SYMBOLS

The following symbols are not relevant to every vehicle.

Symbols ① to ⑫ indicate the subject of each chapter.
① General information
② Specifications
③ Periodic checks and adjustments
④ Engine
⑤ Cooling system
⑥ Fuel system
⑦ Drive train
⑧ Chassis
⑨ Electrical
⑩ Troubleshooting

Symbols ⑪ to ⑬ indicate the following.
⑪ Can be serviced with engine mounted
⑫ Filling fluid
⑬ Lubricant
⑭ Special tool
⑮ Torque
⑯ Wear limit, clearance
⑰ Engine speed
⑱ Electrical data (Ω, V, A)

Symbols ⑲ to ⑴ in the exploded diagrams indicate the types of lubricants and lubrication points.
⑲ Apply engine oil
⑳ Apply gear oil
⑳ Apply molybdenum disulfide oil
⑳ Apply wheel bearing grease
⑳ Apply lithium-soap-based grease
⑳ Apply molybdenum disulfide grease

Symbols ⑷ to ⑸ in the exploded diagrams indicate where to apply a locking agent ⑸ and when to install a new part ⑹.
⑸ Apply the locking agent (LOCTITE®)
⑹ Replace
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NOTICE

This manual was produced by the Yamaha Motor Company 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, so it is assumed that anyone who uses this book to perform maintenance and repairs on Yamaha vehicle has a basic understanding of the mechanical ideas and the procedures of vehicle repair. Repairs attempted by anyone without this knowledge are likely to render the vehicle unsafe and unfit for use.

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

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

IMPORTANT INFORMATION

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

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

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

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

NOTE: A NOTE provides key information to make procedures easier or clearer.
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<td>Poor speed performance</td>
<td>10-5</td>
</tr>
<tr>
<td>Overheating</td>
<td>10-5</td>
</tr>
<tr>
<td>Faulty brake</td>
<td>10-5</td>
</tr>
<tr>
<td>Poor braking effect</td>
<td>10-5</td>
</tr>
<tr>
<td>Shock absorber malfunction</td>
<td>10-5</td>
</tr>
<tr>
<td>Malfunction</td>
<td>10-5</td>
</tr>
<tr>
<td>Unstable handling</td>
<td>10-6</td>
</tr>
<tr>
<td>Lighting system</td>
<td>10-6</td>
</tr>
<tr>
<td>Headlight does not come on</td>
<td>10-6</td>
</tr>
<tr>
<td>Bulb burnt out</td>
<td>10-6</td>
</tr>
</tbody>
</table>
GENERAL INFORMATION

VEHICLE IDENTIFICATION

VEHICLE IDENTIFICATION NUMBER
The vehicle identification number ① is stamped into the left side of the frame.

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

PREPARATION FOR REMOVAL PROCEDURES

1. Remove all dirt, mud, dust and foreign material before removal and disassembly.
2. Use proper tools and cleaning equipment. Refer to “SPECIAL TOOLS”.
3. When disassembling the vehicle, always keep mated parts together. This includes gears, cylinder, piston and other parts that have been “mated” through normal wear. Mated parts must always be reused or replaced as an assembly.
4. During vehicle disassembly, clean all 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

1. 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. Replace all gaskets, seals and O-rings when overhauling the engine. All gasket surfaces, oil seal lips and O-rings must be cleaned.
2. Properly oil all mating parts and bearings during reassembly. Apply grease to the oil seal lips.
**LOCK WASHERS/PLATES AND COTTER PINS**

1. Replace all lock washers/plates (1) and cotter pins after removal. Bend lock tabs along the bolt or nut flats after the bolt or nut has been tightened to specification.

**BEARINGS AND OIL SEALS**

1. Install bearings and oil seals so that the manufacturer's marks or numbers are visible. When installing oil seals, apply a light coating of lithium-soap-based grease to the seal lips. Oil bearings liberally when installing, if appropriate.

   **CAUTION:**

   Do not use compressed air to spin the bearings dry. This will damage the bearing surfaces.

**CIRCLIPS**

1. Check all circlips carefully before reassembly. Always replace piston pin clips after one use. Replace distorted circlips. When installing a circlip (1), make sure that the sharp-edged corner (2) is positioned opposite the thrust (3) it receives. See sectional view.
CHECKING OF CONNECTIONS

Check the connectors for stains, rust, moisture, etc.

1. Disconnect:
   • connector

2. Check:
   • connector
   Moisture → Dry each terminal with an air blower.
   Stains/rust → Connect and disconnect the terminals several times.

3. Check:
   • connector leads
   Looseness → Bend up the pin ① and connect the terminals.

4. Connect:
   • connector terminals

NOTE: ______________________
The two terminals “click” together.

5. Check:
   • continuity (using a pocket tester)

NOTE: ______________________
• If there is no continuity, clean the terminals.
• When checking the wire harness be sure to perform steps 1 to 3.
• As a quick remedy, use a contact revitalizer available at most part stores.
• Check the connector with a pocket tester as shown.
**SPECIAL TOOLS**

The following special tools are necessary for complete and accurate tune-up and assembly. Use only the appropriate special tools; this will help prevent damage caused by the use of inappropriate tools or improvised techniques. Special tools may differ by shape and part number from country to country. In such a case, two types are provided. When placing an order, refer to the list provided below to avoid any mistakes.

For US and CDN
P/N. YM-, YU-, YS-, YK-, ACC-
Except for US and CDN
P/N. 90890-

<table>
<thead>
<tr>
<th>Tool No.</th>
<th>Tool name/Function</th>
<th>Illustration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bolt 90890-01083 YU-01083-1 Weight 90890-01084 YU-01083-3</td>
<td>Slide hammer bolt (M6)/weight These tools are used to remove the rocker arm shafts.</td>
<td><img src="slide_hammer_bolt.png" alt="Slide hammer bolt" /></td>
</tr>
<tr>
<td>90890-01135 YU-01135-B</td>
<td>Crankcase separating tool This tool is used to separate the crankcase.</td>
<td><img src="crankcase_separating_tool.png" alt="Crankcase separating tool" /></td>
</tr>
<tr>
<td>90890-01225 YM-01225-A</td>
<td>Valve guide remover (7.0 mm) This tool is needed to remove and install the valve guides.</td>
<td><img src="valve_guide_remover.png" alt="Valve guide remover" /></td>
</tr>
<tr>
<td>90890-01227 YM-01227</td>
<td>Valve guide reamer (7.0 mm) This tool is needed to rebore the new valve guides.</td>
<td><img src="valve_guide_reamer.png" alt="Valve guide reamer" /></td>
</tr>
<tr>
<td>90890-01229 YM-01229</td>
<td>Coupling gear/middle shaft tool This tool is needed when removing or installing the coupling gear nut.</td>
<td><img src="coupling_gear_tool.png" alt="Coupling gear/middle shaft tool" /></td>
</tr>
<tr>
<td>90890-01275 YU-90060</td>
<td>Crankshaft installer bolt This tool is used to install the crankshaft.</td>
<td><img src="crankshaft_installer_bolt.png" alt="Crankshaft installer bolt" /></td>
</tr>
<tr>
<td>Tool No.</td>
<td>Tool name/Function</td>
<td>Illustration</td>
</tr>
<tr>
<td>---------------</td>
<td>------------------------------------------</td>
<td>--------------</td>
</tr>
<tr>
<td>90890-01304</td>
<td>Piston pin puller</td>
<td><img src="image1.png" alt="Illustration" /></td>
</tr>
<tr>
<td>YU-01304</td>
<td>This tool is used to remove the piston pin.</td>
<td></td>
</tr>
<tr>
<td>90890-01311</td>
<td>Tappet adjusting tool</td>
<td><img src="image2.png" alt="Illustration" /></td>
</tr>
<tr>
<td>YM-08035-A</td>
<td>Valve adjuster 3 mm &amp; 4 mm</td>
<td></td>
</tr>
<tr>
<td>90890-01312</td>
<td>This tool is necessary for adjusting the valve clearance.</td>
<td></td>
</tr>
<tr>
<td>YM-01312-A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>90890-01325</td>
<td>Fuel level gauge</td>
<td><img src="image3.png" alt="Illustration" /></td>
</tr>
<tr>
<td>YM-02460-01</td>
<td>This gauge is used to measure the fuel level in the float chamber.</td>
<td></td>
</tr>
<tr>
<td>90890-01325</td>
<td>Radiator cap tester</td>
<td><img src="image4.png" alt="Illustration" /></td>
</tr>
<tr>
<td>YM-01325-01</td>
<td>This tool is used to check the cooling system.</td>
<td></td>
</tr>
<tr>
<td>90890-01348</td>
<td>Locknut wrench</td>
<td><img src="image5.png" alt="Illustration" /></td>
</tr>
<tr>
<td>YM-01348</td>
<td>This tool is needed when removing or installing the secondary sheave spring.</td>
<td></td>
</tr>
<tr>
<td>90890-01352</td>
<td>Radiator cap tester adapter</td>
<td><img src="image6.png" alt="Illustration" /></td>
</tr>
<tr>
<td>YM-03984</td>
<td>This tool is used to check the cooling system.</td>
<td></td>
</tr>
<tr>
<td>90890-01404</td>
<td>Flywheel puller</td>
<td><img src="image7.png" alt="Illustration" /></td>
</tr>
<tr>
<td>YM-01404</td>
<td>This tool is needed to remove the rotor.</td>
<td></td>
</tr>
<tr>
<td>90890-01426</td>
<td>Oil filter wrench</td>
<td><img src="image8.png" alt="Illustration" /></td>
</tr>
<tr>
<td>YU-38411</td>
<td>This tool is needed to loosen or tighten the oil filter cartridge.</td>
<td></td>
</tr>
<tr>
<td>Tool No.</td>
<td>Tool name/Function</td>
<td>Illustration</td>
</tr>
<tr>
<td>---------------</td>
<td>--------------------------------------------</td>
<td>--------------</td>
</tr>
<tr>
<td>90890-01430</td>
<td>Ring nut wrench</td>
<td></td>
</tr>
<tr>
<td>YM-38404</td>
<td>This tool is needed to removing and</td>
<td></td>
</tr>
<tr>
<td></td>
<td>installing the middle driven shaft</td>
<td></td>
</tr>
<tr>
<td></td>
<td>bearing retainer</td>
<td></td>
</tr>
<tr>
<td>90890-01467</td>
<td>Gear lash measurement tool</td>
<td></td>
</tr>
<tr>
<td>YM-01467</td>
<td>This tool is used to measure the gear</td>
<td></td>
</tr>
<tr>
<td></td>
<td>lash</td>
<td></td>
</tr>
<tr>
<td>90890-01474</td>
<td>Ball joint remover/installer set</td>
<td></td>
</tr>
<tr>
<td>YM-01474</td>
<td>Ball joint adapter set</td>
<td></td>
</tr>
<tr>
<td></td>
<td>These tools are used to removing or</td>
<td></td>
</tr>
<tr>
<td></td>
<td>installing the ball joints</td>
<td></td>
</tr>
<tr>
<td>90890-01701</td>
<td>Sheave holder</td>
<td></td>
</tr>
<tr>
<td>YS-01880-A</td>
<td>Primary sheave holder</td>
<td></td>
</tr>
<tr>
<td></td>
<td>This tool is needed to hold the primary</td>
<td></td>
</tr>
<tr>
<td></td>
<td>sheave when removing or installing the</td>
<td></td>
</tr>
<tr>
<td></td>
<td>sheave bolts</td>
<td></td>
</tr>
<tr>
<td>Compression</td>
<td>Compression gauge</td>
<td></td>
</tr>
<tr>
<td>gauge</td>
<td>Adapter (compression gauge)</td>
<td></td>
</tr>
<tr>
<td>90890-03081</td>
<td>These tools are needed to measure</td>
<td></td>
</tr>
<tr>
<td>Engine</td>
<td>engine compression</td>
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</tr>
<tr>
<td>compression</td>
<td></td>
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</tr>
<tr>
<td>tester</td>
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<tr>
<td>YU-33223</td>
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<tr>
<td>Extension</td>
<td></td>
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<tr>
<td>90890-04082</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pocket</td>
<td>Pocket tester</td>
<td></td>
</tr>
<tr>
<td>tester</td>
<td>This instrument is needed for checking</td>
<td></td>
</tr>
<tr>
<td>90890-03112</td>
<td>the electrical system</td>
<td></td>
</tr>
<tr>
<td>YU-03112-C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Timing light</td>
<td>Timing light</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Inductive clamp timing light</td>
<td></td>
</tr>
<tr>
<td>90890-03141</td>
<td>This instrument is necessary for checking</td>
<td></td>
</tr>
<tr>
<td>YU-03141</td>
<td>ignition timing</td>
<td></td>
</tr>
<tr>
<td>Valve guide</td>
<td>Valve guide installer (7.0 mm)</td>
<td></td>
</tr>
<tr>
<td>installer</td>
<td>This tool is needed to install the valve</td>
<td></td>
</tr>
<tr>
<td>(7.0 mm)</td>
<td>guides</td>
<td></td>
</tr>
<tr>
<td>Tool No.</td>
<td>Tool name/Function</td>
<td>Illustration</td>
</tr>
<tr>
<td>------------------</td>
<td>------------------------------------------</td>
<td>--------------</td>
</tr>
<tr>
<td>90890-04019</td>
<td>Valve spring compressor</td>
<td></td>
</tr>
<tr>
<td>YM-04019</td>
<td>This tool is needed to remove and install the valve assemblies.</td>
<td></td>
</tr>
<tr>
<td>Middle driven shaft bearing driver</td>
<td>Middle driven shaft bearing driver</td>
<td></td>
</tr>
<tr>
<td>90890-04058</td>
<td>Mechanical seal installer</td>
<td></td>
</tr>
<tr>
<td>YM-04058</td>
<td>These tools are used to install the water pump seal.</td>
<td></td>
</tr>
<tr>
<td>Mechanical seal installer</td>
<td>Adapter #11</td>
<td></td>
</tr>
<tr>
<td>90890-04078</td>
<td>Spacer (crankshaft)</td>
<td></td>
</tr>
<tr>
<td>YM-33221-A</td>
<td>These tools are used to install the crankshaft.</td>
<td></td>
</tr>
<tr>
<td>Adapter</td>
<td>Universal joint holder</td>
<td></td>
</tr>
<tr>
<td>YM-33279</td>
<td>This tool is needed when removing or installing the universal joint yoke nut.</td>
<td></td>
</tr>
<tr>
<td>Spacer</td>
<td>Universal clutch holder</td>
<td></td>
</tr>
<tr>
<td>90890-04060</td>
<td>This tool is needed to hold the clutch carrier when removing or installing the carrier nut.</td>
<td></td>
</tr>
<tr>
<td>YM-90070-A</td>
<td>Buffer boss installer set</td>
<td></td>
</tr>
<tr>
<td>90890-04086</td>
<td>These tools are used to install the crankshaft.</td>
<td></td>
</tr>
<tr>
<td>YM-91042</td>
<td>Bearing retainer wrench</td>
<td></td>
</tr>
<tr>
<td>90890-04128</td>
<td>Middle gear bearing retainer</td>
<td></td>
</tr>
<tr>
<td>YM-04128</td>
<td>This tool is needed when removing or installing the bearing retainer.</td>
<td></td>
</tr>
<tr>
<td>Sheave spring compressor</td>
<td>Sheave spring compressor</td>
<td></td>
</tr>
<tr>
<td>90890-04134</td>
<td>This tool is needed when removing or installing the secondary sheave spring.</td>
<td></td>
</tr>
<tr>
<td>YM-04134</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tool No.</td>
<td>Tool name/Function</td>
<td>Illustration</td>
</tr>
<tr>
<td>-------------</td>
<td>--------------------------------------------------------</td>
<td>--------------</td>
</tr>
<tr>
<td>90890-04135</td>
<td>Sheave fixed block</td>
<td></td>
</tr>
<tr>
<td>YM-04135</td>
<td>This tool is needed when removing or installing the secondary sheave spring.</td>
<td></td>
</tr>
<tr>
<td>90890-06754</td>
<td>Ignition checker</td>
<td></td>
</tr>
<tr>
<td>YM-34487</td>
<td>Opama Pet-4000 spark checker</td>
<td></td>
</tr>
<tr>
<td></td>
<td>This instrument is necessary for checking the ignition system components.</td>
<td></td>
</tr>
<tr>
<td>90890-06760</td>
<td>Digital tachometer</td>
<td></td>
</tr>
<tr>
<td>YU-39951-B</td>
<td>This instrument is needed for observing engine rpm.</td>
<td></td>
</tr>
<tr>
<td>90890-85505</td>
<td>Yamaha bond No. 1215 (Three Bond No.1215®)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>This bond is used on crankcase mating surfaces, etc.</td>
<td></td>
</tr>
<tr>
<td>YM-01477</td>
<td>Ball joint remover/installer attachment set</td>
<td></td>
</tr>
<tr>
<td></td>
<td>This tool is used to remove and install the ball joints.</td>
<td></td>
</tr>
<tr>
<td>YU-90050</td>
<td>Crankshaft installer set</td>
<td></td>
</tr>
<tr>
<td></td>
<td>These tools are used to install the crankshaft.</td>
<td></td>
</tr>
</tbody>
</table>
## GENERAL SPECIFICATIONS

### SPECIFICATIONS

#### GENERAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>Item</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Model code</strong></td>
<td>2P51 (for USA)</td>
</tr>
<tr>
<td></td>
<td>2P52 (for CDN)</td>
</tr>
<tr>
<td></td>
<td>2P53 (for Europe)</td>
</tr>
<tr>
<td><strong>Dimensions</strong></td>
<td></td>
</tr>
<tr>
<td>Overall length</td>
<td>2,885 mm (113.6 in)</td>
</tr>
<tr>
<td>Overall width</td>
<td>1,385 mm (54.5 in)</td>
</tr>
<tr>
<td>Overall height</td>
<td>1,853 mm (73.0 in)</td>
</tr>
<tr>
<td>Seat height</td>
<td>818 mm (32.2 in)</td>
</tr>
<tr>
<td>Wheelbase</td>
<td>1,910 mm (75.2 in)</td>
</tr>
<tr>
<td>Minimum ground clearance</td>
<td>280 mm (11.02 in)</td>
</tr>
<tr>
<td>Minimum turning radius</td>
<td>3,900 mm (153.5 in)</td>
</tr>
<tr>
<td><strong>Basic weight</strong></td>
<td></td>
</tr>
<tr>
<td>With oil and full fuel tank</td>
<td>501 kg (1,105 lb) (for USA and CDN)</td>
</tr>
<tr>
<td></td>
<td>514 kg (1,133 lb) (for Europe)</td>
</tr>
<tr>
<td><strong>Engine</strong></td>
<td></td>
</tr>
<tr>
<td>Engine type</td>
<td>Liquid-cooled 4-stroke, SOHC</td>
</tr>
<tr>
<td>Cylinder arrangement</td>
<td>Forward-inclined single cylinder</td>
</tr>
<tr>
<td>Displacement</td>
<td>421 cm³</td>
</tr>
<tr>
<td>Bore × stroke</td>
<td>84.5 × 75.0 mm (3.33 × 2.95 in)</td>
</tr>
<tr>
<td>Compression ratio</td>
<td>10.0 : 1</td>
</tr>
<tr>
<td>Standard compression pressure (at sea level)</td>
<td>1,270 kPa (12.7 kg/cm², 180.6 psi)</td>
</tr>
<tr>
<td></td>
<td>at 700 r/min</td>
</tr>
<tr>
<td>Starting system</td>
<td>Electric starter</td>
</tr>
<tr>
<td>Lubrication system</td>
<td>Wet sump</td>
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</tbody>
</table>
### GENERAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>Item</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Oil type or grade</strong></td>
<td></td>
</tr>
<tr>
<td>Engine oil</td>
<td></td>
</tr>
<tr>
<td>For USA and CDN</td>
<td><strong>API service SE, SF, SG type or higher</strong></td>
</tr>
<tr>
<td>-20° 10° 30° 50° 70° 90° 110°</td>
<td><strong>YAMALUBE 4 (20W40) or SAE 20W40</strong></td>
</tr>
<tr>
<td>0° 10° 30° 50°</td>
<td><strong>YAMALUBE 4 (10W30) or SAE 10W30</strong></td>
</tr>
<tr>
<td>SAE 5W30</td>
<td></td>
</tr>
<tr>
<td><strong>For Europe</strong></td>
<td></td>
</tr>
<tr>
<td>Temp. 0° 10° 20° 30° 40° 50°C</td>
<td></td>
</tr>
<tr>
<td>5W/30</td>
<td><strong>SAE 80API “GL-4” Hypoid gear oil</strong></td>
</tr>
<tr>
<td>10W/30</td>
<td><strong>SAE 80API “GL-4” Hypoid gear oil</strong></td>
</tr>
<tr>
<td>10W/40</td>
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</tr>
<tr>
<td>15W/40</td>
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<tr>
<td>20W/40</td>
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</tr>
<tr>
<td><strong>Final gear oil</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Differential gear oil</strong></td>
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</tr>
<tr>
<td><strong>Oil quantity</strong></td>
<td></td>
</tr>
<tr>
<td>Engine oil</td>
<td></td>
</tr>
<tr>
<td>Periodic oil change</td>
<td>2.50 L (2.20 Imp qt, 2.64 US qt)</td>
</tr>
<tr>
<td>With oil filter replacement</td>
<td>2.60 L (2.29 Imp qt, 2.75 US qt)</td>
</tr>
<tr>
<td>Total amount</td>
<td>3.40 L (2.99 Imp qt, 3.59 US qt)</td>
</tr>
<tr>
<td>Final gear oil</td>
<td></td>
</tr>
<tr>
<td>Periodic oil change</td>
<td>0.25 L (0.22 Imp qt, 0.26 US qt)</td>
</tr>
<tr>
<td>Total amount</td>
<td>0.28 L (0.25 Imp qt, 0.30 US qt)</td>
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<tr>
<td>Differential gear case oil</td>
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</tr>
<tr>
<td>Periodic oil change</td>
<td>0.32 L (0.28 Imp qt, 0.34 US qt)</td>
</tr>
<tr>
<td>Total amount</td>
<td>0.33 L (0.29 Imp qt, 0.35 US qt)</td>
</tr>
<tr>
<td><strong>Air filter</strong></td>
<td></td>
</tr>
<tr>
<td>Engine</td>
<td>Wet element</td>
</tr>
<tr>
<td>Intake duct</td>
<td>Dry element</td>
</tr>
<tr>
<td><strong>Fuel</strong></td>
<td></td>
</tr>
<tr>
<td>Type</td>
<td>Unleaded gasoline only (for USA)</td>
</tr>
<tr>
<td></td>
<td>Regular unleaded gasoline only (for CDN and</td>
</tr>
<tr>
<td></td>
<td>Europe)</td>
</tr>
<tr>
<td>Fuel tank capacity</td>
<td>30 L (6.60 Imp gal, 7.93 US gal)</td>
</tr>
<tr>
<td><strong>Carburetor</strong></td>
<td></td>
</tr>
<tr>
<td>Type/quantity</td>
<td>BSR33/1</td>
</tr>
<tr>
<td>Manufacturer</td>
<td>MIKUNI</td>
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### GENERAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>Item</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Spark plug</strong></td>
<td></td>
</tr>
<tr>
<td>Type/manufacturer</td>
<td>DR8EA/NGK</td>
</tr>
<tr>
<td>Spark plug gap</td>
<td>0.6 ~ 0.7 mm (0.024 ~ 0.028 in)</td>
</tr>
<tr>
<td><strong>Clutch type</strong></td>
<td>Wet, centrifugal automatic</td>
</tr>
<tr>
<td><strong>Transmission</strong></td>
<td></td>
</tr>
<tr>
<td>Primary reduction system</td>
<td>V-belt</td>
</tr>
<tr>
<td>Secondary reduction system</td>
<td>Shaft drive</td>
</tr>
<tr>
<td>Secondary reduction ratio</td>
<td>43/20 × 24/17 × 33/9 (11.129)</td>
</tr>
<tr>
<td>Transmission type</td>
<td>V-belt automatic</td>
</tr>
<tr>
<td>Operation</td>
<td>Right hand operation</td>
</tr>
<tr>
<td>Single speed automatic</td>
<td>2.55 ~ 0.75 : 1</td>
</tr>
<tr>
<td>Sub transmission ratio</td>
<td>low 43/18 (2.389)</td>
</tr>
<tr>
<td></td>
<td>high 39/22 (1.773)</td>
</tr>
<tr>
<td>Reverse gear</td>
<td>30/15 (2.000)</td>
</tr>
<tr>
<td><strong>Chassis</strong></td>
<td></td>
</tr>
<tr>
<td>Frame type</td>
<td>Steel tube frame</td>
</tr>
<tr>
<td>Caster angle</td>
<td>5.0°</td>
</tr>
<tr>
<td>Camber angle</td>
<td>0°</td>
</tr>
<tr>
<td>Kingpin angle</td>
<td>12°</td>
</tr>
<tr>
<td>Kingpin offset</td>
<td>0 mm (0 in)</td>
</tr>
<tr>
<td>Trail</td>
<td>26 mm (1.02 in)</td>
</tr>
<tr>
<td>Tread (STD)</td>
<td>front 1,115 mm (43.90 in)</td>
</tr>
<tr>
<td></td>
<td>rear 1,105 mm (43.50 in)</td>
</tr>
<tr>
<td>Toe-in</td>
<td>15 ~ 25 mm (0.59 ~ 0.98 in)</td>
</tr>
<tr>
<td><strong>Tire</strong></td>
<td></td>
</tr>
<tr>
<td>Type</td>
<td>Tubeless</td>
</tr>
<tr>
<td>Size</td>
<td>front 25 x 8–12NHS</td>
</tr>
<tr>
<td></td>
<td>rear 25 x 10–12NHS</td>
</tr>
<tr>
<td>Manufacturer</td>
<td>front MAXXIS</td>
</tr>
<tr>
<td></td>
<td>rear MAXXIS</td>
</tr>
<tr>
<td>Type</td>
<td>front M951Y</td>
</tr>
<tr>
<td></td>
<td>rear M952Y</td>
</tr>
<tr>
<td><strong>Tire pressure (cold tire)</strong></td>
<td></td>
</tr>
<tr>
<td>Maximum load*</td>
<td>406 kg (895 lb) (for USA and CDN)</td>
</tr>
<tr>
<td></td>
<td>393 kg (866 lb) (for Europe)</td>
</tr>
<tr>
<td>Off-road riding</td>
<td>front 63 ~ 77 kPa (0.63 ~ 0.77 kgf/cm², 9 ~ 11 psi)</td>
</tr>
<tr>
<td></td>
<td>rear 91 ~ 105 kPa (0.91 ~ 1.05 kgf/cm², 13 ~ 15 psi)</td>
</tr>
<tr>
<td>* Load is total weight of cargo, operator, passenger, accessories and tongue weight</td>
<td></td>
</tr>
<tr>
<td><strong>Brake</strong></td>
<td></td>
</tr>
<tr>
<td>Operation</td>
<td>Front and rear unified</td>
</tr>
<tr>
<td>Front brake type</td>
<td>Dual disc brake</td>
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<tr>
<td>Rear brake type</td>
<td>Single disc brake</td>
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### GENERAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>Item</th>
<th>Standard</th>
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<tbody>
<tr>
<td><strong>Suspension</strong></td>
<td></td>
</tr>
<tr>
<td>Front suspension</td>
<td>Double wishbone</td>
</tr>
<tr>
<td>Rear suspension</td>
<td>Double wishbone</td>
</tr>
<tr>
<td><strong>Shock absorber</strong></td>
<td></td>
</tr>
<tr>
<td>Front shock absorber</td>
<td>Coil spring/oil damper</td>
</tr>
<tr>
<td>Rear shock absorber</td>
<td>Coil spring/oil damper</td>
</tr>
<tr>
<td><strong>Wheel travel</strong></td>
<td></td>
</tr>
<tr>
<td>Front wheel travel</td>
<td>185 mm (7.28 in)</td>
</tr>
<tr>
<td>Rear wheel travel</td>
<td>185 mm (7.28 in)</td>
</tr>
<tr>
<td><strong>Electrical</strong></td>
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</tr>
<tr>
<td>Ignition system</td>
<td>D.C. C.D.I.</td>
</tr>
<tr>
<td>Generator system</td>
<td>A.C. magneto</td>
</tr>
<tr>
<td>Battery type</td>
<td>U1L-11</td>
</tr>
<tr>
<td>Battery capacity</td>
<td>12 V, 28 Ah</td>
</tr>
<tr>
<td><strong>Headlight type</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Halogen bulb</td>
</tr>
<tr>
<td><strong>Bulb wattage × quantity</strong></td>
<td></td>
</tr>
<tr>
<td>Headlight</td>
<td>12 V 30 W/30 W × 2</td>
</tr>
<tr>
<td>Tail/brake light</td>
<td>12 V 5 W/21 W × 2</td>
</tr>
<tr>
<td><strong>Indicator lights</strong></td>
<td></td>
</tr>
<tr>
<td>For USA</td>
<td></td>
</tr>
<tr>
<td>Neutral indicator light</td>
<td>12 V 1.7 W × 1</td>
</tr>
<tr>
<td>Reverse indicator light</td>
<td>12 V 1.7 W × 1</td>
</tr>
<tr>
<td>Coolant temperature warning light</td>
<td>12 V 1.7 W × 1</td>
</tr>
<tr>
<td>Parking brake indicator light</td>
<td>12 V 1.7 W × 1</td>
</tr>
<tr>
<td>Four-wheel drive indicator light</td>
<td>12 V 1.7 W × 1</td>
</tr>
<tr>
<td>Differential gear lock indicator light</td>
<td>12 V 1.7 W × 1</td>
</tr>
<tr>
<td>For CDN and Europe</td>
<td></td>
</tr>
<tr>
<td>Neutral indicator light</td>
<td>LED</td>
</tr>
<tr>
<td>Reverse indicator light</td>
<td>LED</td>
</tr>
<tr>
<td>Coolant temperature warning light</td>
<td>LED</td>
</tr>
<tr>
<td>Parking brake indicator light</td>
<td>LED</td>
</tr>
<tr>
<td>Four-wheel drive indicator light</td>
<td>LCD</td>
</tr>
<tr>
<td>High-range indicator light</td>
<td>LED</td>
</tr>
<tr>
<td>Low-range indicator light</td>
<td>LED</td>
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<tr>
<td>Differential gear lock indicator light</td>
<td>LED</td>
</tr>
<tr>
<td>Item</td>
<td>Standard</td>
</tr>
<tr>
<td>----------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td><strong>Cylinder head</strong></td>
<td></td>
</tr>
<tr>
<td>Warp limit *</td>
<td>-----</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Cylinder</strong></td>
<td></td>
</tr>
<tr>
<td>Bore size</td>
<td>84.500 ~ 84.510 mm</td>
</tr>
<tr>
<td></td>
<td>(3.3268 ~ 3.3272 in)</td>
</tr>
<tr>
<td>Out-of-round limit</td>
<td>----</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Taper limit</td>
<td>----</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Camshaft</strong></td>
<td></td>
</tr>
<tr>
<td>Drive method</td>
<td>Chain drive (left)</td>
</tr>
<tr>
<td>Cam dimensions</td>
<td></td>
</tr>
<tr>
<td>Intake &quot;A&quot;</td>
<td>40.62 ~ 40.72 mm</td>
</tr>
<tr>
<td></td>
<td>(1.5992 ~ 1.6031 in)</td>
</tr>
<tr>
<td>&quot;B&quot;</td>
<td>32.18 ~ 32.28 mm</td>
</tr>
<tr>
<td></td>
<td>(1.2669 ~ 1.2709 in)</td>
</tr>
<tr>
<td>Exhaust &quot;A&quot;</td>
<td>40.62 ~ 40.72 mm</td>
</tr>
<tr>
<td></td>
<td>(1.5992 ~ 1.6031 in)</td>
</tr>
<tr>
<td>&quot;B&quot;</td>
<td>32.18 ~ 32.28 mm</td>
</tr>
<tr>
<td></td>
<td>(1.2669 ~ 1.2709 in)</td>
</tr>
<tr>
<td>Camshaft runout limit</td>
<td>----</td>
</tr>
<tr>
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### ENGINE SPECIFICATIONS

<table>
<thead>
<tr>
<th>Item</th>
<th>Standard</th>
<th>Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Timing chain</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model/number of links</td>
<td>DID SCR-0409 SV/116</td>
<td>----</td>
</tr>
<tr>
<td>Timing chain adjustment method</td>
<td>Automatic</td>
<td>----</td>
</tr>
<tr>
<td><strong>Rocker arm/rocker arm shaft</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rocker arm inside diameter</td>
<td>12.000 ~ 12.018 mm (0.4724 ~ 0.4731 in)</td>
<td>12.078 mm (0.4755 in)</td>
</tr>
<tr>
<td>Shaft outside diameter</td>
<td>11.981 ~ 11.991 mm (0.4717 ~ 0.4721 in)</td>
<td>11.951 mm (0.4705 in)</td>
</tr>
<tr>
<td>Arm-to-shaft clearance</td>
<td>0.009 ~ 0.037 mm (0.0004 ~ 0.0015 in)</td>
<td>0.080 mm (0.0031 in)</td>
</tr>
<tr>
<td><strong>Valve, valve seat, valve guide</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Valve clearance (cold)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IN</td>
<td>0.06 ~ 0.10 mm (0.0024 ~ 0.0039 in)</td>
<td>----</td>
</tr>
<tr>
<td>EX</td>
<td>0.16 ~ 0.20 mm (0.0063 ~ 0.0079 in)</td>
<td>----</td>
</tr>
<tr>
<td><strong>Valve dimensions</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>“A” head diameter</td>
<td>IN</td>
<td></td>
</tr>
<tr>
<td></td>
<td>39.9 ~ 40.1 mm (1.5709 ~ 1.5787 in)</td>
<td>----</td>
</tr>
<tr>
<td></td>
<td>EX</td>
<td></td>
</tr>
<tr>
<td></td>
<td>33.9 ~ 34.1 mm (1.3346 ~ 1.3425 in)</td>
<td>----</td>
</tr>
<tr>
<td>“B” face width</td>
<td>IN</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.26 mm (0.0890 in)</td>
<td>----</td>
</tr>
<tr>
<td></td>
<td>EX</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.26 mm (0.0890 in)</td>
<td>----</td>
</tr>
<tr>
<td>“C” seat width</td>
<td>IN</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.2 ~ 1.4 mm (0.0472 ~ 0.0551 in)</td>
<td>1.6 mm</td>
</tr>
<tr>
<td></td>
<td>EX</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.2 ~ 1.4 mm (0.0472 ~ 0.0551 in)</td>
<td>1.6 mm</td>
</tr>
<tr>
<td>“D” margin thickness</td>
<td>IN</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.0 ~ 1.4 mm (0.0394 ~ 0.0551 in)</td>
<td>----</td>
</tr>
<tr>
<td></td>
<td>EX</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.8 ~ 1.2 mm (0.0315 ~ 0.0472 in)</td>
<td>----</td>
</tr>
<tr>
<td>Stem outside diameter</td>
<td>IN</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6.975 ~ 6.990 mm (0.2746 ~ 0.2752 in)</td>
<td>6.950 mm (0.2736 in)</td>
</tr>
<tr>
<td></td>
<td>EX</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6.955 ~ 6.970 mm (0.2738 ~ 0.2744 in)</td>
<td>6.915 mm (0.2722 in)</td>
</tr>
<tr>
<td>Guide inside diameter</td>
<td>IN</td>
<td></td>
</tr>
<tr>
<td></td>
<td>7.000 ~ 7.012 mm (0.2756 ~ 0.2761 in)</td>
<td>7.030 mm (0.2768 in)</td>
</tr>
<tr>
<td></td>
<td>EX</td>
<td></td>
</tr>
<tr>
<td></td>
<td>7.000 ~ 7.012 mm (0.2756 ~ 0.2761 in)</td>
<td>7.030 mm (0.2768 in)</td>
</tr>
<tr>
<td>Item</td>
<td>Standard</td>
<td>Limit</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>----------</td>
<td>-------------</td>
</tr>
<tr>
<td><strong>Stem-to-guide clearance</strong></td>
<td>IN</td>
<td>0.010 ~ 0.037 mm (0.0004 ~ 0.0015 in)</td>
</tr>
<tr>
<td></td>
<td>EX</td>
<td>0.030 ~ 0.057 mm (0.0012 ~ 0.0022 in)</td>
</tr>
<tr>
<td><strong>Stem runout limit</strong></td>
<td>----</td>
<td>0.01 mm (0.0004 in)</td>
</tr>
<tr>
<td><strong>Valve seat width</strong></td>
<td>IN</td>
<td>1.2 ~ 1.4 mm (0.0472 ~ 0.0551 in)</td>
</tr>
<tr>
<td></td>
<td>EX</td>
<td>1.2 ~ 1.4 mm (0.0472 ~ 0.0551 in)</td>
</tr>
<tr>
<td><strong>Valve spring</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Inner spring</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Free length</td>
<td>IN</td>
<td>39.90 mm (1.57 in)</td>
</tr>
<tr>
<td></td>
<td>EX</td>
<td>39.90 mm (1.57 in)</td>
</tr>
<tr>
<td>Set length (valve closed)</td>
<td>IN</td>
<td>33.6 mm (1.32 in)</td>
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<tr>
<td></td>
<td>EX</td>
<td>33.6 mm (1.32 in)</td>
</tr>
<tr>
<td>Compressed pressure</td>
<td>IN</td>
<td>104.9 ~ 120.6 N (10.70 ~ 12.30 kg, 23.58 ~ 27.11 lb)</td>
</tr>
<tr>
<td></td>
<td>EX</td>
<td>104.9 ~ 120.6 N (10.70 ~ 12.30 kg, 23.58 ~ 27.11 lb)</td>
</tr>
<tr>
<td>Tilt limit*</td>
<td>IN</td>
<td>----</td>
</tr>
<tr>
<td></td>
<td>EX</td>
<td>----</td>
</tr>
<tr>
<td><strong>Direction of winding</strong></td>
<td>IN</td>
<td>Counterclockwise</td>
</tr>
<tr>
<td></td>
<td>EX</td>
<td>Counterclockwise</td>
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## ENGINE SPECIFICATIONS

<table>
<thead>
<tr>
<th>Item</th>
<th>Standard</th>
<th>Limit</th>
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</thead>
<tbody>
<tr>
<td>Outer spring</td>
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<td></td>
</tr>
<tr>
<td>Free length IN</td>
<td>43.27 mm (1.70 in)</td>
<td>41.1 mm (1.62 in)</td>
</tr>
<tr>
<td>EX</td>
<td>43.27 mm (1.70 in)</td>
<td></td>
</tr>
<tr>
<td>Set length (valve closed) IN</td>
<td>36.6 mm (1.44 in)</td>
<td>---</td>
</tr>
<tr>
<td>EX</td>
<td>36.6 mm (1.44 in)</td>
<td>---</td>
</tr>
<tr>
<td>Compressed pressure (installed) IN</td>
<td>235.4 ~ 251.1 N</td>
<td>---</td>
</tr>
<tr>
<td>EX</td>
<td>235.4 ~ 251.1 N</td>
<td>---</td>
</tr>
<tr>
<td>Tilt limit * IN</td>
<td>---</td>
<td>2.5°/1.9 mm (2.5°/0.075 in)</td>
</tr>
<tr>
<td>EX</td>
<td>---</td>
<td>2.5°/1.9 mm (2.5°/0.075 in)</td>
</tr>
<tr>
<td>Direction of winding (top view) IN</td>
<td>Clockwise</td>
<td>---</td>
</tr>
<tr>
<td>EX</td>
<td>Clockwise</td>
<td>---</td>
</tr>
</tbody>
</table>

<p>| Piston                                     |                                               |                              |
| Piston to cylinder clearance               | 0.040 ~ 0.065 mm (0.0016 ~ 0.0026 in)        | 0.15 mm (0.0059 in)          |
| Piston size “D”                            | 84.445 ~ 84.460 mm (3.3246 ~ 3.3252 in)      | ---                          |
| Measuring point “H”                        | 5.0 mm (0.20 in)                              | ---                          |
| Piston off-set                             | 0.5 mm (0.0197 in)                            | ---                          |
| Off-set direction                          | Intake side                                   | ---                          |
| Piston pin bore inside diameter            | 20.004 ~ 20.015 mm (0.7876 ~ 0.7880 in)      | 20.045 mm (0.7892 in)        |
| Piston pin outside diameter                | 19.991 ~ 20.000 mm (0.7870 ~ 0.7874 in)      | 19.971 mm (0.7863 in)        |</p>
<table>
<thead>
<tr>
<th>Item</th>
<th>Standard</th>
<th>Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Piston rings</strong></td>
<td></td>
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</tr>
<tr>
<td>Top ring</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type</td>
<td>Barrel</td>
<td>----</td>
</tr>
<tr>
<td>Dimensions (B × T)</td>
<td>1.0 × 3.1 mm</td>
<td>----</td>
</tr>
<tr>
<td>(B × T)</td>
<td>(0.0394 × 0.1220 in)</td>
<td>----</td>
</tr>
<tr>
<td>End gap (installed)</td>
<td>0.20 ~ 0.40 mm</td>
<td>0.65 mm</td>
</tr>
<tr>
<td>(installed)</td>
<td>(0.0079 ~ 0.0157 in)</td>
<td>(0.0256 in)</td>
</tr>
<tr>
<td>Side clearance (installed)</td>
<td>0.03 ~ 0.07 mm</td>
<td>0.12 mm</td>
</tr>
<tr>
<td>(installed)</td>
<td>(0.0012 ~ 0.0028 in)</td>
<td>(0.0047 in)</td>
</tr>
<tr>
<td>2nd ring</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type</td>
<td>Taper</td>
<td>----</td>
</tr>
<tr>
<td>Dimensions (B × T)</td>
<td>1.0 × 3.6 mm</td>
<td>----</td>
</tr>
<tr>
<td>(B × T)</td>
<td>(0.0394 × 0.1417 in)</td>
<td>----</td>
</tr>
<tr>
<td>End gap (installed)</td>
<td>0.40 ~ 0.60 mm</td>
<td>0.95 mm</td>
</tr>
<tr>
<td>(installed)</td>
<td>(0.0157 ~ 0.0236 in)</td>
<td>(0.0374 in)</td>
</tr>
<tr>
<td>Side clearance (installed)</td>
<td>0.02 ~ 0.06 mm</td>
<td>0.12 mm</td>
</tr>
<tr>
<td>(installed)</td>
<td>(0.0008 ~ 0.0024 in)</td>
<td>(0.0047 in)</td>
</tr>
<tr>
<td>Oil ring</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dimensions (B × T)</td>
<td>2.0 × 2.8 mm</td>
<td>----</td>
</tr>
<tr>
<td>(B × T)</td>
<td>(0.0787 × 0.1102 in)</td>
<td>----</td>
</tr>
<tr>
<td>End gap (installed)</td>
<td>0.20 ~ 0.70 mm</td>
<td>----</td>
</tr>
<tr>
<td>(installed)</td>
<td>(0.0079 ~ 0.0276 in)</td>
<td>----</td>
</tr>
<tr>
<td><strong>Crankshaft</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crank width “A”</td>
<td>62.95 ~ 63.00 mm</td>
<td>----</td>
</tr>
<tr>
<td>(A)</td>
<td>(2.4783 ~ 2.4803 in)</td>
<td>----</td>
</tr>
<tr>
<td>Runout limit C1</td>
<td>----</td>
<td>0.03 mm</td>
</tr>
<tr>
<td>(C1)</td>
<td>----</td>
<td>(0.0012 in)</td>
</tr>
<tr>
<td>C2</td>
<td>----</td>
<td>0.03 mm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.0012 in)</td>
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## ENGINE SPECIFICATIONS

<table>
<thead>
<tr>
<th>Item</th>
<th>Standard</th>
<th>Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Big end side clearance “D”</td>
<td>0.25 ~ 0.75 mm (0.0098 ~ 0.0295 in)</td>
<td>1.0 mm (0.0394 in)</td>
</tr>
<tr>
<td>Big end radial clearance “E”</td>
<td>0.010 ~ 0.025 mm (0.0004 ~ 0.0010 in)</td>
<td>1.0 mm (0.0394 in)</td>
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<tr>
<td><strong>Balancer</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Balancer drive method</td>
<td>Gear</td>
<td></td>
</tr>
<tr>
<td><strong>Automatic centrifugal clutch</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clutch shoe thickness</td>
<td>1.5 mm (0.06 in)</td>
<td>1.0 mm (0.04 in)</td>
</tr>
<tr>
<td>Clutch-in revolution</td>
<td>1,900 ~ 2,300 r/min</td>
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</tr>
<tr>
<td>Clutch-stall revolution</td>
<td>3,350 ~ 3,850 r/min</td>
<td></td>
</tr>
<tr>
<td><strong>Transmission</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Secondary shaft deflection limit</td>
<td>----</td>
<td>0.06 mm (0.0024 in)</td>
</tr>
<tr>
<td>Drive axle deflection limit</td>
<td>----</td>
<td>0.06 mm (0.0024 in)</td>
</tr>
<tr>
<td><strong>Shifter</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shifter type</td>
<td>Shift drum and guide bar</td>
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</tr>
<tr>
<td><strong>Air filter oil grade</strong></td>
<td>Yamaha foam air filter oil or other quality foam air filter oil</td>
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<tr>
<td><strong>Carburetor</strong></td>
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<tr>
<td>I. D. mark</td>
<td>2P51 00</td>
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<tr>
<td>Main jet (M.J)</td>
<td>#133.8</td>
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</tr>
<tr>
<td>Main air jet (M.A.J)</td>
<td>#140</td>
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<tr>
<td>Jet needle (J.N)</td>
<td>5ERB1-1</td>
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<tr>
<td>Needle jet (N.J)</td>
<td>P-0M (922)</td>
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<tr>
<td>Pilot air jet (P.A.J.1)</td>
<td>#80</td>
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<tr>
<td>Pilot air jet (P.A.J.2)</td>
<td>1.6</td>
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<tr>
<td>Pilot outlet (P.O)</td>
<td>0.95</td>
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<tr>
<td>Pilot jet (P.J)</td>
<td>#20</td>
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<tr>
<td>Bypass 1 (B.P.1)</td>
<td>0.8</td>
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<tr>
<td>Bypass 2 (B.P.2)</td>
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<tr>
<td>Bypass 3 (B.P.3)</td>
<td>0.8</td>
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<td>Valve seat size (V.S)</td>
<td>1.0</td>
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<tr>
<td>Starter jet (G.S.1)</td>
<td>#57.5</td>
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<tr>
<td>Starter jet (G.S.2)</td>
<td>0.7</td>
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<tr>
<td>Throttle valve size (Th.V)</td>
<td>#90</td>
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<tr>
<td>Float height (F.H)</td>
<td>13 mm (0.51 in)</td>
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<tr>
<td>Fuel level (F.L)</td>
<td>4.0 ~ 5.0 mm (0.16 ~ 0.20 in)</td>
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</tr>
<tr>
<td>Engine idle speed</td>
<td>1,450 ~ 1,550 r/min</td>
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</tr>
<tr>
<td>Intake vacuum</td>
<td>34.7 kPa</td>
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<tr>
<td></td>
<td>(260 mmHg, 10.24 inHg)</td>
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<tr>
<td>Item</td>
<td>Standard</td>
<td>Limit</td>
</tr>
<tr>
<td>--------------------------------------------------------</td>
<td>-------------------------------</td>
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</tr>
<tr>
<td>Oil pump</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oil filter type</td>
<td>Foam</td>
<td>----</td>
</tr>
<tr>
<td>Oil pump type</td>
<td>Trochoid</td>
<td>----</td>
</tr>
<tr>
<td>Inner-rotor-to-outer-rotor-tip clearance</td>
<td>Less than 0.15 mm (0.0059 in)</td>
<td>0.23 mm</td>
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<tr>
<td>Outer-rotor-to-oil-pump-housing clearance</td>
<td>0.010 ~ 0.034 mm</td>
<td>0.104 mm</td>
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<tr>
<td>Oil-pump-housing-to-inner-rotor-and-outer-rotor clearance</td>
<td>(0.0004 ~ 0.0013 in)</td>
<td>(0.0041 in)</td>
</tr>
<tr>
<td>Oil pressure (hot)</td>
<td>7.0 kPa (0.07 kg/cm², 1.0 psi)</td>
<td>----</td>
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<tr>
<td>Pressure check location</td>
<td>Cylinder head</td>
<td></td>
</tr>
<tr>
<td>Cooling system</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Radiator core</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Width</td>
<td>380 mm (14.96 in)</td>
<td>----</td>
</tr>
<tr>
<td>Height</td>
<td>238 mm (9.37 in)</td>
<td>----</td>
</tr>
<tr>
<td>Thickness</td>
<td>24 mm (0.94 in)</td>
<td>----</td>
</tr>
<tr>
<td>Radiator cap opening pressure</td>
<td>110.0 ~ 140.0 kPa</td>
<td>(1.1 ~ 1.4 kg/cm², 15.64 ~ 19.91 psi)</td>
</tr>
<tr>
<td>Radiator capacity (including all routes)</td>
<td>2.7 L (2.38 Imp qt, 2.85 US qt)</td>
<td>----</td>
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<tr>
<td>Coolant reservoir</td>
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<tr>
<td>Capacity</td>
<td>0.35 L (0.31 Imp qt, 0.37 US qt)</td>
<td>----</td>
</tr>
<tr>
<td>From low to full level</td>
<td>0.20 L (0.18 Imp qt, 0.21 US qt)</td>
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<tr>
<td>Water pump</td>
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<tr>
<td>Type</td>
<td>Single-suction centrifugal pump</td>
<td>----</td>
</tr>
<tr>
<td>Reduction ratio</td>
<td>38/32 (1.188)</td>
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<tr>
<td>Shaft drive</td>
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<td></td>
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<tr>
<td>Middle gear backlash</td>
<td>0.1 ~ 0.3 mm (0.004 ~ 0.012 in)</td>
<td>----</td>
</tr>
<tr>
<td>Final gear backlash</td>
<td>0.1 ~ 0.3 mm (0.004 ~ 0.012 in)</td>
<td>----</td>
</tr>
<tr>
<td>Differential gear backlash</td>
<td>0.05 ~ 0.25 mm</td>
<td>(0.002 ~ 0.010 in)</td>
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</tbody>
</table>
Lubrication chart

- Pressure feed
- Splashed scavenging

Cylinder head tightening sequence
### CHASSIS SPECIFICATIONS

<table>
<thead>
<tr>
<th>Item</th>
<th>Standard</th>
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<tbody>
<tr>
<td><strong>Steering system</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type</td>
<td>Rack and pinion</td>
<td></td>
</tr>
<tr>
<td><strong>Front suspension</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shock absorber travel</td>
<td>108 mm (4.25 in)</td>
<td></td>
</tr>
<tr>
<td>Spring free length</td>
<td>313 mm (12.32 in)</td>
<td></td>
</tr>
<tr>
<td>Spring fitting length</td>
<td>247.9 mm (9.76 in)</td>
<td></td>
</tr>
<tr>
<td>Spring rate (K1)</td>
<td>19.4 N/mm (1.98 kg/mm, 110.9 lb/in)</td>
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</tr>
<tr>
<td>Stroke (K1)</td>
<td>0 ~ 108 mm (0 ~ 4.25 in)</td>
<td></td>
</tr>
<tr>
<td>Optional spring</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td><strong>Rear suspension</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shock absorber travel</td>
<td>81 mm (3.19 in)</td>
<td></td>
</tr>
<tr>
<td>Spring free length</td>
<td>328 mm (12.91 in)</td>
<td></td>
</tr>
<tr>
<td>Spring fitting length</td>
<td>273.2 mm (10.76 in)</td>
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</tr>
<tr>
<td>Spring rate (K1)</td>
<td>44.1 N/mm (4.50 kg/mm, 251.99 lb/in)</td>
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</tr>
<tr>
<td>Spring rate (K2)</td>
<td>117.7 N/mm (12.00 kg/mm, 671.96 lb/in)</td>
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<tr>
<td>Stroke (K1)</td>
<td>0 ~ 60 mm (0 ~ 2.36 in)</td>
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</tr>
<tr>
<td>Stroke (K2)</td>
<td>60 ~ 81 mm (2.36 ~ 3.19 in)</td>
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<tr>
<td>Optional spring</td>
<td>No</td>
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</tr>
<tr>
<td><strong>Front wheel</strong></td>
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<td></td>
</tr>
<tr>
<td>Type</td>
<td>Panel wheel</td>
<td></td>
</tr>
<tr>
<td>Rim size</td>
<td>12 x 6.0 AT</td>
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</tr>
<tr>
<td>Rim material</td>
<td>Steel</td>
<td></td>
</tr>
<tr>
<td>Rim runout limit radial</td>
<td>2.0 mm (0.08 in)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.0 mm (0.08 in)</td>
<td></td>
</tr>
<tr>
<td><strong>Rear wheel</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type</td>
<td>Panel wheel</td>
<td></td>
</tr>
<tr>
<td>Rim size</td>
<td>12 x 7.5 AT</td>
<td></td>
</tr>
<tr>
<td>Rim material</td>
<td>Steel</td>
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</tr>
<tr>
<td>Rim runout limit radial</td>
<td>2.0 mm (0.08 in)</td>
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</tr>
<tr>
<td></td>
<td>2.0 mm (0.08 in)</td>
<td></td>
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### CHASSIS SPECIFICATIONS

