE” in chapter 3.

6. Adjust:
• rear brake light operation timing
   Refer to “ADJUSTING THE REAR BRAKE LIGHT SWITCH” in chapter 3.
FRONT BRAKE CALIPER

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Removing the front brake calipers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Brake fluid</td>
<td>2</td>
<td>Remove the parts in the order listed. Drain</td>
</tr>
<tr>
<td>3</td>
<td>Union bolts</td>
<td>4</td>
<td>Refer to “DISASSEMBLING/ASSEMBLING AND INSTALLING THE FRONT BRAKE CALIPERS”.</td>
</tr>
<tr>
<td>4</td>
<td>Copper washers</td>
<td>2</td>
<td>For installation, reverse the removal procedure.</td>
</tr>
<tr>
<td>5</td>
<td>Brake hoses</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Caliper ass’y</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>
Disassembling the front brake calipers.
The following procedure applies to both of the front brake calipers.

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Clips</td>
<td>2</td>
<td>Disassembly the parts in the order listed.</td>
</tr>
<tr>
<td>2</td>
<td>Pad pin</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Pad spring</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Brake pads/shims</td>
<td>2/2</td>
<td>Refer to “DISASSEMBLING THE FRONT BRAKE CALIPERS”.</td>
</tr>
<tr>
<td>5</td>
<td>Caliper pistons</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Bleed screw</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Dust seals</td>
<td>4</td>
<td>For assembly, reverse the disassembly procedure.</td>
</tr>
<tr>
<td>8</td>
<td>Piston seals</td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

Disassembly the parts in the order listed.

6 Nm (0.6 m·kg)
### REAR BRAKE CALIPER

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Removing the rear brake caliper</td>
<td></td>
<td>Remove the parts in the order listed. Drain</td>
</tr>
<tr>
<td>2</td>
<td>Brake fluid</td>
<td>1</td>
<td>Refer to “DISASSEMBLING/ASSEMBLING AND INSTALLING THE REAR BRAKE CALIPER”</td>
</tr>
<tr>
<td>3</td>
<td>Union bolt</td>
<td>2</td>
<td>For installation, reverse the removal procedure.</td>
</tr>
<tr>
<td>4</td>
<td>Copper washers</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Brake hose</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Caliper ass' y</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

** torques:**
- 40 Nm (4.0 m·kg)
- 30 Nm (3.0 m·kg)
Disassembling the rear brake caliper

Cover
Clips
Pad pins
Pad support
Brake pads/shims
Caliper pistons
Dust seals
Piston seals
Bleed screws

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Cover</td>
<td>1</td>
<td>Disassembly the parts in the order listed.</td>
</tr>
<tr>
<td>2</td>
<td>Clips</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Pad pins</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Pad support</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Brake pads/shims</td>
<td>2/2</td>
<td>Refer to “DISASSEMBLING THE REAR BRAKE CALIPER.”</td>
</tr>
<tr>
<td>6</td>
<td>Caliper pistons</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Dust seals</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Piston seals</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Bleed screws</td>
<td>2</td>
<td>For assembly, reverse the disassembly procedure.</td>
</tr>
</tbody>
</table>

New

6 Nm (0.6 m•kg)
DISASSEMBLING THE FRONT BRAKE CALIPERS

The following procedure applies to both of the brake calipers.

NOTE: Before disassembling either brake caliper, drain the brake fluid from the entire brake system.

1. Remove:
   - union bolt
   - copper washers
   - brake hose

NOTE: Put the end of the brake hose into a container and pump out the brake fluid carefully.

2. Remove:
   - brake caliper pistons
   - brake caliper piston seals

a. Secure the right side brake caliper pistons with a piece of wood.
b. Blow compressed air into the brake hose joint opening to force out the left side pistons from the brake caliper.
c. Remove the brake caliper piston seals.
d. Repeat the previous steps to force out the right side pistons from the brake caliper.

WARNING

- Never try to pry out the brake caliper pistons.
- Do not loosen the bolts.
DISASSEMBLING THE REAR BRAKE CALIPER

NOTE:
Before disassembling the brake caliper, drain the brake fluid from the entire brake system.

1. Remove:
   • union bolt (1)
   • copper washers (2)
   • brake hose (3)

NOTE:
Put the end of the brake hose into a container and pump out the brake fluid carefully.

2. Remove:
   • brake caliper pistons (1)
   • brake caliper piston seals (2)

   a. Secure the right side brake caliper pistons with a piece of wood (8).
   b. Blow compressed air into the brake hose joint opening (b) to force out the left side pistons from the brake caliper.

WARNING
• Never try to pry out the brake caliper pistons.
• Do not loosen the bolts.

   c. Remove the brake caliper piston seals.
   d. Repeat the previous steps to force out the right side pistons from the brake caliper.
CHECKING THE FRONT AND REAR BRAKE CALIPERS

<table>
<thead>
<tr>
<th>Recommended brake component</th>
<th>replacement schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brake pads</td>
<td>If necessary</td>
</tr>
<tr>
<td>Piston seals</td>
<td>Every two years</td>
</tr>
<tr>
<td>Brake hoses</td>
<td>Every two years</td>
</tr>
<tr>
<td>Brake fluid</td>
<td>Every two years and whenever the brake is disassembled.</td>
</tr>
</tbody>
</table>

1. Check:
- brake caliper pistons ①
  Rust/scratches/wear → Replace the brake caliper.
- brake caliper cylinders ②
  Scratches/wear → Replace the brake caliper.
- brake calipers ③
  Cracks/damage → Replace.
- brake fluid delivery passages (brake caliper body)
  Obstruction → Blow out with compressed air.

**WARNING**
Whenever a brake caliper is disassembled, replace the brake caliper piston seals.

![Diagrams A and B]

ASSEMBLING AND INSTALLING THE FRONT BRAKE CALIPERS
The following procedure applies to both of the brake calipers.

**WARNING**
- Before installation, all internal brake components should be cleaned and lubricated with clean or new brake fluid.
FRONT AND REAR BRAKES

- Never use solvents on internal brake components as they will cause the piston seals to swell and distort.
- Whenever a brake caliper is disassembled, replace the brake caliper piston seals.

Recommended brake fluid
DOT 4

1. Install:
   - brake caliper ① (temporarily)
   - copper washers (New)
   - brake hose ②
   - union bolt ③

   Union bolt
   30 Nm (3.0 m·kg)

**WARNING**
Proper brake hose routing is essential to insure safe motorcycle operation. Refer to “CABLE ROUTING”.

**CAUTION:**
When installing the brake hose onto the brake caliper ①, make sure that the brake pipe ③ touches the projection ⑤ on the brake caliper.

2. Remove:
   - brake caliper

3. Install:
   - brake pads
   - brake pad springs
   - brake caliper retaining bolt
   - brake caliper
   - brake hose holder
   Refer to “REPLACING THE BRAKE PADS”.

   Brake caliper bolt
   40 Nm (4.0 m·kg)

   Brake hose holder bolt
   7 Nm (0.7 m·kg)

4. Fill:
   - brake master cylinder reservoir (with the specified amount of the recommended brake fluid)
WARNING

• Use only the designated brake fluid. Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.
• Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor brake performance.
• When refilling, be careful that water does not enter the reservoir. Water will significantly lower the boiling point of the brake fluid and could cause vapor lock.

CAUTION:

Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.

5. Bleed:
   • brake system
     Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" in chapter 3.

6. Check:
   • brake fluid level
     Below the minimum level mark
     → Add the recommended brake fluid to the proper level.
     Refer to "CHECKING THE BRAKE FLUID LEVEL" in chapter 3.

7. Check:
   • brake lever operation
     Soft or spongy feeling → Bleed the brake system.
     Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" in chapter 3.
ASSEMBLING AND INSTALLING THE REAR BRAKE CALIPER

WARNING

- Before installation, all internal brake components should be cleaned and lubricated with clean or new brake fluid.
- Never use solvents on internal brake components as they will cause the piston seals to swell and distort.
- Whenever a brake caliper is disassembled, replace the brake caliper piston seals.

Recommended brake fluid
DOT 4

1. Install:
   - brake caliper ① (temporarily)
   - copper washers New
   - brake hose ②
   - union bolt ③

   30 Nm (3.0 m·kg)

WARNING

Proper brake hose routing is essential to insure safe motorcycle operation. Refer to “CABLE ROUTING”.

CAUTION:

When installing the brake hose onto the brake caliper ①, make sure that the brake pipe ② touches the projection ⑤ on the brake caliper.

2. Remove:
   - brake caliper

3. Install:
   - brake pads
   - brake pad springs
   - brake caliper
   - brake hose holder

   40 Nm (4.0 m·kg)
   7 Nm (7.0 m·kg)

Refer to “REPLACING THE REAR BRAKE PADS”.
4. Fill:
   • brake fluid reservoir
     (with the specified amount of the recommended brake fluid)

<table>
<thead>
<tr>
<th>Recommended brake fluid DOT 4</th>
</tr>
</thead>
</table>

**WARNING**

• Use only the designated brake fluid. Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.
• Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor brake performance.
• When refilling, be careful that water does not enter the brake fluid reservoir. Water will significantly lower the boiling point of the brake fluid and could cause vapor lock.

**CAUTION:**

Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.

5. Bleed:
   • brake system
     Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM” in chapter 3.

6. Check:
   • brake fluid level
     Below the minimum level mark (a) → Add the recommended brake fluid to the proper level.
     Refer to “CHECKING THE BRAKE FLUID LEVEL” in chapter 3.

7. Check:
   • brake pedal operation
     Soft or spongy feeling → Bleed the brake system.
     Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM” in chapter 3.
## Removing the front fork

Remove the parts in the order listed. Refer to “FRONT WHEEL AND BRAKE DISCS”.

