NOTICE

This manual was produced by the Yamaha Motor Taiwan Company, Ltd. primarily for use by Yamaha dealers and their qualified mechanics. It is not possible to include all the knowledge of a mechanic in one manual. Therefore, anyone who uses this book to perform maintenance and repairs on Yamaha vehicles should have a basic understanding of mechanics and the techniques to repair these types of vehicles. Repair and maintenance work attempted by anyone without this knowledge is likely to render the vehicle unsafe and unfit for use.

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

NOTE: Designs and specifications are subject to change without notice.

IMPORTANT MANUAL INFORMATION

Particularly important information is distinguished in this manual by the following.
The Safety Alert Symbol means ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!

⚠️ 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 scooter operator, a bystander or a person inspecting or repairing the scooter.

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

⚠️ NOTE: A NOTE provides key information to make procedures easier or clearer.

Downloaded from www.ScooterTime.net
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.

---

**CYLINDER AND PISTON**

1. Removing the cylinder and piston
   - Piston pin clip
   - Piston pin
   - Piston
   - Piston ring set

   **NOTE:**
   - Before removing the piston pin clip, cool the crankcase down with a damp rag to prevent the piston pin clip from falling into the crankcase.
   - Before removing the piston pin, deburr the piston pin clip groove and the piston pin bore area. If both areas are deburred and the piston pin is still difficult to remove, use the piston pin puller set.
   - Use a piston pin puller tool and not a hammer.

2. Removing the cylinder and piston
   - Oil ring
   - Top ring
   - 2nd 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.

---

**CYLINDER AND PISTON**

3. **TABLE**

<table>
<thead>
<tr>
<th>Part Name</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Piston pin clip</td>
<td>1</td>
</tr>
<tr>
<td>Piston pin</td>
<td>2</td>
</tr>
<tr>
<td>Piston</td>
<td>3</td>
</tr>
<tr>
<td>Piston ring set</td>
<td>4</td>
</tr>
<tr>
<td>Oil ring</td>
<td>5</td>
</tr>
<tr>
<td>Top ring</td>
<td>6</td>
</tr>
<tr>
<td>2nd ring</td>
<td>7</td>
</tr>
<tr>
<td>Piston</td>
<td>8</td>
</tr>
<tr>
<td>Piston pin</td>
<td>9</td>
</tr>
</tbody>
</table>

**REMOVING THE CYLINDER AND PISTON**

1. Remove:
   - Piston pin clip
   - Piston pin
   - Piston

2. Remove:
   - Oil ring
   - Top ring
   - 2nd ring

---

**CYLINDER AND PISTON**

4. **EXPLODED DIAGRAM**

   - Cylinder head
   - Timing chain guide (exhaust side)
   - Cylinder
   - Case cap
   - Reed valve assembly
   - Dowel pin
   - Cylinder gasket
   - Piston pin clip
   - Piston pin
   - Piston
   - Piston ring set

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

   **Refer to “INSTALLING THE PISTON AND CYLINDER”.**

   **Refer to “REMOVING THE CYLINDER AND PISTON”.**

   **Refer to “INSTALLING THE PISTON AND CYLINDER”.**

   **For installation, reverse the removal procedure.**
The following symbols are not relevant to every vehicle.

Symbols 1 to 9 indicate the subject of each chapter.

1. General information
2. Specifications
3. Periodic checks and adjustments
4. Chassis
5. Engine
6. Cooling system
7. Carburetor(s)
8. Electrical system
9. Troubleshooting

Symbols 0 to u indicate the following.

0. Serviceable with engine mounted
q. Filling fluid
w. Lubricant
e. Special tool
r. Tightening torque
t. Wear limit, clearance
y. Engine speed
u. Electrical data

Symbols i to d in the exploded diagrams indicate the types of lubricants and lubrication points.

i. Engine oil
o. Gear oil
p. Molybdenum-disulfide oil
a. Wheel-bearing grease
s. Lithium-soap-based grease
d. Molybdenum-disulfide grease

Symbols f to g in the exploded diagrams indicate the following.

f. Apply locking agent (LOCTITE®)
g. Replace the part
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CHAPTER 1
GENERAL INFORMATION

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GENERAL INFORMATION

SCOOTER IDENTIFICATION

EAS00017

VEHICLE IDENTIFICATION NUMBER

The vehicle identification number ① is stamped into the steering head pipe.

EAS00018

MODEL LABEL

The model label ① is affixed to the trunk. This information will be needed to order spare parts.
IMPORTANT INFORMATION

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 the “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.
EAS00023

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 tabs along a flat of the bolt or nut.

EAS00024

BEARINGS AND OIL SEALS
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-based grease. Oil bearings liberally when installing, if appropriate.

1 Oil seal

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

1 Bearing

EAS00025

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 the sharp-edged corner is positioned opposite the thrust that the circlip receives.

4 Shaft
Notes 3 on equipment preparation
Push Rivet (Push type)
Assembly status of the Push Rivet (Push type)

Dissembling
1. Press Center Pin ① inward to release the Lock.
2. Remove the Push Rivet main body ②.

Assembling
1. Restore the Center Pin, replace the Push Rivet main body.
2. Push in the Center Pin until leveling off with the surface position of the Push Rivet main body.
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 all connections are tight.

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

   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.
SPECIAL TOOLS

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. Special tools, part numbers or both may differ depending on the country.

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>90890-01085</td>
<td>Slide hammer bolt (8mm)</td>
<td><img src="image1.png" alt="Slide hammer bolt" /></td>
</tr>
<tr>
<td>YU-01083-2</td>
<td>Weight</td>
<td><img src="image2.png" alt="Weight" /></td>
</tr>
<tr>
<td>90890-01084</td>
<td>These tools are needed to remove the camshaft.</td>
<td></td>
</tr>
<tr>
<td>YU-01083-3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>90890-01235</td>
<td>Rotor holding tool</td>
<td><img src="image3.png" alt="Rotor holding tool" /></td>
</tr>
<tr>
<td>YU-01235</td>
<td></td>
<td></td>
</tr>
<tr>
<td>90890-01268</td>
<td>Ring nut wrench</td>
<td><img src="image4.png" alt="Ring nut wrench" /></td>
</tr>
<tr>
<td>YU-01268</td>
<td>This tool is used to remove the flywheel magneto.</td>
<td></td>
</tr>
<tr>
<td>90890-01304</td>
<td>Piston pin puller set</td>
<td><img src="image5.png" alt="Piston pin puller set" /></td>
</tr>
<tr>
<td>YU-01304</td>
<td>This tool is used to remove the piston pin.</td>
<td></td>
</tr>
<tr>
<td>90890-01312</td>
<td>Fuel level gauge</td>
<td><img src="image6.png" alt="Fuel level gauge" /></td>
</tr>
<tr>
<td>YM-01312-A</td>
<td>This gauge is used to measure the fuel level in the float chamber.</td>
<td></td>
</tr>
<tr>
<td>90890-01337</td>
<td>Clutch spring holder</td>
<td><img src="image7.png" alt="Clutch spring holder" /></td>
</tr>
<tr>
<td>YM-33285</td>
<td>These tools are used for removing the nut with holding the compression spring.</td>
<td></td>
</tr>
<tr>
<td>YM-33285-6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>90890-01348</td>
<td>Lock nut wrench</td>
<td><img src="image8.png" alt="Lock nut wrench" /></td>
</tr>
<tr>
<td>YM-01348</td>
<td>This tool is used when removing or installing the secondary sheave nut.</td>
<td></td>
</tr>
<tr>
<td>90890-01325</td>
<td>Radiator cap tester(1)</td>
<td><img src="image9.png" alt="Radiator cap tester" /></td>
</tr>
<tr>
<td>YU-24460-01</td>
<td>Radiator cap tester adapter(2)</td>
<td><img src="image10.png" alt="Radiator cap tester adapter" /></td>
</tr>
<tr>
<td>90890-01352</td>
<td>This tester and its adapter are needed for checking the cooling system.</td>
<td></td>
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<tr>
<td>YU-33984</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tool NO.</td>
<td>Tool name / Function</td>
<td>Illustration</td>
</tr>
<tr>
<td>-------------</td>
<td>--------------------------------------------------------------------------------------</td>
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<tr>
<td>90890-01367</td>
<td>Fork seal driver weight&lt;br&gt;YM-A9409-7</td>
<td><img src="image1" alt="Illustration" /></td>
</tr>
<tr>
<td>90890-01400</td>
<td>Fork seal driver attachment(Ø30mm)</td>
<td><img src="image2" alt="Illustration" /></td>
</tr>
<tr>
<td>90890-01384</td>
<td>This tool is used when installing the fork seal.</td>
<td></td>
</tr>
<tr>
<td>YM-A9409-7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>90890-01403</td>
<td>Oil seal guide&lt;br&gt;YM-33299</td>
<td><img src="image3" alt="Illustration" /></td>
</tr>
<tr>
<td>YU-A9472</td>
<td>This tool is used for protecting the oil seal lip when installing the secondary sliding sheave.</td>
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</tr>
<tr>
<td>90890-01701</td>
<td>Steering nut wrench&lt;br&gt;YS-01880-A</td>
<td><img src="image4" alt="Illustration" /></td>
</tr>
<tr>
<td>YS-01880-A</td>
<td>This tool is used to loosen and tighten the steering ring nut.</td>
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</tr>
<tr>
<td>90890-03079</td>
<td>Oil seal guide&lt;br&gt;YM-34483</td>
<td><img src="image5" alt="Illustration" /></td>
</tr>
<tr>
<td>YM-34483</td>
<td>This tool is used for protecting the oil seal lip when installing the secondary sliding sheave.</td>
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</tr>
<tr>
<td>90890-03081</td>
<td>Oil seal guide&lt;br&gt;YM-34483</td>
<td><img src="image6" alt="Illustration" /></td>
</tr>
<tr>
<td>YU-33223</td>
<td>This tool is used for holding the secondary sheave.</td>
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<tr>
<td>90890-03141</td>
<td>Oil seal guide&lt;br&gt;YM-34483</td>
<td><img src="image7" alt="Illustration" /></td>
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<td>90890-01384</td>
<td>Oil seal guide&lt;br&gt;YM-33299</td>
<td><img src="image8" alt="Illustration" /></td>
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<td>This tool is used for protecting the oil seal lip when installing the secondary sliding sheave.</td>
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<td>Oil seal guide&lt;br&gt;YM-34483</td>
<td><img src="image10" alt="Illustration" /></td>
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<td>90890-03079</td>
<td>Oil seal guide&lt;br&gt;YM-34483</td>
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<tr>
<td>YM-34483</td>
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<tr>
<td>90890-03081</td>
<td>Oil seal guide&lt;br&gt;YM-34483</td>
<td><img src="image12" alt="Illustration" /></td>
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<tr>
<td>YU-33223</td>
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<td>90890-03141</td>
<td>Oil seal guide&lt;br&gt;YM-34483</td>
<td><img src="image13" alt="Illustration" /></td>
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<td>90890-01384</td>
<td>Oil seal guide&lt;br&gt;YM-33299</td>
<td><img src="image14" alt="Illustration" /></td>
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<td>YM-33299</td>
<td>This tool is used for protecting the oil seal lip when installing the secondary sliding sheave.</td>
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<tr>
<td>90890-01403</td>
<td>Oil seal guide&lt;br&gt;YM-34483</td>
<td><img src="image15" alt="Illustration" /></td>
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<td>YU-A9472</td>
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<td>90890-03079</td>
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<td><img src="image16" alt="Illustration" /></td>
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<td>90890-03081</td>
<td>Oil seal guide&lt;br&gt;YM-34483</td>
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<td>YU-33223</td>
<td>This tool is used for protecting the oil seal lip when installing the secondary sliding sheave.</td>
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<td>90890-03141</td>
<td>Oil seal guide&lt;br&gt;YM-34483</td>
<td><img src="image18" alt="Illustration" /></td>
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<td>YU-03141</td>
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<tr>
<td>90890-01384</td>
<td>Oil seal guide&lt;br&gt;YM-33299</td>
<td><img src="image19" alt="Illustration" /></td>
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<td>YM-33299</td>
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<td>YU-A9472</td>
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<td>90890-03079</td>
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<td><img src="image21" alt="Illustration" /></td>
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<tr>
<td>YM-34483</td>
<td>This tool is used for protecting the oil seal lip when installing the secondary sliding sheave.</td>
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<td>90890-03081</td>
<td>Oil seal guide&lt;br&gt;YM-34483</td>
<td><img src="image22" alt="Illustration" /></td>
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<td>YU-33223</td>
<td>This tool is used for protecting the oil seal lip when installing the secondary sliding sheave.</td>
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<td>Oil seal guide&lt;br&gt;YM-34483</td>
<td><img src="image23" alt="Illustration" /></td>
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<tr>
<td>YU-03141</td>
<td>This tool is used for protecting the oil seal lip when installing the secondary sliding sheave.</td>
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</tr>
<tr>
<td>Tool NO.</td>
<td>Tool name / Function</td>
<td>Illustration</td>
</tr>
<tr>
<td>---------------</td>
<td>----------------------------------------------------------</td>
<td>--------------</td>
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<tr>
<td>90890-04019</td>
<td>Valve spring compressor</td>
<td></td>
</tr>
<tr>
<td>YM-04019</td>
<td>Compressor adapter (Ø 16.5mm)</td>
<td></td>
</tr>
<tr>
<td>90890-04148</td>
<td>These tools are used when removing or installing the valve and the valve spring.</td>
<td></td>
</tr>
<tr>
<td>YM-04148</td>
<td></td>
<td></td>
</tr>
<tr>
<td>90890-04111</td>
<td>Valve guide remover (4.0 mm)</td>
<td></td>
</tr>
<tr>
<td>YM-04111</td>
<td>This tool is used to remove or install the valve guides.</td>
<td></td>
</tr>
<tr>
<td>90890-04112</td>
<td>Valve guide installer (4.0 mm)</td>
<td></td>
</tr>
<tr>
<td>YM-04112</td>
<td>This tool is used to install the valve guides.</td>
<td></td>
</tr>
<tr>
<td>90890-04113</td>
<td>Valve guide remover (4.0 mm)</td>
<td></td>
</tr>
<tr>
<td>YM-04113</td>
<td>This tool is used to rebore the new valve guides.</td>
<td></td>
</tr>
<tr>
<td>90890-06754</td>
<td>Ignition checker</td>
<td></td>
</tr>
<tr>
<td>YM-34487</td>
<td>This instrument is necessary for checking the ignition system components.</td>
<td></td>
</tr>
<tr>
<td>90890-85505</td>
<td>Yamaha bond NO.1215</td>
<td></td>
</tr>
<tr>
<td>ACC-11001-05-01</td>
<td>This sealant (bond) is used on crankcase mating surfaces, etc.</td>
<td></td>
</tr>
</tbody>
</table>
CHAPTER 2
SPECIFICATIONS

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### GENERAL SPECIFICATIONS

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<thead>
<tr>
<th>Item</th>
<th>Standard</th>
<th>Limit</th>
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</thead>
<tbody>
<tr>
<td><strong>Model code</strong></td>
<td>3D11 (for USA)</td>
<td>...</td>
</tr>
<tr>
<td></td>
<td>3D12 (for CAN)</td>
<td>...</td>
</tr>
<tr>
<td><strong>Dimensions</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall length</td>
<td>1665 mm (65.6in)</td>
<td>...</td>
</tr>
<tr>
<td>Overall width</td>
<td>630 mm (24.8in)</td>
<td>...</td>
</tr>
<tr>
<td>Overall height</td>
<td>1005 mm (39.6in)</td>
<td>...</td>
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<tr>
<td>Seat height</td>
<td>715 mm (28.2in)</td>
<td>...</td>
</tr>
<tr>
<td>Wheelbase</td>
<td>1160 mm (45.7in)</td>
<td>...</td>
</tr>
<tr>
<td>Ground clearance</td>
<td>85 mm (3.4in)</td>
<td>...</td>
</tr>
<tr>
<td>Minimum turning radius</td>
<td>1800mm (70.9in)</td>
<td>...</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wet (without oil and a full fuel tank)</td>
<td>81 kg (179lb)</td>
<td>...</td>
</tr>
<tr>
<td>Dry (without oil and fuel)</td>
<td>76kg (168lb)</td>
<td>...</td>
</tr>
<tr>
<td>Maximum load (total of cargo, rider, and accessories)</td>
<td>77kg (170lb)</td>
<td>...</td>
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## ENGINE SPECIFICATIONS

<table>
<thead>
<tr>
<th>Item</th>
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<tbody>
<tr>
<td><strong>Engine</strong></td>
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<td></td>
</tr>
<tr>
<td>Engine type</td>
<td>Liquid-cooled, 4-stroke, SOHC</td>
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</tr>
<tr>
<td>Displacement</td>
<td>0.049L(49cm³)</td>
<td>...</td>
</tr>
<tr>
<td>Cylinder arrangement</td>
<td>Forward inclined single cylinder</td>
<td>...</td>
</tr>
<tr>
<td>Bore × stroke</td>
<td>38.0 × 43.5 mm</td>
<td>...</td>
</tr>
<tr>
<td>Compression ratio</td>
<td>12:1</td>
<td>...</td>
</tr>
<tr>
<td>Engine idle speed</td>
<td>2000~2400 r/min</td>
<td>...</td>
</tr>
<tr>
<td>Vacuum pressure at engine idle speed (AI OFF)</td>
<td>34.7 kpa (260 mmHg)</td>
<td>...</td>
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<tr>
<td>Standard compression pressure (at sea level)</td>
<td>1450 kPa (14.5kgf/cm²) at 700 r/min</td>
<td>...</td>
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<tr>
<td><strong>Fuel</strong></td>
<td></td>
<td></td>
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<tr>
<td>Recommended fuel</td>
<td>Regular unleaded gasoline</td>
<td>...</td>
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<tr>
<td>Fuel tank capacity</td>
<td>4.5L (0.98 Imp gal, 1.18 US gal)</td>
<td>...</td>
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<tr>
<td><strong>Engine oil</strong></td>
<td></td>
<td></td>
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<tr>
<td>Lubrication system</td>
<td>Wet sump</td>
<td>...</td>
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<tr>
<td>Recommended oil</td>
<td>SAE10W-40, 20W-50 YAMALUBE 4</td>
<td>...</td>
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<tr>
<td>-20° -10° 0° 10° 20° 30° 40° 50°</td>
<td>SAE10W-30 SAE10W-40 SAE 20W-40 SAE 20W-50</td>
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<tr>
<td>Quantity</td>
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<td></td>
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<tr>
<td>Periodic oil change</td>
<td>0.73<del>0.83 L (0.67</del>0.76 Imp qt, 0.80~0.90 US qt)</td>
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<tr>
<td>Total amount</td>
<td>0.8<del>0.9L (0.74</del>0.83 Imp qt, 0.87~0.98 US qt)</td>
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<td><strong>Final gear oil</strong></td>
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<tr>
<td>Recommended oil</td>
<td>SAE10W-30 SE motor oil</td>
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<tr>
<td>Periodic oil change</td>
<td>0.09<del>0.11L (0.08</del>0.10 Imp qt, 0.10~0.12 US qt)</td>
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<tr>
<td>Total amount</td>
<td>0.11<del>0.13L (0.10</del>0.12 Imp qt, 0.12~0.14 US qt)</td>
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## ENGINE SPECIFICATIONS

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<thead>
<tr>
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<tr>
<td><strong>Oil filter</strong></td>
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<tr>
<td><strong>Oil pump</strong></td>
<td></td>
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<tr>
<td>Oil pump type</td>
<td>Trochoid</td>
<td>...</td>
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<tr>
<td>Inner rotor to outer rotor tip clearance</td>
<td>0.15 mm or less</td>
<td>0.23mm</td>
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<tr>
<td>Outer rotor to pump housing clearance</td>
<td>0.13-0.18 mm</td>
<td>0.25mm</td>
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<tr>
<td>Oil pump housing to inner rotor and outer rotor clearance</td>
<td>0.07-0.12 mm</td>
<td>0.19mm</td>
</tr>
<tr>
<td><strong>Cooling system</strong></td>
<td></td>
<td></td>
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<tr>
<td>Radiator capacity</td>
<td>0.26L</td>
<td>...</td>
</tr>
<tr>
<td>Radiator cap opening pressure</td>
<td>93.3~122.7 kpa</td>
<td>...</td>
</tr>
<tr>
<td></td>
<td>(0.95<del>1.25kgf/cm², 13.53</del>17.79 psi)</td>
<td></td>
</tr>
<tr>
<td>Valve relief pressure</td>
<td>1.1kpa (0.01kgf/cm², 0.16 psi)</td>
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<tr>
<td>Radiator core</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Width</td>
<td>133.3mm</td>
<td>...</td>
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<tr>
<td>Height</td>
<td>87mm</td>
<td>...</td>
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<tr>
<td>Depth</td>
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<tr>
<td>Coolant reservoir</td>
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<td></td>
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<tr>
<td>Capacity</td>
<td>0.26L</td>
<td>...</td>
</tr>
<tr>
<td>&lt;From low to full lever&gt;</td>
<td>0.15L</td>
<td>...</td>
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<td>Water pump</td>
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<td>Water pump type</td>
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<td>Max. impeller shaft tilt</td>
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<tr>
<td><strong>Starting system type</strong></td>
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<td><strong>Spark plug</strong></td>
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<tr>
<td>Model (manufacturer) × quantity</td>
<td>CR7E (NGK) × 1</td>
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<td>Spark plug gap</td>
<td>0.7~0.8mm</td>
<td>...</td>
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<tr>
<td><strong>Cylinder head</strong></td>
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<td></td>
</tr>
<tr>
<td>Volume</td>
<td>3.1~3.5cm³</td>
<td>...</td>
</tr>
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<td>Max. warpage</td>
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![Diagram of engine parts]
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<thead>
<tr>
<th>Item</th>
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<tr>
<td>Camshaft</td>
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<tr>
<td>Drive system</td>
<td>Chain drive (left)</td>
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<tr>
<td>Intake camshaft lobe dimensions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measurement A</td>
<td>30.158~30.258 mm</td>
<td>30.058 mm</td>
</tr>
<tr>
<td>Measurement B</td>
<td>25.082~25.182 mm</td>
<td>24.982 mm</td>
</tr>
<tr>
<td>Measurement C</td>
<td>5.2077 mm</td>
<td>...</td>
</tr>
<tr>
<td>Exhaust camshaft lobe dimensions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measurement A</td>
<td>30.158~30.258 mm</td>
<td>30.058 mm</td>
</tr>
<tr>
<td>Measurement B</td>
<td>25.020~25.120 mm</td>
<td>24.920 mm</td>
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<tr>
<td>Measurement C</td>
<td>5.2077 mm</td>
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</tr>
<tr>
<td>Max. camshaft runout</td>
<td>...</td>
<td>0.03 mm</td>
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## ENGINE SPECIFICATIONS

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<thead>
<tr>
<th>Item</th>
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<tbody>
<tr>
<td><strong>Timing chain</strong></td>
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<tr>
<td>Model/number of links</td>
<td>Morse 92RH2005 / 82</td>
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<tr>
<td>Tensioning system</td>
<td>Automatic</td>
<td>...</td>
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<tr>
<td><strong>Valve, valve seats, valve guides</strong></td>
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<tr>
<td>Valve clearance (cold)</td>
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<tr>
<td>Intake</td>
<td>0.10~0.16 mm</td>
<td>...</td>
</tr>
<tr>
<td>Exhaust</td>
<td>0.18~0.24 mm</td>
<td>...</td>
</tr>
<tr>
<td>Valve dimensions</td>
<td></td>
<td></td>
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<tr>
<td>Head Diameter</td>
<td></td>
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</tr>
<tr>
<td>Face Width</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seat Width</td>
<td></td>
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<tr>
<td>Margin Thickness</td>
<td></td>
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<tr>
<td>Valve head diameter A</td>
<td>15.4~15.6 mm</td>
<td>...</td>
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<tr>
<td>Exhaust</td>
<td>16.4~16.6 mm</td>
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<tr>
<td>Valve face width B</td>
<td>1.48~2.19 mm</td>
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</tr>
<tr>
<td>Intake</td>
<td>1.48~2.19 mm</td>
<td>...</td>
</tr>
<tr>
<td>Exhaust</td>
<td>1.48~2.19 mm</td>
<td>...</td>
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<tr>
<td>Valve seat width C</td>
<td>0.9~1.1 mm 1.6mm</td>
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<tr>
<td>Intake</td>
<td>0.9~1.1 mm</td>
<td>1.6mm</td>
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<tr>
<td>Exhaust</td>
<td>0.9~1.1 mm</td>
<td>1.6mm</td>
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<tr>
<td>Valve margin thickness D</td>
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<tr>
<td>Intake</td>
<td>0.7 mm</td>
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<tr>
<td>Exhaust</td>
<td>0.7 mm</td>
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<tr>
<td>Valve stem diameter</td>
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<td>3.975~3.990 mm</td>
<td>3.945 mm</td>
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<tr>
<td>Exhaust</td>
<td>3.960~3.975 mm</td>
<td>3.930 mm</td>
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<td>Valve guide inside diameter</td>
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<tr>
<td>Intake</td>
<td>4.000~4.012 mm</td>
<td>4.050 mm</td>
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<tr>
<td>Exhaust</td>
<td>4.000~4.012 mm</td>
<td>4.050 mm</td>
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<td>Valve stem to valve guide clearance</td>
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<tr>
<td>Intake</td>
<td>0.010~0.037 mm</td>
<td>0.080 mm</td>
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<tr>
<td>Exhaust</td>
<td>0.025~0.052 mm</td>
<td>0.100 mm</td>
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<tr>
<td>Valve stem runout</td>
<td>...</td>
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<tr>
<td>Valve seat width</td>
<td>0.9~1.1 mm</td>
<td>1.6mm</td>
</tr>
<tr>
<td>Intake</td>
<td>0.9~1.1 mm</td>
<td>1.6mm</td>
</tr>
<tr>
<td>Exhaust</td>
<td>0.9~1.1 mm</td>
<td>1.6mm</td>
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## Valve springs

<table>
<thead>
<tr>
<th>Item</th>
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<th>Limit</th>
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<tbody>
<tr>
<td>Intake</td>
<td>39.35 mm</td>
<td>37.38 mm</td>
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<tr>
<td>Exhaust</td>
<td>41.57 mm</td>
<td>39.49 mm</td>
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<tr>
<td>Installed length (valve closed)</td>
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<tr>
<td>Intake</td>
<td>28.0 mm</td>
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<tr>
<td>Exhaust</td>
<td>30.0 mm</td>
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<tr>
<td>Compressed spring force (installed)</td>
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<tr>
<td>Intake</td>
<td>91.1<del>104.9N(9.3</del>10.7kg)</td>
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<tr>
<td>Exhaust</td>
<td>107.9<del>124.1N(11.0</del>12.7kg)</td>
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<tr>
<td>Spring tilt</td>
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<td></td>
</tr>
<tr>
<td>Intake</td>
<td></td>
<td>2.5 °/1.7 mm</td>
</tr>
<tr>
<td>Exhaust</td>
<td></td>
<td>2.5 °/1.8 mm</td>
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<tr>
<td>Winding direction (top view)</td>
<td></td>
<td></td>
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<tr>
<td>Intake</td>
<td>Clockwise</td>
<td></td>
</tr>
<tr>
<td>Exhaust</td>
<td>Clockwise</td>
<td></td>
</tr>
<tr>
<td>Valve seat reformed</td>
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## Cylinder

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<thead>
<tr>
<th>Item</th>
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<tbody>
<tr>
<td>Cylinder arrangement</td>
<td>Forward inclined</td>
<td></td>
</tr>
<tr>
<td>Bore × stroke</td>
<td>38.0 × 43.5 mm</td>
<td></td>
</tr>
<tr>
<td>Compression ratio</td>
<td>12:1</td>
<td></td>
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<tr>
<td>Bore</td>
<td>38.000~38.010 mm</td>
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<tr>
<td>Max. taper</td>
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<tr>
<td>Max. out-of-round</td>
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<td>0.05 mm</td>
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## ENGINE SPECIFICATIONS

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<thead>
<tr>
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<tr>
<td><strong>Piston</strong></td>
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<tr>
<td>Piston-to-cylinder clearance</td>
<td>0.010~0.035 mm</td>
<td>0.150 mm</td>
</tr>
<tr>
<td>Diameter D</td>
<td>37.975~37.990 mm</td>
<td>...</td>
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<tr>
<td>Height H</td>
<td>5.0 mm</td>
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<tr>
<td>Piston pin bore (in the piston)</td>
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<tr>
<td>Diameter</td>
<td>10.002~10.013 mm</td>
<td>10.043 mm</td>
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<tr>
<td>Offset</td>
<td>0.35~0.65 mm</td>
<td>...</td>
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<tr>
<td>Offset direction</td>
<td>Intake side</td>
<td>...</td>
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<td>Piston pin</td>
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<td></td>
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<tr>
<td>Outside diameter</td>
<td>9.996~10.000 mm</td>
<td>9.976 mm</td>
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<td>Piston rings</td>
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<td>Top ring</td>
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<tr>
<td>Ring type</td>
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<tr>
<td>Dimensions (B × T)</td>
<td>0.8 × 1.65mm</td>
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<tr>
<td>End gap (installed)</td>
<td>0.05~0.15 mm</td>
<td>0.40 mm</td>
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<tr>
<td>Ring side clearance</td>
<td>0.02~0.08 mm</td>
<td>0.13 mm</td>
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<tr>
<td>2nd ring</td>
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</tr>
<tr>
<td>Ring type</td>
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<tr>
<td>Dimensions (B × T)</td>
<td>0.8 × 1.5mm</td>
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<tr>
<td>End gap (installed)</td>
<td>0.05~0.17 mm</td>
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<td>Ring side clearance</td>
<td>0.02~0.06 mm</td>
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<td>Oil ring</td>
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<td>Dimensions (B × T)</td>
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</tr>
<tr>
<td>End gap (installed)</td>
<td>0.2~0.7 mm</td>
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<tr>
<td>Ring side clearance</td>
<td>0.03~0.15 mm</td>
<td>...</td>
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<tr>
<td>Item</td>
<td>Standard</td>
<td>Limit</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>-------------------</td>
<td>-------</td>
</tr>
<tr>
<td><strong>Rocker arm/rocker arm shaft</strong></td>
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</tr>
<tr>
<td>Rocker arm inside diameter</td>
<td>10.000~10.015mm</td>
<td>...</td>
</tr>
<tr>
<td>Rocker arm shaft outside diameter</td>
<td>9.981~9.991 mm</td>
<td>...</td>
</tr>
<tr>
<td>Arm-to-shaft clearance</td>
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<td><strong>Connecting rod</strong></td>
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<tr>
<td>Connecting rod length</td>
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<tr>
<td>Small end inside diameter</td>
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<td><strong>Crankshaft</strong></td>
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<tr>
<td>Width A</td>
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<td>Max. runout C</td>
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<td>Big end side clearance D</td>
<td>0.15~0.45 mm</td>
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<td>Big end radial clearance E</td>
<td>0~0.010mm</td>
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<td>---------------------------</td>
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<td><strong>Clutch</strong></td>
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<td>Clutch-stall revolution</td>
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<tr>
<td>Main air jet</td>
<td>#80</td>
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<td>Slow air jet</td>
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<td>Slow jet</td>
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<td>Bypass 3</td>
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<td>Fuel level (using fuel level gauge)</td>
<td>6.6~7.6mm</td>
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<td>Engine idle speed</td>
<td>2000~2400 r/min</td>
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<td>CO% (air induction system ON)</td>
<td>Less than 3.5%</td>
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<td>CO% (air induction system OFF)</td>
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<td>Oil temperature (°C)</td>
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## CHASSIS SPECIFICATIONS