<table>
<thead>
<tr>
<th>Item</th>
<th>Standard</th>
<th>Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Front disc brake</strong></td>
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</tr>
<tr>
<td>Type</td>
<td>Dual</td>
<td>----</td>
</tr>
<tr>
<td>Disc outside diameter × thickness</td>
<td>200.0 × 3.5 mm (7.87 × 0.14 in)</td>
<td>3.0 mm (0.12 in)</td>
</tr>
<tr>
<td>Pad thickness inner</td>
<td>5.2 mm (0.20 in)</td>
<td>1.5 mm (0.06 in)</td>
</tr>
<tr>
<td>Pad thickness outer</td>
<td>5.2 mm (0.20 in)</td>
<td>1.5 mm (0.06 in)</td>
</tr>
<tr>
<td>Master cylinder inside diameter</td>
<td>17.46 mm (0.69 in)</td>
<td>----</td>
</tr>
<tr>
<td>Caliper cylinder inside diameter</td>
<td>27.0 mm (1.06 in)</td>
<td>----</td>
</tr>
<tr>
<td>Brake fluid type</td>
<td>DOT 4</td>
<td>----</td>
</tr>
<tr>
<td><strong>Rear disc brake</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type</td>
<td>Single</td>
<td>----</td>
</tr>
<tr>
<td>Disc outside diameter × thickness</td>
<td>165.0 × 5.0 mm (6.50 × 0.20 in)</td>
<td>4.5 mm (0.18 in)</td>
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<tr>
<td>Pad thickness inner</td>
<td>5.6 mm (0.22 in)</td>
<td>1.5 mm (0.06 in)</td>
</tr>
<tr>
<td>Pad thickness outer</td>
<td>5.6 mm (0.22 in)</td>
<td>1.5 mm (0.06 in)</td>
</tr>
<tr>
<td>Master cylinder inside diameter</td>
<td>17.46 mm (0.69 in)</td>
<td>----</td>
</tr>
<tr>
<td>Caliper cylinder inside diameter</td>
<td>32.03 mm (1.26 in)</td>
<td>----</td>
</tr>
<tr>
<td>Brake fluid type</td>
<td>DOT 4</td>
<td>----</td>
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<tr>
<td><strong>Accelerator pedal and brake pedal</strong></td>
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</tr>
<tr>
<td>Accelerator pedal free play</td>
<td>0 mm (0.0 in)</td>
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</tr>
<tr>
<td>Brake pedal free play</td>
<td>0 mm (0.0 in)</td>
<td>----</td>
</tr>
<tr>
<td>Parking brake cable free play</td>
<td>0 ~ 1 click of parking brake lever</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>Voltage</strong></td>
<td>12 V</td>
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</tr>
<tr>
<td><strong>Ignition system</strong></td>
<td></td>
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</tr>
<tr>
<td>Ignition timing (BTDC)</td>
<td>5°/1,500 r/min</td>
<td></td>
</tr>
<tr>
<td>Advancer type</td>
<td>Digital type</td>
<td></td>
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<tr>
<td><strong>C.D.I.</strong></td>
<td></td>
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</tr>
<tr>
<td>Magneto model/manufacturer</td>
<td>F4T46473/MITSUBISHI</td>
<td></td>
</tr>
<tr>
<td>Pickup coil resistance/color</td>
<td>459 ~ 561 Ω at 20 °C (68 °F)/ White/Red – White/Green</td>
<td></td>
</tr>
<tr>
<td>Rotor rotation direction detection coil resistance/color</td>
<td>0.070 ~ 0.086 Ω at 20 °C (68 °F)/ Red – White/Blue</td>
<td></td>
</tr>
<tr>
<td>C.D.I. unit model/manufacturer</td>
<td>F8T40378/MITSUBISHI</td>
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<tr>
<td><strong>Ignition coil</strong></td>
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</tr>
<tr>
<td>Model/manufacturer</td>
<td>2JN/YAMAHA</td>
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<tr>
<td>Minimum spark gap</td>
<td>6.0 mm (0.24 in)</td>
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<tr>
<td>Primary winding resistance</td>
<td>0.18 ~ 0.28 Ω at 20 °C (68 °F)</td>
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<tr>
<td>Secondary winding resistance</td>
<td>6.32 ~ 9.48 kΩ at 20 °C (68 °F)</td>
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<tr>
<td><strong>Spark plug cap</strong></td>
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<tr>
<td>Type</td>
<td>Resin type</td>
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<tr>
<td>Resistance</td>
<td>10 kΩ</td>
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<tr>
<td><strong>Charging system</strong></td>
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<tr>
<td>Type</td>
<td>A.C. magneto generator</td>
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</tr>
<tr>
<td>Model/manufacturer</td>
<td>F4T46473/MITSUBISHI</td>
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</tr>
<tr>
<td>Nominal output</td>
<td>14 V 23 A at 5,000 r/min</td>
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</tr>
<tr>
<td>Charging coil resistance/color</td>
<td>0.31 ~ 0.42 Ω at 20 °C (68 °F)/ White – White</td>
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<tr>
<td><strong>Rectifier/regulator</strong></td>
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<tr>
<td>Regulator type</td>
<td>Semi conductor-short circuit</td>
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<tr>
<td>Model/manufacturer</td>
<td>SH650D-11/SHINDENGEN</td>
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<tr>
<td>No-load regulated voltage (DC)</td>
<td>14.1 ~ 14.9 V</td>
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<tr>
<td>Capacity</td>
<td>18 A</td>
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<tr>
<td>Withstand voltage</td>
<td>200 V</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 starter system</strong></td>
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<tr>
<td>Type</td>
<td>Constant mesh type</td>
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<tr>
<td>Starter motor</td>
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<tr>
<td>Model/manufacturer</td>
<td>SM-13/MITSUBA</td>
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</tr>
<tr>
<td>Output</td>
<td>0.8 kW</td>
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<tr>
<td>Armature coil resistance</td>
<td>0.025 ~ 0.035 Ω at 20 °C (68 °F)</td>
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</tr>
<tr>
<td>Brush overall length</td>
<td>12.5 mm (0.49 in)</td>
<td>5 mm (0.20 in)</td>
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<tr>
<td>Spring force</td>
<td>7.65 ~ 10.01 N</td>
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</tr>
<tr>
<td>Commutator diameter</td>
<td>28 mm (1.10 in)</td>
<td>27 mm (1.06 in)</td>
</tr>
<tr>
<td>Mica undercut</td>
<td>0.7 mm (0.03 in)</td>
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</tr>
<tr>
<td>Starter relay</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model/manufacturer</td>
<td>MS5F-561/JIDECO</td>
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</tr>
<tr>
<td>Amperage rating</td>
<td>180 A</td>
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</tr>
<tr>
<td>Coil winding resistance</td>
<td>4.18 ~ 4.62 Ω at 20 °C (68 °F)</td>
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</tr>
<tr>
<td><strong>Radiator fan</strong></td>
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<tr>
<td>Performance</td>
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<td><strong>Headlight relay</strong></td>
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<td>G8HN-1C4T-DJ-Y52/OMRON</td>
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<td>94.5 ~ 115.5 Ω at 20 °C (68 °F)</td>
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<tr>
<td><strong>Four-wheel drive indicator light relay (for USA)</strong></td>
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<td>ACA22115-1/MATSUSHITA</td>
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<tr>
<td>Coil resistance</td>
<td>72 ~ 88 Ω at 20 °C (68 °F)</td>
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<tr>
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<td><strong>Differential gear lock indicator light relay (for USA)</strong></td>
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<td>Coolant drain bolt (water pump)</td>
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<td>Radiator inlet pipe/radiator outlet pipe holder</td>
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<td>Part to be tightened</td>
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## CHASSIS TIGHTENING TORQUES

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<th>Remarks</th>
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# LUBRICATION POINTS AND LUBRICANT TYPES

## ENGINE

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<td>Yamaha Bond No.1215 (Three Bond No.1215®)</td>
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HOW TO USE THE CONVERSION TABLE

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

Ex.

** mm x 0.03937 = ** in
2 mm x 0.03937 = 0.08 in

** HOW TO USE THE CONVERSION TABLE **

### CONVERSION TABLE

#### METRIC TO IMPERIAL

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<tr>
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<tr>
<td>cm · kg</td>
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<td>mph</td>
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<tr>
<td>km</td>
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<td>mi</td>
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<tr>
<td>m</td>
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<tr>
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<td>in</td>
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<td>oz (IMP liq.)</td>
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<tr>
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COOLANT FLOW DIAGRAMS

1. Radiator
2. Thermo switch 3
3. Radiator outlet hose
4. Radiator inlet hose
5. Radiator outlet pipe
6. Radiator inlet pipe
1. Coolant outlet hose
2. Water pump outlet hose
3. Water pump outlet pipe
4. Radiator outlet pipe
5. Water pump inlet hose
6. Radiator inlet pipe
1 Coolant outlet hose
2 Radiator inlet pipe
3 Radiator inlet hose
OIL FLOW DIAGRAMS

1. Camshaft
2. Crankshaft
3. Drive axle
4. Middle drive pinion gear shaft
1. Oil filter cartridge
2. Oil pipe adapter
3. Oil delivery pipe

OIL FLOW DIAGRAMS
1. Oil delivery pipe
2. Oil pump
3. Oil strainer
1. Oil cooler
2. Oil cooler inlet pipe 2
3. Oil cooler outlet pipe 2
4. Oil cooler inlet hose
5. Oil cooler outlet hose
6. Oil cooler inlet pipe 1
7. Oil cooler outlet pipe 1
1. Oil outlet pipe
2. Oil inlet pipe
3. Oil outlet hose
4. Oil inlet hose
5. Oil cooler inlet pipe 2
6. Oil cooler outlet pipe 2
CABLE ROUTING

1. Left headlight lead
2. Wire harness
3. Throttle cable
4. Brake light switch lead
5. Rectifier/regulator
6. Starter cable
7. Starter (choke) knob
8. Light switch
9. Coolant reservoir breather hose
10. Parking brake switch lead
11. Parking brake cable
12. Rear brake pipe
13. Radiator inlet hose
14. Front brake hoses
15. Radiator fan motor breather hose
16. Differential gear case breather hose
A 30 – 60 mm (1.18 – 2.36 in)
B 160 – 190 mm (6.30 - 7.48 in)
C Fasten the wire harness to the frame with the plastic bands.
D Pull the excess of the hoses through the guide in the upper instrument panel so that there is no slack in the hoses.
E Fasten the throttle cable, parking brake switch lead, and parking brake cable with the plastic clip.
F Fasten the throttle cable with the metal holder.
G Fasten the throttle cable to the radiator inlet hose with the plastic bands.
H 20 mm (0.79 in) or less below the end of the hose protector
I 5 mm (0.20 in) or less above the end of the hose protector
J Route the throttle cable to the inside of the radiator inlet hose.
A Fasten the parking brake cable with the metal holder.
B Fasten the spark plug lead to the air duct assembly 1 with a plastic band.
C Fasten the wire harness to the frame with the plastic bands.
D Pass the tail/brake light lead through the grommet (left and right).
E Fasten the coolant outlet hose and ignition coil leads with the plastic clip.

1) Parking brake cable
2) Spark plug lead
3) Coolant outlet hose
4) Wire harness
5) Tail/brake light lead
6) Carburetor heater leads
7) Carburetor heater
8) Ignition coil
9) Ignition coil lead
Fasten the wire harness with the plastic holders.

Push the excess tail/brake light lead into the rear fender so that there is no slack in the lead (left and right).

Fasten the unused coupler to the wire harness with tape.

Fasten the tail/brake light lead with the plastic holders.

Fasten the tail/brake light lead with the plastic bands.

Fasten the wire harness with the plastic bands.
1. Main switch
2. Starter (choke) knob
3. Auxiliary DC jack
4. Starter (choke) cable
5. Auxiliary DC jack lead
6. Wire harness
7. Coolant reservoir breather hose
8. Right headlight lead
9. Radiator fan motor breather hose
10. Radiator fan motor coupler
11. Thermo switch 3
12. Differential gear case breather hose
13. Gear motor couplers
14. Coolant reservoir hose
15. Radiator outlet hose
16. Speed sensor coupler
17. A.C. magneto couplers
18. Speed sensor lead
19. Ground lead
20. Parking brake switch lead
21. Reverse switch
22. Neutral switch
23. High-range switch
24. Low-range switch
25. Sub-wire harness
26. Throttle cable
27. Radiator inlet pipe
28. Rear brake pipe
29. Radiator outlet pipe
Brake light switch lead
Indicator light assembly leads
On-command four-wheel drive switch and differential gear lock switch lead

A Fasten the wire harness with the plastic bands.
B Fasten the wire harness, radiator fan motor lead, and thermo switch 3 lead to the frame with a plastic band.
C 30 – 60 mm (1.18 – 2.36 in)
D 160 – 190 mm (6.30 – 7.48 in)
E Fasten the radiator outlet hose and coolant reservoir hose with the plastic clip.
F 12 – 22 mm (0.47 – 0.87 in)
G Fasten the wire harness, starter motor lead, ground lead, and starter (choke) cable to the frame with a plastic band.
H Fasten the wire harness, starter motor lead, and ground lead to the frame with a plastic band.
Fasten the wire harness, speed sensor lead, starter motor lead, and ground lead with a plastic band.

**J** 70 – 90 mm (2.76 – 3.54 in)

Fasten the thermo switch 1 lead, carburetor heater leads, starter motor lead, parking brake switch lead, A.C. magneto leads, sub-wire harness, and air vent hose with a plastic band.

**K** 40 – 60 mm (1.57 – 2.36 in)

Fasten the starter (choke) cable with a plastic band.

**L** Fasten the sub-wire harness with the metal holder.

**M** Fasten the A.C. magneto leads, sub-wire harness, thermo switch 1 lead, carburetor heater leads, and parking brake switch lead with a plastic band.

**P** Fasten the throttle cable with a plastic band.
Fasten the radiator inlet pipe with a plastic band.
Fasten the rear brake pipe with a plastic band.
Fasten the radiator outlet pipe with a plastic band.
Fasten the wire harness, starter (choke) cable, starter motor lead, and ground lead with the plastic bands.

Fasten the wire harness, brake light switch lead, and starter (choke) cable with a plastic band.
1) Final gear case breather hose
2) Vacuum hose
3) Fuel hose (fuel pump to carburetor)
4) Cylinder head breather hose
5) Starter (choke) cable
6) Air vent hose
7) Rear brake hose
8) Parking brake cable
9) Wire harness
10) Ignition coil lead
11) Fuel hoses (fuel tank to fuel pump)
12) Rear brake pipe
13) Starter motor lead
14) Fuel tank breather hose
15) Rollover valve
A 20 - 30 mm (0.79 - 1.18 in)
B Pass the final gear case breather hose through the grommet.
C Fasten the cylinder head breather hose and starter (choke) cable with the plastic clip.
D Fasten the starter motor lead, thermo switch 1 lead, carburetor heater leads, and parking brake switch lead with a plastic band.
E Fasten the final gear case breather hose with the plastic holders.
F Pass the wire harness through the grommet.
G Fasten the wire harness with a plastic band.
H Fasten the parking brake cable and wire harness with the plastic clip.
I Fasten the parking brake cable with the metal holder.
J Fasten the wire harness, ignition coil lead, and rear brake hose with a plastic band.
K Fasten the final gear case breather hose and fuel hose (fuel pump to carburetor) with the plastic clip.
L Fasten the fuel filter with a plastic band.
Fasten the fuel hose (fuel tank to fuel pump) with the plastic holders.

Fasten the parking brake cable and final gear case breather hose with the plastic holders.

Fasten the rear brake hose with the plastic bands.

Less than 1 mm (0.04 in)

Fasten the rear brake pipe and wire harness with the plastic holder.

Fasten the starter motor lead, carburetor heater leads, thermo switch 1 lead, and parking brake switch lead with a plastic band.

20 – 40°
1. Throttle cable
2. Rear brake pipe
3. Wire harness
4. A.C. magneto lead couplers
5. Starter (choke) cable
6. Fuel hose (fuel pump to carburetor)
7. Cylinder head breather hose
8. Rear brake hose
9. Vacuum hose
10. Parking brake cable

A. Pass the throttle cable through the cable guide.
B. Fasten the speed sensor lead, starter motor lead, and ground lead with a plastic band.
C. Fasten the wire harness and A.C. magneto leads with a plastic band.
D. Fasten the wire harness with the plastic bands.
E. Make sure that the plastic bands are not fastened too tightly around the wire harness.
Fasten the rear brake pipe with a plastic band.

Fasten the wire harness, speed sensor lead, starter (choke) cable, starter motor lead, and ground lead with a plastic band.
1. Battery
2. Negative battery lead
3. Starter (choke) cable
4. Indicator light assembly couplers
5. On-Command four-wheel drive switch and differential gear lock switch leads
6. On-Command four-wheel drive switch and differential gear lock switch
7. Main switch
8. Starter (choke) knob
9. Light switch
10. Rectifier/regulator
11. Differential gear case breather hose
12. Radiator fan motor breather hose
13. Left headlight lead
14. Throttle cable
15. Right headlight lead
16. Starter motor lead
17. Starter relay lead
18. Four-wheel drive relay 1
19. Four-wheel drive relay 2
20. Starter relay
CABLE ROUTING

- Four-wheel drive relay 3
- Four-wheel drive indicator light relay
- Headlight relay
- Differential gear lock indicator light relay
- Fuse box
- Positive battery lead
- Neutral indicator light
- Reverse indicator light
- Parking brake indicator light
- Four-wheel drive indicator light
- Differential gear lock indicator light

- Coolant temperature indicator light
- C.D.I. unit

A Fasten the wire harness with the plastic bands.
B Pass the radiator fan motor breather hose, differential gear case breather hose, coolant reservoir breather hose, and brake light switch lead through the guide.
C Pass the radiator fan motor breather hose, differential gear case breather hose, throttle cable, and brake light switch lead through the guide.
Pass the radiator fan motor breather hose and differential gear case breather hose through the guide.

Fasten the throttle cable with the plastic holder.

Fasten the left headlight lead, differential gear case breather hose, and radiator fan motor breather hose with the plastic holder.

Fasten the left headlight lead and differential gear case breather hose with the plastic holder.

Fasten the starter motor lead and starter relay lead with the plastic holder.

Fasten the positive battery lead with the plastic holder.

59 ~ 61 mm (2.32 ~ 2.40 in)

4 mm (0.16 in) of clearance or more is required around the boot.

Make sure that the washer is installed on the side of the pedal assembly bracket towards the boot.
1. Auxiliary DC jack
2. Auxiliary DC jack lead
3. Coolant reservoir breather hose
4. Throttle cable
5. Radiator fan motor breather hose
6. Differential gear case breather hose
7. Starter (choke) knob
8. Wire harness
9. Front brake hoses
10. Coolant reservoir hose
11. Ground lead

12. Starter relay lead

A. Fasten the coolant reservoir breather hose with the plastic holders.
B. Fasten the front brake hose bushing with the plastic bands.
C. Fasten the wire harness and ground lead with a plastic band.
D. Fasten the differential gear case breather hose, coolant reservoir hose, radiator fan motor lead, and thermo switch 3 lead with the plastic holder.
PERIODIC CHECKS AND ADJUSTMENTS

INTRODUCTION

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

PERIODIC MAINTENANCE/LUBRICATION

NOTE:

- For vehicles not equipped with an odometer or hour meter, follow the month maintenance intervals.
- For vehicles equipped with an odometer or an hour meter, follow the km (mi) or hours maintenance intervals. However, keep in mind that if the vehicle isn’t used for a long period of time, the month maintenance intervals should be followed.
- Items marked with an asterisk should be performed by a Yamaha dealer as they require special tools, data and technical skills.

<table>
<thead>
<tr>
<th>ITEM</th>
<th>ROUTINE</th>
<th>Whichever comes first</th>
<th>INITIAL</th>
<th>EVERY</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>month</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>km (mi)</td>
<td>320</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>hours</td>
<td>20</td>
</tr>
</tbody>
</table>

| Valves* | • Check valve clearance.  
|         | • Adjust if necessary. |
|         | • Check coolant leakage.  
|         | • Repair if necessary.  
|         | • Replace coolant every 24 months. |
|         | • Check coolant leakage.  
|         | • Repair if necessary.  
|         | • Replace coolant every 24 months. |
| Spark plug | • Check condition.  
|           | • Adjust gap and clean.  
|           | • Replace if necessary. |
| Air filter elements (engine and air intake duct) | • Clean.  
|          | • Replace if necessary. |
| Carburetor* | • Check idle speed/starter operation.  
|            | • Adjust if necessary. |
| Crankcase breather system* | • Check breather hose for cracks or damage.  
|                             | • Replace if necessary. |
| Exhaust system* | • Check for leakage.  
|                 | • Tighten if necessary.  
|                 | • Replace gasket(s) if necessary. |
| Spark arrester | • Clean.  
|                | • Replace pads if worn to the limit. |
| Fuel line* | • Check fuel hose for cracks or damage.  
|           | • Replace if necessary. |
| Engine oil | • Replace (warm engine before draining).  
| Engine oil filter cartridge | • Replace.  
| Final gear oil | • Check oil level/oil leakage.  
| Differential gear oil | • Replace.  
| Front brake* | • Check operation/brake pad wear/leakage/see NOTE page 3-2.  
|                | • Correct if necessary. Replace pads if worn to the limit. |
### PERIODIC MAINTENANCE/LUBRICATION

<table>
<thead>
<tr>
<th>ITEM</th>
<th>ROUTINE</th>
<th>Whichever comes first</th>
<th>INITIAL</th>
<th>EVERY</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>month</td>
<td>km (mi)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>320 (200)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3</td>
<td>1,200 (750)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>6</td>
<td>2,400 (1,500)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>12</td>
<td>4,800 (3,000)</td>
</tr>
<tr>
<td>Rear brake*</td>
<td>• Check operation/brake pad wear/fluid leakage/see ITEM ROUTINE</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td></td>
<td>• Correct if necessary. Replace pads if worn to the limit.</td>
<td></td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Accelerator pedal*</td>
<td>• Check operation and free play.</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>V-belt*</td>
<td>• Check operation.</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td></td>
<td>• Check for wear, cracks, or damage.</td>
<td></td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Wheels*</td>
<td>• Check balance/damage/runout.</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td></td>
<td>• Repair if necessary.</td>
<td></td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Wheel bearings*</td>
<td>• Check bearing assemblies for looseness/damage.</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td></td>
<td>• Replace if damaged.</td>
<td></td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Front and rear suspension*</td>
<td>• Check operation and for leakage.</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td></td>
<td>• Correct if necessary.</td>
<td></td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Steering system*</td>
<td>• Check operation and for looseness/Replace if damaged.</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td></td>
<td>• Check toe-in/Adjust if necessary.</td>
<td></td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Rear upper and lower knuckle pivots*</td>
<td>• Lubricate with lithium-soap-based grease.</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Drive shaft universal joint*</td>
<td>• Lubricate with lithium-soap-based grease.</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Engine mount*</td>
<td>• Check for cracks or damage.</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td></td>
<td>• Check bolt tightness.</td>
<td></td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Front and rear axle boots*</td>
<td>• Check operation.</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td></td>
<td>• Replace if damaged.</td>
<td></td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Stabilizer bushings*</td>
<td>• Check for cracks or damage.</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Fittings and fasteners*</td>
<td>• Check all chassis fittings and fasteners.</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td></td>
<td>• Correct if necessary.</td>
<td></td>
<td>✔</td>
<td>✔</td>
</tr>
</tbody>
</table>

**NOTE:**
- Recommended brake fluid: DOT 4
- Brake fluid replacement:
  - When disassembling the master cylinder or caliper, replace the brake fluid. Normally check the brake fluid level and add fluid as required.
  - On the inner parts of the master cylinder and caliper, replace the oil seals every two years.
  - Replace the brake hoses every four years, or if cracked or damaged.
ADJUSTING THE VALVE CLEARANCE

ENGINE
ADJUSTING THE VALVE CLEARANCE

NOTE:
- The valve clearance must be adjusted when the engine is cool to the touch.
- Adjust the valve clearance when the piston is at the Top Dead Center (TDC) on the compression stroke.

1. Remove:
   - driver seat
   - passenger seat
   - console
   Refer to “SEATS, ENCLOSURE, HOOD AND CARGO BED” in chapter 8.

2. Remove:
   - bracket ①
   - tappet cover (intake) ②
   - tappet cover (exhaust) ③
3. Disconnect:
   - spark plug cap ④
4. Remove:
   - spark plug
5. Remove:
   - air shroud 1 ①
6. Remove:
   - timing plug ①
ADJUSTING THE VALVE CLEARANCE

7. Check:
   • valve clearance
     Out of specification → Adjust.

   **Valve clearance (cold)**
   Intake
   0.06 ~ 0.10 mm
   (0.0024 ~ 0.0039 in)
   Exhaust
   0.16 ~ 0.20 mm
   (0.0063 ~ 0.0079 in)

   a. Turn the crankshaft counterclockwise with a wrench.
   b. Align the “T” mark ① on the rotor with the stationary pointer ② on the A.C. magneto cover. When the “T” mark is aligned with the stationary pointer, the piston is at the Top Dead Center (TDC).

   **NOTE:**
   • When the piston is at the Top Dead Center (TDC) on the compression stroke, there should be clearance between the valve stem tips and their respective valve adjusting screws.
   • If there is no clearance, rotate the crankshaft counterclockwise one turn.

   c. Measure the valve clearance using a thickness gauge ③.

8. Adjust:
   • valve clearance

   a. Loosen the locknut ①.
   b. Insert a thickness gauge ② between the adjusting screw end and the valve end.
   c. Turn the adjusting screw ③ clockwise or counterclockwise with the tappet adjusting tool ④ until the proper clearance is obtained.

   **Valve adjuster 3 mm & 4 mm**
   P/N. YM-08035-A
   Tappet adjusting tool
   P/N. 90890-01311
ADJUSTING THE VALVE CLEARANCE

1. Hold the adjusting screw to prevent it from moving and then tighten the locknut.

| Locknut | 20 Nm (2.0 m·kg, 14 ft·lb) |

2. Hold the adjusting screw to prevent it from moving and then tighten the locknut.

| Locknut | 20 Nm (2.0 m·kg, 14 ft·lb) |

ADJUSTING THE IDLING SPEED

1. Start the engine and let it warm up for several minutes.
2. Remove:
   - driver seat
   - passenger seat
   - console
   - Refer to “SEATS, ENCLOSURE, HOOD AND CARGO BED” in chapter 8.

ADJUSTING THE IDLING SPEED

1. Start the engine and let it warm up for several minutes.
2. Remove:
   - driver seat
   - passenger seat
   - console
   - Refer to “SEATS, ENCLOSURE, HOOD AND CARGO BED” in chapter 8.
ADJUSTING THE IDLING SPEED

3. Attach:
   • tachometer
     (to the spark plug lead)

   Digital tachometer
   P/N. YU-39951-B, 90890-06760

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

   Engine idling speed
   1,450 ~ 1,550 r/min

5. Adjust:
   • engine idling speed

   a. Turn the throttle stop screw ① in or out until
      the specified idling speed is obtained.

   | Turning in | Idling speed increases. |
   | Turning out| Idling speed decreases. |

6. Detach:
   • tachometer

7. Install:
   • console
   • passenger seat
   • driver seat
   Refer to “SEATS, ENCLOSURE, HOOD
   AND CARGO BED” in chapter 8.
ADJUSTING THE THROTTLE CABLE

NOTE: 
Throttle cable free play should be adjusted properly before adjusting the engine idling speed.

1. Remove:
   • driver seat
   • passenger seat
   • console
   Refer to “SEATS, ENCLOSURE, HOOD AND CARGO BED” in chapter 8.

2. Remove:
   • throttle valve cover ①

3. Check:
   • throttle cable ②
   Slack → Remove the slack.

4. Adjust:
   • throttle cable

<table>
<thead>
<tr>
<th>Turning in</th>
<th>Slack increases.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turning out</td>
<td>Slack decreases.</td>
</tr>
</tbody>
</table>

c. Tighten the locknut.

NOTE: 
After adjusting the throttle cable, depress the accelerator pedal a few times and make sure that the throttle valve ③ closes completely after releasing the accelerator pedal.

5. Install:
   • throttle valve cover

6. Install:
   • console
   • passenger seat
   • driver seat
   Refer to “SEATS, ENCLOSURE, HOOD AND CARGO BED” in chapter 8.
ADJUSTING THE STARTER CABLE

1. Remove:
   • driver seat
   • passenger seat
   • console
   Refer to “SEATS, ENCLOSURE, HOOD AND CARGO BED” in chapter 8.

2. Adjust:
   • starter cable

   a. Disconnect the starter cable from the carburetor body.

   **NOTE:**
   Do not remove the starter plunger from the starter cable.

   b. Measure the starter plunger stroke distance of the starter (choke) knob fully closed to fully open position. If the distance is out of specification, adjust it as described below.

   **Starter plunger stroke distance 13 mm (0.51 in)**

   a) Fully closed position
   b) Fully open position

   c. Pull back the boot.
   d. Loosen the locknut.
   e. Turn the adjuster in or out until the correct distance is obtained.

   | Turning in | Distance increases. |
   | Turning out | Distance decreases. |

   f. Tighten the locknut.
   g. Push in the boot.
   h. Connect the starter cable to the carburetor.

3. Install:
   • console
   • passenger seat
   • driver seat
   Refer to “SEATS, ENCLOSURE, HOOD AND CARGO BED” in chapter 8.
CHECKING THE SPARK PLUG

1. Remove:
   • driver seat
   • passenger seat
   • console
   Refer to “SEATS, ENCLOSURE, HOOD AND CARGO BED” in chapter 8.

2. Remove:
   • spark plug

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

4. Check:
   • electrode 1
     Wear/damage → Replace.
   • insulator 2
     Abnormal color → Replace.
     Normal color is a medium-to-light tan color.

5. Clean the spark plug with a spark plug cleaner or wire brush.

6. Measure:
   • spark plug gap @
     Use a wire gauge or thickness gauge.
     Out of specification → Regap.

   Spark plug gap
   0.6 – 0.7 mm (0.024 – 0.028 in)

7. Install:
   • spark plug × 18 Nm (1.8 m·kg, 13 ft·lb)

   NOTE: ____________________________

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

8. Install:
   • console
   • passenger seat
   • driver seat
   Refer to “SEATS, ENCLOSURE, HOOD AND CARGO BED” in chapter 8.
CHECKING THE IGNITION TIMING

CHECKING THE IGNITION TIMING

NOTE: ______________________ __

Engine idling speed and throttle cable free play should be adjusted properly before checking the ignition timing.

1. Remove:
   • driver seat
   • passenger seat
   • console
   Refer to “SEATS, ENCLOSURE, HOOD AND CARGO BED” in chapter 8.

2. Attach:
   • tachometer
   • timing light
     (to the spark plug lead)

   Digital tachometer
   P/N. YU-39951-B, 90890-06760
   Timing light
   P/N. 90890-03141
   Inductive clamp timing light
   P/N. YU-03141

3. Remove:
   • air shroud 1

4. Remove:
   • engine cooling fan 1
CHECKING THE IGNITION TIMING/MEASURING THE COMPRESSION PRESSURE

5. Check:
   • ignition timing

   a. Warm up the engine and keep it at the specified speed.

   ![Engine speed: 1,450 ~ 1,550 r/min]

   b. Remove the timing plug ①.
   c. Visually check the stationary pointer ② to verify it is within the required firing range ③ indicated on the rotor. Incorrect firing range → Check the pulser coil assembly.
   d. Install the timing plug.

6. Install:
   • engine cooling fan

   ![9 Nm (0.9 m · kg, 6.5 ft · lb)]

7. Install:
   • air shroud 1

   ![10 Nm (1.0 m · kg, 7.2 ft · lb)]

8. Detach:
   • timing light
   • tachometer

9. Install:
   • console
   • passenger seat
   • driver seat
   Refer to “SEATS, ENCLOSURE, HOOD AND CARGO BED” in chapter 8.

MEASURING THE COMPRESSION PRESSURE

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

1. Check:
   • valve clearance
     Out of specification → Adjust.
     Refer to “ADJUSTING THE VALVE CLEARANCE”.
2. Start the engine and let it warm up for several minutes.
3. Stop the engine.
MEASURING THE COMPRESSION PRESSURE

4. Remove:
   • spark plug
5. Attach:
   • adapter
   • compression gauge

6. Measure:
   • compression pressure
     Above the maximum pressure:
     Check the cylinder head, valve surfaces, and piston crown for carbon deposits.
     Below the minimum pressure:
     Squirt a few drops of oil into the affected cylinder and measure again.
     Refer to the table below.

<table>
<thead>
<tr>
<th>Reading</th>
<th>Diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Higher than without oil</td>
<td>Worn or damaged piston ring(s)</td>
</tr>
<tr>
<td>Same as without oil</td>
<td>Defective piston ring(s), valve(s), cylinder head gasket or piston is possible.</td>
</tr>
</tbody>
</table>

**Compression pressure (at sea level)**

- Standard:
  - 1,270 kPa (12.70 kg/cm², 180.6 psi) at 700 r/min
- Minimum:
  - 1,105 kPa (11.05 kg/cm², 157.1 psi) at 700 r/min
- Maximum:
  - 1,422 kPa (14.22 kg/cm², 202.2 psi) at 700 r/min

Crank over the engine with the electric starter (be sure the battery is fully charged) with the throttle wide-open until the compression reading on the gauge stabilizes.
MEASURING THE COMPRESSION PRESSURE/ CHECKING THE ENGINE OIL LEVEL

WARNING

When cranking the engine, ground the spark plug lead to prevent sparking.

7. Install:
   • spark plug 18 Nm (1.8 m·kg, 13 ft·lb)
8. Install:
   • console
   • passenger seat
   • driver seat
   Refer to “SEATS, ENCLOSURE, HOOD AND CARGO BED” in chapter 8.

CHECKING THE ENGINE OIL LEVEL

1. Place the vehicle on a level surface.
2. Remove:
   • driver seat
   • passenger seat
   • console
   Refer to “SEATS, ENCLOSURE, HOOD AND CARGO BED” in chapter 8.
3. Check:
   • engine oil level
   Oil level should be between the maximum 1 and minimum 2 marks.
   Oil level low → Add oil to the proper level.

NOTE: Do not screw the dipstick 3 in when checking the oil level.

Recommended oil classification:
API Service “SE”, “SF”, “SG” type or equivalent (e.g. “SF—SE—CC”, “SF—SE—SD” etc.)

CAUTION: Do not allow foreign material to enter the crankcase.

4. Start the engine and let it warm up for several minutes.
5. Stop the engine and check the oil level again.

NOTE: _______________________
Wait a few minutes until the oil settles before checking the oil level.

WARNING _______________________
Never remove the dipstick just after high speed operation because the heated oil could spurt out. Wait until the oil cools down before removing the dipstick.

6. Install:
• console
• passenger seat
• driver seat
Refer to “SEATS, ENCLOSURE, HOOD AND CARGO BED” in chapter 8.

CHANGING THE ENGINE OIL
1. Start the engine and let it warm up for several minutes.
2. Stop the engine and place an oil pan under the engine.
3. Remove:
• driver seat
• passenger seat
• console
Refer to “SEATS, ENCLOSURE, HOOD AND CARGO BED” in chapter 8.
4. Remove:
• engine oil filler plug (dipstick) ①
• engine oil drain bolt ②
Drain the engine oil from the crankcase.

5. If the oil filter cartridge is also to be replaced, perform the following procedure.

~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

a. Remove the oil filter cartridge ① with an oil filter wrench ②.

Oil filter wrench
P/N. YU-38411, 90890-01426
b. Lubricate the O-ring ③ of the new oil filter cartridge with a thin coat of lithium-soap-based grease.

**CAUTION:**

Make sure that the O-ring ③ is positioned correctly in the groove of the oil filter cartridge.

c. Tighten the new oil filter cartridge to specification with an oil filter wrench.

<table>
<thead>
<tr>
<th>Oil filter cartridge</th>
</tr>
</thead>
<tbody>
<tr>
<td>17 Nm (1.7 m·kg, 12 ft·lb)</td>
</tr>
</tbody>
</table>

6. Install:
   - engine oil drain bolt ①

<table>
<thead>
<tr>
<th>Engine oil drain bolt ①</th>
</tr>
</thead>
<tbody>
<tr>
<td>23 Nm (2.3 m·kg, 17 ft·lb)</td>
</tr>
</tbody>
</table>

7. Fill:
   - crankcase
     (with sufficient oil to reach the specified level)
     Refer to "CHECKING THE ENGINE OIL LEVEL".

<table>
<thead>
<tr>
<th>Oil quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Periodic oil change</td>
</tr>
<tr>
<td>2.50 L (2.20 Imp qt, 2.64 US qt)</td>
</tr>
<tr>
<td>With oil filter replacement</td>
</tr>
<tr>
<td>2.60 L (2.29 Imp qt, 2.75 US qt)</td>
</tr>
<tr>
<td>Total amount</td>
</tr>
<tr>
<td>3.40 L (2.99 Imp qt, 3.59 US qt)</td>
</tr>
</tbody>
</table>

8. Install:
   - engine oil filler plug

9. Warm up the engine for a few minutes, then stop the engine.

10. Check:
    - engine
      (for engine oil leaks)
    - oil level
      Refer to "CHECKING THE ENGINE OIL LEVEL".

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11. Check:
   • engine oil pressure

   Oil gallery bolt
   7 Nm (0.7 m·kg, 5.1 ft·lb)

12. Install:
   • console
   • passenger seat
   • driver seat
   Refer to "SEATS, ENCLOSURE, HOOD AND CARGO BED" in chapter 8.

CLEANING THE AIR FILTER ELEMENTS
Cleaning the intake duct air filter element
1. Remove:
   • air intake duct grill ①

2. Remove:
   • air filter element ①
t   (from the air intake duct grill ②)
CLEANING THE AIR FILTER ELEMENTS

3. Clean:
   • air filter element ①

   **NOTE:**
   Remove any large particles from the air filter element by hand, tap the air filter element to remove most of the dust and dirt, and then blow the remaining dirt out with compressed air.

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

5. Install:
   • air filter element
     (into the air intake duct grill)

6. Install:
   • air intake duct grill

**Cleaning the engine air filter element**

1. Remove:
   • driver seat
   • passenger seat
   • console
     Refer to “SEATS, ENCLOSURE, HOOD AND CARGO BED” in chapter 8.

   **NOTE:**
   There is a check hose ① at the bottom of the air filter case. If dust and/or water collects in this hose, clean the air filter element and air filter case.

2. Remove:
   • air filter case cover ①
3. Remove:
   • air filter element assembly
   • air filter element retaining plate
   • air filter element

**CAUTION:**
Never operate the engine with the air filter element removed. This will allow unfiltered air to enter, causing rapid wear and possible engine damage. Additionally, operation without the filter element will affect carburetor tuning with subsequent poor performance and possible engine overheating.

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

5. Clean:
   • air filter element


  a. Wash the element gently, but thoroughly in solvent.

  **WARNING**
  Use a cleaning solvent which is designed to clean parts only. Never use gasoline or low flash point solvents as they may cause a fire or explosion.

  b. Squeeze the excess solvent out of the element and let it dry.

  **CAUTION:**
  Do not twist or wring out the element. This could damage the foam material.

  c. Apply Yamaha foam air filter oil or other quality foam air filter oil (not spray type).
  d. Squeeze out the excess oil.

**NOTE:**
The element should be wet but not dripping.
6. Install:
   • air filter element assembly
   • air filter case cover

**NOTE:**
To prevent air leaks make sure that the sealing surface of the element matches the sealing surface of the case.

7. Install:
   • console
   • passenger seat
   • driver seat

Refer to “SEATS, ENCLOSURE, HOOD AND CARGO BED” in chapter 8.

---

**CHECKING THE COOLANT LEVEL**
1. Place the vehicle on a level surface.
2. Lift the hood up.
3. Check:
   • coolant level

   The coolant level should be between the minimum level mark (a) and maximum level mark (b).

   Below the minimum level mark → Add the recommended coolant to the proper level.

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

4. Start the engine, warm it up for several minutes, and then turn it off.
5. Check:
   • coolant level

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

6. Close the hood.
CHANGING THE COOLANT

1. Remove:
   • driver seat
   • passenger seat
   • console
   Refer to “SEATS, ENCLOSURE, HOOD AND CARGO BED” in chapter 8.

2. Lift the hood up.

3. Remove:
   • coolant reservoir cap ①

4. Disconnect:
   • coolant reservoir hose ②

5. Drain:
   • coolant
   (from the coolant reservoir)

6. Connect:
   • coolant reservoir hose

7. Remove:
   • coolant drain bolt (cylinder) ① (along with the copper washer)
   • coolant drain bolt (water pump) ② (along with the copper washer)
8. Remove:
  • radiator cap ①

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

9. Drain:
  • coolant

10. Disconnect:
  • coolant outlet hose ①
  • water pump inlet hose ②

11. Drain:
  • coolant

12. Check:
  • copper washer ①
  • coolant drain bolt ②
    Damage → Replace.
13. Install:
   - coolant drain bolt (water pump)  
     (along with the copper washer)  
     \[ 10 \text{ Nm} (1.0 \text{ m} \cdot \text{kg}, 7.2 \text{ ft} \cdot \text{lb}) \]
   - coolant drain bolt (cylinder)  
     (along with the copper washer)  
     \[ 10 \text{ Nm} (1.0 \text{ m} \cdot \text{kg}, 7.2 \text{ ft} \cdot \text{lb}) \]

14. Connect:
   - water pump inlet hose
   - coolant outlet hose

15. Remove:
   - air bleed bolt ①

16. Fill:
   - cooling system  
     (with the specified amount of the recommended coolant)

---

**Recommended antifreeze**

High-quality ethylene glycol antifreeze containing corrosion inhibitors for aluminum engines

**Mixing ratio**

1 : 1 (antifreeze : water)

**Quantity**

- Radiator capacity (including all routes)
  - 2.7 L (2.38 Imp qt, 2.85 US qt)
- Coolant reservoir capacity
  - 0.35 L (0.31 Imp qt, 0.37 US qt)

---

**NOTE:** The specified amount of coolant is a standard amount. Fill the cooling system with coolant until coolant comes out of the hole for the air bleed bolt.
Handling notes for coolant
Coolant is potentially harmful and should be handled with special care.

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

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

17. Install:
• air bleed bolt  ⬇️ ⬇️ ⬇️

18. Install:
• radiator cap

19. Fill:
• coolant reservoir
  (with the recommended coolant to the maximum level mark 🆕)

20. Install:
• coolant reservoir cap

21. Start the engine, warm it up for several minutes, and then turn it off.
22. Check:
   • coolant level
     Refer to “CHECKING THE COOLANT LEVEL”.

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

23. Close the hood.

24. Install:
   • console
   • passenger seat
   • driver seat
     Refer to “SEATS, ENCLOSURE, HOOD AND CARGO BED” in chapter 8.
CHECKING THE COOLANT TEMPERATURE WARNING LIGHT

Coolant temperature warning light checking method

1. Turn the main switch “ON”.

2. If the coolant temperature warning light does not come on:
   - Turn the main switch to “START” with the transmission in neutral position.
   - If the coolant temperature warning light comes on momentarily:
     - If the coolant temperature warning light does not come on:
       - The coolant temperature and electrical circuit are OK. Go ahead with riding.
     - If the coolant temperature warning light comes on:
       - Check the electrical circuit.
   - If the coolant temperature warning light comes on:
     - The coolant temperature warning light comes on momentarily.

CHECKING THE V-BELT

1. Remove:
   - driver seat
   - passenger seat
   - console
   Refer to “SEATS, ENCLOSURE, HOOD AND CARGO BED” in chapter 8.
   - drive belt cover
   Refer to “PRIMARY AND SECONDARY SHEAVES” in chapter 4.
CHECKING THE V-BELT

2. Check:
   • V-belt
     Cracks/wear/scaling/chipping → Replace.
     Oil/grease → Check primary sheave and secondary sheave.

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

   V-belt width
   30.7 mm (1.21 in)
   <Limit:> 27.6 mm (1.09 in)

4. Replace:
   • V-belt

   a. Install the bolts (90101-06016) into the secondary fixed sheave hold.

   NOTE: ________________
   Tightening the bolts will push the secondary sliding sheave away, causing the gap between the secondary fixed and sliding sheaves to widen.

   b. Remove the V-belt from the primary sheave and secondary sheave.
   c. Install the new V-belt.

   NOTE: ________________
   Install the V-belt so that its arrow faces the direction shown in the illustration.

   d. Remove the bolts.
CHECKING THE V-BELT / CLEANING THE SPARK ARRESTER

5. Install:
   • drive belt cover
     Refer to “PRIMARY AND SECONDARY SHEAVES” in chapter 4.
   • console
   • passenger seat
   • driver seat
     Refer to “SEATS, ENCLOSURE, HOOD AND CARGO BED” in chapter 8.

CLEANING THE SPARK ARRESTER

1. Clean:
   • spark arrester

WARNING

- Select a well-ventilated area free of combustible materials.
- Always let the exhaust system cool before performing this operation.
- Do not start the engine when the tailpipe is removed from the muffler.

a. Remove the bolts ①.
b. Remove the tailpipe ② by pulling it out of the muffler.
c. Tap the tailpipe lightly with a soft-face hammer or suitable tool, then use a wire brush to remove any carbon deposits from the spark arrester portion of the tailpipe and the inner contact surfaces of the muffler.
d. Insert the tailpipe ② into the muffler and align the bolt holes.
e. Insert the bolt ① and tighten it.

<table>
<thead>
<tr>
<th>Tailpipe bolt</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 Nm (1.0 m·kg, 7.2 ft·lb)</td>
</tr>
</tbody>
</table>

f. Start the engine and rev it up approximately twenty times while momentarily creating exhaust system back pressure by blocking the end of the muffler with a shop towel.
g. Stop the engine and allow the exhaust pipe to cool.
CHASSIS
ADJUSTING THE BRAKE PEDAL
1. Check:
   • brake pedal free play
     Out of specification → Adjust.

NOTE: ______________________ __
The end of the brake rod ① should lightly contact the brake master cylinder ②.

Brake pedal free play
0 mm (0.0 in)

2. Adjust:
   • brake pedal free play

         a. Loosen the locknut ①.
         b. Turn brake rod ② in or out until the correct free play is obtained.

| Turning in | Free play increases. |
| Turning out | Free play decreases. |

c. Tighten the locknut to specification.

Locknut
17 Nm (1.7 m·kg, 12 ft·lb)

NOTE: ______________________ __
Make sure that there is no brake drag on the front or rear wheels.
ADJUSTING THE PARKING BRAKE

1. Shift the drive select lever into low gear “L”.

2. Check:
   • parking brake lever free play
     The maximum free play is equal to one click of the parking brake lever. If necessary, adjust the free play as follows.

**NOTE:**
The parking brake lever must be released when checking and adjusting the parking brake lever free play.

3. Remove:
   • driver seat
   • passenger seat
   • console
   Refer to “SEATS, ENCLOSURE, HOOD AND CARGO BED” in chapter 8.

4. Adjust:
   • parking brake lever free play

   a. Pull back the adjuster cover.
   b. Loosen the locknut (1).
   c. Turn the adjusting nut (2) in or out until the correct free play is obtained.

   | Turning in | Free play increases. |
   | Turning out | Free play decreases. |

d. Tighten the locknut (1).

e. Slide the adjuster cover to its original position.

5. Install:
   • console
   • passenger seat
   • driver seat
   Refer to “SEATS, ENCLOSURE, HOOD AND CARGO BED” in chapter 8.
CHECKING THE BRAKE FLUID LEVEL

1. Place the vehicle on a level surface.

NOTE:
When checking the brake fluid level, make sure that the top of the brake fluid reservoir top is horizontal.

2. Lift the hood up.

3. Check:
   • brake fluid level
     Fluid level is under “MIN” level line → Fill up.

<table>
<thead>
<tr>
<th>Recommended brake fluid</th>
</tr>
</thead>
<tbody>
<tr>
<td>DOT 4</td>
</tr>
</tbody>
</table>

CAUTION:
Brake fluid may erode painted surfaces or plastic parts. Always clean up spilled fluid immediately.

WARNING
• Use only the designed quality brake fluid: otherwise, the rubber seals may deteriorate, causing leakage and poor brake performance.
• Refill with the same type of brake fluid; mixing fluids may result in a harmful chemical reaction and lead to poor performance.
• Be careful that water does not enter the master cylinder when refilling. Water will significantly lower the boiling point of the fluid and may result in a vapor lock.

4. Close the hood.
CHECKING THE FRONT BRAKE PADS

1. Remove:
   • front wheels
   Refer to “FRONT WHEELS AND BRAKE DISCS” in chapter 8.

2. Check:
   • brake pads
   Wear indicator grooves ① almost disappeared → Replace the brake pads as a set.
   Refer to “FRONT AND REAR BRAKES” in chapter 8.

   Brake pad wear limit ③
   1.5 mm (0.06 in)

3. Operate the brake pedal.

4. Install:
   • front wheels
   Refer to “FRONT WHEELS AND BRAKE DISCS” in chapter 8.

CHECKING THE REAR BRAKE PADS

1. Check:
   • brake pads
   Wear indicator grooves ① almost disappeared → Replace the brake pads as a set.
   Refer to “FRONT AND REAR BRAKES” in chapter 8.

   Brake pad wear limit ③
   1.5 mm (0.06 in)

2. Operate the brake pedal.

CHECKING THE BRAKE HOSES AND BRAKE PIPES

1. Remove:
   • driver seat
   • passenger seat
   • console
   Refer to “SEATS, ENCLOSURE, HOOD AND CARGO BED” in chapter 8.
2. Lift the hood up.
3. Lift the cargo bed.
4. Check:
   • front brake hoses
   • rear brake pipes
   • rear brake hose
     Cracks/wear/damage → Replace.
     Fluid leakage → Replace all damaged parts.
     Refer to “FRONT AND REAR BRAKES” in chapter 8.

NOTE: ____________________________
Hold the vehicle in an upright position and apply the brake pedal.

5. Check:
   • brake hose clamps
     Loosen → Tighten.
6. Lower the cargo bed.
7. Close the hood.
8. Install:
   • console
   • passenger seat
   • driver seat
     Refer to “SEATS, ENCLOSURE, HOOD AND CARGO BED” in chapter 8.

BLEEDING THE HYDRAULIC BRAKE SYSTEM

⚠️ WARNING ⬅️
Bleed the brake system if:
• The system has been disassembled.
• A brake hose or brake pipe have been loosened or removed.
• The brake fluid has been very low.
• The brake operation has been faulty.
A loss of braking performance may occur if the brake system is not properly bled.
BLEEDING THE HYDRAULIC BRAKE SYSTEM

1. Bleed:
   - brake system

   a. Add the proper brake fluid to the reservoir.
   b. Install the diaphragm. Be careful not to spill any fluid or allow the reservoir to overflow.
   c. Connect the clear plastic hose \( \text{(1)} \) tightly to the caliper bleed screw \( \text{(2)} \).