- **Front wheel**
- **Brake calipers**
- **Brackets**
- **Bolts (upper bracket)**
- **Cap bolts**
- **Bolts (lower bracket)**
- **Front fork (left/right)**

### Table: Removing the front fork

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Brackets</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Front fender</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Bolts (upper bracket)</td>
<td>2</td>
<td>Remove the parts in the order listed. Refer to “FRONT WHEEL AND BRAKE DISCS”.</td>
</tr>
<tr>
<td>4</td>
<td>Cap bolts</td>
<td>2</td>
<td>Refer to “REMOVING/INSTALLING THE FRONT FORK LEGS”.</td>
</tr>
<tr>
<td>5</td>
<td>Bolts (lower bracket)</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Front fork (left/right)</td>
<td>1/1</td>
<td>For installation, reverse the removal procedure.</td>
</tr>
</tbody>
</table>

### Torque Specifications

- **23 Nm (2.3 m•kg)**
- **30 Nm (3.0 m•kg)**
- **23 Nm (2.3 m•kg)**
- **7 Nm (0.7 m•kg)**
Disassembling the front fork

1. Cap bolts
2. O-rings
3. Plates
4. Spacers
5. Spring seats
6. Fork springs
7. Dust seals
8. Oil seal clips
9. Oil seals
10. Seal spacers
11. Outer tube bushings
12. Bolts (damper rod)
13. Gaskets

Order | Job/Part | Q'ty | Remarks
--- | --- | --- | ---
1 | Disassembling the front fork | 2 | Disassembly the parts in the order listed.
2 | Cap bolts | 2 | Refer to “DISASSEMBLING/ASSEMBLING THE FRONT FORK LEGS”.
2 | O-rings | 2 |
2 | Plates | 2 |
2 | Spacers | 2 |
2 | Spring seats | 2 |
2 | Fork springs | 2 |
2 | Dust seals | 2 |
2 | Oil seal clips | 2 |
2 | Oil seals | 2 |
2 | Seal spacers | 2 |
2 | Outer tube bushings | 2 |
2 | Bolts (damper rod) | 2 |
2 | Gaskets | 2 |

23 Nm (2.3 m·kg)
<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>Inner tubes</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Inner tube bushings</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Oil flow stoppers</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Damper rods</td>
<td>2</td>
<td>Refer to “DISASSEMBLING/ASSEMBLING THE FRONT FORK LEGS”.</td>
</tr>
<tr>
<td>18</td>
<td>Damper rod springs</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Outer tubes</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

For assembly, reverse the disassembly procedure.
REMOVING THE FRONT FORK LEGS
The following procedure applies to both of the front fork legs.

1. Stand the motorcycle on a level surface.

**WARNING**

Securely support the motorcycle so that there is no danger of it falling over.

**NOTE:**
Place the motorcycle on a suitable stand so that the front wheel is elevated.

2. Loosen:
   - upper bracket pinch bolt ①
   - cap bolt ②
   - lower bracket pinch bolt ③

**WARNING**
Before loosening the upper and lower bracket pinch bolts, support the front fork leg.

3. Remove:
   - front fork leg

DISASSEMBLING THE FRONT FORK LEGS
The following procedure applies to both of the front fork legs.

1. Loosen the spring preload adjuster fully.

2. Remove:
   - cap bolt ①
   - plate ②
   - spacer ③
   - spring seat ④
   - spring

3. Drain
   - fork oil
4. Remove:
   • dust seal ①
   • oil seal clip ②
     (with a flat-head screwdriver)

   **CAUTION:**
   Do not scratch the inner tube.

5. Remove:
   • damper rod bolt ①

   **NOTE:**
   While holding the damper rod with the damper rod holder ② and T-handle ③, loosen the damper rod bolt.

   ![Damper rod holder (30 mm)
   90890-01327
   T-Handle
   90890-01326](image)

6. Remove:
   • inner tube

   ***CAUTION:***
   - Excessive force will damage the oil seal and bushing. A damaged oil seal or bushing must be replaced.
   - Avoid bottoming the inner tube into the outer tube during the above procedure, as the oil flow stopper will be damaged.

   ![Inner tube removal procedure](image)
CHECKING THE FRONT FORK LEGS

The following procedure applies to both of the front fork legs.

1. Check:
   - **inner tube ①**
   - **outer tube ②**
     Bends/damage/scratches → Replace.

   **WARNING**
   Do not attempt to straighten a bent inner tube as this may dangerously weaken it.

2. Measure:
   - **spring free length ③**
     Over the specified limit → Replace.

   **Spring free length limit**
   395 mm

3. Check:
   - **damper rod ①**
     Damage/wear → Replace.
     Obstruction → Blow out all of the oil passages with compressed air.
   - **oil flow stopper ②**
     Damage → Replace.

   **CAUTION:**
   - The front fork leg has a built-in damper adjusting rod and a very sophisticated internal construction, which are particularly sensitive to foreign material.
   - When disassembling and assembling the front fork leg, do not allow any foreign material to enter the front fork.

4. Check:
   - **cap bolt O-ring ①**
     Damage/wear → Replace.
ASSEMBLING THE FRONT FORK LEGS
The following procedure applies to both of the front fork legs.

**WARNING**
- Make sure that the oil levels in both front fork legs are equal.
- Uneven oil levels can result in poor handling and a loss of stability.

**NOTE:**
- When assembling the front fork leg, be sure to replace the following parts:
  - inner tube bushing
  - outer tube bushing
  - oil seal
  - dust seal
- Before assembling the front fork leg, make sure that all of the components are clean.

1. Install:
   - damper rod ①

**CAUTION:**
Allow the damper rod to slide slowly down the inner tube ② until it protrudes from the bottom of the inner tube. Be careful not to damage the inner tube.

2. Lubricate:
   - inner tube’s outer surface

   **Recommended lubricant**
   Yamaha fork and shock oil 10W or equivalent

3. Tighten:
   - damper rod bolt ①

**NOTE:**
While holding the damper rod with the damper rod holder ② and T-handle ③, tighten the damper rod bolt.

**Damper rod holder (30 mm)**
90890-01327
T-handle
90890-01326
4. Install:
- outer tube bushing ①
- seal spacer ②
- oil seal ③
  (with the fork seal driver weight ④ and adapter ⑤)

![Diagram of parts](image)

**Fork seal driver weight**
- 90890-01367
- Adapter
  - 90890-01374

**CAUTION:**

Make sure that the numbered side of the oil seal faces up.

**NOTE:**
- Before installing the oil seal, apply lithium soap base grease onto its lips.
- Apply fork oil onto the outer surface of the inner tube.

5. Install:
- oil seal clip ①

**NOTE:**

Adjust the oil seal clip so that it fits into the outer tube groove.

6. Install:
- dust seal ①
  (with the fork seal driver weight) ②
7. Fully compress the front fork leg.
8. Fill:
   - front fork leg  
     (with the specified amount of the recommended fork oil)

```
Quantity (each front fork leg)
538 cm³
Recommended oil
Fork oil 10w
or equivalent
```

**CAUTION:**

- Be sure to use the recommended fork oil. Other oils may have an adverse effect on front fork performance.
- When disassembling and assembling the front fork leg, do not allow any foreign material to enter the front fork.

9. After filling up, slowly pump the fork up and down to distribute the fork oil
10. Measure:
    - Oil level (a)
      Out of specification → Adjust.

```
Oil level:
137 mm
(from the top of the inner tube fully compressed and without the fork spring)
```

**NOTE:**

Hold the fork in an upright position.

11. Install:
    - fork spring
    - spring seat ①
    - spacer ②
    - plate ③
    - cap bolt ④
NOTE:

- Install the fork spring with its smaller pitch upward.
- Before installing the cap bolt, apply grease to the O-ring.
- Temporarily tighten the cap bolt.

INSTALLING THE FRONT FORK LEGS

The following procedure applies to both of the front fork legs.

1. Install:
   - front fork leg
     Temporarily tighten the upper and lower bracket pinch bolts.

   NOTE:

   Make sure that the inner fork tube is flush with the top of the upper bracket.

2. Tighten:
   - lower bracket pinch bolt ①
   - cap bolt ②
   - upper bracket pinch bolt ③

   **WARNING**

   Make sure that the brake hoses are routed properly.

3. Adjust:
   - spring preload adjusters (left and right)
     Refer to “ADJUSTING THE FRONT FORK LEGS” in chapter 3.
### Removing the handlebar

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Master cylinder bracket</td>
<td>1</td>
<td>Remove the parts in the order listed.</td>
</tr>
<tr>
<td>2</td>
<td>Master cylinder (front brake)</td>
<td>1</td>
<td>Refer to “REMOVING/INSTALLING THE HANDLEBAR”.</td>
</tr>
<tr>
<td>3</td>
<td>Throttle cable housing</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Handlebar switch (right)</td>
<td>1</td>
<td>Refer to “INSTALLING THE HANDLEBAR”.</td>
</tr>
<tr>
<td>5</td>
<td>Throttle cable housing</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Throttle cables</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Grip end (right)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Throttle grip</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Master cylinder bracket</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Master cylinder (clutch)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Handlebar switch (left)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Starter lever/Starter cable</td>
<td>1/1</td>
<td>Refer to “INSTALLING THE HANDLEBAR”.</td>
</tr>
<tr>
<td>13</td>
<td>Grip end (left)</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

- **Torque Specifications:**
  - 10 Nm (1.0 m·kg) (Nut: 2, 6, 9, 10, 11, 12, 13)
  - 26 Nm (2.6 m·kg) (Nut: 4, 5, 7)
  - 23 Nm (2.3 m·kg) (Nut: 3, 8)

Refer to "INSTALLING THE HANDLEBAR".
<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>Handlebar grip</td>
<td>1</td>
<td>Refer to “REMOVING THE HANDLEBAR”.</td>
</tr>
<tr>
<td>15</td>
<td>Collar</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Upper handlebar holders</td>
<td>2</td>
<td>Refer to “INSTALLING THE HANDLEBAR”.</td>
</tr>
<tr>
<td>17</td>
<td>Handlebar</td>
<td>1</td>
<td>For installation, reverse the removal procedure.</td>
</tr>
</tbody>
</table>

**26 Nm (2.6 m•kg)**

**10 Nm (1.0 m•kg)**

**23 Nm (2.3 m•kg)**
REMOVING THE HANDLEBAR
1. Stand the motorcycle on a level surface.

WARNING
Securely support the motorcycle so that there is no danger of it falling over.

2. Remove:
   • throttle cable housing ①

   NOTE:
   While removing the throttle cable housing, pull back the rubber cover ②.

3. Remove:
   • handlebar grip (left) ①

   NOTE:
   Blow compressed air between the handlebar and the handlebar grip, and gradually push the grip off the handlebar.

CHECKING THE HANDLEBAR
1. Stand the motorcycle on a level surface.

WARNING
Securely support the motorcycle so that there is no danger of it falling over.

2. Check:
   • handlebar ①
     Bends/cracks/damage → Replace.

   WARNING
   Do not attempt to straighten a bent handlebar as this may dangerously weaken it.
HANDLEBAR

3. Install:
   • handlebar grip

   a. Apply a light coat of rubber adhesive onto the left end of the handlebar.
   b. Slide the handlebar grip over the left end of the handlebar.
   c. Wipe off any excess rubber adhesive with a clean rag.

   ▲ WARNING ▲

   Do not touch the handlebar grip until the rubber adhesive has fully dried.

   ▲ WARNING ▲

INSTALLING THE HANDLEBAR
1. Stand the motorcycle on a level surface.

   ▲ WARNING ▲

   Securely support the motorcycle so that there is no danger of it falling over.

2. Install:
   • handlebar ①
   • upper handlebar holders ②

   Upper handlebar holder bolt
   23 Nm (2.3 m•kg)

   ▲ CAUTION ▲

   • First, tighten the bolts on the front side of the handlebar holder, then on the rear side.
   • Turn the handlebar all the way to the left and right. If there is any contact with the fuel tank, adjust the handlebar position.