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<td>Rim</td>
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<tr>
<td>Size</td>
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<tr>
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<tr>
<td>Rim</td>
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<tr>
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<td>0~55 kg</td>
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<tr>
<td>55~158 kg</td>
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<td>55~158 kg</td>
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<td>Min. tire tread depth</td>
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<td>Item</td>
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<td>Limit</td>
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<td><strong>Front brake</strong></td>
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<td>Brake lever free play (at lever end)</td>
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<td>Brake drum inside diameter</td>
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<tr>
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<tr>
<td>Brake type</td>
<td>Drum brake</td>
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<tr>
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<tr>
<td>Brake lever free play (at lever end)</td>
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<td>Brake drum inside diameter</td>
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<td>Lining thickness</td>
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<td>Suspension type</td>
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<td>Front fork type</td>
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<td>Spring rate (K1)</td>
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<td>Spring stroke (K3)</td>
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## ELECTRICAL SPECIFICATIONS

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<tr>
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<td>Advancer type</td>
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<td>Pickup coil resistance /color</td>
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<td>C.D.I. unit model (manufacturer)</td>
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<td><strong>Ignition coil</strong></td>
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<td>Minimum ignition spark gap</td>
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<td>Secondary coil resistance</td>
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<td>12 V 1.7 W × 1</td>
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<td>Water temperature indicator light</td>
<td>14 V 3.0 W × 1</td>
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## ELECTRICAL SPECIFICATIONS

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<td><strong>Bulbs (voltage/wattage × quantity)</strong></td>
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<td>Tail/brake light</td>
<td>12 V 5W/21 W × 1</td>
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<td>12 V 10 W × 2</td>
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<td>Rear turn signal light</td>
<td>12 V 10 W × 2</td>
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<tr>
<td>Speedometer lighting</td>
<td>12 V 1.7 W × 2</td>
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</tr>
<tr>
<td>Model (manufacturer)</td>
<td>5STF (T-MORIC)</td>
<td>...</td>
</tr>
<tr>
<td>Suction voltage</td>
<td>12V</td>
<td>...</td>
</tr>
<tr>
<td>Power output</td>
<td>0.25 kW</td>
<td>...</td>
</tr>
<tr>
<td>Brushes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall length</td>
<td>7.0 mm</td>
<td>3.5mm</td>
</tr>
<tr>
<td>Quantity</td>
<td>2</td>
<td>...</td>
</tr>
<tr>
<td>Spring force</td>
<td>3.92–5.88 N</td>
<td>...</td>
</tr>
<tr>
<td>Commutator diameter</td>
<td>17.6 mm</td>
<td>16.6mm</td>
</tr>
<tr>
<td>Commutator resistance</td>
<td>0.0378–0.0462 Ω at 20 °C</td>
<td>...</td>
</tr>
<tr>
<td>Mica undercut (depth)</td>
<td>1.35 mm</td>
<td>...</td>
</tr>
<tr>
<td><strong>Starter relay</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model (manufacturer)</td>
<td>5WC 00 (OMRON)</td>
<td>...</td>
</tr>
<tr>
<td>Amperage</td>
<td>50 A</td>
<td>...</td>
</tr>
<tr>
<td>Coil resistance</td>
<td>90–110 Ω</td>
<td>...</td>
</tr>
<tr>
<td>Suction voltage</td>
<td>More than DC10V</td>
<td>...</td>
</tr>
<tr>
<td><strong>Horn</strong></td>
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<tr>
<td>Horn type</td>
<td>Plane</td>
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<tr>
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<td>AH-368 (SAKURA)</td>
<td>...</td>
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<tr>
<td>Max. amperage</td>
<td>1.5 A</td>
<td>...</td>
</tr>
<tr>
<td>Performance</td>
<td>98–108db/2m</td>
<td>...</td>
</tr>
<tr>
<td>Coil resistance</td>
<td>4.05–4.55Ω</td>
<td>...</td>
</tr>
<tr>
<td><strong>Turn signal relay</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Relay type</td>
<td>Full transistor</td>
<td>...</td>
</tr>
<tr>
<td>Model (manufacturer)</td>
<td>5CA9 (TA YOUNG)</td>
<td>...</td>
</tr>
<tr>
<td>Self-cancelling device built-in</td>
<td>NO</td>
<td>...</td>
</tr>
<tr>
<td>Turn signal blinking frequency</td>
<td>75–95 cycles/min</td>
<td>...</td>
</tr>
<tr>
<td>Wattage</td>
<td>10 W × 2 + 1.7 W + AP</td>
<td>...</td>
</tr>
<tr>
<td><strong>Fuel sender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model (manufacturer)</td>
<td>5ST1 (CHAO LONG)</td>
<td>...</td>
</tr>
<tr>
<td>Sender unit resistance-full</td>
<td>6–8 Ω</td>
<td>...</td>
</tr>
<tr>
<td>Sender unit resistance-empty</td>
<td>93.5–96.5 Ω</td>
<td>...</td>
</tr>
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<td><strong>Head light relay</strong></td>
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</tr>
<tr>
<td>Model (manufacturer)</td>
<td>5EB 10 (OMRON)</td>
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<tr>
<td>Coil resistance</td>
<td>90–110 Ω</td>
<td>...</td>
</tr>
<tr>
<td>Diode</td>
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## ELECTRICAL SPECIFICATIONS

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<tr>
<th>Item</th>
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<tr>
<td><strong>Throttle position sensor</strong></td>
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<tr>
<td>Output voltage (throttle opens)</td>
<td>2.8–3.4V</td>
<td>...</td>
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<tr>
<td>Output voltage (throttle closes)</td>
<td>0.625–0.775V</td>
<td>...</td>
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<tr>
<td><strong>Radiator fan</strong></td>
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<td></td>
</tr>
<tr>
<td>Model (manufacturer)</td>
<td>5ST-00 (LUNTAI)</td>
<td>...</td>
</tr>
<tr>
<td>Running rpm</td>
<td>10000 r/min</td>
<td>...</td>
</tr>
<tr>
<td><strong>Thermostat switch</strong></td>
<td></td>
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<tr>
<td>Model (manufacturer)</td>
<td>5ST (NIPPON THERMOSTAT)</td>
<td>...</td>
</tr>
<tr>
<td><strong>Thermo unit</strong></td>
<td></td>
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<tr>
<td>Model (manufacturer)</td>
<td>5JJ (NIPPON THERMOSTAT)</td>
<td>...</td>
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<tr>
<td>Coil resistance at 80 °C</td>
<td>3.413–4.006 kΩ</td>
<td>...</td>
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<tr>
<td>Coil resistance at 105 °C</td>
<td>1.645–1.855 kΩ</td>
<td>...</td>
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<tr>
<td><strong>Fuse (amperage × quantity)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Main fuse</td>
<td>7.5A × 1</td>
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</tr>
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</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.

** Metric Multiplier IMPERIAL

<table>
<thead>
<tr>
<th>** mm</th>
<th>0.03937</th>
<th>** in</th>
</tr>
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<tbody>
<tr>
<td>2 mm</td>
<td>0.03937</td>
<td>0.08 in</td>
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**CONVERSION TABLE**

<table>
<thead>
<tr>
<th>METRIC TO IMPERIAL</th>
<th>Metric unit</th>
<th>Multiplier</th>
<th>Imperial unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tightening torque</td>
<td>m·kg</td>
<td>7.233</td>
<td>ft·lb</td>
</tr>
<tr>
<td></td>
<td>m·kg</td>
<td>86.794</td>
<td>in·lb</td>
</tr>
<tr>
<td></td>
<td>cm·kg</td>
<td>0.0723</td>
<td>ft·lb</td>
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<tr>
<td></td>
<td>cm·kg</td>
<td>0.8679</td>
<td>in·lb</td>
</tr>
<tr>
<td>Weight</td>
<td>kg</td>
<td>2.205</td>
<td>lb</td>
</tr>
<tr>
<td></td>
<td>g</td>
<td>0.03527</td>
<td>oz</td>
</tr>
<tr>
<td>Speed</td>
<td>km/hr</td>
<td>0.6214</td>
<td>mph</td>
</tr>
<tr>
<td>Distance</td>
<td>km</td>
<td>0.6214</td>
<td>mi</td>
</tr>
<tr>
<td></td>
<td>m</td>
<td>3.281</td>
<td>ft</td>
</tr>
<tr>
<td></td>
<td>cm</td>
<td>1.094</td>
<td>yd</td>
</tr>
<tr>
<td></td>
<td>mm</td>
<td>0.3937</td>
<td>in</td>
</tr>
<tr>
<td>Volume/Capacity</td>
<td>cc (cm³)</td>
<td>0.03527</td>
<td>oz (IMP liq.)</td>
</tr>
<tr>
<td></td>
<td>cc (cm³)</td>
<td>0.06102</td>
<td>cu-in</td>
</tr>
<tr>
<td></td>
<td>lt (liter)</td>
<td>0.8799</td>
<td>gal (IMP liq.)</td>
</tr>
<tr>
<td></td>
<td>lt (liter)</td>
<td>0.2199</td>
<td></td>
</tr>
<tr>
<td>Misc.</td>
<td>kg/mm</td>
<td>55.997</td>
<td>lb/in</td>
</tr>
<tr>
<td></td>
<td>kg/cm²</td>
<td>14.2234</td>
<td>psi</td>
</tr>
<tr>
<td></td>
<td>Centigrade (°C)</td>
<td>9/5+32</td>
<td>Fahrenheit (°F)</td>
</tr>
<tr>
<td></td>
<td>oz (IMP liq.)</td>
<td>0.03527</td>
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<tr>
<td></td>
<td>cu-in</td>
<td>0.06102</td>
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<td></td>
<td>gal (IMP liq.)</td>
<td>0.8799</td>
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</tr>
<tr>
<td></td>
<td>lb/in</td>
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<tr>
<td></td>
<td>psi</td>
<td>9/5+32</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fahrenheit (°F)</td>
<td>55.997</td>
<td></td>
</tr>
</tbody>
</table>

**GENERAL TIGHTENING TORQUE SPECIFICATIONS**

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 crisscross 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.

A: Width across flats
B: Thread diameter

<table>
<thead>
<tr>
<th>A (nut)</th>
<th>B (bolt)</th>
<th>General tightening torques</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nm</td>
<td>m·kg</td>
<td>ft·lb</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>
</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></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cylinder head and cylinder</td>
<td>Nut</td>
<td>M6</td>
</tr>
<tr>
<td>Spark plug</td>
<td>-</td>
<td>M10</td>
</tr>
<tr>
<td>Cylinder head(timing chain side)</td>
<td>Bolt</td>
<td>M6</td>
</tr>
<tr>
<td>Exhaust pipe stud bolt</td>
<td>-</td>
<td>M8</td>
</tr>
<tr>
<td>Cylinder head cover</td>
<td>Nut</td>
<td>M6</td>
</tr>
<tr>
<td>Oil check bolt</td>
<td>-</td>
<td>M6</td>
</tr>
<tr>
<td>Water pump housing cover</td>
<td>Bolt</td>
<td>M6</td>
</tr>
<tr>
<td>Water pump assembly</td>
<td>Bolt</td>
<td>M6</td>
</tr>
<tr>
<td>Guide stopper2</td>
<td>Bolt</td>
<td>M6</td>
</tr>
<tr>
<td>Thermostat housing air bleed bolt</td>
<td>-</td>
<td>M6</td>
</tr>
<tr>
<td>Camshaft sprocket</td>
<td>Bolt</td>
<td>M8</td>
</tr>
<tr>
<td>Timing chain tensioner (body)</td>
<td>Bolt</td>
<td>M6</td>
</tr>
<tr>
<td>Timing chain tensioner (plug)</td>
<td>plug</td>
<td>M8</td>
</tr>
<tr>
<td>Thermostat housing</td>
<td>Bolt</td>
<td>M6</td>
</tr>
<tr>
<td>Fan case</td>
<td>Bolt</td>
<td>M6</td>
</tr>
<tr>
<td>Fan</td>
<td>Bolt</td>
<td>M6</td>
</tr>
<tr>
<td>Oil pump assembly</td>
<td>Bolt</td>
<td>M5</td>
</tr>
<tr>
<td>Radiator drain bolt</td>
<td>-</td>
<td>M12</td>
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<tr>
<td>Manifold</td>
<td>Bolt</td>
<td>M6</td>
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<tr>
<td>Air filter assembly</td>
<td>Bolt</td>
<td>M6</td>
</tr>
<tr>
<td>Engine oil drain plug</td>
<td>-</td>
<td>M35</td>
</tr>
<tr>
<td>Air cut-off valve</td>
<td>Bolt</td>
<td>M6</td>
</tr>
<tr>
<td>Muffler</td>
<td>Bolt</td>
<td>M8</td>
</tr>
<tr>
<td>Oil guide</td>
<td>Nult</td>
<td>M6</td>
</tr>
<tr>
<td>Muffler</td>
<td>Nult</td>
<td>M8</td>
</tr>
<tr>
<td>Protector</td>
<td>Screw</td>
<td>M6</td>
</tr>
<tr>
<td>Crankcase(left and right)</td>
<td>Bolt</td>
<td>M6</td>
</tr>
<tr>
<td>Transmission cover</td>
<td>Bolt</td>
<td>M6</td>
</tr>
<tr>
<td>Drain bolt(transmission oil)</td>
<td>Bolt</td>
<td>M6</td>
</tr>
<tr>
<td>Cover1(starter clutch)</td>
<td>Bolt</td>
<td>M6</td>
</tr>
<tr>
<td>Crankcase cover(left)</td>
<td>Bolt</td>
<td>M6</td>
</tr>
<tr>
<td>Hold lead plate bolt</td>
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<td>M6</td>
</tr>
<tr>
<td>Drain bolt(engine oil)</td>
<td>-</td>
<td>M8</td>
</tr>
<tr>
<td>Rear wheel lock nut</td>
<td>-</td>
<td>M8</td>
</tr>
<tr>
<td>Drain bolt(transmission oil fill bolt)</td>
<td>-</td>
<td>M8</td>
</tr>
<tr>
<td>Air filter</td>
<td>Bolt</td>
<td>M6</td>
</tr>
<tr>
<td>Rear wheel lock cover</td>
<td>Bolt</td>
<td>M6</td>
</tr>
<tr>
<td>Plate</td>
<td>Bolt</td>
<td>M6</td>
</tr>
<tr>
<td>Kickstarter</td>
<td>Bolt</td>
<td>M6</td>
</tr>
<tr>
<td>Starter clutch</td>
<td>Nut</td>
<td>M22</td>
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## Cylinder head tightening sequence

<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>
</tr>
</thead>
<tbody>
<tr>
<td>Clutch housing</td>
<td>Nut</td>
<td>M10</td>
<td>1</td>
<td>40</td>
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<tr>
<td>Ignition coil</td>
<td>Bolt</td>
<td>M5</td>
<td>1</td>
<td>8</td>
<td>0.8</td>
</tr>
<tr>
<td>Thermo unit</td>
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<td>PT1/8</td>
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<td>0.8</td>
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<tr>
<td>Primary fixed sheave</td>
<td>Nut</td>
<td>M10</td>
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<td>Starter motor assembly</td>
<td>Bolt</td>
<td>M6</td>
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<td>13</td>
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<tr>
<td>AC magneto rotor</td>
<td>Nut</td>
<td>M12</td>
<td>1</td>
<td>43</td>
<td>4.3</td>
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<tr>
<td>Stator coil</td>
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<td>2</td>
<td>4</td>
<td>0.4</td>
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<tr>
<td>Pickup coil</td>
<td>Screw</td>
<td>M6</td>
<td>2</td>
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## TIGHTENING TORQUES

### CHASSIS

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<thead>
<tr>
<th>Part to be tightened</th>
<th>Thread size</th>
<th>Tightening torque</th>
<th>Remarks</th>
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<tbody>
<tr>
<td>Frame and engine bracket 3</td>
<td>M10</td>
<td>46</td>
<td>4.6</td>
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<tr>
<td>Engine bracket 3 and engine</td>
<td>M10</td>
<td>58</td>
<td>5.8</td>
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<tr>
<td>Handlebar and steering shaft</td>
<td>M10</td>
<td>60</td>
<td>6.0</td>
</tr>
<tr>
<td>Front fork and lower bracket</td>
<td>M10</td>
<td>30</td>
<td>3.0</td>
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<tr>
<td>Seat lock assembly</td>
<td>M6</td>
<td>12</td>
<td>1.2</td>
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<tr>
<td>Rear carrier(front)</td>
<td>M6</td>
<td>10</td>
<td>1.0</td>
</tr>
<tr>
<td>Rear carrier(rear)</td>
<td>M8</td>
<td>23</td>
<td>2.3</td>
</tr>
<tr>
<td>Steering shaft and upper bearing inner race</td>
<td>BC</td>
<td>7</td>
<td>0.7</td>
</tr>
<tr>
<td>Steering shaft and ring nut</td>
<td>BC1</td>
<td>30</td>
<td>3.0</td>
</tr>
<tr>
<td>Trunk</td>
<td>M6</td>
<td>12</td>
<td>1.2</td>
</tr>
<tr>
<td>Footrest board</td>
<td>M6</td>
<td>4</td>
<td>0.4</td>
</tr>
<tr>
<td>Fuel sender</td>
<td>M5</td>
<td>3</td>
<td>0.3</td>
</tr>
<tr>
<td>Resin part and resin cover</td>
<td>About M5</td>
<td>1.5</td>
<td>0.15</td>
</tr>
<tr>
<td>Seat lock adjuster</td>
<td>M6</td>
<td>2</td>
<td>0.2</td>
</tr>
<tr>
<td>Main switch and frame</td>
<td>M6</td>
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<tr>
<td>Front brake camshaft lever</td>
<td>M6</td>
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<td>0.8</td>
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<tr>
<td>Front wheel shaft</td>
<td>M10</td>
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<tr>
<td>Rear wheel shaft</td>
<td>M14</td>
<td>104</td>
<td>10.4</td>
</tr>
<tr>
<td>Rear brake camshaft lever</td>
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<td>7</td>
<td>0.7</td>
</tr>
<tr>
<td>Rear brake pin pivot</td>
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<td>16</td>
<td>1.6</td>
</tr>
<tr>
<td>Speedometer cable</td>
<td>M12</td>
<td>3</td>
<td>0.3</td>
</tr>
<tr>
<td>Rear shock absorber and frame</td>
<td>M10</td>
<td>30</td>
<td>3.0</td>
</tr>
<tr>
<td>Rear shock absorber and engine</td>
<td>M8</td>
<td>16</td>
<td>1.6</td>
</tr>
</tbody>
</table>

### NOTE:

1. First, tighten the upper bearing inner race approximately 7Nm(0.7m·kg, 5.1ft·lb) by using the torque wrench and check turn steering shaft smoothly.
2. Second, hold the upper bearing inner race and tighten the ring nut 30Nm(3.0m·kg, 21.7ft·lb) by using the torque wrench.
3. Final, installing the ball race cover.

---

1. Upper bearing inner race
2. Ring nut
3. Ball race cover

![Diagram of upper bearing inner race and related parts]
<table>
<thead>
<tr>
<th>Lubrication Point</th>
<th>Lubricant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil seal lips</td>
<td></td>
</tr>
<tr>
<td>O-rings (Except V-belt drive unit)</td>
<td></td>
</tr>
<tr>
<td>Cylinder head tightening nut mounting surface</td>
<td>4</td>
</tr>
<tr>
<td>Cylinder head stud bolt thread</td>
<td>4</td>
</tr>
<tr>
<td>Cylinder head gasket dowel pin</td>
<td>4</td>
</tr>
<tr>
<td>Crankshaft pin outside surface</td>
<td>4</td>
</tr>
<tr>
<td>Connecting rod</td>
<td></td>
</tr>
<tr>
<td>Piston outside and ring groove</td>
<td>4</td>
</tr>
<tr>
<td>Piston pin outside surface</td>
<td>4</td>
</tr>
<tr>
<td>surface and bolt thread</td>
<td>4</td>
</tr>
<tr>
<td>Crankshaft journal</td>
<td>4</td>
</tr>
<tr>
<td>Piston (balancer) outside surface</td>
<td>4</td>
</tr>
<tr>
<td>Piston pin (balancer) outside surface</td>
<td>4</td>
</tr>
<tr>
<td>Camshaft lobe</td>
<td></td>
</tr>
<tr>
<td>Camshaft profile journal</td>
<td></td>
</tr>
<tr>
<td>Valve stems (intake and exhaust)</td>
<td></td>
</tr>
<tr>
<td>Valve stem seals(intake and exhaust)</td>
<td></td>
</tr>
<tr>
<td>Valve pads(intake and exhaust)</td>
<td></td>
</tr>
<tr>
<td>Valve stem ends (intake and exhaust)</td>
<td></td>
</tr>
<tr>
<td>Oil pump assembly inside surface</td>
<td></td>
</tr>
<tr>
<td>Oil pipe union bolt thread and surface</td>
<td></td>
</tr>
<tr>
<td>Starter clutch pin and weight</td>
<td></td>
</tr>
<tr>
<td>Idle gear 1 thrust surface</td>
<td>4</td>
</tr>
<tr>
<td>Idle gear 2</td>
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</tr>
<tr>
<td>Main and drive axle serration (sprocket)</td>
<td></td>
</tr>
<tr>
<td>Drive axle taper roller bearing</td>
<td></td>
</tr>
<tr>
<td>Transmission bearing</td>
<td></td>
</tr>
<tr>
<td>Lubrication Point</td>
<td>Lubricant</td>
</tr>
<tr>
<td>------------------------------------------</td>
<td>---------------------------</td>
</tr>
<tr>
<td>Secondary fixed sheave inner surface</td>
<td>BEL-RAY assembly lube®</td>
</tr>
<tr>
<td>Secondary sliding sheave torque cam ditch</td>
<td>BEL-RAY assembly lube®</td>
</tr>
<tr>
<td>Crankcase mating surfaces</td>
<td>Sealant</td>
</tr>
</tbody>
</table>
## LUBRICATION POINTS AND LUBRICANT TYPES

**CHASSIS**

<table>
<thead>
<tr>
<th>Lubrication Point</th>
<th>Lubricant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Front wheel oil seal lips</td>
<td>![Lubricant Icon]</td>
</tr>
<tr>
<td>Steering bearing and bearing races (upper and lower)</td>
<td>![Lubricant Icon]</td>
</tr>
<tr>
<td>Frame head pipe dust seal lips (lower)</td>
<td>![Lubricant Icon]</td>
</tr>
<tr>
<td>Tube guide (throttle grip) inner surface</td>
<td>![Lubricant Icon]</td>
</tr>
<tr>
<td>Brake lever and lever holder bolt sliding surface</td>
<td>![Lubricant Icon]</td>
</tr>
<tr>
<td>Centerstand pivoting point and sliding surface</td>
<td>![Lubricant Icon]</td>
</tr>
<tr>
<td>Rear shock absorber backward, bush inner surface and spacer sliding surface</td>
<td>![Lubricant Icon]</td>
</tr>
<tr>
<td>Seat lock cable and rear wheel lock cable inner surface</td>
<td>![Lubricant Icon]</td>
</tr>
<tr>
<td>Engine bracket and engine mound bolt sliding surface</td>
<td>![Lubricant Icon]</td>
</tr>
</tbody>
</table>
COOLING SYSTEM DIAGRAMS

1. Radiator cap
2. Coolant reservoir
3. Radiator inlet hose
4. Radiator outlet hose
5. Thermo switch
6. Conduit hose
1. Outlet hose (to cylinder)
2. Radiator inlet hose
3. Radiator outlet hose
4. Thermostat
5. Thermostat housing
1 Breather hose
2 Outlet hose (to cylinder)
3 Radiator outlet hose
4 Water pump
1. Thermostat housing
2. Thermostat assembly inlet breather hose
3. Water pump
4. Breather hose
OIL FLOW DIAGRAMS

1. Oil filter
2. Oil pump
3. To cylinder head
4. Oil strainer
5. Oil nozzle
6. Camshaft
1. Crankshaft pin
2. Connecting rod big end bearing
3. Oil nozzle
4. Camshaft
CABLE ROUTING

1. Fuel sender lead
2. C.D.I. unit
3. AI filter
4. Starter motor lead
5. Main switch
6. Rectifier/Regulator
7. Overflow pipe
8. Thermo unit
9. Rear wheel lock cable
10. Rear brake cable
11. Throttle cable kit
12. Seat lock cable
13. Wire harness
14. Hose
15. Bend hose
16. Vacuum sensing hose
17. AC magneto lead

A. Insert the wire harness plate holder to the T-stud of down tube.
B. Insert the seat lock cable into the frame, protector part to the hole position.
C. Insert the L coupler to the ignition coil and installing direction of downward.
D. Clamp the wire harness, thermo switch lead and conduit hose to the frame.
E. Fasten the wire harness, AC magneto lead and starter motor lead to the frame with a plastic locking tie and end of plastic locking the upward.
F. Route the AC magneto lead and bend hose through inside of the frame.

G. Clamp the seat lock cable and wire harness to the frame of cover, install upward of the seat lock cable.
CABLE ROUTING

1. Turn signal relay
2. Horn
3. Head light relay
4. Speedometer cable
5. Front brake cable
6. Starter relay
7. Ignition coil
8. Throttle cable kit
9. Rear wheel lock cable
10. Air cut-off valve assembly
11. Air filter
12. Holder
13. Rectifier/Regulator
14. Clamp
15. Frame
16. Rear brake cable

A. Fasten the throttle cable kit and rear brake cable to the frame and cut the end to be shorter than 5mm, point the band tip to backward and reserve for a finger clearance.

B. Route the rear brake cable through guide of the under cover.

C. Route the seat lock cable through the guard mud rib.

D. 30~40mm

E. Clamp the rear brake cable stopper.

F. Clamp the carburetor drain hose to the rear brake cable, pass the rear brake cable outside the carburetor drain hose.

G. Clamp the rear brake cable to the under cover rib.

H. Clamp the throttle cable kit and Rear wheel lock cable through upward of the frame.

I. Route the rear brake cable through downward of the frame and upward of the under cover.

J. Route the rear brake cable, Rear wheel lock cable and throttle cable kit through side of the frame.

K. Route the lever holder lead coupler(left and right), brake switch lead coupler(front and rear) and speedometer lead coupler into the connector cover. Position the connector cover on the rib of the leg shield 2.

L. To the headlight and front turn signal light(left, right).
M Assemble the horn lead to the best forward of connector cover, do not through back side of the other leads.

N Route the turn signal relay lead and front turn signal light lead(left) through backward of the steering head pipe.
1 Battery negative lead
2 Battery positive lead
3 Fuse box
4 Starter motor lead
5 AC magneto lead
6 Fuel sender

A Insert the wire harness cable strap into the footrest bracket of hole.
B Route the wire harness through concave of the recovery tank and clamp it.
C Insert the ignition coil connector into the ignition coil terminal.
D Clamp the starter relay to the under cover of rib.

E Route the starter motor lead through upward of the engine bracket and through left side of the wire harness.
F Route the breather pipe through downward of the spacer.
G Clamp the taillight lead to the side cover of hook.
H Install the C.D.I. unit to the fuel tank bracket of bracket 1.
I Clamp the seat lock cable protector of marking position to the fuel tank bracket.
J Route the drain pipe along the fuel tank bracket and through the clamp.
K Route the fuel hose and pipe 7 through downward of the breather pipe.
L Route the throttle cable kit through upward of the breather pipe.
M Clamp the auto choke lead and T.P.S. lead to the manifold of clamp.
N Install the ignition coil to the engine.
O Install the clamp to the under cover of hole.
P Install the clamp to the footrest bracket of hole.
Cable Routing Specifications

1. Front brake cable
2. Front brake switch lead
3. Speedometer assembly
4. Speedometer cable
5. Rear brake cable
6. Rear brake switch lead
7. Lever holder lead (left)
8. Handlebar
9. Lever holder lead (right)
10. Lever holder (left)
11. Grip (left)
12. Throttle cable kit
13. Speedometer assembly lead
14. Front fork
15. Frame

A. After locking the right side switch of control lever, confirm the driving status of holder. Turn the holder then release your hand and retrieve the holder quickly.

B. Install the throttle cable to the lever holder (right), and tightening torque 4Nm (0.4m·kg, 2.9ft·lb).

C. Route the lever holder lead (right) and front brake switch lead along backward of the front brake cable.

D. Install the speedometer cable to the speedometer assembly, and tightening torque 3Nm (0.3m·kg, 2.2ft·lb).

E. Route the lever holder lead (left) and lever holder lead (right) through backward of the rear brake cable.

F. First, tighten the upper screw, when assembling the lever holder (left), and tightening torque 4Nm (0.4m·kg, 2.9ft·lb).