   A Front
   B Rear

   d. Place the other end of the hose into a container.
   e. Slowly apply the brake pedal several times.
   f. Push down on the pedal and hold it.
   g. Loosen the bleed screw and allow the pedal to travel towards its limit.
   h. Tighten the bleed screw when the pedal limit has been reached, then release the pedal.
   i. Repeat steps (e) to (h) until all the air bubbles have disappeared from the fluid.
   j. Tighten the bleed screw.

   Front brake caliper bleed screw 6 Nm (0.6 m \( \cdot \) kg, 4.3 ft \( \cdot \) lb)
   Rear brake caliper bleed screw 5 Nm (0.5 m \( \cdot \) kg, 3.6 ft \( \cdot \) lb)

   NOTE: ________________________ 
   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 system have disappeared.

   k. Add brake fluid to the proper level.
   Refer to “CHECKING THE BRAKE FLUID LEVEL”.

   WARNING ________________________ 
   Check the operation of the brake after bleeding the brake system.
ADJUSTING THE SELECT LEVER SHIFT ROD
1. Adjust:
   • Select lever shift rod

   a. Shift the drive select lever into the neutral position “N”.
   b. Loosen both locknuts ①.

   CAUTION: The select lever shift rod locknut (select lever side) has left-handed threads. To loosen the locknut, turn it clockwise.

   c. Adjust the shift rod length for smooth and correct shifting.
   d. Tighten the locknuts ①.

   Locknut 15 Nm (1.5 m·kg, 11 ft·lb)

ADJUSTING THE BRAKE LIGHT SWITCH
NOTE: The brake light switch is operated by movement of the brake pedal.
The brake light switch is properly adjusted when the brake light comes on just before the braking effect starts.
ADJUSTING THE BRAKE LIGHT SWITCH
CHECKING THE FINAL GEAR OIL LEVEL

1. Check:
   • brake light operation timing
     Incorrect → Adjust.

2. Adjust:
   • brake light operation timing

   a. Hold the main body ① of the brake light switch so that it does not rotate and turn the adjusting nut ② in direction ③ or ④ until the brake light comes on at the proper time.

   | Direction ③ | Brake light comes on sooner. |
   | Direction ④ | Brake light comes on later. |

CHECKING THE FINAL GEAR OIL LEVEL

1. Place the vehicle on a level surface.

2. Remove:
   • oil filler plug ①

3. Check:
   • oil level
     Oil level should be up to the brim of the filler hole.
     Oil level low → Add oil to the proper level.

   Recommended oil
   SAE 80 API “GL-4” Hypoid gear oil

   CAUTION:
   Take care not to allow foreign material to enter the final gear case.

4. Install:
   • oil filler plug ①
     \[23 \text{Nm (2.3 m·kg, 17 ft·lb)}\]
CHANGING THE FINAL GEAR OIL

1. Place the vehicle on a level surface.
2. Place a container under the final gear case to collect the used oil.
3. Remove:
   - oil filler plug
   - drain plug
4. Drain:
   - final gear oil
5. Install:
   - drain plug

**NOTE:**
Check the drain plug gasket. If it is damaged, replace it with a new one.

6. Fill:
   - final gear case

**Periodic oil change**
- 0.25 L (0.22 Imp qt, 0.26 US qt)
- **Total amount**
  - 0.28 L (0.25 Imp qt, 0.30 US qt)

**Recommended oil**
- SAE 80 API “GL-4” Hypoid gear oil

**CAUTION:**
Take care not to allow foreign material to enter the final gear case.

7. Install:
   - oil filler plug

CHECKING THE DIFFERENTIAL GEAR OIL

1. Place the vehicle on a level surface.
2. Remove:
   - oil filler plug

---

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CHECKING THE DIFFERENTIAL GEAR OIL/CHANGING THE DIFFERENTIAL GEAR OIL

3. Check:
• Oil level
  Oil level should be up to the brim of filler hole.
  Oil level low → Add oil to proper level.

<table>
<thead>
<tr>
<th>Recommended oil</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAE 80 API “GL-4” Hypoid gear oil</td>
</tr>
</tbody>
</table>

**CAUTION:**
Take care not to allow foreign material to enter the differential gear case.

4. Install:
• Oil filler plug \( \times 23 \text{ Nm} (2.3 \text{ m} \cdot \text{kg}, 17 \text{ ft} \cdot \text{lb}) \)

---

CHANGING THE DIFFERENTIAL GEAR OIL
1. Place the vehicle on a level surface.
2. Place a container under the differential gear case.
3. Remove:
• Oil filler plug ①
• Drain plug ②
4. Drain:
• Differential gear oil
5. Install:
• Drain plug \( \times 10 \text{ Nm} (1.0 \text{ m} \cdot \text{kg}, 7.2 \text{ ft} \cdot \text{lb}) \)

**NOTE:**
Check the gasket (drain plug). If it is damaged, replace it with new one.
6. Fill:
   • differential gear case

   **CAUTION:**
   Take care not to allow foreign material to enter the differential gear case.

7. Install:
   • oil filler plug

---

**CHECKING THE CONSTANT VELOCITY JOINT DUST BOOTS**

1. Check:
   • dust boots ①
   Damage → Replace.
   Refer to “FRONT CONSTANT VELOCITY JOINTS, DIFFERENTIAL GEAR AND FRONT DRIVE SHAFT” in chapter 7.

   ![Diagram A](image1.png)
   ![Diagram B](image2.png)
CHECKING THE STEERING SYSTEM
1. Place the vehicle on a level surface.
2. Check:
   - steering shaft assembly bearings
     Try to move the steering wheel up and down, and back and forth.
     Excessive play → Replace the steering shaft assembly.

3. Check:
   - tie-rod ends
     Turn the steering wheel to the left and right until it stops completely, and then move the steering wheel slightly in the opposite direction.
     Tie-rod end(s) have vertical play → Replace the tie-rod end(s).

4. Raise the front end of the vehicle so that there is no weight on the front wheels.
5. Check:
   - ball joints and/or wheel bearings
     Move the wheels laterally back and forth.
     Excessive free play → Replace the front arms (upper and lower) and/or wheel bearings.

ADJUSTING THE TOE-IN
1. Place the vehicle on a level surface.
2. Measure:
   - toe-in
     Out of specification → Adjust.

### Toe-in
15 ~ 25 mm (0.59 ~ 0.98 in)
(with tires touching the ground)

**NOTE:**
Before measuring the toe-in, make sure that the tire pressure is correct.

- a. Mark both front tire tread centers.
- b. Face the steering wheel straight ahead.
c. Measure distance $A$ between the marks.

d. Rotate the front tires 180° until the marks are exactly opposite one another.

e. Measure distance $B$ between the marks.

f. Calculate the toe-in using the formula given below.

$$\text{Toe-in} = B - A$$

g. If the toe-in is incorrect, adjust it.

3. Adjust:
   • toe-in

⚠️ WARNING
   • Be sure that both tie-rods are turned the same amount. If not, the vehicle will drift right or left even though the steering wheel is positioned straight. This may lead to mishandling and an accident.

   • After setting the toe-in to specification, run the vehicle slowly for some distance with both hands lightly holding the steering wheel and check that the steering wheel responds correctly. If not, turn either the right or left tie-rod within the toe-in specification.

   a. Mark both tie-rods ends.
      This reference point will be needed during adjustment.

   b. Loosen the locknut (tie-rod end) ① on each tie-rod.

   c. The same number of turns should be given to both the right and left tie-rods ② until the specified toe-in is obtained. This is to keep the length of the rods the same.

   d. Tighten the rod end locknut on each tie-rod.

   **Locknut (rod end)**
   40 Nm (4.0 m·kg, 29 ft·lb)
ADJUSTING THE FRONT SHOCK ABSORBERS

**WARNING**
Always adjust the spring preload of both shock absorbers to the same setting. Uneven adjustment can cause poor handling and loss of stability.

**NOTE:**
The spring preload of the shock absorbers can be adjusted to suit the operator’s preference, weight, and the operating conditions.

1. Adjust:
   - spring preload
     Turn the adjuster 1 to increase or decrease the spring preload.

   **Standard position:** 2
   **Minimum (Soft) position:** 1
   **Maximum (Hard) position:** 5

ADJUSTING THE REAR SHOCK ABSORBERS

**WARNING**
Always adjust the spring preload of both shock absorbers to the same setting. Uneven adjustment can cause poor handling and loss of stability.

**NOTE:**
The spring preload of the shock absorbers can be adjusted to suit the operator’s preference, weight, and the operating conditions.

1. Adjust:
   - spring preload
     Turn the adjuster 1 to increase or decrease the spring preload.

   **Standard position:** 2
   **Minimum (Soft) position:** 1
   **Maximum (Hard) position:** 5
CHECKING THE TIRES

WARNING

• TIRE CHARACTERISTICS

1) Tire characteristics influence the handling of the vehicles. The tires listed below have been approved by Yamaha Motor Manufacturing Corporation of America for this model. If other tire combinations are used, they can adversely affect your vehicle's handling characteristics and are therefore not recommended.

<table>
<thead>
<tr>
<th></th>
<th>Manufacturer</th>
<th>Size</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Front</td>
<td>MAXXIS</td>
<td>25 x 8-12 NHS</td>
<td>M951Y</td>
</tr>
<tr>
<td>Rear</td>
<td>MAXXIS</td>
<td>25 x 10-12 NHS</td>
<td>M952Y</td>
</tr>
</tbody>
</table>

• TIRE PRESSURE

1) Recommended tire pressure
   Front 70 kPa (0.70 kg/cm², 10 psi)
   Rear 98 kPa (0.98 kg/cm², 14 psi)

2) Tire pressure below the minimum specification could cause the tire to dislodge from the rim under severe riding conditions.

   The following are minimums:
   Front 63 kPa (0.63 kg/cm², 9 psi)
   Rear 91 kPa (0.91 kg/cm², 13 psi)

3) Use no more than
   Front 250 kPa (2.5 kg/cm², 36 psi)
   Rear 250 kPa (2.5 kg/cm², 36 psi)

   when seating the tire beads. Higher pressures may cause the tire to burst.

   Inflate the tires slowly and carefully.
   Fast inflation could cause the tire to burst.

• MAXIMUM LOADING LIMIT

1) Vehicle loading limit (total weight of cargo, operator, passenger and accessories, and tongue weight): 406 kg (895 lb)

2) Cargo bed: 181 kg (400 lb)

3) Trailer hitch:
   Pulling load (total weight of trailer and cargo): 550 kg (1,212 lb)
   Tongue weight (vertical weight on trailer hitch point): 50 kg (110 lb)

Be extra careful of the vehicle balance and stability when towing a trailer.
1. Measure:
   - tire pressure (cold tire pressure)
     Out of specification → Adjust.

**NOTE:**
- The tire pressure gauge ① is included as standard equipment.
- If dust or the like is stuck to this gauge, it will not provide the correct readings. Therefore, take two measurements of the tire's pressure and use the second reading.

<table>
<thead>
<tr>
<th>Cold tire pressure</th>
<th>Front</th>
<th>Rear</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard</td>
<td>70 kPa</td>
<td>98 kPa</td>
</tr>
<tr>
<td></td>
<td>(0.70 kg/cm², 10 psi)</td>
<td>(0.98 kg/cm², 14 psi)</td>
</tr>
<tr>
<td>Minimum</td>
<td>63 kPa</td>
<td>91 kPa</td>
</tr>
<tr>
<td></td>
<td>(0.63 kg/cm², 9 psi)</td>
<td>(0.91 kg/cm², 13 psi)</td>
</tr>
<tr>
<td>Maximum</td>
<td>77 kPa</td>
<td>105 kPa</td>
</tr>
<tr>
<td></td>
<td>(0.77 kg/cm², 11 psi)</td>
<td>(1.05 kg/cm², 15 psi)</td>
</tr>
</tbody>
</table>

**WARNING**
Uneven or improper tire pressure may adversely affect the handling of this vehicle and may cause loss of control.
- Maintain proper tire pressures.
- Set tire pressures when the tires are cold.
- Tire pressures must be equal in both front tires and equal in both rear tires.

2. Check:
   - tire surfaces
     Wear/damage → Replace.

**Tire wear limit**
Front and rear: 3.0 mm (0.12 in)

**WARNING**
It is dangerous to ride with a worn-out tire. When tire wear is out of specification, replace the tire immediately.
CHECKING THE WHEELS

1. Check:
   • wheels
      Damage/bends → Replace.

NOTE: __________________________________________________________________
Always balance the wheel when a tire or wheel has been changed or replaced.

WARNING __________________________________________________________________
• Never attempt even small repairs to the wheel.
• Ride conservatively after installing a tire to allow it to seat itself properly on the rim.

CHECKING AND LUBRICATING THE CABLES

WARNING __________________________________________________________________
A damaged cable sheath may cause corrosion and interfere with the cable movement. An unsafe condition may result so replace a damaged cable as soon as possible.

1. Check:
   • cable sheath
      Damage → Replace.
2. Check:
   • cable operation
      Unsmooth operation → Lubricate or replace.

Recommended lubricant:
Yamaha chain and cable lube or engine oil

NOTE: __________________________________________________________________
Hold the cable end up and apply several drops of lubricant to the cable.

3. Apply:
   • lithium-soap-based grease
      (onto end of the cable)
LUBRICATING THE PEDALS, ETC.

1. Lubricate the pivoting parts.

<table>
<thead>
<tr>
<th>Recommended lubricant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lithium-soap-based grease</td>
</tr>
</tbody>
</table>
CHECKING AND CHARGING THE BATTERY

**WARNING**

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

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

**FIRST AID IN CASE OF BODILY CONTACT:**

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

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

**CAUTION:**

- This is a sealed battery. Never remove the sealing caps because the balance between cells will not be maintained and battery performance will deteriorate.
- Charging time, charging amperage and charging voltage for 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.
CHECKING AND CHARGING THE BATTERY

NOTE:
Since MF batteries are sealed, it is not possible to check the charge state of the battery by measuring the specific gravity of the electrolyte. Therefore, the charge of the battery has to be checked by measuring the voltage at the battery terminals.

1. Lift the hood up.
2. Remove:
   • battery case cover
3. Disconnect:
   • battery leads

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

4. Remove:
   • battery
5. Check:
   • battery charge

Note: The charge state of an MF battery can be checked by measuring its open-circuit voltage (i.e., the voltage when the positive terminal is disconnected).

No charging is necessary when the open-circuit voltage equals or exceeds 12.8 V.

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

Example

c. Open-circuit voltage = 12.0 V
d. Charging time = 6.5 hours
e. Charge of the battery = 20 ~ 30%
6. Charge:
   - battery
     (refer to the appropriate charging method illustration)

⚠️ WARNING ⚠️
Do not quick charge a battery.

⚠️ CAUTION: ⚠️
- Never remove the MF battery sealing caps.
- Do not use a high-rate battery charger since it forces a high-amperage current into the battery quickly and can cause battery overheating and battery plate damage.
- If it is impossible to regulate the charging current on the battery charger, be careful not to overcharge the battery.
- When charging a battery, be sure to remove it from the vehicle. (If charging has to be done with the battery mounted on the vehicle, 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.
CHECKING AND CHARGING THE BATTERY

Charging method using a variable-current (voltage) charger

Measure the open-circuit voltage prior to charging.

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

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

Adjust the charging voltage to 20 ~ 25 V.

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

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

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

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

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.
CHECKING AND CHARGING THE BATTERY

Charging method using a constant voltage charger

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

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

3. Is the amperage higher than the standard charging amperage written on the battery?
   - **YES**
     - Charge the battery until the charging voltage reaches 15 V.
     - **NOTE:**
       - Set the charging time to a maximum of 20 hours.
   - **NO**
     - **NOTE:**
       - Leave the battery unused for more than 30 minutes before measuring its open-circuit voltage.

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

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

**NOTE:**
This type of battery charger cannot charge an MF battery. A variable voltage charger is recommended.
CHECKING AND CHARGING THE BATTERY/ CHECKING THE FUSES

7. Install:
   • battery
8. Connect:
   • battery leads

**CAUTION:**
First, connect the positive battery lead \( \text{①} \), and then the negative battery lead \( \text{②} \).

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

**Recommended lubricant**
Dielectric grease

11. Install:
    • battery case cover
12. Close the hood.

CHECKING THE FUSES

**CAUTION:**
Always turn off the main switch when checking or replacing a fuse. Otherwise, a short circuit may occur.

1. Lift the hood up.
2. Remove:
   • battery case cover
3. Check:
   • fuses

| a. Connect the pocket tester to the fuse and check it for continuity. |

**NOTE:**
Set the tester to the “\( \Omega \times 1 \)” position.

**Pocket tester**
P/N. YU-03112-C, 90890-03112

b. If the tester indicates “\( \infty \)”, replace the fuse.
CHECKING THE FUSES

4. Replace:
   • blown fuse

   a. Turn off the ignition.
   b. Install a new fuse of the proper amperage.
   c. Turn on switches to verify operation of the related electrical devices.
   d. If the fuse immediately blows again, check the electrical circuit.

<table>
<thead>
<tr>
<th>Description</th>
<th>Current rating</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main fuse</td>
<td>30 A</td>
<td>1</td>
</tr>
<tr>
<td>Lighting system fuse</td>
<td>15 A</td>
<td>1</td>
</tr>
<tr>
<td>Ignition fuse</td>
<td>10 A</td>
<td>1</td>
</tr>
<tr>
<td>Auxiliary DC jack fuse</td>
<td>10 A</td>
<td>1</td>
</tr>
<tr>
<td>Four-wheel drive fuse</td>
<td>3 A</td>
<td>1</td>
</tr>
<tr>
<td>Signaling system fuse</td>
<td>10 A</td>
<td>1</td>
</tr>
<tr>
<td>Carburetor heater fuse</td>
<td>10 A</td>
<td>1</td>
</tr>
<tr>
<td>Backup fuse (odometer and clock)</td>
<td>10 A</td>
<td>1</td>
</tr>
<tr>
<td>Spare fuse</td>
<td>30 A</td>
<td>1</td>
</tr>
<tr>
<td>Spare fuse</td>
<td>15 A</td>
<td>1</td>
</tr>
<tr>
<td>Spare fuse</td>
<td>10 A</td>
<td>1</td>
</tr>
<tr>
<td>Spare fuse</td>
<td>3 A</td>
<td>1</td>
</tr>
</tbody>
</table>

**WARNING**

Never use a fuse with a rating other than that specified. Never use other materials in place of a fuse. An improper fuse may cause extensive damage to the electrical system, a malfunction of the lighting and ignition systems and could possibly cause a fire.

5. Install:
   • battery case cover
6. Close the hood.
ADJUSTING THE HEADLIGHT BEAMS

1. Adjust:
   • headlight beam (vertically)
     Turn the adjuster 1 in or out.

| Turning in | Headlight beam raised. |
| Turning out | Headlight beam lowered. |

CHANGING THE HEADLIGHT BULBS

1. Lift the hood up.
2. Remove:
   • headlight bulb holder cover
3. Disconnect:
   • headlight bulb holder coupler
4. Remove:
   • headlight bulb holder assembly

NOTE: The headlight bulb cannot be removed from the headlight bulb holder. To replace the headlight bulb, replace the headlight bulb holder assembly.

WARNING
Keep flammable products and your hands away from the bulb while it is on, since it will be hot. Do not touch the bulb until it cools down.
CHANGING THE HEADLIGHT BULBS

1. Remove:
   • headlight bulb holder assembly

CAUTION:
Avoid touching the glass part of the bulb.
Keep it free from oil; otherwise, the transparency of the glass, life of the bulb, and luminous flux will be adversely affected. If oil gets on the bulb, thoroughly clean it with a cloth moistened with alcohol or lacquer thinner.

5. Install:
   • headlight bulb holder assembly

6. Connect:
   • headlight bulb holder coupler

7. Install:
   • headlight bulb holder cover

8. Close the hood.

CHANGING THE TAIL/BRAKE LIGHT BULBS

1. Remove:
   • cargo bed panel

2. Remove:
   • tail/brake light bulb holder (with bulb)
   • bulb

NOTE: __________________________________________________________________________
Turn the bulb holder counterclockwise and remove the defective bulb.

WARNING: _________________________________________________________________________
Keep flammable products and your hands away from the bulb while it is on, since it will be hot. Do not touch the bulb until it cools down.
3. Install:
   • bulb [New]
   Secure the new bulb in the tail/brake light bulb holder.

**CAUTION:**
Avoid touching the glass part of the bulb. Keep it free from oil; otherwise, the transparency of the glass, life of the bulb, and luminous flux will be adversely affected. If oil gets on the bulb, thoroughly clean it with a cloth moistened with alcohol or lacquer thinner.

4. Install:
   • tail/brake light bulb holder (with bulb)

5. Install:
   • cargo bed panel

Refer to “SEATS, ENCLOSURE, HOOD AND CARGO BED” in chapter 8.
# ENGINE REMOVAL

## ENGINE

### AIR DUCTS, MUFFLER AND EXHAUST PIPE

**Order**

Removing the air ducts, muffler and exhaust pipe  
Engine oil  
Coolant  
Driver seat/passenger seat/console/seat supports/footrest cover  
Carburetor assembly/air filter case  
Fuel tank

**Q'ty**

Remove the parts in the order listed.

**Remarks**

Drain.  
Refer to “CHANGING THE ENGINE OIL” in chapter 3.  
Drain.  
Refer to “CHANGING THE COOLANT” in chapter 3.  
Refer to “SEATS, ENCLOSURE, HOOD AND CARGO BED” in chapter 8.  
Refer to “CARBURETOR” in chapter 6.  
Refer to “FUEL PUMP AND FUEL TANK” in chapter 6.
ENGINE REMOVAL

Order | Job/Part | Q'ty | Remarks
--- | --- | --- | ---
1 | Heat protector | 1 | Refer to “ENGINE COOLING FAN AND A.C. MAGNETO”.
2 | Muffler stay | 1 |
3 | Muffler damper | 1 |
4 | Muffler bracket | 1 |
5 | Muffler/gasket | 1/1 |
6 | Exhaust pipe/gasket | 1/1 |
7 | Air duct assembly 1 | 1 |
8 | Air duct assembly 2 | 1 |

For installation, reverse the removal procedure.
### SELECT LEVER UNIT AND COOLANT RESERVOIR

<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 select lever unit and coolant reservoir</td>
<td>1</td>
<td>Remove the parts in the order listed.</td>
</tr>
<tr>
<td>2</td>
<td>Shift arm</td>
<td>1</td>
<td><strong>CAUTION:</strong> The select lever shift rod locknut (select lever unit side) has left-handed threads. To loosen the locknut, turn it clockwise.</td>
</tr>
<tr>
<td>3</td>
<td>Select lever unit</td>
<td>1</td>
<td>For installation, reverse the removal procedure.</td>
</tr>
</tbody>
</table>

14 Nm (1.4 m·kg, 10 ft·lb)  
15 Nm (1.5 m·kg, 11 ft·lb)

Select lever unit and coolant reservoir

Shift arm
Select lever shift rod
Select lever unit
## HOSES AND LEADS

### Removing the hoses and leads

<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>Water pump inlet hose</td>
<td>1</td>
<td>Disconnect.</td>
</tr>
<tr>
<td>2</td>
<td>Coolant outlet hose</td>
<td>1</td>
<td>Disconnect.</td>
</tr>
<tr>
<td>3</td>
<td>Oil inlet hose</td>
<td>1</td>
<td>Disconnect.</td>
</tr>
<tr>
<td>4</td>
<td>Oil outlet hose</td>
<td>1</td>
<td>Disconnect.</td>
</tr>
<tr>
<td>5</td>
<td>Vacuum hose</td>
<td>1</td>
<td>Disconnect.</td>
</tr>
<tr>
<td>6</td>
<td>Spark plug cap</td>
<td>1</td>
<td>Disconnect.</td>
</tr>
<tr>
<td>7</td>
<td>Cylinder head breather hose</td>
<td>1</td>
<td>Disconnect.</td>
</tr>
<tr>
<td>8</td>
<td>Thermo switch 1 lead connector</td>
<td>1</td>
<td>Disconnect.</td>
</tr>
<tr>
<td>9</td>
<td>Starter motor lead</td>
<td>1</td>
<td>Disconnect.</td>
</tr>
<tr>
<td>10</td>
<td>A.C. magneto lead coupler</td>
<td>2</td>
<td>Disconnect.</td>
</tr>
<tr>
<td>11</td>
<td>Speed sensor lead coupler</td>
<td>1</td>
<td>Disconnect.</td>
</tr>
<tr>
<td>12</td>
<td>Low-range switch connector</td>
<td>1</td>
<td>Disconnect. White/Red</td>
</tr>
<tr>
<td>13</td>
<td>High-range switch connector</td>
<td>1</td>
<td>Disconnect. Blue/White</td>
</tr>
<tr>
<td>14</td>
<td>Neutral switch connector</td>
<td>1</td>
<td>Disconnect. Sky blue</td>
</tr>
</tbody>
</table>

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>15</td>
<td>Reverse switch connector</td>
<td>1</td>
<td>Disconnect. Green/White</td>
</tr>
<tr>
<td>16</td>
<td>Engine ground lead</td>
<td>1</td>
<td>Disconnect.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>For installation, reverse the removal pro-</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>cedure.</td>
</tr>
</tbody>
</table>
### ENGINE MOUNTING BOLTS

<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 engine mounting bolts</td>
<td></td>
<td>Remove the parts in the order listed.</td>
</tr>
<tr>
<td></td>
<td>Front skid plate/rear skid plate</td>
<td></td>
<td>Refer to “SEATS, ENCLOSURE, HOOD AND CARGO BED” in chapter 8.</td>
</tr>
<tr>
<td></td>
<td>Rear wheels</td>
<td></td>
<td>Refer to “REAR WHEELS AND BRAKE DISC” in chapter 8.</td>
</tr>
<tr>
<td></td>
<td>Final drive gear assembly</td>
<td></td>
<td>Refer to “REAR CONSTANT VELOCITY JOINTS, FINAL DRIVE GEAR AND REAR DRIVE SHAFT” in chapter 7.</td>
</tr>
</tbody>
</table>

- **56 Nm (5.6 m·kg, 40 ft·lb)**
- **42 Nm (4.2 m·kg, 30 ft·lb)**
- **33 Nm (3.3 m·kg, 24 ft·lb)**
<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Engine bracket nut</td>
<td>3</td>
<td><strong>NOTE:</strong> ________________ Remove the engine assembly from the top of the vehicle.</td>
</tr>
<tr>
<td>2</td>
<td>Engine mounting bolt/nut (front)</td>
<td>1/1</td>
<td>CAUTION: ________________ Install all of the bolts/nuts and then tighten them to full torque specifications.</td>
</tr>
<tr>
<td>3</td>
<td>Engine mounting bolt (rear)</td>
<td>2</td>
<td>Refer to “INSTALLING THE ENGINE”. For installation, reverse the removal procedure.</td>
</tr>
<tr>
<td>4</td>
<td>Engine assembly</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Engine bracket</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>
INSTALLING THE ENGINE

1. Install:
   - engine bracket ①
   - engine bracket nut ②
   - engine assembly ③
   - engine mounting bolt (rear) ④
   - engine mounting bolt/nut (front) ⑤

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

2. Tighten:
   - engine bracket nut ②
     \[33\text{ Nm (3.3 m·kg, 24 ft·lb)}\]
   - engine mounting bolt (rear) ④
     \[42\text{ Nm (4.2 m·kg, 30 ft·lb)}\]
   - engine mounting bolt/nut (front) ⑤
     \[56\text{ Nm (5.6 m·kg, 40 ft·lb)}\]

3. Install:
   - air duct assembly 1 ①

   **NOTE:**
   Be sure to align the alignment marks on air duct assembly 1 as shown in the illustrations.
## CYLINDER HEAD

### Order

<table>
<thead>
<tr>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Removing the cylinder head</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Engine assembly</td>
<td>1</td>
<td>Remove the parts in the order listed. Refer to “ENGINE REMOVAL”. Refer to “ADJUSTING THE VALVE CLEARANCE” in chapter 3.</td>
</tr>
<tr>
<td>Timing plug</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spark plug</td>
<td>1/1</td>
<td></td>
</tr>
<tr>
<td>Camshaft sprocket cover/O-ring</td>
<td>1/1</td>
<td></td>
</tr>
<tr>
<td>Air duct assembly 2 bracket</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Tappet cover/O-ring</td>
<td>2/2</td>
<td></td>
</tr>
<tr>
<td>Timing chain tensioner cap bolt</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Timing chain tensioner/gasket</td>
<td>1/1</td>
<td></td>
</tr>
<tr>
<td>Camshaft sprocket</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Cylinder head</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Cylinder head gasket</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Dowel pin</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>O-ring</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

### Diagram

- Cylinder head gasket
- Dowel pin
- O-ring
- Timing chain tensioner cap bolt
- Timing chain tensioner/gasket
- Camshaft sprocket
- Cylinder head
- Camshaft sprocket cover/O-ring
- Air duct assembly 2 bracket
- Spark plug
- Tappet cover/O-ring
- Timing plug
- Engine assembly

### Torque Specifications

- 10 Nm (1.0 m·kg, 7.2 ft·lb)
- 9 Nm (0.9 m·kg, 6.5 ft·lb)
- 10 Nm (1.0 m·kg, 7.2 ft·lb)
- 11 Nm (1.1 m·kg, 8.0 ft·lb)
- 18 Nm (1.8 m·kg, 13 ft·lb)
- 23 Nm (2.3 m·kg, 17 ft·lb)
- 40 Nm (4.0 m·kg, 29 ft·lb)
- 60 Nm (6.0 m·kg, 43 ft·lb)
### Order | Job/Part | Q'ty | Remarks
--- | --- | --- | ---
12 | Coolant outlet joint | 1 | 
13 | Coolant outlet joint gasket | 1 | For installation, reverse the removal procedure.
REMOVING THE CYLINDER HEAD

1. Align:
   • “T” mark
     (with stationary pointer)

   ▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲
   a. Turn the crankshaft counterclockwise with a wrench.
   b. Align the “T” mark ① on the rotor with the stationary pointer ② on the A.C. magneto cover. When the “T” mark is aligned with the stationary pointer, the piston is at the Top Dead Center (TDC).

NOTE: ____________________________
   • When the piston is at the Top Dead Center (TDC) on the compression stroke, there should be clearance between the valve stem tips and their respective valve adjusting screws.
   • If there is no clearance, rotate the crankshaft counterclockwise one turn.

2. Loosen:
   • camshaft sprocket bolt ①

3. Loosen:
   • timing chain tensioner cap bolt

4. Remove:
   • timing chain tensioner
   • camshaft sprocket

NOTE: ____________________________
   • Fasten a safety wire to the timing chain to prevent it from falling into the crankcase.
   • When removing the camshaft sprocket, it is not necessary to separate the timing chain.
5. Remove:
• cylinder head

**NOTE:**
• Loosen the 6-mm bolts first.
• Working in a crisscross pattern, loosen each 10-mm bolt 1/4 of a turn. After all the bolts are loosened, remove them.

### CHECKING THE TAPPET COVERS
1. Check:
   • tappet covers ①
   • O-rings ②
   Cracks/damage → Replace.

### CHECKING THE TIMING CHAIN TENSIONER
1. Check:
   • one-way cam operation (tensioner)
     Unsmooth operation → Replace.

### CHECKING THE CAMSHAFT SPROCKET
1. Check:
   • camshaft sprocket
     Wear/damage → Replace the camshaft sprocket and timing chain as a set.
   ① 1/4 of a tooth
   ② Correct
   ① Timing chain
   ② Sprocket
CHECKING THE CYLINDER HEAD

1. Eliminate:
   • carbon deposits (from the combustion chamber)
     Use a rounded scraper.

   NOTE: ______________________ __

   Do not use a sharp instrument to avoid damaging or scratching:
   • Spark plug threads
   • Valve seats

2. Check:
   • cylinder head
     Scratches/damage → Replace.
   • cylinder head water jacket
     Mineral deposits/rust → Eliminate.

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

   Cylinder head warpage
   Less than 0.03 mm (0.0012 in)

   a. Place a straightedge and a thickness gauge across the cylinder head.
   b. Use a thickness gauge to measure the warpage.
   c. If the warpage is out of specification, resurface the cylinder head.
   d. Place a 400 ~ 600 grit wet sandpaper on the surface plate, and resurface the head using a figure-eight sanding pattern.

   NOTE: ______________________ __

   To ensure an even surface rotate the cylinder head several times.
INSTALLING THE CYLINDER HEAD

1. Install:
   - cylinder head
   - cylinder head bolts (M10) [40 Nm (4.0 m·kg, 29 ft·lb)]
   - cylinder head bolts (M6) [10 Nm (1.0 m·kg, 7.2 ft·lb)]

   **NOTE:**
   - Lubricate the flanges and threads of the bolts (M10) with engine oil.
   - Tighten the bolts (M10) in two stages and a crisscross pattern.

2. Install:
   - camshaft sprocket

   a. Rotate the camshaft to align the camshaft pin ① with the match mark ② on the cylinder head.
   b. Turn the crankshaft counterclockwise with a wrench.
   c. Align the “T” mark ③ on the rotor with the stationary pointer ④ on the A.C. magneto cover. When the “T” mark is aligned with the stationary pointer, the piston is at the Top Dead Center (TDC).

   **CAUTION:**
   Do not turn the crankshaft during the camshaft sprocket installation.

   d. Place the timing chain onto the camshaft sprocket.
   e. Install the camshaft sprocket onto the camshaft and finger tighten the sprocket bolt.
NOTE: ________________________ __

Be sure the “I” mark ⑤ on the camshaft sprocket is aligned with the match mark ② on the cylinder head.

f. Force the camshaft clockwise and counterclockwise to remove timing chain slack.
g. Insert a screwdriver into the timing chain tensioner hole and push the timing chain guide inward.
h. While pushing the timing chain guide, be sure that the camshaft sprocket “I” mark ⑤ is aligned with the match mark ② on the cylinder head.
i. If the marks are aligned, tighten the camshaft sprocket bolt. If the marks are not aligned, change the meshing position of the camshaft sprocket and timing chain.

3. Install:
   • timing chain tensioner

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

   Timing chain tensioner bolts 11 Nm (1.1 m·kg, 8.0 ft·lb)

   ! WARNING ________________________
   Always use a new gasket.

   d. Install the spring, washer and cap bolt.

   Timing chain tensioner cap bolt 23 Nm (2.3 m·kg, 17 ft·lb)
4. Tighten:
   • camshaft sprocket bolt ①
     \[ \text{N-m (60 m·kg, 43 ft·lb) } \]

5. Check:
   • camshaft sprocket “I” mark
   • rotor “T” mark
   Out of alignment → Adjust.
Removing the camshaft, rocker arms and 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>Intake manifold/O-ring</td>
<td>1/1</td>
<td>Remove the parts in the order listed.</td>
</tr>
<tr>
<td>2</td>
<td>Thermo switch 1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Oil gallery bolt</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Lock washer/bearing retainer</td>
<td>1/1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Camshaft</td>
<td>1</td>
<td>Refer to “REMOVING THE CAMSHAFT AND ROCKER ARMS” and “INSTALLING THE CAMSHAFT AND ROCKER ARMS”.</td>
</tr>
<tr>
<td>6</td>
<td>Rocker arm shaft/O-ring</td>
<td>2/2</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Rocker arm</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Locknut/valve adjusting screw</td>
<td>2/2</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Valve cotter</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Valve spring retainer</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Outer valve spring</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

Refer to “REMOVING THE VALVES AND VALVE SPRINGS” and “INSTALLING THE VALVES AND VALVE SPRINGS”.

7 Nm (0.7 m·kg, 5.1 ft·lb)
20 Nm (2.0 m·kg, 14 ft·lb)
20 Nm (2.0 m·kg, 14 ft·lb)
8 Nm (0.8 m·kg, 5.8 ft·lb)
8 Nm (0.8 m·kg, 5.8 ft·lb)
### Order | Job/Part | Q'ty | Remarks
--- | --- | --- | ---
12 | Inner valve spring | 2 | Refer to “REMOVING THE VALVES AND VALVE SPRINGS” and “INSTALLING THE VALVES AND VALVE SPRINGS”.
13 | Intake valve | 1 | 
14 | Exhaust valve | 1 | 
15 | Valve stem seal | 2 | 
16 | Valve spring seat | 2 | For installation, reverse the removal procedure.

- 7 Nm (0.7 m·kg, 5.1 ft·lb)
- 20 Nm (2.0 m·kg, 14 ft·lb)
- 20 Nm (2.0 m·kg, 14 ft·lb)
- 8 Nm (0.8 m·kg, 5.8 ft·lb)
- 8 Nm (0.8 m·kg, 5.8 ft·lb)
REMOVING THE CAMSHAFT AND ROCKER ARMS
1. Remove:
   • camshaft

NOTE: Screw in a M10 bolt into the thread hole on the camshaft, and pull out the camshaft.

2. Remove:
   • rocker arm shafts (intake and exhaust)
   • rocker arms

NOTE: Use a slide hammer bolt and weight to remove the rocker arm shafts.

Slide hammer bolt (M6)
P/N. YU-01083-1, 90890-01083
Weight
P/N. YU-01083-3, 90890-01084

REMOVING THE VALVES AND VALVE SPRINGS
1. Check:
   • valve sealing
     Leakage at the valve seat → Check the valve face, valve seat and valve seat width.
     Refer to “CHECKING THE VALVES AND VALVE SPRINGS”.

a. Pour a clean solvent into the intake and exhaust ports.
b. Check that the valve seals properly.
   There should be no leakage at the valve seat.

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2. Remove:
   • valve cotters

**NOTE:**
Attach a valve spring compressor ① between the valve spring retainer and the cylinder head to remove the valve cotters.

---

**Valve spring compressor**
P/N. YM-04019, 90890-04019

---

**CHECKING THE CAMSHAFT**

1. Check:
   • cam lobes
     Pitting/scratches/blue discoloration → Replace.

2. Measure:
   • cam lobe dimensions ① and ②
     Out of specification → Replace.

---

**Camshaft lobe limit**

<table>
<thead>
<tr>
<th></th>
<th>Intake</th>
<th>Exhaust</th>
</tr>
</thead>
<tbody>
<tr>
<td>①</td>
<td>40.52 mm (1.5953 in)</td>
<td>40.52 mm (1.5953 in)</td>
</tr>
<tr>
<td>②</td>
<td>32.08 mm (1.2630 in)</td>
<td>32.08 mm (1.2630 in)</td>
</tr>
</tbody>
</table>

---

**CHECKING THE ROCKER ARMS AND CAMSHAFT**

1. Check:
   • camshaft lobe contact surface ①
   • valve adjusting screws ②
     Blue discoloration/pitting/scratches → Replace.
2. Check:
   • rocker arms
   • rocker arm shafts
     Damage/wear → Replace.

   ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
   a. Check the two contact areas on the rocker arms for signs of abnormal wear.
   1) Rocker arm shaft hole
   2) Camshaft lobe contact surface
     Excessive wear → Replace.
   b. Check the surface of the rocker arm shafts.
     Blue discoloration/pitting/scratches → Replace/check lubrication.
   c. Measure the inside diameter of the rocker arm holes.
     Out of specification → Replace.

[b]Rocker arm inside diameter
12.000 ~ 12.018 mm
(0.4724 ~ 0.4731 in)
<Limit>: 12.078 mm (0.4755 in)

d. Measure the outside diameter of the rocker arm shafts.
   Out of specification → Replace.

[b]Rocker arm shaft outside diameter
11.981 ~ 11.991 mm
(0.4717 ~ 0.4721 in)
<Limit>: 11.951 mm (0.4705 in)

e. Calculate the clearance by subtracting the rocker arm shaft outside diameter from the rocker arm inside diameter.
   Out of specification → Replace the defective part(s).

[b]Rocker arm to rocker arm shaft clearance
0.009 ~ 0.037 mm
(0.0004 ~ 0.0015 in)
<Limit>: 0.080 mm (0.003 in)

~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
CHECKING THE VALVES AND VALVE SPRINGS

1. Measure:
   • stem-to-guide clearance

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

   Out of specification → Replace the valve guide.

   \[
   \begin{align*}
   \text{Clearance (stem to guide)} & \\
   \text{Intake} & : 0.010 - 0.037 \text{ mm} \\
   & : (0.0004 - 0.0015 \text{ in}) \\
   & : <\text{Limit}>: 0.08 \text{ mm} (0.0031 \text{ in}) \\
   \text{Exhaust} & : 0.030 - 0.057 \text{ mm} \\
   & : (0.0012 - 0.0022 \text{ in}) \\
   & : <\text{Limit}>: 0.10 \text{ mm} (0.0039 \text{ in})
   \end{align*}
\]

2. Replace:
   • valve guide

\[
\text{NOTE: } \text{~~~~~~~~~~~~~~~~} \text{~~~~~~~~~~~~~~~~}
\]
To ease guide removal, installation and to maintain correct fit, heat the cylinder head to 100 °C (212 °F) in an oven.

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

   \[
   \begin{align*}
   \text{Valve guide remover (7.0 mm)} & : \text{P/N. YM-01225-A, 90890-01225} \\
   \text{Valve guide installer (7.0 mm)} & : \text{P/N. YM-04017, 90890-04017} \\
   \text{Valve guide reamer (7.0 mm)} & : \text{P/N. YM-01227, 90890-01227}
   \end{align*}
\]

\[
\text{NOTE: } \text{~~~~~~~~~~~~~~~~} \text{~~~~~~~~~~~~~~~~}
\]
After replacing the valve guide reface the valve seat.
3. Check:
   • valve face
     Pitting/wear → Grind the face.
   • valve stem end
     Mushroom shape or diameter larger than the body of the stem → Replace.

4. Measure:
   • margin thickness @
     Out of specification → Replace.

   **Margin thickness**
   - **Intake**
     1.0 ~ 1.4 mm (0.0394 ~ 0.0551 in)
   - **Exhaust**
     0.8 ~ 1.2 mm (0.0315 ~ 0.0472 in)

5. Measure:
   • valve stem runout
     Out of specification → Replace.

   **Runout limit**
   0.01 mm (0.0004 in)

**NOTE:**
- When installing a new valve, always replace the guide.
- If the valve is removed or replaced, always replace the valve stem seal.

6. Eliminate:
   • carbon deposits
     (from the valve face and valve seat)

7. Check:
   • valve seats
     Pitting/wear → Reface the valve seat.

8. Measure:
   • valve seat width @
     Out of specification → Reface the valve seat.

   **Valve seat width**
   - **Intake**
     1.2 ~ 1.4 mm (0.0472 ~ 0.0551 in)
     <Limit>: 1.6 mm (0.0630 in)
   - **Exhaust**
     1.2 ~ 1.4 mm (0.0472 ~ 0.0551 in)
     <Limit>: 1.6 mm (0.0630 in)
CAMSHAFT, ROCKER ARMS AND VALVES

a. Apply Mechanic's blueing dye (Dykeem) to 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 pattern.
d. Measure the valve seat width. Where the valve seat and valve face made contact, blueing will have been removed.
e. If the valve seat is too wide, too narrow, or the seat is not centered, the valve seat must be refaced.

9. Lap:
   • valve face
   • valve seat

NOTE: ________________________
After refacing the valve seat or replacing the valve and valve guide, the valve seat and valve face should be lapped.

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

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

b. Apply molybdenum disulfide oil to 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 compound.

NOTE: ________________________
For 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.

**NOTE:**
After every lapping operation be sure to clean off all of the compound from the valve face and valve seat.

f. Apply Mechanic's blueing dye (Dykem) to the valve face.
g. Install the valve into the cylinder head.
h. Press the valve through the valve guide and onto the valve seat to make a clear pattern.
i. Measure the valve seat width again. If the valve seat width is out of specification, reface and relap the valve seat.

<table>
<thead>
<tr>
<th>10. Measure:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>• valve spring free length</strong> (a)</td>
</tr>
<tr>
<td>Out of specification → Replace.</td>
</tr>
</tbody>
</table>

**Free length (valve spring)**
- **Inner**
  - 39.90 mm (1.57 in)
  - **<Limit>:** 37.9 mm (1.49 in)
- **Outer**
  - 43.27 mm (1.70 in)
  - **<Limit>:** 41.1 mm (1.62 in)

<table>
<thead>
<tr>
<th>11. Measure:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>• compressed spring force</strong> (b)</td>
</tr>
<tr>
<td>Out of specification → Replace.</td>
</tr>
</tbody>
</table>

**Compressed spring force**
- **Inner**
  - 104.9 ~ 120.6 N at 33.6 mm
    - (10.70 ~ 12.30 kg,
      23.58 ~ 27.11 lb at 1.32 in)
  - **Outer**
    - 235.4 ~ 251.1 N at 36.6 mm
      - (24.00 ~ 25.60 kg,
       52.92 ~ 56.45 lb at 1.44 in)
12. Measure:
   • spring tilt @ ENG:
   Out of specification → Replace.

   Spring tilt limit
   Inner
   2.5°/1.7 mm (2.5°/0.067 in)
   Outer
   2.5°/1.9 mm (2.5°/0.075 in)

**INSTALLING THE VALVES AND VALVE SPRINGS**

1. Apply:
   • molybdenum disulfide oil
     (onto the valve stem and valve stem seal)

2. Install:
   • valve spring seats
   • valve stem seals
   • valves
   • valve springs (inner and outer)
   • valve spring retainers

**NOTE:**
Install the valve springs with the larger pitch @ facing upwards.

3. Install:
   • valve cotters

**NOTE:**
Install the valve cotters while compressing the valve spring with the valve spring compressor.

**Valve spring compressor**
P/N. YM-04019, 90890-04019

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

**CAUTION:**
Hitting the valve tip with excessive force could damage the valve.
INSTALLING THE CAMSHAFT AND ROCKER ARMS

1. Apply:
   - engine oil
   (onto the rocker arm shafts)

2. Install:
   - rocker arms
   - rocker arm shafts (intake and exhaust)

NOTE: Use a slide hammer bolt to install the rocker arm shafts.

3. Install:
   - camshaft

NOTE: Install the camshaft pin hole facing up.

Slide hammer bolt (M6)
P/N. YU-01083-1, 90890-01083
Weight
P/N. YU-01083-3, 90890-01084
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></td>
<td>Removing the cylinder and piston</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cylinder head</td>
<td>1</td>
<td>Remove the parts in the order listed. Refer to “CYLINDER HEAD”.</td>
</tr>
<tr>
<td>1</td>
<td>Coolant inlet joint</td>
<td>1</td>
<td>Refer to “WATER PUMP” in chapter 5.</td>
</tr>
<tr>
<td>2</td>
<td>Timing chain guide (exhaust)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Cylinder/O-ring</td>
<td>1/1</td>
<td>Refer to “INSTALLING THE CYLINDER”.</td>
</tr>
<tr>
<td>4</td>
<td>Cylinder gasket</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Dowel pin</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>O-ring</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Piston pin clip</td>
<td>2</td>
<td>Refer to “REMOVING THE PISTON” and “INSTALLING THE PISTON”.</td>
</tr>
<tr>
<td>8</td>
<td>Piston pin</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Piston</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Piston ring set</td>
<td>1</td>
<td>For installation, reverse the removal procedure.</td>
</tr>
</tbody>
</table>
REMOVING THE PISTON

1. Remove:
   • piston pin clips
   • piston pin
   • piston

NOTE: ______________________
   • Before removing the piston pin, deburr the clip groove and pin hole area. If the piston pin groove is deburred and the piston pin is still difficult to remove, use the piston pin puller.
   • Before removing the piston pin clip, cover the crankcase with a clean rag to prevent the piston pin clip from falling into the crankcase.

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

2. Remove:
   • piston rings

NOTE: ______________________
   Spread the end gaps apart while at the same time lifting the piston ring over the top of the piston crown.

CHECKING THE TIMING CHAIN GUIDE

1. Check:
   • timing chain guide (exhaust)
     Wear/damage → Replace.

CHECKING THE CYLINDER AND PISTON

1. Check:
   • cylinder and piston walls
     Vertical scratches → Rebore or replace the cylinder and the piston.
   • cylinder water jacket
     Mineral deposits/rust → Eliminate.
2. Measure:
   • piston-to-cylinder clearance

1st step:

a. Measure the cylinder bore “C” with the cylinder bore gauge.

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

<table>
<thead>
<tr>
<th>Cylinder bore “C”</th>
<th>84.500 ~ 84.510 mm (3.3268 ~ 3.3272 in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum taper “T”</td>
<td>0.05 mm (0.0020 in)</td>
</tr>
<tr>
<td>Out of round “R”</td>
<td>0.01 mm (0.0004 in)</td>
</tr>
</tbody>
</table>

- “C” = maximum of D₁ ~ D₆
- “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 the piston and piston rings as a set.

2nd step:

a. Measure piston skirt diameter “P” with a micrometer.
@ 5.0 mm (0.20 in) from the piston bottom edge

**Piston skirt diameter “P”**

<table>
<thead>
<tr>
<th>Standard</th>
<th>84.445 ~ 84.460 mm (3.3246 ~ 3.3252 in)</th>
</tr>
</thead>
</table>

b. If out of specification, replace the piston and piston rings as a set.
3rd step:
a. Find the piston-to-cylinder clearance with the following formula.

\[
Piston-to-cylinder \text{ clearance} = \frac{\text{Cylinder bore} \ "C" - \text{Piston skirt diameter} \ "P"}{2}
\]

Piston-to-cylinder clearance
- 0.040 - 0.065 mm
- (0.0016 - 0.0026 in)
- <Limit>: 0.15 mm (0.0059 in)

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

CHECKING THE PISTON RINGS

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

   NOTE: Clean carbon from the piston ring grooves and rings before measuring the side clearance.

<table>
<thead>
<tr>
<th>Side clearance</th>
<th>Standard</th>
<th>Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top ring</td>
<td>0.03 ~ 0.07 mm</td>
<td>0.12 mm</td>
</tr>
<tr>
<td></td>
<td>(0.0012 ~ 0.0028 in)</td>
<td>(0.0047 in)</td>
</tr>
<tr>
<td>2nd ring</td>
<td>0.02 ~ 0.06 mm</td>
<td>0.12 mm</td>
</tr>
<tr>
<td></td>
<td>(0.0008 ~ 0.0024 in)</td>
<td>(0.0047 in)</td>
</tr>
</tbody>
</table>

2. Install:
   - piston ring
     (in cylinder)

   NOTE: Insert a ring into the cylinder and push it approximately 40 mm (1.6 in) into the cylinder. Push the ring with the piston crown so that the ring will be at a right angle to the cylinder bore.

@ 40 mm (1.6 in)
3. Measure:
   • ring end gap
     Out of specification → Replace.

NOTE: You cannot measure the end gap on the expander spacer of the oil control ring. If the oil control ring rails show excessive gap, replace all three rings.

<table>
<thead>
<tr>
<th>End gap</th>
<th>Standard</th>
<th>Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top ring</td>
<td>0.20 ~ 0.40 mm (0.0079 ~ 0.0157 in)</td>
<td>0.65 mm (0.0256 in)</td>
</tr>
<tr>
<td>2nd ring</td>
<td>0.40 ~ 0.60 mm (0.0157 ~ 0.0236 in)</td>
<td>0.95 mm (0.0374 in)</td>
</tr>
<tr>
<td>Oil ring</td>
<td>0.20 ~ 0.70 mm (0.0079 ~ 0.0276 in)</td>
<td>—</td>
</tr>
</tbody>
</table>

CHECKING THE PISTON PIN
1. Check:
   • piston pin
     Blue discoloration/grooves → Replace, then check the lubrication system.
2. Measure:
   • piston pin-to-piston clearance

   a. Measure the piston pin outside diameter ⑧. If out of specification, replace the piston pin.

   **Piston pin outside diameter**
   19.991 ~ 20.000 mm (0.7870 ~ 0.7874 in)
   <Limit>: 19.971 mm (0.7863 in)

   b. Measure the piston pin bore inside diameter ⑨.