   ▲ NOTE ▲

   • The upper handlebar holders should be installed with the arrows ③ facing forward A.
   • Align the match marks ④ on the handlebar with the upper surface of the lower handlebar holders.
3. Install:
- handlebar grip ①
- left grip end ②

**NOTE:**
There should be 1 ~ 3 mm of clearance ③ between the handlebar grip and the left grip end.

4. Install:
- left handlebar switch ①

**NOTE:**
Align the pin on the left handlebar switch with the hole ④ in the handlebar.

5. Install:
- master cylinder (clutch) ①
- master cylinder bracket ②

**NOTE:**
Align the mating surfaces of the master cylinder with the punch mark ⑤ on the handlebar.

6. Install:
- throttle grip ①
- throttle cable housing ②
- throttle cables ③

**NOTE:**
Apply a thin coat of lithium soap base grease onto the inside of the throttle grip and install it onto the handlebar.

**WARNING**
Make sure that the pin ⑥ on the throttle cable housing is aligned with the hole ⑦ in the handlebar.

7. Install:
- right grip end ①
- right handlebar switch ②

**WARNING**
Make sure that the throttle grip operates smoothly.
NOTE:
- Align the pin on the right handlebar switch with the hole in the handlebar.
- There should be 1 ~ 3 mm of clearance between the throttle grip and the right grip end.

8. Install:
- master cylinder ass’y (front brake)

9. Adjust:
- throttle cable free play
  Refer to “ADJUSTING THE THROTTLE CABLE FREE PLAY” in chapter 3.

Throttle cable free play (at the flange of the throttle grip)
3 ~ 5 mm
### Removing the lower bracket

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Front wheel</strong></td>
<td></td>
<td><strong>Remove the parts in the order listed.</strong> <strong>Refer to “FRONT WHEEL AND BRAKE DISCS”.</strong> <strong>Refer to “FRONT FORK”.</strong> <strong>Refer to “HANDLEBAR”.</strong> <strong>Refer to “REMOVING THE LOWER BRACKET/INSTALLING THE STEERING HEAD”.</strong></td>
</tr>
<tr>
<td>1</td>
<td>Front fork</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Handlebar</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Steering stem nut/Washer</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Upper bracket</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Lock washer</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Upper ring nut</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Rubber washer</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Lower ring nut</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Lower bracket</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Rubber seal</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Bearing cover</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Bearing</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>
### Order Job/Part Q'ty Remarks

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>Bearing</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Dust seal</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Lower handlebar holders</td>
<td>2</td>
<td>For installation, reverse the removal procedure.</td>
</tr>
</tbody>
</table>

1st 52 Nm (5.2 m·kg)
2nd 18 Nm (1.8 m·kg)

110 Nm (11.0 m·kg)
40 Nm (4.0 m·kg)
REMOVING THE LOWER BRACKET

1. Stand the motorcycle on a level surface.

**WARNING**

Securely support the motorcycle so that there is no danger of it falling over.

2. Remove:
   - upper ring nut ①
   - lower ring nut ②

**NOTE:**

Hold the lower ring nut with the exhaust and steering nut wrench, then remove the upper ring nut with the ring nut wrench.

Securely support the lower bracket so that there is no danger of it falling.

CHECKING THE STEERING HEAD

1. Wash:
   - bearing balls
   - bearing races

**Recommended cleaning solvent**

Kerosine

2. Check:
   - bearing balls ①
     Damage/pitting ➔ Replace.

3. Replace:
   - bearing balls
   - bearing races
STEERING HEAD

a. Remove the bearing races from the steering head pipe with a long rod ① and hammer.
b. Remove the bearing race from the lower bracket with a floor chisel ② and hammer.
c. Install a new dust seal and new bearing races.

CAUTION:
If the bearing race is not installed properly, the steering head pipe could be damaged.

NOTE:
- Always replace the bearing balls and bearing races as a set.
- Whenever the steering head is disassembled, replace the dust seal.

4. Check:
   - upper bracket
   - lower bracket
     (along with the steering stem)
     Bends/cracks/damage → Replace.

INSTALLING THE STEERING HEAD

1. Lubricate:
   - upper bearing
   - lower bearing
   - bearing races

Recommended lubricant
Lithium soap base grease

2. Install:
   - lower ring nut ①
   - rubber washer ②
   - upper ring nut ③
   - lock washer ④
   Refer to “INSPECTING THE STEERING HEAD” in chapter 3.

3. Install:
   - upper bracket
   - steering stem nut

NOTE: 
Temporarily tighten the steering stem nut.

4. Install:
   - front fork legs
   Refer to “FRONT FORK”.

NOTE: 
Temporarily tighten the upper and lower bracket pinch bolts.
Removing the rear shock absorber, swingarm and drive chain.

Rear wheel

Drive sprocket
1 Rear shock absorber (left/right) 1
2 Chain case 1
3 Brake hose holders 2
4 Tension bar/Caliper bracket 1/1
5 Pivot shaft 1
6 Swingarm 1
7 Drive chain guide 1
8 Dust covers 2
9 Washers 2
10 Bush 1

Remove the parts in the order listed.

Refer to “REAR WHEEL, BRAKEDISC AND REAR WHEEL SPROCKET”.
Refer to “ENGINE” in chapter 4.

Refer to “REMOVING THE SWINGARM”.

Order Job/Part Q'ty Remarks

23 Nm (2.3 m·kg)

125 Nm (12.5 m·kg)

7 Nm (0.7 m·kg)

30 Nm (3.0 m·kg)

7 Nm (0.7 m·kg)
<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>Bearings</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Drive chain</td>
<td>1</td>
<td>For installation, reverse the removal procedure.</td>
</tr>
</tbody>
</table>
HANDLING THE REAR SHOCK ABSORBER AND GAS CYLINDER

WARNING

This rear shock absorber and gas cylinder contain highly compressed nitrogen gas. Before handling the rear shock absorber or gas cylinder, read and make sure you understand the following information. The manufacturer cannot be held responsible for property damage or personal injury that may result from improper handling of the rear shock absorber and gas cylinder.

- Do not tamper or attempt to open the rear shock absorber or gas cylinder.
- Do not subject the rear shock absorber or gas cylinder to an open flame or any other source of high heat. High heat can cause an explosion due to excessive gas pressure.
- Do not deform or damage the rear shock absorber or gas cylinder in any way. If the rear shock absorber, gas cylinder or both are damaged, damping performance will suffer.

DISPOSING OF A REAR SHOCK ABSORBER AND GAS CYLINDER

- Gas pressure must be released before disposing of a rear shock absorber and gas cylinder. To release the gas pressure, drill a 2 ~ 3 mm hole through the gas cylinder at a point 15 ~ 20 mm from its end as shown.

WARNING

Wear eye protection to prevent eye damage from released gas or metal chips.
REAR SHOCK ABSORBER, SWINGARM AND DRIVE CHAIN

EAS00703

REMOVING THE SWINGARM

1. Stand the motorcycle on a level surface.

WARNING

Securely support the motorcycle so that there is no danger of it falling over.

NOTE:

Place the motorcycle on a suitable stand so that the rear wheel is elevated.

2. Remove:
   • rear shock absorber assembly lower bolt ①

NOTE:

When removing the rear shock absorber assembly lower bolt, hold the swingarm so that it does not drop down.

3. Check:
   • swingarm side play
   • swingarm vertical movement

   a. Check the tightening torque of the pivot shaft nut.

Pivot shaft nut

125 Nm (12.5 m·kg)

b. Check the swingarm side play A by moving the swingarm from side to side.

c. If the swingarm side play is out of specification, check the spacers, bearings, washers, and dust covers.

Swingarm side play (at the end of the swingarm)

0 mm

d. Check the swingarm vertical movement B by moving the swingarm up and down.

If swingarm vertical movement is not smooth if there is binding, check the spacers, bearings, washers, and dust covers.
CHECKING THE REAR SHOCK ABSORBER ASSEMBLY AND GAS CYLINDER

1. Check:
   • rear shock absorber rod ①
     Bends/damage → Replace the rear shock absorber assembly.
   • rear shock absorber
     Gas leaks/oil leaks → Replace the rear shock absorber assembly.
   • spring ②
     Damage/wear → Replace the rear shock absorber assembly.
   • gas cylinder ③
     Damage/gas leaks → Replace.
   • bushings
     Damage/wear → Replace.
   • dust seals
     Damage/wear → Replace.
   • bolts
     Bends/damage/wear → Replace.

CHECKING THE SWINGARM

1. Check:
   • swingarm
     Bends/cracks/damage → Replace.

2. Check:
   • pivot shaft
     Roll the pivot shaft on a flat surface.
     Bends → Replace.

   WARNING

Do not attempt to straighten a bent pivot shaft.

3. Wash:
   • pivot shaft
   • dust covers
   • spacer
   • washers
   • bearings

   Recommended cleaning solvent
   Kerosine
4. Check:
- dust covers ①
- washers ②
  Damage/Wear → Replace.
- bearings ③
  Damage/Pitting → Replace.
- bush ④
  Damage/Scratches → Replace.

CHECKING THE DRIVE CHAIN
1. Measure:
- ten-link section ③ of the drive chain
  Out of specification → Replace the drive chain.

Ten-link drive chain section limit
(maximum)
150 mm

NOTE:
- While measuring the ten-link section, push down on the drive chain to increase its tension.
- Measure the length between drive chain roller ① and ⑪ as shown.
- Perform this measurement at two or three different places.

2. Check:
- drive chain
  Stiffness → Clean and lubricate or replace.

3. Clean:
- drive chain

ą. Wipe the drive chain with a clean cloth.
b. Put the drive chain in kerosine and remove any remaining dirt.
c. Remove the drive chain from the kerosine and completely dry it.

CAUTION:
This motorcycle has a drive chain with small rubber O-rings ① between the drive chain side plates. Never use high-pressure water or air, steam, gasoline, certain solvents (e.g., benzine), or a coarse brush to clean the drive chain. High-pressure methods could force dirt or water into the drive chain’s internals, and solvents will deteriorate the O-rings. A coarse brush can also damage the O-rings. Therefore, use only kerosine to clean the drive chain.
REAR SHOCK ABSORBER, SWINGARM AND DRIVE CHAIN

4. Check:
   • O-rings ①
     Damage → Replace the drive chain.
   • Drive chain rollers ②
     Damage/wear → Replace the drive chain.
   • Drive chain side plates ③
     Damage/wear → Replace the drive chain.
   Cracks → Replace the drive chain and make sure that the battery breather hose is properly routed away from the drive chain and below the swingarm.

5. Lubricate:
   • Drive chain

   Recommended lubricant
   Engine oil or chain lubricant suitable for O-ring chains

6. Check:
   • Drive sprocket
   • Rear wheel sprocket
     More than 1/4 tooth④ wear → Replace the drive chain sprockets as a set.
     Bent teeth → Replace the drive chain sprockets as a set.

