ILLUSTRATED SYMBOLS

Illustrated symbols ① to ⑧ are printed on the top right of each page and indicate the subject of each chapter.

① General information
② Specifications
③ Periodic inspections and adjustments
④ Engine overhaul
⑤ Carburetor
⑥ Chassis
⑦ Electrical
⑧ Troubleshooting

Illustrated symbols ⑨ to ⑯ are used to identify the specifications appearing in the text.

⑨ Filling fluid
⑩ Lubricant
⑪ Special tool
⑫ Torque
⑬ Wear limit, clearance
⑭ Engine speed
⑮ Ω, V, A

Illustrated symbols ⑱ to ⑳ in the exploded diagrams indicate the types of lubricants and lubrication points.

⑱ Apply engine oil
⑲ Apply gear oil
⑳ Apply molybdenum disulfide oil
⑳ Apply wheel bearing grease
⑳ Apply lightweight lithium-soap base grease
⑳ Apply molybdenum disulfide grease

Illustrated symbols ㉑ to ㉒ in the exploded diagrams indicate where to apply a locking agent ㉒ and when to install a new part ㉒.

㉑ Apply the locking agent (LOCTITE®)
㉒ Replace
VEHICLE IDENTIFICATION NUMBER

The vehicle identification number is stamped into the right side of the steering head.

**NOTE:**
The vehicle identification number is used to identify your motorcycle and may be used to register your motorcycle with the licensing authority in your state.

ENGINE SERIAL NUMBER

The engine serial number is stamped into the elevated part of the right rear section of the engine.

**NOTE:**
- The first three digits of these numbers are for model identifications; the remaining digits are the unit production number.
- Designs and specifications are subject to change without notice.
**IMPORTANT INFORMATION**

**PREPARATION FOR REMOVAL AND DISASSEMBLY**

1. Remove all dirt, mud, dust, and foreign material before removing and disassembling.

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

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

4. During the motorcycle disassembly, clean all parts and place them in trays in the order of disassembly. This will speed up assembly time and help assure that all parts are correctly reinstalled.

5. Keep away from fire.
ALL REPLACEMENT PARTS
1. Use only genuine Yamaha parts for all replacements. Use oil and/or grease recommended by Yamaha for assembly and adjustment. Other brands may be similar in function and appearance, but inferior in quality.

GASKETS, OIL SEALS, AND O-RINGS
1. All gaskets, seals and O-rings should be replaced when an engine is overhauled. 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. All lock washers/plates and cotter pins must be replaced when they are removed. Lock tab(s) should be bent along the bolt or nut flat(s) after the bolt or nut has been properly tightened.

BEARINGS AND OIL SEALS
1. Install the bearing(s) and oil seal(s) with their manufacturer’s marks or numbers facing outward. (In other words, the stamped letters must be on the side exposed to view.) When installing oil seal(s), apply a light coating of light-weight lithium base grease to the seal lip(s). Oil the bearings liberally when installing.

Do not use compressed air to spin the bearings dry. This causes damage to the bearing surfaces.
CIRCLIPS
1. All circlips should be inspected 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 to the thrust ③ it receives. See the sectional view.
④ Shaft

SPECIAL TOOLS
The proper special tools are necessary for complete and accurate tune-up and assembly. Using the correct special tool will help prevent damage caused by the use of improper tools or improvised techniques.

FOR TUNE UP

1. Steering nut wrench
   P/N. YU-33975
   This tool is used to adjust the spring preload of rear shock absorber.

2. Inductive tachometer
   P/N. YU-8036-A
   This tool is needed for detecting engine r/min.

3. Inductive timing light
   P/N. YM-33277-A
   This tool is necessary for checking ignition timing.

4. Compression gauge
   P/N. YU-33223
   Adapter (M12)
   P/N. YU-33223-3
   These gauges are used to measure the engine compression.

5. Fuel level gauge
   P/N. YM-01312-A
   This gauge is used to measure the fuel level in the float chamber.
FOR ENGINE SERVICE

1. Piston pin puller
   P/N. YU-01304
   This tool is used to remove the piston pin.

2. Sheave holder
   P/N. YS-01880
   This tool is used to hold the rotor when removing or installing the rotor securing nut.

3. Rotor puller
   P/N. 2K7-85555-00
   This tool is used to remove the rotor.

4. Universal clutch holder
   P/N. YM-91042
   This tool is used to hold the clutch when removing or installing the clutch boss locknut.

5. Crankcase separating tool
   P/N. YU-01135-A
   This tool is necessary to remove the crankshaft.

6. Valve spring compressor
   P/N. YM-04019
   This tool is needed to remove and install the valve assemblies.

7. Valve seat cutter set
   P/N. YM-91043
   This tool is needed to resurface the valve seat.

8. Valve guide remover 5 mm (0.20 in)
   P/N. YM-04097
   This tool is used to remove the valve guides.

9. Valve guide reamer 5 mm (0.20 in)
   P/N. YM-04099
   This tool is used to rebore the new valve guide.
Valve guide installer 5 mm (0.20 in)  
P/N. YM-04098  
This tool is needed to install the valve guides properly.

Crankshaft installing set  
P/N. YU-90050  
These tools are used to install the crankshaft.

Adapter (M10)  
P/N. YU-90062  
This tool is used to install the crankshaft.

Crank pot spacer  
P/N. YU-01202  
This tool is used to install the crankshaft.

Quick Gasket®  
P/N. ACC-11001-05-01  
This sealant (bond) is used for crankcase mating surfaces, etc.

Damper rod holder  
P/N. YM-01418  
This tool is used to loosen and tighten the damper rod holding bolt.

Front fork seal drive weight  
P/N. YM-33963-①  
Adapter 43 mm (1.69 in)  
P/N. YM-8020-②  
These tools are used when installing the fork oil seal.

Rod holder  
P/N. YM-01434  
This tool is used to hold the fork spring.

Rod puller attachment (M10)  
P/N. 90890-01436  
This tool is used to pull up the fork damper rod.
1 Dynamic spark tester
P/N. YM-34487
This instrument is necessary for checking the ignition system components.

2 Pocket tester
P/N. YU-03112
This instrument is used for checking the electrical system.

5 Rod puller
P/N. YM-01437
This tool is used to pull up the fork damper.

6 Cylinder cup installer
P/N. 90890-01996
This tool is used to install the master cylinder kit.

7 Drive chain cutter
P/N. YM-33858
This tool is used to cut and join the drive chain.

FOR ELECTRICAL COMPONENTS
## GENERAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>Model Code:</th>
<th>5GF1 5GF2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dimensions:</strong></td>
<td></td>
</tr>
<tr>
<td>Overall length</td>
<td>2,095 mm (82.5 in)</td>
</tr>
<tr>
<td>Overall width</td>
<td>835 mm (32.9 in)</td>
</tr>
<tr>
<td>Overall height</td>
<td>1,260 mm (49.6 in)</td>
</tr>
<tr>
<td>Seat height</td>
<td>915 mm (36.0 in)</td>
</tr>
<tr>
<td>Wheelbase</td>
<td>1,405 mm (55.3 in)</td>
</tr>
<tr>
<td>Minimum ground clearance</td>
<td>305 mm (12.0 in)</td>
</tr>
<tr>
<td>Minimum turning radius</td>
<td>2,200 mm (86.6 in)</td>
</tr>
<tr>
<td><strong>Basic weight:</strong></td>
<td></td>
</tr>
<tr>
<td>With oil and full fuel tank</td>
<td>124 kg (273 lb)</td>
</tr>
<tr>
<td><strong>Engine:</strong></td>
<td></td>
</tr>
<tr>
<td>Engine type</td>
<td>Air-cooled 4-stroke, DOHC</td>
</tr>
<tr>
<td>Cylinder arrangement</td>
<td>Forward-inclined single cylinder</td>
</tr>
<tr>
<td>Displacement</td>
<td>249 cm³</td>
</tr>
<tr>
<td>Bore x stroke</td>
<td>73.0 x 59.6 mm (2.87 x 2.35 in)</td>
</tr>
<tr>
<td>Compression ratio</td>
<td>10.2 : 1</td>
</tr>
<tr>
<td>Compression pressure (STD)</td>
<td>1,200 kPa (12 kg/cm², 174 psi) at 300 r/min</td>
</tr>
<tr>
<td>Starting system</td>
<td>Electric starter</td>
</tr>
<tr>
<td>Lubrication system</td>
<td>Wet sump</td>
</tr>
<tr>
<td><strong>Oil type or grade:</strong></td>
<td></td>
</tr>
<tr>
<td>Engine oil</td>
<td>SAE 20W40 type SE motor oil</td>
</tr>
<tr>
<td>SAE 10W30 type SE motor oil</td>
<td></td>
</tr>
<tr>
<td><strong>Oil capacity:</strong></td>
<td></td>
</tr>
<tr>
<td>Engine oil</td>
<td>1.10 L (0.97 Imp qt, 1.16 US qt)</td>
</tr>
<tr>
<td>With oil filter replacement</td>
<td>1.20 L (1.06 Imp qt, 1.27 US qt)</td>
</tr>
<tr>
<td>Total amount</td>
<td>1.45 L (1.28 Imp qt, 1.53 US qt)</td>
</tr>
<tr>
<td><strong>Air filter:</strong></td>
<td>Wet type element</td>
</tr>
<tr>
<td><strong>Fuel:</strong></td>
<td></td>
</tr>
<tr>
<td>Type</td>
<td>Unleaded fuel only</td>
</tr>
<tr>
<td>Fuel tank capacity</td>
<td>10 L (2.20 Imp gal, 2.64 US gal)</td>
</tr>
<tr>
<td>Fuel reserve amount</td>
<td>2 L (0.44 Imp gal, 0.53 US gal)</td>
</tr>
<tr>
<td>Model</td>
<td>TTR250L(C)</td>
</tr>
<tr>
<td>-------</td>
<td>------------</td>
</tr>
<tr>
<td>Carburetor:</td>
<td></td>
</tr>
<tr>
<td>Type / quantity</td>
<td></td>
</tr>
<tr>
<td>Spark plug:</td>
<td></td>
</tr>
<tr>
<td>Type</td>
<td></td>
</tr>
<tr>
<td>Spark plug gap</td>
<td></td>
</tr>
<tr>
<td>Clutch type:</td>
<td></td>
</tr>
<tr>
<td>Transmission:</td>
<td></td>
</tr>
<tr>
<td>Primary reduction system</td>
<td></td>
</tr>
<tr>
<td>Primary reduction ratio</td>
<td></td>
</tr>
<tr>
<td>Secondary reduction system</td>
<td></td>
</tr>
<tr>
<td>Secondary reduction ratio</td>
<td></td>
</tr>
<tr>
<td>Transmission type</td>
<td></td>
</tr>
<tr>
<td>Operation</td>
<td></td>
</tr>
<tr>
<td>Gear ratio</td>
<td></td>
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<tr>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Chassis:</td>
<td></td>
</tr>
<tr>
<td>Frame type</td>
<td></td>
</tr>
<tr>
<td>Caster angle</td>
<td></td>
</tr>
<tr>
<td>Trail</td>
<td></td>
</tr>
<tr>
<td>Tire:</td>
<td></td>
</tr>
<tr>
<td>Type</td>
<td></td>
</tr>
<tr>
<td>Size</td>
<td></td>
</tr>
<tr>
<td>Manufacturer</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Type</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Tire pressure (cold tire):</td>
<td></td>
</tr>
<tr>
<td>Maximum load-except motorcycle*</td>
<td></td>
</tr>
<tr>
<td>Off-road riding*</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Load is total weight of rider, and accessories.
### GENERAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>Model</th>
<th>TTR250L(C)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Brake:</strong></td>
<td></td>
</tr>
<tr>
<td>Front brake type</td>
<td>Single disc brake</td>
</tr>
<tr>
<td>Front brake operation</td>
<td>Right hand operation</td>
</tr>
<tr>
<td>Rear brake type</td>
<td>Single disc brake</td>
</tr>
<tr>
<td>Rear brake operation</td>
<td>Right foot operation</td>
</tr>
<tr>
<td><strong>Suspension:</strong></td>
<td></td>
</tr>
<tr>
<td>Front suspension</td>
<td>Telescopic fork</td>
</tr>
<tr>
<td>Rear suspension</td>
<td>Swingarm (link suspension)</td>
</tr>
<tr>
<td><strong>Shock absorber:</strong></td>
<td></td>
</tr>
<tr>
<td>Front shock absorber</td>
<td>Coil-air spring / oil damper</td>
</tr>
<tr>
<td>Rear shock absorber</td>
<td>Coil spring / gas-oil damper</td>
</tr>
<tr>
<td><strong>Wheel travel:</strong></td>
<td></td>
</tr>
<tr>
<td>Front wheel travel</td>
<td>280 mm (11.0 in)</td>
</tr>
<tr>
<td>Rear wheel travel</td>
<td>280 mm (11.0 in)</td>
</tr>
<tr>
<td><strong>Electrical:</strong></td>
<td></td>
</tr>
<tr>
<td>Ignition system</td>
<td>C.D.I.</td>
</tr>
<tr>
<td>Generator system</td>
<td>A.C. magneto generator</td>
</tr>
<tr>
<td>Battery type</td>
<td>GT7B-4</td>
</tr>
<tr>
<td>Battery capacity</td>
<td>12 V 6.5 AH</td>
</tr>
<tr>
<td><strong>Headlight type:</strong></td>
<td>Quartz bulb (Halogen)</td>
</tr>
<tr>
<td><strong>Bulb wattage × quantity:</strong></td>
<td></td>
</tr>
<tr>
<td>Headlight</td>
<td>12 V 35 W/36.5 W</td>
</tr>
<tr>
<td>Tail light</td>
<td>12 V 5 W/21 W</td>
</tr>
</tbody>
</table>
# MAINTENANCE SPECIFICATIONS

## ENGINE

<table>
<thead>
<tr>
<th>Model</th>
<th>TTR250L(C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cylinder head:</td>
<td></td>
</tr>
<tr>
<td>Volume</td>
<td>21.6 ~ 22.2 cm³</td>
</tr>
<tr>
<td>&lt;Warp limit&gt;</td>
<td>&lt;0.03 mm (0.0012 in)&gt;</td>
</tr>
<tr>
<td><em>Lines indicate straightedge measurement.</em></td>
<td></td>
</tr>
<tr>
<td>Cylinder:</td>
<td></td>
</tr>
<tr>
<td>Material</td>
<td>Aluminum alloy</td>
</tr>
<tr>
<td>Sleeve type</td>
<td>Sleeveless, surface honing</td>
</tr>
<tr>
<td>Bore size</td>
<td>72.97 ~ 73.02 mm (2.8728 ~ 2.8748 in)</td>
</tr>
<tr>
<td><em>Measuring point 40 mm (1.57 in)</em></td>
<td></td>
</tr>
<tr>
<td>&lt;Wear limit&gt;</td>
<td>&lt;73.1 mm (2.8779 in)&gt;</td>
</tr>
<tr>
<td>&lt;Warp limit&gt;</td>
<td>&lt;0.03 mm (0.0012 in)&gt;</td>
</tr>
<tr>
<td>Camshaft:</td>
<td>Chain drive (right)</td>
</tr>
<tr>
<td>Drive method</td>
<td></td>
</tr>
<tr>
<td>Cam cap inside diameter</td>
<td>24.500 ~ 24.521 mm (0.9646 ~ 0.9654 in)</td>
</tr>
<tr>
<td>Camshaft outside diameter</td>
<td>24.467 ~ 24.480 mm (0.9633 ~ 0.9638 in)</td>
</tr>
<tr>
<td>Shaft-to-cap clearance</td>
<td>0.020 ~ 0.054 mm (0.0008 ~ 0.0021 in)</td>
</tr>
<tr>
<td>Cam dimensions</td>
<td></td>
</tr>
<tr>
<td>Intake</td>
<td>“A” 32.75 ~ 32.85 mm (1.2894 ~ 1.2933 in)</td>
</tr>
<tr>
<td>&lt;limit&gt;</td>
<td>&lt;32.7 mm (1.287 in)&gt;</td>
</tr>
<tr>
<td>“B” 25.0 ~ 25.1 mm (0.9843 ~ 0.9882 in)</td>
<td></td>
</tr>
<tr>
<td>&lt;limit&gt;</td>
<td>&lt;24.96 mm (0.983 in)&gt;</td>
</tr>
<tr>
<td>“C” 7.8 mm (0.3071 in)</td>
<td></td>
</tr>
<tr>
<td>Exhaust</td>
<td>“A” 32.75 ~ 32.85 mm (1.2894 ~ 1.2933 in)</td>
</tr>
<tr>
<td>&lt;limit&gt;</td>
<td>&lt;32.7 mm (1.287 in)&gt;</td>
</tr>
<tr>
<td>“B” 25.0 ~ 25.1 mm (0.9843 ~ 0.9882 in)</td>
<td></td>
</tr>
<tr>
<td>&lt;limit&gt;</td>
<td>&lt;24.96 mm (0.983 in)&gt;</td>
</tr>
<tr>
<td>“C” 7.8 mm (0.3071 in)</td>
<td></td>
</tr>
<tr>
<td>Camshaft runout limit</td>
<td>0.03 mm (0.0012 in)</td>
</tr>
<tr>
<td>Camshaft oil clearance</td>
<td>0.020 ~ 0.054 mm (0.0008 ~ 0.0021 in)</td>
</tr>
<tr>
<td>&lt;Limit&gt;</td>
<td>&lt;0.08 mm (0.0031 in)&gt;</td>
</tr>
<tr>
<td>Cam chain:</td>
<td>82RH2010-122M/122</td>
</tr>
<tr>
<td>Cam chain type / No. of links</td>
<td>Automative</td>
</tr>
<tr>
<td>Cam chain adjustment method</td>
<td></td>
</tr>
</tbody>
</table>
## Valve, valve seat, valve guide:

<table>
<thead>
<tr>
<th></th>
<th>IN</th>
<th>EX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valve clearance (cold)</td>
<td>0.09 ~ 0.19 mm (0.004 ~ 0.007 in)</td>
<td>0.19 ~ 0.27 mm (0.007 ~ 0.011 in)</td>
</tr>
</tbody>
</table>

### Valve dimensions:

- **A** head diameter
  - IN: 28.4 ~ 28.6 mm (1.118 ~ 1.126 in)
  - EX: 23.9 ~ 24.1 mm (0.941 ~ 0.949 in)
- **B** face width
  - IN: 2.26 mm (0.089 in)
  - EX: 2.26 mm (0.089 in)
- **C** seat width
  - IN: 0.9 ~ 1.1 mm (0.035 ~ 0.043 in)
  - EX: 0.9 ~ 1.1 mm (0.035 ~ 0.043 in)
- **D** margin thickness
  - IN: 0.6 ~ 1.0 mm (0.024 ~ 0.039 in)
  - EX: 0.8 ~ 1.2 mm (0.031 ~ 0.047 in)
- Stem outside diameter
  - IN: 4.975 ~ 4.990 mm (0.1959 ~ 0.1965 in)
  - EX: 4.960 ~ 4.975 mm (0.1953 ~ 0.1959 in)
- <Limit>
  - IN: <4.95 mm (0.195 in)>
  - EX: <4.94 mm (0.194 in)>
- Guide inside diameter
  - IN: 5.000 ~ 5.012 mm (0.1969 ~ 0.1973 in)
  - EX: 5.000 ~ 5.012 mm (0.1969 ~ 0.1973 in)
- <Limit>
  - IN: <5.03 mm (0.198 in)>
  - EX: <5.03 mm (0.198 in)>
- Stem-to-guide clearance
  - IN: 0.010 ~ 0.037 mm (0.0004 ~ 0.0015 in)
  - EX: 0.025 ~ 0.052 mm (0.0010 ~ 0.0020 in)
- <Limit>
  - IN: <0.08 mm (0.003 in)>
  - EX: <0.1 mm (0.004 in)>
- <Stem runout limit>
  - <0.01 mm (0.0004 in)>

### Valve face material
- Stellite

### Valve seat width

<table>
<thead>
<tr>
<th></th>
<th>IN</th>
<th>EX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valve seat width</td>
<td>0.9 ~ 1.1 mm (0.0354 ~ 0.0433 in)</td>
<td>0.9 ~ 1.1 mm (0.0354 ~ 0.0433 in)</td>
</tr>
<tr>
<td>&lt;Limit&gt;</td>
<td>IN: &lt;1.6 mm (0.06 in)&gt;</td>
<td>EX: &lt;1.6 mm (0.06 in)&gt;</td>
</tr>
</tbody>
</table>
## MAINTENANCE SPECIFICATIONS

### Valve spring:
- **Free length**
  - IN: 35.59 mm (1.40 in)
  - EX: 35.59 mm (1.40 in)
- **<Limit>**
  - IN: <33.81 mm (1.33 in)>
  - EX: <33.81 mm (1.33 in)>
- **Spring rate**
  - IN-K1: 18.9 N/mm (1.93 kg/mm, 107.92 lb/in)
  - IN-K2: 24.5 N/mm (2.50 kg/mm, 139.9 lb/in)
  - EX-K1: 18.9 N/mm (1.93 kg/mm, 107.92 lb/in)
  - EX-K2: 24.5 N/mm (2.50 kg/mm, 139.9 lb/in)
- **Set length (valve closed)**
  - IN: 30.39 mm (1.2 in)
  - EX: 30.39 mm (1.2 in)
- **Compressed pressure (installed)**
  - IN: 9.3 ~ 10.7 kg (20.50 ~ 23.58 lb)
  - EX: 9.3 ~ 10.7 kg (20.50 ~ 23.58 lb)
- **<Tilt limit>**
  - IN: <2.5° / 1.6 mm (2.5° / 0.063 in)>
  - EX: <2.5° / 1.6 mm (2.5° / 0.063 in)>
- **Direction of winding (top view)**
  - IN: Clockwise
  - EX: Clockwise
- **Valve lifter outside diameter**
  - IN: 22.476 ~ 22.500 mm (0.88 ~ 0.89 in)
  - <Limit>: <22.451 mm (0.88 in)>

### Piston:
- **Piston part number**: 4GY-11631-00
- **Piston to cylinder clearance**: 0.04 ~ 0.06 mm (0.0016 ~ 0.0024 in)
- **<Limit>**: <0.15 mm (0.0059 in)>
- **Piston size “D”**: 72.92 ~ 72.97 mm (2.8709 ~ 2.8728 in)
- **Measuring point “H”**: 1 mm (0.039 in)
- **Piston off-set**: 0.5 mm (0.020 in)
- **Piston off-set direction**: In side
- **Piston pin bore inside diameter**: 18.004 ~ 18.015 mm (0.7088 ~ 0.7093 in)
- **<Limit>**: <18.045 mm (0.71 in)>
- **Piston pin outside diameter**: 17.991 ~ 18.000 mm (0.7083 ~ 0.7087 in)
- **<Limit>**: <17.976 mm (0.71 in)>
### Piston rings:

<table>
<thead>
<tr>
<th>Type</th>
<th>Dimensions (B × T)</th>
<th>End gap (installed)</th>
<th>&lt;Limit&gt;</th>
<th>Side clearance (installed)</th>
<th>&lt;Limit&gt;</th>
<th>Plating/coating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top ring:</td>
<td>1.0 × 3.1 mm (0.039 × 0.122 in)</td>
<td>0.20 ~ 0.35 mm (0.008 ~ 0.014 in)</td>
<td>&lt;0.4 mm (0.016 in)&gt;</td>
<td>0.04 ~ 0.08 mm (0.0016 ~ 0.0031 in)</td>
<td>&lt;0.12 mm (0.005 in)&gt;</td>
<td>Chrome plated/parkerizing</td>
</tr>
<tr>
<td>2nd ring:</td>
<td>1.0 × 3.1 mm (0.039 × 0.122 in)</td>
<td>0.20 ~ 0.35 mm (0.008 ~ 0.014 in)</td>
<td>&lt;0.4 mm (0.016 in)&gt;</td>
<td>0.03 ~ 0.07 mm (0.001 ~ 0.003 in)</td>
<td>&lt;0.12 mm (0.005 in)&gt;</td>
<td>Parkerizing</td>
</tr>
</tbody>
</table>

### Oil ring:

<table>
<thead>
<tr>
<th>Dimensions (B × T)</th>
<th>End gap (installed)</th>
<th>Side clearance</th>
<th>Plating/coating</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.0 × 2.5 mm (0.079 × 0.098 in)</td>
<td>0.2 ~ 0.7 mm (0.008 ~ 0.028 in)</td>
<td>0.060 ~ 0.155 mm (0.002 ~ 0.006 in)</td>
<td>Chrome plated/parkerizing</td>
</tr>
</tbody>
</table>

### Connecting rod:

| Connecting rod length | 102.4 ~ 102.6 mm (4.03 ~ 4.04 in) |

### Crankshaft:

<table>
<thead>
<tr>
<th>Crank width “A”</th>
<th>60.25 ~ 60.30 mm (2.372 ~ 2.374 in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;Runout limit “C”&gt;</td>
<td>&lt;0.03 mm (0.0012 in)&gt;</td>
</tr>
<tr>
<td>Big end side clearance “D”</td>
<td>0.35 ~ 0.85 mm (0.014 ~ 0.033 in)</td>
</tr>
<tr>
<td>Big end radial clearance “E”</td>
<td>0.010 ~ 0.025 mm (0.0004 ~ 0.0010 in)</td>
</tr>
<tr>
<td>Small end free play “F”</td>
<td>0.8 mm (0.0315 in)</td>
</tr>
</tbody>
</table>

### Balancer:

| Balancer drive method | Gear |

### Clutch:

<table>
<thead>
<tr>
<th>Friction plate thickness</th>
<th>2.9 ~ 3.1 mm (0.114 ~ 0.122 in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantity</td>
<td>7 pcs</td>
</tr>
<tr>
<td>&lt;Friction plate wear limit&gt;</td>
<td>&lt;2.7 mm (0.11 in)&gt;</td>
</tr>
<tr>
<td>Clutch plate thickness</td>
<td>1.5 ~ 1.7 mm (0.059 ~ 0.067 in)</td>
</tr>
<tr>
<td>Quantity</td>
<td>6 pcs</td>
</tr>
<tr>
<td>&lt;Warp limit&gt;</td>
<td>&lt;0.05 mm (0.002 in)&gt;</td>
</tr>
<tr>
<td>Clutch spring free length</td>
<td>42.8 mm (1.69 in)</td>
</tr>
<tr>
<td>Quantity</td>
<td>5 pcs</td>
</tr>
<tr>
<td>Minimum length</td>
<td>40.8 mm (1.61 in)</td>
</tr>
<tr>
<td>Clutch housing thrust clearance</td>
<td>0.08 ~ 0.33 mm (0.003 ~ 0.013 in)</td>
</tr>
<tr>
<td>Clutch housing radial clearance</td>
<td>0.010 ~ 0.044 mm (0.0004 ~ 0.0017 in)</td>
</tr>
</tbody>
</table>
## Clutch release method
- Inner push, cam push
- **<Push rod bending limit>** <0.5 mm (0.020 in)>

## Transmission
- **<Main axle deflection limit>** <0.08 mm (0.003 in)>
- **<Drive axle deflection limit>** <0.08 mm (0.003 in)>

## Shifter
- **Shifter type** Cam drum and guide bar
- **Shift fork thickness** 4.76 ~ 4.89 mm (0.1874 ~ 0.1925 in)

## Air filter oil grade:
- Foam-air-filter oil or SAE 10W30 type SE motor oil

## Carburetor:
- **I.D. mark** 5GF1 00
- **Main jet** (M.J) #137
- **Main air jet** (M.A.J) 1.0
- **Jet needle** (J.N) 5C9C-3/5
- **Needle jet** (N.J) 2.595 (V95)
- **Cutaway** (C.A) 4.0
- **Pilot air jet** (P.A.J.1) 1.2
- **Pilot outlet** (P.O) 0.8
- **Pilot jet** (P.J) #52
- **Bypass 1** (B.P.1) 1.0 × 2
- **Pilot screw** (P.S) 1-1/2
- **Valve seat size** (V.S) 2.0
- **Starter jet** (G.S.1) #66
- **Starter jet** (G.S.2) 2.0
- **Float height** (F.H) 26.5 ~ 27.5 mm (1.04 ~ 1.08 in)
- **Fuel level** (F.L) 7.5 ~ 9.5 mm (0.30 ~ 0.37 in)
- **Engine idle speed** 1,250 ~ 1,350 r/min
- **Intake vacuum** 24.0 ~ 29.3 kPa (180 ~ 220 mmHg, 7.087 ~ 8.652 inHg)
- **Oil temperature** 55 ~ 65 °C (131 ~ 149 °F)

## Lubrication system:
- **Oil filter type** Wire mesh type
- **Oil pump type** Trochoid type
- **Tip clearance “A” or “B”** 0.15 mm (0.006 in)
  - **<Limit>** <0.2 mm (0.008 in)>
- **Side clearance** 0.10 ~ 0.15 mm (0.004 ~ 0.006 in)
  - **<Limit>** <0.2 mm (0.008 in)>
- **Housing and rotor clearance** 0.04 ~ 0.09 mm (0.002 ~ 0.004 in)
  - **<Limit>** <0.15 mm (0.006 in)>
- **Oil pressure (hot)** 100 kPa (1 kg/cm², 14.22 psi) at 1,300 r/min
- **Pressure check location** Crankcase cover 3
## 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>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Nm</td>
<td>m·kg</td>
</tr>
<tr>
<td>Cylinder head (camshaft cap)</td>
<td>Flange bolt</td>
<td>M6</td>
<td>8</td>
<td>10</td>
<td>1.0</td>
</tr>
<tr>
<td>Spark plug</td>
<td>–</td>
<td>M10S</td>
<td>1</td>
<td>13</td>
<td>1.3</td>
</tr>
<tr>
<td>Cylinder head (exhaust pipe)</td>
<td>Stud bolt</td>
<td>M10</td>
<td>2</td>
<td>20</td>
<td>2.0</td>
</tr>
<tr>
<td>Cylinder head</td>
<td>Flange bolt</td>
<td>M10</td>
<td>4</td>
<td>40</td>
<td>4.0</td>
</tr>
<tr>
<td>Cylinder head</td>
<td>Nut</td>
<td>M8</td>
<td>2</td>
<td>20</td>
<td>2.0</td>
</tr>
<tr>
<td>Cylinder head cover</td>
<td>Bolt</td>
<td>M6</td>
<td>3</td>
<td>10</td>
<td>1.0</td>
</tr>
<tr>
<td>Flywheel magneto</td>
<td>Flange bolt</td>
<td>M10</td>
<td>1</td>
<td>60</td>
<td>6.0</td>
</tr>
<tr>
<td>Camshaft sprocket</td>
<td>Flange bolt</td>
<td>M7</td>
<td>4</td>
<td>24</td>
<td>2.4</td>
</tr>
<tr>
<td>Camshaft cap</td>
<td>Flange bolt</td>
<td>M6</td>
<td>8</td>
<td>8</td>
<td>0.8</td>
</tr>
<tr>
<td>Timing chain damper 2</td>
<td>Bolt</td>
<td>M6</td>
<td>2</td>
<td>8</td>
<td>0.8</td>
</tr>
<tr>
<td>Stopper guide</td>
<td>Panhead screw</td>
<td>M6</td>
<td>1</td>
<td>7</td>
<td>0.7</td>
</tr>
<tr>
<td>Oil pump assembly</td>
<td>Panhead screw</td>
<td>M6</td>
<td>3</td>
<td>6</td>
<td>0.6</td>
</tr>
<tr>
<td>Drain bolt (oil filter)</td>
<td>Bolt</td>
<td>M6</td>
<td>1</td>
<td>10</td>
<td>1.0</td>
</tr>
<tr>
<td>Oil check bolt</td>
<td>Bolt</td>
<td>M6</td>
<td>1</td>
<td>7</td>
<td>0.7</td>
</tr>
<tr>
<td>Plug (oil cooler)</td>
<td>Plug</td>
<td>M12</td>
<td>3</td>
<td>32</td>
<td>3.2</td>
</tr>
<tr>
<td>Oil delivery pipe</td>
<td>Union bolt</td>
<td>M10</td>
<td>2</td>
<td>20</td>
<td>2.0</td>
</tr>
<tr>
<td>Oil delivery pipe</td>
<td>Union bolt</td>
<td>M8</td>
<td>1</td>
<td>18</td>
<td>1.8</td>
</tr>
<tr>
<td>Relief valve stay</td>
<td>Flange bolt</td>
<td>M6</td>
<td>1</td>
<td>10</td>
<td>1.0</td>
</tr>
<tr>
<td>Carburetor joint (front)</td>
<td>Hose clamp</td>
<td>M4</td>
<td>1</td>
<td>2</td>
<td>0.2</td>
</tr>
<tr>
<td>Carburetor joint (air filter assembly)</td>
<td>Hose clamp</td>
<td>M5</td>
<td>1</td>
<td>5</td>
<td>0.5</td>
</tr>
<tr>
<td>Air filter case assembly</td>
<td>Bolt with washer</td>
<td>M6</td>
<td>3</td>
<td>5</td>
<td>0.5</td>
</tr>
<tr>
<td>Exhaust pipe (cylinder head)</td>
<td>Nut</td>
<td>M8</td>
<td>2</td>
<td>7</td>
<td>0.7</td>
</tr>
<tr>
<td>Exhaust pipe (muffler)</td>
<td>Flange bolt</td>
<td>M8</td>
<td>1</td>
<td>20</td>
<td>2.0</td>
</tr>
<tr>
<td>Muffler</td>
<td>Bolt</td>
<td>M8</td>
<td>2</td>
<td>40</td>
<td>4.0</td>
</tr>
<tr>
<td>Spark arrester</td>
<td>Bolt</td>
<td>M6</td>
<td>3</td>
<td>7</td>
<td>0.7</td>
</tr>
<tr>
<td>Muffler purging bolt</td>
<td>Bolt</td>
<td>M8</td>
<td>1</td>
<td>20</td>
<td>2.0</td>
</tr>
<tr>
<td>Muffler protector</td>
<td>Screw</td>
<td>M6</td>
<td>2</td>
<td>7</td>
<td>0.7</td>
</tr>
<tr>
<td>Crankcase assembly</td>
<td>Bolt</td>
<td>M6</td>
<td>11</td>
<td>10</td>
<td>1.0</td>
</tr>
<tr>
<td>Crankcase cover 1</td>
<td>Bolt</td>
<td>M6</td>
<td>8</td>
<td>10</td>
<td>1.0</td>
</tr>
<tr>
<td>Crankcase cover 2 (starter motor cover)</td>
<td>Bolt</td>
<td>M6</td>
<td>5</td>
<td>10</td>
<td>1.0</td>
</tr>
<tr>
<td>Crankcase cover 3</td>
<td>Bolt</td>
<td>M6</td>
<td>10</td>
<td>10</td>
<td>1.0</td>
</tr>
<tr>
<td>One-way clutch</td>
<td>Bolt</td>
<td>M6</td>
<td>6</td>
<td>10</td>
<td>1.0</td>
</tr>
<tr>
<td>Primary drive gear</td>
<td>Nut</td>
<td>M16</td>
<td>1</td>
<td>80</td>
<td>8.0</td>
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<tr>
<td>Clutch boss</td>
<td>Nut</td>
<td>M16</td>
<td>1</td>
<td>75</td>
<td>7.5</td>
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<tr>
<td>Pressure plate</td>
<td>Screw with washer</td>
<td>M6</td>
<td>5</td>
<td>8</td>
<td>0.8</td>
</tr>
<tr>
<td>Part to be tightened</td>
<td>Part name</td>
<td>Thread size</td>
<td>Q'nty</td>
<td>Tightening torque</td>
<td>Remarks</td>
</tr>
<tr>
<td>----------------------</td>
<td>----------------</td>
<td>-------------</td>
<td>-------</td>
<td>-------------------</td>
<td>---------</td>
</tr>
<tr>
<td>Push rod 2</td>
<td>Nut</td>
<td>M6</td>
<td>1</td>
<td>8 0.8 5.8</td>
<td></td>
</tr>
<tr>
<td>Push lever</td>
<td>Screw</td>
<td>M8</td>
<td>1</td>
<td>12 1.2 8.7</td>
<td></td>
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<tr>
<td>Clutch cable holder</td>
<td>Flange bolt</td>
<td>M6</td>
<td>2</td>
<td>10 1.0 7.2</td>
<td></td>
</tr>
<tr>
<td>Drive sprocket</td>
<td>Nut</td>
<td>M18</td>
<td>1</td>
<td>110 11.0 80</td>
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<tr>
<td>Lever stopper</td>
<td>Bolt</td>
<td>M6</td>
<td>1</td>
<td>10 1.0 7.2</td>
<td></td>
</tr>
<tr>
<td>Shift pedal</td>
<td>Bolt</td>
<td>M6</td>
<td>1</td>
<td>10 1.0 7.2</td>
<td></td>
</tr>
<tr>
<td>Starter motor</td>
<td>Flange bolt</td>
<td>M6</td>
<td>2</td>
<td>10 1.0 7.2</td>
<td></td>
</tr>
<tr>
<td>Drain plug</td>
<td>Straight screw plug</td>
<td>M12</td>
<td>1</td>
<td>20 2.0 14</td>
<td></td>
</tr>
<tr>
<td>Stator coil</td>
<td>Bolt</td>
<td>M5</td>
<td>3</td>
<td>7 0.7 5.1</td>
<td></td>
</tr>
</tbody>
</table>
Tightening sequence