   **Piston pin bore inside diameter**
   20.004 ~ 20.015 mm (0.7876 ~ 0.7880 in)
   <Limit>: 20.045 mm (0.7892 in)

   c. Calculate the piston pin-to-piston clearance with the following formula.

   **Piston pin-to-piston clearance**
   Bore size (piston pin) ⑨ – Outside diameter (piston pin) ⑧
d. If out of specification, replace the piston.

**Piston pin-to-piston clearance**
0.004 ~ 0.024 mm
(0.00016 ~ 0.00094 in)
<Limit>: 0.074 mm (0.0029 in)

---

**INSTALLING THE PISTON**

1. Install:
   - piston rings
     (onto the piston)

**NOTE:**
- Be sure to install the piston rings so that the manufacturer’s marks or numbers are located on the upper side of the rings.
- Lubricate the piston and piston rings liberally with engine oil.

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

   Offset the piston ring end gaps as shown.
   - Top ring end
   - Oil ring end (upper rail)
   - Oil ring end (lower rail)
   - 2nd ring end
   - 20 mm (0.79 in)

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

**NOTE:**
- Apply engine oil onto the piston pin, piston rings and piston.
- Be sure that the arrow mark ③ on the piston points to the exhaust side of the engine.
- Before installing the piston pin clips, cover the crankcase with a clean rag to prevent them piston pin clip from falling into the crankcase.
4. Lubricate:
   • piston
   • piston rings
   • cylinder

NOTE: ____________________________________________
Apply a liberal coating of engine oil.

INSTALLING THE CYLINDER
1. Install:
   • cylinder

NOTE: ____________________________________________
Install the cylinder with one hand while compressing the piston rings with the other hand.

CAUTION: _______________________________________
• Be careful not to damage the timing chain damper during installation.
• Pass the timing chain through the timing chain cavity.
**Removing the engine cooling fan and A.C. magneto**

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Driver seat/passenger seat/console</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Drive belt cover</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Engine oil</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Coolant</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Water pump assembly</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Engine cooling fan air duct assembly</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Air shroud</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

Remove the parts in the order listed.

Refer to “SEATS, ENCLOSURE, HOOD AND CARGO BED” in chapter 8.

Refer to “PRIMARY AND SECONDARY SHEAVES”.

Drain.

Refer to “CHANGING THE ENGINE OIL” in chapter 3.

Drain.

Refer to “CHANGING THE COOLANT” in chapter 3.

Refer to “WATER PUMP” in chapter 5.
<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Engine cooling fan</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Air shroud 2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>A.C. magneto coupler</td>
<td>2</td>
<td>Disconnect.</td>
</tr>
<tr>
<td>6</td>
<td>Engine cooling fan pulley base</td>
<td>1</td>
<td>Refer to “REMOVING THE A.C. MAGNETO” and “INSTALLING THE A.C. MAGNETO”.</td>
</tr>
<tr>
<td>7</td>
<td>A.C. magneto cover/gasket</td>
<td>1/1</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Dowel pin</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Stator lead holder</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Pickup coil</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Stator assembly</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>A.C. magneto rotor</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Woodruff key</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Starter wheel gear</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Washer</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Starter idle gear shaft</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Bearing</td>
<td>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>18</td>
<td>Starter idle gear</td>
<td>1</td>
<td>For installation, reverse the removal procedure.</td>
</tr>
</tbody>
</table>
REMOVING THE A.C. MAGNETO
1. Remove:
   • engine cooling fan pulley base

NOTE: Use the sheave holder to hold the primary sheave.

<table>
<thead>
<tr>
<th>Primary sheave holder</th>
</tr>
</thead>
<tbody>
<tr>
<td>P/N. YS-01880-A</td>
</tr>
<tr>
<td>Sheave holder</td>
</tr>
<tr>
<td>P/N. 90890-01701</td>
</tr>
</tbody>
</table>

2. Remove:
   • A.C. magneto cover
   • gasket
   • dowel pins

NOTE: Working in a crisscross pattern, loosen each bolt 1/4 of a turn. Remove them after all of them are loosened.

<table>
<thead>
<tr>
<th>Flywheel puller</th>
</tr>
</thead>
<tbody>
<tr>
<td>P/N. YM-01404, 90890-01404</td>
</tr>
</tbody>
</table>

3. Remove:
   • A.C. magneto rotor

NOTE: Use the flywheel puller.

CHECKING THE A.C. MAGNETO
1. Check:
   • stator assembly
   • pickup coil
   Damage → Replace.
CHECKING THE STARTER CLUTCH

1. Check:
   • starter clutch
     Cracks/damage → Replace.
   • starter clutch bolts
     Loose → Replace with a new one, and clinch the end of the bolt.

   NOTE: ________________________ ....
   The arrow mark on the starter clutch must face inward, away from the rotor.

<table>
<thead>
<tr>
<th>Starter clutch bolt</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 Nm (3.0 m · kg, 22 ft · lb)</td>
</tr>
<tr>
<td>LOCTITE®</td>
</tr>
</tbody>
</table>

   a. Install the starter wheel gear onto the starter clutch, and hold the starter clutch.
   b. When turning the starter wheel gear counterclockwise [A], the starter clutch and the wheel gear should be engaged.
      If not, the starter clutch is faulty. Replace it.
   c. When turning the starter wheel gear clockwise [B], the starter wheel gear should turn freely.
      If not, the starter clutch is faulty. Replace it.

2. Check:
   • starter idle gear teeth
   • starter wheel gear teeth
     Burrs/chips/roughness/wear → Replace.

3. Check:
   • starter wheel gear
     (contacting surface)
     Damage/pitting/wear → Replace.
CHECKING THE ENGINE COOLING FAN
1. Check:
   • engine cooling fan
   • air shroud 1
   • air shroud 2
   Cracks/damage → Replace.

INSTALLING THE A.C. MAGNETO
1. Apply:
   • sealant (into the slit)
     Yamaha bond No. 1215
     (Three Bond No. 1215®)
     P/N. 90890-85505

2. Install:
   • woodruff key
   • A.C. magneto rotor

NOTE: ______________________
• Before installing the rotor, clean the outside
  of the crankshaft and the inside of the rotor.
• After installing the rotor, check that the rotor
  rotates smoothly. If not, reinstall the key and
  rotor.

3. Install:
   • dowel pins
   • gasket
   • A.C. magneto cover

NOTE: ________________
• When installing the A.C. magneto cover, use
  a long rod to hold the rotor in position from
  the outside. This will make assembly easier.
  Be careful not to damage the oil seal.
• Tighten the bolts in stages, using a criss-
  cross pattern.
4. Install:
   • engine cooling fan pulley base ①  
   
   **NOTE:**
   Use a sheave holder ② to hold the primary sheave.

   **Primary sheave holder**
   P/N. YS-01880-A
   Sheave holder
   P/N. 90890-01701

   **NOTE:**
   Before installing the engine cooling fan pulley base, do not forget to install the O-ring.

5. Install:
   • air shroud ①  
   • engine cooling fan air duct assembly ①  

   **NOTE:**
   Install the engine cooling fan air duct assembly with the arrow mark ② towards the air shroud ①.
### PRIMARY AND SECONDARY SHEAVES

#### Order Job/Part

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Drive belt cover</td>
<td>1</td>
<td>Remove the parts in the order listed.</td>
</tr>
<tr>
<td>2</td>
<td>Rubber gasket</td>
<td>1</td>
<td>Refer to “ENGINE REMOVAL”.</td>
</tr>
<tr>
<td>3</td>
<td>Bearing housing</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Dowel pin</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Primary sliding sheave assembly</td>
<td>1</td>
<td>Refer to “REMOVING THE PRIMARY AND SECONDARY SHEAVES” and “INSTALLING THE PRIMARY AND SECONDARY SHEAVES”.</td>
</tr>
<tr>
<td>6</td>
<td>V-belt</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Primary fixed sheave</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>V-belt case cooling fan</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Spacer</td>
<td>1</td>
<td>For installation, reverse the removal procedure.</td>
</tr>
<tr>
<td>10</td>
<td>Secondary sheave assembly</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

#### Remarks
- Remove the parts in the order listed.
- Refer to “ENGINE REMOVAL”.
- Refer to “REMOVING THE PRIMARY AND SECONDARY SHEAVES” and “INSTALLING THE PRIMARY AND SECONDARY SHEAVES”.
- For installation, reverse the removal procedure.
**Disassembling the primary sliding sheave**

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Primary pulley sheave cap</td>
<td>1</td>
<td>Remove the parts in the order listed.</td>
</tr>
<tr>
<td>2</td>
<td>Primary pulley slider</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Spacer</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Primary pulley cam</td>
<td>1</td>
<td>Refer to “ASSEMBLING THE PRIMARY SHEAVE”.</td>
</tr>
<tr>
<td>5</td>
<td>Primary pulley weight</td>
<td>8</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>2</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Primary sliding sheave</td>
<td>1</td>
<td>For assembly, reverse the disassembly</td>
</tr>
<tr>
<td>9</td>
<td>O-ring</td>
<td>1</td>
<td>procedure.</td>
</tr>
</tbody>
</table>

\[
3 \text{Nm (0.3 m \cdot kg, 2.2 ft \cdot lb)}
\]
### SECONDARY SHEAVE

![Diagram of Secondary Sheave](image)

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Disassembling the secondary</strong></td>
<td></td>
<td>Remove the parts in the order listed.</td>
</tr>
<tr>
<td></td>
<td><strong>sheave</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>①</td>
<td>Spring seat</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>②</td>
<td>Compression spring</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>③</td>
<td>Spring seat</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>④</td>
<td>Guide pin</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>⑤</td>
<td>Secondary sliding sheave</td>
<td>4</td>
<td>Refer to “DISASSEMBLING THE SECONDARY SHEAVE” and “ASSEMBLING THE SECONDARY SHEAVE”.</td>
</tr>
<tr>
<td>⑥</td>
<td>O-ring</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>⑦</td>
<td>Secondary fixed sheave</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>⑧</td>
<td>Oil seal</td>
<td>1</td>
<td>For assembly, reverse the disassembly procedure.</td>
</tr>
<tr>
<td>⑨</td>
<td>Oil seal</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

**90 Nm (9.0 m·kg, 65 ft·lb)**

---

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REMOVING THE PRIMARY AND SECONDARY SHEAVES

1. Loosen:
   • secondary sheave nut
   • primary sheave nut

NOTE:
   • Use the sheave holder to hold the primary sheave.
   • First, loosen the secondary sheave nut, then loosen the primary sheave nut.

DISASSEMBLING THE SECONDARY SHEAVE

1. Remove:
   • primary sheave spring retainer nut

   a. Attach the sheave fixed block, locknut wrench and sheave spring compressor to the secondary sheave assembly.

   b. Place the sheave fixed block in a vise and secure it.
   c. Tighten the sheave spring compressor nut and compress the spring.
   d. Loosen the nut with the locknut wrench.
   e. Remove the nut.
   f. Remove the sheave spring compressor and locknut wrench.
PRIMARY AND SECONDARY SHEAVES

CHECKING THE PRIMARY SHEAVE
1. Check:
   • weight outside diameter \( a \)
     Out of specification → Replace the weight.

   **Weight outside diameter**
   30 mm (1.18 in)
   <Limit>: 29.5 mm (1.16 in)

2. Check:
   • primary pulley sliders
   • primary sliding sheave splines
     Wear/cracks/damage → Replace.
   • spacer
   • primary pulley cam
     Cracks/damage → Replace.

3. Check:
   • primary sliding sheave
   • primary fixed sheave
     Cracks/damage → Replace.

CHECKING THE SECONDARY SHEAVE
1. Check:
   • secondary fixed sheave smooth operation
   • secondary sliding sheave smooth operation
     Scratches/damage → Replace as a set.

2. Check:
   • torque cam grooves \( 1 \)
     Wear/damage → Replace.

3. Check:
   • guide pins \( 2 \)
     Wear/damage → Replace.

4. Check:
   • secondary sheave spring
     Damage → Replace.

5. Measure:
   • secondary sheave spring free length \( a \)
     Out of specification → Replace the secondary sheave spring.

   **Free length**
   121.4 mm (4.78 in)
   <Limit>: 115.33 mm (4.54 in)
CHECKING THE V-BELT CASE COOLING FAN
1. Check:
   • V-belt case cooling fan
     Cracks/damage → Replace.

ASSEMBLING THE PRIMARY SHEAVE
1. Clean:
   • primary sliding sheave face ①
   • primary fixed sheave face ②
   • spacer ③
   • weights ④
   • primary pulley cam face

   NOTE: __________________________
   Remove any excess grease.

2. Install:
   • weights ①

   NOTE: __________________________
   • Apply Yamaha Grizzly grease (90 g) to the whole outer surface of the weights and install.
   • Apply Yamaha Grizzly grease to the inner surface of the spacer.
   • Apply Yamaha Grizzly grease to the inner surface of the primary sliding sheave.

3. Install:
   • spacer
   • sliders ①
   • primary pulley cam ②
   • primary sliding sheave cap

   3 Nm (0.3 m·kg, 2.2 ft·lb)

ASSEMBLING THE SECONDARY SHEAVE
1. Apply:
   • BEL-RAY assembly lube®
     (to the secondary sliding sheave ① inner surface and oil seals)
   • BEL-RAY assembly lube®
     (to the bearings, oil lube and inner surface of the secondary fixed sheave ②)
2. Install:
   - guide pins ①

3. Apply:
   - BEL-RAY assembly lube®
     (to the guide pin sliding grooves ①, and O-rings ② New
   - BEL-RAY assembly lube®

4. Install:
   - spring seat
   - compression spring
   - spring seat
   - primary sheave spring retainer nut

   a. Attach the sheave fixed block, locknut wrench and sheave spring compressor to the secondary sheave assembly.

   b. Place the sheave fixed block in a vise and secure it.
   c. Tighten the sheave spring compressor nut ① and compress the spring.
   d. Install the primary sheave spring retainer nut ② and tighten it to the specified torque using the locknut wrench.

**NOTE:**
Be sure to install the primary sheave spring retainer nut with its chamfered side ③ facing the spring seat.
e. Remove the sheave spring compressor, locknut wrench, and sheave fixed block.

---

**INSTALLING THE PRIMARY AND SECONDARY SHEAVES**

1. Install:
   - secondary sheave assembly
   - V-belt
   - primary sheave assembly

**NOTE:**
- Tightening the bolts ① will push the secondary sliding sheave away, causing the gap between the secondary fixed and sliding sheaves to widen.
- Install the V-belt so that its arrow faces the direction shown in the illustration.

2. Install:
   - spacer
   - V-belt case cooling fan ①
   - primary sheave nut ②
     - 90 Nm (9.0 kg, 65 ft lb)
   - secondary sheave nut ③
     - 100 Nm (10.0 kg, 72 ft lb)

**NOTE:**
- Install the V-belt case cooling fan with the “2P5” mark facing outward.
- Use the sheave holder ④ to hold the primary sheave.
- First, tighten the primary sheave nut ②, then tighten the secondary sheave nut ③.

---

**Primary sheave holder**
P/N. YS-01880-A
Sheave holder
P/N. 90890-01701
Remarks

Remove the parts in the order listed. Refer to “PRIMARY AND SECONDARY SHEAVES”.

Refer to “REMOVING THE CLUTCH” and “INSTALLING THE CLUTCH”.

For installation, reverse the removal procedure.

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Removing the clutch</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary and secondary sheaves</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Clutch housing assembly</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Gasket/dowel pin</td>
<td>1/2</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>One-way clutch bearing</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Clutch carrier assembly</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>
Remove the parts in the order listed.

For assembly, reverse the disassembly procedure.
REMOVING THE CLUTCH

1. Remove:
   • clutch housing assembly
   • gasket
   • dowel pins

NOTE: ______________________________________
Working in crisscross pattern, loosen each bolt 1/4 of a turn. Remove them after all of them are loosened.

2. Straighten:
   • punched portion of the nut 🅰️.

3. Remove:
   • clutch carrier assembly nut 🅱️

NOTE: ______________________________________
Use a clutch holding tool 🅱️ to hold the clutch carrier assembly.

CHECKING THE CLUTCH

1. Check:
   • clutch housing 🅰️
     Heat damage/wear/damage → Replace.
   • one-way clutch bearing 🅱️
     Chafing/wear/damage → Replace.

NOTE: ______________________________________
• Replace the one-way clutch assembly and clutch housing as a set.
• The one-way clutch bearing should be installed in the clutch carrier assembly with the arrow mark facing toward the clutch housing.

a. Install the one-way clutch bearing and clutch carrier assembly to the clutch housing and hold the clutch carrier assembly.
b. When turning the clutch housing clockwise \( A \), the clutch carrier assembly should turn freely. If not, the one-way clutch assembly is faulty. Replace it.

c. When turning the clutch housing counterclockwise \( B \), the clutch housing and clutch carrier assembly should be engaged. If not, the one-way clutch assembly is faulty. Replace it.

2. Check:
   - clutch shoe
     Heat damage → Replace.

3. Measure:
   - clutch shoe thickness
     Out of specification → Replace.

\[
\text{Clutch shoe thickness} \\
1.5 \text{ mm (0.06 in)} \\
\text{Clutch shoe wear limit} \text{ } @ \\
1.0 \text{ mm (0.04 in)}
\]

INSTALLING THE CLUTCH

1. Install:
   - clutch carrier assembly
   - clutch carrier assembly nut \( \text{New} \)

\[
\times 140 \text{ Nm (14.0 m·kg, 100 ft·lb)}
\]

NOTE: Use a clutch holding tool \( \text{Universal clutch holder} \) to hold the clutch carrier assembly.

\[
\text{Universal clutch holder} \\
P/N. YM-91042, 90890-04086
\]

2. Lock the threads with a drift punch.
3. Install:
   • one-way clutch bearing

   **NOTE:** ______________
   The one-way clutch bearing should be installed in the clutch carrier assembly with the arrow mark @ facing toward the clutch housing.

4. Install:
   • dowel pins
   • gasket New
   • clutch housing assembly

   **NOTE:** ______________
   • Tighten the bolts in stages, using a criss-cross pattern.
   • After tightening the bolts, check that the clutch housing assembly to counterclockwise rotates smoothly.
### CRANKCASE

**STARTER MOTOR, TIMING CHAIN AND OIL FILTER**

<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 filter cartridge</td>
<td>1</td>
<td>Remove the parts in the order listed.</td>
</tr>
<tr>
<td>2</td>
<td>Oil outlet pipe/O-ring</td>
<td>1/1</td>
<td>Refer to “ENGINE REMOVAL”.</td>
</tr>
<tr>
<td>3</td>
<td>Oil inlet pipe/O-ring</td>
<td>1/1</td>
<td>Refer to “CYLINDER HEAD”.</td>
</tr>
<tr>
<td>4</td>
<td>Oil pipe adapter/O-ring</td>
<td>1/1</td>
<td>Refer to “CYLINDER AND PISTON”.</td>
</tr>
<tr>
<td>5</td>
<td>Relief valve assembly</td>
<td>1</td>
<td>Refer to “ENGINE COOLING FAN AND A.C. MAGNETO”.</td>
</tr>
<tr>
<td>6</td>
<td>Primary and secondary sheaves</td>
<td></td>
<td>Refer to “PRIMARY AND SECONDARY SHEAVES”.</td>
</tr>
<tr>
<td>7</td>
<td>Clutch carrier assembly</td>
<td></td>
<td>Refer to “CLUTCH”.</td>
</tr>
<tr>
<td>8</td>
<td>Engine assembly</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Cylinder head</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Cylinder and piston</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>A.C. magneto rotor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Oil pipe adapter/O-ring</td>
<td>1/1</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Oil inlet pipe/O-ring</td>
<td>1/1</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Oil outlet pipe/O-ring</td>
<td>1/1</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Oil filter cartridge</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Engine assembly</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Cylinder head</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Cylinder and piston</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>A.C. magneto rotor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Primary and secondary sheaves</td>
<td></td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>Clutch carrier assembly</td>
<td></td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>Oil filter cartridge</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>Oil outlet pipe/O-ring</td>
<td>1/1</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>Oil inlet pipe/O-ring</td>
<td>1/1</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>Oil pipe adapter/O-ring</td>
<td>1/1</td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>Relief valve assembly</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

**torques:**

- 18 Nm (1.8 m·kg, 13 ft·lb)
- 20 Nm (2.0 m·kg, 14 ft·lb)
- 10 Nm (1.0 m·kg, 7.2 ft·lb)
- 18 Nm (1.8 m·kg, 13 ft·lb)
- 7 Nm (0.7 m·kg, 5.1 ft·lb)
- 63 Nm (6.3 m·kg, 45 ft·lb)
- 50 Nm (5.0 m·kg, 36 ft·lb)
- 10 Nm (1.0 m·kg, 7.2 ft·lb)
- 32 Nm (3.2 m·kg, 23 ft·lb)

---

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<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Oil pump drive gear/straight key</td>
<td>1/1</td>
<td>Refer to “REMOVING THE OIL PUMP DRIVE GEAR” and “INSTALLING THE OIL PUMP DRIVE GEAR”.</td>
</tr>
<tr>
<td>7</td>
<td>Oil pump driven gear</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Timing chain guide (intake)</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>Starter motor/O-ring</td>
<td>1/1</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Speed sensor</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Shift drum stopper</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Low-range switch</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>High-range switch</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Neutral switch</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Reverse switch</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Oil filler cap</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Bearing cover/gasket</td>
<td>1/1</td>
<td></td>
</tr>
</tbody>
</table>
19 Oil delivery pipe
20 Oil strainer cover/O-ring
21 Compression spring
22 Oil strainer

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>19</td>
<td>Oil delivery pipe</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Oil strainer cover/O-ring</td>
<td>1/1</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>Compression spring</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>Oil strainer</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

For installation, reverse the removal procedure.
## Remarks

Remove the parts in the order listed.

- Refer to “INSTALLING THE SHIFT LEVER”.
- Refer to “SEPARATING THE CRANKCASE” and “ASSEMBLING THE CRANKCASE”.

For installation, reverse the removal procedure.

### Order

<table>
<thead>
<tr>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Separating the crankcase</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Shift lever cover/gasket</td>
<td>1/1</td>
<td></td>
</tr>
<tr>
<td>2 Shift lever 1/O-ring</td>
<td>1/1</td>
<td></td>
</tr>
<tr>
<td>3 Shift lever 2 assembly</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4 Right crankcase</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5 Dowel pin</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>6 Left crankcase</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>
## CRANKCASE BEARINGS

- **10 Nm (1.0 m·kg, 7.2 ft·lb)**
- **11 Nm (1.1 m·kg, 8.0 ft·lb)**

### Order Job/Part

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Removing the crankcase bearings</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Crankshaft and oil pump</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Transmission</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Middle drive/driven shaft</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Oil seal</td>
<td>3</td>
<td>Remove the parts in the order listed. Refer to “CRANKSHAFT AND OIL PUMP”.</td>
</tr>
<tr>
<td>6</td>
<td>Bearing retainer</td>
<td>2</td>
<td>Refer to “TRANSMISSION”.</td>
</tr>
<tr>
<td>7</td>
<td>Bearing</td>
<td>10</td>
<td>Refer to “MIDDLE GEAR”.</td>
</tr>
</tbody>
</table>

For installation, reverse the removal procedure.
REMOVING THE OIL PUMP DRIVE GEAR

1. Straighten:
   • lock washer tab

2. Remove:
   • oil pump drive gear nut

   a. Temporary install the clutch carrier assembly ①.
   b. Hold the clutch carrier assembly with a clutch holding tool ② and loosen the oil pump drive gear nut.

   ![Universal clutch holder]
   P/N. YM-91042, 90890-04086

   c. Remove the clutch carrier assembly.

SEPARATING THE CRANKCASE

1. Separate:
   • right crankcase

   a. Remove the crankcase bolts.

   ![A Right crankcase]
   ![B Left crankcase]
b. Remove the right crankcase.

**CAUTION:**

Use a soft hammer to tap on one side of the crankcase. Tap only on reinforced portions of the crankcase. Do not tap on the crankcase mating surfaces. Work slowly and carefully. Make sure that the crankcase halves separate evenly.

c. Remove the dowel pins.

---

**CHECKING THE TIMING CHAIN AND GUIDE**

1. Check:
   - timing chain
     Cracks/stiff → Replace the timing chain and camshaft sprocket as a set.

2. Check:
   - timing chain guide (intake)
     Wear/damage → Replace.

**CHECKING THE OIL STRAINER AND OIL DELIVERY PIPE**

1. Check:
   - oil strainer (1)
     Damage → Replace.
     Contaminants → Clean with engine oil.

2. Check:
   - oil delivery pipe
     Cracks/damage → Replace.
     Clogged → Blow out with compressed air.
CHECKING THE RELIEF VALVE
1. Check:
   • relief valve ①
   • spring ②
     Damage/wear → Replace the defective part(s).

CHECKING THE CRANKCASE
1. Thoroughly wash the case halves in a mild solvent.
2. Clean all the gasket mating surfaces and crankcase mating surfaces thoroughly.
3. Check:
   • crankcase
     Cracks/damage → Replace.
   • oil delivery passages
     Clogged → Blow out with compressed air.

CHECKING THE BEARINGS
1. Check:
   • bearing
     Clean and lubricate, then rotate the inner race with a finger.
     Roughness → Replace.

INSTALLING THE BEARING RETAINER
• bearing retainer ①

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

NOTE: ______________________________________
Install the bearing retainer with the “L” mark facing outward.
ASSEMBLING THE CRANKCASE

1. Apply:
   • sealant
      (to the mating surfaces of both case halves)

   Yamaha bond No. 1215
   (Three Bond No. 1215®)
   P/N. 90890-85505

2. Install:
   • dowel pins

3. Fit the right crankcase onto the left crankcase. Tap lightly on the case with a soft hammer.

   CAUTION:
   Before installing and torquing the crankcase holding bolts, be sure to check whether the transmission is functioning properly by manually rotating the shift drum in both directions.

4. Tighten:
   • crankcase bolts
      (follow the proper tightening sequence)

5. Apply:
   • 4-stroke engine oil
      (to the crank pin, bearing and oil delivery hole)

6. Check:
   • crankshaft and transmission operation
     Unsmooth operation → Repair.

NOTE: Tighten the bolts in stages, using a crisscross pattern.
**INSTALLING THE SHIFT LEVER**

1. Install:
   - shift lever 2 assembly
     - 14 Nm (1.4 m·kg, 10 ft·lb)
   - shift lever 1

**NOTE:**
When installing the shift lever 1, align the punch mark @ on the shift lever 1 with the punch marks @ on the shift lever 2.

**INSTALLING THE OIL PUMP DRIVE GEAR**

1. Install:
   - straight key
   - oil pump drive gear
   - lock washer
   - oil pump drive gear nut

2. Tighten:
   - oil pump drive gear nut
     - 50 Nm (5.0 m·kg, 36 ft·lb)

   a. Temporary install the clutch carrier assembly.
   b. Hold the clutch carrier assembly with a clutch holding tool and tighten the oil pump drive gear nut.

3. Bend the lock washer tab.

---

*Universal clutch holder*

P/N. YM-91042, 90890-04086
Removing the crankshaft and oil pump

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Washer/circlip</td>
<td>1/1</td>
<td>Remove the parts in the order listed.</td>
</tr>
<tr>
<td>2</td>
<td>Oil pump assembly/gasket</td>
<td>1/1</td>
<td>Refer to “CRANKCASE”.</td>
</tr>
<tr>
<td>3</td>
<td>Balancer</td>
<td>1</td>
<td>Refer to “REMOVING THE CRANKSHAFT” and “INSTALLING THE CRANKSHAFT AND BALANCER”.</td>
</tr>
<tr>
<td>4</td>
<td>Crankshaft seal</td>
<td>2</td>
<td>For installation, reverse the removal procedure.</td>
</tr>
<tr>
<td>5</td>
<td>Crankshaft</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>
OIL PUMP

Order | Job/Part                   | Q'ty | Remarks
------|---------------------------|------|----------------------------------
①     | Disassembling the oil pump| 1    | Remove the parts in the order listed.
②     | Rotor cover               | 1    | For assembly, reverse the disassembly procedure.
③     | Pin                       | 2    |                                   
④     | Shaft                     | 1    |                                   
⑤     | Pin                       | 1    |                                   
⑥     | Inner rotor               | 1    |                                   
⑦     | Outer rotor               | 1    |                                   
⑧     | Oil pump housing          | 1    |                                   

7 Nm (0.7 m·kg, 5.1 ft·lb)
REMOVING THE CRANKSHAFT
1. Remove:
   • crankshaft seals

NOTE: Mark a note of the position of each crankshaft seal so that they can be installed in the correct place and in the correct direction.

2. Remove:
   • crankshaft
   Use a crankcase separating tool.

<table>
<thead>
<tr>
<th>Crankcase separating tool</th>
</tr>
</thead>
<tbody>
<tr>
<td>P/N. YU-01135-B, 90890-01135</td>
</tr>
</tbody>
</table>

CHECKING THE OIL PUMP
1. Check:
   • oil pump driven gear
   • oil pump housing
   • rotor cover
   Cracks/wear/damage → Replace.

2. Measure:
   • inner-rotor-to-outer-rotor-tip clearance
   • outer-rotor-to-oil-pump-housing clearance
   • oil-pump-housing-to-inner-rotor-and-outer-rotor clearance
   Out of specification → Replace the oil pump.

<table>
<thead>
<tr>
<th>Inner-rotor-to-outer-rotor-tip clearance</th>
</tr>
</thead>
<tbody>
<tr>
<td>less than 0.15 mm (0.0059 in)</td>
</tr>
<tr>
<td>&lt;Limit&gt;: 0.23 mm (0.0091 in)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Outer-rotor-to-oil-pump-housing clearance</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.010 ~ 0.034 mm (0.0004 ~ 0.0013 in)</td>
</tr>
<tr>
<td>&lt;Limit&gt;: 0.104 mm (0.0041 in)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Oil-pump-housing-to-inner-rotor-and-outer-rotor clearance</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.04 ~ 0.09 mm (0.0016 ~ 0.0035 in)</td>
</tr>
<tr>
<td>&lt;Limit&gt;: 0.16 mm (0.0063 in)</td>
</tr>
</tbody>
</table>
3. Check:
   - oil pump operation
     Unsmooth → Repeat steps #1 and #2 or replace the defective parts.

CHECKING THE CRANKSHAFT
1. Measure:
   - crank width \( A \)
     Out of specification → Replace the crankshaft.

   **Crank width**
   - 62.95 - 63.00 mm
     (2.4783 - 2.4803 in)

   - side clearance \( D \)
     Out of specification → Replace the crankshaft.

   **Big end side clearance**
   - 0.25 - 0.75 mm
     (0.0098 - 0.0295 in)
     \(<\text{Limit}>= 1.0 \text{ mm (0.0394 in)}\)

   - runout \( E \)
     Out of specification → Replace the crankshaft.

   **Runout limit**
   - C1: 0.03 mm (0.0012 in)
   - C2: 0.03 mm (0.0012 in)

The crankshaft \( 1 \) and the crank pin \( 2 \) oil passages must be properly interconnected with a tolerance of less than 1 mm (0.04 in).
INSTALLING THE CRANKSHAFT AND BALANCER

1. Install:
   • crankshaft

   Crankshaft installer bolt ①
   P/N. YU-90060, 90890-01275
   Crankshaft installer set
   P/N. YU-90050
   Buffer boss installer set ②
   P/N. 90890-04088
   Adapter #11
   P/N. YM-33279
   Spacer (crankshaft) ③
   P/N. YM-90070-A, 90890-04060

   NOTE: ____________________________

   Hold the connecting rod at the Top Dead Center (TDC) with one hand while turning the nut of the installing tool with the other. Operate the installing tool until the crankshaft bottoms against the bearing.

   CAUTION: ____________________________

   Apply engine oil to each bearing to protect the crankshaft against scratches and to make installation easier.

2. Install:
   • crankshaft seals

   NOTE: ____________________________

   Install the crankshaft seals in the correct place and in the correct direction.

3. Install:
   • balancer ①

   NOTE: ____________________________

   Align the punch marks ② on the drive and driven gear.
### Removing the transmission

Crankcase separation

<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>Driven sprocket</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Chain</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Clutch dog 2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Shift fork “L”</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Spring</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Low wheel gear</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Secondary shaft</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Middle driven gear</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Drive axle</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Guide bar</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

Remove the parts in the order listed. Refer to “CRANKCASE”.

---

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<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>Shift fork “R”</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Spring</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Shift drum</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Clutch dog 1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>High wheel gear</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Middle drive gear</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Spacer/O-ring</td>
<td>1/1</td>
<td>For installation, reverse the removal pro-</td>
</tr>
</tbody>
</table>

cedure.
CHECKING THE SHIFT FORKS

1. Check:
   • shift fork cam follower ①
   • shift fork pawl ②
   Scoring/bends/wear/damage → Replace.

2. Check:
   • guide bar
   Roll the guide bar on a flat surface.
   Bends → Replace.

   **WARNING**
   Do not attempt to straighten a bent guide bar.

3. Check:
   • shift fork movement
   (on the guide bar)
   Unsmooth operation → Replace the shift fork and the guide bar.

4. Check:
   • springs
   Cracks/damage → Replace.

CHECKING THE SHIFT DRUM

1. Check:
   • shift drum grooves
   Scratches/wear/damage → Replace.
CHECKING THE TRANSMISSION

1. Measure:
   • axle runout
     Use a centering device and a dial gauge.
     Out of specification → Replace the bent axle.

<table>
<thead>
<tr>
<th>Runout limit (drive axle)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.06 mm (0.0024 in)</td>
</tr>
</tbody>
</table>

2. Check:
   • gear teeth
     Blue discoloration/pitting/wear → Replace.
   • mated dogs
     Rounded edges/cracks/missing portions → Replace.

3. Check:
   • gear movement
     Unsmooth → Repeat steps #1 and #2 or replace the defective parts.

CHECKING THE SECONDARY SHAFT AND DRIVEN SPROCKET

1. Check:
   • gear teeth
     Blue discoloration/pitting/wear → Replace.

2. Check:
   • gear movement
     Unsmooth → Repeat steps #1 or replace the defective parts.

CHECKING THE CHAIN

1. Check:
   • chain
     Cracks/shift → Replace the chain, secondary shaft and driven sprocket as a set.
INSTALLING THE TRANSMISSION

1. Install:
   • shift drum
   • washer
   • spring (short)
   • shift fork “R” ①
   • drive axle assembly ②
   • guide bar ③
   • clutch dog 2 ④
   • spring (long) ⑤
   • shift fork “L” ⑥

   **NOTE:**
   Be sure to install the shift forks “R” and “L” as shown in the illustration, and make sure that the shift fork guide pin is properly seated in the shift drum groove.

2. Check:
   • shift operation
     Unsmooth operation → Repair.

   **NOTE:**
   • Oil each gear and bearing thoroughly.
   • Before assembling the crankcase, be sure that the transmission is in neutral and that the gears turn freely.
## MIDDLE GEAR

### MIDDLE DRIVE PINION GEAR SHAFT

**Order** | **Job/Part** | **Q'ty** | **Remarks** |
---|---|---|---|
1 | Removing the middle drive pinion gear shaft  
Crankcase separation  
Transmission  
Middle drive pinion gear shaft bearing housing | 1 | Remove the parts in the order listed.  
Refer to “CRANKCASE”.  
Refer to “TRANSMISSION”. |
2 | Middle drive pinion gear | 1 | Refer to “REMOVING THE MIDDLE DRIVE PINION GEAR SHAFT” and “INSTALLING THE MIDDLE DRIVE PINION GEAR SHAFT”.  
Refer to “SELECTING THE MIDDLE DRIVE AND DRIVEN GEAR SHIMS”. |
3 | Shim | 2 | For installation, reverse the removal procedure. |
4 | Middle drive pinion gear shaft | 1 |
5 | Bearing retainer | 2 |

### Torque Values

- **145 Nm** (14.5 m·kg, 105 ft·lb)
- **32 Nm** (3.2 m·kg, 23 ft·lb)
- **25 Nm** (2.5 m·kg, 18 ft·lb)

For installation, reverse the removal procedure.
### MIDDLE DRIVE SHAFT

- **97 Nm (9.7 m·kg, 70 ft·lb)**
- **25 Nm (2.5 m·kg, 18 ft·lb)**
- **80 Nm (8.0 m·kg, 58 ft·lb)**
- **110 Nm (11.0 m·kg, 80 ft·lb)**

**Order** | **Job/Part** | **Q'ty** | **Remarks**
--- | --- | --- | ---
1 | Crankcase separation | 1 | Remove the parts in the order listed. Refer to “CRANKCASE”.
2 | Drive shaft coupling | 1 | Refer to “REMOVING THE MIDDLE DRIVE SHAFT” and “INSTALLING THE MIDDLE DRIVE SHAFT”.
3 | Circlip | 2 | Refer to “SELECTING THE MIDDLE DRIVE AND DRIVEN GEAR SHIMS”.
4 | Bearing | 2 | Refer to “REMOVING THE MIDDLE DRIVE SHAFT” and “INSTALLING THE MIDDLE DRIVE SHAFT”.
5 | Universal joint yoke | 1 | Refer to “REMOVING THE MIDDLE DRIVE SHAFT” and “INSTALLING THE MIDDLE DRIVE SHAFT”.
6 | Bearing housing | 1 | Refer to “REMOVING THE MIDDLE DRIVE SHAFT” and “INSTALLING THE MIDDLE DRIVE SHAFT”.
7 | Shim | 1 | Refer to “REMOVING THE MIDDLE DRIVE SHAFT” and “INSTALLING THE MIDDLE DRIVE SHAFT”.
8 | Middle driven pinion gear | 1 | Refer to “REMOVING THE MIDDLE DRIVE SHAFT” and “INSTALLING THE MIDDLE DRIVE SHAFT”.
9 | Bearing retainer | 1 | Refer to “REMOVING THE MIDDLE DRIVE SHAFT” and “INSTALLING THE MIDDLE DRIVE SHAFT”.

### Remarks
- Remove the parts in the order listed. Refer to “CRANKCASE”.
- Refer to “REMOVING THE MIDDLE DRIVE SHAFT” and “INSTALLING THE MIDDLE DRIVE SHAFT”.
- Refer to “SELECTING THE MIDDLE DRIVE AND DRIVEN GEAR SHIMS”.
For installation, reverse the removal procedure.
REMOVING THE MIDDLE DRIVE PINION GEAR SHAFT

1. Straighten:
   • punched portion of the middle drive pinion gear nut

2. Loosen:
   • middle drive pinion gear nut

**NOTE:**
Secure the middle drive pinion gear shaft in the vise with a clean rag.

3. Remove:
   • middle drive pinion gear nut
   • middle drive pinion gear
   • shim(s)

---

REMOVING THE MIDDLE DRIVE SHAFT

1. Remove:
   • drive shaft coupling nut
   • washer
   • drive shaft coupling

**NOTE:**
Use the coupling gear/middle shaft tool to hold the drive shaft coupling.

---

**Coupling gear/middle shaft tool**

P/N. YM-01229, 90890-01229
2. Remove:
- universal joint

\begin{itemize}
\item Remove the circlips 1.
\item Place the universal joint in a press.
\item With a suitable diameter pipe 2 beneath the yoke 3, press the bearing 4 into the pipe as shown.
\end{itemize}

**NOTE:**
It may be necessary to lightly tap the yoke with a punch.

\begin{itemize}
\item Repeat the steps for the opposite bearing.
\item Remove the yoke.
\end{itemize}

**NOTE:**
It may be necessary to lightly tap the yoke with a punch.

3. Remove:
- middle driven pinion gear nut 1
- washer
- universal joint yoke

**NOTE:**
Use the universal joint holder 2 to hold the universal joint yoke.

4. Remove:
- bearing housing assembly 1

\begin{itemize}
\item Clean the outside surface of the middle driven pinion gear.
\item Place the middle driven pinion gear onto a hydraulic press.
\end{itemize}

**CAUTION:**
- Never directly press the middle driven pinion gear end with a hydraulic press, this will result in damage to the middle driven pinion gear thread.
- Install the suitable socket 2 on the middle driven pinion gear end to protect the thread from damage.
c. Press the middle driven pinion gear end and remove the bearing housing.

5. Remove:
   • bearing retainer
   • bearing

a. Place a folded rag ①.
b. Secure the bearing housing edge in the vise.
c. Attach the bearing retainer wrench ②.

**CAUTION:**
The middle driven pinion gear bearing retainer has left-handed threads. To loosen the retainer turn it clockwise.

d. Remove the bearing retainer and bearing.

6. Remove:
   • bearing retainer ①
   • bearing

**NOTE:**
Attach the ring nut wrench ②.

**CAUTION:**
The middle drive shaft bearing retainer has left-handed threads. To loosen the retainer turn it clockwise.

7. Remove:
   • middle drive shaft ① (with bearing)
CHECKING THE PINION GEAR

1. Check:
   • damper cam surface
     Wear/scratches → Replace damper cam and driven pinion gear as a set.

2. Check:
   • damper spring
     Damage/cracks → Replace.

3. Check:
   • drive pinion gear teeth
   • driven pinion gear teeth
     Pitting/galling/wear → Replace.

4. Check:
   • O-ring
     Damage → Replace.
   • bearings
     Pitting/damage → Replace.

5. Check:
   • universal joint movement
     Roughness → Replace universal joint.

SELECTING THE MIDDLE DRIVE AND DRIVEN GEAR SHIMS

When the drive and driven gear, bearing housing assembly and/or crankcase replaced, be sure to adjust the gear shims and .

1. Select:
   • middle drive pinion gear shim
   • middle driven pinion gear shim

a. Position middle drive and driven pinion gear by using shims and with their respective thickness calculated from information marked on crankcase, bearing housing and drive pinion gear end.

1. Shim thickness “A”
2. Shim thickness “B”
b. To find shim thickness “A” use following formula:

Middle drive pinion gear shim thickness
“A” = \( \alpha - \beta - \gamma \)

Where:
- \( \alpha \) = a numeral (usually a decimal number) on the bearing housing is either added to or subtracted from “10.5”.
- \( \beta \) = drive pinion gear to driven pinion gear center distance (considered constant “55”).
- \( \gamma \) = a numeral (usually a decimal number) on the left crankcase specifies a thickness of “66”.

Example:
1) If the bearing housing is marked “+04”, ...... \( \alpha \) is 10.54.
2) \( \beta \) is 55
3) If the crankcase (left) is marked “66.03”, ...... \( \gamma \) is 66.03.
4) Therefore, the shim thickness is 0.47 mm.

\[
A = 66.03 - 10.54 - 55 = 0.49
\]

5) Round off hundredths digit and select appropriate shim(s).
In the example above, the calculated shim thickness is 0.49 mm. The chart instructs you, however, to round off 9 to 10.

<table>
<thead>
<tr>
<th>Hundredths</th>
<th>Round value</th>
</tr>
</thead>
<tbody>
<tr>
<td>0, 1, 2</td>
<td>0</td>
</tr>
<tr>
<td>3, 4, 5, 6, 7</td>
<td>5</td>
</tr>
<tr>
<td>8, 9</td>
<td>10</td>
</tr>
</tbody>
</table>

Shims are supplied in the following thickness.

<table>
<thead>
<tr>
<th>Middle drive pinion gear shim</th>
<th>Thickness (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.10</td>
</tr>
<tr>
<td></td>
<td>0.15</td>
</tr>
<tr>
<td></td>
<td>0.20</td>
</tr>
</tbody>
</table>
c. To find shim thickness “B” use the following formula:

\[
\text{Middle driven pinion gear shim thickness:} \\
\text{“B”} = \left(\text{\(a\)} - \text{\(b\)} + \text{\(c\)} - \text{\(d\)}\right) - 0.05
\]

Where:
- \(a\) = a numeral (usually a decimal number) on the bearing housing is either added to or subtracted from “76”.
- \(b\) = a numeral (usually a decimal number) on the middle driven pinion gear is either added to or subtracted from “59”.
- \(c\) = a numeral (usually a decimal number) on the middle driven pinion gear is either added to or subtracted from “79.5”.
- \(d\) = a numeral (usually a decimal number) on the left crankcase specifies a thickness of “95.8”.

Example:
1) If the bearing housing is marked “+03”, .....\(a\) is 76.03.
2) If the driven pinion gear is marked “+02”, .....\(b\) is 59.02.
3) If the driven pinion gear is marked “-10”, .....\(c\) is 79.40.
4) If the crankcase (left) is marked “95.79”, .....\(d\) is 95.79.
5) Therefore, the shim thickness is 0.57 mm.

\[
\text{B} = 76.03 - 59.02 + 79.40 - 95.79 - 0.05 = 0.57
\]

6) Round off hundredths digit and select appropriate shim(s).
In the example above, the calculated shim thickness is 0.57 mm. The chart instructs you, however, to round off 7 to 5.

<table>
<thead>
<tr>
<th>Hundredths</th>
<th>Round value</th>
</tr>
</thead>
<tbody>
<tr>
<td>0, 1, 2</td>
<td>0</td>
</tr>
<tr>
<td>3, 4, 5, 6, 7</td>
<td>5</td>
</tr>
<tr>
<td>8, 9</td>
<td>10</td>
</tr>
</tbody>
</table>
Shims are supplied in the following thickness.

<table>
<thead>
<tr>
<th>Middle drive pinion gear shim</th>
<th>Thickness (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.10 0.40</td>
</tr>
<tr>
<td></td>
<td>0.15 0.50</td>
</tr>
<tr>
<td></td>
<td>0.20 0.60</td>
</tr>
<tr>
<td></td>
<td>0.30</td>
</tr>
</tbody>
</table>

**INSTALLING THE MIDDLE DRIVE SHAFT**

1. Install:
   - bearing retainer \[①\]

\[80 \text{Nm (8.0 m·kg, 58 ft·lb)}\]

**NOTE:**
Attach the ring nut wrench \[②\].

**Ring nut wrench**
P/N. YM-38404, 90890-01430

**CAUTION:**
The middle drive shaft bearing retainer has left-handed threads. To tighten the retainer, turn it counterclockwise.
2. Install:
   • bearing retainer

   a. Attach the folded rag ①.
   b. Secure the bearing housing edge in the vise.
   c. Attach the bearing retainer wrench ②.

   ![Bearing retainer](image)
   Middle gear bearing retainer
   P/N. YM-04128
   Bearing retainer wrench
   P/N. 90890-04128

   d. Tighten the bearing retainer.

   **CAUTION:**
   The middle driven pinion gear bearing retainer has left-handed threads. To tighten the retainer, turn it counterclockwise.

   ![Bearing retainer](image)
   Bearing retainer
   110 Nm (11.0 m · kg, 80 ft · lb)

3. Install:
   • shims ①
   • bearing housing

   **NOTE:** Install the shims so that the tabs are positioned as shown in the illustration.

4. Install:
   • universal joint yoke
   • washer
   • middle driven pinion gear nut ①

   ![Joint yoke](image)
   Universal joint holder
   P/N. YM-04062, 90890-04062

   **NOTE:** Use the universal joint holder ② to hold the yoke.
5. Install:
   • universal joint

   a. Install the opposite yoke into the universal joint.
   b. Apply wheel bearing grease to the bearings.

   c. Install the bearing ① onto the yoke.

   **CAUTION:**
   Check each bearing. The needles can easily fall out of their races. Slide the yoke back and forth on the bearings; the yoke will not go all the way onto a bearing if a needle is out of place.

   d. Press each bearing into the universal joint using a suitable socket.

   **NOTE:**
   The bearing must be inserted far enough into the universal joint so that the circlip can be installed.

   e. Install the circlips ② into the groove of each bearing.

6. Install:
   • drive shaft coupling
   • washer
   • drive shaft coupling nut ①

   **NOTE:**
   Use the coupling gear/middle shaft tool ② to hold the drive shaft coupling.

   **Coupling gear/middle shaft tool**
   P/N. YM-01229, 90890-01229

97 Nm (9.7 m·kg, 70 ft·lb)
INSTALLING THE MIDDLE DRIVE PINION GEAR SHAFT

1. Tighten:
   • middle drive pinion gear nut [New]  
     \[ 145 \text{ Nm (14.5 m·kg, 105 ft·lb)} \]

NOTE:

Secure the middle drive shaft in the vise with a clean rag.

2. Lock the threads with a drift punch.

MEASURING THE MIDDLE GEAR BACKLASH

1. Measure:
   • gear lash

   Middle gear lash  
   \[ 0.1 \sim 0.3 \text{ mm (0.004 \sim 0.012 in)} \]

   a. Temporarily install the right crankcase.
   b. Wrap a rag around a screwdriver, and then insert it into the installation hole of the speed sensor in the right crankcase to hold the middle driven pinion gear.
   c. Attach the gear lash measurement tool and dial gauge.

   Gear lash measurement tool  
   P/N. YM-01467, 90890-01467

   \[ 8.11 \text{ mm (0.32 in)} \]
   d. Measure the gear lash while rotating the middle driven pinion gear back and forth.

NOTE:

Measure the gear lash at 4 positions. Rotate the middle driven pinion gear 90° each time.

   e. If the gear lash is incorrect, adjust the gear lash by middle driven pinion gear shims and/or middle drive pinion gear shim(s).
## Removing the radiator and coolant reservoir

Remove the parts in the order listed.

Refer to “OIL COOLER”.

Drain.

Refer to “CHANGING THE COOLANT” in chapter 3.

<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>Thermo switch 3 coupler</td>
<td>1</td>
<td>Disconnect.</td>
</tr>
<tr>
<td>2</td>
<td>Coolant reservoir hose</td>
<td>1</td>
<td>Disconnect.</td>
</tr>
<tr>
<td>3</td>
<td>Radiator fan breather hose</td>
<td>1</td>
<td>Disconnect.</td>
</tr>
<tr>
<td>4</td>
<td>Radiator inlet hose</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Radiator outlet hose</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Water pump inlet hose</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Coolant outlet hose</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Radiator</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Radiator fan</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>
RADIATOR AND COOLANT RESERVOIR

---

Order | Job/Part                  | Q'ty | Remarks                                                                              
--- | -------------------------- | --- | ------------------------------------------------------------------------------------- 
10   | Thermo switch 3           | 1   |                                                                                      
11   | Coolant reservoir         | 1   |                                                                                      
12   | Coolant reservoir breather hose | 1 | Disconnect. For installation, reverse the removal procedure.                          

7 Nm (0.7 m • kg, 5.1 ft • lb)  
8 Nm (0.8 m • kg, 5.8 ft • lb)  
28 Nm (2.8 m • kg, 20 ft • lb)
CHECKING THE RADIATOR

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

   **NOTE:**
   Straighten any flattened fins with a thin, flathead screwdriver.

2. Check:
   • coolant hoses/coolant pipes
     Cracks/damage → Replace.

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

   \[
   \text{Radiator cap opening pressure} \quad 110.0 - 140.0 \text{ kPa} \\
   \quad (1.1 - 1.4 \text{ kg/cm}^2, \quad 15.64 - 19.91 \text{ psi})
   \]

   a. Attach the radiator cap tester 1 and adapter 2 onto the radiator cap 3.

   \[
   \text{Radiator cap tester} \\
   \text{P/N. YU-24460-01, 90890-01325} \\
   \text{Radiator cap tester adapter} \\
   \text{P/N. YU-33984, 90890-01352}
   \]

   b. Apply the specified pressure for ten seconds and make sure that there is no drop in pressure.

4. Check:
   • radiator fan
     Damage → Replace.
     Malfunction → Check and repair.
     Refer to “COOLING SYSTEM” in chapter 9.
Removing the water pump
Driver seat/passenger seat/console

Coolant

1 Water pump outlet hose 1
2 Water pump outlet pipe 1
3 O-ring 1
4 Water pump inlet hose 1
5 Water pump breather hose 1
6 Water pump assembly 1
7 O-ring 1

For installation, reverse the removal procedure.

Remove the parts in the order listed. Refer to “SEATS, ENCLOSURE, HOOD AND CARGO BED” in chapter 8. Drain. Refer to “CHANGING THE COOLANT” in chapter 3.
Disassembling the water pump

1. Water pump housing cover
2. Gasket
3. Circlip
4. Impeller
5. Rubber damper holder
6. Rubber damper
7. Water pump seal
8. Oil seal
9. Bearing
10. Water pump housing

Q'nty
1
1
1
1
1
1
1
1
1

Remarks
Remove the parts in the order listed.