⑤ Correct
① Drive chain roller
② Drive chain sprocket
CHAPTER 7.
ELECTRICAL

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ELECTRICAL COMPONENTS

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2. Fuel sender
3. Starter relay
4. Starting circuit cutoff relay
5. Battery
6. Oil level relay
7. Flasher relay
8. Ignition unit
9. Neutral switch
10. Sidestand switch
11. Rear brake switch
12. Oil level switch
13. Horns
14. Ignition coils
SWITCHES

ELECF

SWITCHES
CHECKING SWITCH CONTINUITY
Check each switch for continuity with the pocket tester. If the continuity reading is incorrect, check the wiring connections and if necessary, replace the switch.

CAUTION:

Never insert the tester probes into the coupler terminal slots. Always insert the probes from the opposite end of the coupler, taking care not to loosen or damage the leads.

NOTE:

Before checking for continuity, set the pocket tester to “0” and to the “Ω × 1” range.
When checking for continuity, switch back and forth between the switch positions a few times.

The terminal connections for switches (e.g., main switch, engine stop switch) are shown in an illustration similar to the one on the left. The switch positions are shown in the far left column and the switch lead colors are shown in the top row in the switch illustration.

NOTE:

“—” indicates a continuity of electricity between switch terminals (i.e., a closed circuit at the respective switch position).

The example illustration on the left shows:
There is continuity between blue/red and red when the switch is set to “PE”.
There is continuity between blue/red and blue, between brown/blue and red, and between blue/yellow and black when the switch is set to “ON”.

Pocket tester
90890-03112

NOTE:

Pocket tester
90890-03112
CHECKING THE SWITCHES

Check each switch for damage or wear, proper connections, and also for continuity between the terminals. Refer to "CHECKING SWITCH CONTINUITY".

- Damage/wear → Repair or replace the switch.
- Improperly connected → Properly connect.
- Incorrect continuity reading → Replace the switch.
CHECKING THE SWITCHES

1. Horn switch
2. Clutch switch
3. Dimmer switch
4. Pass switch
5. Turn signal switch
6. Main switch
7. Front brake switch
8. Engine stop switch
9. Start switch
10. Lights switch (for Europe)
11. Rear brake switch
12. Fuse
13. Side stand switch
14. Neutral switch
15. Oil level switch

*1: for Europe
*2: for AUS
CHECKING THE BULBS AND BULB SOCKETS

Check each bulb and bulb socket for damage or wear, proper connections, and also for continuity between the terminals.

Damage/wear → Repair or replace the bulb, bulb socket or both.
Improperly connected → Properly connect.
Incorrect continuity reading → Repair or replace the bulb, bulb socket or both.

TYPES OF BULBS
The bulbs used on this motorcycle are shown in the illustration on the left.
- Bulbs \( A \) and \( B \) are used for headlights and usually use a bulb holder which must be detached before removing the bulb. The majority of these bulbs can be removed from their respective socket by turning them counterclockwise.
- Bulb \( C \) is used for turn signal and tail/brake lights and can be removed from the socket by pushing and turning the bulb counterclockwise.
- Bulbs \( D \) and \( E \) are used for meter and indicator lights and can be removed from their respective socket by carefully pulling them out.

CHECKING THE CONDITION OF THE BULBS
The following procedure applies to all of the bulbs.
1. Remove:
   - bulb
Since the headlight bulb gets extremely hot, keep flammable products and your hands away from the bulb until it has cooled down.

**CAUTION:**

- Be sure to hold the socket firmly when removing the bulb. Never pull the lead, otherwise it may be pulled out of the terminal in the coupler.
- Avoid touching the glass part of the headlight bulb to keep it free from oil, otherwise the transparency of the glass, the life of the bulb and the luminous flux will be adversely affected. If the headlight bulb gets soiled, thoroughly clean it with a cloth moistened with alcohol or lacquer thinner.

2. Check:
   - bulb (for continuity)
     (with the pocket tester)
     No continuity → Replace.

Before checking for continuity, set the pocket tester to “0” and to the “Ω × 1” range.

- Connect the tester positive probe to terminal ① and the tester negative probe to terminal ②, and check the continuity.
- Connect the tester positive probe to terminal ① and the tester negative probe to terminal ③, and check the continuity.
- If either of the readings indicate no continuity, replace the bulb.
CHECKING THE CONDITION OF THE BULB SOCKETS
The following procedure applies to all of the bulb sockets.
1. Check:
   - bulb socket (for continuity)
     (with the pocket tester)
   No continuity → Replace.

Pocket tester
90890-03112

NOTE:
Check each bulb socket for continuity in the same manner as described in the bulb section; however, note the following.

a. Install a good bulb into the bulb socket.
b. Connect the pocket tester probes to the respective leads of the bulb socket.
c. Check the bulb socket for continuity.
   If any of the readings indicate no continuity, replace the bulb socket.
IGNITION SYSTEM
CIRCUIT DIAGRAM
The ignition system fails to operate (no spark or intermittent spark).

Check:
1. main and ignition fuses
2. battery
3. spark plugs
4. ignition spark gap
5. spark plug cap resistance
6. ignition coil resistance
7. pickup coil resistance
8. main switch
9. engine stop switch
10. neutral switch
11. sidestand switch
12. wiring
(of the entire ignition system)

NOTE:
• Before troubleshooting, remove the following part(-s):
  1) seat
  2) fuel tank
  3) headlight unit
  4) side cover (left)
• Troubleshoot with the following special tool(-s).

Ignition checker
90890-06754
Pocket tester
90890-03112

1. Main and ignition fuses
• Check the main and ignition fuses for continuity. Refer to “CHECKING THE FUSE(S)” in chapter 3.
• Are the main and ignition fuses OK?

YES
NO
Replace the fuse(-s).

2. Battery
• Check the condition of the battery. Refer to “CHECKING AND CHARGING THE BATTERY” in chapter 3.

Min. open-circuit voltage
12.8 V or more at 20°C

• Is the battery OK?

YES
NO
• Clean the battery terminals.
• Recharge or replace the battery.

3. Spark plugs
The following procedure applies to all of the spark plugs.
• Check the condition of the spark plug.
• Check the spark plug type.
• Measure the spark plug gap. Refer to “CHECKING THE SPARK PLUGS” in chapter 3.

Standard spark plug
DPR 8EA-9 (NGK)
X24EPR-U9 (DENSO)
Spark plug gap
0.8 ~ 0.9 mm

• Is the spark plug in good condition, is it of the correct type, and its gap within specification?

YES
NO
Re-gap or replace the spark plug.
4. Ignition spark gap
The following procedure applies to all of the spark plugs.
- Disconnect the spark plug cap from the spark plug.
- Connect the ignition checker ① as shown.
- ② Spark plug cap
- Set the main switch to “ON”.
- Measure the ignition spark gap ③.
- Crank the engine by pushing the start switch and gradually increase the spark gap until a misfire occurs.

```
Min. ignition spark gap
6 mm
```

- Is there a spark and is the spark gap within specification?

```
NO
YES
```

The ignition system is OK.

5. Spark plug cap resistance
The following procedure applies to all of the spark plug caps.
- Disconnect the spark plug cap from the spark plug.
- Connect the pocket tester (Ω × 1) to the spark plug cap as shown.
- Measure the spark plug cap resistance.

```
Primary coil resistance
1.9 ~ 2.9 Ω at 20°C
```

- Connect the pocket tester (Ω × 1k) to the ignition coil as shown.
- Measure the secondary coil resistance.

```
Tester positive probe → red/black
Tester negative probe → orange (gray)
```

6. Ignition coil resistance
The following procedure applies to all of the ignition coils.
- Disconnect the ignition coil connectors from the ignition coil terminals.
- Connect the pocket tester (Ω × 1) to the ignition coil as shown.

```
Spark plug cap resistance
10 kΩ at 20°C
```

- Is the spark plug cap OK?

```
YES
NO
```

Replace the spark plug cap.
7-11

IGNITION SYSTEM

Secondary coil resistance
9.5 ~ 14.3 kΩ at 20°C

• Is the ignition coil OK?

YES
NO

Replace the ignition coil.

Pickup coil resistance
248 ~ 372 Ω at 20°C
(between white/red and white/green)

• Is the pickup coil OK?

YES
NO

Replace the pickup coil.

Main switch

1. Check the main switch for continuity. Refer to “CHECKING THE SWITCHES”.
2. Is the main switch OK?

YES
NO

Replace the main switch.

Engine stop switch

1. Check the engine stop switch for continuity. Refer to “CHECKING THE SWITCHES”.
2. Is the engine stop switch OK?

YES
NO

Replace the right handlebar switch.

Neutral switch

1. Check the neutral switch for continuity. Refer to “CHECKING THE SWITCHES”.
2. Is the neutral switch OK?

YES
NO

Replace the neutral switch.

Sidestand switch

1. Check the sidestand switch for continuity. Refer to “CHECKING THE SWITCHES”.
2. Is the sidestand switch OK?

YES
NO

Replace the sidestand switch.
13. Wiring

- Check the entire ignition system’s wiring. Refer to “CIRCUIT DIAGRAM”.
- Is the ignition system’s wiring properly connected and without defects?

<table>
<thead>
<tr>
<th>NO</th>
<th>YES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Replace the ignitor unit.</td>
<td>Properly connect or repair the ignition system’s wiring.</td>
</tr>
</tbody>
</table>
STARTING CIRCUIT CUTOFF SYSTEM OPERATION

If the engine stop switch is set to “○” and the main switch is set to “ON” (both switches are closed), the starter motor can only operate if at least one of the following conditions is met:

- The transmission is in neutral (the neutral switch is closed).
- The clutch lever is pulled to the handlebar (the clutch switch is closed) and the sidestand is up (the sidestand switch is closed).

The starting circuit cutoff relay prevents the starter motor from operating when neither of these conditions has been met. In this instance, the starting circuit cutoff relay is open so current cannot reach the starter motor. When at least one of the above conditions has been met the starting circuit cutoff relay is closed and the engine can be started by pressing the start switch.

WHEN THE TRANSMISSION IS IN NEUTRAL

WHEN THE SIDESTAND IS UP AND THE CLUTCH LEVER IS PULLED TO THE HANDLEBAR

1. Battery
2. Main fuse
3. Main switch
4. Ignition fuse
5. Engine stop switch
6. Starting circuit cutoff relay
7. Diode
8. Clutch switch
9. Sidestand switch
10. Neutral switch
11. Start switch
12. Starter relay
13. Starter motor
TROUBLESHOOTING

The starter motor fails to turn.

