Spark Plug
U22ESR-N (DENSO)
CR7E (NGK)

Spark plug gap
0.7 ~ 0.8 mm (0.028 ~ 0.031in)

Valve Clearance (cold)
Intake
  0.10 ~ 0.14mm
  (0.004 ~ 0.006in)

Exhuast
  0.16 ~ 0.20mm
  (0.006 ~ 0.008in)
IMPORTANT
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.
This model has been designed and manufactured to perform within certain specifications in regard to performance and emissions. Proper service with the correct tools is necessary to ensure that the vehicle will operate as designed. If there is any question about a service procedure, it is imperative that you contact a Yamaha dealer for any service information changes that apply to this model. This policy is intended to provide the customer with the most satisfaction from his vehicle and to conform to federal environmental quality objectives.
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.

TIP
- This Service Manual contains information regarding periodic maintenance to the emission control system. Please read this material carefully.
- Designs and specifications are subject to change without notice.

IMPORTANT MANUAL INFORMATION
Particularly important information is distinguished in this manual by the following notations.

<table>
<thead>
<tr>
<th>Safety Alert Symbol</th>
<th>This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.</th>
</tr>
</thead>
<tbody>
<tr>
<td>WARNING</td>
<td>A WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.</td>
</tr>
<tr>
<td>NOTICE</td>
<td>A NOTICE indicates special precautions that must be taken to avoid damage to the vehicle or other property.</td>
</tr>
<tr>
<td>TIP</td>
<td>A TIP provides key information to make procedures easier or clearer.</td>
</tr>
</tbody>
</table>
**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.

---

**REMOVING THE CYLINDER AND PISTON**

1. **Remove:**
   - Piston pin clip (1)
   - Piston pin (2)
   - Piston (3)

   **NOTICE**
   - Do not use a hammer to drive the piston pin out.
   - 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 pin bore area.
   - If the areas are deburred and the piston pin is still difficult to remove, use the piston pin puller set 4.

2. **Remove:**
   - Top ring (4)
   - 2nd ring (5)
   - Oil ring (6)

   **TIP**
   - 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**

- Cylinder head
- Timing chain guide (exhaust side)
- Cylinder
- Dowel pin
- Cylinder gasket
- Piston pin clip
- Piston pin
- Piston
- Piston ring set

For installation, reverse the removal procedure.
### SYMBOLS

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. Fuel injection system
8. Electrical system
9. Troubleshooting

Symbols 10 to 17 indicate the following.

10. Serviceable with engine mounted
11. Filling fluid
12. Lubricant
13. Special tool
14. Tightening torque
15. Wear limit, clearance
16. Engine speed
17. Electrical data

Symbols 18 to 25 in the exploded diagrams indicate the types of lubricants and lubrication points.

18. Engine oil
19. Gear oil
20. Molybdenum-disulfide oil
21. Brake fluid
22. Wheel-bearing grease
23. Lithium-soap-based grease
24. Molybdenum-disulfide grease
25. Silicone grease

Symbols 26 to 27 in the exploded diagrams indicate the following.

26. Apply locking agent (LOCTITE®)
27. Replace the part
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<td>TROUBLESHOOTING</td>
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CHAPTER 1
GENERAL INFORMATION

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FEATURES ..................................................................................... 1-2
  OUTLINE OF THE FI SYSTEM .................................................... 1-2
  FI SYSTEM ............................................................................... 1-3
  O₂ sensor .................................................................................. 1-4

IMPORTANT INFORMATION .......................................................... 1-5
  PREPARATION FOR REMOVAL AND DISASSEMBLY ............... 1-5
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  GASKETS, OIL SEALS AND O-RINGS ....................................... 1-5
  LOCK WASHERS/PLATES AND COTTER PINS ......................... 1-6
  BEARINGS AND OIL SEALS ...................................................... 1-6
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CHECKING THE CONNECTIONS .................................................. 1-8

SPECIAL TOOLS ............................................................................ 1-9
VEHICLE IDENTIFICATION NUMBER
The vehicle identification number ① is stamped into the frame.

MODEL LABEL
The model label ① is affixed to the frame under the seat. This information will be needed to order spare parts.
OUTLINE OF THE FI SYSTEM

The main function of a fuel supply system is to provide fuel to the combustion chamber at the optimum air-fuel ratio in accordance with the engine operating conditions and the atmospheric temperature. In the conventional carburetor system, the air-fuel ratio of the mixture that is supplied to the combustion chamber is created by the volume of the intake air and the fuel that is metered by the jet used in the respective carburetor.

Despite the same volume of intake air, the fuel volume requirement varies by the engine operating conditions, such as acceleration, deceleration, or operation under a heavy load. Carburetors that meter the fuel through the use of jets have been provided with various auxiliary devices, so that an optimum air-fuel ratio can be achieved to accommodate the constant changes in the operating conditions of the engine.

As the requirements for the engine to deliver more performance and cleaner exhaust gases increase, it becomes necessary to control the air-fuel ratio in a more precise and finely tuned manner. To accommodate this need, this model has adopted an electronically controlled fuel injection (FI) system, in place of the conventional carburetor system. This system can achieve an optimum air-fuel ratio required by the engine at all times by using a microprocessor that regulates the fuel injection volume according to the engine operating conditions detected by various sensors.

The adoption of the FI system has resulted in a highly precise fuel supply, improved engine response, better fuel economy, and reduced exhaust emissions.
FI SYSTEM
The fuel pump delivers fuel to the fuel injector via the fuel filter. The pressure regulator maintains the fuel pressure that is applied to the fuel injector at only 250 kPa (2.5 kgf/cm², 35.6 psi). Accordingly, when the energizing signal from the ECU energizes the fuel injector, the fuel passage opens, causing the fuel to be injected into the intake manifold only during the time the passage remains open. Therefore, the longer the length of time the fuel injector is energized (injection duration), the greater the volume of fuel that is supplied. Conversely, the shorter the length of time the fuel injector is energized (injection duration), the lesser the volume of fuel that is supplied.

The injection duration and the injection timing are controlled by the ECU. Signals that are input from the crankshaft position sensor, intake air pressure sensor, intake temperature sensor and engine temperature sensor enable the ECU to determine the injection duration. The injection timing is determined through the signals from the crankshaft position sensor. As a result, the volume of fuel that is required by the engine can be supplied at all times in accordance with the driving conditions.

Illustration is for reference only.

1. Fuel pump
2. Fuel injector
3. Ignition coil
4. ECU
5. Catalytic converter
6. Engine temperature sensor
7. Crankshaft position sensor
8. Intake air pressure sensor
9. Throttle body assembly
10. Intake air temperature sensor
11. Air filter case
12. ISC (idle speed control) valve
13. Throttle position sensor
14. O₂ sensor
A. Fuel system
B. Air system
C. Control system
The O₂ sensor has been adopted to enable the catalyst to function at a high degree of efficiency by maintaining the air-fuel mixture near the stoichiometric ratio (14.7:1). This sensor, which is a zirconia type, utilizes the oxygen ion conductivity of the solid electrolyte for detecting the oxygen concentration levels. In actual operation, a zirconia tube made of solid electrolyte is exposed in the exhaust gas, so that the exterior of the zirconia tube is in contact with the exhaust gas and the interior is in contact with the atmosphere whose oxygen concentration level is known. When a difference in the oxygen concentration level is created between the outside and the inside of the zirconia tube, the oxygen ion passes through the zirconia element and generates an electromotive force. The electromotive force increases when the oxygen concentration level is low (rich air-fuel ratio) and the electromotive force decreases when the oxygen concentration level is high (lean air-fuel ratio). As electromotive force is generated in accordance with the concentration of the exhaust gas, the resultant voltage is input into the ECU in order to correct the duration of the injection of fuel.

Diagram:
- **1.** Inner cover
- **2.** Outer cover
- **3.** Zirconia tube
- **4.** Exhaust gas
- **5.** Atmosphere
- **A.** Atmosphere
- **B.** Inner electrode
- **C.** Zirconia element
- **D.** Outer electrode
- **E.** Porous ceramic layer
- **F.** Exhaust gas
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 ① 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

**NOTICE**
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 ①, make sure the sharp-edged corner ② is positioned opposite the thrust ③ that the circlip receives.

④ Shaft
EAS00021
EQUIPMENT PREPARATION
Turn Rivet (Turn type)
Assembly status of the turn rivet (turn 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 turn rivet main body.
2. Turn in the center pin until leveling off with the surface position of the turn 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.

   **TIP**
   If the pin 1 on the terminal is flattened, bend it up.

4. Connect:
   - lead
   - coupler
   - connector

   **TIP**
   Make sure all connections are tight.

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

   **TIP**
   - 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.

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**TIP**
- For U.S.A. and Canada, use part number starting with "YM-", "YU-", or "ACC-".
- For others, use part number starting with "90890-".

---

<table>
<thead>
<tr>
<th>Tool NO.</th>
<th>Tool name / Function</th>
<th>Illustration</th>
</tr>
</thead>
<tbody>
<tr>
<td>90890-01085 (M8) YU-01083-2 90890-01084 YU-01083-3</td>
<td>Slide hammer bolt (8mm) (^1) Weight (^2) (\text{These tools are needed to remove the camshaft.})</td>
<td><img src="image1" alt="Illustration" /></td>
</tr>
<tr>
<td>90890-01235 YU-01235</td>
<td>Rotor holding tool (\text{This tool is used to hold the primary fixed sheave and secondary sheave assembly.})</td>
<td><img src="image2" alt="Illustration" /></td>
</tr>
<tr>
<td>90890-01268 YU-01268</td>
<td>Ring nut wrench (\text{This tool is used to loosen and tighten the exhaust and steering ring nut.})</td>
<td><img src="image3" alt="Illustration" /></td>
</tr>
<tr>
<td>90890-01304 YU-01304</td>
<td>Piston pin puller set (\text{This tool is used to remove the piston pin.})</td>
<td><img src="image4" alt="Illustration" /></td>
</tr>
<tr>
<td>90890-01337 YM-33285</td>
<td>Clutch spring holder (\text{These tool are used for removing the nut with holding the compression spring.})</td>
<td><img src="image5" alt="Illustration" /></td>
</tr>
<tr>
<td>90890-01311 YM-08035-A</td>
<td>Valve adjusting tool (\text{This tool is necessary for adjusting valve clearance.})</td>
<td><img src="image6" alt="Illustration" /></td>
</tr>
<tr>
<td>90890-01326 YM-01326 90890-01294 YM-01300-1</td>
<td>T-handle (^1) Damper rod holder (^2) (\text{These tools are used to hold the damper rod when removing or installing the damper rod.})</td>
<td><img src="image7" alt="Illustration" /></td>
</tr>
<tr>
<td>90890-01348 YM-01348</td>
<td>Lock nut wrench (\text{This tool is used when removing or installing the secondary sheave nut.})</td>
<td><img src="image8" alt="Illustration" /></td>
</tr>
<tr>
<td>Tool NO.</td>
<td>Tool name / Function</td>
<td>Illustration</td>
</tr>
<tr>
<td>-------------------</td>
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<td>--------------</td>
</tr>
<tr>
<td>90890-01189</td>
<td>Flywheel puller</td>
<td></td>
</tr>
<tr>
<td>YM-01189</td>
<td>This tool is used for removing the AC magneto rotor.</td>
<td></td>
</tr>
<tr>
<td>90890-01367</td>
<td>Fork seal driver weight ①</td>
<td></td>
</tr>
<tr>
<td>YM-A9409-7</td>
<td>Fork seal driver attachment (Ø33mm) ②</td>
<td></td>
</tr>
<tr>
<td>90890-01368</td>
<td>These tools are used when installing the fork seal.</td>
<td></td>
</tr>
<tr>
<td>YM-A9409-4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>90890-01384</td>
<td>Oil seal guide</td>
<td></td>
</tr>
<tr>
<td>YM-33299</td>
<td>This tool is used for protecting the oil seal lip when installing the secondary sliding sheave.</td>
<td></td>
</tr>
<tr>
<td>90890-01403</td>
<td>Steering nut wrench</td>
<td></td>
</tr>
<tr>
<td>YU-A9472</td>
<td>This tool is used to loosen and tighten the steering ring nut.</td>
<td></td>
</tr>
<tr>
<td>90890-01701</td>
<td>Sheave holder</td>
<td></td>
</tr>
<tr>
<td>YS-01880-A</td>
<td>This tool is used for holding the secondary sheave.</td>
<td></td>
</tr>
<tr>
<td>90890-03079</td>
<td>Thickness gauge</td>
<td></td>
</tr>
<tr>
<td>YM-34483</td>
<td>This tool is used to measure the valve clearance.</td>
<td></td>
</tr>
<tr>
<td>90890-03081</td>
<td>Compression gauge</td>
<td></td>
</tr>
<tr>
<td>YU-33223</td>
<td>This tool is used to measure the engine compression.</td>
<td></td>
</tr>
<tr>
<td>90890-03112</td>
<td>Pocket tester</td>
<td></td>
</tr>
<tr>
<td>YU-03112-C</td>
<td>This instrument is invaluable for checking the electrical system.</td>
<td></td>
</tr>
<tr>
<td>90890-03174</td>
<td>Digital circuit tester</td>
<td></td>
</tr>
<tr>
<td></td>
<td>This instrument is invaluable for checking the electrical system.</td>
<td></td>
</tr>
<tr>
<td>90890-06760</td>
<td>Digital tachometer</td>
<td></td>
</tr>
<tr>
<td></td>
<td>This tool is needed for detecting engine rpm.</td>
<td></td>
</tr>
<tr>
<td>Tool NO.</td>
<td>Tool name / Function</td>
<td>Illustration</td>
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<tr>
<td>90890-03141</td>
<td>Timing light</td>
<td></td>
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<tr>
<td>90890-03141</td>
<td>This tool is used to check the ignition timing.</td>
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<td>90890-04101</td>
<td>Valve lapper</td>
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<tr>
<td>90890-04101</td>
<td>This tool is needed to remove and install the valve lifters.</td>
<td></td>
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<tr>
<td>90890-04019</td>
<td>Valve spring compressor</td>
<td></td>
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<tr>
<td>YM-04019</td>
<td>Compressor adapter (Ø19mm)</td>
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<tr>
<td>90890-04108</td>
<td>These tools are used when removing or installing the valve and the valve spring.</td>
<td></td>
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<tr>
<td>YM-04108</td>
<td></td>
<td></td>
</tr>
<tr>
<td>90890-04116</td>
<td>Valve guide remover (4.5mm)</td>
<td></td>
</tr>
<tr>
<td>YM-04116</td>
<td>This tool is used to remove or install the valve guides.</td>
<td></td>
</tr>
<tr>
<td>90890-04117</td>
<td>Valve guide installer (4.5mm)</td>
<td></td>
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<tr>
<td>YM-04117</td>
<td>This tool is used to install the valve guides.</td>
<td></td>
</tr>
<tr>
<td>90890-04118</td>
<td>Valve guide reamer (4.5mm)</td>
<td></td>
</tr>
<tr>
<td>YM-04118</td>
<td>This tool is used to rebore the new valve guides.</td>
<td></td>
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<tr>
<td>90890-06754</td>
<td>Ignition checker</td>
<td></td>
</tr>
<tr>
<td>YM-34487</td>
<td>This tool is used to check the ignition system components.</td>
<td></td>
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<tr>
<td>90890-03182</td>
<td>FI diagnostic tool</td>
<td></td>
</tr>
<tr>
<td>YU-03182</td>
<td>Execute CO adjustment, confirm fault code, self diagnosis tool.</td>
<td></td>
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<tr>
<td>90890-03153</td>
<td>Pressure gauge</td>
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<tr>
<td>YU-03153</td>
<td>This tool is used to measure fuel pressure.</td>
<td></td>
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<tr>
<td>90890-03186</td>
<td>Fuel pressure adapter</td>
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<tr>
<td></td>
<td>This tool is used to measure fuel pressure.</td>
<td></td>
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<td>Tool NO.</td>
<td>Tool name / Function</td>
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<tr>
<td>90890-85505</td>
<td>Yamaha bond NO.1215</td>
<td></td>
</tr>
<tr>
<td>ACC-11001-05-01</td>
<td>Sealant (Quick Gasket®)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>This sealant (bond) is used to apply on</td>
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<td>crankcase mating surfaces.</td>
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<td><strong>Model</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Code</td>
<td>32S1 (USA)</td>
<td>...</td>
</tr>
<tr>
<td></td>
<td>32S2 (CAN)</td>
<td>...</td>
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<tr>
<td><strong>Dimensions</strong></td>
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<td></td>
</tr>
<tr>
<td>Overall length</td>
<td>1910mm (75.2in)</td>
<td>...</td>
</tr>
<tr>
<td>Overall width</td>
<td>765mm (30.1in)</td>
<td>...</td>
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<tr>
<td>Overall height</td>
<td>1110mm (43.7in)</td>
<td>...</td>
</tr>
<tr>
<td>Seat height</td>
<td>780mm (30.7in)</td>
<td>...</td>
</tr>
<tr>
<td>Wheelbase</td>
<td>1290mm (50.8in)</td>
<td>...</td>
</tr>
<tr>
<td>Minimum ground clearance</td>
<td>125mm (4.9in)</td>
<td>...</td>
</tr>
<tr>
<td>Minimum turning radius</td>
<td>1900mm (74.8in)</td>
<td>...</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wet (with oil and a full fuel tank)</td>
<td>122kg (269lb)</td>
<td>...</td>
</tr>
<tr>
<td>Dry (without oil and fuel)</td>
<td>116kg (256lb)</td>
<td>...</td>
</tr>
<tr>
<td>Maximum load (total of cargo, rider, passenger, and accessories)</td>
<td>155kg (342lb)</td>
<td>...</td>
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</table>
### ENGINE SPECIFICATIONS

<table>
<thead>
<tr>
<th>Item</th>
<th>Standard</th>
<th>Limit</th>
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<tbody>
<tr>
<td><strong>Engine</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Engine type</td>
<td>Air-cooled, 4-stroke, SOHC</td>
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</tr>
<tr>
<td>Displacement</td>
<td>0.125L (125cm³, 7.63cu-in)</td>
<td></td>
</tr>
<tr>
<td>Cylinder arrangement</td>
<td>Forward inclined</td>
<td></td>
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<tr>
<td>Bore × stroke</td>
<td>52.4 × 57.9mm (2.06 × 2.28in)</td>
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</tr>
<tr>
<td>Compression ratio</td>
<td>10:1</td>
<td></td>
</tr>
<tr>
<td>Engine idle speed</td>
<td>1700 ~ 1900r/min</td>
<td></td>
</tr>
<tr>
<td>Vacuum pressure at engine idle speed</td>
<td>37 ~ 47kPa</td>
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<tr>
<td>Standard compression pressure (at sea level)</td>
<td>1350kPa</td>
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<tr>
<td>Fuel</td>
<td></td>
<td></td>
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<tr>
<td>Recommended fuel</td>
<td>Regular unleaded gasoline only</td>
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<tr>
<td>Fuel tank capacity</td>
<td>Total 6.0L</td>
<td></td>
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<tr>
<td>Engine oil</td>
<td></td>
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<tr>
<td>Lubrication system</td>
<td>Wet sump</td>
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</tr>
<tr>
<td>Recommended oil</td>
<td>SAE20W-40 or SAE10W-30</td>
<td></td>
</tr>
<tr>
<td>API service SG type or higher</td>
<td>JASO standard MA</td>
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</tr>
<tr>
<td>Quantity</td>
<td></td>
<td></td>
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<tr>
<td>Periodic oil change</td>
<td>0.80 ~ 0.90L</td>
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</tr>
<tr>
<td></td>
<td>(0.87 ~ 0.98 US qt,</td>
<td></td>
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<tr>
<td></td>
<td>0.74 ~ 0.83 Imp. qt)</td>
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<tr>
<td>Total amount</td>
<td>0.85 ~ 0.95L</td>
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<tr>
<td></td>
<td>(0.9 ~ 1.0 US qt,</td>
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<tr>
<td></td>
<td>0.75 ~ 0.84 Imp. qt)</td>
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<tr>
<td>Final gear oil</td>
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<tr>
<td>Recommended oil</td>
<td>SAE10W-30 type SE motor oil</td>
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<tr>
<td>Periodic oil change</td>
<td>0.12 ~ 0.14L</td>
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<tr>
<td></td>
<td>(0.13 ~ 0.15 US qt,</td>
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<tr>
<td></td>
<td>0.11 ~ 0.12 Imp. qt)</td>
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<tr>
<td>Total amount</td>
<td>0.14 ~ 0.16L</td>
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<tr>
<td></td>
<td>(0.15 ~ 0.17 US qt,</td>
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<tr>
<td></td>
<td>0.12 ~ 0.14 Imp. qt)</td>
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# ENGINE SPECIFICATIONS

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<thead>
<tr>
<th>Item</th>
<th>Standard</th>
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<tbody>
<tr>
<td><strong>Oil filter</strong></td>
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<tr>
<td>Oil filter type</td>
<td>Wire mesh</td>
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<tr>
<td><strong>Oil pump</strong></td>
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<tr>
<td>Oil pump type</td>
<td>Trochoid</td>
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<tr>
<td>Inner rotor to outer rotor tip clearance</td>
<td>0.15mm (0.006in) or less</td>
<td>0.23mm (0.009in)</td>
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<tr>
<td>Outer rotor to pump housing clearance</td>
<td>0.07 ~ 0.12mm (0.003 ~ 0.005in)</td>
<td>0.19mm (0.008in)</td>
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<tr>
<td><strong>Starting system type</strong></td>
<td>Electric starter</td>
<td>...</td>
</tr>
<tr>
<td><strong>Spark plug</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model (manufacturer) × quantity</td>
<td>U22ESR-N (DENSO) × 1</td>
<td>...</td>
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<tr>
<td>Spark plug gap</td>
<td>0.7 ~ 0.8mm (0.028 ~ 0.031in)</td>
<td>...</td>
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<tr>
<td><strong>Cylinder head</strong></td>
<td></td>
<td></td>
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<tr>
<td>Volume</td>
<td>11.4 ~ 12.0cm³ (0.70 ~ 0.73cu-in)</td>
<td>...</td>
</tr>
<tr>
<td>Maximum warpage</td>
<td>...</td>
<td>0.05mm (0.002in)</td>
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</table>

![Diagram of Cylinder Head](image)
<table>
<thead>
<tr>
<th>Item</th>
<th>Standard</th>
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<tbody>
<tr>
<td><strong>Camshaft</strong></td>
<td></td>
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<tr>
<td>Drive system</td>
<td>Chain drive (left)</td>
<td>...</td>
</tr>
<tr>
<td>Intake camshaft lobe dimensions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measurement A</td>
<td>25.267 ~ 25.367mm (0.995 ~ 0.999in)</td>
<td>25.167mm (0.991in)</td>
</tr>
<tr>
<td>Measurement B</td>
<td>21.069 ~ 21.169mm (0.829 ~ 0.833in)</td>
<td>20.969mm (0.826in)</td>
</tr>
<tr>
<td>Exhaust camshaft lobe dimensions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measurement A</td>
<td>25.275 ~ 25.375mm (0.995 ~ 0.999in)</td>
<td>25.175mm (0.991in)</td>
</tr>
<tr>
<td>Measurement B</td>
<td>21.069 ~ 21.169mm (0.829 ~ 0.833in)</td>
<td>20.969mm (0.826in)</td>
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<td>Maximum camshaft runout</td>
<td>...</td>
<td>0.03mm (0.0012in)</td>
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<tr>
<td>Item</td>
<td>Standard</td>
<td>Limit</td>
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<tr>
<td>-------------------------------------</td>
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<td>-------</td>
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<tr>
<td><strong>Timing chain</strong></td>
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<tr>
<td>Model/number of links</td>
<td>Morse 92RH2005/94</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>
<td></td>
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<tr>
<td>Intake</td>
<td>0.10 ~ 0.14mm (0.004 ~ 0.006in)</td>
<td>...</td>
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<tr>
<td>Exhaust</td>
<td>0.16 ~ 0.20mm (0.006 ~ 0.008in)</td>
<td>...</td>
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<tr>
<td>Valve dimensions</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>
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<tr>
<td>Seat Width</td>
<td></td>
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</tr>
<tr>
<td>Margin Thickness</td>
<td></td>
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</tr>
<tr>
<td>Valve head diameter A</td>
<td>18.9 ~ 19.1mm (0.744 ~ 0.752in)</td>
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<tr>
<td>Intake</td>
<td></td>
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<tr>
<td>Exhaust</td>
<td>16.9 ~ 17.1mm (0.665 ~ 0.673in)</td>
<td>...</td>
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<tr>
<td>Valve face width B</td>
<td>1.48 ~ 2.18mm (0.058 ~ 0.086in)</td>
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<tr>
<td>Intake</td>
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<tr>
<td>Exhaust</td>
<td>1.91 ~ 2.61mm (0.075 ~ 0.103in)</td>
<td>...</td>
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<tr>
<td>Valve seat width C</td>
<td>0.9 ~ 1.1mm (0.035 ~ 0.043in)</td>
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<tr>
<td>Intake</td>
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<tr>
<td>Exhaust</td>
<td>0.9 ~ 1.1mm (0.035 ~ 0.043in)</td>
<td>...</td>
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<tr>
<td>Valve margin thickness D</td>
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<tr>
<td>Intake</td>
<td>0.7mm (0.028in)</td>
<td>...</td>
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<tr>
<td>Exhaust</td>
<td>1.0mm (0.039in)</td>
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<tr>
<td>Valve stem diameter</td>
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<tr>
<td>Intake</td>
<td>4.970 ~ 4.985mm (0.1956 ~ 0.1963in)</td>
<td>4.940mm</td>
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<tr>
<td>Exhaust</td>
<td>4.955 ~ 4.970mm (0.1951 ~ 0.1957in)</td>
<td>4.925mm</td>
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<td>Valve guide inside diameter</td>
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<tr>
<td>Intake</td>
<td>5.000 ~ 5.012mm (0.1969 ~ 0.1973in)</td>
<td>5.050mm</td>
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<tr>
<td>Exhaust</td>
<td>5.000 ~ 5.012mm (0.1969 ~ 0.1973in)</td>
<td>5.050mm</td>
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<tr>
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<tr>
<td>Valve stem to valve guide clearance</td>
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<tr>
<td>Intake</td>
<td>0.015 ~ 0.042mm</td>
<td>0.08mm</td>
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<td></td>
<td>(0.0006 ~ 0.0017in)</td>
<td>(0.0031in)</td>
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<tr>
<td>Exhaust</td>
<td>0.030 ~ 0.057mm</td>
<td>0.1mm</td>
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<td></td>
<td>(0.0012 ~ 0.0022in)</td>
<td>(0.0039in)</td>
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<tr>
<td>Valve stem runout</td>
<td>...</td>
<td>0.01mm</td>
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<td></td>
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<td>(0.0004 in)</td>
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<td>Valve seat width</td>
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<tr>
<td>Intake</td>
<td>0.9 ~ 1.1mm (0.035 ~ 0.043in)</td>
<td>1.6mm</td>
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<tr>
<td></td>
<td></td>
<td>(0.063in)</td>
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<tr>
<td>Exhaust</td>
<td>0.9 ~ 1.1mm (0.035 ~ 0.043in)</td>
<td>1.6mm</td>
</tr>
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<td></td>
<td></td>
<td>(0.063in)</td>
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<tr>
<td>Item</td>
<td>Standard</td>
<td>Limit</td>
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<tr>
<td>-------------------------------------------</td>
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<td>---------------------------</td>
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<tr>
<td><strong>Valve springs</strong></td>
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<td>Free length</td>
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<tr>
<td>Intake</td>
<td>41.88mm (1.649in)</td>
<td>39.786mm (1.566in)</td>
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<tr>
<td>Exhaust</td>
<td>41.88mm (1.649in)</td>
<td>39.786mm (1.566in)</td>
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<tr>
<td>Installed length (valve closed)</td>
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<tr>
<td>Intake</td>
<td>30mm (1.18in)</td>
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<tr>
<td>Exhaust</td>
<td>30mm (1.18in)</td>
<td>...</td>
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<tr>
<td>Compressed spring force (installed)</td>
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<tr>
<td>Intake</td>
<td>137 ~ 157N/mm (13.97 ~ 16.01kgf/mm, 30.83 ~ 35.33lbf/in)</td>
<td>...</td>
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<tr>
<td>Exhaust</td>
<td>137 ~ 157N/mm (13.97 ~ 16.01kgf/mm, 30.83 ~ 35.33lbf/in)</td>
<td>...</td>
</tr>
<tr>
<td>Spring tilt</td>
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<tr>
<td>Intake</td>
<td>... 2.5°/1.8mm (2.5°/0.07in)</td>
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</tr>
<tr>
<td>Exhaust</td>
<td>... 2.5°/1.8mm (2.5°/0.07in)</td>
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<tr>
<td>Winding direction (top view)</td>
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<td></td>
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<tr>
<td>Intake</td>
<td>Clockwise</td>
<td>...</td>
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<tr>
<td>Exhaust</td>
<td>Clockwise</td>
<td>...</td>
</tr>
<tr>
<td>Valve seat reformed</td>
<td>Yes</td>
<td>...</td>
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<tr>
<td><strong>Cylinder</strong></td>
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</tr>
<tr>
<td>Cylinder arrangement</td>
<td>Forward inclined single cylinder</td>
<td>...</td>
</tr>
<tr>
<td>Bore × stroke</td>
<td>52.4 × 57.9mm (2.06 × 2.28in)</td>
<td>...</td>
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<tr>
<td>Compression ratio</td>
<td>10:1</td>
<td>...</td>
</tr>
<tr>
<td>Bore</td>
<td>52.40 ~ 52.41mm (2.0630 ~ 2.0634in)</td>
<td>...</td>
</tr>
<tr>
<td>Maximum taper</td>
<td>... 0.05mm (0.002in)</td>
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</tr>
<tr>
<td>Maximum out-of-round</td>
<td>... 0.05mm (0.002in)</td>
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## ENGINE SPECIFICATIONS

<table>
<thead>
<tr>
<th>Item</th>
<th>Standard</th>
<th>Limit</th>
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<tbody>
<tr>
<td><strong>Piston</strong></td>
<td></td>
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<tr>
<td>Piston-to-cylinder clearance</td>
<td>0.010 ~ 0.035mm (0.0004 ~ 0.0014in)</td>
<td>0.15mm (0.0059in)</td>
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<tr>
<td>Diameter D</td>
<td>52.375 ~ 52.390mm (2.0620 ~ 2.0626in)</td>
<td>...</td>
</tr>
<tr>
<td>Height H</td>
<td>7.0mm (0.28in)</td>
<td>...</td>
</tr>
<tr>
<td>Piston pin bore (in the piston)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diameter</td>
<td>15.002 ~ 15.013mm (0.5906 ~ 0.5911in)</td>
<td>15.043mm (0.5922in)</td>
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<tr>
<td>Offset</td>
<td>0.35 ~ 0.65mm (0.0138 ~ 0.0256in)</td>
<td>...</td>
</tr>
<tr>
<td>Offset direction</td>
<td>Intake side</td>
<td></td>
</tr>
<tr>
<td>Piston pin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outside diameter</td>
<td>14.995 ~ 15.000mm (0.5904 ~ 0.5906in)</td>
<td>14.975mm (0.5896in)</td>
</tr>
<tr>
<td>Piston rings</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Top ring</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ring type</td>
<td>Barrel</td>
<td>...</td>
</tr>
<tr>
<td>Dimensions (B × T)</td>
<td>1.0 × 2.1mm (0.0394 × 0.0827in)</td>
<td>...</td>
</tr>
<tr>
<td>End gap (installed)</td>
<td>0.10 ~ 0.25mm (0.0039 ~ 0.0098in)</td>
<td>0.50mm (0.0197in)</td>
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<tr>
<td>Ring side clearance</td>
<td>0.02 ~ 0.08mm (0.0008 ~ 0.0031in)</td>
<td>0.13mm (0.0051in)</td>
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<tr>
<td>2nd ring</td>
<td></td>
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</tr>
<tr>
<td>Ring type</td>
<td>Taper</td>
<td>...</td>
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<tr>
<td>Dimensions (B × T)</td>
<td>1.0 × 2.1mm (0.0394 × 0.0827in)</td>
<td>...</td>
</tr>
<tr>
<td>End gap (installed)</td>
<td>0.25 ~ 0.40mm (0.0098 ~ 0.0157in)</td>
<td>0.75mm (0.0295in)</td>
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<tr>
<td>Ring side clearance</td>
<td>0.02 ~ 0.06mm (0.0008 ~ 0.0024in)</td>
<td>0.12mm (0.0047in)</td>
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## ENGINE SPECIFICATIONS

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<td>Oil ring</td>
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<td>Dimensions (B × T)</td>
<td>2.0 × 2.5mm</td>
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<tr>
<td></td>
<td>(0.0787 × 0.0984in)</td>
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<tr>
<td>End gap (installed)</td>
<td>0.2 ~ 0.7mm</td>
<td>...</td>
</tr>
<tr>
<td></td>
<td>(0.0079 ~ 0.0276in)</td>
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<tr>
<td>Ring side clearance</td>
<td>0.04 ~ 0.12mm</td>
<td>...</td>
</tr>
<tr>
<td></td>
<td>(0.0016 ~ 0.0047in)</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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<td></td>
</tr>
<tr>
<td>Rocker arm inside diameter</td>
<td>10.000 ~ 10.015mm</td>
<td>(0.3937 ~ 0.3943in)</td>
</tr>
<tr>
<td>Rocker arm shaft outside diameter</td>
<td>9.981 ~ 9.991mm</td>
<td>(0.3930 ~ 0.3933in)</td>
</tr>
<tr>
<td>Arm-to-shaft clearance</td>
<td>0.009 ~ 0.034mm</td>
<td>(0.0004 ~ 0.0013in)</td>
</tr>
<tr>
<td><strong>Connecting rod</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Connecting rod length</td>
<td>93.45 ~ 93.55mm</td>
<td>(36.791 ~ 36.831in)</td>
</tr>
<tr>
<td>Small end inside diameter</td>
<td>15.015 ~ 15.028mm</td>
<td>(0.591 ~ 0.592in)</td>
</tr>
<tr>
<td><strong>Crankshaft</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Width A</td>
<td>45.45 ~ 45.50mm</td>
<td>(1.789 ~ 1.791in)</td>
</tr>
<tr>
<td>Maximum runout C</td>
<td>...</td>
<td>0.03mm (0.0012in)</td>
</tr>
<tr>
<td>Big end side clearance D</td>
<td>0.15 ~ 0.45mm</td>
<td>(0.006 ~ 0.018in)</td>
</tr>
<tr>
<td>Big end radial clearance E</td>
<td>0 ~ 0.01mm (0 ~ 0.0014in)</td>
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</tr>
<tr>
<td><strong>Clutch</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clutch type</td>
<td>Automatic centrifugal</td>
<td>...</td>
</tr>
<tr>
<td>Clutch shoe thickness</td>
<td>3.2mm ~ 3.5mm (0.13~0.14in)</td>
<td>2.0mm (0.079in)</td>
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<tr>
<td>Clutch shoe spring free length</td>
<td>28.5mm (1.12in)</td>
<td>...</td>
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<tr>
<td>Clutch housing inside diameter</td>
<td>120mm (4.72in)</td>
<td>120.5mm (4.74in)</td>
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<tr>
<td>Compression spring free length</td>
<td>108mm (4.25in)</td>
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<tr>
<td>Weight outside diameter</td>
<td>20mm (0.79in)</td>
<td>19.5mm (0.77in)</td>
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<tr>
<td>Clutch-in revolution</td>
<td>2700 ~ 3300r/min</td>
<td>...</td>
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<tr>
<td>Clutch-stall revolution</td>
<td>5150 ~ 6150r/min</td>
<td>...</td>
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<tr>
<td><strong>V-belt</strong></td>
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<tr>
<td>V-belt width</td>
<td>22mm (0.87in)</td>
<td>19.8mm (0.78in)</td>
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## ENGINE SPECIFICATIONS