For assembly, reverse the disassembly procedure.
DISASSEMBLING THE WATER PUMP
1. Remove:
   • rubber damper holder ①
   • rubber damper ②
   (from the impeller, with a thin, flathead screwdriver)

   **NOTE:**
   Do not scratch the impeller shaft.

2. Remove:
   • water pump seal ①

   **NOTE:**
   Tap out the water pump seal from the outside of the water pump housing.

3. Remove:
   • bearing ①
   • oil seal ②

   **NOTE:**
   Tap out the bearing and oil seal from the inside of the water pump housing.

CHECKING THE WATER PUMP
1. Check:
   • water pump housing cover ①
   • water pump housing ②
   • impeller ③
   • rubber damper ④
   • rubber damper holder ⑤
   Cracks/damage/wear → Replace.

2. Check:
   • water pump outlet pipe
   Cracks/damage/wear → Replace.
3. Measure:
- impeller shaft tilt
  Out of specification → Replace.

Maximum impeller shaft tilt
0.15 mm (0.006 in)

1. Straightedge
2. Impeller

ASSEMBLING THE WATER PUMP

1. Install:
   - oil seal ① (into the water pump housing ②)

**NOTE:**
Before installing the oil seal ①, apply tap water or coolant onto its outer surface.

CAUTION: Never lubricate the water pump seal surface with oil or grease.

**NOTE:**
Install the oil seal with a socket ③ that matches its outside diameter.

2. Install:
   - water pump seal ① (into the water pump housing ②)

**NOTE:**
Install the water pump seal with the special tools.

- Mechanical seal installer ③
  P/N. YM-33221-A, 90890-04078
- Middle driven shaft bearing driver ④
  P/N. YM-04058, 90890-04058

A] Push down.
3. Install:
   • rubber damper ① New
   • rubber damper holder ② New

NOTE: ______________________________________
Before installing the rubber damper, apply tap water or coolant onto its outer surface.

CAUTION: ______________________________________
Make sure that the rubber damper and rubber damper holder are flush with the impeller.
Removing the oil cooler
Driver seat/passenger seat/console/left side panel/right side panel/footrest cover
Engine oil

1 Oil cooler inlet pipe 1/oil cooler outlet pipe 1 1/1
2 O-ring 2
3 Oil cooler 1
4 Oil cooler inlet hose 1
5 Oil cooler outlet hose 1
6 Oil outlet hose 1
7 Oil inlet hose 1

Remarks:
Remove the parts in the order listed. Refer to “SEATS, ENCLOSURE, HOOD AND CARGO BED” in chapter 8.

Drain. Refer to “CHANGING THE ENGINE OIL” in chapter 3.
<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>Oil cooler inlet pipe 2/oil cooler outlet pipe 2</td>
<td>1/1</td>
<td>For installation, reverse the removal procedure.</td>
</tr>
</tbody>
</table>

7 Nm (0.7 m·kg, 5.1 ft·lb)
CHECKING THE OIL COOLER

1. Check:
   • oil cooler
     Obstruction → Clean.
     Apply compressed air to the rear of the oil cooler.
     Damage → Repair or replace the oil cooler.

   NOTE: ________________________

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

2. Check:
   • oil hoses/oil pipes
     Cracks/damage → Replace.
### FUEL PUMP AND FUEL TANK

#### FUEL SYSTEM

**FUEL PUMP AND FUEL TANK**

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Vacuum hose</td>
<td>1</td>
<td>Remove the parts in the order listed.</td>
</tr>
<tr>
<td>2</td>
<td>Fuel hose (fuel tank to fuel pump)</td>
<td>2</td>
<td>Refer to “SEATS, ENCLOSURE, HOOD AND CARGO BED” in chapter 8.</td>
</tr>
<tr>
<td>3</td>
<td>Fuel filter</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Fuel hose (fuel pump to carburetor)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Fuel pump</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Fuel tank breather hose</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Rollover valve</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Fuel tank stay</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

**Order Job/Part Q’ty Remarks**

**Removing the fuel pump and fuel tank**

Driver seat/passenger seat/console/right side panel/right corner panel/right protector/passenger seat support

30 Nm (3.0 m·kg, 22 ft·lb)

7 Nm (0.7 m·kg, 5.1 ft·lb)
### Fuel Pump and Fuel Tank

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>Fuel tank cap</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Fuel tank</td>
<td>1</td>
<td>For installation, reverse the removal procedure.</td>
</tr>
</tbody>
</table>

*30 Nm (3.0 m·kg, 22 ft·lb)*

*7 Nm (0.7 m·kg, 5.1 ft·lb)*
CHECKING THE FUEL PUMP OPERATION

1. Remove:
   • driver seat
   • passenger seat
   • console
   • right protector
   Refer to “SEATS, ENCLOSURE, HOOD AND CARGO BED” in chapter 8.

2. Place a container under the end of the fuel hose ①.

3. Check:
   • fuel pump operation

   Suck on the end of the vacuum hose ①.

<table>
<thead>
<tr>
<th>Fuel flows.</th>
<th>Fuel pump is OK.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuel does not flow.</td>
<td>Replace the fuel pump.</td>
</tr>
</tbody>
</table>

4. Install:
   • right protector
   • console
   • passenger seat
   • driver seat
   Refer to “SEATS, ENCLOSURE, HOOD AND CARGO BED” in chapter 8.
## CARBURETOR

**Removing the carburetor**

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Cylinder head breather hose</td>
<td>1</td>
<td>Refer to “SEATS, ENCLOSURE, HOOD AND CARGO BED” in chapter 8.</td>
</tr>
<tr>
<td>2</td>
<td>Air filter case joint</td>
<td>1</td>
<td>Disconnect.</td>
</tr>
<tr>
<td>3</td>
<td>Air filter case</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Carburetor joint (air filter case)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Air vent hose</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Starter cable/starter plunger</td>
<td>1/1</td>
<td>Disconnect.</td>
</tr>
<tr>
<td>7</td>
<td>Fuel hose</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Carburetor heater connector</td>
<td>2</td>
<td>Disconnect.</td>
</tr>
<tr>
<td>9</td>
<td>Carburetor assembly</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Drain hose</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Throttle valve cover</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

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>12</td>
<td>Throttle cable end</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Throttle cable</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Carburetor joint (intake manifold)</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 carburetor

Remove the parts in the order listed.

**NOTE:**

Before disassembling the carburetor, make sure to note the number of times the pilot screw is turned in from the set position to its seated position.

<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>Throttle stop screw</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>②</td>
<td>Vacuum chamber cover</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>③</td>
<td>Spring</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>④</td>
<td>Jet needle holder</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>⑤</td>
<td>Spring</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>⑥</td>
<td>Jet needle set</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>⑦</td>
<td>Piston valve</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>⑧</td>
<td>Coasting enricher diaphragm</td>
<td>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>⑨</td>
<td>Pilot air jet</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>⑩</td>
<td>Drain screw</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>⑪</td>
<td>Float chamber</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>⑫</td>
<td>Float</td>
<td>1</td>
<td>Refer to “ASSEMBLING THE CARBURETOR”.</td>
</tr>
<tr>
<td>⑬</td>
<td>Needle valve set</td>
<td>1</td>
<td>Refer to “ASSEMBLING THE CARBURETOR”.</td>
</tr>
<tr>
<td>⑭</td>
<td>Main jet</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>⑮</td>
<td>Needle jet</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>⑯</td>
<td>Pilot jet</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>⑰</td>
<td>Starter jet</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>⑱</td>
<td>Carburetor heater</td>
<td>1</td>
<td>For assembly, reverse the disassembly procedure.</td>
</tr>
</tbody>
</table>

For assembly, reverse the disassembly procedure.
DISASSEMBLING THE CARBURETOR

NOTE: ________________________

Before disassembling the carburetor, make sure to note the number of times the pilot screw is turned in from the set position to its seated position.

CHECKING THE CARBURETOR

1. Check:
   • carburetor body
   • float chamber
     Cracks/damage → Replace.
   • fuel passage
     Contamination → Clean as indicated.
   • fuel chamber body
     Contamination → Clean.

a. Wash the carburetor in a petroleum based solvent.
   (Do not use any caustic carburetor cleaning solution.)

b. Blow out all of the passages and jets with compressed air.

2. Check:
   • float
   • float tang
     Damage → Replace.

3. Check:
   • needle valve seat
   • needle valve
   • O-ring
     Contamination/wear/damage → Replace as a set.

NOTE: ________________________
Always replace the needle valve and valve seat as a set.
4. Check:
   • piston valve
     Scratches/wear/damage → Replace.
   • rubber diaphragm
     Tears → Replace.

5. Check:
   • vacuum chamber cover
   • spring
     Cracks/damage → Replace.

6. Check:
   • diaphragm (coasting enricher)
   • spring
   • cover
     Tears (diaphragm) /damage → Replace.

7. Check:
   • jet needle
   • main jet
   • needle jet
   • pilot air jet
   • pilot jet
   • starter jet
   • starter plunger
     Bends/wear/damage → Replace.
     Blockage → Blow out the jets with compressed air.
8. Check:
- free movement (piston valve)
  Sticks → Replace the piston valve guide and the piston valve.
  Insert the piston valve into the carburetor body, and check for free movement.

9. Check:
- free movement (throttle valve)
  Sticks → Replace.

**ASSEMBLING THE CARBURETOR**

**NOTE:**
Before assembling the carburetor, make sure to turn out the pilot screw the same number of times, as noted before disassembly, from the seated position to the set position.

**CAUTION:**
Before assembling, wash all of the parts in a clean petroleum based solvent.

1. Measure:
- float height \( \oplus \)
  Out of specification → Adjust.

![Float height diagram]

**Float height (F.H.)**
13 mm (0.51 in)

\[ \text{a. Hold the carburetor in an upside down position.} \]
\[ \text{b. Measure the distance from the front mating surface of the float chamber (gasket removed) to the top of the float.} \]

**NOTE:**
The float arm should be resting on the needle valve, but not compressing it.

\[ \text{c. If the float height is not within the specification, check the valve seat and needle valve.} \]
\[ \text{d. If either is worn, replace them both.} \]
\[ \text{e. If both are fine, adjust the float height by bending the float tang \( \odot \) on the float.} \]
\[ \text{f. Recheck the float height.} \]
ADJUSTING THE FUEL LEVEL

1. Measure:
   • fuel level ③

   Out of specification → Adjust.

   Fuel level
   4.0 – 5.0 mm (0.16 – 0.20 in)
   Above the float chamber mating surface

   Place the vehicle on a level surface.
   Connect the fuel level gauge ① to the drain pipe ②.

   Fuel level gauge
   P/N. YM-01312-A, 90890-01312

   Loosen the drain screw ③.
   Hold the gauge vertically next to the float chamber line.
   Measure the fuel level ③ with the gauge.
   If the fuel level is incorrect, adjust the fuel level.
   Remove the carburetor.
   Check the valve seat and needle valve.
   If either is worn, replace them both.
   If both are fine, adjust the float level by bending the float tang ④ slightly.
   Install the carburetor.
   Recheck the fuel level.
INSTALLING THE CARBURETOR

1. Install:
   • carburetor assembly

   **NOTE:**
   Align the tab (a) on the carburetor body with the slot (b) in the carburetor joint (intake manifold).

2. Install:
   • air filter case joint

   **NOTE:**
   Align the tab (a) on the air filter case joint with the slot (b) in the air filter case.
TROUBLESHOOTING

DRIVE TRAIN

TROUBLESHOOTING

The following conditions may indicate damaged shaft drive components:

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>Possible Causes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. A pronounced hesitation or “jerky” movement during acceleration, deceleration, or sustained speed. (This must not be confused with engine surging or transmission characteristics.)</td>
<td>A. Bearing damage.</td>
</tr>
<tr>
<td></td>
<td>B. Improper gear lash.</td>
</tr>
<tr>
<td></td>
<td>C. Gear tooth damage.</td>
</tr>
<tr>
<td></td>
<td>D. Broken drive shaft.</td>
</tr>
<tr>
<td></td>
<td>E. Broken gear teeth.</td>
</tr>
<tr>
<td></td>
<td>F. Seizure due to lack of lubrication.</td>
</tr>
<tr>
<td>2. A “rolling rumble” noticeable at low speed; a high-pitched whine; a “clunk” from a shaft drive component or area.</td>
<td>G. Small foreign objects lodged between the moving parts.</td>
</tr>
<tr>
<td>3. A locked-up condition of the shaft drive train mechanism, no power transmitted from the engine to the front and/or rear wheel.</td>
<td></td>
</tr>
</tbody>
</table>

**NOTE:**

Areas A, B, and C above may be extremely difficult to diagnose. The symptoms are quite subtle and difficult to distinguish from normal vehicle operating noise. If there is reason to believe these components are damaged, remove the components and check them.

---

Check notes

1. Investigate any unusual noises.

The following “noises” may indicate a mechanical defect:

a. A “rolling rumble” noise during coasting, acceleration, or deceleration. The noise increases with front and/or rear wheel speed, but it does not increase with higher engine or transmission speeds.
   Diagnosis: Possible wheel bearing damage.

b. A “whining” noise that varies with acceleration and deceleration.
   Diagnosis: Possible incorrect reassembly, too-little gear lash.
**Troubleshooting**

---

**CAUTION:**
Too little gear lash is extremely destructive to the gear teeth. If a test ride following reassembly indicates this condition, stop riding immediately to minimize gear damage.

---

c. A slight “thunk” evident at low speed operation. This noise must be distinguished from normal vehicle operation.
Diagnosis: Possible broken gear teeth.

---

**WARNING**
Stop riding immediately if broken gear teeth are suspected. This condition could result in the shaft drive assembly locking up, causing loss of control of the vehicle and possible injury to the rider.

---

2. Check:
   - drained oil
     Drained oil shows large amounts of metal particles → Check the bearing for seizure.

**NOTE:**
A small amount of metal particles in the oil is normal.

---

3. Check:
   - oil leakage

---

a. Clean the entire vehicle thoroughly, then dry it.
b. Apply a leak-localizing compound or dry powder spray to the shaft drive.
c. Road test the vehicle for the distance necessary to locate the leak.
   Leakage → Check the component housing, gasket, and/or seal for damage.
   Damage → Replace the component.

**NOTE:**
- An apparent oil leak on a new or nearly new vehicle may be the result of a rust-preventative coating or excessive seal lubrication.
- Always clean the vehicle and recheck the suspected location of an apparent leakage.

---
# Troubleshooting Chart

When basic condition “a” and “b” exist, check the following points:

<table>
<thead>
<tr>
<th>Troubleshooting Steps</th>
<th>YES Response</th>
<th>NO Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elevate and spin both wheels. Feel for wheel bearing damage.</td>
<td>Replace the wheel bearing. (Refer to “STEERING SYSTEM” and “REAR KNUCKLES AND STABILIZER” in chapter 8.)</td>
<td></td>
</tr>
<tr>
<td>Check the wheel nuts and hub nuts for tightness.</td>
<td>Torque to specification. (Refer to “FRONT WHEELS AND BRAKE DISCS” and “REAR WHEELS AND BRAKE DISC” in chapter 8.)</td>
<td></td>
</tr>
<tr>
<td>Check the front constant velocity joints. Feel for bearing damage.</td>
<td>Constant velocity joint bearings and differential gear bearings are probably not damaged. Repeat the test or remove the individual components.</td>
<td></td>
</tr>
<tr>
<td>Check the parking brake adjustment.</td>
<td>Adjust per instructions. (Refer to “ADJUSTING THE PARKING BRAKE” in chapter 3.)</td>
<td></td>
</tr>
<tr>
<td>Check the rear constant velocity joints. Feel for bearing damage.</td>
<td>Constant velocity joint bearings and final drive gear bearings are probably not damaged. Repeat the test or remove the individual components.</td>
<td></td>
</tr>
</tbody>
</table>

Remove the drive shaft components.
FRONT CONSTANT VELOCITY JOINTS, DIFFERENTIAL GEAR AND FRONT DRIVE SHAFT

55 Nm (5.5 m·kg, 40 ft·lb)

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Constant velocity joint</td>
<td>2</td>
<td>Remove the parts in the order listed.</td>
</tr>
<tr>
<td>2</td>
<td>Gear motor coupler</td>
<td>2</td>
<td>Refer to “SEATS, ENCLOSURE, HOOD AND CARGO BED” in chapter 8.</td>
</tr>
<tr>
<td>3</td>
<td>Differential gear case breather hose</td>
<td>1</td>
<td>Drain.</td>
</tr>
<tr>
<td>4</td>
<td>Differential gear assembly</td>
<td>1</td>
<td>Refer to “STEERING SYSTEM” in chapter 8.</td>
</tr>
<tr>
<td></td>
<td>Removing the front constant velocity joints, differential gear and front</td>
<td></td>
<td>Refer to “FRONT ARMS AND FRONT SHOCK ABSORBERS” in chapter 8.</td>
</tr>
<tr>
<td></td>
<td>drive shaft</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Front skid plate</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Differential gear oil</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Steering knuckle</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Front lower arms</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Refer to “SEATS, ENCLOSURE, HOOD AND CARGO BED” in chapter 8.
Drain.
Refer to “STEERING SYSTEM” in chapter 8.
Refer to “FRONT ARMS AND FRONT SHOCK ABSORBERS” in chapter 8.

Disconnect.
Disconnect.
FRONT CONSTANT VELOCITY JOINTS, DIFFERENTIAL GEAR AND FRONT DRIVE SHAFT

55 Nm (5.5 m·kg, 40 ft·lb)

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Front drive shaft</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Compression spring</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>For installation, reverse the removal proce-</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>dure.</td>
</tr>
</tbody>
</table>

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Disassembling the constant velocity joints

<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>Circlip</td>
<td>1</td>
<td>Remove the parts in the order listed.</td>
</tr>
<tr>
<td>2</td>
<td>Boot band</td>
<td>2</td>
<td>Refer to “ASSEMBLING THE FRONT CONSTANT VELOCITY JOINTS”.</td>
</tr>
<tr>
<td>3</td>
<td>Boot band</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Dust boot</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Circlip</td>
<td>1</td>
<td>For assembly, reverse the disassembly procedure.</td>
</tr>
<tr>
<td>6</td>
<td>Double off-set joint</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Circlip</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Ball bearing</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Joint shaft assembly</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

Remarks:
- Remove the parts in the order listed.
- Refer to “ASSEMBLING THE FRONT CONSTANT VELOCITY JOINTS”.
- For assembly, reverse the disassembly procedure.
### Order Job/Part Q'ty Remarks

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><strong>Disassembling the differential gear</strong></td>
<td>1/1</td>
<td>Remove the parts in the order listed.</td>
</tr>
<tr>
<td>2</td>
<td>Gear motor/O-ring</td>
<td>1/1</td>
<td><strong>NOTE:</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Do not disassemble the gear motor.</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Circlip</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Bearing</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Universal joint</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Universal joint yoke/O-ring</td>
<td>1/1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Stopper bolt/shaft</td>
<td>1/1</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Shift fork (with shift fork sliding gear)</td>
<td>1/1</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Differential gear case cover/O-ring</td>
<td>1/1</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Drive clutch</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Circlip/bearing</td>
<td>1/1</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Adapter</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

**NOTE:**
Refer to “DISASSEMBLING THE UNIVERSAL JOINT” and “ASSEMBLING THE UNIVERSAL JOINT”.

---

**Specifications:**
- **23 Nm (2.3 m·kg, 17 ft·lb)**
- **10 Nm (1.0 m·kg, 7.2 ft·lb)**
- **25 Nm (2.5 m·kg, 18 ft·lb)**
- **13 Nm (1.3 m·kg, 9.4 ft·lb)**
- **62 Nm (6.2 m·kg, 45 ft·lb)**
FRONT CONSTANT VELOCITY JOINTS, DIFFERENTIAL GEAR AND FRONT DRIVE SHAFT

Order | Job/Part                  | Q'ty | Remarks                                           |
------|----------------------------|------|---------------------------------------------------|
12    | Shim (right)               | 1    | Refer to “MEASURING AND ADJUSTING THE DIFFERENTIAL GEAR LASH”. |
13    | Differential gear unit     | 1    | Refer to “MEASURING AND ADJUSTING THE DIFFERENTIAL GEAR LASH”. |
14    | Shim (left)                | 1    |                                                   |
15    | Bearing                    | 1    |                                                   |
16    | Bearing                    | 1    |                                                   |
17    | Circlip/bearing            | 1/1  |                                                   |
18    | Drive pinion gear          | 1    |                                                   |
19    | Differential gear case     | 1    |                                                   |
20    | Bearing                    | 1    | For assembly, reverse the disassembly procedure.  |
DISASSEMBLING THE UNIVERSAL JOINT
1. Remove:
   • universal joint

   ￭ Remove the circlips 1.
   ￭ Place the universal joint in a press.
   ￭ With a suitable diameter pipe 2 beneath the yoke 3, press the bearing 4 into the pipe as shown.

NOTE: _____________________________________________
It may be necessary to lightly tap the yoke with a punch.

   d. Repeat the steps for the opposite bearing.
   e. Remove the yoke.

DISASSEMBLING THE DIFFERENTIAL GEAR
1. Remove:
   • differential gear unit 1

   CAUTION: _____________________________________________
The differential gear unit is assembled into a proper unit at the factory by means of specialized equipment. Do not attempt to disassemble this unit. Disassembly will result in the malfunction of the unit.
CHECKING THE CONSTANT VELOCITY JOINTS

1. Check:
   • double off-set joint spline
   • ball joint spline
   • shaft spline
     Wear/damage → Replace.

2. Check:
   • dust boots
     Cracks/damage → Replace.

**CAUTION:**
Always use a new boot band.

3. Check:
   • balls and ball races
   • inner surface of double off-set joint
     Pitting/wear/damage → Replace.

CHECKING THE DIFFERENTIAL GEAR

1. Check:
   • gear teeth
     Pitting/galling/wear → Replace drive pinion gear and differential gear unit as a set.
   • bearings
     Pitting/damage → Replace.
   • oil seals
   • O-rings
     Damage → Replace.

2. Check:
   • drive shaft splines
   • universal joints
   • drive pinion gear splines
     Wear/damage → Replace.
   • spring
     Fatigue → Replace.
     Move the spring up and down.
3. Check:
   - front drive shaft
     Bends → Replace.
   - torque limiter ①
     Loose → Replace the front drive shaft.

**WARNING**
Do not attempt to straighten a bent shaft; this may dangerously weaken the shaft.

**CHECKING THE GEAR MOTOR**
1. Check:
   - gear motor

   a. Connect two C size batteries to the gear motor terminals ① (as shown in the illustrations).

   **CAUTION:**
   - Do not use a 12 V battery to operate the pinion gear.
   - Do not connect the batteries to the gear motor when it is installed in the gear case. The gear motor should be checked when it is removed from the gear case.

   A Check that the pinion gear ② turns counterclockwise.
   B Check that the pinion gear ② turns clockwise.

   **NOTE:**
   Do not disassemble the gear motor.

**ASSEMBLING THE FRONT CONSTANT VELOCITY JOINTS**
1. Apply:
   - molybdenum disulfide grease
     (into the ball joint assembly)

   **NOTE:**
   Molybdenum disulfide grease is included in the repair kit.
2. Install:
   • dust boots ①
   • boot bands ②, ③ New

   a. Apply molybdenum disulfide grease into the dust boots.

   Molybdenum disulfide grease
   70 g (2.5 oz) per dust boot (front wheel side)
   45 g (1.6 oz) per dust boot (differential gear case side)

b. Install the dust boots.

c. Install the dust boot bands.

NOTE: ______________________________________________________________________
   • The new boot bands may differ from the original ones.
   • The dust boots should be fastened with the boot bands ③ at the grooves in the joint shaft.

3. Check:
   • free play (thrust movement)
     Excessive play → Replace the joint assembly.

ASSEMBLING THE DIFFERENTIAL GEAR

1. Measure:
   • gear lash
     Refer to “MEASURING AND ADJUSTING THE DIFFERENTIAL GEAR LASH”.

2. Install:
   • gear motor

   a. Slide the shift fork sliding gear ①, which is installed to the differential gear case cover, to the right to put it into the 2WD mode.
b. Connect two C size batteries to the gear motor terminal ② to operate the pinion gear ③. Operate the pinion gear until the paint mark ④ on the gear is aligned with the paint mark ⑤ on the gear motor case.

**CAUTION:**
Do not use a 12 V battery to operate the pinion gear.

ca. Insert 8 mm bolts ⑥ into the gear motor ⑦ and use them as a guide to set the motor on the differential gear case cover ⑧ so that the shift fork sliding gear ⑨ does not move.

**CAUTION:**
If the position of the shift fork sliding gear is moved, the position of the differential gear and the indicator light display may differ, and the 2WD or differential lock mode may not be activated.

d. Remove the 8 mm bolts, and then install the motor with the gear motor bolts.

<table>
<thead>
<tr>
<th>Gear motor bolts</th>
</tr>
</thead>
<tbody>
<tr>
<td>13 Nm (1.3 m·kg, 9.4 ft·lb)</td>
</tr>
</tbody>
</table>

3. Install:
- universal joint yoke
- O-ring
- nut 62 Nm (6.2 m·kg, 45 ft·lb)

Use a universal joint holder ①.

<table>
<thead>
<tr>
<th>Universal joint holder</th>
</tr>
</thead>
<tbody>
<tr>
<td>P/N. YM-04062, 90890-04062</td>
</tr>
</tbody>
</table>

**NOTE:**
Apply locking agent (LOCTITE®) to the nut threads.
FRONT CONSTANT VELOCITY JOINTS, DIFFERENTIAL GEAR AND FRONT DRIVE SHAFT

4. Check:
   • differential gear operation
     Unsmooth operation → Replace the differential gear assembly.
     Insert the double off-set joint into the differential gear, and turn the gear back and forth.

ASSEMBLING THE UNIVERSAL JOINT
1. Install:
   • universal joint

   a. Install the opposite yoke into the universal joint.
   b. Apply wheel bearing grease to the bearings.
   c. Install the bearing ① onto the yoke.

   **CAUTION:**
   Check each bearing. The needles can easily fall out of their races. Slide the yoke back and forth on the bearings; the yoke will not go all the way onto a bearing if a needle is out of place.

   d. Press each bearing into the universal joint using a suitable socket.

   **NOTE:**
   The bearing must be inserted far enough into the universal joint so that the circlip can be installed.

   e. Install the circlips ② into the groove of each bearing.

MEASURING AND ADJUSTING THE DIFFERENTIAL GEAR LASH

Measuring the differential gear lash
1. Secure the gear case in a vise or another supporting device.
2. Remove:
   • drain plug
   • gasket
3. Install:
   • a bolt of the specified size (into the drain plug hole)

   **CAUTION:**
   Finger tighten the bolt until it holds the ring gear. Otherwise, the ring gear will be damaged.

4. Attach:
   • gear lash measurement tool
   • dial gauge

   **Gear lash measurement tool**
   P/N. YM-01467, 90890-01467

   @ Measuring point is 21 mm (0.83 in)

5. Measure:
   • gear lash
     Gently rotate the gear coupling from engagement to engagement.

   **Differential gear lash**
   0.05 ~ 0.25 mm
   (0.002 ~ 0.010 in)

   **NOTE:**
   Measure the gear lash at four positions. Rotate the shaft 90° each time.

**Adjusting the differential gear lash**
1. Remove:
   • shim(s) (left)
   • differential gear unit
   • shim(s) (right)
2. Adjust:
   • gear lash

   a. Select the suitable shims using the following chart.

<table>
<thead>
<tr>
<th>Too little gear lash</th>
<th>Reduce right shim thickness.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Too large gear lash</td>
<td>Increase right shim thickness.</td>
</tr>
</tbody>
</table>

   **Ring gear shim (left and right)**

<table>
<thead>
<tr>
<th>Thickness (mm)</th>
<th>0.1</th>
<th>0.2</th>
<th>0.3</th>
<th>0.4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right shim only</td>
<td>0.5</td>
<td>1.0</td>
<td>1.5*</td>
<td></td>
</tr>
<tr>
<td>Thickness (mm)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

   * right shim only

   **NOTE:**
   • Use a combination of shims (left and right) so that the differential gear lash is within specification.
   • Always keep the total combined thickness of the shims (left and right) the same.

   **Example:**
   If the differential gear lash exceeds the specification, increase the thickness of the right shim(s) by 0.1 mm (0.004 in) and decrease the thickness of the left shim(s) by 0.1 mm (0.004 in).

   b. Measure the differential gear lash again.

**CHECKING THE DIFFERENTIAL OPERATION**

1. Block the rear wheels, and elevate the front wheels by placing a suitable stand under the frame.
2. Remove the center cap from the axle nut (right or left).
3. Measure the starting torque of the front wheel (i.e., differential gear preload) with a torque wrench.

**NOTE:**
- Repeat this step several times to obtain an average figure.
- During this test, the other front wheel will turn in the opposite direction.

<table>
<thead>
<tr>
<th>Front wheel starting torque (differential gear preload)</th>
</tr>
</thead>
<tbody>
<tr>
<td>New unit</td>
</tr>
<tr>
<td>17 ~ 25 Nm (1.7 ~ 2.5 m · kg, 12 ~ 18 ft · lb)</td>
</tr>
<tr>
<td>Minimum</td>
</tr>
<tr>
<td>10 Nm (1.0 m · kg, 7.2 ft · lb)</td>
</tr>
</tbody>
</table>

4. Out of specification → Replace the differential gear assembly.

5. Within specification → Install the wheel cap.
# Rear Constant Velocity Joints, Final Drive Gear and Rear Drive Shaft

**Diagram:**

- 70 Nm (7.0 m·kg, 50 ft·lb)

## 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 rear constant velocity joints, final drive gear and rear drive shaft</td>
<td></td>
<td>Remove the parts in the order listed.</td>
</tr>
<tr>
<td>2</td>
<td>Rear skid plate</td>
<td></td>
<td>Refer to “SEATS, ENCLOSURE, HOOD AND CARGO BED” in chapter 8.</td>
</tr>
<tr>
<td>3</td>
<td>Muffler/exhaust pipe</td>
<td></td>
<td>Refer to “ENGINE REMOVAL” in chapter 4.</td>
</tr>
<tr>
<td>4</td>
<td>Final gear oil</td>
<td></td>
<td>Drain.</td>
</tr>
<tr>
<td>5</td>
<td>Rear knuckle</td>
<td></td>
<td>Refer to “REAR KNUCKLES AND STABILIZER” in chapter 8.</td>
</tr>
<tr>
<td>6</td>
<td>Rear lower arm</td>
<td></td>
<td>Refer to “REAR ARMS AND REAR SHOCK ABSORBERS” in chapter 8.</td>
</tr>
<tr>
<td>7</td>
<td>Brake caliper assembly</td>
<td></td>
<td>Refer to “FRONT AND REAR BRAKES” in chapter 8.</td>
</tr>
</tbody>
</table>
**Rear Constant Velocity Joints, Final Drive Gear and Rear Drive Shaft**

<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 constant velocity joint</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Final drive gear case breather hose</td>
<td>1</td>
<td>Disconnect.</td>
</tr>
<tr>
<td>3</td>
<td>Final drive gear assembly</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Compression spring</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Coupling gear</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Rear drive shaft</td>
<td>1</td>
<td>For installation, reverse the removal procedure.</td>
</tr>
</tbody>
</table>

**NOTE:**
Remove the constant velocity joint on the right side of the vehicle, rotate the final gear assembly slightly so that the constant velocity joint on the left side clears the frame, and then remove it.

---

70 Nm (7.0m · kg, 50 ft · lb)

---

**www.midwestmanuals.com**
Disassembling the rear constant velocity joints

1. Circlip
2. Boot band
3. Boot band
4. Dust boot
5. Circlip
6. Double off-set joint
7. Circlip
8. Ball bearing
9. Joint shaft assembly

Q'ty
1
2
2
2
1
1
1
1

Remarks
Remove the parts in the order listed.
Refer to "ASSEMBLING THE REAR CONSTANT VELOCITY JOINTS".
For assembly, reverse the disassembly procedure.
## Disassembling the final drive gear

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Bolt</td>
<td>4</td>
<td>Remove the parts in the order listed. Refer to “REAR WHEELS AND BRAKE DISC” in chapter 8.</td>
</tr>
<tr>
<td>2</td>
<td>Final drive pinion gear shim</td>
<td></td>
<td>Refer to “POSITIONING THE FINAL DRIVE PINION GEAR AND RING GEAR”.</td>
</tr>
<tr>
<td>3</td>
<td>Drive shaft coupling</td>
<td>1</td>
<td>Refer to “DISASSEMBLING THE FINAL DRIVE GEAR” and “ASSEMBLING THE FINAL DRIVE GEAR ASSEMBLY”.</td>
</tr>
<tr>
<td>4</td>
<td>Final drive pinion gear</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Inner race</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>Bearing retainer</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Bearing</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>O-ring</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Final drive pinion gear bearing housing</td>
<td>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>①</td>
<td>Ring gear stopper</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>②</td>
<td>Bolt</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>③</td>
<td>Bolt</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>④</td>
<td>Oil seal</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>⑤</td>
<td>Bearing</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>⑥</td>
<td>O-ring</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>⑦</td>
<td>Ring gear bearing housing</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>⑧</td>
<td>Ring gear shim</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>⑨</td>
<td>Ring gear</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>⑩</td>
<td>Thrust washer</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>⑪</td>
<td>Oil seal</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>⑫</td>
<td>Final gear case</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

**NOTE:** Working in a crisscross pattern, loosen each bolt 1/4 of a turn. After all the bolts are loosened, remove them.

Refer to "POSITIONING THE FINAL DRIVE PINION GEAR AND RING GEAR".
REAR CONSTANT VELOCITY JOINTS, FINAL DRIVE
GEAR AND REAR DRIVE SHAFT

Order | Job/Part | Q'ty | Remarks |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>②</td>
<td>Bearing</td>
<td>1</td>
<td>Refer to “REMOVING THE FINAL DRIVE ROLLER BEARINGS” and “INSTALLING THE FINAL DRIVE ROLLER BEARINGS”. For assembly, reverse the disassembly procedure.</td>
</tr>
<tr>
<td>④</td>
<td>Bearing</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

Torques:
- 20 Nm (2.0 m·kg, 14 ft·lb)
- 23 Nm (2.3 m·kg, 17 ft·lb)
- 23 Nm (2.3 m·kg, 17 ft·lb)
- 170 Nm (17.0 m·kg, 125 ft·lb)
- 80 Nm (8.0 m·kg, 58 ft·lb)
- 32 Nm (3.2 m·kg, 23 ft·lb)
- 40 Nm (4.0 m·kg, 29 ft·lb)
- 16 Nm (1.6 m·kg, 11 ft·lb)
ASSEMBLING THE REAR CONSTANT VELOCITY JOINTS

1. Apply:
   • molybdenum disulfide grease
     (into the ball joint assembly)

2. Install:
   • dust boots
   • boot bands

a. Apply molybdenum disulfide grease into the dust boots.

   Molybdenum disulfide grease
   70 g (2.5 oz) per dust boot (rear wheel side)
   65 g (2.3 oz) per dust boot (final gear case side)

b. Install the dust boots.

c. Install the dust boot bands.

NOTE:____________________

• The new boot bands may differ from the original ones.
• The dust boots should be fastened with the boot bands ③ at the grooves in the joint shaft.

3. Check:
   • free play (thrust movement)
     Excessive play → Replace the joint assembly.

DISASSEMBLING THE FINAL DRIVE GEAR

1. Remove:
   • drive shaft coupling nut

a. Place a folded rag ①.

b. Secure the drive shaft coupling edge in the vise.

c. Remove the drive shaft coupling nut.
2. Remove:
   • final drive pinion gear bearing housing assembly

Caution:
• Never directly press the gear end with a hydraulic press, this will result in damage to the gear thread.
• Install the suitable socket on the gear end to protect the thread from damage.

3. Remove:
   • bearing retainer

Caution:
The bearing retainer has left-handed threads. To loosen the retainer, turn it clockwise.

Removing the Final Drive Roller Bearings
1. Remove:
   • roller bearing (ring gear)

   Use a suitable press tool and an appropriate support for the main housing.
2. Remove:
   • roller bearing (final drive pinion gear) ①

   a. Heat the main housing only to 150 °C (302 °F).
   b. Remove the roller bearing outer race with an appropriately shaped punch ②.
   c. Remove the inner race from the final drive pinion gear.

   **NOTE:**
   The removal of the final drive pinion gear roller bearing is difficult and seldom necessary.

INSTALLING THE FINAL DRIVE ROLLER BEARINGS

1. Install:
   • roller bearing (final drive pinion gear) New

   a. Heat the main housing only to 150 °C (302 °F).
   b. Install the roller bearing outer race using the proper adapter.
   c. Install the inner race onto the drive pinion gear.

2. Install:
   • roller bearing (ring gear) ①

   Use a suitable press tool ② and a press to install the above components into the main housing.

POSITIONING THE FINAL DRIVE PINION GEAR AND RING GEAR

When the final drive pinion gear, ring gear, final gear case and/or ring gear bearing housing are replaced, be sure to adjust the positions of the final drive pinion gear and ring gear using the shim(s).
Selecting the final drive pinion gear shims

1. Select:
   • final drive pinion gear shim(s) \( \text{①} \)

To find the final drive pinion gear shim thickness “A”, use the following formula.

**Final drive pinion gear shim thickness**

\[ A = a + (c - b) - d \]

\( a \) = 92.5 mm

\( b \) = a numeral (usually a decimal number) on the final drive pinion gear bearing housing either added to or subtracted from “34”

\( c \) = a numeral (usually a decimal number) on the final drive pinion gear bearing housing either added to or subtracted from “55”

\( d \) = a numeral (usually a decimal number) on the final gear case either added to or subtracted from “112”

Example:

1) \( a = 92.5 \)

2) If “98” is stamped on the final drive pinion gear bearing housing,
   \( b = 34 + 0.98 \)
   \( = 34.98 \)

3) If “48” is stamped on the final drive pinion gear bearing housing,
   \( c = 55 + 0.48 \)
   \( = 55.48 \)

4) If “03” is stamped on the final gear case,
   \( d = 112 + 0.03 \)
   \( = 112.03 \)

5) Therefore, “A” is 0.97.
   
   \[ A = 92.5 + (55.48 - 34.98) - 112.03 \]
   \( = 0.97 \)

6) Round off the hundredth digit and select the appropriate shim(s).
   
   In the example above, the calculated number is 0.97. The chart instructs you to round off 7 to 5 at the hundredth place. Thus, the shim thickness is 0.95 mm.

<table>
<thead>
<tr>
<th>Hundredths</th>
<th>Rounded value</th>
</tr>
</thead>
<tbody>
<tr>
<td>0, 1, 2</td>
<td>0</td>
</tr>
<tr>
<td>3, 4, 5, 6, 7</td>
<td>5</td>
</tr>
<tr>
<td>8, 9</td>
<td>10</td>
</tr>
</tbody>
</table>
Shims are supplied in the following thicknesses.

<table>
<thead>
<tr>
<th>Final drive pinion gear shim</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thickness (mm)</td>
</tr>
</tbody>
</table>

Selecting the ring gear shims
1. Select:
   • ring gear shim(s) ①

To find the ring gear shim thickness “B”, use the following formula.

\[
B = \omega - f - (g + h)
\]

- \( \omega \) = a numeral (usually a decimal number) on the final gear case either added to or subtracted from “50”
- \( f \) = a numeral (usually a decimal number) on the outside of the ring gear bearing housing and added to “1”
- \( g \) = a numeral (usually a decimal number) on the inside of the ring gear either added to or subtracted from “35”
- \( h \) = bearing thickness (considered constant)

Example:
1) If “98” is stamped on the final gear case, \( \omega = 50 + 0.98 \) = 50.98
2) If “55” is stamped on the ring gear bearing housing, \( f = 1 + 0.55 \) = 1.55
3) If “-05” is stamped on the ring gear, \( g = 35 – 0.05 \) = 34.95
4) \( h = 14.00 \)
5) Therefore, shim thickness “B” is 0.48. 
   \[
   B = 50.98 - 1.55 - (34.95 + 14.00) \\
   = 49.43 - 48.95 \\
   = 0.48
   \]
6) Round off the hundredth digit and select the appropriate shim(s).

In the example above, the calculated number is 0.48. The chart instructs you to round off 8 to 10 at the hundredth place. Thus, the shim thickness is 0.50 mm.

<table>
<thead>
<tr>
<th>Hundredths</th>
<th>Rounded value</th>
</tr>
</thead>
<tbody>
<tr>
<td>0, 1, 2</td>
<td>0</td>
</tr>
<tr>
<td>3, 4, 5, 6, 7</td>
<td>5</td>
</tr>
<tr>
<td>8, 9</td>
<td>10</td>
</tr>
</tbody>
</table>

Shims are supplied in the following thicknesses.

<table>
<thead>
<tr>
<th>Ring gear shim</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thickness (mm)</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

**Selecting the thrust washer**

1. Measure:
   - ring gear thrust clearance “C”

   a. Place four pieces of Plastigauge® between the originally fitted thrust washer and the ring gear.
   b. Install the final gear assembly and tighten the bolts to specification.

<table>
<thead>
<tr>
<th>M8 bolts (ring gear bearing housing)</th>
</tr>
</thead>
<tbody>
<tr>
<td>23 Nm (2.3 m·kg, 17 ft·lb)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>M10 bolts (ring gear bearing housing)</th>
</tr>
</thead>
<tbody>
<tr>
<td>40 Nm (4.0 m·kg, 29 ft·lb)</td>
</tr>
</tbody>
</table>

**NOTE:**

Do not turn the drive pinion gear and ring gear when measuring the clearance with Plastigauge®.
c. Remove the final gear assembly.
d. Measure the thrust clearance. Calculate the width of the flattened Plastigauge®
e. If out of specification, select the correct washer.

2. Select:
   • ring gear thrust clearance “C”

a. Select a suitable thrust washer using the following chart.

<table>
<thead>
<tr>
<th>Thrust washer</th>
<th>Thickness (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1.0 1.1 1.2</td>
</tr>
<tr>
<td></td>
<td>1.3 1.4 1.5</td>
</tr>
<tr>
<td></td>
<td>1.6 1.7 1.8</td>
</tr>
<tr>
<td></td>
<td>1.9 2.0 2.1</td>
</tr>
</tbody>
</table>

b. Repeat the measurement steps until the ring gear thrust clearance is within the specified limits.

Adjusting the ring gear stopper

1. Install:
   • ring gear stopper
   • nut

2. Adjust:
   • ring gear stopper clearance

a. Finger tighten the ring gear stopper ① until it contacts the ring gear ②.
b. Turn the ring gear stopper 120° counterclockwise.
c. Tighten the ring gear stopper nut ③.

| Ring gear stopper nut | 16 Nm (1.6 m·kg, 11 ft·lb) |
CHECKING THE REAR DRIVE SHAFT
1. Check:
   • drive shaft splines
   • coupling gear splines
     Wear/damage → Replace.

CHECKING THE FINAL DRIVE GEAR ASSEMBLY
1. Check:
   • final gear case
   • ring gear bearing housing
     Cracks/damage → Replace.

NOTE: ______________________
When the final gear case and/or the ring gear bearing housing are replaced, be sure to adjust the shim of the final drive pinion gear and/or ring gear.

2. Check:
   • gear teeth
     Pitting/galling/wear → Replace the drive pinion gear and ring gear as a set.
   • oil seals
   • O-rings
     Damage → Replace.

3. Check:
   • bearings
     Damage → Replace.

NOTE: ______________________
• Reusing roller bearings is acceptable, but Yamaha recommends installing new ones.
  Do not reuse the oil seal.
• When the final drive pinion gear and/or ring gear are replaced, be sure to adjust the shim of the final drive pinion gear and/or ring gear.
MEASURING AND ADJUSTING THE FINAL GEAR LASH

Measuring the final gear lash
1. Secure the gear case in a vise or another supporting device.
2. Remove:
   • drain plug
   • gasket
3. Install:
   • a bolt of the specified size ①
   (into the drain plug hole)

**CAUTION:**
Finger tighten the bolt until it holds the ring gear. Otherwise, the ring gear will be damaged.

4. Attach:
   • gear lash measurement tool ①
   • dial gauge ②

**Gear lash measurement tool**
P/N. YM-01467, 90890-01467

① Measuring point is 31.1 mm (1.22 in)

5. Measure:
   • gear lash
   Gently rotate the gear coupling from engagement to engagement.

**Final gear lash**
0.10 ~ 0.30 mm (0.004 ~ 0.012 in)

**NOTE:**
Measure the gear lash at four positions. Rotate the shaft 90° each time.
ADJUSTING THE FINAL GEAR LASH

1. Remove:
   - ring gear bearing housing
   - ring gear shim(s)
   - ring gear
   - thrust washer

2. Adjust:
   - gear lash

a. Select a suitable shim(s) and thrust washer(s) using the following chart.

<table>
<thead>
<tr>
<th>Too little gear lash</th>
<th>Reduce shim thickness.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Too large gear lash</td>
<td>Increase shim thickness.</td>
</tr>
</tbody>
</table>

b. If increased by more than 0.2 mm (0.008 in):
   Reduce the thrust washer thickness by 0.2 mm (0.008 in) for every 0.2 mm of ring gear shim increase.

c. If reduced by more than 0.2 mm (0.008 in):
   Increase the thrust washer thickness by 0.2 mm (0.008 in) for every 0.2 mm that the ring gear shim is decreased.

<table>
<thead>
<tr>
<th>Ring gear shim</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thickness (mm)</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Thrust washer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thickness (mm)</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

ASSEMBLING THE FINAL DRIVE GEAR ASSEMBLY

1. Adjust:
   - final gear lash
   Refer to “MEASURING AND ADJUSTING THE FINAL GEAR LASH”.

www.midwestmanuals.com
2. Install:
- ring gear bearing housing
- ring gear bearing housing bolts (M8) 1
  - 23 Nm (2.3 m·kg, 17 ft·lb)
- ring gear bearing housing bolts (M10) 2
  - 40 Nm (4.0 m·kg, 29 ft·lb)

NOTE: ______________________
Apply sealant to the bolts 1 and 2 threads.

Yamaha bond No. 1215
(Three Bond No. 1215®)
P/N. 90890-85505

3. Install:
- bearing retainer

a. Place a folded rag.
b. Secure the final drive pinion gear bearing housing edge in a vise.

NOTE: ______________________
Apply locking agent (LOCTITE®) to the threads of bearing retainer.

c. Attach the bearing retainer wrench.

d. Tighten the bearing retainer.

CAUTION: ______________________
The bearing retainer has left-hand threads. Turn the retainer counterclockwise to tighten it.
4. Install:
   • drive shaft coupling nut

   a. Place a folded rag ①.
   b. Secure the drive shaft coupling edge in the vise.
   c. Tighten the drive shaft coupling nut.

   Drive shaft coupling nut
   80 Nm (8.0 m·kg, 58 ft·lb)

5. Check:
   • final drive gear operation
     Unsmooth operation → Replace the final drive gear assembly.
     Insert the double off-set joint into the final drive gear, and turn the gear back and forth.
SEATS, ENCLOSURE, HOOD AND CARGO BED

CHASSIS

SEATS, ENCLOSURE, HOOD AND CARGO BED
FRONT GUARD AND HOOD

Order | Job/Part | Q'ty | Remarks
---|---|---|---
1 | Removing the front guard and hood | 1 | Remove the parts in the order listed.
   | Front guard protector | 1 |
   | Front guard | 1 |
   | Headlight coupler | 2 | Disconnect.
   | Hood | 1 | For installation, reverse the removal procedure.

32 Nm (3.2 m·kg, 23 ft·lb)
59 Nm (5.9 m·kg, 43 ft·lb)
7 Nm (0.7 m·kg, 5.1 ft·lb)
SEATS, CONSOLE AND INSTRUMENT PANELS

Removing the seats, console and instrument panels

<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>Driver seat</td>
<td>1</td>
<td>Remove the parts in the order listed.</td>
</tr>
<tr>
<td>2</td>
<td>Passenger seat</td>
<td>1</td>
<td>Disconnect.</td>
</tr>
<tr>
<td>3</td>
<td>Air intake duct</td>
<td>1</td>
<td>Disconnect.</td>
</tr>
<tr>
<td>4</td>
<td>Console</td>
<td>1</td>
<td>Disconnect.</td>
</tr>
<tr>
<td>5</td>
<td>Steering wheel cover</td>
<td>1</td>
<td>Disconnect.</td>
</tr>
<tr>
<td>6</td>
<td>Steering wheel</td>
<td>1</td>
<td>Disconnect.</td>
</tr>
<tr>
<td>7</td>
<td>Pedal cover</td>
<td>1</td>
<td>Disconnect.</td>
</tr>
<tr>
<td>8</td>
<td>Light switch coupler</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Main switch coupler</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>On-Command four-wheel drive switch and differential gear lock switch</td>
<td>2</td>
<td>Disconnect.</td>
</tr>
<tr>
<td>11</td>
<td>Indicator/warning light coupler</td>
<td>2</td>
<td>Disconnect.</td>
</tr>
</tbody>
</table>
### Order, Job/Part, Q'ty, Remarks

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>Auxiliary DC jack connector</td>
<td>2</td>
<td>Disconnect.</td>
</tr>
<tr>
<td>13</td>
<td>Nut/starter cable</td>
<td>1/1</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Upper instrument panel</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Lower instrument panel</td>
<td>1</td>
<td>For installation, reverse the removal procedure.</td>
</tr>
</tbody>
</table>

**Diagrams:**
- **7 Nm (0.7 m·kg, 5.1 ft·lb)**
- **35 Nm (3.5 m·kg, 25 ft·lb)**
### PANELS AND FOOTREST COVER

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Left side panel</td>
<td>1</td>
<td>Remove the parts in the order listed.</td>
</tr>
<tr>
<td>2</td>
<td>Right side panel</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Left corner panel</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Right corner panel</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Left protector 1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Right protector 1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Footrest cover</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Driver seat support</td>
<td>1</td>
<td>For installation, reverse the removal procedure.</td>
</tr>
<tr>
<td>9</td>
<td>Passenger seat support</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

- **16 Nm (1.6 m · kg, 11 ft · lb)**
- **32 Nm (3.2 m · kg, 23 ft · lb)**
- **7 Nm (0.7 m · kg, 5.1 ft · lb)**
CARGO BED

**Removing the cargo bed**

1. Tail/brake light connector 6
2. Gas spring assembly 2
3. Pin 2
4. Cargo bed assembly 1

**Remarks**

Remove the parts in the order listed.
Disconnect.

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

<table>
<thead>
<tr>
<th>Job/Part</th>
<th>Q'nty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Disassembling the cargo bed</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Cargo bed mat</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2 Tailgate cable</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>3 Hinge cover</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>4 Tailgate</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5 Cargo bed panel</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>6 Tail/brake light bulb holder</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>7 Cargo bed release lever</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>8 Cargo hook</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>9 Cargo bed</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

For assembly, reverse the disassembly procedure.

- 7 Nm (0.7 m·kg, 5.1 ft·lb)
- 16 Nm (1.6 m·kg, 11 ft·lb)
SKID PLATES

 Removing the skid plates

<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>Front skid plate</td>
<td>1</td>
<td>Remove the parts in the order listed.</td>
</tr>
<tr>
<td>2</td>
<td>Rear skid plate</td>
<td>1</td>
<td>For installation, reverse the removal procedure.</td>
</tr>
</tbody>
</table>

7 Nm (0.7 m·kg, 5.1 ft·lb)
INSTALLING THE REAR SKID PLATE

1. Install:
   • rear skid plate ①

**NOTE:**
Make sure that the hole ③ in the rear skid plate is towards the left side of the vehicle.

A) Forward
B) Left side
C) Right side
ENCLOSURE AND SEAT BELTS

Order | Job/Part | Q'ty | Remarks
--- | --- | --- | ---
1 | Front top frame | 1 | Removing the enclosure and seat belts
2 | Rear top frame | 1 | Remove the parts in the order listed.
3 | Left support frame | 1 |
4 | Right support frame | 1 |
5 | Left side frame | 1 |
6 | Right side frame | 1 |
7 | Seat belt | 2 |
8 | Buckle | 2 |

For installation, reverse the removal procedure.