Cylinder head

Lubrication chart

Drive axle
- Relief valve
  - Oil pump
    - Oil cleaner
      - Cylinder head
      - Camshaft
        - Main axle
          - Crankshaft
            - Oil strainer
              - Oil pan
### CHASSIS

<table>
<thead>
<tr>
<th>Model</th>
<th>TTR250L(C)</th>
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</thead>
<tbody>
<tr>
<td><strong>Steering system:</strong></td>
<td></td>
</tr>
<tr>
<td>Steering bearing type</td>
<td>Taper roller bearing</td>
</tr>
<tr>
<td><strong>Front suspension:</strong></td>
<td></td>
</tr>
<tr>
<td>Front fork travel</td>
<td>280 mm (11.02 in)</td>
</tr>
<tr>
<td>Fork spring free length</td>
<td>472 mm (18.6 in)</td>
</tr>
<tr>
<td>&lt;Limit&gt;</td>
<td>&lt;462 mm (18.2 in)&gt;</td>
</tr>
<tr>
<td>Spring rate (K1)</td>
<td>4 N/mm (0.41 kg/mm 22.8 lb/in)</td>
</tr>
<tr>
<td>Stroke (K1)</td>
<td>0 ~ 280 mm (0.00 ~ 11.02 in)</td>
</tr>
<tr>
<td>Optional spring</td>
<td>No</td>
</tr>
<tr>
<td>Oil capacity</td>
<td>555 cm³ (19.6 Imp oz, 18.8 US oz)</td>
</tr>
<tr>
<td>Oil level</td>
<td>130 mm (5.12 in)</td>
</tr>
<tr>
<td>Oil grade</td>
<td>Suspension oil “01” or equivalent</td>
</tr>
<tr>
<td>Enclosed gas / air pressure (STD)</td>
<td>0 kPa (0 kg/cm², 0 psi)</td>
</tr>
<tr>
<td>&lt;Min. ~ max.&gt;</td>
<td>0 ~ 40 kPa (0 ~ 0.4 kg/cm³, 0~5.8 psi)</td>
</tr>
<tr>
<td>Inner tube outer diameter</td>
<td>43 mm (1.69 in)</td>
</tr>
<tr>
<td><strong>Rear suspension:</strong></td>
<td></td>
</tr>
<tr>
<td>Shock absorber travel</td>
<td>105 mm (4.13 in)</td>
</tr>
<tr>
<td>Spring free length</td>
<td>246 mm (9.69 in)</td>
</tr>
<tr>
<td>Fitting length</td>
<td>228 mm (8.98 in)</td>
</tr>
<tr>
<td>Spring rate (K1)</td>
<td>58.8 N/mm (6 kg/mm 335.8 lb/in)</td>
</tr>
<tr>
<td>Stroke (K1)</td>
<td>0 ~ 105 mm (0.00 ~ 4.13 in)</td>
</tr>
<tr>
<td>Optional spring</td>
<td>No</td>
</tr>
<tr>
<td>Enclosed gas / air pressure (STD)</td>
<td>1,000 kPa (10 kg/cm², 145 psi)</td>
</tr>
<tr>
<td><strong>Swingarm:</strong></td>
<td></td>
</tr>
<tr>
<td>&lt;Free play limit&gt;</td>
<td>end &lt;1 mm (0.04 in)&gt;</td>
</tr>
<tr>
<td></td>
<td>side &lt;1 mm (0.04 in)&gt;</td>
</tr>
<tr>
<td><strong>Front wheel:</strong></td>
<td></td>
</tr>
<tr>
<td>Type</td>
<td>Spoke wheel</td>
</tr>
<tr>
<td>Rim size</td>
<td>1.60 × 21</td>
</tr>
<tr>
<td>Rim material</td>
<td>Aluminum</td>
</tr>
<tr>
<td>&lt;Rim runout limit&gt;</td>
<td>radial &lt;2 mm (0.08 in)&gt;</td>
</tr>
<tr>
<td></td>
<td>lateral &lt;2 mm (0.08 in)&gt;</td>
</tr>
<tr>
<td><strong>Rear wheel:</strong></td>
<td></td>
</tr>
<tr>
<td>Type</td>
<td>Spoke wheel</td>
</tr>
<tr>
<td>Rim size</td>
<td>2.15 × 18</td>
</tr>
<tr>
<td>Rim material</td>
<td>Aluminum</td>
</tr>
<tr>
<td>&lt;Rim runout limit&gt;</td>
<td>radial &lt;2 mm (0.08 in)&gt;</td>
</tr>
<tr>
<td></td>
<td>lateral &lt;2 mm (0.08 in)&gt;</td>
</tr>
</tbody>
</table>
### Drive chain:
- **Type / manufacturer**: 520V2 / DAIDO
- **No. of links**: 110
- **Chain free play**: 35 ~ 50 mm (1.4 ~ 2.0 in)
- **Sealed type chain**: Yes

### Front disc brake:
- **Type**: Single
- **Disc outside diameter \times thickness**: 245.0 \times 3.5 mm (9.65 \times 0.14 in)
- **Pad thickness**
  - Inner: 4.2 mm (0.17 in)
  - Outer: 4.2 mm (0.17 in)
- **Limit**
  - Inner: <1 mm (0.04 in)
  - Outer: <1 mm (0.04 in)

### Rear disc brake:
- **Type**: Single
- **Disc outside diameter \times thickness**: 220.0 \times 4.5 mm (8.66 \times 0.18 in)
- **Pad thickness**
  - Inner: 5.6 mm (0.22 in)
  - Outer: 5.6 mm (0.22 in)
- **Limit**
  - Inner: <1 mm (0.04 in)
  - Outer: <1 mm (0.04 in)

### Brake lever and brake pedal:
- **Brake lever free play (at lever end)**: 2 ~ 5 mm (0.08 ~ 0.20 in)
- **Brake pedal position**: 10 mm (0.39 in)
- **Clutch lever free play (at lever end)**: 10 ~ 15 mm (0.39 ~ 0.59 in)
## 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>Engine (front upper) and engine stay</td>
<td>M10</td>
<td>Nm 64 m·kg 6.4 ft·lb 46</td>
<td></td>
</tr>
<tr>
<td>Engine stay (front upper) and frame</td>
<td>M8</td>
<td>Nm 30 m·kg 3.0 ft·lb 22</td>
<td></td>
</tr>
<tr>
<td>Engine (front under) and frame</td>
<td>M10</td>
<td>Nm 64 m·kg 6.4 ft·lb 46</td>
<td></td>
</tr>
<tr>
<td>Engine (rear under) and frame</td>
<td>M10</td>
<td>Nm 64 m·kg 6.4 ft·lb 46</td>
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<tr>
<td>Engine (rear middle) and frame</td>
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<td>Nm 64 m·kg 6.4 ft·lb 46</td>
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</tr>
<tr>
<td>Engine stay (rear middle) and frame</td>
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<td>Nm 23 m·kg 2.3 ft·lb 17</td>
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<tr>
<td>Engine (rear upper) and engine stay</td>
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<td>Engine stay (rear upper) and frame</td>
<td>M8</td>
<td>Nm 30 m·kg 3.0 ft·lb 22</td>
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<tr>
<td>Engine guard and frame</td>
<td>M6</td>
<td>Nm 7 m·kg 0.7 ft·lb 5.1</td>
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</tr>
<tr>
<td>Chain tensioner (upper) and frame</td>
<td>M8</td>
<td>Nm 19 m·kg 1.9 ft·lb 13</td>
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<td>Nm 10 m·kg 1.0 ft·lb 7.2</td>
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<td>Back stay and frame</td>
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<td>Nm 35 m·kg 3.5 ft·lb 25</td>
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<tr>
<td>Pivot shaft and frame</td>
<td>M16</td>
<td>Nm 105 m·kg 10.5 ft·lb 75</td>
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<td>Rear suspension (upper) and frame</td>
<td>M10</td>
<td>Nm 46 m·kg 4.6 ft·lb 33</td>
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<td>Relay arm and frame</td>
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<td>Nm 46 m·kg 4.6 ft·lb 33</td>
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<tr>
<td>Relay arm and connecting rod</td>
<td>M14</td>
<td>Nm 59 m·kg 5.9 ft·lb 43</td>
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<tr>
<td>Relay arm and rear suspension</td>
<td>M10</td>
<td>Nm 40 m·kg 4.0 ft·lb 29</td>
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<tr>
<td>Connecting rod and swingarm</td>
<td>M12</td>
<td>Nm 59 m·kg 5.9 ft·lb 43</td>
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<td>Chain protector and chain</td>
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<td>Nm 4 m·kg 0.4 ft·lb 2.9</td>
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<td>Chain guide and swingarm</td>
<td>M6</td>
<td>Nm 7 m·kg 0.7 ft·lb 5.1</td>
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<td>Chain protector and swingarm</td>
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<td>Nm 7 m·kg 0.7 ft·lb 5.1</td>
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<tr>
<td>Chain case and swingarm</td>
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<td>Nm 7 m·kg 0.7 ft·lb 5.1</td>
<td></td>
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<tr>
<td>Rear brake hose (front) and swingarm</td>
<td>M6</td>
<td>Nm 7 m·kg 0.7 ft·lb 5.1</td>
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<tr>
<td>Rear brake hose (rear) and swingarm</td>
<td>M5</td>
<td>Nm 4 m·kg 0.4 ft·lb 2.9</td>
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<tr>
<td>Swingarm and end 3</td>
<td>M5</td>
<td>Nm 4 m·kg 0.4 ft·lb 2.9</td>
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<tr>
<td>Swingarm and bracket</td>
<td>M5</td>
<td>Nm 4 m·kg 0.4 ft·lb 2.9</td>
<td></td>
</tr>
<tr>
<td>Handle crown and inner tube</td>
<td>M8</td>
<td>Nm 23 m·kg 2.3 ft·lb 17</td>
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<tr>
<td>Handle crown and steering shaft</td>
<td>M24</td>
<td>Nm 120 m·kg 12.0 ft·lb 85</td>
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<tr>
<td>Steering shaft and ring nut</td>
<td>M28</td>
<td>Nm 5 m·kg 0.5 ft·lb 3.6</td>
<td>Refer to NOTE.</td>
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<tr>
<td>Handle under holder and handle crown</td>
<td>M12</td>
<td>Nm 40 m·kg 4.0 ft·lb 29</td>
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<tr>
<td>Front master cylinder cap</td>
<td>M4</td>
<td>Nm 2 m·kg 0.2 ft·lb 1.4</td>
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<tr>
<td>Front master cylinder and handlebar</td>
<td>M6</td>
<td>Nm 7 m·kg 0.7 ft·lb 5.1</td>
<td></td>
</tr>
<tr>
<td>Front fender and front fork</td>
<td>M6</td>
<td>Nm 7 m·kg 0.7 ft·lb 5.1</td>
<td></td>
</tr>
<tr>
<td>Speedometer and handle crown</td>
<td>M6</td>
<td>Nm 7 m·kg 0.7 ft·lb 5.1</td>
<td></td>
</tr>
<tr>
<td>Headlight and headlight stay</td>
<td>M6</td>
<td>Nm 7 m·kg 0.7 ft·lb 5.1</td>
<td></td>
</tr>
<tr>
<td>Headlight under stay and under bracket</td>
<td>M6</td>
<td>Nm 7 m·kg 0.7 ft·lb 5.1</td>
<td></td>
</tr>
<tr>
<td>Base valve and outer tube</td>
<td>M22</td>
<td>Nm 55 m·kg 5.5 ft·lb 40</td>
<td></td>
</tr>
<tr>
<td>Cap nut and inner tube</td>
<td>M40</td>
<td>Nm 28 m·kg 2.8 ft·lb 20</td>
<td></td>
</tr>
<tr>
<td>Fuel tank bracket and frame</td>
<td>M6</td>
<td>Nm 10 m·kg 1.0 ft·lb 7.2</td>
<td></td>
</tr>
<tr>
<td>Fuel tank and fuel cock</td>
<td>M6</td>
<td>Nm 7 m·kg 0.7 ft·lb 5.1</td>
<td></td>
</tr>
<tr>
<td>Rectifier/regulator and frame</td>
<td>M6</td>
<td>Nm 7 m·kg 0.7 ft·lb 5.1</td>
<td></td>
</tr>
<tr>
<td>Part to be tightened</td>
<td>Thread size</td>
<td>Tightening torque</td>
<td>Remarks</td>
</tr>
<tr>
<td>--------------------------------------</td>
<td>-------------</td>
<td>-------------------</td>
<td>---------</td>
</tr>
<tr>
<td>Ignition coil and frame</td>
<td>M6</td>
<td>7 0.7 5.1</td>
<td></td>
</tr>
<tr>
<td>Battery box and frame</td>
<td>M6</td>
<td>7 0.7 5.1</td>
<td></td>
</tr>
<tr>
<td>Side cover and frame</td>
<td>M6</td>
<td>7 0.7 5.1</td>
<td></td>
</tr>
<tr>
<td>Seat and frame</td>
<td>M6</td>
<td>7 0.7 5.1</td>
<td></td>
</tr>
<tr>
<td>Rear fender and frame</td>
<td>M6</td>
<td>7 0.7 5.1</td>
<td></td>
</tr>
<tr>
<td>Helmet holder and frame</td>
<td>M6</td>
<td>7 0.7 5.1</td>
<td></td>
</tr>
<tr>
<td>Taillight and rear fender</td>
<td>M6</td>
<td>6 0.6 4.3</td>
<td></td>
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<tr>
<td>Front hub and front disk</td>
<td>M6</td>
<td>12 1.2 8.7</td>
<td></td>
</tr>
<tr>
<td>Front wheel shaft and front fork</td>
<td>M14</td>
<td>58 5.8 42</td>
<td></td>
</tr>
<tr>
<td>Axle holder and front fork</td>
<td>M6</td>
<td>10 1.0 7.2</td>
<td></td>
</tr>
<tr>
<td>Front brake caliper and front fork</td>
<td>M10</td>
<td>30 3.0 22</td>
<td></td>
</tr>
<tr>
<td>Union bolt (front)</td>
<td>M10</td>
<td>30 3.0 22</td>
<td></td>
</tr>
<tr>
<td>Rear wheel shaft and nut</td>
<td>M18</td>
<td>105 10.5 75</td>
<td></td>
</tr>
<tr>
<td>Rear hub and sprocket</td>
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<td></td>
</tr>
<tr>
<td>Rear hub and rear disk</td>
<td>M6</td>
<td>12 1.2 8.7</td>
<td></td>
</tr>
<tr>
<td>Union bolt (rear)</td>
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<td>30 3.0 22</td>
<td></td>
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<td>Rear caliper and protector</td>
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<td>7 0.7 5.1</td>
<td></td>
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<tr>
<td>Sidestand and nut</td>
<td>M10</td>
<td>64 6.4 46</td>
<td></td>
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<tr>
<td>Rear footrest and frame</td>
<td>M8</td>
<td>23 2.3 17</td>
<td></td>
</tr>
<tr>
<td>Rear master cylinder and frame</td>
<td>M8</td>
<td>23 2.3 17</td>
<td></td>
</tr>
<tr>
<td>Rear reservoir tank and frame</td>
<td>M6</td>
<td>7 0.7 5.1</td>
<td></td>
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<tr>
<td>Rear brake pedal and frame</td>
<td>M8</td>
<td>19 1.9 13</td>
<td></td>
</tr>
<tr>
<td>Footrest bracket and frame</td>
<td>M10</td>
<td>64 6.4 46</td>
<td></td>
</tr>
</tbody>
</table>

**NOTE:**

1. First tighten the ring nut approximately 38 Nm (3.8 m • kg, 27 ft • lb) by using the torque wrench, then loosen the ring nut one turn.

2. Retighten the ring nut to specification.
## ELECTRICAL

<table>
<thead>
<tr>
<th>Model</th>
<th>TTR250L(C)</th>
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<tbody>
<tr>
<td>Voltage:</td>
<td>12 V</td>
</tr>
<tr>
<td>Ignition system:</td>
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</tr>
<tr>
<td>Ignition timing (B.T.D.C.)</td>
<td>10° at 1,300 r/min</td>
</tr>
<tr>
<td>Advanced timing (B.T.D.C.)</td>
<td>31° at 8,500 r/min</td>
</tr>
<tr>
<td>Advancer type</td>
<td>Digital type</td>
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<tr>
<td>C.D.I.:</td>
<td></td>
</tr>
<tr>
<td>Pickup coil resistance / color</td>
<td>190 ~ 230 Ω at 20 °C (68 °F) / Yellow – Blue</td>
</tr>
<tr>
<td>C.D.I. unit model / manufacturer</td>
<td>F8T31871 / MITSUBISHI</td>
</tr>
<tr>
<td>Ignition coil:</td>
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</tr>
<tr>
<td>Model / manufacturer</td>
<td>F6T535 / MITSUBISHI</td>
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<tr>
<td>Primary winding resistance</td>
<td>0.36 ~ 0.48 Ω at 20 °C (68 °F)</td>
</tr>
<tr>
<td>Secondary winding resistance</td>
<td>5.44 ~ 7.36 kΩ at 20 °C (68 °F)</td>
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<td>Spark plug cap:</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>Charging system:</td>
<td></td>
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<tr>
<td>Type</td>
<td>A.C. magneto generator</td>
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<tr>
<td>Model / manufacturer</td>
<td>F4T250 / MITSUBISHI</td>
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<tr>
<td>Standard output</td>
<td>14 V 13.5 A at 5,000 r/min</td>
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<tr>
<td>Stator coil resistance / color</td>
<td>1.0 ~ 1.2 kΩ at 20 °C (68 °F) / White – White</td>
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<tr>
<td>Rectifier regulator:</td>
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<tr>
<td>Type</td>
<td>Semi-conductor, short-circuit type</td>
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<tr>
<td>Model / manufacturer</td>
<td>SH629A-12 / 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>
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<td>Withstand voltage</td>
<td>200 V</td>
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<tr>
<td>Battery:</td>
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<tr>
<td>Manufacturer</td>
<td>GS</td>
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<tr>
<td>Specific gravity</td>
<td>1.320</td>
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<tr>
<td>Electric starter system:</td>
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</tr>
<tr>
<td>Type</td>
<td>Constant mesh type</td>
</tr>
<tr>
<td>Starter motor</td>
<td></td>
</tr>
<tr>
<td>Model / manufacturer</td>
<td>SM-13 / MITSUBA</td>
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<tr>
<td>Output</td>
<td>0.65 kW</td>
</tr>
<tr>
<td>Armature coil resistance</td>
<td>0.0017 ~ 0.0027 Ω</td>
</tr>
<tr>
<td>Brush overall length</td>
<td>10 mm (0.39 in)</td>
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<tr>
<td>&lt;Limit&gt;</td>
<td>&lt;4 mm (0.16 in)&gt;</td>
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<tr>
<td>Brush spring pressure</td>
<td>8.82 N (889 gf, 31.75 oz)</td>
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<tr>
<td>Commutator diameter</td>
<td>28 mm (1.10 in)</td>
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<tr>
<td>&lt;Wear limit&gt;</td>
<td>&lt;27 mm (1.06 in)&gt;</td>
</tr>
<tr>
<td>Mica undercut</td>
<td>0.7 mm (0.03 in)</td>
</tr>
<tr>
<td>Model</td>
<td>TTR250L(C)</td>
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<tr>
<td>-------------------------------</td>
<td>----------------------------</td>
</tr>
<tr>
<td>Starter relay:</td>
<td></td>
</tr>
<tr>
<td>Model / manufacturer</td>
<td>MS5D-361 / JIDECO</td>
</tr>
<tr>
<td>Amperage rating</td>
<td>100 A</td>
</tr>
<tr>
<td>Coil winding resistance</td>
<td>3.9 ~ 4.7 Ω at 20 °C (68 °F)</td>
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</tbody>
</table>
GENERAL TORQUE SPECIFICATIONS

This chart specifies torque for standard fasteners with standard I.S.O. pitch threads. Torque specifications for special components or assemblies are included in the applicable sections of this book. To avoid warpage, tighten multi-fastener assemblies in a crisscross fashion, in progressive stages, until full torque is reached. Unless otherwise specified, torque specifications call for clean, dry threads. Components should be at room temperature.

<table>
<thead>
<tr>
<th>A (Nut)</th>
<th>B (Bolt)</th>
<th>General torque specifications</th>
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</thead>
<tbody>
<tr>
<td>10 mm</td>
<td>6 mm</td>
<td>6 0.6 4.3</td>
</tr>
<tr>
<td>12 mm</td>
<td>8 mm</td>
<td>15 1.5 11</td>
</tr>
<tr>
<td>14 mm</td>
<td>10 mm</td>
<td>30 3.0 22</td>
</tr>
<tr>
<td>17 mm</td>
<td>12 mm</td>
<td>55 5.5 40</td>
</tr>
<tr>
<td>19 mm</td>
<td>14 mm</td>
<td>85 8.5 61</td>
</tr>
<tr>
<td>22 mm</td>
<td>16 mm</td>
<td>130 13.0 94</td>
</tr>
</tbody>
</table>

A: Distance across flats
B: Outside thread diameter
<table>
<thead>
<tr>
<th>Lubrication Point</th>
<th>Lubricant Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil seal lips</td>
<td>LS</td>
</tr>
<tr>
<td>O-ring</td>
<td>LS</td>
</tr>
<tr>
<td>Bearing</td>
<td>E</td>
</tr>
<tr>
<td>Piston surface</td>
<td>E</td>
</tr>
<tr>
<td>Piston pin</td>
<td>E</td>
</tr>
<tr>
<td>Crankshaft journal</td>
<td>E</td>
</tr>
<tr>
<td>Balancer (bearing / shaft / gear)</td>
<td>E</td>
</tr>
<tr>
<td>Buffer boss</td>
<td>E</td>
</tr>
<tr>
<td>Camshaft cam lobe / journal</td>
<td>E</td>
</tr>
<tr>
<td>Valve stem (IN, EX)</td>
<td>M</td>
</tr>
<tr>
<td>Valve stem end (IN, EX)</td>
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</tr>
<tr>
<td>Valve lifter (IN, EX)</td>
<td>M</td>
</tr>
<tr>
<td>Oil pump rotor (inner / outer) shaft</td>
<td>M</td>
</tr>
<tr>
<td>Oil pump gasket</td>
<td>M</td>
</tr>
<tr>
<td>Push lever assembly</td>
<td>M</td>
</tr>
<tr>
<td>Idle gear (1, 2) surface</td>
<td>M</td>
</tr>
<tr>
<td>Push rod assembly</td>
<td>M</td>
</tr>
<tr>
<td>Primary driven gear</td>
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</tr>
<tr>
<td>Transmission gear (wheel / pinion)</td>
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<tr>
<td>Axle (main / drive)</td>
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<tr>
<td>Shift cam</td>
<td>M</td>
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<tr>
<td>Shift fork / guide bar</td>
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<tr>
<td>Shift shaft (1, 2)</td>
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<tr>
<td>Matching surface (cylinder head and cylinder head cover)</td>
<td>Yamaha Bond No. 1215®</td>
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<tr>
<td>Crankcase matching surface</td>
<td>Yamaha Bond No. 1215®</td>
</tr>
<tr>
<td>Lubrication Point</td>
<td>Lubricant Type</td>
</tr>
<tr>
<td>-----------------------------------------------------------------------</td>
<td>----------------</td>
</tr>
<tr>
<td>Front wheel oil seal lips</td>
<td></td>
</tr>
<tr>
<td>Rear wheel oil seal lips</td>
<td></td>
</tr>
<tr>
<td>Bearing, oil seal lips (connecting rod)</td>
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</tr>
<tr>
<td>Oil seal lips, bearings (relay arm and frame)</td>
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</tr>
<tr>
<td>Pivot shaft (swingarm)</td>
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</tr>
<tr>
<td>Bearing (relay arm and rear shock absorber)</td>
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</tr>
<tr>
<td>Bolts, collars, seal lips (relay arm and frame)</td>
<td></td>
</tr>
<tr>
<td>Bolt, collars (relay arm and connecting rod)</td>
<td></td>
</tr>
<tr>
<td>Bolt (connecting rod and swingarm)</td>
<td></td>
</tr>
<tr>
<td>Brake pedal shaft</td>
<td></td>
</tr>
<tr>
<td>Bearings (steering head pipe)</td>
<td></td>
</tr>
<tr>
<td>Tube guide (throttle grip) inner surface</td>
<td></td>
</tr>
<tr>
<td>Brake lever, sliding surface</td>
<td></td>
</tr>
<tr>
<td>Clutch lever, sliding surface</td>
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</tr>
<tr>
<td>Clutch lever, sliding surface</td>
<td></td>
</tr>
<tr>
<td>Clutch cable end</td>
<td></td>
</tr>
<tr>
<td>Sidestand bolt, sliding surface</td>
<td></td>
</tr>
<tr>
<td>Bush (chain tensioner)</td>
<td></td>
</tr>
</tbody>
</table>
LUBRICATION DIAGRAM

1 Oil pump
2 Push lever
3 Delivery pipe
1 Relief valve
2 Crankshaft
3 Main axle
4 Drive axle
5 Delivery pipe
6 Push lever
7 Camshaft
1 Oil cleaner
2 Check bolt
3 Oil pump
4 Oil strainer
CABLE ROUTING

1. Throttle cable
2. Wire sub lead
3. A.C. magneto lead
4. Front brake hose
5. Handlebar switch lead (right)
6. Clutch switch lead
7. Handlebar switch lead (left)
8. Headlight lead
9. Wireharness
10. Clutch cable
11. Air vent hose (right)
12. Drain hose
13. Breather hose
14. Air vent hose (left)

A. Cut the end of the band after tightening.
B. Do not put this portion of the harness on the frame after connection.
C. Install the clamp with its open side facing forward.
D. Install the band, making sure its end faces backward.
E. Clamp the front brake hose between its white mark and the slot.
F. Put the handlebar switch (left) lead on top of the leads.
G. Pass the spark plug lead over the leads.
H. Install the clamp with its end facing downward.
I. Pass the breather hose on the inside of the leads that run side by side, but do not clamp it with a band or other clamping device.
Rectifier/regulator lead
Main switch lead
Ignition coil lead
Throttle cable
Clutch cable
Wireharness
Battery (–) lead
Battery (+) lead
Starter relay lead
Fuse (main) lead
Fuel tank breather hose

A Install the clamp with its open side facing outward.
B Tighten the main switch lead to the rectifier/regulator.
C Tighten the ignition coil lead to the ignition coil.
D Pass the throttle cable 1 over the throttle cable 2.
E Install the clamp with its open side facing upward.
F Fasten the clutch cable at the white tape marker with a clamp.
G Pass the fuel tank breather hose under the handle tension bar.
H Affix the fuel tank breather hose and speedometer cable to the clamp.
I Pass the fuel tank breather hose and speedometer cable through the wire guide.
J Fasten the speedometer cable at the white tape marker with a clamp.
K Make sure the projection on the front fork is placed in the slot in the speedometer gear unit.
L Pass the wireharness over the fuel tank bracket.
M Pass the wireharness under the regulator lead coupler. Make sure the coupler does not go over the right side.
N Insert the coupler on the inside of the ground lead.
O Pass the clamp through the right engine stay.
P Face the band end to the inside of the vehicle.
Q Pass the ignition coil lead on the inside of the throttle cable.
R Align the slot and the projection on the front fork.
1. Clutch switch lead
2. Clutch cable
3. Handlebar switch (left) lead
4. Handlebar switch (right) lead
5. Front brake hose
6. Throttle cable
7. Taillight lead

A. The pipe portion of the brake hose should touch the projection on the master cylinder.
B. Install the brake hose with its white mark facing forward.
C. Pass the throttle cable 1 to the inside of the throttle cable 2.
D. Pass the handlebar switch (right) lead to the front of the clutch cable.
E. Do not allow the air ventilation hose to go over the frame.
F. Pass the air ventilation hose through the guide near the air filter intake.
G. Install the clamp with its open side facing inward.
H. Pass the lead under the frame.
I. Fasten the wireharness to the guide on the frame with a plastic band.
J. Pass the wireharness through the guide.
INTRODUCTION
This chapter includes all information necessary to perform recommended inspections and adjustments. These preventive maintenance procedures, if followed, will ensure more reliable vehicle operation and a longer service life. The need for costly overhaul work will be greatly reduced. This information applies to vehicles already in service as well as new vehicles that are being prepared for sale. All service technicians should be familiar with this entire chapter.

PERIODIC MAINTENANCE/LUBRICATION

<table>
<thead>
<tr>
<th>No.</th>
<th>ITEM</th>
<th>CHECKS AND MAINTENANCE JOBS</th>
<th>INITIAL</th>
<th>EVERY</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>100 mi 100 mi</td>
<td>600 mi</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(150 km) 6 months</td>
<td>(1,000 km) 6 months</td>
</tr>
<tr>
<td>1</td>
<td>* Fuel line</td>
<td>• Check fuel hoses for cracks or damage. • Replace if necessary.</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>2</td>
<td>Spark plug</td>
<td>• Check condition. • Clean, regap or replace if necessary.</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>3</td>
<td>* Valves</td>
<td>• Check valve clearance. • Adjust if necessary.</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>4</td>
<td>Air filter</td>
<td>• Clean or replace if necessary.</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>5</td>
<td>* Crankcase breather system</td>
<td>• Check ventilation hose for cracks or damage and drain any deposit. • Replace if necessary.</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>6</td>
<td>* Carburetor</td>
<td>• Check engine idling speed and starter operation. • Adjust if necessary.</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>7</td>
<td>Exhaust system</td>
<td>• Check for leakage. • Retighten if necessary. • Replace gasket if necessary.</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>8</td>
<td>Engine oil</td>
<td>• Check oil level and vehicle for oil leakage. • Correct if necessary. • Change. (Warm engine before draining.)</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>9</td>
<td>Engine oil filter element</td>
<td>• Clean.</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>10</td>
<td>Clutch</td>
<td>• Check operation. • Adjust or replace cable.</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>11</td>
<td>* Front brake</td>
<td>• Check operation, fluid level and vehicle for fluid leakage. • Correct accordingly. • Replace brake pads if necessary.</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>12</td>
<td>* Rear brake</td>
<td>• Check operation, fluid level and vehicle for fluid leakage. • Correct accordingly. • Replace brake pads if necessary.</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>13</td>
<td>* Wheels</td>
<td>• Check balance, runout, spoke tightness and for damage. • Tighten spokes and rebalance, replace if necessary.</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>14</td>
<td>* Tires</td>
<td>• Check tread depth and for damage. • Replace if necessary. • Check air pressure. • Correct if necessary.</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>15</td>
<td>* Wheel bearings</td>
<td>• Check bearing looseness or damage. • Replace if necessary.</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>No.</td>
<td>ITEM</td>
<td>CHECKS AND MAINTENANCE JOBS</td>
<td>INITIAL</td>
<td>EVERY</td>
</tr>
<tr>
<td>-----</td>
<td>------</td>
<td>------------------------------</td>
<td>---------</td>
<td>-------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>100 mi (150 km) or 1 month</td>
<td>600 mi (1,000 km) or 6 months</td>
<td>1,200 mi (2,000 km) or 12 months</td>
</tr>
</tbody>
</table>
| 16  | Drive chain | • Check chain slack.  
• Adjust if necessary. Make sure that the rear wheel is properly aligned.  
• Clean and lubricate. |         | Every ride |
| 17  | * Steering bearings | • Check bearing play and steering for roughness.  
• Correct accordingly.  
• Lubricate with lithium soap base grease every 1,200 mi (2,000 km) or 12 months (whichever comes first). | ✓ | ✓ |
| 18  | * Chassis fasteners | • Make sure that all nuts, bolts and screws are properly tightened.  
• Tighten if necessary. | ✓ | ✓ | ✓ |
| 19  | Sidestand | • Check operation.  
• Lubricate and repair if necessary. | ✓ | ✓ |
| 20  | * Spark arrester | • Clean. | ✓ | |
| 21  | * Front fork | • Check operation and for oil leakage.  
• Correct accordingly. | ✓ | ✓ |
| 22  | * Rear shock absorber assembly | • Check operation and shock absorber for oil leakage.  
• Replace shock absorber assembly if necessary. | ✓ | ✓ |
| 23  | * Rear shock absorber pivoting point | • Check operation.  
• Lubricate with molybdenum disulfide grease. |         | ✓ |

* : Since these items require special tools, data and technical skills, they should be serviced by a Yamaha dealer.