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<thead>
<tr>
<th>Item</th>
<th>Standard</th>
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<tr>
<td><strong>Transmission</strong></td>
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<td></td>
</tr>
<tr>
<td>Transmission type</td>
<td>V-belt automatic</td>
<td></td>
</tr>
<tr>
<td>Primary reduction system</td>
<td>Helical gear</td>
<td></td>
</tr>
<tr>
<td>Primary reduction ratio</td>
<td>40/15 (2.667)</td>
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</tr>
<tr>
<td>Secondary reduction system</td>
<td>Spur gear</td>
<td></td>
</tr>
<tr>
<td>Secondary reduction ratio</td>
<td>44/11 (4.0)</td>
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<tr>
<td>Single speed automatic</td>
<td>2.398 ~ 0.823:1</td>
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</tr>
<tr>
<td>Maximum main axle runout</td>
<td>...</td>
<td>0.04mm (0.002in)</td>
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<tr>
<td>Maximum drive axle runout</td>
<td>...</td>
<td>0.04mm (0.002in)</td>
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<tr>
<td><strong>Air filter</strong></td>
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<td></td>
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<tr>
<td>Type</td>
<td>Wet element</td>
<td></td>
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<tr>
<td><strong>Fuel pump</strong></td>
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<tr>
<td>Pump type</td>
<td>Electrical</td>
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<tr>
<td>Model (manufacturer)</td>
<td>5S9 (AISAN)</td>
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<tr>
<td>Maximum consumption amperage</td>
<td>1.9A</td>
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<tr>
<td>Output pressure</td>
<td>250kPa (2.5kgf/cm², 35.6psi)</td>
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<tr>
<td><strong>Throttle body</strong></td>
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<tr>
<td>Model (manufacturer) × quantity</td>
<td>AC24-7 (AISAN) × 1</td>
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<tr>
<td>Throttle cable free play</td>
<td>3 ~ 5mm (0.12 ~ 0.20in)</td>
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<tr>
<td>(at the flange of the throttle grip)</td>
<td>5S91 00</td>
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<tr>
<td>Engine idling speed</td>
<td>1700 ~ 1900r/min</td>
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<td>Carbon monoxide density (exhaust pipe)</td>
<td>1.0% or less</td>
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<tr>
<td>Carbon monoxide density (tail pipe)</td>
<td>1.0% or less</td>
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<tr>
<td>Oil temperature</td>
<td>70 ~ 110°C (158 ~ 230°F)</td>
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## CHASSIS SPECIFICATIONS

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<tr>
<td><strong>Frame</strong></td>
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<tr>
<td>Frame type</td>
<td>Steel tube underbone</td>
<td>...</td>
</tr>
<tr>
<td>Caster angle</td>
<td>27(^\circ)</td>
<td>...</td>
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<tr>
<td>Trail</td>
<td>90mm (3.54in)</td>
<td>...</td>
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<tr>
<td><strong>Front wheel</strong></td>
<td></td>
<td></td>
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<tr>
<td>Wheel type</td>
<td>Cast wheel</td>
<td>...</td>
</tr>
<tr>
<td>Rim</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Size</td>
<td>J12 × MT2.75</td>
<td>...</td>
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<td>Material</td>
<td>Aluminum</td>
<td>...</td>
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<tr>
<td>Wheel travel</td>
<td>78mm (3.07in)</td>
<td>...</td>
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<tr>
<td>Wheel runout</td>
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<tr>
<td>Maximum radial wheel runout</td>
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<td>1.0mm (0.04in)</td>
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<tr>
<td>Maximum lateral wheel runout</td>
<td></td>
<td>1.0mm (0.04in)</td>
</tr>
<tr>
<td>Wheel axle bending limit</td>
<td>...</td>
<td>0.25mm (0.01in)</td>
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<tr>
<td><strong>Rear wheel</strong></td>
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<td></td>
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<tr>
<td>Wheel type</td>
<td>Cast wheel</td>
<td>...</td>
</tr>
<tr>
<td>Rim</td>
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<td></td>
</tr>
<tr>
<td>Size</td>
<td>J12 × MT3.00</td>
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<tr>
<td>Material</td>
<td>Aluminum</td>
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<tr>
<td>Wheel runout</td>
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<tr>
<td>Maximum radial wheel runout</td>
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<td>1.0mm (0.04in)</td>
</tr>
<tr>
<td>Maximum lateral wheel runout</td>
<td></td>
<td>1.0mm (0.04in)</td>
</tr>
<tr>
<td><strong>Front tire</strong></td>
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<td></td>
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<tr>
<td>Tire type</td>
<td>Tubeless</td>
<td>...</td>
</tr>
<tr>
<td>Size</td>
<td>120/70-12 51L</td>
<td>...</td>
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<tr>
<td>Model (manufacturer)</td>
<td>K761 (KENDA)</td>
<td>...</td>
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<tr>
<td>Tire pressure (cold)</td>
<td>175kPa (1.75kgf/cm(^2), 25psi)</td>
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<tr>
<td>0 ~ 90kg (0 ~ 198lb)</td>
<td>200kPa (2.0kgf/cm(^2), 29psi)</td>
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<tr>
<td>90kg (198lb) ~ maximum load</td>
<td></td>
<td>0.8mm (0.03in)</td>
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## CHASSIS SPECIFICATIONS

<table>
<thead>
<tr>
<th>Item</th>
<th>Standard</th>
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<tbody>
<tr>
<td><strong>Rear tire</strong></td>
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<tr>
<td>Tire type</td>
<td>Tubeless</td>
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</tr>
<tr>
<td>Size</td>
<td>130/70-12 56L</td>
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<tr>
<td>Model (manufacturer)</td>
<td>K761 (KENDA)</td>
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<tr>
<td>Tire pressure (cold)</td>
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<td></td>
</tr>
<tr>
<td>0 ~ 90kg (0 ~ 198lb)</td>
<td>200kPa (2.0kgf/cm², 29psi)</td>
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<tr>
<td>90kg (198lb) ~ maximum load</td>
<td>225kPa (2.25kgf/cm², 33psi)</td>
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<tr>
<td>Minimum tire tread depth</td>
<td></td>
<td>0.8mm</td>
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<tr>
<td></td>
<td></td>
<td>(0.03in)</td>
</tr>
<tr>
<td><strong>Front brake</strong></td>
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<td></td>
</tr>
<tr>
<td>Brake type</td>
<td>Single-disc brake</td>
<td></td>
</tr>
<tr>
<td>Operation</td>
<td>Right-hand operation</td>
<td></td>
</tr>
<tr>
<td>Recommended fluid</td>
<td>DOT 4</td>
<td></td>
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<tr>
<td>Brake disc</td>
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<td></td>
</tr>
<tr>
<td>Diameter × thickness</td>
<td>220 × 4.0mm (8.66 × 0.16in)</td>
<td>220 × 3.5mm (8.66 × 0.14in)</td>
</tr>
<tr>
<td>Minimum thickness</td>
<td></td>
<td>3.5mm</td>
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<tr>
<td></td>
<td></td>
<td>(0.14in)</td>
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<tr>
<td>Maximum deflection</td>
<td></td>
<td>0.15mm</td>
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<tr>
<td></td>
<td></td>
<td>(0.006in)</td>
</tr>
<tr>
<td>Brake pad lining thickness-inner</td>
<td>5.8mm (0.23in)</td>
<td>0.8mm</td>
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<tr>
<td></td>
<td></td>
<td>(0.03in)</td>
</tr>
<tr>
<td>Brake pad lining thickness-outer</td>
<td>5.8mm (0.23in)</td>
<td>0.8mm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.03in)</td>
</tr>
<tr>
<td>Master cylinder inside diameter</td>
<td>11mm (0.43in)</td>
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<tr>
<td>Caliper cylinder inside diameter</td>
<td>35mm (1.38in)</td>
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</tr>
<tr>
<td><strong>Rear brake</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brake type</td>
<td>Drum brake</td>
<td></td>
</tr>
<tr>
<td>Operation</td>
<td>Left-hand operation</td>
<td></td>
</tr>
<tr>
<td>Brake lever free play (at lever end)</td>
<td>10 ~ 20mm (0.39 ~ 0.79in)</td>
<td>151mm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(5.94in)</td>
</tr>
<tr>
<td>Brake drum inside diameter</td>
<td>150mm (5.91in)</td>
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<tr>
<td>Lining thickness</td>
<td>4.0mm (0.16in)</td>
<td>1.0mm</td>
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<td></td>
<td></td>
<td>(0.04in)</td>
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<tr>
<td><strong>Steering system</strong></td>
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<td></td>
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<tr>
<td>Steering bearing type</td>
<td>Angular bearing</td>
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</tr>
<tr>
<td>Lock to lock angle (left)</td>
<td>48°</td>
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</tr>
<tr>
<td>Lock to lock angle (right)</td>
<td>48°</td>
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## CHASSIS SPECIFICATIONS

<table>
<thead>
<tr>
<th>Item</th>
<th>Standard</th>
<th>Limit</th>
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<tbody>
<tr>
<td><strong>Front suspension</strong></td>
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<tr>
<td>Suspension type</td>
<td>Telescopic</td>
<td>...</td>
</tr>
<tr>
<td>Front fork type</td>
<td>Coil spring/oil damper</td>
<td>...</td>
</tr>
<tr>
<td>Front fork travel</td>
<td>90mm (3.54in)</td>
<td>...</td>
</tr>
<tr>
<td>Spring</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Free length</td>
<td>252.1mm (9.93in)</td>
<td>247mm (9.72in)</td>
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<tr>
<td>Installed length</td>
<td>230.9mm (9.09in)</td>
<td>...</td>
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<tr>
<td>Spring rate (K1)</td>
<td>7.1N/mm (0.72kgf/mm, 1.60lbf/in)</td>
<td>...</td>
</tr>
<tr>
<td>Spring rate (K2)</td>
<td>15.4N/mm (1.57kgf/mm, 3.47lbf/in)</td>
<td>...</td>
</tr>
<tr>
<td>Spring stroke (K1)</td>
<td>0 ~ 66.7mm (0 ~ 2.63in)</td>
<td>...</td>
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<tr>
<td>Spring stroke (K2)</td>
<td>66.7 ~ 90mm (2.63 ~ 3.54in)</td>
<td>...</td>
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<tr>
<td>Optional spring available</td>
<td>No</td>
<td>...</td>
</tr>
<tr>
<td>Fork oil</td>
<td>Fork oil 10W or equivalent</td>
<td>...</td>
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<tr>
<td>Recommended oil</td>
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<tr>
<td>Quantity (each front fork leg)</td>
<td>0.104L (0.11 US qt, 0.09 Imp. qt)</td>
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<tr>
<td>Inner tube outer diameter</td>
<td>33mm (1.30in)</td>
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<tr>
<td>Inner tube bending limit</td>
<td>...</td>
<td>0.2mm (0.008in)</td>
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<tr>
<td><strong>Rear suspension</strong></td>
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<td>Suspension type</td>
<td>Unit swing</td>
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<tr>
<td>Rear shock absorber assembly type</td>
<td>Coil spring/oil damper</td>
<td>...</td>
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<tr>
<td>Rear shock absorber assembly travel</td>
<td>70mm (2.76in)</td>
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<tr>
<td>Spring</td>
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<tr>
<td>Free length</td>
<td>235mm (9.25in)</td>
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<td>Installed length</td>
<td>224mm (8.82in)</td>
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<tr>
<td>Spring rate (K1)</td>
<td>9.3N/mm (0.95kgf/mm, 2.09lbf/in)</td>
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<tr>
<td>Spring rate (K2)</td>
<td>13.15N/mm (1.34kgf/mm, 2.96lbf/in)</td>
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<td>Spring rate (K3)</td>
<td>19.23N/mm (1.96kgf/mm, 4.33lbf/in)</td>
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<td>Spring stroke (K1)</td>
<td>0 ~ 24mm (0 ~ 0.94in)</td>
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<td>24 ~ 54mm (0.94 ~ 2.13in)</td>
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<tr>
<td>Spring stroke (K3)</td>
<td>54 ~ 70mm (2.13 ~ 2.76in)</td>
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<td>Optional spring available</td>
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## ELECTRICAL SPECIFICATIONS

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<td><strong>System voltage</strong></td>
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<td><strong>Ignition system</strong></td>
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<td>Transistorized coil ignition</td>
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<td>Ignition timing</td>
<td>5° BTDC at 1800r/min</td>
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<td>Advancer type</td>
<td>Digital</td>
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<tr>
<td>Pickup coil resistance/color</td>
<td>248 ~ 372Ω at 20°C (68°F) /white/red - white/blue</td>
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<td><strong>Ignition coil</strong></td>
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<tr>
<td>Model (manufacturer)</td>
<td>2J N (T-MORIC)</td>
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<td>Minimum ignition spark gap</td>
<td>6mm (0.24in)</td>
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<td>Primary coil resistance</td>
<td>2.16 ~ 2.64Ω at 20°C (68°F)</td>
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<tr>
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<td>8.64 ~ 12.96Ω at 20°C (68°F)</td>
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<td><strong>Spark plug cap</strong></td>
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<tr>
<td>Material</td>
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<tr>
<td>Resistance</td>
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<td>Model (manufacturer)</td>
<td>5S9 (T-MORIC)</td>
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<td>14V 170W/5000r/min</td>
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<td>Stator coil resistance/color</td>
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<td>/white-white</td>
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<td><strong>Rectifier/regulator</strong></td>
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<td>Model (manufacturer)</td>
<td>SH640E-11 (TAIGENE)</td>
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<td>Battery type (manufacturer)</td>
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<tr>
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</tr>
<tr>
<td><strong>Indicator light (voltage/wattage × quantity)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Turn signal indicator light</td>
<td>12V 1.7W × 1</td>
<td></td>
</tr>
<tr>
<td>High beam indicator light</td>
<td>12V 1.7W × 1</td>
<td></td>
</tr>
<tr>
<td>Engine trouble warning light</td>
<td>12V 1.7W × 1</td>
<td></td>
</tr>
<tr>
<td><strong>Bulbs (voltage/wattage × quantity)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Headlight</td>
<td>12V 60W/55W × 2</td>
<td></td>
</tr>
<tr>
<td>Tail/brake light</td>
<td>12V 5W/21W × 1</td>
<td></td>
</tr>
<tr>
<td>Front turn signal light</td>
<td>12V 10W × 2</td>
<td></td>
</tr>
<tr>
<td>Rear turn signal light</td>
<td>12V 10W × 2</td>
<td></td>
</tr>
<tr>
<td>Speedometer light</td>
<td>12V 1.7W × 2</td>
<td></td>
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# ELECTRICAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>Item</th>
<th>Standard</th>
<th>Limit</th>
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</thead>
<tbody>
<tr>
<td><strong>Electric starting system</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>System type</td>
<td>Constant mesh</td>
<td>...</td>
</tr>
<tr>
<td>Starter motor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model (manufacturer)</td>
<td>5S9 00 (T-MORIC)</td>
<td>...</td>
</tr>
<tr>
<td>Suction voltage</td>
<td>12V</td>
<td>...</td>
</tr>
<tr>
<td>Power output</td>
<td>0.35kW</td>
<td>...</td>
</tr>
<tr>
<td>Brushes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall length</td>
<td>10.0mm (0.39in)</td>
<td>3.5mm (0.14in)</td>
</tr>
<tr>
<td>Quantity</td>
<td>2</td>
<td>...</td>
</tr>
<tr>
<td>Spring force</td>
<td>5.52 ~ 8.28N/mm (0.56 ~ 0.84kgf/mm, 1.24 ~ 1.86lbf/in)</td>
<td>...</td>
</tr>
<tr>
<td>Commutator diameter</td>
<td>22mm (0.87in)</td>
<td>21mm (0.83in)</td>
</tr>
<tr>
<td>Commutator resistance</td>
<td>0.0252 ~ 0.0308Ω at 20°C (68°F)</td>
<td>...</td>
</tr>
<tr>
<td>Mica undercut (depth)</td>
<td>1.5mm (0.06in)</td>
<td>...</td>
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<tr>
<td><strong>Starter relay</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model (manufacturer)</td>
<td>5S9 00 (SHIHLIN)</td>
<td>...</td>
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<tr>
<td>Amperage</td>
<td>100A</td>
<td>...</td>
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<tr>
<td>Coil resistance</td>
<td>3.6 ~ 4.4Ω</td>
<td>...</td>
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<tr>
<td>Suction voltage</td>
<td>DC8V</td>
<td>...</td>
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<tr>
<td><strong>Horn</strong></td>
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<td></td>
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<tr>
<td>Horn type</td>
<td>Plane</td>
<td>...</td>
</tr>
<tr>
<td>Model (manufacturer)</td>
<td>YF-12 (NIKKO)</td>
<td>...</td>
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<tr>
<td>Maximum amperage</td>
<td>3A</td>
<td>...</td>
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<tr>
<td>Performance</td>
<td>105 ~ 120dB/2m</td>
<td>...</td>
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<tr>
<td>Coil resistance</td>
<td>1.15 ~ 1.25Ω</td>
<td>...</td>
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<td><strong>Turn signal relay</strong></td>
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<td></td>
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<tr>
<td>Relay type</td>
<td>Condenser</td>
<td>...</td>
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<tr>
<td>Model (manufacturer)</td>
<td>5XN4 (OMRON)</td>
<td>...</td>
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<tr>
<td>Self-cancelling device built-in</td>
<td>NO</td>
<td>...</td>
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<tr>
<td>Turn signal blinking frequency</td>
<td>70 ~ 100cycles/min</td>
<td>...</td>
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<tr>
<td>Wattage</td>
<td>10W × 2 + 3.4W</td>
<td>...</td>
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<tr>
<td><strong>Fuse (amperage × quantity)</strong></td>
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<tr>
<td>Main fuse</td>
<td>20A × 1</td>
<td>...</td>
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<tr>
<td>Ignition fuse</td>
<td>10A × 1</td>
<td>...</td>
</tr>
<tr>
<td>Signaling system fuse</td>
<td>15A × 1</td>
<td>...</td>
</tr>
<tr>
<td>Fuel injection system fuse</td>
<td>10A × 1</td>
<td>...</td>
</tr>
<tr>
<td>Headlight fuse</td>
<td>10A × 1</td>
<td>...</td>
</tr>
<tr>
<td>Spare fuse</td>
<td>20A, 15A, 10A × 1</td>
<td>...</td>
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</table>
## Electrical Specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>Standard</th>
<th>Limit</th>
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<tbody>
<tr>
<td><strong>Fuel sender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model (manufacturer)</td>
<td>5S9 (AISAN)</td>
<td></td>
</tr>
<tr>
<td>Sender unit resistance-full</td>
<td>4 ~ 10Ω</td>
<td></td>
</tr>
<tr>
<td>Sender unit resistance-empty</td>
<td>90 ~ 100Ω</td>
<td></td>
</tr>
<tr>
<td><strong>Fuel level gauge</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gauge type (manufacture)</td>
<td>Analog (CHAOLONG)</td>
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</tr>
<tr>
<td><strong>Starting circuit cut-off relay</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model (manufacturer)</td>
<td>4HC1 (MATSU SHITA)</td>
<td></td>
</tr>
<tr>
<td>Coil resistance</td>
<td>72 ~ 88Ω</td>
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<tr>
<td>Diode</td>
<td>YES</td>
<td></td>
</tr>
<tr>
<td><strong>Headlight relay</strong></td>
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<td></td>
</tr>
<tr>
<td>Model (manufacturer)</td>
<td>4HM-20 (OMRON)</td>
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<tr>
<td>Coil resistance</td>
<td>90 ~ 110Ω</td>
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<tr>
<td>Diode</td>
<td>YES</td>
<td></td>
</tr>
<tr>
<td><strong>Engine temperature sensor</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model (manufacturer)</td>
<td>4P91 (PANASONIC)</td>
<td></td>
</tr>
<tr>
<td>Coil resistance at 100°C (212°F)</td>
<td>0.210 ~ 0.221kΩ</td>
<td></td>
</tr>
<tr>
<td><strong>Intake air pressure sensor</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output voltage</td>
<td>0.789 ~ 4.0V</td>
<td></td>
</tr>
<tr>
<td><strong>Intake air temperature sensor</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coil resistance/color</td>
<td>6kΩ at 0°C (32°F)/brown-white/black-blue</td>
<td></td>
</tr>
<tr>
<td><strong>Throttle position sensor</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voltage/color</td>
<td>5V/blue-black/blue</td>
<td></td>
</tr>
<tr>
<td>Output voltage (closed position)/color</td>
<td>0.63 ~ 0.73V/yellow-black/blue</td>
<td></td>
</tr>
<tr>
<td><strong>ISC (idle speed control) valve</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resistance/color</td>
<td>20Ω at 20°C (68°F)/pink-green/yellow or gray-sky blue</td>
<td></td>
</tr>
<tr>
<td><strong>Lean angle cut-off switch</strong></td>
<td></td>
<td></td>
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<tr>
<td>Voltage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 45°</td>
<td>0.4V</td>
<td></td>
</tr>
<tr>
<td>More than 45°</td>
<td>1.4V</td>
<td></td>
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<tr>
<td><strong>O₂ sensor</strong></td>
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<td></td>
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<tr>
<td>Model (manufacturer)</td>
<td>1B91 (DENSO)</td>
<td></td>
</tr>
<tr>
<td>Coil resistance</td>
<td>11.7 ~ 15.5Ω at 20°C (68°F)</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></td>
<td></td>
<td>Nm</td>
</tr>
<tr>
<td>10 mm</td>
<td>6 mm</td>
<td>6</td>
</tr>
<tr>
<td>12 mm</td>
<td>8 mm</td>
<td>15</td>
</tr>
<tr>
<td>14 mm</td>
<td>10 mm</td>
<td>30</td>
</tr>
<tr>
<td>17 mm</td>
<td>12 mm</td>
<td>55</td>
</tr>
<tr>
<td>19 mm</td>
<td>14 mm</td>
<td>85</td>
</tr>
<tr>
<td>22 mm</td>
<td>16 mm</td>
<td>130</td>
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</table>
### TIGHTENING TORQUES

#### ENGINE

<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>Cylinder head and cylinder</td>
<td>Nut</td>
<td>M8</td>
<td>4</td>
<td>22 2.2 15.9</td>
<td></td>
</tr>
<tr>
<td>Spark plug</td>
<td>-</td>
<td>M10</td>
<td>1</td>
<td>13 1.3 9.4</td>
<td></td>
</tr>
<tr>
<td>Cylinder head (timing chain side)</td>
<td>Bolt</td>
<td>M6</td>
<td>2</td>
<td>12 1.2 8.7</td>
<td></td>
</tr>
<tr>
<td>Exhaust pipe stud bolt</td>
<td>-</td>
<td>M8</td>
<td>2</td>
<td>13 1.3 9.4</td>
<td></td>
</tr>
<tr>
<td>Breather</td>
<td>Bolt</td>
<td>M6</td>
<td>6</td>
<td>2 1.3 9.4</td>
<td></td>
</tr>
<tr>
<td>Valve cover</td>
<td>Bolt</td>
<td>M6</td>
<td>6</td>
<td>7 0.7 5.1</td>
<td></td>
</tr>
<tr>
<td>Stopper plate (camshaft)</td>
<td>Bolt</td>
<td>M6</td>
<td>1</td>
<td>12 1.2 8.7</td>
<td></td>
</tr>
<tr>
<td>Guide stopper 2</td>
<td>Bolt</td>
<td>M6</td>
<td>1</td>
<td>7 0.7 5.1</td>
<td></td>
</tr>
<tr>
<td>Valve clearance adjusting screw lock nut</td>
<td>-</td>
<td>M5</td>
<td>4</td>
<td>7 0.7 5.1</td>
<td></td>
</tr>
<tr>
<td>Camshaft sprocket</td>
<td>Bolt</td>
<td>M8</td>
<td>1</td>
<td>30 3.0 21.7</td>
<td></td>
</tr>
<tr>
<td>Timing chain tensioner (body)</td>
<td>Bolt</td>
<td>M6</td>
<td>2</td>
<td>9 0.9 6.5</td>
<td></td>
</tr>
<tr>
<td>Timing chain tensioner (plug)</td>
<td>Plug</td>
<td>M8</td>
<td>2</td>
<td>8 0.8 5.8</td>
<td></td>
</tr>
<tr>
<td>Air shroud cylinder 1 and 2</td>
<td>Screw</td>
<td>M8</td>
<td>1</td>
<td>1 0.7 1.4</td>
<td></td>
</tr>
<tr>
<td>Air shroud cylinder 3</td>
<td>Screw</td>
<td>M6</td>
<td>3</td>
<td>0.7 1.2</td>
<td></td>
</tr>
<tr>
<td>Fan</td>
<td>Bolt</td>
<td>M6</td>
<td>4</td>
<td>9 0.9 6.5</td>
<td></td>
</tr>
<tr>
<td>Guide</td>
<td>Screw</td>
<td>M5</td>
<td>2</td>
<td>4 0.4 2.9</td>
<td></td>
</tr>
<tr>
<td>Oil pump</td>
<td>-</td>
<td>M30</td>
<td>1</td>
<td>20 2.0 14.5</td>
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</tr>
<tr>
<td>Engine oil drain plug</td>
<td>-</td>
<td>M8</td>
<td>2</td>
<td>10 1.0 7.2</td>
<td></td>
</tr>
<tr>
<td>Intake manifold</td>
<td>Bolt</td>
<td>M6</td>
<td>2</td>
<td>12 1.2 8.7</td>
<td></td>
</tr>
<tr>
<td>Air filter</td>
<td>Screw</td>
<td>M6</td>
<td>2</td>
<td>7 0.7 5.1</td>
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</tr>
<tr>
<td>Fuel injector</td>
<td>Bolt</td>
<td>M6</td>
<td>1</td>
<td>3 0.3 2.2</td>
<td>Touching collar stop.</td>
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<tr>
<td>Intake manifold side band</td>
<td>Band</td>
<td>M4</td>
<td>1</td>
<td>3 0.3 2.2</td>
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<tr>
<td>Air filter side band</td>
<td>Band</td>
<td>M4</td>
<td>1</td>
<td>3 0.3 2.2</td>
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<tr>
<td>Protector</td>
<td>Bolt</td>
<td>M8</td>
<td>4</td>
<td>10 1.0 7.2</td>
<td></td>
</tr>
<tr>
<td>Exhaust pipe</td>
<td>Nut</td>
<td>M8</td>
<td>2</td>
<td>13 1.3 9.4</td>
<td></td>
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<tr>
<td>Muffler</td>
<td>Bolt</td>
<td>M10</td>
<td>1</td>
<td>53 5.3 38.3</td>
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<tr>
<td>Muffler</td>
<td>Bolt</td>
<td>M8</td>
<td>2</td>
<td>31 3.1 22.4</td>
<td></td>
</tr>
<tr>
<td>Crankcase (left and right)</td>
<td>Bolt</td>
<td>M6</td>
<td>8</td>
<td>13 1.3 9.4</td>
<td></td>
</tr>
<tr>
<td>Crankcase (left and right)</td>
<td>Bolt</td>
<td>M6</td>
<td>1</td>
<td>13 1.3 9.4</td>
<td></td>
</tr>
<tr>
<td>V-belt case</td>
<td>Bolt</td>
<td>M6</td>
<td>8</td>
<td>11 1.1 8.0</td>
<td></td>
</tr>
<tr>
<td>Crankcase cover (right)</td>
<td>Bolt</td>
<td>M6</td>
<td>6</td>
<td>10 1.0 7.2</td>
<td></td>
</tr>
<tr>
<td>Cover 1 (magneto base)</td>
<td>Bolt</td>
<td>M6</td>
<td>2</td>
<td>13 1.3 9.4</td>
<td></td>
</tr>
<tr>
<td>Cover 1 (magneto base)</td>
<td>Bolt</td>
<td>M6</td>
<td>1</td>
<td>13 1.3 9.4</td>
<td></td>
</tr>
<tr>
<td>V-belt case cover</td>
<td>Screw</td>
<td>M6</td>
<td>3</td>
<td>7 0.7 5.1</td>
<td></td>
</tr>
<tr>
<td>V-belt case cover</td>
<td>Bolt</td>
<td>M6</td>
<td>2</td>
<td>7 0.7 5.1</td>
<td></td>
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<tr>
<td>Cylinder stud bolt</td>
<td>-</td>
<td>M8</td>
<td>4</td>
<td>13 1.3 9.4</td>
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<tr>
<td>Drain bolt (transmission oil)</td>
<td>-</td>
<td>M8</td>
<td>1</td>
<td>23 2.3 16.6</td>
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<tr>
<td>Drain bolt (engine oil)</td>
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<td>1</td>
<td>20 2.0 14.5</td>
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<tr>
<td>Guide element</td>
<td>Screw</td>
<td>M6</td>
<td>1</td>
<td>7 0.7 5.1</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 (Nm)</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plate (V-belt guide)</td>
<td>Bolt</td>
<td>M6</td>
<td>4</td>
<td>10</td>
<td>7.2</td>
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<tr>
<td>Idle gear plate</td>
<td>Bolt</td>
<td>M6</td>
<td>2</td>
<td>10</td>
<td>7.2</td>
</tr>
<tr>
<td>Plate</td>
<td>Bolt</td>
<td>M6</td>
<td>1</td>
<td>10</td>
<td>7.2</td>
</tr>
<tr>
<td>Clutch housing</td>
<td>Nut</td>
<td>M14</td>
<td>1</td>
<td>60</td>
<td>43.4</td>
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<tr>
<td>Primary fixed sheave</td>
<td>Nut</td>
<td>M12</td>
<td>1</td>
<td>45</td>
<td>32.5</td>
</tr>
<tr>
<td>Starter motor</td>
<td>Bolt</td>
<td>M6</td>
<td>2</td>
<td>7</td>
<td>5.1</td>
</tr>
<tr>
<td>AC magneto rotor</td>
<td>Nut</td>
<td>M12</td>
<td>1</td>
<td>70</td>
<td>50.6</td>
</tr>
<tr>
<td>Stator coil</td>
<td>Screw</td>
<td>M6</td>
<td>3</td>
<td>7</td>
<td>5.1</td>
</tr>
<tr>
<td>Crankshaft position sensor</td>
<td>Screw</td>
<td>M6</td>
<td>2</td>
<td>7</td>
<td>5.1</td>
</tr>
<tr>
<td>Ignition coil</td>
<td>Screw</td>
<td>M6</td>
<td>2</td>
<td>7</td>
<td>5.1</td>
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<tr>
<td>O₂ sensor</td>
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<td>M18</td>
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<td>44</td>
<td>31.8</td>
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<td>Engine temperature sensor</td>
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<td>M10</td>
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<td>18</td>
<td>13.0</td>
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<tr>
<td>Clamp holder</td>
<td>Bolt</td>
<td>M6</td>
<td>2</td>
<td>10</td>
<td>7.2</td>
</tr>
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</table>

Do not use the air impact wrench to tighten.
<table>
<thead>
<tr>
<th>Part to be tightened</th>
<th>Thread size</th>
<th>Tightening torque</th>
<th>Remarks</th>
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<tr>
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<td>Engine bracket 2, compression rod and engine</td>
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<tr>
<td>Handlebar and steering shaft</td>
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<tr>
<td>Brake hose and master cylinder</td>
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<td>Speedometer and speedometer cable</td>
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<tr>
<td>Handlebar bracket and handlebar holder</td>
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<td>Upper handlebar holder</td>
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<td>Fuel tank</td>
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<td>Seat hinge</td>
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<td>Resin part and resin cover</td>
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<tr>
<td>Front brake caliper and bleed screw</td>
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<td>6</td>
<td>0.6</td>
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</table>
TIGHTENING TORQUES

TIP
1. First, tighten the ring nut (lower) approximately 38Nm (3.8m • kgf, 27.5ft • lbf) by using the torque wrench, then loosen the ring nut 1/4 turn.
2. Second, tighten the ring nut (lower) approximately 14Nm (1.4m • kgf, 10.1ft • lbf) by using the torque wrench.
3. Installing the rubber washer.
4. Then finger tighten the center ring nut and touch rubber washer. Align the slots both ring nut and install the lock washer.
5. Final, hold the ring nuts (lower and center) and tighten the ring nut (upper) 75Nm (7.5m • kgf, 54.2ft • lbf) by using the torque wrench.
6. Confirm, adjust the direction handlebar to the right direction, front wheel suspend. Push direction handlebar lightly with the finger approximately 0.15Nm (0.015m • kgf, 0.11ft • lbf), direction handlebar should turn slowly without interference or hindrance.