G. When assembled, the projecting part of the lever holder (left) should be in alignment with the handlebar Comp. hold position.
**CABLE ROUTING**

- **H** After spread with adhesion agent on the inner side, push the grip into the handlebar assembly.
- **I** Allow the gain position to arrive at this range.
- **J** Install the handlebar cover to the handlebar bracket, and tightening torque 4Nm (0.4m·kg, 2.9ft·lb).
- **K** To the headlight.
- **L** Insert the rear brake cable to the lever holder (left).
- **M** When assembling the rear brake cable and speedometer cable, do not interfere.
- **N** Install the speedometer assembly to the handlebar bracket, and tightening torque 7Nm (0.7m·kg, 5.1ft·lb).
- **O** When assembling the leads and cables, clamp and do not interfere.
- **P** Route the throttle cable through best backward of the cables and leads.
- **Q** When assembling the front brake cable and speedometer cable, do not interfere.
- **R** Route the throttle cable through upper of handlebar guide and handlebar upper cover.
- **S** First, tighten the back screw, when assembling the lever holder (right).
- **T** Install the handlebar to the steering shaft, and tightening torque 4Nm (0.4m·kg, 2.9ft·lb).
- **U** Route the bolt through bike of right side, and tightening the nut.

![Diagram of cable routing]
CHAPTER 3
PERIODIC CHECKS AND ADJUSTMENTS

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PERIODIC CHECKS AND ADJUSTMENTS

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

NOTE:
The annual checks must be performed every year, except if a kilometer-based maintenance is performed instead.
From 30,000 km, repeat the maintenance intervals starting from 6,000 km.
Items marked with an asterisk should be performed by a Yamaha dealer as they require special tools, data and technical skills.
**PERIODIC MAINTENANCE AND MINOR REPAIR**

Periodic maintenance chart for the emission control system

<table>
<thead>
<tr>
<th>NO.</th>
<th>ITEM</th>
<th>ROUTINE</th>
<th>INITIAL ODOMETER READING</th>
<th>ODOMETER READING</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>1.000 km (600 mi) or 1 month</td>
<td>4.000 km (2,000 mi) or 6 months</td>
</tr>
<tr>
<td>1</td>
<td>Fuel line</td>
<td>• Check fuel and vacuum hoses for cracks or damage. Replace if necessary.</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>2</td>
<td>Spark plug</td>
<td>• Check condition. Adjust gap and clean. Replace at 7000 km (4000 mi) or 12 months and thereafter every 6000 km (4000 mi) or 12 months.</td>
<td>✓ Replace.</td>
<td>✓ Replace.</td>
</tr>
<tr>
<td>3</td>
<td>Valve clearance</td>
<td>• Check and adjust valve clearance when engine is cold.</td>
<td>✓ Every 10000 km (6000 mi)</td>
<td>✓</td>
</tr>
<tr>
<td>4</td>
<td>Crankcase breather system</td>
<td>• Check breather hose for cracks or damage. Replace if necessary.</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>5</td>
<td>Idle speed</td>
<td>• Check and adjust engine idle speed.</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>6</td>
<td>Exhaust system</td>
<td>• Check for leakage. Tighten if necessary. Replace gasket(s) if necessary.</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>7</td>
<td>Air induction system</td>
<td>• Check the air cut-off valve, reed valve, and hose for damage. Replace any damaged parts.</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

* Since these items require special tools, data and technical skills, have a Yamaha dealer perform the service.
### PERIODIC MAINTENANCE AND MINOR REPAIR

General maintenance and lubrication chart

Maintenance and lubrication, periodic

<table>
<thead>
<tr>
<th>NO.</th>
<th>ITEM</th>
<th>ROUTINE</th>
<th>INITIAL 1,000 km (600 mi) or 1 month</th>
<th>ODOMETER READING 4,000 km (2,000 mi) or 6 months</th>
<th>7,000 km (4,000 mi) or 12 months</th>
<th>10,000 km (6,000 mi) or 18 months</th>
<th>13,000 km (8,000 mi) or 24 months</th>
<th>16,000 km (10,000 mi) or 30 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Air filter element</td>
<td>• Replace.</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>2</td>
<td>Front brake</td>
<td>• Check operation.</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Adjust cable and replace brake shoes if necessary.</td>
<td></td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>3</td>
<td>Rear brake</td>
<td>• Check operation.</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Adjust cable and replace brake shoes if necessary.</td>
<td></td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>4</td>
<td>Wheels</td>
<td>• Check runout and for damage.</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Replace if necessary.</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>5</td>
<td>Tires</td>
<td>• Check tread depth and for damage.</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Replace if necessary.</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Check air pressure.</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>6</td>
<td>Wheel bearings</td>
<td>• Check bearings for smooth operation.</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Replace if necessary.</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>7</td>
<td>Steering bearings</td>
<td>• Check bearing assemblies for looseness.</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Moderately repack with lithium-soap-based grease every 13000 km (8000 mi) or 24 months.</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>8</td>
<td>Chassis fasteners</td>
<td>• Check all chassis fitting and fasteners.</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Correct if necessary.</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>9</td>
<td>Front and rear brake lever pivot</td>
<td>• Apply lithium-soap-based grease (all-purpose grease) lightly.</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>10</td>
<td>Centerstand</td>
<td>• Check operation.</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Lubricate.</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>11</td>
<td>Front fork</td>
<td>• Check operation and for oil leakage.</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Replace if necessary.</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>12</td>
<td>Shock absorber assembly</td>
<td>• Check operation and for oil leakage.</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Replace if necessary.</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>13</td>
<td>Engine oil</td>
<td>• Change (warm engine before draining).</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Check oil level and vehicle for oil leakage.</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>14</td>
<td>Engine oil strainer</td>
<td>• Clean.</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>15</td>
<td>Cooling system</td>
<td>• Check coolant level and vehicle for coolant leakage.</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Change.</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Every 3 years</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>16</td>
<td>Final transmission oil</td>
<td>• Check vehicle for oil leakage.</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Change.</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Every 10000 km (6250 mi)</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>17</td>
<td>V-belt</td>
<td>• Replace.</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>18</td>
<td>Front and rear brake switches</td>
<td>• Check operation.</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>19</td>
<td>Control and meter cables</td>
<td>• Apply Yamaha chain and cable lube or engine oil 10W-30 thoroughly.</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>20</td>
<td>Throttle grip housing and cable</td>
<td>• Check operation and free play.</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Adjust the throttle cable free play if necessary.</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Lubricate the throttle grip housing and cable.</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>21</td>
<td>Lights, signals and switches</td>
<td>• Check operation.</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Adjust headlight beam.</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
</tbody>
</table>
PERIODIC MAINTENANCE AND MINOR REPAIR

* Since these items require special tools, data and technical skills, have a Yamaha dealer perform the service.

NOTE: From 12000 mi (19000 km) or 36 months, repeat the maintenance intervals starting from 4000 mi (7000 km) or 12 months.

NOTE: The air filter needs more frequent service if you are riding in unusually wet or dusty areas.
## COVER AND PANEL

### SEAT AND TRUNK

*Remove the parts in the order listed.*

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>1</td>
<td>Seat</td>
<td>1</td>
<td>Remove the parts in the order listed.</td>
</tr>
<tr>
<td>2</td>
<td>Damper</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Rubber cap</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Trunk</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Rear carrier</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Mat</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Battery cover</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

*23Nm (2.3 m•kg, 16.6 ft•lb)*

*12Nm (1.2 m•kg, 8.7 ft•lb)*

*10Nm (1.0 m•kg, 7.2 ft•lb)*

*12Nm (1.2 m•kg, 8.7 ft•lb)*
## SIDE COVER (LEFT AND RIGHT)

**Order** | **Job/Part** | **Q’ty** | **Remarks** |
--- | --- | --- | --- |
1 | Removing the side cover(left and right) | 1 | Remove the parts in the order listed. Refer to "SEAT AND TRUNK". Disconnect. |
   | Seat/Trunk | 1 |  |
   | Tail / brake and rear turn signal (left, right) light/lead | 1 |  |
   | Front cover | 1 |  |
   | Side cover(left) | 1 |  |
   | Side cover(right) | 1 |  |
   | Tail/brake light | 1 |  |
   | Rear cover | 1 | For installation, reverse the removal procedure. |
### Removing the footrest board and footrest board side cover mole

<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 holder</td>
<td>1</td>
<td>Remove the parts in the order listed.</td>
</tr>
<tr>
<td>2</td>
<td>Battery negative ⓞ lead</td>
<td>1</td>
<td>Refer to “SIDE COVER (LEFT AND RIGHT)”.</td>
</tr>
<tr>
<td>3</td>
<td>Battery positive ⓦ lead</td>
<td>1</td>
<td><strong>CAUTION:</strong> First, disconnect the negative battery lead, and then the positive battery lead.</td>
</tr>
<tr>
<td>4</td>
<td>Battery</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Footrest board side cover mole(left)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Footrest board side cover mole(right)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Footrest board</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

- **4Nm (0.4 m•kg, 2.9 ft•lb)**

- **Remarks:**
  - For installation, reverse the removal procedure.
## Removing the leg shield 1,2

### Job/Part

<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>Cap</td>
<td>1</td>
<td>Remove the parts in the order listed. Refer to “FOOTREST BOARD AND FOOTREST BOARD SIDE COVER MOLE”.</td>
</tr>
<tr>
<td>2</td>
<td>Headlight cover</td>
<td>1</td>
<td>Disconnect.</td>
</tr>
<tr>
<td>3</td>
<td>Head and front turn signal (left, right) light lead</td>
<td>1</td>
<td>Disconnect.</td>
</tr>
<tr>
<td>4</td>
<td>Leg shield 1</td>
<td>1</td>
<td>Disconnect.</td>
</tr>
<tr>
<td>5</td>
<td>Turn signal relay</td>
<td>1</td>
<td>Disconnect.</td>
</tr>
<tr>
<td>6</td>
<td>Headlight relay</td>
<td>1</td>
<td>Disconnect.</td>
</tr>
<tr>
<td>7</td>
<td>Rear wheel lock clip</td>
<td>1</td>
<td>Disconnect.</td>
</tr>
<tr>
<td>8</td>
<td>Hook</td>
<td>1</td>
<td>For installation, reverse the removal procedure.</td>
</tr>
<tr>
<td>9</td>
<td>Leg shield 2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Starter relay</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Coolant reservoir</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Under cover</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

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/trunk
   - battery cover
   - battery holder
   - front cover
   Refer to “COVER AND PANEL”.

2. Drain:
   - coolant
   (completely from the radiator)

3. Remove:
   - radiator cover ①
   - radiator
   - fan case ②
   Refer to “RADIATOR” in chapter 6.

4. Remove:
   - spark plug cap
   - spark plug
   - ignition coil
   - cylinder head cover

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

<table>
<thead>
<tr>
<th>Valve clearance (cold)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intake valve</td>
</tr>
<tr>
<td>0.10 ~ 0.16 mm (0.004 ~ 0.006 in)</td>
</tr>
<tr>
<td>Exhaust valve</td>
</tr>
<tr>
<td>0.18 ~ 0.24 mm (0.007 ~ 0.010 in)</td>
</tr>
</tbody>
</table>

******************************************************************************

a. Turn the crankshaft counterclockwise.
b. When the piston is at TDC on the compression stroke, align the punch mark ⑧ in the camshaft sprocket with the stationary ⑨ on the plate.
c. Align the TDC mark ⑦ on the AC magneto rotor with the stationary pointer ⑥ on the crankcase cover.
d. Measure the valve clearance with a thickness gauge ①.
Out of specification → Adjust.

6. Adjust:
   • valve clearance

   a. Remove the valve pad ② with a magnetic bar ①.

   NOTE:
   • Cover the timing chain opening with a rag to prevent the valve pad from falling into the crankcase.
   • Make a note of the position of each valve pad so that they can be installed in the correct place.

   b. Select the proper valve pad from the following table.

<table>
<thead>
<tr>
<th>Valve pad thickness range</th>
<th>Available valve pads</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nos. 120 ~ 240 1.20 (0.047 in) ~ 2.40 mm (0.095 in)</td>
<td>25 thicknesses in 0.05 mm (0.002 in) increments</td>
</tr>
</tbody>
</table>

c. Round off the original valve pad number according to the following table.
ADJUSTING THE VALVE CLEARANCE

<table>
<thead>
<tr>
<th>Last digit</th>
<th>Rounded value</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 or 2</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>8</td>
<td>10</td>
</tr>
</tbody>
</table>

**EXAMPLE:**
Original valve pad number = 148 (thickness = 1.48 mm (0.058 in))

Rounded value = 150

d. 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.

e. Install the new valve pad.

**NOTE:**
- Lubricate the valve pad with molybdenum disulfide oil.
- Install the valve pad in the correct place.

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

******************************************************************************
### Intake

<table>
<thead>
<tr>
<th>Measured Clearance</th>
<th>Original Valve Pad Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.00-0.04</td>
<td>120 125 130 135 140 145 150 155 160 165 170 175 180 185 190 195 200 205 210 215 220 225 230 235 240</td>
</tr>
<tr>
<td>0.05-0.09</td>
<td>120 125 130 135 140 145 150 155 160 165 170 175 180 185 190 195 200 205 210 215 220 225 230 235 240</td>
</tr>
<tr>
<td>0.10-0.16</td>
<td>125 130 135 140 145 150 155 160 165 170 175 180 185 190 195 200 205 210 215 220 225 230 235 240</td>
</tr>
</tbody>
</table>

**Valve Clearance (cold)**: 0.10-0.16 mm

**Rounded value**: 175

**Measured valve clearance**: 0.24 mm

Replace pad 175 with pad 185

Pad No. 175 = 1.75 mm

Pad No. 185 = 1.85 mm

Always install the valve pad with the number facing down.

### Exhaust

<table>
<thead>
<tr>
<th>Measured Clearance</th>
<th>Original Valve Pad Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.00-0.02</td>
<td>120 125 130 135 140 145 150 155 160 165 170 175 180 185 190 195 200 205 210 215 220 225 230 235 240</td>
</tr>
<tr>
<td>0.03-0.07</td>
<td>120 125 130 135 140 145 150 155 160 165 170 175 180 185 190 195 200 205 210 215 220 225 230 235 240</td>
</tr>
<tr>
<td>0.08-0.12</td>
<td>120 125 130 135 140 145 150 155 160 165 170 175 180 185 190 195 200 205 210 215 220 225 230 235 240</td>
</tr>
<tr>
<td>0.13-0.17</td>
<td>120 125 130 135 140 145 150 155 160 165 170 175 180 185 190 195 200 205 210 215 220 225 230 235 240</td>
</tr>
<tr>
<td>0.18-0.24</td>
<td>125 130 135 140 145 150 155 160 165 170 175 180 185 190 195 200 205 210 215 220 225 230 235 240</td>
</tr>
</tbody>
</table>

**Valve Clearance (cold)**: 0.18-0.24 mm

**Rounded value**: 175

**Measured valve clearance**: 0.32 mm

Replace pad 175 with pad 185

Pad No. 175 = 1.75 mm

Pad No. 185 = 1.85 mm

Always install the valve pad with the number facing down.
7. Install:
   • all removed parts

**NOTE:**
For installation, reverse the removal procedure.

8. Fill:
   • cooling system
   (with the specified amount of the recommended coolant)
   Refer to “CHANGING THE COOLANT”.
ADJUSTING THE ENGINE IDLING SPEED

NOTE:

Prior to adjusting the engine idling speed, the air filter element should be clean, and the engine should have adequate compression.

1. Start the engine and let it warm up for several minutes.
2. Connect:
   • digital tachometer
     (onto the spark plug lead of cylinder)

3. Check:
   • engine idling speed
     Out of specification → Adjust

4. Adjust:
   • engine idling speed

   Turn the throttle stop screw ① in direction ③ or ④ until the specified engine idling speed is obtained.

<table>
<thead>
<tr>
<th>Direction</th>
<th>Engine idling speed is increased.</th>
</tr>
</thead>
<tbody>
<tr>
<td>③</td>
<td></td>
</tr>
<tr>
<td>④</td>
<td></td>
</tr>
</tbody>
</table>

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

   Throttle cable free play (at the flange of the throttle grip)
   1.5 ~ 3.5 mm (0.059 ~ 0.138 in)
CHECKING THE EXHAUST GAS AT IDLE

CHECKING THE EXHAUST GAS AT IDLE
(Measuring the exhaust gas at idle (when air induction system is operation))

1. Stand the scooter on a level surface.

NOTE:
- Place the scooter on a suitable stand.
- Make sure the scooter is upright.

2. Install:
- pocket tester ①.
  (onto the engine oil drain bolt)
- digital tachometer
  (onto the spark plug lead)

Pocket tester
90890-03112
YU-03112-C
Digital tachometer
90890-06760

3. Start the engine and warm it up until the specified oil temperature is reached.

Oil temperature
50~70°C

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

Engine idling speed
2000 ~ 2400 r/min

5. Install:
- carbon monoxide and hydrocarbon tester ①.
- sampling probe ②.
- engine tachometer ③.
NOTE:

- Since it is necessary to insert the sampling probe 600mm into the exhaust pipe, be sure to use a heat-resistant rubber tube as shown in the illustration.
- Be sure to set the heat-resistant rubber tube so that exhaust gas does not leak out.
- Before using the carbon monoxide and hydrocarbon tester, be sure to read the user’s manual.

6. Measure:
- carbon monoxide density
- hydrocarbon density

<table>
<thead>
<tr>
<th>Carbon monoxide density ( when air induction system is operating )</th>
<th>3.5% below</th>
</tr>
</thead>
<tbody>
<tr>
<td>hydrocarbon density ( when air induction system is operating )</td>
<td>1000ppm below</td>
</tr>
</tbody>
</table>

Out of specification → Check air induction system.
Refer to “AIR INDUCTION SYSTEM” in chapter 7.
ADJUSTING THE THROTTLE CABLE FREE PLAY

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

1. Check:
   • throttle cable free play [a]  
     Out of specification → Adjust.

2. Adjust:
   • throttle cable free play

Handlebar side
a. Loosen the locknut [1].
b. Turn the adjusting nut [2] in direction [a] or [b] until the specified throttle cable free play is obtained.

<table>
<thead>
<tr>
<th>Direction</th>
<th>Throttle cable free play</th>
</tr>
</thead>
<tbody>
<tr>
<td>[a]</td>
<td>Increased</td>
</tr>
<tr>
<td>[b]</td>
<td>Decreased</td>
</tr>
</tbody>
</table>

c. Tighten the locknut.

WARNING
After adjusting the throttle cable free play, start the engine and turn the handlebar to the right and to the left to ensure that this does not cause the engine idling speed to change.
CHECKING THE SPARK PLUG

1. Remove:
   - battery cover
   - battery holder
   Refer to “COVER AND PANEL”.
2. Disconnect:
   - spark plug cap
3. Remove:
   - spark plug

**CAUTION:**
Before removing the spark plug, blow away any dirt accumulated in the spark plug well with compressed air to prevent it from falling into the cylinder.

4. Check:
   - spark plug type
     Incorrect → Change.

**Spark plug type (manufacturer)**
CR7E (NGK)

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

6. Clean:
   - spark plug
     (with a spark plug cleaner or wire brush)

7. Measure:
   - spark plug gap ③
     (with a wire Thickness gauge)
     Out of specification → Regap.

**Spark plug gap**
0.7 ~ 0.8 mm (0.028 ~ 0.032 in)

8. Install:
   - spark plug
   12.5 Nm (1.25 m·kg, 9 ft·lb)

**NOTE:**
Before installing the spark plug, clean the spark plug and gasket surface.

9. Connect:
   - spark plug cap
10. Install:
    - battery holder
    - battery cover
    Refer to “COVER AND PANEL”.

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

1. Drain:
   • coolant
     (completely from the radiator)
2. Remove:
   • radiator cover
   • radiator
   • fan case
     Refer to “RADIATOR” in chapter 6.

3. Attach:
   • timing light
   • digital tachometer
     (onto the spark plug lead of cylinder)

4. Check:
   • ignition timing
     ****************************************************
     a. Start the engine, warm it up for several minutes, and then let it run at the specified engine idling speed.
     b. Check that the mark on the AC magneto rotor is within the firing range on the right crankcase cover. Incorrect firing range → Check the ignition system.

   Engine idling speed
   2000 ~ 2400 r/min
CHECKING THE IGNITION TIMING

NOTE: 

The ignition timing is not adjustable.

**************************************************

5. Remove:
   - timing light
   - digital tachometer

6. Install:
   - fan case
   - radiator
   - radiator cover
     Refer to “RADIATOR” in chapter 6.

7. Fill:
   - cooling system
     (with the specified amount of the recommended coolant)
     Refer to “CHANGING THE COOLANT”.

Downloaded from www.ScooterTime.net
MEASURING THE COMPRESSION PRESSURE

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

1. Measure:
   • 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.
3. Remove:
   • battery cover
   • battery holder
     Refer to “COVER AND PANEL”.
4. Disconnect:
   • spark plug cap
5. Remove:
   • spark plug

CAUTION:
Before removing the spark plug, use compressed air to blow away any dirt accumulated in the spark plug well to prevent it from falling into the cylinder.

6. Install:
   • compression gauge

7. Measure:
   • compression pressure
     Out of specification → Refer to steps (c) and (d).
MEASURING THE COMPRESSION PRESSURE

<table>
<thead>
<tr>
<th>Compression pressure (at sea level)</th>
<th>Minimum</th>
<th>1262 kPa (12.6 kgf/cm², 700r/min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard</td>
<td>1450 kPa (14.5 kgf/cm², 700r/min)</td>
<td></td>
</tr>
<tr>
<td>Maximum</td>
<td>1624 kPa (16.2 kgf/cm², 700r/min)</td>
<td></td>
</tr>
</tbody>
</table>

a. Set 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 the spark plug lead before cranking the engine.

c. If the compression pressure is above the maximum specification, check the cylinder head, valve surfaces, and piston crown for carbon deposits.
   Carbon deposits → Eliminate.
d. If the compression pressure is below the minimum specification, pour a teaspoonful of engine oil into the spark plug bore and measure again.
   Refer to the following table.

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

8. Remove:
   • compression gauge
9. Install:
   • spark plug

\[12.5 \text{ Nm (1.25 m \cdot kg \ 9.0 ft \cdot lb)}\]

10. Connect:
    • spark plug cap
11. Install:
    • battery holder
    • battery cover
    Refer to “COVER AND PANEL”.

---

[3-22]
CHECKING THE ENGINE OIL LEVEL

1. Stand the scooter on a level surface.

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

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

3. Check:
- Engine oil level
  - The engine oil level should be between the minimum level mark (a) and maximum level mark (b).
  - Below the minimum level mark → Add the recommended engine oil to the proper level.

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.

**CAUTION:**
- Do not allow foreign materials to enter the crankcase.

**NOTE:**
- Do not allow foreign materials to enter the crankcase.

**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 ①
   - engine oil drain bolt ② (along with the gasket)
4. Drain:
   - engine oil (completely from the crankcase)
5. If the oil filter element is also to be cleaned, perform the following procedure.
   ****************************************************
   a. Remove the oil strainer cover ①, spring ③ and oil filter element ④.
   b. Replace the o-ring ②.
   c. Install the oil strainer cover.
   Oil strainer cover 32 Nm (3.2 m·kg, 23.1 ft·lb)
   ****************************************************
6. Install:
   - engine oil drain bolt (along with the gasket)
   23 Nm (2.3 m·kg, 16.6 ft·lb)
7. Fill:
   - crankcase (with the specified amount of the recommended engine oil)
   Quantity
   Total amount
   0.8~0.9L (0.74~0.83 Imp qt, 0.87~0.98 US qt)
   Periodic oil change
   0.73~0.83 L (0.67~0.76 Imp qt, 0.80~0.90 US qt)
8. Install:
   • engine oil filler cap

9. Start the engine, warm it up for several minutes, and then turn it off.

10. Check:
    • engine
       (for engine oil leaks)

11. Check:
    • engine oil level
       Refer to “CHECKING THE ENGINE OIL LEVEL”.

12. Check:
    • engine oil pressure
       Refer to “CHECKING THE ENGINE OIL PRESSURE”.
CHANGING THE TRANSMISSION OIL

1. Stand the scooter on a level surface.

NOTE:
- Stand the scooter on a suitable stand.
- Make sure that the scooter is upright.

2. Start the engine, warm it up for several minutes, and then turn it off.
3. Place a container under the transmission.

4. Remove:
   - Transmission oil drain bolt
   - Transmission oil fill bolt

   Completely drain the transmission oil.

5. Install:
   - Transmission oil drain bolt
   \[13 \text{ Nm (1.3 m·kg, 9.4 ft·lb)}\]

6. Fill:
   - Transmission oil
     (with the specified amount of the recommended transmission oil)

   **Total amount**
   \[0.11\text{~}0.13\text{L (0.10~0.12 Imp qt, 0.12~0.14 US qt)}\]

   **Periodic oil change**
   \[0.09\text{~}0.11\text{L (0.08~0.10 Imp qt, 0.10~0.12 US qt)}\]

   **Recommended oil**
   SAE10W-30 motor oil

7. Install:
   - Transmission oil fill bolt
     (along with the gasket)
   \[23 \text{ Nm (2.3 m·kg, 16.6 ft·lb)}\]

8. Start the engine for several minutes to warm it up and check for the oil leakage.
MEASURING THE ENGINE OIL PRESSURE

1. Check:
   • engine oil level
     Below the minimum level mark → Add the recommended engine oil to the proper level.
     Refer to “CHECKING THE ENGINE OIL 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:
   • seat/trunk
   • battery cover
   • front cover
   Refer to “COVER AND PANEL”.

4. Lossen:
   • gallery bolt ①

   WARNING
   The engine, muffler and engine oil are extremely hot.

5. Check:
   • engine oil pressure

      a. Start the engine and keep it idling until engine oil starts to seep from the oil gallery bolt. If no engine oil comes out after one minute, turn the engine off so that it will not seize.
      b. Check the engine oil passages, the oil filter and oil pump for damage or leakage. Refer to “OIL PUMP” in chapter 5.
      c. Start the engine after solving the problem(s) and check the engine oil pressure again.
6. Install:
   • gallery bolt
   
   \[ 7 \text{ Nm (0.7 m\*kg, 5.1 ft\*lb)} \]

7. Install:
   • front cover
   • battery cover
   • seat/trunk
   Refer to “COVER AND PANEL”.

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CHECKING THE AIR FILTER ELEMENT

E050086

CHECKING THE AIR FILTER ELEMENT
1. Remove:
   • air filter case cover
   • air filter element
2. Check:
   • air filter element
     Damage/dirty → Replace.
3. Install:
   • air filter element
   • air filter case cover

⚠️ 10 Nm (1.0 m•kg, 7.2 ft•lb)

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:
When installing the air filter element into the air filter case cover, make sure their sealing surfaces are aligned to prevent any air leaks.
CHECKING THE CARBURETOR JOINT AND INTAKE MANIFOLD/CHECKING THE FUEL AND VACUUM HOSES

CHECKING THE CARBURETOR JOINT AND INTAKE MANIFOLD
1. Remove:
   - seat/trunk
   - rear carrier
   - battery cover
   - front cover
   - side cover (left and right)
   - rear cover
   Refer to “COVER AND PANEL”.
2. Check:
   - carburetor joint
   - intake manifold
   Cracks/damage → Replace.
   Refer to “CARBURETOR” in chapter 7.
3. Install:
   - rear cover
   - side cover (left and right)
   - front cover
   - battery cover
   - rear carrier
   - seat/trunk
   Refer to “COVER AND PANEL”.

CHECKING THE FUEL AND VACUUM HOSES
The following procedure applies to all of the fuel and vacuum hoses.
1. Remove:
   - seat/trunk
   Refer to “COVER AND PANEL”.
2. Check:
   - vacuum hose
   - fuel hose
   Cracks/damage → Replace.
   Loose connection → Connect properly.
3. Install:
   - seat/trunk
   Refer to “COVER AND PANEL”.

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EAS0096
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CHECKING THE FUEL HOSES AND FUEL FILTER

The following procedure applies to all of the fuel hoses.

1. Remove:
   - battery cover
   - seat/trunk
   - rear carrier
   - front cover
   - side cover (left and right)
   - rear cover
   Refer to “COVER AND PANEL”.

2. Check:
   - fuel hose ①
     Cracks/damage → Replace.
   - fuel filter ②
     Contaminants/damage → Replace.

   **NOTE:**
   - Drain and flush the fuel tank if abrasive damage to any components of the fuel line is evident.
   - The arrow mark on the fuel filter must point towards the fuel cock as shown.

3. Install:
   - rear cover
   - side cover (left and right)
   - front cover
   - rear carrier
   - seat/trunk
   - battery cover
   Refer to “COVER AND PANEL”.
CHECKING THE CRANKCASE BREATHER HOSE

1. Remove:
   - seat/trunk
   Refer to “COVER AND PANEL”.

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

   **CAUTION:**
   Make sure the crankcase breather hose is routed correctly.

3. Install:
   - seat/trunk
   Refer to “COVER AND PANEL”.

---

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CHECKING THE EXHAUST SYSTEM

The following procedure applies to all of the muffler assembly and gaskets.

1. Remove:
   - muffler assembly
     Refer to “MANIFOLD, AIR FILTER AND MUFFLER ASSEMBLY” in chapter 5.

2. Check:
   - muffler assembly
     Cracks/damage → Replace.
   - gasket
     Exhaust gas leaks → Replace.

3. Check:
   - tightening torque

   **Muffler assembly nut**
   - 13 Nm (1.3 m • kg, 9.4 ft • lb)

   **Muffler and rear arm bolt**
   - 31 Nm (3.1 m • kg, 22.4 ft • lb)

4. Install:
   - muffler assembly
     Refer to “MANIFOLD, AIR FILTER AND MUFFLER ASSEMBLY” in chapter 5.
CHECKING THE COOLANT LEVEL

1. Stand the scooter on a level surface.

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

2. Remove:
- mat
- battery cover
  Refer to “COVER AND PANEL”.

3. Check:
- coolant level
  The coolant level should be between the maximum level mark ③ and minimum level mark ④.
  Below the minimum level mark → Add the recommended coolant to the proper level.

**CAUTION:**
- Adding water instead of coolant lowers the antifreeze content of the coolant. If water is used instead of coolant check, and if necessary, correct the antifreeze concentration of the coolant.
- Use only distilled water. However, if distilled water is not available, soft water may be used.