**NOTE:**

- The air filter needs more frequent service if you are riding in unusually wet or dusty areas.
- **Hydraulic brake system**
  - When disassembling the master cylinder or caliper cylinder, always replace the brake fluid. Check the brake fluid level regularly and fill as required.
  - Replace the oil seals on the inner parts of the master cylinder and caliper cylinder every two years.
  - Replace the brake hoses every four years, or if cracked or damaged.
WARNING

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

1. Remove:
   - Side cover (left) ①

2. Remove:
   - Side cover (right) ①

   **NOTE:** When removing the side covers (left and right), remove the bolt ②. Then pull the front and rear portion of the side cover outward to remove the projection ③ from the grommet.

3. Remove:
   - Seat

4. Turn the fuel cock to "OFF".
5. Disconnect:
   - Fuel hose ①

**NOTE:**
Place a rag on the engine to absorb any spilled fuel.

**WARNING**
Gasoline is highly flammable. Avoid spilling fuel on the hot engine.

6. Disconnect:
   - Fuel tank breather hose ①

7. Remove:
   - Fuel tank bracket bolts ①

8. Remove:
   - Band ①
   - Fuel tank ②

**INSTALLATION**
Reverse the “REMOVAL” procedure. Note the following points.
1. Install:
   - Fuel tank

   **Bolts (fuel tank bracket):**
   10 Nm (1.0 m • kg, 7.2 ft • lb)
2. Install:
- Seat ①
- Side covers (left and right)

<table>
<thead>
<tr>
<th>Bolt (seat):</th>
<th>7 Nm (0.7 m • kg, 5.1 ft • lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bolt (side cover):</td>
<td>7 Nm (0.7 m • kg, 5.1 ft • lb)</td>
</tr>
</tbody>
</table>
ENGINE
VALVE CLEARANCE ADJUSTMENT

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 (T.D.C.) on compression stroke.

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

1. Remove: 
   • Side covers 
   • Seat 
   • Fuel tank 
   Refer to “SEAT, FUEL TANK AND COVERS”.

2. Remove: 
   • Cylinder head cover ① 
   • Spark plug ② 

3. Remove: 
   • Plugs ① (with O-ring)

4. Align: 
   • “T” mark on the rotor 
     With the stationary pointer on the crankcase cover.

T.D.C. alignment steps: 
• Turn the crankshaft clockwise with a wrench.
VALVE CLEARANCE ADJUSTMENT

Align the “T” mark ① on the rotor with stationary pointer ② on the crankcase cover. When the “T” mark is aligned with the stationary pointer, the piston is at Top Dead Center (T.D.C.).

**NOTE:**

T.D.C. on compression stroke check:
- Both cam lobes must have a valve clearance when the rotor match mark ① is aligned with the stationary pointer match mark ②.
- If not, give the crankshaft one counterclockwise turn to meet above condition.

5. Check:
- Valve clearance
  Measure the valve clearance using a feeler gauge.
  Out of specification → Adjust.

<table>
<thead>
<tr>
<th>Valve clearance (cold):</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intake:</td>
</tr>
<tr>
<td>0.09 ~ 0.19 mm</td>
</tr>
<tr>
<td>(0.004 ~ 0.007 in)</td>
</tr>
<tr>
<td>Exhaust:</td>
</tr>
<tr>
<td>0.19 ~ 0.27 mm</td>
</tr>
<tr>
<td>(0.007 ~ 0.011 in)</td>
</tr>
</tbody>
</table>

**Checking steps:**

**NOTE:**

TDC on compression stroke can be found when the cam lobes are opposite each other as shown.
- Measure the valve clearance using a feeler gauge ①.

**NOTE:**
Record the measured reading if the clearance is incorrect.
6. Remove:
   - Exhaust pipe ①

7. Loosen:
   - Cap bolt ①
8. Remove:
   - Cam chain tensioner ②

9. Remove:
   - Camshaft caps ①
   - Camshafts ②

**NOTE:**
- Refer to “ENGINE DISASSEMBLY-CYLINDER HEAD, CAMSHAFTS, CYLINDER AND PISTON” in CHAPTER 4.
- Fasten a wire to the cam chain to prevent it from falling into the crankcase.

10. Adjust:
    - Valve clearance

**Adjustment steps:**
- Remove the valve lifter ① and pad ② using the valve lapper ③.

**NOTE:**
- Place a piece of rag in the cam chain room to prevent the pad from falling into the crankcase.
- Remove the rag after adjustment.
- Select the proper valve adjusting pad from the following chart.
### EXHAUST

<table>
<thead>
<tr>
<th>B</th>
<th>MEASURED CLEARANCE</th>
<th>A</th>
<th>INSTALLED PAD NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.00 ~ 0.04</td>
<td>120</td>
<td>125</td>
<td>130</td>
</tr>
<tr>
<td>0.05 ~ 0.08</td>
<td>120</td>
<td>125</td>
<td>130</td>
</tr>
<tr>
<td>0.09 ~ 0.17</td>
<td>120</td>
<td>125</td>
<td>130</td>
</tr>
<tr>
<td>0.18 ~ 0.20</td>
<td>120</td>
<td>125</td>
<td>130</td>
</tr>
<tr>
<td>0.21 ~ 0.25</td>
<td>125</td>
<td>130</td>
<td>135</td>
</tr>
<tr>
<td>0.26 ~ 0.30</td>
<td>130</td>
<td>135</td>
<td>140</td>
</tr>
<tr>
<td>0.31 ~ 0.35</td>
<td>135</td>
<td>140</td>
<td>145</td>
</tr>
<tr>
<td>0.36 ~ 0.40</td>
<td>140</td>
<td>145</td>
<td>150</td>
</tr>
<tr>
<td>0.41 ~ 0.45</td>
<td>145</td>
<td>150</td>
<td>155</td>
</tr>
<tr>
<td>0.46 ~ 0.50</td>
<td>150</td>
<td>155</td>
<td>160</td>
</tr>
<tr>
<td>0.51 ~ 0.55</td>
<td>155</td>
<td>160</td>
<td>165</td>
</tr>
<tr>
<td>0.56 ~ 0.60</td>
<td>160</td>
<td>165</td>
<td>170</td>
</tr>
<tr>
<td>0.61 ~ 0.65</td>
<td>165</td>
<td>170</td>
<td>175</td>
</tr>
<tr>
<td>0.66 ~ 0.70</td>
<td>170</td>
<td>175</td>
<td>180</td>
</tr>
<tr>
<td>0.71 ~ 0.75</td>
<td>175</td>
<td>180</td>
<td>185</td>
</tr>
<tr>
<td>0.76 ~ 0.80</td>
<td>180</td>
<td>185</td>
<td>190</td>
</tr>
<tr>
<td>0.81 ~ 0.85</td>
<td>185</td>
<td>190</td>
<td>195</td>
</tr>
<tr>
<td>0.86 ~ 0.90</td>
<td>190</td>
<td>195</td>
<td>200</td>
</tr>
<tr>
<td>0.91 ~ 0.95</td>
<td>195</td>
<td>200</td>
<td>205</td>
</tr>
<tr>
<td>0.96 ~ 1.00</td>
<td>200</td>
<td>205</td>
<td>210</td>
</tr>
<tr>
<td>1.01 ~ 1.05</td>
<td>205</td>
<td>210</td>
<td>215</td>
</tr>
<tr>
<td>1.06 ~ 1.10</td>
<td>210</td>
<td>215</td>
<td>220</td>
</tr>
<tr>
<td>1.11 ~ 1.15</td>
<td>215</td>
<td>220</td>
<td>225</td>
</tr>
<tr>
<td>1.16 ~ 1.20</td>
<td>220</td>
<td>225</td>
<td>230</td>
</tr>
<tr>
<td>1.21 ~ 1.25</td>
<td>225</td>
<td>230</td>
<td>235</td>
</tr>
<tr>
<td>1.26 ~ 1.30</td>
<td>230</td>
<td>235</td>
<td>240</td>
</tr>
<tr>
<td>1.31 ~ 1.35</td>
<td>235</td>
<td>240</td>
<td></td>
</tr>
<tr>
<td>1.36 ~ 1.40</td>
<td>235</td>
<td>240</td>
<td></td>
</tr>
<tr>
<td>1.41 ~ 1.45</td>
<td>235</td>
<td>240</td>
<td></td>
</tr>
<tr>
<td>1.46 ~ 1.50</td>
<td>240</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### VALVE CLEARANCE (cold):

- **0.09 ~ 0.17 mm (0.004 ~ 0.007 in)**
- **Example:** Installed is: 170
  - Measured clearance is: 0.27 mm (0.011 in)
  - Replace 170 pad with 180 pad

### VALVE CLEARANCE (cold):

- **0.19 ~ 0.27 mm (0.007 ~ 0.011 in)**
- **Example:** Installed is: 180
  - Measured clearance is: 0.34 mm (0.013 in)
  - Replace 180 pad with 185 pad
NOTE: Thickness of each pad is marked on the pad face that contacts the valve lifter (not the cam).

Round off the hundredths digit of the original pad number to the nearest 0.05 mm increment.

NOTE: Pads can only be selected in 0.05 mm (0.002 in) increments.

Locate the previously installed pad number on the chart. Locate the measured valve clearance on the chart. The point where these coordinates intersect is the new pad number.

Install the new pad and valve lifter.

Recheck the valve clearance and adjust it if necessary.

NOTE: Apply molybdenum disulfide grease to the pad.

Use your finger to rotate the valve lifter smoothly.
VALVE CLEARANCE ADJUSTMENT

11. Install:
- Camshafts ①
- Timing chain ②
- Camshaft caps

Bolt (camshaft caps, cam chain tensioner):
10 Nm (1.0 m • kg, 7.2 ft • lb)
Cap bolt (cam chain tensioner):
8 Nm (0.8 m • kg, 5.8 ft • lb)

NOTE:
- Install the exhaust camshaft first.
- Align the matching marks.
- Refer to “ENGINE ASSEMBLY AND ADJUSTMENT-CYLINDER AND PISTON, CYLINDER HEAD” in CHAPTER 4.
- Apply molybdenum disulfide grease to the camshaft caps.
- Tighten the bolts (camshaft cap) in a criss-cross pattern from inside.
- Turn the crankshaft counterclockwise several turns for the installed parts to settle into the correct position.

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

12. Install:
- Timing chain tensioner

Installing steps:
- While pressing the tensioner rod lightly with your fingers, use a thin screwdriver ① and wind the tensioner rod up fully clockwise.
With the rod fully wound, install the gasket and the chain tensioner ②, and tighten the bolt ③ to the specified torque.

![Image of valve clearance adjustment]

Release the screwdriver, check that the tensioner rod comes out and tighten the gasket and the cap bolt ④ to the specified torque.

![Image of valve clearance adjustment]

---

**Bolt ③ (chain tensioner):** 10 Nm (1.0 m•kg, 7.2 ft•lb)

**Cap bolt ④ (timing chain tensioner):** 8 Nm (0.8 m•kg, 5.8 ft•lb)

---

13. Measure:
- Valve clearance

**Verification steps:**
- Follow the valve clearance measurement steps.
- If the clearance is incorrect, repeat all adjustment steps until the proper clearance is obtained.

---

14. Install:
- Reverse removal steps.
- Cylinder head cover
- Spark plug lead

**Bolt (cylinder head cover):** 10 Nm (1.0 m•kg, 7.2 ft•lb)
15. Install:
- Exhaust pipe

| Engine mount stay ①, ②: | 30 Nm (3.0 m • kg, 22 ft • lb) |
| Engine mount stay ③: | 64 Nm (6.4 m • kg, 46 ft • lb) |
| Nut ④, ⑤: | 20 Nm (2.0 m • kg, 14 ft • lb) |
| Bolt ⑥: | 20 Nm (2.0 m • kg, 14 ft • lb) |

16. Install:
- Side covers
- Seat
- Fuel tank
  Refer to “SEAT, FUEL TANK AND COVERS”.

**TIMING CHAIN ADJUSTMENT**
Adjustment free.

**IDLING SPEED ADJUSTMENT**

1. Start the engine and let it warm up for several minutes.
2. Attach:
   - Inductive tachometer
     To the spark plug lead.

   **Inductive tachometer:**
   P/N. YU-8036-A

3. Check:
   - Engine idling speed
     Out of specification → Adjust.

   **Engine idling speed:**
   1,250 ~ 1,350 r/min
4. Adjust:
- Engine idling speed

Adjustment steps:
- Turn in the pilot screw ① until it is lightly seated.
- Turn out the pilot screw for the specified number of turns.

Pilot screw:
1-1/2 turns out

- Turn the throttle stop screw ② in or out until specified idling speed is obtained.

Turning in → Idling speed becomes higher.
Turning out → Idling speed becomes lower.

THROTTLE CABLE FREE PLAY ADJUSTMENT

NOTE: __________
Before adjusting the throttle cable free play, the engine idle speed should be adjusted.

1. Check:
- Throttle cable free play ③
  Out of specification → Adjust.

Throttle cable free play:
3 ~ 5 mm (0.12 ~ 0.20 in)

2. Adjust:
- Throttle cable free play

Adjustment steps:

NOTE: ______________________
When accelerating, throttle cable #1 ① is pulled and throttle cable #2 ② is pushed.
THROTTLE CABLE FREE PLAY ADJUSTMENT/SPARK PLUG INSPECTION

1st step:
- Loosen the locknut 3 on throttle cable #2.
- Turn the adjuster 4 in or out until all slack is removed from throttle cable #2.

2nd step:
- Loosen the locknut 5 on throttle cable #1.
- Turn the adjuster 6 in or out until the specified free play is obtained.

| Turning in → Free play is increased. |
| Turning out → Free play is decreased. |

- Tighten the locknuts.

**NOTE:**
If the free play can not be adjusted here, adjust it at the throttle grip side of the cable.

Final step:
- Loosen the locknut 7.
- Turn the adjuster 8 in or out until the specified free play is obtained.

| Turning in → Free play is increased. |
| Turning out → Free play is decreased. |

- Tighten the locknut.

**WARNING**
After adjusting, turn the handlebar to the right and left, making sure that the engine idling speed does not change.

---

SPARK PLUG INSPECTION

1. Disconnect:
   - Spark plug cap

2. Remove:
   - Spark plug

When removing the spark plug, use caution to prevent an object from falling into the engine.
3. Inspect:
- Spark plug type
  Incorrect → Replace.

**Standard spark plug:**
**CR9E (NGK), U27ESR-N (DENSO)**

4. Inspect:
- 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:
- Plug gap ③
  Use a wire gauge or feeler gauge.
  Out of specification → Regap.

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

7. Tighten:
- Spark plug

**Spark plug:**
13 Nm (1.3 m•kg, 9.4 ft•lb)

**NOTE:**
- Before installing a spark plug, clean the gasket surface and plug surface.
- If a torque wrench is not available when you are installing a spark plug, a good estimate of the correct torque ② is 1/4 to 1/2 turns past finger tight ①. Have the spark plug torqued to the correct value as soon as possible with a torque wrench.

8. Connect:
- Spark plug cap
IGNITION TIMING CHECK

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

1. Start the engine and let it warm up for several minutes, then stop the engine.
2. Attach:
   - Inductive tachometer
   - Timing light
   To spark plug lead.

3. Check:
   - Ignition timing

Checking steps:
   - Remove the plug.
   - Start the engine and let it run at the specified speed.

   **CAU**
   Under extreme conditions, the oil may spurt out when running the engine. Therefore care should be used.

   - Visually check the stationary pointer ① to verify it is within the required firing range ② indicated on the flywheel.
   Incorrect firing range → Check the pickup coil assembly.

NOTE: Ignition timing is not adjustable.

4. Install:
   - Plug
5. Detach:
   - Timing light
   - Inductive tachometer
COMPRESS ORN PRESSURE MEASUREMENT

NOTE: Insufficient compression pressure will result in performance loss.

1. Check:
   • Valve clearance
     Out of specification → Adjust.
     Refer to “VALVE CLEARANCE ADJUSTMENT”.

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

3. Stop the engine.

4. Disconnect:
   • Spark plug cap

5. Remove:
   • Spark plug
     Refer to “SPARK PLUG INSPECTION”.

6. Attach:
   • Compression gauge ①
   • Adapter ②

7. Check:
   • Compression pressure

Checking steps:
   • 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.

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

   • Check the reading with the specified levels (see table).
If pressure falls below the minimum level:
1) Squirt a few drops of oil into the affected cylinder.
2) Measure the compression again.

<table>
<thead>
<tr>
<th>Reading</th>
<th>Diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Higher than without oil</td>
<td>Worn or damaged pistons</td>
</tr>
<tr>
<td>Same as without oil</td>
<td>Defective ring(s), valves, cylinder head gasket or piston is possible.</td>
</tr>
<tr>
<td>Above maximum level</td>
<td>Inspect cylinder head, valve surfaces, or piston crown for carbon deposits.</td>
</tr>
</tbody>
</table>

8. Install:
- Spark plug

![Spark plug icon]

**Spark plug:**
13 Nm (1.3 m • kg, 9.4 ft • lb)

Refer to “SPARK PLUG INSPECTION”.

9. Connect:
- Spark plug cap

---

**ENGINE OIL LEVEL INSPECTION**

**NOTE:**
Position the motorcycle straight up when checking the oil level as slight tilt to the side can produce false readings.

1. Place the motorcycle on a level place.
2. Warm up the engine for several minutes.
3. Stop the engine and visually check the oil level through the level window.
4. Inspect:
- Oil level
  Oil level should be between maximum ① and minimum ② marks.
  Low oil level → Add oil to proper level.

**NOTE:**
Wait a few minutes until level settles before inspecting.

---

**Recommended oil:**
SAE 20W40 type SE motor oil or SAE 10W30 type SE motor oil

---

**CAU**
- Do not add any chemical additives. Engine oil also lubricates the clutch and additives could cause clutch slippage.
- Do not allow foreign material to enter the crankcase.

5. Install:
- Oil filler cap

6. Start the engine and warm up for several minutes.

---

**When the oil tank is empty, never start the engine.**

7. Stop the engine and inspect the oil level once again.

---

**Oil quantity:**
Periodic oil change:
1.1 L (0.97 Imp qt, 1.16 US qt)
With oil filter replacement:
1.2 L (1.06 Imp qt, 1.27 US qt)
Total amount:
1.45 L (1.28 Imp qt, 1.53 US qt)

---

**ENGINE OIL REPLACEMENT**

---

- Do not add any chemical additives. Engine oil also lubricates the clutch and additives could cause clutch slippage.
- Do not allow foreign material to enter the crankcase.
Engine oil replacement (without oil filter)
1. Place the motorcycle on a level place.
2. Warm up the engine for several minutes, then stop the engine. Then place a receptacle under the drain plug.
3. Remove:
   - Drain plug ①
4. Drain:
   - Engine oil
5. Remove:
   - Bolt ② (oil filter cover-lower)

**NOTE:**
The oil filter cover is secured by three screws. The lower one should be removed so that the filter cavity will drain.
6. Inspect:
   - Washer (drain plug)
     Damage → Replace.
7. Install:
   - Bolt ② (oil filter cover-lower)
   - Drain plug

<table>
<thead>
<tr>
<th>Drain plug ① (crankcase):</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 Nm (2.0 m • kg, 14 ft • lb)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Bolt ② (oil filter cover-lower):</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 Nm (1.0 m • kg, 7.2 ft • lb)</td>
</tr>
</tbody>
</table>

8. Remove:
   - Oil filler cap ①
9. Fill:
   - Crankcase

**Periodic oil change:**
1.1 L (0.97 Imp qt, 1.16 US qt)

- Do not allow foreign material to enter the crankcase.
- Do not add any chemical additives. Engine oil also lubricates the clutch and additives could cause clutch slippage.
10. Install:
    - Oil filler cap
11. Inspect:
- Oil level
  Refer to “ENGINE OIL LEVEL INSPECTION”.
- Oil pressure
  Refer to “OIL PRESSURE INSPECTION”.
- Oil leaks

**Engine oil replacement (with oil filter)**
1. Place the motorcycle on a level place.
2. Warm up the engine for several minutes, then stop the engine. Then place a receptacle under the drain plug.
3. Remove:
   - Drain plug
4. Drain:
   - Engine oil
5. Remove:
   - Screw (oil filter cover-lower)

**NOTE:**
The oil filter cover is secured by three screws. The lower one should be removed so that the filter cavity will drain.

6. Remove:
   - Oil filter cover ①
   - Oil filter ②
   - O-ring ③
7. Inspect:
   - O-ring
     Damage → Replace.
8. Clean:
   - Oil filter
     Clean it with solvent.
     Clog/damage → Replace.

9. Install:
   - Oil filter

   **Install the oil filter as shown.**
   - Oil filter cover
   - Drain plug (crankcase)

   **Bolt (oil filter):**
   10 Nm (1.0 m • kg, 7.2 ft • lb)
   **Drain plug (crankcase):**
   20 Nm (2.0 m • kg, 14 ft • lb)

10. Remove:
    - Oil filler cap
11. Fill:
    - Crankcase

   **With oil filter replacement:**
   1.2 L (1.06 Imp qt, 1.27 US qt)

12. Install:
    - Oil filler cap
13. Inspect:
    - Oil level
      Refer to “ENGINE OIL LEVEL INSPECTION”.
    - Oil pressure
      Refer to “OIL PRESSURE INSPECTION”.
    - Oil leaks

---

**CAU**
- Do not allow foreign material to enter the crankcase.
- Do not add any chemical additives. Engine oil also lubricates the clutch and additives could cause clutch slippage.
OIL PRESSURE INSPECTION

1. Remove:
   • Oil check bolt

2. Start the engine and keep it idling for several minutes.

3. Inspect:
   • Oil condition of the bleed hole
     - Oil flows out → Oil pressure is good.
     - No oil comes out → Oil pressure is bad.

   If no oil comes out after a lapse of one minute, turn off the engine immediately so it will not seize.

4. Tighten:
   • Oil check bolt

   Oil check bolt: 7 Nm (0.7 m • kg, 5.1 ft • lb)

CLUTCH ADJUSTMENT

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

2. Adjust:
   • Clutch cable free play

   Adjustment steps:
   1st step:
   • Make sure that the adjuster and locknut are fully tightened.
   • Loosen the locknut.
   • Turn the adjusting nut in or out until the specified free play is obtained.

   Turning in → Free play is increased.
   Turning out → Free play is decreased.

   Tighten the locknut.

   NOTE: If the free play is incorrect, adjust the clutch cable free play with the adjuster (part of clutch lever holder).
2nd step:

- Loosen the locknut ②.
- Turn the adjuster ① in or out until the correct free play is obtained.

<table>
<thead>
<tr>
<th>Turning in</th>
<th>Free play is increased.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turning out</td>
<td>Free play is decreased.</td>
</tr>
</tbody>
</table>

- Tighten the locknut ②.

AIR FILTER CLEANING

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.

1. Remove:
- Side cover (left)
  Refer to “SEAT, FUEL TANK AND COVERS”.
- Air filter case cover ①
  Refer to “REAR SHOCK ABSORBER AND SWINGARM” in CHAPTER 6.

2. Remove:
- Air filter element assembly ①

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.

3. Inspect:
- Air filter element assembly ①
  Damage → Replace.
4. Clean:
- Air filter element
  Clean it with solvent.

**NOTE:**
After cleaning, remove the remaining solvent by squeezing the element.

**CAU**
Do not twist the filter element when squeezing the filter element.

**WARNING**
Never use low flash point solvents such as gasoline to clean the air filter element. Such solvent may lead to a fire or explosion.

5. Apply recommended oil to the entire surface of the filter and squeeze out the excess oil. The element should be wet but not dripping.

**Recommended oil:**
- SAE 20W40 type SE motor oil or
- SAE 10W30 type SE motor oil

6. Install:
- Air filter element ①
- Band ②

7. Install:
- Air filter case cover
- Side cover (left)

**Bolt (side cover):**
- 7 Nm (0.7 m • kg, 5.1 ft • lb)
SPARK ARRESTER CLEANING

1. Select a well-ventilated area free of combustible materials and make sure the exhaust and muffler are cool.

2. Remove:
   - Spark arrester

3. Clean:
   - Spark arrester with wire brush

4. Install:
   - Spark arrester

<table>
<thead>
<tr>
<th>Bolt (spark arrester):</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 Nm (0.7 m • kg, 5.1 ft • lb)</td>
</tr>
</tbody>
</table>

5. Remove:
   - Purging bolt

6. 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.

7. Stop the engine and allow the exhaust pipe to cool.

8. Install:
   - Purging bolt

<table>
<thead>
<tr>
<th>Purging bolt</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 Nm (2.0 m • kg, 14 ft • lb)</td>
</tr>
</tbody>
</table>
CRANKCASE BREATHER HOSE INSPECTION
1. Inspect:
   - Breather hose ①
     Cracks/damage → Replace.
   - Check hose ②
     Drain oil/water → Clean.

FUEL LINE INSPECTION
1. Inspect:
   - Fuel hose ①
     Cracks/damage → Replace.

EXHAUST SYSTEM INSPECTION
1. Inspect:
   - Exhaust pipe
   - Muffler
     Cracks/damage → Replace.
   - Gasket
     Exhaust gas leaks → Replace.
2. Tighten:
   - Exhaust pipe
   - Muffler

<table>
<thead>
<tr>
<th>Nuts (exhaust pipe) ①:</th>
<th>20 Nm (2.0 m • kg, 14 ft • lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bolt ②:</td>
<td>20 Nm (2.0 m • kg, 14 ft • lb)</td>
</tr>
<tr>
<td>Bolt ③:</td>
<td>40 Nm (4.0 m • kg, 29 ft • lb)</td>
</tr>
</tbody>
</table>

CARBURETOR JOINT INSPECTION
1. Inspect:
   - Carburetor joint ①, ②
     Cracks/damage → Replace.
CHASSIS
FRONT BRAKE ADJUSTMENT
1. Check:
   - Brake lever free play
     Out of specification → Adjust.

   Free play: 2 ~ 5 mm (0.08 ~ 0.20 in)

2. Adjust:
   - Brake lever free play

   Adjustment steps:
   - Loosen the locknut.
   - Turn the adjuster in or out until the specified free play is obtained.

Turning in → Free play is increased.
Turning out → Free play is decreased.

   - Tighten the locknut.

Proper lever free play is essential to avoid excessive brake drag.

WARNING
A soft or spongy feeling in the brake lever can indicate the presence of air in the brake system. This air must be removed by bleeding the brake system before the motorcycle is operated. Air in the system will cause greatly diminished braking capability and can result in loss of control and an accident. Inspect and bleed the system if necessary.

REAR BRAKE ADJUSTMENT
1. Check:
   - Brake pedal height
     Out of specification → Adjust.

   Brake pedal height: 10 mm (0.39 in)
   Below top of footrest.
2. Adjust:

- Brake pedal height

Adjustment steps:

- Loosen the locknut ①.
- Turn the adjuster ② in or out until the specified pedal height is obtained.

| Turning in | Pedal height is increased. |
| Turning out | Pedal height is decreased. |

**WARNING**

After adjusting the brake pedal height, visually check the adjuster end. The adjuster end must appear within 3.0 ~ 5.0 mm (0.12 ~ 0.20 in) ⑤.

- Tighten the locknut ①

| Locknut ①: | 18 Nm (1.8 m • kg, 13 ft • lb) |

**WARNING**

Make sure that the brake does not drag after adjusting it.

**WARNING**

A soft or spongy feeling in the brake pedal can indicate the presence of air in the brake system. This air must be removed by bleeding the brake system before the motorcycle is operated. Air in the system will cause greatly diminished braking capability and can result in loss of control and an accident. Inspect and bleed the system if necessary.

3. Adjust:

- Brake light switch

Refer to “BRAKE LIGHT SWITCH ADJUSTMENT”.
NOTE: Position the motorcycle straight up when inspecting the fluid level.

1. Place the motorcycle on a level surface.

NOTE: Place the motorcycle on its centerstand if a centerstand is equipped. If not, place a suitable stand under the motorcycle.

2. Inspect:
   - Fluid level
     Fluid level is under “LOWER” level line → Fill to proper level.

Recommended fluid:
Front: DOT #4
Rear: DOT #4

NOTE: When inspecting the fluid level of the reservoir at the handlebars, make sure the master cylinder top is horizontal.

CAUTION

The fluid may corrode painted surfaces of plastic parts. Always clean up spilled fluid immediately.

WARNING

- Use only the designated quality fluid. Otherwise, the rubber seals may deteriorate causing leakage and poor brake performance.
- Refill with the same type of fluid. Mixing fluids may result in a harmful chemical reaction leading 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 fluid and may result in vapor lock.
AIR BLEEDING (HYDRAULIC BRAKE SYSTEM)

**WARNING**

Bleed the brake system if:
- The system has been disassembled.
- A brake hose has been loosened or removed.
- The brake fluid is very low.
- The brake operation is faulty.

A loss of braking performance may occur if the brake system is not properly bled.

1. Bleed:
   - Brake fluid

**Air bleeding steps:**

a. Add 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 a clear plastic tube tightly to the caliper bleed screw.

![Diagram A](image)

- Front
- Rear
d. Place the other end of the tube into a container.
e. Slowly apply the brake lever or pedal several times.
f. Pull the lever in or push down on the pedal. Hold the lever or pedal in position.
g. Loosen the bleed screw and allow the lever or pedal to travel towards its limit.
h. Tighten the bleed screw when the lever or pedal limit has been reached, then release the lever or pedal.

![Diagram B](image)

i. Repeat steps (e) to (h) until the air bubbles have been removed from the system.

**NOTE:**

If bleeding is difficult, it may be necessary to let the brake fluid system stabilize for a few hours. Repeat the bleeding procedure when the tiny bubbles in the system have disappeared.

j. Add brake fluid to proper level.
**WARNING**
Check the operation of the brake after bleeding the brake system.

---

**Recommended fluid:**
- Front: DOT #4
- Rear: DOT #4

---

**BRAKE PAD INSPECTION**
1. Activate the brake lever or brake pedal.
2. Inspect:
   - Brake pad
     Wear indicator ① nearly contacting brake disc → Replace brake pads as a set.

---

**Wear limit ⑥:**
- Front: 1.0 mm (0.04 in)
- Rear: 1.0 mm (0.04 in)

---

Refer to “BRAKE PAD REPLACEMENT” in CHAPTER 6.

- A Front
- B Rear
BRAKE HOSE INSPECTION

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

1. Place the motorcycle on a level place.
2. Inspect:
   - Brake hose(s) ①
     Cracks/wear/damage → Replace.
   - Front
   - Rear
3. Hold the motorcycle on upright position and apply the front brake and/or rear brake.
4. Check:
   - Fluid leakage
     Active the brake lever and/or brake pedal several times.
     Fluid leakage → Replace.
     Refer to “FRONT AND REAR BRAKE” in CHAPTER 6.

DRIVE CHAIN SLACK ADJUSTMENT

NOTE: Before checking and/or adjusting, rotate the rear wheel several revolutions and check slack at several points to find the tightest point. Check and/or adjust the chain slack with the rear wheel in its “tightest” position.

CAUTION
Too little chain slack will overload the engine and other vital parts. Keep the slack within the specified limits.

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

1. Place the motorcycle on its centerstand.

NOTE: Elevate the rear wheel by placing a suitable stand under the engine if a centerstand is not equipped.
2. Check:
- Drive chain slack
  Out of specification → Adjust.

![Drive chain slack: 35 ~ 50 mm (1.38 ~ 1.97 in) with elevated rear wheel]

3. Adjust:
- Drive chain slack

Adjustment steps:
- Remove the cotter pin ① and loosen the axle nut ②.
- Turn the chain pullers ③ clockwise or counterclockwise until the specified slack is obtained.

<table>
<thead>
<tr>
<th>Turning clockwise</th>
<th>Slack is decreased.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turning counterclockwise</td>
<td>Slack is increased.</td>
</tr>
</tbody>
</table>

NOTE:
Turn each chain puller exactly the same amount to maintain correct axle alignment. (There are marks on each chain puller. Use them to check for proper alignment.)
- Tighten the axle nut to specification, while pushing up or down on the chain to zero slack.

Axle nut ②:
105 Nm (10.5 m • kg, 75 ft • lb)

4. Install:
- Cotter pin ①

CAU
Do not loosen the axle nut after torque tightening. If the axle nut groove is not aligned with the cotter pin hole, align groove with the hole by tightening up on the axle nut.

⚠️ WARNING
Always use a new cotter pin.
DRIVE CHAIN LUBRICATION
The chain consists of many parts which work against each other. If the chain is not maintained properly, it will wear out rapidly, therefore, form the habit of periodically servicing the chain. This service is especially necessary when riding in dusty conditions.

This motorcycle has a drive chain with small rubber O-rings between the chain plates.

Steam cleaning, high-pressure washes, and certain solvents can damage these O-rings. Use only kerosene to clean the drive chain. Wipe it dry, and thoroughly lubricate it with SAE 30 ~ 50W motor oil. Do not use any other lubricants on the drive chain. They may contain solvents that could damage the O-rings

Recommended lubricant: SAE 30 ~ 50W motor oil or chain lubricants suitable for “O-ring” chains.