1 Lower ring nut
2 Rubber washer
3 Center ring nut
4 Lock washer
5 Upper ring nut
## LUBRICATION POINTS AND LUBRICANT TYPES

### LUBRICATION POINTS AND LUBRICANT TYPES

#### ENGINE

<table>
<thead>
<tr>
<th>Lubrication Point</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Oil seal lips</td>
<td>![LS]</td>
</tr>
<tr>
<td>Bearings</td>
<td>![M]</td>
</tr>
<tr>
<td>O-rings (except V-belt drive unit)</td>
<td>![LS]</td>
</tr>
<tr>
<td>O-rings (fuel injector)</td>
<td>![M]</td>
</tr>
<tr>
<td>Cylinder head tightening nut mounting surface</td>
<td>![M]</td>
</tr>
<tr>
<td>Cylinder head stud bolt thread</td>
<td>![M]</td>
</tr>
<tr>
<td>Cylinder head nut</td>
<td>![M]</td>
</tr>
<tr>
<td>Cylinder head gasket dowel pin</td>
<td>![M]</td>
</tr>
<tr>
<td>Crankshaft pin outside surface</td>
<td>![M]</td>
</tr>
<tr>
<td>Crankshaft journals</td>
<td>![M]</td>
</tr>
<tr>
<td>Connecting rod big end thrust surface</td>
<td>![M]</td>
</tr>
<tr>
<td>Piston and piston rings</td>
<td>![M]</td>
</tr>
<tr>
<td>Piston pin and connecting rod small end surface and bolt thread</td>
<td>![M]</td>
</tr>
<tr>
<td>Piston (balancer) outside surface</td>
<td>![M]</td>
</tr>
<tr>
<td>Piston pin (balancer) outside surface</td>
<td>![M]</td>
</tr>
<tr>
<td>Rocker arm shaft outside surface (intake and exhaust)</td>
<td>![M]</td>
</tr>
<tr>
<td>Rocker arm shaft and rocker arm</td>
<td>![M]</td>
</tr>
<tr>
<td>Camshaft lobes</td>
<td>![M]</td>
</tr>
<tr>
<td>Camshaft journals</td>
<td>![M]</td>
</tr>
<tr>
<td>Valve stems (intake and exhaust)</td>
<td>![M]</td>
</tr>
<tr>
<td>Valve stem seals (intake and exhaust)</td>
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</tr>
<tr>
<td>Valve stem ends (intake and exhaust)</td>
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</tr>
<tr>
<td>Oil pump inside surface</td>
<td>![M]</td>
</tr>
<tr>
<td>Oil pump shaft</td>
<td>![M]</td>
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<td>V-belt case dowel pin</td>
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<td>Starter clutch pin and weight</td>
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<tr>
<td>Idle gear 1 thrust surface</td>
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</tr>
<tr>
<td>Idle gear 2</td>
<td>![M]</td>
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## LUBRICATION POINTS AND LUBRICANT TYPES

<table>
<thead>
<tr>
<th>Lubrication Point</th>
<th>Lubricant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main and drive axle serration (sprocket)</td>
<td>BEL-RAY assembly lube®</td>
</tr>
<tr>
<td>Drive axle taper roller bearing</td>
<td>BEL-RAY assembly lube®</td>
</tr>
<tr>
<td>Transmission bearing</td>
<td>BEL-RAY assembly lube®</td>
</tr>
<tr>
<td>Secondary fixed sheave inner surface</td>
<td>BEL-RAY assembly lube®</td>
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<tr>
<td>Secondary sliding sheave torque cam ditch</td>
<td>BEL-RAY assembly lube®</td>
</tr>
<tr>
<td>Crankcase mating surfaces</td>
<td>Yamaha bond NO.1215</td>
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<td>Lubrication Point</td>
<td>Lubricant</td>
</tr>
<tr>
<td>---------------------------------------------------------------------------------</td>
<td>-----------</td>
</tr>
<tr>
<td>Engine mounting bolt</td>
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<tr>
<td>Steering bearing and bearing races (upper and lower)</td>
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<tr>
<td>Throttle grip inner surface and throttle cables</td>
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</tr>
<tr>
<td>Rear brake lever pivoting point and metal-to-metal moving parts</td>
<td>LS</td>
</tr>
<tr>
<td>Rear brake cable and brake lock lever (cable connection area)</td>
<td>LS</td>
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<tr>
<td>Front wheel oil seal</td>
<td>LS</td>
</tr>
<tr>
<td>Front wheel axle</td>
<td>LS</td>
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<tr>
<td>Speedometer gear unit</td>
<td>LS</td>
</tr>
<tr>
<td>Rear wheel axle</td>
<td>LS</td>
</tr>
<tr>
<td>Sidestand pivoting point and sliding surface metal-to-metal moving parts and</td>
<td>LS</td>
</tr>
<tr>
<td>bolt outer surface</td>
<td></td>
</tr>
<tr>
<td>Centerstand shaft pivoting point and metal-to-metal moving parts</td>
<td>LS</td>
</tr>
<tr>
<td>Centerstand stopper pivoting point</td>
<td>LS</td>
</tr>
<tr>
<td>Centerstand and sidestand spring hook metal-to-metal moving parts</td>
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<tr>
<td>Caliper piston seal</td>
<td>BF</td>
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<tr>
<td>Rubber parts inside the master cylinder</td>
<td>S</td>
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<tr>
<td>Caliper piston dust seal</td>
<td>S</td>
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<tr>
<td>Front brake lever retaining bolt</td>
<td>S</td>
</tr>
<tr>
<td>Sliding area between brake lever and master cylinder</td>
<td>S</td>
</tr>
<tr>
<td>Caliper bracket slide pins and/or retaining bolt</td>
<td>S</td>
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</tbody>
</table>
CABLE ROUTING

1. Connector cover
2. Horn
3. Front bracket
4. Starting circuit cut-off relay
5. Turn signal relay
6. Headlight relay
7. ECU lead
8. Turn signal relay lead
9. Main switch
10. Horn lead
11. Main switch lead
12. Rectifier/regulator lead
13. Wire harness
14. Throttle cable assembly
15. Seat lock cable
16. O₂ sensor lead
17. Fuel injector lead
18. Engine temperature sensor lead
19. Positive wire lead
20. Starter relay lead
21. Clamp (90464-25803)
22. Air shroud cylinder 2
23. Rectifier/regulator
24. Body earth lead
25. ECU
26. Speedometer lead
27. Left lever holder lead

A. After connect the headlight coupler, lead do not touch horn.
B. Speedometer cable passes through the right hole of inner fender.
C. Five couplers of speedometer lead and lever holder.
D. ECU lead passes by the right side of the inner fender rib.
Headlight relay lead passes by the right side of inner fender rib.
Start relay sub lead to forward.
Orientation: white tape.
Totally cover the terminal after locking.
Torque: 4Nm (0.4m • kgf, 2.9ft • lbf).
Starter relay inserts into holder certainly.
After connecting, press lead of tail/brake light into the holder on side cover.
Seat lock cable passes through the hole of seat bracket 1.
Pipe 11 passes by the open hole of air shroud cylinder 2.
Fuse box passes under the wire harness.
Speedometer cable passes through the wire holder.
Rectifier/regulator lead passes by the back of the head pipe.
ECU lead passes under of the front bracket.

Turn signal relay lead passes under of the front bracket.
After connecting, put the front signal light coupler (left and right), brake light switch coupler (front and rear) and right handlebar switch lead coupler in the connector cover. Connector cover hold to leg shield 2 rib.
Band the speedometer cable stopper in the top and white tape range of left lever holder lead.
1. Rectifier/regulator
2. Body earth lead
3. Horn
4. ECU
5. Headlight lead
6. Turn signal relay
7. Horn lead
8. Rectifier/regulator lead
9. Brake hose holder 3
10. Brake hose holder 1
11. Fuel hose
12. Pipe 3
13. Roll over valve
14. Pipe 4
15. Rear brake cable
16. Sidestand switch

A. Rear brake cable passes through the wire guide of front bracket.

B. Brake hose passes through the left hole of inner fender.
C. Locate the end of gasoline overflow pipe at between frame and air duct.
D. Rear brake holder 2 holds the rear brake cable and covers the ultrasonic weld mark at the PVC protector.
E. Locate at between compression rod and air duct.
F. Rear brake cable passes through the wire guide.
G. Tightening the body earth terminal and rectifier/regulator.
1. Plain washer
2. Lean angle cut-off switch
3. Lean angle cut-off switch lead
4. FI diagnostic tool
5. Hight tension cord
6. Fuel pump lead
7. Engine temperature sensor lead
8. Fuel injector lead
9. Clamp (90464-13800)
10. Starter motor positive lead
11. Starter motor negative lead
12. Starter motor
13. Pipe 4
14. Roll over valve
15. Pipe 3
16. Canister
17. Fuel hose
18. Ignition coil
19. Battery
20. Battery band
21. Clamp (90464-12812)

A. Fasten the sidestand switch lead to the frame with a plastic locking tie, point the band tip to down of car body.
B. Seat lock cable inserts into the right hole of frame, and the protector must be at the hole.
C. Fuse box lead passes under the wire harness.
D. Pass the positive and negative battery leads through the slot in the footrest board, leads and wire harness do not twine.
E. Do not cut off, point the band tip to down.
F Ignition coil lead passes under the cross tube.
G Pass the throttle cable assembly through wire guide.
H Locate the white tape of wire harness in the holder.
I Clamp (90464-10800) the O₂ sensor lead.
J Clamp (90464-25803) the starter motor lead, AC magneto lead, ISC (idle speed control) valve lead, sensor module (MAQS) lead, fuel injector lead and O₂ sensor lead.
K Seat lock cable passes through the hole of seat bracket.
L Tail/brake light lead pass under the seat lock cable.
M Turn signal light lead pass through the hole at license bracket and combine with tail/brake light lead.
N After combining the couplers, insert them into the sockets at tail/brake light.
O Yellow mark to up of pipe 11.
P Assembly range of starter motor negative lead terminal.
Q Torque: 7Nm (0.7m • kgf, 5.1ft • lbf).
R The terminal of battery negative pole (black lead) shall tough the left surface of battery box at least.
S Battery band buckles the rear side and then front.
T The terminal of battery positive pole (red lead) shall be aimed at the center of mark “+” at footrest board.
U Torque: 5Nm (0.5m • kgf, 3.6ft • lbf).
V After combining the fuel injector coupler, align the coupler (forward side) with the clamp (inside).
<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Rear brake cable</td>
</tr>
<tr>
<td>2</td>
<td>Speedometer</td>
</tr>
<tr>
<td>3</td>
<td>Front master cylinder</td>
</tr>
<tr>
<td>4</td>
<td>Brush guard (right)</td>
</tr>
<tr>
<td>5</td>
<td>Turn signal light (right)</td>
</tr>
<tr>
<td>6</td>
<td>Throttle cable assembly</td>
</tr>
<tr>
<td>7</td>
<td>Speedometer cable</td>
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<tr>
<td>8</td>
<td>Turn signal light (left)</td>
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<td>9</td>
<td>Brush guard (left)</td>
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<td>10</td>
<td>Handlebar bracket</td>
</tr>
<tr>
<td>11</td>
<td>Clamp (90464-12812)</td>
</tr>
<tr>
<td>12</td>
<td>Bracket</td>
</tr>
<tr>
<td>13</td>
<td>Turn signal light lead (right)</td>
</tr>
<tr>
<td>14</td>
<td>Right handlebar switch lead</td>
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<tr>
<td>15</td>
<td>Front brake light switch lead</td>
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<tr>
<td>16</td>
<td>Speedometer lead</td>
</tr>
<tr>
<td>17</td>
<td>Rear brake light switch lead</td>
</tr>
<tr>
<td>18</td>
<td>Left lever holder lead</td>
</tr>
<tr>
<td>19</td>
<td>Turn signal light lead (left)</td>
</tr>
<tr>
<td>20</td>
<td>Brake hose</td>
</tr>
</tbody>
</table>

**A** Fasten the right handlebar switch lead, front brake light switch lead and right turn signal light lead to the handlebar.

**B** Upper screw tighten first.

**C** Torque: 4Nm (0.4m • kgf, 2.9ft • lbf).

**D** Band holds the wires and hoses with finger clearance, and cut off the surplus until 5mm left. Band is above the pin of handlebar bracket.

**E** When assemble the lower handlebar holder, the position point is in the front.
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.

### PERIODIC MAINTENANCE AND ADJUSTMENTS

#### Periodic maintenance chart for the emission control system

<table>
<thead>
<tr>
<th>NO.</th>
<th>ITEM</th>
<th>ROUTINE</th>
<th>INITIAL</th>
<th>ODOMETER READING</th>
</tr>
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<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>1000 km (600 mi) or 1 month</td>
<td>4000 km (2000 mi) or 6 months</td>
</tr>
<tr>
<td>1</td>
<td>* Fuel line</td>
<td>• Check fuel hoses for cracks or damage.</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Replace if necessary.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Spark plug</td>
<td>• Check condition.</td>
<td>✓</td>
<td>Replace.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Adjust gap and clean.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Replace at 7000 km (4000 mi) or 12 months</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>and thereafter every 6000 km (4000 mi) or 12</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>months.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>* Valve clearance</td>
<td>• Check and adjust valve clearance when engine is cold.</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>4</td>
<td>* Crankcase breather system</td>
<td>• Check breather hose for cracks or damage.</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Replace if necessary.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>* Fuel injection</td>
<td>• Check engine idle speed.</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>6</td>
<td>* Exhaust system</td>
<td>• Check for leakage.</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Tighten if necessary.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Replace gasket(s) if necessary.</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.
<table>
<thead>
<tr>
<th>NO.</th>
<th>ITEM</th>
<th>ROUTINE</th>
<th>INITIAL</th>
<th>ODOMETER READING</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>1000 km (600 mi) or 1 month</td>
<td>4000 km (2000 mi) or 6 months</td>
</tr>
<tr>
<td>1</td>
<td>Air filter element</td>
<td>• Replace.</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>2</td>
<td>V-belt case air filter element</td>
<td>• Clean</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>3</td>
<td>Front brake</td>
<td>• Check operation, fluid level, and for fluid leakage. • Replace brake pads if necessary.</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>4</td>
<td>Rear brake</td>
<td>• Check operation. • Adjust cable and replace brake shoes if necessary.</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>5</td>
<td>Brake hose</td>
<td>• Check for cracks or damage. • Replace. Every 4 years</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>6</td>
<td>Wheels</td>
<td>• Check runout and for damage. • Replace if necessary.</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>7</td>
<td>Tires</td>
<td>• Check tread depth and for damage. • Replace if necessary. • Check air pressure. • Correct if necessary.</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>8</td>
<td>Wheel bearings</td>
<td>• Check bearings for smooth operation. • Replace if necessary.</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>9</td>
<td>Steering bearings</td>
<td>• Check bearing assemblies for looseness. • Moderately repack with lithium-soap-based grease every 13000 km (8000 mi) or 24 months. Repack.</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>10</td>
<td>Chassis fasteners</td>
<td>• Check all chassis fitting and fasteners. • Correct if necessary.</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>11</td>
<td>Front brake lever pivot shaft</td>
<td>• Apply silicone grease lightly.</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>12</td>
<td>Rear brake lever pivot shaft</td>
<td>• Apply lithium-soap-based grease lightly.</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>13</td>
<td>Centerstand and sidestand pivots</td>
<td>• Check operation. • Apply lithium-soap-based grease lightly.</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>14</td>
<td>Sidestand switch</td>
<td>• Check operation and replace if necessary.</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>15</td>
<td>Front fork</td>
<td>• Check operation and for oil leakage. • Replace if necessary.</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>16</td>
<td>Shock absorber assemblies</td>
<td>• Check operation and for oil leakage. • Replace if necessary.</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>17</td>
<td>Engine oil</td>
<td>• Change (warm engine before draining). • Check oil level and vehicle for oil leakage.</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>18</td>
<td>Engine oil strainer</td>
<td>• Clean.</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>19</td>
<td>Final transmission oil</td>
<td>• Check vehicle for oil leakage. • Change.</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>20</td>
<td>V-belt</td>
<td>• Replace. Every 18000 km (12000 mi)</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>21</td>
<td>Front and rear brake switches</td>
<td>• Check operation.</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>22</td>
<td>Control and meter cables</td>
<td>• Apply Yamaha chain and cable lube or engine oil thoroughly.</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>23</td>
<td>Throttle grip housing and cable</td>
<td>• Check operation and free play. • Adjust the throttle cable free play if necessary. • Lubricate the throttle grip housing and cable.</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>24</td>
<td>Lights, signals and switches</td>
<td>• Check operation. • Adjust headlight beam.</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>
TIP

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

Air filter and V-belt filter
- This model’s air filter is equipped with a disposable oil-coated paper element, which must not be cleaned with compressed air to avoid damaging it.
- The air filter element needs to be replaced and V-belt filter needs to be serviced more frequently when riding in unusually wet or dusty areas.

Hydraulic brake service
- After disassembling the brake master cylinder and caliper, always change the fluid. Regularly check the brake fluid level and fill the reservoir as required.
- Every two years replace the internal components of the brake master cylinder and caliper, and change the brake fluid.
- Replace the brake hose every four years and if cracked or damaged.
**Removing the seat and trunk**

<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>Fuel tank cap cover</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Seat hinge</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Upper cover</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Trunk</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Side cover (left)</td>
<td>1</td>
<td>For installation, reverse the removal pro-</td>
</tr>
<tr>
<td>7</td>
<td>Side cover (right)</td>
<td>1</td>
<td>cedure.</td>
</tr>
</tbody>
</table>

*7Nm (0.7 m·kgf, 5.1 ft·lbf)*
**FOOTREST BOARD**

### Drawing

![Diagram of a motorcycle footrest board with labeled parts and notes on torque values.]

### Table of Parts and Torque

<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 footrest board</td>
<td></td>
<td>Remove the parts in the order listed.</td>
</tr>
<tr>
<td>1</td>
<td>Battery box cover</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Front cover</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Band</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Battery negative lead</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Battery positive lead</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Battery</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Cap</td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

### Warnings and Notes

- **NOTICE**
  - First, disconnect the negative battery lead, and then the positive battery lead.
  - After installing the battery be sure to turn the main switch from “ON” to “OFF” three times in 3 seconds intervals to initialize the idle speed control system.
While installing, the fuse box should be installed to the correct position.

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>
</table>
| 8     | Footrest board   | 1    | **TIP**
|       |                  |      | While installing, the fuse box should be    |
|       |                  |      | installed to the correct position.          |
|       |                  |      | For installation, reverse the removal       |
|       |                  |      | procedure.                                  |
# LEG SHIELD 1 ASSEMBLY AND LEG SHIELD 2

![Diagram of bike parts]

<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 leg shield 1 assembly and leg shield 2</td>
<td>1</td>
<td>Remove the parts in the order listed. Refer to &quot;FOOTREST BOARD&quot;.</td>
</tr>
<tr>
<td>1</td>
<td>Footrest board</td>
<td>1</td>
<td>ucking.</td>
</tr>
<tr>
<td>2</td>
<td>Headlight coupler</td>
<td>1</td>
<td>Disconnect.</td>
</tr>
<tr>
<td>3</td>
<td>Leg shield 1 assembly</td>
<td>1</td>
<td>For installation, reverse the removal procedure.</td>
</tr>
<tr>
<td>4</td>
<td>Main switch cover</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Leg shield 2</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

**Remarks**

- 7Nm (0.7 m•kgf, 5.1 ft•lb)
- 9Nm (0.9 m•kgf, 6.5 ft•lb)
- 23Nm (2.3 m•kgf, 16.6 ft•lb)
- 14Nm (1.4 m•kgf, 10.1 ft•lb)
### Disassembling the leg shield 1 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>Panel</td>
<td>1</td>
<td>Remove the parts in the order listed.</td>
</tr>
<tr>
<td>②</td>
<td>Headlight cover</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>③</td>
<td>Headlight assembly</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>④</td>
<td>Panel (leg shield 1)</td>
<td>1</td>
<td>For assembly, reverse the disassembly procedure.</td>
</tr>
<tr>
<td>⑤</td>
<td>Leg shield 1</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

*7Nm (0.7 m·kgf, 5.1 ft·lbf)*
ADJUSTING THE VALVE CLEARANCE

ENGINE

ADJUSTING THE VALVE CLEARANCE

The following procedure applies to all of the valves.

TIP

- 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:
   - battery box cover
   - front cover
   Refer to “COVER AND PANEL”.

2. Remove:
   - spark plug cap
   - spark plug
   - ignition coil
   - valve cover (intake and exhaust)
   - breather

3. 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 ~ 0.14mm (0.004 ~ 0.006in)</td>
</tr>
<tr>
<td>Exhaust valve</td>
</tr>
<tr>
<td>0.16 ~ 0.20mm (0.006 ~ 0.008in)</td>
</tr>
</tbody>
</table>

a. Turn the crankshaft counterclockwise.
b. When the piston is at TDC on the compression stroke, align the punch mark ① in the camshaft sprocket with the stationary ⑤ on the cylinder head.
Adjusting the Valve Clearance

3. Adjust:
- valve clearance

4. Adjust:
- valve clearance

a. Loosen the locknut ①.
b. Insert a thickness gauge ② between the end of the adjusting screw and the valve tip.
c. Turn the adjusting screw ③ in direction ① or ② until the specified valve clearance is obtained.

d. Hold the adjusting screw to prevent it from moving and tighten the locknut to specification.

Valve adjusting tool
90890-01311 (YM-08035-A)

Locknut
7Nm (0.7m • kgf, 5.1ft • lbf)
e. Measure the valve clearance again.
f. If the valve clearance is still out of specification, repeat all of the valve clearance adjustment steps until the specified clearance is obtained.

5. Install:
   • breather
     7Nm (0.7m • kgf, 5.1ft • lbf)
   • valve cover (intake and exhaust)
     7Nm (0.7m • kgf, 5.1ft • lbf)
   • ignition coil
     7Nm (0.7m • kgf, 5.1ft • lbf)
   • spark plug
     13Nm (1.3m • kgf, 9.4ft • lbf)

6. Install:
   • front cover
   • battery box cover
     Refer to “COVER AND PANEL”.

3-11
TIP
Prior to checking 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. Remove:
   - battery box cover
   - front cover
   Refer to “COVER AND PANEL”.

3. Connect:
   - digital tachometer ①
     (onto the spark plug lead of cylinder)
   
   ![Digital Tachometer](image)

   Digital tachometer
   90890-06760

4. Check:
   - engine idling speed
   Out of specification → Replace the throttle body.

   ![Engine Idling Speed](image)

   Engine idling speed
   1700 ~ 1900r/min

5. Install:
   - front cover
   - battery box cover
   Refer to “COVER AND PANEL”.

3-12
TIP
Prior to adjusting the throttle cable free play, the engine idling speed should be checked properly.

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

   Throttle cable free play (at the flange of the throttle grip)
   3 ~ 5mm (0.12 ~ 0.20in)

2. Adjust:
   • throttle cable free play

   ▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲
   a. Loosen the locknut ①.
   b. Turn the adjusting nut ② in direction ③ or ④ until the specified throttle cable free play is obtained.

   Direction ③: Throttle cable free play is increased.
   Direction ④: Throttle cable free play is decreased.

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.

▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲
**ADJUSTING THE SEAT SPRING FORCE**

When open the seat and seat will not fold up automatically, adjust the spring force.

1. Remove:
   - seat
   - upper cover
2. Adjust:
   - screw ①

<table>
<thead>
<tr>
<th>Direction</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>①</td>
<td>Spring force is increased.</td>
</tr>
<tr>
<td>②</td>
<td>Spring force is decreased.</td>
</tr>
</tbody>
</table>

3. Install:
   - upper cover
   - seat
CHECKING THE SPARK PLUG

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

⚠️ WARNING
Remove the spark plug cap, the engine is extremely hot.

3. Remove:
   - spark plug

NOTICE
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)
   U22ESR-N (DENSO)

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 ~ 0.8mm (0.028 ~ 0.031in)
8. Install:
   • spark plug

   \[13\text{Nm}(1.3\text{m} \cdot \text{kgf}, 9.4\text{ft} \cdot \text{lbf})\]

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

9. Connect:
   • spark plug cap

10. Install:
    • front cover
    • battery box cover
    Refer to “COVER AND PANEL”.
CHECKING THE IGNITION TIMING

TIP
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. Remove:
   • battery box cover
   • front cover
   Refer to "COVER AND PANEL".

2. Attach:
   • digital tachometer ① (onto the spark plug lead of cylinder)
   • timing light ②

   ![Timing light](90890-03141 (YU-03141)
   Digital tachometer 90890-06760)

3. Check:
   • ignition timing

   ▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼
a. Start the engine, warm it up for several minutes, and then let it run at the specified engine idling speed.
b. Check that the mark \( \circ \) on the AC magneto rotor is within the firing range \( \bullet \) on the crankcase. Incorrect firing range → Check the ignition system.

**TIP**
The ignition timing is not adjustable.

4. Remove:
   - timing light
   - digital tachometer

5. Install:
   - front cover
   - battery box cover
   Refer to "COVER AND PANEL".
MEASURING THE COMPRESSION PRESSURE

TIP
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 box cover
   - front cover
     Refer to “COVER AND PANEL”.
4. Disconnect:
   - spark plug cap

WARNING
Remove the spark plug cap, the engine is extremely hot.

5. Remove:
   - spark plug

NOTICE
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 1

Compression gauge 90890-03081 (YU-33223)
MEASURING THE COMPRESSION PRESSURE

7. Measure:
   - compression pressure
     Out of specification → Refer to steps (c) and (d).

<table>
<thead>
<tr>
<th>Compression pressure (at sea level)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Minimum</strong></td>
</tr>
<tr>
<td>1175kPa (11.8kgf/cm², 167psi) at 1800r/min</td>
</tr>
<tr>
<td><strong>Standard</strong></td>
</tr>
<tr>
<td>1350kPa (13.5kgf/cm², 192psi) at 1800r/min</td>
</tr>
<tr>
<td><strong>Maximum</strong></td>
</tr>
<tr>
<td>1512kPa (15.1kgf/cm², 215psi) at 1800r/min</td>
</tr>
</tbody>
</table>

WARNING
To prevent sparking, ground the spark plug lead before cranking the engine.

a. Set the main switch to “ON”.
b. With the throttle wide open, crank the engine until the reading on the compression gauge stabilizes.

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>
</tr>
</thead>
<tbody>
<tr>
<td>Reading</td>
</tr>
<tr>
<td>Higher than without oil</td>
</tr>
<tr>
<td>Same as without oil</td>
</tr>
</tbody>
</table>

▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲
MEASURING THE COMPRESSION PRESSURE

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

| 13Nm(1.3m = kgf, 9.4ft = lbf) |

10. Connect:
    - spark plug cap
11. Install:
    - front cover
    - battery box cover
    Refer to “COVER AND PANEL”.
1. Stand the scooter on a level surface.

**TIP**
- 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.

**Recommended engine oil type**

SAE20W-40 or SAE10W-30

**Recommended engine oil grade**

API service SG type or higher

JASO standard MA

**NOTICE**

Do not allow foreign materials to enter the crankcase.

**TIP**

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

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

**TIP**

Before checking the engine oil level, wait a few minutes until the oil has settled.
CHANGING THE ENGINE OIL

1. Start the engine, warm it up for several minutes, and then turn it off.
2. Place a container under the engine oil drain bolt.

3. Remove:
   - engine oil filler cap
   - engine oil drain bolt (along with the gasket)

4. Drain:
   - engine oil
     (completely from the crankcase)

5. If the oil filter element is also to be replaced or cleaned, perform the following procedure.

   ▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼
   a. Remove the oil strainer cover, spring and oil filter element.
   b. Replace the new O-ring.
   c. Install the new or clean oil filter element and the oil strainer cover.

   Oil strainer cover
   20Nm(2.0m • kgf, 14.5ft • lbf)

   ▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲

6. Install:
   - engine oil drain bolt
     (along with the gasket)

   20Nm(2.0m • kgf, 14.5ft • lbf)

7. Fill:
   - crankcase
     (with the specified amount of the recommended engine oil)
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

a. Disconnect the engine temperature sensor coupler.
b. Slightly loosen the engine temperature sensor ①.
c. Start the engine and keep it idling until engine oil starts to seep from the engine temperature sensor. If no engine oil comes out after one minute, turn the engine off so that it will not seize.
d. Check the engine oil passages, the oil filter cartridge and the oil pump for damage or leakage. Refer to “OIL PUMP” in chapter 5.
e. Start the engine after solving the problem(s) and check the engine oil pressure again.
f. Tighten the engine temperature sensor to specification.
g. Connect the engine temperature sensor coupler.
CHANGING THE TRANSMISSION OIL

1. Stand the scooter on a level surface.

TIP
- Stand the scooter on a suitable stand.
- Make sure that the scooter upright.

2. Start the engine, warm it up for several minutes, and then turn it off.
3. Place a container under the transmission oil drain bolt.
4. Remove:
   - transmission oil fill cap
   - transmission oil drain bolt
5. Drain:
   - transmission oil
     (completely from the transmission case)
6. Install:
   - transmission oil drain bolt
   \[ \text{23Nm (2.3m} \cdot \text{kgf, 16.6ft} \cdot \text{lbf)} \]
7. Fill:
   - transmission case
     (with the specified amount of the recommended transmission oil)

\[ \text{Recommended oil} \]
\[ \text{SAE 10W-30 type SE motor oil} \]
\[ \text{Total amount} \]
\[ 0.14 \sim 0.16L \ (0.15 \sim 0.17 \text{ US qt, 0.12} \sim 0.14 \text{ Imp. qt}) \]
\[ \text{Periodic oil change} \]
\[ 0.12 \sim 0.14L \ (0.13 \sim 0.15 \text{ US qt, 0.11} \sim 0.12 \text{ Imp. qt}) \]
8. Install:
   - O-ring
   - transmission oil fill cap
9. Start the engine for several minutes to warm it up and check for the oil leakage.
10. Check:
    - transmission case
      (for transmission oil leaks)
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.

   **NOTICE**
   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:
   - battery box cover
   - front cover
   Refer to "COVER AND PANEL".

4. Disconnect:
   - engine temperature sensor coupler

5. Lossen:
   - engine temperature sensor ①

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

6. Check:
   - engine oil pressure

   a. Start the engine and keep it idling until engine oil starts to seep from the engine temperature sensor. 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.

7. Tighten:
   • engine temperature sensor

   18Nm(1.8m • kgf, 13.0ft • lbf)

8. Connect:
   • engine temperature sensor coupler

9. Install:
   • front cover
   • battery box cover
   Refer to “COVER AND PANEL”.
CLEANING THE AIR FILTER ELEMENT

1. Remove:
   • air filter case cover ①
   • air filter element ②

2. Clean:
   • air filter element ①
     Apply compressed air to the outer surface of the air filter element.

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

TIP
   • Replace the air filter element every 6000km (3500mi).
   • The air filter needs more frequent service if you are riding in unusually wet or dusty areas.

4. Install:
   • air filter element
   • air filter case cover

NOTICE
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.

TIP
When installing the air filter element into the air filter case cover, make sure their sealing surfaces are aligned to prevent any air leaks.
CLEANING THE V-BELT CASE AIR FILTER ELEMENT

1. Remove:
   • V-belt case cover
   • V-belt case air filter guide
   • V-belt case air filter element

2. Clean:
   • V-belt case air filter element (with solvent)

TIP
After cleaning, carefully pat the V-belt case air filter element on a clean cloth to remove the excess solvent.

3. Check:
   • V-belt case air filter element
   Damage → Replace.

4. Apply the recommended oil to the entire surface of the V-belt case air filter element and then carefully pat the V-belt case air filter element on a clean cloth to remove the excess oil. The V-belt case air filter element should be wet but not dripping.

**Recommended oil**

- Engine oil

5. Install:
   • V-belt case air filter element
   • V-belt case air filter guide

- 7Nm (0.7m • kgf, 5.1ft • lbf)

- V-belt case cover

- 7Nm (0.7m • kgf, 5.1ft • lbf)
CHECKING THE THROTTLE BODY JOINT AND INTAKE MANIFOLD

1. Remove:
   - seat
   - trunk
   - battery box cover
   - front cover
   Refer to “COVER AND PANEL”.

2. Remove:
   - fuel tank
   Refer to “REMOVING THE FUEL TANK” in chapter 6.

3. Check:
   - throttle body joint
   - intake manifold
   Cracks/damage → Replace.
   Refer to “CYLINDER HEAD” in chapter 5.

4. Install:
   - fuel tank
   Refer to “INSTALLING THE FUEL TANK AND FUEL HOSE” in chapter 6.

5. Install:
   - front cover
   - battery box cover
   - trunk
   - seat
   Refer to “COVER AND PANEL”.

CHECKING THE FUEL HOSE
The following procedure applies to all of the fuel and impulse hoses.

1. Remove:
   - seat
   - trunk
   - battery box cover
   - front cover
   Refer to “COVER AND PANEL”.

3-30
CHECKING THE FUEL HOSE/CHECKING THE BREATHER HOSES

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

3. Install:
   - front cover
   - battery box cover
   - trunk
   - seat
   Refer to "COVER AND PANEL".

EAS0098

CHECKING THE BREATHER HOSES

1. Remove:
   - seat
   - trunk
   - battery box cover
   - front cover
   Refer to "COVER AND PANEL".

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

   NOTICE
   Make sure the breather hoses are routed correctly.

3. Install:
   - front cover
   - battery box cover
   - trunk
   - seat
   Refer to "COVER AND PANEL".
CHECKING THE EXHAUST SYSTEM

The following procedure applies to all of the muffler and gasket.

1. Remove:
   - O₂ sensor coupler
   - muffler
   Refer to “REAR SHOCK ABSORBER ASSEMBLIES AND SWINGARM” in chapter 4.

2. Check:
   - muffler (1)
     Crack/damage → Replace.
   - gasket (2)
     Exhaust gas leak → Replace.

3. Check:
   - tightening torque

4. Install:
   - muffler
   - O₂ sensor coupler
   Refer to “REAR SHOCK ABSORBER ASSEMBLIES AND SWINGARM” in chapter 4.
CHECKING THE CANISTER AND ROLL OVER VALVE

The following procedure applies to all of the canister and roll over valve.

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

2. Check:
   - hose (to throttle body) ①
   - hose (to roll over valve) ②
   Cracks/damage → Replace.
   Loose connection → Connect properly.

3. Remove:
   - canister ①

4. Check:
   - canister
   Cracks/damage → Replace.
   Obstruction → Blow out with compressed air.

5. Install:
   - canister

TIP
While installing, make sure the canister is routed correctly.

6. Remove:
   - roll over valve ①
7. Check:
• roll over valve

^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^

a. Remove the roll over valve.
b. Put roll over valve with the vertical angle.
c. Connect the hose to direction @ and blow air in the hose.

Unobstructed → Normal.
Obstruction → Replace.

d. Put roll over valve with the horizontal angle.
e. Connect the hose to direction @ and blow air in the hose.

Unobstructed → Replace.
Obstruction → Normal.

^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^

8. Install:
• roll over valve

TIP
Roll over valve should be installed on the frame with the vertical angle. If roll over valve to slope or the horizontal (more than about 45 degrees) installation, will make the scooter unable to start.

9. Install:
• trunk
• seat
Refer to “COVER AND PANEL”.

EAS00114

ADJUSTING THE REAR BRAKE

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

   Brake lever free play
   10 ~ 20mm (0.39 ~ 0.79in)

2. Adjust:
   • brake lever free play

   Turn the adjusting nut ① in direction ② or ③ until the specified brake lever free play is obtained.

   Direction ②  Brake lever free play is increased.
   Direction ③  Brake lever free play is decreased.

   NOTICE
   After adjusting the brake lever free play, make sure there is no brake drag.
CHECKING THE BRAKE FLUID LEVEL

1. Stand the scooter on a level surface.

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

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

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

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

TIP
In order to ensure a correct reading of the brake fluid level, make sure the top of the brake fluid reservoir is horizontal.
CHECKING THE FRONT BRAKE PADS
The following procedure applies to all of the brake pads.
1. Operate the brake.
2. Check:
   - front brake pad
     Wear indicators ① almost touch the brake disc → Replace the brake pads as a set. Refer to “REPLACING THE FRONT BRAKE PADS” in chapter 4.

CHECKING THE 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 “REAR WHEEL AND REAR BRAKE” in chapter 4.

CHECKING THE FRONT BRAKE HOSE
1. Check:
   - brake hose ①
     Cracks/damage/wear → Replace.
2. Check:
   - brake hose holder
     Loose connection → Tighten the holder bolt.
3. Hold the scooter upright and apply the front brake several times.
4. Check:
   - brake hose
     Brake fluid leakage → Replace the damaged hose. Refer to “FRONT BRAKE” in chapter 4.
BLEEDING THE HYDRAULIC BRAKE SYSTEM

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

1. Remove:
   - brake master cylinder reservoir cap

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

2. Bleed:
   - hydraulic brake system

a. Fill the brake fluid reservoir to the proper level with the recommended brake fluid.
b. Install the brake master cylinder reservoir diaphragm.
c. Connect a clear plastic hose (1) tightly to the bleed screw (2).
d. Place the other end of the hose into a container.
e. Slowly apply the brake lever several times.
f. Fully pull the brake lever without releasing it.
g. Loosen the bleed screw.
TIP
Loosening the bleed screw will release the pressure and cause the brake lever to contact the throttle grip.

h. Tighten the bleed screw and then release the brake lever.
i. Repeat steps (e) to (h) until all of the air bubbles have disappeared from the brake fluid in the plastic hose.
j. Tighten the bleed screw to specification.

<table>
<thead>
<tr>
<th>Bleed screw</th>
</tr>
</thead>
<tbody>
<tr>
<td>6Nm (0.6m • kgf, 4.3ft • lbf)</td>
</tr>
</tbody>
</table>

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

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

▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲

3. Install:
   • brake master cylinder reservoir cap

| 1.6Nm (0.16m • kgf, 1.5ft • lbf) |
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.