4. Start the engine, warm it up for several minutes, and then turn it off.

5. Check:
- coolant level

**NOTE:**
Before checking the coolant level, wait a few minutes until it settles.

6. Install:
- battery cover
- mat
  Refer to “COVER AND PANEL”.

---

3-34
CHECKING THE COOLING SYSTEM

1. Remove:
   - seat/trunk
   - battery cover
   - front cover
   - battery holder/battery
   - footrest board side cover mole (left and right)
   - mat/footrest board
   Refer to “COVER AND PANEL”.
   - radiator cover
   Refer to “COOLING SYSTEM” in chapter 6.

2. Check:
   - radiator ①
   - radiator inlet hose ②
   - radiator outlet hose ③
   Cracks/damage → Replace.
   Refer to “COOLING SYSTEM” in chapter 6.

3. Install:
   - radiator cover
     Refer to “COOLING SYSTEM” in chapter 6.
   - mat/footrest board
   - footrest board side cover mole (left and right)
   - battery holder/battery
   - front cover
   - battery cover
   - seat/trunk
   Refer to “COVER AND PANEL”.

3-35
CHANGING THE COOLANT

1. Remove:
   • mat
   • battery cover
   • footrest board side cover mole (right)
     Refer to “COVER AND PANEL”.
   • radiator cover
     Refer to “COOLING SYSTEM” in chapter 6.
   • radiator cover

2. Disconnect:
   • coolant reservoir hose

3. Drain:
   • coolant
     (from the coolant reservoir)
   • coolant
     (from the radiator under drain bolt)

4. Remove:
   • radiator cap

**WARNING**

A hot radiator is under pressure. Therefore, do not remove the radiator cap when the engine is hot. Scalding hot fluid and steam may be blown out, which could cause serious injury. When the engine has cooled, open the radiator cap as follows:
Place a thick rag or a towel over the radiator cap and slowly turn the radiator cap counterclockwise toward the detent to allow any residual pressure to escape. When the hissing sound has stopped, press down on the radiator cap and turn it counterclockwise to remove.

The following procedure applies to all of the coolant drain bolts and copper washers.

5. Connect:
   • coolant reservoir hose

6. Install:
   • radiator under drain bolt

\[
\begin{array}{c}
2 \text{ Nm (0.2 m \cdot kg, 1.5 ft \cdot lb)}
\end{array}
\]
CHANGING THE COOLANT

7. Fill:
   • cooling system
   (with the specified amount of the recommended coolant)

   Recommended antifreeze
   High-quality ethylene glycol antifreeze containing corrosion inhibitors for aluminum engines
   Mixing ratio
   1:1 (antifreeze:water)
   Quantity
   Total amount
   0.52 L (0.48 Imp qt, 0.57 US qt)
   Coolant reservoir capacity
   0.26 L (0.24 Imp qt, 0.28 US qt)
   From minimum to maximum level mark
   0.10~0.25 L (0.09~0.14 Imp qt, 0.11~0.16 US qt)

Handling notes for coolant
Coolant is potentially harmful and should be handled with special care.

**WARNING**
- If coolant splashes in your eyes, thoroughly wash them with water and consult a doctor.
- If coolant splashes on your clothes, quickly wash it away with water and then with soap and water.
- If coolant is swallowed, induce vomiting and get immediate medical attention.

**CAUTION:**
- Adding water instead of coolant lowers the antifreeze content of the coolant. If water is used instead of coolant check, and if necessary, correct the antifreeze concentration of the coolant.
- Use only distilled water. However, if distilled water is not available, soft water may be used.
- If coolant comes into contact with painted surfaces, immediately wash them with water.
- Do not mix different types of antifreeze.

8. Install:
   • radiator cap
9. Fill:
   - coolant reservoir
     (with the recommended coolant to the maximum level mark (a))

10. Install:
    - coolant reservoir cap

11. Start the engine, warm it up for several minutes, and then stop it.

12. Check:
    - coolant level
      Refer to "CHECKING THE COOLANT LEVEL".

**NOTE:**
Before checking the coolant level, wait a few minutes until the coolant has settled.

13. Install:
    - radiator cover
      Refer to "COOLING SYSTEM" in chapter 6.
    - footrest board side cover mole (right)
    - battery cover
    - mat
      Refer to "COVER AND PANEL".
CHASSIS

ADJUSTING THE FRONT BRAKE

1. Check:
   - brake lever free play
     Out of specification → Adjust.

   Brake lever free play (at the end of the brake lever)
   10 ~ 20 mm (0.394 ~ 0.787 in)

2. Adjust:
   - brake lever free play

   a. Turn the adjusting nut in direction a or b until the specified brake lever free play is obtained.

   Direction a: Brake lever free play is increased.
   Direction b: Brake lever free play is decreased.

   CAUTION:
   After adjusting the brake lever free play, make sure there is no brake drag.

ADJUSTING THE REAR BRAKE

1. Check:
   - brake lever free play
     Out of specification → Adjust.

   Brake lever free play
   10 ~ 20 mm (0.394 ~ 0.787 in)

2. Adjust:
   - brake lever free play

   a. Turn the adjusting nut in direction a or b until the specified brake lever free play is obtained.

   Direction a: Brake lever free play is increased.
   Direction b: Brake lever free play is decreased.

   CAUTION:
   After adjusting the brake lever free play, make sure there is no brake drag.
CHECKING THE FRONT AND REAR BRAKE SHOES

1. Operate the brake.
2. Check:
   - wear indicator ①
     Reaches the wear limit line ② → Replace the brake shoes as a set.
   Refer to “FRONT WHEEL AND FRONT BRAKE” and “REAR WHEEL AND REAR BRAKE” in chapter 4.

A Front brake
B Rear brake
CHECKING AND ADJUSTING THE STEERING HEAD

1. Stand the scooter on a level surface.

**WARNING**

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

**NOTE:**

Place the scooter 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.
     Binding/looseness → Adjust the steering head.

3. Remove:
   - head light cover
   - leg shield
   Refer to “COVER AND PANEL”.

4. Adjust:
   - steering head

   a. Remove the upper cover.
   b. Loosen the steering nut ① and then tighten it to specification with the steering nut wrench.

   **NOTE:**

   Set the torque wrench at a right angle to the steering nut wrench.

   c. Loosen the upper bearing inner race ② completely and then tighten it to specification with a steering nut wrench ③.
CHECKING AND ADJUSTING THE STEERING HEAD

**WARNING**
Do not overtighten the upper bearing inner race.

- **Upper bearing inner race (final tightening torque)**
  - 7 Nm (0.7 m·kg, 5.1 ft·lb)

**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 upper cover and check the bearing race.

Refer to “STEERING HEAD” in chapter 4.

**e.** Hold the upper bearing inner race with a steering nut wrench and tighten the steering nut with a steering nut wrench.

**Steering nut wrench**
- 90890-01403
- YU-A9472

- **Steering nut**
  - 30 Nm (3.0 m·kg, 21.7 ft·lb)

5. Install:
- leg shield 1
- head light cover

Refer to “COVER AND PANEL”.

---

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CHECKING THE FRONT FORK

1. Stand the scooter on a level surface.

**WARNING**

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

2. Check:
   - inner tube
     Damage/scratches → Replace.
   - dust seal
     Damage/scratches → Replace.

3. Hold the scooter upright and apply the front brake.

4. Check:
   - front fork operation
     Push down hard on the handlebar several times and check if the front fork rebounds smoothly.
     Rough movement → Repair.
     Refer to “FRONT FORK” in chapter 4.
CHECKING THE TIRES

The following procedure applies to both of the tires.

1. Check:
   - 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 scooter could cause tire damage, an accident or an injury.
- NEVER OVERLOAD THE SCOOTER.

<table>
<thead>
<tr>
<th>Basic weight</th>
<th>81 kg (179 lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(with oil and a full fuel tank)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Maximum load*</th>
<th>77 kg (170 lb)</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Cold tire pressure</th>
<th>Front</th>
<th>Rear</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 ~ 77 kg (0 ~ 170 lb)</td>
<td>150 kPa (1.5 kgf/cm², 22 psi)</td>
<td>175 kPa (1.75 kgf/cm², 25 psi)</td>
</tr>
</tbody>
</table>

*Total weight of rider, passenger, cargo and accessories

**WARNING**

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

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

   Minimum tire tread depth
   0.8 mm (0.032 in)

   ① Tire tread depth
   ② Sidewall
   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 tube tires, 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 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.

<table>
<thead>
<tr>
<th>A</th>
<th>Tire</th>
<th>B</th>
<th>Wheel</th>
</tr>
</thead>
</table>

<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 Taiwan 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 scooter.

**Front tire**

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Model</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHENG SHIN</td>
<td>C-922</td>
<td>90/90-10 41J</td>
</tr>
</tbody>
</table>

**Rear tire**

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Model</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHENG SHIN</td>
<td>C-922</td>
<td>90/90-10 41J</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 inner and outer cables.

⚠️ WARNING
Damaged outer cable may cause the cable to corrode and interfere with its movement. Replace damaged outer cable and inner cables as soon as possible.

1. Check:
   • outer cable
     Damage → Replace.
2. Check:
   • cable operation
     Rough movement → Lubricate.

Recommended lubricant
Engine oil or a suitable cable lubricant

NOTE:
Hold the cable end upright and pour a few drops of lubricant into the cable sheath or use a suitable lubricating device.
LUBRICATING THE LEVERS AND PEDALS
Lubricate the pivoting point and metal-to-metal moving parts of the levers and pedals.

Recommended lubricant
Lithium-soap-based grease

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

Recommended lubricant
Lithium-soap-based grease
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 an 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:
   - mat
   - battery cover
   - battery holder
   Refer to “COVER AND PANEL”.

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

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

3. Remove:
   - battery

4. Check:
   - battery charge

a. Connect a digital pocket tester to the battery terminals.

Pocket tester
90890-03112 (YU-03112-C)

Positive tester probe → positive battery terminal
Negative tester probe → negative battery terminal

NOTE:
- The charge state of an 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**

- Open-circuit voltage = 12.0 V
- Charging time = 6.5 hours
- Charge of the battery = 20 ~ 30%

5. Charge:
- battery (refer to the appropriate charging method illustration)

⚠️ WARNING

Do not quick charge a battery.

⚠️ CAUTION:

- Never remove the MF battery sealing caps.
- Do not use a high-rate battery charger since it forces 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 scooter. (If charging has to be done with the battery mounted on the scooter, disconnect the negative battery 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 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 an 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.
CHARGING AND CHARGING THE BATTERY

Charging method using a variable-current (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?

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.)

Adjust the charging voltage to 20 ~ 25V.

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

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.

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.”
**CHECKING AND CHARGING THE BATTERY**

**CHARGING METHOD USING A CONSTANT VOLTAGE CHARGER**

1. Measure the open-circuit voltage prior to charging.

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

3. Is the amperage higher than the standard charging amperage written on the battery?
   - **YES**: Charge the battery until the charging voltage reaches 15 V.
   - **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.

   - **NO**: This type of battery charger cannot charge an MF battery. A variable voltage charger is recommended.

---

**CAUTION:**

Constant amperage chargers are not suitable for charging MF batteries.
6. Install:
   • battery

7. Connect:
   • battery leads
     (to the battery terminals)

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

8. Check:
   • battery terminals
     - Dirt → Clean with a wire brush.
     - Loose connection → Connect properly.

9. Lubricate:
   • battery terminals

<table>
<thead>
<tr>
<th>Recommended lubricant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dielectric grease</td>
</tr>
</tbody>
</table>

10. Install:
    • battery holder
    • battery cover
    • mat
     Refer to “COVER AND PANEL”.

---

**EAS00181**

**CHECKING THE FUSE**
The following procedure applies to all of the fuse.

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

1. Remove:
   • mat
   • battery cover
     Refer to “COVER AND PANEL”.

---

3-55

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2. Check:
   • fuse

   a. Connect the pocket tester to the fuse and check the continuity.

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

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

3. Replace:
   • blown fuse

   a. Set the main switch to “OFF”.
   b. Install a new fuse of the correct amperage rating.
   c. Set on the switches to verify if the electrical circuit is operational.
   d. If the fuse immediately blows again, check the electrical circuit.

<table>
<thead>
<tr>
<th>Fuse</th>
<th>Amperage rating</th>
<th>Q’ty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main</td>
<td>7.5A</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:
   • battery cover
   • mat

   Refer to “COVER AND PANEL”. 
REPLACING THE HEADLIGHT BULB

1. Remove:
   • headlight cover

2. Disconnect:
   • headlight coupler

3. Remove:
   • headlight bulb holder rubber
   • headlight bulb holder
   • headlight bulb

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

4. 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.

5. Install:
   • headlight bulb holder
6. Connect:
   • headlight bulb holder rubber
7. Install:
   • headlight lead coupler
8. Install:
   • headlight cover
ADJUSTING THE HEADLIGHT BEAM

1. Adjust:
   • headlight beam (vertically)

   a. Turn the adjusting screw 1 in direction a or b.

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

2. Adjust:
   • headlight beam (horizontally)

   a. Turn the adjusting knob 2 in direction a or b.

<table>
<thead>
<tr>
<th>Direction</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a)</td>
<td>Headlight beam moves right</td>
</tr>
<tr>
<td>(b)</td>
<td>Headlight beam moves left</td>
</tr>
</tbody>
</table>
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FRONT WHEEL AND BRAKE

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
</table>
| 1     | Stop ring                 | 1    | Remove the parts in the order listed.  
|       |                            |      | **NOTE:** Place the scooter on a suitable stand so that the front wheel is elevated.  
| 2     | Speedometer cable         | 1    | Refer to "REMOVING THE FRONT WHEEL and INSTALLING THE FRONT WHEEL".  
| 3     | Adjuster                  | 1    |                                              |
| 4     | Front brake cable         | 1    |                                              |
| 5     | Pin                       | 1    |                                              |
| 6     | Wheel axle nut            | 1    |                                              |
| 7     | Wheel axle                | 1    |                                              |
| 8     | Front brake shoe plate    | 1    |                                              |
| 9     | Collar                    | 1    |                                              |
| 10    | Front wheel               | 1    | For installation, reverse the removal procedure.|

Removing the front wheel and brake

Remove the parts in the order listed.

NOTE: Place the scooter on a suitable stand so that the front wheel is elevated.

Refer to "REMOVING THE FRONT WHEEL and INSTALLING THE FRONT WHEEL".

For installation, reverse the removal procedure.

48Nm (4.8 mkg, 34.7 ft lb)
### 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></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></td>
</tr>
<tr>
<td>④</td>
<td>Bearing</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

Remove the parts in the order listed.

Refer to “REMOVING THE FRONT WHEEL” and “INSTALLING THE FRONT WHEEL” for assembly, reverse the disassembly procedure.
## FRONT BRAKE SHOE PLATE

### Disassembling the front brake shoe plate

<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 shoe kit</td>
<td>1</td>
<td>Remove the parts in the order listed.</td>
</tr>
<tr>
<td>2</td>
<td>Tension spring</td>
<td>2</td>
<td>Refer to “DISASSEMBLING THE BRAKE SHOE PLATE” and “ASSEMBLING THE BRAKE SHOE PLATE”.</td>
</tr>
<tr>
<td>3</td>
<td>Comshaft lever</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Indicator plate</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Return spring</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Brake camshaft / O-ring</td>
<td>1/1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Oil seal</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Oil seal</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Circlip</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Plate washer</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Speedometer clutch</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Drive gear</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Plate washer</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Bush</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Oil seal</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Speedometer gear</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Plate washer</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

- **注意事项**: 8Nm (0.8 m·kg, 5.8 ft·lb)

- **组装**，请逆向拆解步骤。
REMOVING THE FRONT WHEEL

1. Stand the scooter on a level surface.

**WARNING**

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

**NOTE:**

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

2. Remove:
   - speedometer cable
   - front brake cable
   - front wheel axle nut
   - front wheel axle
   - front wheel
   - collar
   - front brake shoe plate

Refer to “FRONT WHEEL AND BRAKE”.

DISASSEMBLING THE BRAKE SHOE PLATE

1. Remove:
   - front brake shoe
   - comshaft lever
   - indicator plate
   - return spring
   - brake camshaft
   - speedometer gear

**NOTE:**

Remove the bush from the brake shoe plate with the meter gear bush tool.

2. Remove:
   - circlip
   - plate washer
   - speedometer clutch
   - drive gear
   - plate washer

3. Remove:
   - bush
   - speedometer gear
   - plate washer
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:
   - radial wheel runout ①
   - lateral wheel runout ②
     Over the specified limits → Replace.

   **Radial wheel runout limit**
   1.0 mm (0.04 in)

   **Lateral wheel runout limit**
   1.0 mm (0.04 in)

4. Check:
   - wheel bearings
     Front wheel turns roughly or is loose → Replace the wheel bearings.
   - oil seals
     Damage/wear → Replace.

5. Replace:
   - wheel bearings New
   - oil seal New

*******************************************************************************

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a. Clean the outside of the front wheel hub.
b. Remove the oil seal ① with a flat-head screwdriver.

**NOTE:**
To prevent damaging the wheel, place a rag ② between the screwdriver and the wheel surface.

c. Remove the wheel bearings ④ with a general bearing puller ③.
d. Install the new wheel bearings and oil seal in the reverse order of disassembly.

EAS00535

**CHECKING THE SPEEDOMETER GEAR UNIT**

1. Check:
   - speedometer clutch
     Bends/damage/wear → Replace.

2. Check:
   - speedometer drive gear ①
   - speedometer gear ②
     Damage/wear → Replace.
CHECKING THE BRAKE
The following procedure applies to all of the brake shoes.

1. Check:
   - brake shoe lining
     Glazed areas → Repair.
     Sand the glazed areas with course sandpaper.

   NOTE: After sanding the glazed areas, clean the brake shoe with a cloth.

2. Measure:
   - brake shoe lining thickness
     Out of specification → Replace.

   Brake shoe lining thickness limit
   (minimum)
   2.0 mm (0.079 in)

   WARNING
   Do not allow oil or grease to contact the brake shoes.

   NOTE: Replace the brake shoes as a set, if either is worn to the wear limit.

3. Measure:
   - brake drum inside diameter
     Out of specification → Replace the wheel.

   Brake drum inside diameter limit
   (maximum)
   110.5 mm (4.35 in)
4. Check:
   • brake drum inner surface
     Oil deposits → Clean.
     Remove the oil with a rag soaked in lacquer thinner or solvent.
     Scratches → Repair.
     Lightly and evenly polish the scratches with an emery cloth.

5. Check:
   • brake camshaft
     Damage/wear → Replace.

---

EAS0537

ASSEMBLING THE BRAKE SHOE PLATE

1. Install:
   • brake camshaft ①
   • spring
   • brake shoe wear indicator ②

a. Install the brake camshaft so its punch mark ③ is positioned as shown.
b. Align the projection ⑥ on the brake shoe wear indicator with the notch in the brake camshaft.
c. Check that the brake shoes are properly positioned.

2. Install:
   • camshaft lever

   7 Nm (0.7 m kg, 5.1 ft lb)

   Align the camshaft punch mark ③ and camshaft lever punch mark ⑥ is positioned as shown.

3. Install:
   • speedometer gear
   • bush (with the meter gear bush tool)
ASSEMBLING THE FRONT WHEEL

1. Install:
   - wheel bearing (right) \( \textit{New} \)
   - oil seal \( \textit{New} \)
   - spacer
   - wheel bearing (left) \( \textit{New} \)

   a. Install the new wheel bearings and oil seal in the reverse order of disassembly.

   **CAUTION:**

   Do not contact the wheel bearing inner race \( \textcircled{1} \) or balls \( \textcircled{2} \). Contact should be made only with the outer race \( \textcircled{3} \).

   **NOTE:**

   Use a socket \( \textcircled{4} \) that matches the diameter of the wheel bearing outer race and oil seal.

2. Install:
   - brake shoe plate
   
   Align the tab on the speedometer clutch with the slot in the wheel hub.
INSTALLING THE FRONT WHEEL

1. Lubricate:
   - wheel axle
   - wheel bearings
   - oil seal lips
   - speedometer drive gear
   - speedometer gear

   Recommended lubricant
   Lithium-soap-based grease

2. Install:
   - front wheel

   NOTE:
   Make sure the slot in the brake shoe plate fits over the stopper on the outer tube.

3. Tighten:
   - wheel axle nut

   48 Nm (4.8 m•kg, 34.7 ft•lb)

   WARNING
   Make sure the brake cable is routed properly.

   CAUTION:
   Before tightening the wheel axle nut, push down hard on the handlebar several times and check if the front fork rebounds smoothly.
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 disc installed.

1. Remove:
   - balancing weight(s)

2. Find:
   - front wheel’s heavy spot

NOTE: Place the front wheel on a suitable balancing stand.

*****************************************************

a. Spin the front wheel.
b. When the front wheel stops, put an “X1” mark at the bottom of the wheel.
c. Turn the front wheel 90° so that the “X1” mark is positioned as shown.
d. Release the front wheel.
e. When the wheel stops, put an “X2” mark at the bottom of the wheel.
f. Repeat steps (d) through (f) 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”.
*****************************************************

Downloaded from www.ScooterTime.net
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 it stays at each position shown.
   b. If the front wheel does not remain stationary at all of the positions, rebalance it.
   ****************************************************
### REAR WHEEL AND BRAKE

#### 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>Self lock nut/Plate washer</td>
<td>1/1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Brake adjuster</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Rear brake cable</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Pin</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Rear wheel</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Brake shoe kit</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Tension spring</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Plate washer</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Camshaft lever</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Indicator plate</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Return spring</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Brake camshaft/O-ring</td>
<td>1/2</td>
<td></td>
</tr>
</tbody>
</table>

**NOTE:**
Place the scooter on a suitable stand so that the front wheel is elevated.

Refer to “MANIFOLD, AIR FILTER AND MUFFLER ASSEMBLY” in chapter 5.

For installation, reverse the removal procedure.
REMOVING THE REAR WHEEL

1. Stand the scooter on a level surface.

**WARNING**
Securley support the scooter so that there is no danger of it falling over.

**NOTE:**
Place the scooter on a suitable stand so that the rear wheel is elevated.

2. Remove:
   - brake adjuster

3. Remove:
   - muffler assembly
   - wheel axle nut (1)

4. Remove:
   - rear wheel (1)
CHECKING THE REAR WHEEL
1. Check:
   • tire
   • rear wheel
     Damage/wear → Replace.
     Refer to “CHECKING THE TIRES” and
     “CHECKING THE WHEELS” in chapter
     3.
2. Measure:
   • radial wheel runout
   • lateral wheel runout
   Refer to “CHECKING THE FRONT
   WHEEL”.

CHECKING THE REAR WHEEL DRIVE HUB
1. Check:
   • rear wheel drive hub
     Cracks/damage → Replace.
CHECKING THE BRAKE
The following procedure applies to all of the brake shoes.

1. Check:
   - brake shoe lining
     Glazed areas → Repair.
     Sand the glazed areas with course sandpaper.

   NOTE:
   After sanding the glazed areas, clean the brake shoe with a cloth.

2. Measure:
   - brake shoe lining thickness @
     Out of specification → Replace.

   **Brake shoe lining thickness limit (minimum)**
   2.0 mm (0.079 in)

   **WARNING**
   Do not allow oil or grease to contact the brake shoes.

   NOTE:
   Replace the brake shoes as a set, if either is worn to the wear limit.

3. Measure:
   - brake drum inside diameter b
     Out of specification → Replace the wheel.

   **Brake drum inside diameter limit (maximum)**
   110.5 mm (4.35 in)

4. Check:
   - brake drum inner surface
     Oil deposits → Clean.
     Remove the oil with a rag soaked in lacquer thinner or solvent.
     Scratches → Repair.
     Lightly and evenly polish the scratches with an emery cloth.

5. Check:
   - brake camshaft
     Damage/wear → Replace.
ASSEMBLING THE BRAKE SHOE PLATE

1. Install:
   • brake camshaft ①
   - 7 Nm (0.7 m•kg, 5.1 ft•lb)
     • return spring ②
     • brake shoe wear indicator ③

   a. Install the brake camshaft ① so its punch mark ③ is positioned as shown.
   b. Align the projection ② on the brake shoe wear indicator with the notch in the brake shoe camshaft.
   c. Check that the brake shoes are properly positioned.

2. Install:
   • brake shoes ①
   • tension springs

   CAUTION:
   • Do not put lubricating oil on the brake lining.
   • Change the tension spring at the same time of changing the brake shoe.
   • Refer to the direction in the illustration when assembling the brake shoe and spring.
   • Refer to the illustration with regards to the assembly direction of tension spring, and do not let the spring hook and coil to be damaged by the pliers.
INSTALLING THE REAR WHEEL

1. Lubricate:
   • wheel axle

   Recommended lubricant
   Lithium-soap-based grease

2. Install:
   • rear wheel

3. Tighten:
   • wheel axle nut

   \[ 104 \text{ Nm (10.4 \text{ m} \cdot \text{kg, 75.2 ft} \cdot \text{lb})} \]

4. Install:
   • muffler assembly

5. Adjust:
   • brake lever free play
   Refer to “ADJUSTING THE REAR BRAKE” in chapter 3.

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 rear wheel drive hub installed.

1. Adjust:
   • rear wheel static balance
   Refer to “ADJUSTING THE FRONT WHEEL STATIC BALANCE”.

4-18
Removing the front fork legs

Front wheel
Handlebar
Front fork assembly
Headlight cover
Leg shield 1
Lower bracket pinch bolt
Snap ring
Inner tube plug
Front fork leg

30Nm (3.0 m·kg, 21.7 ft·lb)

Remove the parts in the order listed.
Refer to “FRONT WHEEL AND BRAKE”.
Refer to “HANDLE BAR”.
Refer to “STEERING HEAD”.
Refer to “COVER AND PANEL” in chapter 3.

For installation, reverse the removal procedure.
### Disassembling the front fork legs

<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>Band</td>
<td>1</td>
<td>Remove the parts in the order listed.</td>
</tr>
<tr>
<td>2</td>
<td>Boot</td>
<td>1</td>
<td>Refer to “DISASSEMBLING AND INSTALLING THE FRONT FORK LEGS”</td>
</tr>
<tr>
<td>3</td>
<td>Dust seal</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Circlip</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Spring guide</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Rebound spring</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Inner tube</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Damper rubber</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Fork spring</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Outer tube</td>
<td>1</td>
<td>For assembly, reverse the disassembly procedure.</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 scooter on a level surface.

**WARNING**
Securely support the scooter so that there is no danger of it falling over.

**NOTE:**
Place the scooter on a suitable stand so that the front wheel is elevated.

2. Loosen:
   - lower bracket pinch bolt
3. Remove:
   - snap ring
   - front fork leg

**WARNING**
Before loosening the lower bracket pinch bolts, support the front fork leg.

DISASSEMBLING THE FRONT FORK LEGS
The following procedure applies to both of the front fork legs.

1. Remove:
   - band
   - foot
   - inner tube plug

2. Remove:
   - dust seal
   - circlip
   - spring guide
   - rebound spring
   - inner tube

**CAUTION:**
Do not scratch the inner tube.
CHECKING THE FRONT FORK LEGS
The following procedure applies to both of the front fork legs.

1. Check:
   - inner tube
   - outer tube
   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
   Out of specification → Replace.

   **Spring free length**
   125 mm (4.921 in)
   <Limit> : 122.5 mm (4.823 in)

3. Check:
   - inner tube
   - spring guide
   - rebound spring
   Damage/wear → Replace.

4. Check:
   - damper rubber
   - fork spring
   - outer tube
   Damage/wear → Replace.
ASSEMBLING THE FRONT FORK LEGS
The following procedure applies to both of the front fork legs.

NOTE:
- When assembling the front fork leg, be sure to replace the following parts:
  - dust seal
  - circlip
- Before assembling the front fork leg, make sure all of the components are clean.

1. Install:
   - fork spring ①
   - damper rubber ②

   NOTE:
   - Install the spring with the smaller pitch facing down.

2. Lubricate:
   - inner tube’s outer surface
   - rebound spring
   - fork spring
   - circlip

   Recommended lubricant
   Molybdenum-disulfide grease

3. Install:
   - inner tube ①
   - rebound spring ②
   - spring guide ③
   - circlip ④ New
   - dust seal ⑤ New

4. Install:
   - boot
   - band New
INSTALLING THE FRONT FORK LEGS
The following procedure applies to both of the front fork legs.

1. Install:
   - front fork leg ①
   - snap ring ② New
   - inner tube plug
   - lower bracket pinch bolt ③

   **NOTE:**
   Pull up the inner tube until it stops, then install the snap ring to groove.

2. Tighten:
   - lower bracket pinch bolt

   ⚠ 30 Nm (3.0 m • kg, 21.7 ft • lb)
**Removing the handlebar**
Headlight cover
Leg shield 1
1
2
3
4
5
6
7
8
9
10
11
12
13
14

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
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<tr>
<td>1</td>
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<tr>
<td>2</td>
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<td>3</td>
<td>Speedometer assembly</td>
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<td>4</td>
<td>Rear view mirror(left and right)</td>
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<tr>
<td>5</td>
<td>Front brake cable</td>
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<td>6</td>
<td>Front brake switch</td>
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<tr>
<td>7</td>
<td>Brake lever (right)</td>
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</tr>
<tr>
<td>8</td>
<td>Handlebar holder assembly(right)</td>
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</tr>
<tr>
<td>9</td>
<td>Throttle cable kit</td>
<td>1</td>
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<tr>
<td>10</td>
<td>Throttle grip assembly</td>
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</tr>
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<td>11</td>
<td>Rear brake cable</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Rear brake switch</td>
<td>1</td>
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</tr>
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<td>13</td>
<td>Brake lever(left)</td>
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</tr>
<tr>
<td>14</td>
<td>Handlebar holder assembly(left)</td>
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</tr>
</tbody>
</table>

Remove the parts in the order listed. Refer to “COVER AND PANEL” in chapter 3.

**60Nm (6.0 m·kg, 43.4 ft·lb)**
HANDLEBAR

For installation, reverse the removal procedure.

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q’ty</th>
<th>Remarks</th>
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<tbody>
<tr>
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<tr>
<td>16</td>
<td>Handlebar upper cover</td>
<td>1</td>
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<tr>
<td>17</td>
<td>Handlebar assembly</td>
<td>1</td>
<td>For installation, reverse the removal procedure.</td>
</tr>
</tbody>
</table>

60Nm (6.0 m-kg, 43.4 ft-lb)
REMOVING THE HANDLEBAR

1. Stand the scooter on a level surface.
2. Remove:
   - handlebar holder assembly (right) ①
   - throttle grip assembly ②

   **NOTE:**
   While removing the handlebar holder assembly (right), pull back the rubber cover.

3. Remove:
   - handlebar grip

   **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 scooter on a level surface.
2. Check:
   - handlebar ①
     Bends/cracks/damage → Replace.