STEERING HEAD ADJUSTMENT

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

1. Place the motorcycle on a level place.
2. Elevate the front wheel by placing a suitable stand under the frame and engine.
3. Check:
   - Steering assembly bearings
     - Grasp the bottom of the forks and gently rock the fork assembly back and forth.
     - Looseness $\rightarrow$ Adjust steering head.
4. Adjust:
   - Steering head
5. Remove:
- Bolts (handlebar) ①
- Nut (steering shaft) ②
- Speedometer ③
- Upper bracket ④
- Pinch bolts (upper bracket)

6. Adjust:
- Steering head

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

Adjustment steps:
- Remove the lock washer ①.
- Remove the ring nut (upper) ② and damper collar ③, then loosen the ring nut (lower) ④.
- Tighten the ring nut (lower) using ring nut wrench ⑤.

NOTE: Set the torque wrench to the ring nut wrench so that they form a right angle.

<table>
<thead>
<tr>
<th>Ring nut wrench:</th>
</tr>
</thead>
<tbody>
<tr>
<td>P/N. YU-33975</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ring nut-lower ④ (initial tightening):</th>
</tr>
</thead>
<tbody>
<tr>
<td>38 Nm (3.8 m·kg, 27 ft·lb)</td>
</tr>
</tbody>
</table>

- Loosen the ring nut (lower) one turn.
- Retighten the ring nut (lower) using the ring nut wrench.

<table>
<thead>
<tr>
<th>Ring nut-lower ④ (final tightening):</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 Nm (0.5 m·kg, 3.6 ft·lb)</td>
</tr>
</tbody>
</table>

⚠️ WARNING
Avoid overtightening.
Check the steering stem by turning it lock to lock. If there is any binding, remove the steering stem assembly and inspect the steering bearings.

Install the damper collar and ring nut (upper) ②.

Finger tighten the ring nut (upper) ②, then align the slots of both ring nuts. If not aligned, hold the ring nut (lower) ④ and tighten the other until they are aligned.

Install the lock washer ①.

**NOTE:**
Make sure the lock washer tabs are placed in the slots.

---

7. Install:
- Upper bracket ①
- Nut ②
Refer to “STEERING HEAD AND HANDLEBAR” in CHAPTER 6.

Cap nut ② (steering shaft):
120 Nm (12 m·kg, 85 ft·lb)

8. Install:
- Handlebar ①
- Bolts ② (handlebar crown)
- Pinch bolts (upper bracket)

Bolt ② (handlebar crown):
23 Nm (2.3 m·kg, 17 ft·lb)
Pinch bolt (upper bracket):
23 Nm (2.3 m·kg, 17 ft·lb)

---

**WARNING**

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

1. Place the motorcycle on a level place.
2. Remove:
- Band ①
- Fork boots ②
3. Check:
   - Inner tube ①
     Scratch/damage → Replace.
   - Dust seal ②
   - Oil seal
     Excessive oil leakage → Replace.

4. Hold the motorcycle on upright position and apply the front brake.

5. Check:
   - Operation
     Pump the front fork up and down for several times.
     Unsmooth operation → Repair.
     Refer to “FRONT FORK” in CHAPTER 6.

6. Install:
   - Fork boots
   - Band
     Refer to “FRONT FORK” in CHAPTER 6.

**CAU**
Always use a new band.

---

**WARNING**
- Always adjust each fork to the same setting. Uneven adjustment can cause poor handling and loss of stability.
- Securely support the motorcycle so there is no danger of it falling over.

**Compression damping**
1. Adjust:
   - Compression damping
     Turn the adjuster ① in or out.

<table>
<thead>
<tr>
<th>Turning in</th>
<th>Compression damping is harder.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turning out</td>
<td>Compression damping is softer.</td>
</tr>
</tbody>
</table>
Always keep the adjustment level equal on both forks.
Never attempt to turn the adjuster beyond the maximum or minimum setting.

Spring preload adjusting air valve
1. Elevate the front wheel by placing a suitable stand under the frame and engine.

NOTE:
When checking and adjusting the air pressure, there should be no weight on the front end of the motorcycle.

2. Remove:
   ● Air valve caps

3. Adjust:
   ● Air pressure

Adjustment steps:
Check the air pressure with an air pressure gauge.

Stiffer → Increase the air pressure.
   (Use an air pump or pressurized air supply.)
Softer → Decrease the air pressure.
   (Release the air by pushing the valve.)

Standard air pressure:
0 kPa (0 kg/cm², 0 psi)
Maximum air pressure:
40 kPa (0.4 kg/cm², 5.7 psi)

Never exceed the maximum pressure as oil seal damage may occur.

⚠️ WARNING
The difference between the left and right tubes should be 10 kPa (0.1 kg/cm², 1.4 psi) or less.
4. Install:
   - Air valve caps

REAR SHOCK ABSORBER ADJUSTMENT

**WARNING**

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

1. Remove:
   - Side cover (right)
   - Battery box
   - Seat
   
   Refer to “REAR SHOCK ABSORBER AND SWINGARM” in CHAPTER 6.

Spring preload

1. Adjust:
   - Spring preload
     Turn the adjuster ① in or out.

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

Adjustment steps:
Spring preload
   - Loosen the locknut ② using the ring nut wrench.
   - Turn the adjuster ① in or out.

   - Turning in → Spring preload is increased.
   - Turning out → Spring preload is decreased.

Ring nut wrench:
P/N. 90890-01443
Never attempt to turn the adjuster beyond the maximum or minimum setting.

1. Tighten the locknut.

2. Locknut: 70 Nm (7.0 m•kg, 50 ft•lb)

CAU
Always tighten the locknut against the spring adjuster and torque the locknut to specification.

Compression damping
1. Adjust:
   - Compression damping
     Turn the adjuster ① to in or out.

 Turning in ➔ Compression damping is harder.
 Turning out ➔ Compression damping is softer.

 Adjuster position:
   Standard: 11 clicks in
   Minimum: 5 click in from full turn out
   Maximum: 15 clicks in

Never turn the adjuster beyond the maximum or minimum setting.
REAR SHOCK ABSORBER ADJUSTMENT/ TIRE INSPECTION

Rebound damping
1. Adjust:
   • Rebound damping
     Turn the adjuster in or out.

| Turning in → | Rebound damping is harder. |
| Turning out → | Rebound damping is softer. |

Adjuster position:
  Standard: 8 clicks out
  Minimum: 16 clicks out
  Maximum: 1 click out from full turn in.

TIRE INSPECTION
1. Measure:
   • Tire pressure
     Out of specification → Adjust.

WARNING
   • Tire inflation pressure should be checked and adjusted when the temperature of the tire equals the ambient air temperature. Tire inflation pressure must be adjusted according to total weight of cargo, rider, passenger, and accessories (fairing, saddlebags, etc. if approved for this model), and vehicle speed.
   • Proper loading of your motorcycle is important for the handling, braking, and other performance and safety characteristics of your motorcycle. Do not carry loosely packed items that can shift. Securely pack your heaviest items close to the center of the motorcycle, and distribute the weight evenly from side to side. Properly adjust the suspension for your load, and check the condition and pressure of your tires. NEVER OVERLOAD YOUR MOTORCYCLE. Make sure the total weight of the cargo, rider, passenger, and accessories (fairing, saddlebags, etc. if approved for this model) does not exceed the maximum load of the motorcycle. Operation of an overloaded motorcycle could cause tire damage, an accident, or even injury.
Basic weight:
With oil and full fuel tank 124 kg (273 lb)

Maximum load-
except motorcycle* 90 kg (198 lb)

<table>
<thead>
<tr>
<th>Cold tire pressure</th>
<th>Front</th>
<th>Rear</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off-road riding*</td>
<td>100 kPa</td>
<td>100 kPa</td>
</tr>
<tr>
<td></td>
<td>(1 kg/cm², 14.5 psi)</td>
<td>(1 kg/cm², 14.5 psi)</td>
</tr>
</tbody>
</table>

*Load is the total weight of rider, and accessories.

2. Inspect:
- Tire surfaces
  Wear/damage → Replace.

**WARNING**
- It is dangerous to ride with a worn-out tire. When a tire tread begins to show lines, replace the tire immediately.
- Patching a punctured tube is not recommended. If it is absolutely necessary to do so, use great care and replace the tube as soon as possible with a good quality replacement.
- Do not attempt to use tubeless tires on a wheel designed for tube type tires only. Tire failure and personal injury may result from sudden deflation.

<table>
<thead>
<tr>
<th></th>
<th>Tube type wheel → Tube type tire only.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tubeless type wheel</td>
<td>Tube type or tubeless tire.</td>
</tr>
</tbody>
</table>
TIRE INSPECTION

- Be sure to install the correct tube when using tube type tires.
- After extensive tests, the tires mentioned below have been approved by Yamaha motor Co., Ltd. for this model. No guarantee for handling characteristics can be given if tire combinations other than what is approved are used on this motorcycle. The front and rear tires should be of the same manufacture and design.

Front:

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Size</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>DUNLOP</td>
<td>80/100-21</td>
<td>Tube</td>
</tr>
<tr>
<td></td>
<td>51M</td>
<td></td>
</tr>
</tbody>
</table>

Rear:

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Size</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>DUNLOP</td>
<td>100/100-18</td>
<td>Tube</td>
</tr>
<tr>
<td></td>
<td>59M</td>
<td></td>
</tr>
</tbody>
</table>

NOTE:

For tires with the “DRIVE” mark ①:
- Install the wheel with the “DRIVE” mark pointing in the rotating direction.
- Align the light point mark (yellow) ② with the valve installation point.

WARNING

- After mounting a tire, ride conservatively to allow proper tire to rim seating. Failure to do so may cause an accident resulting in motorcycle damage and possible operator injury.
- After a tire repair or replacement, be sure to torque tighten the valve stem locknut ① to specification.

Valve stem locknut ①: 1.5 Nm (0.15 m • kg, 1.1 ft • lb)
WHEEL INSPECTION

1. Inspect:
   - 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.

SPOKES INSPECTION AND TIGHTENING

1. Inspect:
   - Spokes ①
     Bend/damage → Replace.
     Loose spoke → Retighten.

2. Tighten:
   - Spokes
     ② Spoke wrench

NOTE:
Be sure to retighten these spokes before and after break-in.

Nipple:
3 Nm (0.3 m • kg, 2.2 ft • lb)

CABLE INSPECTION AND LUBRICATION

WARNING
A damaged cable sheath may cause corrosion and interfere with the cable movement. An unsafe condition may result, so replace such a damaged cable as soon as possible.
1. Inspect:
   - Cable sheath
     Damage → Replace.
2. Check:
   - Cable operation
     Unsmooth operation → Lubricate.

**NOTE:**
Hold cable end high and apply several drops of lubricant to cable.

**Recommended lubricant:** SAE 10W30 motor oil

**LEVER AND PEDAL LUBRICATION**
Lubricate the lever and pedal at their pivoting points.

**Recommended lubricant:** SAE 10W30 motor oil

**SIDESTAND LUBRICATION**
Lubricate the sidestand at pivoting points.

**Recommended lubricant:** SAE 10W30 motor oil
NOTE: Since the MF battery is of a sealed-type construction, it is impossible to measure the specific gravity of the electrolyte in order to check the state of charge in the battery. Therefore, to check the state of charge in the battery, voltage must be measured at the battery terminals.

CAUTION

CHARGING METHOD

- This battery is of the sealed type. Never remove sealing caps even when charging. With the sealing caps removed, the balance will not be maintained, and battery performance will lower gradually.
- Never add water. If distilled water is added, chemical reaction in the battery will not proceed in the normal way, thus making it impossible for the battery to operate regularly.
- The charging time, charging current and charging voltage for the MF battery are different from those of general type batteries.
  The MF battery should be charged as instructed in the “Charging method”. Should the battery be overcharged, the electrolyte level will lower extremely. Therefore, use special care when charging the battery.
- Avoid using any electrolyte other than specified. The specific gravity of the MF battery electrolyte is 1.32 at 20 °C (68 °F). (The specific gravity of the general type battery electrolyte is 1.28.) If the electrolyte whose specific gravity is less than 1.32, the sulfuric acid will decrease and thus low battery performance will result. Should any electrolyte, whose specific gravity is 1.32 or more, be used, the battery plates will corrode and battery life will shorten.
### WARNING

Battery electrolyte is dangerous; it contains sulfuric acid and therefore is poisonous and highly caustic.

Always follow these preventive measures:
- Avoid bodily contact with electrolyte as it can cause severe burns or permanent eye injury.
- Wear protective eye gear when handling or working near batteries.
- Antidote (EXTERNAL):
  - SKIN-Flush with water.
  - EYES-Flush with water for 15 minutes and get immediate medical attention.
- Antidote (INTERNAL):
  - Drink large quantities of water or milk follow with milk of magnesia, beaten egg, or vegetable oil. Get immediate medical attention.
  - Batteries also generate explosive hydrogen gas, therefore you should always follow these preventive measures:
    - Charge batteries in a well-ventilated area.
    - Keep batteries away from fire, sparks, or open flames (e.g., welding equipment, lighted cigarettes, etc.)
    - DO NOT SMOKE when charging or handling batteries.

**KEEP BATTERIES AND ELECTROLYTE OUT OF REACH OF CHILDREN.**

1. Remove:
   - Side cover (right)
   - Refer to “SEAT, FUEL TANK AND COVERS”.

2. Disconnect:
   - Battery leads
   - Disconnect the negative lead ① first and then disconnect the positive lead ②.

3. Remove:
   - Battery
4. Check:
- Battery condition

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

Battery condition checking steps:
- Connect a digital volt meter to the battery terminals.

Tester (+) lead → Battery (+) terminal.
Tester (−) lead → Battery (−) terminal.

NOTE: The state of a discharged MF battery can be checked by measuring the open-circuit voltage (the voltage measured with the positive terminal being disconnected).

<table>
<thead>
<tr>
<th>Open-circuit voltage</th>
<th>Charging time</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.8 V or more</td>
<td>No charging is necessary.</td>
</tr>
</tbody>
</table>

- Check the battery condition using the given figures.
  Example:
  Open-circuit voltage = 12.0 V
  Charging time = 6.5 hours
  Condition of charge in battery = 20 ~ 30 %

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

5. Charging method of MF batteries.

- If it is impossible to set the standard charging current, be sure not to overcharge.
- When charging the battery, be sure to remove it from the machine. (If charging has to be done with the battery mounted on the machine for some reason, be sure to disconnect the wire at the negative terminal.)
- Never remove the sealing plug from the MF battery.
Use special care so that charging clips are in full contact with the terminal and that they are not shorted. (A corroded clip of the charger may cause the battery to generate heat at the contact area. A weak clip spring may cause sparks.)

Before removing the clips from the battery terminals, be sure to turn off the power switch of the charger.

Change in the open-circuit voltage of the MF battery after being charged is shown in the figure. The open-circuit voltage is stabilized 30 minutes after charging has been completed. Therefore, to check the condition of the battery, measure the open-circuit voltage 30 minutes after charging has been completed.
Charging method using a variable-current (voltage) type charger

1. Measure the open-circuit voltage prior to charging.
2. Connect a charger and AMP meter to the battery, and start charging.
3. Make sure the current is higher than the standard charging current written on the battery.
   - **Yes**: Adjust the voltage so that current is at standard charging level.
   - **No**: By turning the charging voltage adjust dial, set the charging voltage at 20 ~ 25 V.
     - **Yes**: Monitor the amperage for 3 ~ 5 minutes to check if the standard charging current is reached.
     - **No**: If current does not exceed standard charging current after 5 minutes, replace the battery.

In case that charging requires more than 5 hours, it is advisable to check the charging current after a lapse of 5 hours. If there is any change in the amperage, readjust the voltage to obtain the standard charging current.

- Measure the battery open-circuit voltage after having left the battery unused for more than 30 minutes.
  - 12.8 V or more — Charging is complete.
  - 12.7 V or less — Recharging is required.
  - Under 12.0 V — Replace the battery.

NOTE: Voltage should be measured 30 minutes after the machine is stopped.

NOTE: Set the charging voltage at 16 ~ 17V. (If the setting is lower, charging will be in sufficient. If too high, the battery will be over-charged.)
BATTERY INSPECTION

Charging method using a constant-voltage type charger

Measure the open-circuit voltage prior to charging.

Connect a charger and AMP meter to the battery, and start charging.

Make sure the current is higher than the standard charging current written on the battery.

YES

| Charge the battery until the battery's charging voltage is 15 V. |

NO

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

NOTE: Voltage should be measured 30 minutes after the machine is stopped.

NOTE:
Set the charging time at 20 hours (maximum).

Check the open-circuit voltage after having left the battery for 30 minutes after charging.
12.8 V or more — Charging is complete.
12.7 V or less — Recharging is necessary.
Under 12 V — Replace the battery.

Charging method using a constant-current type charger
This type of charger cannot charge the MF battery.
6. Inspect:
   - Battery terminal
     Dirty terminal → Clean with wire brush.
     Poor connection → Correct.

   **NOTE:**
   After cleaning the terminals, apply grease lightly to the terminals.

7. Install:
   - Battery
8. Connect:
   - Battery leads

   **CAUTION**
   Connect the positive lead first and then connect the negative lead.

9. Install:
   - Side cover (right)

   **Bolt (side cover):**
   7 Nm (0.7 m • kg, 5.1 ft • lb)

---

**FUSE INSPECTION**

**NB302001**

Don’t forget to turn off the main switch when checking or replacing the fuse. Otherwise, it may cause accidental short-circuiting.

1. Remove:
   - Side cover (right)
   Refer to “SEAT, FUEL TANK AND COVERS”.
2. Remove:
   • Fuse ①

3. Inspect:
   • Fuse

   ***********************************************************
   Inspection steps:
   • Connect the pocket tester to the fuse and check it for continuity.

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

   Pocket tester:
   P/N. YU-03112

   • If the tester indicates ∞, the fuse is blown and needs to be replaced.
   ***********************************************************

4. Replace:
   • Blown fuse

   ***********************************************************
   Blown fuse replacement steps:
   • Turn off the ignition and the circuit.
   • Install a new fuse of proper amperage.

   Fuse:
   15 A × 1 pc.

   • Turn on the switches to verify operation of electrical device.
   • If the fuse blows immediately again, check the circuit in question.
   ***********************************************************

   WARNING
   Never use a fuse with a rating other than specified, or other material in place of a fuse. An improper fuse may cause damage to the electrical system and possible cause a fire, or the lighting and/or ignition may cease to function.
HEADLIGHT BEAM ADJUSTMENT
1. Adjust:
   ● Headlight beam (vertical)

<table>
<thead>
<tr>
<th>To raise the beam</th>
<th>Turn adjusting screw ① counterclockwise.</th>
</tr>
</thead>
<tbody>
<tr>
<td>To lower the beam</td>
<td>Turn adjusting screw ① clockwise.</td>
</tr>
</tbody>
</table>

HEADLIGHT BULB REPLACEMENT
1. Remove:
   ● Cover (headlight)
2. Disconnect:
   ● Headlight leads

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

3. Install:
   ● Bulb (new)

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

4. Install:
   ● Bulb cover
   ● Headlight leads
5. Install:
   ● Cover (headlight)
ENGINE REMOVE

NOTE:
It is not necessary to remove the engine in order to remove the following components.
- Cylinder head
- Cylinder
- Clutch
- Oil pump
- CDI magneto

SEAT, FUEL TANK AND COVERS
1. Remove:
   - Side covers
   - Seat
   - Fuel tank
   Refer to “SEAT, FUEL TANK AND COVERS” in CHAPTER 3.

CARBURETOR
1. Remove:
   - Carburetor ①
   Refer to “CARBURETOR” in CHAPTER 5.

ENGINE GUARD
1. Remove:
   - Engine guard ①

ENGINE OIL
1. Drain:
   - Oil filler cap ①
   - Drain plug ②
   Refer to “ENGINE OIL REPLACEMENT” in CHAPTER 3.
BATTERY
1. Remove:
   • Battery ①
   Refer to “BATTERY INSPECTION” in CHAPTER 3.

EXHAUST PIPE
1. Loosen:
   • Bolt ① (clamp)
2. Remove:
   • Mounting bolts ② (front-upper)
   • Nuts ③ (exhaust pipe)
3. Remove:
   • Exhaust pipe

CRANKCASE BREATHER HOSE
1. Disconnect:
   • Crankcase breather hose ①

STARTER MOTOR
1. Disconnect:
   • Gas chamber
   Refer to “REAR SHOCK ABSORBER AND SWINGARM” in CHAPTER 6.
2. Remove:
   • Oil delivery pipe ①
3. Disconnect:
   • Starter motor lead ②
   • Ground lead ③
4. Remove:
   • Starter motor ①
CLUTCH CABLE AND LEADS
1. Remove:
   • Clutch cable

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

Removal steps:
   • Loosen the locknuts 2, 4.
   • Turn the adjuster 3, 5 enough to free the clutch cable.
   • Unhook the cable end 6 from the clutch lever.
   • Unhook the cable end from the clutch push lever 7.

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

2. Disconnect:
   • A.C. magneto leads
   • Neutral switch lead

3. Disconnect:
   • Spark plug lead

DRIVE SPROCKET
1. Remove:
   • Shift pedal
   • Crankcase cover 3
2. Remove:
- Nut ①
- Lock washer ②
- Drive sprocket ③

**NOTE:**
- Straighten the lock washer tab.
- Loosen the nut while applying the rear brake.
- First remove the drive chain on the rear sprocket side.

**FOOTREST AND BRAKE PEDAL**
1. Remove:
- Footrest (right) ①
- Brake pedal ②

**ENGINE REMOVAL**
1. Place a suitable stand under the frame and engine

⚠️ **WARNING**
Securely support the motorcycle so there is no danger of it falling over.

2. Remove:
- Mounting bolts ① (rear-upper)

3. Remove:
- Mounting bolt ① (front-lower)
- Mounting bolt ② (rear-center)
- Mounting bolt ③ (rear-lower)
- Engine bracket ④

4. Remove:
- Engine assembly
  (from right side of motorcycle)
ENGINE DISASSEMBLY

CYLINDER HEAD, CAMSHAFTS, CYLINDER AND PISTON

1. Remove:
   - Cylinder head cover ①
   - Spark plug ②

2. Remove:
   - Plugs (with O-ring)

3. Align:
   - “T” mark on the rotor
     With the stationary pointer on the crankcase cover.

   ******************************************************************************
   TDC alignment steps:
   - Turn the crankshaft clockwise with wrench.
   - Align the “T” mark ① on the rotor with the stationary pointer ② on the crankcase cover. When the “T” mark is aligned with the stationary pointer, the piston is at Top Dead Center (TDC).

   NOTE:  
   TDC on compression stroke check:
   - Both cam lobes must have a valve clearance when the cam sprockets match mark is aligned with the cylinder head match mark.
   - If not, give the crankshaft one counterclockwise turn to meet above condition.

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

4. Loosen:
   - Cap bolt ① (chain tensioner)

5. Remove:
   - Chain tensioner ②
6. Remove:
   - Camshaft caps

   **NOTE:**
   Fasten a safety wire \( \textcircled{1} \) to the timing chain to prevent it from falling into the crankcase.

7. Remove:
   - Camshaft \( \textcircled{1} \) (intake)
   - Camshaft \( \textcircled{2} \) (exhaust)
   - Dowel pins \( \textcircled{3} \)

   **NOTE:**
   Remove the camshaft cap bolts in a crisscross pattern from outside to inside.

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

8. Remove:
   - Bolts
   - Nuts

   **NOTE:**
   - Loosen the bolts and nuts in the loosening sequence indicated by the numbers.
   - Loosen the bolts starting with the highest numbered one.
   - Loosen the bolts 1/4 turn each and remove them after all are loosened.

9. Remove:
   - Cylinder head \( \textcircled{1} \)
10. Remove:
- Dowel pins ①
- Gasket ② (cylinder head)
- Timing chain guide ③ (exhaust)
- Cylinder ④

11. Remove:
- Dowel pins ①
- Gasket ② (cylinder)

12. Remove:
- Piston pin circlip ①
- Piston pin ②
- Piston ③

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

Do not use a hammer to drive the piston pin out.
CLUTCH, OIL PUMP AND BALANCER GEAR

NOTE: ________________________________________
With the engine mounted, the clutch and oil pump can be maintained by removing the following parts.
- Footrest (right)
- Brake pedal

1. Remove:
   - Crankcase cover ① (right)

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

2. Remove:
   - Dowel pins
   - Gasket (crankcase cover)
   - Bolt ①

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

3. Remove:
   - Clutch springs ①
   - Pressure plate ②
   - Friction plates ③
   - Clutch plates ④

4. Straighten:
   - Lock washer tab ①
5. Loosen:
- Nut ② (clutch boss)

**NOTE:**
Loosen the nut (clutch boss) while holding the clutch boss with the universal clutch holder ③.

<table>
<thead>
<tr>
<th>Universal clutch holder:</th>
</tr>
</thead>
<tbody>
<tr>
<td>P/N. YU-91042</td>
</tr>
</tbody>
</table>

6. Remove:
- Clutch boss ①
- Thrust plate ②
- Primary driven gear ③
- Ball ④
- Push rod ⑤

7. Straighten:
- Lock washer tab ①

8. Loosen:
- Nut ② (crankshaft)

**NOTE:**
- Place a folded rag or aluminum plate between the teeth of the primary drive gear and driven gear.
- Take care not to damage the gear teeth.

9. Remove:
- Lock washer ①
- Drive gear ②
- Timing chain guide ③
- Oil pump gear cover ④

**NOTE:**
Remove the cover by pulling outward as shown.

10. Remove:
- Oil pump assembly ①
- Oil strainer ②
11. Remove:
- Circlip ①
- Collar ②
- Circlip

**SHIFT SHAFT**

**NOTE:**
With the engine mounted, the shift shaft can be maintained by removing the following parts.
- Footrest (right)
- Brake pedal
- Clutch
- Oil pump

1. Remove:
- Circlip ①
- Shift lever ②
- Stopper lever ③
- Torsion spring ④

**ROTOR AND STARTER DRIVES**

**NOTE:**
With the engine mounted, the CDI magneto and starter drives can be maintained by removing the following parts.
- Side cover (right)
- Shift pedal
- Fuel tank
- Seat
- Engine guard

1. Disconnect:
- Neutral switch lead ①
- Neutral switch ②
2. Remove:
   - Generator cover

3. Remove:
   - Starter idle gear 1
   - Shaft
   - Bearing

4. Remove:
   - Crankcase cover 1 (left)

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

5. Remove:
   - Starter idle gear 2
   - Push lever assembly

6. Remove:
   - Bolt (rotor)

**NOTE:**
Loosen the bolt (rotor) while holding the rotor with the sheave holder.

*Sheave holder: P/N. YS-01880*
Do not allow the rotor holder to touch the projection ③ on the rotor.

7. Remove:
- Rotor ①
  Use the sheave holder ② and rotor puller ③.

   ![Diagram of rotor puller]

   **Rotor puller:**
   P/N. 2K7-85555-00

8. Remove:
- Starter wheel gear ①
- Woodruff key ②
- Bearing
- Washer

**OIL FILTER**
1. Remove:
   - Oil filter cover
2. Remove:
   - Oil filter ①
   - O-rings ②

**CRANKCASE**
1. Remove:
   - Bolts (crankcase)

**NOTE:** Working in a crisscross pattern, loosen all screws 1/4 turn each. Remove them after all are loosened.
2. Align:
- Shift cam segment ①

**NOTE:**
Turn the shift cam to the position shown in the figure so that it does not contact the crankcase when separating the crankcase.

3. Remove:
- Crankcase

**CA**
- The crankcase should be separated from right side.
- Separate the crankcase after checking the shift cam segment and removing the drive axle circlip.
- Do not damage the crankcase mating surfaces.

4. Remove:
- Dowel pins

**BALANCER, TRANSMISSION AND SHIFTER**
1. Remove:
- Shift shaft 1 ①
- Shift shaft 2 ②

2. Remove:
- Shift cam ①
- Shift fork guide bar ②
- Shift fork R ③
- Shift fork C ④
- Shift fork L ⑤
3. Remove:
- Balancer shaft ①
- Main axle shaft ②
- Drive axle shaft ③

CRANKSHAFT
1. Remove:
- Crankshaft assembly ①
Use the crankcase separating tool ②.

NOTE:
Tighten the tool holding bolts, but make sure that the tool body is vertical with the crankshaft. If necessary, one screw may be backed out slightly to level tool body.

BEARINGS AND OIL SEALS
1. Remove:
- Oil seals
- Bearings

VALVE
NOTE:
Before removing the internal parts (valve, valve spring, valve seat etc.) of the cylinder head, the valve sealing should be checked.

1. Remove:
- Lifters ①
- Pads

NOTE:
Identify each lifter and pad position very carefully so that it can be reinstalled in its original place.
2. Check:
- Valve sealing
  Leakage at valve seat → Inspect the valve face, valve seat and valve seat width. Refer to “INSPECTION AND REPAIR-VALVE SEAT”.

*********************************
Checking steps:
- Pour a clean solvent ① into the intake and exhaust ports.
- Check the valve sealing. There should be no leakage at the valve seat ②.
*********************************

3. Remove:
- Valve cotters ①

NOTE: 
Remove the valve cotters while compressing the valve spring with the valve spring compressor ②.

Valve spring compressor:
P/N. YM-04019

4. Remove:
- Valve retainer ①
- Oil seal ②
- Valve spring ③
- Spring seat ④
- Valve ⑤

NOTE: 
Identify each part position very carefully so that it can be reinstalled in its original place.
INSPECTION AND REPAIR

CYLINDER HEAD

1. Eliminate:
   - Carbon deposit
     (from combustion chamber)
     Use rounded scraper ①.

   **NOTE:**
   Do not use a sharp instrument and avoid damaging or scratching:
   - Spark plug thread
   - Valve seat

2. Inspect:
   - Cylinder head
     Scratches/damage → Replace.

3. Measure:
   - Warpage
     Out of specification → Resurface.

4. Resurface:
   - Cylinder head

   **Resurfacement steps:**
   - Place a 400 ~ 600 grit wet sandpaper on the surface plate, and resurface the head using a figure-eight sanding pattern.

   **NOTE:**
   Rotate the head several times to avoid removing too much material from one side.

VALVE SEAT

1. Eliminate:
   - Carbon deposit
     (from valve face and valve seat)

2. Inspect:
   - Valve seat
     Pitting/wear → Reface the valve seat.
3. Measure:
- Valve seat width
  - Out of specification → Reface the valve seat.

**Valve seat width:**
- Intake: 0.9 ~ 1.1 mm (0.035 ~ 0.043 in)
- Exhaust: 0.9 ~ 1.1 mm (0.035 ~ 0.043 in)

**Measurement steps:**
- Apply the Mechanic’s blueing dye (Dykem) to the valve face.
- Install the valve into the cylinder head.
- Press the valve through the valve guide and onto the valve seat to make a clear pattern.
- Measure the valve seat width. Wherever the valve seat and valve face made contact, blueing will have been removed.
- If the valve seat width is too wide, too narrow, or seat has not centered, the valve seat must be refaced.

**Measurement steps:**

<table>
<thead>
<tr>
<th>Section</th>
<th>Cutter</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>30°</td>
</tr>
<tr>
<td>B</td>
<td>45°</td>
</tr>
<tr>
<td>C</td>
<td>60°</td>
</tr>
</tbody>
</table>

4. Reface:
- Valve seat
  - Use a 30°, 45° and 60° valve seat cutter.

When twisting the cutter, keep an even downward pressure (4 ~ 5 kg) to prevent chatter marks.
Refacing steps:

A. Valve seat is centered on the valve face but it is too wide.

<table>
<thead>
<tr>
<th>Valve seat cutter set</th>
<th>Desired result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use lightly 45° cutter 60° cutter</td>
<td>To reduce valve seat width to 1.0 mm (0.039 in).</td>
</tr>
</tbody>
</table>

B. Valve seat is in the middle of the face but it is too narrow.

<table>
<thead>
<tr>
<th>Valve seat cutter set</th>
<th>Desired result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use 45° cutter</td>
<td>To achieve a uniform valve seat width of 1.0 mm (0.039 in).</td>
</tr>
</tbody>
</table>

C. Valve seat is too narrow and it is near valve margin.

<table>
<thead>
<tr>
<th>Valve seat cutter set</th>
<th>Desired result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use First: 30° cutter Second: 45° cutter</td>
<td>To center the seat and to achieve its width of 1.0 mm (0.039 in).</td>
</tr>
</tbody>
</table>

D. Valve seat is too narrow and it is located near the bottom edge of the valve face.

<table>
<thead>
<tr>
<th>Valve seat cutter set</th>
<th>Desired result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use First: 60° cutter Second: 45° cutter</td>
<td>To center the seat and increase its width.</td>
</tr>
</tbody>
</table>

5. 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.
Lapping steps:

- Apply a coarse lapping compound to the valve face.

**Be sure no compound enters the gap between the valve stem and guide.**

- Apply a molybdenum disulfide oil to the valve stem.
- Install the valve into the cylinder head.
- Turn the valve until the valve face and valve seat are evenly polished, then clean off all compound.

**NOTE:**
To obtain the best lapping results, lightly tap the valve seat while rotating the valve back and forth between your hands.

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

**NOTE:**
Be sure to clean off all compound from the valve face and valve seat after every lapping operation.

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

**************************************************
VALVE AND VALVE GUIDE

1. Measure:
   - Stem-to-guide clearance

<table>
<thead>
<tr>
<th>Stem-to-guide clearance =</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valve guide inside diameter ( \bar{a} ) – Valve stem diameter ( \bar{b} )</td>
</tr>
</tbody>
</table>

   Out of specification \( \rightarrow \) Replace valve guide.

2. Replace:
   - Valve guide

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

   Replacement steps:

   **NOTE:**
   Heat the cylinder head in an oven to 100 °C (212 °F) to ease guide removal and installation and to maintain correct interference fit.

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

<table>
<thead>
<tr>
<th>Valve guide remover:</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 mm (0.20 in):</td>
</tr>
<tr>
<td>P/N. YM-04097</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Valve guide reamer:</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 mm (0.20 in):</td>
</tr>
<tr>
<td>P/N. YM-04099</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Valve guide installer:</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 mm (0.20 in):</td>
</tr>
<tr>
<td>P/N. YM-04098</td>
</tr>
</tbody>
</table>

   **NOTE:**
   Reface the valve seat after replacing the valve guide.

   ***********************************************
3. Eliminate:
   - Carbon deposit
     (from valve face)

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

5. Measure:
   - Margin thickness 🟢
     Out of specification → Replace.

   Margin thickness:
   IN: 0.6 ~ 1.0 mm (0.02 ~ 0.04 in)
   EX: 0.8 ~ 1.2 mm (0.03 ~ 0.05 in)

6. Measure:
   - Runout (valve stem)
     Out of specification → Replace.

   Runout:
   Less than 0.010 mm (0.0004 in)

   NOTE:
   - Always replace the guide if the valve is
     replaced.
   - Always replace the oil seal if the valve is
     removed.