64 Nm (6.4 m·kg, 46 ft·lb)

59 Nm (5.9 m·kg, 43 ft·lb)
## Removing the front wheels

<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>Front wheel</td>
<td>1</td>
<td>Remove the parts in the order listed. Place the vehicle on a level surface.</td>
</tr>
<tr>
<td>2</td>
<td>Center cap</td>
<td>1</td>
<td>Refer to “INSTALLING THE FRONT WHEELS”.</td>
</tr>
<tr>
<td>3</td>
<td>Axle nut</td>
<td>1</td>
<td>Refer to “INSTALLING THE FRONT WHEEL HUBS”.</td>
</tr>
</tbody>
</table>

- **30 Nm (3.0 m·kg, 22 ft·lb)**
- **48 Nm (4.8 m·kg, 35 ft·lb)**
- **350 Nm (35.0 m·kg, 255 ft·lb)**
- **55 Nm (5.5 m·kg, 40 ft·lb)**
### FRONT WHEELS AND BRAKE DISCS

#### Order Job/Part Q'ty Remarks

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Brake caliper assembly</td>
<td>1</td>
<td><strong>NOTE:</strong>  Do not depress the brake pedal when the brake caliper is off of the brake disc as the brake pads will be forced shut.</td>
</tr>
<tr>
<td>5</td>
<td>Front wheel hub</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Brake disc</td>
<td>1</td>
<td>For installation, reverse the removal procedure.</td>
</tr>
</tbody>
</table>

**New**

30 Nm (3.0 m • kg, 22 ft • lb)

48 Nm (4.8 m • kg, 35 ft • lb)

350 Nm (35.0 m • kg, 255 ft • lb)

55 Nm (5.5 m • kg, 40 ft • lb)
CHECKING THE FRONT WHEELS
1. Check:
   • wheel
2. Measure:
   • wheel runout
   Over the specified limit → Replace the wheel or check the wheel bearing play ①.

   Wheel runout limit
   Radial ②: 2.0 mm (0.08 in)
   Lateral ③: 2.0 mm (0.08 in)

3. Check:
   • wheel balance
   Out of balance → Adjust.

   WARNING
   After replacing the tire, ride conservatively to allow the tire to be properly seated in the rim. Failure to do so may cause an accident resulting in vehicle damage and possible injury.

CHECKING THE FRONT WHEEL HUBS
1. Check:
   • wheel hub ①
     Cracks/damage → Replace.
   • splines (wheel hub) ②
     Wear/damage → Replace.
CHECKING THE FRONT BRAKE DISCS
1. Check:
   • brake disc
     Galling/damage → Replace.
2. Measure:
   • brake disc deflection
     Out of specification → Check the wheel runout.
     If wheel runout is within the limits, replace the brake disc.

   **Brake disc maximum deflection 0.10 mm (0.004 in)**

   • brake disc thickness ③
     Out of specification → Replace.

   **Brake disc minimum thickness 3.0 mm (0.12 in)**

INSTALLING THE FRONT WHEEL HUBS
1. Install:
   • axle nut

   **New**

   350 Nm (35.0 m·kg, 255 ft·lb)

   NOTE:
   • Do not apply oil to the seat of the nut.
   • After tightening the nut, stake the collar of the nut into the notch of the shaft.

INSTALLING THE FRONT WHEELS
1. Install:
   • wheel

   NOTE:
   The arrow mark ① on the tire must point in the direction of rotation ③ of the wheel.

2. Tighten:
   • wheel nuts ①

   **55 Nm (5.5 m·kg, 40 ft·lb)**

   **WARNING**
   Tapered wheel nuts ① are used for both the front and rear wheels. Install each nut with its tapered side towards the wheel.
REAR WHEELS AND BRAKE DISC

REAR WHEELS

Order | Job/Part | Q'ty | Remarks
--- | --- | --- | ---
1 | Removing the rear wheels | | Remove the parts in the order listed. Place the vehicle on a level surface.
1 | Rear wheel | 1 | Securely support the vehicle so there is no danger of it falling over.
2 | Center cap | 1 | Refer to “INSTALLING THE REAR WHEELS”.
3 | Axle nut | 1 | Refer to “INSTALLING THE REAR WHEEL HUBS”.
4 | Rear wheel hub | 1 | For installation, reverse the removal procedure.

350 Nm (35.0 m·kg, 255 ft·lb)
55 Nm (5.5 m·kg, 40 ft·lb)
## REAR BRAKE DISC

**Image:** A diagram of a rear brake disc with a label indicating a torque value of 10 Nm (1.0 m·kg, 7.2 ft·lb).

### Table: Job/Part Removal

<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 rear brake disc</strong></td>
<td>1</td>
<td>Remove the parts in the order listed. Refer to “FRONT AND REAR BRAKES”. Refer to “REAR CONSTANT VELOCITY JOINTS, FINAL DRIVE GEAR AND REAR DRIVE SHAFT” in chapter 7. For installation, reverse the removal procedure.</td>
</tr>
<tr>
<td></td>
<td>Brake caliper assembly</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Final drive gear</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Rear brake disc</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>
CHECKING THE REAR WHEELS
1. Check:
   • wheel
     Refer to "CHECKING THE FRONT WHEELS".
2. Measure:
   • wheel runout
     Refer to "CHECKING THE FRONT WHEELS".
     Over the specified limit → Replace.

<table>
<thead>
<tr>
<th>Wheel runout limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radial: 2.0 mm (0.08 in)</td>
</tr>
<tr>
<td>Lateral: 2.0 mm (0.08 in)</td>
</tr>
</tbody>
</table>

3. Check:
   • wheel balance
     Refer to "CHECKING THE FRONT WHEELS".
     Out of balance → Adjust.

CHECKING THE REAR WHEEL HUBS
1. Check:
   • wheel hub ①
     Cracks/damage → Replace.
   • splines (wheel hub) ②
     Wear/damage → Replace.

CHECKING THE REAR BRAKE DISC
1. Check:
   • brake disc
     Gallling/damage → Replace.
2. Measure:
   • brake disc deflection
     Out of specification → Replace.

<table>
<thead>
<tr>
<th>Brake disc maximum deflection</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.10 mm (0.004 in)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Brake disc minimum thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.5 mm (0.18 in)</td>
</tr>
</tbody>
</table>
INSTALLING THE REAR WHEEL HUBS
1. Install:
   • axle nut
   Refer to "INSTALLING THE FRONT WHEEL HUBS".

INSTALLING THE REAR WHEELS
1. Install:
   • wheel
   Refer to "INSTALLING THE FRONT WHEELS".
2. Tighten:
   • wheel nuts
   Refer to "INSTALLING THE FRONT WHEELS".
### FRONT AND REAR BRAKES

#### FRONT BRAKE PADS

**Removing the front brake pads**

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Brake caliper mounting bolt</td>
<td>2</td>
<td>Remove the parts in the order listed. Refer to “FRONT WHEELS AND BRAKE DISCS”.</td>
</tr>
<tr>
<td>2</td>
<td>Brake pad holding bolt</td>
<td>2</td>
<td>Refer to “REPLACING THE FRONT BRAKE PADS”.</td>
</tr>
<tr>
<td>3</td>
<td>Brake pad</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Pad spring</td>
<td>1</td>
<td>For installation, reverse the removal procedure.</td>
</tr>
</tbody>
</table>

**Notes:**

- Front wheel
- 48 Nm (4.8 m·kg, 35 ft·lb)
- 18 Nm (1.8 m·kg, 13 ft·lb)
REAR BRAKE PADS

40Nm (4.0 m·kg, 29 ft·lb)

17 Nm (1.7 m·kg, 12 ft·lb)

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Removing the rear brake pads</strong></td>
<td></td>
<td>Remove the parts in the order listed.</td>
</tr>
<tr>
<td></td>
<td>Rear skid plate</td>
<td></td>
<td>Refer to &quot;SEATS, ENCLOSURE, HOOD AND CARGO BED&quot;.</td>
</tr>
<tr>
<td>1</td>
<td>Spring</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Parking brake cable</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Brake caliper mounting bolt</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Brake pad holding bolt</td>
<td>2</td>
<td>Refer to &quot;REPLACING THE REAR BRAKE PADS&quot;.</td>
</tr>
<tr>
<td>5</td>
<td>Brake pad (piston side)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Brake pad</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Insulator/pad shim</td>
<td>2/2</td>
<td>For installation, reverse the removal proce-</td>
</tr>
<tr>
<td>8</td>
<td>Pad spring</td>
<td>1</td>
<td>dure.</td>
</tr>
</tbody>
</table>

For installation, reverse the removal procedure.
CAUTION: Disc brake components rarely require disassembly. DO NOT:

- disassemble components unless absolutely necessary;
- use solvents on internal brake components;
- use spent brake fluid for cleaning; (use only clean brake fluid)
- allow brake fluid to come in contact with the eyes, as this may cause eye injury;
- splash brake fluid onto painted surfaces or plastic parts, as this may cause damage;
- disconnect any hydraulic connection, as this would require the entire brake system to be disassembled, drained, cleaned, properly filled and bled after reassembly.

REPLACING THE FRONT BRAKE PADS

NOTE: It is not necessary to disassemble the brake caliper and brake hose to replace the brake pads.

1. Measure:
   - brake pad wear limit
     Out of specification → Replace the brake pads as a set.

Brake pad wear limit
1.5 mm (0.06 in)
FRONT AND REAR BRAKES

2. Install:
   • brake pads
   • brake pad spring

NOTE: _______________________________________
Always install new brake pads and brake pad spring as a set.

a. Connect a suitable hose ① tightly to the brake caliper bleed screw ②. Put the other end of this hose into an open container.
b. Loosen the brake caliper bleed screw and, using a finger, push the caliper piston into the brake caliper.
c. Tighten the brake caliper bleed screw.

d. Install the retaining bolts and brake caliper.

<table>
<thead>
<tr>
<th>Brake caliper bleed screw</th>
<th>6 Nm (0.6 m · kg, 4.3 ft · lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brake pad holding bolt</td>
<td>18 Nm (1.8 m · kg, 13 ft · lb)</td>
</tr>
<tr>
<td>Brake caliper mounting bolt</td>
<td>48 Nm (4.8 m · kg, 35 ft · lb)</td>
</tr>
</tbody>
</table>

3. Check:
   • brake fluid level
     Refer to “CHECKING THE BRAKE FLUID LEVEL” in chapter 3.

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

REPLACING THE REAR BRAKE PADS

NOTE: _______________________________________
It is not necessary to disassemble the brake caliper and brake hose to replace the brake pads.
1. Measure:
   • brake pad wear limit (③)
     Out of specification → Replace the brake pads as a set.

   ![Brake pad wear limit](image)
   **Brake pad wear limit**
   1.5 mm (0.06 in)

2. Install:
   • brake pads
   • brake pad spring

   ![Installation Diagram](image)

   NOTE: ______________________

   Always install new brake pads, new brake pad shims, new insulators, and a new brake pad spring as a set.

   a. Connect a suitable hose (①) tightly to the brake caliper bleed screw (②). Put the other end of this hose into an open container.

   b. Loosen the brake caliper bleed screw, and then turn the brake caliper piston (③) clockwise until section (②) of the brake caliper piston is level with the surface of the brake caliper body.

   NOTE: ______________________

   Align an end (⑤) of the groove in the brake caliper piston with the punch mark (⑥) on the brake caliper body.

   c. Tighten the brake caliper bleed screw.

   ![Tighten Screw](image)

   **Brake caliper bleed screw**
   5 Nm (0.5 m·kg, 3.6 ft·lb)

   d. Install new brake pads, new insulators, new brake pad shims and a new brake pad spring.

   NOTE: ______________________

   Align the projection (④) on the piston side of the brake pad with the groove in the brake caliper piston.
e. Install the brake pad holding bolts, the brake caliper, and the brake caliper mounting bolts.

![Brake pad holding bolt]

- Brake pad holding bolt
  - 17 Nm (1.7 m·kg, 12 ft·lb)

![Brake caliper mounting bolt]

- Brake caliper mounting bolt
  - 40 Nm (4.0 m·kg, 29 ft·lb)

3. Check:
   - brake fluid level
     Refer to “CHECKING THE BRAKE FLUID LEVEL” in chapter 3.

4. Check:
   - brake pedal operation
     Soft or spongy feeling → Bleed the brake system.
     Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM” in chapter 3.
### BRAKE MASTER CYLINDER

**Removing the brake master cylinder**

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Brake fluid</td>
<td>1</td>
<td>Remove the parts in the order listed. Drain.</td>
</tr>
<tr>
<td>2</td>
<td>Brake fluid reservoir cap</td>
<td>1</td>
<td>Remove the parts in the order listed. Drain.</td>
</tr>
<tr>
<td>3</td>
<td>Brake fluid reservoir diaphragm</td>
<td>1</td>
<td>Remove the parts in the order listed. Drain.</td>
</tr>
<tr>
<td>4</td>
<td>Brake fluid reservoir float</td>
<td>1</td>
<td>Remove the parts in the order listed. Drain.</td>
</tr>
<tr>
<td>5</td>
<td>Union bolt</td>
<td>1</td>
<td>Remove the parts in the order listed. Drain.</td>
</tr>
<tr>
<td>6</td>
<td>Copper washer</td>
<td>2</td>
<td>Remove the parts in the order listed. Drain.</td>
</tr>
<tr>
<td>7</td>
<td>Brake hose</td>
<td>1</td>
<td>Refer to “INSTALLING THE BRAKE MASTER CYLINDER”.</td>
</tr>
<tr>
<td>8</td>
<td>Brake pipe</td>
<td>1</td>
<td>Refer to “INSTALLING THE BRAKE MASTER CYLINDER”.</td>
</tr>
<tr>
<td>9</td>
<td>Brake master cylinder</td>
<td>1</td>
<td>For installation, reverse the removal procedure.</td>
</tr>
</tbody>
</table>
FRONT AND REAR BRAKES

Disassembling the 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>Primary brake master cylinder kit</td>
<td>1</td>
<td>Refer to “ASSEMBLING THE BRAKE MASTER CYLINDER”.</td>
</tr>
<tr>
<td>④</td>
<td>Secondary brake master cylinder kit stopper</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>⑤</td>
<td>Gasket</td>
<td>1</td>
<td>For assembly, reverse the disassembly procedure.</td>
</tr>
<tr>
<td>⑥</td>
<td>Secondary brake master cylinder kit</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

9 Nm (0.9 m · kg, 6.5 ft · lb)
CHECKING THE MASTER CYLINDER

1. Check:
   • brake master cylinder
     Wear/scratches → Replace the brake master cylinder assembly.
   • brake master cylinder body
     Cracks/damage → Replace.
   • brake fluid delivery passage
     (brake master cylinder body)
     Blockage → Blow out with compressed air.

2. Check:
   • brake master cylinder kit
     Scratches/wear/damage → Replace as a set.
   A Primary brake master cylinder kit
   B Secondary brake master cylinder kit

3. Check:
   • brake fluid reservoir
   • brake fluid reservoir diaphragm
     Cracks/damage → Replace.

ASSEMBLING THE BRAKE MASTER CYLINDER

⚠️ WARNING ⚠️
• All internal brake components should be cleaned and lubricated with new brake fluid only before installation.

⚠️ Recommended brake fluid ⚠️
• DOT 4

• Whenever a master cylinder is disassembled, replace the piston seals and dust seals.
INSTALLING THE BRAKE MASTER CYLINDER

1. Install:
   • brake master cylinder
     $16 \text{Nm} (1.6 \text{m} \cdot \text{kg}, 11 \text{ft} \cdot \text{lb})$

2. Install:
   • brake pipe
     $19 \text{Nm} (1.9 \text{m} \cdot \text{kg}, 13 \text{ft} \cdot \text{lb})$
   • copper washers
   • brake hose
   • union bolt
     $27 \text{Nm} (2.7 \text{m} \cdot \text{kg}, 19 \text{ft} \cdot \text{lb})$

**NOTE:**
Tighten the union bolt while holding the brake hose as shown.

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

3. Fill:
   • brake fluid reservoir

**Recommended brake fluid**
DOT 4

**CAUTION:**
Brake fluid may damage painted surfaces or plastic parts. Always clean up spilled brake fluid immediately.

**WARNING**
• Use only the designated quality brake fluid: other brake fluids may deteriorate the rubber seals, causing leakage and poor brake performance.
• Refill with the same type of brake fluid: mixing brake fluids may result in a harmful chemical reaction and lead to poor brake performance.
• Be careful that water does not enter the brake master cylinder when refilling. Water will significantly lower the boiling point of the brake fluid and may result in vapor lock.
4. Air bleed:
   • brake system
     Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM” in chapter 3.

5. Check:
   • brake fluid level
     Brake fluid level is under the “MIN” level line
     → Fill up.
     Refer to “CHECKING THE BRAKE FLUID LEVEL” in chapter 3.

6. Adjust:
   • brake pedal free play
     Refer to “ADJUSTING THE BRAKE PEDAL” in chapter 3.
FRONT BRAKE CALIPERS

Removing the front brake calipers

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Union bolt</td>
<td>1</td>
<td>Remove the parts in the order listed.</td>
</tr>
<tr>
<td>2</td>
<td>Copper washer</td>
<td>2</td>
<td>Drain. Refer to “FRONT WHEELS AND BRAKE</td>
</tr>
<tr>
<td>3</td>
<td>Brake hose</td>
<td>1</td>
<td>DISCS”.</td>
</tr>
<tr>
<td>4</td>
<td>Brake pad holding bolt</td>
<td>2</td>
<td>Disconnect. Refer to “INSTALLING</td>
</tr>
<tr>
<td>5</td>
<td>Brake caliper mounting</td>
<td>2</td>
<td>THE FRONT BRAKE CALIPERS”.</td>
</tr>
<tr>
<td>6</td>
<td>brake caliper assembly</td>
<td>1</td>
<td>For installation, reverse the removal</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>procedure.</td>
</tr>
</tbody>
</table>
### Disassembling the Front Brake Calipers

**Order** | **Job/Part** | **Q'ty** | **Remarks**
--- | --- | --- | ---
1 | Brake pad holding bolt | 2 | Remove the parts in the order listed.
2 | Brake pad | 2 |
3 | Pad spring | 1 |
4 | Caliper bracket | 1 |
5 | Brake caliper piston | 2 | Refer to “DISASSEMBLING THE FRONT BRAKE CALIPERS” and “ASSEMBLING THE FRONT BRAKE CALIPERS”.
6 | Dust seal | 2 |
7 | Caliper piston seal | 2 | For assembly, reverse the disassembly procedure.
8 | Bleed screw | 1 |
### Rear Brake Caliper

![Diagram of Rear Brake Caliper]

**Torque Specifications:**
- 40 Nm (4.0 m·kg, 29 ft·lb)
- 7 Nm (0.7 m·kg, 5.1 ft·lb)
- 27 Nm (2.7 m·kg, 19 ft·lb)

#### Order Job/Part Q'ty Remarks

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Parking brake switch coupler</td>
<td>1</td>
<td>Remove the parts in the order listed.</td>
</tr>
<tr>
<td>2</td>
<td>Parking brake cable</td>
<td>1</td>
<td>Refer to “SEATS, ENCLOSURE, HOOD AND CARGO BED”.</td>
</tr>
<tr>
<td>3</td>
<td>Parking brake cable</td>
<td>1</td>
<td>Drain.</td>
</tr>
<tr>
<td>4</td>
<td>Parking brake lever assembly mounting bolt</td>
<td>1</td>
<td>Disconnect.</td>
</tr>
<tr>
<td>5</td>
<td>Parking brake lever assembly</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

**Diagrams:**
- Diagram of rear brake caliper components.
- Torque specifications for various bolts.

---

**Additional Information:**
- Rear skid plate
- Brake fluid
- Spring
- Parking brake cable

---

**Website:** www.midwestmanuals.com
40 Nm (4.0 m·kg, 29 ft·lb)

7 Nm (0.7 m·kg, 5.1 ft·lb)

27 Nm (2.7 m·kg, 19 ft·lb)

---

<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>Union bolt</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Copper washer</td>
<td>2</td>
<td>Disconnect. Refer to “INSTALLING THE REAR BRAKE CALIPER”.</td>
</tr>
<tr>
<td>8</td>
<td>Brake hose</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Brake caliper mounting bolt</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Brake caliper assembly</td>
<td>1</td>
<td>For installation, reverse the removal procedure.</td>
</tr>
</tbody>
</table>

www.midwestmanuals.com
## Disassembling the Rear Brake Caliper

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Brake pad holding bolt</td>
<td>2</td>
<td>Remove the parts in the order listed.</td>
</tr>
<tr>
<td>2</td>
<td>Brake pad (piston side)</td>
<td>1</td>
<td>Refer to “ASSEMBLING THE REAR BRAKE CALIPER”.</td>
</tr>
<tr>
<td>3</td>
<td>Brake pad</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Insulator/pad shim</td>
<td>2/2</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Pad spring</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Brake caliper bracket</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Parking brake arm nut</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Parking brake arm</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Set bolt</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Parking brake arm shaft</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Parking brake case bolt</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

### Torque Specifications
- 5 Nm (0.5 m·kg, 3.6 ft·lb)
- 17 Nm (1.7 m·kg, 12 ft·lb)
- 22 Nm (2.2 m·kg, 16 ft·lb)
- 9 Nm (0.9 m·kg, 6.5 ft·lb)
4. Parking brake case
   1
   Refer to “ASSEMBLING THE REAR BRAKE CALIPER”.

5. Gasket
   1
   Refer to “DISASSEMBLING THE FRONT BRAKE CALIPERS” and “ASSEMBLING THE REAR BRAKE CALIPER”.

6. Brake caliper piston
   1

7. Dust seal
   1

8. Caliper piston seal
   1

9. Bleed screw
   1
   For assembly, reverse the disassembly procedure.

**Notes:**
- **Tightening Torque:**
  - 5 Nm (0.5 m·kg, 3.6 ft·lb)
  - 17 Nm (1.7 m·kg, 12 ft·lb)
  - 22 Nm (2.2 m·kg, 16 ft·lb)

**Important:**
- Follow the reverse procedure for assembly.
FRONT AND REAR BRAKES

REMOVING THE REAR BRAKE CALIPER

NOTE: ____________________________
If the rear brake caliper cannot be removed easily, first remove the brake pads, and then remove the caliper.

---

DISASSEMBLING THE FRONT BRAKE CALIPERS

1. Remove:
   • brake caliper pistons
   • dust seals ①
   • caliper piston seals ②

▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲^
CHECKING THE FRONT AND REAR BRAKE CALIPERS

Recommended brake component replacement schedule:

<table>
<thead>
<tr>
<th>Component</th>
<th>Replacement Schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brake pads</td>
<td>As required</td>
</tr>
<tr>
<td>Piston seals, dust seals</td>
<td>Every two years</td>
</tr>
<tr>
<td>Brake hoses</td>
<td>Every two years</td>
</tr>
<tr>
<td>Brake fluid</td>
<td>Replace when brakes are disassembled.</td>
</tr>
</tbody>
</table>

⚠️ WARNING ⚠️
All internal brake components should be cleaned in new brake fluid only. Do not use solvents as they will cause seals to swell and distort.

1. Check:
   - brake caliper pistons (1)
     Scratches/rust/wear → Replace the brake caliper assembly.
   - brake caliper cylinders (2)
     Wear/scratches → Replace the brake caliper assembly.
   - brake caliper body (3)
     Cracks/damage → Replace.
   - brake fluid delivery passage (brake caliper body)
     Blockage → Blow out with compressed air.

⚠️ WARNING ⚠️
Replace the caliper piston seals and dust seals whenever a brake caliper is disassembled.

[A] Front
[B] Rear
ASSEMBLING THE FRONT BRAKE CALIPERS

The following procedure applies to both of the front brake calipers.

**WARNING**

- All internal brake components should be cleaned and lubricated with new brake fluid only before installation.

**Recommended brake fluid**

DOT 4

- Replace the caliper piston seals and dust seals whenever a brake caliper is disassembled.

1. Install:
   - caliper piston seals
   - dust seals

2. Install:
   - brake caliper pistons
ASSEMBLING THE REAR BRAKE CALIPER

**WARNING**
- All internal brake components should be cleaned and lubricated with new brake fluid only before installation.

**Recommended brake fluid**
DOT 4

- Replace the caliper piston seal and dust seal whenever the brake caliper is disassembled.

1. Install:
   - caliper piston seal [1] New
   - dust seal [2] New

2. Install:
   - brake caliper piston [1]
   - Turn the brake caliper piston clockwise until section [a] of the brake caliper piston is level with the surface of the brake caliper body.

**NOTE:**
Align an end [b] of the groove in the brake caliper piston with the punch mark [c] on the brake caliper body.

3. Install:
   - gasket [1]
   - parking brake case [2]
   - parking brake case bolts [3] [22 Nm (2.2 m·kg, 16 ft·lb)]
   - O-ring [4]
4. Install:
   • parking brake arm shaft ①
   • parking brake arm ②
   • set bolt ③
   • parking brake arm nut ④

   **NOTE:**
   Apply lithium-soap-based grease to the parking brake arm shaft and set bolt.

   a. Screw in the parking brake arm shaft counterclockwise completely so that the punch mark ③ on the parking brake arm shaft is between the alignment marks ④.

   **NOTE:**
   The hole for the parking brake arm shaft has multiple threads. If the punch mark ③ on the parking brake arm shaft is not between the alignment marks ④ when the parking brake arm shaft is screwed in completely, remove the parking brake arm shaft and screw it in from a different starting position.

   b. Turn the parking brake arm shaft approximately 60° clockwise.

   c. Install the parking brake arm to the parking brake arm shaft so that the punch mark ⑤ on the parking brake arm is aligned with the punch mark ③ on the parking brake arm shaft.

   d. Turn the parking brake arm until it contacts the pin ⑤.

   e. Finger tighten the set bolt.

   f. Tighten the parking brake arm nut.

   **Parking brake arm nut**
   9 Nm (0.9 m·kg, 6.5 ft·lb)

5. Install:
   • brake pad (piston side) ⑥
     (with insulator and pad shim)

   **NOTE:**
   Align the projection ③ on the piston side of the brake pad with the groove in the brake caliper piston.
FRONT AND REAR BRAKES

6. Install:
   • brake pad holding bolts
     \[17 \text{Nm (1.7 m·kg, 12 ft·lb)}\]

EBS00434

INSTALLING THE FRONT BRAKE CALIPERS
The following procedure applies to both of the front brake calipers.
1. Install:
   • brake caliper assembly
   • brake caliper mounting bolts
     \[48 \text{Nm (4.8 m·kg, 35 ft·lb)}\]
   • brake hose ①
   • copper washers ②
   • union bolt ③
     \[27 \text{Nm (2.7 m·kg, 19 ft·lb)}\]

CAUTION:
When installing the brake hose on the brake caliper, make sure that the brake pipe touches the projection ③ on the brake caliper.

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

2. Fill:
   • brake reservoir

   \[\text{Recommended brake fluid DOT 4}\]

CAUTION:
Brake fluid may damage painted surfaces or plastic parts. Always clean up spilled brake fluid immediately.
FRONT AND REAR BRAKES

**WARNING**

- Use only the designated quality brake fluid: other brake fluids may deteriorate the rubber seals, causing leakage and poor brake performance.
- Refill with the same type of brake fluid: mixing brake fluids may result in a harmful chemical reaction and lead to poor brake performance.
- Be careful that water does not enter the master cylinder when refilling. Water will significantly lower the boiling point of the brake fluid and may result in vapor lock.

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

4. Check:
   - brake fluid level
   Brake fluid level is below the “MIN” level line → Add the recommended brake fluid to the proper level.
   Refer to “CHECKING THE BRAKE FLUID LEVEL” in chapter 3.

---

**INSTALLING THE REAR BRAKE CALIPER**

1. Install:
   - brake caliper assembly
   - brake caliper mounting bolts
     \[ 40 \text{ Nm} (4.0 \text{ m} \cdot \text{kg}, 29 \text{ ft} \cdot \text{lb}) \]
   - brake hose ①
   - copper washers
   - union bolt ② \[ 27 \text{ Nm} (2.7 \text{ m} \cdot \text{kg}, 19 \text{ ft} \cdot \text{lb}) \]

**NOTE:**

Tighten the union bolt while holding the brake hose as shown.

---

**WARNING**

Proper brake hose routing is essential to insure safe vehicle operation. Refer to “CABLE ROUTING” in chapter 2.
2. Fill:
   - brake reservoir

   ![Recommended brake fluid]
   DOT 4

   **CAUTION:**
   Brake fluid may damage painted surfaces or plastic parts. Always clean up spilled brake fluid immediately.

   **WARNING**
   - Use only the designated quality brake fluid: other brake fluids may deteriorate the rubber seals, causing leakage and poor brake performance.
   - Refill with the same type of brake fluid: mixing brake fluids may result in a harmful chemical reaction and lead to poor brake performance.
   - Be careful that water does not enter the master cylinder when refilling. Water will significantly lower the boiling point of the brake fluid and may result in vapor lock.

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

4. Check:
   - brake fluid level
   Brake fluid level is below the “MIN” level line
   → Add the recommended brake fluid to the proper level.
   Refer to “CHECKING THE BRAKE FLUID LEVEL” in chapter 3.

5. Adjust:
   - parking brake cable free play
   Refer to “ADJUSTING THE PARKING BRAKE” in chapter 3.
## PEDAL ASSEMBLY

### Removing the pedal 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>Splash plate</td>
<td>1</td>
<td>Remove the parts in the order listed. Refer to “SEATS, ENCLOSURE, HOOD AND CARGO BED”. Refer to “STEERING SYSTEM”. Refer to “FRONT AND REAR BRAKES”. Disconnect. Disconnect.</td>
</tr>
<tr>
<td>2</td>
<td>Brake light switch coupler</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Brake switch</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Throttle cable</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Pin</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Brake pedal rod</td>
<td>1</td>
<td>For installation, reverse the removal procedure.</td>
</tr>
<tr>
<td>7</td>
<td>Pedal assembly</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>
Disassembling the pedal 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>Spring</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>2</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Brake pedal</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Spring</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Circlip</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Washer</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Accelerator pedal</td>
<td>1</td>
<td>For assembly, reverse the disassembly procedure.</td>
</tr>
<tr>
<td>9</td>
<td>Pedal assembly bracket</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>
STEERING SYSTEM
STEERING COLUMN AND STEERING ASSEMBLY

Removing the steering column and steering assembly
Steering wheel cover/steering wheel/upper instrument panel/lower instrument panel

<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>Steering shaft</td>
<td>1</td>
<td>Remove the parts in the order listed.</td>
</tr>
<tr>
<td>2</td>
<td>Steering joint</td>
<td>1</td>
<td>Refer to &quot;SEATS, ENCLOSURE, HOOD AND CARGO BED&quot;.</td>
</tr>
<tr>
<td>3</td>
<td>Steering assembly</td>
<td>1</td>
<td>For installation, reverse the removal procedure.</td>
</tr>
</tbody>
</table>

Order Job/Part Remarks

1. Steering shaft
2. Steering joint
3. Steering assembly

- 21 Nm (2.1 m·kg, 15 ft·lb)
- 22 Nm (2.2 m·kg, 16 ft·lb)
- 39 Nm (3.9 m·kg, 28 ft·lb)
- 48 Nm (4.8 m·kg, 35 ft·lb)
Disassembling the steering assembly

1. Tie-rod end locknut
2. Tie-rod end
3. Plastic locking tie
4. Dust boot
5. Adjuster
6. Spring
7. Pressure pad
8. Oil seal
9. Circlip
10. Pinion gear
11. Circlip
12. Bearing

Order | Job/Part | Q'ty | Remarks
--- | --- | --- | ---
| Disassembling the steering assembly | | | Remove the parts in the order listed.
1 | Tie-rod end locknut | 2 | Refer to “ASSEMBLING THE STEERING ASSEMBLY”.
2 | Tie-rod end | 2 |
3 | Plastic locking tie | 2 |
4 | Dust boot | 2 |
5 | Adjuster | 1 |
6 | Spring | 1 |
7 | Pressure pad | 1 |
8 | Oil seal | 1 |
9 | Circlip | 1 |
10 | Pinion gear | 1 |
11 | Circlip | 1 |
12 | Bearing | 1 |

New

40 Nm (4.0 m·kg, 29 ft·lb)
Order | Job/Part         | Q'ty | Remarks                                                                                           
--- | ----------------- | ---  | ------------------------------------------------------------------------------------------------- 
13  | Steering assembly| 1    | Refer to “ASSEMBLING THE STEERING ASSEMBLY”. For assembly, reverse the disassembly procedure.    

40 Nm (4.0 m·kg, 29 ft·lb)
DISASSEMBLING THE STEERING ASSEMBLY
1. Remove:
   • oil seal
   • circlip
   • pinion gear with bearing

**NOTE:**
Lightly tap on the steering housing with a soft hammer to remove the pinion gear easily.

---

CHECKING THE STEERING JOINT
1. Check:
   • steering joint
     Rough movement → Replace.

CHECKING THE STEERING ASSEMBLY
1. Check:
   • pinion gear bearing
     Check the bearing movement on the pinion gear by rotating with the fingers.
     Roughness → Replace.

2. Check:
   • pinion needle bearing
     Damage → Replace.

**NOTE:**
When replacing the pinion needle bearing, it is recommended to replace the steering assembly. The steering housing may be subject to damage during removal of the pinion needle bearing.
3. Check:
   • rack gear teeth ①
   • pinion gear teeth ②
   Wear/damage → Replace the steering assembly.

   **NOTE:**
   The wear pattern on the rack and pinion gear teeth should be uniform. An uneven wear pattern may indicate improper adjustment or lack of lubrication.

4. Check:
   • pressure pad ①
     Wear/damage → Replace.
   • dust boots ②
     Damage → Replace.

5. Check:
   • tie-rod free play and movement
     Free play → Replace the tie-rod end.
     Turns roughly → Replace the tie-rod end.

6. Check:
   • tie-rods
     Bends/damage → Replace.

**ASSEMBLING THE STEERING ASSEMBLY**

1. Lubricate:
   • bearing
   • rack gear
   • pinion gear
   • oil seal

   **Recommended lubricant**
   Lithium-soap-based grease
2. Install:
   • steering assembly
   • bearing
   • circlips
   • pinion gear
   • oil seal

   **NOTE:** After centering the rack gear, make two alignment marks on the pinion gear and the steering housing to mark the position of the pinion gear. This is necessary to install the steering joint to the pinion gear properly.

3. Apply lithium-soap-based grease to the gear surface of the rack gear.

   **Lithium-soap-based grease**
   5 ~ 10 g (0.2 ~ 0.4 oz)

4. Adjust:
   • rack gear-pinion gear backlash
   a. Install the force pressure pad, spring, and adjuster.
   b. Tighten the adjuster 3.9 Nm (0.39 m·kg, 2.8 ft·lb) LOCTITE®
   c. Loosen the adjuster 15 ~ 25°.

5. Install:
   • dust boots
   • plastic locking tie
   • tie-rod end
   • tie-rod end locknut

   **40 Nm (4.0 m·kg, 29 ft·lb)**

---

**INSTALLING THE STEERING SYSTEM**

1. Adjust:
   • toe-in
   Refer to “ADJUSTING THE TOE-IN” in chapter 3.
## TIE-RODS AND STEERING KNUCKLES

### Order Job/Part Q'ty Remarks

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Removing the tie-rods and steering knuckles</strong></td>
<td></td>
<td>Remove the parts in the order listed.</td>
</tr>
<tr>
<td></td>
<td>Front wheel/brake disc</td>
<td></td>
<td>Refer to “FRONT WHEELS AND BRAKE DISCS”.</td>
</tr>
<tr>
<td>1</td>
<td>Tie-rod</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Brake disc guard</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Nut</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>O-ring</td>
<td>1</td>
<td>Refer to “REMOVING THE STEERING KNUCKLES”.</td>
</tr>
<tr>
<td>5</td>
<td>Brake hose holder bolt</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Steering knuckle</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Circlip</td>
<td>1</td>
<td>For installation, reverse the removal procedure.</td>
</tr>
<tr>
<td>8</td>
<td>Ball joint</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Rubber boot</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>
STEERING SYSTEM

REMOVING THE STEERING KNUCKLES
1. Remove:
   • steering knuckle ①

NOTE: Use a general puller to separate the ball joints ② from the steering knuckle ① or the front lower arm ③.

CHECKING THE TIE-RODS
1. Check:
   • tie-rod free play and movement
     Free play → Replace the tie-rod end.
     Turns roughly → Replace the tie-rod end.
2. Check:
   • tie-rods
     Bends/damage → Replace the steering assembly.

CHECKING THE STEERING KNUCKLES
1. Check:
   • steering knuckles
     Damage/pitting → Replace.

2. Check:
   • ball joints
     Damage/pitting → Replace the ball joint.
     Free play → Replace the ball joint.
     Turns roughly → Replace the ball joint.

a. Clean the outside of the steering knuckle.
b. Remove the steering knuckle oil seal.
c. Remove the circlip ① and rubber boot ②.
   Use the ball joint remover and installer set.
d. Install the body ③, short bolt ⑤, remover washer ⑥ and remover spacer ⑦ onto the ball joint.

**NOTE:**

- Remover washer ⑥ must be aligned with the projection on the head of the ball joint.
- Surface ⑧ of the remover spacer ⑦ must be aligned with the surface ⑨ of the steering knuckle.

e. Hold the body ③ in place while turning in the short bolt ⑤ to remove the ball joint ① from the steering knuckle.

f. Remove the ball joint remover/installer.

---

g. Install the long bolt ④, installer spacer ⑨ and installer guide ⑩ onto the body ③.
h. Attach the assembled ball joint remover/installer, new ball joint ② and installer attachment ③ to the steering knuckle ③.

**NOTE:**
Do not tap or damage the top of the ball joint.

i. Hold the body ③ in place while turning in the long bolt ② to install the new ball joint ② into the steering knuckle ③.

j. Remove the ball joint remover/installer.

k. Apply lithium-soap base grease to the new ball joint ②.

l. Install a new rubber boot and new circlip.

**NOTE:**
Always use a new ball joint set.

m. Install a steering knuckle oil seal.

---

3. Check:
- **front wheel bearings**
  Bearings allow play in the wheel hubs or the wheel turns roughly → Replace.
- **oil seals**
  Damage → Replace.

---

a. Clean the outside of the steering knuckle.

b. Remove the oil seals ①.

c. Drive out the bearings ②.

**WARNING**
Eye protection is recommended when using striking tools.

d. Remove the spacer ③.

e. Apply lithium base grease to the bearings and oil seals.

f. Install the spacer to the steering knuckle.

g. Install the new bearings.

**NOTE:**
Install the outside bearing first.

**CAUTION:**
Do not strike the center race or balls of the bearing. Contact should be made only with the outer race.
h. Install the new oil seals.

NOTE: ______________________________________

When installing the oil seals, the "seal side" of the oil seal faces out.
### FRONT ARMS AND FRONT SHOCK ABSORBERS

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Removing the front arms and front shock absorbers</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Front wheel/brake disc</td>
<td>1</td>
<td>Remove the parts in the order listed.</td>
</tr>
<tr>
<td>1</td>
<td>Brake disc guard</td>
<td>1</td>
<td>Refer to “FRONT WHEELS AND BRAKE DISCS”.</td>
</tr>
<tr>
<td>2</td>
<td>Front arm protector</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Nut</td>
<td>2</td>
<td>Refer to “REMOVING THE FRONT ARMS” and “INSTALLING THE FRONT ARMS AND FRONT SHOCK ABSORBERS”.</td>
</tr>
<tr>
<td>4</td>
<td>Bolt/nut</td>
<td>2/2</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Front lower arm/bushing/washer</td>
<td>1/2/1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Nut/bolt</td>
<td>2/2</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Front shock absorber</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Bolt/nut</td>
<td>2/2</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Front upper arm/bushing/washer</td>
<td>1/2/1</td>
<td></td>
</tr>
</tbody>
</table>

**Tightening Torque Specifications:**

- 45 Nm (4.5 m·kg, 32 ft·lb)
- 7 Nm (0.7 m·kg, 5.1 ft·lb)
- 30 Nm (3.0 m·kg, 22 ft·lb)

---

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## Order Job/Part Q'ty Remarks

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>Circlip</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Ball joint</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Rubber boot</td>
<td>1</td>
<td>For installation, reverse the removal pro-</td>
</tr>
</tbody>
</table>

For installation, reverse the removal procedure.
FRONT ARMS AND FRONT SHOCK ABSORBERS

REMOVING THE FRONT ARMS
1. Check:
   • front arm free play

   a. Check the front arm side play [A] by moving it from side to side.
   If side play is noticeable, check the bushings.

   b. Check the front arm vertical movement [B] by moving it up and down.
   If the vertical movement is tight or rough, or if there is binding, check the bushings.

2. Remove:
   • front arms

CHECKING THE FRONT ARMS
1. Check:
   • front arms
   Bends/damage → Replace.

2. Check:
   • bushings
   Wear/damage → Replace.

3. Check:
   • ball joint
   Damage/pitting → Replace the ball joint.
   Free play → Replace the ball joint.
   Turns roughly → Replace the ball joint.

   a. Clean the outside of the front upper arm.
   b. Remove the circlip [1] and rubber boot [2].
   Use the ball joint remover and installer set.
c. Install the body 3, long bolt 4, and remover washer 5 onto ball joint.

**NOTE:**
Remover washer 5 must be aligned with the projection on the head of the ball joint.

d. Hold the body 3 in place while turning in the long bolt 4 to remove the ball joint 3 from the front upper arm.

e. Remove the ball joint remover/installer.

f. Install the long bolt 4, installer spacer 6 and installer guide 7 onto the body 3.

g. Attach the assembled ball joint remover/installer, new ball joint 11 and installer attachment 7 to the front upper arm 12.

**NOTE:**
Do not tap or damage the top of the ball joint.

h. Hold the body 3 in place while turning in the long bolt 4 to install the new ball joint 11 into the front upper arm 12.

i. Remove the ball joint remover/installer.
j. Apply lithium-soap base grease to the new ball joint ③.
k. Install a new rubber boot and new circlip.

NOTE: ______________________

Always use a new ball joint set.

--------------------------------------------

CHECKING THE FRONT SHOCK ABSORBERS

1. Check:
   • shock absorber rod
     Bends/damage → Replace the shock absorber assembly.
   • shock absorber assembly
     Oil leaks → Replace the shock absorber assembly.
   • spring
     Fatigue → Replace the shock absorber assembly.
     Move the spring up and down.
INSTALLING THE FRONT ARMS AND FRONT SHOCK ABSORBERS

1. Install:
   - front arms
   - front shock absorber

a. Install the front upper arm ① and front lower arm ②.

   NOTE: Lubricate the bolts ③ with lithium-soap-based grease.
   - Be sure to position the bolts ③ so that the bolt head faces outward.
   - Temporarily tighten the nuts ④.

b. Install the front shock absorber ⑤.

   NOTE: Be sure to position the bolts ⑥ so that the bolt head faces forward.

c. Install the ball joints.

   Nut ⑦
   45 Nm (4.5 m·kg, 32 ft·lb)

d. Install the new cotter pins.

e. Tighten the nuts ④.

   Nut ④
   45 Nm (4.5 m·kg, 32 ft·lb)
REAR KNUCKLES AND STABILIZER

Order Job/Part Q'ty Remarks
--- --- --- ---
1 O-ring 1 Remove the parts in the order listed.
2 Rear knuckle 1 Refer to “REAR WHEELS AND BRAKE DISC”.
3 Spacer cover 4
4 Spacer 2
5 Stabilizer joint 2
6 Stabilizer holder 2
7 Bushing 2
8 Stabilizer 1

For installation, reverse the removal procedure.
CHECKING THE REAR KNUCKLES

1. Check:
   • rear knuckle
     Damage/pitting → Replace.

2. Check:
   • rear wheel bearings
     Bearings allow play in the wheel hubs or the wheel turns roughly → Replace.
   • oil seals
     Damage → Replace.

⚠️ WARNING
Eye protection is recommended when using striking tools.

d. Remove the spacer ③.
e. Apply lithium base grease to the bearings and oil seals.
f. Install the spacer to the rear knuckle.
g. Install the new bearings.

NOTE: ________________________
Install the outside bearing first.

⚠️ CAUTION:
Do not strike the center race or balls of the bearing. Contact should be made only with the outer race.

h. Install a new oil seal.

NOTE: ________________________
When installing the oil seals, the “seal side” of the oil seal faces out.

CHECKING THE STABILIZER

1. Check:
   • stabilizer
     Bends/cracks/damage → Replace.
INSTALLING THE STABILIZER

1. Install:
   • stabilizer ①
   • bushing ②
   • stabilizer holder ③

NOTE: 
Install the bushing with its slit ③ facing rearward.

A] Forward
REAR ARMS AND REAR SHOCK ABSORBERS

Removing the rear arms and rear shock absorbers
Rear knuckle/stabilizer

<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>Nut/bolt</td>
<td>2/2</td>
<td>Remove the parts in the order listed.</td>
</tr>
<tr>
<td>2</td>
<td>Rear upper arm/bushing</td>
<td>1/2</td>
<td>Refer to “REAR KNUCKLES AND STABILIZER”.</td>
</tr>
<tr>
<td>3</td>
<td>Nut/bolt</td>
<td>2/2</td>
<td>Refer to “INSTALLING THE REAR ARMS AND REAR SHOCK ABSORBERS”.</td>
</tr>
<tr>
<td>4</td>
<td>Rear shock absorber</td>
<td>1</td>
<td>For installation, reverse the removal pro-</td>
</tr>
<tr>
<td>5</td>
<td>Nut/bolt</td>
<td>2/2</td>
<td>cedure.</td>
</tr>
<tr>
<td>6</td>
<td>Rear lower arm/bushing</td>
<td>1/2</td>
<td></td>
</tr>
</tbody>
</table>

45 Nm (4.5 m • kg, 32 ft • lb)
REAR ARMS AND REAR SHOCK ABSORBERS

CHECKING THE REAR ARMS
1. Check:
   • rear arms ①
     Bends/damage → Replace.
2. Check:
   • bushings ②
     Wear/damage → Replace.

CHECKING THE REAR SHOCK ABSORBERS
1. Check:
   • shock absorber rod
     Bends/damage → Replace the shock absorber assembly.
   • shock absorber assembly
     Oil leaks → Replace the shock absorber assembly.
   • spring
     Move the spring up and down.
     Fatigue → Replace the shock absorber assembly.
INSTALLING THE REAR ARMS AND REAR SHOCK ABSORBERS

1. Install:
   - rear arms
   - rear shock absorber

a. Install the rear upper arm ① and rear lower arm ②.

NOTE: 
- Lubricate the bolts ③ with lithium-soap-based grease.
- Be sure to position the bolts ③ so that the bolt head faces inward.
- Temporarily tighten the nuts ④.

b. Install the rear shock absorber ⑤.

NOTE: Be sure to position the bolts ⑥ so that the bolt head faces backward.

c. Install the rear knuckle.

NOTE: Be sure to position the bolts ⑥ so that the bolt head faces forward.

d. Tighten the nuts ④.
ELECTRICAL COMPONENTS

- Diode 1
- Thermo switch 2
- Diode 2
- Circuit breaker (radiator fan motor)
- Carburetor heater
- Thermo switch 1
- Ignition coil
- Low-range switch
- High-range switch
- Neutral switch
- Reverse switch
- Parking brake switch
- Parking brake switch
- Brake light switch
- Pickup coil/stator assembly
- Speed sensor
- Gear motor
- Radiator fan
- Thermo switch 3
1. Rectifier/regulator
2. Auxiliary DC jack
3. Indicator light assembly 1
4. Indicator light assembly 2
5. On-Command four-wheel drive switch and differential gear lock switch
6. Main switch
7. Light switch
8. Four-wheel drive relay 1
9. Four-wheel drive relay 2
10. Starter relay
11. Main fuse
12. Four-wheel drive relay 3
13. Four-wheel drive indicator light relay
14. Headlight relay
15. Differential gear lock indicator light relay
16. Fuse box
17. C.D.I. unit
18. Battery
CHECKING THE SWITCHES

Use a pocket tester to check the terminals for continuity. If the continuity is faulty at any point, replace the switch.

**Pocket tester**
P/N. YU-03112-C, 90890-03112

**NOTE:**
- Set the pocket tester to “0” before starting the test.
- The pocket tester should be set to the “Ω × 1” range when testing the switch for continuity.
- Turn the switch on and off a few times when checking it.

CHECKING A SWITCH SHOWN IN THE MANUAL

The terminal connections for switches (main switch, light switch, etc.) are shown in a chart similar to the one on the left. This chart shows the switch positions in the column and the switch lead colors in the top row.

For each switch position, “○—○” indicates the terminals with continuity.

The example chart shows that:

1. There is continuity between the “Brown/Blue and Red” leads when the switch is set to “ON”.

---

**Diagram:**
- Checking the switches with a pocket tester.
- Pocket tester model and part numbers.
- **NOTE:** Setting the pocket tester and testing for continuity.
- Example chart showing switch positions and continuity.

---

**Image:**
- Diagram of a pocket tester connected to a switch, with continuity testing instructions.
CHECKING THE SWITCH CONTINUITY

Refer to “CHECKING THE SWITCHES” and check for continuity between lead terminals.

Poor connection, no continuity → Correct or replace.

* The coupler locations are circled.
CHECKING THE SWITCHES

1. Fuse
2. Brake light switch
3. On-Command four-wheel drive switch and differential gear lock switch
4. Main switch
5. Light switch
6. Parking brake switch
7. Reverse switch
8. Neutral switch
9. High-range switch
10. Low-range switch
11. Four-wheel drive switch
CHECKING THE BULBS AND BULB SOCKETS

CHECKING THE BULBS AND BULB SOCKETS

Check each bulb and bulb socket for damage or wear, proper connections, and also for continuity between the terminals.

Damage/wear → Repair or replace the bulb, bulb socket or both.
Improperly connected → Properly connect.
Incorrect continuity reading → Repair or replace the bulb, bulb socket or both.

TYPES OF BULBS

The bulbs used on this vehicle are shown in the illustration on the left.
- Bulbs A and B are used for headlights and usually use a bulb holder which must be detached before removing the bulb. The majority of these bulbs can be removed from their respective socket by turning them counterclockwise.
- Bulb C is used for turn signal and tail/brake lights and can be removed from the socket by pushing and turning the bulb counterclockwise.
- Bulbs D and E are used for meter and indicator lights and can be removed from their respective socket by carefully pulling them out.

CHECKING THE CONDITION OF THE BULBS

The following procedure applies to all of the bulbs.

1. Remove:
   - bulb
CHECKING THE BULBS AND BULB SOCKETS

WARNING

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

CAUTION:

• Be sure to hold the socket firmly when removing the bulb. Never pull the lead, otherwise it may be pulled out of the terminal in the coupler.
• Avoid touching the glass part of the headlight bulb to keep it free from oil, otherwise the transparency of the glass, the life of the bulb and the luminous flux will be adversely affected. If the headlight bulb gets soiled, thoroughly clean it with a cloth moistened with alcohol or lacquer thinner.

2. Check:
• bulb (for continuity) (with the pocket tester)
  No continuity → Replace.

Pocket tester
P/N. YU-03112-C, 90890-03112

NOTE:
Before checking for continuity, set the pocket tester to “0” and to the “Ω x 1” range.

a. Connect the tester (+) lead to terminal ① and the tester (−) lead to terminal ②, and check the continuity.
b. Connect the tester (+) lead to terminal ① and the tester (−) lead to terminal ③, and check the continuity.
c. If either of the readings indicate no continuity, replace the bulb.
CHECKING THE BULBS AND BULB SOCKETS

CHECKING THE CONDITION OF THE BULB SOCKETS
The following procedure applies to all of the bulb sockets.
1. Check:
   • bulb socket (for continuity)
     (with the pocket tester)
     No continuity → Replace.