   **WARNING**
   Do not attempt to straighten a bent handlebar as this may dangerously weaken it.
INSTALLING THE HANDLEBAR

1. Stand the scooter on a level surface.

**WARNING**

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

2. Install:
   - Handlebar

   **NOTE:**
   Align the slot on the handlebar with the steering shaft surface.

3. Tighten:
   - Handlebar
   - 60 Nm (6.0 m·kg, 43.4 ft·lb)

   **CAUTION:**
   There must be a space after tightening bolt.

4. Install:
   - Handlebar upper cover

5. Install:
   - Handlebar holder assembly (left)

   **NOTE:**
   Align the projection on the handlebar holder assembly (left) with the hole on the handlebar.

6. Install:
   - Throttle grip assembly
   - Handlebar holder assembly (right)
   - Throttle cable kit

---

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NOTE:
- Lubricate the inside of the throttle grip with a thin coat of lithium-soap-based grease and install it onto the handlebar(4).
- Align the projection(3) on the right handlebar holder assembly with the hole(6) on the handlebar.

WARNING
Make sure the throttle grip operates smoothly.

7. 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)
1.5 ~ 3.5 mm (0.059 ~ 0.138 in)
### Removing the front fork assembly

Front wheel  
Leg shield 1  
Handlebar assembly  
Front fender  
Inner fender  
Cable holder  
Ball race cover  
Ring nut  
Upper bearing inner race  
Front fork assembly  
Upper bearing  
Lower bearing  
Upper bearing outer race  
Lower bearing outer race  
Lower bearing inner race

<table>
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<th>Job/Part</th>
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<th>Remarks</th>
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</tr>
<tr>
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<td>Front wheel</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Leg shield 1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Handlebar assembly</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Front fender</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Inner fender</td>
<td>1</td>
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</tr>
<tr>
<td>4</td>
<td>Cable holder</td>
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<tr>
<td>5</td>
<td>Ball race cover</td>
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<tr>
<td>6</td>
<td>Ring nut</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Upper bearing inner race</td>
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</tr>
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<td>8</td>
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<td></td>
</tr>
<tr>
<td>9</td>
<td>Upper bearing</td>
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<td>10</td>
<td>Lower bearing</td>
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<td>11</td>
<td>Upper bearing outer race</td>
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<td>12</td>
<td>Lower bearing outer race</td>
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<tr>
<td></td>
<td>Lower bearing inner race</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

Remove the parts in the order listed.  
Refer to “FRONT WHEEL AND BRAKE”. 
Refer to “COVER AND PANEL” in chapter 3.  
Refer to “HANDLEBAR”. 

For installation, reverse the removal procedure.
REMOVING THE FRONT FORK ASSEMBLY

1. Stand the scooter on a level surface.

**WARNING**
Securely support the scooter so that there is no danger of it falling over.

**NOTE:**
Place the scooter on a suitable stand so that the front wheel is elevated.

2. Remove:
   - ball race cover
   - ring nut
   (with the ring nut wrench)

   ![Ring nut wrench diagram](90890-01268_YU-01268)

3. Remove:
   - upper bearing inner race
   (with the ring nut wrench)

   **WARNING**
Securely support the front fork assembly so that there is no danger of it falling.
CHECKING THE STEERING HEAD

1. Wash:
   - bearing balls
   - bearing races

<table>
<thead>
<tr>
<th>Recommended cleaning solvent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kerosene</td>
</tr>
</tbody>
</table>

2. Check:
   - bearing balls
   - bearing races
   - Damage/pitting → Replace.

3. Replace:
   - bearing balls
   - bearing races
   - a. Remove the bearing races from the steering head pipe with a long rod and hammer.
   - b. Remove the bearing race from the front fork assembly with a floor chisel and hammer.

**CAUTION:**
If the bearing race is not installed properly, the steering head pipe could be damaged.

**NOTE:**
Always replace the balls and bearing races as a set.

4. Check:
   - front fork assembly
     (along with the steering stem)
     Bends/cracks/damage → Replace.
INSTALLING THE STEERING HEAD

1. Lubricate:
   - bearing balls ①
   - bearing races

   Recommended lubricant
   Lithium-soap-based grease

2. Install:
   - front fork assembly ①
   - upper bearing inner race ②

   7 Nm (0.7 m·kg, 5.1 ft·lb)

   (with the ring nut wrench ③)

3. Install:
   - ring nut ①

   30 Nm (3.0 m·kg, 21.7 ft·lb)

   (with the ring nut wrench ②)

   Ring nut wrench
   90890-01403
   YU-A9472

Refer to “CHECKING THE STEERING HEAD” in chapter 3.
### Removing the Rear Shock Absorber Assembly

<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>Rear shock absorber assembly upper nut</td>
<td>1</td>
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<tr>
<td>2</td>
<td>Rear shock absorber assembly upper bolt</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Rear shock absorber assembly lower bolt</td>
<td>1</td>
<td>For installation, reverse the removal proce-</td>
</tr>
<tr>
<td>4</td>
<td>Rear shock absorber assembly</td>
<td>1</td>
<td>dure.</td>
</tr>
</tbody>
</table>

**Torque Specifications:**
- **30N\(\text{m}\) (3.0 \text{m\(\times\)kg}, 21.7 \text{ft\(\times\)lb})**
- **16N\(\text{m}\) (1.6 \text{m\(\times\)kg}, 11.6 \text{ft\(\times\)lb})**
REAR SHOCK ABSORBER ASSEMBLY

REMOVING THE REAR SHOCK ABSORBER ASSEMBLY
1. Stand the scooter on a level surface.

**WARNING**
Securely support the scooter so that there is no danger of it falling over.

**NOTE:**
Place the scooter on a suitable stand so that the rear wheel is elevated.

2. Remove:
   - rear shock absorber nut (upper)
   - rear shock absorber bolt (lower)

CHECKING THE REAR SHOCK ABSORBER ASSEMBLY
1. Check:
   - rear shock absorber rod
     Bend/damage → Replace the rear shock absorber assembly.
   - rear shock absorber
     Oil leak → Replace the rear shock absorber assembly.
   - spring
     Damage/wear → Replace the rear shock absorber assembly.
   - bushing
     Damage/wear → Replace.
   - dust seal
     Damage/wear → Replace.
   - bolts
     Bends/damage/wear → Replace.
REAR SHOCK ABSORBER ASSEMBLY

INSTALLING THE REAR SHOCK ABSORBER ASSEMBLY

1. Lubricate:
   • spacer
   • bush

   Recommended lubricant
   Molybdenum disulfide grease

2. Install:
   • rear shock absorber assembly

3. Tighten:
   • rear shock absorber assembly upper nut
     \[ \times 30 \text{ Nm (3.0 m\cdot kg, 21.7 ft\cdot lb)} \]
   • rear shock absorber assembly lower bolt
     \[ \times 16 \text{ Nm (1.6 m\cdot kg, 11.6 ft\cdot lb)} \]
CHAPTER 5
ENGINE

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Removing the leads, hoses and rear brake

Seat/Trunk/Rear carrier
Battery cover/Battery holder
Battery/Front cover
Side cover (left and right)/Rear cover
Footrest board side cover mole (left and right)
Mat/Footrest board
Coolant

Radiator
Thermostat housing
Water pump assembly
Carburetor
Thermo unit lead

<table>
<thead>
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<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
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<td></td>
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<td>Refer to “COVER AND PANEL” in chapter 3.</td>
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<td>Battery/Front cover</td>
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<td>Side cover (left and right)/Rear cover</td>
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<td>Footrest board side cover mole (left and right)</td>
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<td>Radiator</td>
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<td>Refer to “CARBURETOR” in chapter 7.</td>
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<tr>
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<td>Water pump assembly</td>
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<td>Carburetor</td>
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<td>Thermo unit lead</td>
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### Job/Part

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<th>Q'ty</th>
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<tr>
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<td>Starting motor lead/Earth lead</td>
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<td>Disconnect.</td>
</tr>
<tr>
<td>3</td>
<td>Ignition primary coil lead</td>
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</tr>
<tr>
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<td>Vacuum hose(to air cut-off valve)</td>
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<td></td>
</tr>
<tr>
<td>5</td>
<td>Hose(to air cut-off valve)</td>
<td>1</td>
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<tr>
<td>6</td>
<td>Vacuum hose(to fuel cock)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Rear brake cable/Adjuster/Pin</td>
<td>1/1/1</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Kickstarter</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Rear wheel lock cable cover</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Rear wheel lock cable</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Rear shock absorber assembly lower bolt</td>
<td>1</td>
<td>Refer to &quot;REAR SHOCK ABSORBER ASSEMBLY&quot; in chapter 4.</td>
</tr>
<tr>
<td>12</td>
<td>Self lock nut</td>
<td>1</td>
<td>Refer to &quot;INSTALLING THE ENGINE&quot;.</td>
</tr>
<tr>
<td>13</td>
<td>Engine mounting bolt</td>
<td>1</td>
<td>For installation, reverse the removal procedure.</td>
</tr>
</tbody>
</table>

- 46Nm (4.6 m·kg, 33.3 ft·lb)
- 10Nm (1.0 m·kg, 7.2 ft·lb)
- 12Nm (1.2 m·kg, 8.7 ft·lb)
- 16Nm (1.6 m·kg, 11.6 ft·lb)
- 12Nm (1.2 m·kg, 8.7 ft·lb)
- 16Nm (1.6 m·kg, 11.6 ft·lb)
## MANIFOLD, AIR FILTER AND MUFFLER ASSEMBLY

### Removing the manifold, air filter and muffler assembly

**Rear brake cable (adjuster/pin)**
- 10Nm (1.0 m/kg, 7.2 ft/lb)

**Rear wheel lock cable**
- 8Nm (0.8 m/kg, 5.8 ft/lb)

**Hose (to air cut-off valve)**
- 10Nm (1.0 m/kg, 7.2 ft/lb)

**Vacuum hose (to air cut-off valve)**
- 13Nm (1.3 m/kg, 9.4 ft/lb)

**Vacuum hose (to fuel cock)**
- 8Nm (0.8 m/kg, 5.8 ft/lb)

**Throttle cable kit**
- 10Nm (1.0 m/kg, 7.2 ft/lb)

**Auto choke lead**
- 6Nm (0.6 m/kg, 4.4 ft/lb)

**Throttle position sensor lead**
- 10Nm (1.0 m/kg, 7.2 ft/lb)

**Muffler assembly / Gasket**
- 31Nm (3.1 m/kg, 22.4 ft/lb)

**Spark plug cap**
- 13Nm (1.3 m/kg, 9.4 ft/lb)

**Ignition coil**
- 10Nm (1.0 m/kg, 7.2 ft/lb)

**Air filter assembly / Breather hose**
- 10Nm (1.0 m/kg, 7.2 ft/lb)

**Starter motor assembly**
- 10Nm (1.0 m/kg, 7.2 ft/lb)

**Rear fender**
- 10Nm (1.0 m/kg, 7.2 ft/lb)

**Manifold / O-ring**
- 13Nm (1.3 m/kg, 9.4 ft/lb)

---

<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>Muffler assembly / Gasket</td>
<td>1/1</td>
<td>Remove the parts in the order listed.</td>
</tr>
<tr>
<td>2</td>
<td>Spark plug cap</td>
<td>1</td>
<td>Refer to “LEADS, HOSES AND REAR BRAKE”.</td>
</tr>
<tr>
<td>3</td>
<td>Ignition coil</td>
<td>1</td>
<td>Refer to “CARBURETOR” in chapter 7.</td>
</tr>
<tr>
<td>4</td>
<td>Air filter assembly / Breather hose</td>
<td>1/1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Starter motor assembly</td>
<td>1</td>
<td>For installation, reverse the removal procedure.</td>
</tr>
<tr>
<td>6</td>
<td>Rear fender</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Manifold / O-ring</td>
<td>1/1</td>
<td></td>
</tr>
</tbody>
</table>

---

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INSTALLING THE ENGINE

1. Install:
   ● engine [1]
   ● engine mounting bolt [2]
   ● self lock nut [3]

   **NOTE:**
   Do not fully tighten the bolts.

2. Tighten:
   ● self lock nut

   ![46Nm(4.6 m • kg, 33.3 ft • lb)]

3. Tighten:
   ● rear shock absorber assembly lower bolt [1]

   ![16 Nm (1.6 m • kg, 11.6 ft • lb)]
## Removing the cylinder head

- Muffler assembly
- Air filter assembly/Breather hose
- Manifold/O-ring
- Thermostat unit
- Spark plug
- Cylinder head cover
- O-ring
- Timing chain tensioner assembly
- Timing chain tensioner gasket
- Camshaft sprocket
- Bolt
- Nut
- Plate
- Cylinder head
- Cylinder head gasket
- Dowel pin

### Table

<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>Thermostat unit</td>
<td>1</td>
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<tr>
<td>2</td>
<td>Spark plug</td>
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<td>3</td>
<td>Cylinder head cover</td>
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<tr>
<td>4</td>
<td>O-ring</td>
<td>1</td>
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<td>5</td>
<td>Timing chain tensioner assembly</td>
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<td>6</td>
<td>Timing chain tensioner gasket</td>
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</tr>
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<td>7</td>
<td>Camshaft sprocket</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Bolt</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Nut</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Plate</td>
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<td></td>
</tr>
<tr>
<td>11</td>
<td>Cylinder head</td>
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<td></td>
</tr>
<tr>
<td>12</td>
<td>Cylinder head gasket</td>
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<td></td>
</tr>
<tr>
<td>13</td>
<td>Dowel pin</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

### Remarks

- Remove the parts in the order listed.
- Refer to "MANIFOLD, AIR FILTER AND MUFFLER ASSEMBLY".
- Refer to "REMOVING THE CYLINDER HEAD".
- For installation, reverse the removal procedure.

---

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REMOVING THE CYLINDER HEAD

1. Remove:
   • crankcase cover (left)
     Refer to "BELT DRIVE".
   • cylinder head cover

2. Align:
   • "I" mark \( \text{a} \) on the magneto rotor
     (with the stationary pointer \( \text{b} \) on the crankcase cover)

   ******************************************************************************
   a. Turn the primary fixed sheave counterclockwise.
   b. When the piston is at TDC on the compression stroke, align the "I" mark \( \text{c} \) on the camshaft sprocket with the mark \( \text{d} \) on the plate.
   ******************************************************************************

3. Loosen:
   • timing chain tensioner bolt
   • camshaft sprocket bolt \( \text{1} \)
     While holding the crank bolt with a wrench \( \text{2} \), remove the camshaft sprocket bolt \( \text{1} \).

Rotor holding tool
90890-01235
YU-01235
4. Remove:
   - timing chain tensioner (along with the gasket)
   - camshaft sprocket ①
   - timing chain ②

   **NOTE:**
   To prevent the timing chain from falling into the crankcase, fasten it with a wire.

5. Remove:
   - cylinder head

   **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

1. Eliminate:
   - combustion chamber carbon deposits
     (with a rounded scraper)

   **NOTE:**
   Do not use a sharp instrument to avoid damaging or scratching:
   - spark plug bore thread
   - valve seats

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

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

   **Maximum cylinder head warpage**
   0.05 mm (0.002 in)

   a. Place a straightedge and a thickness gauge across the cylinder head.
   b. Measure the warpage.
   c. If the limit 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
   - dowel pins

2. Install:
   - cylinder head

3. Tighten:
   - cylinder head nuts
     \[ 10 \text{ Nm (1.0 m} \cdot \text{kg, 7.2 ft} \cdot \text{lb) } \]
   - cylinder head bolts
     \[ 10 \text{ Nm (1.0 m} \cdot \text{kg, 7.2 ft} \cdot \text{lb) } \]

NOTE:
- Lubricate the cylinder head nuts with engine oil.
- Tighten the cylinder head nuts in the proper tightening sequence as shown and torque them in two stages.

4. Install:
   - camshaft sprocket ①
   - timing chain ②

*******************************************************************************
   a. Turn the primary pulley counterclockwise.
   b. Align the “I” mark ① on the AC magneto rotor with the stationary pointer ② on the crankcase cover.
   c. Align the “I” mark ③ on the camshaft sprocket with the stationary pointer ④ on the plate.
   d. Install the timing chain onto the camshaft sprocket, and then install the camshaft sprocket onto the camshaft.

NOTE:
- When installing the camshaft sprocket, be sure to keep the timing chain as tight as possible on the exhaust side.
- Align the slot on the camshaft with the tab in the camshaft sprocket.
CAUTION: Do not turn the crankshaft when installing the camshaft to avoid damage or improper valve timing.

e. While holding the camshaft, temporarily tighten the camshaft sprocket bolt.
f. Remove the wire from the timing chain.

5. Install
   - camshaft sprocket bolt

6. Install:
   - timing chain tensioner gasket
   - timing chain tensioner

   a. Remove the cap bolt and spring.
   b. Release the timing chain tensioner one-way cam and push the timing chain tensioner rod all the way into the timing chain tensioner housing.
   c. Install the timing chain tensioner and gasket onto the cylinder.

   Timing chain tensioner bolt
   9 Nm (0.9 m·kg, 6.5 ft·lb)

   d. Install the spring and cap bolt.

   Cap bolt
   8 Nm (0.8 m·kg, 5.8 ft·lb)
7. Turn:
• crankshaft
  (several turns counterclockwise)

8. Check:
• “I” mark @
  Align the “I” mark on the AC magneto rotor with the stationary pointer b on the crankcase cover.
• “I” mark ©
  Align the “I” mark on the camshaft sprocket with the stationary pointer d on the plate.
  Out of alignment → Correct.
  Refer to the installation steps above.

9. Tighten:
• camshaft sprocket bolt
  30 Nm (3.0 m•kg, 21.7 ft•lb)

**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.

10. Measure:
• valve clearance
  Out of specification → Adjust
  Refer to “ADJUSTING THE VALVE CLEARANCE” in chapter 3.
## THE ROCKERS ARMS AND CAMSHAFT

### THE ROCKERS ARMS AND CAMSHAFT

![Image of the rocker arms and camshaft](image_url)

<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 rocker arms and cam-shaft</td>
<td></td>
<td>Remove the parts in the order listed.</td>
</tr>
<tr>
<td></td>
<td>Cylinder head</td>
<td>1</td>
<td>Refer to “CYLINDER HEAD”.</td>
</tr>
<tr>
<td>2</td>
<td>Camshaft</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Rocker arm shaft (intake)</td>
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<td></td>
</tr>
<tr>
<td>4</td>
<td>Rocker arm shaft (exhaust)</td>
<td>1</td>
<td></td>
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<tr>
<td>5</td>
<td>Rocker arm (intake)</td>
<td>1</td>
<td>For installation, reverse the removal pro-</td>
</tr>
<tr>
<td>6</td>
<td>Rocker arm (exhaust)</td>
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</tr>
<tr>
<td>7</td>
<td>Spring</td>
<td>2</td>
<td>cedure.</td>
</tr>
</tbody>
</table>

For installation, reverse the removal procedure.
REMOVING THE ROCKER ARMS AND CAMSHAFT

1. Remove:
   • camshaft

2. Remove:
   • intake rocker arm shaft
   • exhaust rocker arm shaft
   • intake rocker arm
   • exhaust rocker arm

**NOTE:**
Remove the rocker arm shafts with the clip plier.

CHECKING THE CAMSHAFT

1. Check:
   • camshaft bushings
     Damage/wear → Replace.

2. Check:
   • camshaft lobes
     Blue discoloration/pitting/scratches → Replace the camshaft.

3. Measure:
   • camshaft lobe dimensions a and b
     Out of specification → Replace the camshaft.
Camshaft lobe dimension limit

**Intake**
- ① 30.158~30.258 mm (1.187~1.191 in)
  - <Limit>: 30.058 mm
- ② 25.082~25.182 mm (0.987~0.991 in)
  - <Limit>: 24.982 mm

**Exhaust**
- ① 30.158~30.258 mm (1.187~1.191 in)
  - <Limit>: 30.058 mm
- ② 25.020~25.120 mm (0.985~0.989 in)
  - <Limit>: 24.920 mm

4. Check:
- camshaft oil passage
  - Obstruction → Blow out with compressed air.

---

**CHECKING THE ROCKER ARMS AND ROCKER ARM SHAFTS**

The following procedure applies to all of the rocker arms and rocker arm shafts.

1. Check:
   - rocker arm (camshaft touch surface ①)
   - rocker arm (valve touch surface ②)
     - Damage/wear → Replace.

2. Check:
   - rocker arm shaft
     - Blue discoloration/excessive wear/pitting/scratches → Replace or check the lubrication system.

3. Check:
   - camshaft lobe
     - Excessive wear → Replace the camshaft.
4. Measure:
   - Rocker arm inside diameter
     Out of specification → Replace.

   **Rocker arm inside diameter**
   10 ~ 10.015 mm (0.393 ~ 0.394 in)

5. Measure:
   - Rocker arm shaft outside diameter
     Out of specification → Replace.

   **Rocker arm shaft outside diameter**
   9.981 ~ 9.991 mm (0.392 ~ 0.393 in)

6. Calculate:
   - Rocker-arm-to-rocker-arm-shaft clearance

   **NOTE:**
   Calculate the clearance by subtracting the rocker arm shaft outside diameter from the rocker arm inside diameter.

   Above 0.034 mm (0.001 in) → Replace the defective part(s).

   **Rocker-arm-to-rocker-arm-shaft clearance**
   0.009 ~ 0.034 mm (0.0004 ~ 0.001 in)
CHECKING THE TIMING CHAIN, CAMSHAFT SPROCKETS, AND TIMING CHAIN GUIDES

The following procedure applies to all of the camshaft sprockets and timing chain guides.

1. Check:
   - timing chain
     Damage/stiffness → Replace the timing chain and camshaft sprockets as a set.

2. Check:
   - camshaft sprocket
     More than 1/4 tooth wear (a) → Replace the camshaft sprockets and the timing chain as a set.
     
     (a) 1/4 tooth

3. Check:
   - timing chain guide (exhaust side)
   - timing chain guide (intake side)
   - Timing chain roller
   - Camshaft sprocket
   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
   - o-ring New
   - spring
   - one-way cam
   - gasket New
   - timing chain tensioner rod
     Damage/wear → Replace the defective part(s).
INSTALLING THE CAMSHAFT AND ROCKER ARMS

1. Lubricate:
   * camshaft (1)
   
   **Recommended lubricant**
   Camshaft
   Molybdenum disulfide oil
   Camshaft bearing
   Engine oil

2. Lubricate:
   * rocker arm shafts
   
   **Recommended lubricant**
   Molybdenum disulfide oil

3. Install:
   * exhaust rocker arm (1)
   * spring (2)
   * exhaust rocker arm shaft (3)

   **NOTE:**
   Make sure the exhaust rocker arm shaft is completely pushed into the cylinder head.

4. Install:
   * intake rocker arm (1)
   * spring (2)
   * intake rocker arm shaft (3)

   **NOTE:**
   Make sure the intake rocker arm shaft is completely pushed into the cylinder head.
### Removing the valves and valve springs

- **Cylinder head**
- **Rocker arm and rocker arm shaft**

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
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</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Valve pad</td>
<td>3</td>
<td>Remove the parts in the order listed.</td>
</tr>
<tr>
<td>2</td>
<td>Valve cotter</td>
<td>6</td>
<td>Refer to “CYLINDER HEAD”.</td>
</tr>
<tr>
<td>3</td>
<td>Valve spring retainer</td>
<td>3</td>
<td>Refer to “THE ROCKER ARMS AND CANKSHAFT”.</td>
</tr>
<tr>
<td>4</td>
<td>Valve spring</td>
<td>3</td>
<td>Refer to “INSTALLING THE VALVES AND VALVE SPRINGS”.</td>
</tr>
<tr>
<td>5</td>
<td>Valve(intake)</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Valve(exhaust)</td>
<td>1</td>
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</tr>
<tr>
<td>7</td>
<td>Valve stem seal</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Valve stem seat</td>
<td>3</td>
<td>For installation, reverse the removal procedure.</td>
</tr>
<tr>
<td>9</td>
<td>Valve guide</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>
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 the valves properly seal.

---

1. 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 at into the intake and exhaust ports.
   b. Check that the valves properly seal.

   **NOTE:**
   
   There should be no leakage at the valve seat 1.

   *****************************************

2. Remove:
   - **valve pads 1**

3. Remove:
   - **valve cotters 1**

   **NOTE:**
   
   Remove the valve cotters by compressing the valve spring with the valve spring compressor and the valve spring compressor attachment 2.

---

Valve spring compressor
90890-04019 (YM-04019)

Valve spring compressor attachment
90890-04148 (YM-04148)
4. Remove:
- valve spring retainer ①
- valve spring ②
- valve stem seal ③
- valve spring seat ④
- valve ⑤

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

EAS00239

**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

   \[
   \text{Valve-stem-to-valve-guide clearance} = \text{Valve guide inside diameter} - \text{Valve stem diameter}
   \]

   Out of specification → Replace the valve guide.

   | Valve-stem-to-valve-guide clearance | Intake       | [Limit]: 0.08 mm (0.003 in) |
   |-------------------------------------|-------------|
   |                                    | 0.010 ~ 0.037 mm (0.0004 ~ 0.0015 in) |

   |          | Exhaust    | [Limit]: 0.10 mm (0.004 in) |
   |          | 0.025 ~ 0.052 mm (0.001 ~ 0.002 in) |

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 in an oven.

a. Remove the valve guide with the valve guide remover ①.
b. Install the new valve guide with the valve guide installer ② and valve guide remover ①.
c. After installing the valve guide, bore the valve guide with the valve guide reamer ③ to obtain the proper valve-stem-to-valve-guide clearance.
VALVES AND VALVE SPRINGS

NOTE: After replacing the valve guide, reface the valve seat.

Valve guide remover (4.0 mm)  
90890-04111(YM-04111)
Valve guide installer (4.0 mm)  
90890-04112(YM-04112)
Valve guide reamer (4.0 mm)  
90890-04113(YM-04113)

*******************************************************************************

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 (a)
     Out of specification → Replace the valve.

   Valve margin thickness
   0.70 mm (0.028 in)

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 (0.0004 in)
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 (0.035 ~ 0.043 in)
     <Limit>: 1.6 mm (0.063 in)
     Exhaust: 0.9 ~ 1.1 mm (0.035 ~ 0.043 in)
     <Limit>: 1.6 mm (0.063 in)

   a. Apply Mechanic’s blueing dye (Dykom) \( b \) onto the valve face.
   b. Install the valve into the cylinder head.
   c. Press the valve through the valve guide and onto the valve seat to make a clear impression.
   d. Measure the valve seat width.

NOTE:
Where the valve seat and valve face contacted one another, the blueing will have been removed.

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.
a. Apply a coarse lapping compound to the valve face.

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

b. Apply molybdenum disulfide oil onto the valve stem.
c. 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 hands.

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.

*****************************************************************************

**VALVES AND VALVE SPRINGS**

---

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CHECKING THE VALVE SPRINGS

The following procedure applies to all of the valve springs.

1. Measure:
- valve spring free length \( \text{a} \)
  
  Out of specification → Replace the valve spring.

<table>
<thead>
<tr>
<th>Valve spring free length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intake valve spring</td>
</tr>
<tr>
<td>39.35 mm (1.549 in)</td>
</tr>
<tr>
<td>&lt;Limit&gt;: 37.38 mm (1.472 in)</td>
</tr>
<tr>
<td>Exhaust valve spring</td>
</tr>
<tr>
<td>41.57 mm (1.637 in)</td>
</tr>
<tr>
<td>&lt;Limit&gt;: 39.49 mm (1.555 in)</td>
</tr>
</tbody>
</table>

2. Measure:
- compressed valve spring force \( \text{a} \)
  
  Out of specification → Replace the valve spring.

<table>
<thead>
<tr>
<th>Compressed valve spring force (installed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intake valve spring</td>
</tr>
<tr>
<td>9.3~10.7 kg at 28 mm (20.5 ~ 23.6 lb at 1.102 in)</td>
</tr>
<tr>
<td>Exhaust valve spring</td>
</tr>
<tr>
<td>11.0 ~ 12.7 kg at 30 mm (24.3 ~ 28.0 lb at 1.181 in)</td>
</tr>
</tbody>
</table>

3. Measure:
- valve spring tilt \( \text{a} \)
  
  Out of specification → Replace the valve spring.

<table>
<thead>
<tr>
<th>Spring tilt limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intake valve spring</td>
</tr>
<tr>
<td>1.7 mm (0.067 in) (2.5°)</td>
</tr>
<tr>
<td>Exhaust valve spring</td>
</tr>
<tr>
<td>1.8 mm (0.071 in)(2.5°)</td>
</tr>
</tbody>
</table>
INSTALLING THE VALVES
The following procedure applies to all of the valves and related components.

1. Deburr:
   - valve stem end
     (with an oil stone)

2. Lubricate:
   - valve stem
   - valve stem seal
     (with the recommended lubricant)

   **Recommended lubricant**
   Molybdenum disulfide oil

3. Install:
   - valve
   - valve spring seat
   - valve stem seal
   - New valve spring
   - valve spring retainer
     (into the cylinder head)

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

4. Install:
   - valve cotters

   **NOTE:**
   Install the valve cotters by compressing the valve spring with the valve spring compressor and the valve spring compressor attachment.
5. To secure the valve cotters 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.

6. Install:
   - valve pad ①

**NOTE:**
- Lubricate the valve pad with molybdenum disulfide oil.
- Each valve pad must be reinstalled in its original position.
### CYLINDER AND PISTON

**Removing the cylinder and piston**

<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.</td>
</tr>
<tr>
<td>2</td>
<td>Cylinder</td>
<td>1</td>
<td>Refer to “CYLINDER HEAD”.</td>
</tr>
<tr>
<td>3</td>
<td>Case cap</td>
<td>1</td>
<td>Refer to “INSTALLING THE PISTON AND CYLINDER”.</td>
</tr>
<tr>
<td>4</td>
<td>Reed valve assembly</td>
<td>1</td>
<td>Refer to “REMOVING THE CYLINDER AND PISTON”.</td>
</tr>
<tr>
<td>5</td>
<td>Dowel pin</td>
<td>2</td>
<td>Refer to “INSTALLING THE PISTON AND CYLINDER”.</td>
</tr>
<tr>
<td>6</td>
<td>Cylinder gasket</td>
<td>1</td>
<td>For installation, reverse the removal pro-</td>
</tr>
<tr>
<td>7</td>
<td>Piston pin clip</td>
<td>2</td>
<td>cedure.</td>
</tr>
<tr>
<td>8</td>
<td>Piston pin</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Piston</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Piston ring set</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

**Order:**

- **New**
- **10Nm (1.0 m·kg, 7.2 ft·lb)**
REMOVING THE CYLINDER AND PISTON

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.
   - 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 set.(4).