NB243004
VALVE SPRING
1. Measure:
   - Free length 🟢 (valve spring)
     Out of specification → Replace.

   Free length (valve spring)

<table>
<thead>
<tr>
<th></th>
<th>Intake</th>
<th>Exhaust</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>33.81 ~ 35.59 mm</td>
<td>(13.31 ~ 14.01 in)</td>
</tr>
</tbody>
</table>
2. Measure:
- Compressed force (valve spring) Out of specification → Replace.
  - Installed length

### Compressed force:

<table>
<thead>
<tr>
<th></th>
<th>Spring at 30.39 mm (1.20 in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intake</td>
<td>9.3 ~ 10.7 kg (20.53 ~ 23.62 lb)</td>
</tr>
<tr>
<td>Exhaust</td>
<td>9.3 ~ 10.7 kg (20.53 ~ 23.62 lb)</td>
</tr>
</tbody>
</table>

3. Measure:
- Spring tilt Out of specification → Replace.

### Spring tilt:

- Intake:
  - Less than 1.6 mm (0.063 in)
- Exhaust:
  - Less than 1.6 mm (0.063 in)

**NB243005**

**CAMSHAFT**

1. Inspect:
- Cam lobes
  - Pitting/scratches/blue discoloration → Replace.

2. Measure:
- Cam lobes length and Out of specification → Replace.

### Cam lobes length:

<table>
<thead>
<tr>
<th>Intake, Exhaust</th>
<th>Intake, Exhaust</th>
</tr>
</thead>
<tbody>
<tr>
<td>a 25.00 ~ 25.10 mm (0.9843 ~ 0.9882 in)</td>
<td>a 32.75 ~ 32.85 mm (1.2894 ~ 1.2933 in)</td>
</tr>
</tbody>
</table>
3. Measure:
- Runout (camshaft)
  Out of specification → Replace.

**Runout (camshaft):**
Less than 0.03 mm (0.0012 in)

4. Measure:
- Camshaft-to-cap clearance
  Out of specification → Measure bearing diameter (camshaft).

**Camshaft-to-cap clearance:**
0.020 ~ 0.054 mm
(0.0008 ~ 0.0021 in)

Measurement steps:
- Install the camshaft onto the cylinder head.
- Position a strip of Plastigauge® onto the camshaft.
- Install the dowel pins and camshaft caps.

**Bolt (camshaft cap):**
10 Nm (1.0 m • kg, 7.2 ft • lb)

NOTE:
- Tighten the camshaft caps in a crisscross pattern from innermost to outer.
- Do not turn the camshaft when measuring clearance with the Plastigauge®.
- Remove the camshaft caps and measure the width of the Plastigauge®.

5. Measure:
- Bearing diameter (camshaft)
  Out of specification → Replace camshaft. Within specification → Replace cylinder head.

**Bearing diameter (camshaft):**
24.467 ~ 24.480 mm
(0.9633 ~ 0.9638 in)
NB643006
VALVE LIFTER
1. Inspect:
   ● Valve lifters
     Scratches/damage → Replace both lifters and camshaft case.

NB643007
TIMING CHAIN, SPROCKET AND CHAIN GUIDE
1. Inspect:
   ● Timing chain
     Stiff/cracks → Replace the timing chain and the sprockets as a set.

2. Inspect:
   ● Cam sprocket
     Wear/damage → Replace the cam sprockets and the timing chain as a set.
     ① 1/4 tooth
     ② Correct
     ③ Roller
     ④ Sprocket

3. Inspect:
   ● Chain guide ① (exhaust side)
   ● Chain guide ② (intake side)
     Wear/damage → Replace.
4. Check:
- Timing chain tensioner movement

**Checking steps:**
- While pressing the tensioner rod lightly with fingers, use a thin screwdriver ① and wind the tensioner rod up fully clockwise.
- When releasing the screwdriver by pressing lightly with fingers, make sure that the tensioner rod will come out smoothly.
- If not, replace the tensioner assembly.

### CYLINDER AND PISTON

**1. Eliminate:**
- Carbon deposits
  (from the piston crown ① and ring grooves ②.)

**2. Inspect:**
- Piston wall
  Wear/scratches/damage → Replace.

**3. Eliminate:**
- Score marks and lacquer deposits
  (from the side of the piston)
  Use a 600 ~ 800 grit wet sandpaper.

**NOTE:** Sand in a crisscross pattern. Do not sand excessively.

**4. Inspect:**
- Cylinder wall
  Wear/scratches → Re bore or replace.

**5. Measure:**
- Piston-to-cylinder clearance

**Measurement steps:**

**1st steps:**
- Measure the cylinder bore “C” with a cylinder bore gauge.
  @ 40 mm (1.6 in) from the cylinder top
NOTE:
Measure the cylinder bore “C” in parallel to and at right angles to the crankshaft. Then, find the average of the measurements.

Cylinder bore “C”:
72.970 ~ 73.020 mm
(2.873 ~ 2.875 in)
<Limit: 73.1 mm (2.878 in)

\[ C = \frac{X + Y}{2} \]

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

2nd steps:
- Measure the piston skirt diameter “P” with a micrometer.
- 4.0 mm (0.16 in) from the piston bottom edge

Piston skirt diameter “P”:
72.920 ~ 72.970 mm
(2.871 ~ 2.873 in)

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

3rd steps:
- Find the piston-to-cylinder clearance with following formula.

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

Piston-to-cylinder clearance:
0.040 ~ 0.060 mm
(0.0016 ~ 0.0024 in)
<Limit: 0.1 mm (0.004 in)>

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

***************************************************************
NB243009
PISTON RING
1. Measure:
   - Side clearance
     Out of specification → Replace the piston and the piston rings as a set.

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

<table>
<thead>
<tr>
<th>Side clearance:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top ring:</td>
</tr>
<tr>
<td>0.040 ~ 0.080 mm</td>
</tr>
<tr>
<td>(0.0016 ~ 0.0031 in)</td>
</tr>
<tr>
<td>2nd ring:</td>
</tr>
<tr>
<td>0.030 ~ 0.070 mm</td>
</tr>
<tr>
<td>(0.0012 ~ 0.0028 in)</td>
</tr>
</tbody>
</table>

2. Position:
   - Piston ring
     (into the cylinder)

NOTE:
Push the ring with the piston crown so that the ring will be at a right angle to cylinder bore.

3. Measure:
   - 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>
</tr>
</thead>
<tbody>
<tr>
<td>Top ring:</td>
</tr>
<tr>
<td>0.20 ~ 0.35 mm (0.008 ~ 0.014 in)</td>
</tr>
<tr>
<td>2nd ring:</td>
</tr>
<tr>
<td>0.20 ~ 0.35 mm (0.008 ~ 0.014 in)</td>
</tr>
<tr>
<td>Oil ring:</td>
</tr>
<tr>
<td>0.20 ~ 0.70 mm (0.008 ~ 0.028 in)</td>
</tr>
</tbody>
</table>

NB243010
PISTON PIN
1. Inspect:
   - Piston pin ①
     Blue discoloration/groove → Replace, then inspect lubrication system.
2. Measure:
- Piston pin outside diameter
  Out of specification → Replace.

   ![Outside diameter (piston pin): 17.991 ~ 18.000 mm (0.7083 ~ 0.7087 in)]

   ① Micrometer

3. Measure:
- Piston pin bore inside diameter
  Out of specification → Replace.

   ![Piston pin bore inside diameter: 18.004 ~ 18.015 mm (0.7088 ~ 0.7093 in)]

CRANKSHAFT

1. Measure:
- Crank width A
  Out of specification → Replace crankshaft.

   ![Crank width: 60.25 ~ 60.30 mm (2.372 ~ 2.374 in)]

- Runout C
  Out of specification → Replace crankshaft and/or bearing.

   ![Runout limit: 0.03 mm (0.0012 in)]

- Big end side clearance D
  Out of specification → Replace big end bearing, crank pin and/or connecting rod.

   ![Big end side clearance: 0.35 ~ 0.85 mm (0.013 ~ 0.033 in)]

- Small end free play F
  Out of specification → Replace connecting rod.

   ![Small end free play: 0.8 mm (0.03 in)]
2. Inspect:
- Crankshaft sprocket (cam chain sprocket)
  ①
  Wear/damage → Replace the crankshaft.

3. Inspect:
- Crankcase bearing ①
  Abnormal noise/turn roughly/free play → Replace.
  A Free play

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

Crankshaft reassembling point:
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).

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

BALANCER DRIVE GEAR AND BALANCER GEAR
1. Inspect:
- Balancer drive gear teeth ①
- Balancer gear teeth ②
  Wear/damage → Replace both gears.

2. Inspect:
- Match marks ①
  If they are not aligned → Align match marks as shown.
INSPECTION AND REPAIR

NB243013

PRIMARY DRIVE
1. Inspect:
   - Primary driven gear teeth
   - Clutch boss
     Wear/damage → Replace.
     Excessive noise during operation → Replace.

NB243014

CLUTCH
1. Inspect:
   - Friction plate
     Damage/wear → Replace friction plates as a set.
2. Measure:
   - Friction plate thickness
     Out of specification → Replace friction plates as a set.
     Measure at all four points.

<table>
<thead>
<tr>
<th></th>
<th>Thickness</th>
<th>Wear limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type “A”</td>
<td>2.90 ~ 3.10 mm</td>
<td>2.7 mm</td>
</tr>
<tr>
<td></td>
<td>(0.114 ~ 0.122 in)</td>
<td>(0.106 in)</td>
</tr>
<tr>
<td>(7 pcs.)</td>
<td>2.7 mm</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.106 in)</td>
<td></td>
</tr>
</tbody>
</table>

3. Inspect:
   - Clutch plate
     Damage → Replace clutch plates as a set.

4. Measure:
   - Clutch plate warpage
     Out of specification → Replace clutch plates as a set.
     Use a surface plate and feeler gauge.

   Warp limit:
   Less than 0.05 mm (0.002 in)

5. Inspect:
   - Clutch spring
     Damage → Replace as a set.
6. Measure:
   - Clutch spring free length
     Out of specification → Replace springs as a set.

   Free length (clutch spring): 42.8 mm (1.685 in)
   <Limit>: 40.8 mm (1.606 in)
7. Inspect:
   - Dogs on the primary driven gear ①
     Scoring/wear/damage → Deburr or replace.
   - Clutch boss splines ②
     Scoring/wear/damage → Replace the clutch boss.

**NOTE:**
Scoring on the clutch housing dogs and the clutch boss splines will cause erratic operation.

8. Check:
   - Circumferential play
     Free play exists → Replace.

9. Inspect:
   - Pressure plate ①
   - Push plate ②
   - Push rod 1 ③
   - O-ring ④
   - Ball ⑤
   - Push rod 2 ⑥
   - Push lever ⑦
     Wear/bend/damage → Replace.

**NB243015**

TRANSMISSION AND SHIFTER

1. Inspect:
   - Shift fork cam follower ①
   - Shift fork pawl ②
     Scoring/bends/wear → Replace.
2. Inspect:
- Shift cam groove ①
- Shift cam segment ②
  Wear/damage → Replace.

3. Check:
- Shift fork movement
  Unsmooth operation → Replace shift fork and/or guide bar.

4. Check:
- Guide bar
  Roll the guide bar on a flat surface.
  Bends → Replace.

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

5. Measure:
- Runout (drive axle and main axle)
  Out of specification → Replace.

![ Runout: Less than 0.08 mm (0.003 in) ]

**WARNING**
Do not attempt to straighten a bent axle.

6. Inspect:
- Gear teeth
  Blue discoloration/pitting/wear → Replace.
- Mated dogs
  Rounded edges/cracks/missing portions → Replace.
7. Inspect:
- Shift shaft 1
- Shift shaft 2
- Stopper lever
- Torsion spring
  Cracks/damage → Replace.

8. Inspect:
- Shift lever
- Torsion spring
  Cracks/damage → Replace.

**NB243016**

**OIL PUMP AND STRAINER**

1. Measure:
- Tip clearance (between inner rotor and outer rotor)
- Side clearance (between outer rotor and pump housing)

Out of specification → Replace the oil pump.

- Tip clearance: 0.15 mm (0.006 in)
- Side clearance: 0.10 ~ 0.15 mm (0.004 ~ 0.006 in)
2. Inspect:
- Oil pump driven gear ①
- Oil pump ②
  Wear/cracks/damage → Replace.
3. Inspect:
- Oil strainer
  Damage → Replace.

NB243012

ELECTRIC STARTER DRIVE
1. Inspect:
- Starter idle gear 1 teeth ①
- Starter idle gear 2 teeth ②
  Burrs/chips/roughness/wear → Replace.

2. Inspect:
- Starter wheel gear
  (contacting surfaces)
  Pitting/wear/damage → Replace.

3. Inspect:
- Starter clutch assembly ①
- Starter clutch ②
  Wear/damage → Replace.
4. Check:
- Starter clutch operation

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

Checking steps:
- Install the starter wheel gear to the starter clutch, and hold the starter clutch.
- When turning the starter wheel gear clockwise A, the starter clutch and the wheel gear should be engaged.
  If not, the starter clutch is faulty. Replace it.
- When turning the starter wheel gear counterclockwise B, the starter clutch gear should turn freely.
  If not, the starter clutch is faulty. Replace it.
**************************************************************************
5. Inspect:
   • Pickup coil ①
   • Stator coil ②
   Damage → Replace.

**NB243018**

**CRANKCASE**
1. Thoroughly wash the case halves with mild solvent.
2. Thoroughly clean all the gasket mating surfaces and crankcase mating surfaces.
3. Inspect:
   • Crankcase
     Cracks/damage → Replace.
   • Oil delivery passages
     Clog → Blow out with compressed air.

**NB243019**

**BEARING AND OIL SEAL**
1. Inspect:
   • Bearings
     Clean and lubricate, then rotate inner race with finger.
     Roughness → Replace.

   **CA**
   Do not use compressed air to spin the bearings dry. This causes damage to the surfaces.

2. Inspect:
   • Oil seals
     Damage/wear → Replace.

**NB243020**

**CIRCLIP AND WASHER**
1. Inspect:
   • Circlips
   • Washers
     Damage/looseness/bends → Replace.
ENGINE ASSEMBLY AND ADJUSTMENT

CRANKSHAFT AND BALANCER

1. Bearing
2. Woodruff key
3. Crankshaft assembly
4. Woodruff key
5. Bearing
6. Bearings
7. Buffer boss
8. Balancer gear
9. Spring
10. Dowel pin
11. Absorber plate
12. Balancer weight

60 Nm (6.0 m • kg, 43 ft • lb)
CRANKSHAFT AND BALANCER SHAFT

1. Attach:
   - Crankshaft installing tool

   ![Crankpot spacer](P/N. YU-01202)
   ![Adapter #12](P/N. YU-90062)
   ![Crankshaft installer set](P/N. YU-90050)

2. Install:
   - Crankshaft

   **NOTE:**
   Hold the connecting rod at top dead center 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.

   **CA**
   To protect the crankshaft against scratches or to make installation easier, apply grease to the oil seal lips and apply engine oil to each bearing.

3. Install:
   - Balancer shaft

   **NOTE:**
   When installing the balancer shaft, align the punched mark A on the crankshaft drive gear with the punched mark B on the balancer gear.
TRANSMISSION
1 Drive sprocket 8 1st wheel gear
2 Oil seal 10 Bearing
3 Bearing 11 Bearing
4 Drive axle 12 Bearing
5 2nd wheel gear 13 2nd pinion gear
6 5th wheel gear 14 5th pinion gear
7 4th wheel gear 15 3rd/4th pinion gear
8 3rd wheel gear 16 6th pinion gear
9 6th wheel gear 17 Main axle
18 Main axle
19 Bearing

110 Nm (11.0 m•kg, 79 ft•lb)
SHIFTER
① Shift shaft 1
② Shift shaft 2
③ Oil seal
④ Shift fork L
⑤ Shift fork C
⑥ Shift fork R
⑦ Shift fork guide bar
⑧ Shift cam
⑨ Torsion spring
⑩ Shift lever assembly
⑪ Stopper lever
⑫ Torsion spring
ENGINE ASSEMBLY AND ADJUSTMENT

TRANSMISSION AND SHIFTER

1. Install:
   - Neutral switch

2. Apply:
   - Molybdenum disulfide oil
     (onto the drive axle, main axle and gears)

3. Install:
   - Drive axle assembly ①
   - Main axle assembly ②

- Circlip ③
  Install the chamfered side ④ facing the gear ⑤.

⚠️ WARNING
Always use a new circlip.

- Circlip ③
- Spline ⑥
  Center the circlip ends on the spline.

Do not expand the circlip more than needed.

4. Install:
   - Main axle assembly ①
   - Drive axle assembly ②

5. Apply:
   - 4-stroke engine oil
     (onto shift fork guide bars)
6. Install:
- Shift cam ①
- Shift fork C ②
- Shift fork L ③
- Shift fork R ④
- Shift fork guide bar ⑤

**NOTE:**
Install the shift forks with the embossed mark on each shift fork facing the right side of the engine.

7. Check:
- Transmission operation
  Unsmooth operation → Repair.

8. Install:
- Shift shaft 1 ①
- Shift shaft 2 ②

**NOTE:**
Mesh the shift shaft 2 mark ③ with the shift shaft 1 pawl center ⑥.
CRANKCASE
1  Crankcase (right)
2  Dowel pin
3  Crankcase (left)
4  Drain bolt
5  Breather plate 2
6  Breather plate 1
7  Holder (clutch cable)
8  Breather hose

10 Nm (1.0 m • kg, 7.2 ft • lb)
7 Nm (0.7 m • kg, 5.1 ft • lb)
20 Nm (2.0 m • kg, 14 ft • lb)
CRANKCASE (RIGHT)
1. Apply:
   - Sealant
     (onto mating surfaces of both case halves)

   Quick Gasket®:
P/N. ACC-11001-05-01

   NOTE: DO NOT ALLOW any sealant to come in contact with the oil gallery.

2. Install:
   - Dowel pins

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

4. Tighten:
   - Bolt (crankcase)

   Bolt (crankcase):
   10 Nm (1.0 m • kg, 7.2 ft • lb)

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

6. Check:
   - Crankshaft and transmission operation
     Unsmooth operation → Repair.

SHIFT SHAFT
1. Install:
   - Circlip ① (to drive axle)
   - Collar ②
   - Circlip ③
2. Install:
- Torsion spring ①
- Stopper lever ②
- Washer ③
- Shift lever ④
- Circlip
- Cam chain
- Cam chain damper

NOTE:
- Set the torsion spring ① and stopper lever ② at proper position.
- Install the torsion spring ⑤ fitting to the guide pin ⑥.
- Install the shift lever with the marks ④ and ⑧ aligned.
OIL PUMP

1. Pump gear cover
2. Pump driven gear
3. Pump cover
4. Oil pump assembly
5. Oil strainer
CLUTCH

1. Clutch spring
2. Pressure plate
3. Push plate
4. Clutch plate
5. Friction plate
6. Clutch boss
7. Thrust plate
8. Push lever
9. Push rod 2
10. Ball
11. O-ring
12. Push rod 1
13. Primary driven gear
14. Primary drive gear
15. Oil seal
16. Bearing

ENGINE ASSEMBLY AND ADJUSTMENT

8 Nm (0.8 m•kg, 5.8 ft•lb)

75 Nm (7.5 m•kg, 54 ft•lb)

12 Nm (1.2 m•kg, 8.7 ft•lb)

80 Nm (8.0 m•kg, 58 ft•lb)
ENGINE ASSEMBLY AND ADJUSTMENT

OIL PUMP
1. Install:
   - Gasket
   - Oil pump assembly
   - Pump cover
   - Oil strainer

   **Bolts (oil pump):**
   6 Nm (0.6 m • kg, 4.3 ft • lb)

2. Install:
   - Pump driven gear
   - Circlip

3. Install:
   - Gear cover

CLUTCH
1. Install:
   - Key
   - Primary drive gear

2. Apply:
   - 4-stroke engine oil
     (onto journal and gear teeth)

3. Install:
   - Primary driven gear
   - Thrust plate
   - Clutch boss assembly
   - Lock washer
   - Nut (clutch boss)

**NOTE:**
Fit the tabs of the lock washer onto the grooves of the clutch boss.
4. Tighten:
- Nut ① (clutch boss)

**NOTE:**
Tighten the nut (clutch boss) while holding the clutch boss with the universal clutch holder ②.

<table>
<thead>
<tr>
<th>Universal clutch holder:</th>
<th>P/N. YM-91042</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nut ① (clutch boss):</td>
<td>75 Nm (7.5 m • kg, 54 ft • lb)</td>
</tr>
</tbody>
</table>

5. Bend:
- Lock washer tabs
  (along nut flats)

6. Install:
- Push lever assembly ①

| Bolt (push lever):       | 12 Nm (1.2 m • kg, 8.7 ft • lb) |

7. Install:
- Clutch plate ①
- Friction plate ②

**NOTE:**
- Apply 4-stroke engine oil to the plates and install.
- Install the clutch plates and friction plates alternately on the clutch boss, starting with a friction plate and ending with a friction plate.

8. Install:
- Push rod 2 ①
- Ball ②
9. Install:
- Push rod 1
- Push rod seal
- Push plate
- Pressure plate
- Plain washer
- Nut
- Spring
- Bolts

**NOTE:**
Tighten the bolts in a crisscross pattern.

<table>
<thead>
<tr>
<th>Bolt (pressure plate):</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 Nm (0.8 m•kg, 5.8 ft•lb)</td>
</tr>
</tbody>
</table>

10. Check:
- Push lever position
  Push the push lever assembly in the direction of the arrow and make sure that the match marks are aligned.
  Not aligned → Adjust.
- Match mark on the push lever assembly
- Match mark on the crankcase

11. Adjust:
- Push lever position

**Adjustment steps:**
- Loosen the locknut.
- Turn the adjuster clockwise or counterclockwise until both match marks are aligned.
- Hold the adjuster to prevent it from moving and thoroughly tighten the locknut.

Do not overtighten the adjuster, as this may eliminate the necessary free play between the push rods.

<table>
<thead>
<tr>
<th>Locknut (push rod 1):</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 Nm (0.8 m•kg, 5.8 ft•lb)</td>
</tr>
</tbody>
</table>
12. Install:
- Claw washer
- Lock washer
- Nut

**NOTE:**
- Place a folded rag or aluminum plate between the teeth of the drive gear and primary driven gear.
- Take care not to damage the gear teeth.

13. Bend the lock washer tab along the nut flats.

14. Install:
- Dowel pin
- Gasket (crankcase cover)

15. Install:
- Crankcase cover (right)

**Bolt (crankcase cover):**
10 Nm (1.0 m • kg, 7.2 ft • lb)

**NOTE:**
Tighten the bolts (crankcase cover) in a criss-cross pattern.

**OIL FILTER**
1. Apply:
- 4-stroke engine oil
  (to the oil filter and into the oil passage)

2. Install:
- Oil filter
- O-rings
- Oil filter cover

**Bolt (oil filter cover):**
10 Nm (1.0 m • kg, 7.2 ft • lb)

Install the oil filter as shown.
ENGINE ASSEMBLY AND ADJUSTMENT

ROTOR AND STARTER DRIVES

1 Starter idle gear 1
2 Bearing
3 Shaft 1
4 Bearing
5 Washer
6 Starter idle gear 2
7 Bearing
8 Plate washer
9 Bearing
10 Starter wheel gear
11 Starter clutch
12 Rotor
13 Stator coil
14 Clamp

60 Nm (6.0 m•kg, 43 ft•lb)
10 Nm (1.0 m•kg, 7.2 ft•lb)
7 Nm (0.7 m•kg, 5.1 ft•lb)
ENGINE ASSEMBLY AND ADJUSTMENT

ROTOR AND STARTER DRIVES

NOTE: Fasten a safety wire to the timing chain to prevent it from falling into the crankcase.

1. Apply:
   - 4-stroke engine oil
     (onto journal and starter drives)

2. Install:
   - Starter clutch
   - Bolt ①

   **Bolt ① (Starter clutch):**
   10 Nm (1.0 m • kg, 7.2 ft • lb)

3. Install:
   - Plain washer ①
   - Bearing ②

4. Install:
   - Starter wheel gear ①
   - Woodruff key ②

5. Install:
   - Rotor

NOTE: Temporarily install the rotor aligning the key way of the rotor with the woodruff key. Turn the starter wheel gear clockwise and install the rotor to starter wheel gear.
6. Install:
   - Washer ①
   - Bolt ②

   **Bolt ② (rotor):**
   60 Nm (6.0 m • kg, 43 ft • lb)

   **NOTE:**
   Tighten the bolt (rotor) while holding the rotor with the sheave holder ③.

   **Sheave holder:**
   P/N. YS-01880

   **CA**
   Do not allow the rotor holder to touch the projections on the rotor.

7. Install:
   - Dowel pins
   - Gasket (crankcase cover)
   - Washers (idle gear 2)
   - Idle gear 2 ①

8. Install:
   - Crankcase cover 1 ①

   **Bolt (crankcase cover 1):**
   10 Nm (1.0 m • kg, 7.2 ft • lb)

9. Install:
   - Shaft ①
   - Bearing ②
   - Starter idle gear 1 ③
   - Generator cover

   **Bolt (generator cover):**
   10 Nm (1.0 m • kg, 7.2 ft • lb)
CYLINDER AND PISTON
1 Cylinder
2 Dowel pin
3 O-ring
4 Cylinder gasket
5 Piston ring
6 Piston pin clip
7 Piston
8 Piston pin
CYLINDER AND PISTON

1. Apply:
   - 4-stroke engine oil
     (onto piston rings and piston pins)

2. Install:
   - Piston rings

   **NOTE:**
   Be sure to install the rings so that manufacturer’s marks or numbers are located on the top side of the rings.

3. Install:
   - Piston ①
   - Piston pin ②
   - Piston pin clip ③

   **NOTE:**
   - The arrow ④ on the piston must point to the front of the engine.
   - Before installing the piston pin clip, cover the crankcase with a clean towel or rag so you will not accidentally drop the piston pin clip and material into the crankcase.

4. Position:
   - Top ring
   - 2nd ring
   - Oil rings
   - Offset the piston ring end gaps as shown.
     ① Top ring end
     ② Oil ring end (lower)
     ③ Oil ring end (upper)
     ④ 2nd ring end

5. Install:
   - Dowel pins ①
   - Gasket ② (cylinder)
6. Install:
   - O-ring ①

7. Install:
   - Cylinder

**NOTE:**
Install the cylinder with one hand while compressing the piston ring with the other hand.

8. Install:
   - Timing chain guide ① (exhaust)
   - Dowel pins ②
   - Gasket ③ (cylinder head)
ENGINE ASSEMBLY AND ADJUSTMENT

CYLINDER HEAD
1 Mount rubber
2 Cylinder head cover gasket
3 Cylinder head assembly
4 Camshaft cap
5 Camshaft cap
6 Dowel pin
7 Circlip
8 Valve guide
9 Spark plug
10 Cylinder head gasket
VALVE, CAMSHAFT AND CAM CHAIN

① Timing chain guide (intake)  ⑩ Adjusting pad
② Camshaft (intake)          ⑪ Valve cotter
③ Camshaft (exhaust)         ⑫ Valve retainer
④ Cam sprocket               ⑬ Oil seal
⑤ Timing chain               ⑭ Valve spring
⑥ Timing chain guide (exhaust) ⑮ Spring seat
⑦ Stopper guide              ⑯ Valve (intake)
⑧ Timing chain tensioner     ⑰ Valve (exhaust)
⑨ Valve lifter
VALVE AND CAMSHAFT

1. Deburr:
   - Valve stem end
     Use an oil stone to smooth the stem end.

2. Apply:
   - Molybdenum disulfide oil
     (onto valve stem ₁ and oil seal ₂)

3. Install:
   - Valve ₁
   - Spring seat ₂
   - Oil seal ₃
   - Valve spring ₄
   - Valve retainer ₅
     (into cylinder head)

NOTE:
- Make sure that each valve is installed in its original place.
- Install the valve spring with the larger pitch ₆ facing upwards.
- Smaller pitch ₇
4. Install:
- Valve cotters ①

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

5. Secure the valve cotters onto the valve stem by tapping lightly with a piece of wood.

**NOTE:**
Do not hit so much as to damage the valve.

6. Apply:
- Molybdenum disulfide oil
  (onto outer surface of valve lifters and pads)

7. Install:
- Valve lifters ①
- Pads ②

**NOTE:**
- When rotated with a finger, the valve lifter should move smoothly.
- Identify each lifter and pad position very carefully so that they can be reinstalled in their original place.

8. Apply:
- Molybdenum disulfide oil
  (onto camshaft journal)
ENGINE ASSEMBLY AND ADJUSTMENT

CYLINDER HEAD

1. Install:
   - Cylinder head ①

   | Bolts ① ~ ④ (cylinder head): |
   | 40 Nm (4.0 m • kg, 29 ft • lb) |
   | Nuts ⑤, ⑥ (cylinder head):    |
   | 20 Nm (2.0 m • kg, 14 ft • lb) |
   | Bolts ⑦, ⑧ (cylinder head):   |
   | 10 Nm (1.0 m • kg, 7.2 ft • lb) |

   NOTE:
   - Apply engine oil onto the nut threads.
   - Tighten the nuts in a crisscross pattern.

2. Install:
   - Exhaust camshaft ①
   - Intake camshaft ②
   - Dowel pins ③

3. Install:
   - Camshaft caps ① (intake camshaft)
   - Camshaft caps ② (exhaust camshaft)

   NOTE:
   Install the camshaft cap with the arrow mark embossed facing right side of the engine.

4. Tighten:
   - Bolts (camshaft caps)

   | Bolt (camshaft caps):       |
   | 10 Nm (1.0 m • kg, 7.2 ft • lb) |

   NOTE:
   Tighten the bolts (camshaft caps) in a crisscross pattern from inner most to outer caps.
The bolts (camshaft caps) must be tightened evenly or damage to the cylinder head, camshaft caps and camshaft will result.

5. Install:
- Cam sprockets

Installing steps:
- Turn the crankshaft clockwise until the TDC mark ① is aligned with the stationary pointer ②.
- Fit the timing chain onto both cam sprockets and install the cam sprockets on the camshafts.

NOTE:
When installing the cam sprockets, start with the exhaust camshaft to keep the timing chain as tense as possible on the exhaust side, and set the respective match marks to be parallel with the case surface on the corresponding sides.

“І” : Intake side
“E” : Exhaust side

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

- While holding the camshafts, temporarily tighten the bolts.

6. Install:
- Timing chain tensioner

Installation steps:
- While pressing the tensioner rod lightly with fingers, use a thin screwdriver ① and wind the tensioner rod up fully clockwise.
With the rod fully wound, install the gasket and the chain tensioner ②, and tighten the bolts ③ to the specified torque.

**Bolt ③ (chain tensioner):** 10 Nm (1.0 m • kg, 7.2 ft • lb)

Release the screwdriver, check if the tensioner rod comes out and tighten the gasket and the cap bolt to the specified torque.

**Cap bolt (timing chain tensioner):** 8 Nm (0.8 m • kg, 5.8 ft • lb)

---

### 7. Check:
- **Valve timing**
  - Incorrect timing → Adjust.
  - Refer to above steps 4 ~ 6.

### 8. Check:
- **Valve clearance**
  - Out of specification → Adjust.
  - Refer to “VALVE CLEARANCE ADJUSTMENT” in CHAPTER 3.

**Intake valve (cold):**
- 0.09 ~ 0.17 mm (0.004 ~ 0.007 in)

**Exhaust valve (cold):**
- 0.19 ~ 0.27 mm (0.007 ~ 0.011 in)

### 9. Install:
- **Cylinder head cover ①**

**Bolt (cylinder head):**
- 10 Nm (1.0 m • kg, 7.2 ft • lb)

### 10. Install:
- **Timing plug**
- **Plug**

---

**REMOUNTING ENGINE**

When remounting the engine, reverse the removal procedure. Note the following points.

1. **Install:**
   - **Bracket 1 ①**
   - **Mounting bolt (front-lower) ②**
   - **Mounting bolt (rear-lower) ③**
   - **Mounting bolt (rear-upper) ④**
NOTE:  
Install all the bolts and nuts first, and then tighten the bolts and nuts to specifications.

<table>
<thead>
<tr>
<th>Bracket bolts:</th>
<th>23 Nm (2.3 m • kg, 17 ft • lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mounting bolts:</td>
<td>64 Nm (6.4 m • kg, 46 ft • lb)</td>
</tr>
</tbody>
</table>

2. Tighten:  
- Bolt ①

| Stay bolts (cylinder head-stay): | 64 Nm (6.4 m • kg, 46 ft • lb) |
| Stay bolts (stay-frame):         | 30 Nm (3.0 m • kg, 22 ft • lb)  |

3. Install:  
- Brake pedal ①  
- Footrest (right) ②  
Refer to “ENGINE REMOVAL”.

| Bolt (brake pedal):             | 19 Nm (1.9 m • kg, 13 ft • lb) |
| Bolt (footrest):                | 64 Nm (6.4 m • kg, 46 ft • lb)  |

4. Adjust:  
- Brake pedal height ③  
Refer to “REAR BRAKE ADJUSTMENT” in CHAPTER 3.

Brake pedal height:  
10 mm (0.39 in)  
Below top of footrest

5. Install:  
- Drive chain (with drive sprocket ①)  
- Lock washer ②  
- Nut ③  
Refer to “ENGINE REMOVAL”.

| Nut ③:                        | 110 Nm (11.0 m • kg, 80 ft • lb) |

WARNING  
Use a new lock washer.
6. Bend:
   - Lock washer tabs
     (along nut flats)

7. Adjust:
   - Drive chain slack
     Refer to “DRIVE CHAIN SLACK ADJUSTMENT” in CHAPTER 3.

   Drive chain slack:
   35 ~ 50 mm (1.38 ~ 1.97 in)

8. Install:
   - Crankcase cover 2 ①
   - Shift pedal ②

   Bolt (crankcase cover 2):
   10 Nm (1.0 m • kg, 7.2 ft • lb)

   Bolt (shift pedal):
   10 Nm (1.0 m • kg, 7.2 ft • lb)

9. Install:
   - Engine guard ①

   Bolt (engine guard):
   7 Nm (0.7 m • kg, 5.1 ft • lb)
10. Apply:
- Lithium soap base grease
  (onto the O-ring on starter motor)

11. Install:
- Starter motor

**Bolts (starter motor):**
10 Nm (1.0 m • kg, 7.2 ft • lb)

12. Connect:
- Starter motor lead ①
- Ground lead ②

13. Install:
- Gas chamber
  Refer to “ENGINE REMOVAL”.

14. Install:
- Oil delivery pipe ③

15. Connect:
- A.C. magneto lead ①
- Neutral switch lead ②

16. Connect:
- Spark plug lead

17. Connect:
- Clutch cable

18. Adjust:
- Clutch cable free play
  Refer to “CLUTCH ADJUSTMENT” in CHAPTER 3.

**Free play:**
10 ~ 15 mm (0.39 ~ 0.59 in)
at clutch lever end
19. Install:
- Exhaust pipe ①
- Engine stay ②

20. Connect:
- Battery negative lead
  Refer to “BATTERY INSPECTION” in CHAPTER 3.
21. Connect:
- Carburetor
- Air vent hose
  Refer to “CARBURETOR” in CHAPTER 5.
22. Install:
- Fuel tank
  Refer to “SEAT, FUEL TANK AND COVERS” in CHAPTER 3.
23. Fill:
- 4-stroke engine oil
  (in to the crankcase)
  Refer to “ENGINE OIL LEVEL INSPECTION” and “ENGINE OIL REPLACEMENT” in CHAPTER 3.