Check:
1. main and ignition fuses
2. battery
3. starter motor
4. starting circuit cutoff relay
5. diode
6. starter relay
7. main switch
8. engine stop switch
9. neutral switch
10. sidestand switch
11. clutch switch
12. start switch
13. wiring
(of the entire starting system)

NOTE:
• Before, troubleshooting, remove the following part(-s):
  1) seat
  2) fuel tank
  3) headlight unit
• Troubleshoot with the following special tool(-s).

Pocket tester
90890-03112

1. Main and ignition fuses
• Check the main and ignition fuses for continuity.
  Refer to “CHECKING THE FUSES” in chapter 3.
• Are the main and ignition fuses OK?
  YES  NO
  Replace the fuse(-s).

2. Battery
• Check the condition of the battery.
  Refer to “CHECKING AND CHARGING THE BATTERY” in chapter 3.

Open-circuit voltage
12.8 V or more at 20°C
• Is the battery OK?
  YES  NO
  • Clean the battery terminals.
  • Recharge or replace the battery.

3. Starter motor
• Connect the battery positive terminal 1 and starter motor lead 2 with a jumper lead 3.

WARNING
• A wire that is used as a jumper lead must have at least the same capacity of the battery lead, otherwise the jumper lead may burn.
• This check is likely to produce sparks, therefore make sure that no flammable gas or fluid is in the vicinity.
• Does the starter motor turn?
  YES  NO
  Repair or replace the starter motor.
4. Starting circuit cutoff relay

- Disconnect the relay unit from the coupler.
- Connect the pocket tester (Ω × 1) and battery (12 V) to the relay unit terminals as shown.

**Battery positive terminal → red/black** ①
**Battery negative terminal → black/yellow** ②

**Tester positive probe → blue/white** ③
**Tester negative probe → black** ④

• Does the starting circuit cutoff relay have continuity between black and blue/white?

- YES
- NO

Replace the relay unit.

5. Diode

- Disconnect the starting circuit cutoff relay from the coupler.
- Connect the pocket tester (Ω × 1) to the starting circuit cutoff relay terminals as shown.
- Measure the starting circuit cutoff relay for continuity as follows.

**Tester positive probe → light green** ①
**Tester negative probe → black/yellow** ②

**Tester positive probe → black/yellow** ②
**Tester negative probe → light green** ①

**Continuity**

**No continuity**

**NOTE:**

When you switch the “−” and “+” leads of the digital pocket tester the readings in the above chart will be reversed.

• Are the tester readings correct?

- YES
- NO

Replace the relay unit.
6. Starter relay
• Disconnect the starter relay from the coupler.
• Connect the pocket tester (Ω × 1) and battery (12 V) to the starter relay coupler as shown.

Battery positive terminal → red/white
Battery negative terminal → blue/white

Tester positive probe → red
Tester negative probe → black

• Does the starter relay have continuity between red and black?

YES
NO
Replace the starter relay.

7. Main switch
• Check the main switch for continuity. Refer to “CHECKING THE SWITCHES”.
• Is the main switch OK?

YES
NO
Replace the main switch.

8. Engine stop switch
• Check the engine stop switch for continuity. Refer to “CHECKING THE SWITCHES”.
• Is the engine stop switch OK?

YES
NO
Replace the right handlebar switch.

9. Neutral switch
• Check the neutral switch for continuity. Refer to “CHECKING THE SWITCHES”.
• Is the neutral switch OK?

YES
NO
Replace the neutral switch.

10. Sidestand switch
• Check the sidestand switch for continuity. Refer to “CHECKING THE SWITCHES”.
• Is the sidestand switch OK?

YES
NO
Replace the sidestand switch.

11. Clutch switch
• Check the clutch switch for continuity. Refer to “CHECKING THE SWITCHES”.
• Is the clutch switch OK?

YES
NO
Replace the clutch switch.
## 12. Start switch

- Check the start switch for continuity. Refer to "CHECKING THE SWITCHES".
- Is the start switch OK?

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Replace the right handlebar switch.</td>
</tr>
</tbody>
</table>

## 13. Wiring

- Check the entire starting system’s wiring. Refer to "CIRCUIT DIAGRAM".
- Is the starting system’s wiring properly connected and without defects?

<table>
<thead>
<tr>
<th>NO</th>
<th>YES</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Properly connect or repair the starting system's wiring.</td>
</tr>
<tr>
<td></td>
<td>The starting system circuit is OK.</td>
</tr>
</tbody>
</table>
### STARTER MOTOR

**Order** | **Job/Part** | **Q'ty** | **Remarks** |
---|---|---|---|
1 | Removing the starter motor |
  | Starter motor lead | 1 | Remove the parts in the order listed. |
  | Starter motor assembly | 1 | |
2 | For installation, reverse the removal procedure. |

**Disassembling the starter motor**

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
</table>
1 | Starter motor front cover | 1 | Disassembly the parts in the order listed. |
2 | Washer set | 1 | |
3 | Starter motor rear cover | 1 | |
4 | washer set | 1 | |
5 | Brush holder/brush | 1/1 | |
6 | Armature assembly | 1 | For assembly, reverse the disassembly procedure. |
7 | Starter motor yoke | 1 | |
Checking The Starter Motor

1. Check:
   - commutator
     Dirt → Clean with 600 grit sandpaper.

2. Measure:
   - commutator diameter \( \text{a} \)
     Out of specification → Replace the starter motor.

### Min. commutator diameter
27 mm

3. Measure:
   - mica undercut \( \text{a} \)
     Out of specification → Scrape the mica to the proper measurement with a hacksaw blade which has been grounded to fit the commutator.

### Mica undercut
0.7 mm

**NOTE:**

The mica must be undercut to ensure proper operation of the commutator.

4. Measure:
   - armature assembly resistances (commutator and insulation)
     Out of specification → Replace the starter motor.

#### Pocket tester

\[ 90890-03112 \]

### Armature assembly

**Commutator resistance**

\[ 0.025 \sim 0.035 \, \Omega \text{ at } 20^\circ C \]

**Insulation resistance**

Above 1 M\( \Omega \) at 20°C

b. If any resistance is out of specification, replace the starter motor.
5. Measure:
- brush length \( \text{\textregistered} \)
  Out of specification \( \rightarrow \) Replace the brushes as a set.

\[
\text{Min. brush length}
\]

5 mm

6. Measure:
- brush spring force
  Out of specification \( \rightarrow \) Replace the brush springs as a set.

\[
\text{Brush spring force}
\]

7.65 \( \sim \) 10.01 N (0.780 \( \sim \) 1.021 kg)

7. Check:
- gear teeth
  Damage/wear \( \rightarrow \) Replace the gear.

8. Check:
- oil seal
  Damage/wear \( \rightarrow \) Replace the defective part(-s).

---

**Assembling The Starter Motor**

1. Install:
- brush holder (1)

**NOTE:**
Align the tab (3) on the brush holder with the slot (6) in the starter motor rear cover.

2. Install:
- starter motor yoke (1)
- O-rings (2) **New**
- starter motor front cover (3)
- starter motor rear cover (4)
- bolts

\[
\text{5 Nm (0.5 m\cdot kg)}
\]

**NOTE:**
Align the match marks (3) on the starter motor yoke with the match marks (6) on the front and rear covers.
TROUBLESHOOTING

The battery is not being charged.

Check:
1. main fuse
2. battery
3. charging voltage
4. startor coil assembly resistance
5. brush check
6. field coil resistance
7. main switch
8. wiring
   (of the entire charging system)

NOTE:
• Before troubleshooting, remove the following part(-s):
  1) seat
  2) fuel tank
  3) headlight unit
• Troubleshoot with the following special tool(-s).

1. Main fuse
   • Check the main fuse for continuity.
     Refer to “CHECKING THE FUSES” in chapter 3.
   • Is the main fuse OK?

   YES
   NO

Replace the fuse.

2. Battery
   • Check the condition of the battery.
     Refer to “CHECKING AND CHARGING THE BATTERY” in chapter 3.

   Open-circuit voltage
   12.8 V or more at 20°C
   • Is the battery OK?

   YES
   NO

   • Clean the battery terminals.
   • Recharge or replace the battery.

3. Charging voltage
   • Connect the engine tachometer to the spark plug lead of cylinder #1.
   • Connect the pocket tester (DC 20 V) to the battery as shown.

   Tester positive probe → battery positive terminal
   Tester negative probe → battery negative terminal

   • Start the engine and let it run at approximately 5,000 r/min.
   • Measure the charging voltage.

   Charging voltage
   14 V at 5,000 r/min

Engine tachometer
90890-03113
Pocket tester
90890-03112
**NOTE:**

Make sure that the battery is fully charged.

- Is the charging voltage within specification?

**NO**

**YES**

The charging circuit is OK.

---

4. Stator coil assembly resistances

- Remove the generator cover.
- Connect the pocket tester (Ω × 1) to the stator coil assembly coupler as shown.

<table>
<thead>
<tr>
<th>Tester positive probe</th>
<th>white</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tester negative probe</td>
<td>black</td>
<td>2</td>
</tr>
</tbody>
</table>

- Measure the stator coil assembly resistances.

**Stator coil resistance**

0.19 ~ 0.21 Ω at 20°C

- Is the stator coil assembly OK?

**NO**

**YES**

Replace the stator coil assembly.

---

5. Brush check

- Remove the brush holder ①.

- Check the brush spring.
- Measure the overall length of brushes.

**Brush spring force**

5.10 ~ 5.69 N (0.52 ~ 0.58 kg)

**Brush overall length <wear limit>**

13.7 mm <4.7 mm>

- Are the brush spring and brush OK?

**NO**

**YES**

Replace the brushes and brush spring as a set.
6. Field coil resistance
   • Connect the pocket tester (Ω × 1) to the rotor as shown.
   • Measure the field coil resistance.
   
   **Field coil resistance**
   2.8 ~ 3.0 Ω at 20°C

   • Is the field coil OK?
   
   **YES**
   Replace the field coil.
   **NO**

7. Main switch
   • Check the main switch for continuity. Refer to "CHECKING THE SWITCHES".
   • Is the main switch OK?
   
   **YES**
   Replace the main switch.
   **NO**

8. Wiring
   • Check the wiring connections of the entire charging system. Refer to "CIRCUIT DIAGRAM".
   • Is the charging system's wiring properly connected and without defects?
   
   **NO**
   Properly connect or repair the charging system's wiring.
   **YES**
   Replace the rectifier.
### A.C. GENERATOR

#### Disassembling the A.C. Generator

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Disassembling the A.C. Generator</strong></td>
<td></td>
<td>Disassembly the parts in the order list.</td>
</tr>
<tr>
<td>1</td>
<td>Cover</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Brush holder</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Regulator</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Rectifier cover</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Rectifier</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Rear cover</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Rotor assembly</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Bearing cover</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Bearing</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Bearing</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Stator assembly</td>
<td>1</td>
<td>For assembly, reverse the disassembly procedure.</td>
</tr>
</tbody>
</table>
TROUBLESHOOTING

Any of the following fail to light: headlight, high beam indicator light, taillight, auxiliary light (for Europe) or meter light.