   **Piston pin puller set**
   90890-01304(YU-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 CYLINDER AND PISTON

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

2. Measure:
   - piston-to-cylinder clearance

a. Please carry out the following inspections:
   - cylinder
   Measure the piston pin in both of its horizontal axis direction a and its right angle direction b at six positions of A, B, etc. with a cylinder gauge.
   Abrasion = Max. value - min. value as measured at those six positions.
   When abrasion is beyond limit → Replace it

<table>
<thead>
<tr>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>38.000 ~ 38.010 mm(1.4961 ~ 1.4965 in)</td>
</tr>
</tbody>
</table>

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

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

   a) 5 mm (0.197 in) from the bottom edge of the piston

   Piston size “P”
   37.975 ~ 37.990 mm (1.495 ~ 1.496 in)

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”

<table>
<thead>
<tr>
<th>Piston-to-cylinder clearance</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.010 ~ 0.035 mm (0.0004 ~ 0.0014 in)</td>
</tr>
<tr>
<td>&lt;Limit&gt;: 0.15 mm (0.006 in)</td>
</tr>
</tbody>
</table>

f. If out of specification, replace the cylinder, and 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.

   **Piston ring side clearance**
   - **Top ring**: 0.02 ~ 0.08 mm (0.0008 ~ 0.0031 in)
     <Limit>: 0.13 mm (0.0051 in)
   - **2nd ring**: 0.02 ~ 0.06 mm (0.0008 ~ 0.0024 in)
     <Limit>: 0.12 mm (0.0047 in)

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

   **NOTE:**
   Level the piston ring into the cylinder with the piston crown.

   @ 10 mm (0.394 in)

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.

   **Piston ring end gap**
   - **Top ring**: 0.05 ~ 0.15 mm (0.0020 ~ 0.0059 in)
     <Limit>: 0.40 mm (0.0157 in)
   - **2nd ring**: 0.05 ~ 0.17 mm (0.0020 ~ 0.0067 in)
     <Limit>: 0.52 mm (0.0205 in)
   - **Oil ring**: 0.20 ~ 0.70 mm (0.0079 ~ 0.0276 in)
CHECKING THE PISTON PIN

1. Check:
   - Piston pin
     Blue discoloration/grooves → Replace the piston pin and then check the lubrication system.

2. Measure:
   - Piston pin outside diameter @
     Out of specification → Replace the piston pin.

   **Piston pin outside diameter**
   - 9.996 ~ 10.000 mm (0.3935 ~ 0.3937 in)
   - <Limit>: 9.976 mm (0.3928 in)

3. Measure:
   - Piston pin bore diameter B
     Out of specification → Replace the piston.

   **Piston pin bore diameter**
   - 10.002 ~ 10.013 mm (0.3938 ~ 0.3942 in)
   - <Limit>: 10.043 mm (0.3954 in)

4. Calculate:
   - Piston-pin-to-piston-pin-bore clearance
     Out of specification → Replace the piston pin and piston as a set.

   **Piston-pin-to-piston-pin-bore clearance**
   - \( = \text{Piston pin bore diameter } B - \text{Piston pin outside diameter } @ \)

   **Piston-pin-to-piston clearance**
   - 0.002 ~ 0.017 mm (0.0001 ~ 0.0007 in)
CHECKING THE TIMING CHAIN GUIDE
1. Check:
   - timing chain guide (exhaust side)
     Damage/wear → Replace

INSTALLING THE PISTON AND CYLINDER
1. Install:
   - oil ring expander ①
   - oil ring rail ②
   - 2nd ring ③
   - top ring ④

   NOTE:
   Be sure to install the piston rings so that the manufacturer’s marks or numbers face up.

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

   NOTE:
   • Apply engine oil the piston pin.
   • Make sure the arrow mark ④ on the piston points towards the exhaust side of the cylinder.
   • Before installing the piston pin clip, cover the crankcase opening with a clean rag to prevent the clip from falling into the crankcase.
3. Install:
- gasket **NEW**
- dowel pins

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

<table>
<thead>
<tr>
<th>Recommended lubricant</th>
<th>Engine oil</th>
</tr>
</thead>
</table>

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

6. Install:
- timing chain guide (exhaust side)
- cylinder 1

**NOTE:**
- While compressing the piston rings with one hand, install the cylinder with the other hand.
- Pass the timing chain and timing chain guide (exhaust side) through the timing chain cavity.
**BELT DRIVE**

**CRANKCASE COVER (LEFT)**

- Removing the crankcase cover (left):
  - Kickstarter
  - Rear wheel lock cable cover
  - Rear wheel lock cable
  - Crankcase cover (left)
  - Dowel pin
  - Kick pinion gear
  - Kick pinion gear clip
  - Circlip/Plate washer
  - Kick shaft assembly
  - Torsion spring
  - Solid bush
  - Holder
  - Torsion spring
  - Stopper lever assembly

<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>Crankcase cover (left)</td>
<td>1</td>
<td>Remove the parts in the order listed.</td>
</tr>
<tr>
<td>2</td>
<td>Rear wheel lock cable</td>
<td>1</td>
<td>Refer to “LEADS, HOSES AND REAR BRAKE”.</td>
</tr>
<tr>
<td>3</td>
<td>Rear wheel lock cable</td>
<td>1</td>
<td>Refer to “INSTALLING THE KICKSTARTER”.</td>
</tr>
<tr>
<td>4</td>
<td>Dowel pin</td>
<td>2</td>
<td>For installation, reverse the removal procedure.</td>
</tr>
<tr>
<td>5</td>
<td>Kick pinion gear</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Kick pinion gear clip</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Circlip/Plate washer</td>
<td>1/1</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Kick shaft assembly</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Torsion spring</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Solid bush</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Holder</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Torsion spring</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Stopper lever assembly</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>
INSTALLING THE KICKSTARTER

1. Install:
   - solid bush\(^1\)
   - kick shaft assembly\(^2\)
   - torsion spring\(^3\)

2. Hook:
   - kickstarter spring

**NOTE:**
Hook the spring end\(^a\) on the kickstarter shaft \(^b\) as shown, and hook the other end \(^c\) on the projection\(^d\).

3. Install:
   - plain washer
   - circlip\(^1\) New

4. Install:
   - kick pinion gear\(^1\)
   - kick pinion gear clip\(^2\)

**NOTE:**
Install the clip at the position shown.
### Removing the V-belt, clutch, primary and secondary sheave

<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>Primary sheave nut/Plate washer</td>
<td>1/1</td>
<td>Remove the parts in the order listed.</td>
</tr>
<tr>
<td>2</td>
<td>Oneway clutch</td>
<td>1</td>
<td>Refer to “ REMOVING AND INSTALLING THE SECONDARY SHEAVE “</td>
</tr>
<tr>
<td>3</td>
<td>Primary fixed sheave</td>
<td>1</td>
<td>Refer to “ REMOVING AND INSTALLING THE PRIMARY SHEAVE “</td>
</tr>
<tr>
<td>4</td>
<td>Secondary sheave nut</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Clutch housing</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Secondary sheave assembly</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>V-belt</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Collar</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Primary sliding sheave</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Cam/Weight</td>
<td>1/6</td>
<td>For installation, reverse the removal procedure.</td>
</tr>
<tr>
<td>11</td>
<td>Slider</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Plate washer</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>
Disassemble the parts in the order listed. Refer to "REMOVING AND INSTALLING THE SECONDARY SHEAVE".

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>1</td>
<td>Clutch carrier nut</td>
<td>1</td>
<td>Disassemble the parts in the order listed.</td>
</tr>
<tr>
<td>2</td>
<td>Clutch carrier</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Clutch shoe spring</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Compression spring</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Secondary spring seat</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Guide pin</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Secondary sliding sheave</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>O-ring</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Oil seal</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Secondary fixed sheave</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>
REMVOING THE PRIMARY SHEAVE
1. Remove:
   - primary sheave nut ①
   - plate washer ②
   - oneway clutch ③
   - primary fixed sheave ④

NOTE:
While holding the primary fixed sheave with the rotor holding tool ⑤, loosen the primary fixed sheave nut.

Rotor holding tool:
90890-01235 (YU-01235)

REMVOING THE SECONDARY SHEAVE AND V-BELT
1. Remove:
   - secondary sheave nut ①
   - clutch housing ②

NOTE:
While holding the clutch housing with the sheave holder ③, loosen the secondary sheave nut.

Sheave holder:
90890-01701 (YS-01880-A)

2. Loosen:
   - clutch carrier nut ①

CAUTION:
Do not remove the clutch carrier nut at this stage.

NOTE:
While holding the clutch carrier with the rotor holding tool ②, loosen the clutch carrier nut one full turn with the locknut wrench ③.

Rotor holding tool:
90890-01235 (YU-01235)
Locknut wrench:
90890-01348 (YM-01348)
3. Remove:
- secondary sheave assembly ①
- V-belt ②

**NOTE:**
Remove the V-belt and clutch assembly from the primary sheave side.

**DISASSEMBLING THE SECONDARY SHEAVE**

1. Remove:
- clutch carrier nut ①

**NOTE:**
Install the clutch spring holder ② and clutch spring holder arm ③ onto the secondary sheave as shown. Then, compress the spring, and remove the clutch carrier nut ①.

**CHECKING THE CLUTCH SHOE**

1. Measure:
- clutch shoe
  - Scratches → Glaze using coarses sandpaper.
  - Damage/wear → Replace

**Clutch shoe thickness**
- 3.7 mm (0.146 in)
- **<Limit>:** 2.0 mm (0.079 in)

**NOTE:**
Inspect clutch shoes ③.
After removing the clutch weight spring, do not use them again.
Replace the all two as a set.
CHECKING THE V-BELT

1. Check:
   • V-belt ①
     Cracks/damage/wear → Replace.
     Grease/oil → Clean the primary and secondary sheave.

2. Measure:
   • V-belt width ③
     Out of specification → Replace.

   V-belt width
   16.8 mm (0.0661 in)
   <Limit>: 15.8 mm (0.622 in)

CHECKING THE PRIMARY SHEAVE

1. Check:
   • primary sliding sheave①
   • primary fixed sheave②
     Cracks/damage/wear → Replace the primary sliding sheave, primary fixed sheave and V-belt.

2. Check:
   • free movement
     Insert the collar② into the primary sliding sheave①, and check for free movement.
     Stick or excessive play → Replace the primary sliding sheave or collar.
CHECKING THE PRIMARY SHEAVE WEIGHTS

The following procedure applies to all of the primary sheave weights.

1. Check:
   - primary sheave weight
     Cracks/damage/wear → Replace.

2. Measure:
   - primary sheave weight outside diameter
     Out of specification → Replace.

   Primary sheave weight outside diameter
   15 mm (0.591 in)
   <Limit>: 14.5 mm (0.571 in)

CHECKING THE SLIDER

1. Check:
   - slider
     Damage/wear → Replace

CHECKING THE SECONDARY SHEAVE

1. Check:
   - secondary fixed sheave
   - secondary sliding sheave
     Cracks/damage/wear → Replace the secondary fixed and sliding sheaves as a set.

2. Check:
   - torque cam groove
     Damage/wear → Replace the secondary fixed and sliding sheaves as a set.

3. Check:
   - guide pin
     Damage/wear → Replace the secondary fixed and sliding sheaves as a set.
ASSEMBLING THE PRIMARY SHEAVE

1. Clean:
   - primary fixed sheave (1)
   - primary sliding sheave (2)
   - collar (3)
   - primary sheave weights (4)

**NOTE:**
Use thinner to clean up grease, dirt on the primary sliding sheave cam side (5).

2. Install:
   - primary sliding sheave (1)
   - primary sheave weights (2)
   - collar (3)

3. Install:
   - slider (1)
   - cam (2)
ASSEMBLING THE SECONDARY SHEAVE

1. Lubricate:
   - secondary fixed sheave's inner surface
   - secondary sliding sheave's inner surface
   - oil seals
   - bearings
   (with the recommended lubricant)

   **Recommended lubricant**
   BEL-RAY assembly lube®

2. Install:
   - secondary sliding sheave

   **NOTE:**
   Install the secondary sliding sheave onto the secondary fixed sheave with the oil seal guide.

   **Oil seal guide**
   90890-01384 (YM-33299)

3. Install:
   - guide pin

4. Lubricate:
   - guide pin groove
   - o-ring
   (with the recommended lubricant)

   **Recommended lubricant**
   BEL-RAY assembly lube®
5. Install:
- secondary sheave
- spring
- clutch carrier

**NOTE:**
Attach the clutch spring holder and clutch spring holder arm onto the secondary sheave as shown. Then, compress the spring, and tighten the clutch carrier nut.

![Clutch spring holder](image)

Clutch spring holder
90890-01337 (YM-33285)
(YM-33285-6)

---

**INSTALLING THE BELT DRIVE**

1. Install:
- V-belt
- clutch assembly

**CAUTION:**
Do not allow grease to contact the V-belt, secondary sheave assembly.

**NOTE:**
Install the V-belt onto the primary sheave side.

2. Install:
- clutch carrier nut

\[ 55 \text{ Nm} (5.5 \text{ m}\cdot\text{kg}, 39.8 \text{ ft}\cdot\text{lb}) \]

**NOTE:**
While holding the clutch carrier with the rotor holding tool, tighten the clutch carrier nut with the locknut wrench.

![Rotor holding tool](image)

Rotor holding tool
90890-01235

Locknut wrench
90890-01348 (YM-01348)
3. Install:
   - clutch housing ①
   - secondary sheave nut ②

   **40 Nm (4.0 m•kg, 28.9 ft•lb)**

   **NOTE:**
   Tighten the secondary sheave nut with the sheave holder ③.

   **Sheave holder**
   90890-01701 (YS-01880-A)

4. Install:
   - primary fixed sheave ①
   - primary sheave nut ②

   **30 Nm (3.0 m•kg, 21.7 ft•lb)**

   **NOTE:**
   While holding the primary fixed sheave with the rotor holding tool ③, tighten the primary fixed sheave nut.

5. Position:
   - V-belt ①

   **NOTE:**
   Position the V-belt in the primary sheave ② (when the pulley is at its widest position) and in the secondary sheave ③ (when the pulley is at its narrowest position), and make sure the V-belt is tight.
### Removing the stator coil assembly

**Coolant**

- Radiator
- Seat/Trunk/Mat
- Rear carrier/Front cover
- Side cover (left and right)
- Rear cover/Battery cover
- Battery holder/Battery
- Footrest board side cover mole (left and right)
- Footrest board

<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>AC magneto lead</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Fan/O-ring</td>
<td>1/1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Nut/Plate washer</td>
<td>1/1</td>
<td>Disconnect.</td>
</tr>
<tr>
<td>4</td>
<td>AC magneto rotor</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Woodruff key</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

Remove the parts in the order listed.
Drain.
Refer to “CHANGING THE COOLANT” in chapter 3.
Refer to “RADIATOR” in chapter 6.

Refer to “COVER AND PANEL” in chapter 3.
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>6</td>
<td>Lock plate</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Pick up coil</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Stator coil assembly</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

For installation, reverse the removal procedure.
### Removing the starter clutch

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Removing the starter clutch</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Engine oil</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>AC magneto rotor</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Stator coil assembly</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Crankcase cover(right)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Gasket</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Dowel pin</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Starter clutch nut</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Washer</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Starter wheel gear</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Roller</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Collar</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Starter clutch</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Idle gear</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Shaft</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

Remove the parts in the order listed.
Drain.
Refer to "CHANGING THE ENGINE OIL" in chapter 3.
Refer to "REMOVING AND INSTALLING THE AC MAGNETO".

**CAUTION:**
The starter clutch nut is left-hand thread.

Refer to "REMOVING AND INSTALLING THE STARTER CLUTCH".

For installation, reverse the removal procedure.
REMOVING THE AC MAGNETO

1. Remove:
   - AC magneto rotor nut
   - washer

**NOTE:**
- While holding the AC magneto rotor with the sheave holder, loosen the AC magneto rotor nut.
- Do not allow the sheave holder to touch the projection on the AC magneto rotor.

2. Remove:
   - AC magneto rotor (with the flywheel puller)
   - woodruff key

**CAUTION:**
To protect the end of the crankshaft, place an appropriate sized socket between the flywheel puller set’s center bolt and the crankshaft.

**NOTE:**
Make sure the flywheel puller is centered over the AC magneto rotor.
REMOVING THE STARTER CLUTCH

1. Remove:
   - crankcase cover (right)

   **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.

2. Remove:
   - starter clutch nut
   - washer
   - starter wheel gear
   - roller
   - collar
   - starter clutch
   - idle gear

   **NOTE:**
   The starter clutch nut is left-hand thread.
CHECKING THE STARTER CLUTCH

1. Check:
   • starter clutch roller
     Damage/wear → Replace.

2. Check:
   • starter clutch idle gear
   • starter wheel gear
     Burrs/chips/roughness/wear → Replace the defective part(s).

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

4. Check:
   • starter clutch operation

******************************************************************************

a. Install the starter wheel gear onto the starter clutch and hold the starter clutch.

b. When turning the starter wheel gear clockwise [A], the starter clutch and the starter wheel gear should engage, otherwise the starter clutch is faulty and must be replaced.

c. When turning the starter wheel gear counterclockwise [B], it should turn freely, otherwise the starter clutch is faulty and must be replaced.
******************************************************************************
INSTALLING THE STARTER CLUTCH

1. Install:
   - idle gear
   - starter clutch
   - collar
   - roller
   - starter wheel gear
   - washer
   - starter clutch nut

\[ 90 \text{ Nm (9.0 m} \cdot \text{kg, 65.1 ft} \cdot \text{lb}) \]

**NOTE:**
The starter clutch nut is left-hand thread.

2. Install:
   - gasket [New]
   - crankcase cover (right)

\[ 10 \text{ Nm (1.0 m} \cdot \text{kg, 7.2 ft} \cdot \text{lb}) \]

INSTALLING THE AC MAGNETO

1. Install:
   - stator coil assembly
   - pick up coil
   - woodruff key
   - AC magneto rotor
   - washer
   - AC magneto rotor nut

**NOTE:**
- Clean the tapered portion of the crankshaft and the AC magneto rotor hub.
- When installing the AC magneto rotor, make sure the woodruff key is properly seated in the keyway of the crankshaft.
2. Tighten:
   - AC magneto rotor nut ①

\[ 43 \text{ Nm (4.3 m•kg, 31.1 ft•lb)} \]

**NOTE:**
- While holding the AC magneto rotor ③ with the sheave holder ②, tighten the AC magneto rotor nut.
- Do not allow the sheave holder to touch the projection on the AC magneto rotor.

**Sheave holder**
- 90890-01701
- YS-01880-A
### Disassembling 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>Drive gear</td>
<td>1</td>
<td>Remove the parts in the order listed. Refer to “RADIATOR” in chapter 6.</td>
</tr>
<tr>
<td>2</td>
<td>Circlip/Plate washer</td>
<td>1/1</td>
<td>Refer to “STARTER CLUTCH AND AC MAGNETO”.</td>
</tr>
<tr>
<td>3</td>
<td>Oil pump driven gear</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Dowel pin</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Oil pump housing</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Oil pump shaft</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Inner rotor</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Outer rotor</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Oil pump housing cover</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Gasket</td>
<td>1</td>
<td>For assembly, reverse the disassembly procedure.</td>
</tr>
</tbody>
</table>

1Nm (0.1 mkg, 0.7 ftlb)

4Nm (0.4 mkg, 2.9 ftlb)
CHECKING THE OIL PUMP

1. Check:
   - oil pump drive gear
   - oil pump driven gear
   - oil pump housing
   - oil pump housing cover
   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]
   Out of specification → Replace the oil pump.

3. Check:
   - oil pump operation
     Rough movement → 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 housing 2)
   - pin 3
   - inner rotor 4
   - outer rotor 5
   - oil pump housing cover 6
   - oil pump housing screw

   \[\times\ 1 \text{ Nm (0.1 \text{ m } \cdot \text{ kg}, 0.7 \text{ ft } \cdot \text{ lb})}\]

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

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

INSTALLING THE OIL PUMP

1. Install:
   - oil pump drive gear 1
   - gasket **New**
   - oil pump assembly 2
   - oil pump bolt

   \[\times\ 4 \text{ Nm (0.4 \text{ m } \cdot \text{ kg}, 2.9 \text{ ft } \cdot \text{ lb})}\]

   **CAUTION:**
   After tightening the bolts, make sure the oil pump turns smoothly.
### Removing the transmission

**Order** | **Job/Part** | **Q’ty** | **Remarks**
--- | --- | --- | ---
1 | Circlip | 1 | Remove the parts in the order listed. Drain.
2 | Transmission cover | 1 | Refer to “CHANGING THE TRANSMISSION OIL” in chapter 3.
3 | Transmission cover gasket | 1 | Refer to “MANIFOLD, AIR FILTER AND MUFFLER ASSEMBLY”.
4 | Dowel pin | 2 | Refer to “REAR WHEEL AND BRAKE” in chapter 4.
5 | Main axle | 1 | Refer to “BELT DRIVE”.
6 | Drive axle | 1 | For installation, reverse the removal procedure.
7 | Primary drive gear shaft | 1 |
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**
   0.04 mm (0.0002 in)

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

   **Primary drive gear shaft runout limit**
   0.04 mm (0.0002 in)

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.

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

6. Check:
   - circlip
     Bends/damage/looseness → Replace.
## CRANKSHAFT

### CRANKSHAFT ASSEMBLY

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Removing the crankshaft assembly</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Tension spring</td>
<td>1</td>
<td>Remove the parts in the order listed. Refer to “ENGINE”.</td>
</tr>
<tr>
<td>2</td>
<td>Circlip/Plate washer</td>
<td>1/1</td>
<td>Refer to “CYLINDER HEAD”.</td>
</tr>
<tr>
<td>3</td>
<td>Pin</td>
<td>1</td>
<td>Refer to “CYLINDER AND PISTON”.</td>
</tr>
<tr>
<td>4</td>
<td>Centerstand</td>
<td>1</td>
<td>Refer to “V-BELT, CLUTCH, PRIMARY AND SECONDARY SHEAVE”.</td>
</tr>
<tr>
<td></td>
<td>Engine</td>
<td></td>
<td>Refer to “COOLING SYSTEM” in chapter 6.</td>
</tr>
<tr>
<td></td>
<td>Cylinder head</td>
<td></td>
<td>Refer to “STARTER CLUTCH AND AC MAGNETO”.</td>
</tr>
<tr>
<td></td>
<td>Cylinder piston</td>
<td></td>
<td>Refer to “OIL PUMP”.</td>
</tr>
<tr>
<td></td>
<td>V-belt, clutch, primary and secondary sheave</td>
<td></td>
<td>Refer to “TRANSMISSION”.</td>
</tr>
<tr>
<td></td>
<td>Radiator</td>
<td></td>
<td>Refer to “REAR WHEEL AND BRAKE” in chapter 4.</td>
</tr>
<tr>
<td></td>
<td>Water pump</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Starter clutch</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>AC magneto</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Oil pump</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Transmission</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Rear wheel</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Order | Job/Part | Q’by | Remarks
--- | --- | --- | ---
5 | Hook | 1 | Refer to “DISASSEMBLING THE CRANKCASE”
6 | Drain plug | 1 |  
7 | Oil strainer | 1 |  
8 | Compression spring | 1 |  
9 | O-ring | 1 |  
10 | Crankcase (right) | 1 |  
11 | Spacer | 1 |  
12 | Dowel pin | 2 |  
13 | Guide | 1 |  
14 | Crankshaft | 1 |  
15 | Timing chain | 1 |  
16 | Crankcase (left) | 1 | Refer to “INSTALLING THE CRANKSHAFT”
17 | Oil seal | 1 |  
18 | Bolt/O-ring | 1/1 |  
19 | Timing chain guide | 1 | For installation, reverse the removal procedure.
DISASSEMBLING THE CRANKCASE

1. Remove:
   • centerstand assembly

2. 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.

3. Remove:
   • right crankcase
   • spacer

   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 the crankcase halves separate evenly.
CHECKING THE TIMING CHAIN AND TIMING CHAIN GUIDE

1. Check:
   • timing chain
     Damage/stiffness → Replace the timing chain.

2. Check:
   • timing chain guide (intake side)
     Damage/wear → Replace.
CHECKING THE CRANKSHAFT AND CONNECTING ROD

1. Measure:
   - crankshaft runout
     Out of specification → Replace the crankshaft, bearing or both.

   **NOTE:**
   Turn the crankshaft slowly.

   **Maximum crankshaft runout**
   0.03 mm (0.001 in)

2. Measure:
   - big end side clearance
     Out of specification → Replace the big end bearing, crankshaft pin, or connecting rod.

   **Big end side clearance**
   0.15~0.45 mm (0.006~0.018 in)

3. Measure:
   - crankshaft width
     Out of specification → Replace the crankshaft.

   **Crankshaft width**
   42.45~42.50 mm (1.671~1.673 in)

4. Check:
   - crankshaft sprocket ①
     Damage/wear → Replace the crankshafts.
   - bearing ②
     Cracks/damage/wear → Replace the crankshaft.
   - oil pump drive gear
     Damage/wear → Replace the crankshaft.
CRANKSHAFT

5. Check:
- crankshaft journal
  Scratches/wear → Replace the crankshaft.
- crankshaft journal oil passage
  Obstruction → Blow out with compressed air.

EAS00399

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.

EAS00401

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.

EAS00402

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

1. Install:
   - timing chain guide (intake side)
   - timing chain
   - crankshaft assembly

NOTE: Install the timing chain so it is not visible through the opening in the left crankcase.

CAUTION:
To avoid scratching the crankshaft and to ease the installation procedure, lubricate the oil seal lips with lithium-soap-based grease and each bearing with engine oil.

NOTE: Put the timing chain in parallel into the crankcase, then use hands to place the crankshaft assembly into the crankcase. Manually rotate the crankshaft to check whether it is tightly engaged with the timing chain. (if not, install again)

ASSEMBLING THE CRANKCASE

1. Thoroughly clean all the gasket mating surfaces and crankcase mating surfaces.

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

   Yamaha bond No. 1215
   90890-85505
   ACC-11001-05-01

NOTE: Do not allow any sealant to come into contact with the oil gallery.

3. Install:
   - dowel pins
   - spacer
   - right crankcase

4. Tighten:
   - crankcase

   \(10 \text{ Nm (1.0 m \cdot kg, 7.2 ft \cdot lb)}\)
CHAPTER 6
RADIATOR

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ASSEMBLING THE WATER PUMP ................................................ 6-11
INSTALLING THE WATER PUMP .................................................. 6-12
## COOLING SYSTEM

### Removing the radiator

- Seat/Trunk
- Battery cover/Battery holder
- Battery/Front cover
- Footrest board side cover mole (left and right)
- Mat/Footrest board
- Coolant

<table>
<thead>
<tr>
<th>Order</th>
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<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Radiator cover</td>
<td>1</td>
<td>Remove the parts in the order listed.</td>
</tr>
<tr>
<td>2</td>
<td>Radiator cap</td>
<td>1</td>
<td>Refer to &quot;COVER AND PANEL&quot; in chapter 3.</td>
</tr>
<tr>
<td>3</td>
<td>Conduit hose</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Radiator inlet hose</td>
<td>1</td>
<td>Drain. Refer to &quot;CHANGING THE COOLANT&quot; in chapter 3.</td>
</tr>
<tr>
<td>5</td>
<td>Radiator outlet hose</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Radiator</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Fan case</td>
<td>1</td>
<td>For installation, reverse the removal proce-</td>
</tr>
</tbody>
</table>

**Torque Specifications:**

- 10Nm (1.0 m-kg, 7.2 ft-lb)
CHECKING THE RADIATOR

1. Check:
   - radiator fins
     Obstruction → Clean. Apply compressed air to the rear of the radiator.
     Damage → Repair or replace.

   NOTE: Straighten any flattened fins with a thin, flat-head screwdriver.

2. Check:
   - radiator hoses Radiator inlet hose① Radiator outlet hose②
     Cracks/damage → Replace.

3. Measure:
   - radiator cap opening pressure
     Below the specified pressure → Replace the radiator cap.

   Radiator cap opening pressure
   93.3 ~ 122.7 kPa
   (0.95 ~ 1.25 kg/cm², 13.53 ~ 17.79 psi)

   a. Install the radiator cap tester① and radiator cap tester adapter② to the radiator cap③.

   b. Apply the specified pressure for ten seconds and make sure there is no drop in pressure.
4. Check:
   • radiator fan
     Damage → Replace.
     Malfunction → Check and repair.

EAS0456

INSTALLING THE RADIATOR

1. Fill:
   • cooling system
     (with the specified amount of the recommended coolant)
     Refer to “CHANGING THE COOLANT” in chapter 3.

2. Check:
   • cooling system
     Leaks → Repair or replace any faulty part.

3. Measure:
   • radiator cap opening pressure
     Below the specified pressure → Replace
     the radiator cap.
     Refer to “CHECKING THE RADIATOR”.