**Nuts (exhaust pipe):**
- 20 Nm (2.0 m • kg, 14 ft • lb)

**Bolt (clamp):**
- 20 Nm (2.0 m • kg, 14 ft • lb)

**Nuts (stay-frame):**
- 30 Nm (3.0 m • kg, 22 ft • lb)

**Nut (stay-engine):**
- 64 Nm (6.4 m • kg, 46 ft • lb)

**Oil quantity:**
- Total amount: 1.45 L (1.28 Imp qt, 1.53 US qt)

**Oil check bolt:**
- 7 Nm (0.7 m • kg, 5.1 ft • lb)

---

Never start the engine when the oil has been drained.
CARBURETOR

1. Throttle arm assembly
2. Jet needle set
3. Throttle valve
4. Pump lever
5. Starter plunger assembly
6. Needle valve set
7. One-way valve
8. Diaphragm assembly (acceleration pump)
9. Check valve assembly
10. Float
11. Baffle plate
12. Needle jet
13. Main jet
14. Pilot jet
15. Pilot screw
16. Throttle stop screw

SPECIFICATIONS

<table>
<thead>
<tr>
<th>ID MARK</th>
<th>5GF1 00</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAIN JET (M.J.)</td>
<td>#137</td>
</tr>
<tr>
<td>PILOT JET (P.J.)</td>
<td>#52</td>
</tr>
<tr>
<td>JET NEEDLE (J.N.)</td>
<td>#5C9C-3/5</td>
</tr>
<tr>
<td>NEEDLE JET (N.J.)</td>
<td>2.595 (V95)</td>
</tr>
<tr>
<td>PILOT SCREW (P.S.)</td>
<td>1-1/2 turns out</td>
</tr>
<tr>
<td>FLOAT HEIGHT (F.H.)</td>
<td>26.5 ~ 27.5 mm</td>
</tr>
<tr>
<td>FUEL LEVEL A (F.L.)</td>
<td>7.5 ~ 9.5 mm</td>
</tr>
<tr>
<td>ENGINE IDLING SPEED</td>
<td>1,250 ~ 1,350 r/min</td>
</tr>
<tr>
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</tr>
</tbody>
</table>

Below the float chamber mating surface
REMOVAL
1. Remove:
   - Side covers
   - Seat
   - Fuel tank
   Refer to “SEAT, FUEL TANK AND COVERS” in CHAPTER 3.

2. Drain:
   - Fuel ① (float chamber)
   Refer to “ENGINE REMOVAL” in CHAPTER 4.
3. Loosen:
   - Clamps ② (carburetor joint)
4. Remove:
   - Bolts (air filter case)

5. Loosen:
   - Locknuts ①
6. Disconnect:
   - Throttle cable ②
   - Throttle cable ③
     (from throttle lever and cable holder)
   - Air vent hoses
   - Fuel hose
   - Overflow pipe

7. Remove:
   - Carburetor

NOTE:
The air filter case must be pulled back so that the carburetor can be removed.
CARBURETOR

DISASSEMBLY

NOTE:

The following parts can be cleaned and inspected without disassembly.
- Starter plunger
- Throttle stop screw
- Pilot screw

1. Disconnect:
   - Starter plunger assembly ①

2. Remove:
   - Float chamber ①
   - Pilot screw ②

3. Remove:
   - Baffle plate ①
   - Float pin ②
   - Float ③
   - Needle valve assembly ④

   NOTE: Remove the float pin in the arrow direction.

4. Remove:
   - Main jet ①
   - Pilot jet ②
   - Main nozzle ③
   - Valve seat ④
5. Remove:
   - Cap (carburetor mixing chamber body) ①

6. Remove:
   - Screw (throttle arm) ①

7. Remove:
   - Screws (throttle valve) ①

8. Remove:
   - Throttle valve ①
   - Ring ②
   - Jet needle ③
   - Needle holder ④
   - Spring ⑤

9. Remove:
   - Cover assembly ①
   - Spring ②
   - Diaphragm ③
   - O-ring ④
INSPECTION

1. Inspect:
   - Carburetor mixing chamber body
   - Carburetor float chamber body
     Contamination → Blow out passages with compressed air.

   **NOTE:**
   Use a petroleum based solvent for cleaning.
   (Do not use any caustic carburetor cleaning solution.)
   Blow out all passages and jets with compressed air.

   **CAUTION:**
   - The starter jet is press-fit, so it is unremovable.
   - Do not use a wire for cleaning.

2. Inspect:
   - Main jet ①
   - Main nozzle ②
   - Pilot jet ③
   - Pilot screw ④
     Wear/damage → Replace.
     Clogs → Blow out the jets with compressed air.

3. Inspect:
   - Starter jet ①
     Contamination → Clean.

   **NOTE:**
   The starter jet is of a fixed type.

4. Inspect:
   - Throttle valve ①
     Scratches/wear/damage → Replace diaphragm assembly.
   - Jet needle ②
     Wear/bend/damage → Replace.
5. Inspect:
- Valve seat ①
- Needle valve ②
- O-ring ③
  Damage/wear → Replace as a set.

**NOTE:**
Always replace the needle valve and valve seat as a set.

6. Inspect:
- Starter plunger ①
  Bends/wear/damage → Replace.
- Spring ②
  Damage → Replace.

7. Inspect:
- Diaphragm ①
  Tears/damage → Replace diaphragm assembly.
- Spring ②
  Damage → Replace.

8. Inspect:
- Float ①
- Float arm ②
  Damage → Replace.

9. Check:
- Free movement
  Stick → Replace.
  Insert the throttle valve into the carburetor body, and check for free movement.
ASSEMBLY
Reverse the “DISASSEMBLY” procedures. Note the following points.

Before reassembling, wash all the parts in clean petroleum based solvent. Always use a new gasket.

1. Install:
   - Main nozzle ①
   - Main jet ②
   - Pilot jet ③

2. Install:
   - Valve seat ①

3. Install:
   - Float ①
   - Needle valve assembly ②
   - Float pin ③
   - Baffle plate ④

   **NOTE:**
   Install the float pin in the arrow direction.

4. Install:
   - Float chamber ①
   - Pilot screw ②
5. Install:
- O-ring
- Diaphragm
- Spring
- Cover assembly

6. Install:
- Starter plunger assembly

7. Install:
- Throttle valve
- Ring
- Jet needle

8. Install:
- Throttle valve
- Throttle arm

9. Install:
- Cap (mixing chamber assembly)
10. Install:
- Air vent hose ①
- Fuel hose
- Air vent hose

**INSTALLATION**

1. Install:
- Carburetor assembly
  Refer to “ENGINE REMOVAL” in CHAPTER 4.

2. Install:
- Throttle cables ①
  Refer to “CABLE ROUTING” in CHAPTER 2.

3. Adjust:
- Throttle cable free play
  Refer to “THROTTLE CABLE FREE PLAY ADJUSTMENT” in CHAPTER 3.

   **Throttle cable free play:**
   3 ~ 5 mm (0.12 ~ 0.20 in)

4. Adjust:
- Idle speed
  Refer to “IDLING SPEED ADJUSTMENT” in CHAPTER 3.

   **Engine idle speed:**
   1,250 ~ 1,350 r/min
FUEL LEVEL ADJUSTMENT

1. Place the motorcycle on a level place.
2. Use a suitable stand under the frame and engine to ensure that the carburetor is positioned vertically.
3. Connect the fuel level gauge 1 to the float chamber drain pipe.

Fuel level gauge:
P/N. YM-01312-A

4. Turn the fuel cock to “ON” or “RES”.
5. Loosen the drain screw 2.
6. Hold the gauge vertically next to the float chamber mating surface (front).
7. Measure:
   - Fuel level @
     Out of specification → Adjust.

Fuel level:
7.5 ~ 9.5 mm (0.30 ~ 0.37 in)
Below the float chamber mating surface (front)

8. Adjust:
   - Fuel level

Adjustment steps:
   - Remove the carburetor.
   - Inspect the valve seat and needle valve.
   - If either is worn, replace them both.
   - If both are fine, adjust the float height by bending the float tang 1 on the float.
   - Recheck the fuel level.

******************************************************************************
THROTTLE VALVE POSITION

1. Adjust:
   ● Throttle valve position

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

   Adjustment steps:
   ● Loosen the locknut ①.
   ● Turn the throttle grip to the full-throttle position ③.
   ● Turn the adjuster ② in or out so that throttle valve bottom is positioned within the limits as specified.

   Throttle valve position ③:
   0 ~ 1 mm (0 ~ 0.04 in)

   ● Tighten the locknut.

   *********************************
**FRONT WHEEL**

1. Wheel axle
2. Speedometer gear unit
3. Oil seal
4. Bearing
5. Spacer
6. Front wheel
7. Bearing
8. Oil seal
9. Collar

---

**TIRE AIR PRESSURE (COLD):**

<table>
<thead>
<tr>
<th>Load except motorcycle*</th>
<th>90 kg (198 lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cold tire pressure</td>
<td></td>
</tr>
<tr>
<td>Front</td>
<td>100 kPa (1 kg/cm², 14.5 psi)</td>
</tr>
<tr>
<td>Rear</td>
<td>100 kPa (1 kg/cm², 14.5 psi)</td>
</tr>
</tbody>
</table>

* Load is the total weight of rider and accessories.

---

58 Nm (5.8 m·kg, 42 ft·lb)
REMOVAL

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

1. Place the motorcycle on a level place.
2. Elevate the front wheel by placing a suitable stand under the frame and engine.

3. Loosen:
   - Nuts (axle holder) ①
4. Remove:
   - Speedometer cable ②
   - Wheel axle ③
   - Front wheel

NOTE:
Do not depress the brake lever when the wheel is off the motorcycle otherwise the brake pads will be forced shut.

5. Remove:
   - Collar (left) ①
   - Speedometer gear unit ②

INSPECTION
1. Eliminate any corrosion from parts.
2. Inspect:
   - Wheel axle
     Roll the axle on a flat surface.
     Bends → Replace.

WARNING
Do not attempt to straighten a bent axle.

3. Inspect:
   - Tire
     Wear/damage → Replace.
     Refer to “TIRE INSPECTION” in CHAPTER 3.
   - Wheel
     Bends/damage → Replace.
     Refer to “WHEEL INSPECTION” in CHAPTER 3.
4. Check:
- Spoke(s)
  - Bend/damage → Replace.
  - Loose spoke(s) → Retighten.
  - Turn the wheel and tap the spokes with a screwdriver.

**NOTE:**
A tight spoke will emit a clear, ringing tone; a loose spoke will sound flat.

5. Tighten:
- Loose spokes

| Nipple: | 2 Nm (0.2 m • kg, 1.4 ft • lb) |

**NOTE:**
Check the wheel runout after tightening the spokes.

6. Measure:
- Wheel runout
  - Out of specification → Check the wheel and bearing play.

<table>
<thead>
<tr>
<th>Rim runout limits:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vertical 1: 2.0 mm (0.08 in)</td>
</tr>
<tr>
<td>Lateral 2: 2.0 mm (0.08 in)</td>
</tr>
</tbody>
</table>

7. Inspect:
- Collar
  - Wear/damage → Replace.

**WARNING**
- After mounting a tire, ride conservatively to allow proper tire to rim seating. Failure to do so may cause an accident resulting in motorcycle damage and possible operator injury.
- After a tire repair or replacement, be sure to torque tighten the valve stem locknut to specification.

| Valve stem locknut: | 1.5 Nm (0.15 m • kg, 1.1 ft • lb) |
8. Check:
- Wheel bearings
  Abnormal noise/turn roughly/free play → Replace.
- Oil seals
  Wear/damage → Replace.

*****************************************************
Oil seal and wheel bearing replacement steps:
- Clean the outside of the wheel hub.
- Remove the oil seal ① using a flat-head screwdriver.

NOTE: Place a rag ② on the outer edge to prevent damage.

- Remove the bearings ③ using a general bearing puller.
- Install the new bearing and new oil seal by reversing the previous steps.

NOTE: Use a socket that matches the outside diameter of the race of the bearing and oil seal.

Do not strike the center race or balls of the bearing. Contact should be made only with the outer race.

*****************************************************
INSTALLATION
Reverse the “Removal” procedure. Note the following points.

1. Lubricate:
   - Wheel axle
   - Spacer
   - Bearings
   - Oil seal (lips)

2. Install:
   - Collar

   **NOTE:**
   Install the oil seal taking care not to damage or reverse the lips.

3. Install:
   - Speedometer gear unit

   **NOTE:**
   Make sure that the wheel hub and the speedometer gear unit are installed with the projections meshed into the slots.

4. Install:
   - Front wheel assembly

   **NOTE:**
   Make sure that the slot in the speedometer gear unit fits over the stopper on the front fork outer tube.

5. Tighten:
   - Wheel axle

   **Wheel axle:**
   58 Nm (5.8 m • kg, 42 ft • lb)
6. Tighten:
- Nuts (axle holder) ①

<table>
<thead>
<tr>
<th>Nuts ①:</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 Nm (1.0 m • kg, 7.2 ft • lb)</td>
</tr>
</tbody>
</table>

C
The axle holder should be installed with the arrow mark ② facing upward.

WHEEL STATIC BALANCE ADJUSTMENT

NOTE:
- After replacing the tire and/or rim, the wheel static balance should be adjusted.
- Adjust the wheel static balance with the brake disc installed.

1. Remove:
- Balancing weight

2. Set the wheel on a suitable stand.
3. Find:
- Heavy spot

Procedure:
- a. Spin the wheel and wait for it to rest.
- b. Put an "X₁" mark on the wheel bottom spot.
- c. Turn the wheel so that the "X₁" mark is 90° up.
- d. Let the wheel fall and wait for it to rest. Put an "X₂" mark on the wheel bottom spot.
- e. Repeat the above, b., c., and d. several times until these marks come to the same spot.
- f. This spot is the heavy spot "X".

******************************************************************************
4. Adjust:
- Wheel static balance

Adjusting steps:
- Install a balancing weight ① on the rim exactly opposite to the heavy spot “X”.

NOTE: ____________________________
Start with the smallest weight.

- Turn the wheel so that the heavy spot is 90° up.
- Check that the heavy spot is at rest there. If not, try another weight until the wheel is balanced.

NOTE: ____________________________
For the first and second measurements, mount a balancing weight or weights on the opposite side of the brake disc. For the third measurement and the following, mount them on the brake disc side.

CA
Do not install more than 4 pieces of balancing weight.

5. Check:
- Wheel static balance

Checking steps:
- Turn the wheel so that it comes to each point as shown.
- Check that the wheel is at rest at each point. If not, readjust the wheel static balance.
**REAR WHEEL**

1. Rear wheel  
2. Cotter pin  
3. Washer  
4. Chain puller 2  
5. Collar  
6. Oil seal  
7. Bearing  
8. Rear hub  
9. Bead stopper  
10. Spacer  
11. Bearing  
12. Oil seal  
13. Collar  
14. Chain puller 1  
15. Wheel axle

**TIRE AIR PRESSURE (COLD):**

<table>
<thead>
<tr>
<th></th>
<th>Maximum load-</th>
<th>Cold tire pressure</th>
<th>Off-road riding*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>except motorcycle*</td>
<td>Front</td>
<td>Rear</td>
</tr>
<tr>
<td></td>
<td>90 kg (198 lb)</td>
<td>100 kPa (1 kg/cm², 14.5 psi)</td>
<td>100 kPa (1 kg/cm², 14.5 psi)</td>
</tr>
</tbody>
</table>

* Load is the total weight of rider and accessories.
REAR WHEEL

REMOVAL
1. Place the motorcycle on a level place.

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

2. Elevate the rear wheel by placing a suitable stand under the swingarm.

3. Remove:
   - Cotter pin ①
   - Axle nut ②
   - Washer ③
   - Chain puller 1 ④
   - Wheel axle ⑤

4. Remove:
   - Rear wheel

**NOTE:**
Before removing the rear wheel, push the wheel forward and remove the drive chain.

5. Remove:
   - Rear brake caliper assembly ①

INSPECTION
1. Inspect:
   - Tire
   - Rear wheel axle
   - Wheel
   - Refer to “FRONT WHEEL”.
2. Measure:
- Wheel runout
  Refer to “FRONT WHEEL”.

3. Check:
- Spoke(s)
- Wheel bearings
- Oil seals
  Refer to “FRONT WHEEL”.

**INSTALLATION**
Reverse the “Removal” procedure.
Note the following points.

1. Lubricate:
- Rear wheel axle
- Bearings
- Oil seals

**Recommended lubricant:**
Lithium soap base grease

2. Install:
- Rear brake caliper assembly

3. Install:
- Rear wheel

4. Adjust:
- Drive chain slack

**Drive chain slack:**
35 ~ 50 mm (1.38 ~ 1.97 in)

Refer to “DRIVE CHAIN SLACK ADJUSTMENT” in CHAPTER 3.

5. Tighten:
- Nut (rear wheel axle)

**Nut (rear wheel axle):**
105 Nm (10.5 m • kg, 75 ft • lb)
6. Install:
  • Cotter pin

**NOTE:**
Bend the ends of the cotter pin.

**WARNING**
Always use a new cotter pin.

**NB272004**
WHEEL STATIC BALANCE ADJUSTMENT

**NOTE:**
• After replacing the tire and/or rim, the wheel static balance should be adjusted.
• Adjust the wheel static balance with the brake disc and the wheel hub installed.

1. Adjust:
  • Wheel static balance
    Refer to “FRONT WHEEL – WHEEL STATIC BALANCE ADJUSTMENT”.
FRONT AND REAR BRAKE

1. Master cylinder assembly
2. Master cylinder cap
3. Diaphragm
4. Master cylinder kit
5. Brake hose
6. Brake caliper assembly
7. Caliper piston assembly
8. Caliper seal kit
9. Pad spring
10. Bleed screw
11. Brake pads
12. Pad pin
13. Brake disc
1. Brake caliper assembly
2. Caliper piston assembly
3. Caliper seal kit
4. Pad spring
5. Brake pads
6. Shim
7. Pad pin
8. Bleed screw
9. Brake disc
10. Protector
11. Brake hose holder
12. Brake hose
13. Master cylinder assembly
14. Master cylinder kit
15. Reservoir tank cap
16. Diaphragm bush
17. Diaphragm
18. Reservoir tank cap
19. Reservoir hose
20. Pin
21. Cotter pin

30 Nm (3.0 m • kg, 22 ft • lb)
18 Nm (1.8 m • kg, 13 ft • lb)
6 Nm (0.6 m • kg, 4.3 ft • lb)
12 Nm (1.2 m • kg, 8.7 ft • lb)
10 Nm (1.0 m • kg, 7.2 ft • lb)
4 Nm (0.4 m • kg, 2.9 ft • lb)
Disc brake components rarely require disassembly. DO NOT:

- Disassemble components unless absolutely necessary.
- Use solvents on internal brake component.
- Use contaminated brake fluid for cleaning.
- Allow brake fluid to come in contact with the eyes otherwise eye injury may occur.
- Allow brake fluid to contact painted surfaces or plastic parts otherwise damage may occur.
- Disconnect any hydraulic connection otherwise the entire system must be disassembled, drained, cleaned, and then properly filled and bled after reassembly.

**WARNING**

- Use only designated 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 vapor lock.

---

**BRAKE PAD REPLACEMENT**

**NOTE:**

It is not necessary to disassemble the brake caliper and brake hose to replace the brake pads.

**Front brake**

1. Loosen:
   - Pad pins ①
2. Remove:
   - Bolts ①
   - Caliper body ②

3. Remove:
   - Pad pins
   - Brake pads ①
   - Pad spring ②

**NOTE:**
- Replace the pad spring if pad replacement is required.
- Replace the pads as a set if either is found to be worn to the wear limit.

**Wear limit ③:**
1.0 mm (0.04 in)

4. Inspect:
   - Caliper body ①
     Cracks/damage → Replace caliper assembly.
   - Rubber boot ②
     Wear/cracks/damage → Replace.
   - Caliper bracket ③

5. Lubricate:
   - Guide pins

**Recommended lubricant:**
Lithium soap base grease

**NOTE:**
Place the rubber boot ② securely in the groove of the slide collar when installing the guide pin.

6. Install:
   - Caliper bracket
7. Install:
- Pad spring ①
- Brake pads ②
- Pad pins

| Pad pins: 18 Nm (1.8 m · kg, 13 ft · lb) |

**NOTE:** Install the brake pad (inner) with its ③ portion aligning with ⑤ of the caliper.

********* Installation steps: *********
- Connect a clear plastic tube ① tightly to the caliper bleed screw. Then, place the other end of this hose into an open container.
- Loosen the caliper bleed screw and push the piston into the caliper with your finger.
- Tighten the caliper bleed screw.

| Caliper bleed screw: 6 Nm (0.6 m · kg, 4.3 ft · lb) |

********* Install: *********
- Caliper body

| Bolts ① (caliper body): 23 Nm (2.3 m · kg, 17 ft · lb) |

**WARNING**
Proper hose routing is essential to insure safe motorcycle operation.
Refer to “CABLE ROUTING” in CHAPTER 2.

8. Install:
- Caliper body

9. Inspect:
- Brake fluid level
  Refer to “BRAKE FLUID INSPECTION” in CHAPTER 3.
  ① “LOWER” level line
10. Check:
- Brake lever operation
  A soft or spongy feeling → Bleed the brake system.
  Refer to “AIR BLEEDING (HYDRAULIC BRAKE SYSTEM)” in CHAPTER 3.

Rear brake
1. Remove:
- Caliper protector
- Pad pins

2. Remove:
- Brake pads
- Shim (piston side)

3. Measure:
- Pad thickness
  Out of specification → Replace.

**NOTE:**
- Replace the pad spring if pad replacement is required.
- Replace the pads as a set if either is found to be worn to the wear limit.

**Wear limit:**
1.0 mm (0.04 in)

4. Install:
- Brake pads (with pad shim)
- Pad pins
**Installation steps:**
- Connect a suitable hose 1 tightly to the caliper bleed screw. Then, place the other end of this hose into an open container.
- Loosen the caliper bleed screw and push the pistons into the caliper with your finger.
- Tighten the caliper bleed screw.

<table>
<thead>
<tr>
<th>Caliper bleed screw:</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 Nm (0.6 m • kg, 4.3 ft • lb)</td>
</tr>
</tbody>
</table>

- Install the pad spring (new).
- Install the pad shims (new) to the brake pads (new).
- Install the brake pads and pad pins.
- Tighten the pad pins.

<table>
<thead>
<tr>
<th>Pad pins (brake pads):</th>
</tr>
</thead>
<tbody>
<tr>
<td>18 Nm (1.8 m • kg, 13 ft • lb)</td>
</tr>
</tbody>
</table>

**5. Inspect:**
- Brake fluid level
  - Refer to “BRAKE FLUID LEVEL INSPECTION” in CHAPTER 3.
  - “LOWER” level line

**6. Check:**
- Brake pedal operation
  - A soft or spongy feeling → Bleed the brake system.
  - Refer to “AIR BLEEDING (HYDRAULIC BRAKE SYSTEM)” in CHAPTER 3.

**CALIPER DISASSEMBLY**

**NOTE:**
Before disassembling the front brake caliper or rear brake caliper, drain the brake hoses, master cylinders, brake calipers and reservoir tanks of their brake fluid.

**WARNING**
Securely support the motorcycle so there is no danger of it falling over.
Front brake
1. Loosen:
   - Pad pins ①
   - Union bolt ②

2. Remove:
   - Caliper body
     Refer to “BRAKE PAD REPLACEMENT”.
3. Remove:
   - Pad pins
   - Union bolt
   - Copper washers

**NOTE:**
Place a container under the caliper to collect any remaining brake fluid.

4. Remove:
   - Brake pads
   - Pad spring

5. Remove:
   - Support bracket ①

6. Remove:
   - Piston ①

**Removal steps:**
- Blow compressed air into the tube joint opening to force out the piston from the caliper body.
**WARNING**

- Never try to pry out the piston.
- Cover the piston with a rag. Use care so that the piston does not cause injury as it is expelled from the cylinder.

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

7. Remove:
- Piston seals ①

---

**Rear brake**

**NOTE:**
Before disassembling the rear brake caliper, drain the brake system of its brake fluid.

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

1. Remove:
- Cover ①
2. Loosen:
- Pad pins ②
- Union bolt ③

3. Remove:
- Rear wheel
- Caliper assembly ①
Refer to “REAR WHEEL”.
4. Remove:
- Union bolt
- Pad pins
- Brake pads (with pad shim)
- Pad spring
  Refer to “BRAKE PAD REPLACEMENT”.
5. Remove:
- Piston ①

*******************************
Removal steps:
- Blow compressed air into the hose joint opening to force out the caliper pistons from the caliper body.

⚠️ WARNING
- Never try to pry out the piston.
- Cover the piston with a rag. Use care so that the piston does not cause injury as it is expelled from the cylinder.

*******************************
6. Remove:
- Piston seals ①

Remove the piston seal by pushing it in with a finger. Do not use a screwdriver.

MASTER CYLINDER DISASSEMBLY

NOTE:
Before disassembling the front or rear brake master cylinders, drain the brake hoses, master cylinders, brake calipers and reservoir tanks of their brake fluid.

⚠️ WARNING
Securely support the motorcycle so there is no danger of it falling over.
**Front brake**

1. Remove:
   - Brush guard
   - Brake lever
   - Return spring (brake lever)
   - Brake switch

   **NOTE:**
   Remove the brake switch by pushing up the stopper with a thin screwdriver.

2. Remove:
   - Union bolt
   - Copper washers

   **NOTE:**
   Place a container under the master cylinder to collect any remaining brake fluid.

3. Remove:
   - Master cylinder bracket
   - Master cylinder

4. Remove:
   - Master cylinder cap
   - Diaphragm
   - Rubber boot
   - Circlip
   - Master cylinder kit

   **NOTE:**
   - Remove the circlip using circlip pliers.
   - Place a container under the master cylinder to collect any remaining brake fluid.

**Rear brake**

1. Remove:
   - Cotter pin
   - Washer
   - Pin
2. Remove:
- Union bolt ①
- Copper washers ②
3. Disconnect:
- Brake hoses ③

4. Remove:
- Master cylinder ①

5. Remove:
- Reservoir tank ①

6. Remove:
- Dust boot ①
- Circlip ②
- Push rod ③
- Master cylinder kit ④
- Joint (brake hose) ⑤
- O-ring ⑥

7. Remove:
- Brake hose ①
- Cap stopper (reservoir tank) ②
- Cap (reservoir tank) ③
- Inner cap (reservoir tank) ④
- Diaphragm ⑤
INSPECTION AND REPAIR
Recommended brake component replacement schedule:

<table>
<thead>
<tr>
<th>Component</th>
<th>Schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brake pads</td>
<td>As required</td>
</tr>
<tr>
<td>Piston seals</td>
<td>Every two years</td>
</tr>
<tr>
<td>Brake hoses</td>
<td>Every four years</td>
</tr>
<tr>
<td>Brake fluid</td>
<td>Replace only when brakes are disassembled.</td>
</tr>
</tbody>
</table>

**WARNING**
All internal parts should be cleaned in new brake fluid only. Do not use solvents as they will cause seals to swell and distort.

1. Inspect:
- Caliper cylinder
  Wear/scratches → Replace the caliper assembly.
- Caliper piston
  Scratches/rust/wear → Replace the caliper assembly.
- Caliper body
  Cracks/damage → Replace the brake caliper assembly.
- Oil delivery passage (caliper body)
  Blow out with compressed air.

2. Inspect:
- Master cylinder ①
  Wear/scratches → Replace the master cylinder assembly.
- Master cylinder bodies ②
  Cracks/damage → Replace.
- Oil delivery passages
  (master cylinder bodies)
  Blow out with compressed air.
3. Inspect:
- Master cylinder kits ①
  Scratches/wear/damage → Replace as a set.
  A Front
  B Rear

4. Inspect:
- Reservoir tank ① Cracks/damage → Replace.
- Diaphragm (front) ②
- Diaphragm (rear) ③
  Wear/damage → Replace.

5. Inspect:
- Brake hoses (front, rear)
  Cracks/wear/damage → Replace.

6. Measure:
- Brake pads (thickness ⑧)
  Out of specification → Replace.
  A Front
  B Rear

<table>
<thead>
<tr>
<th>Wear limit:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0 mm (0.04 in)</td>
</tr>
</tbody>
</table>

**NOTE:**
- Replace the pad spring as a set if pad replacement is required.
- Replace the pads as a set if either is found to be worn to the wear limit.

7. Inspect:
- Brake discs (front and rear)
  Galling/damage → Replace.
  A Front
  B Rear
8. Measure:
- Brake disc deflection
  Out of specification → Inspect wheel runout. If the wheel runout is within the limits replace the brake disc.

<table>
<thead>
<tr>
<th>Maximum deflection:</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5 mm (0.020 in)</td>
</tr>
</tbody>
</table>

1. Dial gauge
2. Brake disc thickness
   Out of specification → Replace.

<table>
<thead>
<tr>
<th>Minimum thickness:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Front:</td>
</tr>
<tr>
<td>3 mm (0.118 in)</td>
</tr>
<tr>
<td>Rear:</td>
</tr>
<tr>
<td>4 mm (0.157 in)</td>
</tr>
</tbody>
</table>

**NOTE:**
Tighten the bolts (brake disc) in stage using a crisscross pattern.

<table>
<thead>
<tr>
<th>Bolts (brake disc):</th>
</tr>
</thead>
<tbody>
<tr>
<td>Front:</td>
</tr>
<tr>
<td>12 Nm (1.2 m • kg, 8.7 ft • lb)</td>
</tr>
<tr>
<td>LOCTITE®</td>
</tr>
<tr>
<td>Rear:</td>
</tr>
<tr>
<td>12 Nm (1.2 m • kg, 8.7 ft • lb)</td>
</tr>
<tr>
<td>LOCTITE®</td>
</tr>
</tbody>
</table>

**CALIPER ASSEMBLY**

**WARNING**
- All internal parts should be cleaned in new brake fluid only.
- Internal parts should be lubricated with brake fluid when installed.

<table>
<thead>
<tr>
<th>Brake fluid:</th>
</tr>
</thead>
<tbody>
<tr>
<td>DOT #4</td>
</tr>
</tbody>
</table>

- Replace the piston seal and dust boot whenever a caliper is disassembled.
Front brake
1. Install:
   - Piston seals ①
   - Pistons ②

2. Install:
   - Support bracket ①

**NOTE:**
Place the rubber boot securely in the groove of the guide pin when installing the caliper body.

3. Install:
   - Pad spring ①
   - Brake pads ②
   - Pad pins ③

   Refer to “BRAKE PAD REPLACEMENT”.

   **Pad pins ③:**
   18 Nm (1.8 m • kg, 13 ft • lb)

4. Install:
   - Caliper ①
   - Copper washers ②
   - Brake hose ③
   - Union bolt ④

   **Union bolt ③:**
   30 Nm (3.0 m • kg, 22 ft • lb)

**WARNING**
- Proper hose routing is essential to insure safe motorcycle operation.

  Refer to “CABLE ROUTING” in CHAPTER 2.
- Always use new copper washers.
5. Fill:
- Brake fluid

![Recommended brake fluid: DOT #4](image)

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

**WARNING**
- Use only the designated 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 vapor lock.

6. Air bleed:
- Brake system
  Refer to “AIR BLEEDING (HYDRAULIC BRAKE SYSTEM)” in CHAPTER 3.

7. Inspect:
- Brake fluid level
  Fluid level is under “LOWER” level line ① → Fill up.
  Refer to “BRAKE FLUID LEVEL INSPECTION” in CHAPTER 3.

8. Install:
- Diaphragm ①
- Plate ②
Rear brake
1. Install:
   - Piston seals
   - Caliper piston

⚠️ WARNING
Always use new piston seals.

2. Install:
   - Pad spring
   - Brake pads (with pad shim)
   - Pad pins
   Refer to “BRAKE PAD REPLACEMENT”.

3. Install:
   - Caliper assembly
   - Copper washers
   - Union bolt
   - Rear wheel
   Refer to “REAR WHEEL”.

| Union bolt 3: | 30 Nm (3.0 m • kg, 22 ft • lb) |

When installing the brake hose to the caliper, lightly touch the brake pipe with the projection on the caliper.

⚠️ WARNING
- Proper hose routing is essential to insure safe motorcycle operation. Refer to “CABLE ROUTING” in CHAPTER 2.
- Always use new copper washers.
4. Fill:
   - Brake fluid

   Recommended brake fluid:
   DOT #4

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

   **WARNING**
   - Use only the designated 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 vapor lock.

5. Air bleed:
   - Brake system
     Refer to “AIR BLEEDING (HYDRAULIC BRAKE SYSTEM)” in CHAPTER 3.

6. Inspect:
   - Brake fluid level
     Fluid level is under “LOWER” level line → Replenish.
     Refer to “BRAKE FLUID LEVEL INSPECTION” in CHAPTER 3.