   Pocket tester
   P/N. YU-03112-C, 90890-03112

NOTE: ________________________
Check each bulb socket for continuity in the same manner as described in the bulb section; however, note the following.

a. Install a good bulb into the bulb socket.
b. Connect the pocket tester probes to the respective leads of the bulb socket.
c. Check the bulb socket for continuity. If any of the readings indicate no continuity, replace the bulb socket.
1. A.C. magneto
2. Main switch
3. Battery
4. Main fuse
5. C.D.I. unit
6. Ignition coil
7. Spark plug
8. Ignition fuse
TROUBLESHOOTING

IF THE IGNITION SYSTEM FAILS TO OPERATE (NO SPARK OR INTERMITTENT SPARK):

Procedure
Check:
1. Fuses (main, ignition)
2. Battery
3. Spark plug
4. Ignition spark gap
5. Spark plug cap resistance
6. Ignition coil resistance
7. Main switch
8. Pickup coil resistance
9. Rotor rotation direction detection coil resistance
10. Wiring connection (the entire ignition system)

NOTE:
- Remove the following part(s) before troubleshooting:
  1) Console
  2) Footrest cover
- Use the following special tool(s) for troubleshooting.

1. Fuses (main, ignition)
   Refer to “CHECKING THE SWITCHES”.
   NO CONTINUITY
   Replace the fuse.

2. Battery
   • Check the battery condition.
     Refer to “CHECKING AND CHARGING THE BATTERY” in chapter 3.
   Open-circuit voltage
   12.8 V or more at 20 °C (68 °F)
   CORRECT
   • Clean the battery terminals.
   • Recharge or replace the battery.

Opama Pet-4000 spark checker
P/N. YM-34487
Ignition checker
P/N. 90890-06754
Pocket tester
P/N. YU-03112-C, 90890-03112
3. Spark plug

- Check the spark plug condition.
- Check the spark plug type.
- Check the spark plug gap.

Refer to "CHECKING THE SPARK PLUG" in chapter 3.

- Spark plug gap
  0.6 - 0.7 mm (0.024 - 0.028 in)

4. Ignition spark gap

- Disconnect the spark plug cap from the spark plug.
- Connect the pulse ignition spark checker as shown.
  ① Spark plug cap
  ② Spark plug
  ③ Spark plug gap

- Turn the main switch to "ON".
- Check the ignition spark gap.
- Crank the engine by pushing the starter switch, and increase the spark gap until a misfiring occurs.

- Minimum spark gap
  6.0 mm (0.24 in)

- OUT OF SPECIFICATION OR NO SPARK

- INCORRECT
  Repair or replace the spark plug.

- MEETS SPECIFICATION
  The ignition system is not faulty.
5. Spark plug cap resistance

- Remove the spark plug cap.
- Connect the pocket tester (Ω × 1k) to the spark plug cap.

- Check that the spark plug cap has the specified resistance.

**Spark plug cap resistance**
10 kΩ at 20 °C (68 °F)

MEETS SPECIFICATION

6. Ignition coil resistance

- Disconnect the ignition coil connector from the wire harness.
- Connect the pocket tester (Ω × 1) to the ignition coil.

**Primary coil resistance**
0.18 ~ 0.28 Ω at 20 °C (68 °F)

- Connect the pocket tester (Ω × 1k) to the ignition coil.

**Secondary coil resistance**
6.32 ~ 9.48 kΩ at 20 °C (68 °F)

BOTH MEET SPECIFICATION

- Connect the pocket tester (Ω × 1k) to the ignition coil.

**Tester (+) lead → Orange lead terminal**
**Tester (-) lead → Ignition coil base**

- Check that the primary coil has the specified resistance.

- Check that the secondary coil has the specified resistance.

Replace the spark plug cap.

OUT OF SPECIFICATION

Replace the ignition coil.

OUT OF SPECIFICATION
7. Main switch

Refer to "CHECKING THE SWITCHES".

INCORRECT

CORRECT

8. Pickup coil resistance

- Disconnect the A.C. magneto coupler from the wire harness.
- Connect the pocket tester (Ω x 100) to the pickup coil terminal.

**Tester (+) lead → White/Red terminal**
**Tester (−) lead → White/Green terminal**

- Check the pickup coil for the specified resistance.

**Pickup coil resistance**

459 ~ 561 Ω at 20 °C (68 °F)

MEETS SPECIFICATION

OUT OF SPECIFICATION

Replace the pickup coil/stator assembly.

9. Rotor rotation direction detection coil resistance

- Disconnect the A.C. magneto coupler from the wire harness.
- Connect the pocket tester (Ω x 1) to the rotor rotation direction detection coil terminal.

**Tester (+) lead → Red terminal**
**Tester (−) lead → White/Blue terminal**

- Check the rotor rotation direction detection coil for the specified resistance.

**Rotor rotation direction detection coil resistance**

0.070 ~ 0.086 Ω at 20 °C (68 °F)

MEETS SPECIFICATION

OUT OF SPECIFICATION

Replace the pickup coil/stator assembly.
10. Wiring connection

- Check the connections of the entire ignition system.
  Refer to “CIRCUIT DIAGRAM”.

CORRECT

Replace the C.D.I. unit.

POOR CONNECTION

Properly connect the ignition system.
STARTING CIRCUIT OPERATION

The starting circuit on this model consists of the starter motor, starter relay, brake light switch, C.D.I. unit and neutral switch. If the main switch is “START” position, the starter motor can be operated only if:

- The transmission is in neutral (the neutral switch is closed).
- The brake pedal is pressed (the brake light switch is closed).

Diagram:

1. Main fuse
2. Battery
3. Starter relay
4. Starter motor
5. Diode 1
6. Signaling system fuse
7. Brake light switch
8. Ignition fuse
9. C.D.I. unit
10. Neutral switch

A TO MAIN SWITCH
B FROM MAIN SWITCH
ELECTRIC STARTING SYSTEM

TROUBLESHOOTING

IF THE STARTER MOTOR FAILS TO OPERATE:

Procedure
Check:
1. Fuses (main, ignition, signaling system)
2. Battery
3. Starter motor
4. Starter relay
5. Main switch
6. Neutral switch
7. Brake light switch
8. Diode 1
9. Wiring connection (the entire starting system)

NOTE: ______________________ __

• Remove the following part(s) before troubleshooting:
  1) Console
• Use the following special tool(s) for troubleshooting.

Pocket tester
P/N. YU-03112-C, 90890-03112

1. Fuses (main, ignition, signaling system)
Refer to “CHECKING THE SWITCHES”.

CONTINUITY

NO CONTINUITY
Replace the fuse.

2. Battery
• Check the battery condition.
  Refer to “CHECKING AND CHARGING THE BATTERY” in chapter 3.

Open-circuit voltage
12.8 V or more at 20 °C (68 °F)

CORRECT

* INCORRECT
• Clean the battery terminals.
• Recharge or replace the battery.
3. Starter motor

- Connect the battery (+) terminal ① and starter motor lead ② using a jumper lead ③ *
- Check the operation of the starter motor.

**WARNING**
- A wire that is used as a jumper lead must have the equivalent capacity or more as that of the battery lead, otherwise the jumper lead may burn.
- This check is likely to produce sparks, so be sure that no flammable gas or fluid is in the vicinity.

4. Starter relay

- Remove the starter relay from the wire harness.
- Connect the pocket tester (Ω x 1) and the battery (12 V) to the starter relay terminals.

| Battery (+) terminal → Yellow/Blue terminal ① |
| Battery (-) terminal → Blue/Black terminal ② |
| Tester (+) lead → Red terminal ③ |
| Tester (-) lead → Black terminal ④ |
- Check the starter relay for continuity.

5. Main switch

Refer to “CHECKING THE SWITCHES”.

**CORRECT**
- Replace the main switch.
**ELECTRIC STARTING SYSTEM**

6. Neutral switch
   - Refer to “CHECKING THE SWITCHES”.
   - **CORRECT**
   - INCORRECT
     - Replace the neutral switch.

7. Brake light switch
   - Refer to “CHECKING THE SWITCHES”.
   - **CORRECT**
   - INCORRECT
     - Replace the brake light switch.

8. Diode 1
   - Remove the diode from the coupler.
   - Connect the pocket tester (Ω x 1) to the diode terminals as shown.
   - Check the diode for continuity as follows.

<table>
<thead>
<tr>
<th>Tester (+) lead → Yellow/Blue terminal</th>
<th>Tester (-) lead → Black/Yellow terminal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tester (+) lead → Yellow/Blue terminal</td>
<td>Continuity</td>
</tr>
<tr>
<td>Tester (-) lead → Black/Yellow terminal</td>
<td></td>
</tr>
<tr>
<td>Tester (+) lead → Black/Yellow terminal</td>
<td>No continuity</td>
</tr>
<tr>
<td>Tester (-) lead → Yellow/Blue terminal</td>
<td></td>
</tr>
<tr>
<td>Tester (+) lead → Blue/White terminal</td>
<td></td>
</tr>
<tr>
<td>Tester (-) lead → Yellow/Blue terminal</td>
<td></td>
</tr>
</tbody>
</table>

   ![Diode Diagram]

   **NOTE:** When you switch the tester’s positive and negative probes, the readings in the left chart will be reversed.

   INCORRECT
   - Replace the diode 1.

9. Wiring connection
   - Check the connections of the entire starting system.
   - Refer to “CIRCUIT DIAGRAM”.
   - **CORRECT**
   - POOR CONNECTION
     - Properly connect the starting system.

   Replace the C.D.I. unit.

**EB803028**
### ELECTRIC STARTING SYSTEM

#### STARTER MOTOR

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Removing the starter motor</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Starter motor lead</td>
<td>1</td>
<td>Remove the parts in the order listed.</td>
</tr>
<tr>
<td>2</td>
<td>Starter motor/O-ring</td>
<td>1/1</td>
<td>For installation, reverse the removal pro-</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>cedure.</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Disassembling the starter motor</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Bracket 1</td>
<td>1</td>
<td>Remove the parts in the order listed.</td>
</tr>
<tr>
<td>2</td>
<td>Washer</td>
<td>1</td>
<td></td>
</tr>
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<td>3</td>
<td>Shims</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Bracket 2</td>
<td>1</td>
<td></td>
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<tr>
<td>5</td>
<td>Shims</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Brush seat 1/brush seat 2</td>
<td>1/1</td>
<td>Refer to “ASSEMBLING THE STARTER MOTOR”.</td>
</tr>
<tr>
<td>7</td>
<td>Armature coil</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Yoke</td>
<td>1</td>
<td>For assembly, reverse the disassembly pro-</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>cedure.</td>
</tr>
</tbody>
</table>
ELECTRIC STARTING SYSTEM

CHECKING THE STARTER MOTOR

1. Check:
   - commutator
     Dirty → Clean it with #600 grit sandpaper.

2. Measure:
   - commutator diameter @
     Out of specification → Replace the starter motor.

3. Measure:
   - mica undercut b
     Out of specification → Scrape the mica using a hacksaw blade.

NOTE: ____________________________
Scrape the mica to the proper measurement using a hacksaw blade which has been grounded to fit the commutator.

4. Check:
   - armature coil (insulation/continuity)
     Defects → Replace the starter motor.

a. Connect the pocket tester for the continuity check ① and insulation check ②.

b. Measure the armature resistances.

Armature coil resistance
Continuity check
0.025 ~ 0.035 Ω at 20 °C (68 °F)
Insulation check
More than 1 MΩ at 20 °C (68 °F)

c. If the resistance is incorrect, replace the starter motor.

9 - 22
5. Measure:
   • brush length (each)
     Out of specification → Replace the brush.

   **Brush length**
   12.5 mm (0.49 in)
   **<Wear limit>:**
   5 mm (0.20 in)

6. Measure:
   • brush spring force
     Fatigue/out of specification → Replace as a set.

   **Brush spring force**
   7.65 ~ 10.01 N
   (780 ~ 1,021 g, 27.5 ~ 36.0 oz)

7. Check:
   • oil seal
   • bushing
   • O-rings
     Wear/damage → Replace.

---

**ASSEMBLING THE STARTER MOTOR**

1. Install:
   • brush seat 1

   **NOTE:** ______________________
   Align the projection on the brush seat 1 with the slot on the yoke.

2. Install:
   • yoke
   • brackets

   **NOTE:** ______________________
   Align the match marks on the yoke with the match marks on the brackets.
TROUBLESHOOTING

IF THE BATTERY IS NOT CHARGED:

Procedure
Check:
1. Fuse (main)
2. Battery
3. Charging voltage

4. Charging coil resistance
5. Wiring connections
   (the entire charging system)

NOTE:
• Remove the following part(s) before troubleshooting:
  1) Console
  2) Footrest cover
• Use the following special tool(s) for troubleshooting.

1. Fuse (main)
   Refer to “CHECKING THE SWITCHES”.
   Digit: tachometer
   P/N. YU-39951-B, 90890-06760
   Pocket tester
   P/N. YU-03112-C, 90890-03112

2. Battery
   • Check the battery condition.
     Refer to “CHECKING AND CHARGING THE BATTERY” in chapter 3.
   • Clean the battery terminals.
     • Recharge or replace the battery.

Open-circuit voltage
12.8 V or more at 20 °C (68 °F)

3. Charging voltage
   • Connect the engine tachometer to the spark plug lead.
   • Connect the pocket tester (DC 20 V) to the battery.

   Tester (+) lead → Battery (+) terminal
   Tester (−) lead → Battery (−) terminal
   NO CONTINUITY
   Replace the fuse.
   CONTINUITY
   CORRECT
   INCORRECT
CHARGING SYSTEM

1. Start the engine and accelerate to about 1,000 r/min.

Charging voltage 14 V at 1,000 r/min

NOTE: Use a fully charged battery.

OUT OF SPECIFICATION

MEETS SPECIFICATION

The charging circuit is not faulty.

EB804012

4. Charging coil resistance

- Disconnect the A.C. magneto coupler from the wire harness.
- Connect the pocket tester (Ω x 1) to the charging coils.

Tester (+) lead → White terminal ①
Tester (−) lead → White terminal ②

Tester (+) lead → White terminal ①
Tester (−) lead → White terminal ③

Tester (+) lead → White terminal ②
Tester (−) lead → White terminal ③

- Measure the charging coil resistance.

Charging coil resistance 0.31 ~ 0.42 Ω at 20 °C (68 °F)

OUT OF SPECIFICATION

Replace the pickup coil/stator assembly.

MEETS SPECIFICATION

EB804015

5. Wiring connections

- Check the connections of the entire charging system.
  Refer to “CIRCUIT DIAGRAM”.

POOR CONNECTION

CORRECT

Replace the rectifier/regulator.

Replace properly connect the charging system.
TROUBLESHOOTING

IF THE HEADLIGHTS AND/OR TAILLIGHTS FAIL TO COME ON:

Procedure
Check:
1. Fuses (main, lighting system)
2. Battery
3. Main switch
4. Light switch
5. Headlight relay
6. Wiring connections (the entire lighting system)

NOTE: ______________________ __

• Remove the following part(s) before troubleshooting:
  1) Console
• Use the following special tool(s) for troubleshooting.

1. Fuses (main, lighting system)
Refer to “CHECKING THE SWITCHES”.

Pocket tester
P/N. YU-03112-C, 90890-03112

2. Battery
• Check the battery condition.
  Refer to “CHECKING AND CHARGING THE BATTERY” in chapter 3.

Open-circuit voltage
12.8 V or more at 20 °C (68 °F)

3. Main switch
Refer to “CHECKING THE SWITCHES”.

4. Light switch

INCORRECT

 Replace the main switch.

CORRECT

 Replace the fuse.

INCORRECT

• Clean the battery terminals.
• Recharge or replace the battery.

CORRECT

CONTINUITY
4. Light switch
Refer to “CHECKING THE SWITCHES”.

5. Headlight relay
- Remove the headlight relay from the wire harness.
- Connect the pocket tester (Ω x 1) and the battery (12 V) to the headlight relay terminals.

| Tester (+) lead → Blue terminal | 1 |
| Tester (−) lead → Green terminal | 2 |
| Battery (+) terminal → Yellow terminal | 3 |
| Battery (−) terminal → Black terminal | 4 |
| Tester (+) lead → Blue terminal | 1 |
| Tester (−) lead → Yellow terminal | 5 |

- Check the headlight relay for continuity.

6. Wiring connection
- Check the connections of the entire lighting system.
Refer to “CIRCUIT DIAGRAM”.

**INCORRECT**
Replace the light switch.

**NO CONTINUITY**
Replace the headlight relay.

**POOR CONNECTION**
Properly connect the lighting system.

**CORRECT**
Check the condition of each of the lighting system’s circuits.
Refer to “CHECKING THE LIGHTING SYSTEM”.

---

*EB805013*
CHECKING THE LIGHTING SYSTEM

1. If the headlights fail to come on:

   1. Headlight bulb holder
      • Check the headlight bulb holder for continuity.
      
      **NOTE:** The headlight bulb cannot be removed from the headlight bulb holder. To replace the headlight bulb, replace the headlight bulb holder assembly.


      **CONTINUITY**

      NO CONTINUITY

      Replace the headlight bulb holder.

      **OUT OF SPECIFICATION**

      The wiring circuit from the main switch to the headlight bulb holder coupler is faulty, repair it.

   2. Voltage
      • Connect the pocket tester (DC 20 V) to the headlight couplers.

      **Tester (+) lead → Green terminal 1 or Yellow terminal 2**
      **Tester (-) lead → Black terminal 3**

      [Diagram of tester connection points: A. When the light switch is on "©®"; B. When the light switch is on "©".]

      • Turn the main switch to “ON”.
      • Turn the light switch to “©®” or “©”.
      • Check the voltage (12 V) of the “Green” and “Yellow” leads on the headlight bulb holder coupler.

      **MEETS SPECIFICATION**

      This circuit is not faulty.
2. If the taillights fail to come on:

1. Bulb and bulb socket
   - Check the bulb and bulb socket for continuity.

   ![Continuity Test Diagram]

   **NO CONTINUITY**
   - Replace the bulb and/or bulb socket.

   **CONTINUITY**

2. Voltage
   - Connect the pocket tester (DC 20 V) to the tail/brake light connectors.
   - **Tester (+) lead → Blue lead terminal ①**
   - **Tester (−) lead → Black lead terminal ②**

   **OUT OF SPECIFICATION**
   - The wiring circuit from the main switch to the bulb socket connector is faulty, repair it.

   **MEETS SPECIFICATION**
   - This circuit is not faulty.
1. Main switch
2. Battery
3. Main fuse
4. Brake light switch
5. Reverse switch
6. C.D.I. unit
7. Neutral switch
8. Parking brake switch
9. Thermo switch 1
10. Gear motor
11. Diode 2
12. Four-wheel drive indicator light
13. Differential gear lock indicator light
14. Coolant temperature warning light
15. Four-wheel drive indicator light relay
16. Differential gear lock indicator light relay
17. Neutral indicator light
18. Reverse indicator light
19. Parking brake indicator light
20. Signaling system fuse
21. Tail/brake light
TROUBLESHOOTING

IF A BRAKE LIGHT, AN INDICATOR LIGHT, OR THE WARNING LIGHT FAILS TO COME ON:

Procedure
Check:
1. Fuses (main, signaling system)
2. Battery
3. Main switch
4. Wiring connections
   (the entire signal system)

NOTE:
• Remove the following part(s) before troubleshooting:
  1) Console
• Use the following special tool(s) for troubleshooting.

1. Fuses (main, signaling system)
   Refer to “CHECKING THE SWITCHES”.

2. Battery
   • Check the battery condition.
     Refer to “CHECKING AND CHARGING THE BATTERY” in chapter 3.
   Open-circuit voltage
   12.8 V or more at 20 °C (68 °F)

3. Main switch
   Refer to “CHECKING THE SWITCHES”.

Pocket tester
P/N. YU-03112-C, 90890-03112

NO CONTINUITY
CONTINUITY

INCORRECT
CORRECT

Replace the fuse.

• Clean the battery terminals.
• Recharge or replace the battery.

INCORRECT
CORRECT

Replace the main switch.
4. Wiring connections

- Check the connections of the entire signal system.
  Refer to "CIRCUIT DIAGRAM".

<table>
<thead>
<tr>
<th>*</th>
<th>POOR CONNECTION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CORRECT</strong></td>
<td></td>
</tr>
</tbody>
</table>

- Check the condition of each of the signal system's circuits.
  Refer to "CHECKING THE SIGNAL SYSTEM".

Properly connect the signal system.
CHECKING THE SIGNAL SYSTEM

1. If the brake lights fail to come on:

1. Bulb and bulb socket
   • Check the bulb and bulb socket for continuity.

2. Brake light switch
   Refer to “CHECKING THE SWITCHES”.

3. Voltage
   • Connect the pocket tester (DC 20 V) to the bulb socket connector.
   Tester (+) lead → Yellow terminal ①
   Tester (−) lead → Black terminal ②

   • Turn the main switch to “ON”.
   • Press the brake pedal.
   • Check the voltage (12 V) of the “Yellow” lead on the bulb socket connector.

   NO CONTINUITY
   Replace the bulb and/or bulb socket.

   CONTINUITY
   NO CONTINUITY
   Replace the brake light switch.

   OUT OF SPECIFICATION
   The wiring circuit from the main switch to the bulb socket connector is faulty, repair it.

   MEETS SPECIFICATION
   This circuit is not faulty.
2. If the neutral indicator light fails to come on:

1. Bulb and bulb socket
   • Check the bulb and bulb socket for continuity.

2. Neutral switch
   Refer to “CHECKING THE SWITCHES”.

3. Voltage
   • Connect the pocket tester (DC 20 V) to the indicator light assembly 2 coupler.
     - Tester (+) lead → Brown terminal ①
     - Tester (–) lead → Sky blue terminal ②
   • Turn the main switch to “ON”.
   • Shift the drive select lever into the neutral position “N”.
   • Check the voltage (12 V).

   - MEETS SPECIFICATION
   - OUT OF SPECIFICATION

   This circuit is not faulty.

Replace the bulb and/or bulb socket.
Replace the neutral switch.
The wiring circuit from the main switch to the neutral switch is faulty, repair it.
3. If the parking brake indicator light fails to come on:

1. Bulb and bulb socket
   - Check the bulb and bulb socket for continuity.

   CONTINUITY

2. Parking brake switch
   Refer to “CHECKING THE SWITCHES”.

   CONTINUITY

3. Voltage
   - Connect the pocket tester (DC 20 V) to the indicator light assembly 2 coupler.

   Tester (+) lead → Brown terminal ①
   Tester (–) lead → Blue/Red terminal ②

   - Turn the main switch to “ON”.
   - Pull the parking brake lever up.
   - Check the voltage (12 V).

   MEETS SPECIFICATION

   This circuit is not faulty.

   OUT OF SPECIFICATION

   The wiring circuit from the main switch to the parking brake switch is faulty, repair it.
4. If the reverse indicator light fails to come on:

1. Bulb and bulb socket
   - Check the bulb and bulb socket for continuity.

   [Diagram: Bulb and bulb socket continuity check]

   CONTINUITY

   NO CONTINUITY

   Replace the bulb and/or bulb socket.

2. Reverse switch
   Refer to “CHECKING THE SWITCHES”.

   CONTINUITY

   NO CONTINUITY

   Replace the reverse switch.

3. Voltage
   - Connect the pocket tester (DC 20 V) to the indicator light assembly 2 coupler.

   Tester (+) lead → Brown terminal ①
   Tester (-) lead → Green/Blue terminal ②

   [Diagram: Voltage measurement setup]

   - Turn the main switch to “ON”.
   - Shift the drive select lever into the reverse gear “R”.
   - Check the voltage (12 V).

   MEETS SPECIFICATION

   OUT OF SPECIFICATION

   The wiring circuit from the main switch to the reverse switch is faulty, repair it.

   Replace the C.D.I. unit.
5. If the coolant temperature warning light does not come on when the main switch is turned to "ON", or if the coolant temperature warning light does not come on when the temperature is high (more than 117 ~ 123 °C (242.6 ~ 253.4 °F)):

1. Bulb and bulb socket
   - Check the bulb and bulb socket for continuity.

2. Thermo switch 1
   - Remove the thermo switch 1 from the cylinder head.
   - Connect the pocket tester (Ω x 1) to the thermo switch 1  
   - Immerse the thermo switch 1 in coolant.
   - Check the thermo switch 1 for continuity.
   - While heating the coolant use a thermometer to record the temperatures.

   
   ![Diagram of Thermo Switch 1 Test]

   A The thermo switch 1 circuit is open and the coolant temperature warning light is off.
   B The thermo switch 1 circuit is closed and the coolant temperature warning light is on.

<table>
<thead>
<tr>
<th>Test step</th>
<th>Coolant temperature</th>
<th>Continuity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Less than 120 ± 3 °C</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(248 ± 5.4 °F)</td>
<td>No</td>
</tr>
<tr>
<td>2</td>
<td>More than 120 ± 3 °C</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(248 ± 5.4 °F)</td>
<td>Yes</td>
</tr>
<tr>
<td>3</td>
<td>More than 113 °C</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(235.4 °F)</td>
<td>Yes</td>
</tr>
<tr>
<td>4</td>
<td>Less than 113 °C</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(235.4 °F)</td>
<td>No</td>
</tr>
</tbody>
</table>

Test steps 1 & 2: Heating phase
Test steps 3 & 4: Cooling phase

**WARNING**
Handle the thermo switch 1 with special care.
Never subject it to a strong shock or allow it to be dropped. Should it be dropped, it must be replaced.

Thermo switch 1
8 Nm (0.8 m·kg, 5.8 ft·lb)
Three bond sealoc® #10

*GOOD CONDITION*

Replace the bulb and/or bulb socket.

*BAD CONDITION*

Replace the thermo switch 1.
3. Voltage

- Connect the pocket tester (DC 20 V) to the indicator light assembly 1 coupler.

| Tester (+) lead → Brown terminal ① |
| Tester (−) lead → Frame ground |

- Turn the main switch to “ON”.
- Check the voltage (12 V).

MEETS SPECIFICATION

4. Diode 2

- Remove the diode from the coupler.
- Connect the pocket tester (Ω x 1) to the diode terminals as shown.
- Check the diode for continuity as follows.

| Tester (+) lead → Blue/Black terminal ① | Continuity |
| Tester (−) lead → White/Blue terminal ② |

| Tester (+) lead → White/Blue terminal ② | No continuity |
| Tester (−) lead → Blue/Black terminal ① |

CORRECT

Check the coolant temperature warning light circuit.

OUT OF SPECIFICATION

The wiring circuit from the main switch to the thermo switch 1 is faulty, repair it.

NOTE:

When you switch the tester's positive and negative probes, the readings in the left chart will be reversed.

INCORRECT

Replace the diode 2.
6. If the differential gear lock indicator light fails to come on:

1. Bulb and bulb socket
   • Check the bulb and bulb socket for continuity.

   ![Diagram of bulb and bulb socket](image)

   **NO CONTINUITY**
   Replace the bulb and/or bulb socket.

2. Differential gear lock indicator light relay
   • Remove the differential gear lock indicator light relay from the wire harness.
   • Connect the pocket tester (Ω × 1) and the battery (12 V) to the differential gear lock indicator light relay terminals.
   • Check the differential gear lock indicator light relay for continuity as follows.

<table>
<thead>
<tr>
<th>Tester (+) lead →</th>
<th>Continuity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black/Green terminal</td>
<td>①</td>
</tr>
<tr>
<td>Tester (−) lead →</td>
<td></td>
</tr>
<tr>
<td>Black terminal</td>
<td>②</td>
</tr>
</tbody>
</table>

   | Battery (+) terminal → |
   | Brown terminal       | ③          |
   | Battery (−) terminal → |
   | Black/Red terminal   | ④          |

   **NO CONTINUITY**
   Replace the differential gear lock indicator light relay.

3. Four-wheel drive switch
   Refer to "CHECKING THE SWITCHES".

   **NO CONTINUITY**
   Replace the gear motor.
4. Voltage

- Connect the pocket tester (DC 20 V) to the indicator light assembly 1 coupler.

Tester (+) lead → Brown terminal ①
Tester (−) lead → Black/Green terminal ②

- Turn the main switch to “ON”.
- Set the differential gear lock switch to “LOCK”.
- Check the voltage (12 V).

The wiring circuit from the main switch to the four-wheel drive switch is faulty, repair it.

Refer to “2WD/4WD SELECTING SYSTEM”.

OUT OF SPECIFICATION

MEETS SPECIFICATION
7. If the four-wheel drive indicator light fails to come on:

1. Bulb and bulb socket
   • Check the bulb and bulb socket for continuity.

2. Four-wheel drive indicator light relay
   • Remove the four-wheel drive indicator light relay from the wire harness.
   • Connect the pocket tester (Ω × 1) and the battery (12 V) to the four-wheel drive indicator light relay terminals.
   • Check the four-wheel drive indicator light relay for continuity as follows.

   | Tester (+) lead | Continuity | Tester (−) lead |
   | White/Yellow terminal | White/Black terminal |
   | Battery (+) terminal | Brown terminal |
   | Battery (−) terminal | White/Black terminal |

3. Four-wheel drive switch
   Refer to “CHECKING THE SWITCHES”.

* Replace the gear motor.
4. Voltage

- Connect the pocket tester (DC 20 V) to the indicator light assembly 1 coupler.

| Tester (+) lead → Brown terminal ① |
| Tester (−) lead → White/Yellow terminal ② |

- Turn the main switch to “ON”.
- Set the On-Command four-wheel drive switch to “4WD”.
- Check the voltage (12 V).

MEETS SPECIFICATION

Refer to “2WD/4WD SELECTING SYSTEM”.

OUT OF SPECIFICATION

The wiring circuit from the main switch to the four-wheel drive switch is faulty, repair it.
TROUBLESHOOTING

IF THE FAN MOTOR DOES NOT MOVE:

Procedure
Check:
1. Fuse (main)
2. Battery
3. Main switch
4. Radiator fan motor
5. Circuit breaker (radiator fan motor)
6. Thermo switch 3
7. Wiring connection (the entire cooling system)

NOTE:
* Remove the following part(s) before troubleshooting.
  1) Console
* Use the following special tool(s) for troubleshooting.

1. Fuse (main)
   Refer to “CHECKING THE SWITCHES”.

   ![Diagram]
   
   1. Fuse (main)
   
   NO CONTINUITY

   ![Diagram]
   
   Replace the fuse.

2. Battery
   • Check the battery condition.
     Refer to “CHECKING AND CHARGING THE BATTERY” in chapter 3.
   
   ![Diagram]
   
   Open-circuit voltage
   12.8 V or more at 20 °C (68 °F)

   ![Diagram]
   
   CORRECT

   ![Diagram]
   
   INCORRECT

   • Clean the battery terminals.
   • Recharge or replace the battery.

3. Main switch
   Refer to “CHECKING THE SWITCHES”.

   ![Diagram]
   
   CORRECT

   ![Diagram]
   
   INCORRECT

   Replace the main switch.
4. Radiator fan motor

- Disconnect the radiator fan motor coupler.
- Connect the battery (12 V) as shown.

**Battery (+) lead → Blue terminal ①**
**Battery (−) lead → Black terminal ②**

- Check the operation of the radiator fan motor.

5. Circuit breaker (radiator fan motor)

- Remove the circuit breaker from the wire harness.
- Connect the pocket tester (Ω × 1) to the circuit breaker.

**Circuit breaker resistance**
Zero Ω at 20 °C (68 °F)

- **MEETS SPECIFICATION**
- **OUT OF SPECIFICATION**

**DOES NOT TURN**
- Replace the radiator fan motor.
- Replace the circuit breaker.
6. Thermo switch 3

- Remove the thermo switch 3 from the radiator.
- Connect the pocket tester (Ω × 1) to the thermo switch 3.
- Immerse the thermo switch 3 in coolant.
- Check the thermo switch 3 for continuity. While heating the coolant use a thermometer to record the temperatures.

<table>
<thead>
<tr>
<th>Test step</th>
<th>Coolant temperature</th>
<th>Continuity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Less than 75 ± 3 °C (167 ± 5.4 °F)</td>
<td>No</td>
</tr>
<tr>
<td>2</td>
<td>More than 75 ± 3 °C (167 ± 5.4 °F)</td>
<td>Yes</td>
</tr>
<tr>
<td>3</td>
<td>More than 68 °C (154.4 °F)</td>
<td>Yes</td>
</tr>
<tr>
<td>4</td>
<td>Less than 68 °C (154.4 °F)</td>
<td>No</td>
</tr>
</tbody>
</table>

Test steps 1 & 2: Heating phase
Test steps 3 & 4: Cooling phase

**WARNING**

Handle the thermo switch 3 with special care.
Never subject it to a strong shock or allow it to be dropped. Should it be dropped, it must be replaced.

Thermo switch 3
28 Nm (2.8 m·kg, 20 ft·lb)

Replace the thermo switch 3.
7. Wiring connection

- Check the connections of the entire cooling system.
- Refer to "CIRCUIT DIAGRAM".

This circuit is not faulty.

POOR CONNECTION

CORRECT

Properly connect the cooling system.
① Main switch
② Battery
③ Main fuse
④ C.D.I. unit
⑤ Four-wheel drive relay 2
⑥ Four-wheel drive relay 1
⑦ Four-wheel drive fuse
⑧ Four-wheel drive relay 3
⑨ On-Command four-wheel drive switch and differential gear lock switch
⑩ Gear motor
TROUBLESHOOTING

IF THE FOUR-WHEEL DRIVE INDICATOR FAILS TO COME ON:

Procedure
Check:
1. Fuses (main, four-wheel drive)
2. Battery
3. Main switch
4. Four-wheel drive relay 1
5. Four-wheel drive relay 2
6. Four-wheel drive relay 3

NOTE: 
• Remove the following part(s) before troubleshooting:
  1) Console
• Use the following special tool(s) for troubleshooting.

1. Fuses (main, four-wheel drive)
   Refer to “CHECKING THE SWITCHES”.

2. Battery
   • Check the battery condition.
     Refer to “CHECKING AND CHARGING THE BATTERY” in chapter 3.
   Open-circuit voltage
   12.8 V or more at 20 °C (68 °F)

3. Main switch
   Refer to “CHECKING THE SWITCHES”.

Pocket tester
P/N. YU-03112-C, 90890-03112

7. On-Command four-wheel drive switch and differential gear lock switch
8. Gear motor
9. Wiring connections
   (the entire 2WD/4WD selecting system)

NO CONTINUITY
Replace the fuse.

INCORRECT
• Clean the battery terminals.
• Recharge or replace the battery.

CORRECT

INCORRECT
Replace the main switch.

*
4. Four-wheel drive relay 2

- Remove the four-wheel drive relay 2 from the wire harness.
- Connect the pocket tester ($\Omega \times 1$) and the battery (12 V) to the four-wheel drive relay 2 terminals.

<table>
<thead>
<tr>
<th>Tester (+) lead</th>
<th>Black/Yellow terminal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tester (−) lead</td>
<td>Black terminal</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Battery (+) terminal</th>
<th>Brown/Red terminal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Battery (−) terminal</td>
<td>Blue/Red terminal</td>
</tr>
</tbody>
</table>

- Check the four-wheel drive relay 2 for continuity.

5. Four-wheel drive relay 1

- Remove the four-wheel drive relay 1 from the wire harness.
- Connect the pocket tester ($\Omega \times 1$) and the battery (12 V) to the four-wheel drive relay 1 terminals.

<table>
<thead>
<tr>
<th>Tester (+) lead</th>
<th>Brown/Black terminal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tester (−) lead</td>
<td>Black terminal</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Battery (+) terminal</th>
<th>Brown/Red terminal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Battery (−) terminal</td>
<td>Blue/Green terminal</td>
</tr>
</tbody>
</table>

- Check the four-wheel drive relay 1 for continuity.
6. Four-wheel drive relay 3

- Remove the four-wheel drive relay 3 from the wire harness.
- Connect the pocket tester (Ω × 1) and the battery (12 V) to the four-wheel drive relay 3 terminals.

<table>
<thead>
<tr>
<th>Battery (+) terminal</th>
<th>Brown/Red terminal 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Battery (−) terminal</td>
<td>Yellow/Black terminal 2</td>
</tr>
<tr>
<td>Tester (+) lead</td>
<td>Brown terminal 3</td>
</tr>
<tr>
<td>Tester (−) lead</td>
<td>Gray terminal 4</td>
</tr>
</tbody>
</table>

- Check the four-wheel drive relay 3 for continuity.

7. On-Command four-wheel drive switch and differential gear lock switch

Refer to “CHECKING THE SWITCHES”.

---

![Diagram](image)

**CONTINUITY**

- NO CONTINUITY
  - Replace the four-wheel drive relay 3.

**INCORRECT**

- Replace the On-Command four-wheel drive switch and differential gear lock switch.

**CORRECT**
8. Gear motor

- Disconnect the gear motor coupler.
- Remove the gear motor from the differential gear case.

Refer to “FRONT CONSTANT VELOCITY JOINTS, DIFFERENTIAL GEAR AND FRONT DRIVE SHAFT” in chapter 7.
- Connect two C size batteries to the gear motor terminals ① (as shown illustrations).

A Check that the pinion gear ② turns counterclockwise.
B Check that the pinion gear ② turns clockwise.

- Make sure that the drive gear (shift fork sliding gear) operates correctly.

**NOTE:**
When installing the differential gear case in the gear motor, refer to “FRONT CONSTANT VELOCITY JOINTS, DIFFERENTIAL GEAR AND FRONT DRIVE SHAFT” in chapter 7.

INCORRECT

CORRECT

Replace the gear motor.

9. Wiring connection

- Check the connections of the entire 2WD/4WD selecting system.

Refer to “CIRCUIT DIAGRAM”.

INCORRECT

CORRECT

Replace the C.D.I. unit.

Properly connect the 2WD/4WD selecting system.
TROUBLESHOOTING

IF THE CARBURETOR HEATING SYSTEM FAILS TO OPERATE:

Procedure
Check:
1. Fuses (main, carburetor heater)
2. Battery
3. Main switch
4. Thermo switch 2
5. Carburetor heater
6. Wiring connection (the entire carburetor heating system)

NOTE:
- Remove the following part(s) before troubleshooting.
  1) Console
- Use the following special tool(s) for troubleshooting.

1. Fuses (main, carburetor heater)
   Refer to “CHECKING THE SWITCHES”.
   NO CONTINUITY
   CORRECT
   Replace the fuse.

2. Battery
   - Check the battery condition.
     Refer to “CHECKING AND CHARGING THE BATTERY” in chapter 3.
   Open-circuit voltage
   12.8 V or more at 20 °C (68 °F)
   CORRECT
   INCORRECT
   - Clean the battery terminals.
   - Recharge or replace the battery.

3. Main switch
   Refer to “CHECKING THE SWITCHES”.
   CORRECT
   Replace the main switch.

Pocket tester
P/N. YU-03112-C, 90890-03112

*
4. Thermo switch 2

- Remove the thermo switch 2 from the wire harness.
- Connect the pocket tester ($\Omega \times 1$) to the thermo switch 2 ①.
- Immerse the thermo switch 2 in a container filled with water ②.
- Place a thermometer ③ in the water.
- Slowly heat the water, then let it cool to the specified temperature as indicated in the table.
- Check the thermo switch 2 for continuity at the temperatures indicated in the table.

<table>
<thead>
<tr>
<th>Test step</th>
<th>Water temperature</th>
<th>Continuity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Less than 16 ± 3 °C (60.8 ± 5.4 °F)</td>
<td>Yes</td>
</tr>
<tr>
<td>2</td>
<td>More than 16 ± 3 °C (60.8 ± 5.4 °F)</td>
<td>No</td>
</tr>
<tr>
<td>3</td>
<td>More than 11 ± 3 °C (51.8 ± 5.4 °F)</td>
<td>No</td>
</tr>
<tr>
<td>4</td>
<td>Less than 11 ± 3 °C (51.8 ± 5.4 °F)</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Test steps 1 & 2: Heating phase
Test steps 3 & 4: Cooling phase

Replace the thermo switch 2.
5. Carburetor heater

- Remove the carburetor heater from the carburetor.
- Connect the pocket tester ($\Omega \times 1$) to the carburetor heater.

**Tester (+) lead → Carburetor heater terminal**

**Tester (−) lead → Carburetor heater body**

- Measure the carburetor heater resistance.

| Carburetor heater resistance | 6 ~ 12 $\Omega$ at 20 °C (68 °F) |

**CORRECT**

6. Wiring connection

- Check the connections on the entire carburetor heating system.
  Refer to “CIRCUIT DIAGRAM”.

**CORRECT**

This circuit is not faulty.
TROUBLESHOOTING

NOTE:
The following troubleshooting does not cover all the possible causes of trouble. It should be helpful, however, as a guide to troubleshooting. Refer to the relative procedure in this manual for check, adjustment and replacement of parts.

STARTING FAILURE/HARD STARTING

FUEL SYSTEM
Fuel tank
• Empty
• Clogged fuel filter
• Clogged fuel breather hose
• Deteriorated or contaminated fuel
Fuel pump
• Clogged fuel hose
• Damaged vacuum hose

Carburetor
• Deteriorated or contaminated fuel
• Clogged pilot jet
• Clogged pilot air passage
• Sucked-in air
• Deformed float
• Worn needle valve
• Improperly sealed valve seat
• Improperly adjusted fuel level
• Improperly set pilot jet
• Clogged starter jet
• Starter plunger malfunction

Air filter
• Clogged air filter element

ELECTRICAL SYSTEM
Spark plug
• Improper plug gap
• Worn electrodes
• Wire between terminals broken
• Improper heat range
• Faulty spark plug cap
Ignition coil
• Broken or shorted primary/secondary
• Faulty spark plug lead
• Broken body
C.D.I. system
• Faulty C.D.I. unit
• Faulty pickup coil
• Broken woodruff key

Switches and wiring
• Faulty main switch
• Broken or shorted wiring
• Faulty neutral switch
• Faulty reverse switch
• Faulty low-range switch
• Faulty high-range switch
• Faulty brake light switch

Starter motor
• Faulty starter motor
• Faulty starter relay
• Faulty starter clutch

Battery
• Faulty battery
COMPRESSION SYSTEM
Cylinder and cylinder head
- Loose spark plug
- Loose cylinder head or cylinder
- Broken cylinder head gasket
- Broken cylinder gasket
- Worn, damaged or seized cylinder

Valves, camshaft and crankshaft
- Improperly sealed valve
- Improperly contacted valve and valve seat
- Improper valve timing
- Broken valve spring
- Seized camshaft
- Seized crankshaft

Piston and piston rings
- Improperly installed piston ring
- Worn, fatigued or broken piston ring
- Seized piston ring
- Seized or damaged piston

Crankcase and crankshaft
- Improperly seated crankcase
- Seized crankshaft

Valve train
- Improperly adjusted valve clearance
- Improperly adjusted valve timing

POOR IDLE SPEED PERFORMANCE
Carburetor
- Improperly returned starter plunger
- Loose pilot jet
- Clogged pilot jet
- Clogged pilot air jet
- Improperly adjusted idle speed (throttle stop screw)
- Improper throttle cable play
- Flooded carburetor

Electrical system
- Faulty spark plug
- Faulty C.D.I. unit
- Faulty pickup coil
- Faulty charging/rotor rotation direction detection coil
- Faulty ignition coil

Valve train
- Improperly adjusted valve clearance

Air filter
- Clogged air filter element

POOR MEDIUM AND HIGH-SPEED PERFORMANCE
Carburetor
- Improper jet needle clip position
- Improperly adjusted fuel level
- Clogged or loose main jet
- Deteriorated or contaminated fuel

Air filter
- Clogged air filter element
The following conditions may indicate damaged shaft drive components:

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>Possible Causes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. A pronounced hesitation or “jerky” movement during acceleration, deceleration, or sustained speed. (This must not be confused with engine surging or transmission characteristics.)</td>
<td>A. Bearing damage.</td>
</tr>
<tr>
<td></td>
<td>B. Improper gear lash.</td>
</tr>
<tr>
<td></td>
<td>C. Gear tooth damage.</td>
</tr>
<tr>
<td></td>
<td>D. Broken drive shaft.</td>
</tr>
<tr>
<td></td>
<td>E. Broken gear teeth.</td>
</tr>
<tr>
<td></td>
<td>F. Seizure due to lack of lubrication.</td>
</tr>
<tr>
<td></td>
<td>G. Small foreign objects lodged between the moving parts.</td>
</tr>
<tr>
<td>2. A “rolling rumble” noticeable at low speed; a high-pitched whine; a “clunk” from a shaft drive component or area.</td>
<td></td>
</tr>
<tr>
<td>3. A locked-up condition of the shaft drive mechanism, no power transmitted from the engine to the front and/or rear wheels.</td>
<td></td>
</tr>
</tbody>
</table>

**NOTE:**
Areas A, B, and C above may be extremely difficult to diagnose. The symptoms are quite subtle and difficult to distinguish from normal vehicle operating noise. If there is reason to believe these components are damaged, remove the components and check them.
FAUL TV GEAR
SHIFTING! ISTRHTBGLI?

FAUL TV GEAR
SHIFTING
HARD SHIFTING
Refer to “CLUTCH SLIPPING”.

SHIFT LEVER DOES NOT MOVE
Shift drum and shift forks
• Groove jammed with impurities
• Seized shift fork
• Bent shift fork guide bar

JUMPS OUT OF GEAR
Shift forks
• Worn shift fork

FAUL TV CLUTCH PERFORMANCE

Transmission
• Seized transmission gear
• Jammed impurities
• Incorrectly assembled transmission

Shift guide
• Broken shift guide

Transmission
• Seized transmission gears

Shift drum
• Improper thrust play
• Worn shift drum groove

Transmission
• Worn gear dog

ENGINE OPERATES BUT VEHICLE WILL NOT MOVE
V-belt
• Bent, damaged or worn V-belt
• V-belt slips

Primary pulley cam and primary pulley slider
• Damaged or worn primary pulley cam
• Damaged or worn primary pulley slider

CLUTCH SLIPPING
Clutch spring
• Damaged, loose or worn clutch shoe spring

CLUTCH SHOE
• Damaged or worn clutch shoe

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 shoe
• Bent, damaged or worn clutch shoe
POOR SPEED PERFORMANCE

V-belt
- Oil or grease on the V-belt

Primary pulley weight
- Faulty operation
- Worn primary pulley weight

Primary fixed sheave
- Worn primary fixed sheave

Primary sliding sheave
- Worn primary sliding sheave

Secondary fixed sheave
- Worn secondary fixed sheave

Secondary sliding sheave
- Worn secondary sliding sheave

OVERHEATING

Ignition system
- Improper spark plug gap
- Improper spark plug heat range
- Faulty C.D.I. unit

Fuel system
- Improper carburetor main jet (improper setting)
- Improper fuel level
- Clogged air filter element

Compression system
- Heavy carbon deposit

Engine oil
- Improper oil level
- Improper oil viscosity
- Inferior oil quality

Brake
- Brake drag

Cooling system
- Low coolant level
- Clogged or damaged radiator
- Damaged or faulty water pump
- Faulty fan motor
- Faulty thermo switch

Oil cooling system
- Clogged or damaged oil cooler

FAULTY BRAKE

POOR BRAKING EFFECT

Disc brake
- Worn brake pads
- Worn disc
- Air in brake fluid
- Leaking brake fluid
- Faulty master cylinder kit cup
- Faulty caliper kit seal
- Loose union bolt
- Broken brake hose and pipe
- Oily or greasy disc/brake pads
- Improper brake fluid level

SHOCK ABSORBER MALFUNCTION

MALFUNCTION
- Bent or damaged damper rod
- Damaged oil seal lip
- Fatigued shock absorber spring
UNSTABLE HANDLING/LIGHTING SYSTEM

UNSTABLE HANDLING

Steering
- Improperly installed or bent
- Incorrect toe-in
- Bent steering shaft
- Improperly installed steering shaft
- Damaged bearing
- Bent tie-rods
- Deformed steering knuckles

Tires
- Uneven tire pressures on both sides
- Incorrect tire pressure
- Uneven tire wear

Wheels
- Deformed wheel
- Loose bearing
- Bent or loose wheel axle
- Excessive wheel runout

Frame
- Bent
- Damaged frame

LIGHTING SYSTEM

HEADLIGHTS DO NOT COME ON
- Improper bulb
- Too many electric accessories
- Hard charging (broken stator coil and/or faulty rectifier/regulator)
- Incorrect connection
- Improperly grounded
- Poor contacts (main or lights switch)
- Bulb life expired

BULB BURNT OUT
- Improper bulb
- Faulty battery
- Faulty rectifier/regulator
- Improperly grounded
- Faulty main and/or lights switch
- Bulb life expired
YXR45FAV 2006 WIRING DIAGRAM

1. A.C. magneto
2. Rectifier/regulator
3. Main switch
4. Backup fuse (odometer and clock)
5. Carburetor heater fuse
6. Battery
7. Main fuse
8. Starter relay
9. Starter motor
10. Brake light switch
11. Diode 1
12. Reverse light switch
13. C.D.I. unit
14. Ignition coil
15. Spark plug
16. Speed sensor
17. Meter assembly
18. Multi-function meter
19. Differential gear lock indicator light
20. Coolant temperature warning light
21. Reverse indicator light
22. Neutral indicator light
23. Parking brake indicator light
24. High-range indicator light
25. Low-range indicator light
26. Low-range switch
27. High-range switch
28. Neutral switch
29. Parking brake switch
30. Thermo switch 1
31. Thermo switch 2
32. Carburetor heater
33. Four-wheel drive relay 2
34. Four-wheel drive relay 1
35. Four-wheel drive fuse
36. Four-wheel drive relay 3
37. On-Command four-wheel drive switch and differential gear lock switch
38. Gear motor
39. Diode 2
40. Indicator light assembly 1
41. Four-wheel drive indicator light
42. Differential gear lock indicator light
43. Coolant temperature warning light
44. Four-wheel drive indicator light relay
45. Differential gear lock indicator light relay
46. Indicator light assembly 2
47. Neutral indicator light

COLOR CODE

B ............ Black
Br .......... Brown
G .......... Green
Gy .......... Gray
L .......... Blue
O .......... Orange
P .......... Pink
R .......... Red
Sb .......... Sky blue
W .......... White
Y .......... Yellow
B/G ......... Black/Green
B/R ......... Black/Red
B/W ......... Black/White
B/Y ......... Black/Yellow
Br/B ......... Brown/Black
Br/L ......... Brown/Blue
Br/R ......... Brown/Red
G/L ......... Green/Blue
G/R ......... Green/Red
G/W ......... Green/White
L/B ......... Blue/Black
L/G ......... Blue/Green
L/R ......... Blue/Red
L/W ......... Blue/White
L/Y ......... Blue/Yellow
O/R ......... Orange/Red
R/B ......... Red/Black
R/G ......... Red/Green
R/W ......... Red/White
R/Y ......... Red/Yellow
W/B ......... White/Black
W/G ......... White/Green
W/L ......... White/Blue
W/R ......... White/Red
W/Y ......... White/Yellow
Y/B ......... Yellow/Black
Y/L ......... Yellow/Blue

Optional
HOW TO USE THIS MANUAL

MANUAL ORGANIZATION
This manual consists of chapters for the main categories of subjects. (See “symbols”)
1st title ①: This is the title of the chapter with its symbol in the upper right corner of each page.
2nd title ②: This title indicates the section of the chapter and only appears on the first page of each section. It is located in the upper left corner of the page.
3rd title ③: This title indicates a sub-section that is followed by step-by-step procedures accompanied by corresponding illustrations.

EXPLODED DIAGRAMS
To help identify parts and clarify procedure steps, there are exploded diagrams at the start of each removal and disassembly section.
1. An easy-to-see exploded diagram ④ is provided for removal and disassembly jobs.
2. Numbers ⑤ are given in the order of the jobs in the exploded diagram. A number that is enclosed by a circle indicates a disassembly step.
3. An explanation of jobs and notes is presented in an easy-to-read way by the use of symbol marks ⑥. The meanings of the symbol marks are given on the next page.
4. A job instruction chart ⑦ accompanies the exploded diagram, providing the order of jobs, names of parts, notes in jobs, etc.
5. For jobs requiring more information, the step-by-step format supplements ⑧ are given in addition to the exploded diagram and the job instruction chart.