**TIP**
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:
- leg shield 1
  Refer to “COVER AND PANEL”.

4. Adjust:
- steering head

\[\begin{align*}
\text{a. Remove the upper ring nut } & \text{1, lock washer } \text{2, the center ring nut } \text{3 and the rubber washer } \text{4}. \\
\text{b. Loosen the lower ring nut } & \text{5 and then tighten it to specification with the ring nut wrench } \text{6}. \\
\end{align*}\]

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

\[\text{Ring nut wrench} \quad 90890-01403 \ (YU-A9472)\]
CHECKING AND ADJUSTING THE STEERING HEAD

---

**Lower ring nut (initial tightening torque)**
38Nm (3.8m • kgf, 27.5ft • lbf)

**c.** Losen the lower ring nut completely and then tighten it to specification with a steering nut wrench.

⚠️ **WARNING**
Do not over tighten the lower ring nut.

**Lower ring nut (final tightening torque)**
14Nm (1.4m • kgf, 10.1ft • lbf)

d. Check the steering head for looseness or binding by turning the front fork all the way in both directions. If any binding is felt, remove the lower bracket and check the upper and lower bearings. Refer to “STEERING HEAD” in chapter 4.
e. Install the rubber washer.
f. Install the center ring nut 7.
g. Finger tighten the center ring nut, then align the slots of both ring nuts. If necessary, hold the lower ring nut and tighten the center ring nut until their slots are aligned.
h. Install the lock washer 8.

**TIP**
Make sure the lock washer tabs sit correctly in the ring nut slots 6.

i. Hold the lower and center ring nuts with a ring nut wrench and tighten the upper ring nut with a steering nut wrench.

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

**Ring nut wrench**
90890-01268 (YU-01268)

**Upper ring nut**
75Nm (7.5m • kgf, 54.2ft • lbf)

---

5. Install:
- leg shield 1
  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.
   - oil seal
     Oil leakage → 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.
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 (with oil and a full fuel tank)</th>
<th>122 kg (269 lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum load*</td>
<td>155 kg (342 lb)</td>
</tr>
</tbody>
</table>

**cold tire pressure**

<table>
<thead>
<tr>
<th>Up to 90 kg (198 lb)</th>
<th>175 kPa (1.75 kgf/cm², 25 psi)</th>
<th>200 kPa (2.00 kgf/cm², 25 psi)</th>
</tr>
</thead>
<tbody>
<tr>
<td>90 kg (198 lb)~ max load*</td>
<td>200 kPa (2.00 kgf/cm², 29 psi)</td>
<td>225 kPa (2.25 kgf/cm², 33 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.
2. Check:
   - Tire surfaces
     Damage/wear → Replace the tire.

   Minimum tire tread depth
   0.8mm (0.03in)

   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>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tire</td>
<td>Wheel</td>
</tr>
</tbody>
</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.
CHECKING THE TIRES

<table>
<thead>
<tr>
<th>Front tire</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturer</td>
<td>Model</td>
<td>Size</td>
</tr>
<tr>
<td>KENDA</td>
<td>K761</td>
<td>120/70-12 51L</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rear tire</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturer</td>
<td>Model</td>
<td>Size</td>
</tr>
<tr>
<td>KENDA</td>
<td>K761</td>
<td>130/70-12 56L</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.

**TIP**

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.

**TIP**
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

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

Recommended lubricant
Lithium-soap-based grease

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

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

LUBRICATING THE REAR SUSPENSION
Lubricate the pivoting point and metal-to-metal moving parts of the rear suspension.

Recommended lubricant
Lithium-soap-based grease
WARNING

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

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

FIRST AID IN CASE OF BODILY CONTACT:

EXTERNAL
- Skin — Wash with water.
- Eyes — Flush with water for 15 minutes and get immediate medical attention.

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

NOTICE
- 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.
TIP
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:
   • battery box cover
   Refer to “COVER AND PANEL”.

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

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

3. Remove:
   • band
   • battery

4. Check:
   • battery charge

a. Connect a digital circuit tester ① to the battery terminals.

   Digital circuit tester
   90890-03174

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

TIP
• 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).
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CHECKING AND CHARGING THE BATTERY

- 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.

⚠️ NOTICE

- 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.

These values vary with the temperature, the condition of the battery plates, and the electrolyte level.

<table>
<thead>
<tr>
<th>Open-circuit voltage (V)</th>
<th>Charging condition of the battery (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>13.0</td>
<td>100</td>
</tr>
<tr>
<td>12.5</td>
<td>90</td>
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<tr>
<td>12.0</td>
<td>80</td>
</tr>
<tr>
<td>11.5</td>
<td>70</td>
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</table>

<table>
<thead>
<tr>
<th>Charging condition of the battery (%)</th>
<th>Open-circuit voltage (V)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>14</td>
</tr>
<tr>
<td>20</td>
<td>13</td>
</tr>
<tr>
<td>25</td>
<td>12</td>
</tr>
<tr>
<td>30</td>
<td>11</td>
</tr>
<tr>
<td>50</td>
<td>10</td>
</tr>
<tr>
<td>75</td>
<td>9</td>
</tr>
<tr>
<td>100</td>
<td>8</td>
</tr>
</tbody>
</table>

Relationship between the open-circuit voltage and the charging time at 20˚C.

Ambient temperature 20˚C

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 method using a variable-current (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: Adjust the charging voltage to 20 ~ 25V.
   - NO: Monitor the amperage for 3 ~ 5 minutes. Is the standard charging amperage exceeded?
     - YES: If the amperage does not exceed the standard charging amperage after 5 minutes, replace the battery.
     - NO: Leave the battery unused for more than 30 minutes before measuring its open-circuit voltage.

TIP
- Leave the battery unused for more than 30 minutes before measuring its opencircuit voltage.
- 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 voltage to obtain the standard charging amperage.
Set the timer to the charging time determined by the opencircuit voltage. Refer to “CHECKING AND CHARGING 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.
This type of battery charger cannot charge an MF battery. A variable voltage charger is recommended.

Charging method using a constant voltage charger

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

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

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

**YES**

Charge the battery until the charging voltage reaches 15 V.

**TIP**
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.

**NOTICE**
Constant amperage chargers are not suitable for charging MF batteries.

**NO**

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

**TIP**
Leave the battery unused for more than 30 minutes before measuring its opencircuit voltage.

---

**CHECKING AND CHARGING THE BATTERY**

**CHK ADJ**

**Charger**

**Ammeter**

**Voltmeter**
CHECKING AND CHARGING THE BATTERY

6. Install:
   • battery
   • band

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

   **NOTICE**
   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

   **Recommended lubricant**
   Dielectric grease

10. Install:
    • battery box cover
       Refer to “COVER AND PANEL”.
CHECKING THE FUSES

The following procedure applies to all of the fuses.

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

1. Remove:
   - battery box cover
   Refer to “COVER AND PANEL”.

2. Check:
   - fuse

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

   **TIP**
   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.
CHECKING THE FUSES

<table>
<thead>
<tr>
<th>Fuses</th>
<th>Amperage rating</th>
<th>Q'ty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main</td>
<td>20A</td>
<td>1</td>
</tr>
<tr>
<td>Headlight</td>
<td>10A</td>
<td>1</td>
</tr>
<tr>
<td>Signaling system</td>
<td>15A</td>
<td>1</td>
</tr>
<tr>
<td>Ignition</td>
<td>10A</td>
<td>1</td>
</tr>
<tr>
<td>Fuel injection system</td>
<td>10A</td>
<td>1</td>
</tr>
<tr>
<td>Reserve</td>
<td>20A</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>15A</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>10A</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 box cover
     Refer to “COVER AND PANEL”.
REPLACING THE HEADLIGHT BULBS

The following procedure applies to both of the headlight bulbs.

1. Remove:
   - safeguard
   - leg shield 1
     Refer to "COVER AND PANEL".

2. Disconnect:
   - headlight coupler

3. Remove:
   - dust boot
   - headlight bulb holder ①
   - headlight bulb ②

**WARNING**

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

4. Install:
   - headlight bulb New
     Secure the new headlight bulb with the headlight bulb holder.

**NOTICE**

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
   - dust boot

6. Connect:
   - headlight coupler

7. Install:
   - leg shield 1
   - safeguard
     Refer to "COVER AND PANEL".
ADJUSTING THE HEADLIGHT BEAMS

The following procedure applies to both of the headlights.

1. Adjust:
   - headlight beam (vertically)

   ▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼
   a. Turn the low beam light adjusting screw ① in direction a or b.

   Direction a [Headlight beam is raised.]
   Direction b [Headlight beam is lowered.]

   b. Turn the high beam light adjusting screw ② in direction c or d.

   Direction c [Headlight beam is raised.]
   Direction d [Headlight beam is lowered.]

   ▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲

2. Adjust:
   - headlight beam (horizontally)

   ▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼
   a. Turn the low beam light adjusting screw ① in direction a or b.

   Direction a [Headlight beam moves to the right.]
   Direction b [Headlight beam moves to the left.]

   b. Turn the high beam light adjusting screw ② in direction c or d.

   Direction c [Headlight beam moves to the left.]
   Direction d [Headlight beam moves to the right.]

   ▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲
CHAPTER 4
CHASSIS

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Removing the front wheel and brake disc

1. Speedometer cable
2. Wheel axle nut
3. Wheel axle
4. Front wheel
5. Collar
6. Speedometer gear unit
7. Front brake disc

Remove the parts in the order listed.

**TIP**

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

Disconnect.

For installation, reverse the removal procedure.

- 4Nm (0.4 m•kgf, 2.9 ft•lbf)
- 70Nm (7.0 m•kgf, 50.6 ft•lbf)
- 23Nm (2.3 m•kgf, 16.6 ft•lbf)
## 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>Remove the parts in the order listed.</td>
</tr>
<tr>
<td>2</td>
<td>Bearing</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Spacer</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Bearing</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

For assembly, reverse the disassembly procedure.

- New part

---

**Remarks**

- Order Job/Part
- Q’ty
- Remarks
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.

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

2. Remove:
   - speedometer cable
   - front wheel axle nut
   - front wheel axle
   - front wheel
   - collar
   - speedometer gear unit

**TIP**
Do not apply the brake lever when removing the front wheel.
CHECKING THE FRONT WHEEL

1. Check:
   - wheel axle
     Roll the wheel axle on a flat surface.
     Bends → Replace.

   Wheel axle bending limit
   0.25mm (0.01in)

   **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
   1.0mm (0.04in)

   Lateral wheel runout limit
   1.0mm (0.04in)

4. Check:
   - wheel bearings
     Front wheel turns roughly or is loose → Replace the wheel bearings.
   - oil seal
     Damage/wear → Replace.
5. Replace:
  - wheel bearings [New]
  - oil seal [New]

▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼

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

tip
To prevent damaging the wheel, place a rag 2 between the screwdriver and the wheel surface.

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

▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲
CHECKING THE BRAKE DISC

1. Check:
   - brake disc
     Damage/galling $\rightarrow$ Replace.

2. Measure:
   - brake disc deflection @
     Out of specification $\rightarrow$ Correct the brake disc deflection or replace the brake disc.

Brake disc deflection limit (maximum)
0.15mm (0.006in)

\[\text{Brake disc thickness limit (minimum)}\]
3.5mm (0.14in)

3. Measure:
   - brake disc thickness (b)
     Measure the brake disc thickness at a few different locations.
     Out of specification $\rightarrow$ Replace.

4. Adjust:
   - brake disc deflection

\[\text{Brake disc thickness limit (minimum)}\]
3.5mm (0.14in)

\[\text{Brake disc thickness limit (maximum)}\]
0.15mm (0.006in)

a. Place the scooter on a suitable stand so that the front wheel is elevated.
b. Before measuring the front brake disc deflection, turn the handlebar to the left or right to ensure that the front wheel is stationary.
c. Remove the brake caliper.
d. Hold the dial gauge at a right angle against the brake disc surface.
e. Measure the deflection 2 ~ 3mm (0.08 ~ 0.12in) below the edge of the brake disc.
TIP
Tighten the brake disc bolts in stages and in a crisscross pattern.

Brake disc bolt
23Nm (2.3m • kgf, 16.6ft • lbf)
LOCTITE®

d. Measure the brake disc deflection.
e. If out of specification, repeat the adjustment steps until the brake disc deflection is within specification.
f. If the brake disc deflection cannot be brought within specification, replace the brake disc.

EAS00535
CHECKING THE SPEEDOMETER GEAR UNIT
1. Check:
   - speedometer clutch
     Bends/damage/wear → Replace.
2. Check:
   - speedometer drive gear ①
   - speedometer driven gear ②
     Damage/wear → Replace.

EAS00539
ASSEMBLING THE FRONT WHEEL
1. Install:
   - wheel bearing
   - spacer
   - oil seal ▶️

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

   NOTICE
   Do not contact the wheel bearing inner race ① or balls ②. Contact should be made only with the outer race ③.

   TIP
   Use a socket ④ that matches the diameter of the wheel bearing outer race and oil seal.
INSTALLING THE FRONT WHEEL

1. Lubricate:
   - wheel axle
   - wheel bearings
   - oil seal lip
   - speedometer gear unit

   **Recommended lubricant**
   Lithium-soap-based grease

2. Install:
   - speedometer gear unit ①

   **TIP**
   Make sure the speedometer gear unit and the wheel hub are installed with the two projections ② meshed into the speedometer clutch ③ respectively.

3. Install:
   - front wheel

   **TIP**
   Make sure the slot ① in the speedometer gear unit fits over the stopper ② on the outer tube.

4. Tighten:
   - wheel axle

   $70\text{Nm (7.0m \cdot kgf, 50.6ft \cdot lbf)}$

   **NOTICE**
   Before tightening the wheel axle nut, push down hard on the handlebar several times and check if the front fork rebounds smoothly.

5. Install:
   - speedometer cable

   $4\text{Nm (0.4m \cdot kgf, 2.9ft \cdot lbf)}$
ADJUSTING THE FRONT WHEEL STATIC BALANCE

TIP
- 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

TIP
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”.
3. Adjust:
   - front wheel static balance

   ▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼
   a. Install a balancing weight \( \textcircled{1} \) onto the rim exactly opposite the heavy spot “X”.

   **TIP**
   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.

   ▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲
### Removing the rear wheel and rear brake

<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 adjuster</td>
<td>1</td>
<td>Remove the parts in the order listed.</td>
</tr>
<tr>
<td>2</td>
<td>Brake cable</td>
<td>1</td>
<td><strong>TIP</strong></td>
</tr>
<tr>
<td>3</td>
<td>Compression spring</td>
<td>1</td>
<td>Place the scooter on a suitable stand so that the front wheel is elevated.</td>
</tr>
<tr>
<td>4</td>
<td>Pin</td>
<td>1</td>
<td>Refer to “REAR SHOCK ABSORBER ASSEMBLIES AND SWINGARM”.</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>Refer to “ASSEMBLING THE BRAKE SHOES”.</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>Brake shoe wear indicator</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Brake camshaft/O-ring</td>
<td>1/2</td>
<td></td>
</tr>
</tbody>
</table>

**Remarks**

*O₂ sensor coupler, Muffler, Swingarm*

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

Refer to “REAR SHOCK ABSORBER ASSEMBLIES AND SWINGARM”.

Refer to “ASSEMBLING THE BRAKE SHOES”.

**Order Job/Part**

- Removing the rear wheel and rear brake
- O₂ sensor coupler
- Muffler
- Swingarm
- Brake adjuster
- Brake cable
- Compression spring
- Pin
- Rear wheel
- Brake shoe kit
- Tension spring
- Plate washer
- Camshaft lever
- Brake shoe wear indicator
- Brake camshaft/O-ring
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>12</td>
<td>Collar</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

10Nm (1.0 m•kgf, 7.2 ft•lbf)
REMOVING THE REAR WHEEL

1. Stand the scooter on a level surface.

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

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

2. Disconnect:
   - $O_2$ sensor coupler

3. Remove:
   - muffler
   - wheel axle nut ①
   - swingarm
   Refer to “REAR SHOCK ABSORBER ASSEMBLIES AND SWINGARM”.

4. Loosen:
   - brake adjuster

5. Remove:
   - rear wheel

6. Remove:
   - brake shoe kit
   - brake camshaft lever
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 the rear wheel.

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.

TIP

After sanding the glazed areas, clean the brake shoe with a cloth.
REAR WHEEL AND REAR BRAKE

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

   Brake shoe lining thickness limit (minimum)
   1.0mm (0.04in)

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

   TIP
   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)
   151mm (5.94in)

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 SHOES

1. Install:
   • O-rings New
   • brake camshaft ①
   • brake shoe wear indicator ②
TIP
Lubricate the brake camshaft and O-rings with lithium-soap-based grease.

⚠️ WARNING
After installing the brake camshaft and O-rings, remove any excess grease.

▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼

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

▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲

2. Tighten:
• brake camshaft lever

\[10\text{Nm}(1.0\text{m • kgf, 7.2ft • lbf})\]

3. Install:
• brake shoe kit ①
• tension springs

NOTICE
• 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.
REAR WHEEL AND REAR BRAKE

INSTALLING THE REAR WHEEL
1. Lubricate:
   • wheel axle

   Recommended lubricant
   Lithium-soap-based grease

2. Install:
   • rear wheel

3. Install:
   • swingarm
   • wheel axle nut ①
   • muffler
   Refer to “REAR SHOCK ABSORBER ASSEMBLIES AND SWINGARM”.

4. Connect:
   • $O_2$ sensor coupler

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

TIP

- 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”.

### FRONT BRAKE PADS

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>Removing the front brake pads</td>
<td>1</td>
<td>Remove the parts in the order listed.</td>
</tr>
<tr>
<td>2</td>
<td>Brake caliper</td>
<td>1</td>
<td>Disconnect.</td>
</tr>
<tr>
<td>3</td>
<td>Circlip</td>
<td>1</td>
<td>Refer to “REPLACING THE FRONT BRAKE PADS”.</td>
</tr>
<tr>
<td>4</td>
<td>Brake pad retaining bolt</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Brake pad</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Brake pad spring</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

**Tightening Torques**

- **13Nm (1.3 m·kgf, 9.4 ft·lb)**
- **49Nm (4.9 m·kgf, 35.4 ft·lb)**
Disc brake components rarely require disassembly. Therefore, always follow these preventive measures:

- Never disassemble brake components unless absolutely necessary.
- If any connection on the hydraulic brake system is disconnected, the entire brake system must be disassembled, drained, cleaned, properly filled, and bled after reassembly.
- Never use solvents on internal brake components.
- Use only clean or new brake fluid for cleaning brake components.
- Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.
- Avoid brake fluid coming into contact with the eyes as it can cause serious injury.

**FIRST AID FOR BRAKE FLUID ENTERING THE EYES:**

- Flush with water for 15 minutes and get immediate medical attention.
REPLACING THE FRONT BRAKE PADS

**TIP**
When replacing the brake pads, it is not necessary to disconnect the brake hose or disassemble the brake caliper.

1. Loosen:
   - brake pad retaining bolt (1)
2. Remove:
   - brake caliper (2)
3. Remove:
   - circlip
   - brake pad retaining bolt
   - brake pads
   - brake pad springs

4. Measure:
   - brake pad wear limit (3)
   Out of specification → Replace the brake pads as a set.

   **Brake pad wear limit**
   0.8mm (0.03in)

5. Install:
   - brake pad springs
   - brake pads

**TIP**
Always install new brake pads and a new brake pad springs as a set.

**TIP**
Make sure the brake pad springs is installed correctly as shown.
6. Lubricate:
   • brake pad retaining bolt

   **Recommended lubricant**
   Silicone grease

   **NOTICE**
   • Do not allow grease to contact the brake pads.
   • Remove any excess grease.

7. Install:
   • brake pad retaining bolt
     \[13\text{Nm} (1.3\text{m} \cdot \text{kgf}, 9.4\text{ft} \cdot \text{lbf})\]
   • circlip
   • brake caliper
     \[49\text{Nm} (4.9\text{m} \cdot \text{kgf}, 35.4\text{ft} \cdot \text{lbf})\]

8. Check:
   • brake fluid level
     Below the level mark \(a\) → Add the recommended brake fluid to the proper level.
     Refer to “CHECKING THE BRAKE FLUID LEVEL” in chapter 3.

9. Check:
   • brake lever operation
     Soft or spongy feeling → Bleed the brake system.
     Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM” in chapter 3.
FRONT BRAKE MASTER CYLINDER

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q’ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Removing the front brake master cylinder</td>
<td>1</td>
<td>Remove the parts in the order listed.</td>
</tr>
<tr>
<td>2</td>
<td>Brush guard (right)</td>
<td>1</td>
<td>Refer to “HANDLEBAR”.</td>
</tr>
<tr>
<td>3</td>
<td>Brake fluid</td>
<td>1</td>
<td>Drain.</td>
</tr>
<tr>
<td>4</td>
<td>Brake master reservoir cap</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Brake master reservoir holder</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Brake master reservoir diaphragm</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Brake lever/compress spring</td>
<td>1/1</td>
<td>Refer to “DISASSEMBLING THE FRONT BRAKE MASTER CYLINDER” and “ASSEMBLING AND INSTALLING THE FRONT BRAKE MASTER CYLINDER”.</td>
</tr>
<tr>
<td>8</td>
<td>Front brake light switch</td>
<td>1</td>
<td>Disconnect.</td>
</tr>
<tr>
<td>9</td>
<td>Union bolt</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Copper washer</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Brake hose</td>
<td>1</td>
<td>For installation, reverse the removal procedure.</td>
</tr>
<tr>
<td>12</td>
<td>Brake master cylinder holder</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Brake master cylinder</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>
### Disassembling the front brake master cylinder

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>①</td>
<td>Dust boot</td>
<td>1</td>
<td>Remove the parts in the order listed.</td>
</tr>
<tr>
<td>②</td>
<td>Circlip</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>③</td>
<td>Washer</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>④</td>
<td>Brake master cylinder kit</td>
<td>1</td>
<td>For assembly, reverse the disassembly</td>
</tr>
<tr>
<td>⑤</td>
<td>Brake master cylinder body</td>
<td>1</td>
<td>procedure.</td>
</tr>
</tbody>
</table>
DISASSEMBLING THE FRONT BRAKE MASTER CYLINDER

TIP
Before disassembling the front brake master cylinder, drain the brake fluid from the entire brake system.

1. Remove:
   • brush guard (right)
     Refer to “HANDLEBAR”.

2. Remove:
   • brake lever/compress spring
   • front brake light switch
   • union bolt ①
   • copper washers ②
   • brake hose ③

   TIP
To collect any remaining brake fluid, place a container under the master cylinder and the end of the brake hose.

3. Remove:
   • brake master cylinder holder
   • brake master cylinder

4. Remove:
   • dust boot
   • circlip
   • washer
   • brake master cylinder kit
CHECKING THE FRONT BRAKE MASTER CYLINDER

1. Check:
   - brake master cylinder ①
     Damage/scratches/wear → Replace.
   - brake fluid delivery passages
     (brake master cylinder body)
     Obstruction → Blow out with compressed air.

2. Check:
   - brake master cylinder kit ①
     Damage/scratches/wear → Replace.

3. Check:
   - brake master cylinder reservoir
     Cracks/damage → Replace.
   - brake master cylinder reservoir diaphragm ①
     Damage/wear → Replace.

4. Check:
   - brake hose ①
     Cracks/damage/wear → Replace.
WARNING

- Before installation, all internal brake components should be cleaned and lubricated with clean or new brake fluid.
- Never use solvents on internal brake components.

Recommended brake fluid
DOT 4

1. Install:
- brake master cylinder kit ①
- washer ②
- circlip ③ New
- dust boot ④

2. Install:
- brake master cylinder ①
- brake master cylinder holder ②

TIP
- Install the brake master cylinder holder with the "UP" mark facing up.
- Align the end of the brake master cylinder holder with the punch mark ④ in the handlebar.
- First, tighten the upper bolt, then the lower bolt.
3. Install:
- copper washers ①
- brake hose ②
- union bolt ③

\[ 26 \text{Nm} (2.6 \text{m} \cdot \text{kgf}, 18.8 \text{ft} \cdot \text{lbf}) \]

**NOTICE**
When installing the brake hose onto the brake master cylinder, make sure the brake hose touch the projection ⑥ on the brake master cylinder.

**WARNING**
Proper brake hose routing is essential to insure safe scooter operation. Refer to “CABLE ROUTING” in chapter 2.

**TIP**
- While holding the brake hose, tighten the union bolt as shown.
- Turn the handlebar to the left and right to make sure the brake hose does not touch other parts (e.g., wire harness, cables, leads). Correct if necessary.

4. Fill:
- brake fluid reservoir
  (with the specified amount of the recommended brake fluid)

**Recommended brake fluid**
DOT 4

**WARNING**
- Use only the designated brake fluid. Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.
- Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor brake performance.
- When refilling, be careful that water does not enter the brake fluid reservoir. Water will significantly lower the boiling point of the brake fluid and could cause vapor lock.
5. Bleed:
   - brake system
   Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM” in chapter 3.

6. Check:
   - brake fluid level
     Below the minimum level mark (③) → Add the recommended brake fluid to the proper level.
     Refer to “CHECKING THE BRAKE FLUID LEVEL” in chapter 3.

7. Check:
   - brake lever operation
     Soft or spongy feeling → Bleed the brake system.
     Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM” in chapter 3.

8. Install:
   - brush guard (right)
   Refer to “HANDLEBAR”.

---

**NOTICE**

Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.
## FRONT BRAKE CALIPER

### Order

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q’ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Removing the front brake caliper</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Brake fluid</td>
<td>1</td>
<td>Remove the parts in the order listed. Drain.</td>
</tr>
<tr>
<td>2</td>
<td>Brake hose holder 1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Union bolt</td>
<td>1</td>
<td>Disconnect.</td>
</tr>
<tr>
<td>4</td>
<td>Copper washer</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Brake hose</td>
<td>1</td>
<td>For installation, reverse the removal pro-</td>
</tr>
<tr>
<td></td>
<td>Brake caliper</td>
<td>1</td>
<td>cedure.</td>
</tr>
</tbody>
</table>

**Tightening Torques:**

- 26 Nm (2.6 m•kgf, 18.8 ft•lbf)
- 7 Nm (0.7 m•kgf, 5.1 ft•lbf)
- 49 Nm (4.9 m•kgf, 35.4 ft•lbf)
Disassembling the front brake caliper
Brake pad
Brake pad spring
Brake caliper bracket
Brake caliper piston
Brake caliper dust seal
Brake caliper piston seal
Spring
Spring seat
Bleed screw/cap
Brake caliper body

Remove the parts in the order listed.
Refer to “REPLACING THE FRONT BRAKE PADS”.
Refer to “DISASSEMBLING THE FRONT BRAKE CALIPER” and “ASSEMBLING AND INSTALLING THE FRONT BRAKE CALIPER”.

For assembly, reverse the disassembly procedure.
DISASSEMBLING THE FRONT BRAKE CALIPER

TIP
Before disassembling the brake caliper, drain the brake fluid from the entire brake system.

1. Remove:
   - union bolt
   - copper washers
   - brake hose

TIP
Put the end of the brake hose into a container and pump out the brake fluid carefully.

2. Remove:
   - brake caliper piston
   - brake caliper dust seal
   - brake caliper piston seal
   - spring
   - spring seat

▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼
   a. Blow compressed air into the brake hose joint opening to force out the pistons from the brake caliper.

WARNING
   - Cover the brake caliper piston with a rag. Be careful not to get injured when the piston are expelled from the brake caliper.
   - Never try to pry out the brake caliper piston.

   b. Remove the brake caliper piston seal and dust seal.

▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲
CHECKING THE FRONT BRAKE CALIPER

<table>
<thead>
<tr>
<th>Recommended brake component replacement schedule</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Brake pads</td>
<td>If necessary</td>
</tr>
<tr>
<td>Piston seal</td>
<td>Every two years</td>
</tr>
<tr>
<td>Brake hose</td>
<td>Every four years</td>
</tr>
<tr>
<td>Brake fluid</td>
<td>Every two years and whenever the brake is disassembled</td>
</tr>
</tbody>
</table>

1. Check:
   - brake caliper piston ①
     Rust/scratches/wear → Replace the brake caliper piston.
   - brake caliper cylinder ②
     Scratches/wear → Replace the brake caliper assembly.
   - brake caliper body ③
     Cracks/damage → Replace the brake caliper assembly.
   - brake fluid delivery passages
     (brake caliper body)
     Obstruction → Blow out with compressed air.

   **WARNING**
   Whenever a brake caliper is disassembled, replace the piston seal and dust seal.

2. Check:
   - brake caliper bracket
     Cracks/damage → Replace.
FRONT BRAKE CALIPER

ASSEMBLING AND INSTALLING THE FRONT BRAKE CALIPER

**WARNING**
- Before installation, all internal brake components should be cleaned and lubricated with clean or new brake fluid.
- Never use solvents on internal brake components as they will cause the piston seal to swell and distort.
- Whenever a brake caliper is disassembled, replace the brake caliper piston seal and dust seal.

**Recommended brake fluid**
DOT 4

1. Install:
- brake caliper piston seal ① New
- brake caliper dust seal ② New
- brake caliper piston ③

2. Lubricate:
- brake caliper piston seal
- brake caliper dust seal

**Recommended lubricant**
- Brake caliper piston seal
- Brake fluid
- Brake caliper dust seal
- Silicone grease

3. Install:
- brake caliper bracket

4. Lubricate:
- brake caliper guide bar

**Recommended lubricant**
Silicone grease
5. Install:
- brake caliper \(^1\) (temporarily)
- copper washers \(^2\) New
- brake hose \(^3\) New
- union bolt \(^4\)

\[ 26\text{Nm (2.6m•kgf, 18.8ft•lbf)} \]
- brake hose holder 1

\[ 7\text{Nm (0.7m•kgf, 5.1ft•lbf)} \]

**WARNING**
Proper brake hose routing is essential to insure safe scooter operation. Refer to “CABLE ROUTING” in chapter 2.

6. Remove:
- brake caliper

7. Install:
- spring seat
- spring
- brake pads
- brake pad springs
- brake caliper retaining bolt

\[ 13\text{Nm (1.3m•kgf, 9.4ft•lbf)} \]
- circlip
- brake caliper

\[ 49\text{Nm (4.9m•kgf, 35.4ft•lbf)} \]

Refer to “REPLACING THE BRAKE PADS”.

---

![Diagram](image-url)
8. Fill:
   - brake fluid reservoir
     (with the specified amount of the recommended brake fluid)

Recommended brake fluid
DOT 4

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

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

9. Bleed:
   - brake system
     Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM” in chapter 3.

10. Check:
    - brake fluid level
      Below the level mark ③ → Add the recommended brake fluid to the proper level. Refer to “CHECKING THE BRAKE FLUID LEVEL” in chapter 3.
11. Check:
   • brake lever operation
     Soft or spongy feeling → Bleed the brake system.
     Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM” in chapter 3.
## Removing 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>Leg shield 1</td>
<td>1</td>
<td>Remove the parts in the order listed. The following procedure applies to both of the front fork legs. Refer to “COVER AND PANEL” in chapter 3.</td>
</tr>
<tr>
<td>2</td>
<td>Front wheel</td>
<td>1</td>
<td>Refer to “FRONT WHEEL AND BRAKE DISC”.</td>
</tr>
<tr>
<td>3</td>
<td>Brake hose holder 1</td>
<td>1</td>
<td>Refer to “FRONT BRAKE”.</td>
</tr>
<tr>
<td>4</td>
<td>Brake caliper</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Front fender</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Lower bracket pinch bolt</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Stopper ring</td>
<td>1</td>
<td>Loosen. Refer to “REMOVING THE FRONT FORK LEGS” and “INSTALLING THE FRONT FORK LEGS”. For installation, reverse the removal procedure.</td>
</tr>
<tr>
<td>8</td>
<td>Front fork leg</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>
Disassembling the front fork legs

Remove the parts in the order listed. The following procedure applies to both of the front fork legs.

**Order** | **Job/Part** | **Q'ty** | **Remarks**
--- | --- | --- | ---
1 | Clamp/boot | 1/1 | Refer to “DISASSEMBLING THE FRONT FORK LEGS” and “ASSEMBLING THE FRONT FORK LEGS”.
2 | Cap | 1 |
3 | Stopper ring | 1 |
4 | Collar/O-ring | 1/1 |
5 | Fork spring | 1 |
6 | Damper rod bolt/copper washer | 1/1 |
7 | Damper rod | 1 |
8 | Rebound spring | 1 |
9 | Inner tube | 1 |
10 | Oil seal clip | 1 |
11 | Oil seal | 1 |
12 | Outer tube | 1 |

*20Nm (2.0 m•kgf, 14.5 ft•lbf)*
### FRONT FORK

For assembly, reverse the disassembly procedure.

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q’ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>20Nm (2.0 m·kgf, 14.5 ft·lbf)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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.

**TIP**

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

2. Remove:
   - leg shield 1
     Refer to “COVER AND PANEL” in chapter 3.
   - brake hose holder 1
   - brake caliper
     Refer to “FRONT BRAKE”.
   - front wheel
     Refer to “FRONT WHEEL AND BRAKE DISC”.

3. Loosen:
   - lower bracket pinch bolt

4. Remove:
   - stopper ring

**WARNING**

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

5. Remove:
   - front fork leg
DISASSEMBLING THE FRONT FORK LEGS
The following procedure applies to both of the front fork legs.

1. Remove:
   • clamp/boot

2. Remove:
   • cap
   • stopper ring
   • collar/O-ring
   • fork spring

   NOTICE
   The collar/O-ring and fork spring jump out after removing stopper ring.

3. Drain:
   • fork oil

   TIP
   Stroke the outer tube several times while draining the fork oil.

4. Remove:
   • damper rod assembly bolt
   • copper washer

   TIP
   While holding the damper rod with the damper rod holder and T-handle, loosen the damper rod assembly bolt.
5. Remove:
   - damper rod ①
   - rebound spring
   - inner tube ②

6. Remove:
   - oil seal clip ① (with a flat-head screwdriver)

   **NOTICE**
   Do not scratch the inner tube.

7. Remove:
   - oil seal ①

   **NOTICE**
   Never reuse the oil seal.

   - Rag ②
CHECKING THE FRONT FORK LEGS
The following procedure applies to both of the front fork legs.

1. Check:
   - inner tube ①
   - outer tube ②
   Bends/damage/scratches → Replace.

**WARNING**
Do not attempt to straighten a bent inner tube as this may dangerously weaken it.

2. Measure:
   - spring free length ③
   Out of specification → Replace.

   **Spring free length**
   252.1mm (9.93in)
   <Limit>: 247mm (9.72in)

3. Check:
   - damper rod ①
   Damage/wear → Replace.
   Obstruction → Blow out all of the oil passages with compressed air.

4. Check:
   - collar ①
   - O-ring ②
   Damage/wear → Replace.
ASSEMBLING THE FRONT FORK LEGS
The following procedure applies to both of the front fork legs.

**WARNING**
- Make sure the oil levels in both front fork legs are equal.
- Uneven oil levels can result in poor handling and a loss of stability.

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

1. Install:
   - damper rod assembly ①
   - rebound spring ②

**NOTICE**
Allow the damper rod assembly to slide slowly down the inner tube ③ until it protrudes from the bottom of the inner tube. Be careful not to damage the inner tube.

2. Lubricate:
   - inner tube's outer surface

   **Recommended lubricant**
   Fork oil 10W or equivalent

3. Tighten:
   - copper washer New
   - damper rod assembly bolt ①

   **20Nm (2.0m • kgf, 14.5ft • lbf)**
   LOCTITE ®
While holding the damper rod assembly with the damper rod holder ② and T-handle ③, tighten the damper rod assembly bolt.

Damper rod holder
90890-01294 (YM-01300-1)
T-handle
90890-01326 (YM-01326)

4. Install:
- oil seal ① New
  (with the fork seal driver weight ② and adapter ③)

Fork seal driver weight
90890-01367 (YM-A9409-7)
Adapter
90890-01368 (YM-A9409-4)

NOTICE
Make sure the numbered side of the oil seal faces up.