7. Adjust:
   - Drive chain slack

   Drive chain slack:
   35 ~ 50 mm (1.38 ~ 1.97 in)

   Refer to “DRIVE CHAIN SLACK ADJUSTMENT” in CHAPTER 3.
MASTER CYLINDER ASSEMBLY

**WARNING**
- All internal parts should be cleaned in new brake fluid only.
- Internal parts should be lubricated with brake fluid when installed.

![Diagram of brake components]

Brake fluid: DOT #4

**Front brake**
1. Install:
   - Master cylinder kit ①
   - Circlip ②
   - Rubber boot ③
   - Plate ④

   **NOTE:**
   When installing the plate ④, push it in securely to the shown position.

2. Install:
   - Master cylinder ①

   **NOTE:**
   - Install the master cylinder bracket with the “UP” mark facing upward.
   - Tighten first the upper bolt, then the lower bolt.

   **Bolt (master cylinder bracket):**
   7 Nm (0.7 m • kg, 5.1 ft • lb)

3. Install:
   - Copper washers ②
   - Brake hose ③
   - Union bolt ④

   **Union bolt ③:**
   30 Nm (3.0 m • kg, 22 ft • lb)
NOTE: ____________________________
Install the brake hose as shown.

**WARNING**
- Proper hose routing is essential to insure safe motorcycle operation. Refer to “CABLE ROUTING” in CHAPTER 2.
- Always use new copper washers.

4. Install:
   - Brake switch
   - Spring
   - Brake lever
   - Brake lever cover
   - Mirror (right)

NOTE: ____________________________
Apply lithium soap base grease to the pivot shaft of the brake lever.

**Rear brake**

1. Install:
   - O-ring ①
   - Joint (brake hose) ②
   - Master cylinder kit ③
   - Push rod ④
   - Circlip ⑤
   - Dust boot ⑥

2. Install:
   - Master cylinder ①
   - Copper washers ②
   - Brake hose ③
   - Union bolt ④

<table>
<thead>
<tr>
<th>Bolts (master cylinder):</th>
<th>23 Nm (2.3 m • kg, 17 ft • lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Union bolt ④:</td>
<td>30 Nm (3.0 m • kg, 22 ft • lb)</td>
</tr>
</tbody>
</table>

NOTE: ____________________________
When installing the brake hose to the master cylinder, make sure the brake pipe lightly touches the projection on the copper washer (lower).
Proper hose routing is essential to insure safe motorcycle operation. Refer to “CABLE ROUTING” in CHAPTER 2.

Always use new copper washers.

3. Install:
- Pin ①
- Washer ②
- Cotter pin ③

Always use a new cotter pin.

4. Install:
- Reservoir tank

NOTE: At this time, temporarily install the reservoir tank without its cap and cap stopper.

5. Connect:
- Brake hose

6. Fill:
- Brake fluid

Recommended brake fluid: DOT #4

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

WARNING
- Use only the designated 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 vapor lock.
7. Air bleed:
   - Brake system
   Refer to “AIR BLEEDING (HYDRAULIC BRAKE SYSTEM)” in CHAPTER 3.

8. Inspect:
   - Brake fluid level
     Fluid level is under the “LOWER” level line → Replenish.
     Refer to “BRAKE FLUID LEVEL INSPECTION” in CHAPTER 3.

9. Install:
   - Diaphragm ①
   - Holder (diaphragm) ②
   - Cap (reservoir tank) ③
   - Stopper (reservoir tank cap) ④
   - Reservoir tank

10. Adjust:
    - Rear brake pedal height

    **Pedal height:**
    10 mm (0.394 in)
    (below the top of the footrest)

    Refer to “REAR BRAKE ADJUSTMENT” in CHAPTER 3.
FRONT FORK

1 Front fork assembly (left)  
2 Cap bolt  
3 Upper seat  
4 Collar  
5 Lower seat  
6 Fork spring  
7 Locknut  
8 Piston rod  
9 Rebound spring  
10 Damper rod  
11 Inner tube  
12 Piston metal  
13 Retaining clip  
14 Dust seal  
15 Oil seal  
16 Plain washer  
17 Slide metal  
18 Oil lock pieces  
19 Brake hose holder  
20 Base valve assembly  
21 Cap  
22 Front fork assembly (right)  
23 Axle holder  
24 Boot
REMOVAL

⚠️ **WARNING**  
Support the motorcycle securely so there is no danger of it falling over.

1. Place the motorcycle on a level place.  
2. Elevate the front wheel by placing a suitable stand under the frame and engine.  
3. Remove:  
   - Front wheel  
     Refer to “FRONT WHEEL”.  
4. Remove:  
   - Holder 1 (brake hose)  
   - Bolts 2 (brake caliper)

5. Loosen:  
   - Cap bolt 1

**NOTE:**  
Before loosening the cap bolt, the fork legs must be bled by pushing the air valve 2.

6. Loosen:  
   - Pinch bolts 1 (handlebar crown)  
   - Pinch bolts 2 (lower bracket)

⚠️ **WARNING**  
Support the fork before loosening the pinch bolt.

7. Remove:  
   - Front fork  
   - Fork boot 1
DISASSEMBLY
1. Remove:
   - Cap bolt (from the inner tube)
2. Remove:
   - Cap bolt ① (from the piston rod)

NOTE: Remove the cap bolt using the rod holder ②.

3. Remove:
   - Collars ①
   - Spring seats ②
   - Fork spring ③
4. Drain:
   - Fork oil

5. Remove:
   - Retaining clip ①

NOTE: Use a thin screwdriver, and be careful not to scratch the inner fork tube.

6. Remove:
   - Base valve ①
   - Damper rod assembly ②
   - Damper rod holder ③

NOTE: When loosening the base valve ① (damper rod ②), the damper rod must be held with the damper rod holder ③.
7. Remove:
- Inner fork tube

Removal steps:
- Hold the fork leg horizontally.
- Clamp the caliper mounting boss of the outer fork tube securely in a vise with soft jaws.
- Separate the inner tube from the outer tube by pulling forcefully but carefully on the inner tube.

- Excessive force will damage the oil seal and/or the slide and piston metals. Damaged oil seal, slide metal and piston metal must be replaced.
- Avoid bottoming the inner fork tube in the outer fork tube during the above procedure, as the oil lock piece will be damaged.

8. Remove:
- Piston metal ①
- Slide metal ②
- Plain washer ③
- Oil seal ④
- Dust seal ⑤
- Oil lock piece

INSPECTION
1. Inspect:
- Inner fork tube ①
- Outer fork tube ②
  Scratches/bends/damage → Replace.

⚠️ WARNING
Do not attempt to straighten a bent inner fork tube as this may dangerously weaken the tube.
2. Measure:
- Fork spring free length ③
  Out of specification → Replace.

<table>
<thead>
<tr>
<th>Fork spring free length:</th>
</tr>
</thead>
<tbody>
<tr>
<td>472 mm (18.58 in)</td>
</tr>
<tr>
<td>Minimum free length:</td>
</tr>
<tr>
<td>462 mm (18.19 in)</td>
</tr>
</tbody>
</table>

3. Inspect:
- Damper rod ①
  Wear/bends/damage → Replace.
  Contamination → Blow out all oil passages with compressed air.

**WARNING**
Do not attempt to straighten a bent damper rod as this may dangerously weaken the rod.

4. Inspect:
- Piston rod ①
- Rebound spring ②
  Wear/bends/damage → Replace.

5. Inspect:
- Cap bolt ①
- Spring seats ②
- Spacer ③
- Oil lock piece ④
  Damage → Replace.

6. Inspect:
- Base valve ①
  Damage → Replace.
  Contamination → Blow out all oil passages with compressed air.
ASSEMBLY
Reverse the “DISASSEMBLY” procedure. Note the following points.

NOTE:
- When assembling the front fork, be sure to replace the following parts.
  * Piston metal
  * Slide metal
  * Oil seal
  * Dust seal
- Make sure all components are clean before assembling the fork.

1. Install:
   * Rebound spring ①
   * Piston rod ②
   * Oil lock piece ③
   * Damper rod ④

2. Install:
   * Damper rod assembly ①
to the inner tube ②

3. Install:
   * Inner fork tube ①
to the outer fork tube ②
4. Tighten:
- Base valve ① (damper rod)
  Use the damper rod holder ② to hold the damper rod.

| Damper rod holder: YM-01418
| Base valve (damper rod): 55 Nm (5.5 m·kg, 40 ft·lb) LOCTITE® |

**WARNING**
Always use a new copper washer.

5. Install:
- Oil seal ①
  Use the fork seal driver weight ② and adapter ③.

| Fork seal driver weight: YM-33963
| Adapter: 43 mm (1.69 in): YM-8020 |

**NOTE:**
Before installing the oil seal, apply the lithium soap base grease onto the oil seal lips.

Be sure that the oil seal numbered side faces upward.

**NOTE:**
- Apply fork oil on the inner tube.
- When installing the oil seal and dust seal ①, use a plastic sheet ② lubricated with fork oil to protect the oil seal lip.
- Install the oil seal with its manufacturer’s marks or number facing the axle holder side.
6. Install:
- Retaining clip

**NOTE:**
Fit the oil seal retaining clip ① correctly in the groove of the outer fork tube.

7. Fill:
- Front fork oil
  To the top of the inner tube with the recommended fork oil.

Fork oil capacity:
- 555 cm³
  (19.57 Imp oz, 18.76 US oz)

**Recommended oil:**
- Yamaha suspension oil 01 or equivalent

- Be sure to use the recommended fork oil.
  If other oils are used, they may have an adverse effect on the front fork performance.
- **NEVER** allow foreign materials to enter the front fork.

8. Attach:
- Rod puller ①
- Rod puller attachment ② (to damper rod ③)

**Rod puller:**
- P/N. YM-01437

**Rod puller attachment:**
- P/N. 90890-01436

9. After filling the front fork leg, pump the damper rod ③ slowly up and down more than 10 times to distribute the fork oil.

**NOTE:**
Be sure to pump the damper rod slowly because the fork oil may spurt out.
10. After filling, pump the inner tube slowly up and down (about 150 mm (5.90 in)) to distribute the fork oil once more.

**NOTE:**
Be careful not to stroke the inner tube over. A stroke of 150 mm (5.90 in) or more will cause air to enter. In this case, repeat the steps 8 to 9.

11. Wait ten minutes until the air bubbles have dispersed from the front fork, and the oil has been distributed evenly in the system before setting the recommended oil level.

**NOTE:**
Pour the fork oil up to the top of the inner tube to ensure that it spreads to all its parts. Failing to do so will make it impossible to obtain the correct level.

Be sure to bleed the front forks after filling them with oil.

12. Measure:
- Oil level (left and right) ③

Out of specification → Adjust.

<table>
<thead>
<tr>
<th>Fork oil level ③:</th>
</tr>
</thead>
<tbody>
<tr>
<td>130 mm (5.12 in)</td>
</tr>
</tbody>
</table>

From the top of the outer tube with inner tube and damper rod ① fully compressed without spring.

**WARNING**
Never fail to fill to the specified oil level ③ and always make sure to adjust each front fork leg to the same level. Uneven adjustment can cause poor handling and loss of stability.

13. Install:
- Fork spring ①
- Spring seats ②
- Collar ③
- Cap bolt ④
  
  Fully tighten with your finger.

14. Tighten:
- Locknut

<table>
<thead>
<tr>
<th>Nut:</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 Nm (1.5 m • kg, 11 ft • lb)</td>
</tr>
</tbody>
</table>
Installing steps:

- Install the rod puller ① and attachment ② to the damper rod ③.
- Install the fork spring, spring seats and collars.
- Pull up the rod puller and set the rod holder ① between the locknut ② and spring seat.

**NOTE:**
Use the “B”-marked side of rod holder.

- Remove the rod puller and attachment.
- Temporarily install the cap bolt.
- Tighten the locknut.

**NOTE:**
Be careful, this fork spring is compressed.

---

15. Install:
- Inner tube (to cap bolt)  
  Temporarily tighten the cap bolt.

16. Install:
- Fork boot ①

---

**INSTALLATION**
Reverse the “REMOVAL” procedure.
Note the following points.

1. Install:
- Front fork
  Temporarily tighten the pinch bolts.
NOTE:
Position the inner fork tube end in such a way that it is flush with the top of the handle crown.

2. Tighten:
- Pinch bolts 1 (lower bracket)
- Pinch bolts 2 (handlebar crown)
- Cap bolt 3

Pinch bolt 1 (lower bracket):
30 Nm (3.0 m • kg, 22 ft • lb)
Pinch bolts 2 (handlebar crown):
23 Nm (2.3 m • kg, 17 ft • lb)
Cap bolt 3:
28 Nm (2.8 m • kg, 20 ft • lb)

3. Install:
- Bolt (brake caliper)
- Holder (brake hose)

Bolt (brake caliper):
23 Nm (2.3 m • kg, 17 ft • lb)
Bolt (brake hose holder):
7 Nm (0.7 m • kg, 5.1 ft • lb)

**WARNING**
Proper hose routing is essential to insure safe motorcycle operation. Refer to “CABLE ROUTING” in CHAPTER 2.

4. Install:
- Front wheel

Bolt (wheel axle):
58 Nm (5.8 m • kg, 42 ft • lb)

Refer to “FRONT WHEEL”.

5. Adjust:
- Air pressure
  Refer to “FRONT FORK ADJUSTMENT” in CHAPTER 3.

Standard air pressure:
0 kPa (0 kg/cm², 0 psi)
Maximum air pressure:
40 kPa (0.4 kg/cm², 5.7 psi)
### STEERING HEAD AND HANDLEBAR

1. Handlebar holder (upper)
2. Handlebar holder (lower)
3. Headlight stay 2
4. Cap
5. Handlebar crown
6. Headlight stay 1
7. Brake hose holder
8. Lock washer
9. Ring nut
10. Damper collar
11. Washer
12. Cover
13. Washer
14. Bearing (upper)
15. Bearing (lower)
16. Steering shaft
17. Stay

**TIGHTENING STEPS:**

- Tighten the ring nut. 38 Nm (3.8 m•kg, 27 ft•lb)
- Loosen it one turn.
- Retighten it. 5 Nm (0.5 m•kg, 3.6 ft•lb)
REMOVAL
Handlebar

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

1. Place the motorcycle on a level place.

2. Remove:
   - Master cylinder assembly ①
   - Master cylinder bracket ②
   - Bands ③

3. Remove:
   - Handlebar switch (right)

4. Remove:
   - Throttle cable holder ①
   - Throttle cable ②
   - Plate ③
   - Throttle grip ④

5. Remove:
   - Lever holder ①
   - Handlebar switch ② (left)
   - Grip ③
   - Bands ④
6. Remove:
- Handlebar upper holder ①
- Handlebar ②
- Handlebar lower holder ③

Steering head

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

1. Place the motorcycle on a level place.
2. Elevate the front wheel by placing a suitable stand under the frame and engine.

3. Remove:
- Handlebar
  Refer to “Handlebar”.
4. Remove:
- Front wheel
  Refer to “FRONT WHEEL”.

5. Remove:
- Front fork
  Refer to “FRONT FORK”.
6. Remove:
- Front fender ①

7. Remove:
- Holder ① (brake hose)
8. Disconnect:
- Speedometer cable
9. Remove:
- Speedometer assembly ①

10. Remove:
- Handlebar crown ①

**NOTE:**
Loosen the steering stem nut ② and remove the handlebar crown ①. Take care that the handlebar crown does not touch the fuel tank.

11. Remove:
- Lock washer ①
- Ring nut ②
- Rubber washer

**NOTE:**
Remove the ring nut ① by using the ring nut wrench ②.

**WARNING**
Support the lower bracket so that it may not fall down.

12. Remove:
- Washer
- Cover ①
- Washer ②
- Bearing ③ (upper)
- Steering stem ④
**INSPECTION**

1. Inspect:
   - Handlebar ①
     Bends/cracks/damage → Replace.

**WARNING**

Do not attempt to straighten a bent handlebar as this may dangerously weaken the handlebar.

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

Replacement steps:
- Remove the handlebar grip.
- Apply a light coat of an adhesive for rubber on the left new handlebar end.
- Install the handlebar grip.

**NOTE:**
Wipe off excess adhesive with a clean rag.

**WARNING**

Leave the handlebar intact until the adhesive becomes dry enough to make the grip and handlebar stuck securely.

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

2. Inspect:
   - Bearing ① (lower)
   - Bearing ② (upper)
   - Bearing race
     Wear/pitting/damage → Replace as a set.

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

Replacement steps:
- Remove the bearing races from the slot on the steering head pipe using a long rod ③ and hammer as shown.
- Remove the bearing race on the steering stem using the floor chisel ④ and the hammer as shown.
- Install the new dust seal, bearings and races.
Always replace bearings and races as a set.

- A slant installation of the bearings and the races will damage the frame, so take care to install them horizontally.
- Do not strike the rollers.

3. Inspect:
- Handlebar crown ①
- Lower bracket ②
  - Cracks/damage → Replace.
- Steering shaft ③
  - Bends/damage → Replace the lower bracket assembly.

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

**INSTALLATION**

**Handlebar**
Reverse the “REMOVAL” procedure.

Note the following points.

1. Lubricate:
   - Handlebar

| Lithium soap base grease |

**NOTE:**
Before installing the throttle grip onto the handlebar, apply a light coat of lithium soap base grease onto the handlebar end.
2. Install:
- Handlebar holder 1 (lower)
- Clip
- Handlebar 2

Bolt (handlebar):
23 Nm (2.3 m • kg, 17 ft • lb)

NOTE:
The upper handlebar holder should be installed with the punch mark ① facing forward.

CA
First tighten the bolts on the front side of the handlebar holder, and then tighten the bolts on the rear side.

3. Install:
- Handlebar switch 1 (left)
- Lever holder ②
- Grip ③
- Bands ④

NOTE:
Apply a light coat of lithium soap base grease onto the clutch cable end.

4. Install:
- Throttle grip ①
- Plate ②
- Throttle cable ③
- Throttle cable holder ④

WARNING
Provide a clearance of 1 mm (0.04 in) ③ between the throttle grip and the throttle cable holder.

5. Install:
- Master cylinder assembly ①
- Master cylinder bracket ②
- Bands ③
- Handlebar switch (right) ④
NOTE: When installing the handlebar switch (right), make sure its projection fits into the hole.

- Install the master cylinder bracket with the “UP” mark facing upward.
- Tighten first the upper bolt, then the lower bolt.

**WARNING**

Proper hose routing is essential to insure safe motorcycle operation. Refer to “CABLE ROUTING” in CHAPTER 2.

6. Adjust:

- Clutch cable free play

**Free play:**

10 ~ 15 mm (0.4 ~ 0.6 in) (at the lever end)

Refer to “CLUTCH ADJUSTMENT” in CHAPTER 3.

---

**Steering head**

Reverse the “REMOVAL” procedure. Note the following points.

1. Lubricate:
   - Bearing (upper and lower)
   - Bearing races

   **Lithium soap base grease**

2. Install:
   - Steering shaft
   - Washer
   - Cover
   - Washer
   - Ring nut

Hold the steering shaft until it is secured.
3. Tighten:
   ● Ring nut \( \textcircled{1} \)

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

Tightening steps:
   ● Tighten the ring nut using the ring nut wrench \( \textcircled{2} \).

![Ring nut wrench: P/N. YU-33975](image)

NOTE: Set the torque wrench to the ring nut wrench so that they form a right angle.

![Ring nut \( \textcircled{1} \) (lower) (initial tightening): 5 Nm (0.5 m•kg, 3.6 ft•lb)](image)

   ● Turn the lower bracket to the left and right making sure there is no binding, and then loosen the ring nut one turn.
   ● Retighten the ring nut using the ring nut wrench.

![Ring nut \( \textcircled{1} \) (lower) (final tightening): 38 Nm (3.8 m•kg, 27 ft•lb)](image)

**WARNING**

Avoid over tightening.

NOTE: Check the steering head by turning the steering from lock to lock, after adjusting the steering head. If the steering is stiff, loosen the ring nut but not to the extent of allowing free play in the bearing. If the steering is loose, repeat the adjustment steps.

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

4. Install:
   ● Rubber washer
   ● Ring nut \( \textcircled{1} \)
   ● Lock washer \( \textcircled{2} \)
5. Install:
- Handlebar crown ①

**NOTE:**
Temporarily tighten the steering stem nut ②.

6. Install:
- Brake hose holder
- Front flasher assembly

7. Install:
- Front fork
  Refer to “FRONT FORK”.

**NOTE:**
Temporarily tighten the pinch bolts.

8. Tighten:
- Steering stem nut

<table>
<thead>
<tr>
<th>Steering stem nut:</th>
</tr>
</thead>
<tbody>
<tr>
<td>120 Nm (12 m • kg, 85 ft • lb)</td>
</tr>
</tbody>
</table>

9. Tighten:
- Pinch bolts (front fork)

<table>
<thead>
<tr>
<th>Pinch bolt (lower bracket):</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 Nm (3.0 m • kg, 22 ft • lb)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pinch bolt (handlebar crown):</th>
</tr>
</thead>
<tbody>
<tr>
<td>23 Nm (2.3 m • kg, 17 ft • lb)</td>
</tr>
</tbody>
</table>

10. Install:
- Speedometer assembly ①

**Note:**
Make sure that the cables and leads are routed properly. Refer to “CABLE ROUTING” in CHAPTER 2.
WARNING

Proper hose routing is essential to insure safe motorcycle operation. Refer to “CABLE ROUTING” in CHAPTER 2.

11. Connect:
   • Speedometer cable
     Refer to “CABLE ROUTING” in CHAPTER 2.

12. Install:
   • Headlight assembly
   • Front cover

13. Install:
   • Brake caliper
   • Holder (brake hose)
     Refer to “FRONT FORK”.

<table>
<thead>
<tr>
<th>Bolt (brake caliper):</th>
<th>30 Nm (3.0 m • kg, 22 ft • lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bolt (holder):</td>
<td>7 Nm (0.7 m • kg, 5.1 ft • lb)</td>
</tr>
</tbody>
</table>

14. Install:
   • Front fender

| Bolt (front fender): | 8 Nm (0.8 m • kg, 5.8 ft • lb) |

15. Install:
   • Front wheel
     Refer to “FRONT WHEEL”.

| Wheel axle:          | 58 Nm (5.8 m • kg, 42 ft • lb) |

16. Install:
   • Handlebar
     Refer to “Handlebar”.

| Bolt (handlebar):    | 23 Nm (2.3 m • kg, 17 ft • lb) |
| Bolt (master cylinder bracket): | 7 Nm (0.7 m • kg, 5.1 ft • lb) |
Rear shock absorber and swingarm

1. Rear shock absorber

46 Nm (4.6 m·kg, 33 ft·lb)

40 Nm (4.0 m·kg, 29 ft·lb)
1. Pivot shaft
2. Thrust cover (swingarm)
3. Oil seal
4. Bearing
5. Swingarm
6. Bush
7. Oil seal
8. Bearing
9. Connecting rod
10. Collar
11. Oil seal
12. Collar
13. Dust seal
14. Circlip
15. Bearing
16. Bearing
17. Oil seal
18. Collar
19. Oil seal
20. Bearing
21. Bearing
22. Collar
23. Dust seal
24. Circlip
25. Oil seal
26. Bearing
27. Relay arm
28. Collar
29. Oil seal
30. Bearing
31. Bearing
32. Oil seal
33. Collar
34. Dust seal
35. Circlip
36. Oil seal
37. Bearing
38. Relay arm
39. Collar
40. Oil seal
41. Bearing
42. Relay arm
43. Collar
44. Oil seal
45. Bearing
46. Connecting rod
47. Collar
48. Oil seal
49. Bearing
50. Relay arm
51. Collar
52. Oil seal
53. Bearing
54. Connecting rod
55. Collar
56. Oil seal
57. Bearing
58. Connecting rod
59. Collar
60. Oil seal
61. Bearing
62. Relay arm
63. Collar
64. Oil seal
65. Bearing
66. Relay arm
67. Collar
68. Oil seal
69. Bearing
70. Connecting rod
71. Collar
72. Oil seal
73. Bearing
74. Relay arm
75. Collar
76. Oil seal
77. Bearing
78. Connecting rod
79. Collar
80. Oil seal
81. Bearing
82. Relay arm
83. Collar
84. Oil seal
85. Bearing
86. Connecting rod
87. Collar
88. Oil seal
89. Bearing
90. Relay arm
91. Collar
92. Oil seal
93. Bearing
94. Connecting rod
95. Collar
96. Oil seal
97. Bearing
98. Relay arm
99. Collar
100. Oil seal
101. Bearing
102. Connecting rod
103. Collar
104. Oil seal
105. Bearing
106. Relay arm
107. Collar
108. Oil seal
109. Bearing
110. Connecting rod
111. Collar
112. Oil seal
113. Bearing
114. Relay arm
115. Collar
116. Oil seal
117. Bearing
118. Connecting rod
119. Collar
120. Oil seal
121. Bearing
122. Relay arm
123. Collar
124. Oil seal
125. Bearing
126. Connecting rod
127. Collar
128. Oil seal
129. Bearing
130. Relay arm
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132. Oil seal
133. Bearing
134. Connecting rod
135. Collar
136. Oil seal
137. Bearing
138. Relay arm
139. Collar
140. Oil seal
141. Bearing
142. Connecting rod
143. Collar
144. Oil seal
145. Bearing
146. Relay arm
147. Collar
148. Oil seal
149. Bearing
150. Connecting rod
151. Collar
152. Oil seal
153. Bearing
154. Relay arm
155. Collar
156. Oil seal
157. Bearing
158. Connecting rod
159. Collar
160. Oil seal
161. Bearing
162. Relay arm
163. Collar
164. Oil seal
165. Bearing
166. Connecting rod
167. Collar
168. Oil seal
169. Bearing
170. Relay arm
171. Collar
172. Oil seal
173. Bearing
174. Connecting rod
175. Collar
176. Oil seal
177. Bearing
178. Relay arm
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180. Oil seal
181. Bearing
182. Connecting rod
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184. Oil seal
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186. Relay arm
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190. Connecting rod
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192. Oil seal
193. Bearing
194. Relay arm
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196. Oil seal
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198. Connecting rod
199. Collar
200. Oil seal
201. Bearing
202. Relay arm
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204. Oil seal
205. Bearing
206. Connecting rod
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208. Oil seal
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210. Relay arm
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212. Oil seal
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214. Connecting rod
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216. Oil seal
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220. Oil seal
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222. Connecting rod
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224. Oil seal
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234. Relay arm
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236. Oil seal
237. Bearing
238. Connecting rod
239. Collar
240. Oil seal
241. Bearing
242. Relay arm
243. Collar
244. Oil seal
245. Bearing
246. Connecting rod
247. Collar
248. Oil seal
249. Bearing
250. Relay arm
251. Collar
252. Oil seal
253. Bearing
254. Connecting rod
255. Collar
256. Oil seal
257. Bearing
258. Relay arm
259. Collar
260. Oil seal
261. Bearing
262. Connecting rod
263. Collar
264. Oil seal
265. Bearing
266. Relay arm
267. Collar
268. Oil seal
269. Bearing
270. Connecting rod
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273. Bearing
274. Relay arm
275. Collar
276. Oil seal
277. Bearing
278. Connecting rod
279. Collar
280. Oil seal
281. Bearing
282. Relay arm
283. Collar
284. Oil seal
285. Bearing
286. Connecting rod
287. Collar
288. Oil seal
289. Bearing
290. Relay arm
291. Collar
292. Oil seal
293. Bearing
294. Connecting rod
295. Collar
296. Oil seal
297. Bearing
298. Relay arm
299. Collar
300. Oil seal
301. Bearing
302. Connecting rod
303. Collar
304. Oil seal
305. Bearing
306. Relay arm
307. Collar
308. Oil seal
309. Bearing
310. Connecting rod
311. Collar
312. Oil seal
313. Bearing
314. Relay arm
315. Collar
316. Oil seal
317. Bearing
318. Connecting rod
319. Collar
320. Oil seal
321. Bearing
322. Relay arm
323. Collar
324. Oil seal
325. Bearing
326. Connecting rod
327. Collar
328. Oil seal
329. Bearing
330. Relay arm
331. Collar
332. Oil seal
333. Bearing
334. Connecting rod
335. Collar
336. Oil seal
337. Bearing
338. Relay arm
339. Collar
340. Oil seal
341. Bearing
342. Connecting rod
343. Collar
344. Oil seal
345. Bearing
346. Relay arm
347. Collar
348. Oil seal
349. Bearing
350. Connecting rod
351. Collar
352. Oil seal
353. Bearing
354. Relay arm
355. Collar
356. Oil seal
357. Bearing
358. Connecting rod
359. Collar
360. Oil seal
361. Bearing
362. Relay arm
363. Collar
364. Oil seal
365. Bearing
366. Connecting rod
367. Collar
368. Oil seal
369. Bearing
370. Relay arm
360 - 59
HANDLING NOTES

⚠️ WARNING ⚠️
This shock absorber contains highly pressurized nitrogen gas. Read and understand the following information before handling the shock absorber. The manufacturer cannot be held responsible for property damage or personal injury that may result from improper handling.

- Do not tamper with or attempt to open the cylinder assembly.
- Do not subject shock absorber to an open flame or other high heat source. This may cause the unit to explode due to excessive gas pressure.
- Do not deform or damage the cylinder in any way. Cylinder damage will result in poor damping performance.
- Take care not to scratch the contact surface of the piston rod with the cylinder; or oil could leak out.
- When scrapping the shock absorber, refer to “NOTES ON DISPOSAL”.

NOTES ON DISPOSAL

*******************************************************************************
Shock absorber disposal steps:
Gas pressure must be released before disposing of the shock absorber assembly. To do so, drill a 2 ~ 3 mm (0.08 ~ 0.12 in) hole through the gas cylinder at a point 15 ~ 20 mm (0.6 ~ 0.8 in) from the end or the gas cylinder case.

⚠️ WARNING ⚠️
Wear eye protection to prevent eye damage from escaping gas and/or metal chips.

*******************************************************************************
REAR SHOCK ABSORBER AND SWINGARM

REMOVAL
Air filter case

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

1. Place the motorcycle on a level place.
2. Remove:
   - Side covers
   - Seat
   - Fuel tank
     Refer to “SEAT, FUEL TANK AND COVERS” in CHAPTER 3.
3. Elevate the rear wheel by placing a suitable stand under the frame and engine.
4. Disconnect:
   - CDI unit ①
   - Bolts ②
5. Remove:
   - Rear frame 2 ①
6. Disconnect:
   - Breather hose 1
   - Breather hose 2
     Refer to “CRANKCASE BREATHER HOSE INSPECTION” in CHAPTER 3.
7. Loosen:
   - Screw (carburetor joint clamp)
8. Remove:
   - Bolts
9. Remove:
- Air filter case assembly

**Rear shock absorber**

**WARNING**

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

1. Place the motorcycle on a level place.
2. Remove:
   - Side covers
   - Seat
   - Fuel tank
   Refer to “SEAT, FUEL TANK AND COVERS” in CHAPTER 3.
3. Elevate the rear wheel by placing a suitable stand under the frame and engine.

4. Remove:
   - Air filter case assembly
   Refer to “Air filter case”.
5. Disconnect:
   - Carburetor assembly
   Refer to “CARBURETOR” in CHAPTER 5.

6. Remove:
   - Gas cylinder ① (shock absorber assembly)
   - Battery ②
   - Battery case ③
7. Remove:
   - Rear shock absorber bolt (lower)

8. Remove:
   - Rear shock absorber nut ① (upper)

9. Remove:
   - Rear shock absorber

**Swingarm**

⚠️ **WARNING**

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

1. Place the motorcycle on a level place.
2. Elevate the rear wheel by placing a suitable stand under the frame and engine.
3. Remove:
   - Rear shock absorber
     Refer to “Rear shock absorber”.
4. Remove:
   - Rear wheel
     Refer to “REAR WHEEL”.

---

6 - 63
5. Remove:
- Brake hose holders ①
- Rear brake caliper

6. Remove:
- Chain case ①
- Chain guide ②

NOTE:
When removing the chain case, lift up and remove the chain case from the swingarm L-shaped part ③ on the back.

7. Check:
- Swingarm free play

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

**Inspection steps:**
- Check the tightening torque of the pivot shaft (swingarm) securing nut ①.

<table>
<thead>
<tr>
<th>Nut ① (pivot shaft):</th>
</tr>
</thead>
<tbody>
<tr>
<td>105 Nm (10.5 m • kg, 75 ft • lb)</td>
</tr>
</tbody>
</table>

- Check the swingarm side play A by moving it from side to side.
  If side play is noticeable, check the inner collar, bearing, washer and thrust cover.

<table>
<thead>
<tr>
<th>Side play (at end of swingarm):</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limit: 1.0 mm (0.04 in)</td>
</tr>
</tbody>
</table>

- Check the swingarm vertical movement B by moving it up and down.
  If vertical movement is tight or if there is binding, check the inner collar, bearing, washer and thrust cover.

**********************************************************************************
8. Remove:
- Bolt (relay arm-connecting rod)
- Nut

9. Remove:
- Nut ① (pivot shaft)
- Washer ②
- Pivot shaft ③
- Swingarm

10. Remove:
- Relay arm

11. Remove:
- Caps
- Connecting arm ①

12. Remove:
- Chain protector ①
INSPECTION
1. Inspect:
   - Rear shock absorber
     Oil leaks/damage → Replace the rear shock absorber.
   - Gas cylinder
     Oil leaks/damage → Replace the rear shock absorber.

**WARNING**
Do not disassemble the shock absorber, because of the highly pressurized nitrogen gas in it.

2. Inspect:
   - Bearing
     Pitting/noise/damage → Replace.
     Loss of solid lubrication \( \text{①} \) → Replace.

**NOTE:**
Polylube bearings*, with solid lubrication, have been adopted with the intent to make the needle bearings, used in this model, maintenance free. With polylube bearings, no grease nipple and regular lubrication is necessary. However, grease should be applied to all oil seals and collars when removed or installed.

*Polylube bearing
Grease and an ultra-high molecular weight polyethylene are the lubricating elements which are used. These two elements become solid after heat treatment, where they are sealed into the bearing race and perform as a solid lubricant to reduce friction when necessary.
Features
- Water seepage is no longer a problem since the polylube is solid. If water seeps into the bearing, it will emulsify and will not flow out.
- Lubrication can continuously be supplied to the contact points when heat is generated by the friction caused by the centrifugal forces, since the lubricant is solid and always remains inside the bearing.