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Clutch housing assembly</td>
<td>Refer to &quot;PRIMARY AND SECONDARY SHEAVES&quot;, &quot;REMOVING THE CLUTCH&quot; and &quot;INSTALLING THE CLUTCH&quot;.</td>
</tr>
<tr>
<td>2</td>
<td>Basket pins</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>One-way clutch bearing</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Clutch carrier assembly</td>
<td></td>
</tr>
</tbody>
</table>

**CHECKING THE CLUTCH**
1. Check:
   - clutch housing (C)
   - basket (M)
   - one-way clutch bearing (B)
   - inner race bearing (G)

**NOTE**
- Refer to the one-way clutch assembly and clutch housing as a set.
- The one-way clutch bearing should be installed in the clutch carrier assembly with the inner race facing toward the clutch housing.
- Use a large holding tool to hold the one-way clutch bearing and clutch carrier assembly to the clutch housing and rotate it to prevent rotation.
The following symbols are not relevant to every vehicle.

Symbols ₁ to ₁₀ indicate the subject of each chapter.

₁ General information
₂ Specifications
₃ Periodic checks and adjustments
₄ Engine
₅ Cooling system
₆ Fuel system
₇ Drive train
₈ Chassis
₉ Electrical
₁₀ Troubleshooting

Symbols ₁₁ to ₁₈ indicate the following.

₁₁ Can be serviced with engine mounted
₁₂ Filling fluid
₁₃ Lubricant
₁₄ Special tool
₁₅ Torque
₁₆ Wear limit, clearance
₁₇ Engine speed
₁₈ Electrical data (Ω, V, A)

Symbols ₁₉ to ₂₄ in the exploded diagrams indicate the types of lubricants and lubrication points.

₁₉ Apply engine oil
₂₀ Apply gear oil
₂₁ Apply molybdenum disulfide oil
₂₂ Apply wheel bearing grease
₂₃ Apply lithium-soap-based grease
₂₄ Apply molybdenum disulfide grease

Symbols ₂₅ to ₂₆ in the exploded diagrams indicate where to apply a locking agent and when to install a new part.

₂₅ Apply the locking agent (LOCTITE®)
₂₆ Replace
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YXR45FW 2007 WIRING DIAGRAM
### GENERAL SPECIFICATIONS

#### Model code

<table>
<thead>
<tr>
<th>Item</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model code</td>
<td>2P54, 2P55, 2P56</td>
</tr>
</tbody>
</table>

#### Oil type or grade

<table>
<thead>
<tr>
<th>Item</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engine oil</td>
<td>API service SG type or higher, JASO standard MA</td>
</tr>
</tbody>
</table>

![Diagram of temperature range for Yamalube 4 (20W40) or SAE 20W40](image)

#### Final gear oil

- SAE 80 API GL-4 Hypoid gear oil

#### Differential gear oil

- SAE 80 API GL-5 Hypoid gear oil

#### Indicator lights

**Except for special edition models**

- Neutral indicator light: 12 V 1.7 W x 1
- Reverse indicator light: 12 V 1.7 W x 1
- Coolant temperature warning light: 12 V 1.7 W x 1
- Parking brake indicator light: 12 V 1.7 W x 1
- Four-wheel drive indicator light: 12 V 1.7 W x 1
- Differential gear lock indicator light: 12 V 1.7 W x 1

**For special edition models**

- Neutral indicator light: LED
- Reverse indicator light: LED
- Coolant temperature warning light: LED
- Parking brake indicator light: LED
- Four-wheel drive indicator: LCD
- High-range indicator light: LED
- Low-range indicator light: LED
- Differential gear lock indicator light: LED
### CHASSIS SPECIFICATIONS

<table>
<thead>
<tr>
<th>Item</th>
<th>Standard Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Front wheel</strong></td>
<td></td>
</tr>
<tr>
<td>Type</td>
<td>Panel wheel (except for special edition models)</td>
</tr>
<tr>
<td></td>
<td>Cast wheel (for special edition models)</td>
</tr>
<tr>
<td>Rim size</td>
<td>12 × 6.0 AT</td>
</tr>
<tr>
<td>Rim material</td>
<td>Steel (except for special edition models)</td>
</tr>
<tr>
<td></td>
<td>Aluminum (for special edition models)</td>
</tr>
<tr>
<td>Rim runout limit radial</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.0 mm (0.08 in)</td>
</tr>
<tr>
<td>Rim runout limit lateral</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.0 mm (0.08 in)</td>
</tr>
<tr>
<td><strong>Rear wheel</strong></td>
<td></td>
</tr>
<tr>
<td>Type</td>
<td>Panel wheel (except for special edition models)</td>
</tr>
<tr>
<td></td>
<td>Cast wheel (for special edition models)</td>
</tr>
<tr>
<td>Rim size</td>
<td>12 × 7.5 AT</td>
</tr>
<tr>
<td>Rim material</td>
<td>Steel (except for special edition models)</td>
</tr>
<tr>
<td></td>
<td>Aluminum (for special edition models)</td>
</tr>
<tr>
<td>Rim runout limit radial</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.0 mm (0.08 in)</td>
</tr>
<tr>
<td>Rim runout limit lateral</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.0 mm (0.08 in)</td>
</tr>
</tbody>
</table>

### ELECTRICAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>Item</th>
<th>Standard</th>
<th>Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Electric starter system</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type</td>
<td>Constant mesh type</td>
<td></td>
</tr>
<tr>
<td>Starter motor</td>
<td>SM-13/MITSUBA</td>
<td></td>
</tr>
<tr>
<td>Model/manufacturer</td>
<td>0.8 kW</td>
<td></td>
</tr>
<tr>
<td>Output</td>
<td>0.025 ~ 0.035 Ω at 20 °C (68 °F)</td>
<td></td>
</tr>
<tr>
<td>Armature coil resistance</td>
<td>12.5 mm (0.49 in)</td>
<td>5 mm (0.20 in)</td>
</tr>
<tr>
<td>Brush overall length</td>
<td>7.65 ~ 10.01 N</td>
<td></td>
</tr>
<tr>
<td>Spring force</td>
<td>(780 ~ 1,021 g, 27.5 ~ 36.0 oz)</td>
<td></td>
</tr>
<tr>
<td>Commutator diameter</td>
<td>28 mm (1.10 in)</td>
<td>27 mm (1.06 in)</td>
</tr>
<tr>
<td>Mica undercut</td>
<td>0.7 mm (0.03 in)</td>
<td></td>
</tr>
<tr>
<td>Starter relay</td>
<td>2768112-A/JIDECO</td>
<td></td>
</tr>
<tr>
<td>Model/manufacturer</td>
<td>180 A</td>
<td></td>
</tr>
<tr>
<td>Amperage rating</td>
<td>4.18 ~ 4.62 Ω at 20 °C (68 °F)</td>
<td></td>
</tr>
<tr>
<td>Coil winding resistance</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**ELECTRICAL SPECIFICATIONS/ TIGHTENING TORQUES**

<table>
<thead>
<tr>
<th>Item</th>
<th>Standard</th>
<th>Limit</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuel sender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model/manufacturer</td>
<td>5UG/NIPPON SEIKI</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resistance (full)</td>
<td>4 ~ 10 Ω</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resistance (Empty)</td>
<td>90 ~ 100 Ω</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Four-wheel drive indicator light relay (except for special edition models)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model/manufacturer</td>
<td>ACA22115-1/MATSUSHITA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coil resistance</td>
<td>72 ~ 88 Ω at 20 °C (68 °F)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amperage</td>
<td>20 A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Differential gear lock indicator light relay (except for special edition models)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model/manufacturer</td>
<td>ACA22115-1/MATSUSHITA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coil resistance</td>
<td>72 ~ 88 Ω at 20 °C (68 °F)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amperage</td>
<td>20 A</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**TIGHTENING TORQUES**

**CHASSIS TIGHTENING TORQUES**

<table>
<thead>
<tr>
<th>Part to be tightened</th>
<th>Thread size</th>
<th>Tightening torque</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stabilizer joint and stabilizer</td>
<td>M10</td>
<td>60 m·kg 6.0 ft·lb</td>
<td></td>
</tr>
<tr>
<td>Stabilizer joint and rear lower arm</td>
<td>M10</td>
<td>60 m·kg 6.0 ft·lb</td>
<td></td>
</tr>
<tr>
<td>Rear brake pipe and rear brake master cylinder assembly</td>
<td>M10</td>
<td>19 m·kg 1.9 ft·lb</td>
<td></td>
</tr>
<tr>
<td>Upper support frame (enclosure) and lower support frame (enclosure)</td>
<td>M8</td>
<td>26 m·kg 2.6 ft·lb</td>
<td></td>
</tr>
<tr>
<td>Headrest and upper support frame (enclosure)</td>
<td>M6</td>
<td>7 m·kg 0.7 ft·lb</td>
<td></td>
</tr>
</tbody>
</table>
CABLE ROUTING

1. Left headlight lead
2. Wire harness
3. Throttle cable
4. Brake light switch lead
5. Rectifier/regulator
6. Starter cable
7. Starter (choke) knob
8. Light switch
9. Coolant reservoir breather hose

10. Parking brake switch lead
11. Parking brake cable
12. Rear brake pipe
13. Radiator inlet hose
14. Front brake hose
15. Radiator fan motor breather hose
16. Differential gear case breather hose
A 30 ~ 60 mm (1.18 ~ 2.36 in)
B 160 ~ 190 mm (6.30 ~ 7.48 in)
C Fasten the wire harness to the frame with the plastic bands.
D Pull the excess of the hoses through the guide in the upper instrument panel so that they have no slack.
E Fasten the throttle cable, parking brake switch lead, and parking brake cable with the plastic clip.
F Fasten the throttle cable with the metal holder.
G Fasten the throttle cable to the radiator inlet hose with the plastic bands.
H 20 mm (0.79 in) or less below the end of the hose protector
I 5 mm (0.20 in) or less above the end of the hose protector
J Route the throttle cable to the inside of the radiator inlet hose.
① Parking brake cable
② Spark plug lead
③ Coolant outlet hose
④ Wire harness
⑤ Tail/brake light lead
⑥ Carburetor heater leads
⑦ Carburetor heater
⑧ Ignition coil
⑨ Ignition coil lead

A Fasten the parking brake cable with the metal holder.
B Fasten the spark plug lead to the air duct assembly 1 with a plastic band.
C Fasten the wire harness to the frame with the plastic bands.
D Pass the tail/brake light lead through the grommet (left and right).
E Fasten the coolant outlet hose and ignition coil leads with the plastic clip.
Fasten the wire harness with the plastic holders.

Push the excess tail/brake light lead into the rear fender so that there is no slack in the lead (left and right).

Fasten the tail/brake light lead with the plastic holders.

Fasten the tail/brake light lead with the plastic bands.

Fasten the wire harness with the plastic bands.
1. Main switch
2. Starter (choke) knob
3. Auxiliary DC jack
4. Starter (choke) cable
5. Auxiliary DC jack lead
6. Wire harness
7. Coolant reservoir breather hose
8. Right headlight lead
9. Radiator fan motor breather hose
10. Radiator fan motor coupler
11. Thermo switch 3
12. Differential gear case breather hose
13. Gear motor couplers
14. Coolant reservoir hose
15. Radiator outlet hose
16. Speed sensor coupler
17. A.C. magneto couplers
18. Speed sensor lead
19. Ground lead
20. Parking brake switch lead
21. Fuel sender lead
22. Reverse switch
23. Neutral switch
24. High-range switch
25. Low-range switch
26. Sub-wire harness
27. Throttle cable
28. Radiator inlet pipe
29. Rear brake pipe
30. Radiator outlet pipe
\[ \text{Brake light switch lead} \]
\[ \text{Indicator light assembly leads} \]
\[ \text{On-command four-wheel drive switch and differential gear lock switch lead} \]

\[ \text{Fasten the wire harness with the plastic bands.} \]

\[ \text{Fasten the wire harness, radiator fan motor lead, and thermo switch 3 lead to the frame with a plastic band.} \]

\[ \text{CABLE ROUTING} \]

\[ \text{30 – 60 mm (1.18 – 2.36 in)} \]

\[ \text{160 – 190 mm (6.30 – 7.48 in)} \]

\[ \text{Fasten the radiator outlet hose and coolant reservoir hose with the plastic clip.} \]

\[ \text{12 – 22 mm (0.47 – 0.87 in)} \]

\[ \text{Fasten the wire harness, starter motor lead, and ground lead to the frame with a plastic band.} \]
Fasten the wire harness, speed sensor lead, starter motor lead, and ground lead with a plastic band.

70 ~ 90 mm (2.76 ~ 3.54 in)

Fasten the thermo switch 1 lead, carburetor heater leads, starter motor lead, parking brake switch lead, A.C. magneto leads, sub-wire harness, air vent hose, and fuel sender lead with a plastic band.

40 ~ 60 mm (1.57 ~ 2.36 in)

Fasten the starter (choke) cable with a plastic band.

Fasten the sub-wire harness with the metal holder.

Fasten the A.C. magneto leads, sub-wire harness, thermo switch 1 lead, carburetor heater leads, parking brake switch lead, and fuel sender lead with a plastic band.

Fasten the throttle cable with a plastic band.
Fasten the radiator inlet pipe with a plastic band.

Fasten the rear brake pipe with a plastic band.

Fasten the radiator outlet pipe with a plastic band.

Fasten the wire harness, starter (choke) cable, starter motor lead, and ground lead with the plastic bands.

Fasten the wire harness, brake light switch lead, and starter (choke) cable with a plastic band.
1. Final gear case breather hose
2. Vacuum hose
3. Fuel hose (fuel pump to carburetor)
4. Cylinder head breather hose
5. Starter (choke) cable
6. Air vent hose
7. Rear brake hose
8. Parking brake cable
9. Wire harness
10. Fuel hoses (fuel tank to fuel pump)
11. Rear brake pipe

- Starter motor lead
- Fuel tank breather hose
- Rollover valve
A 20 ~ 30 mm (0.79 ~ 1.18 in)
B Pass the final gear case breather hose through the grommet.
C Fasten the cylinder head breather hose and starter (choke) cable with the plastic clip.
D Fasten the starter motor lead, thermo switch 1 lead, carburetor heater leads, and parking brake switch lead with a plastic band.
E Fasten the final gear case breather hose with the plastic holders.
F Pass the wire harness through the grommet.
G Fasten the wire harness with a plastic band.
H Fasten the parking brake cable and wire harness with the plastic clip.
I Fasten the parking brake cable with the metal holder.
J Fasten the wire harness and rear brake hose with a plastic band.
K Fasten the final gear case breather hose and fuel hose (fuel pump to carburetor) with the plastic clip.
L Fasten the fuel filter with a plastic band.
Fasten the fuel hose (fuel tank to fuel pump) with the plastic holders.

N Fasten the parking brake cable and final gear case breather hose with the plastic holders.

O Fasten the rear brake hose with the plastic bands.

P Less than 1 mm (0.04 in)

Q Fasten the rear brake pipe and wire harness with the plastic holder.

R 20 ~ 40°
CABLE ROUTING

① Battery
② Negative battery lead
③ Starter (choke) cable
④ Meter assembly couplers (for special edition models)
⑤ Indicator light assembly couplers (except for special edition models)
⑥ On-Command four-wheel drive switch and differential gear lock switch leads
⑦ On-Command four-wheel drive switch and differential gear lock switch
⑧ Main switch
⑨ Starter (choke) knob
⑩ Light switch
⑪ Rectifier/regulator
⑫ Differential gear case breather hose
⑬ Radiator fan motor breather hose
⑭ Left headlight lead
⑮ Throttle cable
⑯ Right headlight lead
⑰ Starter motor lead
⑱ Starter relay lead

---

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1 Four-wheel drive relay 1
2 Four-wheel drive relay 2
3 Starter relay
4 Four-wheel drive relay 3
5 Four-wheel drive indicator light relay (except for special edition models)
6 Headlight relay
7 Differential gear lock indicator light relay (except for special edition models)
8 Fuse box
9 Positive battery lead

10 Neutral indicator light (except for special edition models)
11 Reverse indicator light (except for special edition models)
12 Parking brake indicator light (except for special edition models)
13 Four-wheel drive indicator light (except for special edition models)
14 Differential gear lock indicator light (except for special edition models)
Coolant temperature indicator light (except for special edition models)
C.D.I. unit

A Fasten the wire harness and the leads of the unused couplers with a plastic band. (for special edition models)
B Fasten the wire harness with the plastic bands.

C Pass the radiator fan motor breather hose, differential gear case breather hose, coolant reservoir breather hose, and brake light switch lead through the guide.
D Pass the radiator fan motor breather hose, differential gear case breather hose, throttle cable, and brake light switch lead through the guide.
E Pass the radiator fan motor breather hose and differential gear case breather hose through the guide.
Fasten the throttle cable with the plastic holder.

Fasten the left headlight lead, differential gear case breather hose, and radiator fan motor breather hose with the plastic holder.

Fasten the left headlight lead and differential gear case breather hose with the plastic holder.

Fasten the starter motor lead and starter relay lead with the plastic holder.

Fasten the positive battery lead with the plastic holder.

4 mm (0.16 in) of clearance or more is required around the boot.

Make sure that the washer is installed on the side of the pedal assembly bracket towards the boot.

59 ~ 61 mm (2.32 ~ 2.40 in)
1. Auxiliary DC jack
2. Auxiliary DC jack lead
3. Coolant reservoir breather hose
4. Throttle cable
5. Radiator fan motor breather hose
6. Differential gear case breather hose
7. Starter (choke) knob
8. Wire harness
9. Front brake hoses
10. Coolant reservoir hose
11. Ground lead
12. Starter relay lead

A. Fasten the coolant reservoir breather hose with the plastic holders.
B. Fasten the front brake hose bushing with the plastic bands.
C. Fasten the wire harness and ground lead with a plastic band.
D. Fasten the differential gear case breather hose, coolant reservoir hose, radiator fan motor lead, and thermo switch 3 lead with the plastic holder.
CHANGING A HEADLIGHT BULB

PERIODIC CHECKS AND ADJUSTMENTS

ELECTRICAL

CHANGING A HEADLIGHT BULB

1. Lift the hood up.
2. Remove:
   • cover at the rear of the headlight

3. Remove:
   • headlight bulb holder cover

4. Remove:
   • headlight bulb holder
   • bulb

NOTE: Remove the headlight bulb holder by pushing it in and turning it counterclockwise.

WARNING

Keep flammable products and your hands away from the bulb while it is on, since it will be hot. Do not touch the bulb until it cools down.

5. Install:
   • bulb

   Secure the new bulb with the headlight bulb holder.

CAUTION:

Avoid touching the glass part of the bulb. Keep it free from oil; otherwise, the transparency of the glass, life of the bulb, and luminous flux will be adversely affected. If oil gets on the bulb, thoroughly clean it with a cloth moistened with alcohol or lacquer thinner.
6. Install:
   • headlight bulb holder
   • headlight bulb holder cover
   • cover at the rear of the headlight
7. Close the hood.
# FUEL PUMP AND FUEL TANK

## FUEL SYSTEM

### FUEL PUMP AND FUEL TANK

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Vacuum hose</td>
<td>1</td>
<td>Remove the parts in the order listed.</td>
</tr>
<tr>
<td>2</td>
<td>Fuel hose (fuel tank to fuel pump)</td>
<td>2</td>
<td>Refer to “SEATS, ENCLOSURE, HOOD AND CARGO BED” in chapter 8. (Manual No.: 2P5-F8197-10)</td>
</tr>
<tr>
<td>3</td>
<td>Fuel filter</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Fuel hose (fuel pump to carburetor)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Fuel pump</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Fuel tank breather hose</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Rollover valve</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Fuel sender</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Fuel tank stay</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

![Diagram](image)

- 30 Nm (3.0 m·kg, 22 ft·lb)
- 7 Nm (0.7 m·kg, 5.1 ft·lb)

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### Order List

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>Fuel tank cap</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Fuel tank</td>
<td>1</td>
<td>For installation, reverse the removal procedure.</td>
</tr>
</tbody>
</table>

**Note:**
- **30 Nm (3.0 m·kg, 22 ft·lb)**
- **7 Nm (0.7 m·kg, 5.1 ft·lb)**
CHASSIS

SEATS, ENCLOSURE, HOOD AND CARGO BED

FRONT GUARD AND HOOD

- 32 Nm (3.2 m·kg, 23 ft·lb)
- 59 Nm (5.9 m·kg, 43 ft·lb)
- 7 Nm (0.7 m·kg, 5.1 ft·lb)

Order | Job/Part | Q’ty | Remarks
--- | --- | --- | ---
1 | Front guard protector | 1 | Remove the parts in the order listed.
2 | Front guard | 1 | Disconnect.
3 | Headlight coupler | 2 | For installation, reverse the removal procedure.
4 | Hood | 1 |
ENCLOSURE AND SEAT BELTS

Order | Job/Part | Q'ty | Remarks
--- | --- | --- | ---
1 | Front top frame | 1 | Remove the parts in the order listed.
2 | Rear top frame | 1 |
3 | Headrest | 2 |
4 | Upper support frame | 1 |
5 | Lower support frame | 1 |
6 | Left side frame | 1 |
7 | Right side frame | 1 |
8 | Seat belt | 2 |
9 | Buckle | 2 |

For installation, reverse the removal procedure.
### FRONT AND REAR BRAKES
#### BRAKE MASTER CYLINDER

**Order**

<table>
<thead>
<tr>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Removing the brake master cylinder</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brake fluid</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Brake fluid reservoir cap</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2 Brake fluid reservoir diaphragm</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3 Brake fluid reservoir float</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4 Brake pipe</td>
<td>1</td>
<td>Disconnect.</td>
</tr>
<tr>
<td>5 Brake pipe</td>
<td>1</td>
<td>Disconnect.</td>
</tr>
<tr>
<td>6 Brake master cylinder</td>
<td>1</td>
<td>Refer to “INSTALLING THE BRAKE MASTER CYLINDER” in chapter 8. (Manual No.: 2P5-F8197-10) For installation, reverse the removal procedure.</td>
</tr>
</tbody>
</table>

**Torque Specifications**

- 19 Nm (1.9 m·kg, 13 ft·lb)
- 16 Nm (1.6 m·kg, 11 ft·lb)
ELECTRICAL COMPONENTS

ELECTRICAL

ELECTRICAL COMPONENTS

① Fuel sender
② Diode 1
③ Thermo switch 2
④ Diode 2
⑤ Circuit breaker
   (radiator fan motor)
⑥ Carburetor heater
⑦ Thermo switch 1
⑧ Ignition coil
⑨ Low-range switch
⑩ High-range switch
⑪ Neutral switch
⑫ Reverse switch
⑬ Parking brake switch
⑭ Brake light switch
⑮ Pickup coil/stator assembly
⑯ Speed sensor
⑰ Gear motor
⑱ Radiator fan
⑲ Thermo switch 3
ELECTRICAL COMPONENTS

1 Rectifier/regulator
2 Auxiliary DC jack
3 Indicator light assembly 1 (except for special edition models)
4 Indicator light assembly 2 (except for special edition models)
5 On-Command four-wheel drive switch and differential gear lock switch
6 Main switch
7 Light switch
8 Four-wheel drive relay 1
9 Four-wheel drive relay 2
10 Starter relay
11 Main fuse
12 Four-wheel drive relay 3
13 Four-wheel drive indicator light relay (except for special edition models)
14 Headlight relay
15 Differential gear lock indicator light relay (except for special edition models)
16 Fuse box
17 C.D.I. unit
18 Battery
Main switch
Backup fuse (odometer and clock)
Battery
Main fuse
Brake light switch
Reverse switch
C.D.I. unit
Multi-function meter
Differential gear lock indicator light
Coolant temperature warning light
Reverse indicator light
Neutral indicator light
Parking brake indicator light
High-range indicator light
Low-range indicator light
Low-range switch
High-range switch
Neutral switch
Parking brake switch
Fuel sender
Thermo switch 1
On-Command four-wheel drive switch and differential gear lock switch
Gear motor
Diode 2
Four-wheel drive indicator light
Differential gear lock indicator light
Coolant temperature warning light
Four-wheel drive indicator light relay
Differential gear lock indicator light relay
Neutral indicator light
Reverse indicator light
Parking brake indicator light
Signaling system fuse
Ignition fuse
Tail/brake light

A Except for special edition models
B For special edition models
   Except for special edition models (optional)
CHECKING THE SIGNALING SYSTEM

1. The fuel level gauge fails to operate.

   1. Fuel sender
      • Remove the fuel sender from the fuel tank.
      • Connect the pocket tester to the fuel sender coupler as shown.

   Positive tester probe → green ①
   Negative tester probe → black ②

   • Measure the fuel sender resistances.

   Fuel sender resistance (up position “full” ①)
      (Ω × 1)
      4 ~ 10 Ω at 20 °C
   Fuel sender resistance (down position “empty” ②)
      (Ω × 10)
      90 ~ 100 Ω at 20 °C

   • Is the fuel sender OK?

      YES
      Replace the fuel sender.

      NO

2. Voltage
   • Connect the pocket tester (DC 20 V) to the meter assembly coupler (wire harness side) as shown.

   Positive tester probe → red/white ①
   Negative tester probe → black ②

   • Set the main switch to “ON”.
   • Measure the voltage (DC 12 V) of red/white ① on the meter assembly coupler (wire harness side).
   • Is the voltage within specification?

      YES
      Replace the meter assembly.

      NO
      Check the wiring connections of the entire signaling system.
YXR45FW 2007 WIRING DIAGRAM

1. A.C. magneto
2. Rectifier/regulator
3. Main switch
4. Backup fuse (odometer and clock)
5. Carburetor heater fuse
6. Battery
7. Main fuse
8. Starter relay
9. Starter motor
10. Brake light switch
11. Diode 1
12. Reverse switch
13. C.D.I. unit
14. Ignition coil
15. Spark plug
16. Speed sensor
17. Meter assembly
18. Multi-function meter
19. Differential gear lock indicator light
20. Coolant temperature warning light
21. Reverse indicator light
22. Neutral indicator light
23. Parking brake indicator light
24. High-range indicator light
25. Low-range indicator light
26. Low-range switch
27. High-range switch
28. Neutral switch
29. Parking brake switch
30. Fuel sender
31. Thermo switch 1
32. Thermo switch 2
33. Carburetor heater
34. Four-wheel drive relay 2
35. Four-wheel drive relay 1
36. Four-wheel drive fuse
37. Four-wheel drive relay 3
38. On-Command four-wheel drive switch and differential gear lock switch
39. Gear motor
40. Diode 2
41. Indicator light assembly 1
42. Four-wheel drive indicator light
43. Differential gear lock indicator light
44. Coolant temperature warning light
45. Four-wheel drive indicator light relay
46. Differential gear lock indicator light relay
47. Indicator light assembly 2

COLOR CODE

- B .......... Black
- Br .......... Brown
- G .......... Green
- Gy .......... Gray
- L .......... Blue
- Lg .......... Light green
- O .......... Orange
- P .......... Pink
- R .......... Red
- Sb .......... Sky blue
- W .......... White
- Y .......... Yellow
- B/G .......... Black/Green
- B/R .......... Black/Red
- B/W .......... Black/White
- B/Y .......... Black/Yellow
- Br/B .......... Brown/Black
- Br/L .......... Brown/Blue
- Br/R .......... Brown/Red
- G/I .......... Green/Blue
- G/R .......... Green/Red
- G/W .......... Green/White
- G/Y .......... Green/Yellow
- L/B .......... Blue/Black
- L/G .......... Blue/Gray
- L/R .......... Blue/Red
- L/W .......... Blue/White
- L/Y .......... Blue/Yellow
- O/R .......... Orange/Red
- R/B .......... Red/Black
- R/G .......... Red/Green
- R/W .......... Red/White
- R/Y .......... Red/Yellow
- W/B .......... White/Black
- W/G .......... White/Gray
- W/L .......... White/Blue
- W/R .......... White/Red
- W/Y .......... White/Yellow
- Y/B .......... Yellow/Black
- Y/L .......... Yellow/Blue
HOW TO USE THIS MANUAL

MANUAL ORGANIZATION

This manual consists of chapters for the main categories of subjects. (See “symbols”)
1st title (1): This is the title of the chapter with its symbol in the upper right corner of each page.
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EXPLODED DIAGRAMS

To help identify parts and clarify procedure steps, there are exploded diagrams at the start of each removal and disassembly section.
1. An easy-to-see exploded diagram (3) is provided for removal and disassembly jobs.
2. Numbers (5) are given in the order of the jobs in the exploded diagram. A number that is enclosed by a circle indicates a disassembly step.
3. An explanation of jobs and notes is presented in an easy-to-read way by the use of symbol marks (6). The meanings of the symbol marks are given on the next page.
4. A job instruction chart (7) accompanies the exploded diagram, providing the order of jobs, names of parts, notes in jobs, etc.
5. For jobs requiring more information, the step-by-step format supplements (8) are given in addition to the exploded diagram and the job instruction chart.

---

CLUTCH

Removing the clutch
Remove the primary and secondary sheaves, clutch housing assembly, clutch carrier assembly, gasket/dowel pin, one-way clutch bearing, clutch bearing assembly.

Checking the clutch
Check:
- Heat damage/wear/damage
- Replace.
- One-way clutch bearing
- Replace.

NOTE:
- Always check the clutch carrier assembly and clutch housing assembly.
- The one-way clutch bearing should be installed in the clutch carrier assembly with the arrow mark facing toward the clutch housing.

---

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---

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**SYMBOLS**

The following symbols are not relevant to every vehicle.

Symbols ① to ⑪ indicate the subject of each chapter.

- ① General information
- ② Specifications
- ③ Periodic checks and adjustments
- ④ Engine
- ⑤ Cooling system
- ⑥ Carburetion
- ⑦ Drive train
- ⑧ Chassis
- ⑨ Electrical
- ⑩ Troubleshooting

Symbols ⑫ to ⑯ indicate the following:

- ⑫ Can be serviced with engine mounted
- ⑬ Filling fluid
- ⑭ Lubricant
- ⑮ Special tool
- ⑯ Torque
- ⑰ Wear limit, clearance
- ⑱ Engine speed
- ⑲ Electrical data (Ω, V, A)

Symbols ⑳ to ㉑ in the exploded diagrams indicate the types of lubricants and lubrication points.

- ⑳ Apply engine oil
- ㉑ Apply gear oil
- ㉒ Apply molybdenum disulfide oil
- ㉓ Apply brake fluid
- ㉔ Apply wheel bearing grease
- ㉕ Apply lithium-soap-based grease
- ㉖ Apply molybdenum disulfide grease
- ㉗ Apply silicone grease

Symbols ㉘ to ㉙ in the exploded diagrams indicate where to apply a locking agent ㉘ and when to install a new part ㉚.

- ㉘ Apply the locking agent (LOCTITE®)
- ㉙ Replace

- ㉚ Replace
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   TIGHTENING TORQUES ............................................................................ 1
      CHASSIS TIGHTENING TORQUES ............................................ 1

CHASSIS ........................................................................................................ 2
   SEATS, ENCLOSURE, HOOD AND CARGO BED .................................. 2
   SEATS, CONSOLE AND INSTRUMENT PANELS ............................... 2
   SIDE DOORS ........................................................................................... 4
# General Specifications/Tightening Torques

## General Specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model code</td>
<td>2P5A, 2P5C, 2P5D</td>
</tr>
</tbody>
</table>

## Tightening Torques

### Chassis Tightening Torques

<table>
<thead>
<tr>
<th>Part to be tightened</th>
<th>Thread size</th>
<th>Tightening torque</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Passenger seat and passenger handhold bracket</td>
<td>M6</td>
<td>8</td>
<td>5.8</td>
</tr>
<tr>
<td>Passenger handhold strap and passenger handhold bracket</td>
<td>M6</td>
<td>7</td>
<td>5.1</td>
</tr>
<tr>
<td>Handle latch and side door</td>
<td>M5</td>
<td>5</td>
<td>3.6</td>
</tr>
<tr>
<td>Side door bracket and side door</td>
<td>M6</td>
<td>7</td>
<td>5.1</td>
</tr>
<tr>
<td>Frame and hinge</td>
<td>M8</td>
<td>23</td>
<td>17</td>
</tr>
<tr>
<td>Frame and latch</td>
<td>M6</td>
<td>8</td>
<td>5.8</td>
</tr>
</tbody>
</table>
Removing the seats, console and instrument panels

<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>Driver seat</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Passenger seat</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Air intake duct</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Console</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Steering wheel cover</td>
<td>1</td>
<td>Disconnect.</td>
</tr>
<tr>
<td>6</td>
<td>Steering wheel</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Pedal cover</td>
<td>1</td>
<td>Disconnect.</td>
</tr>
<tr>
<td>8</td>
<td>Light switch coupler</td>
<td>1</td>
<td>Disconnect.</td>
</tr>
<tr>
<td>9</td>
<td>Main switch coupler</td>
<td>1</td>
<td>Disconnect.</td>
</tr>
<tr>
<td>10</td>
<td>On-Command four-wheel drive switch and differential gear lock switch</td>
<td>2</td>
<td>Disconnect.</td>
</tr>
<tr>
<td>11</td>
<td>Indicator/warning light coupler</td>
<td>2</td>
<td>Disconnect.</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>12</td>
<td>Auxiliary DC jack connector</td>
<td>2</td>
<td>Disconnect.</td>
</tr>
<tr>
<td>13</td>
<td>Nut/starter cable</td>
<td>1/1</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Upper instrument panel</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Lower instrument panel</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Passenger handhold strap</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Passenger handhold grip</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Passenger handhold bracket</td>
<td>1</td>
<td>For installation, reverse the removal procedure.</td>
</tr>
</tbody>
</table>
## SIDE DOORS

### Order

<table>
<thead>
<tr>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Removing the side doors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Rubber protector</td>
<td>2</td>
<td>Remove the parts in order listed. The following procedure applies to both of the side doors.</td>
</tr>
<tr>
<td>2 Side door</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3 Handle latch</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4 Side door bracket</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>5 Hinge</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6 Latch</td>
<td>1</td>
<td>For installation, reverse the removal procedure.</td>
</tr>
</tbody>
</table>
HOW TO USE THIS MANUAL

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4. A job instruction chart ① accompanies the exploded diagram, providing the order of jobs, names of parts, notes in jobs, etc.
5. For jobs requiring more information, the step-by-step format supplements ③ are given in addition to the exploded diagram and the job instruction chart.

---

**Removing the Clutch**
1. Remove:
   - clutch housing assembly
   - gasket
   - pin
   - bearing
   - carrier assembly
   - nut

   1/4 turn. Remove them after all of them are loosened.

2. Straighten:
   - punched portion of the nut ③

3. Remove:
   - clutch carrier assembly

   WARNING
   The clutch carrier assembly nut has left-hand threads. To loosen the clutch carrier assembly nut turn it clockwise.

   TIP
   Use a clutch holding tool to hold the clutch carrier assembly.

---

**Job Instruction Chart**

<table>
<thead>
<tr>
<th>Order</th>
<th>Job</th>
<th>Part</th>
<th>Qty.</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Remove the clutch Primary and secondary sheaves</td>
<td>1</td>
<td>1</td>
<td>Refer to “PRIMAR AND SECONDARY BRACKETS”.</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>2</td>
<td>1</td>
<td>Refer to “REMOVING THE CLUTCH”.</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>3</td>
<td>1</td>
<td>INSTALLING THE CLUTCH”.</td>
</tr>
</tbody>
</table>

For installation, reverse the removal procedure.

---

**Exploded Diagram**

[Diagram showing clutch components and removal process]
SYMBOLS

The following symbols are not relevant to every vehicle.

Symbols ① to ⑩ indicate the subject of each chapter.

① General information
  ② Specifications
  ③ Periodic checks and adjustments
  ④ Engine
  ⑤ Cooling system
  ⑥ Fuel system
  ⑦ Drive train
  ⑧ Chassis
  ⑨ Electrical
  ⑩ Troubleshooting

Symbols ⑪ to ⑮ indicate the following

⑪ Can be serviced with engine mounted
⑫ Filling fluid
⑬ Lubricant
⑭ Special tool
⑮ Torque
⑯ Wear limit, clearance
⑰ Engine speed
⑱ Electrical data (Ω, V, A)

Symbols ⑯ to ⑸ in the exploded diagrams indicate the types of lubricants and lubrication points.

⑲ Apply engine oil
⑳ Apply gear oil
⑴ Apply molybdenum disulfide oil
⑵ Apply brake fluid
⑶ Apply wheel bearing grease
⑷ Apply lithium-soap-based grease
⑸ Apply molybdenum disulfide grease
⑹ Apply silicone grease

Symbols ⑷ to ⑹ in the exploded diagrams indicate where to apply a locking agent ⑷ and when to install a new part ⑸.

⑸ Apply the locking agent (LOCTITE®)
⑹ Replace
CONTENTS

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ENGINE

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CIRCUIT DIAGRAM ...................................................................... 7
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## GENERAL SPECIFICATIONS

### SPECIFICATIONS

<table>
<thead>
<tr>
<th>Item</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model code</td>
<td>2P5F, 2P5G</td>
</tr>
<tr>
<td><strong>Basic weight</strong></td>
<td></td>
</tr>
<tr>
<td>With oil and full fuel tank</td>
<td>509 kg (1,122 lb)</td>
</tr>
<tr>
<td><strong>Oil type or grade</strong></td>
<td></td>
</tr>
<tr>
<td>Engine oil</td>
<td>SAE80 API GL-4 Hypoid gear oil</td>
</tr>
<tr>
<td>API service SG type or higher, JASO standard MA</td>
<td></td>
</tr>
<tr>
<td>YAMALUBE 4 (10W-40) or SAE 10W-40</td>
<td></td>
</tr>
<tr>
<td>YAMALUBE 4-CW (5W-30) or SAE 5W-30</td>
<td></td>
</tr>
<tr>
<td>Final gear oil</td>
<td>SAE80 API GL-4 Hypoid gear oil</td>
</tr>
<tr>
<td>Differential gear oil</td>
<td>SAE80 API GL-5 Hypoid gear oil</td>
</tr>
<tr>
<td><strong>Chassis</strong></td>
<td></td>
</tr>
<tr>
<td>Frame type</td>
<td>Steel tube frame</td>
</tr>
<tr>
<td>Caster angle</td>
<td>5.0°</td>
</tr>
<tr>
<td>Camber angle</td>
<td>0°</td>
</tr>
<tr>
<td>Kingpin angle</td>
<td>11.8°</td>
</tr>
<tr>
<td>Kingpin offset</td>
<td>0 mm (0 in)</td>
</tr>
<tr>
<td>Trail</td>
<td>26 mm (1.02 in)</td>
</tr>
<tr>
<td>Tread (STD)</td>
<td></td>
</tr>
<tr>
<td>front</td>
<td>1,115 mm (43.90 in)</td>
</tr>
<tr>
<td>rear</td>
<td>1,105 mm (43.50 in)</td>
</tr>
<tr>
<td>Toe-in</td>
<td>15 ~ 25 mm (0.59 ~ 0.98 in)</td>
</tr>
<tr>
<td><strong>Tire pressure (cold tire)</strong></td>
<td></td>
</tr>
<tr>
<td>Maximum load*</td>
<td>398 kg (877 lb)</td>
</tr>
<tr>
<td>Off-road riding</td>
<td></td>
</tr>
<tr>
<td>front</td>
<td>63 ~ 77 kPa (0.63 ~ 0.77 kgf/cm², 9 ~ 11 psi)</td>
</tr>
<tr>
<td>rear</td>
<td>91 ~ 105 kPa (0.91 ~ 1.05 kgf/cm², 13 ~ 15 psi)</td>
</tr>
<tr>
<td>* Load is total weight of cargo, operator, passenger, accessories and tongue weight</td>
<td></td>
</tr>
<tr>
<td><strong>Headlight type</strong></td>
<td></td>
</tr>
<tr>
<td>Krypton bulb</td>
<td></td>
</tr>
<tr>
<td><strong>Indicator lights</strong></td>
<td></td>
</tr>
<tr>
<td>Neutral indicator light</td>
<td>12 V 1.7 W × 1</td>
</tr>
<tr>
<td>Reverse indicator light</td>
<td>12 V 1.7 W × 1</td>
</tr>
<tr>
<td>Coolant temperature warning light</td>
<td>12 V 1.7 W × 1</td>
</tr>
<tr>
<td>Parking brake indicator light</td>
<td>12 V 1.7 W × 1</td>
</tr>
<tr>
<td>Four-wheel drive indicator light</td>
<td>12 V 1.7 W × 1</td>
</tr>
<tr>
<td>Differential gear lock indicator light</td>
<td>12 V 1.7 W × 1</td>
</tr>
<tr>
<td>Helmet/seat belt indicator light</td>
<td>12 V 1.7 W × 1</td>
</tr>
</tbody>
</table>
### CHASSIS SPECIFICATIONS

<table>
<thead>
<tr>
<th>Item</th>
<th>Standard</th>
<th>Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Front wheel</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type</td>
<td>Panel wheel</td>
<td>----</td>
</tr>
<tr>
<td>Rim size</td>
<td>12 x 6.0 AT</td>
<td>----</td>
</tr>
<tr>
<td>Rim material</td>
<td>Steel</td>
<td>----</td>
</tr>
<tr>
<td>Rim runout limit radial</td>
<td>----</td>
<td>2.0 mm (0.08 in)</td>
</tr>
<tr>
<td>lateral</td>
<td>----</td>
<td>2.0 mm (0.08 in)</td>
</tr>
<tr>
<td><strong>Rear wheel</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type</td>
<td>Panel wheel</td>
<td>----</td>
</tr>
<tr>
<td>Rim size</td>
<td>12 x 7.5 AT</td>
<td>----</td>
</tr>
<tr>
<td>Rim material</td>
<td>Steel</td>
<td>----</td>
</tr>
<tr>
<td>Rim runout limit radial</td>
<td>----</td>
<td>2.0 mm (0.08 in)</td>
</tr>
<tr>
<td>lateral</td>
<td>----</td>
<td>2.0 mm (0.08 in)</td>
</tr>
</tbody>
</table>

### ENGINE TIGHTENING TORQUES

<table>
<thead>
<tr>
<th>Part to be tightened</th>
<th>Part name</th>
<th>Thread size</th>
<th>Q'ty</th>
<th>Tightening torque</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Universal joint yoke (middle driven pinion gear)</td>
<td>Nut</td>
<td>M16</td>
<td>150</td>
<td>15.0</td>
</tr>
</tbody>
</table>
### MIDDLE GEAR

#### MIDDLE DRIVE SHAFT

<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Drive shaft coupling</td>
<td>1</td>
<td>Remove the parts in the order listed. Refer to “CRANKCASE” in chapter 4. (Manual No.: 2P5-F8197-10)</td>
</tr>
<tr>
<td>2</td>
<td>Circlip</td>
<td>2</td>
<td>Refer to “REMOVING THE MIDDLE DRIVE SHAFT” and “INSTALLING THE MIDDLE DRIVE SHAFT” in chapter 4. (Manual No.: 2P5-F8197-10)</td>
</tr>
<tr>
<td>3</td>
<td>Bearing</td>
<td>2</td>
<td>Refer to “SELECTING THE MIDDLE DRIVE AND DRIVEN GEAR SHIMS” in chapter 4. (Manual No.: 2P5-F8197-10)</td>
</tr>
<tr>
<td>4</td>
<td>Universal joint</td>
<td>1</td>
<td>Refer to “REMOVING THE MIDDLE DRIVE SHAFT” and “INSTALLING THE MIDDLE DRIVE SHAFT” in chapter 4. (Manual No.: 2P5-F8197-10)</td>
</tr>
<tr>
<td>5</td>
<td>Universal joint yoke</td>
<td>1</td>
<td>Refer to “REMOVING THE MIDDLE DRIVE SHAFT” and “INSTALLING THE MIDDLE DRIVE SHAFT” in chapter 4. (Manual No.: 2P5-F8197-10)</td>
</tr>
<tr>
<td>6</td>
<td>Bearing housing</td>
<td>1</td>
<td>Refer to “REMOVING THE MIDDLE DRIVE SHAFT” and “INSTALLING THE MIDDLE DRIVE SHAFT” in chapter 4. (Manual No.: 2P5-F8197-10)</td>
</tr>
<tr>
<td>7</td>
<td>Shim</td>
<td>1</td>
<td>Refer to “REMOVING THE MIDDLE DRIVE SHAFT” and “INSTALLING THE MIDDLE DRIVE SHAFT” in chapter 4. (Manual No.: 2P5-F8197-10)</td>
</tr>
<tr>
<td>8</td>
<td>Middle driven pinion gear</td>
<td>1</td>
<td>Refer to “REMOVING THE MIDDLE DRIVE SHAFT” and “INSTALLING THE MIDDLE DRIVE SHAFT” in chapter 4. (Manual No.: 2P5-F8197-10)</td>
</tr>
<tr>
<td>9</td>
<td>Bearing retainer</td>
<td>1</td>
<td>Refer to “REMOVING THE MIDDLE DRIVE SHAFT” and “INSTALLING THE MIDDLE DRIVE SHAFT” in chapter 4. (Manual No.: 2P5-F8197-10)</td>
</tr>
</tbody>
</table>

**Remarks**

- 97 Nm (9.7 m·kg, 70 ft·lb)
- 80 Nm (8.0 m·kg, 58 ft·lb)
- 110 Nm (11.0 m·kg, 80 ft·lb)
- 25 Nm (2.5 m·kg, 18 ft·lb)
- 150 Nm (15.0 m·kg, 110 ft·lb)
<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>Damper cam</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Spring</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Gear coupling</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Bearing retainer</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Middle drive shaft</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>
### CHASSIS

#### SEATS, ENCLOSURE, HOOD AND CARGO BED

#### SEATS, CONSOLE AND INSTRUMENT PANELS

<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>Driver seat</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Passenger seat</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Air intake duct</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Console</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Steering wheel cover</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Steering wheel</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Pedal cover</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Light switch coupler</td>
<td>1</td>
<td>Disconnect.</td>
</tr>
<tr>
<td>9</td>
<td>Main switch coupler</td>
<td>1</td>
<td>Disconnect.</td>
</tr>
<tr>
<td>10</td>
<td>On-Command four-wheel drive switch and</td>
<td>2</td>
<td>Disconnect.</td>
</tr>
<tr>
<td></td>
<td>differential gear lock switch</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Indicator/warning light coupler</td>
<td>2</td>
<td>Disconnect.</td>
</tr>
<tr>
<td>12</td>
<td>Helmet/seat belt indicator light coupler</td>
<td>1</td>
<td>Disconnect.</td>
</tr>
</tbody>
</table>

Removal Procedure:

1. **Removing the seats, console and instrument panels**
   - Order the parts in the following sequence:
     - Driver seat
     - Passenger seat
     - Air intake duct
     - Console
     - Steering wheel cover
     - Steering wheel
     - Pedal cover
     - Light switch coupler
     - Main switch coupler
     - On-Command four-wheel drive switch and differential gear lock switch
     - Indicator/warning light coupler
     - Helmet/seat belt indicator light coupler
   - Remove the parts in the order listed.

- **Torque Specifications**:
  - 7 Nm (0.7 m·kg, 5.1 ft·lb)
  - 8 Nm (0.8 m·kg, 5.8 ft·lb)
  - 35 Nm (3.5 m·kg, 25 ft·lb)
<table>
<thead>
<tr>
<th>Order</th>
<th>Job/Part</th>
<th>Q’ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>Auxiliary DC jack coupler</td>
<td>1</td>
<td>Disconnect.</td>
</tr>
<tr>
<td>14</td>
<td>Nut/starter cable</td>
<td>1/1</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Upper instrument panel</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Lower instrument panel</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Passenger handhold strap</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Passenger handhold grip</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Passenger handhold bracket</td>
<td>1</td>
<td>For installation, reverse the removal proce-</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>dure.</td>
</tr>
</tbody>
</table>
③ Main switch
④ Backup fuse (odometer and clock)
⑤ Battery
⑥ Main fuse
⑦ Brake light switch
⑧ Reverse switch
⑨ C.D.I. unit
⑩ Multi-function meter
⑪ Differential gear lock indicator light
⑫ Coolant temperature warning light
⑬ Reverse indicator light
⑭ Neutral indicator light
⑮ Parking brake indicator light
⑯ High-range indicator light
⑰ Low-range indicator light
⑱ Low-range switch
⑲ High-range switch
⑳ Neutral switch
⑴ Parking brake switch
⑵ Fuel sender
⑶ Thermo switch 1
⑷ On-Command four-wheel drive switch and differential gear lock switch
⑸ Gear motor
⑹ Diode 2
⑺ Four-wheel drive indicator light
⑻ Differential gear lock indicator light
⑼ Coolant temperature warning light
⑽ Four-wheel drive indicator light relay
⑾ Differential gear lock indicator light relay
⑿ Neutral indicator light
⒀ Reverse indicator light
⒁ Parking brake indicator light
⒂ Signaling system fuse
⒃ Ignition fuse
⒄ Tail/brake light
⒅ Helmet/seat belt indicator light

A For USA
B For CDN
CHECKING THE SIGNALING SYSTEM

1. The helmet/seat belt indicator light fails to come on.
   1. Helmet/seat belt indicator light bulb and bulb socket
      • Check the helmet/seat belt indicator light bulb and bulb socket for continuity. Refer to “CHECKING THE BULBS AND BULB SOCKETS” in chapter 9. (Manual No.: 2P5-F8197-10)
      • Are the helmet/seat belt indicator light bulb and bulb socket OK?

         YES
         NO

Replace the helmet/seat belt indicator light bulb, bulb socket or both.

2. Voltage
   • Connect the pocket tester (DC 20 V) to the helmet/seat belt indicator light coupler (wire harness side) as shown.

   Positive tester probe → brown ①
   Negative tester probe → black ②

   • Set the main switch to “ON”.
   • Measure the voltage (12 V) of brown ① on the helmet/seat belt indicator light coupler (wire harness side).
   • Is the voltage within specification?
YXR45FY 2009 WIRING DIAGRAM

1. A.C. magneto
2. Rectifier/regulator
3. Main switch
4. Backup fuse (odometer and clock)
5. Carburetor heater fuse
6. Battery
7. Main fuse
8. Starter relay
9. Starter motor
10. Brake light switch
11. Diode 1
12. Reverse switch
13. C.D.I. unit
14. Ignition coil
15. Spark plug
16. Speed sensor
17. Meter assembly
18. Differential meter indicator light
19. Multi-function meter
20. Differential gear lock indicator light
21. Coolant temperature warning light
22. Reverse indicator light
23. Neutral indicator light
24. Parking brake indicator light
25. High-range indicator light
26. Low-range indicator light
27. Reverse indicator light
28. Neutral switch
29. Parking brake switch
30. Fuel sender
31. Thermo switch 1
32. Thermo switch 2
33. Carburetor heater
34. Four-wheel drive relay 2
35. Four-wheel drive relay 1
36. Four-wheel drive fuse
37. Four-wheel drive relay 3
38. On-Command four-wheel drive switch and differential gear lock switch
39. Gear motor
40. Diode 2
41. Indicator light assembly 1
42. Four-wheel drive indicator light
43. Differential gear lock indicator light
44. Coolant temperature warning light
45. Four-wheel drive indicator light relay
46. Differential gear lock indicator light relay
47. Indicator light assembly 2

COLOR CODE
B ........ Black
Br .......... Brown
G .......... Green
Gy ........ Gray
L .......... Blue
Lg .......... Light green
O .......... Orange
P .......... Pink
R .......... Red
Sb .......... Sky blue
W .......... White
Y .......... Yellow
B/G ......... Black/Green
B/R ......... Black/Red
B/W ......... Black/White
B/Y ......... Black/Yellow
Br/B ......... Brown/Black
Br/L ......... Brown/Blue
Br/R ......... Brown/Red
G/L ......... Green/Blue
G/R ......... Green/Red
G/W ......... Green/White
G/Y ......... Green/Yellow
L/B ......... Blue/Black
L/G ......... Blue/Green
L/R ......... Blue/Red
L/W ......... Blue/White
L/Y ......... Blue/Yellow
O/R ......... Orange/Red
R/B ......... Red/Black
R/G ......... Red/Green
R/W ......... Red/White
R/Y ......... Red/Yellow
W/B ......... White/Black
W/G ......... White/Blue
W/L ......... White/Blue
W/R ......... White/Red
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