Check:
1. main, and headlight fuses
2. battery
3. main switch
4. lights switch (for Europe)
5. dimmer switch
6. pass switch
7. wiring
   (of the entire charging system)

NOTE: 
• Before troubleshooting, remove the following part(-s):
  1) seat
  2) fuel tank
  3) headlight unit
• Troubleshoot with the following special tool(-s).

Pocket tester
90890-03112

1. Main, and headlight fuses
   • Check the main, and headlight fuses for continuity.
     Refer to “CHECKING THE FUSES” in chapter 3.
   • Are the main, and headlight fuses OK?
     YES NO
     Replace the fuse(-s).

2. Battery
   • Check the condition of the battery.
     Refer to “CHECKING AND CHARGING THE BATTERY” in chapter 3.

Open-circuit voltage
12.8 V or more at 20°C
   • Is the battery OK?
     YES NO
     • Clean the battery terminals.
     • Recharge or replace the battery.

3. Main switch
   • Check the main switch for continuity.
     Refer to “CHECKING THE SWITCHES”.
   • Is the main switch OK?
     YES NO
     Replace the main switch.

4. Lights switch (for Europe)
   • Check the lights switch for continuity.
     Refer to “CHECKING THE SWITCHES”.
   • Is the lights switch OK?
     YES NO
     The lights switch is faulty. Replace the right handlebar switch.
5. Dimmer switch
- Check the dimmer switch for continuity. Refer to “CHECKING THE SWITCHES”.
- Is the dimmer switch OK?

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>The dimmer switch is faulty. Replace the left handlebar switch.</td>
<td></td>
</tr>
</tbody>
</table>

6. Pass switch
- Check the pass switch for continuity. Refer to “CHECKING THE SWITCHES”.
- Is the pass switch OK?

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>The pass switch is faulty. Replace the left handlebar switch.</td>
<td></td>
</tr>
</tbody>
</table>

7. Wiring
- Check the entire lighting system’s wiring. Refer to “CIRCUIT DIAGRAM”.
- Is the lighting system’s wiring properly connected and without defects?

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Check the condition of each of the lighting system’s circuits. Refer to “CHECKING THE LIGHTING SYSTEM”.</td>
<td></td>
</tr>
<tr>
<td>Properly connect or repair the lighting system’s wiring.</td>
<td></td>
</tr>
</tbody>
</table>

CHECKING THE LIGHTING SYSTEM
1. The headlight and the high beam indicator light fail to come on.

1. Headlight bulb and socket
- Check the headlight bulb and socket for continuity. Refer to “CHECKING THE BULBS AND BULB SOCKETS”.
- Are the headlight bulb and socket OK?

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Replace the headlight bulb, socket or both.</td>
<td></td>
</tr>
</tbody>
</table>

2. Voltage
- Connect the pocket tester (DC 20 V) to the headlight and high beam indicator light couplers as shown.

[A] When the dimmer switch is set to “ ”
[B] When the dimmer switch is set to “ ”

Headlight coupler (wire harness side)
2. Voltage

- Connect the pocket tester (20 V) to the meter assembly coupler (wire harness side) as shown.

Tester positive probe → blue
Tester negative probe → black

Set the main switch to “ON”.
Set the light switch to “ ” or “ ”.
Measure the voltage (12 V) of blue on the meter assembly coupler (wire harness side).
Is the voltage within specification?

This circuit is OK.

The wiring circuit from the main switch to the meter assembly coupler is faulty and must be repaired.

3. A tail/brake light fails to come on.

1. Tail/brake light bulb and socket

- Check the tail/brake light bulb and socket for continuity.
Refer to “CHECKING THE BULBS AND BULB SOCKETS”.
- Are the tail/brake light bulb and socket OK?

Replace the tail/brake light bulb, socket or both.
2. Voltage

- Connect the pocket tester (DC 20 V) to the tail/brake light coupler (wire harness side) as shown.

**Tester positive probe → blue/red**
**Tester negative probe → black**

- Set the main switch to “ON”.
- Set the light switch to “ ” or “ ”.
- Measure the voltage (12 V) of blue/red on the tail/brake light coupler (wire harness side).
- Is the voltage within specification?

**YES**
This circuit is OK.

**NO**
Replace the auxiliary light bulb, socket or both.

The wiring circuit from the main switch to the tail/brake light coupler is faulty and must be repaired.

4. The auxiliary light fails to come on. (for Europe)

1. Auxiliary light bulb and socket

- Check the auxiliary light bulb and socket for continuity.
  Refer to “CHECKING THE BULBS AND BULB SOCKETS”.
- Are the auxiliary light bulb and socket OK?

**YES**
Replace the auxiliary light bulb, socket or both.

**NO**
This circuit is OK.

The wiring circuit from the main switch to the auxiliary light connectors is faulty and must be repaired.
TROUBLESHOOTING

• Any of the following fail to light: turn signal light, brake light or an indicator light.
• The horn fails to sound.

Check:
1. main and signaling system fuses
2. battery
3. main switch
4. wiring
   (of the entire signaling system)

NOTE:
• Before troubleshooting, remove the following part(-s):
  1) seats
  2) fuel tank
  3) headlight unit
• Troubleshoot with the following special tool(-s).

Pocket tester
90890-03112

1. Main and signaling system fuses
• Check the main and signaling system fuses for continuity.
  Refer to “CHECKING AND CHANGING THE FUSES” in chapter 3.
• Are the main and signaling system fuses OK?
   YES NO
   Replace the fuse(-s).

2. Battery
• Check the condition of the battery.
  Refer to “CHECKING THE BATTERY” in chapter 3.

Open-circuit voltage
12.8 V or more at 20°C
• Is the battery OK?
   YES NO
   • Clean the battery terminals.
   • Recharge or replace the battery.

3. Main switch
• Check the main switch for continuity.
  Refer to “CHECKING THE SWITCHES”.
• Is the main switch OK?
   YES NO
   Replace the main switch.

4. Wiring
• Check the entire signaling system’s wiring.
  Refer to “CIRCUIT DIAGRAM”.
• Is the signaling system’s wiring properly connected and without defects?
   YES NO
   Check the condition of each of the signaling system’s circuits.
   Refer to “CHECKING THE SIGNALING SYSTEM”.
   Properly connect or repair the signaling system’s wiring.
CHECKING THE SIGNALING SYSTEM
1. The horn fails to sound.

1. Horn switch
- Check the horn switch for continuity. Refer to “CHECKING THE SWITCHES”.
- Is the horn switch OK?

   YES
   NO

   Replace the left handlebar switch.

2. Voltage
- Connect the pocket tester (DC 20 V) to the horn connector at the horn terminal as shown.

   Tester positive probe → brown
   Tester negative probe → ground

- Set the main switch to “ON”.
- Measure the voltage (12 V) of brown at the horn terminal.
- Is the voltage within specification?

   YES
   NO

   The wiring circuit from the main switch to the horn connector is faulty and must be repaired.

3. Horn
- Disconnect the black connector at the horn terminal.
- Connect a jumper lead 1 to the horn terminal and ground the jumper lead.
- Set the main switch to “ON”.
- Does the horn sound?

   YES
   NO

4. Voltage
- Connect the pocket tester (DC 20 V) to the horn connector at the black terminal as shown.

   Tester positive probe → black
   Tester negative probe → ground

- Set the main switch to “ON”.
- Measure the voltage (12 V) of black 1 at the horn terminal.
- Is the voltage within specification?

   YES
   NO

   Repair or replace the horn.

Replace the horn.
2. A tail/brake light fails to come on.

1. Tail/brake light bulb and socket

- Check the tail/brake light bulb and socket for continuity. Refer to "CHECKING THE BULBS AND BULB SOCKETS".
- Are the tail/brake light bulb and socket OK?

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Replace the tail/brake light bulb, socket or both.</td>
<td></td>
</tr>
</tbody>
</table>

2. Brake light switches

- Check the brake light switches for continuity. Refer to "CHECKING THE SWITCHES".
- Is the brake light switch OK?

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Replace the brake light switch.</td>
<td></td>
</tr>
</tbody>
</table>

3. Voltage

- Connect the pocket tester (DC 20 V) to the tail/brake light coupler (wire harness side) as shown.

<table>
<thead>
<tr>
<th>Tester positive probe</th>
<th>yellow</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tester negative probe</td>
<td>black</td>
</tr>
</tbody>
</table>

- Set the main switch to “ON".
- Pull in the brake lever or push down on the brake pedal.
- Measure the voltage (12 V) of yellow at the tail/brake light coupler (wire harness side).
- Is the voltage within specification?

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>This circuit is OK. The wiring circuit from the main switch to the tail/brake light coupler is faulty and must be repaired.</td>
<td></td>
</tr>
</tbody>
</table>

3. A turn signal light, turn signal indicator light or both fail to blink.

1. Turn signal light bulb and socket

- Check the turn signal light bulb and socket for continuity. Refer to "CHECKING THE BULBS AND BULB SOCKETS".
- Are the turn signal light bulb and socket OK?

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Replace the turn signal light bulb, socket or both.</td>
<td></td>
</tr>
</tbody>
</table>
2. Turn signal switch

• Check the turn signal for continuity. Refer to "CHECKING THE SWITCHES".
• Is the turn signal switch OK?

   YES   NO

Replace the left handlebar switch.

3. Voltage

• Connect the pocket tester (DC 20 V) to the flasher relay coupler (wire harness side) as shown.

   Tester positive probe → brown (1)
   Tester negative probe → ground

   YES   NO

The wiring circuit from the main switch to the flasher relay coupler (flasher relay side) is faulty and must be repaired.

4. Voltage

• Connect the tester (DC 20 V) to the flasher relay coupler (wire harness side) as shown.

5. Voltage

• Connect the pocket tester (DC 20 V) to the turn signal light connectors or the meter assembly coupler (wire harness side) as shown.

   A) Turn signal light
   B) Turn signal indicator light

   Left turn signal light
   Tester positive probe → chocolate (1)
   Tester negative probe → ground

   Right turn signal light
   Tester positive probe → dark green
   Tester negative probe → ground (2)
4. The neutral indicator light fails to come on.

1. Neutral indicator light bulb and socket
   - Check the neutral indicator light bulb and socket for continuity. Refer to “CHECKING THE BULBS AND BULB SOCKETS”.
   - Are the neutral indicator light bulb and socket OK?
     - YES
     - NO
     Replace the neutral indicator light bulb, socket or both.

2. Neutral switch
   - Check the neutral switch for continuity. Refer to “CHECKING THE SWITCHES”.
   - Is the neutral switch OK?
     - YES
     - NO
     Replace the neutral switch.

3. Diode
   - Disconnect the starting circuit cutoff relay from the coupler.
   - Connect the pocket tester (Ω x 1) to the starting circuit cutoff relay terminals as shown.
   - Measure the starting circuit cutoff relay for continuity as follows.