TIP
- Before installing the oil seal, lubricate its lips with lithium soap base grease.
- Lubricate the outer surface of the inner tube with fork oil.
- Before installing the oil seal, cover the top of the front fork leg with a plastic bag ④ to protect the oil seal during installation.
5. Install:
- oil seal clip ①

**TIP**
Adjust the oil seal clip so that it fits into the outer tube's groove.

6. Fill:
- front fork leg (with the specified amount of the recommended fork oil)

<table>
<thead>
<tr>
<th>Quantity (each front fork leg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.104L (0.11 US qt, 0.09 Imp. qt)</td>
</tr>
</tbody>
</table>

**Recommended oil**
Fork oil 10W or equivalent

**TIP**
- While filling the front fork leg, keep it upright.
- After filling, slowly pump the front fork leg up and down to distribute the fork oil.

7. Install:
- fork spring ①
- collar
- O-ring New
- stopper ring
- cap
INSTALLING THE FRONT FORK LEGS

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

1. Install:
   - front fork leg
   - stopper ring ①

   **TIP**
   Pull up the inner tube until it stops, then install the stopper ring.

2. Tighten:
   - lower bracket pinch bolt ②

   \[ 26 \text{Nm (2.6m·kgf, 18.8ft·lbf)} \]

3. Install:
   - front wheel
     Refer to “FRONT WHEEL AND BRAKE DISC”.
   - brake caliper
   - brake hose holder 1
     Refer to “FRONT BRAKE”.
   - leg shield 1
     Refer to “COVER AND PANEL” in chapter 3.
## Handlebar

### Removing the Handlebar

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Rear view mirror (left and right)</td>
<td>1/1</td>
<td>Remove the parts in the order listed. Refer to &quot;COVER AND PANEL&quot; in chapter 3. Disconnect. Refer to &quot;FRONT BRAKE&quot;.</td>
</tr>
<tr>
<td>2</td>
<td>Brush guard (left and right)</td>
<td>1/1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Band</td>
<td>2</td>
<td>Cut.</td>
</tr>
<tr>
<td>4</td>
<td>Front turn signal light (right)</td>
<td>1</td>
<td>Disconnect. Refer to &quot;REMOVING THE HANDLEBAR&quot; and &quot;INSTALLING THE HANDLEBAR&quot;.</td>
</tr>
<tr>
<td>5</td>
<td>Right handlebar switch</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Throttle cable assembly</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Throttle grip assembly</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Handlebar grip</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Brake light switch (rear)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Front turn signal light (left)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Rear brake cable</td>
<td>1</td>
<td>Disconnect.</td>
</tr>
<tr>
<td>12</td>
<td>Left lever holder</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

- **5Nm (0.5 m·kgf, 3.6 ft·lbf)**
- **28Nm (2.8 m·kgf, 20.3 ft·lbf)**
For installation, reverse the removal procedure.
REMOVING 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. Remove:
   - leg shield 1
   - leg shield 2
     Refer to “COVER AND PANEL” in chapter 3.
   - rear view mirror (left and right)
   - brush guard (left and right)
   - band

3. Disconnect:
   - brake master cylinder
     Refer to “FRONT BRAKE”.

4. Remove:
   - front turn signal light (right)
   - right handlebar switch ①
   - throttle cable assembly ②
   - throttle grip assembly ③

**TIP**

While removing the right handlebar switch, pull back the rubber cover.

5. Remove:
   - rear brake cable
   - brake light switch (rear)
   - front turn signal light (left)
   - left lever holder
   - handlebar grip ①
   - upper handlebar holder
   - handlebar

**TIP**

Blow compressed air between the handlebar and the handlebar grip, and gradually push the grip off the handlebar.
CHECKING THE HANDLEBAR

1. 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 ①
   - upper handlebar holders ②

\[ 28 \text{Nm}(2.8 \text{m} \cdot \text{kgf}, 20.3 \text{ft} \cdot \text{lbf}) \]

NOTICE
First, tighten the bolts on the front side of the handlebar holders, and then on the rear side.

TIP
- The upper handlebar holders should be installed with the arrow marks ⑤ facing forward [A].
- Align the match marks ⑥ on the handlebar with the upper surface of the handlebar lower holder.

3. Install:
   - left lever holder ①

TIP
Align the projection ⑤ on the left handlebar switch with the hole ⑥ in the handlebar.

4. Install:
   - handlebar grip

TIP
Before installing the handlebar grip, apply the bond.
5. Install:
- throttle grip assembly
- throttle cable assembly
- right handlebar switch

**TIP**
- Lubricate the inside of the throttle grip assembly with a thin coat of lithium-soap-based grease and install it onto the handlebar.
- Align the projection on the right handlebar switch with the hole in the handlebar.

**WARNING**
Make sure the throttle grip operates smoothly.

6. Install:
- brake master cylinder
  Refer to “FRONT BRAKE”.
7. Install:
- band
- brush guard (left and right)
- rear view mirror (left and right)
8. Install:
- leg shield 2
- leg shield 1
  Refer to “COVER AND PANEL” in chapter 3.
9. Adjust:
- throttle cable free play
  Refer to “ADJUSTING THE THROTTLE CABLE FREE PLAY” in chapter 3.

**Throttle cable free play (at the flange of the throttle grip)**
3 ~5mm (0.12 ~ 0.20in)
Removing the handlebar bracket and front bracket

<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>Handlebar</td>
<td>1</td>
<td>Remove the parts in the order listed. Refer to “HANDLEBAR”.</td>
</tr>
<tr>
<td>2</td>
<td>Handlebar cover</td>
<td>1</td>
<td>Disconnect.</td>
</tr>
<tr>
<td>3</td>
<td>Lower handlebar holder</td>
<td>1</td>
<td>Disconnect.</td>
</tr>
<tr>
<td>4</td>
<td>Speedometer cable</td>
<td>1</td>
<td>Disconnect.</td>
</tr>
<tr>
<td>5</td>
<td>Speedometer</td>
<td>1</td>
<td>Disconnect.</td>
</tr>
<tr>
<td>6</td>
<td>Turn signal relay</td>
<td>1</td>
<td>Disconnect.</td>
</tr>
<tr>
<td>7</td>
<td>Rectifier/regulator</td>
<td>1</td>
<td>Disconnect.</td>
</tr>
<tr>
<td>8</td>
<td>ECU</td>
<td>1</td>
<td>Disconnect.</td>
</tr>
<tr>
<td>9</td>
<td>Horn</td>
<td>1</td>
<td>Disconnect.</td>
</tr>
<tr>
<td>10</td>
<td>Headlight relay</td>
<td>1</td>
<td>Disconnect.</td>
</tr>
<tr>
<td>11</td>
<td>Starting circuit cut-off relay</td>
<td>1</td>
<td>Disconnect.</td>
</tr>
<tr>
<td>12</td>
<td>Front bracket</td>
<td>1</td>
<td>Cut.</td>
</tr>
<tr>
<td>13</td>
<td>Band</td>
<td>1</td>
<td>For installation, reverse the removal procedure.</td>
</tr>
<tr>
<td></td>
<td>Handlebar bracket</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>
**LOWER BRACKET**

### Removing the lower bracket

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1</strong></td>
<td>Brake hose holder 2</td>
<td>1</td>
<td>Remove the parts in the order listed. Refer to “COVER AND PANEL” in chapter 3. Refer to “REMOVING THE LOWER BRACKET” and “INSTALLING THE STEERING HEAD”.</td>
</tr>
<tr>
<td><strong>2</strong></td>
<td>Upper ring nut</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td><strong>3</strong></td>
<td>Lock washer</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td><strong>4</strong></td>
<td>Center ring nut</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td><strong>5</strong></td>
<td>Rubber washer</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td><strong>6</strong></td>
<td>Lower ring nut</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td><strong>7</strong></td>
<td>Bearing race cover</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td><strong>8</strong></td>
<td>Upper bearing inner race</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td><strong>9</strong></td>
<td>Lower bracket</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td><strong>10</strong></td>
<td>Upper bearing</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

**Torque Specifications**

- 7Nm (0.7 m·kgf, 5.1 ft·lbf)
- 75Nm (7.5 m·kgf, 54.2 ft·lbf)
- 1st 38Nm (3.8 m·kgf, 27.5 ft·lbf)
- 2nd 14Nm (1.4 m·kgf, 10.1 ft·lbf)

Refer to “FRONT WHEEL AND BRAKE DISC”.
Refer to “FRONT BRAKE”.
Refer to “FRONT FORK”.
Refer to “HANDLEBAR”. Refer to “HANDLEBAR BRACKET AND FRONT BRACKET”.

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>Lower bearing</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Upper bearing outer race</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Lower bearing outer race</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Lower bearing inner race</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Dust seal</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

For installation, reverse the removal procedure.
1. Stand the scooter on a level surface.

**WARNING**

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

2. Remove:
   - brake hose holder ②
   - handlebar bracket ①

**TIP**

Remove the handlebar bracket by loosening the ring nut ② gradually.

3. Remove:
   - upper ring nut ① (with the ring nut wrench ②)
   - lock washer
   - center ring nut
   - rubber washer

**Ring nut wrench**

90890-01268 (YU-01268)

4. Remove:
   - lower ring nut ① (with the ring nut wrench ②)

**Ring nut wrench**

90890-01268 (YU-01268)

**WARNING**

Securely support the lower bracket so that there is no danger of it falling.
CHECKING THE STEERING HEAD

1. Wash:
   - bearings
   - bearing races

   Recommended cleaning solvent
   Kerosene

2. Check:
   - bearings ①
   - bearing races ②
     Damage/pitting → Replace.

3. Replace:
   - bearings
   - bearing races
   - dust seal

   ▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼
   a. Remove the bearing races from the steering head pipe with a long rod ① and hammer.
   b. Remove the bearing race from the lower bracket with a floor chisel ② and hammer.
   c. Install a new dust seal, bearings and bearing races.

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

   TIP
   - Always replace the bearings and bearing races as a set.
   - Whenever the steering head is disassembled, replace the dust seal.

   ▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼

4. Check:
   - handlebar bracket
   - lower bracket
     (along with the steering stem)
     Bends/cracks/damage → Replace.
INSTALLING THE STEERING HEAD

1. Lubricate:
   • bearings ①
   • bearing races

   **Recommended lubricant**
   Lithium-soap-based grease

2. Install:
   • lower ring nut ①
   • rubber washer ②
   • center ring nut ③
   • lock washer ④
   • upper ring nut ⑤
   Refer to “CHECKING THE STEERING HEAD” in chapter 3.

3. Install:
   • handlebar bracket ①

   **60Nm (6.0m • kgf, 43.4 ft • lbf)**

   **TIP**
   Align the handlebar bracket across rod ② on the lower bracket concave ③.

4. Tighten:
   • brake hose holder 2

   **7Nm (0.7m • kgf, 5.1 ft • lbf)**

   • lower handlebar holder

   **48Nm (4.8m • kgf, 34.7 ft • lbf)**
### Removing the Rear Shock Absorber Assemblies and Swingarm

<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>O₂ sensor coupler</td>
<td>1</td>
<td>Remove the parts in the order listed.</td>
</tr>
<tr>
<td>2</td>
<td>Muffler/gasket</td>
<td>1/1</td>
<td>Disconnect.</td>
</tr>
<tr>
<td>3</td>
<td>O₂ sensor</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Rear shock absorber assembly (left and right)</td>
<td>1/1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Rear wheel axle nut</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Spacer</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Oil seal</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Swingarm</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>Collar</td>
<td>1</td>
<td>For installation, reverse the removal procedure.</td>
</tr>
</tbody>
</table>
REAR SHOCK ABSORBERS AND SWINGARM

CHAS

1. Stand the scooter on a level surface.

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

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

2. Remove:
- rear shock absorber assemblies

---

CHECKING THE REAR SHOCK ABSORBER ASSEMBLY

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

1. Check:
   - rear shock absorber rod
     Bends/damage → Replace the rear shock absorber assembly.
   - rear shock absorber
     Oil leaks → Replace the rear shock absorber assembly.
   - spring
     Damage/wear → Replace the rear shock absorber assembly.
   - bushings
     Damage/wear → Replace.
   - dust seals
     Damage/wear → Replace.
   - bolts
     Bends/damage/wear → Replace.
INSTALLING THE REAR SHOCK ABSORBER ASSEMBLIES

1. Install:
   - rear shock absorber assembly upper nuts (1)
     - 30Nm (3.0m•kgf, 21.7ft•lbf)
   - rear shock absorber assembly lower bolts (2)
     - 18Nm (1.8m•kgf, 13.0ft•lbf)

REMOVING THE SWINGARM

1. Stand the scooter on a level surface.

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

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

2. Disconnect:
   - O₂ sensor coupler
3. Remove:
   - muffler
4. Remove:
   - rear wheel axle nut (1)
   - rear shock absorber assembly lower bolt (right) (2)
5. Remove:
   - swingarm
CHECKING THE SWINGARM
1. Check:
   - swingarm
     Bends/cracks/damage → Replace.
2. Check:
   - spacer
   - collar
   - oil seals
   - bearing
     Damage/wear → Replace.

INSTALLING THE SWINGARM
1. Lubricate:
   - bearing
   - oil seal lips
   - rear wheel axle splines

   **Recommended lubricant**
   *Lithium-soap-based grease*

2. Install:
   - swingarm
     **31Nm (3.1m • kgf, 22.4ft • lbf)**
   - rear wheel axle nut
     **105Nm (10.5m • kgf, 75.9ft • lbf)**
   - rear shock absorber assembly lower bolt (right)
     **18Nm (1.8m • kgf, 13.0ft • lbf)**

3. Install:
   - muffler
4. Tighten:
   • exhaust pipe nut

   \[13\text{Nm (1.3m \cdot \text{kgf, 9.4ft \cdot lbf})}\]

   • muffler and swingarm bolt

   \[31\text{Nm (3.1m \cdot \text{kgf, 22.4ft \cdot lbf})}\]

   • muffler and swingarm bolt

   \[53\text{Nm (5.3m \cdot \text{kgf, 38.3ft \cdot lbf})}\]

5. Connect:
   • O₂ sensor coupler
CHAPTER 5
ENGINE

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**ENGINE REMOVAL LEADS AND HOSES**

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<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Removing the leads and hoses</td>
<td></td>
<td>Remove the parts in the order listed.</td>
</tr>
<tr>
<td></td>
<td>Seat/trunk</td>
<td></td>
<td>Refer to “COVER AND PANEL” in chapter 3.</td>
</tr>
<tr>
<td></td>
<td>Battery box cover/front cover</td>
<td></td>
<td>Refer to “REAR WHEEL AND REAR BRAKE” in chapter 4.</td>
</tr>
<tr>
<td></td>
<td>Side cover (left and right)</td>
<td></td>
<td>Refer to “REAR SHOCK ABSORBER ASSEMBLIES AND SWINGARM” in chapter 4.</td>
</tr>
<tr>
<td></td>
<td>Battery/footrest board</td>
<td></td>
<td>Refer to “BELT DRIVE”.</td>
</tr>
<tr>
<td></td>
<td>Rear brake cable/adjuster/spring/pin</td>
<td></td>
<td>Refer to “STARTER CLUTCH AND AC MAGNETO”.</td>
</tr>
<tr>
<td></td>
<td>Oxygen sensor coupler</td>
<td></td>
<td>Refer to “THROTTLE BODY AND FUEL INJECTOR “ in chapter 6.</td>
</tr>
<tr>
<td></td>
<td>Muffler</td>
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<td></td>
<td>Air duct</td>
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<td></td>
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<tr>
<td></td>
<td>Crankshaft position sensor/stator coil</td>
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<td></td>
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<tr>
<td></td>
<td>Assembly coupler</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Throttle body and fuel injector</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Starter motor</td>
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</tr>
</tbody>
</table>

- 3Nm (0.3 m•kgf, 2.2 ft•lbf)
- 7Nm (0.7 m•kgf, 5.1 ft•lbf)
### ENGINE REMOVAL

#### Remarks
- **Order Job/Part**
  - **1** Rear brake cable holder
  - **2** Spark plug cap
  - **3** Engine temperature sensor coupler
  - **4** Air filter/breather hose

<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>Rear brake cable holder</td>
<td>1</td>
<td>TEM” in chapter 7.</td>
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<tr>
<td>2</td>
<td>Spark plug cap</td>
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<td>Disconnect.</td>
</tr>
<tr>
<td>3</td>
<td>Engine temperature sensor coupler</td>
<td>1</td>
<td>Disconnect.</td>
</tr>
<tr>
<td>4</td>
<td>Air filter/breather hose</td>
<td>1/1</td>
<td>For installation, reverse the removal procedure.</td>
</tr>
</tbody>
</table>

---

**Torque Specifications**
- 3Nm (0.3 m·kgf, 2.2 ft·lbf)
- 7Nm (0.7 m·kgf, 5.1 ft·lbf)

---

**ENGINE REMOVAL**

**ENG**
### Removing the Engine

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Rear fender</td>
<td>1</td>
<td>Remove the parts in the order listed.</td>
</tr>
<tr>
<td>2</td>
<td>Rear shock absorber assembly lower bolt</td>
<td>2</td>
<td><strong>TIP</strong> Place a suitable stand under the frame and engine.</td>
</tr>
<tr>
<td>3</td>
<td>Engine mounting nut/washer</td>
<td>1/1</td>
<td>Refer to “INSTALLING THE ENGINE”.</td>
</tr>
<tr>
<td>4</td>
<td>Engine mounting bolt</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Engine</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Washer</td>
<td>1</td>
<td>For installation, reverse the removal pro-</td>
</tr>
<tr>
<td>7</td>
<td>Collar</td>
<td>2</td>
<td>cedure.</td>
</tr>
</tbody>
</table>

**TIP**: Place a suitable stand under the frame and engine. For installation, reverse the removal procedure.
INSTALLING THE ENGINE

1. Install:
   - engine ①
   - engine mounting bolt ②
   - engine mounting nut ③

   **TIP**
   - Apply lithium-soap-based grease to the unthreaded portion of the engine mounting bolt shaft.
   - Do not fully tighten the engine mounting bolt.

2. Install:
   - rear shock absorber assembly lower bolts ①

   **TIP**
   Do not fully tighten the bolts.

3. Tighten:
   - engine mounting bolt
     - 32Nm (3.2m • kgf, 23.1ft • lbf)
   - rear shock absorber assembly lower bolts
     - 18Nm (1.8m • kgf, 13.0ft • lbf)
Removing the cylinder head
Air guide
Air shroud cylinder 3
V-belt case
Muffler

1 Engine temperature sensor 1
2 Intake manifold/O-ring 1/1
3 Joint/O-ring 1/1
4 Spark plug 1
5 Breather/O-ring 1/1
6 Valve cover (intake)/O-ring 1/1
7 Valve cover (exhaust)/O-ring 1/1
8 Air shroud cylinder 2

Remarks
Remove the parts in the order listed.
Refer to “STARTER CLUTCH AND AC MAGNETO”.
Refer to “BELT DRIVE”.
Refer to “REAR SHOCK ABSORBER ASSEMBLIES AND SWINGARM” in chapter 4.
Refer to “REMOVING THE CYLINDER HEAD” and “INSTALLING THE CYLINDER HEAD”.

Order | Job/Part | Q’ty | Remarks
--- | --- | --- | ---
1 | Engine temperature sensor | 1 | Remove the parts in the order listed.
2 | Intake manifold/O-ring | 1/1 | Refer to “STARTER CLUTCH AND AC MAGNETO”.
3 | Joint/O-ring | 1/1 | Refer to “BELT DRIVE”.
4 | Spark plug | 1 | Refer to “REAR SHOCK ABSORBER ASSEMBLIES AND SWINGARM” in chapter 4.
5 | Breather/O-ring | 1/1 | Refer to “REMOVING THE CYLINDER HEAD” and “INSTALLING THE CYLINDER HEAD”.
6 | Valve cover (intake)/O-ring | 1/1 | 
7 | Valve cover (exhaust)/O-ring | 1/1 | 
8 | Air shroud cylinder 2 | 1 |
For installation, reverse the removal procedure.
REMOVING THE CYLINDER HEAD

1. Remove:
   - air guide
   - air shroud cylinder 3
     Refer to “STARTER CLUTCH AND AC MAGNETO”.
   - V-belt case
     Refer to “BELT DRIVE”.
   - muffler
     Refer to “REAR SHOCK ABSORBER ASSEMBLIES AND SWINGARM” in chapter 4.

2. Remove:
   - breather/O-ring
   - valve cover (intake)/O-ring
   - valve cover (exhaust)/O-ring

3. Align:
   - “I” mark ① on the AC magneto rotor
     (with the stationary pointer ② on the crankcase)

4. Remove:
   - air shroud cylinder 2
   - air shroud cylinder 1

5. Loosen:
   - timing chain tensioner cap bolt
   - camshaft sprocket bolt ①
     While holding the primary fixed sheave with a rotor holding tool ②, remove the camshaft sprocket bolt.
6. Remove:
- timing chain tensioner (along with the gasket)
- camshaft sprocket bolt
- camshaft sprocket plate
- camshaft sprocket
- timing chain

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

7. Remove:
- cylinder head

**TIP**
- 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)

TIP
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
Less than 0.05mm (0.002in)

▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲

a. Place a straightedge ① and a thickness gauge ② 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.

TIP
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
     - 22 Nm (2.2 m • kgf, 15.9 ft • lbf)
   - cylinder head bolts
     - 12 Nm (1.2 m • kgf, 8.7 ft • lbf)

TIP
- Lubricate the cylinder head nuts with engine oil.
- Tighten the cylinder head nuts and bolts 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 fixed sheave counterclockwise.
    b. Align the “I” mark ③ on the AC magneto rotor with the stationary pointer ④ on the crankcase.
    c. Align the “I” mark ⑤ on the camshaft sprocket with the stationary pointer ⑥ on the cylinder head.
    d. Install the timing chain onto the camshaft sprocket, and then install the camshaft sprocket onto the camshaft.
TIP
- 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.

NOTICE
Do not turn the crankshaft when installing the camshaft to avoid damage or improper valve timing.

e. Remove the wire from the timing chain.

5. Install
   - camshaft sprocket plate ①
   - camshaft sprocket bolt ②

TIP
While holding the camshaft and install the camshaft sprocket plate, temporarily tighten the camshaft sprocket bolt.

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

a. Remove the cap bolt ① and spring ②.
b. Release the timing chain tensioner one-way cam ③ and push the timing chain tensioner rod ④ all the way into the timing chain tensioner housing.
c. Install the timing chain tensioner and gasket ⑤ onto the cylinder.

d. Install the spring ② and cap bolt ①.

Timing chain tensioner bolt
9 Nm (0.9 m • kgf, 6.5 ft • lbf)
7. Turn:
- crankshaft
  (several turns counterclockwise)

8. Check:
- "I" mark
  Align the "I" mark on the AC magneto rotor with the stationary pointer on the crankcase.
- "I" mark
  Align the "I" mark on the camshaft sprocket with the stationary pointer on the cylinder head.
  Out of alignment → Correct.
  Refer to the installation steps above.

9. Tighten:
- camshaft sprocket bolt

\[8 \text{Nm (0.8 m·kgf, 5.8 ft·lbf)}\]

**NOTICE**

Be sure to tighten the camshaft sprocket bolt 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.
### Removing the rocker arms and camshaft

Cylinder head
- Stopper plate
- Locknut
- Adjusting screw
- Rocker arm shaft (intake)
- Rocker arm (intake)
- Rocker arm shaft (exhaust)
- Rocker arm (exhaust)
- Camshaft

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q’ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Cylinder head</td>
<td>1</td>
<td>Remove the parts in the order listed. Refer to “CYLINDER HEAD”.</td>
</tr>
<tr>
<td>2</td>
<td>Stopper plate</td>
<td>1</td>
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</tr>
<tr>
<td>3</td>
<td>Locknut</td>
<td>4</td>
<td>Refer to “REMOVING THE ROCKER ARMS AND CAMSHAFT” and “INSTALLING THE CAMSHAFT AND ROCKER ARMS”.</td>
</tr>
<tr>
<td>4</td>
<td>Adjusting screw</td>
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</tr>
<tr>
<td>5</td>
<td>Rocker arm shaft (intake)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Rocker arm (intake)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Rocker arm shaft (exhaust)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Rocker arm (exhaust)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Camshaft</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

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

1. Remove:
   - locknut ①
   - stopper plate ②

2. Remove:
   - intake rocker arm shaft
   - exhaust rocker arm shaft
   - intake rocker arm
   - exhaust rocker arm
   
   **TIP**
   Remove the rocker arm shafts with the slide hammer bolt ① and weight ②.

   **Slide hammer bolt**
   90890-01085 (YU-01083-2)
   **Weight**
   90890-01084 (YU-01083-3)

3. Remove:
   - camshaft ①

   **TIP**
   Slide hammer bolt ② into the threaded end of the camshaft and then pull out the camshaft.

   **Slide hammer bolt**
   90890-01085 (YU-01083-2)
   **Weight**
   90890-01084 (YU-01083-3)
CHECKING THE CAMSHAFT

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

2. Measure:
   • camshaft lobe dimensions a and b
     Out of specification → Replace the camshaft.

   Camshaft lobe dimension limit
   Intake
   a 25.267 ~ 25.367mm (0.995 ~ 0.999in)
     <Limit>: 25.167mm (0.991in)
   b 21.069 ~ 21.169mm (0.829 ~ 0.833in)
     <Limit>: 20.969mm (0.826in)
   Exhaust
   a 25.275 ~ 25.375mm (0.995 ~ 0.999in)
     <Limit>: 25.175mm (0.991in)
   b 21.069 ~ 21.169mm (0.829 ~ 0.833in)
     <Limit>: 20.969mm (0.826in)

3. Check:
   • camshaft oil passage
     Obstruction → Blow out with compressed air.
THE ROCKER ARMS AND CAMSHAFT

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 \(a\)
     Out of specification → Replace.

   ![Image of measuring rocker arm inside diameter]

   **Rocker arm inside diameter**
   10.000 ~ 10.015mm (0.3937 ~ 0.3943in)

5. Measure:
   - rocker arm shaft outside diameter \(a\)
     Out of specification → Replace.

   ![Image of measuring rocker arm shaft outside diameter]

   **Rocker arm shaft outside diameter**
   9.981 ~ 9.991mm (0.3930 ~ 0.3933in)

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

   **TIP**
   Calculate the clearance by subtracting the rocker arm shaft outside diameter from the rocker arm inside diameter.
Above 0.034mm (0.0013in) → Replace the defective part(s).

**Rocker-arm-to-rocker-arm-shaft clearance**

0.009 ~ 0.034mm (0.0004 ~ 0.0013in)

---

**CHECKING THE TIMING CHAIN, CAMSHAFT SPROCKET AND TIMING CHAIN GUIDES**

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

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

2. **Check:**
   - camshaft sprocket
     More than 1/4 tooth wear → Replace the camshaft sprocket and the timing chain as a set.
     ① Timing chain roller
     ② Camshaft sprocket

3. **Check:**
   - timing chain guide (exhaust side)
   - timing chain guide (intake side)
     Damage/wear → Replace the defective part(s).
CHECKING THE TIMING CHAIN TENSIONER

1. Check:
   - timing chain tensioner
     Cracks/damage → Replace.

2. Check:
   - one-way cam operation
     Rough movement → Replace the timing chain tensioner.

3. Check:
   - cap bolt
   - O-ring New
   - spring
   - one-way cam
   - gasket New
   - timing chain tensioner rod
     Damage/wear → Replace the defective part(s).

a. Removing the spring and cap bolt.
b. Return cam chain tensioner one way cam.
   Press tensioner rod to the cam chain tensioner housing.
c. Installing the spring and cap bolt.
d. Loosen the front end of cam chain tensioner slowly.
e. Make sure to return to the front end of cam chain tensioner.
INSTALLING THE CAMSHAFT AND ROCKER ARMS

1. Lubricate:
   - camshaft

   **Recommended lubricant**
   - Camshaft engine oil
   - Camshaft bearing engine oil

2. Lubricate:
   - rocker arms
   - rocker arm shafts

   **Recommended lubricant**
   - Molybdenum disulfide oil

3. Install:
   - exhaust rocker arm
   - exhaust rocker arm shaft

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

4. Install:
   - intake rocker arm
   - intake rocker arm shaft

   **TIP**
   Make sure the intake rocker arm shaft is completely pushed into the cylinder head.

   **NOTICE**
   Make sure the threaded part of the rocker arm shaft faces out.
5. Install:
- stopper plate ①
- locknut ②

\[ 12 \text{Nm} \ (1.2 \text{m} \cdot \text{kgf}, \ 8.7 \text{ft} \cdot \text{lbf}) \]
Removing the valves and valve springs
Cylinder head
Rocker arms
Rocker arm shafts
Camshaft
Valve cotter
Valve spring retainer
Valve spring
Valve (intake)
Valve (exhaust)
Valve stem seal
Valve stem seat/valve guide
O-ring

Remove the parts in the order listed.
Refer to “CYLINDER HEAD”.
Refer to “REMOVING THE ROCKER ARMS AND CAMSHAFT” and “INSTALLING THE CAMSHAFT AND ROCKER ARMS”.
Refer to “REMOVING THE VALVES” and “INSTALLING THE VALVES”.

<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>Valve cotter</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Valve spring retainer</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Valve spring</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Valve (intake)</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Valve (exhaust)</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Valve stem seal</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Valve stem seat/valve guide</td>
<td>4</td>
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</tr>
<tr>
<td>8</td>
<td>O-ring</td>
<td>8</td>
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<td>Order</td>
<td>Job/Part</td>
<td>Q'ty</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>For installation, reverse the removal procedure.</td>
</tr>
</tbody>
</table>
REMOVING THE VALVES
The following procedure applies to all of the valves and related components.

TIP
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”.

2. Remove:
   ● valve cotters ①

TIP
Remove the valve cotters by compressing the valve spring with the valve spring compressor ② and the valve spring compressor attachment ③.

Valve spring compressor 90890-04019 (YM-04019)
Valve spring compressor attachment 90890-04108 (YM-04108)
3. Remove:
- valve spring retainer ①
- valve spring ②
- valve stem seal ③
- valve ④

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

---

**CHECKING THE VALVES AND VALVE GUIDES**
The following procedure applies to all of the valves and valve guides.

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

Valve-stem-to-valve-guide clearance =
Valve guide inside diameter ② -
Valve stem diameter ⑥

Out of specification → Replace the valve guide.

<table>
<thead>
<tr>
<th>Valve-stem-to-valve-guide clearance</th>
<th>Intake: 0.015 ~ 0.042mm (0.0006 ~ 0.0017in)</th>
<th>Limit: 0.08mm (0.0031in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exhaust: 0.030 ~ 0.057mm (0.0012 ~ 0.0022in)</td>
<td>Limit: 0.10mm (0.0039in)</td>
<td></td>
</tr>
</tbody>
</table>
2. Replace:
   • valve guide

**TIP**
To ease valve guide removal and installation, and to maintain the correct fit, heat the cylinder head to 100°C (212°F) in an oven.

▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼

a. Remove the valve guide with 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.

**TIP**
After replacing the valve guide, reface the valve seat.

- Valve guide remover (4.5mm)
  90890-04116 (YM-04116)
- Valve guide installer (4.5mm)
  90890-04117 (YM-04117)
- Valve guide reamer (4.5mm)
  90890-04118 (YM-04118)

▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲

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 \( \rightarrow \) Replace the valve.

   **Valve margin thickness (intake)**
   0.7mm (0.028in)

   **Valve margin thickness (exhaust)**
   1.0mm (0.039in)

6. Measure:
   • valve stem runout
     Out of specification \( \rightarrow \) Replace the valve.

**TIP**
- 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**
0.01mm (0.0004in)
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 ~ 1.1mm (0.035 ~ 0.043in)
   - Exhaust: 0.9 ~ 1.1mm (0.035 ~ 0.043in)
     \(<\text{Limit}>: 1.6\text{mm (0.063in)}\)

   a. Apply Mechanic’s blueing dye (Dykem) \( b \) 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.

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

4. Lap:
   • valve face
   • valve seat

   **TIP**
   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 a to the valve face.

**NOTICE**
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.

tip
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 (Dyken) b onto the valve face.
h. Install the valve into the cylinder head.
i. Press the valve through the valve guide and onto the valve seat to make a clear impression.
j. Measure the valve seat width again. If the valve seat width is out of specification, reface and lap the valve seat.
CHECKING THE VALVE SPRINGS

The following procedure applies to all of the valve springs.

1. Measure:
   • valve spring free length (a)
     Out of specification → Replace the valve spring.

   Valve spring free length
   41.88mm (1.649in)
   <Limit>: 39.786mm (1.566in)

2. Measure:
   • compressed valve spring force (a)
     Out of specification → Replace the valve spring.

   Compressed valve spring force (installed)
   137 ~ 157N/mm (13.97 ~ 16.01kgf/mm, 30.83 ~ 35.33lbf/in) at 30mm (1.18in)

3. Measure:
   • valve spring tilt (a)
     Out of specification → Replace the valve spring.

   Spring tilt limit
   2.5°/1.8mm (2.5°/0.07in)
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 ①
   • valve stem seal ②
     (with the recommended lubricant)

<table>
<thead>
<tr>
<th>Recommended lubricant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Molybdenum disulfide oil</td>
</tr>
</tbody>
</table>

3. Install:
   • valve ①
   • valve stem seal ② New
   • valve spring ③
   • valve spring retainer ④
     (into the cylinder head)

**TIP**
Install the valve spring with the larger pitch ① facing up.

③ Smaller pitch

4. Install:
   • valve cotters ①

**TIP**
Install the valve cotters by compressing the valve spring with the valve spring compressor ② and the valve spring compressor attachment ③.
5. To secure the valve cotters onto the valve stem, lightly tap the valve tip with a soft-face hammer.

NOTICE

Hitting the valve tip with excessive force could damage the valve.
### 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>Timing chain guide (exhaust side)</td>
<td>1</td>
<td>Remove the parts in the order listed. Refer to “CYLINDER HEAD”.</td>
</tr>
<tr>
<td>2</td>
<td>Cylinder</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Dowel pin</td>
<td>2</td>
<td>Refer to “REMOVING THE CYLINDER AND PISTON” and “INSTALLING THE PISTON AND CYLINDER”.</td>
</tr>
<tr>
<td>4</td>
<td>Cylinder gasket</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Piston pin clip</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Piston pin</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Piston</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Piston ring set</td>
<td>1</td>
<td>For installation, reverse the removal procedure.</td>
</tr>
</tbody>
</table>

Refer to “CYLINDER HEAD”, “REMOVING THE CYLINDER AND PISTON” and “INSTALLING THE PISTON AND CYLINDER”. For installation, reverse the removal procedure.
REMOVING THE CYLINDER AND PISTON

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

**NOTICE**
Do not use a hammer to drive the piston pin out.

**TIP**
- 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

**TIP**
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 → Rebore or replace the cylinder, and replace the piston and piston rings as a set.