**Removing the thermostat assembly**

Seat/Trunk/Rear carrier  
Battery cover/Battery holder  
Battery/Front cover  
Side cover (left and right)/Rear cover  
Footrest board side cover mole (left and right)  
Mat/Footrest board  
Coolant  
Radiator inlet hose  
Thermostat assembly inlet breather hose (to carburetor)  
Thermostat assembly outlet breather hose (to water pump)  
Thermo switch lead  
Thermo switch/O-ring  
Thermostat housing

<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>Remove the parts in the order listed.</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Refer to &quot;COVER AND PANEL&quot; in chapter 3.</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Drain. Refer to &quot;CHANGING THE COOLANT&quot; in chapter 3.</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Refer to &quot;RADIATOR&quot;. Disconnect.</td>
<td>1/1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Disconnect.</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

**闪闪发光**

| 6Nm (0.6 mkg, 6.8 ft-lb) | 16Nm (1.6 mkg, 11.8 ft-lb) | EAS00460 THERMOSTAT ASSEMBLY | A | A | A | A | A |

**Remarks**

- 6-4

**Cool**

**THERMOSTAT ASSEMBLY**

---

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<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Thermostat assembly</td>
<td>1</td>
<td>For installation, reverse the removal pro-</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>cedure.</td>
</tr>
</tbody>
</table>
CHECKING THE THERMOSTAT

1. Check:
   - thermostat ①
     Does not open at 65 ~ 80°C → Replace.

   ****************************************
   a. Suspend the thermostat in a container filled with water.
   b. Slowly heat the water.
   c. Place a thermometer in the water.
   d. While stirring the water, observe the thermostat and thermometer's indicated temperature.

   ****************************************

2. Check:
   - thermostat housing
     Cracks/damage → Replace.

NOTE:
If the accuracy of the thermostat is in doubt, replace it. A faulty thermostat could cause serious overheating or overcooling.
INSTALLING THE THERMOSTAT ASSEMBLY

1. Install:
   - thermostat
   - thermostat housing
   - thermostat assembly inlet breather hose.
   - thermostat assembly outlet breather hose.

2. Fill:
   - cooling system
     (with the specified amount of the recommended coolant)
     Refer to “CHANGING THE COOLANT” in chapter 3.

3. Check:
   - cooling system
     Leaks → Repair or replace any faulty part.

4. Measure:
   - radiator cap opening pressure
     Below the specified pressure → Replace the radiator cap.
     Refer to “CHECKING THE RADIATOR”.

### Removing the water 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>Breather hose</td>
<td>1</td>
<td>Remove the parts in the order listed.</td>
</tr>
<tr>
<td>2</td>
<td>Outlet hose(to cylinder)</td>
<td>1</td>
<td>Refer to “COVER AND PANEL” in chapter 3.</td>
</tr>
<tr>
<td>3</td>
<td>Water pump housing cover</td>
<td>1</td>
<td>Drain.</td>
</tr>
<tr>
<td>4</td>
<td>Gasket</td>
<td>1</td>
<td>Refer to “CHANGING THE COOLANT” in chapter 3.</td>
</tr>
</tbody>
</table>

Refer to “THERMOSTAT ASSEMBLY”.

Refer to “RADIATOR”.

Disconnect.
<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Water pump housing</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Dowel pin</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Plate</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Impeller shaft</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Oil seal</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>Gasket</td>
<td>1</td>
<td>For installation, reverse the removal procedure.</td>
</tr>
</tbody>
</table>

For installation, reverse the removal procedure.
DISASSEMBLING THE WATER PUMP

1. Remove:
   - water pump housing cover
   - dowel pin
   - gasket

2. Remove:
   - plate
   - impeller shaft
   - gasket
   - oil seal
     (with a thin, flat-head screwdriver)
   - bearing

NOTE:
Remove the oil seal from the inside of the water pump housing.
Remove the bearing from the inside of the water pump housing.

CHECKING THE WATER PUMP

1. Check:
   - water pump housing cover
   - water pump housing
   - impeller
     Cracks/damage/wear → Replace.

2. Check:
   - water pump seal
     Cracks/damage/wear → Replace.

3. Check:
   - bearing
     Rough movement → Replace.

4. Check:
   - radiator outlet hose
     Cracks/damage/wear → Replace.
ASSEMBLING THE WATER PUMP

1. Install:
   - oil seal\textit{New} ① (into the water pump housing ③)
   - bearing ②

   \textbf{NOTE:}
   - Before installing the oil seal, apply tap water or coolant onto its outer surface.
   - Install the oil seal with a socket that matches its outside diameter.

   \textbf{CAUTION:}
   Never lubricate the water pump seal surface with oil or grease.

2. Measure:
   - impeller shaft tilt
     Out of specification \(\rightarrow\) Replace the impeller shaft.

   \begin{center}
   \textbf{Impeller shaft tilt limit}
   \begin{tabular}{l}
   \textbf{0.15 mm (0.006 in)}
   \end{tabular}
   \end{center}

   ① Straightedge
   ② Impeller

3. Install:
   - impeller shaft ①
   - plate ②

   \textbf{CAUTION:}
   After installation, check that the impeller shaft rotates smoothly.

4. Install:
   - gasket\textit{New}
   - water pump housing cover ①
INSTALLING THE WATER PUMP

1. Install:
   - gasket \textit{New}
   - water pump assembly 1

\[
\begin{align*}
10 \text{ Nm (1.0 m\cdot kg, 7.2 ft\cdot lb)}
\end{align*}
\]

\textbf{NOTE:}
Align the slit \textit{a} on the impeller shaft with the projection \textit{b} on the camshaft sprocket bolt.

2. Fill:
   - cooling system
     - (with the specified amount of the recommended coolant)
     - Refer to “CHANGING THE COOLANT” in chapter 3.

3. Check:
   - cooling system
     - Leaks \rightarrow Repair or replace the faulty part.

4. Measure:
   - radiator cap opening pressure
     - Below the specified pressure \rightarrow Replace the radiator cap.
     - Refer to “CHECKING THE RADIATOR.”
CHAPTER 7
CARBRETOR

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CHECKING THE CARBURETOR ............................................................ 7-4
ASSEMBLING THE CARBURETOR ....................................................... 7-6
INSTALLING THE CARBURETOR ....................................................... 7-7
MEASURING AND ADJUSTING THE FUEL LEVEL .......................... 7-8
CHECKING THE AUTOCHOKE UNIT ................................................. 7-9
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CHECKING THE THROTTLE POSITION SENSOR ............................ 7-11

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### Removing the carburetor

Remove the parts in the order listed. Refer to "COVER AND PANEL" in chapter 3.

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</thead>
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<td>Disconnect.</td>
</tr>
<tr>
<td>2</td>
<td>Battery cover/Front cover</td>
<td>1</td>
<td>Disconnect.</td>
</tr>
<tr>
<td>3</td>
<td>Hose(to cylinder head)</td>
<td>1</td>
<td>Disconnect.</td>
</tr>
<tr>
<td>4</td>
<td>Auto choke lead</td>
<td>1</td>
<td>Disconnect.</td>
</tr>
<tr>
<td>5</td>
<td>Throttle position sensor lead</td>
<td>1</td>
<td>Disconnect.</td>
</tr>
<tr>
<td>6</td>
<td>Fuel hose</td>
<td>1</td>
<td>Disconnect.</td>
</tr>
<tr>
<td>7</td>
<td>Compensator hose</td>
<td>1</td>
<td>Disconnect.</td>
</tr>
<tr>
<td>8</td>
<td>Thermostat assembly inlet breather hose</td>
<td>1</td>
<td>Lossen.</td>
</tr>
<tr>
<td>9</td>
<td>Throttle cable kit</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Clamp(air filter assembly)</td>
<td>1</td>
<td>For installation, reverse the removal procedure.</td>
</tr>
<tr>
<td>11</td>
<td>Carburetor assembly</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

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### Disassembling the Carburetor

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<th>Job/Part</th>
<th>Q’ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Auto choke cap</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Auto choke unit</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Auto choke holder</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Auto choke seat</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Throttle stop screw kit</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Bracket</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Vacuum chamber cover/Piston valve spring</td>
<td>1/1</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Piston valve</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Jet needle kit</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Float chamber</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Float chamber rubber gasket</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Accelerator pump assembly</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Float pin</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Float</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Needle valve</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Main jet</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

Remove the parts in the order listed.

**CAUTION:**

Before leaving the factory, throttle position sensor should be measured and adjusted with a precision instrument. Any adjustment is strictly prohibited.

When changing, use carburetor for final assembly exchange. Supplier should not make any changes after dismounting the adjusting bolt.

Refer to “ASSEMBLING THE CARBURETOR”.

---

Refer to “ASSEMBLING THE CARBURETOR”.

---

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<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>17</td>
<td>Main nozzle</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Needle jet</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Slow air jet</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Slow jet</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>Throttle position sensor</td>
<td>1</td>
<td>For assembly, reverse the disassembly procedure.</td>
</tr>
</tbody>
</table>

For assembly, reverse the disassembly procedure.
CHECKING THE CARBURETOR

1. Check:
   • carburetor body
   • float chamber
     Cracks/damage → Replace.

2. Check:
   • fuel passages
     Obstruction → Clean.

   a. Wash the carburetor in a petroleum-based solvent. Do not use any caustic carburetor cleaning solution.
   b. Blow out all of the passages and jets with compressed air.

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
     Damage/obstruction/wear → Replace.

7. Check:
   - piston valve ①
     Damage/scratches/wear → Replace.
   - piston valve diaphragm ②
     Cracks/tears → Replace.

8. Check:
   - vacuum chamber cover ①
   - piston valve spring ②
     Cracks/damage → Replace.

9. Check:
   - jet needle ①
   - main jet ②
   - main nozzle ③
   - slow air jet ④
   - slow jet ⑤
   - needle jet ⑥
     Bends/damage/wear → Replace.
     Obstruction → Clean.
     Blow out the jets with compressed air.

10. Check:
    - piston valve movement
        Insert the piston valve into the carburetor body and move it up and down.
        Tightness → Replace the piston valve.

11. Check:
    - vacuum hoses
    - fuel hoses
      Cracks/damage/wear → Replace.
      Obstruction → Clean.
      Blow out the hoses with compressed air.
ASSEMBLING THE CARBURETOR

CAUTION:
- Before assembling the carburetor, wash all of the parts in a petroleum-based solvent.
- Always use a new gasket.

1. Install:
   - needle jet 1
   - main nozzle 2
   - main jet 3
   - slow air jet 4

2. Install:
   - float 1
   - needle valve 2
   - float pin 3
   - screw 4

3. Install:
   - float chamber rubber gasket New
   - float chamber

4. Install:
   - accelerator pump diaphragm 1
   - accelerator pump spring 2
   - boot 3
   - accelerator pump diaphragm gasket 4
   - float chamber body

5. Install:
   - coasting enricher diaphragm 1
   - compression spring 2
   - coasting enricher cover 3

6. Install:
   - jet needle kit
   - piston valve
7. Install:
- piston valve spring
- vacuum chamber cover

8. Install:
- bracket
- auto choke unit
- throttle position sensor

EAS00492

INSTALLING THE CARBURETOR

1. Adjust:
   - engine idling speed

   **Engine idling speed**
   2,000 ~ 2,400r/min

   Refer to “ADJUSTING THE ENGINE IDLING SPEED” in chapter 3.

2. Adjust:
   - throttle cable free play

   **Throttle cable free play (at the flange of the throttle grip)**
   1.5 ~ 3.5 mm (0.059 ~ 0.138 in)

   Refer to “ADJUSTING THE THROTTLE CABLE FREE PLAY” in chapter 3.
MEASURING AND ADJUSTING THE FUEL LEVEL

1. Measure:
   - fuel level ①
     Out of specification → Adjust.

<table>
<thead>
<tr>
<th>Fuel level (below the float chamber mating surface)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.6<del>7.6 mm (0.26</del>0.30 in)</td>
</tr>
</tbody>
</table>

   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 onto the fuel drain pipe ②.
   d. Loosen the fuel drain screw
   e. Hold the fuel level gauge vertically next to the float chamber ③.
   f. Measure the fuel level ①.

2. Adjust:
   - fuel level

   a. Remove the carburetor.
   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.
   f. Measure the fuel level ① again.
   g. Repeat steps (a) to (f) until the fuel level is within specification.
CHECKING THE AUTOCHOKE UNIT

NOTE: When checking the autochoke unit, the ambient temperature must be lower than 45°C.

1. Remove:
   • carburetor
2. Check:
   • autochoke unit

a. Connect a 3.3-mm hose to the starter air passage and blow into the hose.

NOTE: When the starter plunger is open, air should come out of the other side of the starter air passage.

<table>
<thead>
<tr>
<th>Starter plunger opens</th>
<th>Perform step (3).</th>
</tr>
</thead>
<tbody>
<tr>
<td>Starter plunger closes</td>
<td>Replace the autochoke unit.</td>
</tr>
</tbody>
</table>

3. Check:
   • autochoke unit

a. Connect the autochoke unit leads to a 12.0-V battery for five minutes.

Positive battery lead 1 → green/black
Negative battery lead 2 → yellow

b. Connect a 3.3-mm hose to the starter air passage and blow into the hose.

<table>
<thead>
<tr>
<th>Starter plunger opens.</th>
<th>Replace the autochoke unit.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Starter plunger closes.</td>
<td>Autochoke is OK.</td>
</tr>
</tbody>
</table>
**CHECKING THE FUEL COCK**

1. Remove:
   - seat/trunk
   - battery cover
   - front cover
   Refer to “COVER AND PANEL” in chapter 3.

2. Check:
   - fuel cock

   ********************************************
   a. Disconnect the fuel cock to carburetor fuel hose from the carburetor.
   b. Place a container under the end of the fuel hose.
   c. Start the engine and check if fuel flows from the fuel hose.
   d. Stop the engine and check if the fuel stops flowing from the fuel hose.

<table>
<thead>
<tr>
<th>Fuel flows.</th>
<th>Fuel cock is OK.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuel does not flow.</td>
<td>Replace the fuel cock.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fuel stops flowing.</th>
<th>Fuel cock is OK.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuel flows.</td>
<td>Replace the fuel cock.</td>
</tr>
</tbody>
</table>

********************************************

3. Install:
   - front cover
   - battery cover
   - seat/trunk
   Refer to “COVER AND PANEL” in chapter 3.
CHECKING THE THROTTLE POSITION SENSOR

NOTE:
Before checking the throttle position sensor, the engine idling speed should be properly adjusted.

1. Check:
   • throttle position sensor

******************************************************************************

a. Turn the main switch to “ON”.
b. Connect the pocket tester (DC 20V) to the throttle position sensor.

   Tester positive lead → yellow/blue ①
   Tester negative lead → black/blue ②

c. Check the throttle position sensor input voltage.

   DC5V voltage positive lead → blue ③
   DC5V voltage negative lead → black/blue ②

   | throttle opens. | 2.8~3.4V. |
   | throttle closes. | 0.625~0.775V |

   Out of specification → Replace the carburetor.

CAUTION:
Please do not make any adjustment on throttle position sensor.

******************************************************************************
### AIR INDUCTION SYSTEM

**Removing the air induction system**

<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>Hose (from AI air filter)</td>
<td>1</td>
<td>Remove the parts in the order listed. Refer to “COVER AND PANEL” in chapter 3.</td>
</tr>
<tr>
<td>2</td>
<td>Vacuum hose (from manifold)</td>
<td>1</td>
<td>For installation, reverse the removal procedure.</td>
</tr>
<tr>
<td>3</td>
<td>Hose (to cylinder head)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Air cut-off valve assembly</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

**Torque:**

10Nm (1.0 m•kg, 7.2 ft•lb)
CHECKING THE AIR INDUCTION SYSTEM

1. Check:
   - hoses
     Loose connection → Connect properly.
     Cracks/damage → Replace.
   - pipe
     Cracks/damage → Replace.

2. Check:
   - air cut-off valve
     Cracks/damage → Replace.

NOTE:
When the negative pressure is applied to the part (1), check that the continuity in the direction of arrow mark is completely lost. If the negative pressure is not loaded, the continuity can be obtained.
# CHAPTER 8
## ELECTRICAL

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<td>Checking Switch Continuity</td>
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<td>Starting Circuit Cut-Off System Operation</td>
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<td>Charging System</td>
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<td>Circuit Diagram</td>
<td>8-23</td>
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<td>Troubleshooting</td>
<td>8-24</td>
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<td>Lighting System</td>
<td>8-26</td>
</tr>
<tr>
<td>Circuit Diagram</td>
<td>8-26</td>
</tr>
<tr>
<td>Troubleshooting</td>
<td>8-27</td>
</tr>
<tr>
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<td>Circuit Diagram</td>
<td>8-45</td>
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<tr>
<td>Troubleshooting</td>
<td>8-46</td>
</tr>
</tbody>
</table>
ELECTRICAL COMPONENTS

1. Rear brake light switch
2. Front brake light switch
3. Main switch
4. Starter relay
5. Thermo unit
6. Fuel sender
7. C.D.I. unit
8. Ignition coil
9. Spark plug cap
10. Battery
11. Main fuse
12. Turn signal relay
13. Horn
14. Rectifier/Regulator
15. Thermo switch
16. Headlight relay
17. Wire harness
<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>Color Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Main switch</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>AC magneto</td>
<td>B Black</td>
</tr>
<tr>
<td>3</td>
<td>Rectifier/Regulator</td>
<td>G Green</td>
</tr>
<tr>
<td>4</td>
<td>Battery</td>
<td>L Blue</td>
</tr>
<tr>
<td>5</td>
<td>Main fuse</td>
<td>P Pink</td>
</tr>
<tr>
<td>6</td>
<td>Starter relay</td>
<td>R Red</td>
</tr>
<tr>
<td>7</td>
<td>Starter motor</td>
<td>W White</td>
</tr>
<tr>
<td>8</td>
<td>C.D.I. unit</td>
<td>Y Yellow</td>
</tr>
<tr>
<td>9</td>
<td>Ignition coil</td>
<td>Br Brown</td>
</tr>
<tr>
<td>10</td>
<td>Auto choke unit</td>
<td>Ch Chocolate</td>
</tr>
<tr>
<td>11</td>
<td>Front brake light switch</td>
<td>Dg Dark green</td>
</tr>
<tr>
<td>12</td>
<td>Rear brake light switch</td>
<td>Or Orange</td>
</tr>
<tr>
<td>13</td>
<td>Start switch</td>
<td>B/L Black/Blue</td>
</tr>
<tr>
<td>14</td>
<td>Engine stop switch</td>
<td>G/B Green/Black</td>
</tr>
<tr>
<td>15</td>
<td>Horn</td>
<td>G/R Green/Red</td>
</tr>
<tr>
<td>16</td>
<td>Horn switch</td>
<td>G/Y Green/Yellow</td>
</tr>
<tr>
<td>17</td>
<td>Headlight relay</td>
<td>G/W Green/White</td>
</tr>
<tr>
<td>18</td>
<td>Turn signal switch</td>
<td>L/W Blue/White</td>
</tr>
<tr>
<td>19</td>
<td>Turn signal relay</td>
<td>L/Y Blue/Yellow</td>
</tr>
<tr>
<td>20</td>
<td>Tail/brake light</td>
<td>W/L White/Blue</td>
</tr>
<tr>
<td>21</td>
<td>Dimmer switch</td>
<td>W/R White/Red</td>
</tr>
<tr>
<td>22</td>
<td>Water temperature indicator light</td>
<td>Y/B Yellow/Black</td>
</tr>
<tr>
<td>23</td>
<td>Speedometer light</td>
<td>Y/L Yellow/Blue</td>
</tr>
<tr>
<td>24</td>
<td>High beam indicator light</td>
<td>Y/R Yellow/Red</td>
</tr>
<tr>
<td>25</td>
<td>Turn signal indicator light(left)</td>
<td>Br/W Brown/White</td>
</tr>
<tr>
<td>26</td>
<td>Turn signal indicator light(right)</td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>Fuel sender</td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>Headlight</td>
<td></td>
</tr>
<tr>
<td>29</td>
<td>Front turn signal light(left)</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>Front turn signal light(right)</td>
<td></td>
</tr>
<tr>
<td>31</td>
<td>Rear turn signal light(left)</td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>Rear turn signal light(right)</td>
<td></td>
</tr>
<tr>
<td>33</td>
<td>Thermo switch</td>
<td></td>
</tr>
<tr>
<td>34</td>
<td>Thermo unit</td>
<td></td>
</tr>
<tr>
<td>35</td>
<td>Throttle position sensor</td>
<td></td>
</tr>
</tbody>
</table>
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.

Pocket tester
90890-03112 (YU-03112-C)

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 (a) are shown in the far left column and the switch lead colors (b) are shown in the top row in the switch illustration.

NOTE:

“Ω-Ω” 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 that:

There is continuity between black and black/white when the switch is set to “OFF”. There is continuity between red and brown when the switch is set to “ON”.

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 (a) are shown in the far left column and the switch lead colors (b) are shown in the top row in the switch illustration.

NOTE:

“Ω-Ω” 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 that:

There is continuity between black and black/white when the switch is set to “OFF”. There is continuity between red and brown when the switch is set to “ON”.
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.
- Improperly connected → Properly connect.
- Incorrect continuity reading → Replace the switch.

![Diagram of various switches and symbols]

**Rear brake light switch**

**Dimmer switch**

**Horn switch**

**Turn signal light switch**

**Start switch**

**Engine stop switch**

**Front brake light switch**

**Main switch**
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.
- No continuity → Repair or replace the bulb, bulb socket or both.

TYPES OF BULBS

The bulbs used on this scooter are shown in the illustration on the left.

- Bulbs A and B are used for the headlights and usually use a bulb holder that must be detached before removing the bulb. The majority of these types of bulbs can be removed from their respective socket by turning them counterclockwise.

- Bulbs 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 BULBS AND BULB SOCKETS

CHECKING THE CONDITION OF THE BULBS
The following procedure applies to all of the bulbs.

1. Remove:
   • bulb

   **WARNING**
   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.

   **Pocket tester**
   90890-03112 (YU-03112-C)

   **NOTE:**
   Before checking for continuity, set the pocket tester to “0” and to the “Ω × 1” range.

   a. Connect the positive tester probe to terminal (1) and the negative tester probe to terminal (2), and check the continuity.
   b. Connect the positive tester probe to terminal (1) and the negative tester probe to terminal (3), and check the continuity.
   c. 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 (YU-03112-C)

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

1. Main switch
2. Pickup coil
3. Battery
4. Main fuse
5. C.D.I. unit
6. Ignition coil
7. Engine stop switch

Connecting with GND. Wire

EAS00734
IGNITION SYSTEM
CIRCUIT DIAGRAM

1 Main switch
2 Pickup coil
3 Battery
4 Main fuse
5 C.D.I. unit
6 Ignition coil
7 Engine stop switch

Connecting with GND. Wire
IGNITION SYSTEM

TROUBLESHOOTING

The ignition system fails to operate (no spark or intermittent spark).

Check:
1. main fuse
2. battery
3. spark plug
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. wiring connections (of the entire ignition system)

NOTE:
- Before troubleshooting, remove the following part(s):
  1. Battery cover/Battery holder
  2. Head light cover
  3. Leg shield
  4. Seat/Trunk
- Troubleshoot with the following special tool(s).

1. Main Fuse
   - Check the fuse for continuity.
   - Refer to “CHECKING THE FUSE” in chapter 3.
   - Is the fuse OK?
     - YES
     - NO

2. Battery
   - Check the condition of the battery.
   - Refer to “CHECKING AND CHARGING THE BATTERY” in chapter 3.
   - Is the battery OK?
     - YES
     - NO

   - Clean the battery terminals.
   - Recharge or replace the battery.

3. Spark plug
   - Check the condition of the spark plug.
   - Check the spark plug type.
   - Measure the spark plug gap.
   - Refer to “CHECKING THE SPARK PLUG” in chapter 3.
   - Is the spark plug in good condition, is it of the correct type, and is its gap within specification?
     - YES
     - NO

   - Re-gap or replace the spark plug.

Ignition checker
90890-06754
YM-34487
Pocket tester
90890-03112
YU-03112-C
4. Ignition spark gap
   - 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 starter switch and gradually increase the spark gap until a misfire occurs.

<table>
<thead>
<tr>
<th>Minimum ignition spark gap</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 mm (0.24 in)</td>
</tr>
</tbody>
</table>

- Is there a spark and is the spark gap within specification?

   NO  YES

   The ignition system is OK.

5. Spark plug cap resistance
   - Remove the spark plug cap from the spark plug lead.
   - Connect the pocket tester (“Ω × 1k” range) to the spark plug cap as shown.
   - Measure the spark plug cap resistance.

   Spark plug cap resistance
   4~6 kΩ at 20°C

   YES  NO

   Replace the spark plug cap.

6. Ignition coil resistance
   - Disconnect the ignition coil connectors from the ignition coil terminals.
   - Connect the pocket tester (Ω × 1) to the ignition coil as shown.

   Positive tester probe ➔ orange
   Negative tester probe ➔ black
7. Pickup coil resistance
- Disconnect the pickup coil coupler from the wire harness.
- Connect the pocket tester (Ω × 100) to the pickup coil terminal as shown.

Positive tester probe → white/red
Negative tester probe → white/blue

- Measure the pickup coil resistance.

Pickup coil resistance
248 ~ 372Ω at 20°C (between white/red and white/blue)

- Is the pickup coil OK?

YES   NO
Replace the pickup coil.

8. Main switch
- Check the main switch for continuity. Refer to "CHECKING THE SWITCHES".
- Is the main switch OK?

YES   NO
Replace the main switch.
9. 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.

10. Wiring
   • Check the entire ignition system’s wiring.
     Refer to “CIRCUIT DIAGRAM”.
   • Is the ignition system’s wiring properly connected and without defects?

   YES  NO

   Replace the C.D.I. unit.
   Properly connect or repair the ignition system’s wiring.
ELECTRIC STARTING SYSTEM

EAS00796

STARTING CIRCUIT CUT-OFF SYSTEM OPERATION

If the main switch is set to “ON” (switch is closed), the starter motor can only operate if at least one of the following conditions is met:
- The brake lever (front or rear) is pulled to the handlebar (the brake light switch is closed).

1️⃣ Battery
2️⃣ Main fuse
3️⃣ Main switch
4️⃣ Front brake light switch
5️⃣ Rear brake light switch
6️⃣ Engine stop switch
7️⃣ Start switch
8️⃣ Starter relay
9️⃣ Starter motor

Downloaded from www.ScooterTime.net
TROUBLESHOOTING

The starter motor fails to turn.

Check:
1. main fuse
2. battery
3. starter motor
4. starter relay
5. main switch
6. brake light switch (front, rear)
7. engine stop switch
8. start switch
9. wiring connections
   (of the entire starting system)

NOTE:
Before troubleshooting, remove the following part(s):
1. Seat/Trunk/Rear carrier
2. Mat/Front cover
3. Side cover (left and right)/Rear cover
4. Battery cover/Battery holder
5. Footrest board side cover mole (right, left)
6. Footrest board
7. Head light cover/Leg shield
8. Air filter assembly
   Troubleshoot with the following special tool(s).

Pocket tester
90890-03112 (YU-03112-C)

1. Main fuse
   • Check the fuse for continuity.
   Refer to “CHECKING THE FUSE” in chapter 3.
   • Is the 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.
   Minimum 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 positive battery 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 or more as that of the battery lead, otherwise the jumper lead may burn.
- This check is likely to produce sparks, therefore make sure nothing flammable is in the vicinity.

- Does the starter motor turn?

  YES  NO

  Repair or replace the starter motor.

4. Starter relay

- Disconnect the starter relay coupler from the coupler.
- Connect the pocket tester (Ω × 1) and battery (12 V) to the starter relay coupler as shown.

  Positive battery terminal → green/yellow ①
  Negative battery terminal → blue/white ②
  Positive tester probe → red ③
  Negative tester probe → red ④

- Does the starter relay have continuity between red ③ and red ④?

  YES  NO

  Replace the starter relay.

5. Main switch

- Check the main switch for continuity.
  Refer to "CHECKING THE SWITCHES".
- Is the main switch OK?

  YES  NO

  Replace the main switch.
6. Brake light switch (front and rear)

- Check the brake light switch for continuity.
  Refer to “CHECKING THE SWITCHES”.
- Is the brake light switch OK?

  YES  NO

  Replace the brake light switch.

7. 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.

8. Start switch

- Check the start switch for continuity.
  Refer to “CHECKING THE SWITCHES”.
- Is the start switch OK?

  YES  NO

  Replace the right handlebar switch.

9. Wiring

- Check the entire starting system’s wiring.
  Refer to “CIRCUIT DIAGRAM”.
- Is the starting system’s wiring properly connected and without defects?

  YES  NO

  The starting system circuit is OK.
  Properly connect or repair the starting system’s wiring.
## ELECTRIC STARTING SYSTEM

### STARTER MOTOR

**Removing the starter motor**
- Seat/Trunk
- Front cover
- Battery cover
- Air filter assembly
- Starter motor lead
- Starter motor

<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></td>
<td>1</td>
<td>Remove the parts in the order listed. Refer to “COVER AND PANEL” in chapter 3.</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>1</td>
<td>Refer to “MANIFOLD, AIR FILTER AND MUFFLER ASSEMBLY” in chapter 5. Disconnect.</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>1</td>
<td>For installation, reverse the removal procedure.</td>
</tr>
</tbody>
</table>

**Disassembling the starter motor**
- O-ring
- Gasket
- Stator assembly
- O-ring
- Armature coil
- Brush
- Plate washer

<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>O-ring</td>
<td>1</td>
<td>Disassemble the parts in the order listed.</td>
</tr>
<tr>
<td>2</td>
<td>Gasket</td>
<td>1</td>
<td>For assembly, reverse the disassembly procedure.</td>
</tr>
<tr>
<td>3</td>
<td>Stator assembly</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>O-ring</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Armature coil</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Brush</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Plate washer</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>
CHECKING THE STARTER MOTOR

1. Check:
   • commutator
     Dirt → Clean with 600-grit sandpaper.

2. Measure:
   • commutator diameter (a)
     Out of specification → Replace the starter motor.

   **Commutator wear limit**
   16.6 mm (0.654 in)

3. Measure:
   • mica undercut (b)
     Out of specification → Scrape the mica to the proper measurement with a hacksaw blade that has been grounded to fit the commutator.

   **Mica undercut**
   1.35 mm (0.053 in)

**NOTE:**
The mica of the commutator 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.

   a. Measure the armature assembly resistances with the pocket tester.

   **Pocket tester**
   90890-03132 (YU-03112-C)

   **Armature coil**
   Commutator resistance (1)
   0.0378 ~ 0.0462 Ω at 20°C
   Insulation resistance (2)
   Above 1 MΩ at 20°C

   b. If any resistance is out of specification, replace the starter motor.

8-20
5. Measure:
   - brush length @
   Out of specification → Replace the brushes as a set.