   **Tester positive probe → light green**
   **Tester negative probe → sky blue**

   **Continuity**
   **No continuity**

   ![Diode Diagram]

   **NOTE:**
   When you switch the “–” and “+” leads of the digital pocket tester the readings in the above chart will be reversed.

   - Are the tester readings correct?
     - YES
     - NO
     Replace the relay unit.
4. Voltage

- Connect the pocket tester (DC 20 V) to the meter assembly coupler (wire harness side) as shown.

**Tester positive probe → brown** ①
**Tester negative probe → sky blue** ②

- Set the main switch to “ON”.
- Measure the voltage (12 V) of brown ① and sky blue ② at the meter assembly coupler.
- Is the voltage within specification?

![Diagram of meter assembly coupler]

**YES**

This circuit is OK.

**NO**

The wiring circuit from the main switch to the meter light bulb coupler is faulty and must be repaired.

2. Oil level switch

- Drain the engine oil and remove the oil level switch from the oil pan.
- Check the oil level switch for continuity. Refer to “CHECKING THE SWITCHES”.
- Is the oil level switch OK?

![Diagram of oil level switch]

**YES**

Replace the oil level switch.

**NO**

3. Oil level relay

- Disconnect the oil level relay from the coupler.
- Connect the pocket tester (Ω × 1) and battery (12 V) to the oil level relay terminals as shown.

**Battery positive terminal → brown** ①
**Battery negative terminal → black/red** ②

**Tester positive probe → red/blue** ③
**Tester negative probe → black** ④

- Does the oil level relay have continuity between red/blue and black?

![Diagram of oil level relay]

**YES**

Replace the oil level relay.

**NO**

5. The oil level warning light fails to come on.

1. Oil level warning light bulb and socket

- Check the oil level warning light bulb and socket for continuity. Refer to “CHECKING THE BULBS AND BULB SOCKETS”
- Are the oil level warning light bulb and socket OK?

![Diagram of oil level switch and socket]

**YES**

Replace the oil level warning light bulb, socket or both.

**NO**

EAS00802
4. Starting circuit cutoff relay

- Disconnect the relay unit from the coupler.
- Connect the pocket tester (Ω x 1) to the relay unit terminals as shown.

**Tester positive probe → red/blue** ①
**Tester negative probe → black/red** ②

- Measure the relay unit resistance.

**Relay unit resistance**
8.2 Ω at 20°C

- Is the relay unit OK?

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Replace the starting circuit cutoff relay.</td>
<td></td>
</tr>
</tbody>
</table>

5. Voltage

- Connect the pocket tester (DC 20 V) to the meter assembly coupler (wire harness side) as shown.

**Tester positive probe → brown** ①
**Tester negative probe → black/red** ②

- Measure the fuel sender resistance.

<table>
<thead>
<tr>
<th>Fuel sender resistance (up position)</th>
<th>4 ~ 10 Ω at 20°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuel sender resistance (down position)</td>
<td>90 ~ 100 Ω at 20°C</td>
</tr>
</tbody>
</table>

- Is the fuel sender OK?

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Replace the fuel sender.</td>
<td></td>
</tr>
</tbody>
</table>

6. The fuel level gauge fails to operate.

1. Fuel sender

- Disconnect the fuel sender coupler from the wire harness.
- Drain the fuel from the fuel tank and remove the fuel sender from the fuel tank.
- Connect the pocket tester to the fuel sender coupler as shown.

**Tester positive probe → green** ①
**Tester negative probe → black** ②

- Set the main switch to “ON”.
- Measure the voltage (12 V) of brown ① and black/red at the meter assembly coupler.
- Is the voltage within specification?

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>This circuit is OK.</td>
<td></td>
</tr>
<tr>
<td>The wiring circuit from the main switch to the meter assembly coupler is faulty and must be repaired.</td>
<td></td>
</tr>
</tbody>
</table>

EAS00954
2. Voltage

Connect the pocket tester (DC 20 V) to the meter assembly coupler (wire harness side) as shown.

Tester positive probe → brown ①
Tester negative probe → black ②

• Check that the fuel level gauge needle move to "F" to "E".

Before reading the fuel level gauge, leave the float in one position (either up or down) for at least three minutes.

• Does the fuel level gauge needle move appropriately?

![Diagram of wiring circuit](image)

- Set the main switch to “ON”.
- Measure the voltage (12 V).
- Is the voltage within specification?

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>The wiring circuit from the main switch to the meter assembly coupler is faulty and must be repaired.</td>
<td></td>
</tr>
</tbody>
</table>

• NOTE: 

3. Fuel level gauge

• Set the main switch to “ON”.
• Move the float up ① or down ②.

![Diagram of fuel level gauge](image)

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>This circuit is OK.</td>
<td>Replace the fuel level gauge.</td>
</tr>
</tbody>
</table>
SELF-DIAGNOSIS

The XJR1300 (L) features a self-diagnosing system for the following circuit(s):
- throttle position sensor
- ignition circuit

If any of these circuits are defective, their respective condition codes will be displayed on the tachometer when the main switch is set to “ON” (irrespective of whether the engine is running or not). The engine is not operated condition code at 2,000 r/min.

<table>
<thead>
<tr>
<th>Circuit</th>
<th>Defect(-s)</th>
<th>System response</th>
<th>Condition code</th>
</tr>
</thead>
</table>
| Throttle position sensor | • Disconnected  
|                   | • Short-circuit  
|                   | • Locked     | • The ignitor unit stays set to the wide-open throttle ignition timing.  
|                   |                       | The motorcycle can be ridden.  
|                   |                       | The tachometer displays the condition code.                                      | 3,000 r/min    |
| Ignition circuit | • Incorrect input signal for side stand switch and neutral switch. | • No ignition  
|                   |                       | • The tachometer displays the condition code.                                      | 2,000 r/min    |

Tachometer display sequence
1) Throttle position sensor

- Revolution $(\times 10^3 \text{ r/min})$
  - 1) $0 \text{ r/min} \ldots 3 \text{ seconds}$
  - 2) Condition code ... 2.5 seconds
  - 3) Engine speed ... 3 seconds

If the engine is stopped, the engine speed (3) is 0 r/min.

2) Ignition circuit

- Revolution $(\times 10^3 \text{ r/min})$
  - 1) $0 \text{ r/min} \ldots 3 \text{ seconds}$
  - 2) Condition code ... 2.5 seconds
TROUBLESHOOTING

The tachometer starts to display the self-diagnosis sequence.

Check:
1. throttle position sensor
2. ignition circuit

NOTE:
• Before troubleshooting, remove the following parts(-s):
  1) rider seat
  2) fuel tank
  3) air filter case
• Troubleshoot with the following special tool(-s).

Pocket tester
90890-03112

1. Throttle position sensor
CIRCUIT DIAGRAM

EAS00835

1. Wire harness
• Check the wire harness for continuity. Refer to “CIRCUIT DIAGRAM”.
• Is the wire harness OK?

YES
NO

Repair or replace the wire harness.

2. Throttle position sensor
• Check the throttle position sensor for continuity. Refer to “CHECKING AND ADJUSTING THE THROTTLE POSITION SENSOR” in chapter 6.
• Is the throttle position sensor OK?

YES
NO

Replace the ignitor unit. Replace the throttle position sensor.
3. Main switch
- Check the main switch for continuity. Refer to “CHECKING THE SWITCHES”.
- Is the main switch OK?
  - YES
  - NO
  - Replace the main switch.

4. Wire harness
- Check the wire harness for continuity. Refer to “CIRCUIT DIAGRAM”.
- Is the wire harness OK?
  - YES
  - NO
  - Repair or replace the wire harness.

5. Starting circuit cutoff relay
- Disconnect the starting circuit cutoff relay from the coupler.
- Connect the pocket tester (Ω × 1) to the starting circuit cutoff relay terminals as shown.
- Measure the starting circuit cutoff relay for continuity as follows.

<table>
<thead>
<tr>
<th>Tester positive probe</th>
<th>Light green</th>
<th>Continuity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tester negative probe</td>
<td>Blue/yellow</td>
<td></td>
</tr>
</tbody>
</table>

| Tester positive probe | Blue/yellow | No continuity |
| Tester negative probe | Light green |             |

5 Main switch
8 Starting circuit cutoff relay
9 Ignitor unit
**NOTE:**
When you switch the “−” and “+” leads of the digital pocket tester the readings in the above chart will be reversed.

- Are the tester readings correct?

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Replace the ignitor unit.</td>
<td>Replace the relay unit.</td>
</tr>
</tbody>
</table>
CHAPTER 8.
TROUBLESHOOTING

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TURN SIGNAL BUNKS SLOWLY ......................... 8-5
TURN SIGNAL REMAINS LIT ........................... 8-5
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HORN DOES NOT SOUND ................................. 8-5
TROUBLESHOOTING

NOTE:
The following guide for troubleshooting does not cover all the possible causes of trouble. It should be helpful, however, as a guide to basic troubleshooting. Refer to the relative procedure in this manual for checks, adjustments, and replacement of parts.

STARTING PROBLEMS

ENGINE
Cylinders and cylinder head(-s)
• Loose spark plug
• Loose cylinder head
• Damaged cylinder head gasket
• Worn or damaged cylinder
• Incorrect valve clearance
• Incorrectly sealed valve
• Incorrect valve-to-valve-seat contact
• Incorrect valve timing
• Faulty valve spring
• Seized valve

Pistons and piston rings
• Incorrectly installed piston ring
• Damaged, worn or fatigued piston ring
• Seized piston ring
• Seized or damaged piston

Air filter
• Incorrectly installed air filter
• Clogged air filter element

Crankcase and crankshaft
• Incorrectly assembled crankcase
• Seized crankshaft

FUEL SYSTEM

Fuel tank
• Empty fuel tank
• Clogged fuel filter
• Clogged fuel tank breather hose
• Deteriorated or contaminated fuel

Fuel cock
• Clogged or damaged fuel hose/vacuum hose

Carburetors
• Deteriorated or contaminated fuel
• Clogged pilot jet
• Clogged pilot air passage
• Sucked-in air
• Damaged float
• Worn needle valve
• Worn or damaged needle valve seat
• Incorrect fuel level
• Incorrectly installed pilot jet
• Clogged starter jet
• Faulty starter plunger
• Incorrectly adjusted starter cable

ELECTRICAL SYSTEMS

Battery
• Faulty battery
• Discharged battery

Fuses
• Blown, damaged or incorrect fuse
• Incorrectly installed fuse

Spark plugs
• Incorrect spark plug gap
• Incorrect spark plug heat range
• Fouled spark plug
• Worn or damaged electrode
• Worn or damaged insulator
• Faulty spark plug cap

Ignition coils
• Damaged ignition coil
• Broken or shorted primary or secondary coils
• Faulty spark plug lead