2. Measure:
   - piston-to-cylinder clearance

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

<table>
<thead>
<tr>
<th>Cylinder bore “C”</th>
<th>52.40 ~ 52.41mm (2.0630 ~ 2.0634in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Taper limit “T”</td>
<td>0.05mm (0.002in)</td>
</tr>
<tr>
<td>Out-of-round “R”</td>
<td>0.05mm (0.002in)</td>
</tr>
</tbody>
</table>

“C” = maximum of D1 - D2
“T” = maximum of D1 or D2 - maximum of D5 or D6
“R” = maximum of D1, D3 or D5 - minimum of D2, D4 or D6

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

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

7mm (0.28in) from the bottom edge of the piston

<table>
<thead>
<tr>
<th>Standard</th>
<th>Piston size “P”</th>
</tr>
</thead>
<tbody>
<tr>
<td>52.375 ~ 52.390mm</td>
<td>52.375 ~ 52.390mm (2.0620 ~ 2.0626in)</td>
</tr>
</tbody>
</table>

d. If out of specification, replace the piston and piston rings as a set.
e. Calculate the piston-to-cylinder clearance with the following formula.

\[
Piston-to-cylinder
clearance = \\
Cylinder\ bore\ \text{"C"} - \\
Piston\ skirt\ diameter\ \text{"P"}
\]

\[\text{Piston-to-cylinder clearance} = \\
0.010 \sim 0.035\text{mm (0.0004} \sim 0.0014\text{in)}
\]

<Limit>: 0.15mm (0.0059in)

f. If out of specification, rebore or replace the cylinder, and replace the piston and piston rings as a set.

▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲

CYLINDER AND PISTON
CHECKING THE PISTON RINGS

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

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

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

   **TIP**
   Level the piston ring into the cylinder with the piston crown.

   - 20mm (0.79in)

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

   **TIP**
   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
     - 0.10 ~ 0.25mm (0.0039 ~ 0.0098in)
     - <Limit>: 0.50mm (0.0197in)
   - 2nd ring
     - 0.25 ~ 0.40mm (0.0098 ~ 0.0157in)
     - <Limit>: 0.75mm (0.0295in)
   - Oil ring
     - 0.20 ~ 0.70mm (0.0079 ~ 0.0276in)
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
   14.995 ~ 15.000mm (0.5904 ~ 0.5906in)
   <Limit>: 14.975mm (0.5896in)

3. Measure:
   • piston pin bore diameter
     Out of specification → Replace the piston.

   Piston pin bore diameter
   15.002 ~ 15.013mm (0.5904 ~ 0.5906in)
   <Limit>: 15.043mm (0.5922in)

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 =
   Piston pin bore diameter - Piston pin outside diameter

   Piston-pin-to-piston clearance
   0.002 ~ 0.018mm (0.00008 ~ 0.0007in)
CHECKING THE TIMING CHAIN GUIDE (EXHAUST SIDE)
1. Check:
   - timing chain guide (exhaust side)
     Damage/wear → Replace

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

TIP
Be sure to install the piston rings so that the manufacturer's marks or numbers \( a \) face up.

2. Install:
   - piston \( 1 \)
   - piston pin \( 2 \)
   - piston pin clip \( 3 \) \( \text{New} \)

TIP
- Apply engine oil the piston pin.
- Make sure the arrow mark \( a \) 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)

   **Recommended lubricant**
   Engine oil

5. Offset:
   - piston ring end gaps

   ```
   a  Top ring
   b  Lower oil ring rail
   c  Upper oil ring rail
   d  2nd ring
   A  Exhaust side
   ```

6. Install:
   - cylinder 1

**TIP**
- 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

**V-BELT CASE**

- **Removing the V-belt case**

<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>Air duct</td>
<td>1</td>
<td>Remove the parts in the order listed.</td>
</tr>
<tr>
<td>2</td>
<td>V-belt case cover</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>V-belt case filter guide</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>V-belt case filter element</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>O-ring</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Gasket (V-belt case)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Plate</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Gasket (plate)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>V-belt case</td>
<td>1</td>
<td>For installation, reverse the removal pro-</td>
</tr>
</tbody>
</table>

**Torque Specifications**

- 7Nm (0.7 m·kgf, 5.1 ft·lbf)
- 10Nm (1.0 m·kgf, 7.2 ft·lbf)
- 11Nm (1.1 m·kgf, 8.0 ft·lbf)
### Removing the V-belt and primary/secondary sheave

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>V-belt and primary/secondary sheave</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Primary fixed 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 “V-BELT CASE”.</td>
</tr>
<tr>
<td>3</td>
<td>Primary fixed sheave</td>
<td>1</td>
<td>Refer to “REMOVING THE PRIMARY SHEAVE” and “INSTALLING THE SECONDARY SHEAVE, V-BELT AND PRIMARY SHEAVE”.</td>
</tr>
<tr>
<td>4</td>
<td>Clutch housing</td>
<td>1</td>
<td>Refer to “REMOVING THE SECONDARY SHEAVE AND V-BELT” and “INSTALLING THE SECONDARY SHEAVE, V-BELT AND PRIMARY SHEAVE”.</td>
</tr>
<tr>
<td>5</td>
<td>Secondary sheave</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>V-belt</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Plate washer</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>Cam/slider</td>
<td>1/3</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Primary sheave weight</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Oil seal</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Primary sliding sheave</td>
<td>1</td>
<td>For installation, reverse the removal procedure.</td>
</tr>
</tbody>
</table>

**60Nm (6.0 m·kgf, 43.2 ft·lbf)**

**45Nm (4.5 m·kgf, 32.5 ft·lbf)**
**Disassembling the 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>Clutch carrier nut</td>
<td>1</td>
<td>Disassemble the parts in the order listed.</td>
</tr>
<tr>
<td>2</td>
<td>Clip</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Plate</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Clutch shoe spring</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Clutch shoe</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Damper</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Clutch carrier</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Compression spring</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Spring seat</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Guide pin</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Secondary sliding sheave</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>O-ring</td>
<td>2</td>
<td>For assembly, reverse the disassembly procedure.</td>
</tr>
<tr>
<td>13</td>
<td>Oil seal</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Secondary fixed sheave</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

**Note:**

- **90Nm (9.0 m·kgf, 7.2 ft·lbf)**
REMOVING THE PRIMARY SHEAVE

1. Remove:
   - V-belt case
   - Refer to “V-BELT CASE”.

2. Remove:
   - primary fixed sheave nut
   - plate washer
   - one way clutch
   - primary fixed sheave

**TIP**
While holding the primary fixed sheave with the rotor holding tool, loosen the primary fixed sheave nut.

<table>
<thead>
<tr>
<th>Rotor holding tool</th>
</tr>
</thead>
<tbody>
<tr>
<td>90890-01235 (YU-01235)</td>
</tr>
</tbody>
</table>

REMOVING THE SECONDARY SHEAVE AND V-BELT

1. Remove:
   - secondary sheave nut
   - clutch housing

**TIP**
While holding the clutch housing with the sheave holder, loosen the secondary sheave nut.

<table>
<thead>
<tr>
<th>Sheave holder</th>
</tr>
</thead>
<tbody>
<tr>
<td>90890-01701 (YS-01880-A)</td>
</tr>
</tbody>
</table>

2. Loosen:
   - clutch carrier nut

**NOTICE**
Do not remove the clutch carrier nut at this stage.
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 1
- V-belt 2

**TIP**
Remove the V-belt and secondary sheave from the primary sheave side.

**DISASSEMBLING THE SECONDARY SHEAVE**

1. Remove:
- clutch carrier nut 1

**TIP**
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.

**CHECKING THE CLUTCH SHOES**
The following procedure applies to all of the clutch shoes.

1. Check:
   - clutch shoe
     Damage/wear → Replace the clutch shoes and springs as a set.
     Glazed areas → Sand with coarse sandpaper.
TIP
After sanding the glazed areas, clean the clutch with a cloth.

2. Measure:
- clutch shoe thickness
Out of specification → Replace the clutch shoes and springs as a set.

<table>
<thead>
<tr>
<th>Clutch shoe thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.2 ~ 3.5mm (0.13 ~ 0.14in)</td>
</tr>
<tr>
<td>&lt;Limit&gt;: 2.0mm (0.079in)</td>
</tr>
</tbody>
</table>

TIP
- Inspect clutch shoes a.
- After removing the clutch shoe spring, do not use them again.
- Replace the all three as a set.

EAS00320
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 a
  Out of specification → Replace.

<table>
<thead>
<tr>
<th>V-belt width</th>
</tr>
</thead>
<tbody>
<tr>
<td>22mm (0.87in)</td>
</tr>
<tr>
<td>&lt;Limit&gt;: 19.8mm (0.78in)</td>
</tr>
</tbody>
</table>
CHECKING THE PRIMARY SHEAVE

1. Check:
   - primary sliding sheave ①
   - primary fixed sheave ②
   Cracks/damage/wear → Replace the primary sliding sheave, primary fixed sheave and V-belt.

2. Check:
   - free movement
   Stick or excessive play → Replace the primary sliding sheave, collar or both.

TIP
   Insert the collar ② into the primary sliding sheave ①, and check for free movement.

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 ③
     Out of specification → Replace.

Primary sheave weight outside diameter

20mm (0.79in)

<Limit>: 19.5mm (0.77in)
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

TIP
Use thinner to clean up grease, dirt on the primary sliding sheave cam side ⑤.

2. Install:
   • primary sheave weights ①
   • collar ②

3. Install:
   • sliders 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)

<table>
<thead>
<tr>
<th>Recommended lubricant</th>
</tr>
</thead>
<tbody>
<tr>
<td>BEL-RAY assembly lube®</td>
</tr>
</tbody>
</table>

2. Install:
   - secondary sliding sheave

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

<table>
<thead>
<tr>
<th>Oil seal guide</th>
</tr>
</thead>
<tbody>
<tr>
<td>90890-01384 (YM-33299)</td>
</tr>
</tbody>
</table>

3. Install:
   - guide pin

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

<table>
<thead>
<tr>
<th>Recommended lubricant</th>
</tr>
</thead>
<tbody>
<tr>
<td>BEL-RAY assembly lube®</td>
</tr>
</tbody>
</table>
5. Install:
- secondary sheave (1)
- spring
- clutch carrier (2)

**TIP**
Attach the clutch spring holder (3) and clutch spring holder arm (4) onto the secondary sheave as shown. Then, compress the spring, and tighten the clutch carrier nut (5).

![Image of clutch spring holder](image_url)

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

---

EAS0025

**INSTALLING THE SECONDARY SHEAVE, V-BELT AND PRIMARY SHEAVE**

1. Install:
- V-belt (1)
- secondary sheave (2)

**NOTICE**
Do not allow grease to contact the V-belt and secondary sheave.

**TIP**
- Install the V-belt onto the primary sheave side.
- Install the V-belt with printed arrow mark on the V-belt facing in the direction shown in the illustration.

2. Install:
- clutch carrier nut (1)

![Image of clutch carrier](image_url)

**TIP**
While holding the clutch carrier with the rotor holding tool (2), tighten the clutch carrier nut with the locknut wrench (3).
3. Install:
   - clutch housing ①
   - secondary sheave nut ②

   **TIP**
   Tighten the secondary sheave nut with the sheave holder ③.

4. Install:
   - primary fixed sheave ①
   - oneway clutch
   - plate washer
   - primary fixed sheave nut ②

   **TIP**
   While holding the primary fixed sheave with the rotor holding tool ③, tighten the primary fixed sheave nut.
5. Position:
   • V-belt ①

**TIP**
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.

6. Install:
   • V-belt case
     Refer to “V-BELT CASE”.
Removing the stator coil 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>Air guide</td>
<td>1</td>
<td>Remove the parts in the order listed.</td>
</tr>
<tr>
<td>2</td>
<td>Air shroud cylinder 3</td>
<td>1</td>
<td>Disconnect.</td>
</tr>
<tr>
<td>3</td>
<td>Pickup coil/stator coil assembly coupler</td>
<td>1/1</td>
<td>For installation, reverse the removal procedure.</td>
</tr>
<tr>
<td>4</td>
<td>Fan</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>AC magneto rotor</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Woodruff key</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Lock plate</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Pickup coil</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Stator coil assembly</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>
## 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>1</td>
<td>Idle gear plate</td>
<td>1</td>
<td>Remove the parts in the order listed.</td>
</tr>
<tr>
<td>2</td>
<td>Plate washer</td>
<td>1</td>
<td>Refer to “V-BELT CASE”.</td>
</tr>
<tr>
<td>3</td>
<td>Idle gear</td>
<td>1</td>
<td>Refer to “V-BELT AND PRIMARY/SECONDARY SHEAVE”.</td>
</tr>
<tr>
<td>4</td>
<td>Starter clutch</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Starter wheel gear holder</td>
<td>1</td>
<td>For installation, reverse the removal pro-</td>
</tr>
<tr>
<td>6</td>
<td>Starter wheel gear</td>
<td>1</td>
<td>cedure.</td>
</tr>
<tr>
<td>7</td>
<td>Roller</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>
REMOVING THE AC MAGNETO

1. Remove:
   - air guide
   - air shroud cylinder 3

2. Remove:
   - fan
   - AC magneto rotor nut
   - washer

TIP
While holding the AC magneto rotor with the rotor holding tool, loosen the AC magneto rotor nut.

3. Remove:
   - AC magneto rotor (with the flywheel puller)
   - woodruff key
   - stator coil assembly

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

TIP
Make sure the flywheel puller set is centered over the AC magneto rotor.

Rotor holding tool
90890-01235 (YU-01235)

Flywheel puller
90890-01189 (YM-01189)
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 wheel gear.

4. Check:
   - starter clutch operation

   ▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼
   a. Install the starter wheel gear ①onto the starter clutch ② 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 AC MAGNETO

1. Install:
   - stator coil assembly
   - crankshaft position sensor
   - woodruff key
   - AC magneto rotor
   - washer
   - AC magneto rotor nut

   **TIP**
   - 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
     
     | 70 Nm (7.0 m • kgf, 50.6 ft • lbf) |

   **TIP**
   While holding the AC magneto rotor with the rotor holding tool, tighten the AC magneto rotor nut.

   Rotor holding tool
   90890-01235 (YU-01235)

3. Install:
   - fan

   | 9N•m (0.9 m • kgf, 6.5 ft • lbf) |

4. Install:
   - air shroud cylinder
   - air guide
### Removing the oil pump

- AC magneto rotor
- Stator coil assembly
- Cover/O-ring
- Gasket
- Oil seal
- Dowel pin
- Circlip/plate washer
- Oil pump driven gear
- Dowel pin
- Oil pump
- Gasket

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'nty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Removing the oil pump</td>
<td>1/1</td>
<td>Remove the parts in the order listed. Refer to “STARTER CLUTCH AND AC MAGNETO”.</td>
</tr>
<tr>
<td>2</td>
<td>AC magneto rotor</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Stator coil assembly</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Cover/O-ring</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Gasket</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Oil seal</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Dowel pin</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Circlip/plate washer</td>
<td>1/1</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Oil pump driven gear</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Dowel pin</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Oil pump</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Gasket</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

For installation, reverse the removal procedure.
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
   - outer-rotor-to-oil-pump-housing clearance
   Out of specification → Replace the oil pump.

   ① Inner rotor
   ② Outer rotor
   ③ Oil pump housing

   Inner-rotor-to-outer-rotor-tip clearance
   0.15mm (0.006in) or less
   <Limit>: 0.23mm (0.009in)
   Outer-rotor-to-oil-pump-housing clearance
   0.07 ~ 0.12mm (0.003 ~ 0.005in)
   <Limit>: 0.19mm (0.008in)

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 (to the oil pump housing)
   - pin
   - inner rotor
   - outer rotor
   - oil pump housing cover
   - oil pump housing screw

**TIP**

When installing the inner rotor, align the pin in the oil pump shaft with the groove in the inner rotor.

---

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

---

INSTALLING THE OIL PUMP

1. Install:
   - gasket **New**
   - oil pump

| 4 Nm (0.4 m • kgf, 2.9 ft • lbf) |

**NOTICE**

After tightening the bolts, make sure the oil pump turns smoothly.

---

2. Install:
   - O-ring **New**
   - cover

<p>| 13 Nm (1.3 m • kgf, 9.4 ft • lbf) |</p>
<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 transmission</td>
<td></td>
<td>Remove the parts in the order listed.</td>
</tr>
<tr>
<td>2</td>
<td>Transmission oil</td>
<td></td>
<td>10Nm (1.0 m•kgf, 7.2 ft•lbf)</td>
</tr>
<tr>
<td>3</td>
<td>Muffler</td>
<td>1</td>
<td>Refer to “REAR SHOCK ABSORBER ASSEMBLIES AND SWINGARM” in chapter 4.</td>
</tr>
<tr>
<td>4</td>
<td>Swingarm</td>
<td>1</td>
<td>Refer to “REAR WHEEL AND REAR BRAKE” in chapter 4.</td>
</tr>
<tr>
<td>5</td>
<td>Rear wheel</td>
<td>1</td>
<td>Refer to “BELT DRIVE”.</td>
</tr>
<tr>
<td>6</td>
<td>V-belt case</td>
<td>1</td>
<td>For installation, reverse the removal procedure.</td>
</tr>
<tr>
<td>7</td>
<td>V-belt</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Secondary sheave</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Right crankcase cover</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Right crankcase cover gasket</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Dowel pin</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Primary drive gear shaft</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Main axle</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Drive axle</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>
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**
   0.04mm (0.002in)

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

   **Drive axle runout limit**
   0.04mm (0.002in)

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.
### Removing the crankshaft assembly

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
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<td>1</td>
<td>Tension spring</td>
<td>2</td>
<td>Remove the parts in the order listed. Refer to “ENGINE REMOVEL”. Refer to “CYLINDER HEAD”. Refer to “CYLINDER AND PISTON”. Refer to “BELT DRIVE”.</td>
</tr>
<tr>
<td>2</td>
<td>Centerstand</td>
<td>1</td>
<td>Refer to “STARTER CLUTCH AND AC MAGNETO”. Refer to “OIL PUMP”. Refer to “REAR SHOCK ABSORBER ASSEMBLIES AND SWINGARM” in chapter 4. Refer to “Refer to “REAR WHEEL AND REAR BRAKE” in chapter 4.”.</td>
</tr>
<tr>
<td>3</td>
<td>Spacer/collar</td>
<td>1/2</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Bolt/O-ring</td>
<td>1/1</td>
<td></td>
</tr>
<tr>
<td>Order</td>
<td>Job/Part</td>
<td>Q'ty</td>
<td>Remarks</td>
</tr>
<tr>
<td>-------</td>
<td>--------------------------------</td>
<td>------</td>
<td>----------------------------------------------</td>
</tr>
<tr>
<td>5</td>
<td>Timing chain guide (intake side)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Crankcase (right)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Oil seal</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Crankshaft assembly</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Timing chain</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Oil seal</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Shaft</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Bearing</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Crankcase (left)</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>
DISASSEMBLING THE CRANKCASE

1. Remove:
   • centerstand

2. Remove:
   • crankcase bolts ①

   **TIP**
   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 ①

   **NOTICE**
   Tap on one side of the crankcase with a soft-face hammer ②. 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.
REMOVING THE CRANKSHAFT ASSEMBLY

1. Remove:
   - crankshaft assembly ①
   - timing chain ②

TIP
- Before removing the crankshaft assembly, remove the timing chain from the crankshaft sprocket.
- The crankshaft assembly cannot be removed if the timing chain is attached onto the crankshaft sprocket.

CHECKING THE CRANKSHAFT AND CONNECTING ROD

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

TIP
- Turn the crankshaft slowly.

Maximum crankshaft runout
0.03mm (0.0012in)

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 ~ 0.45mm (0.006 ~ 0.018in)
3. Measure:
- crankshaft width
  Out of specification → Replace the crankshaft.

**Crankshaft width**
45.45 ~ 45.50mm (1.789 ~ 1.791in)

4. Check:
- crankshaft sprocket ①
  Damage/wear → Replace the crankshaft.
- bearing ②
  Cracks/damage/wear → Replace the crankshaft.
- oil pump drive gear ③
  Damage/wear → Replace the crankshaft.

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

**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.
EAS00207
CHECKING THE TIMING CHAIN AND TIMING CHAIN GUIDE (INTAKE SIDE)

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

2. Check:
   • timing chain guide (intake side)
     Damage/wear → Replace.

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.
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)**

   **TIP**

   Do not allow any sealant to come into contact with the oil gallery.
3. Install:
- dowel pins
- right crankcase ①

**TIP**
Tap lightly on the right crankcase with a soft-face hammer.

4. Tighten:
- crankcase bolts

\[13\text{Nm}(1.3\text{m•kgf}, 9.4\text{ft•lbf})\]

**TIP**
Tighten the crankcase bolts in stages and in a crisscross pattern.

5. Apply:
- engine oil
  (onto the crankshaft pin, bearing and oil delivery hole)

6. Check:
- crankshaft operation
  Rough movement→Repair.
CHAPTER 6
FUEL INJECTION SYSTEM

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## FUEL INJECTION SYSTEM

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3. Lean angle cut-off switch  
4. Fuel hose  
5. Ignition coil  
6. Fuel injector  
7. Intake air pressure sensor  
8. ISC (idle speed control) valve  
9. Intake air temperature sensor  
10. Battery  
11. Air filter case  
12. Catalytic converter  
13. Crankshaft position sensor  
14. Engine temperature sensor  
15. Spark plug  
16. Fuel tank  
17. Fuel pump  
18. Throttle position sensor  
19. $O_2$ sensor
FUEL INJECTION SYSTEM

1. Crankshaft position sensor
2. Main fuse
3. Fuel injection system fuse
4. Battery
5. Main switch
6. Sidestand switch
7. Engine stop switch
8. Ignition fuse
9. Signaling system fuse
10. Engine trouble warning light
11. Speed sensor
12. Ignition coil
13. Spark plug
14. Fuel injector
15. Fuel pump
16. ECU
17. Lean angle cut-off switch
18. Engine temperature sensor
19. Intake air pressure sensor
20. Intake air temperature sensor
21. Throttle position sensor
22. O2 sensor
23. ISC (idle speed control) valve
24. FI diagnostic tool
ECU’S SELF-DIAGNOSTIC FUNCTION

The ECU is equipped with a self-diagnostic function in order to ensure that the engine control system is operating normally. If this function detects a malfunction in the system, it immediately operates the engine under substitute characteristics and illuminates the engine trouble warning light to alert the rider that a malfunction has occurred in the system. Once a malfunction has been detected, a fault code is stored in the memory of the ECU.

- To inform the rider that the fuel injection system is not functioning correctly, the engine trouble warning light flashes when the start switch is being pushed to start the engine.
- If a malfunction is detected in the system by the self-diagnostic function, this mode provides an appropriate substitute characteristic operation, and alerts the rider of the detected malfunction by illuminating the engine trouble warning light.
- After the engine has been stopped, the lowest fault code number appears on the engine trouble warning light (or displayed on the FI diagnostic tool). It remains stored in the memory of the ECU until it is deleted.

Engine trouble warning light fault code indication

Digit of 10: Cycles of 1 see. ON and 1.5 sec. OFF.
Digit of 1: Cycles of 0.5 sec, ON and 0.5 sec. OFF.
<Example> 42

<table>
<thead>
<tr>
<th>Light ON</th>
<th>Light OFF</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 1.5 1 1.5 1 1.5 1 1.5 05 05 05 3</td>
</tr>
</tbody>
</table>

Engine trouble warning light indication and FI system operating condition

<table>
<thead>
<tr>
<th>Engine condition</th>
<th>Warning light indication</th>
<th>FI operation</th>
<th>Vehicle operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operate (cranking with electric starter)</td>
<td>Flashing</td>
<td>Operation stopped</td>
<td>Unable</td>
</tr>
<tr>
<td>Stop (indicate the fault code)</td>
<td>Flashing</td>
<td>Operated with substitute characteristics in accordance with the description of the malfunction</td>
<td>Able</td>
</tr>
</tbody>
</table>

6-4
CHECKING FOR A DEFECTIVE ENGINE TROUBLE WARNING LIGHT BULB
The engine trouble warning light comes on for 2 seconds after the main switch has been turned “ON” and when the start switch is being pushed. If the warning light does not come on under these conditions, the warning light bulb may be defective.

SELF-DIAGNOSTIC FUNCTION TABLE
If the ECU detects an abnormal signal from a sensor while the vehicle is being driven, the ECU illuminates the engine trouble warning light and provides the engine with alternate operating instructions that are appropriate for the type of malfunction.

When an abnormal signal is received from a sensor, the ECU processes the specified values that are programmed for each sensor in order to provide the engine with alternate operating instructions that enable the engine to continue to operate or stop operating, depending on the conditions.

The ECU takes fail-safe actions in two ways: one in which the sensor output is set to a prescribed value, and the other in which the ECU directly operates an actuator. Details on the fail-safe actions are given in the table below.

<table>
<thead>
<tr>
<th>Fault code No.</th>
<th>Item</th>
<th>Symptom</th>
<th>Engine startability</th>
<th>Vehicle driveability</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>Crankshaft position sensor</td>
<td>No normal signals are received from the crankshaft position sensor.</td>
<td>Unable</td>
<td>Unable</td>
</tr>
<tr>
<td>13, 14</td>
<td>Intake air pressure sensor (open or short circuit system)</td>
<td>Intake air pressure sensor-open or short circuit detected. Faulty intake air pressure sensor system.</td>
<td>Able</td>
<td>Able</td>
</tr>
<tr>
<td>15, 16</td>
<td>Throttle position sensor (open or short circuit)(stuck)</td>
<td>Throttle position sensor-open or short circuit detected. A stuck throttle position sensor is detected.</td>
<td>Able</td>
<td>Able</td>
</tr>
<tr>
<td>19</td>
<td>Broken or disconnected sidestand lead of the ECU</td>
<td>Open circuit in the input line (sidestand) of the ECU is detected.</td>
<td>Unable</td>
<td>Unable</td>
</tr>
<tr>
<td>22</td>
<td>Intake air temperature sensor</td>
<td>Intake air temperature sensor-open or short circuit is detected.</td>
<td>Able</td>
<td>Able</td>
</tr>
<tr>
<td>24</td>
<td>O₂ sensor</td>
<td>No normal signal is received from the O₂ sensor.</td>
<td>Able</td>
<td>Able</td>
</tr>
<tr>
<td>28</td>
<td>Engine temperature sensor</td>
<td>Engine temperature sensor-open or short circuit detected.</td>
<td>Able</td>
<td>Able</td>
</tr>
<tr>
<td>33</td>
<td>Faulty ignition</td>
<td>Open circuit detected in the primary lead of the ignition coil.</td>
<td>Unable</td>
<td>Unable</td>
</tr>
<tr>
<td>37</td>
<td>ISC (idle speed control) valve (stuck fully open)</td>
<td>Engine speed is high when the engine is idling.</td>
<td>Able</td>
<td>Able</td>
</tr>
<tr>
<td>Fault code No.</td>
<td>Item</td>
<td>Symptom</td>
<td>Engine startability</td>
<td>Vehicle driveability</td>
</tr>
<tr>
<td>---------------</td>
<td>------</td>
<td>---------</td>
<td>---------------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>39</td>
<td>Fuel injector</td>
<td>Fuel injector open or short circuit is detected.</td>
<td>Unable</td>
<td>Unable</td>
</tr>
<tr>
<td>40</td>
<td>Lean angle cut-off switch (latch up detected) (open or short circuit)</td>
<td>The vehicle has overturned. Lean angle cut-off switch-open or short circuit is detected.</td>
<td>Unable</td>
<td>Unable</td>
</tr>
<tr>
<td>41</td>
<td>Lean angle cut-off switch (open or short circuit)</td>
<td>The vehicle has overturned. Lean angle cut-off switch-open or short circuit is detected.</td>
<td>Unable</td>
<td>Unable</td>
</tr>
<tr>
<td>42</td>
<td>Speed sensor</td>
<td>No normal signals are received from the speed sensor.</td>
<td>Able</td>
<td>Able</td>
</tr>
<tr>
<td>43</td>
<td>Fuel system voltage (monitoring voltage)</td>
<td>Power supply to fuel injector, fuel pump and ignition coil are not normal.</td>
<td>Able</td>
<td>Able</td>
</tr>
<tr>
<td>44</td>
<td>Error in reading from or writing on EEPROM</td>
<td>An error is detected while reading from or writing on EEPROM (CO adjustment value, code re-registering key code, and throttle valve fully closed notification value).</td>
<td>Able</td>
<td>Able</td>
</tr>
<tr>
<td>46</td>
<td>Vehicle system power supply (monitoring voltage)</td>
<td>Power supply to FI system is not normal.(red lead)</td>
<td>Able</td>
<td>Able</td>
</tr>
<tr>
<td>50</td>
<td>ECU internal malfunction (memory check error)</td>
<td>Faulty ECU memory. When this malfunction is detected, the code number might not appear on the engine trouble warning light or displayed on FI diagnostic tool.</td>
<td>Unable</td>
<td>Unable</td>
</tr>
<tr>
<td>61</td>
<td>ISC (idle speed control) valve unit (open or short circuit)</td>
<td>ISC (idle speed control) valve unit-open or short circuit detected.</td>
<td>Able</td>
<td>Able</td>
</tr>
<tr>
<td></td>
<td>Start unable warning</td>
<td>Engine trouble warning light flashes when the start switch is turned ON.</td>
<td>Unable</td>
<td>Unable</td>
</tr>
</tbody>
</table>

**FUEL INJECTION SYSTEM**
**TROUBLESHOOTING CHART**

Engine operation is not normal or the engine trouble warning light is on.

*Engine trouble warning light may not come on even if the engine operation is not normal.*

The engine trouble warning light comes on.

Check the fault code number displayed on the FI diagnostic tool.

Identify the system with the malfunction. Refer to "FAIL-SAFE ACTIONS TABLE".

Identify the probable cause of malfunction. Refer to "Fault code table".

Check and repair the probable cause of malfunction.

<table>
<thead>
<tr>
<th>Faultcode No. YES</th>
<th>Faultcode No. NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Check and repair. Refer to &quot;TROUBLESHOOTING DETAILS&quot;. Monitor the operation of the sensors and actuators in the diagnostic mode. Refer to &quot;Diagnostic mode table&quot;.</td>
<td>Check and repair. Refer to &quot;FAIL-SAFE ACTIONS TABLE&quot;.</td>
</tr>
</tbody>
</table>

Perform ECU reinstatement action. Refer to "Reinstatement method" in "TROUBLESHOOTING DETAILS".

Turn the main switch to "OFF", turn the main switch back to "ON", and then check if the fault code number is still displayed.

Fault code number not displayed

Erasering the malfunction history:

The malfunction history is stored even if the main switch is turned OFF. The malfunction history must be erased in the diagnostic mode. Refer to "Diagnostic mode table (Diagnostic code No.62)".

*Operated when the engine trouble warning light is on.*
DIAGNOSTIC MODE

It is possible to monitor the sensor output data or check the activation of actuators with connecting the FI diagnostic tool to the normal mode or the diagnostic monitoring mode.

FI diagnostic tool
90890-03182 (YU-03182)

Setting the normal mode

TIP

The engine speed, engine temperature, and fault code, if detected, can be displayed on the LCD of the FI diagnostic tool when the tool is connected to the vehicle and is set to the normal mode.

1. Turn the main switch to “OFF”.
2. Disconnect the self diag signal connector ①, and then connect the FI diagnostic tool ② as shown.
3. Turn the main switch to “ON” and start the engine.

TIP

- Engine temperature and engine revolution appears on the LCD of the FI diagnostic tool.
- “POWER” LED (Green) comes on.
- If a malfunction is detected in the system, “WARNING” LED (Orange) comes on. However the fault code is not appears on the LCD of FI diagnostic tool.

4. Stop the engine.

TIP

If a malfunction is detected in the system, the fault code appears on the LCD of the FI diagnostic tool. And also, “WARNING” LED (Orange) comes on.

5. Turn the main switch to “OFF” to cancel the normal mode.
6. Disconnect the FI diagnostic tool and connect the self diag signal connector.
FUEL INJECTION SYSTEM

Setting the diagnostic mode
1. Turn the main switch to “OFF”.
2. Disconnect the self diag signal connector ①, and then connect the FL diagnostic-tool ② as shown.
3. While press the “MODE” button, turn the main switch to “ON”.

TIP
- “DIAG” appears on the LCD of the FL diagnostic tool.
- “POWER” LED (Green) comes on.

4. Press the “UP” button to select the CO adjustment mode “CO” or the diagnostic mode “DIAG”.
5. After selecting “DIAG”, press the “MODE” button.
6. Select the diagnostic code number that applies to the item that was verified with the fault code number by pressing the “UP” and “DOWN” buttons.

TIP
- The diagnostic code number appears on the LCD (D01-D70).
- To decrease the selected diagnostic code number, press the “DOWN” button. Press the “DOWN” button for 1 second or longer to automatically decrease the diagnostic code numbers.
- To increase the selected diagnostic code number, press the “UP” button. Press the “UP” button for 1 second or longer to automatically increase the diagnostic code numbers.

7. Verify the operation of the sensor or actuator.
   - Sensor operation
     The data representing the operating conditions of the sensor appears on the LCD.
   - Actuator operation
     Press the “MODE” button to operate the actuator.

8. Turn the main switch to “OFF” to cancel the diagnostic mode.
9. Disconnect the FL diagnostic tool and connect the self diag signal connector.
### Fault code table

<table>
<thead>
<tr>
<th>Fault codeNo.</th>
<th>Symptom</th>
<th>Probable cause of malfunction</th>
<th>Diagnostic code</th>
</tr>
</thead>
</table>
| 12           | No normal signals are received from the crankshaft position sensor.   | • Open or short circuit in wiring harness.  
• Defective crankshaft position sensor.  
• Malfunction in pickup rotor.  
• Improperly installed sensor lead connector in the coupler. |                 |
| 13           | Intake air pressure sensor-open or short circuit detected.            | • Open or short circuit in wiring sub lead.  
• Open or short circuit in wiring harness.  
• Defective intake air pressure sensor.  
• Improperly installed sensor lead connector in the coupler. | D03             |
| 14           | Faulty intake air pressure sensor system                              | • Intake air pressure sensor is disconnected, or clogged. | D03             |
| 15           | Throttle position sensor-open or short circuit detected.             | • Open or short circuit in wiring sub lead.  
• Open or short circuit in wiring harness.  
• Defective throttle position sensor.  
• Improperly installed throttle position sensor lead connector in the coupler. | D01             |
| 16           | A stuck throttle position sensor is detected.                         | • Stuck throttle position sensor.  
• Defective throttle position sensor. | D01             |
| 19           | Open circuit in the input line (sidestand lead) of ECU is detected when the start switch is pressed. | • Open circuit in wiring harness (ECU coupler). | D20             |
| 22           | Intake air temperature sensor-open or short circuit detected.        | • Open or short circuit in wire sub lead.  
• Open or short circuit in wiring harness.  
• Defective intake temperature sensor.  
• Improperly installed sensor lead connector in the coupler. | D05             |
| 24           | No normal signal is received from the O₂ sensor.                     | • Open or short circuit in wiring harness.  
• Defective O₂ sensor.  
• Improperly installed sensor. |                 |
| 28           | Engine temperature sensor-open or short circuit detected.            | • Open or short circuit in wiring harness.  
• Defective engine temperature sensor.  
• Improperly installed lead connector in the coupler. | D11             |
| 30           | The vehicle has overturned.                                           | • Overturned condition. | D08             |
| 33           | Open circuit is detected in the primary lead of the ignition coil.    | • Open circuit in wiring harness.  
• Malfunction in ignition coil.  
• Improperly installed primary lead connector in the coupler. | D30             |
| 37           | The ISC (idle speed control) valve is stuck fully open.              | • Malfunction in throttle body.  
• Malfunction in throttle cables.  
• ISC (idle speed control) valve is stuck fully open. | D54             |
| 39           | Fuel injector open or short circuit is detected.                     | • Open or short circuit in wiring harness.  
• Defective fuel injector.  
• Improperly installed lead connector in the coupler. | D36             |
| 41           | Lean angle cut-off switch-open or short circuit detected.            | • Open or short circuit in wiring harness.  
• Defective lean angle cut-off switch.  
• Improperly installed lead connector in the coupler. | D08             |
| 42           | No normal signals are received from the speed sensor.                | • Open or short circuit in wiring harness.  
• Defective speed sensor.  
• Improperly installed lead connector in the coupler. | D07             |
| 43           | Power supply to the fuel injector, fuel pump and ignition coil are not normal. | • Open or short circuit in wiring harness. | D09             |
| 44           | An error is detected while reading or writing on EEPROM.             | • Malfunction in ECU. (The CO adjustment value, code reregistering key code, and throttle valve fully closed notification value are not properly written on or read from the internal memory.) | D60             |
| 46           | Power supply to F1 system is not normal (red lead)                   | • Malfunction in charging system. |                 |
| 50           | Faulty ECU memory. When this malfunction is detected, the code number might not appear on the engine trouble warning light or displayed on F1 diagnostic tool. | • Malfunction in ECU. (The program and data are not properly written on or read from the internal memory.) |                 |
| 61           | ISC (idle speed control) valve open or short circuit is detected.    | • Open or short circuit in wiring harness.  
• Improperly installed lead connector in the coupler. | D54             |
### Diagnostic mode table

**TIP**
- Check the intake air temperature and engine temperature as close as possible to the intake air temperature sensor and the engine temperature sensor respectively.
- If it is not possible to check the intake air temperature, use the ambient temperature as reference.