   **Brush length wear limit**
   3.5 mm (0.14 in)

6. Measure:
   - brush spring force
   Out of specification → Replace the brush springs as a set.

   **Brush spring force**
   3.92 ~ 5.88 N

7. Check:
   - gear teeth
     Damage/wear → Replace the gear.

8. Check:
   - bearing①
   - oil seal②
   - bush③
   Damage/wear → Replace.
ASSEMBLING THE STARTER MOTOR

1. Install:
   - brush seat ①

2. Install:
   - washer ①
   - armature coil ②
   - o-ing ③
   - stator assembly ④

3. Install:
   - bolts ①

**NOTE:**
Align the match marks ④ on the starter motor yoke with the match marks ⑤ on the front and starter motor rear covers.

\[ 5 \text{ Nm (0.5 m \cdot kg, 3.6 ft \cdot lb)} \]
TROUBLESHOOTING

The battery is not being charged.

Check:
1. main fuse
2. battery
3. charging voltage
4. stator coil resistance
5. wiring connections
   (of the entire charging system)

NOTE:
- Before troubleshooting, remove the following part(s):
  1. Seat/Trunk
  2. Battery cover
  3. Headlight cover
  4. Leg shield
- Troubleshoot with the following special tool(s).

Digital tachometer
90890-06760
Pocket tester
90890-03112 (YU-03112-C)

1. Main fuse
   - Check the fuse for continuity.
     Refer to “CHECKING THE FUSE” in chapter 3.
   - Is the 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.

   Minimum 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.
   • Connect the pocket tester (DC 20 V) to the battery as shown.

   Positive tester probe → positive battery terminal
   Negative tester probe → negative battery terminal

   • Start the engine and let it run at approximately 5,000 r/min.
   • Measure the charging voltage.

   Charging voltage
   14 V at 5000r/min
The charging circuit is OK.

<table>
<thead>
<tr>
<th>NOTE:</th>
<th>Make sure the battery is fully charged.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is the charging voltage within specification?</td>
<td></td>
</tr>
<tr>
<td>NO</td>
<td>YES</td>
</tr>
</tbody>
</table>

The charging circuit is OK.

4. Stator coil resistance

- Remove the starter coil couplers from wireharness.
- Connect the pocket tester (Ω x 1) to the stator coils as shown.

**Positive tester probe → white**
**Negative tester probe → ground**

- Measure the stator coil resistances.

<table>
<thead>
<tr>
<th>Stator coil resistance</th>
<th>0.288 ~ 0.432 Ω at 20°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>(between white and ground)</td>
<td></td>
</tr>
</tbody>
</table>

- Is the stator coil OK?

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
</table>

Replace the stator coil assembly.

5. Wiring

- Check the entire charging system’s wiring. Refer to “CIRCUIT DIAGRAM”.
- Is the charging system’s wiring properly connected and without defects?

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
</table>

Replace the rectifier/regulator.

Properly connect or repair the charging system’s wiring.
TROUBLESHOOTING

Any of the following fail to light: headlight, high beam indicator light or meter light.

Check:
1. main fuse
2. battery
3. lighting coil resistance.
4. main switch
5. dimmer switch
6. headlight relay
7. wiring connections (of the entire lighting system)

NOTE:
• Before troubleshooting, remove the following part(s):
  1. Seat/Trunk
  2. Battery cover
  3. Headlight cover
  4. Leg shield
• Troubleshoot with the following special tool(s).

Pocket tester
90890-03112 (YU-03112-C)

1. Main fuse
• Check the fuses for continuity.
  Refer to “CHECKING THE FUSE” in chapter 3.
• Is the 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.

Minimum 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. Lighting coil resistance
• Disconnect the lighting coil coupler from the wire harness.
• Connect the pocket tester (Ω x 1) to the lighting coil terminal as shown.

Positive tester probe ➔ yellow/red
Negative tester probe ➔ ground

• Measure the lighting coil resistance.

Lighting coil resistance
0.256 ~ 0.384 Ω at 20°C
(between yellow/red and ground)

• Is the lighting coil OK?

YES
NO
Replace the lighting coil.
4. Main switch
   - Check the main switch for continuity. Refer to "CHECKING THE SWITCHES".
   - Is the main switch OK?
   
   **YES**
   - Replace the main switch.
   
   **NO**

5. Dimmer switch
   - Check the dimmer switch for continuity. Refer to "CHECKING THE SWITCHES".
   - Is the dimmer switch OK?
   
   **YES**
   - The dimmer switch is faulty. Replace the left handlebar switch.
   
   **NO**

6. Headlight relay
   - Disconnect the headlight relay coupler from the wire harness.
   - Connect the pocket tester ($\Omega \times 1$) and battery (12 V) to the headlight relay coupler as shown.

   **Positive battery terminal → green/yellow** ①
   **Negative battery terminal → blue/white** ②
   **Positive tester probe → yellow/red** ③
   **Negative tester probe → blue** ④

   - Does the starting headlight relay have continuity between blue and yellow/red?
   
   **YES**
   - Replace the headlight relay.
   
   **NO**

7. Wiring
   - Check the entire lighting system's wiring. Refer to "CIRCUIT DIAGRAM".
   - Is the lighting system's wiring properly connected and without defects?
   
   **YES**
   - Properly connect or repair the lighting system's wiring.
   
   **NO**

---

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# 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. **High beam indicator light bulb and socket**
   - Check the high beam indicator light bulb and socket for continuity.
   - Refer to “CHECKING THE BULBS AND BULB SOCKETS”
   - Are the high beam indicator light bulb and socket OK?

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Replace the high beam indicator light bulb, socket or both.</td>
<td></td>
</tr>
</tbody>
</table>

3. **Voltage**
   - Connect the pocket tester (DC 20 V) to the headlight and high beam indicator light couplers as shown.
   - When the dimmer switch is set to “%” or “&”.
   - Headlight coupler (wire harness side)
     - Positive tester probe → green ①
     - Negative tester probe → black ②
     - Positive tester probe → yellow ③
     - Negative tester probe → black ④
   - High beam indicator light
     - Positive tester probe → yellow ①
     - Negative tester probe → black ②

   - Set the main switch to “ON”.
   - Start the engine.
   - Set the dimmer switch to “%” or “&”.
   - Measure the voltage (DC 12 V) on the headlight coupler (wire harness side).
   - Measure the voltage (DC 12 V) on the dimmer switch coupler (wire harness side) when the dimmer switch is set to “%”.
   - Is the voltage within specification?
The wiring circuit from the main switch to the headlight and high beam indicator light coupler are faulty and must be repaired.

This circuit is OK.

2. The meter light fails to come on.

1. Meter light bulb and socket
   - Check the meter light bulb and socket for continuity.
     Refer to “CHECKING THE BULBS AND BULB SOCKETS”
   - Are the meter light bulb and socket OK?

   YES NO

Replace the meter light bulb, socket or both.

2. Voltage
   - Connect the pocket tester (DC 20 V) to the meter light coupler (wire harness side) as shown.

   Positive tester probe → brown (1)
   Negative tester probe → black (2)

   • Set the main switch to “ON”.
   • Measure the voltage (DC 12 V) of brown (1) on the meter light coupler (wire harness side).
   • Is the voltage within specification?

   YES NO

This circuit is OK.

The wiring circuit from the main switch to the meter light coupler is faulty and must be repaired.
Refer to “CIRCUIT DIAGRAM”.

---

This circuit is OK.
4. Wiring

- Check the entire lighting system's wiring.
  Refer to “CIRCUIT DIAGRAM”.
- Is the lighting system's wiring properly connected and without defects?

YES  NO

Check the condition of each of the lighting system’s circuits.
Refer to “CIRCUIT DIAGRAM”.

Properly connect or repair the lighting system's wiring.
SIGNALING SYSTEM
CIRCUIT DIAGRAM

1. Main switch
2. Battery
3. Main fuse
4. Front brake light switch
5. Rear brake light switch
6. Horn
7. Horn switch
8. Turn signal switch
9. Turn signal relay
10. Tail/brake light
11. Left turn signal indicator light
12. Right turn signal indicator light
13. Fuel sender
14. Front turn signal light(left)
15. Front turn signal light(right)
16. Rear turn signal light(left)
17. Rear turn signal light(right)
### 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 fuse
2. battery
3. main switch
4. wiring connections (of the entire signaling system)

**NOTE:**
- Before troubleshooting, remove the following part(s):
  1. Head light cover/Leg shield
  2. Battery cover
  3. Seat/Trunk
  4. Rear carrier
  5. Front cover
  6. Side cover (left and right)/Rear cover
- Troubleshoot with the following special tool(s):
  - Pocket tester 90890-03112 (YU-03112-C)

---

#### 2. Battery

- Check the condition of the battery. Refer to “CHECKING AND CHARGING THE BATTERY” in chapter 3.

<table>
<thead>
<tr>
<th>Minimum open-circuit voltage</th>
<th>12.8 V or more at 20°C</th>
</tr>
</thead>
</table>

- Is the battery OK?

  **YES**
  - Clean the battery terminals.
  - Recharge or replace the battery.

  **NO**

---

#### 3. Main switch

- Check the main switch for continuity. Refer to “CHECKING THE SWITCHES”.
- Is the main switch OK?

  **YES**
  - Replace the main switch.

  **NO**

---

#### 4. Wiring

- Check the entire signal system’s wiring. Refer to “CIRCUIT DIAGRAM”.
- Is the signaling system’s wiring properly connected and without defects?

  **YES**
  - Check the condition of each of the signaling system’s circuits. Refer to “CHECKING THE SIGNALING SYSTEM”.

  **NO**
  - Properly connect or repair the signaling system’s wiring.

---

**ELEC**
### 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?

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
</table>

Replace the left handlebar switch.

#### 2. Voltage
- Connect the pocket tester (DC 20 V) to the horn connector at the horn terminal as shown.

Positive tester probe → brown ①  
Negative tester probe → ground

- Set the main switch to “ON”.
- Push the horn switch.
- Measure the voltage (DC 12 V) of brown at the horn terminal.
- Is the voltage within specification?

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
</table>

The wiring circuit from the main switch to the horn connector is faulty and must be repaired. Refer to “CIRCUIT DIAGRAM”.

#### 3. Horn
- Disconnect the pink 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”.
- Push the horn switch.
- Does the horn sound?

<table>
<thead>
<tr>
<th>NO</th>
<th>YES</th>
</tr>
</thead>
</table>

The horn is OK.

#### 4. Voltage
- Connect the pocket tester (DC 20 V) to the horn connector at the pink terminal as shown.

Positive tester probe → pink ①  
Negative tester probe → ground

- Set the main switch to “ON”.
- Measure the voltage (DC 12 V) of pink ① at the horn terminal.
- Is the voltage within specification?

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
</table>

Repair or replace the horn.

Replace the horn.
2. The 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?
   
   ![Diagram of tail/brake light bulb and socket](image)

   **YES**
   Replace the tail/brake light bulb, socket or both.

   **NO**

2. Brake light switches
   • Check the brake light switches for continuity. Refer to “CHECKING THE SWITCHES”.
   • Is the brake light switch OK?
   
   ![Diagram of brake light switches](image)

   **YES**
   The wiring circuit from the main switch to the tail/brake light bulb connector is faulty and must be repaired. Refer to “CIRCUIT DIAGRAM”.

   **NO**
   Replace the brake light switch.

3. Voltage
   • Connect the pocket tester (DC 20 V) to the tail/brake light coupler (wire harness side) as shown.
   
   **Positive tester probe → green/yellow**
   **Negative tester probe → black**

   ![Diagram of voltage measurement](image)

   • Set the main switch to “ON”.
   • Pull in the brake levers.
   • Measure the voltage (DC 12 V) of green/yellow on the tail/brake light coupler (wire harness side).
   • Is the voltage within specification?
   
   **YES**
   The wiring circuit from the main switch to the tail/brake light coupler is faulty and must be repaired. Refer to “CIRCUIT DIAGRAM”.

   **NO**

   ![Diagram of voltage measurement](image)
3. The turn signal light, turn signal indicator light or both fail to blink.

1. Turn signal light and turn signal indicator light bulbs and sockets
   - Check the turn signal light bulb and socket for continuity. Refer to “CHECKING THE BULBS AND BULB SOCKETS”
   - Check the turn signal indicator light bulb and socket for continuity. Refer to “CHECKING THE BULBS AND BULB SOCKETS”
   - Are the turn signal light bulb and socket OK?

   YES
   NO

   Replace the turn signal light and/or turn signal indicator light bulb, socket or both.

2. Turn signal switch
   - Check the turn signal switch 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 turn signal relay coupler (wire harness side) as shown.

   Positive tester probe → brown
   Negative tester probe → ground

   - Set the main switch to “ON”.
   - Measure the voltage (DC 12 V) on brown ① at the turn signal relay coupler (wire harness side).
   - Is the voltage within specification?

   YES
   NO

   The wiring circuit from the main switch to the turn signal relay coupler is faulty and must be repaired. Refer to “CIRCUIT DIAGRAM”.

---

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4. Voltage

- Connect the pocket tester (DC 20 V) to the turn signal relay coupler (wire harness side) as shown.

**Positive tester probe → brown/white** ①
**Negative tester probe → ground**

- Set the main switch to “ON”.
- Set the turn signal switch to “〈” or “〉”.
- Measure the voltage (DC 12 V) on brown/white ① at the turn signal relay coupler (wire harness side).
- Is the voltage within specification?

   **YES**

   The turn signal relay is faulty and must be replaced.

   **NO**

5. Voltage

- Connect the pocket tester (DC 20 V) to the turn signal light connector or meter assembly coupler (wire harness side) as shown.

**Left turn signal light**
**Positive tester probe → chocolate** ①
**Negative tester probe → ground**

**Right turn signal light**
**Positive tester probe → dark green** ②
**Negative tester probe → ground**

- Set the main switch to “ON”.
- Set the turn signal switch to “〈” or “〉”.
- Measure the voltage (DC 12 V) of chocolate ① or dark green ② at the turn signal light connector (wire harness side).
- Is the voltage within specification?

   **YES**

   This circuit is OK.

   **NO**

   The wiring circuit from the turn signal switch to the turn signal light connector is faulty and must be repaired.

---

8-37
4. The fuel level meter fails to operate.

1. Fuel sender
   - Remove the fuel sender from the fuel tank.
   - Connect the pocket tester (Ω × 1) to the fuel sender coupler (wire harness side) as shown.

   Positive tester probe → green •
   Negative tester probe → black •

   Measure the fuel sender resistances.

   Fuel sender resistance (up position F)(Ω × 1)
   6~8Ω at 20°C

   Fuel sender resistance (down position E)(Ω × 10)
   93.5~96.5Ω at 20°C

   Is the fuel sender OK?

   YES NO
   Replace the fuel sender.

2. Voltage
   - Connect the pocket tester (DC 20 V) to the meter light coupler (wire harness side) as shown.

   Positive tester probe → brown •
   Negative tester probe → black •

   Set the main switch to “ON”.
   Measure the voltage (DC 12 V) of brown on the meter light coupler (wire harness side).
   Is the voltage within specification?

   YES NO

   Check the wiring connections of the entire signaling system. Refer to “CIRCUIT DIAGRAM”.

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3. Fuel level meter

- Set the main switch to "ON".
- Move the float up ① or down ②.

- Check that the fuel level meter needle moves to “F” or “E”.

**NOTE:**
Before reading the fuel level meter, leave the float in one position (either up or down) for at least three minutes.

- Does the fuel level meter needle move appropriately?

  - YES
  - NO

This circuit is OK. Replace the speedometer.

4. Wiring

- Check the entire signaling system’s wiring
COOLING SYSTEM
CIRCUIT DIAGRAM

1. Main switch
2. Battery
3. Main fuse
4. C.D.I. unit
5. Water temperature indicator light
6. Thermo switch
7. Thermo unit

Connecting with GND. Wire

MARK     Explanation

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COOLING SYSTEM

TROUBLESHOOTING

The cooling system fails to operate.

Check:
1. main fuse
2. battery
3. main switch
4. thermo switch
5. water temperature indicator light
6. wiring connections
   (the entire cooling system)

NOTE:
- Before troubleshooting, remove the following part(s):
  1. Seat/Trunk
  2. Battery cover
  3. Front cover
  4. Head light cover
  5. Leg shield 1
  6. Drain the coolant
- Troubleshoot with the following special tool(s).

Pocket tester
90890-03112 (YU-03112-C)

1. Main fuse
   - Check the fuse for continuity.
     Refer to “CHECKING THE FUSE” in chapter 3.
   - Is the 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.

   Minimum 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. Thermo switch

• Remove the thermo switch from the thermostat housing.
• Connect the pocket tester (Ω × 1) to the thermo switch ① as shown.
• Immerse the thermo switch in a container filled with coolant②.
• Place a thermometer③ in the coolant.
• Slowly heat the coolant, then let it cool down to the specified temperature.
• Check the thermo switch for continuity at the temperatures indicated below.

<table>
<thead>
<tr>
<th>Test step</th>
<th>Coolant temperature</th>
<th>Continuity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0 ~ 56 °C</td>
<td>NO</td>
</tr>
<tr>
<td>2</td>
<td>More than 65 ± 2 °C</td>
<td>YES</td>
</tr>
<tr>
<td>3*</td>
<td>65 ± 2°C to 56°C</td>
<td>YES</td>
</tr>
<tr>
<td>4*</td>
<td>Less than 56 °C</td>
<td>NO</td>
</tr>
</tbody>
</table>

Steps 1 & 2: Heating phase
Steps 3 & 4: Cooling phase

A WARNING

• Handle the thermo switch with special care.
• Never subject the thermo switch to strong shocks. If the thermo switch is dropped, replace it.

Thermo switch
23 Nm (2.3 m · kg, 16.6 ft · lb)
Three bond sealock®10

Does the thermo switch operate properly as described above?

YES NO

Replace the thermo switch.
5. The water temperature indicator light fails to operate.

1. Thermo unit

- Remove the thermo unit from the cylinder head.
- Connect the pocket tester (Ω × 1k) to the thermo unit as shown.

<table>
<thead>
<tr>
<th>Positive tester probe → black/blue</th>
<th>Negative tester probe → green/red</th>
</tr>
</thead>
</table>

- Measure the thermo unit resistance.

**Thermo unit resistance**
- 3.413~4.006k Ω at 80 °C
- 1.645~1.855k Ω at 105 °C

- Is the thermo unit OK?
  - YES
  - NO

  Replace the thermo unit.

2. Voltage

- Connect the pocket tester (DC 20 V) to the meter light coupler (wire harness side) as shown.

| Positive tester probe → green/red |
| Negative tester probe → ground |

- Set the main switch to “ON”.
- Measure the voltage (DC 12 V) of green/red on the meter light coupler (wire harness side).
- Is the voltage within specification?
  - YES
  - NO

The wiring circuit from the main switch to the thermo unit connector is faulty and must be repaired.
3. Water temperature indicator light

- Remove the thermo unit coupler.
- Set the main switch to “ON”.
- Connect the green/red (1) and black/blue (2) with a jumper lead (3).

- Is the water temperature indicator light OK?

   **YES**
   - This circuit is OK.

   **NO**
   - Replace the water temperature indicator light

---

6. Wiring

- Check the entire cooling system’s wiring. Refer to “CIRCUIT DIAGRAM”.
- Is the cooling system’s wiring properly connected and without defects?

   **YES**
   - Replace the C.D.I. unit

   **NO**
   - Properly connect or repair the cooling system’s wiring.
TROUBLESHOOTING

The auto choke system fails to operate.

Check:
1. main fuse
2. battery
3. thermo switch
4. auto choke unit
5. wiring connections (of the entire autochoke system)

NOTE:
- Before troubleshooting, remove the following part(s):
  1. Seat/Trunk
  2. Battery cover
  3. Front cover
- Troubleshoot with the following special tool(s).

Pocket tester
90890-03112 (YU-03112-C)

2. Battery
- Check the condition of the battery. Refer to “CHECKING AND CHARGING THE BATTERY” in chapter 3.

Minimum 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.

1. Main fuse
- Check the main fuse for continuity. Refer to “CHECKING THE FUSE” in chapter 3.
- Is the fuse OK?

YES
NO

Replace the fuse.

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3. Thermo switch

- Remove the thermo switch from the thermostat housing.
- Connect the pocket tester (Ω × 1) to the thermo switch 1 as shown.
- Immerse the thermo switch in a container filled with coolant 2.
- Place a thermometer 3 in the coolant.
- Slowly heat the coolant, then let it cool down to the specified temperature.
- Check the thermo switch for continuity at the temperatures indicated below.

<table>
<thead>
<tr>
<th>Test step</th>
<th>Coolant temperature</th>
<th>Continuity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0 ~ 56 °C</td>
<td>NO</td>
</tr>
<tr>
<td>2</td>
<td>More than 65 ± 2 °C</td>
<td>YES</td>
</tr>
<tr>
<td>3*</td>
<td>65 ± 2°C to 56°C</td>
<td>YES</td>
</tr>
<tr>
<td>4*</td>
<td>Less than 56 °C</td>
<td>NO</td>
</tr>
</tbody>
</table>

Steps 1 & 2: Heating phase
Steps 3 & 4: Cooling phase

**WARNING**

- Handle the thermo switch with special care.
- Never subject the thermo switch to strong shocks. If the thermo switch is dropped, replace it.

Thermo switch
23 Nm (2.3 m·kg, 16.6 ft·lb)
Three bond sealock®10
4. Auto choke unit

- Disconnect the auto choke unit coupler from wire harness.
- Connect the pocket tester (Ω × 1) to the Auto choke unit coupler as shown.

Positive tester probe ➔ green/black ①
Negative tester probe ➔ yellow ②

- Measure the auto choke unit resistance.

Auto choke unit resistance
20 Ω at 20°C

- Is the auto choke unit OK?
  YES  NO
  Replace the auto choke unit.

5. Wiring

- Check the entire auto choke system's wiring. Refer to "CIRCUIT DIAGRAM".
- Is the auto choke system's wiring properly connected and without defects?
  YES  NO
  Replace the C.D.I. unit
  Properly connect or repair the auto choke system's wiring.
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TROUBLE SHOOTING

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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 FAILURE / HARD STARTING

ENGINE

Cylinder and cylinder head
- Loose spark plug
- Loose cylinder head or cylinder
- Damaged cylinder head gasket
- Damaged cylinder gasket
- Worn or damaged cylinder
- Incorrect valve clearance
- Improperly sealed valve
- Incorrect valve-to-valve-seat contact
- Incorrect valve timing
- Faulty valve spring
- Seized valve

Piston and piston ring
- Improperly installed piston ring
- Damaged, worn or fatigued piston ring
- Seized piston ring
- Seized or damaged piston

Air filter
- Improperly installed air filter
- Clogged air filter element

Crankcase and crankshaft
- Improperly assembled crankcase
- Seized crankshaft

FUEL SYSTEM

Fuel tank
- Empty fuel tank
- Clogged fuel tank cap breather hole
- Deteriorated or contaminated fuel
- Clogged or damaged fuel hose

Fuel cock
- Faulty fuel cock
- Damaged vacuum hose
- Improperly routed hose

Carburetor
- Deteriorated or contaminated fuel
- Clogged slow jet
- Clogged pilot air passage
- Sucked-in air
- Damaged float
- Worn needle valve
- Improperly installed needle valve seat
- Incorrect fuel level
- Improperly installed slow jet
- Clogged starter jet

Autochoke unit
- Faulty starter plunger
- Faulty C.D.I. unit
- Faulty thermo switch

ELECTRICAL SYSTEMS

Battery
- Discharged battery
- Faulty battery

Fuse
- Blown, damaged or incorrect fuse
- Improperly installed fuse

Spark plug
- 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 coil
- Cracked or broken ignition coil body
- Broken or shorted primary or secondary coils
- Faulty spark plug lead
STARTING FAILURES/HARD STARTING/ INCORRECT ENGINE IDLING SPEED

Ignition system
- Faulty C.D.I. unit
- Faulty pickup coil
- Broken AC magneto rotor woodruff key

Switches and wiring
- Faulty main switch
- Faulty engine stop switch
- Broken or shorted wiring
- Faulty front, rear or both brake light switches
- Faulty start switch
- Improperly grounded circuit
- Loose connections

Starting system
- Faulty starter motor
- Faulty starter relay
- Faulty starter clutch

INCORRECT ENGINE IDLING SPEED

ENGINE
Cylinder and cylinder head
- Incorrect valve clearance
- Damaged valve train components

Air filter
- Clogged air filter element

FUEL SYSTEM
Carburetor
- Faulty starter plunger
- Loose or clogged slow jet
- Loose or clogged slow air jet
- Damaged or loose carburetor joint
- Improperly synchronized carburetor
- Improperly adjusted engine idling speed (throttle stop screw)
- Improper throttle cable free play
- Flooded carburetor

Autochoke unit
- Faulty starter plunger
- Faulty C.D.I. unit

ELECTRICAL SYSTEMS
Battery
- Discharged battery
- Faulty battery

Spark plug
- 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 coil
- Faulty spark plug lead

Ignition system
- Faulty C.D.I. unit
- Faulty pickup coil
POOR MEDIUM-AND-HIGH-SPEED PERFORMANCE

Refer to “STARTING FAILURE/HARD STARTING”.

ENGINE
Air filter
● Clogged air filter element

Air intake system
● Bent, clogged or disconnected carburetor air vent hose
● Clogged or leaking air duct

FUEL SYSTEM
Carburetor
● Faulty diaphragm
● Incorrect fuel level
● Loose or clogged main jet
● Faulty accelerating pump

Fuel cock
● Faulty fuel cock

FAULTY CLUTCH

ENGINE OPERATES BUT SCOOTER WILL NOT MOVE

V-belt
● Bent, damaged or worn V-belt
● Slipping V-belt

Primary pulley cam and primary pulley slider
● Damaged or worn primary pulley cam
● Damaged or worn primary pulley slider

Clutch spring(s)
● Damaged clutch spring

Transmission gears
● Damaged transmission gear

CLUTCH SLIPS
Clutch shoe springs
● Damaged, loose or worn clutch shoe spring
Clutch shoes
● Damaged or worn clutch shoe

Primary sliding sheave
● Seized primary sliding sheave

POOR STARTING PERFORMANCE
V-belt
● V-belt slips
● Oil or grease on the V-belt

Primary sliding sheave
● Faulty operation
● Worn pin groove
● Worn pin

Clutch shoes
● Bent, damaged or worn clutch shoe
POOR SPEED PERFORMANCE
V-belt
- Oil or grease on the V-belt

Primary pulley weight(s)
- Faulty operation
- Worn primary pulley weight

Primary fixed sheave
- Worn primary fixed sheave

Primary sliding sheave
- Worn primary sliding sheave

Secondary fixed sheave
- Worn secondary fixed sheave

Secondary sliding sheave
- Worn secondary sliding sheave

Hose(s) and pipe(s)
- Damaged hose
- Improperly connected hose
- Damaged pipe
- Improperly connected pipe

FUEL SYSTEM
Carburetor
- Incorrect main jet setting
- Incorrect fuel level
- Damaged or loose carburetor joint

Air filter
- Clogged air filter element

CHASSIS
Brake(s)
- Dragging brake

ELECTRICAL SYSTEMS
Spark plug
- Incorrect spark plug gap
- Incorrect spark plug heat range

Ignition system
- Faulty C.D.I. unit

Cooling System
Thermostat
- Thermostat stays open

ENGINE
Clogged coolant passages
- Heavy carbon buildup

Engine oil
- Incorrect oil level
- Incorrect oil viscosity
- Inferior oil quality

COOLING SYSTEM
Coolant
- Low coolant level

Radiator
- Damaged or leaking radiator
- Faulty radiator cap
- Bent or damaged radiator fan

Water pump
- Damaged or faulty water pump

Thermostat
- Thermostat stays closed

Oil cooler
- Clogged or damaged oil cooler

OVERHEATING

OVERCOOLING
POOR BRAKING PERFORMANCE

**Drum brake**
- Worn brake shoe
- Worn or rusty brake drum
- Incorrect brake lever position
- Incorrect brake lever free play
- Incorrect brake camshaft lever position
- Incorrect brake shoe position
- Damaged or fatigued brake shoe spring
- Oil or grease on the brake shoe
- Oil or grease on the brake drum

**Faulty Front Fork Legs**

**MALFUNCTION**
- Bent or damaged inner tube
- Bent or damaged outer tube
- Damaged fork spring
- Bent or damaged damper rod

UNSTABLE HANDLING

**Handlebar**
- Bent or improperly installed handlebar

**Steering head components**
- Improperly installed lower bracket (improperly tightened ring nut)
- Bent steering stem
- Damaged ball bearing or bearing race

**Front fork leg(s)**
- Unevenly tensioned fork spring (both front fork legs)
- Broken fork spring
- Bent or damaged inner tube
- Bent or damaged outer tube

**Rear shock absorber assembly**
- Faulty rear shock absorber spring
- Leaking oil

**Tire(s)**
- Uneven tire pressures (front and rear)
- Incorrect tire pressure
- Uneven tire wear

**Wheel(s)**
- Incorrect wheel balance
- Deformed cast wheel
- Damaged wheel bearing
- Bent or loose wheel axle
- Excessive wheel runout

**Frame**
- Bent frame
- Damaged steering head pipe
- Improperly installed bearing race
HEADLIGHT DOES NOT COME ON
- Wrong headlight bulb
- Faulty headlight relay
- Too many electrical accessories
- Hard charging
- Incorrect connection
- Improperly grounded circuit
- Poor contacts (main or light switch)
- Burnt-out headlight bulb

HEADLIGHT BULB BURNT OUT
- Wrong headlight bulb
- Faulty battery
- Faulty rectifier/regulator
- Improperly grounded circuit
- Faulty main switch
- Faulty light switch
- Headlight bulb life expired

TAIL/BRAKE LIGHT DOES NOT COME ON
- 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
- Tail/brake light bulb life expired

TURN SIGNAL DOES NOT COME ON
- Faulty turn signal switch
- Faulty turn signal relay
- Burnt-out turn signal bulb
- Incorrect connection
- Damaged or faulty wire harness
- Improperly grounded circuit
- Faulty battery
- Blown, damaged or incorrect fuse

TURN SIGNAL BLINKS SLOWLY
- Faulty turn signal relay
- Faulty main switch
- Faulty turn signal switch
- Incorrect turn signal bulb
- Faulty battery

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
- Improperly adjusted horn
- Damaged or faulty horn
- Faulty main switch
- Faulty horn switch
- Faulty battery
- Blown, damaged or incorrect fuse
- Faulty wire harness