Ignition system
• Faulty ignitor unit
• Faulty pickup coil

Switches and wiring
• Faulty main switch
• Faulty engine stop switch
• Broken or shorted wiring
• Faulty neutral switch
• Faulty start switch
• Faulty sidestand switch
• Faulty clutch switch
• Incorrectly grounded circuit
• Loose connections

Starting system
• Faulty starter motor
• Faulty starter relay
• Faulty starting circuit cutoff relay
• Faulty starter clutch
INCORRECT ENGINE IDLING SPEED

**ENGINE**
- Cylinders and cylinder head
  - Incorrect valve clearance
- Damaged valve train components
- Air filter
  - Clogged air filter element

**FUEL SYSTEM**
- Carburetors
  - Faulty starter plunger
  - Loose or clogged pilot jet
  - Loose or clogged pilot air jet
  - Damaged or loose carburetor joint
  - Incorrectly synchronized carburetors
  - Incorrectly adjusted engine idling speed
    (throttle stop screw)
  - Incorrect throttle cable free play
  - Flooded carburetor

**ELECTRICAL SYSTEMS**
- Battery
  - Faulty battery
- Discharged battery
- Spark plugs
  - Incorrect spark plug gap
  - Incorrect spark plug heat range
  - Fouled spark plug
  - Worn or damaged electrode
  - Worn or damaged insulator
  - Faulty spark plug cap
- Ignition coils
  - Broken or shorted primary or secondary coils
  - Faulty spark plug lead
  - Damaged ignition coil
- Ignition system
  - Faulty ignition unit
  - Faulty pickup coil

POOR MEDIUM-AND-HIGH-SPEED PERFORMANCE

Refer to “STARTING PROBLEMS”.

**ENGINE**
- Air filter
  - Clogged air filter element

**FUEL SYSTEM**
- Carburetors
  - Faulty diaphragm
  - Incorrect fuel level
  - Loose or clogged main jet

FAULTY GEAR SHIFTING

SHIFTING IS DIFFICULT
Refer to “CLUTCH DRAGS”.

**SHIFT PEDAL DOES NOT MOVE**
- Shift shaft
  - Incorrectly adjusted shift rod
  - Bent shift shaft
  - Foreign object in a shift drum groove
  - Seized shift fork
  - Bent shift fork guide bar
- Transmission
  - Seized transmission gear
  - Foreign object between transmission gears
  - Incorrectly assembled transmission

**JUMPS OUT OF GEAR**
- Shift shaft
  - Incorrect shift pedal position
  - Incorrectly returned stopper lever
- Shift forks
  - Worn shift fork
- Shift drum
  - Incorrect axial play
  - Worn shift drum groove
- Transmission
  - Worn gear dog
FAULTY CLUTCH

CLUTCH SLIPS

Clutch
- Improperly assembled clutch
- Improperly assembled clutch master cylinder
- Improperly assembled clutch release cylinder
- Loose or fatigued clutch spring
- Loose union bolt
- Worn friction plate
- Worn clutch plate
- Damaged clutch release cylinder

Engine oil
- Incorrect oil level
- Incorrect oil viscosity (low)
- Deteriorated oil

CLUTCH DRAGS

Clutch
- Unevenly tensioned clutch springs
- Warped pressure plate
- Bent clutch plate
- Swollen friction plate
- Bent clutch pull rod
- Damaged clutch boss
- Burnt primary driven gear bushing
- Damaged clutch release cylinder
- Match marks not aligned

Engine oil
- Incorrect oil level
- Incorrect oil viscosity (high)
- Deteriorated oil

OVERHEATING

ENGINE

Cylinder head(-s) and piston(-s)
- Heavy carbon buildup

Engine oil
- Incorrect oil level
- Incorrect oil viscosity
- Inferior oil quality

FUEL SYSTEM

Carburetors
- Incorrect main jet setting
- Incorrect fuel level
- Damaged or loose carburetor joint

Air filter
- Clogged air filter element

CHASSIS

Brakes
- Dragging brake

ELECTRICAL SYSTEMS

Spark plugs
- Incorrect spark plug gap
- Incorrect spark plug heat range

Ignition system
- Faulty ignitor unit
POOR BRAKING PERFORMANCE/FAULTY FRONT FORK LEGS/UNSTABLE HANDLING

EAS00857

POOR BRAKING PERFORMANCE

• Worn brake pad
• Worn brake disc
• Air in hydraulic brake system
• Leaking brake fluid
• Faulty brake caliper piston seal
• Loose union bolt
• Damaged brake hose
• Oil or grease on the brake disc
• Oil or grease on the brake pad
• Incorrect brake fluid level

EAS00860

FAULTY FRONT FORK LEGS

LEAKING OIL

• Bent, damaged or rusty inner tube
• Damaged outer tube
• Incorrectly installed oil seal
• Damaged oil seal lip
• Incorrect oil level (high)
• Loose damper rod assembly bolt
• Damaged damper rod assembly bolt copper washer
• Damaged cap bolt O-ring
• Bent or damaged inner tube
• Bent or damaged outer tube
• Faulty rear shock absorber spring
• Leaking oil or gas
• Uneven tire pressures (front and rear)
• Incorrect tire pressure
• Uneven tire wear

MALFUNCTION

• Bent or damaged inner tube
• Bent or damaged outer tube
• Damaged fork spring
• Incorrect oil viscosity
• Incorrect oil level

EAS00862

UNSTABLE HANDLING

Handlebar

• Bent or incorrectly installed right handlebar
• Bent or incorrectly installed left handlebar

Steering head components

• Incorrectly installed upper bracket
• Incorrectly installed lower bracket (incorrectly tightened ring nut)
• Bent steering stem
• Damaged ball bearing or bearing race

Front fork legs

• Uneven oil levels (both front fork legs)
• Unevenly tensioned fork spring (both front fork legs)
• Damaged fork spring
• Bent or damaged inner tube
• Bent or damaged outer tube

Swingarm

• Worn bearing or bushing
• Bent or damaged swingarm

Rear shock absorber assembly

• Faulty rear shock absorber spring
• Leaking oil or gas

Tires

• Uneven tire pressures (front and rear)
• Incorrect tire pressure
• Uneven tire wear

Wheels

• Incorrect wheel balance
• Deformed cast wheel
• Damaged wheel bearing
• Bent or loose wheel axle
• Excessive wheel runout

Frame

• Bent frame
• Damaged steering head pipe
• Incorrectly installed bearing race
FAULTY LIGHTING AND SIGNALING SYSTEMS

HEADLIGHT DOES NOT LIGHT
- Wrong headlight bulb
- Too many electrical accessories
- Hard charging
- Incorrect connection
- Incorrectly grounded circuit
- Poor contacts (main or light switch)
- Burnt-out headlight bulb

HEADLIGHT BULB BURNT OUT
- Wrong headlight bulb
- Faulty battery
- Faulty rectifier/regulator
- Incorrectly grounded circuit
- Faulty main switch
- Faulty light switch
- Headlight bulb life expired

TAIL/BRAKE LIGHT DOES NOT LIGHT
- Wrong tail/brake light bulb
- Too many electrical accessories
- Incorrect connection
- Burnt-out tail/brake light bulb

TAIL/BRAKE LIGHT BULB BURNT OUT
- Wrong tail/brake light bulb
- Faulty battery
- Incorrectly adjusted rear brake light switch
- Tail/brake light bulb life expired

TURN SIGNAL DOES NOT LIGHT
- Faulty turn signal switch
- Faulty turn signal relay
- Burnt-out turn signal bulb
- Incorrect connection
- Damaged or faulty wire harness
- Incorrectly grounded circuit
- Faulty battery
- Blown, damaged or incorrect fuse

TURN SIGNAL BLINKS SLOWLY
- Faulty turn signal relay
- Faulty main switch
- Faulty turn signal switch
- Wrong turn signal bulb

TURN SIGNAL REMAINS LIT
- Faulty turn signal relay
- Burnt-out-turn signal bulb

TURN SIGNAL BLINKS QUICKLY
- Incorrect turn signal bulb
- Faulty turn signal relay
- Burnt-out turn signal bulb

HORN DOES NOT SOUND
- Incorrectly adjusted horn
- Damaged or faulty horn
- Faulty main switch
- Faulty horn switch
- Faulty battery
- Blown, damaged or incorrect fuse
- Faulty wire harness
XJR1300'99 WIRING DIAGRAM for EUR

COLOR CODE

B . . . . Black
Br . . . . Brown
Ch . . Chocolate
Dg . . Dark green
G . . . . Green
Gy . . . . Gray
L . . . . Blue
Lg . . . . Light green
O . . . . Orange
Sb . . . . Sky blue
P . . . . Pink
R . . . . Red
Y . . . . Yellow
Br/L . . . Brown/Blue
Br/W . . . Brown/White
G/Y . . . Green/Yellow
L/B . . . Blue/Black
L/R . . . Blue/Red
L/W . . . Blue/White
L/Y . . . Blue/Yellow
R/B . . . Red/Black
R/L . . . Red/Blue
R/W . . . Red/White
R/Y . . . Red/Yellow
W/G . . . White/Green
W/R . . . White/Red
Y/B . . . Yellow/Black

1. AC generator
2. Fuse (main)
3. Battery
4. Starter relay
5. Main switch
6. Fuse (ignition)
7. Starter motor
8. Starting circuit cut-off relay
9. Ignitor unit
10. Ignition coil
11. Spark plug
12. Pickup coil
13. TPS (throttle position sensor)
14. Neutral switch
15. Sidestand switch
16. Oil level relay
17. Start switch
18. Engine stop switch
19. Front brake switch
20. Handlebar switches (right)
21. Lights switch
22. Fuse (signal)
23. Rear brake switch
24. Horn
25. Flasher relay
26. Oil level switch
27. Connector
28. Meter assembly
29. Tachometer
30. Fuel gauge
31. Fuel sender
32. Meter lights
33. Neutral indicator light
34. Turn signal indicator light (left)
35. Turn signal indicator light (right)
36. Oil warning light
37. High beam indicator light
38. Clutch switch
39. Turn signal switch
40. Horn switch
41. Pass switch
42. Dimmer switch
43. Handlebar switch (left)
44. Fuse (headlight)
45. Auxiliary light
46. Tail/brake light
47. Headlight
48. Front turn signal lights
49. Rear turn signal lights
XJR1300L WIRING DIAGRAM for AUS

COLOR CODE
Ch . . . Chocolate  P . . . Pink  G/Y . . . Green/Yellow  R/Y . . . Red/Yellow
Dg . . . Dark green  R . . . Red  L/B . . . Blue/Black  W/G . . . White/Green
L . . . Blue  B/R . . . Black/Red  L/Y . . . Blue/Yellow
Lg . . . Light green  B/Y . . . Black/Yellow  R/B . . . Red/Black