<table>
<thead>
<tr>
<th>Diagnostic code</th>
<th>Item</th>
<th>Description of action</th>
<th>Data displayed on FI diagnostic tool (reference value)</th>
</tr>
</thead>
</table>
| D01             | Throttle angle | Displays the throttle angle.  
• Check with throttle fully closed.  
• Check with throttle fully open. | 0-125 degrees  
• Fully closed position (14-20)  
• Fully open position (97-107) |
| D03             | Intake air pressure | Displays the intake air pressure.  
• Check the pressure in the intake manifold. | Compare it to the value displayed on the FI diagnostic tool. |
| D05             | Intake air temperature | Displays the intake air temperature.  
• Check the temperature in the intake manifold. | Compare it to the value displayed on the FI diagnostic tool. |
| D07             | Vehicle speed pulse | Displays the accumulation of the vehicle pulses that are generated when the tire is spun. | (0-999; resets to 0 after 999)  
OK if the numbers appear on the FI diagnostic tool. |
| D08             | Lean angle cut-off switch | Displays the lean angle cut-off switch values. | Upright: 0.4 V  
Overturned: 1.4 V |
| D09             | Fuel system voltage (battery voltage) | Displays the fuel system voltage (battery voltage). | 0.18-7 V  
Normally, approximately 12.0 V |
| D11             | Engine temperature sensor | Displays the engine temperature sensor.  
• Check the engine temperature sensor in the cylinder head. | Compare it to the value displayed on the FI diagnostic tool. |
| D20             | Sidestand switch | Displays that the switch is ON or OFF. | Stand retracted: ON  
Stand extended: OFF |
| D30             | Ignition coil | When the "MODE" button is pressed, the ignition coil is actuated five times per second and the "WARNING" LED (orange) comes on.  
• Connect an ignition checker. | Check that spark is generated, 5 times with the "MODE" button press. |
| D36             | Fuel injector | When the "MODE" button is pressed, the fuel injector is actuated five times per second and the "WARNING" LED (orange) comes on. | Check the operating sound of the fuel injector five times with "MODE" button press. |
| D52             | Headlight relay | When the "MODE" button is pressed, the headlight relay is actuated five times every 5 seconds and the engine trouble warning light comes on. (ON 2 seconds, OFF 3 seconds). | Check the headlight relay operating 5 times with the "MODE" button is pressed. |
| D54             | ISC (idle speed control) valve | When the "MODE" button is pressed, the ISC (idle speed control) valve fully closes, and then it opens until it is at the standby opening position when the engine is started. This operation takes approximately 3 seconds until it is completed. | The ISC (idle speed control) valve unit vibrates when the ISC (idle speed control) valve operates. |
| D60             | EEPROM fault code display | Transmits the abnormal portion of the data in the EEPROM that has been detected as a fault code 44.  
• If multiple malfunctions have been detected, different codes are displayed at 2-second intervals, and this process is repeated. | 01 CO adjustment value is detected.  
(00) Displays when there is no malfunction. |
| D61             | Malfunction history code display | Displays the codes of the history of the self-diagnosis malfunctions (i.e., a code of a malfunction that occurred once and which has been corrected).  
• If multiple malfunctions have been detected, different codes are displayed at 2-second intervals, and this process is repeated. | 12-61  
(00) Displays when there is no malfunction. |
| D62             | Malfunction history code erasure | Displays the total number of codes that are being detected through self-diagnosis and the fault codes in the past history.  
• Erases only the history codes when the "MODE" button is pressed. | 00-18  
(00) Displays when there is no malfunction. |
| D70             | Control number | Displays the program control number. | 00-254 |
Communication error with the FI diagnostic tool

<table>
<thead>
<tr>
<th>LCD Display</th>
<th>Symptom</th>
<th>Probable cause of malfunction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waiting for connect-</td>
<td>No signals are received from the ECU.</td>
<td>• Improper installed lead connector in the coupler.</td>
</tr>
<tr>
<td>ion...</td>
<td></td>
<td>• The main switch is OFF position.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Malfunction in FI diagnostic tool.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Malfunction in ECU.</td>
</tr>
<tr>
<td>ERROR 4</td>
<td>Commands from the FI diagnostic tool are not accepted by the ECU.</td>
<td>• Turn the main switch to “OFF” once, and then turn it back to CO adjustment mode or diagnostic mode.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Vehicle battery is insufficiently charged.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Malfunction in FI diagnostic tool.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Malfunction in ECU.</td>
</tr>
</tbody>
</table>

**TROUBLESHOOTING DETAILS**

This section describes the countermeasures per fault code number displayed on the FI diagnostic tool. Check and service the items or components that are the probable cause of the malfunction following the order given.

After the check and service of the malfunctioned part has been completed, reset the FI diagnostic tool display according to the “Reinstatement method”.

Fault code No.:
- Fault code number displayed on the FI diagnostic tool when the engine failed to work normally. Refer to “Fault code table”.

Diagnostic code No.:
- Diagnostic code number to be used when the diagnostic mode is operated. Refer to “DIAGNOSTIC MODE”.

EAS00908
No normal signals are received from the crankshaft position sensor.

<table>
<thead>
<tr>
<th>Order</th>
<th>Inspection operation item and probable cause</th>
<th>Operation item and countermeasure</th>
<th>Reinstatement method</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Installed condition of sensor.</td>
<td>Check the installed area for looseness or pinching.</td>
<td>Reinstated by cranking the engine.</td>
</tr>
<tr>
<td>2</td>
<td>Connected condition of connector.</td>
<td>If there is a malfunction, repair it and connect it securely. Crankshaft position sensor coupler Main wiring harness ECU coupler</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Inspect the coupler for any pins that may have pulled out. Check that the coupler is connected securely.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>TIP</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Set the main switch to OFF before connecting or disconnecting the connector.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Open or short circuit in wiring harness.</td>
<td>Repair or replace if there is an open or short circuit between the main wiring harnesses. Between sensor coupler and ECU coupler. white/red black/blue</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Defective crankshaft position sensor.</td>
<td>Replace if defective.</td>
<td></td>
</tr>
</tbody>
</table>
### FUEL INJECTION SYSTEM

**Fault code No. 13**

**Symptom:** Intake air pressure sensor-open or short circuit detected.

**Used diagnostic code No. D03 (intake air pressure sensor)**

<table>
<thead>
<tr>
<th>Order</th>
<th>Inspection operation item and probable cause</th>
<th>Operation item and countermeasure</th>
<th>Reinstatement method</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Connected condition of connector &lt;br&gt;Inspect the coupler for any pins that may have pulled out. &lt;br&gt;Check the locking condition of the coupler.</td>
<td>If there is a malfunction, repair it and connect it securely. &lt;br&gt;Intake air pressure sensor coupler &lt;br&gt;Main wiring harness ECU coupler</td>
<td>Reinstated by turning the main switch ON.</td>
</tr>
<tr>
<td>2</td>
<td>Open or short circuit in wiring harness.</td>
<td>Repair or replace if there is an open or short circuit. &lt;br&gt;Between sensor coupler and ECU coupler &lt;br&gt;black/blue - black/blue &lt;br&gt;pink/white - pink/white &lt;br&gt;blue - blue</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Defective intake air pressure sensor.</td>
<td>Execute the diagnostic mode (code No. D03) &lt;br&gt;Replace the throttle body.</td>
<td></td>
</tr>
</tbody>
</table>

**TIP**

- Do not remove the sensor module.
- Set the main switch to OFF before connecting or disconnecting the connector.

1. Connect the digital circuit tester to the intake air pressure sensor coupler as shown.

   ![Connection Diagram]

   **Positive tester probe → pink/white**
   **Negative tester probe → black/blue**

2. Set the main switch to "ON".
3. Measure the intake air pressure sensor output voltage.

   **Intake air pressure sensor output voltage**
   0.789~4.0V

4. Is the intake air pressure sensor OK?
## FUEL INJECTION SYSTEM

### Intake air pressure sensor system malfunction (clogged or detached)

<table>
<thead>
<tr>
<th>Fault code No.</th>
<th>14</th>
<th>Symptom</th>
<th>Operation item and countermeasure</th>
<th>Reinstatement method</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Used diagnostic code No. D03 (intake air pressure sensor)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Order</td>
<td>Inspection operation item and probable cause</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Connected state of connector&lt;br&gt;Intake air pressure sensor coupler&lt;br&gt;Main wiring harness ECU coupler</td>
<td>Check the coupler for any pins that may have pulled out.&lt;br&gt;Check that the coupler is connected securely.&lt;br&gt;If there is a malfunction, repair it and connect it securely.</td>
<td>Reinstated by starting the engine and operating it at idle.</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Defective intake air pressure sensor.</td>
<td>Execute the diagnostic mode (code No. D03)&lt;br&gt;Replace the throttle body.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**TIP**<br>Do not remove the sensor module.<br>Refer to “Fault code No. 13”.

### Throttle position sensor-open or short circuit detected.

<table>
<thead>
<tr>
<th>Fault code No.</th>
<th>15</th>
<th>Symptom</th>
<th>Operation item and countermeasure</th>
<th>Reinstatement method</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Used diagnostic code No. D01 (throttle position sensor)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Order</td>
<td>Inspection operation item and probable cause</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Installed condition of throttle position sensor.</td>
<td>Check the installed area for looseness or pinching.&lt;br&gt;Check that it is installed in the specified position.&lt;br&gt;Refer to “THROTTLE BODY AND FUEL INJECTOR”.</td>
<td>Reinstated by turning the main switch ON.</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Connected condition of connector&lt;br&gt;Inspect the coupler for any pins that may have pulled out.&lt;br&gt;Check the locking condition of the coupler.</td>
<td>If there is a malfunction, repair it and connect it securely.&lt;br&gt;Throttle position sensor coupler&lt;br&gt;Main wiring harness ECU coupler</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Open or short circuit in wiring harness.</td>
<td>Repair or replace if there is an open or short circuit.&lt;br&gt;Between sensor coupler and ECU coupler&lt;br&gt;black/blue - black/blue&lt;br&gt;yellow - yellow&lt;br&gt;blue - blue</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Defective throttle position sensor.</td>
<td>Execute the diagnostic mode (code No. D01)&lt;br&gt;Replace the throttle body.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**TIP**<br>Do not remove the sensor module.<br>Refer to “THROTTLE BODY AND FUEL INJECTOR”.

---

6-15
### FUEL INJECTION SYSTEM

#### Fault code No. 16

**Symptom**
Stuck throttle position sensor detected.

**Used diagnostic code No. D01 (throttle position sensor)**

<table>
<thead>
<tr>
<th>Order</th>
<th>Inspection operation item and probable cause</th>
<th>Operation item and countermeasure</th>
<th>Reinstatement method</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Installed condition of throttle position sensor.</td>
<td>Check the installed area for looseness or pinching. Check that it is installed in the specified position. Refer to “THROTTLE BODY AND FUEL INJECTOR”.</td>
<td>Reinstated by starting the engine, operating it at idle, and then racing it.</td>
</tr>
<tr>
<td>2</td>
<td>Defective throttle position sensor</td>
<td>Execute the diagnostic mode (code No. 01) Replace the throttle body.</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>TIP</strong></td>
<td>Do not remove the sensor module.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Refer to “THROTTLE BODY AND FUEL INJECTOR”.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>When fault code No. 15 has been detected</td>
<td>Refer to “Fault code No. 15”.</td>
<td>Refer to “Fault code No. 15”.</td>
</tr>
</tbody>
</table>

#### Fault code No. 19

**Symptom**
Open circuit in the input line of ECU (sidestand lead) detected.

**Used diagnostic code No. D20 (sidestand switch)**

<table>
<thead>
<tr>
<th>Order</th>
<th>Inspection operation item and probable cause</th>
<th>Operation item and countermeasure</th>
<th>Reinstatement method</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Connected state of connector Main wiring harness ECU coupler (sidestand connector)</td>
<td>Execute the diagnostic mode (code No. D20) Check the coupler for any pins that may have pulled out. Check the locking condition of the coupler. If there is a malfunction, repair it and connect it securely.</td>
<td>Reinstated by reconnecting the wiring and retracting the sidestand.</td>
</tr>
<tr>
<td>2</td>
<td>Open or short circuit in wiring harness.</td>
<td>Between main switch coupler and ECU coupler. black/yellow - blue/yellow Sidestand switch and main switch coupler. black/white - black/white</td>
<td></td>
</tr>
</tbody>
</table>
### FUEL INJECTION SYSTEM

**Used diagnostic code No. D05 (intake air temperature sensor)**

<table>
<thead>
<tr>
<th>Order</th>
<th>Inspection operation item and probable cause</th>
<th>Operation item and countermeasure</th>
<th>Reinstatement method</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Installed condition of sensor</td>
<td>Check the installed area for looseness or pinching.</td>
<td>Reinstated by turning the main switch ON.</td>
</tr>
<tr>
<td>2</td>
<td>Connected condition of connector. Inspect the coupler for any pins that may have pulled out. Check the locking condition of the coupler.</td>
<td>If there is a malfunction, repair it and connect it securely. Intake air temperature sensor coupler Main wiring harness ECU coupler</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Open or short circuit in wiring harness.</td>
<td>Repair or replace if there is an open or short circuit. Between sensor coupler and ECU coupler black/blue - black/blue brown/white - brown/white</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Defective intake air temperature sensor.</td>
<td>Execute the diagnostic mode (code No. D05) Replace the throttle body.</td>
<td></td>
</tr>
</tbody>
</table>

**TIP**
Do not remove the sensor module.

1. Connect the digital circuit tester to the intake air temperature sensor terminal as shown.

```
Positive tester probe → brown/white  
Negative tester probe → black/blue
```

2. Measure the intake air temperature sensor resistance.

```
Intake air temperature sensor resistance
6kΩ at 20°C (68°F)
```

**WARNING**
- Handle the intake air temperature sensor with special care.
- Never subject the intake air temperature sensor to strong shocks. If the intake air temperature sensor is dropped, replace it.

3. Is the intake air temperature sensor OK?
### Fault code No. 28: No normal signal is received from the O₂ sensor.

**Used diagnostic code No. --**

<table>
<thead>
<tr>
<th>Order</th>
<th>Inspection operation item and probable cause</th>
<th>Operation item and countermeasure</th>
<th>Reinstatement method</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Defective O₂ sensor.</td>
<td>Replace if defective.</td>
<td>Reinstated by starting the engine, operating it at idle, and then racing it after it has warmed up.</td>
</tr>
<tr>
<td>2</td>
<td>Open or short circuit in wiring harness.</td>
<td>Repair or replace if there is there is an open or short circuit. Main wiring harness black/blue - gray/green red/black - black/green</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Installed state of O₂ sensor.</td>
<td>Check the installed area for looseness or pinching.</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Connected state of connector Inspect the coupler for any pins that may have pulled out. Check the locking condition of the coupler.</td>
<td>If there is a malfunction, repair it and connect it securely. O₂ sensor coupler Main wiring ECU harness coupler</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Check fuel pressure</td>
<td>Refer to “CHECKING THE FUEL PUMP AND PRESSURE REGULATOR OPERATION.”</td>
<td></td>
</tr>
</tbody>
</table>

### Fault code No. 24: Engine temperature sensor open or short circuit is detected.

**Used diagnostic code No. D11 (engine temperature sensor)**

<table>
<thead>
<tr>
<th>Order</th>
<th>Inspection operation item and probable cause</th>
<th>Operation item and countermeasure</th>
<th>Reinstatement method</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Installed condition of sensor</td>
<td>Check the installed area for looseness or pinching.</td>
<td>Reinstated by turning the main switch ON.</td>
</tr>
<tr>
<td>2</td>
<td>Connected condition of connector Inspect the coupler for any pins that may have pulled out. Check the locking condition of the coupler.</td>
<td>If there is a malfunction, repair it and connect it securely. Engine temperature sensor coupler Main wiring harness ECU coupler</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Open or short circuit in wiring harness.</td>
<td>Repair or replace if there is an open or short circuit. Between sensor coupler and ECU coupler black/blue-black/blue green/red - green/red</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Defective engine temperature sensor.</td>
<td>Execute the diagnostic mode (code No.D11) Replace if defective.</td>
<td></td>
</tr>
</tbody>
</table>
The vehicle has overturned.

<table>
<thead>
<tr>
<th>Order</th>
<th>Inspection operation item and probable cause</th>
<th>Operation item and countermeasure</th>
<th>Reinstatement method</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The vehicle has overturned.</td>
<td>Raise the vehicle upright.</td>
<td>Reinstated by turning the main switch ON (however, the engine cannot be restarted unless the main switch is first turned OFF).</td>
</tr>
<tr>
<td>2</td>
<td>Installed condition of the lean angle cut-off switch</td>
<td>Check the installed area for looseness or pinching.</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Connected condition of connector</td>
<td>If there is a malfunction, repair it and connect it securely. Lean angle cut-off switch coupler Main wiring harness ECU coupler</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Inspect the coupler for any pins that may have pulled out. Check the locking condition of the coupler.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Defective lean angle cut-off switch</td>
<td>Execute the diagnostic mode (code No. D08) Replace if defective. 1. Remove the lean angle cut-off switch from the vehicle. 2. Connect the lean angle cut-off switch coupler to the wire harness. 3. Connect the digital circuit tester to the lean angle cut-off switch terminals as shown.</td>
<td></td>
</tr>
</tbody>
</table>

| Positive tester probe → blue ① Negative tester probe → yellow/green ② |

4. When turning the lean angle cut-off switch approximately 45°, the voltage reading change from 0.4 V to 1.4 V.

5. Is the lean angle cut-off switch OK?
# Fuel Injection System

**Fault code No. 33 | Symptom:** Open circuit detected in the primary lead of the ignition coil.

**Used diagnostic code No. D30**

<table>
<thead>
<tr>
<th>Order</th>
<th>Inspection operation item and probable cause</th>
<th>Operation item and countermeasure</th>
<th>Reinstatement method</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Connected condition of connector&lt;br&gt;Inspect the coupler for any pins that may have pulled out.&lt;br&gt;Check the locking condition of the coupler.</td>
<td>If there is a malfunction, repair it and connect it securely.&lt;br&gt;Ignition coil primary side coupler - orange&lt;br&gt;Main wiring harness ECU coupler</td>
<td>Reinstated by starting the engine and operating it at idle.</td>
</tr>
<tr>
<td>2</td>
<td>Open or short circuit in lead.</td>
<td>Repair or replace if there is an open or short circuit.&lt;br&gt;Between ignition coil coupler and ECU coupler/main harness orange - orange</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Defective ignition coil (test the primary and secondary coils for continuity).</td>
<td>Execute the diagnostic mode (code No. D30)&lt;br&gt;Replace if defective.&lt;br&gt;Refer to “IGNITION SYSTEM” in chapter 7.</td>
<td></td>
</tr>
</tbody>
</table>

**Fault code No. 37 | Symptom:** Engine speed is high when the engine is idling.

**Used diagnostic code No. D54 (ISC (idle speed control) valve)**

<table>
<thead>
<tr>
<th>Order</th>
<th>Inspection operation item and probable cause</th>
<th>Operation item and countermeasure</th>
<th>Reinstatement method</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Throttle valve does not fully close</td>
<td>Check the throttle body.&lt;br&gt;Refer to “THROTTLE BODY AND FUEL INJECTOR”.&lt;br&gt;Check the throttle cable assembly.&lt;br&gt;Refer to “ADJUSTING THE THROTTLE CABLE FREE PLAY” in chapter 3.</td>
<td>Reinstated if the engine idle speed is within specification after starting the engine.</td>
</tr>
<tr>
<td>2</td>
<td>ISC (idle speed control) valve stuck fully open</td>
<td>The ISC (idle speed control) valve is stuck fully open if it does not operate when the main switch is set to OFF.&lt;br&gt;(Touch the ISC (idle speed control) valve unit with your hand and check if it is vibrating to confirm if the ISC (idle speed control) valve is operating.)&lt;br&gt;&lt;br&gt;&lt;strong&gt;TIP&lt;/strong&gt;&lt;br&gt;Do not remove the ISC (idle speed control) valve unit.</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>ISC (idle speed control) valve not moving correctly</td>
<td>Execute the diagnostic mode (code No. D54)&lt;br&gt;After the ISC (idle speed control) valve is fully closed, it opens until it is at the standby opening position when the engine is started. This operation takes approximately 3 seconds until it is completed. Start the engine. If the error recurs, replace the throttle body assembly.</td>
<td></td>
</tr>
</tbody>
</table>
### FUEL INJECTION SYSTEM

#### Fault code No. 39 Symptom
Fuel injector open or short circuit is detected.

**Used diagnostic code No. D36 (fuel injector)**

<table>
<thead>
<tr>
<th>Order</th>
<th>Inspection operation item and probable cause</th>
<th>Operation item and countermeasure</th>
<th>Reinstatement method</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Connected condition of connector. Inspect the coupler for any pins that may have pulled out. Check the locking condition of the coupler.</td>
<td>If there is a malfunction, repair it and connect it securely. Fuel injector coupler - orange/black Main wiring harness ECU coupler</td>
<td>Reinstated by starting the engine.</td>
</tr>
<tr>
<td>2</td>
<td>Open or short circuit in lead wire.</td>
<td>Repair or replace if there is an open or short circuit. Between fuel injector coupler and ECU coupler/main harness orange/black - orange/black</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Defective fuel injector</td>
<td>Execute the diagnostic mode (code No. D36) Replace if defective.</td>
<td></td>
</tr>
</tbody>
</table>

#### Fault code No. 41 Symptom
Lean angle cut-off switch open or short circuit is detected.

**Used diagnostic code No. D08 (lean angle cut-off switch)**

<table>
<thead>
<tr>
<th>Order</th>
<th>Inspection operation item and probable cause</th>
<th>Operation item and countermeasure</th>
<th>Reinstatement method</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Connected condition of connector. Inspect the coupler for any pins that may have pulled out. Check the locking condition of the coupler.</td>
<td>If there is a malfunction, repair it and connect it securely. Lean angle cut-off switch coupler Main wiring harness ECU coupler</td>
<td>Reinstated by turning the main switch ON.</td>
</tr>
<tr>
<td>2</td>
<td>Open or short circuit in wiring harness.</td>
<td>Repair or replace if there is an open or short circuit. Between switch coupler and ECU coupler black/blue - black/blue yellow/green - yellow/green blue- blue</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Defective lean angle cut-off switch</td>
<td>Execute the diagnostic mode (code No. D08) Replace if defective. Refer to Fault code No. 30.</td>
<td></td>
</tr>
</tbody>
</table>
No normal signals are received from the speed sensor.

<table>
<thead>
<tr>
<th>Order</th>
<th>Inspection operation item and probable cause</th>
<th>Operation item and countermeasure</th>
<th>Reinstatement method</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Connected condition of speedometer connector&lt;br&gt;Inspect the coupler for any pins that may have pulled out.&lt;br&gt;Check the locking condition of the coupler.</td>
<td>If there is a malfunction, repair it and connect it securely.&lt;br&gt;Speedometer coupler&lt;br&gt;Main wiring harness ECU coupler</td>
<td>Reinstated by inputting the vehicle speed signals by turning the front wheel.</td>
</tr>
<tr>
<td>2</td>
<td>Open or short circuit in speedometer lead.</td>
<td>Repair or replace if there is an open or short circuit.&lt;br&gt;Between speedometer coupler and ECU coupler&lt;br&gt;white - white&lt;br&gt;black/blue - black/blue</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Breakage speedometer cable or speedometer gear unit.</td>
<td>Execute the diagnostic mode (code No.D07)&lt;br&gt;Checking the speedometer cable breakage and loose connection.&lt;br&gt;Checking the movement of the speedometer gear unit (1).&lt;br&gt;Checking the breakage of the wheel hub projections (a) and speedometer clutch (b).</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Defective speed sensor</td>
<td>Execute the diagnostic mode (code No. D07)&lt;br&gt;Replace the meter assembly.</td>
<td></td>
</tr>
</tbody>
</table>
### FUEL INJECTION SYSTEM

#### Fault code No. 43

<table>
<thead>
<tr>
<th>Order</th>
<th>Inspection operation item and probable cause</th>
<th>Operation item and countermeasure</th>
<th>Reinstatement method</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Connected condition of connector&lt;br&gt;Inspect the coupler for any pins that may have pulled out.&lt;br&gt;Check the locking condition of the coupler.</td>
<td>If there is a malfunction, repair it and connect it securely.&lt;br&gt;ECU coupler</td>
<td>Reinstated by turning the main switch ON.</td>
</tr>
</tbody>
</table>

Used diagnostic code No. D09 (fuel system voltage)

1. **Fault code No. 44**

   **Symptom:** An error is detected while reading from or writing on EEPROM (CO adjustment value, code re-registering key code, and throttle valve fully closed notification value).

   **Used diagnostic code No. D60** (EEPROM improper cylinder indication)

<table>
<thead>
<tr>
<th>Order</th>
<th>Inspection operation item and probable cause</th>
<th>Operation item and countermeasure</th>
<th>Reinstatement method</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Malfunction in ECU&lt;br&gt;01 is displayed on meter.&lt;br&gt;Readjust the CO of the displayed cylinder.&lt;br&gt;Replace ECU if defective.</td>
<td>Execute the diagnostic mode (code No. D60)</td>
<td>Reinstated by turning the main switch ON.</td>
</tr>
</tbody>
</table>
## FUEL INJECTION SYSTEM

### Fault code No. 46  Symptom: Power supply to FI system is not normal. (red lead)

<table>
<thead>
<tr>
<th>Used diagnostic code No.--</th>
<th>Order</th>
<th>Inspection operation item and probable cause</th>
<th>Operation item and countermeasure</th>
<th>Reinstatement method</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>Connected condition of connector&lt;br&gt;Inspect the coupler for any pins that may have pulled out.&lt;br&gt;Check the locking condition of the coupler.</td>
<td>If there is a malfunction, repair it and connect it securely.&lt;br&gt;ECU coupler</td>
<td>Reinstated by turning the main switch ON.</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Faulty battery</td>
<td>Replace or charge the battery.&lt;br&gt;Refer to “CHECKING AND CHARGING THE BATTERY” in chapter 3.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Malfunction in rectifier/regulator</td>
<td>Replace if defective.&lt;br&gt;Refer to “CHARGING SYSTEM” in chapter 7.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Open or short circuit in wiring harness.</td>
<td>Repair or replace if there is an open or short circuit.&lt;br&gt;Between battery and ECU red-red</td>
<td></td>
</tr>
</tbody>
</table>

### Fault code No. 50  Symptom: Faulty ECU memory. (when this malfunction is detected in the ECU, the fault code number might not appear on the meter.)

<table>
<thead>
<tr>
<th>Used diagnostic code No.--</th>
<th>Order</th>
<th>Inspection operation item and probable cause</th>
<th>Operation item and countermeasure</th>
<th>Reinstatement method</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>Malfunction in ECU</td>
<td>Replace the ECU.</td>
<td>Reinstated by turning the main switch ON.</td>
</tr>
</tbody>
</table>
## Fault code No. 61 Symptom
### ISC (idle speed control) valve open or short circuit is detected.

**Used diagnostic code No. D54 (ISC (idle speed control) valve)**

<table>
<thead>
<tr>
<th>Order</th>
<th>Inspection operation item and probable cause</th>
<th>Operation item and countermeasure</th>
<th>Reinstatement method</th>
</tr>
</thead>
</table>
| 1     | Connected condition of connector           | If there is a malfunction, repair it and connect it securely.  
       | Inspect the coupler for any pins that may have pulled out.  
       | Check the locking condition of the coupler.  
       | ISC (idle speed control) valve coupler  
       | Main wiring harness ECU coupler | Reinstated by setting the main switch to ON. The ISC (idle speed control) valve fully closes, and then it opens until it is at the standby opening position when the engine is started. |
| 2     | Open or short circuit in lead.              | Repair or replace if there is an open or short circuit.  
       | Between ISC (idle speed control) valve and ECU coupler/main harness  
       | pink - pink  
       | green/yellow-green/yellow  
       | gray - gray  
       | sky blue-sky blue | |
| 3     | Detective ISC (idle speed control) valve   | Execute diagnostic mode (code No. D54)  
       | Replace the throttle body.  
       | **TIP**  
       | Do not remove the ISC (idle speed control) valve.  
       | Refer to “THROTTLE BODY AND FUEL INJECTOR”. | |
### FUEL TANK

<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 fuel tank</td>
<td></td>
<td>Remove the parts in the order listed.</td>
</tr>
<tr>
<td>1</td>
<td>Seat/trunk</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Battery box cover/front cover</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Side cover (left and right)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Fuel pump coupler</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Fuel hose</td>
<td>1</td>
<td>Disconnect.</td>
</tr>
<tr>
<td>6</td>
<td>Fuel return hose</td>
<td>1</td>
<td>Disconnect.</td>
</tr>
<tr>
<td>7</td>
<td>Fuel tank cap</td>
<td>1</td>
<td>Disconnect.</td>
</tr>
<tr>
<td>8</td>
<td>Filler cover/overflow pipe</td>
<td>1/1</td>
<td></td>
</tr>
</tbody>
</table>

**TIP**

Place the scooter on a suitable stand.

Refer to “COVER AND PANEL” in chapter 3.

Drain.

Disconnect.
## THROTTLE BODY AND FUEL INJECTOR

### Order

<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>Fuel pump</td>
<td>1</td>
<td>Refer to “REMOVING THE FUEL PUMP” and “INSTALLING THE FUEL PUMP”.</td>
</tr>
<tr>
<td>7</td>
<td>Fuel tank</td>
<td>1</td>
<td>Refer to “REMOVING THE FUEL TANK” and “INSTALLING THE FUEL TANK AND FUEL HOSE”. For installation, reverse the removal procedure.</td>
</tr>
</tbody>
</table>

### Diagram

- **10Nm (1.0 m·kgf, 7.2 ft·lbf)**
- **7Nm (0.7 m·kgf, 5.1 ft·lbf)**
- **4Nm (0.4 m·kgf, 2.9 ft·lbf)**

**Refer to “REMOVING THE FUEL TANK” and “INSTALLING THE FUEL TANK AND FUEL HOSE”**.

Refer to “REMOVING THE FUEL PUMP” and “INSTALLING THE FUEL PUMP”. For installation, reverse the removal procedure.

(Explanations and specifications related to the diagram and table content.)
FI

FUEL INJECTOR AND FUEL HOSE

Removing the fuel injector and fuel hose:
- Fuel tank
- Fuel hose holder (to frame)
- Fuel hose holder (to intake manifold)
- Clamp
- Fuel injector coupler
- Fuel injector and fuel hose

Q’ty
1 1 1 1 1

Remarks
Remove the parts in the order listed.
Refer to "REMOVING THE FUEL TANK".
Disconnect.
For installation, reverse the removal procedure.

Order | Job/Part | Q’ty | Remarks
--- | --- | --- | ---
1 | Removing the fuel injector and fuel hose |  | Remove the parts in the order listed.
| Fuel tank | 1 | Refer to "REMOVING THE FUEL TANK".
| Fuel hose holder (to frame) | 1 | Disconnect.
| Fuel hose holder (to intake manifold) | 1 | For installation, reverse the removal procedure.
| Clamp | 1 | |
| Fuel injector coupler | 1 | |
| Fuel injector and fuel hose | 1 | |
### Removing the Throttle Body

Remove the parts in the order listed.

<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>Fuel tank</td>
<td>1</td>
<td>Disconnect.</td>
</tr>
<tr>
<td>2</td>
<td>Fuel pipe (to throttle body)</td>
<td>1</td>
<td>Lossen.</td>
</tr>
<tr>
<td>3</td>
<td>Throttle body clamp screw</td>
<td>1</td>
<td>Disconnect.</td>
</tr>
<tr>
<td>4</td>
<td>ISC (idle speed control) valve coupler</td>
<td>1</td>
<td>Disconnect.</td>
</tr>
<tr>
<td>5</td>
<td>Throttle cable assembly</td>
<td>1</td>
<td>Disconnect.</td>
</tr>
<tr>
<td>6</td>
<td>Throttle body</td>
<td>1</td>
<td>For installation, reverse the removal pro-</td>
</tr>
</tbody>
</table>

Refer to "ENGINE REMOVAL" in chapter 5.

Refer to "FUEL TANK".

\[ 5 \text{Nm} (0.5 \text{m} \cdot \text{kgf}, 3.6 \text{ft} \cdot \text{lb}) \]

\[ 3 \text{Nm} (0.3 \text{m} \cdot \text{kgf}, 2.2 \text{ft} \cdot \text{lb}) \]
THROTTLE BODY AND FUEL INJECTOR

REMOVING THE FUEL TANK
1. Extract the fuel in the fuel tank through the fuel tank cap with a pump.
2. Remove:
   - fuel return hose
   - fuel hose ①

**NOTICE**
- Be sure to disconnect the fuel hose by hand. Do not forcefully disconnect the hose with tools.
- Although the fuel has been removed from the fuel tank be careful when removing the fuel hose, since there may be fuel remaining in it.
- Do not disconnect the fuel hose from the fuel hose connector. Disconnect the connector from the fuel pump.

**TIP**
- Before removing the hose, place a few rags in the area under where it will be removed.
- Hold fuel hose connector ① draw down, press tenon ② draw backward and then, can remove the fuel hose.

A Draw down
B Draw backward

3. Disconnect:
   - fuel pump coupler
4. Remove:
   - fuel tank

**TIP**
Do not set the fuel tank down so that the installation surface of the fuel pump is directly under the tank. Be sure to lean the fuel tank in an upright position.
REMOVING THE FUEL PUMP

1. Remove:
   ● fuel tank
   Refer to “REMOVING THE FUEL TANK”.
2. Remove:
   ● fuel pump

**NOTICE**
- Do not drop the fuel pump or give it a strong shock.
- Do not touch the base section of the fuel sender.

EAS0911

**NOTICE**
The fuel pump should not be disassembled.
CHECKING THE FUEL INJECTOR
1. Check:
   - fuel injector
     Damage → Replace.

CHECKING THE THROTTLE BODY
1. Check:
   - throttle body
     Cracks/damage → Replace the throttle body.
2. Check:
   - butterfly valve
     Damage/scratches/wear → Replace.