C
- Be careful not to damage the solid lubrication of the bearing when removing, inspecting, or installing the bearing.
- If the bearing is damaged, replace it with a new one.

3. Inspect:
- Swingarm ①
  Bends/cracks/damage → Replace.

4. Inspect:
- Connecting arm ①
  Bends/cracks/damage → Replace.
- Collars ②
  Wear/damage → Replace.

5. Inspect:
- Relay arm ①
  Bends/cracks/damage → Replace.
- Oil seals ②
  Wear/damage → Replace.
- Collars ③
  Wear/damage → Replace.
6. Inspect:
- Oil seal ①
  Wear/damage → Replace.
- Washer ②
- Thrust cover ③
- Bush ④
  Scratches/damage → Replace.

7. Inspect:
- Chain guide ①
- Chain protector ②
  Cracks/damage → Replace.

**INSTALLATION**

**Rear shock absorber**
Reverse the “REMOVAL” procedure.

Note the following points.

1. Lubricate:
- Collars (inner surface)

2. Install:
- Rear shock absorber

3. Tighten:
- Nut ① (upper side)

4. Tighten:
- Bolt ② (lower side)

5. Install:
- Gas cylinder
- Carburetor assembly

**Molybdenum disulfide grease**

Nut ① (upper side): 46 Nm (4.6 m•kg, 33 ft•lb)
Bolt ② (lower side): 40 Nm (4.0 m•kg, 29 ft•lb)
6. Install:
- Air filter case
  Refer to “REAR SHOCK ABSORBER AND SWINGARM”.

7. Install:
- CDI unit
- Rear frame 2

---

**Swingarm**
Reverse “REMOVAL” procedure.
Note the following points.

1. Lubricate:
   - Oil seal
   - Bushing
   - Thrust cover (inside)
   - Collar
   - Pivot shaft
   - Bolt (relay arm-swingarm)
   - Bolt (connecting arm-relay arm)
   - Bolt (connecting arm-frame)

   Molybdenum disulfide grease

2. Tighten:
   - Nut ① (swingarm-connecting arm)

   **Nut ① (swingarm-connecting arm):**
   59 Nm (5.9 m·kg, 43 ft·lb)

3. Install:
   - Rubber caps
   - Chain protector

4. Install:
   - Bolt ① (frame-relay arm)

   **Bolt ① (relay arm):**
   46 Nm (4.6 m·kg, 33 ft·lb)
5. Tighten:
- Swingarm
- Nut ① (pivot shaft)

Nut ① (pivot shaft):
105 Nm (10.5 m • kg, 75 ft • lb)

6. Install:
- Nut ① (connecting arm-relay arm)

Nut ① (connecting arm-relay arm):
59 Nm (5.9 m • kg, 43 ft • lb)

7. Tighten:
- Bolt ① (chain case)
- Bolt ② (chain guide)

Bolt ① (chain case):
7 Nm (0.7 m • kg, 5.1 ft • lb)
Bolt ② (chain guide):
7 Nm (0.7 m • kg, 5.1 ft • lb)

8. Install:
- Rear shock absorber
  Refer to “REAR SHOCK ABSORBER”.

9. Install:
- Rear wheel
  Refer to “REAR WHEEL”.

10. Adjust:
- Drive chain slack

Drive chain slack:
35 ~ 50 mm (1.38 ~ 1.97 in)

Refer to “DRIVE CHAIN SLACK ADJUST-MENT” in CHAPTER 3.
11. Tighten:
   • Axle nut

   **Axle nut:**
   105 Nm (10.5 m·kg, 75 ft·lb)

   Refer to “REAR WHEEL”.

12. Install:
   • Cotter pin

   **NOTE:**
   Bend the ends of the cotter pin as illustrated.

   **WARNING**
   Always use a new cotter pin.

13. Install:
   • Fuel tank
   • Seat
   • Side covers

   **Bolt**
   (fuel tank, seat and side covers):
   7 Nm (0.7 m·kg, 5.1 ft·lb)
DRIVE CHAIN AND SPROCKETS

1. Driven sprocket
2. Chain joint
3. Drive chain
4. Washer
5. Drive sprocket

110 Nm (11.0 m·kg, 80 ft·lb)
NOTE: 
Before removing the drive chain and sprockets, drive chain slack and 10-link length of drive chain should be measured.

REMOVAL
1. Elevate the rear wheel by placing a suitable stand under the frame and engine.

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

2. Remove:
   - Shift pedal ①
   - Crankcase cover 2 ②

3. Remove:
   - Drive sprocket
   - Drive chain
   Refer to “ENGINE REMOVAL” in CHAPTER 4.

4. Remove:
   - Chain joint clip ①
5. Remove:
- Chain joint
  Use the drive chain cutter tool ①.

<table>
<thead>
<tr>
<th>Drive chain cutter:</th>
</tr>
</thead>
<tbody>
<tr>
<td>P/N. 90890-01286</td>
</tr>
</tbody>
</table>

6. Remove:
- Link plate ①
- O-ring ②
- Pin ③
- Drive chain ④

7. Remove:
- Rear wheel
  Refer to “REAR WHEEL”.

**INSPECTION**

1. Measure:
- 10-link length ⑧ (drive chain)
  Use ⑧ vernier caliper gauge.
  Out of specification → Replace the drive chain.

<table>
<thead>
<tr>
<th>10-link length limit:</th>
</tr>
</thead>
<tbody>
<tr>
<td>150.1 mm (5.90 in)</td>
</tr>
</tbody>
</table>

**NOTE:**
- For measurement, increase the chain tension with your finger.
- 10-link length is a measurement between the inside edges of the ① and ① rollers as shown.
- Two or three different 10-link lengths should be measured.

2. Clean:
- Drive chain
  Place it in kerosene, and brush off as much dirt as possible. Then, remove the chain from the kerosene and dry it off.
This motorcycle has a drive chain with small rubber O-rings between the chain plates. Steam cleaning, high-pressure washers, and certain solvents can damage these O-rings. Use only kerosene to clean the drive chain.

3. Inspect:
- O-ring (drive chain)
  Damage → Replace the drive chain.
- Rollers
- Chain joint
  Damage/wear → Replace the drive chain.

- Replace the whole drive chain when one O-ring falls off.
- Replace the drive chain, the drive sprocket and the driven sprocket as a set.

4. Inspect:
- Drive chain stiffness
  Stiff → Clean and lubricate or replace.

5. Inspect:
- Drive sprocket
- Driven sprocket
  More than 1/4 tooth wear → Replace the sprocket.
  Bent teeth → Replace the sprocket.

INSTALLATION
Reverse the “REMOVAL” procedure.
Note the following points.
1. Lubricate:
- Drive chain
- Chain joint (new)

Drive chain lubricant:
SAE 30 ~ 50W motor oil or chain lubricants suitable for “O-ring” chains.
2. Install:
- Rear wheel
  Refer to “REAR WHEEL”.

3. Install:
- Drive chain ①
- Drive sprocket ②
- Washer ③
- Nut ④

<table>
<thead>
<tr>
<th>Nut (drive sprocket):</th>
</tr>
</thead>
<tbody>
<tr>
<td>110 Nm (11.0 m • kg, 80 ft • lb)</td>
</tr>
</tbody>
</table>

**NOTE:**
Tighten the nut (drive sprocket) while applying the rear brake.

4. Install:
- Chain joint ①
- O-ring ②
- Link plate ③
  Use the drive chain cutter tool ④.

<table>
<thead>
<tr>
<th>Drive chain cutter:</th>
</tr>
</thead>
<tbody>
<tr>
<td>P/N. YM-33858</td>
</tr>
</tbody>
</table>

5. Install:
- Chain joint clip ①

**CA**
Be sure to install the chain joint clip to the direction as shown.

6. Adjust:
- Drive chain slack
  Refer to “DRIVE CHAIN SLACK ADJUSTMENT” in CHAPTER 3.

<table>
<thead>
<tr>
<th>Drive chain slack:</th>
</tr>
</thead>
<tbody>
<tr>
<td>35 ~ 50 mm (1.38 ~ 1.97 in)</td>
</tr>
</tbody>
</table>
Too little chain slack will overload the engine and other vital parts; keep the slack within the specified limits.

7. Tighten:
- Axle nut
- Bolt (drive sprocket)

8. Install:
- Cotter pin

**NOTE:**
Bend the ends of the cotter pin as illustrated.

**WARNING**
Always use a new cotter pin.

9. Install:
- Crankcase cover 2 (drive sprocket)
- Shift pedal

Refer to “ENGINE ASSEMBLY AND ADJUSTMENT” in CHAPTER 4.

<table>
<thead>
<tr>
<th>Axle nut:</th>
</tr>
</thead>
<tbody>
<tr>
<td>105 Nm (10.5 m • kg, 75 ft • lb)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Bolt (crankcase cover 2):</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 Nm (1.0 m • kg, 7.2 ft • lb)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Bolt (shift pedal):</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 Nm (1.0 m • kg, 7.2 ft • lb)</td>
</tr>
</tbody>
</table>
NOTE:
- The “START” switch is closed while the button (switch) is pushed.
- The clutch switch is closed while the clutch lever is pulled.
- The neutral switch is closed while the transmission is in neutral.

COLOR CODE

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<tr>
<td>O</td>
<td>Orange</td>
<td>L/W</td>
<td>Blue/White</td>
<td>W/R</td>
</tr>
</tbody>
</table>
ELECTRICAL COMPONENTS

1. Wireharness
2. Rectifier/regulator
3. CDI unit
4. Battery
5. Fuse
6. Fuse holder assembly
7. Ignition coil
8. Plug cap
9. Main switch assembly

BATTERY:
SPECIFIC GRAVITY: 1.320

IGNITION COIL:
PRIMARY COIL RESISTANCE:
0.36 ~ 0.48 Ω at 20 °C (68 °F)
SECONDARY COIL RESISTANCE:
5.4 ~ 7.4 kΩ at 20 °C (68 °F)
1. Neutral switch
2. Starter relay
CHECKING OF CONNECTIONS

Dealing with stains, rust, moisture, etc. on the connector.

1. Disconnect:
   - Connector
2. Dry each terminal with an air blower.

3. Connect and disconnect the connector two or three times.
4. Pull the lead to check that it will not come off.
5. If the terminal comes off, bend up the pin ① and reinsert the terminal into the connector.

6. Connect:
   - Connector
7. Check for continuity with a tester.

**NOTE:**
- If there is no continuity, clean the terminals.
- Be sure to perform the above steps 1 to 7 when checking the wire harness.
- When replacing the CDI unit, be sure to check its connector.
- For a field remedy, use a contact revitalizer available on the market.
- Use the tester on the connector as shown.
IGNITION SYSTEM
CIRCUIT DIAGRAM

1. AC magneto
2. “ENGINE STOP” switch
3. Main switch
4. Fuse (main)
5. Battery
6. CDI unit
7. Ignition coil
8. Spark plug

---

[Diagram of the ignition system]
IF THE IGNITION SYSTEM SHOULD BECOME INOPERATIVE
(NO SPARK OR INTERMITTENT SPARK)

Procedure
Check:
1. Fuse (main)
2. Battery
3. Spark plug
4. Ignition spark gap
5. Spark plug cap resistance
6. Ignition coil resistance
7. Main switch
8. “ENGINE STOP” switch
9. Pickup coil resistance
10. Wiring connection (entire ignition system)

NOTE:
• Remove the following parts before troubleshooting.
  1) Seat
  2) Side covers
  3) Fuel tank

Dynamic spark tester: YM-34487
Pocket tester: YU-03112

1. Fuse (main)
   • Remove the fuse.
   • Connect the pocket tester ($\Omega \times 1$) to the fuse.
   • Check the fuse for continuity.

   CONTINUITY

   NO CONTINUITY

   Replace the fuses.

2. Battery
   • Check the battery condition.
     Refer to “BATTERY INSPECTION” in CHAPTER 3.
   • Open circuit voltage: 12.8 V or more

   CORRECT

   INCORRECT

   • Clean the battery terminals.
   • Recharge or replace the battery.
3. Spark plug

- Check the spark plug condition.
- Check the spark plug type.
- Check the spark plug gap.

Refer to "SPARK PLUG INSPECTION" in CHAPTER 3.

**Standard spark plug:**
CR9E (NGK), U27ESR-N (N.D.)

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

---

4. Ignition spark gap

- Disconnect the spark plug cap from the spark plug.
- Connect the dynamic spark tester as shown.

**Minimum spark gap:**
6.0 mm (0.24 in)

---

5. Spark plug cap resistance

- Remove the spark plug cap.
- Connect the pocket tester (Ω × 1k) to the spark plug cap.
• Check the spark plug cap for specified resistance.

<table>
<thead>
<tr>
<th>Spark plug cap resistance:</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 kΩ at 20 °C (68 °F)</td>
</tr>
</tbody>
</table>

---

**OUT OF SPECIFICATION**

Replace the spark plug cap.

---

6. Ignition coil resistance

• Disconnect the ignition coil leads from the ignition coil.
• Connect the pocket tester (Ω x 1) to the ignition coil.

**Tester (+) lead → (+) Orange lead**
**Tester (–) lead → (–) Body earth**

• Check the primary coil for specified resistance.

<table>
<thead>
<tr>
<th>Primary coil resistance:</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.36 ~ 0.48 Ω at 20 °C (68 °F)</td>
</tr>
</tbody>
</table>

---

• Connect the pocket tester (Ω x 1 k) to the ignition coil.

**Tester (+) lead → Spark plug lead**
**Tester (–) lead → Body earth**

• Check the secondary coil for specified resistance.

<table>
<thead>
<tr>
<th>Secondary coil resistance:</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.44 ~ 7.36 kΩ at 20 °C (68 °F)</td>
</tr>
<tr>
<td>(Spark plug lead-spark plug lead)</td>
</tr>
</tbody>
</table>

---

**OUT OF SPECIFICATION**

Replace the ignition coil.

---

* BOTH MEET SPECIFICATIONS
7. Main switch

- Disconnect the main switch coupler from the wireharness.
- Check the switch component for continuity between “Red ① and Brown ②”.

**INCORRECT**

Replace the main switch.

**CORRECT**

8. “ENGINE STOP” switch

- Disconnect the handlebar switch (right) coupler from the wireharness.
- Check the switch component for continuity between “Red/White ① and Red/White ②”.

**INCORRECT**

Replace the handlebar switch (right).

**CORRECT**
9. Pickup coil resistance

- Disconnect the pickup coil coupler from the wireharness.
- Connect the pocket tester (Ω x 100) to the pickup coil terminal.

**Tester (+) lead → White/Red ①**
**Tester (–) lead → White/Blue ②**

- Check the pickup coil for specified resistance.

**Pickup coil resistance:**
190 ~ 230 Ω at 20 °C (68 °F)
(White/Red-White/Blue)

---

10. Wiring connection

- Check the entire ignition system for connections.
  Refer to “WIRING DIAGRAM”.

---

**OUT OF SPECIFICATION**

Replace the pickup coil.

**POOR CONNECTION**

Correct.

---

Replace the CDI unit.
ELECTRICAL STARTING SYSTEM
CIRCUIT DIAGRAM

3 Main switch  13 “START” switch
4 Fuse (main)  16 Neutral switch
5 Battery  17 Clutch switch
6 Starter relay  7 Starter motor
8 Diode  9 “ENGINE STOP” switch
STARTING CIRCUIT OPERATION

The starting circuit on this model consists of the starter motor and starter relay. If the “ENGINE STOP” switch and the main switch are both closed, the starter motor can operate only if:

The starter relay prevents the starter from operating when neither of these conditions have been met. In this instance, the starter relay is open so current cannot reach the starter motor.

When one of both of the above conditions have been met, however, the starter relay is closed, and the engine can be started by pressing the starter switch.

The transmission is in neutral (the neutral switch is closed).

or if

The clutch lever is pulled to the handlebar (the clutch switch is closed).

The starter relay prevents the starter from operating when neither of these conditions have been met. In this instance, the starter relay is open so current cannot reach the starter motor.

When one of both of the above conditions have been met, however, the starter relay is closed, and the engine can be started by pressing the starter switch.

- WHEN THE TRANSMISSION IS IN NEUTRAL
- WHEN THE CLUTCH LEVER IS PULLED IN

1 Battery
2 Fuse
3 Main switch
4 “ENGINE STOP” switch
5 Starter relay
6 Starter motor
7 “START” switch
8 Clutch switch
9 Neutral switch
ELECTRICAL STARTING SYSTEM

TROUBLESHOOTING

STARTER MOTOR DOES NOT OPERATE.

Procedure

Check:

1. Fuse (main)
2. Battery
3. Starter motor
4. Starter relay
5. Main switch
6. "ENGINE STOP" switch
7. Neutral switch
8. Clutch switch
9. "START" switch
10. Wiring connection (entire electric starting system)

NOTE:

Remove the following parts before troubleshooting.
1) Seat
2) Side covers
3) Fuel tank
4) Engine guard

Pocket tester: YU-03112

1. Fuse (main)

- Remove the fuse.
- Connect the pocket tester (Ω × 1) to the fuse.
- Check the fuse for continuity.

Continuity

No continuity

Replace the fuse.

Correct

2. Battery

- Check the battery condition.
  Refer to "BATTERY INSPECTION" in CHAPTER 3.

Open circuit voltage:
12.8 V or more at 20 °C (68 °F)

Continuity

Incorrect

- Clean the battery terminals.
- Recharge or replace the battery.

*
3. Starter motor

- Connect the battery positive terminal \( \text{①} \) and starter motor cable \( \text{②} \) using a jumper lead \( \text{③} \)*.
- Check the starter motor for operation.

**WARNING**

- A wire for jumper lead must have the equivalent capacity as that of the battery lead or more, otherwise it may cause the jumper lead to be burned.
- This check is likely to produce sparks, so be sure that no flammable gas or fluid is in the vicinity.

4. Starter relay

- Disconnect the starter relay coupler from the wireharness.
- Connect the starter relay lead “Red/White” \( \text{①} \) to the battery positive terminal using the jumper lead \( \text{②} \).
- Ground the starter relay lead “Blue/White” \( \text{③} \) to the frame using the jumper lead \( \text{②} \).
- Check the starter motor for operation.

**DOES NOT MOVE**

- Repair or replace the starter motor.

**DOES NOT MOVE**

- Replace the starter relay.
5. Main switch

- Disconnect the main switch coupler from the wireharness.
- Check the switch component for continuity between “Red ① and Brown ②”.

**INCORRECT**

Replace the main switch.

**CORRECT**

6. “ENGINE STOP” switch

- Disconnect the handlebar switch (right) coupler from the wireharness.
- Check the switch component for continuity between “Red/White ① and Red/White ②”.

**INCORRECT**

Replace the handlebar switch (right).

**CORRECT**
7. Neutral switch

- Disconnect the neutral switch lead from the wireharness.
- Check the switch component for continuity between “Sky blue ① and Ground”.

8. Clutch switch

- Disconnect the clutch switch coupler from the wireharness.
- Check the clutch switch component for continuity between “Black ① and Black ②”.

INCORRECT

Replace the neutral switch.

INCORRECT

Replace the clutch switch.

CORRECT

CORRECT
9. “START” switch

- Disconnect the handlebar switch (right) coupler from the wireharness.
- Check the “START” switch component for continuity between “Blue/White ① and Black ②”.

10. Wiring connection

- Check the entire starting system for connections.
  Refer to “WIRING DIAGRAM”.

CORRECT

INCORRECT

POOR CONNECTION

Correct
STARTER MOTOR
① Starter motor lead
② Brush
③ Bracket
④ O-ring
⑤ Armature
⑥ Yoke
NB284250

Removal
1. Remove:
   - Starter motor
   Refer to “ENGINE DISASSEMBLY” in CHAPTER 4.

NB284251

Disassembly
1. Put identifying marks ① on the brackets for reassembly as shown.
2. Remove:
   - Bolts ②
3. Remove:
   - Armature ①
   - Yoke ②
   - Brush ③

NB284252

Inspection and repair
1. Inspect:
   - Commutator
2. Measure:
   - Commutator diameter ③
     Out of specification → Replace the starter motor.
   - Commutator wear limit: 27 mm (1.06 in)
3. Measure:
   - Mica undercut ⑥
     Out of specification → Scrape the mica to proper value using a hacksaw blade ground to fit.
   - Mica undercut: 0.7 mm (0.028 in)
NOTE: The mica insulation of the commutator must be undercut to ensure proper operation of the commutator.

4. Inspect:
   - Armature coil (insulation/continuity)
     Defects → Replace the starter motor.

Inspecting steps:
   - Connect the pocket tester for continuity check ① and insulation check ②.
   - Measure the armature resistances.

<table>
<thead>
<tr>
<th>Armature coil resistance:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuity check ①:</td>
</tr>
<tr>
<td>0.0017 ~ 0.0027 Ω at 20 °C (68 °F)</td>
</tr>
<tr>
<td>Insulation check ②:</td>
</tr>
<tr>
<td>More than 1 MΩ at 20 °C (68 °F)</td>
</tr>
</tbody>
</table>

   - If ③ resistance is incorrect, replace the starter motor.

5. Measure:
   - Brush length ③
     Out of specification → Replace.

<table>
<thead>
<tr>
<th>Brush length limit:</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 mm (0.16 in)</td>
</tr>
</tbody>
</table>

6. Inspect:
   - Bearing
   - Oil seal
   - O-rings
   - Bush
     Damage → Replace.

Assembly
Reverse the “Removal” procedure.
Note the following points.
1. Install:
   - Armature ①
   - Washers ②
2. Install:
- Brush set

**NOTE:**
Align the projection on the brush seat with the slot on the housing.

3. Install:
- Armature ①
- Bracket ②

**NOTE:**
When installing the armature, avoid damage to the brush.

4. Install:
- Yoke ①
- O-ring ②

**NOTE:**
Align the match mark A and install.

5. Install:
- Bracket ①
- O-ring ②

6. Tighten:
- Bolts

| Bolt: |
| 5 Nm (0.5 m • kg, 3.6 ft • lb) |

**NOTE:**
Align the match mark B and install.

**Installation**
1. Install:
- Starter motor

**NOTE:**
Apply a thin coat of grease onto the O-ring.

| Bolt (starter motor): |
| 10 Nm (1.0 m • kg, 7.2 ft • lb) |

Refer to "ENGINE ASSEMBLY" in CHAPTER 4.
① A.C. magneto
② Rectifier/regulator
④ Fuse (main)
⑤ Battery
THE BATTERY IS NOT CHARGED.

Procedure

Check:
1. Fuse (main)
2. Battery
3. Charging voltage
4. Stator coil resistance
5. Wiring connection (entire charging system)

NOTE:
- Remove the following parts before troubleshooting:
  1) Seat
  2) Side covers
  3) Fuel tank
- Use the following special tool(s) in this troubleshooting:
  Inductive tachometer: YU-8036-A
  Pocket tester: YU-03112

1. Fuse (main)
- Remove the fuse.
- Connect the pocket tester (Ω x 1) to the fuse.
- Check the fuse for continuity.

   NO CONTINUITY
   Replace the fuse.

   CONTINUITY

2. Battery
- Check the battery condition.
  Refer to “BATTERY INSPECTION” in CHAPTER 3.
  Open circuit voltage:
  12.8 V or more at 20 °C (68 °F)

   INCORRECT
   - Clean the battery terminals.
   - Recharge or replace the battery.

   CORRECT

3. Charging voltage
- Connect the inductive tachometer to the spark plug lead.
- Connect the pocket tester (DC 20 V) to the battery.

   Tester (+) lead → Battery (+) terminal
   Tester (−) lead → Battery (−) terminal
• Start the engine and accelerate to about 3,000 r/min.
• Check the charging voltage.

**Charging voltage:**

- 13.0 ~ 15.0 V at 3,000 r/min.

**NOTE:**

Use a fully charged battery.

---

**Charging system:**

- MEETS SPECIFICATION
  - Charging voltage: 13.0 ~ 15.0 V at 3,000 r/min.
  - Charging circuit is good.

- OUT OF SPECIFICATION
  - Use a fully charged battery.

---

**4. Stator coil resistance**

- Disconnect the stator coil coupler from the wireharness.
- Connect the pocket tester (Ω x 1) to the stator coils.
- Measure the stator coil resistances.

**Tester (+) lead → White lead**

1. **Tester (-) lead → White lead**

2. **Tester (+) lead → White lead**

3. **Tester (-) lead → White lead**

**Stator coil resistance:**

- 1.0 ~ 1.2 Ω at 20°C (68°F)

---

**5. Wiring connection**

- Check the entire charging system for connections.
  - Refer to “WIRING DIAGRAM”.

**POOR CONNECTION**

Correct.

**CORRECT**

Replace the rectifier/regulator.

**BOTH MEET SPECIFICATIONS**

Replace the stator assembly.

---

**OUT OF SPECIFICATION**

Replace the rectifier/regulator.
LIGHTING SYSTEM
CIRCUIT DIAGRAM

③ Main switch
④ Fuse (main)
⑤ Battery
⑧ Tail light
⑨ “LIGHTS” switch
⑩ Headlight
TROUBLESHOOTING

HEADLIGHT, “HIGH BEAM” INDICATOR LIGHT, AND/OR TAILLIGHT DO NOT COME ON

Procedure

Check:
1. Fuse (main)
2. Battery
3. Main switch
4. “LIGHTS” switch
5. Wiring connection (entire charging system)

NOTE:

- Remove the following parts before troubleshooting.
  1) Seat
  2) Side covers
  3) Fuel tank
- Use the following special tool(s) in this troubleshooting.

Pocket tester: YU-03112

1. Fuse (main)
   - Remove the fuse.
   - Connect the pocket tester (Ω x 1) to the fuse.
   - Check the fuse for continuity.

   NO CONTINUITY
   Replace the fuse.

   CONTINUITY

2. Battery
   - Check the battery condition.
   - Refer to “BATTERY INSPECTION” in CHAPTER 3.

   Open circuit voltage:
   12.8 V or more at 20 °C (68 °F)

   INCORRECT
   - Clean the battery terminals.
   - Recharge or replace the battery.

   CORRECT

3. Main switch
   - Disconnect the main switch coupler from the wireharness.
   - Check the switch component for continuity between “Red 1 and Brown 2”.

   NO CONTINUITY
   Replace the fuse.
4. "LIGHTS" switch

- Disconnect the "LIGHTS" switch coupler from the wireharness.
- Check the switch component for continuity between "Brown ① and Yellow ②".

5. Wiring connection

- Check the entire lighting system for connections.
  Refer to "WIRING DIAGRAM".

Check condition of each circuit of the lighting system.
Refer to "LIGHTING SYSTEM CHECK".
LIGHTING SYSTEM CHECK

1. The headlight and “HIGH BEAM” indicator light do not come on.

   1. Bulb and bulb socket
      - Check the bulb and bulb socket for continuity.

         NO CONTINUITY
         
         Replace the bulb and/or bulb socket.

         CONTINUITY

   2. Voltage
      - Connect the pocket tester (DC 20 V) to the headlight couplers.

         Headlight:
         Tester (+) lead → Yellow 1 lead
         Tester (–) lead → Black 2 lead

         OUT OF SPECIFICATION
         
         Wiring circuit from main switch to bulb socket connector is faulty, repair.

         MEETS SPECIFICATION

This circuit is good.
2. Taillight does not come on.

1. Bulb and bulb socket
   - Check the bulb and bulb socket for continuity.

   **NO CONTINUITY**
   - Replace the bulb and/or bulb socket.

   **CONTINUITY**

2. Voltage
   - Connect the pocket tester (DC 20 V) to the bulb socket connector.

   **Tester (+) lead → Blue ① terminal**
   **Tester (−) lead → Black ② terminal**

   **OUT OF SPECIFICATION**
   - Wiring circuit from main switch to bulb socket connector is faulty, repair.

   **MEETS SPECIFICATION**
   - Turn the main switch to “ON”.
   - Check for voltage (12 V) on the “Blue” lead at the bulb socket connector.

   **This circuit is good.**
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 inspection, adjustment and replacement of parts.

STARTING FAILURE/HARD STARTING

FUEL SYSTEM

Fuel tank
- Empty
- Clogged fuel filter
- Clogged fuel strainer
- Deteriorated fuel, fuel containing water or foreign material
- Clogged fuel breather hose

Fuel cock
- Clogged fuel hose
- Clogged fuel filter

Air filter element
- Clogged

Carburetor
- Deteriorated fuel, fuel containing water or foreign material
- Clogged pilot jet
- Clogged pilot air passage
- Sucked-in air
- Deformed float
- Groove-worn needle valve
- Improperly sealed valve seat
- Improperly adjusted fuel level
- Improperly set pilot jet
- Clogged starter jet
- Faulty starter plunger
- Improperly adjusted pilot screw

ELECTRICAL SYSTEM

Spark plug
- Improper plug gap
- Worn electrodes
- Severed wire between terminals broken
- Improper heat range
- Faulty spark plug cap

Ignition coil
- Broken or shorted primary/secondary
- Faulty spark plug lead
- Broken body

CDI system
- Faulty CDI unit
- Faulty pickup coil
- Broken woodruff key

COMPRESSION SYSTEM

Cylinder and cylinder head
- Loose spark plug
- Loose cylinder head or cylinder
- Broken cylinder head gasket
- Worn, damaged or seized cylinder

Crankcase and crankshaft
- Improperly sealed crankcase
- Seized crankshaft

Starter motor
- Faulty starter motor
- Faulty starter relay
- Faulty starter clutch
Switches and wiring
- Faulty main switch
- Faulty "ENGINE STOP" switch
- Broken or shorted wiring
- Faulty neutral switch
- Faulty "START" switch
- Faulty clutch switch

Valve and camshaft
- Improperly sealed valve
- Improper valve to valve seat contact
- Improper valve timing
- Broken valve spring
- Seized camshaft

Piston and piston ring
- Improperly installed piston ring
- Worn, fatigued or broken piston ring
- Seized piston ring
- Seized or damaged piston

POOR IDLE SPEED PERFORMANCE

Carburetor
- Improperly returned starter plunger
- Loose pilot jet
- Clogged pilot air jet
- Improperly adjusted idle speed (throttle stop screw/air screw)
- Improper throttle cable free play
- Flooded carburetor

Electrical system
- Faulty battery
- Faulty spark plug
- Faulty CDI unit
- Faulty pickup coil
- Faulty ignition coil

Valve train
- Improperly adjusted valve clearance

POOR MEDIUM AND HIGH SPEED PERFORMANCE

Carburetor
- Improper jet needle clip position
- Diaphragm malfunction
- Improperly adjusted fuel level
- Clogged or loose main jet

Air filter
- Clogged air filter element
NB293100

**FAULTY GEAR SHIFTING**

**HARD SHIFTING**
Refer to “CLUTCH DRAGGING”.

---

**SHIFT PEDAL DOES NOT MOVE**

**Shift shaft**
- Bent shift shaft

**Shift cam, shift fork**
- Groove jammed with impurities
- Seized shift fork
- Bent shift fork guide bar

---

**JUMP-OUT GEAR**

**Shift shaft**
- Improperly adjusted shift lever position
- Improperly returned stopper lever

**Shift fork**
- Worn shift fork

---

**CLUTCH SLIPPING/DRAGGING**

**CLUTCH SLIPPING**

**Clutch**
- Improperly adjusted clutch cable
- Loose clutch spring
- Fatigued clutch spring
- Worn friction plate
- Worn clutch plate
- Incorrectly assembled clutch

---

**CLUTCH DRAGGING**

**Engine oil**
- High oil level
- Improper quality (high viscosity)
- Deterioration

**Clutch**
- Warped clutch plate
- Unevenly tensioned clutch spring
- Match mark not aligned
- Loose clutch boss nut
- Burnt primary driven gear bushing
- Bent clutch plate
- Swollen friction plate
- Broken clutch boss

---
OVERHEATING/FAULTY BRAKE FRONT FORK OIL LEAKAGE AND FRONT FORK MALFUNCTION

OVERHEATING

Fuel system
- Improper carburetor main jet (improper setting)
- Improperly adjusted fuel level
- Clogged air filter element

Ignition system
- Improper spark plug gap
- Improper spark plug heat range
- Faulty ignition coil

Compression system
- Heavy carbon built-up

Brake
- Dragging brake

FAULTY BRAKE

POOR BRAKING EFFECT

Disc brake
- Worn brake pad
- Worn brake disc
- Air in brake fluid
- Leaking brake fluid
- Faulty cylinder kit cup
- Faulty caliper kit seal
- Loose union bolt
- Broken brake hose
- Oily or greasy brake disc
- Oily or greasy brake pad
- Improper brake fluid level

Engine oil
- Incorrect oil level
- Improper oil viscosity
- Inferior oil quality

FRONT FORK OIL LEAKAGE AND FRONT FORK MALFUNCTION

OIL LEAKAGE
- Bent, damaged or rusty inner tube
- Damaged or cracked outer tube
- Damaged oil seal lip
- Improperly installed oil seal
- Improper oil level (too much)
- Loose damper rod holding bolt
- Broken cap bolt O-ring
- Loose drain bolt
- Damaged drain bolt gasket

MALFUNCTION
- Bent, deformed or damaged inner tube
- Bent or deformed outer tube
- Damaged fork spring
- Worn or damaged slide metal
- Bent or damaged damper rod
- Improper oil viscosity
- Improper oil level
INSTABLE HANDLING

Handlebars
- Improperly installed or bent

Tires
- Uneven tire pressures on both sides
- Incorrect tire pressure
- Unevenly worn tires

Front forks
- Uneven oil level on both sides
- Uneven spring tension
  (uneven damping adjuster position)
- Broken spring
- Twisted front fork

Drive chain
- Improperly adjusted chain slack

Steering
- Improperly installed upper bracket
- Bent steering stem
- Improperly installed steering stem
  (improperly tightened ring nut)
- Damaged bearing or bearing race

Wheels
- Incorrect wheel balance
- Deformed cast wheel
- Loose bearing
- Bent or loose wheel axle
- Excessive wheel run-out

Swingarm
- Worn bearing or bush
- Bent or damaged

Frame
- Twisted
- Damaged head pipe
- Improperly installed bearing race

Rear shock absorber
- Fatigued spring
- Improperly adjusted spring preload
- Oil and gas leakage
FAULTY SIGNAL AND LIGHTING SYSTEM

HEADLIGHT DARK
- Improper bulb
- Too many electric accessories
- Hard charging (broken stator coil and/or faulty rectifier/regulator)
- Incorrect connection
- Improperly grounded
- Poor contact (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