NOTICE
- Do not adjust the stop screw ①.
- Do not clean the throttle body ass'y using carburetor cleaner or compressed air.
- When replace the throttle body the main switch is operated three times turn ON and OFF position.
  (ON position : 3 seconds more, OFF position : 3 seconds more). And then, start the engine and keep idling at 10 minutes more.
INSTALLING THE FUEL PUMP
1. Install:
   - fuel pump

\[4 \text{Nm (0.4m \cdot \text{kgf}, 2.9ft \cdot \text{lbf})}\]

TIP
- Do not damage the installation surface of the fuel tank when installing the fuel pump.
- Always use a new fuel pump gasket.
- Align the projection \(a\) on the fuel pump with the alignment mark \(b\) on the fuel tank.
- Tighten the fuel pump bolts in the proper tightening sequence as shown and torque them in two stages.

A Forward

INSTALLING THE FUEL TANK AND FUEL HOSE
1. Install:
   - fuel tank

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

2. Connect:
   - fuel pump coupler

3. Install:
   - fuel hose \(\text{①}\)
   - fuel return hose

NOTICE
When installing the fuel hose, make sure that it is securely connected, and that the fuel hose holders are in the correct position, otherwise the fuel hose will not be properly installed.

TIP
- Install the fuel hose connector securely onto the fuel tank until a distinct “click” is heard, and then make sure that it does not come loose.
- After installing the fuel hose, hold fuel hose connector \(\text{①}\) push to the bottom up and make sure that it is installed securely.
CHECKING THE FUEL PUMP AND PRESSURE REGULATOR OPERATION

1. Check:
   a. pressure regulator operation

   a. Remove the battery box cover and front cover.
      Refer to "COVER AND PANEL" in chapter 3.
   b. Remove the fuel hose ① from the fuel pump.

   NOTICE
   Although the fuel has been removed from the fuel tank, be careful when removing the fuel hose, since there may be fuel remaining in it.

   TIP
   Before removing the hose, place a few rags in the area under where it will be removed.

   c. Connect the pressure gauge ② and adapter ③ onto the fuel hose.

   Pressure gauge
   90890-03153 (YU-03153)
   Adapter
   90890-03186

   d. Start the engine.
   e. Measure the fuel pressure.

   Fuel pressure
   250kPa (2.5kgf/cm², 35.6psi)

   Faulty → Replace the fuel pump.

   ▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲
CHECKING THE THROTTLE POSITION SENSOR

1. Check:
   • throttle position sensor

   a. Connect the digital circuit tester to the terminals of the throttle position sensor.

   Positive tester probe → blue terminal (1)
   Negative tester probe → black/blue terminal (2)

   b. Measure the throttle position sensor voltage.
      Out of specification → Replace or repair the wire harness.

   Throttle position sensor voltage
   5V (blue-black/blue)

c. Connect the digital circuit tester to the terminals of the throttle position sensor.

   Positive tester probed → yellow terminal (3)
   Negative tester probe → black/blue terminal (2)

   d. While slowly opening the throttle, check that the throttle position sensor voltage is increased.
      Voltage does not change or it changes abruptly → Replace the throttle body.
      Out of specification (closed position) → Replace the throttle body.

   Throttle position sensor voltage
   (closed position)
   0.63 ~ 0.73 V
   (yellow-black/blue)
TIP
Do not remove the ISC (idle speed control) valve unit completely from the throttle body assembly.

1. Check:
   • ISC (idle speed control) valve

   a. Disconnect the ISC (idle speed control) valve coupler from the ISC (idle speed control) valve.
   b. Connect the digital circuit tester to the terminals of the ISC (idle speed control) valve.

   Positive tester probe → pink terminal (1)
   Negative tester probe → green/yellow terminal (2)

   Positive tester probe → gray terminal (3)
   Negative tester probe → sky blue terminal (4)

   Digital circuit tester
   90890-03174

   c. Measure the ISC (idle speed control) valve resistance.
      Out of specification → Replace the throttle body.

   ISC (idle speed control) valve resistance
   20 Ω at 20°C (68°F)
CHAPTER 7
ELECTRICAL SYSTEM

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ELECTRICAL COMPONENTS

ELECTRICAL SYSTEM

1. Main switch 11. Spark plug cap
2. Front brake light switch 12. Fuel pump
3. Rectifier/regulator 13. Starter relay
4. Rear brake light switch 14. Horn
5. Sidestand switch 15. Turn signal relay
7. Main fuse 17. Headlight relay
8. ECU 18. Stator coil
10. Ignition coil
Color Code

1. AC magneto
2. Rectifier/regulator
3. Body earth
4. Main fuse
5. Fuel injection system fuse
6. Battery
7. Wire lead
8. Starter relay
9. Starter motor
10. Starting circuit cut-off relay
11. Main switch
12. Sidestand switch
13. Headlight relay
14. Start switch
15. Engine stop switch
16. Ignition fuse
17. Signaling system fuse
18. Headlight fuse
19. Fuel level gauge
20. Speedometer light
21. High beam indicator light
22. Engine trouble warning light
23. Speed sensor
24. Turn signal indicator light
25. Horn
26. Turn signal relay
27. Front brake light switch
28. Rear brake light switch
29. Horn switch
30. Dimmer switch
31. Turn signal switch
32. Headlight
33. Front turn signal light (left)
34. Front turn signal light (right)
35. Rear turn signal light (left)
36. Rear turn signal light (right)
37. Tail/brake light
38. Ignition coil
39. Spark plug
40. Fuel injector
41. Fuel pump
42. ECU
43. Lean angle cut-off switch
44. Engine temperature sensor
45. Intake air pressure sensor
46. Intake air temperature sensor
47. Throttle position sensor
48. O2 sensor
49. ISC (idle speed control) valve
50. FI diagnostic tool

B ............... Black
Br ............... Brown
Ch ............... Chocolate
Dg ............... Dark green
G ................. Green
Gy ............... Gray
L .................. Blue
Lg ................ Light green
Or ................ Orange
P .................. Pink
R ................. Red
Sb ............... Sky blue
W ................. White
Y .................. Yellow
B/L ................ Black/Blue
B/G .............. Black/Green
B/R .............. Black/Red
B/W ............. Black/White
G/R.............. Green/Red
G/Y .............. Green/Y ellow
L/B ............... Blue/Black
L/W .............. Blue/White
L/Y ............... Blue/Y ellow
Or/B............. Orange/Black
P/W ............. Pink/White
R/B .............. Red/Black
R/L ............. Red/Blue
R/W ............. Red/White
W/B ............. White/Black
W/L ............. White/Blue
W/R ............. White/Red
Y/G .............. Yellow/Green
Br/L.............. Brown/Blue
Br/W ........... Brown/White
Gy/G ........... Gray/Green
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.

NOTICE

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)

TIP

- Before checking for continuity, set the pocket tester to “0” and to the “Ω × 1” range.
- When checking for continuity, switch back and forth between the switch positions a few times.

The terminal connections for switches (e.g., main switch, engine stop switch) are shown in an illustration similar to the one on the left. The switch positions are shown in the far left column and the switch lead colors are shown in the top row in the switch illustration.

TIP

“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 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 are shown in the far left column and the switch lead colors are shown in the top row in the switch illustration.

TIP

“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 red and brown when the switch is set to “ON”.

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

1. Rear brake light switch
2. Dimmer switch
3. Horn switch
4. Turn signal switch
5. Main fuse
6. Start switch
7. Engine stop switch
8. Main switch
9. Front brake light switch
10. Sidestand 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 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.
**NOTICE**

- 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)

**TIP**

Before checking for continuity, set the pocket tester to “0” and to the “Ω × 1” range.

---

**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.
TIP
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 Crankshaft position sensor
4 Main fuse
6 Battery
11 Main switch
12 Sidestand switch
15 Engine stop switch
16 Ignition fuse
33 Ignition coil
32 Spark plug
42 ECU
44 Lean angle cut-off switch
TROUBLESHOOTING

The ignition system fails to operate (no spark or intermittent spark).

Check:
1. main and ignition fuses
2. battery
3. spark plug
4. ignition spark gap
5. spark plug cap resistance
6. ignition coil resistance
7. crankshaft position sensor resistance
8. main switch
9. engine stop switch
10. sidestand switch
11. lean angle cut-off switch
12. wiring connections
   (of the entire ignition system)

TIP
- Before troubleshooting, remove the following part(s):
  1. battery box cover
  2. front cover
  3. leg shield 1
  4. footrest board
- Troubleshoot with the following special tool(s).

Ignition checker
90890-06754 (YM-34487)
Pocket tester
90890-03112(YU-03112-C)

1. Main and ignition fuses
- Check the main and ignition fuses for continuity.
  Refer to “CHECKING THE FUSES” in chapter 3.
- Are the main and ignition fuses OK?

   YES  NO

   Replace the fuse(s)

2. Battery
- Check the condition of the battery.
  Refer to “CHECKING AND CHARGING THE BATTERY” in chapter 3.
- Minimum open-circuit voltage
  12.8 V or more at 20°C (68°F)
- 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.
- Standard spark plug
  U22ESR-N (DENSO)
  Spark plug gap
  0.7 ~ 0.8 mm (0.028 ~ 0.031in)
- 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 SYSTEM

**4. Ignition spark gap**
- Disconnect the spark plug cap from the spark plug.
- Connect the ignition checker ① as shown.
- Spark plug cap ②.
- Set the main switch to “ON”.
- Measure the ignition spark gap a.
- 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 6 mm (0.24in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Is there a spark and is the spark gap within specification?</td>
</tr>
</tbody>
</table>

- **NO**
- **YES**

The ignition system is OK.

**5. Spark plug cap resistance**
- Remove the spark plug cap from the spark plug lead.
- Connect the ignition checker ① as shown.
- Spark plug cap ②.
- Connect the pocket tester (Ω × 1k” range) to the spark plug cap as shown.
- Measure the spark plug cap resistance.

**Spark plug cap resistance**
8~12 kΩ at 20°C (68°F)

- **YES**
- **NO**

Is the spark plug cap OK?

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 ①**
**Negative tester probe → red/black ②**
7. Crankshaft position sensor resistance

- Disconnect the crankshaft position sensor coupler from the wire harness.
- Connect the pocket tester (Ω × 100) to the crankshaft position sensor coupler as shown.

Positive tester probe → white/red (1)
Negative tester probe → white/blue (2)

8. Measure the primary coil resistance.

Primary coil resistance
2.16 ~ 2.64 Ω at 20°C (68°F)

- Connect the pocket tester (Ω × 1k) to the ignition coil as shown.

Negative tester probe → orange (2)
Positive tester probe → spark plug lead (1)

8. Measure the secondary coil resistance.

Secondary coil resistance
8.64 ~ 12.96 kΩ at 20°C (68°F)

- Is the ignition coil OK?

Replace the ignition coil.

8. Is the crankshaft position sensor OK?

Crankshaft position sensor resistance
248 ~ 372Ω at 20°C (68°F)
(between white/red and white/blue)

Replace the crankshaft position sensor/stator assembly.
8. Main switch
- Check the main switch for continuity. Refer to “CHECKING THE SWITCHES”.
- Is the main switch OK?

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>YES</td>
<td>Replace the main switch.</td>
</tr>
<tr>
<td>NO</td>
<td>Replace the main switch.</td>
</tr>
</tbody>
</table>

9. Engine stop switch
- Check the engine stop switch for continuity. Refer to “CHECKING THE SWITCHES”.
- Is the engine stop switch OK?

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>YES</td>
<td>Replace the right handlebar switch.</td>
</tr>
<tr>
<td>NO</td>
<td>Replace the right handlebar switch.</td>
</tr>
</tbody>
</table>

10. Sidestand switch
- Check the sidestand switch for continuity. Refer to “CHECKING THE SWITCHES”.
- Is the sidestand switch OK?

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>YES</td>
<td>Replace the sidestand switch.</td>
</tr>
<tr>
<td>NO</td>
<td>Replace the sidestand switch.</td>
</tr>
</tbody>
</table>

11. Lean angle cut-off switch
- Remove the lean angle cut-off switch.
- Connect the pocket tester (Ω × 1) to the lean angle cut-off switch terminals as shown.

Positive tester probe → blue ①
Negative tester probe → yellow/green ②

Lean angle cut-off switch voltage
- Less than 45° ③ → 0.4V
- More than 45° ⑤ → 1.4V

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>YES</td>
<td>Replace the lean angle cut-off switch.</td>
</tr>
<tr>
<td>NO</td>
<td>Replace the lean angle cut-off switch.</td>
</tr>
</tbody>
</table>
## 12. Wiring

- Check the entire ignition system's wiring. Refer to “CIRCUIT DIAGRAM”.
- Is the ignition system's wiring properly connected and without defects?

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Replace the ECU.</td>
<td>Properly connect or repair the ignition system's wiring.</td>
</tr>
</tbody>
</table>
ELEC STARTING SYSTEM

CIRCUIT DIAGRAM

1. Main fuse
2. Battery
3. Wire lead
4. Starter relay
5. Starter motor
6. Starting circuit cut-off relay
7. Main switch
8. Sidestand switch
9. Start switch
10. Engine stop switch
11. Ignition fuse
12. Signaling system fuse
13. Front brake light switch
14. Rear brake light switch

Diagram showing connections and components of the electric starting system.
STARTING CIRCUIT CUT-OFF SYSTEM OPERATION

If the engine stop switch is set to "O" and the main switch is set to "ON" (both switches are closed), the starter motor can only operate if at least one of the following conditions is met:

- The brake lever (front or rear) is pulled to the handlebar (the brake light switch is closed) and the sidestand is up (the sidestand switch is closed).

1. Battery
2. Main fuse
3. Main switch
4. Ignition fuse
5. Signaling system fuse
6. Front brake light switch
7. Rear brake light switch
8. Engine stop switch
9. Starting circuit cut-off relay
10. Sidestand switch
11. Start switch
12. Wire lead
13. Starter relay
14. Starter motor
The starter motor fails to turn.

Check:
1. main, signal and ignition fuses
2. battery
3. starter motor
4. starting circuit cut-off relay
5. starter relay
6. main switch
7. engine stop switch
8. brake light switch (front and rear)
9. sidestand switch
10. start switch
11. wiring connections
   (of the entire starting system)

TIP
- Before troubleshooting, remove the following part(s):
  1. battery box cover/front cover
  2. seat/trunk
  3. side cover (right)
  4. leg shield 1
- Troubleshoot with the following special tool(s).

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

---

1. Main, signal and ignition fuses
  - Check the main, signal and ignition fuses for continuity.
  - Refer to "CHECKING THE FUSES" in chapter 3.
  - Are the main, signal and ignition fuses OK?

   YES
   NO

   Replace the fuse(s).

2. Battery
  - Check the condition of the battery.
  - Refer to "CHECKING AND CHARGING THE BATTERY" in chapter 3.

   Minimum open-circuit voltage
   12.8 V or more at 20°C (68°F)

   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. Starting circuit cut-off relay
- Disconnect the starting circuit cut-off relay coupler from the wire harness.
- Connect the pocket tester (Ω × 1) and battery (12 V) to the starting circuit cut-off relay coupler as shown.

  Positive battery terminal → red/black (1)
  Negative battery terminal → black/white (2)

  Positive tester probe → blue/yellow (3)
  Negative tester probe → red/white (4)

- Does the starting circuit cut-off relay have continuity between blue/yellow and red/white?
  - **YES**
  - **NO**

  Replace the starting circuit cut-off relay.
### ELECTRIC STARTING SYSTEM

#### 5. 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.

<table>
<thead>
<tr>
<th>Positive battery terminal → red/white</th>
<th>Negative battery terminal → blue/white</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive tester probe → red</td>
<td>Negative tester probe → red</td>
</tr>
</tbody>
</table>

- Does the starter relay have continuity between red and red?

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Replace the starter relay.</td>
<td></td>
</tr>
</tbody>
</table>

#### 6. Main switch
- Check the main switch for continuity.
- Refer to “CHECKING THE SWITCHES”.
- Is the main switch OK?

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Replace the main switch.</td>
<td></td>
</tr>
</tbody>
</table>

#### 7. Engine stop switch
- Check the engine stop switch for continuity.
- Refer to “CHECKING THE SWITCHES”.
- Is the engine stop switch OK?

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Replace the right handlebar switch.</td>
<td></td>
</tr>
</tbody>
</table>

#### 8. Brake light switch (front and rear)
- Check the brake light switches for continuity.
  Refer to “CHECKING THE SWITCHES”.
- Is each brake light switch OK?

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Replace the brake light switch(es).</td>
<td></td>
</tr>
</tbody>
</table>

#### 9. Sidestand switch
- Check the sidestand switch for continuity.
  Refer to “CHECKING THE SWITCHES”.
- Is the sidestand switch OK?

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Replace the sidestand switch.</td>
<td></td>
</tr>
</tbody>
</table>
10. Start switch

- Check the start switch for continuity. Refer to “CHECKING THE SWITCHES”.
- Is the start switch OK?

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Replace the right handlebar switch.</td>
<td></td>
</tr>
</tbody>
</table>

11. Wiring

- Check the entire starting system’s wiring. Refer to “CIRCUIT DIAGRAM”.
- Is the starting system’s wiring properly connected and without defects?

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>The starting system circuit is ok.</td>
<td>Properly connect or repair the starting system’s wiring.</td>
</tr>
</tbody>
</table>
### ELECTRIC STARTING SYSTEM

**EAS00767**

**STARTER MOTOR**

![Diagram of starter motor components]

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q’ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><strong>Removing the starter motor</strong>&lt;br&gt;Seat/trunk</td>
<td></td>
<td>Remove the parts in the order listed. Refer to “COVER AND PANEL” in chapter 3. Refer to “ENGINE REMOVEL” in chapter 5. Disconnect. For installation, reverse the removal procedure.</td>
</tr>
<tr>
<td>2</td>
<td>Air filter/breather hose</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Starter motor lead/earth lead</td>
<td>1/1</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Starter motor</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

- **Disassembling the starter motor**
  - O-ring: 1<br>  - Starter motor front cover: 1<br>  - O-ring: 1<br>  - Brush: 2<br>  - Brush Spring: 2<br>  - Circlip: 1<br>  - Armature: 1<br>  - Stator: 1<br>  - O-ring: 1<br>  - Starter motor rear cover: 1

- **Order Job/Part**
  - **Removing the starter motor**
    - Seat/trunk
    - Air filter/breather hose
    - Starter motor lead/earth lead
    - Starter motor
  - **Disassembling the starter motor**
    - O-ring
    - Starter motor front cover
    - O-ring
    - Brush
    - Brush Spring
    - Circlip
    - Armature
    - Stator
    - O-ring
    - Starter motor rear cover

### Torque Specifications

- 7Nm (0.7 m•kgf, 5.1 ft•lbf)
- 4Nm (0.4 m•kgf, 2.9 ft•lbf)
For assembly, reverse the disassembly procedure.
CHECKING THE STARTER MOTOR

1. Check:
   - commutator
     Dirt → Clean with 600-grit sandpaper.

2. Measure:
   - commutator diameter \( \text{a} \)
     Out of specification → Replace the starter motor.

   Commutator wear limit
   21 mm (0.83in)

3. Measure:
   - mica undercut \( \text{b} \)
     Out of specification → Scrape the mica to the proper measurement with a hack-saw blade that has been grounded to fit the commutator.

   Mica undercut
   1.5 mm (0.06in)

TIP
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.

   Armature coil
   Commutator resistance \( \text{1} \)
   0.0252 ~ 0.0308 \( \Omega \) at 20°C (68°F)
   Insulation resistance \( \text{2} \)
   Above 1 M\( \Omega \) at 20°C (68°F)

   b. If any resistance is out of specification, replace the starter motor.
5. Measure:
- brush length \( \textcircled{a} \)
  Out of specification → Replace the brushes as a set.

[Brush length wear limit
3.5 mm (0.14in)]

6. Measure:
- brush spring force
  Out of specification → Replace the brush springs as a set.

[Brush spring force
5.52 ~ 8.28 N/mm (0.56 ~ 0.84kgf/mm, 1.24 ~ 1.86lbf/in)]

7. Check:
- gear teeth
  Damage/wear → Replace the gear.

8. Check:
- bearing \( \textcircled{1} \)
- oil seal \( \textcircled{2} \)
- bush \( \textcircled{3} \)
  Damage/wear → Replace.
ASSEMBLING THE STARTER MOTOR

1. Install:
   • brush spring
   • brush ①

2. Install:
   • armature
   • starter motor front cover ①
   • O-ing ② New
   • stator ③
   • O-ing ④ New
   • starter motor rear cover ⑤

3. Install:
   • O-rings New
   • bolts ①

TIP
Align the match marks ② on the stator with the match marks ⑥ on the front and starter motor rear covers.

\[ \text{4Nm (0.4m • kgf, 2.9ft • lbf)} \]
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)

TIP
- Before troubleshooting, remove the following part(s):
  1. battery box cover
  2. front cover
  3. leg shield 1
- Troubleshoot with the following special tool(s).

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

1. Main fuse
   - Check the main fuse for continuity.
   - Refer to “CHECKING THE FUSES” in chapter 3.
   - Is the main fuse OK?

   YES  NO

   Replace the fuse.

2. Battery
   - Check the condition of the battery.
   - Refer to “CHECKING AND CHARGING THE BATTERY” in chapter 3.

   Minimum open-circuit voltage
   12.8 V or more at 20°C (68°F)

   YES  NO

   - Clean the battery terminals.
   - Recharge or replace the battery.

3. Charging voltage
   - Connect the digital 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

   DC20V

   - 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.

4. Stator coil resistance

- Disconnect the starter coil coupler from the wire harness.
- Connect the pocket tester (\(\Omega \times 1\)) to the stator coil as shown.

Positive tester probe → white ①
Negative tester probe → white ②

Positive tester probe → white ①
Negative tester probe → white ③

Positive tester probe → white ②
Negative tester probe → white ③

- Measure the stator coil resistances.

**Stator coil resistance**

0.28 ~ 0.42 \(\Omega\) at 20°C (68°F)

- Is the stator coil OK?

YES

NO

Replace the crankshaft position sensor/stator coil assembly.

5. Wiring

- Check the wiring connections of the entire charging system. Refer to “CIRCUIT DIAGRAM”.
- Is the charging system’s wiring properly connected and without defects?

YES

NO

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, taillight or meter light.

Check:
1. main and headlight fuses
2. battery
3. main switch
4. dimmer switch
5. headlight relay
6. wiring connections
   (of the entire lighting system)

TIP
- Before troubleshooting, remove the following part(s):
  1. battery box cover
  2. front cover
  3. leg shield 1
- Troubleshoot with the following special tool(s).

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

1. Main and headlight fuses
   - Check the main and headlight fuses for continuity.
     Refer to “CHECKING THE FUSES” in chapter 3.
   - Are the fuses OK?

   YES  NO

Replace the fuse(s).

2. Battery
   - Check the condition of the battery.
     Refer to “CHECKING AND CHARGING THE BATTERY” in chapter 3.

Minimum open-circuit voltage
12.8 V or more at 20°C (68°F)

   - 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. Dimmer switch
   - Check the dimmer switch for continuity.
     Refer to “CHECKING THE SWITCHES”.
   - Is the dimmer switch OK?

   YES  NO

The dimmer switch is faulty. Replace the left handlebar switch.
5. Headlight relay
- Disconnect the headlight relay coupler from the wire harness.
- Connect the pocket tester (Ω × 1) and battery (12 V) to the headlight relay coupler as shown.

**Positive battery terminal → white/black ①**
**Negative battery terminal → brown/blue ②**

**Positive tester probe → blue/black ③**
**Negative tester probe → brown/blue ④**

- Does the headlight relay have continuity between blue/black and brown/blue?

  **YES**
  Replace the headlight relay.

  **NO**

6. 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**

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?

  **YES**
  Replace the headlight bulb, socket or both.

  **NO**

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?

  **YES**

  **NO**
  Replace the high beam indicator light bulb, socket or both.
### 3. Voltage

- Connect the pocket tester (DC 20 V) to the headlight and high beam indicator light couplers as shown.

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>When the dimmer switch is set to “%”</td>
<td>This circuit is OK.</td>
</tr>
<tr>
<td>When the dimmer switch is set to “&amp;”</td>
<td>The wiring circuit from the main switch to the headlight coupler or meter assembly coupler is faulty and must be repaired. Refer to “CIRCUIT DIAGRAM”.</td>
</tr>
</tbody>
</table>

#### Headlight
- Positive tester probe → yellow
- Negative tester probe → black
- Positive tester probe → green
- Negative tester probe → black

#### Headlight coupler

![Headlight coupler diagram](image)

#### High beam indicator light
- Positive tester probe → yellow
- Negative tester probe → black

#### Meter assembly coupler

![Meter assembly coupler diagram](image)

- Set the main switch to “ON”.
- Set the engine stop switch to “O”.
- Start the engine.
- Set the dimmer switch to “%” or “&”.
- Measure the voltage (DC 12 V) of yellow or green on the headlight coupler (wire harness side) and yellow on the meter assembly coupler (wire harness side).
- Is the voltage within specification?
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 → blue
   Negative tester probe → black

   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”.
3. 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?

   **YES**
   Replace the tail/brake light bulb, socket or both.

   **NO**

2. Voltage
   • Connect the pocket tester (DC 20 V) to the tail/brake light coupler (wire harness side) as shown.

   **Positive tester probe → blue**
   **Negative tester probe → black**

   • Set the main switch to “ON”.
   • Measure the voltage (DC 12 V) of blue 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 tail/brake light coupler is faulty and must be repaired. Refer to “CIRCUIT DIAGRAM”.
SIGNALING SYSTEM
CIRCUIT DIAGRAM

- Main fuse
- Battery
- Main switch
- Signaling system fuse
- Fuel level gauge
- Turn signal indicator light
- Horn
- Turn signal relay
- Front brake light switch
- Rear brake light switch
- Horn switch
- Turn signal switch
- Front turn signal light (left)
- Front turn signal light (right)
- Rear turn signal light (left)
- Rear turn signal light (right)
- Tail/brake light
- Fuel pump
TROUBLESHOOTING

- Any of the following fail to light: turn signal light, brake light or an indicator light.
- The horn fails to sound.

Check:
1. main and signaling fuses
2. battery
3. main switch
4. wiring connections (of the entire signaling system)

TIP
- Before troubleshooting, remove the following part(s):
  1. battery box cover
  2. front cover
  3. leg shield
- Troubleshoot with the following special tool(s).

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

1. Main and signaling fuses
   - Check the main and signaling fuses for continuity.
   - Refer to “CHECKING THE FUSES” in chapter 3.
   - Are the main and signaling fuses OK?

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 (68°F)

   - Is the battery OK?

   YES NO

   - Clean the battery terminals.
   - Recharge or replace the battery.

3. Main switch
   - Check the main switch for continuity.
   - Refer to “CHECKING THE SWITCHES”.
   - Is the main switch OK?

   YES NO

   Replace the main switch.

4. Wiring
   - Check the entire signal system’s wiring.
   - Refer to “CIRCUIT DIAGRAM”.
   - Is the signal system’s wiring properly connected and without defects?

   YES NO

   Check the condition of each of the signaling system’s circuits.
   - Refer to “CHECKING THE SIGNALING SYSTEM”.

   Properly connect or repair the signaling system’s wiring.
CHECKING THE SIGNALING SYSTEM

1. The horn fails to sound.

1. Horn switch
   - Check the horn switch for continuity.
   - Refer to “CHECKING THE SWITCHES”.
   - Is the horn switch OK?

   \[ \begin{array}{ll}
   \text{YES} & \rightarrow \text{NO} \\
   \text{Replace the left handlebar switch.}
   \end{array} \]

2. Voltage
   - Connect the pocket tester (DC 20 V) to the horn connector at the horn terminal as shown.

   Positive tester probe \( \rightarrow \) brown \( \circ \)
   Negative tester probe \( \rightarrow \) ground

   \[ \begin{array}{ll}
   \text{NO} & \rightarrow \text{YES} \\
   \text{The horn is OK.}
   \end{array} \]

3. Horn
   - Disconnect the pink connector at the horn terminal.
   - Connect a jumper lead \( \circ \) to the horn terminal and ground the jumper lead.
   - Set the main switch to “ON”.
   - Push the horn switch.
   - Does the horn sound?

   \[ \begin{array}{ll}
   \text{NO} & \rightarrow \text{YES} \\
   \text{Replace the horn.}
   \end{array} \]

4. Voltage
   - Connect the pocket tester (DC 20 V) to the horn connector at the pink terminal as shown.

   Positive tester probe \( \rightarrow \) pink \( \circ \)
   Negative tester probe \( \rightarrow \) ground

   \[ \begin{array}{ll}
   \text{NO} & \rightarrow \text{YES} \\
   \text{Repair or replace the horn.}
   \end{array} \]
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?
  
  **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?
  
  **YES**
  Replace the brake light switch.
  
  **NO**

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 ①**
  **Negative tester probe ➔ black ②**

- Set the main switch to “ON”.
- Pull in the brake levers.
- Measure the voltage (DC 12 V) of green/yellow ① on the tail/brake light coupler (wire harness side).
- Is the voltage within specification?
  
  **YES**
  This circuit is OK.
  
  **NO**
  The wiring circuit from the main switch to the tail/brake light coupler is faulty and must be repaired.
  Refer to “CIRCUIT DIAGRAM”.

7-38
3. The turn signal light, turn signal indicator light or both fail to blink.

1. Turn signal indicator light bulb and socket
   - Check the turn signal indicator light bulb and socket for continuity. Refer to “CHECKING THE BULBS AND BULB SOCKETS”
   - Are the turn signal indicator light bulb and socket OK?

   **YES**
   - Replace the turn signal indicator light bulb, socket or both.

   **NO**

2. Turn signal light bulb and socket
   - Check the turn signal light bulb and socket for continuity. Refer to “CHECKING THE BULBS AND BULB SOCKETS”
   - Are the turn signal light bulb and socket OK?

   **YES**
   - Replace the turn signal light bulb, socket or both.

   **NO**

3. 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.

4. Voltage
   - Connect the pocket tester (DC 20 V) to the turn signal relay coupler (wire harness side) as shown.
   - 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**
   - The wiring circuit from the main switch to the turn signal relay coupler is faulty and must be repaired. Refer to “CIRCUIT DIAGRAM”.

   **NO**
5. 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”.
- 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  NO

The turn signal relay is faulty and must be replaced.

6. Voltage
- Connect the pocket tester (DC 20 V) to the turn signal light coupler 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 the chocolate ① or dark green ② at the turn signal light coupler (wire harness side).
- Is the voltage within specification?

YES  NO

This circuit is OK.
The wiring circuit from the turn signal switch to the turn signal light coupler is faulty and must be repaired.
4. The fuel level gauge fails to operate.

1. Fuel sender
   - Remove the fuel pump 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)**
   4~10Ω at 20°C (68°F)
   **Fuel sender resistance (down position “E”) (Ω × 10)**
   90~100Ω at 20°C (68°F)

   - Is the fuel sender OK?

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?

---

Replace the fuel pump.
### 3. Fuel level gauge

- Set the main switch to “ON”.
- Move the float up (1) or down (2).

#### TIP
Before reading the fuel level gauge, leave the float in one position (either up or down) for at least three minutes.

- Check that the fuel level gauge needle moves to “F” or “E”.

#### Does the fuel level gauge needle move appropriately?

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>This circuit is OK.</td>
<td>Replace the speedometer.</td>
</tr>
</tbody>
</table>

### 4. Wiring

Check the entire signaling system’s wiring.
CHAPTER 8  
TROUBLE SHOOTING

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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 pump**
- Faulty fuel pump
- Improperly routed hose

**Throttle body**
- Deteriorated or contaminated fuel
- Sucked-in air

**ELECTRICAL SYSTEMS**

**Battery**
- Discharged battery
- Faulty battery

**Fuse(s)**
- 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 coil
- Faulty spark plug lead

**Ignition system**
- Faulty ECU
- Faulty crankshaft position sensor
- 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
- Faulty sidestand switch
- Improperly grounded circuit
- Loose connections

**Starting system**
- Faulty starter motor
- Faulty starter relay
- Faulty starting circuit cut-off relay
- Faulty starter clutch
INCORRECT ENGINE IDLING SPEED/POOR MEDIUM-AND-HIGH-SPEED PERFORMANCE

INCORRECT ENGINE IDLING SPEED
ENGINE
Cylinder and cylinder head
- Incorrect valve clearance
- Damaged valve train components

Air filter
- Clogged air filter element

FUEL SYSTEM
Throttle body
- Damaged or loose throttle body joint
- Improperly ISC (idle speed control) valve
- Improper throttle cable free play
- Flooded throttle body

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 ECU
- Faulty crankshaft position sensor

POOR MEDIUM-AND-HIGH-SPEED PERFORMANCE
Refer to “STARTING FAILURE/HARD START-ING”.

ENGINE
Air filter
- Clogged air filter element

FUEL SYSTEM
Throttle body
- Faulty diaphragm

Fuel pump
- Faulty fuel pump
**FAULTY CLUTCH/OVERHEATING**

**EAS00853**

**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
- Worn V-belt
- Oil or grease on the V-belt

Primary pulley weight(s)
- Faulty operation

**OVERHEATING**

ENGINE

Clogged coolant passages
- Heavy carbon buildup in cylinder head and piston

Engine oil
- Incorrect oil level
- Incorrect oil viscosity
- Inferior oil quality

FUEL SYSTEM

Throttle body
- Faulty throttle body
- Damaged or loose throttle body 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 ECU
- Faulty engine temperature sensor
POOR BRAKING PERFORMANCE

Disc brake
- Worn brake pad
- Worn brake disc
- Air in hydraulic brake system
- Leaking brake fluid
- Faulty brake caliper kit
- Faulty brake caliper seal
- Loose union bolt
- Damaged brake hose
- Oil or grease on the brake disc
- Oil or grease on the brake pad
- Incorrect brake fluid level

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

LEAKING OIL
- Bent, damaged or rusty inner tube
- Cracked or damaged outer tube
- Improperly installed oil seal
- Damaged oil seal lip
- Incorrect oil level (high)
- Loose damper rod assembly bolt
- Damaged damper rod assembly bolt copper washer
- Cracked or damaged cap bolt O-ring

MALFUNCTION
- Bent or damaged inner tube
- Bent or damaged outer tube
- Damaged fork spring
- Worn or damaged outer tube bushing
- Bent or damaged damper rod
- Incorrect oil viscosity
- Incorrect oil level

UNSTABLE HANDLING

Handlebar
- Bent or improperly installed handlebar

Steering head components
- Improperly installed handlebar bracket
- Improperly installed lower bracket (improperly tightened ring nut)
- Bent steering stem
- Damaged ball bearing or bearing race

Front fork leg(s)
- Uneven oil levels (both front fork legs)
- Unevenly tensioned fork spring (both front fork legs)
- Broken fork spring
- Bent or damaged inner tube
- Bent or damaged outer tube

Swingarm
- Worn bearing or bushing
- Bent or damaged swingarm

Rear shock absorber assemblies
- 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
FAULTY LIGHTING OR SIGNALING SYSTEM

HEADLIGHT DOES NOT COME ON
- Wrong headlight bulb
- Too many electrical accessories
- Hard charging
- Incorrect connection
- Improperly grounded circuit
- Poor contacts (main switch)
- Burnt-out headlight bulb
- Faulty headlight relay

HEADLIGHT BULB BURNT OUT
- Wrong headlight bulb
- Faulty battery
- Faulty rectifier/regulator
- Improperly grounded circuit
- Faulty main switch
- Faulty headlight relay
- 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
- Faulty front or rear brake light switch
- 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